友讯达科技
Friendcom

FC-301D
SERVICE MANUAL

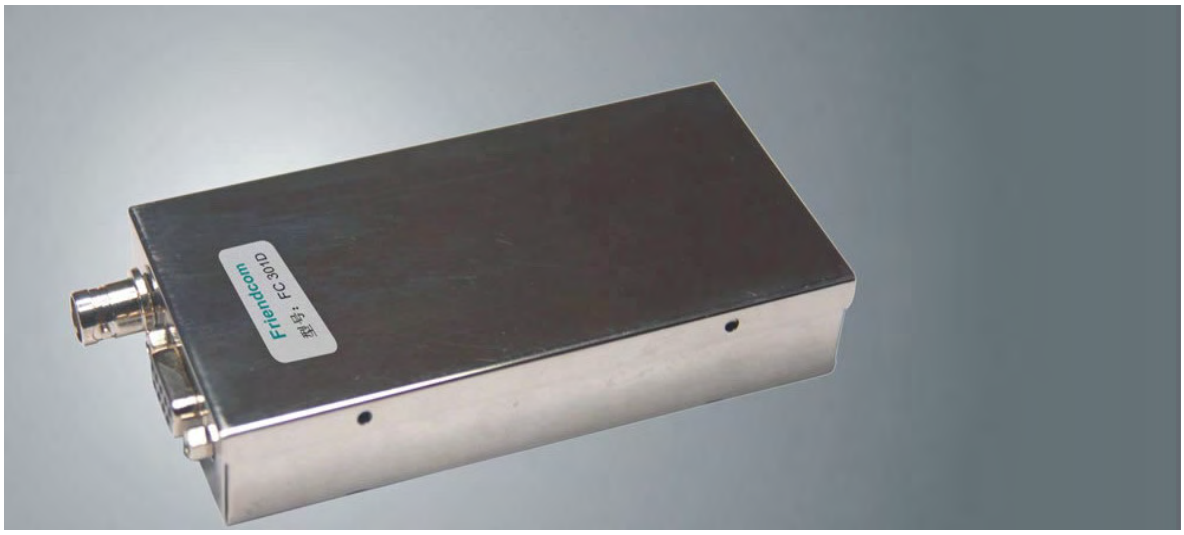

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TABLE OF CONTENTS

SPECIFICATION

GENERAL

Equipment Type……Data Radio

Performance Specification…….....TIA/EIA-603 & ETS 300-113

Band ……..UHF/VHF

Channel Spacings……25KHz,12.5KHz programmable

RF Output Power……1W / 5W Programmable

Modulation type ……16K0F3E,8K5F3E

Intermediate Frequency…… 45.1MHz & 455KHz

Number of Channels……16

Frequency Source ……Synthesizer

Operation Rating……Intermittent

5:5:90 (TX: RX: Standby)

Power Supply ……12.5V DC Nominal Voltage

Temperature Range

Storage……from –40°C to +80°C

Operating……from –30°C to +60°C

Current Consumption

Standby (Muted) ……≤40mA

Transmit 5 Watts RF Power ……< 1.5A

Transmit 1 Watt RF Power……<0.8A

Frequency Bands : ……RX UHF: U1 400 – 470 MHz

……TX UHF: U1 400 – 470 MHz

Dimensions……(120mm)L x (60mm)W x (20mm)H

Weight……≤150 grams

TRANSMITTER

Sustained Transmission…… Nominal conditions

Time:	5	10	30 sec
Power:	>95%	>95%	>90%

Frequency Error……±2.5 ppm

Frequency Deviation:

25kHz Channel Spacing……≤±5.0kHz,

12.5kHz Channel Spacing……≤±2.5kHz,

Audio Frequency Response…… Within +1/-3dB of 6dB octave

@300Hz to 2.55kHz for 12.5kHz C.S
@300Hz to 3.0khz for 25kHz C.S

Adjacent Channel Power

25kHz……< 70 dBc @ Nominal Condition

<65 dBc @ Extreme Condition

12.5kHz ……< 60 dBc @ Nominal Condition

< 55 dBc @ Extreme Condition

Conducted Spurious Emission ……< -36 dBM

Modulation Sensitivity…… 100mV RMS@60% peak Dev.

Hum & Noise:

25kHz Channel Spacing……>40 dB (with no PSOPH)

12.5kHz Channel Spacing……>36 dB (with POSPH)

Modulation Symmetry ……<10% Peak Dev@1kHz input for nominal dev +20dB

Load Stability……No osc at >= 10:1 VSWR all phase angles and suitable antenna
No destroy at >= 20:1 all phase angle

RECEIVER

Sensitivity(12dB Sinad) ……UHF <-117 dBm,
VHF<-118dBm@Nom.Condition

Amplitude Characteristic……<±3dB

Adjacent Channel Selectivity:

25 kHz Channel Spacing ……≥70dB @ Nom.,

12.5kHz Channel Spacing……≥60dB@Nom.,

Spurious Response Rejection……70dB

Image Response…… > 70 dB

IF Response …… >70 dB

Others……> 70 dB

Intermodulation Response Rejection……≥65 dB

Conducted Spurious Emission @ Nominal Conditions……<−57 dBm

AF Distortion .....<5% @ Nom.,
<10%@ Extreme Condition

RX Hum & Noise:

25.0kHz CP.....< 40dB No PSOPH

12.5kHz CP .....< 40dB with PSOPH

Receiver Response Time .....< 20ms

Squelch Opening sensitivity: .....−118dBm

Squelch Closing sensitivity ..... −121dBm

Squelch Attack Time:

RF Level at Threshold ..... <40ms

RF Level at Threshold +20dB.....<30ms

L.O. Frequency Temperature Stability.....1 st <2.5 ppm,

2 nd <10 ppm for –30°C to +60°C

L.O. Frequency Aging Rate.....±2 ppm/year

REFERENCE CRYSTAL

Frequency..... 13MHz

Temperature Characteristic.....+/- 2.5PPM

from –30°C to +60°C

Aging Rate.....< 2ppm/year in 1 st year

<1ppm/year thereafter

TX to RX ..... < 20

RX to TX ..... < 25

ENVIRONMENTAL (performance without degradation unless stated)

Temperature..... deg C

Operating.....−30° to +60°C Degradation

Specified@Extreme

Storage ..... −40°C to +80°C

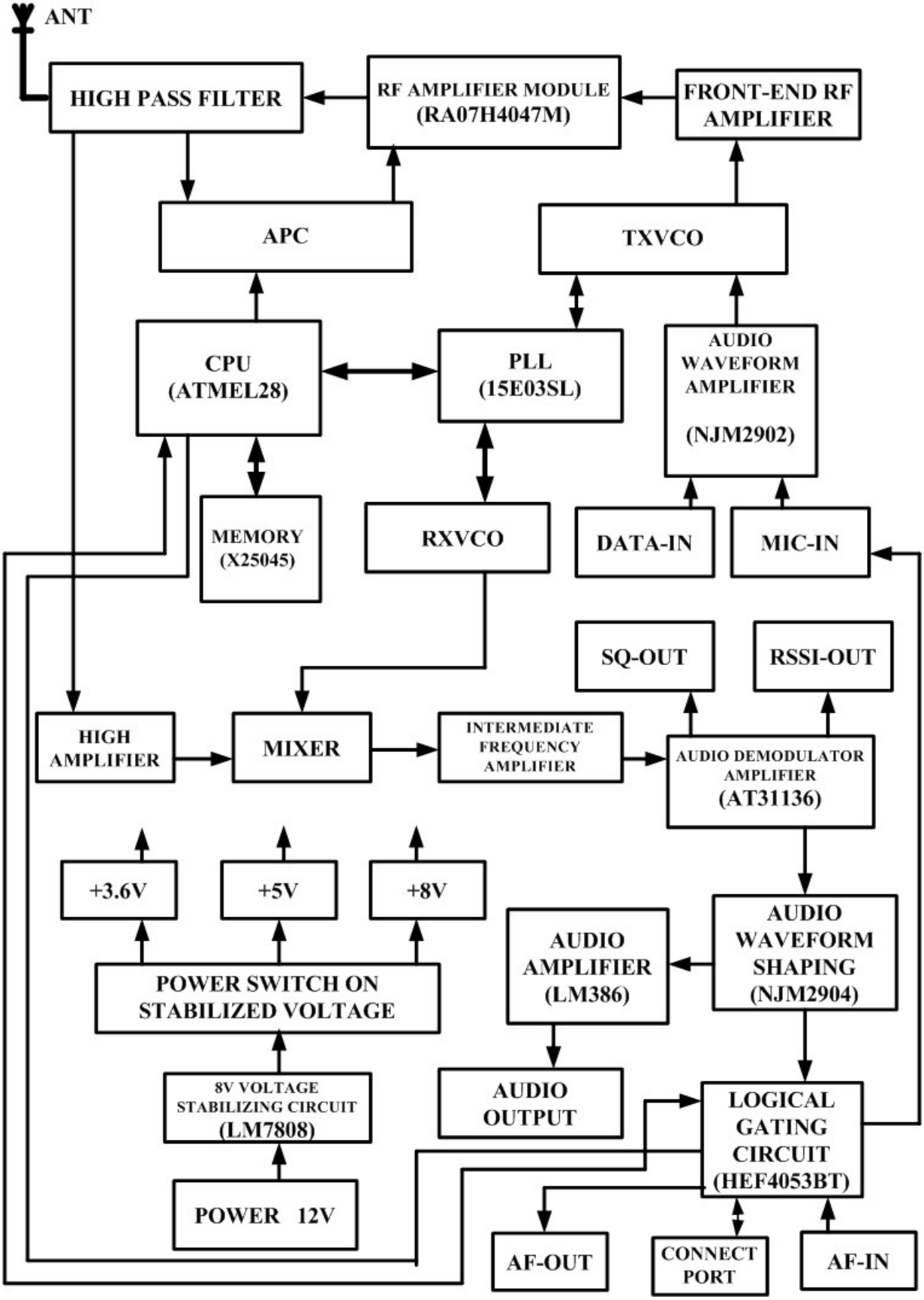
Recharging ..... −10 to +55

ESD..... 20kV (C-MIC >= 15kV)

Vibration..... MIL STD 810 C Procedures I,II,V and IEC68 26

• *Due to contintuning researching and development the company reserves the right to alter these specifications without prior notice.*

FC-301D CIRCUIT DIAGRAM



INTORDUCTION

The FC-301D Series of RF Link Modules from Friendcom utilizes the latest technology in its design and manufacturing. Both the UHF and VHF models are PLL (Phase Lock Loop Synthesizer) / microprocessor controlled, and offer one to five watts of power with 16 channel capability. Multiple functions including 1200 to 9600 baud rates,AC audio coupling,GMSK and FSK modulation are standard in these fully programmable wide bandwidth RF Link Module units.

FEATURES

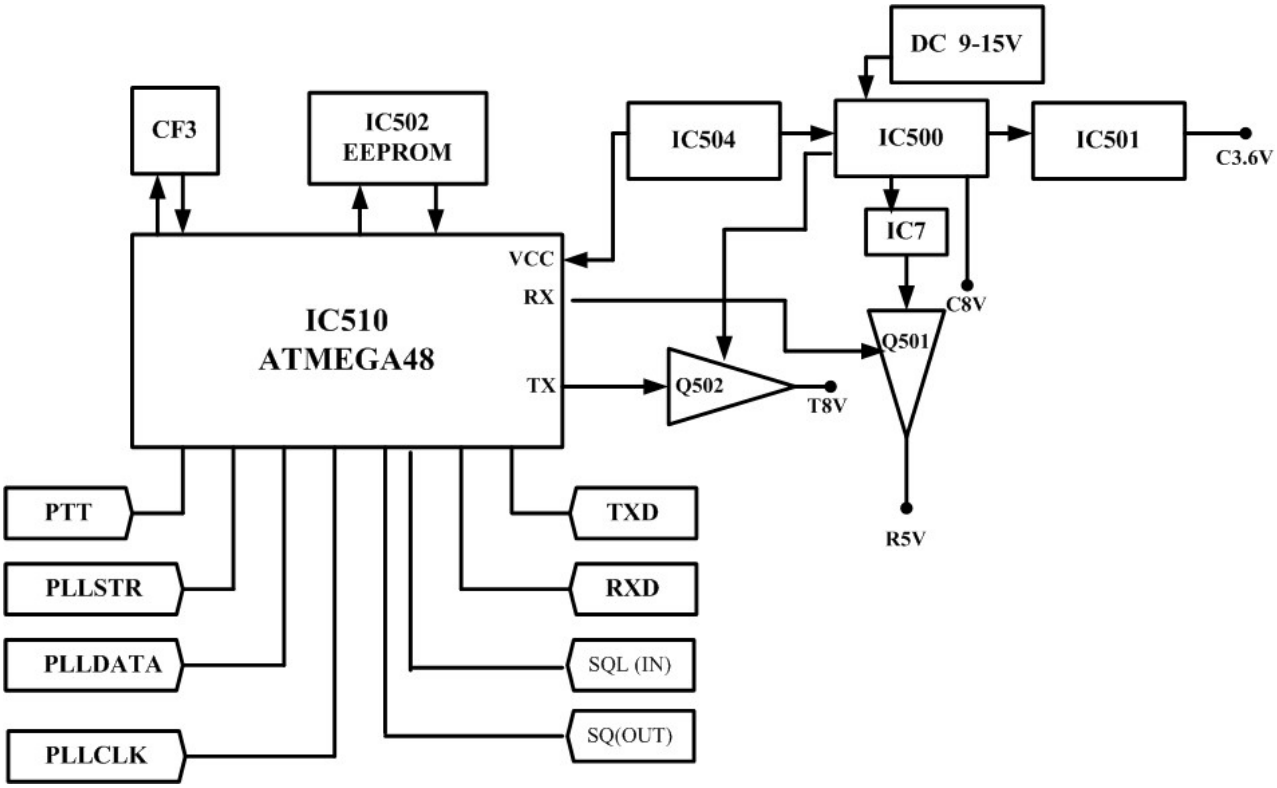
- **16 Channels**
- **1 / 5 Watt Programmable Output**
- **12.5 / 25 kHz Programmable Channel Spacing**

THEORY OF OPERATION

The Base Band signal circuits

It contains the CPU, power circuit ,TX signal circuit,RX signal circuit.

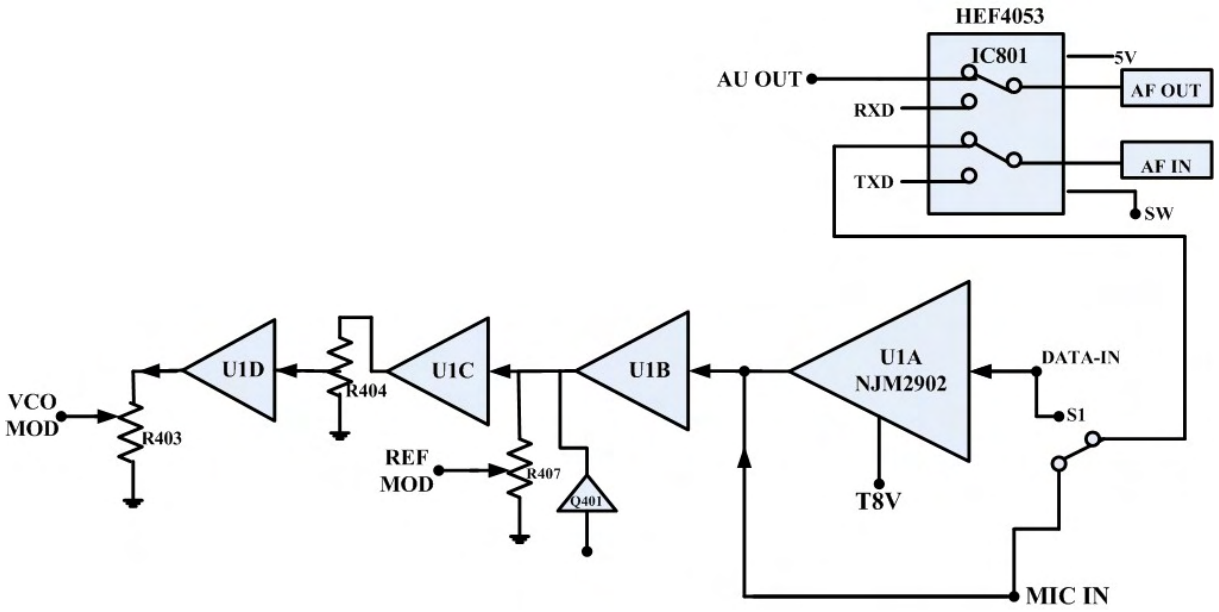
The CPU circuit and power circuit



From Block Digram above: The DC power was regulated to 8 volt by IC500 ,and supplied to the RF part. IC504 convert 8 volt to 5volt and supply to IC510. Q500 is RX power supply switch, Q502 is TX power supply switch. IC501 supply 3.6V to PLL IC. Channels can be selected by the switch (CF3). IC510 controls digital frequency synthesize by PLL STR ,PLL DATA and PLL CCK.

The CPU SQ pin detect the signal from PIN14 of IC2. when there is no receiveing signal, the input level is about 1.2V, and PIN8 of IC510 output high level(5V). When detect input receiving signal, the input level is about 0V, and PIN8 of IC510 output low level(5V).

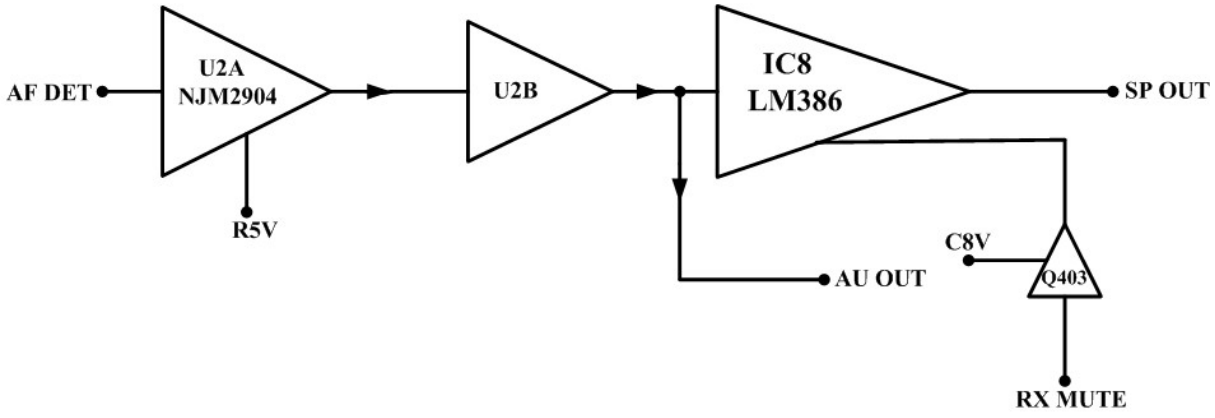
TX signal circuit



From the above Block Diagram : IC801 is audio/Data and UART signal switch. When the SW pin is high ,audio/data signal can go through IC801. S1 is a switch between audio and data input, when transmit audio, MIC IN port is shorted, when transmit data, DATA IN port is shorted. As it was data signal it will pass through DATA-IN port and amplified by U1A, then it was coupling by C431 and pass to U1B for amplify again;as it was audio signal it will pass

through MIC-IN port and amplified by U1B; then it will divide into two signal, one will coupling by C405 R407 and fed to TCXO for TX modulation; the other one was amplified by U1C,after coupling by C428,R404,C427 ;the voice signal is filtered by U1D which is a low pass filter, the output of U1D is then fed to VCO for TX modulation after coupling by C415,R403 again. Q401 is a Wideband /narrow-band switch .

RX signal circuit

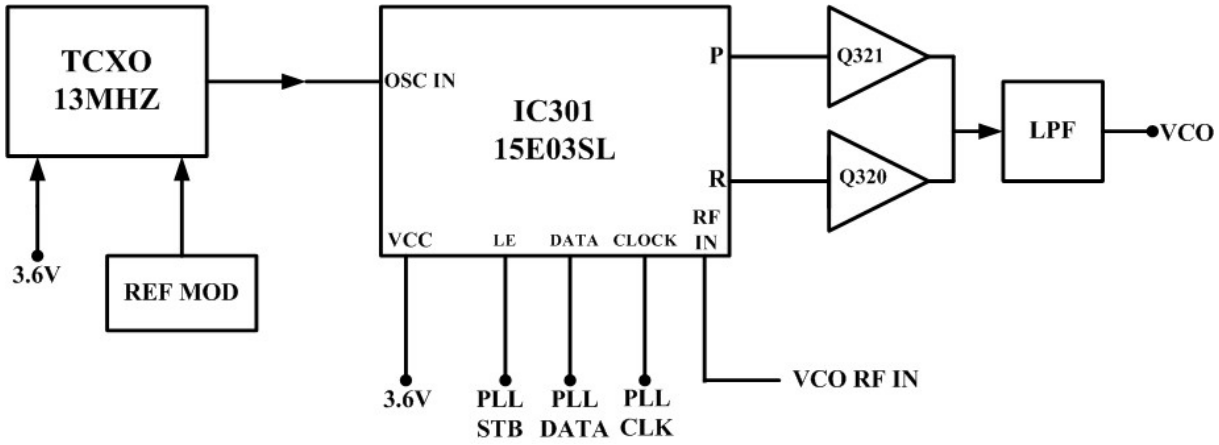


From the above Block Diagram; The resulting AF signal from IC2 enters base band processing chip U2. First coupling by C412 and amplified by U2A ,then it is filtered by U2B which is a low pass filter.After U2B,one signal pass through IC801 and send to COM pin 2, one signal is amplify by audio amplifierIC8, and sent to the horn directly. Q403 is a audio PA switch.

RF circuit

Main include PLL circuit / TX circuit /RX circuit

PLL Frequency Synthesizer



From the above Block Diagram : PLL circuit generates the first local oscillator signal for reception and RF signal for transmission.

1. PLL Circuit

Step frequency of PLL can be 5.0 KHz or 6.25 KHz. A 13MHz reference oscillator signal is divided at IC301 by a counter to generate a 5.0 KHz or 6.25 KHz reference frequency. Output signal from VCO is buffer amplified by Q301 and divided at IC301 by a frequency divider. The divided signal is compared with 5.0 KHz or 6.25 KHz reference signal in the phase comparator of IC301. The output signal from phase comparator is filtered through a low pass filter(Q320/Q321/ R39/C328/R318/R31/C327/R316/C326)

to generate a level D.C., and the level D.C. controls oscillator frequency by controlling VCO.

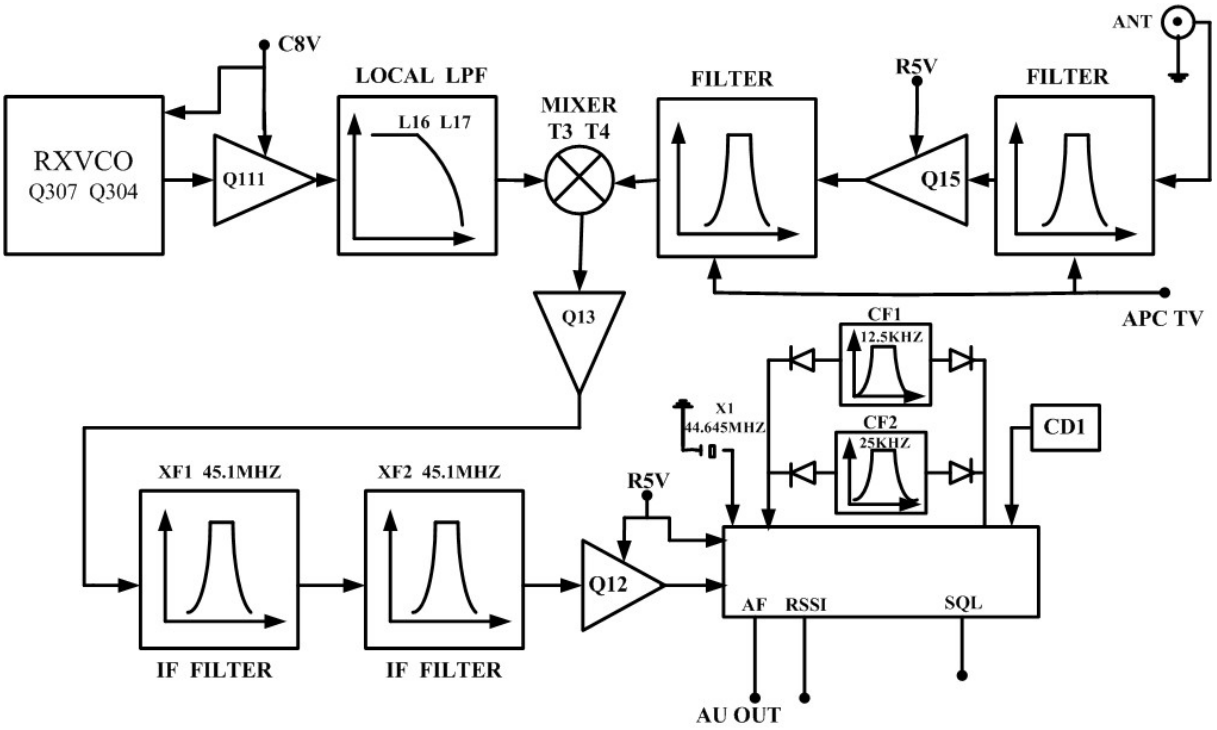
2. VCO

The operating frequency is generated by Q302 in transmit mode and by Q307 in receive mode. Operating frequency generate a control voltage by phase comparator to control varactor diodes so that the oscillator frequency is consistent with the MCU preset frequency(D301、D302、D303 and D304 in transmit mode, and D307、D308、D309 and D310 in receive mode). T/R pin is set high level in receive mode, and low level in transmit mode. The output from Q302 and Q307 is amplified by Q304 and sent to buffer amplifier.

3. Unlock Detector

An unlock condition appears if low level appears at MUXOUT pin of IC301. Transmission is forbidden if this condition is detected by CPU IC510.

Receiver



The receiver utilizes double conversion superheterodyne (UHF)/(VHF).

1. Front-end RF Amplifier

The signal from antenna is amplified at LNA (Q15) after passing through a transmit/receive circuit and a band pass filter（D211/D212/D241/C264/C260/L25/L26）. Before passing the first mixer（T3、T4、TC3）, the amplified signal is filtered through another band pass filter（D208/D209/C240/C257/C258/L23/L24） to remove unwanted signals.

2. First Mixer

The signal from RF amplifier is mixed with the first local from PLL frequency synthesizer circuit at the fix mixer (T3、T4、TC3) to create a 45.1MHz first IF signal. The first IF signal is then amplified by Q13 and fed through a crystal filter (XF1) to further remove unwanted signals.

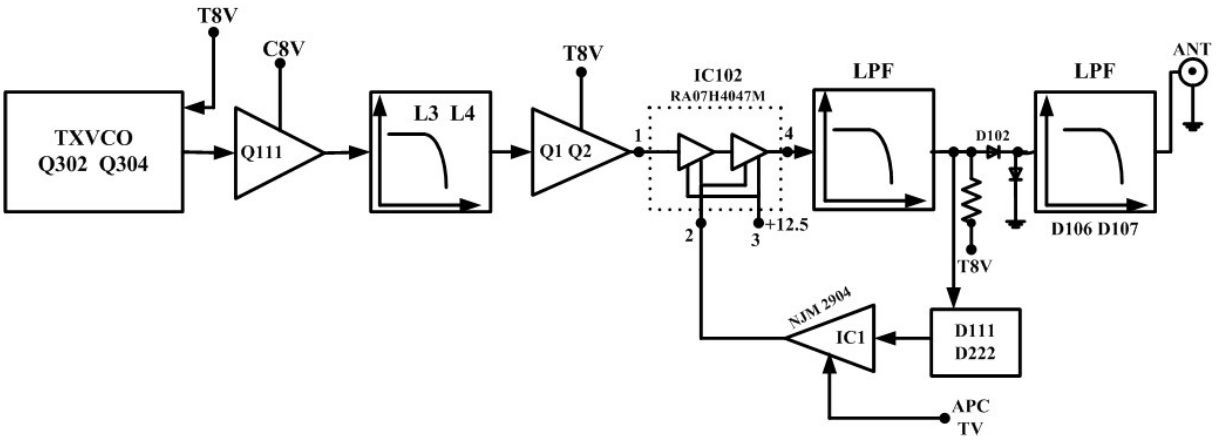
3. IF Amplifier

The first IF signal is amplified by Q13 before passing through crystal filter and by Q12 after crystal filter and then enters IF processing chip IC2. The signal from IC2 is mixed with the second oscillator signal again in IC2 to create a 455 KHz second IF signal. The second IF signal then passes through a 455KHz ceramic filter (wideband: CF2，narrowband: CF1) to eliminate unwanted signals before it is amplified and detected in IC2.

4. Narrowband/Wideband Switch Circuit

Pin W/NCON of IC510 outputs narrowband (high level) and wideband (low level) controlling signal respectively to turn on corresponding diode-connector, and to choose ceramic filter CF2 (wideband) or CF1 (narrowband) to filter useless spurious signal.

Transmitter



1. RF Power Amplifier

The transmit signal from VCO buffer amplifier (Q304、Q111) is amplified by Q1 and Q2. The amplified signal is then amplified by the power amplifier I102 to create 5.0W RF power.

2. Antenna Switch and LPF

Output signal from RF amplifier passes through a low-pass filter network and a transmit/receive switch circuit comprised of D102，D106 and D107 before it reaches the antenna terminal. D106 and D107 is turned on (conductive) in transmit mode and off (isolated) in receive mode.

3. APC

The automatic power control (APC) circuit stabilizes the transmit output power by detecting the forward and backward power of final stage amplifier. IC1 (2/2) compares the preset reference voltage with the voltage obtained from the regulated power signal. APC voltage is proportional to the forward and backward power. The output voltage controls the bias voltage of power amplifier module.The output power can be controlled by the software.

MAINTENANCE AND REPAIR

GERNERAL

When removing or fitting, use the Exploded View and Parts List, located on page 61 in conjunction with the following procedures:

• WARNING: Disconnect the FC-301D from all external equipment at the connector prior to disassembly.

REMOVING & REPLACING THE UPPER COVER

Removing the Upper Cover:

1. Unscrew the four side cover mounting screws located on the side cover of the radio.

To replace the Upper Cover:

1. Reverse the steps taken to remove the Upper Cover.

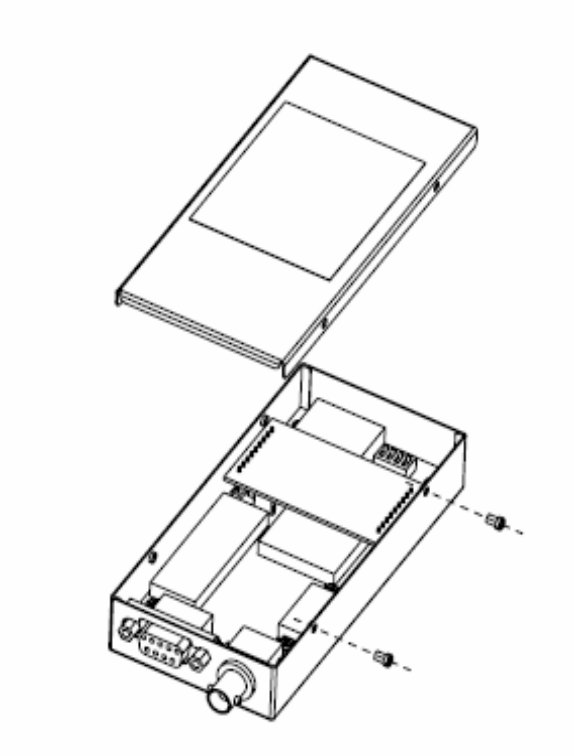


Figure 1-Upper cover removal

REMOVING&REPLACING THE INTERPHASE CONNECTION BOARD

Removing the interphase connection board:

1.Remove the Upper Cover (refer to Removing & Replacing the Upper Cover).

2.Disconnect the DB9 pin connector on CON401.

3.Unscrew the two mounting screws on the Amplifier module.

4.Remove the interphase connection board directly.

To replace interphase connection board:

1. Reverse the steps taken to remove the interphase connection board

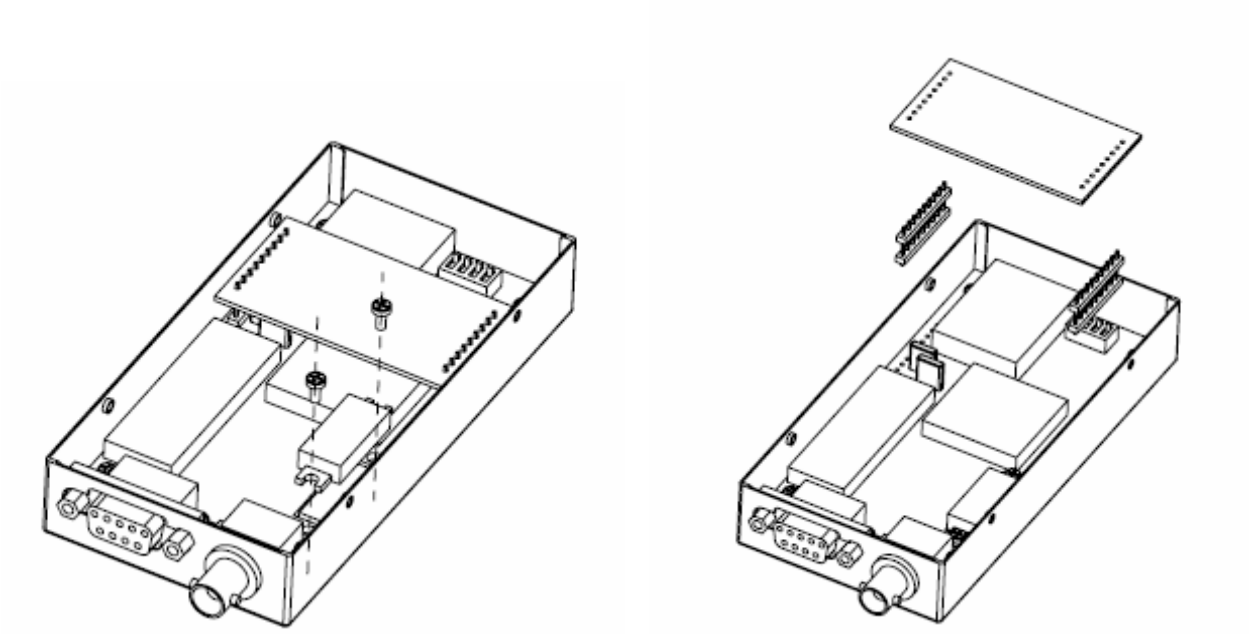


Figure 2 Interphase connection board removal

REMOVING & REPLACING THE RF BOARD

Removing the RF Board Assembly:

1.Remove the Upper Cover (refer to Removing & Replacing the Upper Cover).

2.Remove the interphase connection board (refer to Removing & Replacing the interphase connection board).

3. Unscrew the 4 mounting screws

4. Unsolder the antenna connector cable.

5. Remove the RF Board Assembly.

To replace the RF Board Assembly:

1.Reverse the steps taken to remove the RF Board Assembly.

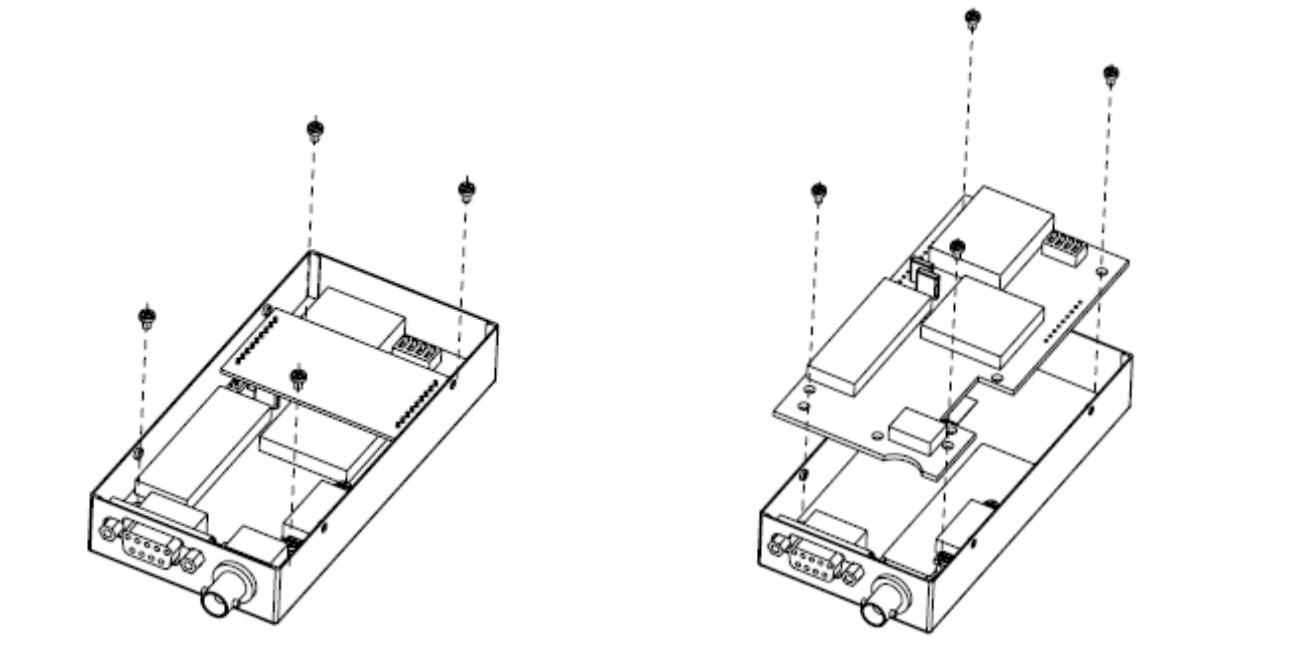


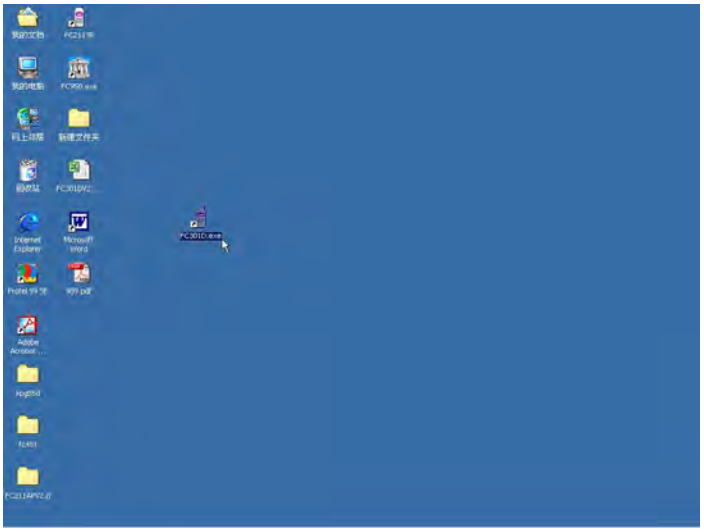
Figure 3 RF BOARD Removal

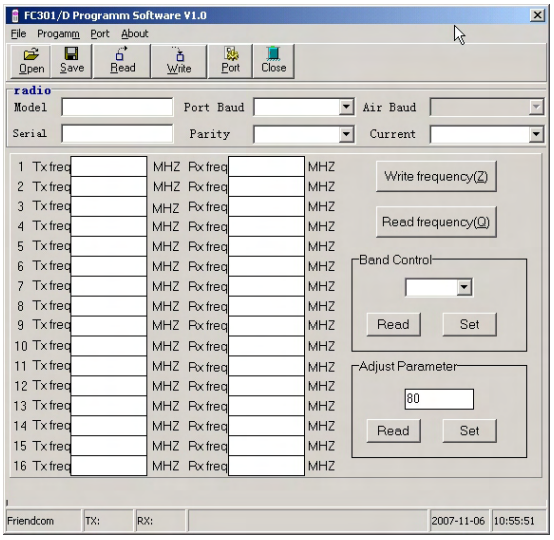
PROGRAMMING

The detailed information on programming the FC-301D radio in following procedures.

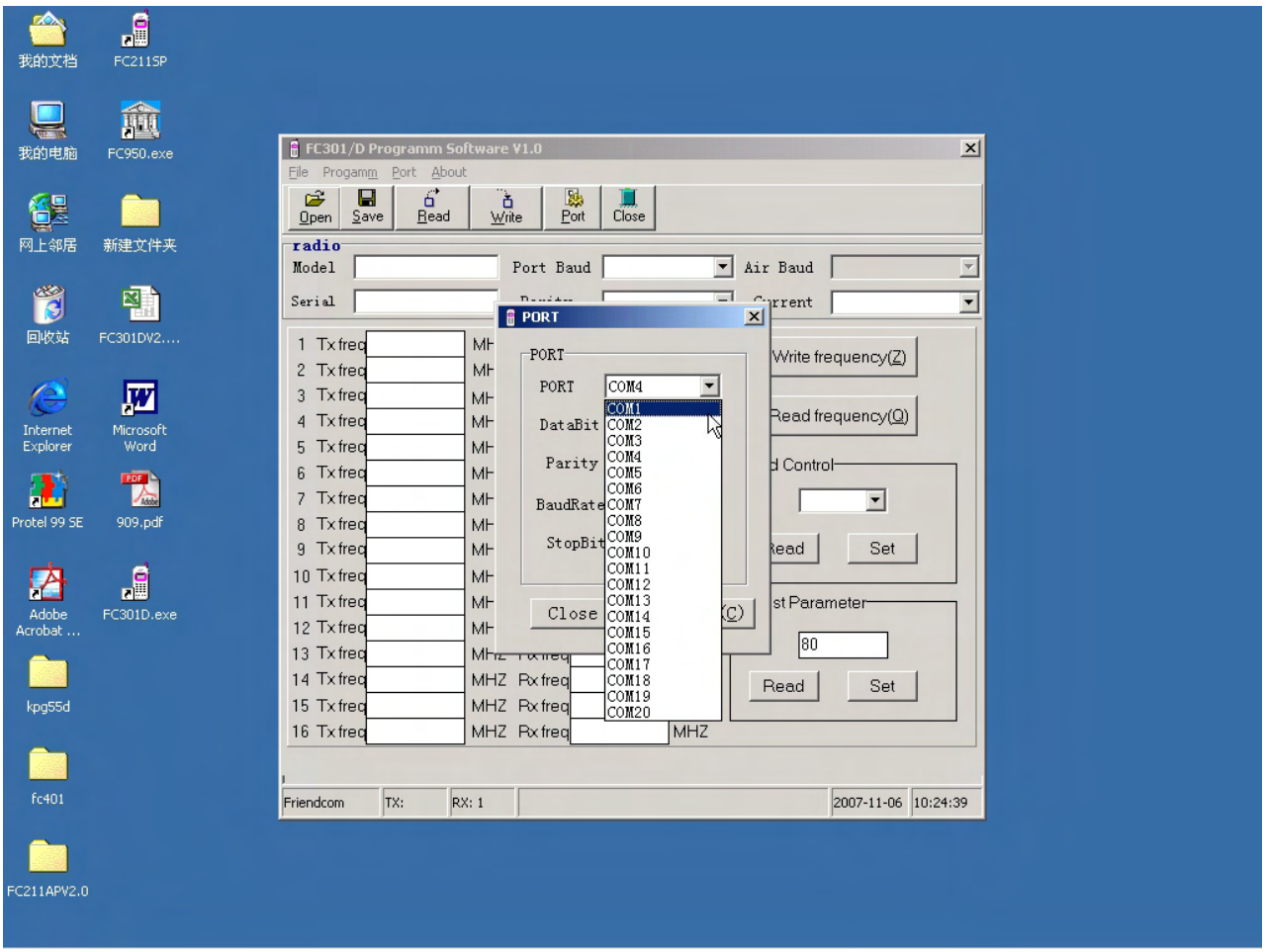
Ⅰ. To start the FC-301/D Program Software and read the parameters of FC-301/D RF Link Module

- Firstly make sure to connect data port J1 of FC-301D with PC via RS232 data cable.
- Double click the "FC301D.exe". The software will enter into main interface of FC-301D as the following:

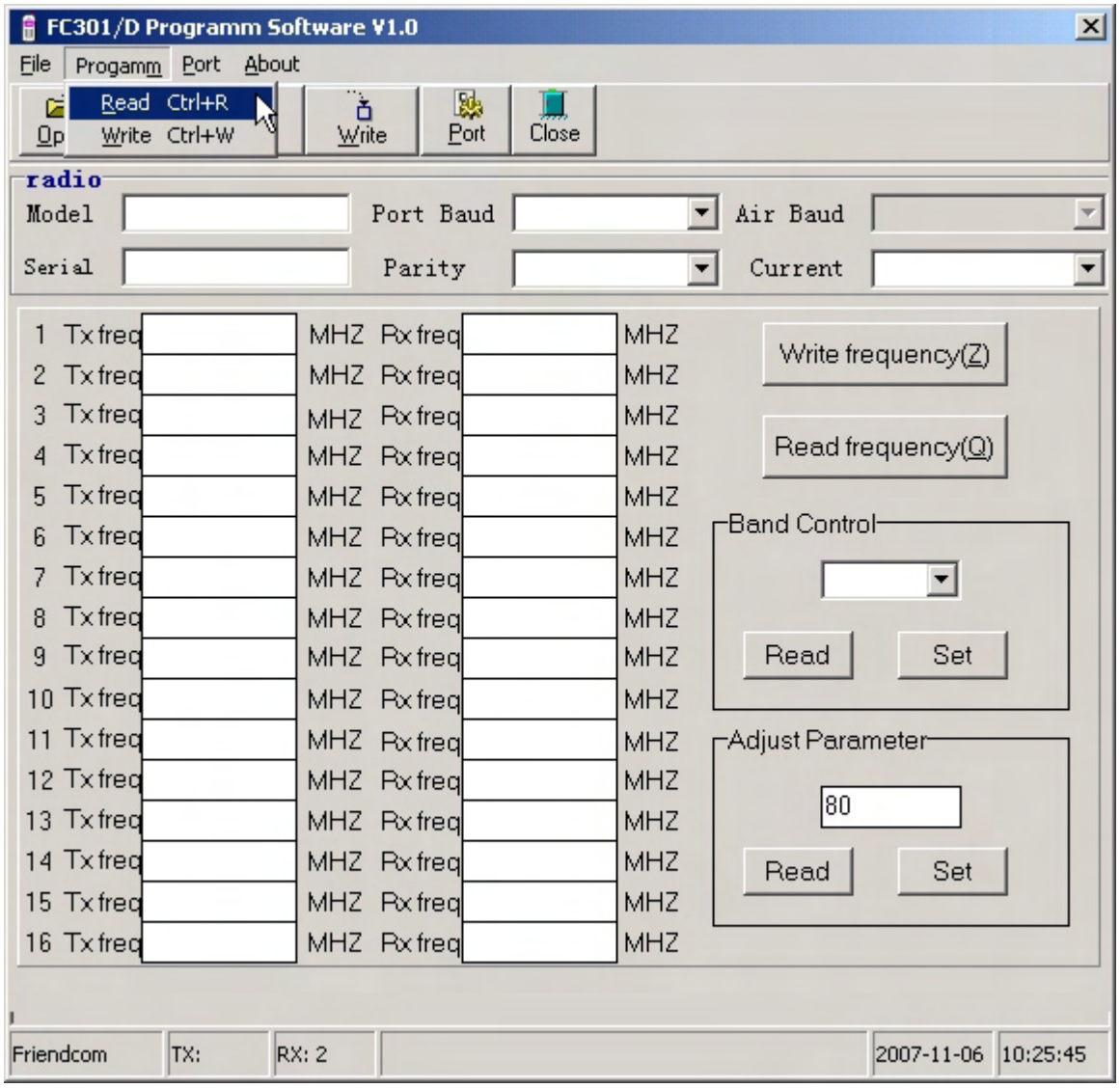




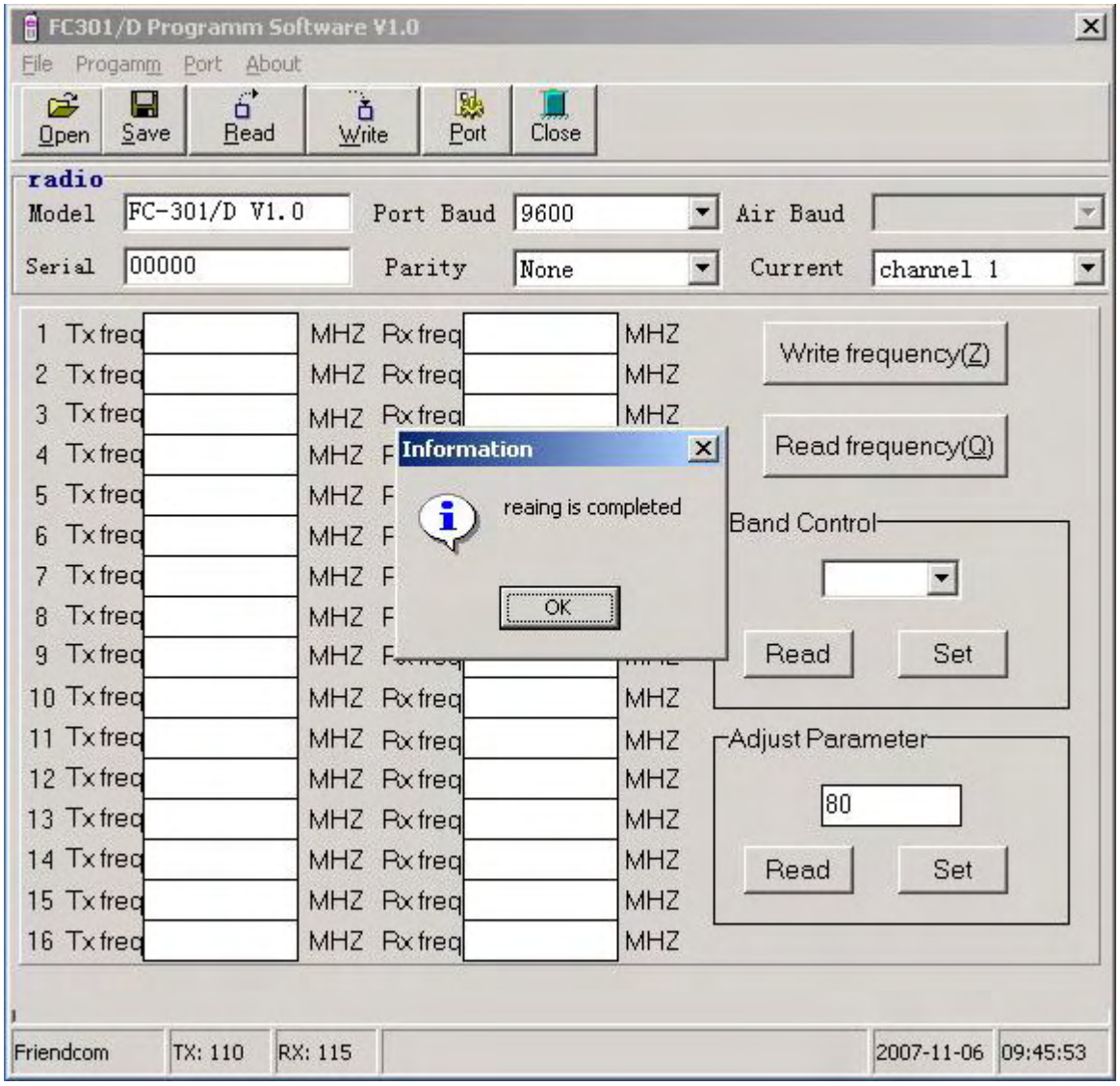
- Run the ‘Port’ in the main menu or press the Icon ‘Port ’ , The software will enter into the Port parameter setting interface.



- Run ‘ Program ’ -> ‘ Read ’ in the main menu, The software will detect and read the parameters of FC-301D.



- After run step 4, FC-301/D will automatically detect the FC-301/D RF link module and display the parameters of the module on the screen.



Ⅱ. To change the parameters of the RF link module

After reading the previous parameters, User can change the parameters of the module to new ones.

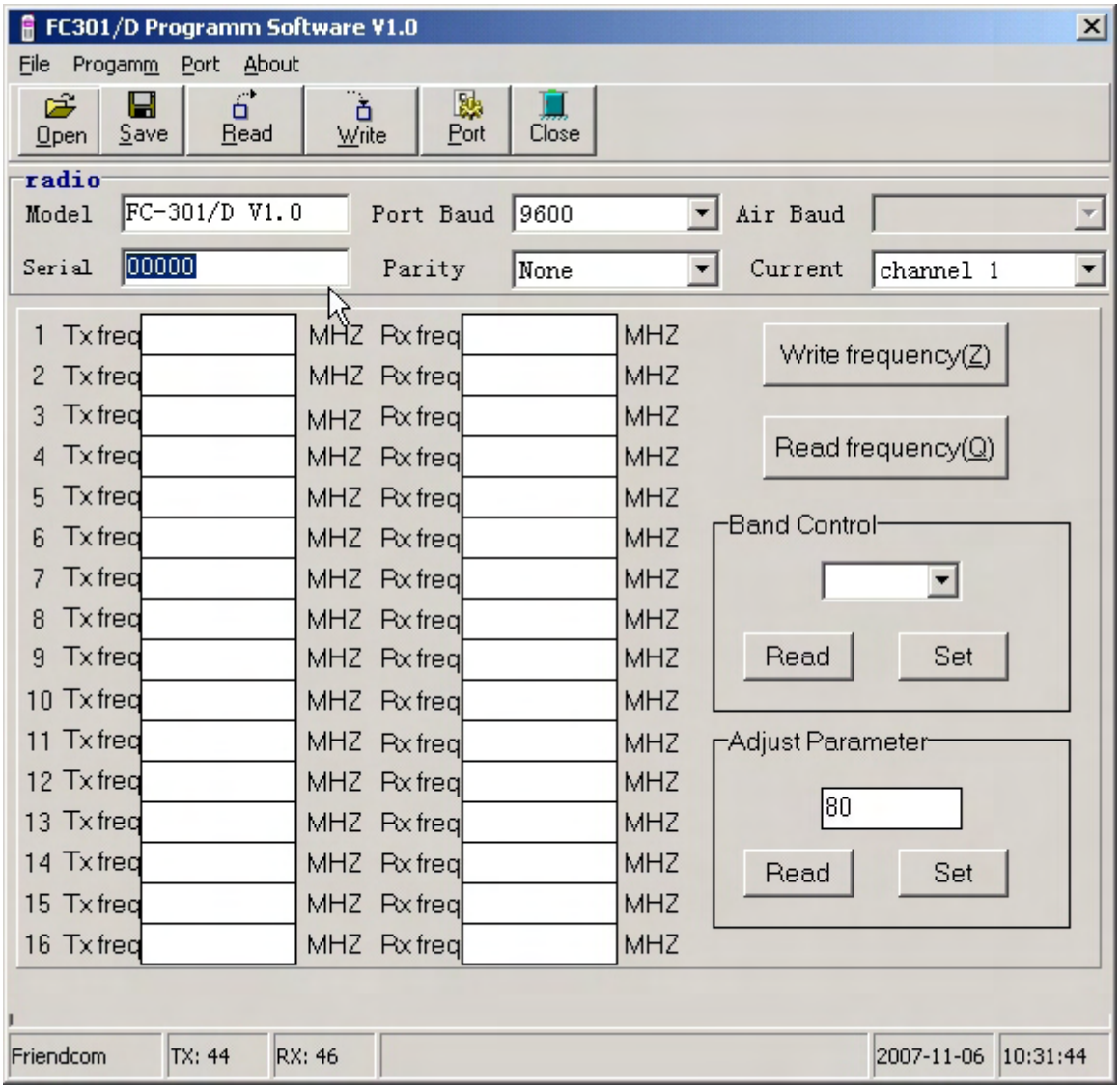
Model：Only for check, it can not be changed.

Serial No：Input 5 digits for ID code. Zero will be added to the front. The value less than 65536.

Port Baud：Optional from the list box

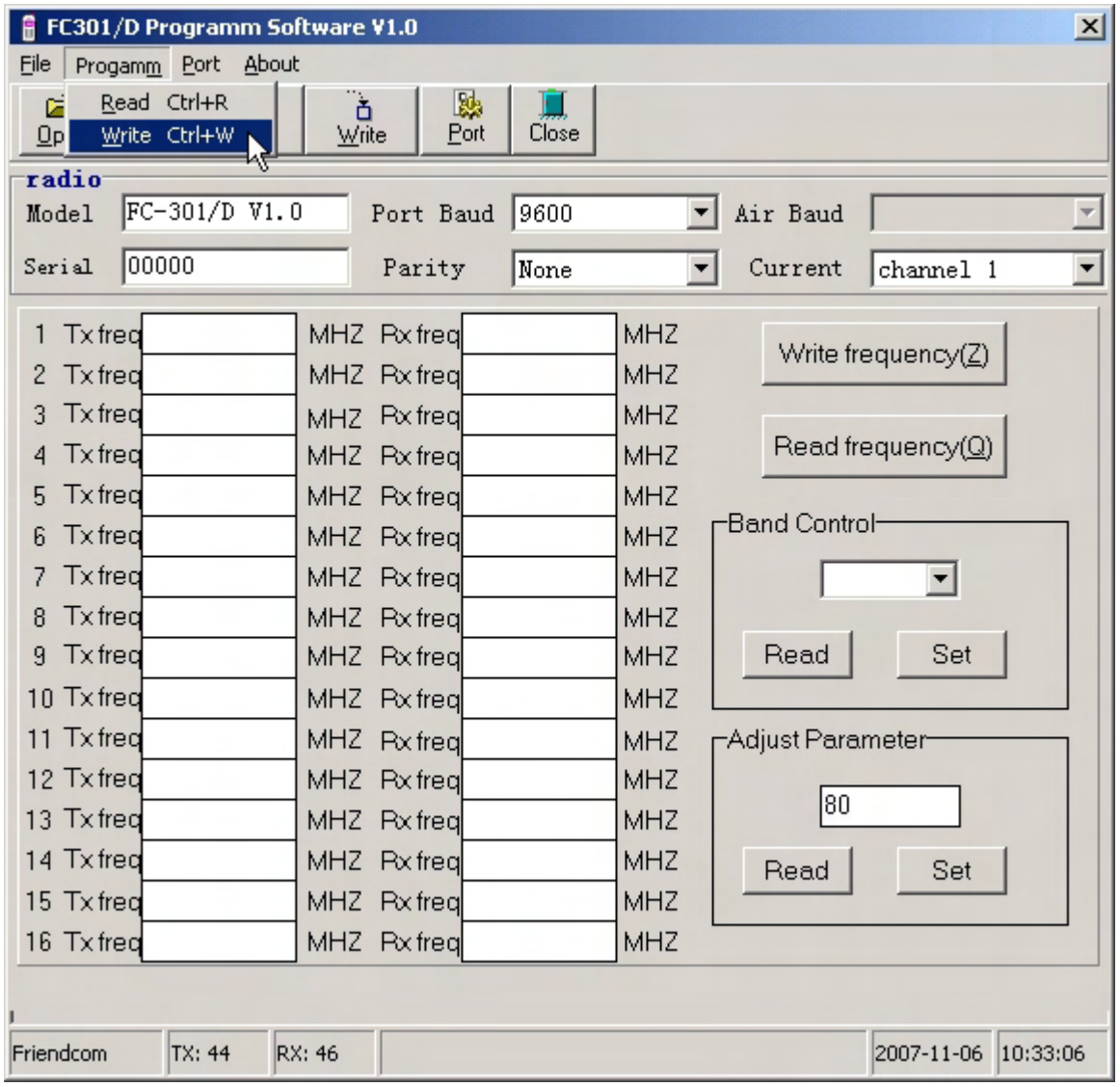
Parity： Optional from the list box

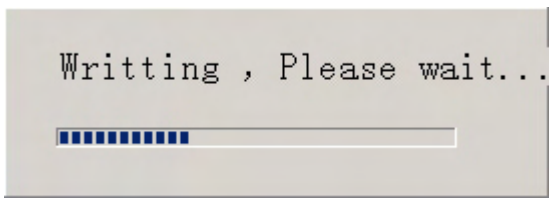
Channel： Only for check, it can not be changed



III. To write the parameters into the module

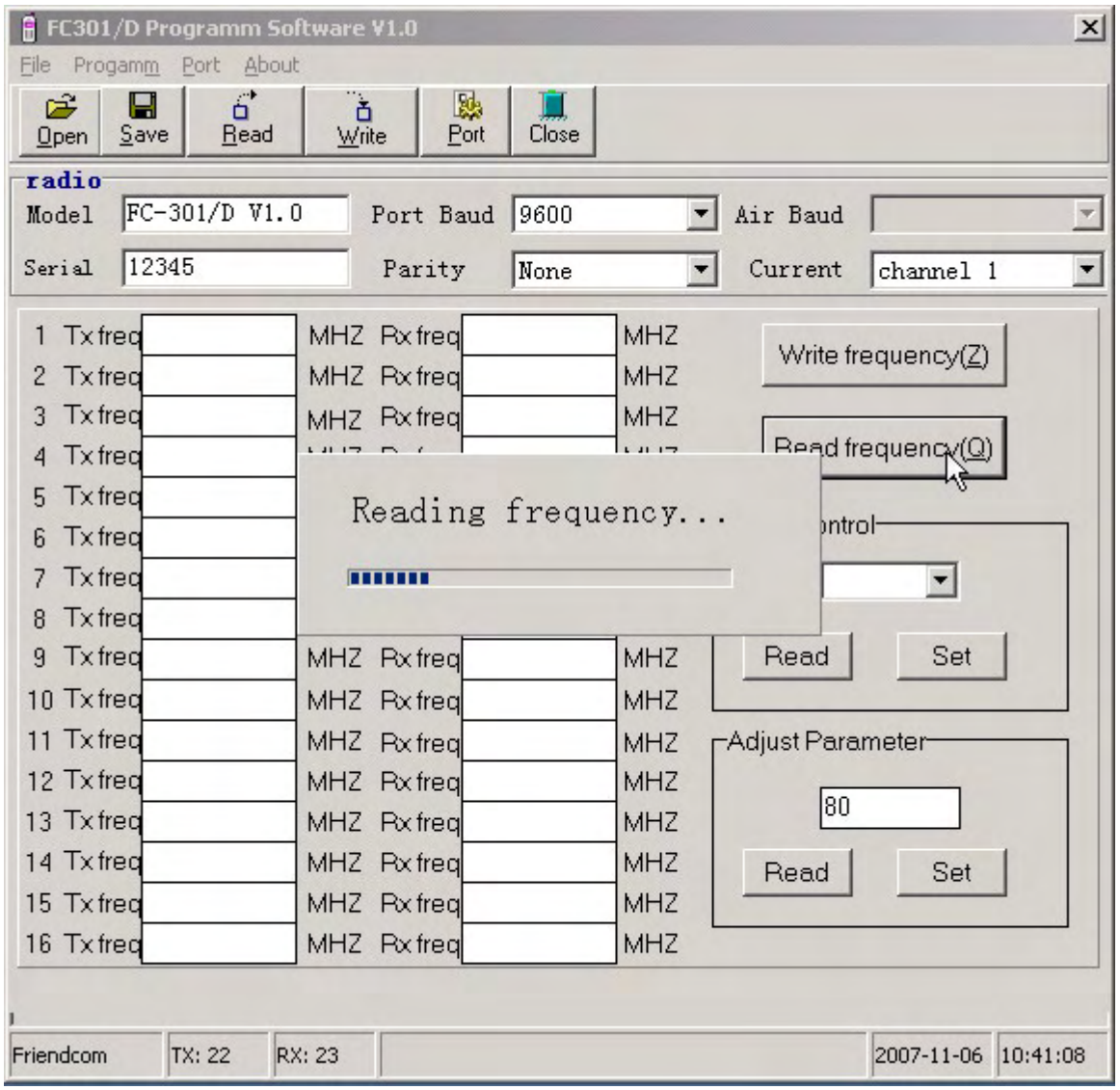
Run ‘Program’ -> ‘ Write ’ in the main menu, The changed parameters will be written into the FC-301/D module.

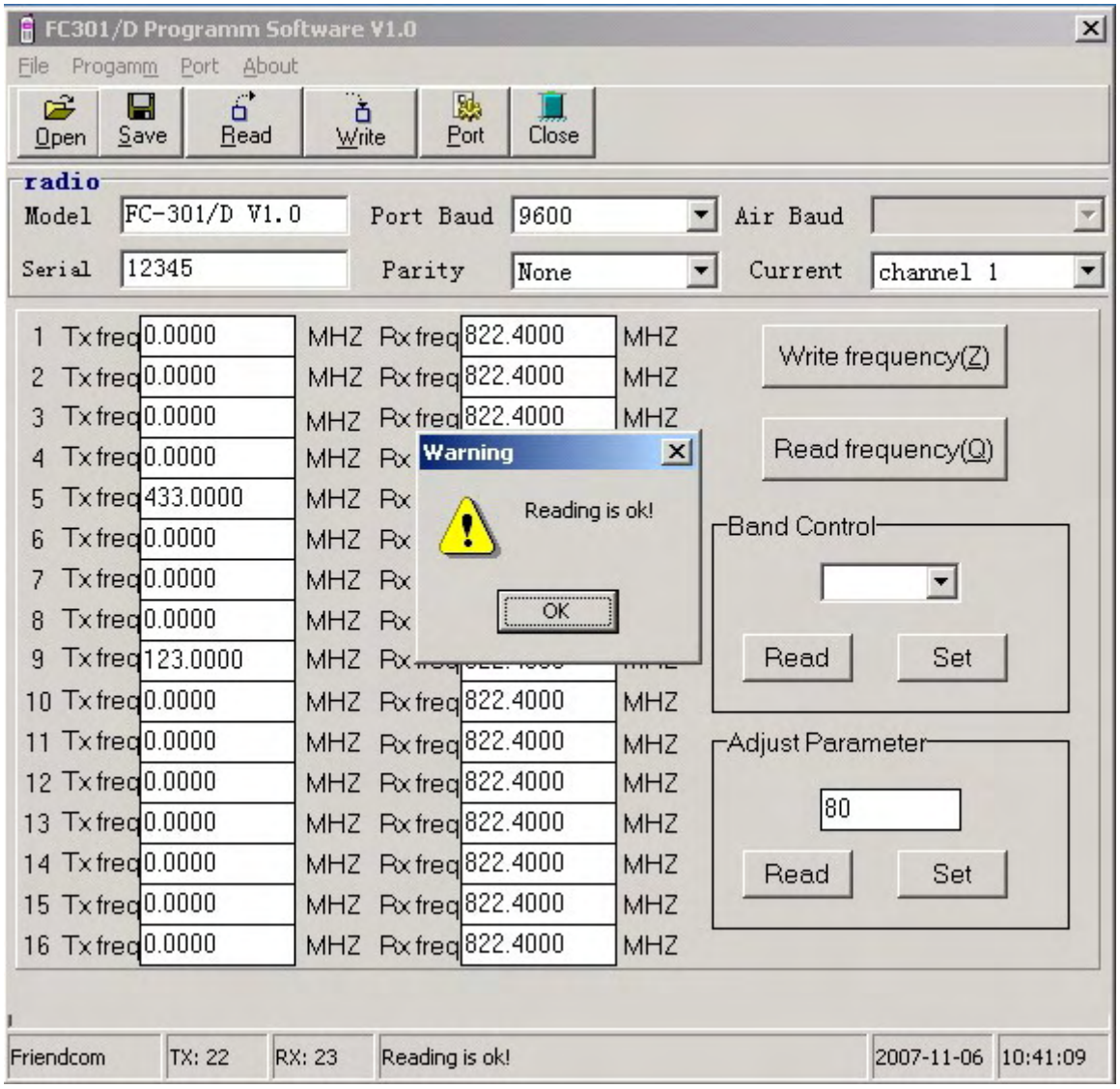




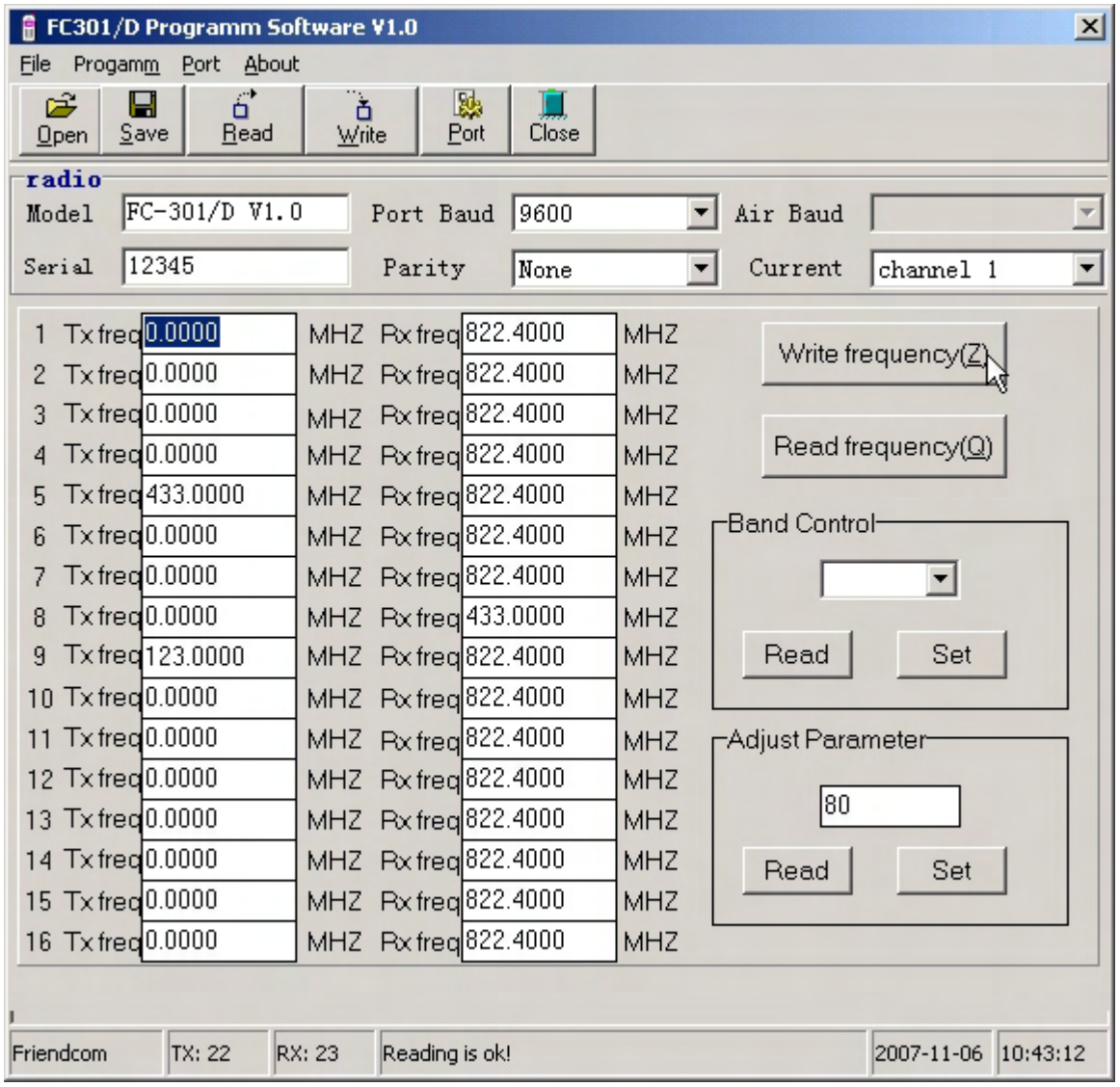
Ⅳ. To read / write the frequency

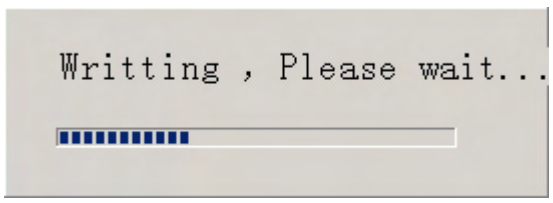
Click the button ‘Read Frequency’, the frequency of the channel from 1-16 will be displayed on the screen.

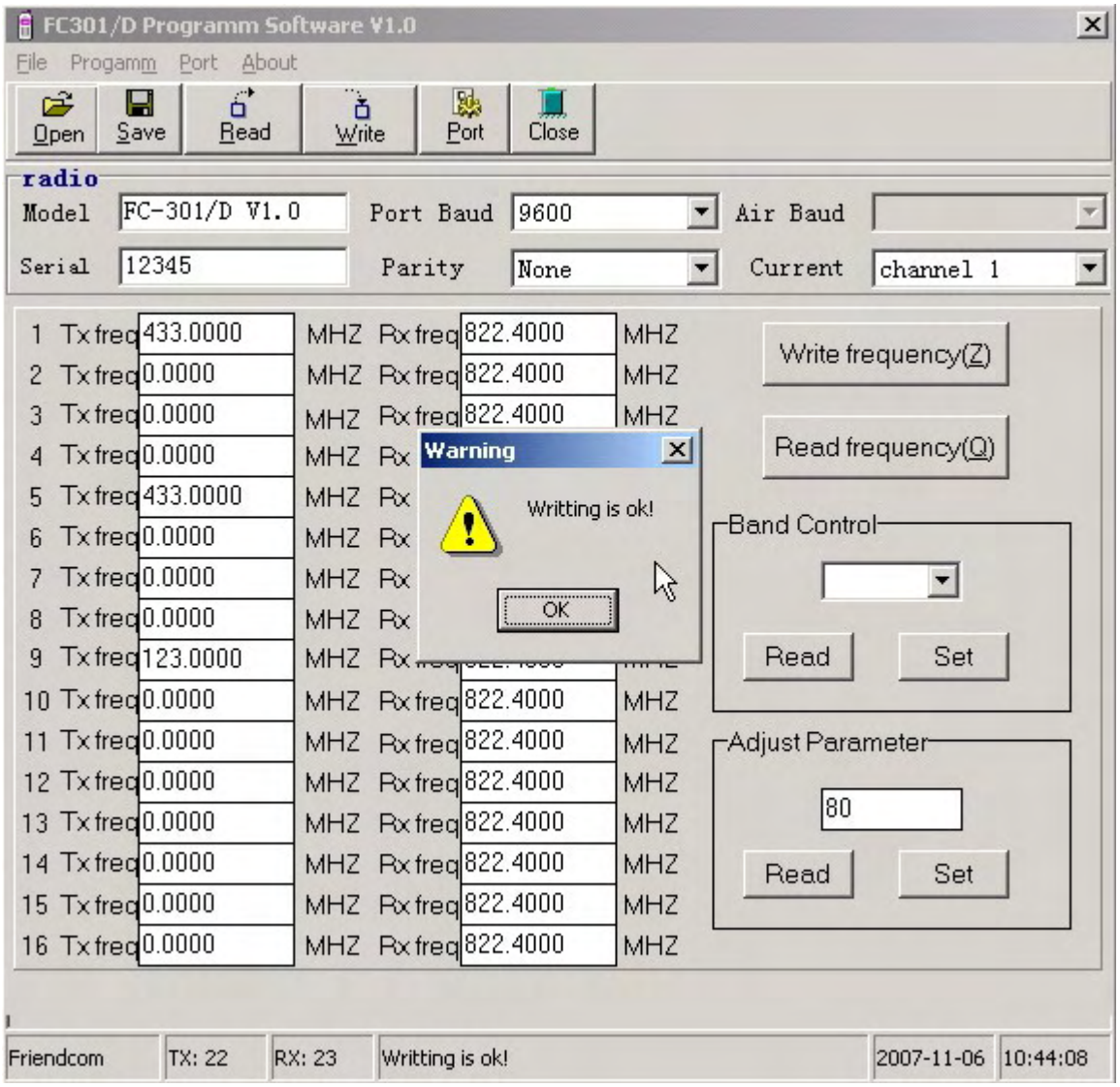



FC301/D Programm Software V1.0
File Progamm Port About
Open Save Read Write Port Close
radio
Model FC-301/D V1.0
Port Baud 9600
Air Baud
Serial 12345
Parity None
Current channel 1
1 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
2 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
3 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
4 Tx freq 0.0000 MHZ Rx
5 Tx freq 433.0000 MHZ Rx
6 Tx freq 0.0000 MHZ Rx
7 Tx freq 0.0000 MHZ Rx
8 Tx freq 0.0000 MHZ Rx
9 Tx freq 123.0000 MHZ Rx
10 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
11 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
12 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
13 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
14 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
15 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
16 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
Warning
Reading is ok!
OK
Write frequency(Z)
Read frequency(Q)
Band Control
Read
Set
Adjust Parameter
80
Read
Set
Friendcom
TX: 22
RX: 23
Reading is ok!
2007-11-06
10:41:09

New frequency can be input into each channel and click the ‘Write Frequency’ button, the new frequency will be written into the module.

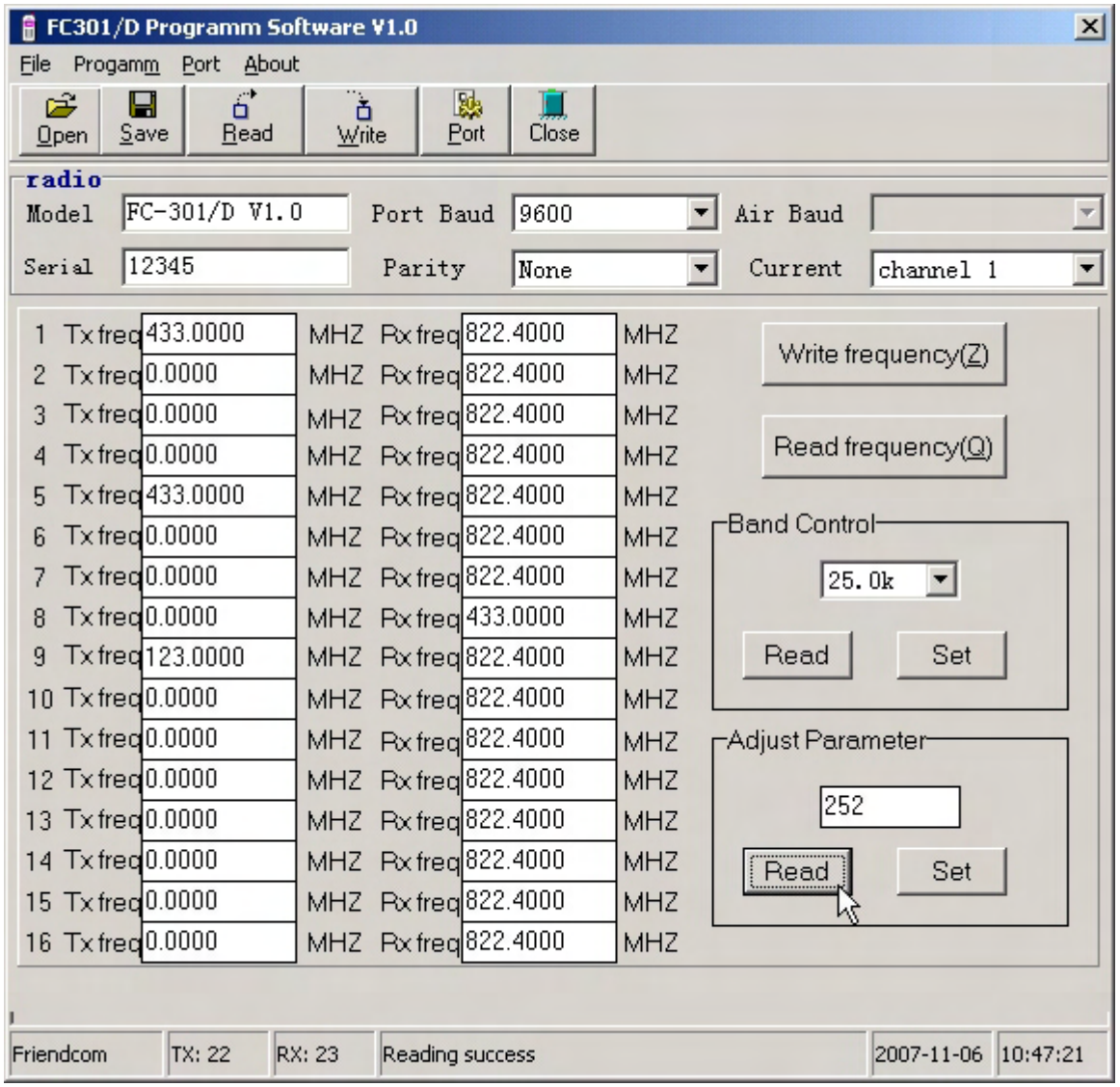





FC301/D Programm Software V1.0
File Progamm Port About
Open Save Read Write Port Close
radio
Model FC-301/D V1.0
Port Baud 9600
Air Baud
Serial 12345
Parity None
Current channel 1
1 Tx freq 433.0000 MHZ Rx freq 822.4000 MHZ
2 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
3 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
4 Tx freq 0.0000 MHZ Rx
5 Tx freq 433.0000 MHZ Rx
6 Tx freq 0.0000 MHZ Rx
7 Tx freq 0.0000 MHZ Rx
8 Tx freq 0.0000 MHZ Rx
9 Tx freq 123.0000 MHZ Rx
10 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
11 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
12 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
13 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
14 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
15 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
16 Tx freq 0.0000 MHZ Rx freq 822.4000 MHZ
Warning
Writting is ok!
OK
Write frequency(Z)
Read frequency(Q)
Band Control
Read
Set
Adjust Parameter
80
Read
Set
Friendcom
TX: 22
RX: 23
Writting is ok!
2007-11-06
10:44:08

Ⅴ. The switch between 12.5kHz and 25kHz channel spacing

In the ‘Band Control ’ interface, Click ‘Read’ , the current channel spacing 12.5kHz or 25kHz can be read out. Click ‘Set’, the selected channel spacing 12.5kHz or 25kHz can be written into the module.



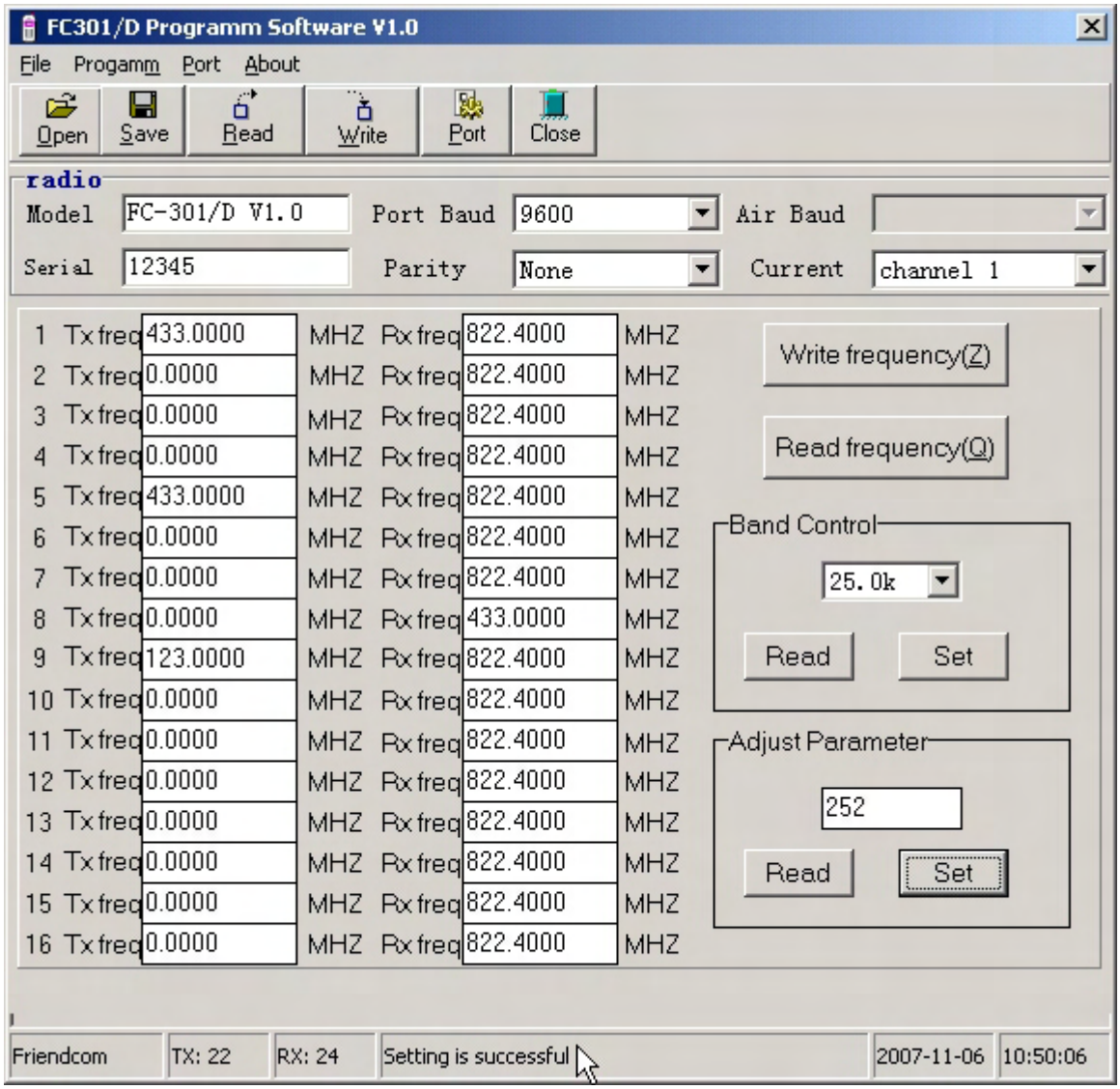
Ⅵ. To adjust the parameters

● While the module works in transmission or reception status on one fixed frequency, Click ‘Set’ in ‘Adjust Parameter’ to adjust the sensitivity or the RF power on one frequency. Click ‘Read’ to read the adjusted parameters of the current frequency.

● Turning Value ,the value range is between 0 and 255; when its value is 0 ,the corresponding voltage of CPU APC/TV pin is 4.0V,as the value increase the voltage of CPU APC/TV will decrease correspondingly . when its value is 255, the Voltage of CPU APC/TV pin is 0V. it is in inverse proportion relationship between two value.

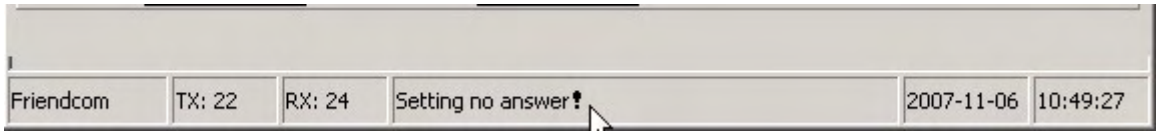
● Set turning value of RX (TV Value)

Fristly adjust CON1 pin8 SW port to low level and change RF at the status of RX ;



Secondly input the corresponding value in ‘Adjust Parameter’ according to channel frequency ;you will see ‘Setting successful’after you click ‘set’.

Otherwise you will see ‘Setting no answer’which indicate setting fail.



Thirdly,after setting success you can wait for 10 seconds or switch channel button to make the newest parameter be stored in CPU.

● Read the Turning Value of RX (TV Value)

Fristly adjust CON1 pin8 SW port to low level and change RF at the status of RX ;

Secondly click the button ‘Read’ in Adjust Parameter,you will see ‘Reading success’message and the detail parameter below; otherwise you will see ‘Reading no answer’and it indicate read failed it need to read again .(Without necessary please remmeber not to change the turning value which have set in factory ,otherwise it will affect other technologic parameter in RF)

● Set turning value of TX (APC Value)

Fristly adjust CON1 pin8 SW port to low level and change RF at the status of RX ;

Secondly input the corresponding value in ‘Adjust Parameter’ according to channel output frequency ;you will see ‘Setting successful’after you click ‘set’.Otherwise you will see ‘Setting no answer’which indicate setting fail.

Thirdly,after setting success you can switch channel button to make the newest parameter be stored in CPU.

● Read the Turning Value of TX (TV Value)

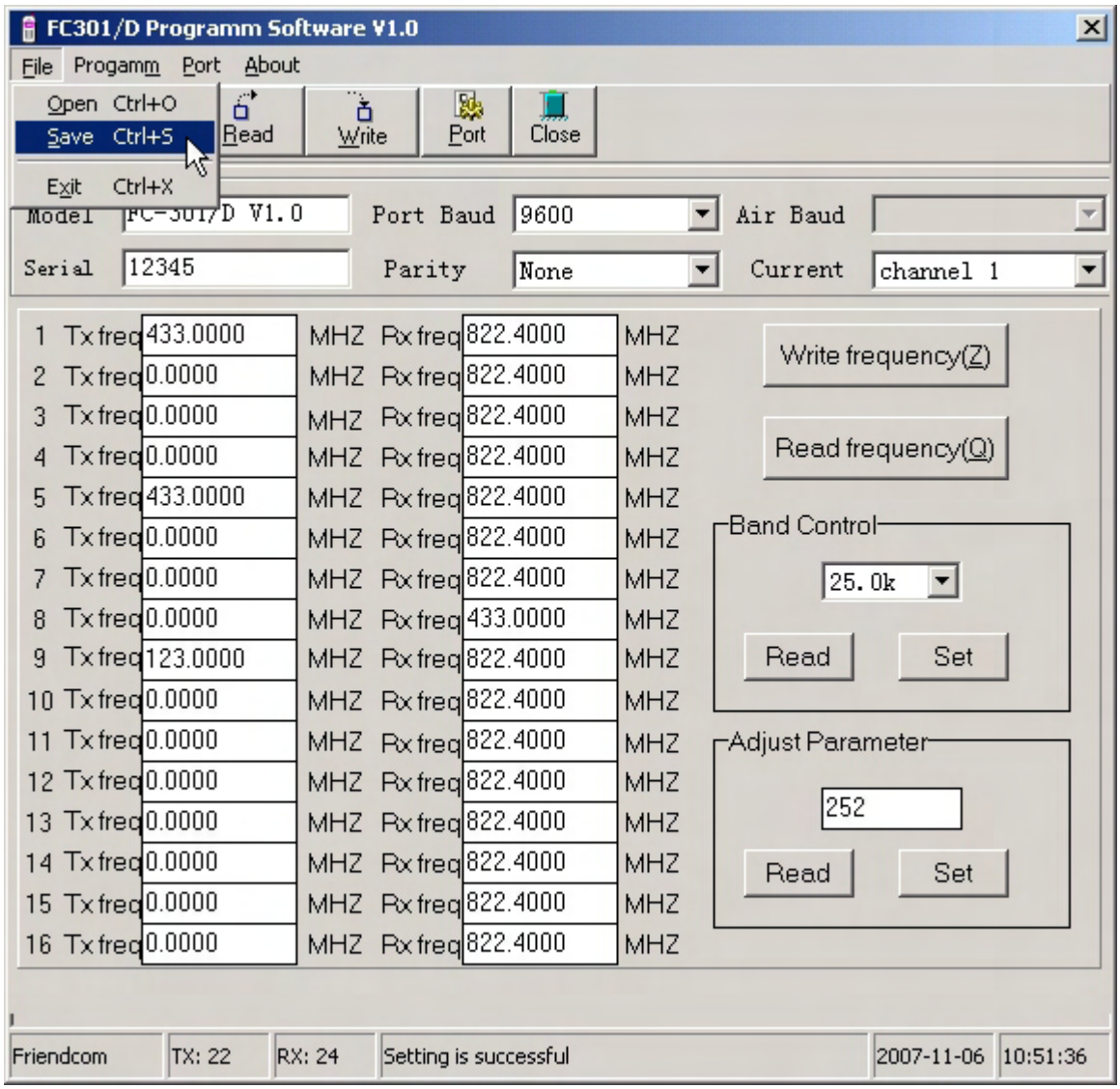
Fristly adjust CON1 pin8 SW port to low level and change RF at the status of TX ;

Secondly click the button ‘Read’ in Adjust Parameter,you will see

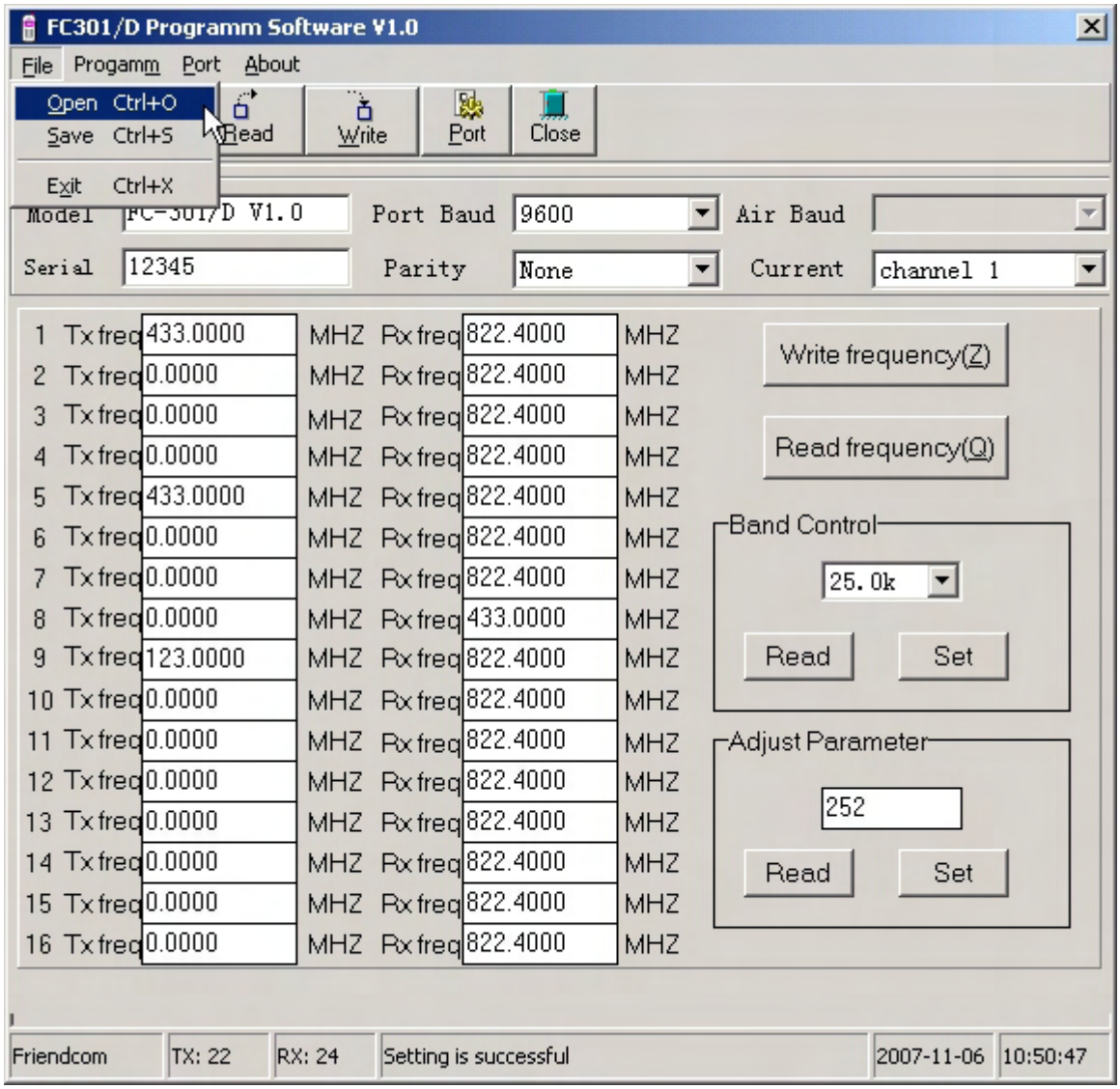
‘Reading success’message and the detail parameter below; otherwise you will see ‘Reading no answer’and it indicate read failed and need to read again .

Ⅶ. To save or open parameter file

● Run ‘File’->‘Save’ menu, The ‘Save’ interface will be displayed on the screen, Input the file name for saving, and press ‘Save’ button, the current parameters of the module will be saved into the appointed file for later use.



● Run ‘File’->‘Open’ menu, The ‘open’ interface will be displayed on the screen, Choose the file name which saved the parameters, and press ‘Open’ button, the parameters of the module saved in the file will be displayed on the screen.



ALIGNMENT PROCEDURE

The FC-301D is by design, broad band covering UHF(400-470 MHz) and should require no special alignment, unless repairs are performed on the receiver portion. Should repairs be necessary, use the "Alignment Points Diagram" on page, in conjunction with the following procedures:

PCB Testing

1.Adjust the power supply voltage to 12.5V before connect FC-301D to power supply, switch the power on. Then set up the channal frequency (Refer to the attached list on page 60)

2. Switch CF3 to 16 channels and set the transceiver to TX . Adjust VR1 and read the TX frequency from the equipment until the TX frequency is 469.9750MHz .adjust TC301 and test the VT voltage of TP1 until the voltage is 4.7±0.2V; switch CF3 to 8 channels and test the VT voltage ,it should be 0.7±0.2V

3. Switch CF3 to 16 channels and set the transceiver to RX . Read the TX frequency from the equipment ,it should be 424.8750MHz .adjust TC302 and test the VT voltage of TP1,the voltage should be 4.7±0.2V; switch CF3 to 8 channels and test the VT voltage ,it should be 0.7±0.2V

Audio Test of TX

1.Set Wireless Conmmunication Test set at the status of RX Test

2. Set the audio out of Wireless Conmmunication Test set as 1K; the amplitude of sinusoidal signal as 100mV.

3.Connect the audio output to CONI pin1 of FC301D,switch S1 to MIC-IN;then adjust the RF at the status of TX , connect the audio output to TP4 ,adjust VR403 for a reading of audio signal amplitude as 58mV and distortion is less than 3%

4.Connect the audio output to CONI pin1 of FC301D,switch S1 to DATA-IN;then adjust the RF at the status of TX , fristly connect the audio output to TP3 ,adjust VR404 for a reading of audio signal amplitude as 100mV and distortion is less than 3%; Secondly connect the audio output to TP4 ,adjust VR403 for a reading of audio signal amplitude as 59mV and distortion is less than 3%; thirdly connect the audio output to TP5 ,adjust VR407 for a reading of audio signal amplitude as 0.7V and distortion is less than 3%.

RF Test of TX

1.Set Wireless Conmmunication Test Set at the status of TX Test.

2.Fristly testing TP6 , fine turning VR1 to control the error between TX frequency and standard frequency among ±300Hz.

3.Set the channel space as wide-band,fristly test TP6 by set the output

frequency of Wireless Conmmunication Test set as 1KHz; the amplitude of sinusoidal signal as 100mV.Secondly test channe 1 ,8 and 16 separately for a reading of TX power 20mV+5mW, frequency deviation 3KHZ+0.5KHz and distortion is less than 3%; Also off the output signal of Test Set the frequency deviation should less than 70Hz.

4.Set the channel space as narrow-band,fristly test TP6 by set the output frequency of Wireless Conmmunication Test set as 1KHz; the amplitude of sinusoidal signal as 100mV.Secondly test channe 1 to chennel 8 separately for a reading of TX power 20mV+5mW, frequency deviation 1.5KHz＋0.5KHz and distortion is less than 3%; Also off the output signal of Test Set the frequency deviation should less than 70Hz.

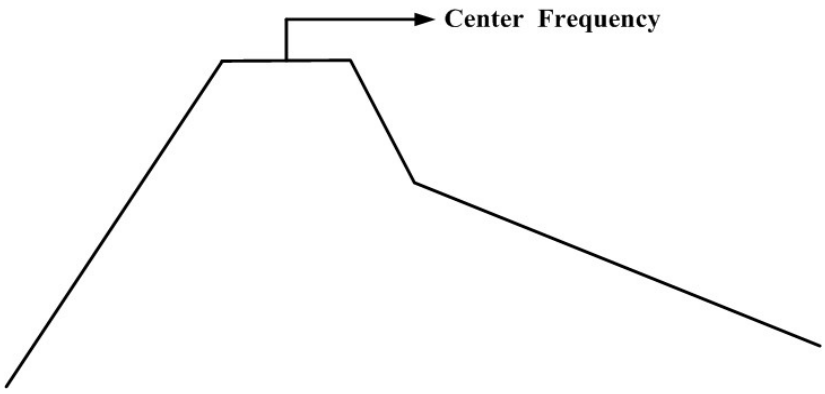
Passband Test of RX

1. Setting of Test Set(HP8920) as follow :

   TX Test---- SPEC ANL---- RF Ant-----Center Freq -------Input scanning frequency------Ref Level set as － 20dBm-------Span set as 200MHz-------Main select RF Gen -------Eixed---------Amplitude set as － 40dBm---- RF Out.

2. Connect the ANT IN port of Test Set to TP7 , and see its frequency spectrum as below

3. Each frequency have to set to corresponding turning value ,for detail turning value please refer to attached diagram on page ? ? ? ?



TX Test of FC301D

1.Set Wireless Conmmunication Test Set at the status of TX Test; Also set FC301D at the status of TX .

2.Fine turning VR1 to meet the error between TX frequency and standard frequency among ±300Hz.

3.Please refer to the diagram on page ? to adjust turning value for each channel , to control the TX output power of each channel to be 4.5W-6W and current to be less than 1.5A

4.Set the output frequency of Wireless Conmmunication Test set as 1KHz; the amplitude of sinusoidal signal as 100mV;testing for reading of frequency deviation to be 3KHz+0.5KHz for wide-band and 1.5KHz±0.5KHz for narrow band; and the distortion is less than 3%; Also off the output signal of Test Set the frequency deviation should less than 80Hz.

RX Wide Band Test of FC-301D

1.Set Wireless Conmmunication Test Set at the status of TX Test , and the

modulation signal of Test set have to be setted field intensity as 1mv ,frequency as 1KHz and frequency deviation as 3kHz. Also set FC301D at the status of RX

2.Please refer to wiring diagram and operation on page 49 to testing for a reading of AF OUT level to be 210+20mV and ditortion less than 5%

3.Please refer to Turning Value on page ? ,set the RF output signal of the Test Set to 0.28μV and test the Sinad,it should be better than 12dB.

4.When Sinad drop to be 10dB, SQ should be high level output and Voltage range should be more than 4.5V; When Sinad rise to more than 12dB, SQ should be low level output and Voltage range should be less than 0.4V;

5.Testing the RSSI output level should to be 2.2V-0.8V

6.Testing the audio output power to 2.2V+50mV.

RX Narrow Band Test of FC301D

1.Set Wireless Conmmunication Test Set at the status of TX Test , and the modulation signal of Test set have to be setted as follow ;field intensity as 1mv ,frequency as 1KHz and frequency deviation as 1.5kHz. Also set FC301D at the status of RX

2.Please refer to wiring diagram and operation on page ? to testing for a reading of AF OUT level to be 210+20mV and ditortion less than 5%

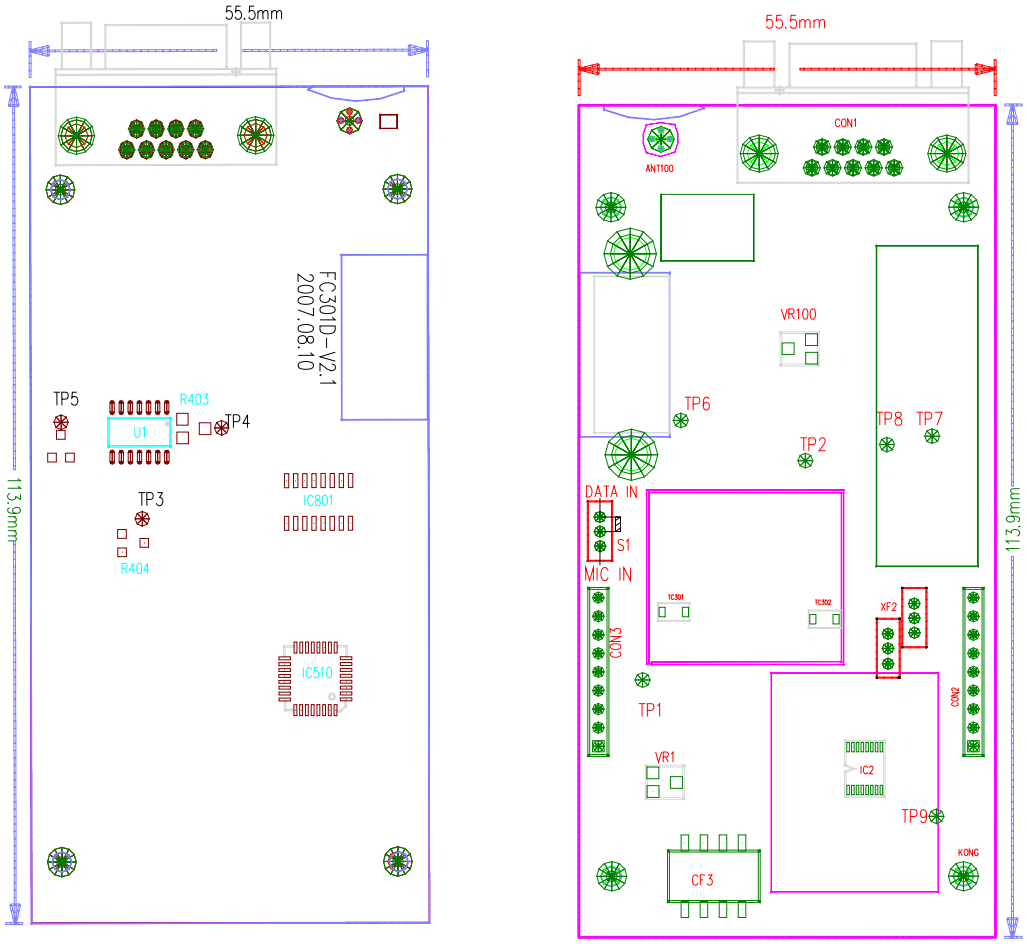
3.Please refer to Turning Value on page 60,set the RF output signal of the Test Set to 0.35μV and test the Sinad,it should be better than 12dB.

4.When Sinad drop to be 10dB, SQ should be high level output and Voltage range should be more than 4.5V; When Sinad rise to more than 12dB, SQ should be low level output and Voltage range should be less than 0.4V;

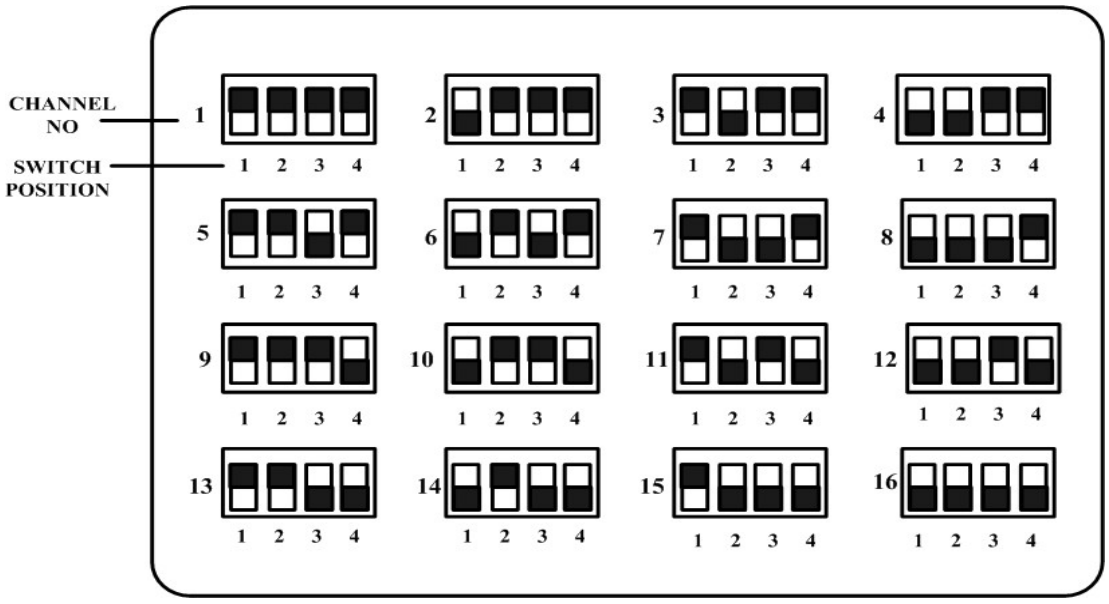
5.Testing the RSSI output level should to be 2.2V-0.8V

6. Testing the audio output power to 2.2V+50mV.

ALIGNMENT POINTS DIAGRAM



DIGITAL BOARD ALIGNMENT POINTS



CHANNEL SELECT SWITCH

COMPONENT REPLACEMENT

Surface Mount Components

Surface mount components should always be replaced using a temperature controlled soldering system. The soldering tools may be either a temperature controlled soldering iron or a temperature controlled hot-air soldering station. A hot-air system is recommended for the removal of components on these boards. With either soldering system, a temperature of 700° F (371° C) should be maintained.

The following procedures outline the removal and replacement of surface mount components. If a hot-air soldering system is employed, see the manufacturer's operating instructions for detailed information on the use of your system.

- CAUTION: Avoid applying heat to the body of any surface mount component using standard soldering methods. Heat should be applied only to the metalized terminals of the components. Hot-air systems do not damage the components since the heat is quickly and evenly distributed to the external surface of the component
- CAUTION: The CMOS Integrated Circuit devices used in this equipment can be destroyed by static discharges. Before handling one of these devices, service technicians should discharge themselves by touching the case of a bench test instrument that has a 3-prong power

cord connected to an outlet with a known good earth ground. When soldering or desoldering a CMOS device, the soldering equipment should have a known good earth ground.

Surface Mount Removal

1.Grip the component with tweezers or small needle nose pliers.

2.Alternately heat the metalized terminal ends of the surface mount component with the soldering iron. If a hot-air system is used, direct the heat to the terminals of the component. Use extreme care with the soldering equipment to prevent damage to the printed circuit board (PCB) and the surrounding components.

3.When the solder on all terminals is liquefied, gently remove the component. Excessive force may cause the PCB pads to separate from the board if all solder is not completely liquefied.

4.It may be necessary to remove excess solder using a vacuum de-soldering tool or Solder wick. Again, use great care when de-soldering or soldering on the printed circuit boards. It may also be necessary to remove the epoxy adhesive that was under the surface mount component and any flux on the printed circuit board.

Surface Mount Component Replacement

1. “Tin” one terminal end of the new component and the corresponding pad of the PCB. Use as little solder as possible.

2.Place the component on the PCB pads, observing proper polarity for capacitors, diodes, transistors, etc.

3.Simultaneously touch the “tinned” terminal end and the “tinned” pad with the soldering iron. Slightly press the component down on the board as the solder liquefies. Solder all terminals, allowing the component time to cool between each application of heat. Do not apply heat for an excessive length of time and do not use excessive solder.

With a hot-air system, apply hot air until all “tinned” areas are melted and the component is seated in place. It may be necessary to slightly press the component down on the board. Touch up the soldered connections with a standard soldering iron if needed. Do not use excessive solder.

- CAUTION: Some chemicals may damage the internal and external plastic parts of the radio.

4.Allow the component and the board to cool and then remove all flux from the area using alcohol or another approved flux remover.

Surface Mounted Integrated Circuit Replacement

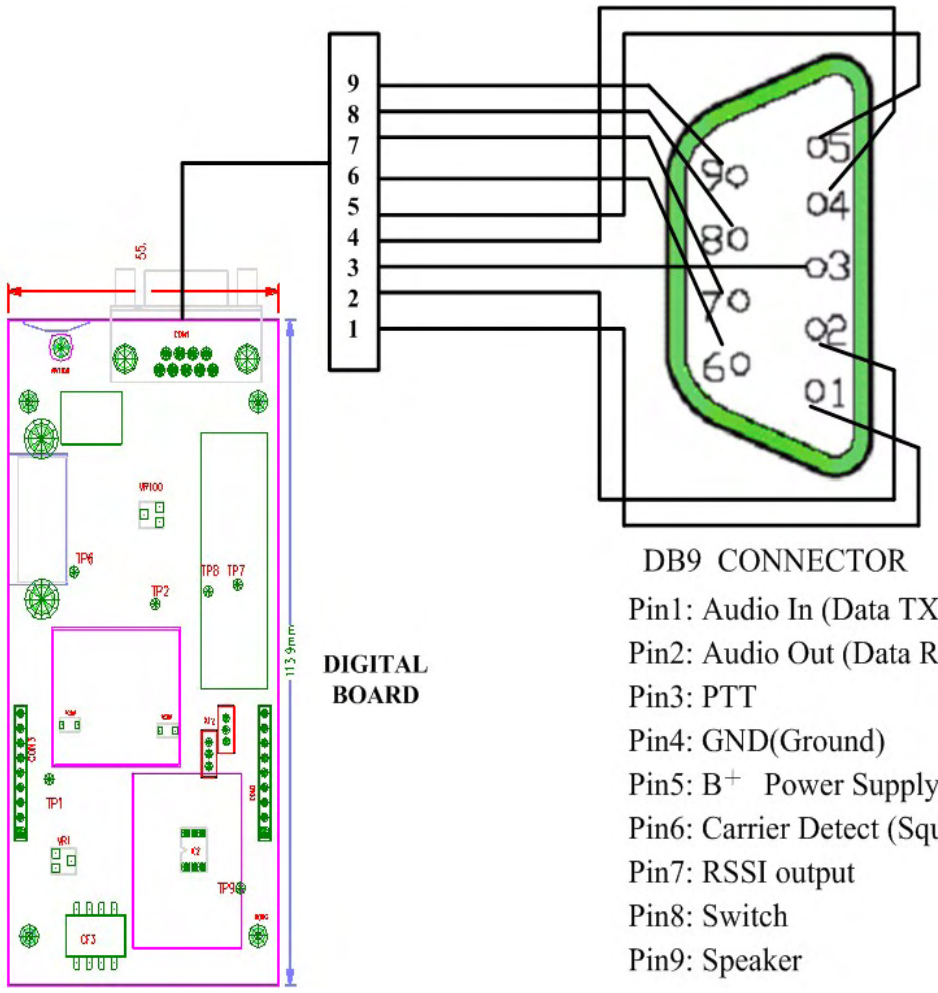
Soldering and de-soldering techniques of the surface mounted IC’s are similar to the above outlined procedures for the surface mounted chip components. Use extreme care and observe static precautions when removing or replacing the defective (or suspect) IC’s. This will prevent any damage to the printed circuit board or the surrounding circuitry.

The hot-air soldering system is the best method of replacing surface mount ICís. The IC’s can easily be removed and installed using the hot-air system. See the manufacturerís instructions for complete details on tip selection and other operating instructions unique to your system. If a hot-air system is not available, the service technician may wish to clip the pins near the body of the defective IC and remove it. The pins can then be removed from the PCB with a standard soldering iron and tweezers, and the new IC installed following the Surface Mount Component Replacement procedures. It may not be necessary to “tin” all (or any) of the IC pins before the installation process.

TROUBLESHOOTING GUIDE

SYMPTOM S	CAUSES	COUNTERMEASURES
Unit does not work	1.No power incomplete connection 2. No input voltage of 5V or 8V 3. CPU does not work 4. EEPROM fail 5. Channel error 6. PLL error	1.Check COM1 connection 2. Check IC500、IC504 3. Check IC510 4. Check IC502 5. Check CF3 6. Check TCXO、VCO、PLL IC
Bad RX Sensitivity	1.Antenna signal short-circuit 2.Antenna signal open-circuit 3. Bad electronic turner 4. Defective high frequency amplifier 5. Bad mixer 6. Local signal amplitude become small 7. Bad 1st and 2nd intermediate frequency	1. Check D106 D107 2. Antenna loose weld 3. Check L23 L24 L25 L26 4. Replace Q15 5. Check IC3 T3 T4 6. Check D103 Q111 7. Check XF1 XF2 IC2
Defective RX	1. No output signal 2. Bad signal waveform 3. Bad stability of VCO	1. Replace IC801 2. Check U2 c412 c404 3. Check component of VCO
PLL Error	1. TCXO frenquency error 2. Bad stability of VCO 3. PLL can't be locked	1.Check crystal oscillator of TCXO 2.Check the component of TX/RXVCO 3. IC301 Q321 Q320 C327
Low TX Power	1. Bad amplfier circuit 2. Bad APC circuit	1. Replace IC102 2. Check D102 IC1
No TX Power	1. No power on TX 2. No signal on driver 3. Bad amplfier circuit 4. Bad APC circuit	1. Check Q502 Q503 2. Check Q1 Q2 D101 3. Check IC102 D102 4. Check IC1
No Modulation	1. No input signal 2. No TX signal	1. Check IC801 2. Check U1 R403 R404

WIRING DIAGRAM



FC-301D DIGITAL BOARD PARTS LIST

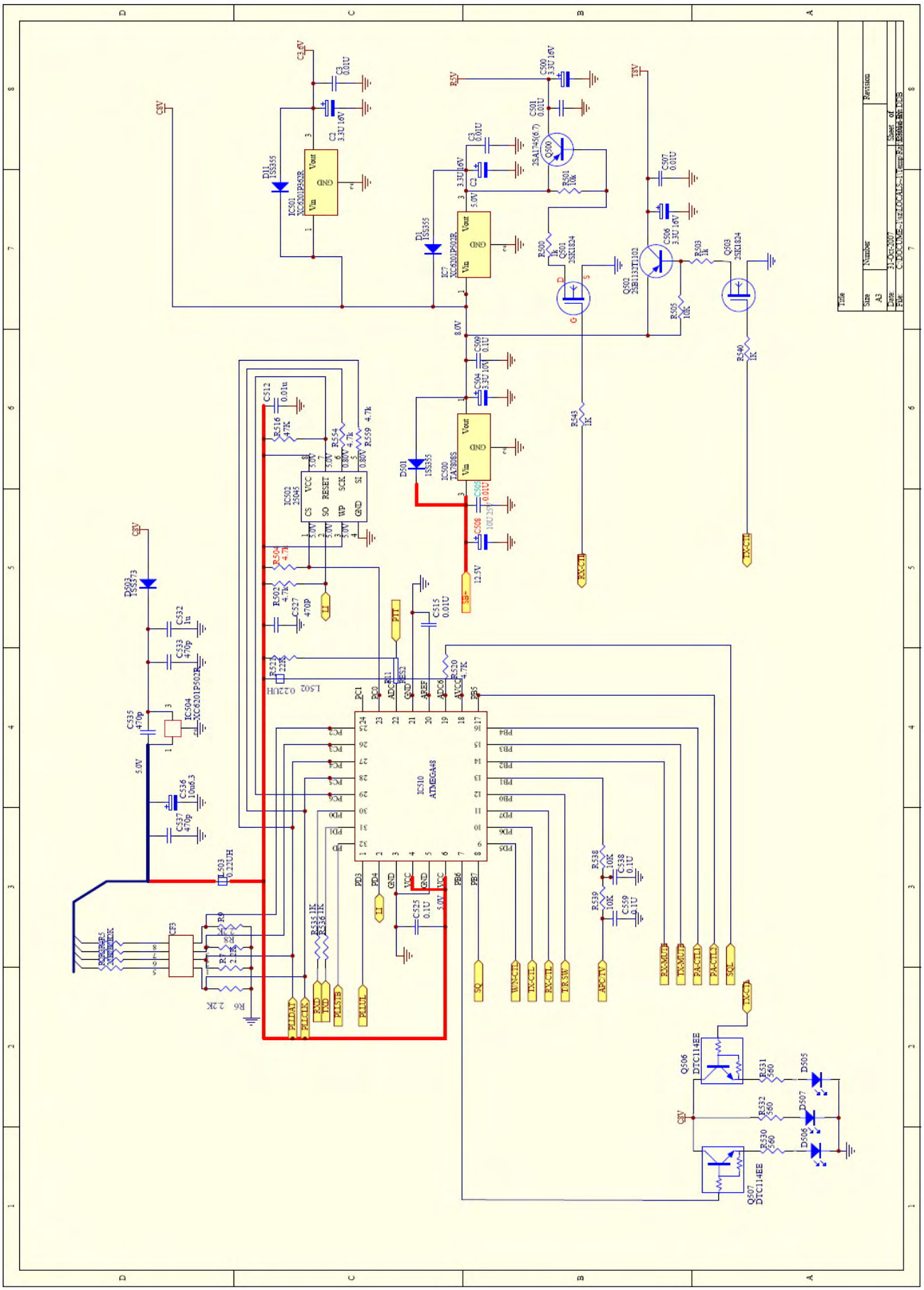
FC-301D DIGITAL BOARD PARTS LIST

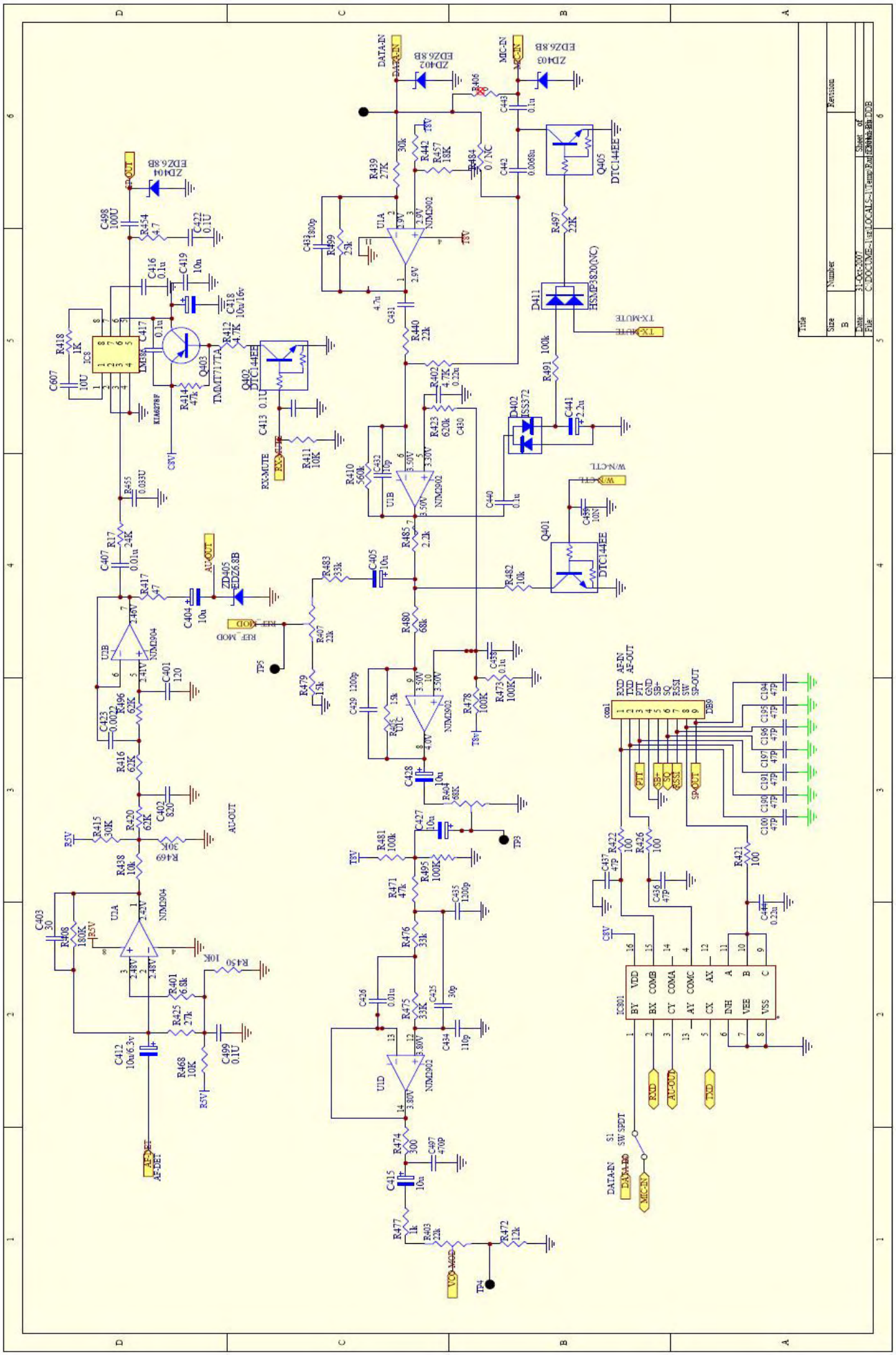
	REFERENCE NO.	DESCRIPTION	QUANTITY
1	ANT100	ANTENNA BNC	1
2	C1 C127 C136	CAP, 1.5PF±0.1PF 50V 0603 MURATA	3
3	C2 C140 C147 C219 C342 C404 C405 C412 C415 C418 C427 C428 C500 C502 C504 C506 C508 C536 C607	CAP,TA 10UF±10% 50V A GRADE MURATA	20
4	C3 C163 C211 C215 C217 C218 C221 C223 C226 C228 C232 C357 C419 C426 C439 C501 C503 C507 C509 C512	CAP, 0.01UF±10% 50V 0603 MURATA	21
5	C4 C108 C119 C224 C304 C318 C324 C331 C332 C421	CAP, 1000PF±10% 50V 0603 MURATA	11
6	C5	CAP, 2PF±0.1PF 50V 0603 MURATA	2
7	C7 C106 C120 C302 C306 C308 C310	CAP, 3PF±0.1PF 50V 0603 MURATA	7
8	C100 C190 C191 C193 C194 C195 C196 C197 C436 C437	CAP, 47PF±10% 50V 0603 MURATA	10
9	C101 C107 C111 C121 C129 C131 C133 C138 C141 C148 C150 C151 C153 C154 C155 C158 C168 C169 C179 C180 C192 C227 C301 C314 C315 C317 C329 C343 C358 C364 C365 C497 C527 C533 C535 C537	CAP, 470PF±10% 50V 0603 MURATA	36
10	C102 C103 C124 C125 C220 C230 C241 C309	CAP, 4PF±0.1PF 50V 0603 MURATA	8
11	C104 C222 C260 C264	CAP, 12PF±5% 50V 0603 MURATA	4
12	C105 C128 C320	CAP, 15PF±5% 50V 0603 MURATA	3
13	C117 C313 C321 C367	CAP, 6PF±0.1PF 50V 0603 MURATA	4
14	C118 C122 C123 C126 C144 C156 C173 C174	CAP, 1PF±0.1PF 50V 0603 MURATA	8
15	C130 C135 C137 C139 C143 C146 C162 C203 C208 C210 C212 C216 C235 C237 C239 C245 C246 C247 C249 C334 C337 C338 C345 C356 C368 C413 C416 C417 C422 C438 C443 C499 C505 C525 C538 C559	CAP, 0.1UF±10% 50V 0603 MURATA	36
16	C165 C383 C316 C336	CAP,TA 4.7UF±10% 50V A GRADE MURATA	4
17	C171 C172 C307 C312 C325	CAP, 0.5PF±0.1PF 50V 0603 MURATA	5
18	C201	CAP, 4700PF±10% 50V 0603 MURATA	1
19	C202 C407 C532	CAP, 1UF±10% 50V 0603 MURATA	3
20	C205 C433	CAP, 1800PF±10% 50V 0603 MURATA	2
21	C206 C207	CAP, 220PF±5% 50V 0603 MURATA	2
22	C209 C255	CAP, 82PF±5% 50V 0603 MURATA	2
23	C213 C279	CAP, 33PF±10% 50V 0603 MURATA	2
24	C214	CAP, 18PF±5% 50V 0603 MURATA	1
25	C225 C231 C257 C258 C322	CAP, 7PF±0.1PF 50V 0603 MURATA	5
26	C229 C244 C253 C323	CAP, 8PF±0.1PF 50V 0603 MURATA	4
27	C234 C236 C238 C242 C305 C319 C339 C340 C341	CAP, 100PF±5% 50V 0603 MURATA	9
28	C240 C382 C360 C361 C362	CAP, 5PF±0.1PF 50V 0603 MURATA	5
29	C303 C330 C335 C359 C432	CAP, 10PF±0.1% 50V 0603 MURATA	5
30	C311	CAP, 180PF±5% 50V 0603 MURATA	1
31	C326 C328	CAP, 0.1UF±10% 50V 0603 MURATA	2
32	C327	CAP,TA 2.2UF±10% 50V A GRADE MURATA	1
33	C344 C354	CAP,TA 1UF±10% 50V A GRADE MURATA	2
34	C363	CAP, 22PF±5% 50V 0603 MURATA	1
35	C401 C434	CAP, 120PF±5% 50V 0603 MURATA	2
36	C402	CAP, 820PF±10% 50V 0603 MURATA	1
37	C403 C425	CAP, 30PF±5% 50V 0603 MURATA	2
38	C423	CAP, 2200PF±10% 50V 0603 MURATA	1
39	C429 C435	CAP, 1200PF±10% 50V 0603 MURATA	2
40	C442	CAP, 6800PF±10% 50V 0603 MURATA	1
41	C430 C444	CAP, 0.22UF±10% 50V 0603 MURATA	2
42	C431	CAP, 0.1UF±10% 50V 0805 MURATA	1
43	C442	CAP, 6800PF±10% 50V 0603 MURATA	1
44	C498	CAP,TA 100UF±10% 50V A GRADE MURATA	1
45	CD1	FREQURENCY DETECTOR, 455K C24	1

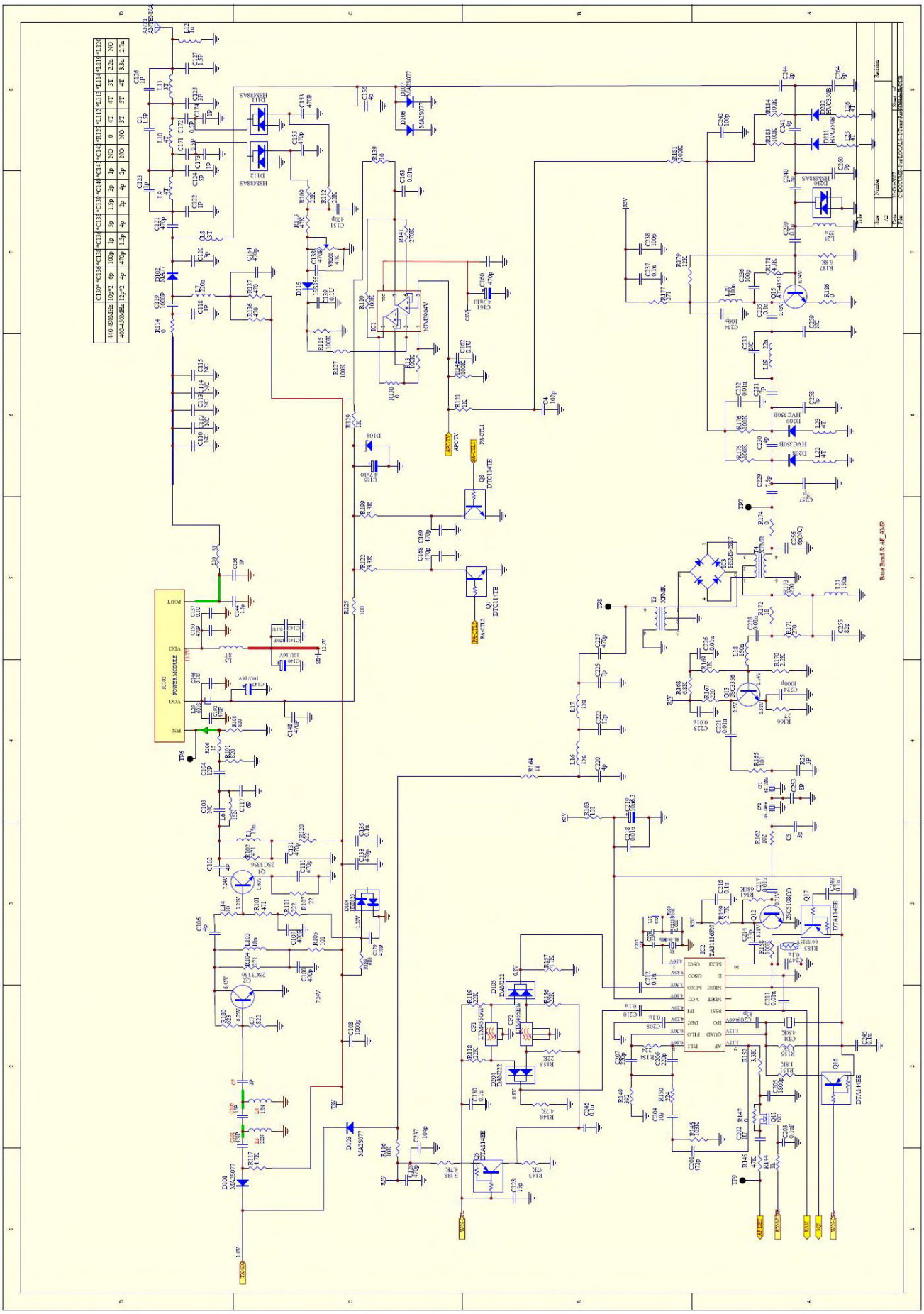
46	CF1	FILTER ,CER LTM455GW 455KHz ±4.5KHZ DIP	1
47	CF2	FILTER ,CER LTM455FW 455KHz ±6KHZ DIP	1
48	CF3	SW,CODING, SO-8	1
49	CON1	DB9 SOCKET	1
50	CON2 CON3	NEEDLE LINE SOCKET,9PIN 2.54mm	2
51	CON2 CON3	PIN HEADER, 9PIN 2.54mm	2
52	CON2 CON3	301D CONNECTING DIP PCB	1
53	D1 D115 D500 D501	DIODE, 1SS355 SOD-323 (TE17) TOSHIBA	4
54	D101 D103 D106 D107	DIODE, SW, MA2S077 SOD-323 Panasonic	4
55	D102	DIODE,SW, MA77 SOD-23 HITACHI	1
56	D104	DIODE, HSB123 SOT-23	1
57	D105 D204	DIODE, DAN222 SOT-323 HITACHI	2
58	D108 D320	DIODE, SCHOTTKY HZU5ALL SOD-323 5V RENESAS	2
59	D111 D112 D210	DIODE, HSM88AS SOT-23 HITACHI	3
60	D208 D209 D211 D212	DIODE, VARACTOR HVC350B SOD-323 HITACHI	4
61	D301 D302 D303 D304 D307 D308 D309 D310	DIODE, VARACTOR 1SV305 SOD-323 HITACHI	8
62	D305	DIODE, BB179 SOD-323 PHILIPS	1
63	D306 D311	DIODE,SW, MA2S111 SOD-323 Panasonic	2
64	D503	DIODE, 1SS373 SOD-323 (TE17) TOSHIBA	1
65	D505 D506	LED, Φ3 DIP	1
66	D507	LED,RED Φ3 DIP	1
67	IC1	IC, NJM2904 SSOP8 JRC	2
68	IC2	IC, TA31136FN SSOP16	1
69	IC3	DIODE, HSMS-2827 SOD-143	1
70	IC7 IC504	IC, XC6201P502R TO-89 (RoHS)	2
71	IC8	IC, LM386M-1 SO-8	1
72	IC102	COOLING SILICA GEL 20*10*3	2
73	IC102	ALUMINIUM BOARD	1
74	IC102	AMPLIFIER MODULE ,RA07H4047M	1
75	IC301	IC, MB15E03SL SSOP16 FUJITSU	1
76	IC500	IC, LM7808 TO-220 DIP	1
77	IC501	IC, XC6201P362R TO-89 (RoHS)	1
78	IC502	IC, X25043 SO-8	1
79	IC510	IC, ATmega48/V TQFP32 ATMEL	1
80	IC801	IC, HEF4053BT SO-16 MULTIPLEXERS	1
81	L1 L301 L322 L103	INDUCTOR ,CHIP 18nH ±5% 0603 MURATA	4
82	L3 L117 L305	INDUCTOR ,CHIP 22nH ±5% 0603 MURATA	3
83	L4 L6 L16 L17	INDUCTOR ,CHIP 15nH ±5% 0603 MURATA	4
84	L5	COIL, AIR E2-0.35*1.5*8TR RIGHT ANGLE (RoHS)	1
85	L7 L316 L502 L503	INDUCTOR ,COIL 220nH ±5% 0805 MURATA	4
86	L8 L9 L10 L22 L23 L25 L26	COIL, AIR E2-0.35*1.5*4TL RIGHT ANGLE	7
87	L11 L30	COIL, AIR E2-0.35*1.5*3TR RIGHT ANGLE (RoHS)	2
88	L12	INDUCTOR ,COIL 1uH ±10% 2520 COILCRAFT(RoHS)	1
89	L14	RES, 10Ω 1/10W ±5% 0603 YAGEO	3
90	L15	INDUCTOR ,CHIP 470nH ±5% 0603 MURATA	1
91	L18 L21	INDUCTOR ,COIL 150nH ±5% 0805 MURATA	2
92	L19	INDUCTOR,COIL,CER,GREEN, 33nH 0805 GREEN MURATA	1
93	L20	INDUCTOR ,COIL 180nH ±5% 0805 MURATA	1
94	L24	INDUCTOR,COIL,CER ,GREEN,15nH 0805 MURATA(RoHS)	1
95	L29	BEAD, SMD 0805 600Ω±25% MURATA(100MHz)	1
96	L302 L303 L308 L309 L313 L320	INDUCTOR ,CHIP 3.3uH ±10% 0603 MURATA	6
97	L304 L310	INDUCTOR,COIL,CER,WHITE, 22nH 1206 MURATA(RoHS)	2
98	L306	INDUCTOR ,CHIP 47nH ±5% 0603 MURATA	1
99	L307 L311 L314	BEAD, SMD 0603 MURATA(100MHz)	3
100	L312 L321	INDUCTOR ,CHIP 100nH ±5% 0603 MURATA	2
101	L315	INDUCTOR ,COIL 560nH ±5% 2520 MURATA	1
102	NC	RES, 8.2K 1/10W ±5% 0603 YAGEO	0
103	Q1 Q2 Q13	TRIODE, 2SC3356 SOT-23 NEC	3

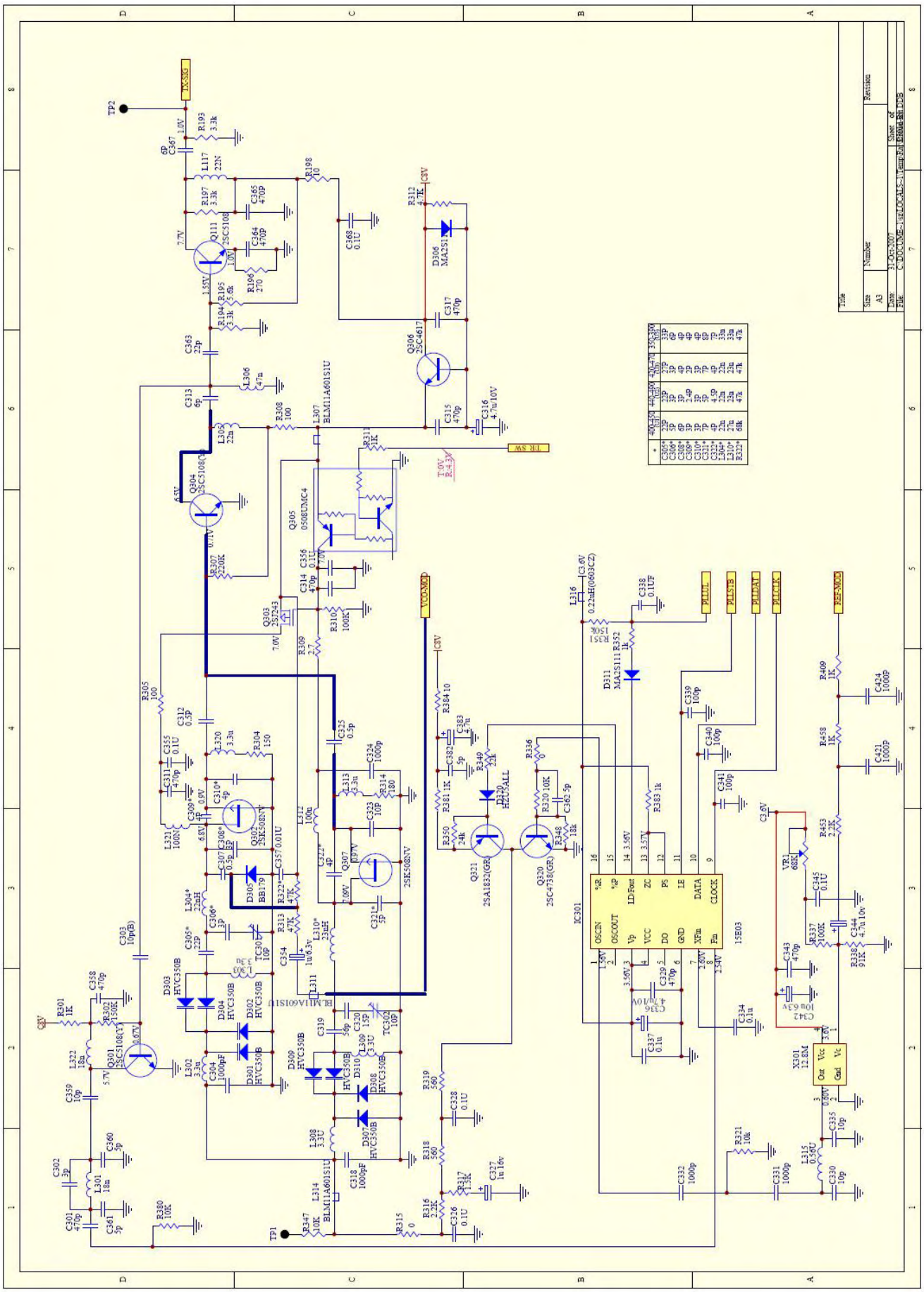
104	Q5 Q17	TRIODE, DTA114EE(TL) SOT-323 Rohm	2
105	Q7 Q8 Q506 Q507	TRIODE, DTC114EE(TL) SOT-323 Rohm	3
106	Q12 Q301 Q304 Q111	TRIODE, 2SC5108(Y) SOT-323 TOSHIBA	4
107	Q15	TRIODE, AT-41511 SOT-23 TOSHIBA	1
108	Q16	TRIODE, DTA144EE(TL) SOT-323 Rohm	1
109	Q302 Q307	TRIODE, 2SK508-T1B-A--K52 SOT-23 (RoHS)	2
110	Q303	TRIODE, 2SJ243 SOT-323 TOSHIBA	1
111	Q306	TRIODE, 2SC4617 SOT-323 Rohm	1
112	Q305	IC, UMC4 SOT-363	1
113	Q320	TRIODE, 2SC4738 SOT-323 TOSHIBA	1
114	Q321	TRIODE, 2SA1832(GR) SOT-323 TOSHIBA	1
115	Q401 Q402	TRIODE, DTC144EE(TL) SOT-323 Rohm	2
116	Q403	TRIODE, FMMT717TA SOT-23 (RoHS)	1
117	Q500	TRIODE, 2SA1745(6.7) SOT-23 SANYO	1
118	Q501 Q503	FET , 2SK1824 SOT-323 NEC	2
119	Q502	TRIODE, MMT3906 SOT-23 PHILIPS	1
120	R2 R3 R4 R5 R521 R12 R109 R112 R118 R119 R153 R156	RES, 22K 1/10W ±5% 0603 YAGEO	13
121	R6 R7 R8 R9 R316 R453 R485 R530 R531 R532	RES, 2.2K 1/10W ±5% 0603 YAGEO	10
122	R11 R117 R148 R157 R188 R312 R402 R412 R502 R504	RES, 4.7K 1/10W ±5% 0603 YAGEO	11
123	R13 R110 R115 R121 R127 R142 R158 R175 R176 R181 R183 R184 R310 R337 R347 R473 R478 R481 R495	RES, 100K 1/10W ±5% 0603 YAGEO	19
124	R17 R350 R472 R499	RES, 24K 1/10W ±5% 0603 YAGEO	4
125	R25	CAP, 2PF±0.1PF 50V 0603 MURATA	2
126	R101 R136 R137 R554 R559	RES, 470Ω 1/10W ±5% 0603 YAGEO	5
127	R102 R104 R171 R173 R196	RES, 270Ω 1/10W ±5% 0603 YAGEO	5
128	R105 R125 R163 R305 R309 R421 R422 R426	RES, 100Ω 1/10W ±5% 0603 YAGEO	8
129	R106	RES, 5.6Ω 1/10W ±5% 0805 YAGEO	1
130	R107 R120	RES, 22Ω 1/10W ±5% 0603 YAGEO	2
131	R108 R111 R191	RES, 820Ω 1/10W ±5% 0603 YAGEO	3
132	R113 R143 R145 R313 R414 R471 R516	RES, 47K 1/10W ±5% 0603 YAGEO	7
133	R114	RES, 0Ω 1/10W ±5% 0805 YAGEO	1
134	R116 R146 R160 C204 R321 R411 R438 R450 R468 R501 R505 R538 R539	RES, 10K 1/10W ±5% 0603 YAGEO	13
135	R129 R144 R169 R301 R311 R352 R381 R383 R409 R418 R458 R477 R500 R503 R535 R536 R540 R543	RES, 1K 1/10W ±5% 0603 YAGEO	18
136	R138 R147 R174 R186 R315 R336	RES, 0Ω 1/10W ±5% 0603 YAGEO	6
137	R139 R384	RES, 10Ω 1/10W ±5% 0603 YAGEO	3
138	R141 R302	RES, 330K 1/10W ±5% 0603 YAGEO	2
139	R149 R194	RES, 3.9K 1/10W ±5% 0603 YAGEO	2
140	R150 R154	RES, 220K 1/10W ±5% 0603 YAGEO	2
141	R151 R155 R317	RES, 1.5K 1/10W ±5% 0603 YAGEO	3
142	R152 R193 R197	RES, 3.3K 1/10W ±5% 0603 YAGEO	3
143	R159 R170 R482	RES, 2.7K 1/10W ±5% 0603 YAGEO	3
144	R161	RES, 680K 1/10W ±5% 0603 YAGEO	1
145	R162 R165 R318 R319	RES, 560Ω 1/10W ±5% 0603 YAGEO	4
146	R164 R172	RES, 18Ω 1/10W ±5% 0603 YAGEO	2
147	R166	RES, 33Ω 1/10W ±5% 0603 YAGEO	1
148	R167 R308	RES, 220Ω 1/10W ±5% 0603 YAGEO	2
149	R168 R187 R401	RES, 6.8K 1/10W ±5% 0603 YAGEO	3
150	R177	RES, 510Ω 1/10W ±5% 0603 YAGEO	1
151	R178	RES, 4.3K 1/10W ±5% 0603 YAGEO	1
152	R179 R320 R349	RES, 12K 1/10W ±5% 0603 YAGEO	3
153	R180 R416 R420 R496	RES, 62K 1/10W ±5% 0603 YAGEO	4
154	R189	RES, 680Ω 1/10W ±5% 0603 YAGEO	1
155	R195 R405 R479	RES, 15K 1/10W ±5% 0603 YAGEO	3
156	R198	RES, 62Ω 1/10W ±5% 0603 YAGEO	1
157	R304	RES, 330Ω 1/10W ±5% 0603 YAGEO	6
158	R307	RES, 390K 1/10W ±5% 0603 YAGEO	1
159	R322 R339	RES, 120K 1/10W ±5% 0603 YAGEO	2
160	R338	RES, 91K 1/10W ±5% 0603 YAGEO	1

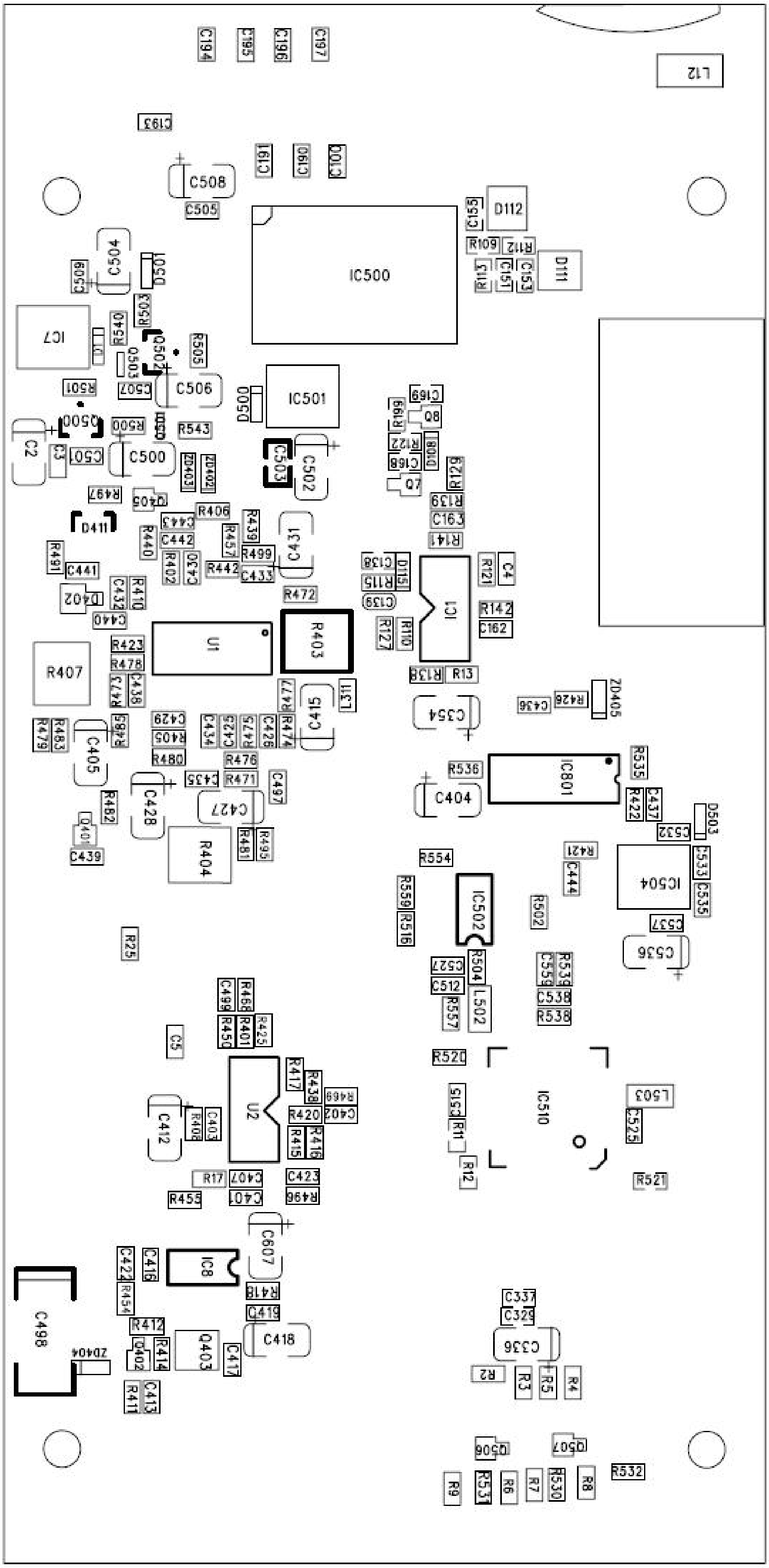
161	R348 R457	RES, 18K 1/10W ±5% 0603 YAGEO	2
162	R351	RES, 150K 1/10W ±5% 0603 YAGEO	1
163	R403 R407	RES, 22K 1/10W ±5% 0603 YAGEO	2
164	R408	RES, 180K 1/10W ±5% 0603 YAGEO	1
165	R410	RES, 560K 1/10W ±5% 0603 YAGEO	1
166	R415 R442 R469	RES, 0K 1/10W ±5% 0603 YAGEO	3
167	R417	RES, 47Ω 1/10W ±5% 0603 YAGEO	1
168	R423	RES, 620K 1/10W ±5% 0603 YAGEO	1
169	R425 R439	RES, 27K 1/10W ±5% 0603 YAGEO	2
170	R454	RES, 4.7Ω 1/10W ±5% 0603 YAGEO	1
171	R455	CAP, 0.033UF±10% 50V 0603 MURATA	1
172	R474 314	RES, 300Ω 1/10W ±5% 0603 YAGEO	2
173	R475 R476 R483	RES, 33K 1/10W ±5% 0603 YAGEO	3
174	R480	RES, 68K 1/10W ±5% 0603 YAGEO	1
175	T3 T4	COIL, 3002 muRata	2
176	TC301 TC302	CAPVAR, 10PF 2*2 TC03C100A-TP02 MURATA	2
177	U1	IC, NJM2902L SO16 NARROW TYPE	1
178	U2	IC, NJM2904 SSOP8 JRC	2
179	VR100	RES, 47K (3*4)(+25%) 0603 MVR22HXBRN683(RoHS)	1
180	VR1 R404	RES, (3*4) 68K Ω (+25%) 0603 MVR22HXBRN683(RoHS)	2
181	X301	TCXO, 13MHz±2.5PPM 5*3.2*1.5MM NDK	1
182	XF1 XF2	CRYSTAL FILTER,45.100MHZ±7.5KHZ UM-5 DIP	2
183	X1	CRYSTAL ,44.645MHz ±10%PPM DIP	1
184	ZD402 ZD403 ZD404 ZD405	DIODE, EDZ6.8B(TE61) SOD-523 ROHM	4







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C196
C197
L12
C193
C191
C190
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IC500
C155
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R109
R112
R113
C151
C153
D111
C509
C504
D501
R503
IC7
R540
Q502
R505
Q503
R501
C507
C506
D500
IC501
C169
R119
Q8
Q500
R500
R543
R122
D110
C2
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C500
ZD403
ZD402
C503
C502
C168
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R129
R497
Q405
R406
R439
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R457
C431
R139
C163
R141
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R440
R402
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R442
C433
C138
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R478
R473
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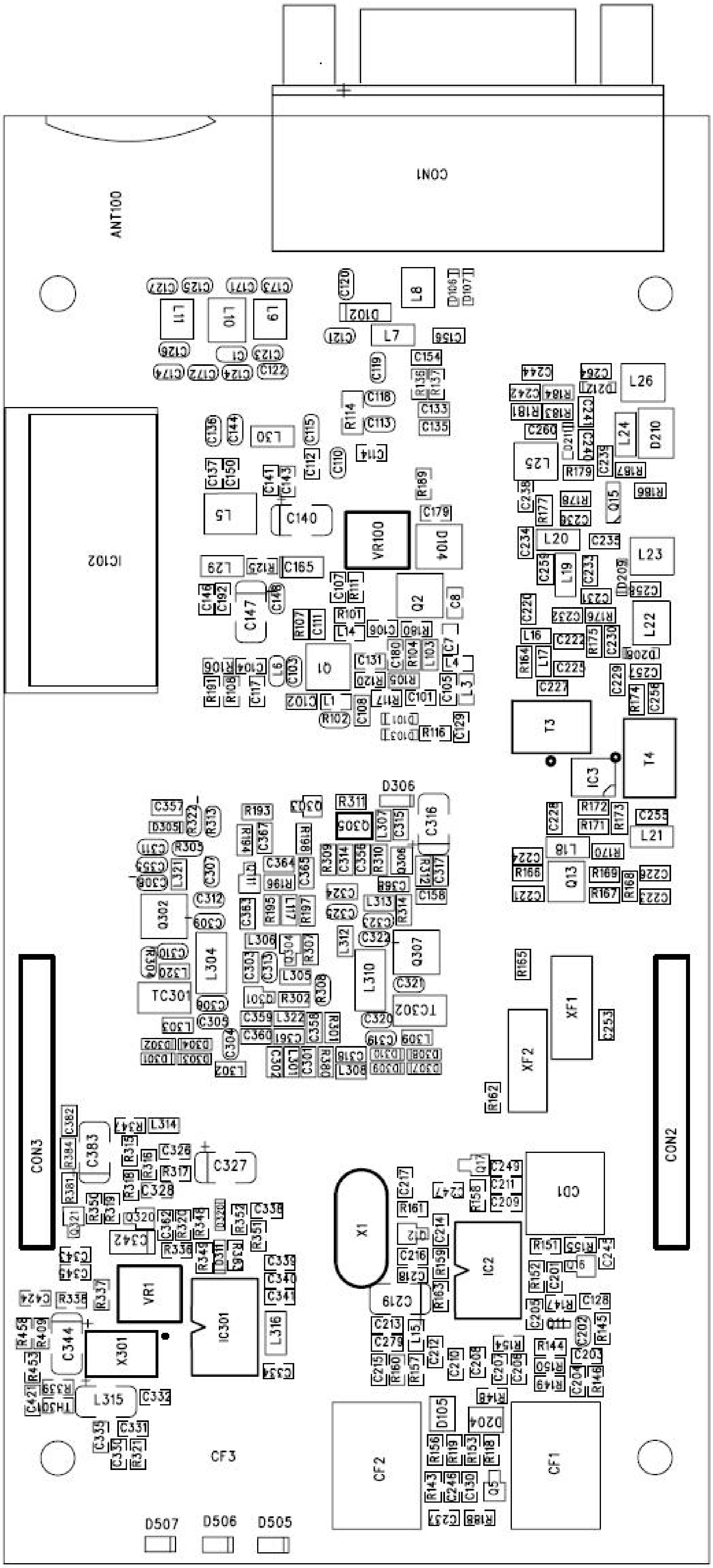
R530
R8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VR100
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Q2
T3
T4
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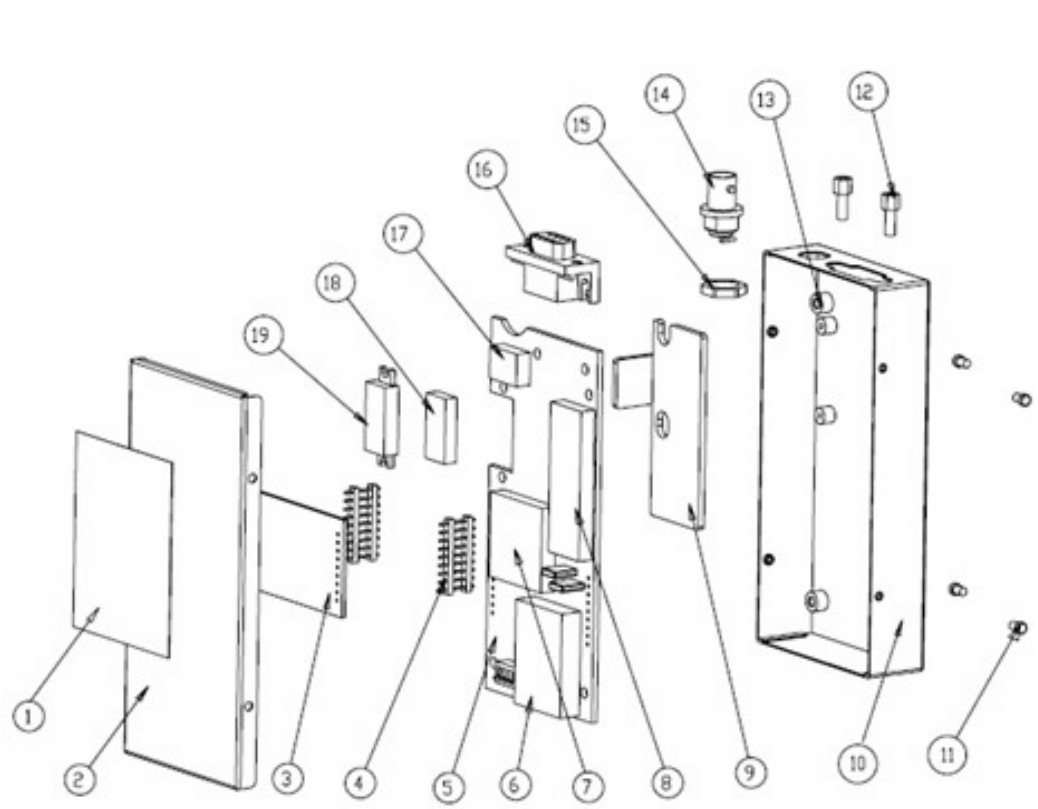
XF1
XF2
CON2
CON3
TC301
TC302
IC301
VR1
X301
X1
IC2
CD1
CF1
CF2
CF3
D505
D506
D507

FACTORY SETTING DIAGRAM

Channel	RX Frequency	RX Turning Value (TV)	TX Frequency	TX Turning Value (APC)
1	400.1250MHZ	170	400.1250MHZ	65
2	405.1250MHZ	165	405.1250MHZ	65
3	410.1250MHZ	160	410.1250MHZ	65
4	415.1250MHZ	155	415.1250MHZ	65
5	420.1250MHZ	150	420.1250MHZ	65
6	425.1250MHZ	145	425.1250MHZ	65
7	430.1250MHZ	140	430.1250MHZ	65
8	435.1250MHZ	135	435.1250MHZ	65
9	436.1250MHZ	130	436.1250MHZ	65
10	440.1250MHZ	130	440.1250MHZ	65
11	445.1250MHZ	125	445.1250MHZ	65
12	450.125MHZ	120	450.1250MHZ	65
13	455.1250MHZ	115	455.1250MHZ	65
14	460.1250MHZ	110	460.1250MHZ	65
15	465.1250MHZ	105	465.1250MHZ	65
16	469.9750MHZ	100	469.9750MHZ	65

From above diagram ,TX Turning Value is base on 5W normal output power,please refer to The Manual of FC-301/D Program Software if you need other Turning value base on other output power.

EXPLODED VIEW & PARTS LIST



ITEM #	NAME	QUANTITY	DESCRIPTION
1	Label	1	self-adhesive paper
2	Front crust	1	stainless steel
3	Interphase connection board	1	Standard component
4	Plug-In unit	1	Standard component
5	PCB board	1	Standard component
6	Shielding case	1	Tinplate (nickel plating)
7	Shielding case B	1	Tinplate (nickel plating)
8	Shielding case C	1	Tinplate(nickel plating)
9	Cold sink	1	aluminum sheet
10	Back crust	1	Standard component
11	Screw	4	Standard component
12	Screw for DB9	2	stainless steel
13	Cooper pillar	6	stainless steel
14	Antenna connector	1	Standard component
15	Antenna spacer	1	Standard component
16	DB9 connector	1	Standard component
17	Shielding case D	1	Tinplate (nickel plating)
18	Cold silica gel	2	silica gel
19	IC module	1	Standard component