MIDLAND®
RADIO CORPORATION

Operations Manual for the P25
Base Tech III Base/Repeater Station

DIGITAL • DIGITAL WIRELESS • SANS FIL NUMERIQUE • INALÁMBRICO DIGITAL
P25

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Version 6
680-090-2042

www.midlandradio.com

Introduction

We thank you for choosing the Midland P25 Base Tech III Base/Repeater Station to meet your communication needs. Properly used, this product will give you many years of reliable service. To get the most out of your purchase, be sure to carefully read this manual before operating the radio.

The overall operation of this radio depends entirely on how it has been programmed. If it is not functioning as desired, please check the programming first.

This manual covers up to firmware version 71BS299 and 71CPV012 (early versions) and 71MD/ 71CSCM (Low Current/ Late versions)

If you should need Midland Technical Support, please call 1-816-462-0463 or lmrservice@midlandradio.com

Other useful Midland numbers;
Main Line- 816-241-8500
Main Fax- 816-241-5713
LMR Sales- 816-462-0462
Credit Dept- 816-462-0464
Technical Support and Engineering Fax- 816-241-3272
Warranty Service- 816-462-0438

We welcome any comments on how we may improve our products to better server our customers.

WARNING: 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)

NOTICE: The AMBE+2 ™ voice coding Technology embodied in this product is protected by intellectual property rights including patent rights, copyrights and trade secrets of Digital Voice Systems, Inc. This voice coding Technology is licensed solely for use within this Communications Equipment. The user of this Technology is explicitly prohibited from attempting to extract, remove, decompile, reverse engineer or disassemble the Object Code, or in any other way convert the Object Code into a human readable form. U.S. Patents Nos. #5,870,405, #5,826,222, #5,754,974 #5,701,390, #5,715,365, #5,649,050, #5,630,011, #5,581,656, #5,517,511, #5,491,772, #5,247,579, #5,226,084 and #5,195,166.

Table of Contents

1. LCD DISPLAY

LCD display consists of 4 x 20 characters as shown.

Line 1: The Incoming RSSI with 10 steps

Line 2: The output power levels with 10 steps

Line 3: The left 4 letters show channel numbers. The middle 8 letters shows the channel name (if not programmed, it will be blank).

The right 4 letters displays the status of the radio as described below.

a. RX mode: **A=** Only Analog can be received
M= Mix, both analog and digital can be received
D= Only digital can be received.

b. TX mode: **D**=PTT digital transmission
A=PTT analog transmission

c. . Monitor mode: ☒= Monitor off

d. P-25 squelch: **N=** Normal squelch
S= Selective squelch

Remaining symbols are:

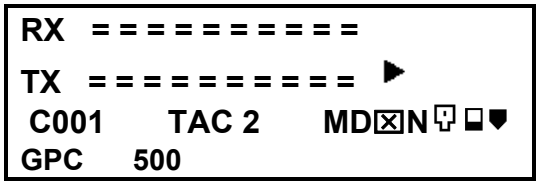
Key lock mode: =Key lock ON (*Not displayed if in Low Voltage alarm)*

Low Voltage Icon: = Low Voltage state (*Icon flashes with ALM LED)*

Shift mode: SHIFT KEY ICON (reverts to normal within 2 seconds)

Line 4: The left 2-3 letters show GPC (GROUP CALL), AC (ALL CALL), IC (INDIVIDUAL CALL).

The right 18 letters displays the GROUP NAME, INDIVIDUAL NUMBERS, ETC.



2. LED DISPLAY

The Midland Base Tech III has 5 LED's

From left to right;

DIGI= The LED is on when receiving a digital signal

REP= The LED is on when in repeat mode.

(The BASE TECH III can be programmed for, SIMPLEX -SEMIDUPLEX - DUPLEX- REPEATER on a per channel basis.)

ALM= The LED flashes when an error on either TX, RX, PA or Low Voltage occurs

TX= The LED is on when in Transmit

BUSY= The LED is on when receiving a signal (carrier present).

3. KEY CONTROLS

3.1 Key entry ***without*** SHIFT key

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

A = P-25 calls (*Group Call, All Call, and Individual Call*)

B = The beginning and the end of individual call number

C = TX Transmit mode (Clear or Secure), ***only models with encryption firmware***.

D = P-25 mode (*analog or digital TX*)

* = Cancel channel number, individual number

= Ending channel number, individual number

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

F = P25 Conventional Control Messages (*SBC*)

MON= Monitor toggle ON or OFF

Rotary knob= ***(early firmware)*** Volume, Squelch, Back Light Dimmer and Timer
(late firmware) Volume, Squelch, Back Light Dimmer, Light Timer and Site Monitor Timer

3.2 Key entry ***following*** SHIFT key

0= P-25 test mode start and finish

1=Backlight ON/OFF

2=TX power Hi/LOW

3=Talk around ON/OFF

4= Encryption key info ***only models with encryption firmware***

5= Encryption key info ***only models with encryption firmware***

6= Journal on/off ***(BS/ CPV/ MD firmware)***/
= NAC Steer/ Base Station Toggle ***(CSCM firmware)***

7=Indicates Analog channel data (*while depressed*)

8=Key lock ON/OFF

9=No function

A=Manual CWID send key

B=Programmed CWID Start/Stop key

C= Cryptogram Test ***only models with encryption firmware***

D= RX Mode (Analog/ Mixed/ Digital)

*= Indicating P-25 data (*while depressed*)

#= DTMF Entry

CH= Toggle Bar-Graph or TX RX Frequencies

F= SBC (Conventional Control Messages) Mode / Emergency Call

MON = P-25 squelch normal or selective and analog MONITOR modes.

4. PROGRAMMING

The Midland Base Tech III must be programmed with Windows 2000, XP, Vista or Windows 7 operating system.

The 91-1480CD software and 91-1303B programming cable are required to program the radio and are available through your Midland dealer or LMR Sales Department.

Note: During actual data transfer the radio will not operate but should be complete within 30 seconds or less.

5. CONTROL KNOB

5.1 VOLUME

Rotate the knob to change the volume level.

The volume level varies from 0 to 34. If the local speaker is active, the audible beep level will change as the knob is rotated.

Figure 3 shows the Volume at level 12

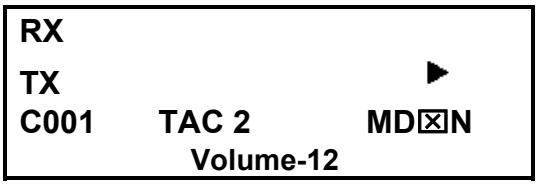


Figure 3

5.2 SQUELCH CONTROL

Push the rotary knob once to select the squelch level and then turn the knob to vary the level from 0 to 15. 0 is open squelch.
Figure-4 shows the Squelch at level 6

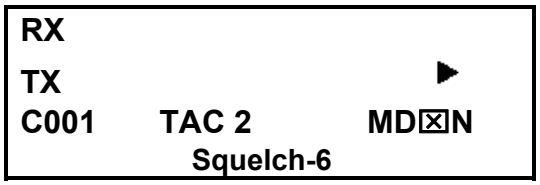


Figure 4

5.3 LCD BACKLIGHT DIMMER

Push the rotary knob twice to select the dimmer level and then turn the knob to select a level from 0 to 15, 0 is the darkest.
Figure-5 shows the Dimmer at level 5

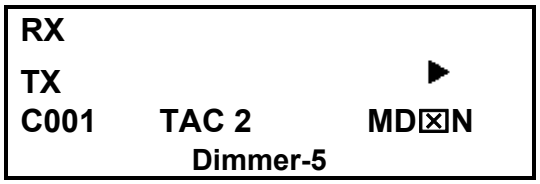


Figure 5

5.4 LCD BACKLIGHT TIMER

Push the rotary knob three times to adjust the Backlight Timer. The Time varies from 0 to 30 seconds. This function is inactive when the Backlight has been turned on with SHIFT + 1 (Backlight ON/OFF).
Figure-6 shows the Backlight Timer set for 15 seconds

Figure 6

5.5 ST MONI TIMER (MD/ CSCM firmware only)

Push the rotary knob four times to adjust the Site Monitor Timer. The Time varies from NON USE to 900 seconds in 30 second increments. ***This function is still in development and should be left in the NON-USE position.***
Figure-7 shows the ST MONI set for NON USE

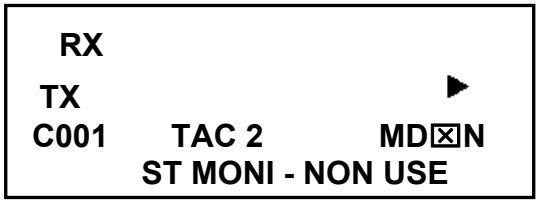


Figure 7

6. CHANNEL SELECTION

The Midland Base Tech III has capability of up to 500 channels.

Press CH, and then enter the channel number. Then end with "#" or wait 2 seconds for channel change to complete.

Example-1 CH-8; *Press* CH + 0 + 0 + 8 or CH +8 + #

Example-2 CH-500; *Press* CH + 5 + 0 + 0

Example-3 Increment: *Press CH + A + #*

Each "A" press will increment one channel after "CH", within 2 seconds.

Example-4 Decrement: *Press CH + B + #*

Each "B" press will decrement one channel after "CH", within 2 seconds.

7. P-25 CALLING SELECTION *(Digital Base Mode Only)*

Press and release A repeatedly to scroll through the menu

Radio displays **GPC 00001= Group 1 Call,**

GPC everygroup= All Call,

IDC--------- = Individual Call

Figure-8 Shows Talk Group Identification (*TGID*), Group 1 Call

Figure-9 shows an All Call (*everygroup*), to everygroup on the same NAC

Figure-10 Shows an Individual Call, to and individual unit ID on the same NAC.

(*Refer to Section 11, Figure 11 and 12 for ID entry*).

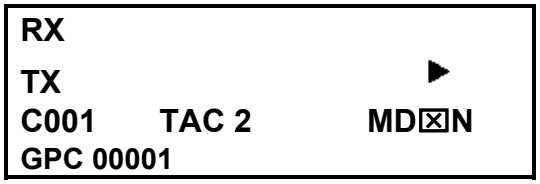


Figure 8

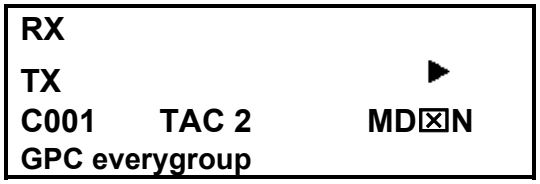


Figure 9

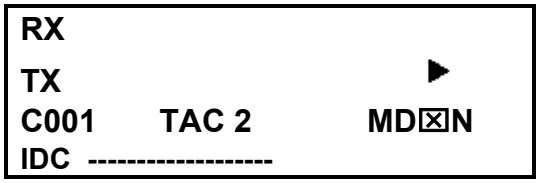


Figure 10

7.1 INDIVIDUAL CALL ENTRY *(Digital Base Mode Only)*

Press and release A repeatedly until IDC----- is displayed.
Press B, and enter the numerical Unit ID.
To deleted a digit, *Press the star (*) key*
Press B or # to complete entry.

Figure-11 shows entry start, when B is pressed
Figure-12 shows completed entry, 1 + 2 + 3 + 4 + 5 + B

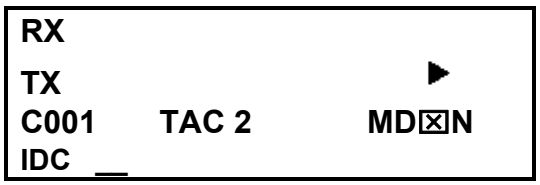


Figure 11

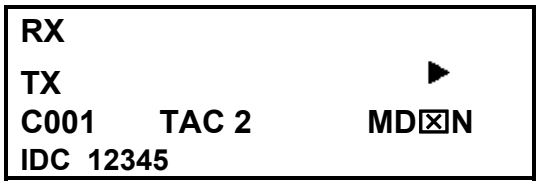


Figure 12

8. P-25 PTT & RX MODE

8.1 P25 PTT MODE

Press D to select PTT (*Push-To-Talk*), mode.

When the display shows **PTT is Analog**, the radio transmits in analog mode.

When the display shows **PTT is Digital**, the radio transmits in digital mode.

Figure-13 Shows Analog

Figure-14 Shows Digital

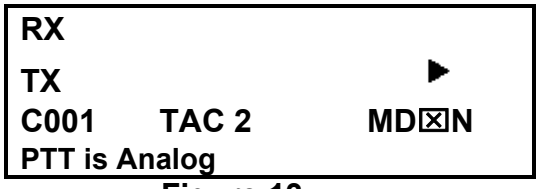


Figure 13

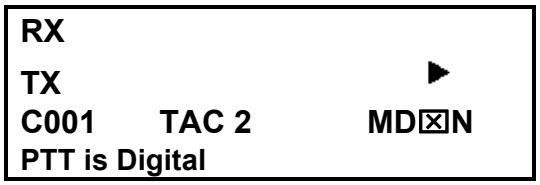


Figure 14

8.2. P-25 RECEIVE MODE

Press SHIFT + D to select Receive mode.

When the display shows **RX is Analog,** the radio receives only in analog mode.

When the display shows **RX is Digital**, the radio receives only in digital mode.

When the display shows **RX is Mix**, the radio receives in either analog or digital mode.

Figure-15 Shows Analog

Figure-16 Shows Digital

Figure-17 Shows Mix Mode

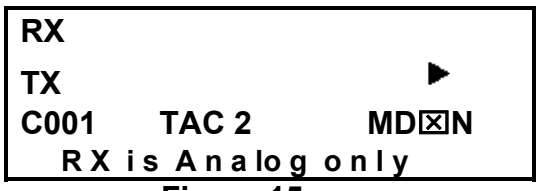


Figure 15

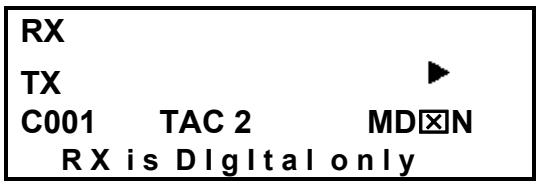


Figure 16

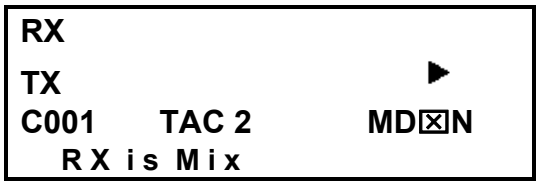


Figure 17

9. P25 CONVENTIONAL CONTROL SIGNALLING (*SBC*)

(Digital Base Mode Only)

Please note: SBC functions are selectable in the Programming Software. The Base Tech III has been developed to work with any P25 radio under the TIA specifications. However not all subscriber radios have the capability of these functions.

9.1 EMERGENCY MODE TX-

Press and hold the F key to send an EMERGENCY call. (*Note: The radio will transmit on the* ***programmed*** *EMERGENCY channel not necessarily the channel that appears on the display.)*

Reboot the radio to clear the Emergency Alert.

EMERGENCY MODE RX-

To clear a received Emergency call, *Press and release F* twice.

***Press F* to enter the SBC mode.**

Key functions after entering menu selection;

Press A for the next and *B* for the previous menu item.

C stops transmission (The radio transmits the SBC 4 times until acknowledged.)

D moves the cursor between items within the selection.

***** deletes the last digit.

transmits the selected SBC mode.

Please Note: When the radio is in SBC mode, it can receive Group calls, All Call and Individual calls but no source address (caller unit ID), is displayed.

Emergency calls can be received when in SBC mode but the radio gives priority to Radio Inhibit. Both Emergency and Radio Inhibit are ignored when in SBC transmitting mode.

The radio will revert to normal operation if no key is pressed for 10 seconds.

9.2 CALL ALERT-

To send a Call Alert, *Press F* then *Press A or B* until the selection is displayed, then *enter the target ID* of the radio to alert and *Press #*. If the target radio has received the Call Alert the display should show “ACK” (acknowledgement).
Figure 18 displays a Call Alert ACK

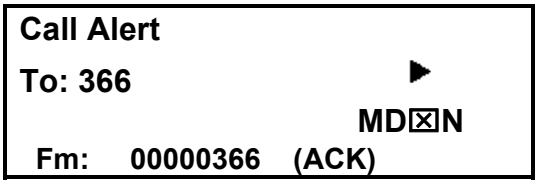


Figure 18

9.3 RADIO CHECK-

The dispatcher can send a message to a subscriber unit requesting a response from the radio (for example, to check if it is in operation).

To initiate a Radio Check, *Press F* then *Press A or B* until the selection is displayed, then *enter the target ID* of the radio to alert and *Press #*. If the target radio has received the Call Alert the display should show “ACK” (acknowledgement).
Figure 19 shows Radio Check Display.

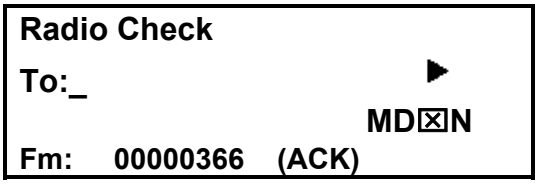


Figure 19

9.4 RADIO INHIBIT-

This function is used to disable a subscriber unit (Mobile or Portable). The subscriber unit cannot be turned on at all until an Uninhibit Command is sent. The password must match the password entered in the BTIII program for inhibit to occur.

To Inhibit a radio, *Press F* then *Press A or B* until the selection is displayed then enter the target radio's ID. *Press D* and enter the programmed password, then *Press #*. The target radio will be totally disabled. If the target radio has received the Call Alert the display should show "ACK" (acknowledgement).
Figure 20 shows the Radio Inhibit entry display.

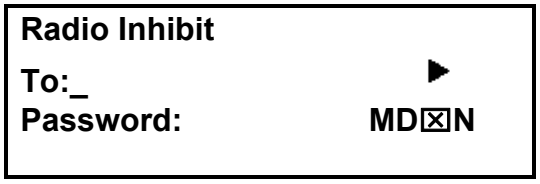


Figure 20

9.5 RADIO UNINHIBIT-

Used to enable a subscriber unit that has been disabled, the password must match the password entered in the BTIII program.

To Un-inhibit a radio, *Press F* then *Press A or B* until the selection is displayed and *enter the target radio's ID*, *enter the password and then Press #*. The target radio will be returned to normal operation. The target radio should send an ACK if successful.

Figure 21 shows the Radio Uninhibit entry mode.

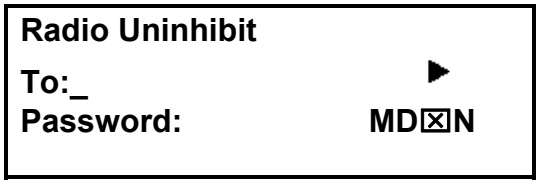


Figure 21

9.6 STATUS UPDATE-

Used to send user status. The status numbers relates to an actual message list. Indicates the User status (0-255) and Unit status (0-255).

To send a Status Update, *Press F* then *Press A or B* until the selection is displayed and *enter the target radio ID*. Then *Press D* and *enter the User (USR), message number, Press D again and enter the Unit number*, then *Press #.* If the target radio has received the Call Alert the display should show “ACK” (acknowledgement).
Figure 22 shows Status Update ready to be sent to 366.

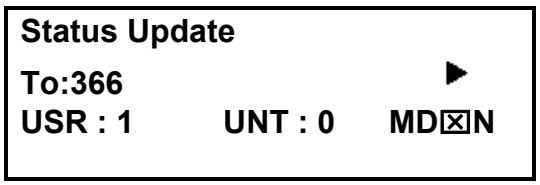


Figure 22

9.7 STATUS REQUEST-

Status Request is used to request the status of another unit. After the request is sent the target unit should respond with the current status. In the example below USR: 2, means the number 2 status message.

To send a Status Request, *Press F* then *Press A or B* until the selection is displayed and *enter the target radio ID* then *Press #.* The target unit should respond with the message number, unit ID and ACK.
Figure 23 shows Status Request received from 366.

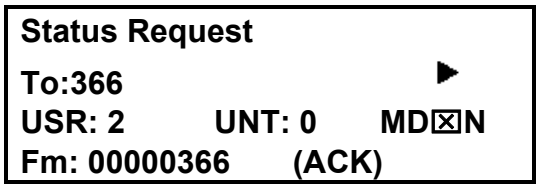


Figure 23

9.8 PREDEFINED MESSAGES-

Is used to send a predefined system message.

To send a Predefined Message, *Press F* then *Press A or B* until the selection is displayed, then *enter the target radio ID*, *Press D* and enter a message number and *Press #*. The target radio should send and ACK if successful.

Figure 24 shows message 2 ready to be sent to 366.

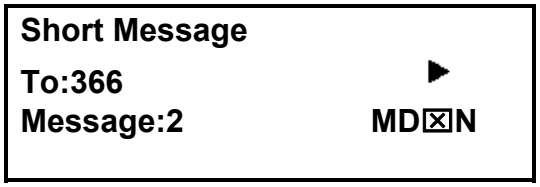


Figure 24

9.9 RADIO MONITOR-

Used to key up a target radio from 10 to 60 seconds and monitor the transmit audio.

To monitor a radio, *Press F* then *Press A or B* until the selection is displayed, then *enter the target radio ID*, *Press D* and enter 1 (10sec),2 (30sec), or 3 (60sec).

Figure 25 shows Radio Monitor request to 366 to transmit for 30 seconds.

Figure 25

9.10 TELEPHONE-

Used to initiate a telephone interconnect request on the RF subsystem.
Press F then *Press A or B* until the selection is displayed, then *enter the complete telephone number* including country and area code. (max. 16 digits)*, then Press #*.
Figure 26 shows the Midland Radio Corporation telephone number.

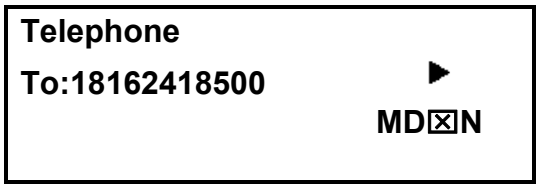


Figure 26

9.11 SBC LOG-

To toggle the SBC LOG ON, *Press SHIFT+F*, to turn the LOG OFF *Press F.*
When the SBC LOG is entered, the last SBC call is displayed. *Press B* to scroll to the previous records and *Press A* to scroll to the end of the list.
The radio will store up to 99 log entries. When more than 99 entries are made the oldest log will be deleted.
Note: When the radio is reset or reprogrammed, all logs are deleted.
Figure 27 shows the fifth entry of the SBC Log.

Figure 27

10. P-25 SQUELCH ADJUSTMENT

Press SHIFT + MON to choose the P-25 squelch mode.

Normal SQL= If NAC is the same, the receiver will unmute

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

Figure-28 Shows Normal SQ

Figure-29 Shows Selective SQ

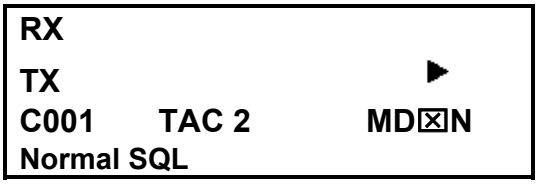


Figure 28

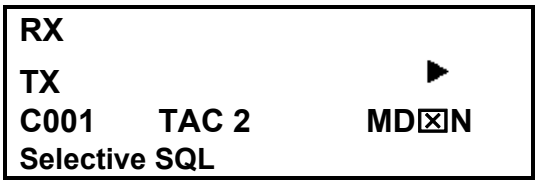


Figure 29

11. TALKGROUP ALIAS ID

When GPC is selected with the “A” key, the TGID alias is indicated as programmed (*Max 8 characters*)

Figure-30 shows POLICE for the TGID alias.

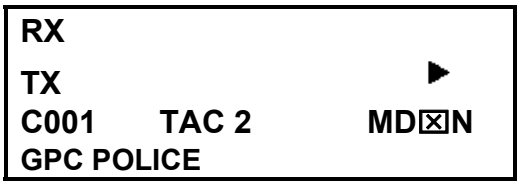


Figure 30

12. KEY-LOCK

Press SHIFT+8 to enable and disable the Key-lock. This symbol shows on the LCD. Key-Lock and Key-Unlock icon is displayed for 2 seconds and then reverts to show the TGID.
The PTT, MON and SHIFT key are not locked
If PTT, MON and SHIFT needs to be locked, select DISABLE in the programming software. 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-31 shows key locked
Figure-32 shows key unlocked

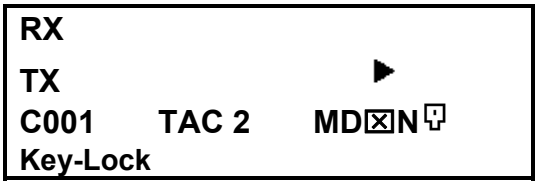


Figure 31

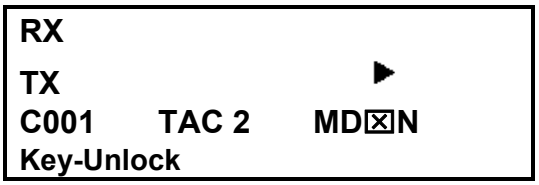


Figure 32

13. MANUAL CWID START AND STOP

Press SHIFT + A to manually send the programmed CWID.

CAUTION: THE TRANSMITTER WILL ENERGIZE IMMEDIATELY WHEN "A" IS PRESSED!

To turn OFF CWID, *Press SHIFT + HOLD B* for 2 seconds
(This disables both programmed and manual CWID)

To return to normal operation, either reboot the radio or
Press SHIFT+ HOLD B for 2 seconds
(*CWID must be enabled in programming to use these functions*).

Figure 33 shows CWID Sending
Figure 34 shows CWID function stop
Figure 35 shows CWID function start

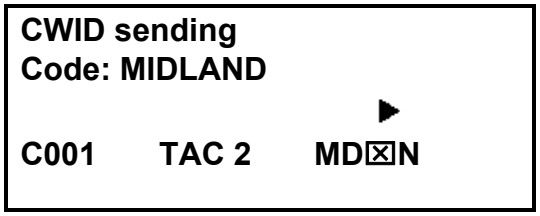


Figure 33

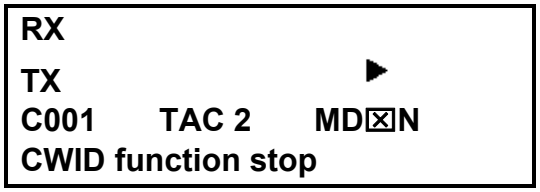


Figure 34

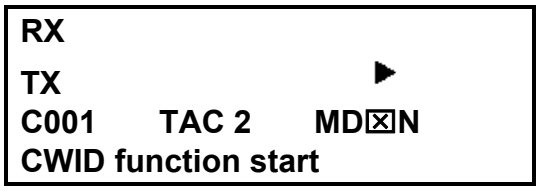


Figure 35

14. DTMF ENCODE

Press SHIFT + # and then enter 0-9, * or # to transmit DTMF.
The DTMF modulation level will be the same as the CWID level.
Figure 36 displays DTMF Encode mode.

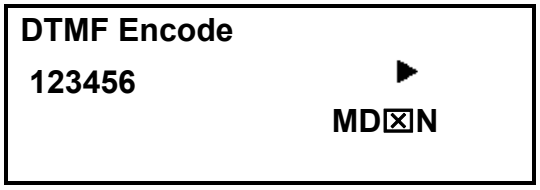


Figure 36

15. ANALOG CHANNEL DATA

Press SHIFT+7 to scroll through the data. 7 must be depressed to scroll.

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

6) TX RX Modulation type either PM or FM (*PM is the default*)

(*The INFORMATION DISPLAY selection in the 91-1480CD* MISCELLANOUS MENU *must be set to ENABLE to display this information.)*

Figure-37 Displays indicates a narrow channel during scroll.

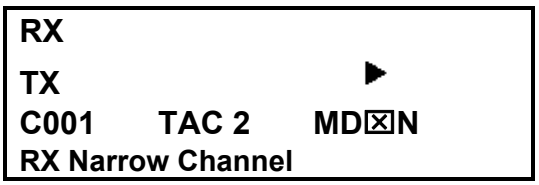


Figure 37

16. P-25 CHANNEL DATA

*Press SHIFT+ **** to scroll through the data, * must be depressed to scroll.

1/ Unit ID (*source address*)
2/ RX NAC
3/ TX-NAC
4/ TGID
5/Emergency Alarm RCV
6/Call Alert RCV
7/ Radio Check RCV
8/ Radio Inhibit RCV
9/ Radio Un-inhibit RCV
10/ Status Update RCV
11/ Status Request RCV
12/ Short Message RCV
13/ Radio Monitor RCV

These functions may be enabled and disabled in the programming software's "MISCELLANEOUS/ INFORMATION DISPLAY" section.

Figure 38 Shows the Unit ID

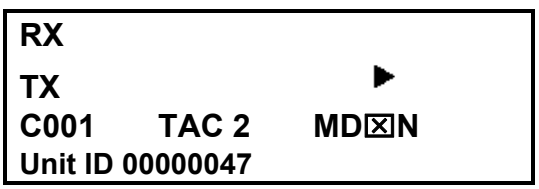


Figure 38

17. BAR GRAPH/CHANNEL DISPLAY

Press SHIFT + CH to eliminate the channel name/bar graph and display the frequencies for TX and RX.

Press SHIFT + CH to toggle back.

Figure-39 Displays the frequencies instead of channel name.

The 1st and 2nd character on line 1 indicates Receive Channel

The 3rd character indicates Wide band

The 4th character indicates Simplex mode.

The modes of operation are: “S” = Simplex, “H” = Semi duplex;
“D” = Duplex and “R” = Repeat

Line 2, “TXN” indicates TX is Narrow band.

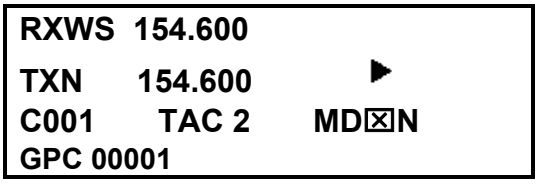


Figure 39

18. LCD BACKLIGHT TOGGLE

By Default, the Backlight illuminates for 30 seconds after any key press then goes out. *Press SHIFT +1* for the backlight to stay on. *Press SHIFT+ 1* again to return to default operation.

Figure-40 Indicates the backlight is ON.

See section 5 for backlight timer settings.

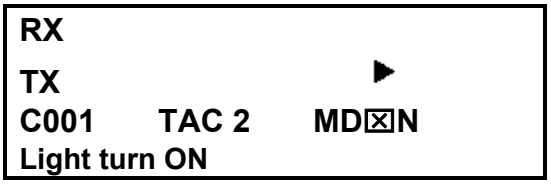


Figure 40

19. CHANGING TX POWER

Press SHIFT+2 to select High or Low TX power. ▶ Indicates high power.

If the radio is programmed for Hi power, the radio can be changed to low power with this function. If the radio is programmed for low power, it cannot be switched to HI power with this function.

The Figure-41 Displays the Hi power symbol.

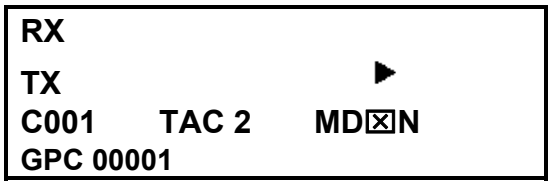


Figure 41

20. CALLER ID

In Simplex mode the Midland Base Tech III display indicates the source Unit ID or Individual ID.

Figure-42 Displays the source ID as 00000366 in group call mode.

Figure-43 Displays the source ID in Individual Call mode.

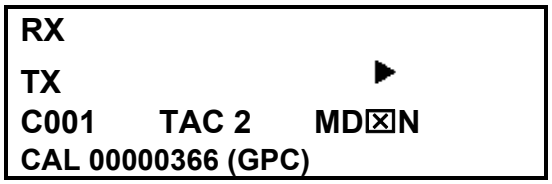


Figure 42

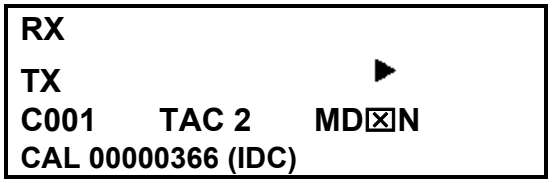


Figure 43

21. EMERGENCY CALL RECEPTION

The 4th line of the LCD shows the Emergency ALM when an emergency call is received. The LCD back light flashes and the audible tone heard from the speaker can be increased or decreased with the volume control. Figure-44 below displays the Emergency Caller's ID 00000366.

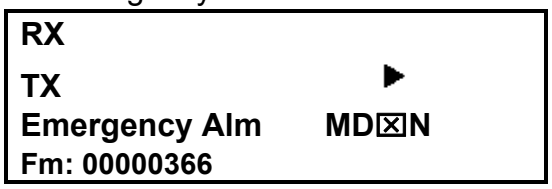


Figure 44

22. REPEAT MODE

21.1 *ANALOG*

If the received CTCSS/DCS matches the programmed CTCSS/DCS, the radio transmits the programmed carrier frequency and CTCSS/DCS. Hang time is programmable (0-9.9sec), through the “Miscellaneous” tab of the 91-1480CD software.

22.2 *DIGITAL*

Matching NAC (Network Access Code);

If the programmed NAC matches the received NAC it allows the radio to repeat. The programmed NAC and TGID (Talk Group Identification), is transmitted.

$F7F in RX NAC

If the RX NAC is $F7F, all incoming signals are repeated with the same NAC and TGID as received.

$F7F in RX NAC w/ Through OFF;

If the RX NAC is $F7F, receives all incoming signals and transmits the programmed NAC and TGID.

Note: Hang time is programmable (0-9.9 seconds), through the “Miscellaneous” tab of the Base Tech III (91-1480-CD) software.

22.3 *MIXED*

In Mixed mode, the radio receives both Analog and Digital signals automatically. Individual channel programming can be combined as described in a) and b) above. If the radio receives analog, it transmits analog, if it receives digital, it transmits digital.

23. BASE MODE

23.1 *ANALOG*

If the received CTCSS/DCS matches the programmed CTCSS/DCS, the radio's receiver will open. The MON key may be pressed to bypass any tone signaling.

23.2 *DIGITAL*

Matching NAC (Network Access Code);

If the programmed NAC/TGID matches the received NAC/TGID, the receiver will open. Pressing SHIFT + MON switches between Selective SQL and Normal SQL mode.

$F7E in RX NAC

If the NAC is set for $F7E, the radio should receive any incoming NAC.

23.3 *MIXED*

In Mixed mode, the radio receives both Analog and Digital signal automatically.

Channel programming can be combined as described in 23.1 and 23.2 above on an individual channel.

24. REMOTE CONTROL

The BASE TECH III can be controlled remotely by pulling pin 24 of the EXT OPTION 25 pin D-sub connector to a low level. Local operation is restored when pin 24 goes HI.

In the Remote Mode only channels 1-16 can be controlled. Also when in Remote Mode Front Panel MON and Channel Selection is disabled.

Refer to the chart on page 35 for Channel control pin outs and other related information.

Figure-45 below shows CH –1 in remote control mode. The 3rd line shows E001 instead of C001 (*EXXX means remote, CXXX is Local Mode*)

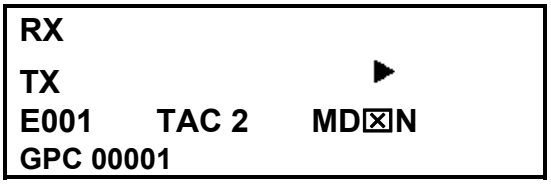


Figure 45

25. P-25 TEST MODE

Press SHIFT+ 0 to put the radio into test mode. Then press the following numbers for the test you wish to perform.

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”

- Sends the Standard Tone Test Pattern in TX mode.
- Indicates BER (Bit Error Rate) in RX mode.

Figure-46 Displays that the radio is in the “P25 Test Mode” and “Test Pattern”

Figure-47Displays Symbol Rate

Figure-48 Displays Low Deviation

Figure-49 Displays C4FM Modulation

Figure-50 Displays TX Tone Test

Figure-51 Displays RX Tone Test and BER of 5%

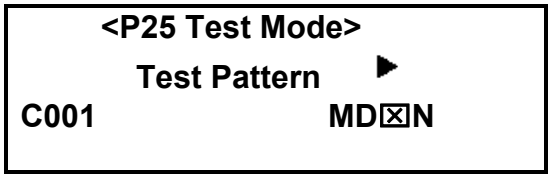


Figure 46

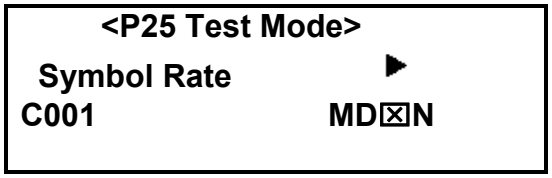


Figure 47

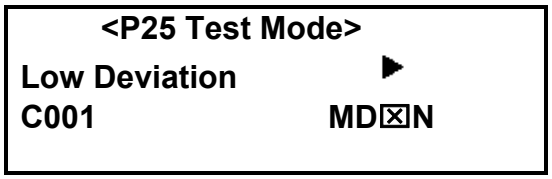


Figure 48

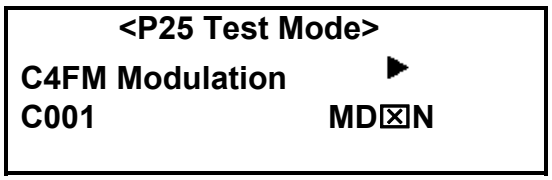


Figure 49

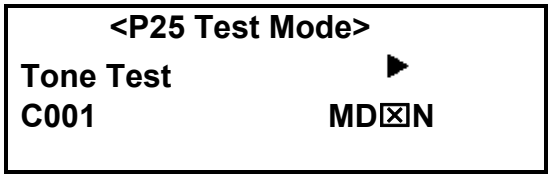


Figure 50

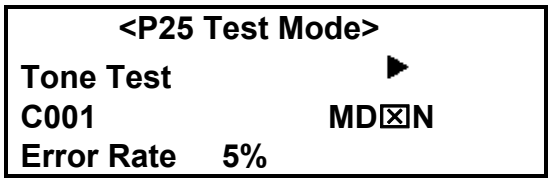


Figure 51

26A. ADJUSTMENT MODES (71BS firmware)

While Grounding TP-2 on the analog logic board, *switch the radio on*.

(See the Midland Base Tech III Service Manual for the TP-2 location and for proper procedure)

Press # to change selections.

Press A (Up) and B (Down) to adjust the level.

-RX 0 dBm Out =Rx 0 dBm output level adjustment (*At pins 20 & 21 on the EXT OPTION 25 pin D-sub connector*).

-REPEAT DEVI =Deviation level adjustment for “Repeat” mode (analog)

-TX DIGITAL DEV =Deviation level adjustment (digital)

- TX ANALOG DEVI =Deviation level adjustment (analog)

-TX TONE DEVI =CWID Deviation level adjustment

(The CWID level must be adjusted before it will send any code)

(Above 71BS 2.95 only)

- CTC DECODR DLY = CTCSS Decoder Delay Adjustment.
Delays attack time of the CTCSS Decoder on Repeaters

You must reboot the radio to return to normal operation

Figure-52 Displays RX wide 0dbm out
Figure-53 Displays Repeat Modulation adjustment for repeat mode
Figure-54 Displays TX MOD-Digital
Figure-55 Displays TX MOD-Analog (TXW for Wide and TXN for narrow) whatever the current channel is programmed for.
Figure-56 Displays TX TONE DEVI, This is the CWID level adjustment
Figure-57 Displays CTC DECODR DLY This is the CTCSS Decoder Delay adjustment. Normally set for “0”

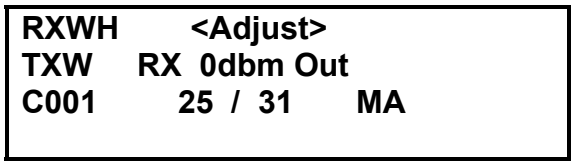


Figure 52

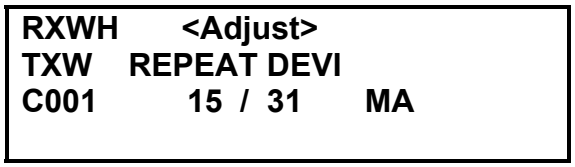


Figure 53

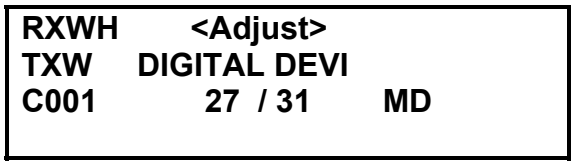


Figure 54

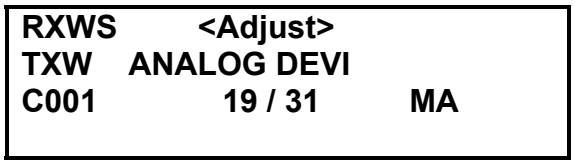


Figure 55

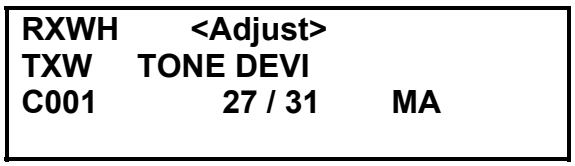


Figure 56

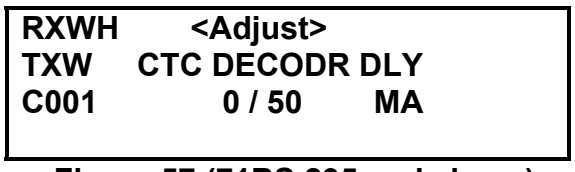


Figure 57 (71BS 295 and above)

26B. ADJUSTMENT MODES (71MD/ CSCM firmware)

While Grounding TP-2 on the analog logic board, *switch the radio on*.

(See the Midland Base Tech III Service Manual for the TP-2 location and for proper procedure)

Press # to change selections.

Press A (Up) and B (Down) to adjust the level.

-RX 0 dBm Out =Rx 0 dBm output level adjustment (*At pins 20 & 21 on the EXT OPTION 25 pin D-sub connector*).

-REPEAT DEVI =Deviation level adjustment for “Repeat” mode (analog)

-TX DIGITAL DEV =Deviation level adjustment (digital)

- TX ANALOG DEVI =Deviation level adjustment (analog)

-TX TONE DEVI =CWID Deviation level adjustment

(The CWID level must be adjusted before it will send any code)

-CTC/DCS DEVI WID =CTCSS/DCS Deviation adjustment for Wide Band Channels

-CTC/DCS DEVI NRW =CTCSS/DCS Deviation adjustment for Narrow Band Channels

You must reboot the radio to return to normal operation

Figure-58 Displays RX wide 0dbm out

Figure-59 Displays RX MOD-1, Modulation adjustment for repeat mode

Figure-60 Displays TX MOD-Digital

Figure-61 Displays TX MOD-Analog (TXW for Wide and TXN for narrow) whatever the current channel is programmed for.

Figure-62 Displays TX TONE DEVI, This is the CWID level adjustment.

Figure 63 Displays CTCSS/ DCS Deviation for wideband operation.

Figure 64 Displays CTCSS/ DCS Deviation for narrowband operation.

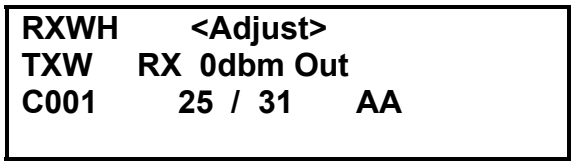


Figure 58

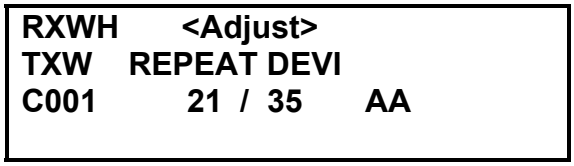


Figure 59

Figure 60

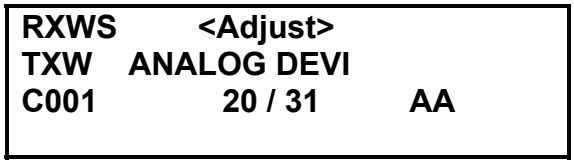


Figure 61

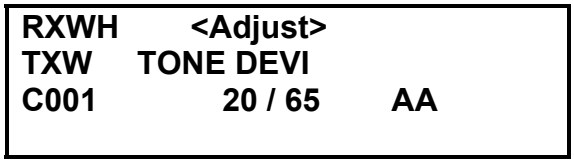


Figure 62

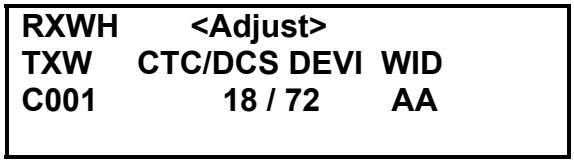


Figure 63

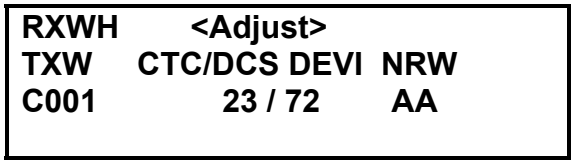


Figure 64

27. KEY TEST

Press and Hold C, *switch on* the radio.

Then depress any key to test.

Figure-65 shows initial display

Figure-66 shows CH key depressed.

Figure-67 shows rotary switch turn clockwise

Figure-68 shows rotary switch turn counter-clockwise

If no key is pressed for 5 seconds, the radio reboots to normal operation.

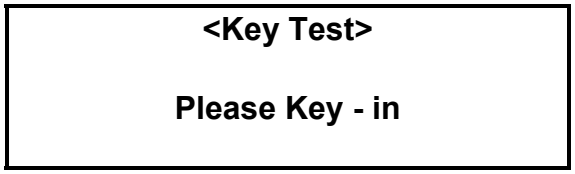


Figure 65

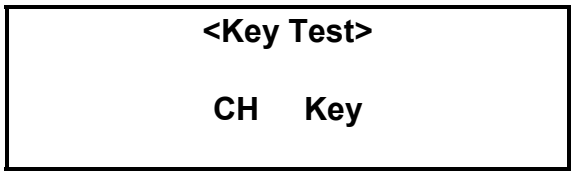


Figure 66

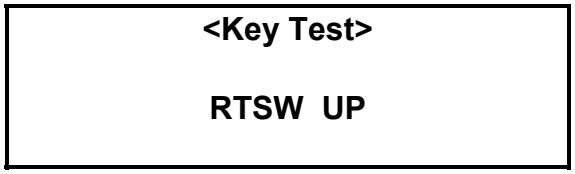


Figure 67

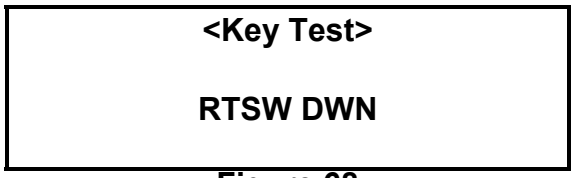


Figure 68

28. DISPLAYING THE FIRWARE VERSIONS

Both the radio and DSP firmware versions are indicated on the LCD after the radio switches on for 2 seconds, **unless a "Starting Message" has been programmed.**

Figure-69 Displays Radio and DSP Firmware versions

Figure 69

Figure-70 Shows the programmable starting message "Your Message Here".

Figure 70

29. DISPLAYING THE SERIAL NUMBER

Press and Hold D, turn on the radio, the serial number is indicated. (max 8 digits). When the D key is released, the radio will reboot in the normal mode.
Figure-71 shows 7300329 serial number

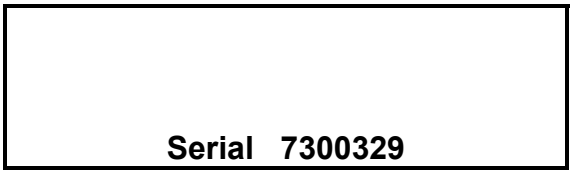


Figure 71

30. DISPLAYING THE PROGRAMMING SOFTWARE VERSION

Press and Hold A, and turn on the radio, the programming software version is indicated. When the A key is released, the radio will reboot in the normal mode
Figure-72 shows V-0.2.3642 version

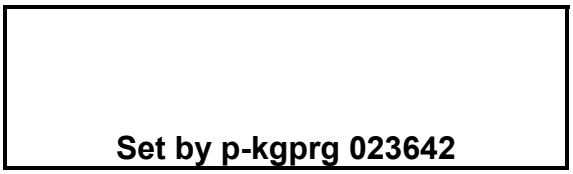


Figure 72

31. DATA CHECK

The Midland Base Tech III has a self diagnostic function. All data in the EEROM is checked every time the radio is switched on. If the data is not properly stored, the radio automatically turns to programming mode
Figure-73 shows ERROM Data error

Figure 73

32. ERROR MESSAGES

If there is a problem with the RX PLL, TX PLL or PA, then the ALM LED flashes on and indicates which section has the issue.
Figure-49 displays a 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-74 Displays a RX PLL error
Figure-75 Displays a TX PLL error
Figure-76 Displays a PA error

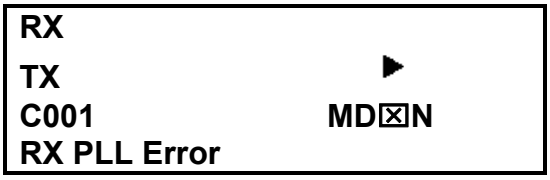


Figure 74

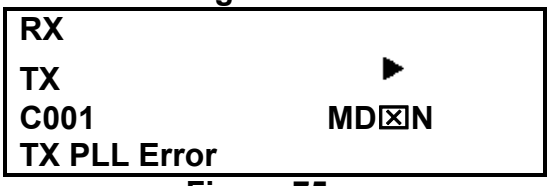


Figure 75

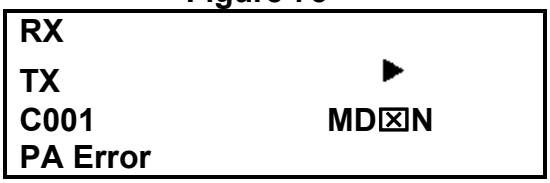


Figure 76

33. FIRMWARE ERROR DETECTION

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

34. RS232 ERROR DETECTION

If the communications between PC and the radio have trouble, the following messages are shown on the LCD.
-Overrun error
-Framing error
-Parity error
-Unknown command
-Data unmatched
-Send error
-Answer timeout
Receive timeout

35. DSP ERROR DETECTION

When there is a problem with the DSP, the following message may be shown on the display. Please check that the DSP board is installed correctly, and the correct firmware version is displayed at startup.

Figure-77 shows DSP failure

Figure-78 shows DSP not ready

Figure-79 shows DSP serial error

Figure 77

Figure 78

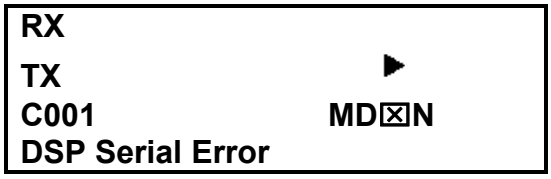


Figure 79

36. Option Port Pin out

25 pin D-sub connector for remote control is provided on the rear panel of Base Tech III. The functions of each pin are as follows:

Pin No.	*Name*	*Description*	*I/O*	*Levels*	*Comments*
1	CH0	LSB external binary channel selection	I	0-+3.3VDC	0000 is channel 1
2	CH1	External binary channel selection	I	0-+3.3VDC	
3	CH2	External binary channel selection	I	0-+3.3VDC	
4	CH3	MSB External binary channel selection	I	0-+3.3VDC	1111 is channel 16
5	Unassigned				
6	REM MON	Remote Monitor	I	0-+3.3VDC	+3.3V=Monitor On
7	GND	Ground			
8	Unassigned				
9	REM D/A	Remote Digital / Analog select		0V – 3.3V	+3.3V = Analog 0V = Digital
10	DEM OUT	Discriminator audio out	O	≈330mVrms 1KHz @ ±3KHz	C4FM on DIGITAL MODE
11	BUSY	Channel busy indication	O	0-+3.3VDC	+3.3V=Busy
12	RSSI	Receive signal strength indicator	O	0-+2.5VDC analog	
13	MOD1	External audio modulation input	I	≈50mVrms 1Khz for ±3KHz	
14	GND	Ground			
15	PTT	Push to talk	I	0-+3.3VDC	0V=transmit
16	MOD2	External modulation input	I	≈400mVrms 1KHz for ±3KHz	After limiter and filtering /LOW FREQ i.e. External CTCSS/DCS IN
17	SIMP	Simplex mode selected	O	0-+3.3VDC	0V=simplex
18	ERR	Alarm indication	O	0-+3.3VDC	Duty Cycle Determines which alarm
19	DECODE	Decode valid indication	O	0-+3.3VDC	+3.3V=Valid Signaling
20	RX AUD1	Buffered receive audio	O	≈700mVrms 1KHz @ ±3KHz	1 & 2 Can produce 0 dBm into
21	RX AUD2	Buffered receive audio	O	≈700mVrms 1KHz @ ±3KHz	600 ohm input
22	TX OUT		O		
23	EXT PW/SW	External power switch	I	0-Open source	0V=ON ***(When Power SW is OFF)***
24	REMOTE	Remote Mode	I	0-+3.3VDC	0V=Remote Mode
25	*+12V*		*O*	*12 vdc*	*800mA Max out*

NOTE: Pins 1-4, 6 and 9 are only available when pin 24 (Remote Mode) is at 0V. See page 23 for more information on display indications

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