

**OPERATOR'S MANUAL**  
**BASE TECH III BASE/REPEATER STATION**  
**P25/ANALOG**



December, 2006

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**Attention: The antenna(s) used for this transmitter must be fixed-mounted on outdoor permanent structures with a separation distance of at least 6 meters from all persons during normal operation. The peak conducted output power at each antenna terminal must not exceed 250 Watts and the peak radiated output power must not exceed 1000 Watts EIPR. Users and installers must ensure that FCC requirements for satisfying RF exposure compliance are met. (See FCC Rules Part 1, Sections 1307 and 1310)**

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## 1) LCD Display

LCD display consists of 4 x 20 characters as shown.

Line 1 : Incoming RSSI with 10 steps

Line 2: Output power levels with 10 steps

Line 3: Left 4 letters show Channel Numbers. Middle 8 letters show channel name (if not programmed, shows blank).

Right 4 letters show status of the radio.

1/ RX mode : M= Mix, both analog and digital can be received

D= Only digital can be received.

2/ TX mode: D=PTT digital transmission


A=PTT analog transmission


3/ Monitor mode: X= Monitor off

S= Selective squelch

4/ P-25 squelch: N= Normal squelch

S= Selective squelch

5/ Key lock mode:  =Key lock

6/ Shift mode:  Depressing the SHIFT KEY (back to normal after 2 seconds)

Line 4 : Left 2 letters .show GROUP CALL, ALL CALL, INDIVIDUAL CALL.

Right 18 letters show GROUP NAME, INDIVIDUAL NUMBERS, ETC.

	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
1	RX	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
2	TX	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	▶	▶
3	C001	Channel																		
4	GP	500																		

## 2) LED Display

BASE TECH III has 5 LED's, from the left ;

DIGI= LED on when receiving digital signal

REP= LED on when repeat mode. BASE TECH III can be programmed

SIMPLEX -SEMIDUPLEX - DUPLEX- REPEATER on a per channel basis

ALM= LED flashing on when an error on either TX or RX occurs

TX= LED on when in Transmit

BUSY= LED on when carrier is present

### 3) Key controls

#### a/ Key entry without SHIFT key

0-9 : channel numbers and individual call address (target address)

A: P-25 calls (Group call, All call, Individual call)

B: The beginning and the end of individual call number

C: No function

D= P-25 mode (analog or digital)

\*= Cancel channel number, individual number

#= Ending channel number, individual number

CH= Channel number entry, depress CH, then 0-9 for channels

F(Scan)= No function

MON= monitor ON or OFF '

Rotary knob: Volume, Squelch, Back Light Dimmer level

#### b/ Key entry following to SHIFT key

0= P-25 test mode start and finish

1=back light ON/OFF

2=Tx power Hi/LOW

3=No function

4=No function

5=No function

6=No function

7=Indicating channel data

8=Key lock ON/OFF

9=No function

A= No function

B= No function

C= No function

D= No function

\*= Indicating P-25 data

#=No function

CH= Toggle Bar-Graph ON/OFF

F(scan)= No function

MON=P-25 squelch. normal or selective squelch

#### 4) Programming

Base Tech III can be programmed through PC at anytime when RX mode. Programming is not possible while Base Tech III in key entry.

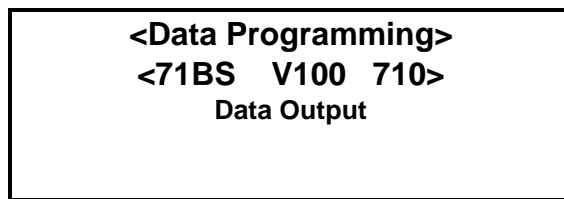
When programming is started, the LCD indicates as shown.

Figure-1 shows Data from radio to PC,

Figure-2 shows Data from PC to radio.

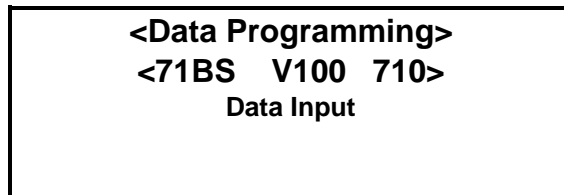
If the program software is not communicating properly, the radio will re-write again and again (endless). When this happens, keep depressing SHIFT and switch on the radio. Then the radio will recover.

Figure-3 shows display when SHIFT+ POWER switch on.



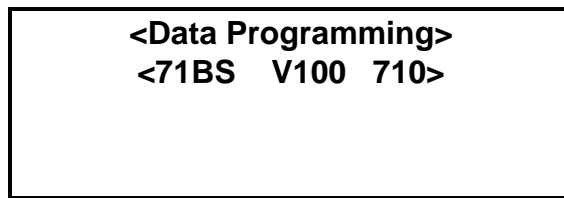
**<Data Programming>**  
**<71BS V100 710>**  
**Data Output**

Figure 1.



**<Data Programming>**  
**<71BS V100 710>**  
**Data Input**

Figure 2.



**<Data Programming>**  
**<71BS V100 710>**

Figure 3.

5) Volume control

Push rotary knob, and then rotating the knob. Volume level varies from VOL-0 to VOL-34.

Figure 4 shows VOL-12 level

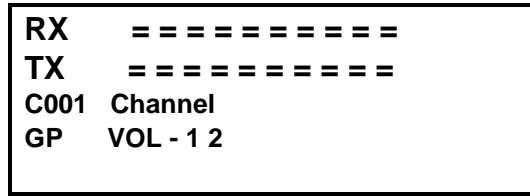


Figure 4.

6) Squelch control

Push rotary knob to select Squelch. Squelch level varies from SQL-1 to SQL-15.

Figure-5 shows SQL-9 level

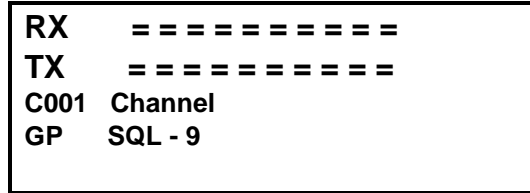


Figure 5.

7) LCD backlight dimmer

Push rotary knob to select DIM. Dimmer level varies from DIM-0 to DIM-15. DIM-0 is the most darkest.

Figure-6 shows DIM-5 level

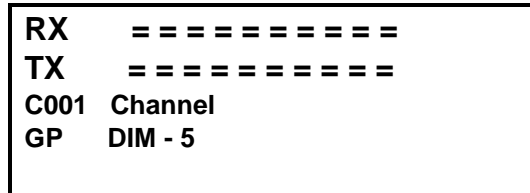


Figure 6

### 8) Channel Selection

BASE TECH III has capability of up to 500 channels. Press CH, and then 0-9 key for channel numbers Example:-1 CH-8

CH + 0 + 0 + 8 or CH + 8 + #

Example-2 CH-500

CH + 5 + 0 + 0

### 9) P-25 Squelch control

Press SHIFT then MON to choose P-25 squelch mode.

Normal SQ= If NAC is the same, then receiver will unmute

Selective SQ= If NAC and GROUP is the same, then receiver will unmute

If radio is called with the correct individual number, then radio will unmute.

Figure-7 shows Normal SQ,

Figure-8 shows Selective SQ

<b>RX</b>			
<b>TX</b>			
<b>C001</b>	<b>Channel</b>		<b>MDXN</b>
<b>GP</b>	<b>Normal</b>	<b>SQL</b>	

Figure 7.

<b>RX</b>			
<b>TX</b>			
<b>C001</b>	<b>Channel</b>		<b>MDXN</b>
<b>GP</b>	<b>Selective</b>	<b>SQL</b>	

Figure 8



10) P-25 PTT mode

Press D to select PTT mode.

When PTT= analog, PTT transmits analog

When PTT= digital, PTT transmits digital;

Figure-9 shows Analog

Figure-10 shows Digital

<b>RX</b>		
<b>TX</b>		
<b>C001</b>	<b>Channel</b>	<b>MAXN</b>
<b>GP</b>	<b>PTT is Analog</b>	

Figure 9

<b>RX</b>		
<b>TX</b>		
<b>C001</b>	<b>Channel</b>	<b>MDXN</b>
<b>GP</b>	<b>PTT is Digital</b>	

Figure 10

11) P-25 Calling selection

Press A to select GP= group call, AL= all call, ID= individual call

Figure-11 shows group call 500=TGID (talk group ID)

Figure-12 show all call, 65535=all call group TGID

Figure-13 shows individual call

<b>RX</b>		
<b>TX</b>		
<b>C001</b>	<b>Channel</b>	<b>MDXN</b>
<b>GP</b>	<b>500</b>	

Figure 11

<b>RX</b>		
<b>TX</b>		
<b>C001</b>	<b>Channel</b>	<b>MDXN</b>
<b>AL</b>	<b>65535</b>	

Figure 12.

<b>RX</b>		
<b>TX</b>		
<b>C001</b>	<b>Channel</b>	<b>MDXN</b>
<b>ID</b>	<b>-----</b>	

Figure13

12) Individual call (target call)

This function works only selected Individual call in Para-11

Press B, and enter 0-9 for individual numbers.

Press B or # to complete entry.

To clear, press \* to erase the last entry.

Figure-14 shows to start entry, pressing B

Figure-15 shows to complete entry, 1 +2+3+4+5+B

```
RX
TX
C001 Channel MDXN
ID  _
```

Figure 14.

```
RX
TX
C001 Channel MDXN
ID  1 2 3 4 5
```

Figure 15.

13) Group name


If GP is selected, TGID name is indicated (Max 8 characters)

Figure-16 shows POLICE for TGID name

```
RX
TX
C001 Channel MDXN
GP  P O L I C E
```

Figure 16

#### 14) Key lock

SHIFT+8 = Key lock. This symbol  shows on LCD  
However, PTT, MON and SHIFT key are not locked.  
If you need to lock these 3 keys, then you may select in Programming software as DISABLE. If the station is to be remotely controlled it is recommended to leave PTT enabled, Remote PTT will not work when PTT is locked.  
To release key lock, press SHIFT+ 8 again.  
Figure-17 shows key locked  
Figure-18 shows key unlocked

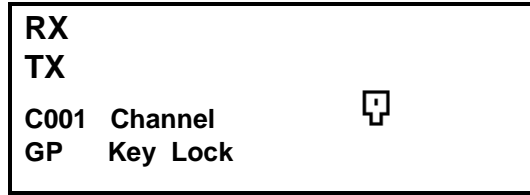


Figure 17

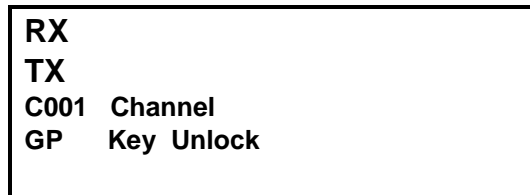


Figure 18

#### 15) Channel status data

Press SHIFT+7 shows the following modes, every 1.5 seconds to check modes when 7 is depressed.

1/ Rx width (narrow/wide/4khz)

2/ TX width (narrow/wide/4KHz)

3/ Base mode (Simplex/Semi-duplex/Duplex/Repeater)

4/ Rx CTCSS/DCS, CTCSS and DCS are used in Rx

5/ TX CTCSS/DCS, CTCSS and DCS are used in TX However, these functions must be enabled in software at MISCELLANEOUS menu; INFORMATION DISPLAY-ENABLE

Figure-19 shows SHIFT+ 7 indicating narrow channel.

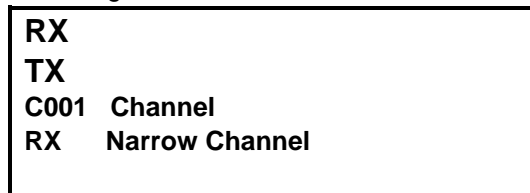


Figure 19

16) P-25 Status data

Press SHIFT+\* shows the following modes, every 1.5 seconds to move when \* is depressed.

1/ Unit ID (source address)

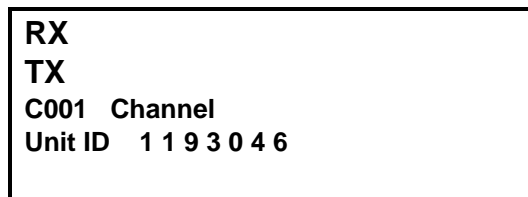
2/ RX NAC

3/ TX-NAC

4/ TGID

However, these functions must be enabled in software at MISCELLANEOUS menu; INFORMATION DISPLAY-ENABLE

Figure 20 shows SHIFT+\* indicating Unit ID code



**RX  
TX  
C001 Channel  
Unit ID 1 1 9 3 0 4 6**

Figure 20

17) Bar Graph/ Channel Display

Press SHIFT+CH to eliminate bar graph. In turn, current working frequencies are shown on LCD.

Press SHIFT + CH to toggle back

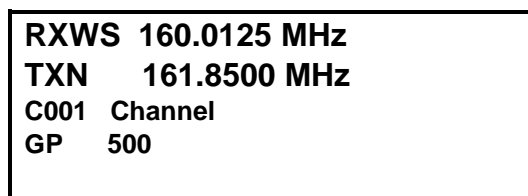
Figure-21 shows SHIFT+CH to indicate TX and RX frequencies.

“RXWS” indicates RX is Wide band, Simplex mode and “TXN” indicates TX is Narrow band

The 3<sup>rd</sup> character indicate Wide band or Narrow band operation.

The 4<sup>th</sup> character on line 1 is as follows: “S” = Simplex Mode; “H” = Semi duplex Mode;

“D” = Duplex mode; “R” = Repeat Mode



**RXWS 160.0125 MHz  
TXN 161.8500 MHz  
C001 Channel  
GP 500**

Figure 21

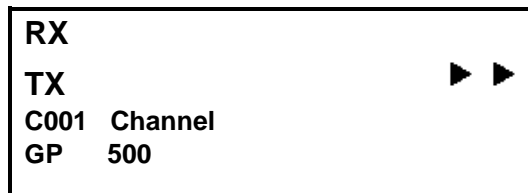
18) LCD back light hold

By Default, back light illuminates for 5 seconds after any key press then goes out. Press SHIFT +1 for back light hold. Press SHIFT+ 1 again to be back normal. Figure-below shows back light turns on.



19) Changing TX power

Press SHIFT+2 to select High and Low TX power. ▶▶ shows high power. If the radios are pre-programmed Hi-Lo power with programming soft, SHIFT+2 overcomes this pre-program level. Figure-below shows Hi power with SHIFT+2.



20) Caller ID

BASE TECH III indicates caller's Unit ID or Individual ID. However if the radio is programmed as repeater mode, these caller's ID are not displayed. Figure-below shows caller's ID 12345.



21) Emergency call reception

In the 4th line of the LCD shows EMG when emergency received. LCD back light is flashing and audible tone out from speaker. Figure-below shows Emergency caller's ID 98765.



22) Repeater mode

BASE TECH III repeats automatically when programmed as a repeater.

a) Rx mode = digital

Repeats only the same NAC code. If the NAC is \$F7F, all incoming signals are repeated. .

Repeating shuts automatically after 0.0-9.9 seconds if no incoming signal is detected (Hang Timer -programmable).

b) Rx mode = Mix

In addition with above conditions, radio repeats the correct CTCSS, DCS are detected, or only the carrier as well.

Radio can not repeat analog and digital at the same time.

23) Remote control

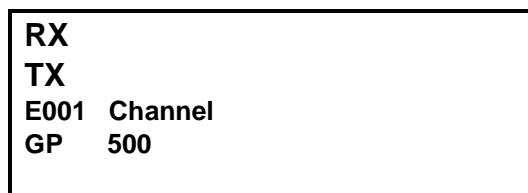
BASE TECH III can be controlled by remotely. Pull the EXT/CH at low level, radio works as remote mode.

To recover normal mode, EXT/CH set at HI. Please note the maximum channels through remote control is up to 16 channels.

CHO – CH3 : all low .. . CH-1

CHO – CH3 : all high.....CH-16

Figure-below shows CH –1 in remote control mode. The 3rd line shows E001 instead of C001 (EXXX means remote, CXXX is Local Mode)



24) P-25 Test mode

Press SHIFT+ 0 to move test mode. The table for test mode are;

- 1/ Standard transmitter test pattern
- 2/ Standard transmitter symbol rate pattern
- 3/ Standard transmitter low deviation pattern
- 4/ Standard transmitter C4FM modulation fidelity pattern
- 5/ Standard tone test pattern

Press the PTT to transmit above patterns. To change patterns, press key 1-5.

Figure-23 shows test mode, LCD indicates from 1 to 5 alternatively.

Figure-24 show Symbol rate

Figure-25 shows Low deviation(CTCSS/DCS)

Figure-26 shows C4FM

Figure-27 shows Tone test

At Tone test, indicates Rx error bit rate in %

Figure-28 shows error rate 45%

Figure-29 shows back to 1 mode.

<p style="text-align: center;"><b>&lt;P 25 Test Mode&gt;</b> <b>Test Pattern</b> <b>C0001 Channel</b></p>
-------------------------------------------------------------------------------------------------------------------

Figure 23

<p style="text-align: center;"><b>&lt;P 25 Test Mode&gt;</b> <b>Symbolic Rate</b> <b>C0001 Channel</b></p>
--------------------------------------------------------------------------------------------------------------------

Figure 24

<p style="text-align: center;"><b>&lt;P 25 Test Mode&gt;</b> <b>Low Deviation</b> <b>C0001 Channel</b></p>
--------------------------------------------------------------------------------------------------------------------

Figure 25



**<P 25 Test Mode>  
C4FM modulation  
C0001 Channel**

Figure 26

**<P 25 Test Mode>  
Tone Test  
C0001 Channel**

Figure 27

**<P 25 Test Mode>  
Tone Test  
C0001 Channel  
Error Rate 45%**

Figure 28

**<P 25 Test Mode>  
Test Pattern  
C0001 Channel**

Figure 29

25) Adjust mode

Ground the TP-2 on the analog logic board, and switch on the radio. Then the following parameters are adjustable. TXW or TXN will be displayed on line 2 (for Wide or Narrow TX)

1/ RX 0 dbm Out.. Rx 0dBm output level

2/ RX FX828 MOD-1... Deviation level at the repeater mode (analog) (Currently not active)

3/ TX DIGITAL DEVI... Deviation level (digital)

4/ TX ANALOG DEVI... Deviation level (analog)

Press A and B to adjust the level, and # key for changing mode.

Cycle power to radio to return to the normal mode.

Figure-30 shows adjust mode RX 0dbm Out

Figure-31 shows RX MOD-1 (Currently not active)

Figure-32 shows TX MOD-Digital

Figure-33 shows TX MOD-Analog

```
      <Adjust Mode>
TXW  RX 0dbm Out
C0001  2 5 / 3 1
```

Figure 30

```
      <Adjust Mode>
TXW  FX828 MOD1
C0001  0 / 3 1
```

Figure 31

```
      <Adjust Mode>
TXW  DIGITAL DEVI
C0001  15 / 3 1
```

Figure 32

```
      <Adjust Mode>
TXW  ANALOG DEVI
C0001  1 5 / 3 1
```

Figure 33

26) Key test

Keep depressing C and switch on the radio, then radio comes to Key test mode.  
Figure-34 shows key test mode

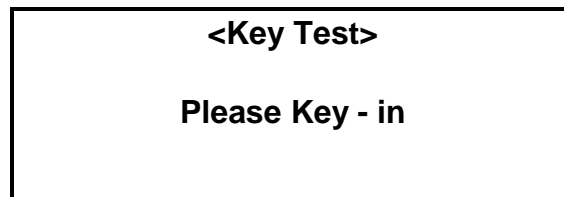


Figure 34

Then depress any key to test.

Figure-35 shows CH key depressed.

Figure-36 shows rotary switch turn clockwise

Figure-37 shows rotary switch turn counter-clockwise

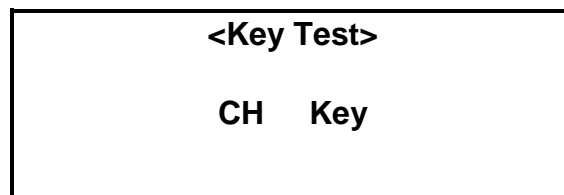


Figure 35

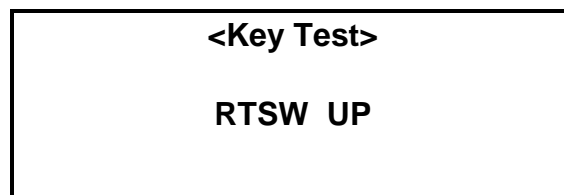


Figure 36

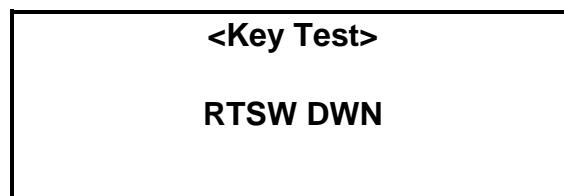


Figure 37

27) Displaying firmware version

Both firmware and DSP soft version are indicated on LCD after the radio switch on for 2 seconds.

Figure-38 shows when “no start message” is programmed

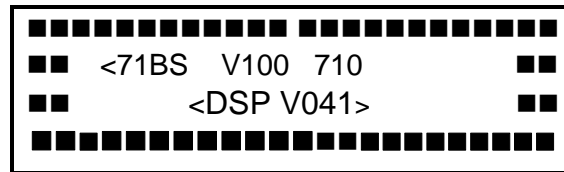


Figure 38

Figure-39 shows start message “Your Messag Here” is programmed

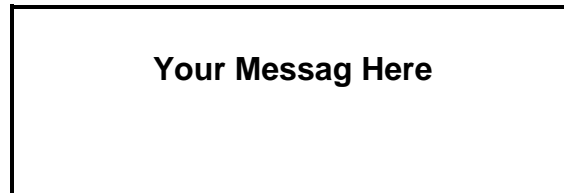


Figure 39

28) Displaying serial number

Press D and switch on the radio, the serial number is indicated. (max 8 digits). Releasing D key, the radio starts normally.

Figure-40 shows KY0000329 serial number

r

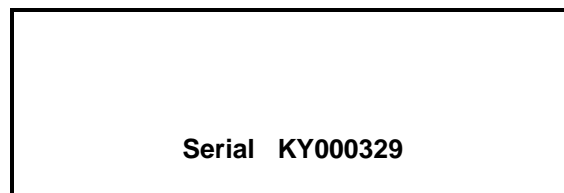


Figure 40

29) Displaying Program software version

Keep pressing A and turn on the radio, then programming soft version is indicated. Releasing A key to start radio normally.

Figure-41 shows V-1.00 version

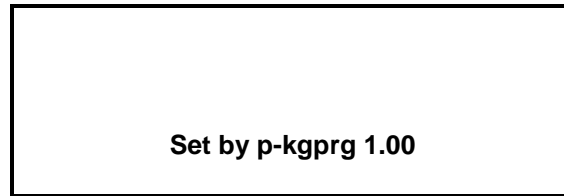


Figure 41

30) Data check

BASE TECH III has self diagnostic function. All data in EEROM is checked every time the radio is switched on. If the data is not properly stored, radio automatically turns to programming mode

Figure-42 shows EROM error

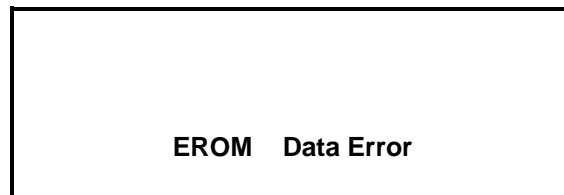


Figure 42

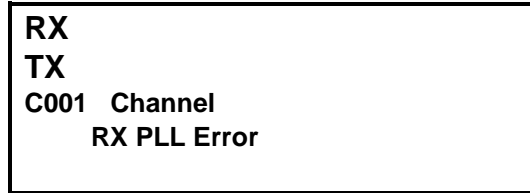
31) Error Displays

Either RX PLL, TX PLL or PA power is defective, then ALM LED flashes on and indicates which unit becomes faulty.

Figure-43 shows RX PLL error, Note this may be displayed in REM mode if the remote channel lines are open or a channel is selected remotely that is not programmed. (EXXX will be displayed instead of CXXX, where XXX is the channel number.)

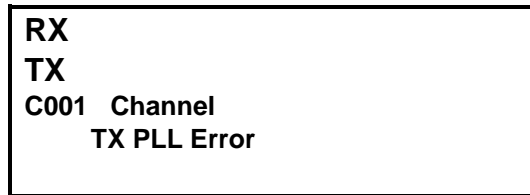
Figure-44 shows TX PLL error

Figure-45 shows PA error



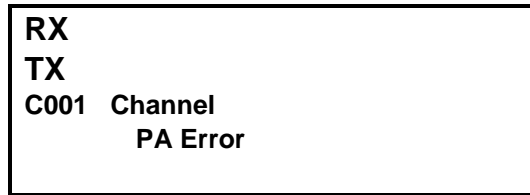
**RX**  
**TX**  
**C001 Channel**  
**RX PLL Error**

Figure 43



**RX**  
**TX**  
**C001 Channel**  
**TX PLL Error**

Figure 44



**RX**  
**TX**  
**C001 Channel**  
**PA Error**

Figure 45

32) Firmware error detection

When the radio itself detects malfunction, the main CPU will restart automatically.

33) RS232 error detection

If the communications between PC and the radio have trouble, the following message are shown on the LCD.

- 1/ Over run error
- 2/ Framing error
- 3/ Parity error
- 4/ Unknown command
- 5/ Data unmatched
- 6/ Send error
- 7/ Answer timeout
- 8/ Receive timeout

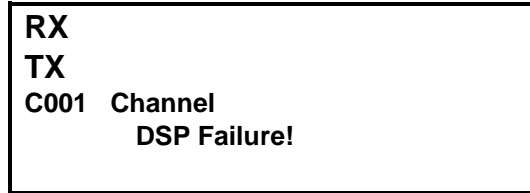
34) DSP error detection

When DSP does not work properly, the following message are shown on the LCD. Please check DSP board is firmly connected, or replacing the DSP board.

Figure-46 shows DSP failure

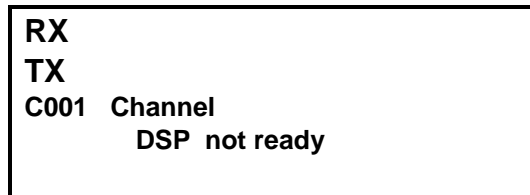
Figure-47 shows DSP not ready

Figure-48 shows DSP serial error



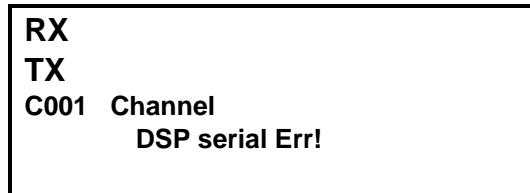
**RX**  
**TX**  
**C001 Channel**  
**DSP Failure!**

Figure 46



**RX**  
**TX**  
**C001 Channel**  
**DSP not ready**

Figure 47



**RX**  
**TX**  
**C001 Channel**  
**DSP serial Err!**

Figure 48



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