

# YAESU

Radio for Professionals

HF/50/144/430MHz ALL MODE TRANSCEIVER

## FTX-1series

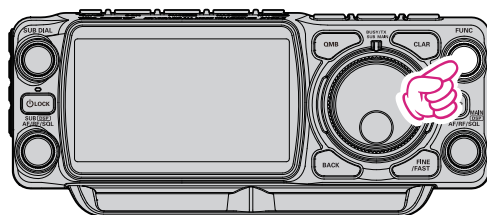
### CAT Operation Reference Manual

#### Important Notes

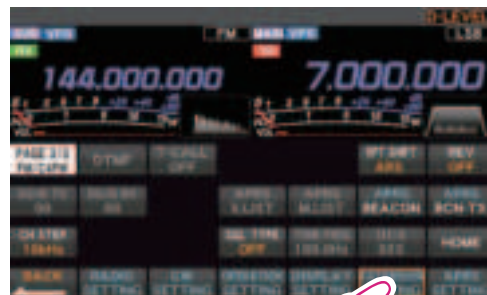
The CAT operation does not work with MAIN Firmware before Ver. 1.08.  
Please update the MAIN firmware to Ver. 1.08 or later.

#### How to Confirm the Firmware Version

1. Press and hold the [FUNC] knob.



2. Touch [EXTENSION SETTING].  
If [EXTENSION SETTING] is not displayed,  
touch [FWD→] to display [EXTENSION  
SETTING] and then touch it.



3. Touch [SOFT VERSION].  
The versions of each firmware will be  
displayed on the TFT screen.

Current MAIN firmware version



# CAT (Computer Aided Transceiver) Operation

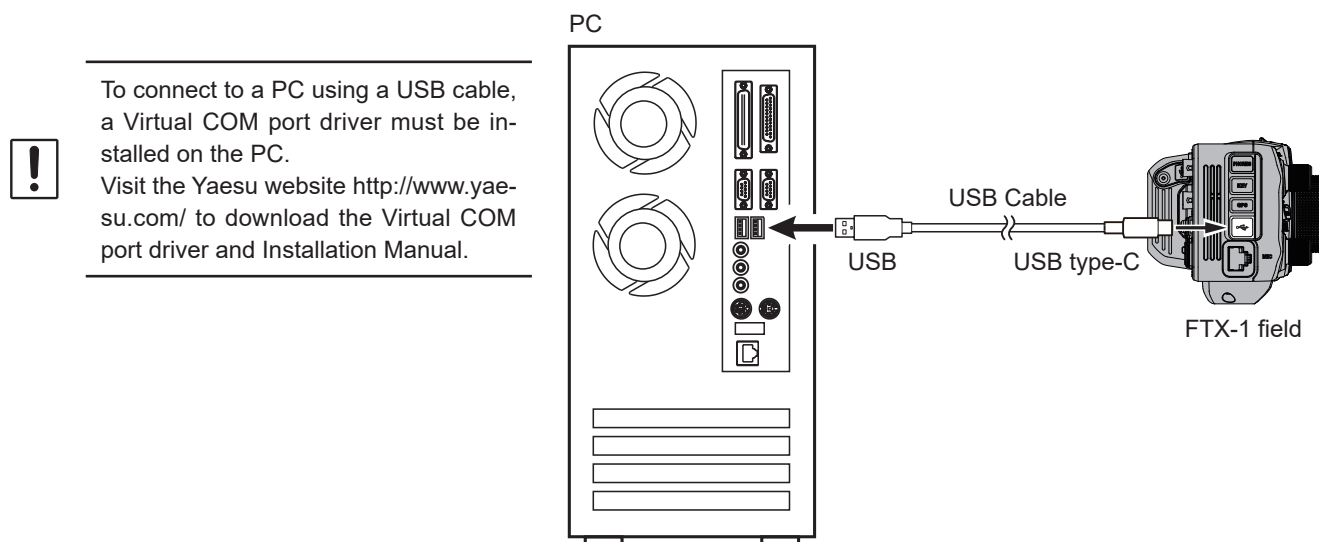
## Overview

The CAT (Computer Aided Transceiver) System in the **FTX-1** series transceiver provides control of frequency, VFO, memory, and other settings using an external personal computer. This allows multiple control operations to be fully automated with single mouse clicks, or keystroke operations on the computer keyboard.

YAESU MUSEN does not produce CAT System operating software due to the wide variety of personal computers and operating systems in use today. However, the information provided in this chapter explains the serial data structure and opcodes used by the CAT system. This information, along with the short programming examples, is intended to help you start writing programs on your own. As you become more familiar with CAT operation, you can customize programs for your operating needs and utilize the full operating potential of this system.

## Using the USB Cable (CAT-1 / CAT-2)

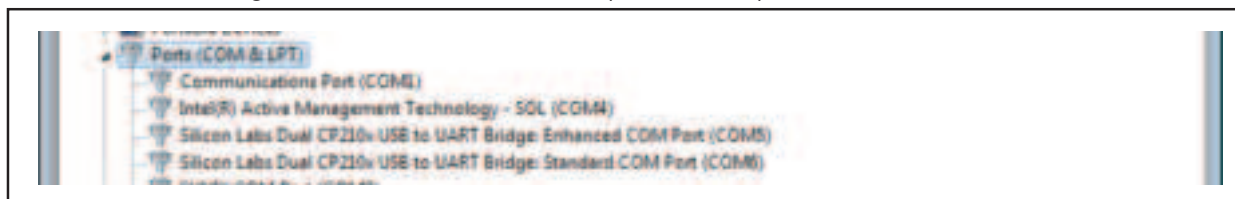
The **FTX-1** transceiver has a built-in USB to Dual UART Bridge, allowing direct connection from the side-panel USB jack to the USB jack of a computer without the need for an interface device, simply use a USB cable to connect to the USB jack on the computer.



## How to Confirm the Installation, and the COM Port Number

After the FTX-1 and computer are connected, confirm that the virtual COM driver has been installed successfully:

1. Press and hold the power switch to turn the transceiver ON.
2. Connect the transceiver and PC with a commercially available USB cable (type-C).
3. Open the "Device Manager" screen in Windows.
4. On the Device Manager screen, double-click "Port (COM & LPT)".



"Silicon Labs Dual CP210x USB to UART Bridge : Enhanced COM Port (COM\*\*)"

"Silicon Labs Dual CP210x USB to UART Bridge : Standard COM Port (COM\*\*)"

\*(The number in the "(COM\*\*)" portion may vary from computer to computer.)

The above example indicates that COM5 can be used for CAT communications (CAT-1), while COM6 can be used for TX control (PTT, CW Keying, Digital Mode Operation) or CAT communications (CAT-2).

When performing software port configuration, select the COM port numbers that were confirmed using the procedure above.



If a "!" or "X" is displayed for the port on the Device Manager, uninstall and reinstall the virtual COM driver.

# CAT (Computer Aided Transceiver) Operation

The FTX-1 contains two virtual COM ports, an Enhanced COM Port and a Standard COM Port.

These ports offer the following functions:

- **Enhanced COM Port (CAT-1):** CAT Communications (Frequency and Communication Mode Settings)
- **Standard COM Port (CAT-2):** TX Controls (PTT control, CW Keying, Digital Mode Operation) or CAT Communications (Frequency and Communication Mode Settings)\*

When performing software port configuration, select the COM port numbers that were confirmed using the procedure above, use the two confirmed COM port numbers for each software function. The frequency and communication mode and PTT control can be set from the software, and CW keying, digital communication, etc. can be performed simultaneously.

**\*NOTE:** (When using a standard COM port (CAT-2) for CAT communication (setting frequency, communication mode, etc.) and using hardware flow control by RTS or DTR, be sure to set the following menu items to “**OFF**” (factory default) to disable PTT control by RTS or DTR.)

| Menu Item     |             | Menu Function | Available Settings (Default: Bold) |
|---------------|-------------|---------------|------------------------------------|
| RADIO SETTING | MODE SSB    | RPTT SELECT   | <b>OFF</b> / RTS / DTR             |
|               | MODE AM     | RPTT SELECT   | <b>OFF</b> / RTS / DTR             |
|               | MODE FM     | RPTT SELECT   | <b>OFF</b> / RTS / DTR             |
|               | MODE DATA   | RPTT SELECT   | <b>OFF</b> / RTS / DTR             |
|               | MODE RTTY   | RPTT SELECT   | <b>OFF</b> / RTS / DTR             |
| CW SETTING    | MODE CW     | RPTT SELECT   | <b>OFF</b> / RTS / DTR             |
|               |             | PC KEYING     | <b>OFF</b> / RTS / DTR             |
| PRESET        | PRESET1 - 5 | RPTT SELECT   | OFF / <b>RTS</b> / DTR             |



- If a transceiver with a different serial number is connected and turned on, different COM port numbers will be assigned to it, making it possible to perform individual COM port configurations for separate transceivers.
- When using the USB cable for TX control, the transceiver may switch to the transmit mode when the computer is started.
- Always close the application on the computer before disconnecting the USB cable.

# CAT (Computer Aided Transceiver) Operation

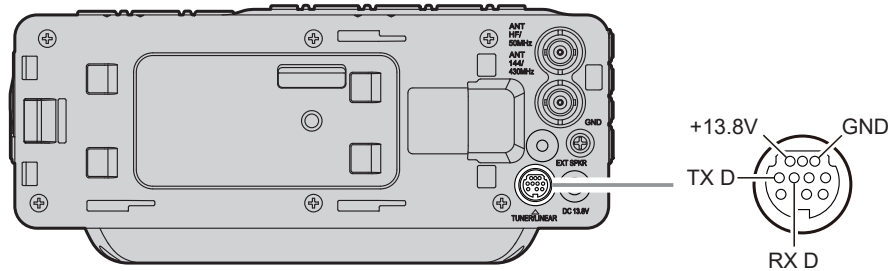
## Using the UART (CAT-3)

The TUNER/LINEAR jack on the rear panel of the FTX-1 field head can be used for CAT communication (5V CMOS level serial communication).

Set to "CAT-3" in the setting menu [OPERATION SETTING] → [GENERAL] → [TUN/LIN PORT SELECT]. (Factory setting: OPTION)



- Since the serial communication of this jack is 5V CMOS level, it cannot be directly connected to the RS-232C terminal of the PC.
- The connection cable must be prepared by yourself using the optional band data cable T9207451A (mini DIN 10-pin to DIN 10-pin).
- CAT communication cannot be used simultaneously with an external antenna tuner or linear amplifier.



| Pin Name | I/O    | Function                                                        |
|----------|--------|-----------------------------------------------------------------|
| +13V     | –      | 13 VDC output linked to radio ON                                |
| GND      | –      | Signal Ground                                                   |
| TXD      | Output | Outputs the Serial Data from the transceiver to the PC (5V TTL) |
| RXD      | Input  | Inputs the Serial Data from the PC to the transceiver (5V TTL)  |

## Communication Parameters

- Asynchronous communication
- Baud rate: 38400bps\* (CAT-1, CAT-3 terminals) or 4800bps\* (CAT-2 terminal)
- Start bit: 1
- Data bits: 8
- Stop bits: 1 or 2\* (CAT-2: 1 (Fixed))
- Paritybits: None
- \*(Factory default)

CAT communication settings can be changed using the following menu items.

| Menu Item         |         | Menu Function        | Available Settings (Default: Bold)                |
|-------------------|---------|----------------------|---------------------------------------------------|
| OPERATION SETTING | GENERAL | CAT-1 RATE           | 4800 / 9600 / 19200 / <b>38400</b> / 115200 (bps) |
|                   |         | CAT-1 TIME OUT TIMER | <b>10</b> / 100 / 1000 / 3000 (msec)              |
|                   |         | CAT-1 CAT-3 STOP BIT | <b>1bit</b> / 2bit                                |
|                   |         | CAT-2 RATE           | <b>4800</b> / 9600 / 19200 / 38400 / 115200 (bps) |
|                   |         | CAT-2 TIME OUT TIMER | <b>10</b> / 100 / 1000 / 3000 (msec)              |
|                   |         | CAT-3 RATE           | 4800 / 9600 / 19200 / <b>38400</b> / 115200 (bps) |
|                   |         | CAT-3 TIME OUT TIMER | <b>10</b> / 100 / 1000 / 3000 (msec)              |

# CAT (Computer Aided Transceiver) Operation

## Control Command

A computer control command is composed of an alphabetical command, various parameters, and the terminator that signals the end of the control command.

**Example:** Set the MAIN-side frequency to 14.250000 MHz.

|           |                  |            |
|-----------|------------------|------------|
| <b>FA</b> | <b>014250000</b> | <b>;</b>   |
| ↑         | ↑                | ↑          |
| Command   | Parameter        | Terminator |

There are three commands for the **FTX-1** as shown below:

|                        |                            |                          |
|------------------------|----------------------------|--------------------------|
| <b>Set</b> command:    | Set a particular condition | (to the <b>FTX-1</b> )   |
| <b>Read</b> command:   | Reads an answer            | (from the <b>FTX-1</b> ) |
| <b>Answer</b> command: | Transmits a condition      | (from the <b>FTX-1</b> ) |

For example, note the following case of the FA command (Set the MAIN-side frequency):

- ☐ To set the MAIN-side frequency to 14.250000 MHz, the following command is sent from the computer to the transceiver:  
    **"FA014250000;"** (Set command)
- ☐ To read the MAIN-side frequency, the following command is sent from the computer to the transceiver:  
    **"FA;"** (Read command)
- ☐ When the Read command above has been sent, the following command is returned to the computer:  
    **"FA014250000;"** (Answer command)

## Alphabetical Commands

A command consists of 2 alphabetical characters.

You may use either lower or upper case characters. The commands available for this transceiver are listed in the "PC Control Command Tables" on the following pages.

## Parameters

Parameters are used to specify information necessary to implement the desired command.

The parameters to be used for each command are predetermined. The number of digits assigned to each parameter is also predetermined. Refer to the "Control Command List" and the "Control Command Tables" to configure the appropriate parameters.

When configuring parameters, be careful not to make the following mistakes.

**For example,**

when the correct parameter is **"IS00+1000"** (IF SHIFT):

|                     |                                                                           |
|---------------------|---------------------------------------------------------------------------|
| <b>IS001000;</b>    | Not enough parameters specified (No direction (+) given for the IF shift) |
| <b>IS00+100;</b>    | Not enough digits (Only three frequency digits given)                     |
| <b>IS00_+_1000;</b> | Unnecessary characters between parameters                                 |
| <b>IS00+10000;</b>  | Too many digits (Five frequency digits given)                             |

**Note:** If a particular parameter is not applicable to the **FTX-1**, the parameter digits should be filled using any character except the ASCII control codes (00 to 1Fh) and the terminator (;).

## Terminator

To signal the end of a command, it is necessary to use a semicolon (;). The digit where this special character must appear differs depending on the command used.

# CAT (Computer Aided Transceiver) Operation

## CAT Control Command List

| Command | Function                    | Set | Read | Ans. | AI |
|---------|-----------------------------|-----|------|------|----|
| AB      | MAIN-side to SUB-side       | O   | X    | X    | X  |
| AC      | ANTENNA TUNER CONTROL       | O   | O    | O    | O  |
| AG      | AF GAIN                     | O   | O    | O    | O  |
| AI      | AUTO INFORMATION            | O   | O    | O    | X  |
| AM      | MAIN-side to MEMORY CHANNEL | O   | X    | X    | X  |
| AO      | AMC OUTPUT LEVEL            | O   | O    | O    | O  |
| BA      | SUB-side to MAIN-side       | O   | X    | X    | X  |
| BC      | AUTO NOTCH (DNF)            | O   | O    | O    | O  |
| BD      | BAND DOWN                   | O   | X    | X    | X  |
| BI      | BREAK-IN                    | O   | O    | O    | O  |
| BM      | SUB-side to MEMORY CHANNEL  | O   | X    | X    | X  |
| BP      | MANUAL NOTCH                | O   | O    | O    | O  |
| BS      | BAND SELECT                 | O   | X    | X    | X  |
| BU      | BAND UP                     | O   | X    | X    | X  |
| CF      | CLAR (Clarifier)            | O   | O    | O    | O  |
| CH      | CHANNEL UP/DOWN             | O   | X    | X    | X  |
| CN      | CTCSS NUMBER                | O   | O    | O    | O  |
| CO      | CONTOUR/APF                 | O   | O    | O    | O  |
| CS      | CW SPOT                     | O   | O    | O    | O  |
| CT      | CTCSS                       | O   | O    | O    | O  |
| DA      | LCD CONTRAST/DIMMER         | O   | O    | O    | X  |
| DN      | DOWN                        | O   | X    | X    | X  |
| DT      | DATE AND TIME               | O   | O    | O    | X  |
| EX      | MENU                        | O   | O    | O    | O  |
| FA      | FREQUENCY MAIN-side         | O   | O    | O    | O  |
| FB      | FREQUENCY SUB-side          | O   | O    | O    | O  |
| FN      | FINE TUNING                 | O   | O    | O    | O  |
| FR      | FUNCTION RX                 | O   | O    | O    | O  |
| FT      | FUNCTION TX                 | O   | O    | O    | O  |
| GP      | GP OUT A/B/C/D              | O   | O    | O    | X  |
| GT      | AGC FUNCTION                | O   | O    | O    | O  |
| ID      | IDENTIFICATION              | X   | O    | O    | X  |
| IF      | INFORMATION (MAIN-side)     | X   | O    | O    | O  |
| IS      | IF SHIFT                    | O   | O    | O    | O  |
| KM      | KEYER MEMORY                | O   | O    | O    | X  |
| KP      | KEY PITCH                   | O   | O    | O    | O  |
| KR      | KEYER                       | O   | O    | O    | O  |
| KS      | KEY SPEED                   | O   | O    | O    | O  |
| KY      | CW KEYING MEMORY PLAY       | O   | X    | X    | X  |
| LK      | LOCK                        | O   | O    | O    | O  |
| LM      | LOAD MESSAGE                | O   | O    | O    | X  |
| MA      | MEMORY CHANNEL to MAIN-side | O   | X    | X    | X  |
| MB      | MEMORY CHANNEL to SUB-side  | O   | X    | X    | X  |
| MC      | MEMORY CHANNEL              | O   | O    | O    | X  |
| MD      | MODE                        | O   | O    | O    | O  |
| MG      | MIC GAIN                    | O   | O    | O    | O  |
| ML      | MONITOR LEVEL               | O   | O    | O    | O  |

| Command | Function                             | Set | Read | Ans. | AI |
|---------|--------------------------------------|-----|------|------|----|
| MR      | MEMORY READ                          | X   | O    | O    | X  |
| MS      | METER SW                             | O   | O    | O    | O  |
| MT      | MEMORY CHANNEL WRITE/TAG             | O   | O    | O    | X  |
| MW      | MEMORY WRITE                         | O   | X    | X    | X  |
| MX      | MOX SET                              | O   | O    | O    | O  |
| MZ      | SPLIT MEMORY                         | O   | O    | O    | O  |
| NA      | NARROW                               | O   | O    | O    | O  |
| NL      | NOISE BLANKER LEVEL                  | O   | O    | O    | O  |
| OI      | OPPOSITE BAND (SUB-side) INFORMATION | X   | O    | O    | O  |
| OS      | OFFSET (Repeater Shift)              | O   | O    | O    | O  |
| PA      | PRE-AMP (IPO)                        | O   | O    | O    | O  |
| PB      | PLAY BACK                            | O   | O    | O    | X  |
| PC      | POWER CONTROL                        | O   | O    | O    | O  |
| PL      | SPEECH PROCESSOR LEVEL               | O   | O    | O    | O  |
| PR      | SPEECH PROCESSOR                     | O   | O    | O    | O  |
| PS      | POWER SWITCH                         | O   | O    | O    | X  |
| QI      | QMB STORE                            | O   | X    | X    | X  |
| QR      | QMB RECALL                           | O   | X    | X    | X  |
| RA      | RF ATTENUATOR                        | O   | O    | O    | O  |
| RG      | RF GAIN                              | O   | O    | O    | O  |
| RI      | RADIO INFORMATION                    | X   | O    | O    | O  |
| RL      | NOISE REDUCTION (DNR) LEVEL          | O   | O    | O    | O  |
| RM      | READ METER                           | X   | O    | O    | O  |
| SC      | SCAN                                 | O   | O    | O    | O  |
| SD      | SEMI BREAK-IN DELAY TIME             | O   | O    | O    | O  |
| SF      | SUB DIAL                             | O   | O    | O    | O  |
| SH      | WIDTH                                | O   | O    | O    | O  |
| SM      | S METER                              | X   | O    | O    | X  |
| SQ      | SQUELCH LEVEL                        | O   | O    | O    | O  |
| SS      | SPECTRUM SCOPE                       | O   | O    | O    | O  |
| ST      | SPLIT                                | O   | O    | O    | O  |
| SV      | SWAP VFO                             | O   | X    | X    | X  |
| TS      | TXW                                  | O   | O    | O    | O  |
| TX      | TX SET                               | O   | O    | O    | O  |
| UP      | UP                                   | O   | X    | X    | X  |
| VD      | VOX DELAY TIME                       | O   | O    | O    | O  |
| VE      | FIRMWARE VERSION                     | X   | O    | O    | X  |
| VG      | VOX GAIN                             | O   | O    | O    | O  |
| VM      | [V/M(MW)] KEY FUNCTION               | O   | X    | X    | X  |
| VM      | [V/M(MW)] KEY FUNCTION               | O   | O    | O    | O  |
| VS      | VFO SELECT                           | O   | O    | O    | O  |
| VX      | VOX                                  | O   | O    | O    | O  |
| ZI      | ZERO IN                              | O   | X    | X    | X  |

# CAT (Computer Aided Transceiver) Operation

| AB     | MAIN-side to SUB-side |   |   |   |   |   |   |   |   |    |
|--------|-----------------------|---|---|---|---|---|---|---|---|----|
| Set    | 1                     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | A                     | B | ; |   |   |   |   |   |   |    |
| Read   | 1                     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                       |   |   |   |   |   |   |   |   |    |
| Answer | 1                     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                       |   |   |   |   |   |   |   |   |    |

| AC     | ANTENNA TUNER CONTROL |   |    |    |    |   |   |   |   |    |
|--------|-----------------------|---|----|----|----|---|---|---|---|----|
| Set    | 1                     | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | A                     | C | P1 | P2 | P3 | ; |   |   |   |    |
| Read   | 1                     | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | A                     | C | ;  |    |    |   |   |   |   |    |
| Answer | 1                     | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | A                     | C | P1 | P2 | P3 | ; |   |   |   |    |

**P1** 0: Internal Antenna Tuner (FTX-1 optima)  
 1: External Antenna Tuner  
**P2** 0: External Antenna Tuner  
 1: -  
 2: ATAS  
**P3** P2=0 (Antenna Tuner):  
 0: Tuner "OFF" (Tuning Stop)  
 1: Tuner "ON"  
 2: -  
 3: Tuning Start  
 P2=2 (ATAS):  
 0: Tuning Stop  
 1: Tuning frequency up (50 msec)  
 2: Tuning frequency down (50 msec)  
 3: Tuning Start

| AG     | AF GAIN |   |    |    |    |    |   |   |   |    |
|--------|---------|---|----|----|----|----|---|---|---|----|
| Set    | 1       | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | A       | G | P1 | P2 | P2 | P2 | ; |   |   |    |
| Read   | 1       | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | A       | G | P1 | ;  |    |    |   |   |   |    |
| Answer | 1       | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | A       | G | P1 | P2 | P2 | P2 | ; |   |   |    |

**P1** 0: MAIN-side  
 1: SUB-side  
**P2** 000 - 255

| AI     | AUTO INFORMATION |   |    |   |   |   |   |   |   |    |
|--------|------------------|---|----|---|---|---|---|---|---|----|
| Set    | 1                | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | A                | I | P1 | ; |   |   |   |   |   |    |
| Read   | 1                | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | A                | I | ;  |   |   |   |   |   |   |    |
| Answer | 1                | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | A                | I | P1 | ; |   |   |   |   |   |    |

**P1** 0: Auto Information "OFF"  
 1: Auto Information "ON"

**NOTES:**

- When the status of the radio changes, the Read value of the **AI** applicable command (see "CAT Control Command List" (page 5)) is automatically sent to the PC.
- Set ON/OFF for each CAT-1, CAT-2, and CAT-3.
- This parameter is set to "0" (OFF) automatically when the transceiver is turned "OFF".

| AM     | MAIN-SIDE TO MEMORY CHANNEL |   |   |   |   |   |   |   |   |    |
|--------|-----------------------------|---|---|---|---|---|---|---|---|----|
| Set    | 1                           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | A                           | M | ; |   |   |   |   |   |   |    |
| Read   | 1                           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                             |   |   |   |   |   |   |   |   |    |
| Answer | 1                           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                             |   |   |   |   |   |   |   |   |    |

| AO     | AMC OUTPUT LEVEL |   |    |    |    |   |   |   |   |    |
|--------|------------------|---|----|----|----|---|---|---|---|----|
| Set    | 1                | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | A                | O | P1 | P1 | P1 | ; |   |   |   |    |
| Read   | 1                | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | A                | O | ;  |    |    |   |   |   |   |    |
| Answer | 1                | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | A                | O | P1 | P1 | P1 | ; |   |   |   |    |

**P1** 001-100: AMC OUTPUT LEVEL

| BA     | SUB-side to MAIN-side |   |   |   |   |   |   |   |   |    |
|--------|-----------------------|---|---|---|---|---|---|---|---|----|
| Set    | 1                     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | B                     | A | ; |   |   |   |   |   |   |    |
| Read   | 1                     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                       |   |   |   |   |   |   |   |   |    |
| Answer | 1                     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                       |   |   |   |   |   |   |   |   |    |

# CAT (Computer Aided Transceiver) Operation

| <b>BC</b> | <b>AUTO NOTCH (DNF)</b> |          |    |    |   |   |   |   |   |    |
|-----------|-------------------------|----------|----|----|---|---|---|---|---|----|
| Set       | 1                       | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>B</b>                | <b>C</b> | P1 | P2 | ; |   |   |   |   |    |
| Read      | 1                       | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>B</b>                | <b>C</b> | P1 | ;  |   |   |   |   |   |    |
| Answer    | 1                       | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>B</b>                | <b>C</b> | P1 | P2 | ; |   |   |   |   |    |

P1 0: MAIN-side  
 1: SUB-side  
 P2 0: Auto Notch "OFF"  
 1: Auto Notch "ON"

| <b>BD</b> | <b>BAND DOWN</b> |          |    |   |   |   |   |   |   |    |
|-----------|------------------|----------|----|---|---|---|---|---|---|----|
| Set       | 1                | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>B</b>         | <b>D</b> | P1 | ; |   |   |   |   |   |    |
| Read      | 1                | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           |                  |          |    |   |   |   |   |   |   |    |
| Answer    | 1                | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           |                  |          |    |   |   |   |   |   |   |    |

P1 0: MAIN-side  
 1: SUB-side

| <b>BI</b> | <b>BREAK-IN</b> |          |    |   |   |   |   |   |   |    |
|-----------|-----------------|----------|----|---|---|---|---|---|---|----|
| Set       | 1               | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>B</b>        | <b>I</b> | P1 | ; |   |   |   |   |   |    |
| Read      | 1               | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>B</b>        | <b>I</b> | ;  |   |   |   |   |   |   |    |
| Answer    | 1               | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>B</b>        | <b>I</b> | P1 | ; |   |   |   |   |   |    |

P1 0: Break-in "OFF"  
 1: Break-in "ON"

| <b>BM</b> | <b>SUB-side to MEMORY CHANNEL</b> |          |   |   |   |   |   |   |   |    |
|-----------|-----------------------------------|----------|---|---|---|---|---|---|---|----|
| Set       | 1                                 | 2        | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>B</b>                          | <b>M</b> | ; |   |   |   |   |   |   |    |
| Read      | 1                                 | 2        | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           |                                   |          |   |   |   |   |   |   |   |    |
| Answer    | 1                                 | 2        | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           |                                   |          |   |   |   |   |   |   |   |    |

| <b>BP</b> | <b>MANUAL NOTCH</b> |          |    |    |    |    |   |   |   |    |
|-----------|---------------------|----------|----|----|----|----|---|---|---|----|
| Set       | 1                   | 2        | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|           | <b>B</b>            | <b>P</b> | P1 | P2 | P3 | P3 | ; |   |   |    |
| Read      | 1                   | 2        | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|           | <b>B</b>            | <b>P</b> | P1 | P2 | ;  |    |   |   |   |    |
| Answer    | 1                   | 2        | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|           | <b>B</b>            | <b>P</b> | P1 | P2 | P3 | P3 | ; |   |   |    |

P1 0: MAIN-side  
 1: SUB-side  
 P2 0: Manual NOTCH "ON/OFF"  
 1: Manual NOTCH Frequency  
 P3 P2=0  
 000: "OFF"  
 001: "ON"  
 P2=1  
 001 - 320 (NOTCH Frequency : x 10 Hz )

| <b>BS</b> | <b>BAND SELECT</b> |          |    |    |    |   |   |   |   |    |
|-----------|--------------------|----------|----|----|----|---|---|---|---|----|
| Set       | 1                  | 2        | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|           | <b>B</b>           | <b>S</b> | P1 | P2 | P2 | ; |   |   |   |    |
| Read      | 1                  | 2        | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|           |                    |          |    |    |    |   |   |   |   |    |
| Answer    | 1                  | 2        | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|           |                    |          |    |    |    |   |   |   |   |    |

P1 0: MAIN-side  
 1: SUB-side  
 P2 00: 1.8 MHz    04: 10 MHz    08: 24.5 MHz    12: AIR  
 01: 3.5 MHz    05: 14 MHz    09: 28 MHz    13: 144 MHz  
 02: 5 MHz    06: 18 MHz    10: 50 MHz    14: 430 MHz  
 03: 7 MHz    07: 21 MHz    11: 70 MHz/GEN

| <b>BU</b> | <b>BAND UP</b> |          |    |   |   |   |   |   |   |    |
|-----------|----------------|----------|----|---|---|---|---|---|---|----|
| Set       | 1              | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>B</b>       | <b>U</b> | P1 | ; |   |   |   |   |   |    |
| Read      | 1              | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           |                |          |    |   |   |   |   |   |   |    |
| Answer    | 1              | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           |                |          |    |   |   |   |   |   |   |    |

P1 0: MAIN-side  
 1: SUB-side

# CAT (Computer Aided Transceiver) Operation

| CF     | CLAR ON/OFF |   |    |    |    |    |    |    |    |    |    |
|--------|-------------|---|----|----|----|----|----|----|----|----|----|
| Set    | 1           | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
|        | C           | F | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | ;  |
| Read   | 1           | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
|        | C           | F | P1 | P2 | P3 | ;  |    |    |    |    |    |
| Answer | 1           | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
|        | C           | F | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | ;  |

P1 0: MAIN-side  
 1: SUB-side  
 P2 0: (Fixed)  
 P3 0: CLAR Setting  
 1: CLAR Frequency  
 P3=0 (CLAR Setting):  
 P4 0: RX CLAR OFF  
 1: RX CLAR ON  
 P5 0: TX CLAR OFF  
 1: TX CLAR ON  
 P6-P8 0: (Fixed)  
 P3=1 (CLAR Frequency):  
 P4 + / -  
 P5-P8 0000 - 9999 Hz

| CH     | CHANNEL UP/DOWN |   |    |   |   |   |   |   |   |    |
|--------|-----------------|---|----|---|---|---|---|---|---|----|
| Set    | 1               | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | C               | H | P1 | ; |   |   |   |   |   |    |
| Read   | 1               | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                 |   |    |   |   |   |   |   |   |    |
| Answer | 1               | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                 |   |    |   |   |   |   |   |   |    |

P1 0: Memory Channel "UP"  
 1: Memory Channel "DOWN"

| CN     | CTCSS TONE FREQUENCY / DCS CODE |   |    |    |    |    |    |   |   |    |
|--------|---------------------------------|---|----|----|----|----|----|---|---|----|
| Set    | 1                               | 2 | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 |
|        | C                               | N | P1 | P2 | P3 | P3 | P3 | ; |   |    |
| Read   | 1                               | 2 | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 |
|        | C                               | N | P1 | P2 | ;  |    |    |   |   |    |
| Answer | 1                               | 2 | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 |
|        | C                               | N | P1 | P2 | P3 | P3 | P3 | ; |   |    |

P1 0: MAIN-side  
 1: SUB-side  
 P2 0: CTCSS  
 1: DCS  
 P3 P2=0 (CTCSS) 000 - 049: Tone Frequency Number (See Table 1)  
 P2=1 (DCS) 000 - 103: DCS Number (See Table 2)

| Table 1 (CTCSS Tone Chart) |         |     |          |     |          |     |          |     |          |     |          |
|----------------------------|---------|-----|----------|-----|----------|-----|----------|-----|----------|-----|----------|
| 000                        | 67.0 Hz | 009 | 91.5 Hz  | 018 | 123.0 Hz | 027 | 162.2 Hz | 036 | 189.9 Hz | 045 | 229.1 Hz |
| 001                        | 69.3 Hz | 010 | 94.8 Hz  | 019 | 127.3 Hz | 028 | 165.5 Hz | 037 | 192.8 Hz | 046 | 233.6 Hz |
| 002                        | 71.9 Hz | 011 | 97.4 Hz  | 020 | 131.8 Hz | 029 | 167.9 Hz | 038 | 196.6 Hz | 047 | 241.8 Hz |
| 003                        | 74.4 Hz | 012 | 100.0 Hz | 021 | 136.5 Hz | 030 | 171.3 Hz | 039 | 199.5 Hz | 048 | 250.3 Hz |
| 004                        | 77.0 Hz | 013 | 103.5 Hz | 022 | 141.3 Hz | 031 | 173.8 Hz | 040 | 203.5 Hz | 049 | 254.1 Hz |
| 005                        | 79.7 Hz | 014 | 107.2 Hz | 023 | 146.2 Hz | 032 | 177.3 Hz | 041 | 206.5 Hz | -   | -        |
| 006                        | 82.5 Hz | 015 | 110.9 Hz | 024 | 151.4 Hz | 033 | 179.9 Hz | 042 | 210.7 Hz | -   | -        |
| 007                        | 85.4 Hz | 016 | 114.8 Hz | 025 | 156.7 Hz | 034 | 183.5 Hz | 043 | 218.1 Hz | -   | -        |
| 008                        | 88.5 Hz | 017 | 118.8 Hz | 026 | 159.8 Hz | 035 | 186.2 Hz | 044 | 225.7 Hz | -   | -        |

| Table 2 (DCS Code Chart) |     |     |     |     |     |     |     |     |     |     |     |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 000                      | 023 | 015 | 074 | 030 | 165 | 045 | 261 | 060 | 356 | 075 | 462 |
| 001                      | 025 | 016 | 114 | 031 | 172 | 046 | 263 | 061 | 364 | 076 | 464 |
| 002                      | 026 | 017 | 115 | 032 | 174 | 047 | 265 | 062 | 365 | 077 | 465 |
| 003                      | 031 | 018 | 116 | 033 | 205 | 048 | 266 | 063 | 371 | 078 | 466 |
| 004                      | 032 | 019 | 122 | 034 | 212 | 049 | 271 | 064 | 411 | 079 | 503 |
| 005                      | 036 | 020 | 125 | 035 | 223 | 050 | 274 | 065 | 412 | 080 | 506 |
| 006                      | 043 | 021 | 131 | 036 | 225 | 051 | 306 | 066 | 413 | 081 | 516 |
| 007                      | 047 | 022 | 132 | 037 | 226 | 052 | 311 | 067 | 423 | 082 | 523 |
| 008                      | 051 | 023 | 134 | 038 | 243 | 053 | 315 | 068 | 431 | 083 | 526 |
| 009                      | 053 | 024 | 143 | 039 | 244 | 054 | 325 | 069 | 432 | 084 | 532 |
| 010                      | 054 | 025 | 145 | 040 | 245 | 055 | 331 | 070 | 445 | 085 | 546 |
| 011                      | 065 | 026 | 152 | 041 | 246 | 056 | 332 | 071 | 446 | 086 | 565 |
| 012                      | 071 | 027 | 155 | 042 | 251 | 057 | 343 | 072 | 452 | 087 | 606 |
| 013                      | 072 | 028 | 156 | 043 | 252 | 058 | 346 | 073 | 454 | 088 | 612 |
| 014                      | 073 | 029 | 162 | 044 | 255 | 059 | 351 | 074 | 455 | 089 | 624 |

| CO     | CONTOUR |   |    |    |    |    |    |    |   |    |
|--------|---------|---|----|----|----|----|----|----|---|----|
| Set    | 1       | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 |
|        | C       | O | P1 | P2 | P3 | P3 | P3 | P3 | ; |    |
| Read   | 1       | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 |
|        | C       | O | P1 | P2 | ;  |    |    |    |   |    |
| Answer | 1       | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 |
|        | C       | O | P1 | P2 | P3 | P3 | P3 | P3 | ; |    |

P1 0: MAIN-side  
 1: SUB-side  
 P2 0: CONTOUR "ON/OFF"  
 1: CONTOUR FREQ  
 2: APF "ON/OFF"  
 3: APF FREQ  
 P3 P2=0 0000: CONTOUR "OFF"  
 0001: CONTOUR "ON"  
 P2=1 0010 - 3200  
 (CONTOUR Frequency: 10 - 3200Hz)  
 P2=2 0000: APF "OFF"  
 0001: APF "ON"  
 P2=3 0000 - 0050 (APF Frequency: -250 - 250 Hz )

# CAT (Computer Aided Transceiver) Operation

| CS     | CW SPOT |   |    |   |   |   |   |   |   |    |                                        |
|--------|---------|---|----|---|---|---|---|---|---|----|----------------------------------------|
| Set    | 1       | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 | P1 0: CW SPOT "OFF"<br>1: CW SPOT "ON" |
|        | C       | S | P1 | ; |   |   |   |   |   |    |                                        |
| Read   | 1       | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                        |
|        | C       | S | ;  |   |   |   |   |   |   |    |                                        |
| Answer | 1       | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                        |
|        | C       | S | P1 | ; |   |   |   |   |   |    |                                        |

| CT     | SQL TYPE |   |    |    |   |   |   |   |   |    |                                                                                                                                                                  |
|--------|----------|---|----|----|---|---|---|---|---|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set    | 1        | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 | P1 0: MAIN-side<br>1: SUB-side<br>P2 0: CTCSS "OFF"<br>1: CTCSS ENC "ON" / DEC "OFF"<br>2: CTCSS ENC "ON" / DEC "ON"<br>3: DCS "ON"<br>4: PR FREQ<br>5: REV TONE |
|        | C        | T | P1 | P2 | ; |   |   |   |   |    |                                                                                                                                                                  |
| Read   | 1        | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |                                                                                                                                                                  |
|        | C        | T | P1 | ;  |   |   |   |   |   |    |                                                                                                                                                                  |
| Answer | 1        | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |                                                                                                                                                                  |
|        | C        | T | P1 | P2 | ; |   |   |   |   |    |                                                                                                                                                                  |

| DA     | DIMMER |   |    |    |    |    |    |    |    |    |    |                                                                                                                                               |
|--------|--------|---|----|----|----|----|----|----|----|----|----|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Set    | 1      | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | P1 00: (Fixed)<br>P2 00 - 20: TFT Display Contrast<br>P3 00 - 20: TFT Display Brightness Level<br>P4 00 - 20: LED Indicators Brightness Level |
|        | D      | A | P1 | P1 | P2 | P2 | P3 | P3 | P4 | P4 | ;  |                                                                                                                                               |
| Read   | 1      | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |                                                                                                                                               |
|        | D      | A | ;  |    |    |    |    |    |    |    |    |                                                                                                                                               |
| Answer | 1      | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |                                                                                                                                               |
|        | D      | A | P1 | P1 | P2 | P2 | P3 | P3 | P4 | P4 | ;  |                                                                                                                                               |

| DN     | MIC DOWN |   |   |   |   |   |   |   |   |    |  |
|--------|----------|---|---|---|---|---|---|---|---|----|--|
| Set    | 1        | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |  |
|        | D        | N | ; |   |   |   |   |   |   |    |  |
| Read   | 1        | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |  |
|        |          |   |   |   |   |   |   |   |   |    |  |
| Answer | 1        | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |  |
|        |          |   |   |   |   |   |   |   |   |    |  |

| DT     | DATE AND TIME |   |    |    |    |    |    |   |     |    |  |                                                                                                                                    |
|--------|---------------|---|----|----|----|----|----|---|-----|----|--|------------------------------------------------------------------------------------------------------------------------------------|
| Set    | 1             | 2 | 3  | 4  | 5  | 6  | 7  | ~ | n-1 | n  |  | P1 0: Date<br>1: Time (Local)<br>P2 P1=0    yyyymmdd (Year/Month/Date)<br>P1=1    hhmmss (Hour/Minute/Second, 24 hour time system) |
|        | D             | T | P1 | P2 | P2 | P2 | P2 | ~ | P2  | ;  |  |                                                                                                                                    |
| Read   | 1             | 2 | 3  | 4  | 5  | 6  | 7  | 8 | 9   | 10 |  |                                                                                                                                    |
|        | D             | T | P1 | ;  |    |    |    |   |     |    |  |                                                                                                                                    |
| Answer | 1             | 2 | 3  | 4  | 5  | 6  | 7  | ~ | n-1 | n  |  |                                                                                                                                    |
|        | D             | T | P1 | P2 | P2 | P2 | P2 | ~ | P2  | ;  |  |                                                                                                                                    |

| EO     | ENCODER OFFSET |   |    |    |    |    |    |    |    |    |                                                                                                                                                                                                 |
|--------|----------------|---|----|----|----|----|----|----|----|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set    | 1              | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | P1 0: MAIN-side<br>1: SUB-side<br>2: MAIN-side and SUB-side<br>P2 0: MAIN dial<br>1: FUNC knob<br>P3 +: Up<br>-: Down<br>P4 P2=0<br>0: Hz<br>1: kHz<br>2: MHz<br>P2=1<br>0: fix<br>P5 000 - 999 |
|        | E              | O | P1 | P2 | P3 | P4 | P5 | P5 | P5 | ;  |                                                                                                                                                                                                 |
| Read   | 1              | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |                                                                                                                                                                                                 |
|        |                |   |    |    |    |    |    |    |    |    |                                                                                                                                                                                                 |
| Answer | 1              | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |                                                                                                                                                                                                 |
|        |                |   |    |    |    |    |    |    |    |    |                                                                                                                                                                                                 |

| EX     | MENU |   |    |    |    |    |    |    |    |    |    |    |                                                                              |
|--------|------|---|----|----|----|----|----|----|----|----|----|----|------------------------------------------------------------------------------|
| Set    | 1    | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | ~  | nn | ** | P1 : 01 - 07<br>P2 : 01 - 07<br>P3 : 01 - 26<br>P4 : Parameter (See Table 3) |
|        | E    | X | P1 | P1 | P2 | P2 | P3 | P3 | P4 | ~  | P4 | ;  |                                                                              |
| Read   | 1    | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | nn | ** |                                                                              |
|        | E    | X | P1 | P1 | P2 | P2 | P3 | P3 | ;  |    |    |    |                                                                              |
| Answer | 1    | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | ~  | nn | ** |                                                                              |
|        | E    | X | P1 | P1 | P2 | P2 | P3 | P3 | P4 | ~  | P4 | ;  |                                                                              |

# CAT (Computer Aided Transceiver) Operation

| Table 3 (MENU Chart)  |                  |    |                     |                                                                                                                                                                                                                       |  |        |
|-----------------------|------------------|----|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|
| P1                    | P2               | P3 | Function            | P4                                                                                                                                                                                                                    |  | Digits |
| 01<br>(RADIO SETTING) | 01<br>(MODE SSB) | 01 | AF TREBLE GAIN      | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                                                |  | 3      |
|                       |                  | 02 | AF MIDDLE TONE GAIN | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                                                |  | 3      |
|                       |                  | 03 | AF BASS GAIN        | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                                                |  | 3      |
|                       |                  | 04 | AGC FAST DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                                                        |  | 4      |
|                       |                  | 05 | AGC MID DELAY       | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                                                        |  | 4      |
|                       |                  | 06 | AGC SLOW DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                                                        |  | 4      |
|                       |                  | 07 | LCUT FREQ           | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                                                                                                                                                                        |  | 2      |
|                       |                  | 08 | LCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                                              |  | 1      |
|                       |                  | 09 | HCUT FREQ           | 00: OFF 01: 700 Hz - 67: 4000 Hz (50 Hz steps)                                                                                                                                                                        |  | 2      |
|                       |                  | 10 | HCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                                              |  | 1      |
|                       |                  | 11 | USB OUT LEVEL       | 000 - 100                                                                                                                                                                                                             |  | 3      |
|                       |                  | 12 | TX BPF SEL          | 0: 50 - 3050 1: 100 - 2900 2: 200 - 2800 3: 300 - 2700 4: 400 - 2600 (Hz)                                                                                                                                             |  | 1      |
|                       |                  | 13 | MOD SOURCE          | 0: MIC 1: USB 2: Bluetooth 3: AUTO                                                                                                                                                                                    |  | 1      |
|                       |                  | 14 | USB MOD GAIN        | 000 - 100                                                                                                                                                                                                             |  | 3      |
|                       |                  | 15 | RPTT SELECT         | 0: OFF 1: RTS 2: DTR                                                                                                                                                                                                  |  | 1      |
|                       |                  | 16 | NAR WIDTH           | 00: 300 01: 400 02: 600 03: 850 04: 1100 05: 1200 06: 1500 07: 1650<br>08: 1800 09: 1950 10: 2100 11: 2250 12: 2400 13: 2450 14: 2500 15: 2600<br>16: 2700 17: 2800 18: 2900 19: 3000 20: 3200 21: 3500 22: 4000 (Hz) |  | 2      |
|                       |                  | 17 | CW AUTO MODE        | 0: OFF 1: 50MHz 2: ON                                                                                                                                                                                                 |  | 1      |
|                       | 02<br>(MODE AM)  | 01 | AF TREBLE GAIN      | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                                                |  | 3      |
|                       |                  | 02 | AF MIDDLE TONE GAIN | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                                                |  | 3      |
|                       |                  | 03 | AF BASS GAIN        | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                                                |  | 3      |
|                       |                  | 04 | AGC FAST DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                                                        |  | 4      |
|                       |                  | 05 | AGC MID DELAY       | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                                                        |  | 4      |
|                       |                  | 06 | AGC SLOW DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                                                        |  | 4      |
|                       |                  | 07 | LCUT FREQ           | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                                                                                                                                                                        |  | 2      |
|                       |                  | 08 | LCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                                              |  | 1      |
|                       |                  | 09 | HCUT FREQ           | 00: OFF 01: 700 Hz - 67: 4000 Hz (50 Hz steps)                                                                                                                                                                        |  | 2      |
|                       |                  | 10 | HCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                                              |  | 1      |
|                       |                  | 11 | USB OUT LEVEL       | 000 - 100                                                                                                                                                                                                             |  | 3      |
|                       |                  | 12 | TX BPF SEL          | 0: 50 - 3050 1: 100 - 2900 2: 200 - 2800 3: 300 - 2700 4: 400 - 2600                                                                                                                                                  |  | 1      |
|                       |                  | 13 | MOD SOURCE          | 0: MIC 1: USB 2: Bluetooth 3: AUTO                                                                                                                                                                                    |  | 1      |
|                       |                  | 14 | USB MOD GAIN        | 000 - 100                                                                                                                                                                                                             |  | 3      |
|                       |                  | 15 | RPTT SELECT         | 0: OFF 1: RTS 2: DTR                                                                                                                                                                                                  |  | 1      |
|                       | 03<br>(MODE FM)  | 01 | AF TREBLE GAIN      | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                                                |  | 3      |
|                       |                  | 02 | AF MIDDLE TONE GAIN | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                                                |  | 3      |
|                       |                  | 03 | AF BASS GAIN        | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                                                |  | 3      |
|                       |                  | 04 | AGC FAST DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                                                        |  | 4      |
|                       |                  | 05 | AGC MID DELAY       | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                                                        |  | 4      |
|                       |                  | 06 | AGC SLOW DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                                                        |  | 4      |
|                       |                  | 07 | LCUT FREQ           | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                                                                                                                                                                        |  | 2      |
|                       |                  | 08 | LCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                                              |  | 1      |
|                       |                  | 09 | HCUT FREQ           | 00: OFF 01: 700 Hz - 67: 4000 Hz (50 Hz steps)                                                                                                                                                                        |  | 2      |
|                       |                  | 10 | HCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                                              |  | 1      |
|                       |                  | 11 | USB OUT LEVEL       | 000 - 100                                                                                                                                                                                                             |  | 3      |
|                       |                  | 12 | MOD SOURCE          | 0: MIC 1: USB 2: Bluetooth 3: AUTO                                                                                                                                                                                    |  | 1      |
|                       |                  | 13 | USB MOD GAIN        | 000 - 100                                                                                                                                                                                                             |  | 3      |
|                       |                  | 14 | RPTT SELECT         | 0: OFF 1: RTS 2: DTR                                                                                                                                                                                                  |  | 1      |
|                       |                  | 15 | RPT SHIFT           | 0: - 1: SIMPLEX 2: + 3: ARS                                                                                                                                                                                           |  | 1      |
|                       |                  | 16 | RPT SHIFT(28MHz)    | 0 - 1000 kHz (P4 = 0000 - 1000, 10 kHz/step)                                                                                                                                                                          |  | 4      |
|                       |                  | 17 | RPT SHIFT(50MHz)    | 0 - 4000 kHz (P4 = 0000 - 4000, 10 kHz/step)                                                                                                                                                                          |  | 4      |
|                       |                  | 18 | RPT SHIFT(144MHz)   | 0 - 100MHz (P4 = 0000 - 0100, 50 kHz/step)                                                                                                                                                                            |  | 4      |
|                       |                  | 19 | RPT SHIFT(430MHz)   | 0 - 100MHz (P4 = 0000 - 0100, 50 kHz/step)                                                                                                                                                                            |  | 4      |
|                       |                  | 20 | SQL TYPE            | 0: OFF 1: ENC 2: TSQ 3: DCS 4: PR FREQ 5: REV TONE                                                                                                                                                                    |  | 1      |
|                       |                  | 21 | TONE FREQ           | 00: 67.0 - 49: 254.1Hz                                                                                                                                                                                                |  | 2      |
|                       |                  | 22 | DCS CODE            | 00: 023 - 103: 754                                                                                                                                                                                                    |  | 2      |
|                       |                  | 23 | DCS RX REVERS       | 0: NORMAL 1: REVERS 2: BOTH                                                                                                                                                                                           |  | 1      |
|                       |                  | 24 | DCS TX REVERS       | 0: NORMAL 1: REVERS                                                                                                                                                                                                   |  | 1      |
|                       |                  | 25 | PR FREQ             | 300 - 3000 Hz (P4= 0300 - 3000, 100 Hz/step)                                                                                                                                                                          |  | 4      |
|                       |                  | 26 | DTMF DELAY          | 0: 50 1: 250 2: 450 3: 750 4: 1000 (ms)                                                                                                                                                                               |  | 1      |
|                       |                  | 27 | DTMF SPEED          | 0: 50 1: 100 (ms)                                                                                                                                                                                                     |  | 1      |
|                       |                  | 28 | DTMF MEMORY1        | 0 - 9, A, B, C, D, *, #, - (space) (Up to 16 characters)                                                                                                                                                              |  | 16     |
|                       |                  | 29 | DTMF MEMORY2        | 0 - 9, A, B, C, D, *, #, - (space) (Up to 16 characters)                                                                                                                                                              |  | 16     |
|                       |                  | 30 | DTMF MEMORY3        | 0 - 9, A, B, C, D, *, #, - (space) (Up to 16 characters)                                                                                                                                                              |  | 16     |
|                       |                  | 31 | DTMF MEMORY4        | 0 - 9, A, B, C, D, *, #, - (space) (Up to 16 characters)                                                                                                                                                              |  | 16     |
|                       |                  | 32 | DTMF MEMORY5        | 0 - 9, A, B, C, D, *, #, - (space) (Up to 16 characters)                                                                                                                                                              |  | 16     |
|                       |                  | 33 | DTMF MEMORY6        | 0 - 9, A, B, C, D, *, #, - (space) (Up to 16 characters)                                                                                                                                                              |  | 16     |
|                       |                  | 34 | DTMF MEMORY7        | 0 - 9, A, B, C, D, *, #, - (space) (Up to 16 characters)                                                                                                                                                              |  | 16     |
|                       |                  | 35 | DTMF MEMORY8        | 0 - 9, A, B, C, D, *, #, - (space) (Up to 16 characters)                                                                                                                                                              |  | 16     |
|                       |                  | 36 | DTMF MEMORY9        | 0 - 9, A, B, C, D, *, #, - (space) (Up to 16 characters)                                                                                                                                                              |  | 16     |
|                       |                  | 37 | DTMF MEMORY10       | 0 - 9, A, B, C, D, *, #, - (space) (Up to 16 characters)                                                                                                                                                              |  | 16     |

# CAT (Computer Aided Transceiver) Operation

| Table 3 (MENU Chart)  |                   |    |                     |                                                                                                                                                                                           |        |
|-----------------------|-------------------|----|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| P1                    | P2                | P3 | Function            | P4                                                                                                                                                                                        | Digits |
| 01<br>(RADIO SETTING) | 04<br>(MODE DATA) | 01 | AF TREBLE GAIN      | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                    | 3      |
|                       |                   | 02 | AF MIDDLE TONE GAIN | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                    | 3      |
|                       |                   | 03 | AF BASS GAIN        | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                    | 3      |
|                       |                   | 04 | AGC FAST DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                            | 4      |
|                       |                   | 05 | AGC MID DELAY       | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                            | 4      |
|                       |                   | 06 | AGC SLOW DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                            | 4      |
|                       |                   | 07 | LCUT FREQ           | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                                                                                                                                            | 2      |
|                       |                   | 08 | LCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                  | 1      |
|                       |                   | 09 | HCUT FREQ           | 00: OFF 01: 700 Hz - 67: 4000 Hz (50 Hz steps)                                                                                                                                            | 2      |
|                       |                   | 10 | HCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                  | 1      |
|                       |                   | 11 | USB OUT LEVEL       | 000 - 100                                                                                                                                                                                 | 3      |
|                       |                   | 12 | TX BPF SEL          | 0: 50 - 3050 1: 100 - 2900 2: 200 - 2800 3: 300 - 2700 4: 400 - 2600                                                                                                                      | 1      |
|                       |                   | 13 | MOD SOURCE          | 0: MIC 1: USB 2: Bluetooth 3: AUTO                                                                                                                                                        | 1      |
|                       |                   | 14 | USB MOD GAIN        | 000 - 100                                                                                                                                                                                 | 3      |
|                       |                   | 15 | RPTT SELECT         | 0: OFF 1: RTS 2: DTR                                                                                                                                                                      | 1      |
|                       |                   | 16 | NAR WIDTH           | 00: 50 01:100 02: 150 03: 200 04: 250 05: 300 06: 350 07: 400<br>08: 450 09: 500 10: 600 11: 800 12: 1200 13: 1400 14: 1700 15: 2000<br>16: 2400 17: 3000 18: 3200 19: 3500 20: 4000 (Hz) | 2      |
|                       |                   | 17 | PSK TONE            | 0: 1000Hz 1: 1500Hz 2: 2000Hz                                                                                                                                                             | 1      |
|                       |                   | 18 | DATA SHIFT (SSB)    | 0 - 3000 Hz (P4 = 0000 - 3000, 10 Hz steps)                                                                                                                                               | 4      |
|                       | 05<br>(MODE RTTY) | 01 | AF TREBLE GAIN      | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                    | 3      |
|                       |                   | 02 | AF MIDDLE TONE GAIN | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                    | 3      |
|                       |                   | 03 | AF BASS GAIN        | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                    | 3      |
|                       |                   | 04 | AGC FAST DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                            | 4      |
|                       |                   | 05 | AGC MID DELAY       | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                            | 4      |
|                       |                   | 06 | AGC SLOW DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                            | 4      |
|                       |                   | 07 | LCUT FREQ           | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                                                                                                                                            | 2      |
|                       |                   | 08 | LCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                  | 1      |
|                       |                   | 09 | HCUT FREQ           | 00: OFF 01: 700 Hz - 67: 4000 Hz (50 Hz steps)                                                                                                                                            | 2      |
|                       |                   | 10 | HCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                  | 1      |
|                       |                   | 11 | USB OUT LEVEL       | 000 - 100                                                                                                                                                                                 | 3      |
|                       |                   | 12 | RPTT SELECT         | 0: OFF 1: RTS 2: DTR                                                                                                                                                                      | 1      |
|                       |                   | 13 | NAR WIDTH           | 00: 50 01:100 02: 150 03: 200 04: 250 05: 300 06: 350 07: 400<br>08: 450 09: 500 10: 600 11: 800 12: 1200 13: 1400 14: 1700 15: 2000<br>16: 2400 17: 3000 18: 3200 19: 3500 20: 4000 (Hz) | 2      |
|                       |                   | 14 | MARK FREQUENCY      | 0: 1275 Hz 1: 2125 Hz                                                                                                                                                                     | 1      |
|                       |                   | 15 | SHIFT FREQUENCY     | 0: 170 Hz 1: 200 Hz 2: 425 Hz 3: 850 Hz                                                                                                                                                   | 1      |
|                       |                   | 16 | POLARITY-TX         | 0: NOR 1: REV                                                                                                                                                                             | 1      |
|                       | 06<br>(DIGITAL)   | 01 | DIGITAL POPUP       | 00: OFF 01: 2 sec - 59: 60sec 60: CONTINUE                                                                                                                                                | 2      |
|                       |                   | 02 | LOCATION SERVICE    | 0: OFF 1: ON                                                                                                                                                                              | 1      |
|                       |                   | 03 | STANDBY BEEP        | 0: OFF 1: ON                                                                                                                                                                              | 1      |
|                       |                   | 04 | DP-ID LIST          | —                                                                                                                                                                                         | -      |
|                       |                   | 05 | RADIO ID            | —                                                                                                                                                                                         | -      |
| 02<br>(CW SETTING)    | 01<br>(MODE CW)   | 01 | AF TREBLE GAIN      | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                    | 3      |
|                       |                   | 02 | AF MIDDLE TONE GAIN | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                    | 3      |
|                       |                   | 03 | AF BASS GAIN        | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                    | 3      |
|                       |                   | 04 | AGC FAST DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                            | 4      |
|                       |                   | 05 | AGC MID DELAY       | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                            | 4      |
|                       |                   | 06 | AGC SLOW DELAY      | 20 - 4000 msec (P4= 0020 - 4000, 20 msec/step)                                                                                                                                            | 4      |
|                       |                   | 07 | LCUT FREQ           | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                                                                                                                                            | 2      |
|                       |                   | 08 | LCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                  | 1      |
|                       |                   | 09 | HCUT FREQ           | 00: OFF 01: 700 Hz - 67: 4000 Hz (50 Hz steps)                                                                                                                                            | 2      |
|                       |                   | 10 | HCUT SLOPE          | 0: 6 dB/oct 1: 18 dB/oct                                                                                                                                                                  | 1      |
|                       |                   | 11 | USB OUT LEVEL       | 000 - 100                                                                                                                                                                                 | 3      |
|                       |                   | 12 | RPTT SELECT         | 0: OFF 1: RTS 2: DTR                                                                                                                                                                      | 1      |
|                       |                   | 13 | NAR WIDTH           | 00: 50 01:100 02: 150 03: 200 04: 250 05: 300 06: 350 07: 400<br>08: 450 09: 500 10: 600 11: 800 12: 1200 13: 1400 14: 1700 15: 2000<br>16: 2400 17: 3000 18: 3200 19: 3500 20: 4000 (Hz) | 2      |
|                       |                   | 14 | PC KEYING           | 0: OFF 1: RTS 2: DTR                                                                                                                                                                      | 1      |
|                       |                   | 15 | CW BK-IN TYPE       | 0: SEMI 1: FULL                                                                                                                                                                           | 1      |
|                       |                   | 16 | CW FREQ DISPLAY     | 0: DIRECT FREQ 1: PITCH OFFSET                                                                                                                                                            | 1      |
|                       |                   | 17 | QSK DELAY TIME      | 0: 15 msec 1: 20 msec 2: 25 msec 3: 30 msec                                                                                                                                               | 1      |
|                       |                   | 18 | CW INDICATOR        | 0: OFF 1: ON                                                                                                                                                                              | 1      |
|                       | 02<br>(KEYER)     | 01 | KEYER TYPE          | 0: OFF 1: BUG 2: ELEKEY-A 3: ELEKEY-B 4: ELEKEY-Y 5: ACS                                                                                                                                  | 1      |
|                       |                   | 02 | KEYER DOT/DASH      | 0: NOR 1: REV                                                                                                                                                                             | 1      |
|                       |                   | 03 | CW WEIGHT           | 2.5 - 4.5 (P4 = 25 - 45)                                                                                                                                                                  | 2      |
|                       |                   | 04 | NUMBER STYLE        | 0: 1290 1: AUNO 2: AUNT 3: A2NO 4: A2NT 5: 12NO 6: 12NT                                                                                                                                   | 1      |
|                       |                   | 05 | CONTEST NUMBER      | 0001 - 9999                                                                                                                                                                               | 4      |
|                       |                   | 06 | CW MEMORY 1         | 0: TEXT 1: MESSAGE                                                                                                                                                                        | 1      |
|                       |                   | 07 | CW MEMORY 2         | 0: TEXT 1: MESSAGE                                                                                                                                                                        | 1      |
|                       |                   | 08 | CW MEMORY 3         | 0: TEXT 1: MESSAGE                                                                                                                                                                        | 1      |
|                       |                   | 09 | CW MEMORY 4         | 0: TEXT 1: MESSAGE                                                                                                                                                                        | 1      |
|                       |                   | 10 | CW MEMORY 5         | 0: TEXT 1: MESSAGE                                                                                                                                                                        | 1      |
|                       |                   | 11 | REPEAT INTERVAL     | 1 - 60 sec (P4 = 01 - 60)                                                                                                                                                                 | 2      |

# CAT (Computer Aided Transceiver) Operation

| Table 3 (MENU Chart)      |                    |    |                      |                                                                                                                                                                                                   |        |
|---------------------------|--------------------|----|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| P1                        | P2                 | P3 | Function             | P4                                                                                                                                                                                                | Digits |
| 03<br>(OPERATION SETTING) | 01<br>(GENERAL)    | 01 | BEEP LEVEL           | 000 - 100                                                                                                                                                                                         | 3      |
|                           |                    | 02 | RF/SQL VR            | 0: RF 1: SQL 2:SQL (FM MODE only)                                                                                                                                                                 | 1      |
|                           |                    | 03 | TUN/LIN PORT SELECT  | 0: EXT-TUNER 1: LINEAR 2: CAT-3 3: GPO                                                                                                                                                            | 1      |
|                           |                    | 04 | TUNER SELECT         | 0: INT 1: INT (FAST) 2: EXT 3: ATAS                                                                                                                                                               | 1      |
|                           |                    | 05 | CAT-1 RATE           | 0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4:115200 bps                                                                                                                                    | 1      |
|                           |                    | 06 | CAT-1 TIME OUT TIMER | 0: 10 msec 1: 100 msec 2: 1000 msec 3: 3000 msec                                                                                                                                                  | 1      |
|                           |                    | 07 | CAT-1 CAT-3 STOP BIT | 0: 1 bit 1: 2 bit                                                                                                                                                                                 | 1      |
|                           |                    | 08 | CAT-2 RATE           | 0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4:115200 bps                                                                                                                                    | 1      |
|                           |                    | 09 | CAT-2 TIME OUT TIMER | 0: 10 msec 1: 100 msec 2: 1000 msec 3: 3000 msec                                                                                                                                                  | 1      |
|                           |                    | 10 | CAT-3 RATE           | 0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4:115200 bps                                                                                                                                    | 1      |
|                           |                    | 11 | CAT-3 TIME OUT TIMER | 0: 10 msec 1: 100 msec 2: 1000 msec 3: 3000 msec                                                                                                                                                  | 1      |
|                           |                    | 12 | TX TIME OUT TIMER    | 00: OFF 01: 01 min - 30: 30 min (P4= 00 - 30)                                                                                                                                                     | 2      |
|                           |                    | 13 | REF FREQ ADJ         | -25 - +00 (or -00) - +25 (P4= -25 - +00 or -00 - +25)                                                                                                                                             | 3      |
|                           |                    | 14 | CHARGE CONTROL       | 0: OFF 1: ON                                                                                                                                                                                      | 1      |
|                           |                    | 15 | SUB BAND MUTE        | 0: OFF 1: ON                                                                                                                                                                                      | 1      |
|                           |                    | 16 | SPEAKER SELECT       | 0: Auto 1: INT 2: BOTH                                                                                                                                                                            | 1      |
|                           |                    | 17 | DITHER               | 0: OFF 1: ON                                                                                                                                                                                      | 1      |
|                           | 02<br>(BAND-SCAN)  | 01 | QMB CH               | 0: 5ch 1: 10ch                                                                                                                                                                                    | 1      |
|                           |                    | 02 | BAND STACK           | 0: OFF 1: ON                                                                                                                                                                                      | 1      |
|                           |                    | 03 | BAND EDGE            | 0: OFF 1: ON                                                                                                                                                                                      | 1      |
|                           |                    | 04 | SCAN RESUME          | 0: BUSY 1: HOLD 2: 1sec 3: 3sec 4: 5sec                                                                                                                                                           | 1      |
|                           | 03<br>(RX-DSP)     | 01 | IF NOTCH WIDTH       | 0: NARROW 1: WIDE                                                                                                                                                                                 | 1      |
|                           |                    | 02 | NB REJECTION         | 0: LOW 1: MID 2: HIGH                                                                                                                                                                             | 1      |
|                           |                    | 03 | NB WIDTH             | 0: NARROW 1: MEDIUM 2: WIDE                                                                                                                                                                       | 1      |
|                           |                    | 04 | APF WIDTH            | 0: NARROW 1: MEDIUM 2: WIDE                                                                                                                                                                       | 1      |
|                           |                    | 05 | CONTOUR LEVEL        | -40 - -00 (or +00) - +20 (P4 = -40 - -00 or +00 - +20)                                                                                                                                            | 3      |
|                           |                    | 06 | CONTOUR WIDTH        | 01 - 11                                                                                                                                                                                           | 2      |
|                           | 04<br>(TX AUDIO)   | 01 | AMC RELEASE TIME     | 0: FAST 1: MID 2: SLOW                                                                                                                                                                            | 1      |
|                           |                    | 02 | PRMTRC EQ1 FREQ      | 00 : OFF 01: 100 Hz - 07: 700 Hz (100 Hz steps)                                                                                                                                                   | 2      |
|                           |                    | 03 | PRMTRC EQ1 LEVEL     | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                            | 3      |
|                           |                    | 04 | PRMTRC EQ1 BWTH      | 00 - 10                                                                                                                                                                                           | 2      |
|                           |                    | 05 | PRMTRC EQ2 FREQ      | 00: OFF 01: 700 Hz - 09: 1500 Hz (100 Hz steps)                                                                                                                                                   | 2      |
|                           |                    | 06 | PRMTRC EQ2 LEVEL     | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                            | 3      |
|                           |                    | 07 | PRMTRC EQ2 BWTH      | 00 - 10                                                                                                                                                                                           | 2      |
|                           |                    | 08 | PRMTRC EQ3 FREQ      | 00 : OFF 01: 1500 Hz - 18: 3200 Hz (100 Hz steps)                                                                                                                                                 | 2      |
|                           |                    | 09 | PRMTRC EQ3 LEVEL     | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                            | 3      |
|                           |                    | 10 | PRMTRC EQ3 BWTH      | 00 - 10                                                                                                                                                                                           | 2      |
|                           |                    | 11 | P PRMTRC EQ1 FREQ    | 00 : OFF 01: 100 Hz - 07: 700 Hz (100 Hz steps)                                                                                                                                                   | 2      |
|                           |                    | 12 | P PRMTRC EQ1 LEVEL   | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                            | 3      |
|                           |                    | 13 | P PRMTRC EQ1 BWTH    | 00 - 10                                                                                                                                                                                           | 2      |
|                           |                    | 14 | P PRMTRC EQ2 FREQ    | 00: OFF 01: 700 Hz - 09: 1500 Hz (100 Hz steps)                                                                                                                                                   | 2      |
|                           |                    | 15 | P PRMTRC EQ2 LEVEL   | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                            | 3      |
|                           |                    | 16 | P PRMTRC EQ2 BWTH    | 00 - 10                                                                                                                                                                                           | 2      |
|                           |                    | 17 | P PRMTRC EQ3 FREQ    | 00 : OFF 01: 1500 Hz - 18: 3200 Hz (100 Hz steps)                                                                                                                                                 | 2      |
|                           |                    | 18 | P PRMTRC EQ3 LEVEL   | -20 - -00 (or +00) - +10 (P4 = -20 - -00 or +00 - +10)                                                                                                                                            | 3      |
|                           |                    | 19 | P PRMTRC EQ3 BWTH    | 00 - 10                                                                                                                                                                                           | 2      |
|                           | 05<br>(TX GENERAL) | 01 | MAX POWER (BAT)      | 005 - 060 (P4 = 005 - 060)                                                                                                                                                                        | 3      |
|                           |                    | 02 | QRP MODE             | 0: OFF 1: ON                                                                                                                                                                                      | 1      |
|                           |                    | 03 | HF MAX POWER         | 005 - 010 (P4 = 005 - 010)                                                                                                                                                                        | 3      |
|                           |                    | 04 | 50M MAX POWER        | 005 - 010 (P4 = 005 - 010)                                                                                                                                                                        | 3      |
|                           |                    | 05 | 70M MAX POWER        | 005 - 060 (P4 = 005 - 060)                                                                                                                                                                        | 3      |
|                           |                    | 06 | 144M MAX POWER       | 005 - 100 (P4 = 005 - 100)                                                                                                                                                                        | 3      |
|                           |                    | 07 | 430M MAX POWER       | 005 - 100 (P4 = 005 - 100)                                                                                                                                                                        | 3      |
|                           |                    | 08 | AM HF/50 MAX POWER   | 005 - 025 (P4 = 005 - 025)                                                                                                                                                                        | 3      |
|                           |                    | 09 | AM V/U MAX POWER     | 005 - 025 (P4 = 005 - 025)                                                                                                                                                                        | 3      |
|                           |                    | 10 | VOX SELECT           | 0: MIC 1: USB 2: Bluetooth                                                                                                                                                                        | 1      |
|                           |                    | 11 | EMERGENCY FREQ TX    | 0: OFF 1: ON                                                                                                                                                                                      | 1      |
|                           |                    | 12 | TX INHIBIT           | 0: OFF 1: ON                                                                                                                                                                                      | 1      |
|                           |                    | 13 | METER DETECTOR       | 0: AVERAGE 1: PEAK                                                                                                                                                                                | 1      |
|                           | 06<br>(KEY/DIAL)   | 01 | SSB/CW DIAL STEP     | 0: 5 1: 10 2: 20 (Hz)                                                                                                                                                                             | 1      |
|                           |                    | 02 | RTTY/PSK DIAL STEP   | 0: 5 1: 10 2: 20 (Hz)                                                                                                                                                                             | 1      |
|                           |                    | 03 | FM DIAL STEP         | 0: 5 1: 6.25 2: 10 3: 12.5 4: 20 5: 25 (kHz) 6: Auto                                                                                                                                              | 1      |
|                           |                    | 04 | CH STEP              | 0: 1 1: 2.5 2: 5 3: 10 (kHz)                                                                                                                                                                      | 1      |
|                           |                    | 05 | AM CH STEP           | 0: 2.5 1: 5 2: 9 3: 10 4: 12.5 5: 25 (kHz)                                                                                                                                                        | 1      |
|                           |                    | 06 | FM CH STEP           | 0: 5 1: 6.25 2: 10 3: 12.5 4: 20 5: 25 (kHz)                                                                                                                                                      | 1      |
|                           |                    | 07 | MAIN STEPS PER REV.  | 0: 50 1: 100 2: 200                                                                                                                                                                               | 1      |
|                           |                    | 08 | MIC P1               | 00:LOCK 01:QMB 02:>/< 03:V/M 04:TUNER<br>05:VOX/MOX 06:MODE 07:ZIN/SPOT 08:SPLIT 09:FINE<br>10:NAR 11:NB 12:DNR 13:FREQ UP 14:FREQ DOWN<br>15:BAND UP 16:BAND DOWN 17 ATT 18:IPO 19:DNF<br>20:AGC | 2      |
|                           |                    | 09 | MIC P2               |                                                                                                                                                                                                   |        |
|                           |                    | 10 | MIC P3               |                                                                                                                                                                                                   |        |
|                           |                    | 11 | MIC P4               |                                                                                                                                                                                                   |        |
|                           |                    | 12 | MIC UP               |                                                                                                                                                                                                   |        |
|                           |                    | 13 | MIC DOWN             |                                                                                                                                                                                                   |        |
|                           |                    | 14 | MIC SCAN             | 0: OFF 1: ON                                                                                                                                                                                      | 1      |

# CAT (Computer Aided Transceiver) Operation

| Table 3 (MENU Chart)      |                       |    |                       |                                                   |        |  |
|---------------------------|-----------------------|----|-----------------------|---------------------------------------------------|--------|--|
| P1                        | P2                    | P3 | Function              | P4                                                | Digits |  |
| 03<br>(OPERATION SETTING) | 07<br>(OPTION)        | 01 | TUNER TYPE SEL ANT1   | 0: INT 1: INT(FAST) 2: EXT 3: ATAS                | 1      |  |
|                           |                       | 02 | TUNER TYPE SEL ANT2   | 0: INT 1: INT(FAST) 2: EXT 3: ATAS                | 1      |  |
|                           |                       | 03 | ANT2 OPERATION        | 0: TRX 1: TX-ANT1, RX-ANT2 2: TRX-ANT1, RX-ANT2   | 1      |  |
|                           |                       | 04 | HF ANT SELECT         | 0: ANT1 1: ANT2                                   | 1      |  |
|                           |                       | 05 | HF MAX POWER          | 005 - 100 (P4 = 005 - 100)                        | 3      |  |
|                           |                       | 06 | 50M MAX POWER         | 005 - 100 (P4 = 005 - 100)                        | 3      |  |
|                           |                       | 07 | 70M MAX POWER         | 005 - 050 (P4 = 005 - 050)                        | 3      |  |
|                           |                       | 08 | 144M MAX POWER        | 005 - 050 (P4 = 005 - 050)                        | 3      |  |
|                           |                       | 09 | 430M MAX POWER        | 005 - 050 (P4 = 005 - 050)                        | 3      |  |
|                           |                       | 10 | AM MAX POWER          | 005 - 025 (P4 = 005 - 025)                        | 3      |  |
|                           |                       | 11 | AM V/U MAX POWER      | 005 - 013 (P4 = 005 - 013)                        | 3      |  |
|                           |                       | 12 | GPS                   | 0: OFF 1: ON                                      | 1      |  |
|                           |                       | 13 | GPS PINNING           | 0: OFF 1: ON                                      | 1      |  |
|                           |                       | 14 | GPS BAUDRATE          | 0: 4800 1: 9600 2: 19200 3: 38400 4: 115200 (bps) | 1      |  |
|                           |                       | 15 | BLUETOOTH             | —                                                 | -      |  |
| 04<br>(DISPLAY SETTING)   | 01<br>(DISPLAY)       | 01 | MY CALL               | Up to 10 characters                               | 10     |  |
|                           |                       | 02 | MY CALL TIME          | 0: OFF 1: 1 2: 2 3: 3 4: 4 5: 5 (sec)             | 1      |  |
|                           |                       | 03 | POP-UP TIME           | 0: FAST 1: MID 2: SLOW                            | 1      |  |
|                           |                       | 04 | SCREEN SAVER          | 0: OFF 1: 1 2: 2 3: 5 4: 15 5: 30 6: 60 (min)     | 1      |  |
|                           |                       | 05 | SCREEN SAVER(BAT)     | 0: OFF 1: 1 2: 2 3: 5 4: 15 5: 30 6: 60 (min)     | 1      |  |
|                           |                       | 06 | SAVER TYPE            | 0: Logo 1: DIMMER 2: DISP OFF                     | 1      |  |
|                           |                       | 07 | AUTO POWER OFF        | 0: OFF 1: 0.5 - 24: 12 (hour)                     | 1      |  |
|                           |                       | 08 | LED DIMMER            | 00 - 20                                           | 2      |  |
|                           | 02<br>(UNIT)          | 01 | POSITION UNIT         | 0: dd°MM.mm' 1: dd°mm'ss"                         | 1      |  |
|                           |                       | 02 | DISTANCE UNIT         | 0: km 1: mile                                     | 1      |  |
|                           |                       | 03 | SPEED UNIT            | 0: km/h 1: knot 3: mph                            | 1      |  |
|                           |                       | 04 | ALTITUDE UNIT         | 0: m 1: ft                                        | 1      |  |
|                           |                       | 05 | TEMP UNIT             | 0: °C 1: °F                                       | 1      |  |
|                           |                       | 06 | RAIN UNIT             | 0: mm 1: INCH                                     | 1      |  |
|                           |                       | 07 | WIND UNIT             | 0: m/s 2: mph                                     | 1      |  |
|                           | 03<br>(SCOPE)         | 01 | RBW                   | 0: HIGH 1: MID 2: LOW                             | 1      |  |
|                           |                       | 02 | SCOPE CTR             | 0: FILTER 1: CARRIER                              | 1      |  |
|                           |                       | 03 | 2D DISP SENSITIVITY   | 0: NORMAL 1: HI                                   | 1      |  |
|                           |                       | 04 | 3DSS DISP SENSITIVITY | 0: NORMAL 1: HI                                   | 1      |  |
|                           |                       | 05 | AVERAGE               | 0: OFF 1: 2 2: 4 3: 8                             | 1      |  |
|                           | 04<br>(VFO IND COLOR) | 01 | VMI COLOR VFO         | 0: BLUE 1: GREEN 2: WHITE 3: NONE                 | 1      |  |
|                           |                       | 02 | VMI COLOR MEMORY      | 0: BLUE 1: GREEN 2: WHITE 3: NONE                 | 1      |  |
|                           |                       | 03 | VMI COLOR CLAR        | 0: RED 1: NONE                                    | 1      |  |
| 05<br>(EXTENSION SETTING) | 01<br>(DATE&TIME)     | 01 | TIME ZONE             | -12 (-120) - 0 - +14 (+140) (h) (0.5h steps)      | 4      |  |
|                           |                       | 02 | DAY                   | —                                                 | -      |  |
|                           |                       | 03 | MONTH                 | —                                                 | -      |  |
|                           |                       | 04 | YEAR                  | —                                                 | -      |  |
|                           |                       | 05 | HOUR                  | —                                                 | -      |  |
|                           |                       | 06 | MINUTE                | —                                                 | -      |  |
|                           | 01<br>(MY POSITION)   | 07 | GPS TIME SET          | 0: AUTO 1: MANUAL                                 | 1      |  |
|                           |                       | 08 | MY POSITION           | 0: GPS 1: MANUAL                                  | 1      |  |
|                           |                       | 09 | MY POSITION LATITUDE  | Latitude: x xx°xx' xx"                            | -      |  |
|                           |                       | 10 | MY POSITION LONGITUDE | Longitude: x xxx°xx' xx"                          | -      |  |
|                           | 02<br>(SD CARD)       | 01 | MEM LIST LOAD         | —                                                 | -      |  |
|                           |                       | 02 | MEM LIST SAVE         | —                                                 | -      |  |
|                           |                       | 03 | MENU LOAD             | —                                                 | -      |  |
|                           |                       | 04 | MENU SAVE             | —                                                 | -      |  |
|                           |                       | 05 | INFORMATIONS          | —                                                 | -      |  |
|                           |                       | 06 | FIRMWARE UPDATE       | —                                                 | -      |  |
|                           |                       | 07 | FORMAT                | —                                                 | -      |  |
|                           | 03<br>(SOFT VERSION)  | 01 | SOFT VERSION          | —                                                 | -      |  |
|                           | 04<br>(CALIBRATION)   | 01 | CALIBRATION           | —                                                 | -      |  |
|                           | 05<br>(RESET)         | 01 | MEMORY CLEAR          | —                                                 | -      |  |
|                           |                       | 02 | MENU CLEAR            | —                                                 | -      |  |
|                           |                       | 03 | ALL RESET             | —                                                 | -      |  |
|                           | 05<br>(CERTIFICATION) | 04 | CERTIFICATION         | —                                                 | -      |  |

# CAT (Computer Aided Transceiver) Operation

| Table 3 (MENU Chart) |                      |    |                    |                                                                                                                                                                                                               |        |  |
|----------------------|----------------------|----|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--|
| P1                   | P2                   | P3 | Function           | P4                                                                                                                                                                                                            | Digits |  |
| 06<br>(APRS SETTING) | 01<br>(GENERAL)      | 01 | MODEM SELECT       | 0: OFF 1: AUTO 2: MAIN 3: SUB                                                                                                                                                                                 | 1      |  |
|                      |                      | 02 | MODEM TYPE         | 0: 1200bps 1: 9600bps                                                                                                                                                                                         | 1      |  |
|                      |                      | 03 | APRS AF MUTE       | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 04 | APRS TX DELAY      | 0: 100ms 1: 200ms 2: 300ms 3: 400ms 4: 500ms 5: 750ms 6: 1000ms                                                                                                                                               | 1      |  |
|                      |                      | 05 | CALLSIGN(APRS)     | xxxxxx-xx                                                                                                                                                                                                     | 8      |  |
|                      |                      | 09 | APRS DESTINATION   | APYX01 (fix)                                                                                                                                                                                                  | 6      |  |
|                      | 02<br>(MSG TEMPLATE) | 01 | MESSAGE TEXT1      | Up to 16 characters (ASCII)                                                                                                                                                                                   | 16     |  |
|                      |                      | 02 | MESSAGE TEXT2      | Up to 16 characters (ASCII)                                                                                                                                                                                   | 16     |  |
|                      |                      | 03 | MESSAGE TEXT3      | Up to 16 characters (ASCII)                                                                                                                                                                                   | 16     |  |
|                      |                      | 04 | MESSAGE TEXT4      | Up to 16 characters (ASCII)                                                                                                                                                                                   | 16     |  |
|                      |                      | 05 | MESSAGE TEXT5      | Up to 16 characters (ASCII)                                                                                                                                                                                   | 16     |  |
|                      |                      | 06 | MESSAGE TEXT6      | Up to 16 characters (ASCII)                                                                                                                                                                                   | 16     |  |
|                      |                      | 07 | MESSAGE TEXT7      | Up to 16 characters (ASCII)                                                                                                                                                                                   | 16     |  |
|                      |                      | 08 | MESSAGE TEXT8      | Up to 16 characters (ASCII)                                                                                                                                                                                   | 16     |  |
|                      | 03<br>(MY SYMBOL)    | 01 | MY SYMBOL          | 0: ICON1 1: ICON2 2: ICON3 3: USER                                                                                                                                                                            | 1      |  |
|                      |                      | 02 | ICON1              | See Table 4 (see page 16)                                                                                                                                                                                     | 2      |  |
|                      |                      | 03 | ICON2              | See Table 4 (see page 16)                                                                                                                                                                                     | 2      |  |
|                      |                      | 04 | ICON3              | See Table 4 (see page 16)                                                                                                                                                                                     | 2      |  |
|                      |                      | 05 | USER               | See Table 4 (see page 16)                                                                                                                                                                                     | 2      |  |
|                      | 04<br>(DIGI PATH)    | 01 | PATH SELECT        | 0: OFF 1: WIDE1-1 2: WIDE1-1.WIDE2-1                                                                                                                                                                          | 1      |  |
| 07<br>(APRS BEACON)  | 01<br>(BEACON SET.)  | 01 | BEACON TYPE        | 0: OFF 1: AUTO 2: SMART                                                                                                                                                                                       | 1      |  |
|                      |                      | 02 | INFO AMBIGUITY     | 0: OFF 1: 1dig 2: 2dig 3: 3dig 4: 4dig                                                                                                                                                                        | 1      |  |
|                      |                      | 03 | INFO SPEED/COURSE  | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 04 | INFO ALTITUDE      | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 05 | POSITION COMMENT   | 00: Off duty 01: En Route 02: In Service 03: Returning 04: Committed<br>05: Special 06: Priority 07: Custom 0 08: Custom 1 09: Custom 2<br>10: Custom 3 11: Custom 4 12: Custom 5 13: Custom 6 14: EMERGENCY! | 2      |  |
|                      |                      | 06 | EMERGENCY BEACON   | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      | 02<br>(AUTO BEACON)  | 01 | INTERVAL TIME      | 0:30sec / 1:1min / 2:2min / 3:3min / 4:5min / 5:10min / 6:15min / 7:20min / 8:30min / 9:60min                                                                                                                 | 1      |  |
|                      |                      | 02 | PROPORTIONAL       | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 03 | DECAY              | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 04 | AUTO LOW SPEED     | 01 - 99 (km/h or mph (1km or 1mph/Step)                                                                                                                                                                       | 2      |  |
|                      |                      | 05 | BEACON DELAY       | 005 - 180 (sec)                                                                                                                                                                                               | 3      |  |
|                      | 03<br>(SmartBeac.)   | 01 | SMART LOW SPEED    | 02 - 30 (km/h or mph (1km or 1mph/Step)                                                                                                                                                                       | 2      |  |
|                      |                      | 02 | SMART HIGH SPEED   | 03 - 90 (km/h or mph (1km or 1mph/Step)                                                                                                                                                                       | 2      |  |
|                      |                      | 03 | SMART SLOW RATE    | 001 - 100 (min) (1min/step)                                                                                                                                                                                   | 3      |  |
|                      |                      | 04 | SMART FAST RATE    | 010 - 180 (sec) (1sec/step)                                                                                                                                                                                   | 3      |  |
|                      |                      | 05 | SMART TURN ANGLE   | 05 - 90 (degree) (1degree/step)                                                                                                                                                                               | 2      |  |
|                      |                      | 06 | SMART TURN SLOPE   | 001 - 255 (1/step)                                                                                                                                                                                            | 3      |  |
|                      |                      | 07 | SMART TURN TIME    | 005 - 180 (sec) (1sec/step)                                                                                                                                                                                   | 3      |  |
|                      | 04<br>(BEACON TEXT)  | 01 | STATUS TEXT SELECT | 0: OFF 1: TEXT1 2: TEXT2 3: TEXT3 4: TEXT4 5: TEXT5                                                                                                                                                           | 1      |  |
|                      |                      | 02 | TX RATE            | 0: 1/1 1: 1/2 2: 1/3 3: 1/4 4: 1/5 5: 1/6 6: 1/7 7: 1/8                                                                                                                                                       | 1      |  |
|                      |                      | 03 | BEACON FREQUENCY   | 0: None 1: FREQUENCY 2: FREQ & SQL & SHIFT                                                                                                                                                                    | 1      |  |
|                      |                      | 04 | STATUS TEXT1       | Up to 60 characters (ASCII)                                                                                                                                                                                   | 60     |  |
|                      |                      | 05 | STATUS TEXT2       | Up to 60 characters (ASCII)                                                                                                                                                                                   | 60     |  |
|                      |                      | 06 | STATUS TEXT3       | Up to 60 characters (ASCII)                                                                                                                                                                                   | 60     |  |
|                      |                      | 07 | STATUS TEXT4       | Up to 60 characters (ASCII)                                                                                                                                                                                   | 60     |  |
|                      |                      | 08 | STATUS TEXT5       | Up to 60 characters (ASCII)                                                                                                                                                                                   | 60     |  |
| 08<br>(APRS FILTER)  | 01<br>(LIST SETTING) | 01 | STATION LIST SORT  | 0: TIME 1: CALLSIGN 2: DISTANCE                                                                                                                                                                               | 1      |  |
|                      |                      | 01 | Mic-E              | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      | 02<br>(STATION LIST) | 02 | POSITION           | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 03 | WEATHER            | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 04 | OBJECT             | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 05 | ITEM               | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 06 | STATUS             | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 07 | OTHER              | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 08 | ALTNET             | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      | 03<br>(POPUP)        | 01 | BEACON             | 0: OFF 1: 3sec 2: 5sec 3: 10sec 4: HOLD                                                                                                                                                                       | 1      |  |
|                      |                      | 02 | MESSAGE            | 0: OFF 1: 3sec 2: 5sec 3: 10sec 4: HOLD                                                                                                                                                                       | 1      |  |
|                      |                      | 03 | MY PACKET          | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      | 04<br>(RINGER)       | 01 | TX BEACON          | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 02 | RX BEACON          | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 03 | TX MESSAGE         | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 04 | RX MESSAGE         | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      |                      | 07 | MY PACKET          | 0: OFF 1: ON                                                                                                                                                                                                  | 1      |  |
|                      | 06<br>(MSG FIL.)     | 01 | MESSAGE GROUP1     | Up to 9 characters (ASCII)                                                                                                                                                                                    | 9      |  |
|                      |                      | 02 | MESSAGE GROUP2     | Up to 9 characters (ASCII)                                                                                                                                                                                    | 9      |  |
|                      |                      | 03 | MESSAGE GROUP3     | Up to 9 characters (ASCII)                                                                                                                                                                                    | 9      |  |
|                      |                      | 04 | MESSAGE GROUP4     | Up to 9 characters (ASCII)                                                                                                                                                                                    | 9      |  |
|                      |                      | 05 | MESSAGE GROUP5     | Up to 9 characters (ASCII)                                                                                                                                                                                    | 9      |  |
|                      |                      | 06 | MESSAGE GROUP6     | Up to 9 characters (ASCII)                                                                                                                                                                                    | 9      |  |
|                      |                      | 07 | BULLETIN 1         | Up to 9 characters (ASCII)                                                                                                                                                                                    | 9      |  |
|                      |                      | 08 | BULLETIN 2         | Up to 9 characters (ASCII)                                                                                                                                                                                    | 9      |  |
|                      |                      | 09 | BULLETIN 3         | Up to 9 characters (ASCII)                                                                                                                                                                                    | 9      |  |

# CAT (Computer Aided Transceiver) Operation

| Table 3 (MENU Chart) |                 |    |                      |                                                                         |        |
|----------------------|-----------------|----|----------------------|-------------------------------------------------------------------------|--------|
| P1                   | P2              | P3 | Function             | P4                                                                      | Digits |
| 09<br>(PRESET)       | 01<br>(PRESET1) | 01 | PRESET NAME          | Up to 12 characters                                                     | 12     |
|                      |                 | 02 | CAT-1 RATE           | 0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4:115200 bps          | 1      |
|                      |                 | 03 | CAT-1 TIME OUT TIMER | 0: 10 msec 1: 100 msec 2: 1000 msec 3: 3000 msec                        | 1      |
|                      |                 | 04 | CAT-1 CAT-3 STOP BIT | 0: 1 bit 1: 2 bit                                                       | 1      |
|                      |                 | 05 | AGC FAST DELAY       | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 06 | AGC MID DELAY        | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 07 | AGC SLOW DELAY       | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 08 | LCUT FREQ            | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                          | 2      |
|                      |                 | 09 | LCUT SLOPE           | 0: 6dB/oct 1: 18dB/oct                                                  | 1      |
|                      |                 | 10 | HCUT FREQ            | 00: OFF 01:700Hz - 67:4000Hz (50 Hz steps)                              | 2      |
|                      |                 | 11 | HCUT SLOPE           | 0: 6dB/oct 1: 18dB/oct                                                  | 1      |
|                      |                 | 12 | USB OUT LEVEL        | 000 - 100                                                               | 3      |
|                      |                 | 13 | TX BPF SEL           | 0: 50 - 3050 1: 100 - 2900 2: 200 - 2800 3: 300 - 2700 4: 400 - 2600 Hz | 1      |
|                      |                 | 14 | MOD SOURCE           | 0: MIC 1: USB 2: REAR (RTTY/DATA Jack) 3: AUTO                          | 1      |
|                      |                 | 15 | USB MOD GAIN         | 000 - 100                                                               | 3      |
|                      |                 | 16 | RPTT SELECT          | 0: OFF 1: RTS 2:DTR 3:DAKY (RTTY/DATA Jack)                             | 1      |
|                      | 02<br>(PRESET2) | 01 | PRESET NAME          | Up to 12 characters                                                     | 12     |
|                      |                 | 02 | CAT-1 RATE           | 0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4:115200 bps          | 1      |
|                      |                 | 03 | CAT-1 TIME OUT TIMER | 0: 10 msec 1: 100 msec 2: 1000 msec 3: 3000 msec                        | 1      |
|                      |                 | 04 | CAT-1 CAT-3 STOP BIT | 0: 1 bit 1: 2 bit                                                       | 1      |
|                      |                 | 05 | AGC FAST DELAY       | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 06 | AGC MID DELAY        | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 07 | AGC SLOW DELAY       | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 08 | LCUT FREQ            | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                          | 2      |
|                      |                 | 09 | LCUT SLOPE           | 0: 6dB/oct 1: 18dB/oct                                                  | 1      |
|                      |                 | 10 | HCUT FREQ            | 00: OFF 01:700Hz - 67:4000Hz (50 Hz steps)                              | 2      |
|                      |                 | 11 | HCUT SLOPE           | 0: 6dB/oct 1: 18dB/oct                                                  | 1      |
|                      |                 | 12 | USB OUT LEVEL        | 000 - 100                                                               | 3      |
|                      |                 | 13 | TX BPF SEL           | 0: 50 - 3050 1: 100 - 2900 2: 200 - 2800 3: 300 - 2700 4: 400 - 2600 Hz | 1      |
|                      |                 | 14 | MOD SOURCE           | 0: MIC 1: USB 2: REAR (RTTY/DATA Jack) 3: AUTO                          | 1      |
|                      |                 | 15 | USB MOD GAIN         | 000 - 100                                                               | 3      |
|                      |                 | 16 | RPTT SELECT          | 0: OFF 1: RTS 2:DTR 3:DAKY (RTTY/DATA Jack)                             | 1      |
|                      | 03<br>(PRESET3) | 01 | PRESET NAME          | Up to 12 characters                                                     | 12     |
|                      |                 | 02 | CAT-1 RATE           | 0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4:115200 bps          | 1      |
|                      |                 | 03 | CAT-1 TIME OUT TIMER | 0: 10 msec 1: 100 msec 2: 1000 msec 3: 3000 msec                        | 1      |
|                      |                 | 04 | CAT-1 CAT-3 STOP BIT | 0: 1 bit 1: 2 bit                                                       | 1      |
|                      |                 | 05 | AGC FAST DELAY       | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 06 | AGC MID DELAY        | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 07 | AGC SLOW DELAY       | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 08 | LCUT FREQ            | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                          | 2      |
|                      |                 | 09 | LCUT SLOPE           | 0: 6dB/oct 1: 18dB/oct                                                  | 1      |
|                      |                 | 10 | HCUT FREQ            | 00: OFF 01:700Hz - 67:4000Hz (50 Hz steps)                              | 2      |
|                      |                 | 11 | HCUT SLOPE           | 0: 6dB/oct 1: 18dB/oct                                                  | 1      |
|                      |                 | 12 | USB OUT LEVEL        | 000 - 100                                                               | 3      |
|                      |                 | 13 | TX BPF SEL           | 0: 50 - 3050 1: 100 - 2900 2: 200 - 2800 3: 300 - 2700 4: 400 - 2600 Hz | 1      |
|                      |                 | 14 | MOD SOURCE           | 0: MIC 1: USB 2: REAR (RTTY/DATA Jack) 3: AUTO                          | 1      |
|                      |                 | 15 | USB MOD GAIN         | 000 - 100                                                               | 3      |
|                      |                 | 16 | RPTT SELECT          | 0: OFF 1: RTS 2:DTR 3:DAKY (RTTY/DATA Jack)                             | 1      |
|                      | 04<br>(PRESET4) | 01 | PRESET NAME          | Up to 12 characters                                                     | 12     |
|                      |                 | 02 | CAT-1 RATE           | 0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4:115200 bps          | 1      |
|                      |                 | 03 | CAT-1 TIME OUT TIMER | 0: 10 msec 1: 100 msec 2: 1000 msec 3: 3000 msec                        | 1      |
|                      |                 | 04 | CAT-1 CAT-3 STOP BIT | 0: 1 bit 1: 2 bit                                                       | 1      |
|                      |                 | 05 | AGC FAST DELAY       | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 06 | AGC MID DELAY        | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 07 | AGC SLOW DELAY       | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 08 | LCUT FREQ            | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                          | 2      |
|                      |                 | 09 | LCUT SLOPE           | 0: 6dB/oct 1: 18dB/oct                                                  | 1      |
|                      |                 | 10 | HCUT FREQ            | 00: OFF 01:700Hz - 67:4000Hz (50 Hz steps)                              | 2      |
|                      |                 | 11 | HCUT SLOPE           | 0: 6dB/oct 1: 18dB/oct                                                  | 1      |
|                      |                 | 12 | USB OUT LEVEL        | 000 - 100                                                               | 3      |
|                      |                 | 13 | TX BPF SEL           | 0: 50 - 3050 1: 100 - 2900 2: 200 - 2800 3: 300 - 2700 4: 400 - 2600 Hz | 1      |
|                      |                 | 14 | MOD SOURCE           | 0: MIC 1: USB 2: REAR (RTTY/DATA Jack) 3: AUTO                          | 1      |
|                      |                 | 15 | USB MOD GAIN         | 000 - 100                                                               | 3      |
|                      |                 | 16 | RPTT SELECT          | 0: OFF 1: RTS 2:DTR 3:DAKY (RTTY/DATA Jack)                             | 1      |
|                      | 05<br>(PRESET5) | 01 | PRESET NAME          | Up to 12 characters                                                     | 12     |
|                      |                 | 02 | CAT-1 RATE           | 0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4:115200 bps          | 1      |
|                      |                 | 03 | CAT-1 TIME OUT TIMER | 0: 10 msec 1: 100 msec 2: 1000 msec 3: 3000 msec                        | 1      |
|                      |                 | 04 | CAT-1 CAT-3 STOP BIT | 0: 1 bit 1: 2 bit                                                       | 1      |
|                      |                 | 05 | AGC FAST DELAY       | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 06 | AGC MID DELAY        | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 07 | AGC SLOW DELAY       | 20 - 4000 (P4 = 0020 - 4000, 20 msec steps)                             | 4      |
|                      |                 | 08 | LCUT FREQ            | 00: OFF 01: 100 Hz - 19: 1000 Hz (50 Hz steps)                          | 2      |
|                      |                 | 09 | LCUT SLOPE           | 0: 6dB/oct 1: 18dB/oct                                                  | 1      |
|                      |                 | 10 | HCUT FREQ            | 00: OFF 01:700Hz - 67:4000Hz (50 Hz steps)                              | 2      |
|                      |                 | 11 | HCUT SLOPE           | 0: 6dB/oct 1: 18dB/oct                                                  | 1      |
|                      |                 | 12 | USB OUT LEVEL        | 000 - 100                                                               | 3      |
|                      |                 | 13 | TX BPF SEL           | 0: 50 - 3050 1: 100 - 2900 2: 200 - 2800 3: 300 - 2700 4: 400 - 2600 Hz | 1      |
|                      |                 | 14 | MOD SOURCE           | 0: MIC 1: USB 2: REAR (RTTY/DATA Jack) 3: AUTO                          | 1      |
|                      |                 | 15 | USB MOD GAIN         | 000 - 100                                                               | 3      |
|                      |                 | 16 | RPTT SELECT          | 0: OFF 1: RTS 2:DTR 3:DAKY (RTTY/DATA Jack)                             | 1      |

# CAT (Computer Aided Transceiver) Operation

| Table 3 (MENU Chart) |                   |    |                      |                |        |
|----------------------|-------------------|----|----------------------|----------------|--------|
| P1                   | P2                | P3 | Function             | P4             | Digits |
| 11<br>(BLUETOOTH)    | 01<br>(Bluetooth) | 01 | Bluetooth            | 0: OFF 1: ON   | 1      |
|                      |                   | 02 | Device Name : Status | —              | 1      |
|                      |                   | 03 | DEVICE LIST          | —              | -      |
|                      |                   | 04 | AUDIO                | 0: AUTO 1: FIX | 1      |

| Table 4 (MY SYMBOL Chart) |                 |     |                 |     |                 |     |                 |     |                  |     |                  |
|---------------------------|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|------------------|-----|------------------|
| P4                        | ICON            | P4  | ICON            | P4  | ICON            | P4  | ICON            | P4  | ICON             | P4  | ICON             |
| / 0                       | Circle          | / _ | Weather Station | / j | Jeep            | / u | Bus             | \ . | Ambiguous        | \ u | Overlaid Truck   |
| / '                       | Small Aircraft  | / < | Motorcycle      | / K | School          | / V | ATV             | \ ; | Park/Picnic Area | \ v | Overlaid Van     |
| / -                       | House QTH (VHF) | / = | Railroad Engine | / k | School          | / v | ATV             | \ ^ | Aircraft         | \ W | NWS Site         |
| / #                       | DIGI            | / > | Car             | / m | Mic-E Repeater  | / W | NWS Site        | \ _ | WX Site          | \ x | Obstruction      |
| / &                       | HF Gateway      | / a | Ambulance       | / O | Balloon         | / X | Helicopter      | \ = | APRStt           | \ Y | Radios & Devices |
| / .                       | X               | / b | Bycycle         | / P | Police          | / Y | Yacht(sailboat) | \ > | Overlaid Car     | E 0 | EchoLink         |
| / :                       | Fire            | / C | Canoe           | / R | REC.Vehicle     | / y | Yacht(sailboat) | \ A | APRStt           | I 0 | IRLP             |
| / ;                       | Campground      | / E | Eyeball         | / r | REC.Vehicle     | \ 0 | Circle          | \ K | Kenwood HT       | K Y | Kenwood Radios   |
| / [                       | Human/Person    | / f | Fire Truck      | / s | Ship(powerboat) | \ - | House (HF)      | \ m | Value Signpost   | W 0 | WIRES            |
| / \                       | Triangle(DF)    | / g | Glider          | / T | SSTV            | \ # | Overlay DIGI    | \ n | Overlay Triangle | Y Y | Yaesu Radios     |
| / ^                       | Large Aircraft  | / l | TCP/IP          | / U | Bus             | \ & | Overlay Gate    | \ s | Overlaid Ship    | —   | —                |

| FA     | FREQUENCY VFO MAIN-SIDE |   |    |    |    |    |    |    |    |    |    |    |
|--------|-------------------------|---|----|----|----|----|----|----|----|----|----|----|
| Set    | 1                       | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
|        | F                       | A | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | ;  |
| Read   | 1                       | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
|        | F                       | A | ;  |    |    |    |    |    |    |    |    |    |
| Answer | 1                       | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
|        | F                       | A | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | ;  |

| FB     | FREQUENCY VFO SUB-SIDE |   |    |    |    |    |    |    |    |    |    |    |
|--------|------------------------|---|----|----|----|----|----|----|----|----|----|----|
| Set    | 1                      | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
|        | F                      | B | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | ;  |
| Read   | 1                      | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
|        | F                      | B | ;  |    |    |    |    |    |    |    |    |    |
| Answer | 1                      | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
|        | F                      | B | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | ;  |

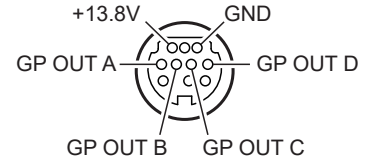
| FN     | FINE TUNING |   |    |   |   |   |   |   |   |    |                                                           |  |
|--------|-------------|---|----|---|---|---|---|---|---|----|-----------------------------------------------------------|--|
| Set    | 1           | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 | P1 0: "OFF"<br>1: Fine Tuning "ON"<br>2: Fast Tuning "ON" |  |
|        | F           | N | P1 | ; |   |   |   |   |   |    |                                                           |  |
| Read   | 1           | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                                           |  |
|        | F           | N | ;  |   |   |   |   |   |   |    |                                                           |  |
| Answer | 1           | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                                           |  |
|        | F           | N | P1 | ; |   |   |   |   |   |    |                                                           |  |

| FR     | FUNCTION RX |   |    |    |   |   |   |   |   |    |                                           |  |
|--------|-------------|---|----|----|---|---|---|---|---|----|-------------------------------------------|--|
| Set    | 1           | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 | P1 00: Dual receive<br>01: Single receive |  |
|        | F           | R | P1 | P1 | ; |   |   |   |   |    |                                           |  |
| Read   | 1           | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |                                           |  |
|        | F           | R | ;  |    |   |   |   |   |   |    |                                           |  |
| Answer | 1           | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |                                           |  |
|        | F           | R | P1 | P1 | ; |   |   |   |   |    |                                           |  |

| FT     | FUNCTION TX |   |    |   |   |   |   |   |   |    |                                                        |  |
|--------|-------------|---|----|---|---|---|---|---|---|----|--------------------------------------------------------|--|
| Set    | 1           | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 | P1 0: MAIN-side Transmitter<br>1: SUB-side Transmitter |  |
|        | F           | T | P1 | ; |   |   |   |   |   |    |                                                        |  |
| Read   | 1           | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                                        |  |
|        | F           | T | ;  |   |   |   |   |   |   |    |                                                        |  |
| Answer | 1           | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                                        |  |
|        | F           | T | P1 | ; |   |   |   |   |   |    |                                                        |  |

# CAT (Computer Aided Transceiver) Operation

| GP     | GP OUT |   |    |    |    |    |   |   |   |    |                                                                                                                                                                                                                   |
|--------|--------|---|----|----|----|----|---|---|---|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set    | 1      | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 | P1 0: GP OUT A "LOW"<br>1: GP OUT A "HIGH"<br>P2 0: GP OUT B "LOW"<br>1: GP OUT B "HIGH"<br>P3 0: GP OUT C "LOW"<br>1: GP OUT C "HIGH"<br>P4 0: GP OUT D "LOW"<br>1: GP OUT D "HIGH"<br>*5V CMOS Level, Max. 3 mA |
|        | G      | P | P1 | P2 | P3 | P4 | ; |   |   |    |                                                                                                                                                                                                                   |
| Read   | 1      | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |                                                                                                                                                                                                                   |
|        | G      | P | ;  |    |    |    |   |   |   |    |                                                                                                                                                                                                                   |
| Answer | 1      | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 | Set to "GPO" in the setting menu [OPERATION SETTING] → [GENERAL] →<br>→ [TUN/LIN PORT SELECT].<br>(Factory setting: "OPTION")                                                                                     |
|        | G      | P | P1 | P2 | P3 | P4 | ; |   |   |    |                                                                                                                                                                                                                   |



| GT     | AGC FUNCTION |   |    |    |   |   |   |   |   |    |                                                                                                                                                                                                                                                                  |
|--------|--------------|---|----|----|---|---|---|---|---|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set    | 1            | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 | P1 0: MAIN-side<br>1: SUB-side<br>P2 0: AGC "OFF"<br>1: AGC "FAST"<br>2: AGC "MID"<br>3: AGC "SLOW"<br>4: AGC "AUTO"<br>P3 0: AGC "OFF"<br>1: AGC "FAST"<br>2: AGC "MID"<br>3: AGC "SLOW"<br>4: AGC "AUTO" - FAST<br>5: AGC "AUTO - MID"<br>6: AGC "AUTO - SLOW" |
|        | G            | T | P1 | P2 | ; |   |   |   |   |    |                                                                                                                                                                                                                                                                  |
| Read   | 1            | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |                                                                                                                                                                                                                                                                  |
|        | G            | T | P1 | ;  |   |   |   |   |   |    |                                                                                                                                                                                                                                                                  |
| Answer | 1            | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |                                                                                                                                                                                                                                                                  |
|        | G            | T | P1 | P3 | ; |   |   |   |   |    |                                                                                                                                                                                                                                                                  |

| ID     | IDENTIFICATION |   |    |    |    |    |   |   |   |    |                 |
|--------|----------------|---|----|----|----|----|---|---|---|----|-----------------|
| Set    | 1              | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 | P1 0840 (Fixed) |
|        |                |   |    |    |    |    |   |   |   |    |                 |
| Read   | 1              | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |                 |
|        | I              | D | ;  |    |    |    |   |   |   |    |                 |
| Answer | 1              | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |                 |
|        | I              | D | P1 | P1 | P1 | P1 | ; |   |   |    |                 |

| IF     | INFORMATION VFO MAIN-SIDE |    |    |    |    |    |    |    |     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------|---------------------------|----|----|----|----|----|----|----|-----|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set    | 1                         | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9   | 10 | P1 00000: VFO or MT or QMB (5 Bytes)<br>00001 - 00999: (Memory Channel)<br>P-01L - P-50U: (PMS)<br>50001 - 50020: (5MHz BAND)<br>EMGCH: (EMERGENCY CH)<br>P2 VFO Frequency (Hz) (9 Bytes)<br>P3 Clarifier Direction +: Plus Shift, -: Minus Shift (1 Bytes)<br>Clarifier Offset: 0000 - 9990 (Hz) (4 Bytes)<br>P4 0: RX CLAR "OFF" 1: RX CLAR "ON"<br>P5 0: TX CLAR "OFF" 1: TX CLAR "ON"<br>P6 MODE 0:- 1: LSB 2: USB 3: CW-U 4: FM<br>5: AM 6: RTTY-L 7: CW-L 8: DATA-L 9: RTTY-U<br>A: DATA-FM B: FM-N C: DATA-U D: AM-N E: PSK<br>F: DATA-FM-N G: - H: C4FM-DN I: C4FM-VW J: -<br>P7 0: VFO 1: Memory Channel 2: Memory Tune 3: Quick Memory Bank (QMB)<br>4: - 5: PMS<br>P8 0: OFF 1: CTCSS ENC/DEC 2: CTCSS ENC 3: DCS 4: PR FREQ<br>5: REV TONE<br>P9 00: (Fixed)<br>P10 0: Simplex 1: Plus Shift 2: Minus Shift |
|        |                           |    |    |    |    |    |    |    |     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Read   | 1                         | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9   | 10 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        | I                         | F  | ;  |    |    |    |    |    |     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Answer | 1                         | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9   | 10 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        | I                         | F  | P1 | P1 | P1 | P1 | P2 | P2 | P2  |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        | 11                        | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19  | 20 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        | P2                        | P2 | P2 | P2 | P2 | P3 | P3 | P3 | P3  |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        | 21                        | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29  | 30 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        | P3                        | P4 | P5 | P6 | P7 | P8 | P9 | P9 | P10 | ;  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| IS     | IF-SHIFT |   |    |    |    |    |    |    |    |    |                                                                                                |
|--------|----------|---|----|----|----|----|----|----|----|----|------------------------------------------------------------------------------------------------|
| Set    | 1        | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | P1 0: MAIN-side<br>1: SUB-side<br>P2 0: (Fixed)<br>P3 + / -<br>P4 0000 - 1200 Hz (20 Hz steps) |
|        | I        | S | P1 | P2 | P3 | P4 | P4 | P4 | P4 | ;  |                                                                                                |
| Read   | 1        | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |                                                                                                |
|        | I        | S | P1 | ;  |    |    |    |    |    |    |                                                                                                |
| Answer | 1        | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |                                                                                                |
|        | I        | S | P1 | P2 | P3 | P4 | P4 | P4 | P4 | ;  |                                                                                                |

| KM     | KEYING MEMORY |   |    |    |    |    |    |   |     |    |                                                                                       |
|--------|---------------|---|----|----|----|----|----|---|-----|----|---------------------------------------------------------------------------------------|
| Set    | 1             | 2 | 3  | 4  | 5  | 6  | 7  | ~ | n-1 | n  | P1 1 - 5 : Keyer Memory Channel Number<br>P2 Message Characters (up to 50 characters) |
|        | K             | M | P1 | P2 | P2 | P2 | P2 | ~ | P2  | ;  |                                                                                       |
| Read   | 1             | 2 | 3  | 4  | 5  | 6  | 7  | 8 | 9   | 10 |                                                                                       |
|        | K             | M | P1 | ;  |    |    |    |   |     |    |                                                                                       |
| Answer | 1             | 2 | 3  | 4  | 5  | 6  | 7  | ~ | n-1 | n  |                                                                                       |
|        | K             | M | P1 | P2 | P2 | P2 | P2 | ~ | P2  | ;  |                                                                                       |

# CAT (Computer Aided Transceiver) Operation

| <b>KP</b> | <b>KEY PITCH FREQUENCY</b> |          |    |    |   |   |   |   |   |    |
|-----------|----------------------------|----------|----|----|---|---|---|---|---|----|
| Set       | 1                          | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>K</b>                   | <b>P</b> | P1 | P1 | ; |   |   |   |   |    |
| Read      | 1                          | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>K</b>                   | <b>P</b> | ;  |    |   |   |   |   |   |    |
| Answer    | 1                          | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>K</b>                   | <b>P</b> | P1 | P1 | ; |   |   |   |   |    |

P1 00: 300 Hz - 75: 1050 Hz (10Hz steps)

| <b>KR</b> | <b>KEYER</b> |          |    |   |   |   |   |   |   |    |
|-----------|--------------|----------|----|---|---|---|---|---|---|----|
| Set       | 1            | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>K</b>     | <b>R</b> | P1 | ; |   |   |   |   |   |    |
| Read      | 1            | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>K</b>     | <b>R</b> | ;  |   |   |   |   |   |   |    |
| Answer    | 1            | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>K</b>     | <b>R</b> | P1 | ; |   |   |   |   |   |    |

P1 0: CW KEYER "OFF"  
1: CW KEYER "ON"

| <b>KS</b> | <b>KEYER SPEED</b> |          |    |    |    |   |   |   |   |    |
|-----------|--------------------|----------|----|----|----|---|---|---|---|----|
| Set       | 1                  | 2        | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|           | <b>K</b>           | <b>S</b> | P1 | P1 | P1 | ; |   |   |   |    |
| Read      | 1                  | 2        | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|           | <b>K</b>           | <b>S</b> | ;  |    |    |   |   |   |   |    |
| Answer    | 1                  | 2        | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|           | <b>K</b>           | <b>S</b> | P1 | P1 | P1 | ; |   |   |   |    |

P1 004 - 060 (WPM)

| <b>KY</b> | <b>CW KEYING MEMORY PLAY</b> |          |    |    |   |   |   |   |   |    |
|-----------|------------------------------|----------|----|----|---|---|---|---|---|----|
| Set       | 1                            | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>K</b>                     | <b>Y</b> | P1 | P2 | ; |   |   |   |   |    |
| Read      | 1                            | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           |                              |          |    |    |   |   |   |   |   |    |
| Answer    | 1                            | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           |                              |          |    |    |   |   |   |   |   |    |

P1 0: CW TEXT Memory    1: CW MESSAGE Memory  
P2 0: STOP  
1: CW TEXT/MESSAGE Memory "1" Playback  
2: CW TEXT/MESSAGE Memory "2" Playback  
3: CW TEXT/MESSAGE Memory "3" Playback  
4: CW TEXT/MESSAGE Memory "4" Playback  
5: CW TEXT/MESSAGE Memory "5" Playback

| <b>LK</b> | <b>LOCK</b> |          |    |   |   |   |   |   |   |    |
|-----------|-------------|----------|----|---|---|---|---|---|---|----|
| Set       | 1           | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>L</b>    | <b>K</b> | P1 | ; |   |   |   |   |   |    |
| Read      | 1           | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>L</b>    | <b>K</b> | ;  |   |   |   |   |   |   |    |
| Answer    | 1           | 2        | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>L</b>    | <b>K</b> | P1 | ; |   |   |   |   |   |    |

P1 0: Lock "OFF"  
1: Lock "ON"

| <b>LM</b> | <b>LOAD MESSAGE</b> |          |    |    |   |   |   |   |   |    |
|-----------|---------------------|----------|----|----|---|---|---|---|---|----|
| Set       | 1                   | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>L</b>            | <b>M</b> | P1 | P2 | ; |   |   |   |   |    |
| Read      | 1                   | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>L</b>            | <b>M</b> | P1 | ;  |   |   |   |   |   |    |
| Answer    | 1                   | 2        | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>L</b>            | <b>M</b> | P1 | P2 | ; |   |   |   |   |    |

P1 0: MESSAGE (DVS)    1: RECORD  
P2 P1=0 (MESSAGE)  
0: Play Stop/ Recording Stop  
1: Select CH "1"  
2: Select CH "2"  
3: Select CH "3"  
4: Select CH "4"  
5: Select CH "5"  
P1=1 (RECORD)  
0: Recording Stop  
1: Recording Start

| <b>MA</b> | <b>MEMORY CHANNEL to VFO MAIN-SIDE</b> |          |   |   |   |   |   |   |   |    |
|-----------|----------------------------------------|----------|---|---|---|---|---|---|---|----|
| Set       | 1                                      | 2        | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           | <b>M</b>                               | <b>A</b> | ; |   |   |   |   |   |   |    |
| Read      | 1                                      | 2        | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           |                                        |          |   |   |   |   |   |   |   |    |
| Answer    | 1                                      | 2        | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|           |                                        |          |   |   |   |   |   |   |   |    |

# CAT (Computer Aided Transceiver) Operation

| MB     | MEMORY CHANNEL to VFO SUB-SIDE |   |   |   |   |   |   |   |   |    |
|--------|--------------------------------|---|---|---|---|---|---|---|---|----|
| Set    | 1                              | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | M                              | B | ; |   |   |   |   |   |   |    |
| Read   | 1                              | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                                |   |   |   |   |   |   |   |   |    |
| Answer | 1                              | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                                |   |   |   |   |   |   |   |   |    |

| MC     | MEMORY CHANNEL |   |    |    |    |    |    |    |   |    |
|--------|----------------|---|----|----|----|----|----|----|---|----|
| Set    | 1              | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 |
|        | M              | C | P1 | P2 | P2 | P2 | P2 | P2 | ; |    |
| Read   | 1              | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 |
|        | M              | C | ;  |    |    |    |    |    |   |    |
| Answer | 1              | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 |
|        | M              | C | P1 | P2 | P2 | P2 | P2 | P2 | ; |    |

P1 0: MAIN-side  
 1: SUB-side  
 P2 00001 - 00099: (Memory Channel)  
 P-01L - P-50U: (PMS)  
 50000 - 50020: (5MHz BAND)  
 EMGCH: (EMERGENCY CH)

| MD     | OPERATING MODE |   |    |    |   |   |   |   |   |    |
|--------|----------------|---|----|----|---|---|---|---|---|----|
| Set    | 1              | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | M              | D | P1 | P2 | ; |   |   |   |   |    |
| Read   | 1              | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | M              | D | P1 | ;  |   |   |   |   |   |    |
| Answer | 1              | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | M              | D | P1 | P2 | ; |   |   |   |   |    |

P1 0: MAIN-side  
 1: SUB-side  
 P2 MODE 0:- 1: LSB 2: USB 3: CW-U 4: FM  
 5: AM 6: RTTY-L 7: CW-L 8: DATA-L 9: RTTY-U  
 A: DATA-FM B: FM-N C: DATA-U D: AM-N E: PSK  
 F: DATA-FM-N G: - H: C4FM-DN I: C4FM-VW J: -

| MG     | MIC GAIN |   |    |    |    |   |   |   |   |    |
|--------|----------|---|----|----|----|---|---|---|---|----|
| Set    | 1        | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | M        | G | P1 | P1 | P1 | ; |   |   |   |    |
| Read   | 1        | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | M        | G | ;  |    |    |   |   |   |   |    |
| Answer | 1        | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | M        | G | P1 | P1 | P1 | ; |   |   |   |    |

P1 000 - 100

| ML     | MONITOR LEVEL |   |    |    |    |    |   |   |   |    |
|--------|---------------|---|----|----|----|----|---|---|---|----|
| Set    | 1             | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | M             | L | P1 | P2 | P2 | P2 | ; |   |   |    |
| Read   | 1             | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | M             | L | P1 | ;  |    |    |   |   |   |    |
| Answer | 1             | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | M             | L | P1 | P2 | P2 | P2 | ; |   |   |    |

P1 0: MONI "ON/OFF"  
 1: MONI Level  
 P2 P1=0  
 000: MONI "OFF"  
 001: MONI "ON"  
 P1=1  
 000 - 100

| MR     | MEMORY CHANNEL READ |    |    |    |    |    |    |    |    |    |
|--------|---------------------|----|----|----|----|----|----|----|----|----|
| Set    | 1                   | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|        |                     |    |    |    |    |    |    |    |    |    |
| Read   | 1                   | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|        | M                   | R  | P0 | P0 | P0 | P0 | P0 | ;  |    |    |
| Answer | 1                   | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|        |                     |    |    |    |    |    |    |    |    |    |
|        | M                   | R  | P1 | P1 | P1 | P1 | P1 | P2 | P2 | P2 |
|        | 11                  | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|        | P2                  | P2 | P2 | P2 | P2 | P2 | P3 | P3 | P3 | P3 |
|        | 21                  | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |

P0 00000: VFO or MT or QMB (5 Bytes)  
 00001 - 00999: (Memory Channel)  
 P-01L - P-50U: (PMS)  
 50001 - 50020: (5MHz BAND)  
 EMGCH: (EMERGENCY CH)  
 P1 00000: VFO or MT or QMB (5 Bytes)  
 00001 - 00999: (Memory Channel)  
 P-01L - P-50U: (PMS)  
 50001 - 50020: (5MHz BAND)  
 EMGCH: (EMERGENCY CH)  
 P2 VFO Frequency (Hz) (9 Bytes)  
 P3 Clarifier Direction +: Plus Shift, -: Minus Shift (1 Bytes)  
 Clarifier Offset: 0000 - 9990 (Hz) (4 Bytes)  
 P4 0: RX CLAR "OFF" 1: RX CLAR "ON"  
 P5 0: TX CLAR "OFF" 1: TX CLAR "ON"  
 P6 MODE 0:- 1: LSB 2: USB 3: CW-U 4: FM  
 5: AM 6: RTTY-L 7: CW-L 8: DATA-L 9: RTTY-U  
 A: DATA-FM B: FM-N C: DATA-U D: AM-N E: PSK  
 F: DATA-FM-N G: - H: C4FM-DN I: C4FM-VW J: -  
 P7 0: VFO 1: Memory Channel 2: Memory Tune 3: Quick Memory Bank (QMB)  
 4: - 5: PMS  
 P8 0: OFF 1: CTCSS ENC/DEC 2: CTCSS ENC 3: DCS 4: PR FREQ  
 5: REV TONE  
 P9 00: (Fixed)  
 P10 0: Simplex 1: Plus Shift 2: Minus Shift

# CAT (Computer Aided Transceiver) Operation

| MS     | METER SW |   |    |    |   |   |   |   |   |    |                                                          |
|--------|----------|---|----|----|---|---|---|---|---|----|----------------------------------------------------------|
| Set    | 1        | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 | P1 MAIN-side<br>0: PO 1: COMP 2: ALC 3: VDD 4: ID 5: SWR |
|        | M        | S | P1 | P2 | ; |   |   |   |   |    |                                                          |
| Read   | 1        | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 | P2 SUB-side<br>0: PO 1: COMP 2: ALC 3: VDD 4: ID 5: SWR  |
|        | M        | S | ;  |    |   |   |   |   |   |    |                                                          |
| Answer | 1        | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |                                                          |
|        | M        | S | P1 | P2 | ; |   |   |   |   |    |                                                          |

| MT     | MEMORY CHANNEL TAG WRITE |    |    |    |    |    |    |    |    |    |                                                                                                                                                                      |
|--------|--------------------------|----|----|----|----|----|----|----|----|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set    | 1                        | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | P0 00001 - 00099: (Memory Channel)<br>P-01L - P-50U: (PMS)<br>50001 - 50009: (5MHz BAND)<br>EMGCH: (EMERGENCY CH)<br>P1 TAG Characters (up to 12 characters) (ASCII) |
|        | M                        | T  | P0 | P0 | P0 | P0 | P0 | P1 | P1 | P1 |                                                                                                                                                                      |
|        | 11                       | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |                                                                                                                                                                      |
| Read   | P1                       | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | ;  |                                                                                                                                                                      |
|        | 1                        | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |                                                                                                                                                                      |
|        | M                        | T  | P0 | P0 | P0 | P0 | P0 | ;  |    |    |                                                                                                                                                                      |
| Answer | 1                        | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |                                                                                                                                                                      |
|        | M                        | T  | P0 | P0 | P0 | P0 | P0 | P1 | P1 | P1 |                                                                                                                                                                      |
|        | 11                       | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |                                                                                                                                                                      |
|        | P1                       | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | ;  |                                                                                                                                                                      |

| MW     | MEMORY CHANNEL WRITE |    |    |    |    |    |    |    |     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------|----------------------|----|----|----|----|----|----|----|-----|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set    | 1                    | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9   | 10 | P1 00000: -<br>00001 - 00999: (Memory Channel)<br>P-01L - P-50U: (PMS)<br>P2 VFO Frequency (Hz) (9 Bytes)<br>P3 Clarifier Direction +: Plus Shift, -: Minus Shift (1 Bytes)<br>Clarifier Offset: 0000 - 9990 (Hz) (4 Bytes)<br>P4 0: RX CLAR "OFF" 1: RX CLAR "ON"<br>P5 0: TX CLAR "OFF" 1: TX CLAR "ON"<br>P6 MODE 0:- 1: LSB 2: USB 3: CW-U 4: FM<br>5: AM 6: RTTY-L 7: CW-L 8: DATA-L 9: RTTY-U<br>A: DATA-FM B: FM-N C: DATA-U D: AM-N E: PSK<br>F: DATA-FM-N G: - H: C4FM-DN I: C4FM-VW J: -<br>P7 0: VFO 1: Memory Channel 2: Memory Tune 3: Quick Memory Bank (QMB)<br>4: - 5: PMS<br>P8 0: OFF 1: CTCSS ENC/DEC 2: CTCSS ENC 3: DCS 4: PR FREQ<br>5: REV TONE<br>P9 00: (Fixed)<br>P10 0: Simplex 1: Plus Shift 2: Minus Shift |
|        | M                    | W  | P1 | P1 | P1 | P1 | P1 | P2 | P2  | P2 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        | 11                   | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19  | 20 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        | P2                   | P2 | P2 | P2 | P2 | P2 | P3 | P3 | P3  | P3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        | 21                   | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29  | 30 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        | P3                   | P4 | P5 | P6 | P7 | P8 | P9 | P9 | P10 | ;  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Read   | 1                    | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9   | 10 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        |                      |    |    |    |    |    |    |    |     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Answer | 1                    | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9   | 10 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|        |                      |    |    |    |    |    |    |    |     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| MX     | MOX |   |    |   |   |   |   |   |   |    |                                |
|--------|-----|---|----|---|---|---|---|---|---|----|--------------------------------|
| Set    | 1   | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 | P1 0: MOX "OFF"<br>1: MOX "ON" |
|        | M   | X | P1 | ; |   |   |   |   |   |    |                                |
| Read   | 1   | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                |
|        | M   | X | ;  |   |   |   |   |   |   |    |                                |
| Answer | 1   | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                |
|        | M   | X | P1 | ; |   |   |   |   |   |    |                                |

| MZ     | SPLIT MEMORY |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                              |
|--------|--------------|----|----|----|----|----|----|----|----|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set    | 1            | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | P1 00000: VFO, MT, QMB mode<br>00001 - 00999: Memory channel<br>P-01L - P-50U: PMS channel (P-01L, P-01U, P-02L, P-02U ----- P-50L, P50U)<br>P2 0: SPLIT memory "OFF"<br>1: SPLIT memory "ON"<br>P3 000030000 - 470000000 Hz |
|        | M            | Z  | P1 | P1 | P1 | P1 | P1 | P2 | P3 | P3 |                                                                                                                                                                                                                              |
|        | 11           | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |                                                                                                                                                                                                                              |
| Read   | P3           | P3 | P3 | P3 | P3 | P3 | P3 | ;  |    |    |                                                                                                                                                                                                                              |
|        | 1            | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |                                                                                                                                                                                                                              |
|        | M            | Z  | P1 | P1 | P1 | P1 | P1 | ;  |    |    |                                                                                                                                                                                                                              |
| Answer | 1            | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |                                                                                                                                                                                                                              |
|        | M            | Z  | P1 | P1 | P1 | P1 | P1 | P2 | P3 | P3 |                                                                                                                                                                                                                              |
|        | 11           | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |                                                                                                                                                                                                                              |
|        | P3           | P3 | P3 | P3 | P3 | P3 | P3 | ;  |    |    |                                                                                                                                                                                                                              |

| NA     | NARROW |   |    |    |   |   |   |   |   |    |                                                                        |
|--------|--------|---|----|----|---|---|---|---|---|----|------------------------------------------------------------------------|
| Set    | 1      | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 | P1 0: MAIN-side<br>1: SUB-side<br>P2 0: NARROW "OFF"<br>1: NARROW "ON" |
|        | N      | A | P1 | P2 | ; |   |   |   |   |    |                                                                        |
| Read   | 1      | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |                                                                        |
|        | N      | A | P1 | ;  |   |   |   |   |   |    |                                                                        |
| Answer | 1      | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |                                                                        |
|        | N      | A | P1 | P2 | ; |   |   |   |   |    |                                                                        |

# CAT (Computer Aided Transceiver) Operation

| NL     | NOISE BLANKER LEVEL |   |    |    |    |    |   |   |   |    |
|--------|---------------------|---|----|----|----|----|---|---|---|----|
| Set    | 1                   | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | N                   | L | P1 | P2 | P2 | P2 | ; |   |   |    |
| Read   | 1                   | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | N                   | L | P1 | ;  |    |    |   |   |   |    |
| Answer | 1                   | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | N                   | L | P1 | P2 | P2 | P2 | ; |   |   |    |

P1 0: MAIN-side  
1: SUB-side  
P2 000: OFF  
001 - 010: (NB Level)

| OI     | OPPOSITE BAND INFORMATION (SUB-SIDE) |    |    |    |    |    |    |     |    |    |
|--------|--------------------------------------|----|----|----|----|----|----|-----|----|----|
| Set    | 1                                    | 2  | 3  | 4  | 5  | 6  | 7  | 8   | 9  | 10 |
|        |                                      |    |    |    |    |    |    |     |    |    |
| Read   | 1                                    | 2  | 3  | 4  | 5  | 6  | 7  | 8   | 9  | 10 |
|        | O                                    | I  | ;  |    |    |    |    |     |    |    |
| Answer | 1                                    | 2  | 3  | 4  | 5  | 6  | 7  | 8   | 9  | 10 |
|        | O                                    | I  | P1 | P1 | P1 | P1 | P1 | P2  | P2 | P2 |
|        | 11                                   | 12 | 13 | 14 | 15 | 16 | 17 | 18  | 19 | 20 |
|        | P2                                   | P2 | P2 | P2 | P2 | P2 | P3 | P3  | P3 | P3 |
|        | 21                                   | 22 | 23 | 24 | 25 | 26 | 27 | 28  | 29 | 30 |
|        | P3                                   | P4 | P5 | P6 | P7 | P8 | P9 | P10 | ;  |    |

P1 00000: VFO or MT or QMB (5 Bytes)  
00001 - 00999: (Memory Channel)  
P-01L - P-50U: (PMS)  
50001 - 50020: (5MHz BAND)  
EMGCH: (EMERGENCY CH)  
P2 VFO Frequency (Hz) (9 Bytes)  
P3 Clarifier Direction +: Plus Shift, -: Minus Shift (1 Bytes)  
Clarifier Offset: 0000 - 9990 (Hz) (4 Bytes)  
P4 0: RX CLAR "OFF" 1: RX CLAR "ON"  
P5 0: TX CLAR "OFF" 1: TX CLAR "ON"  
P6 MODE 0:- 1: LSB 2: USB 3: CW-U 4: FM  
5: AM 6: RTTY-L 7: CW-L 8: DATA-L 9: RTTY-U  
A: DATA-FM B: FM-N C: DATA-U D: AM-N E: PSK  
F: DATA-FM-N G: - H: C4FM-DN I: C4FM-VW J: -  
P7 0: VFO 1: Memory Channel 2: Memory Tune 3: Quick Memory Bank (QMB)  
4: - 5: PMS  
P8 0: OFF 1: CTCSS ENC/DEC 2: CTCSS ENC 3: DCS 4: PR FREQ  
5: REV TONE  
P9 00: (Fixed)  
P10 0: Simplex 1: Plus Shift 2: Minus Shift

| OS     | OFFSET (REPEATER SHIFT) |   |    |    |   |   |   |   |   |    |
|--------|-------------------------|---|----|----|---|---|---|---|---|----|
| Set    | 1                       | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | O                       | S | P1 | P2 | ; |   |   |   |   |    |
| Read   | 1                       | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | O                       | S | P1 | ;  |   |   |   |   |   |    |
| Answer | 1                       | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | O                       | S | P1 | P2 | ; |   |   |   |   |    |

P1 0: MAIN-side  
1: SUB-side  
P2 0: Simplex  
1: Plus Shift (+ Offset)  
2: Minus Shift (- Offset)  
3: ARS (Automatic Repeater Shift)  
\*: This command can be activated only with an FM mode.

| PA     | PRE-AMP (IPO) |   |    |    |   |   |   |   |   |    |
|--------|---------------|---|----|----|---|---|---|---|---|----|
| Set    | 1             | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P             | A | P1 | P2 | ; |   |   |   |   |    |
| Read   | 1             | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P             | A | P1 | ;  |   |   |   |   |   |    |
| Answer | 1             | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P             | A | P1 | P2 | ; |   |   |   |   |    |

P1 0: HF/50MHz band  
1: VHF band  
2: UHF band  
P2 P1=0 0: IPO (HF/50)  
1: AMP1 (HF/50)  
2: AMP2 (HF/50)  
P1=1 0: VHF Pre AMP "OFF"  
1: VHF Pre AMP "ON"  
P1=2 0: UHF Pre AMP "OFF"  
1: UHF Pre AMP "ON"

| PB     | PLAY BACK |   |    |    |   |   |   |   |   |    |
|--------|-----------|---|----|----|---|---|---|---|---|----|
| Set    | 1         | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P         | B | P1 | P2 | ; |   |   |   |   |    |
| Read   | 1         | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P         | B | P1 | ;  |   |   |   |   |   |    |
| Answer | 1         | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P         | B | P1 | P2 | ; |   |   |   |   |    |

P1 0: (Fixed)  
P2 0: MESSAGE Playback / Recording Stop  
1: MESSAGE CH "1" Playback Start  
2: MESSAGE CH "2" Playback Start  
3: MESSAGE CH "3" Playback Start  
4: MESSAGE CH "4" Playback Start  
5: MESSAGE CH "5" Playback Start

| PC     | POWER CONTROL |   |    |    |    |    |   |   |   |    |
|--------|---------------|---|----|----|----|----|---|---|---|----|
| Set    | 1             | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | P             | C | P1 | P2 | P2 | P2 | ; |   |   |    |
| Read   | 1             | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | P             | C | ;  |    |    |    |   |   |   |    |
| Answer | 1             | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | P             | C | P1 | P2 | P2 | P2 | ; |   |   |    |

P1 1: FTX-1 field head  
2: SPA-1  
P2 P1=1: 005 - 010 (W)  
P1=2: 005 - 100 (W)

# CAT (Computer Aided Transceiver) Operation

| PL     | SPEECH PROCESSOR LEVEL |   |    |    |    |   |   |   |   |    |
|--------|------------------------|---|----|----|----|---|---|---|---|----|
| Set    | 1                      | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | P                      | L | P1 | P1 | P1 | ; |   |   |   |    |
| Read   | 1                      | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | P                      | L | ;  |    |    |   |   |   |   |    |
| Answer | 1                      | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | P                      | L | P1 | P1 | P1 | ; |   |   |   |    |

P1 000: "OFF", 001 -100

| PR     | SPEECH PROCESSOR |   |    |    |   |   |   |   |   |    |
|--------|------------------|---|----|----|---|---|---|---|---|----|
| Set    | 1                | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P                | R | P1 | P2 | ; |   |   |   |   |    |
| Read   | 1                | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P                | R | P1 | ;  |   |   |   |   |   |    |
| Answer | 1                | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P                | R | P1 | P2 | ; |   |   |   |   |    |

P1 0: Speech Processor  
1: Parametric Microphone Equalizer  
P2 1: "OFF"  
2: "ON"

| PS     | POWER SWITCH |   |    |   |   |   |   |   |   |    |
|--------|--------------|---|----|---|---|---|---|---|---|----|
| Set    | 1            | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P            | S | P1 | ; |   |   |   |   |   |    |
| Read   | 1            | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P            | S | ;  |   |   |   |   |   |   |    |
| Answer | 1            | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | P            | S | P1 | ; |   |   |   |   |   |    |

P1 0: POWER "OFF"

| QI     | QMB STORE |   |   |   |   |   |   |   |   |    |
|--------|-----------|---|---|---|---|---|---|---|---|----|
| Set    | 1         | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | Q         | I | ; |   |   |   |   |   |   |    |
| Read   | 1         | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |           |   |   |   |   |   |   |   |   |    |
| Answer | 1         | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |           |   |   |   |   |   |   |   |   |    |

| QR     | QMB RECALL |   |   |   |   |   |   |   |   |    |
|--------|------------|---|---|---|---|---|---|---|---|----|
| Set    | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | Q          | R | ; |   |   |   |   |   |   |    |
| Read   | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |            |   |   |   |   |   |   |   |   |    |
| Answer | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |            |   |   |   |   |   |   |   |   |    |

| RA     | RF ATTENUATOR |   |    |    |   |   |   |   |   |    |
|--------|---------------|---|----|----|---|---|---|---|---|----|
| Set    | 1             | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | R             | A | P1 | P2 | ; |   |   |   |   |    |
| Read   | 1             | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | R             | A | P1 | ;  |   |   |   |   |   |    |
| Answer | 1             | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | R             | A | P1 | P2 | ; |   |   |   |   |    |

P1 0: (Fixed)  
P2 0: "OFF"  
1: "ON"

| RG     | RF GAIN |   |    |    |    |    |   |   |   |    |
|--------|---------|---|----|----|----|----|---|---|---|----|
| Set    | 1       | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | R       | G | P1 | P2 | P2 | P2 | ; |   |   |    |
| Read   | 1       | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | R       | G | P1 | ;  |    |    |   |   |   |    |
| Answer | 1       | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | R       | G | P1 | P2 | P2 | P2 | ; |   |   |    |

P1 0: MAIN-side  
1: SUB-side  
P2 000 - 255

| RI     | RADIO INFORMATION |   |    |    |    |    |    |    |    |    |    |
|--------|-------------------|---|----|----|----|----|----|----|----|----|----|
| Set    | 1                 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
|        |                   |   |    |    |    |    |    |    |    |    |    |
| Read   | 1                 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
|        | R                 | I | P1 | ;  |    |    |    |    |    |    |    |
| Answer | 1                 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
|        | R                 | I | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | ;  |

P1 0: (Fixed)  
P2 0: Normal 1: Hi-SWR  
P3 0: Stop 1: Recording 2: Playing  
P4 0: RX 1: TX 2: TX INHIBIT  
P5 0: (Fixed)  
P6 0: Antenna tuner: Tuning stopped 1:Antenna tuner: Tuning  
P7 0: Scan Stop 1:Scanning 2:Scan Pause  
P8 0: SQL Closed 1: SQL Open (BUSY)

# CAT (Computer Aided Transceiver) Operation

| RL     | NOISE REDUCTION LEVEL (DNR) |   |    |    |    |   |   |   |   |    |
|--------|-----------------------------|---|----|----|----|---|---|---|---|----|
| Set    | 1                           | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | R                           | L | P1 | P2 | P2 | ; |   |   |   |    |
| Read   | 1                           | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | R                           | L | P1 | ;  |    |   |   |   |   |    |
| Answer | 1                           | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | R                           | L | P1 | P2 | P2 | ; |   |   |   |    |

P1 0: MAIN-side  
1: SUB-side  
P2 00: "OFF", 01 -10

| RM     | READ METER |   |    |    |    |    |    |    |    |    |
|--------|------------|---|----|----|----|----|----|----|----|----|
| Set    | 1          | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|        |            |   |    |    |    |    |    |    |    |    |
| Read   | 1          | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|        | R          | M | P1 | ;  |    |    |    |    |    |    |
| Answer | 1          | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|        | R          | M | P1 | P2 | P2 | P2 | P3 | P3 | P3 | ;  |

P1=0  
P2: Meter 000 - 255 (MAIN-side)  
P3: Meter 000 - 255 (SUB-side)  
P1= 1: S (Main-side) 2: S (SUB-side) 3: COMP 4: ALC 5: PO  
6: SWR 7: IDD 8: VDD  
P2: 000 - 255  
P3: 000 (Fixed)

| SC     | SCAN |   |    |    |   |   |   |   |   |    |
|--------|------|---|----|----|---|---|---|---|---|----|
| Set    | 1    | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | S    | C | P1 | P2 | ; |   |   |   |   |    |
| Read   | 1    | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | S    | C | ;  |    |   |   |   |   |   |    |
| Answer | 1    | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | S    | C | P1 | P2 | ; |   |   |   |   |    |

P1 0: MAIN-side  
1: SUB-side  
P2 0: Scan "OFF"  
1: Scan "ON" (UP ward)  
2: Scan "ON" (DOWN ward)

| SD     | CW BREAK-IN DELAY TIME |   |    |    |   |   |   |   |   |    |
|--------|------------------------|---|----|----|---|---|---|---|---|----|
| Set    | 1                      | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | S                      | D | P1 | P1 | ; |   |   |   |   |    |
| Read   | 1                      | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | S                      | D | ;  |    |   |   |   |   |   |    |
| Answer | 1                      | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | S                      | D | P1 | P1 | ; |   |   |   |   |    |

00: 30 01: 50 02: 100 03: 150 04: 200 05: 250  
06: 300 - 33: 3000 (msec)  
**NOTE:** 06 to 33: 100 msec steps

| SF     | FUNC KNOB FUNCTION |   |    |    |   |   |   |   |   |    |
|--------|--------------------|---|----|----|---|---|---|---|---|----|
| Set    | 1                  | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | S                  | F | P1 | P2 | ; |   |   |   |   |    |
| Read   | 1                  | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | S                  | F | P1 | ;  |   |   |   |   |   |    |
| Answer | 1                  | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | S                  | F | P1 | P2 | ; |   |   |   |   |    |

P1 0: FUNC knob  
P2 0: -  
1: SCOPE LEVEL 2: PEAK 3: COLOR  
4: CONTRAST 5: DIMMER 6: - 7: MIC GAIN  
8: PROC LEVEL 9: AMC LEVEL A: VOX GAIN B: VOX DELAY  
C: - D: RF POWER E: MONI LEVEL F: CW SPEED  
G: CW PITCH H: BK-DELAY

# CAT (Computer Aided Transceiver) Operation

| SH     | WIDTH |   |    |    |    |    |   |   |   |    |
|--------|-------|---|----|----|----|----|---|---|---|----|
| Set    | 1     | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | S     | H | P1 | P2 | P3 | P3 | ; |   |   |    |
| Read   | 1     | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | S     | H | P1 | ;  |    |    |   |   |   |    |
| Answer | 1     | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | S     | H | P1 | P2 | P3 | P3 | ; |   |   |    |

P1 0: MAIN-side  
 1: SUB-side  
 P2 0: (Fixed)  
 P3 00 - 23 (See Table 5)

| Table 5 (Bandwidth Chart) |            |                                                              |                 |                          |                  |
|---------------------------|------------|--------------------------------------------------------------|-----------------|--------------------------|------------------|
| Command                   | Bandwidth  |                                                              |                 |                          |                  |
| P3                        | LSB / USB  | CW-L / CW-U /<br>DATA-L / DATA-U /<br>RTTY-L / RTTY-U<br>PSK | AM-N            | AM / FM-N /<br>DATA-FM-N | FM / DATA-FM     |
| 00 (Default)              | (Default)* | (Default)*                                                   | -               | -                        | -                |
| 01                        | 300 Hz     | 50 Hz                                                        | 6000 Hz (Fixed) | -                        | -                |
| 02                        | 400 Hz     | 100 Hz                                                       | -               | 9000 Hz (Fixed)          | -                |
| 03                        | 600 Hz     | 150 Hz                                                       | -               | -                        | 16000 Hz (Fixed) |
| 04                        | 850 Hz     | 200 Hz                                                       | -               | -                        | -                |
| 05                        | 1100 Hz    | 250 Hz                                                       | -               | -                        | -                |
| 06                        | 1200 Hz    | 300 Hz                                                       | -               | -                        | -                |
| 07                        | 1500 Hz    | 350 Hz                                                       | -               | -                        | -                |
| 08                        | 1650 Hz    | 400 Hz                                                       | -               | -                        | -                |
| 09                        | 1800 Hz    | 450 Hz                                                       | -               | -                        | -                |
| 10                        | 1950 Hz    | 500 Hz                                                       | -               | -                        | -                |
| 11                        | 2100 Hz    | 600 Hz                                                       | -               | -                        | -                |
| 12                        | 2250 Hz    | 800 Hz                                                       | -               | -                        | -                |
| 13                        | 2400 Hz    | 1200 Hz                                                      | -               | -                        | -                |
| 14                        | 2450 Hz    | 1400 Hz                                                      | -               | -                        | -                |
| 15                        | 2500 Hz    | 1700 Hz                                                      | -               | -                        | -                |
| 16                        | 2600 Hz    | 2000 Hz                                                      | -               | -                        | -                |
| 17                        | 2700 Hz    | 2400 Hz                                                      | -               | -                        | -                |
| 18                        | 2800 Hz    | 3000 Hz                                                      | -               | -                        | -                |
| 19                        | 2900 Hz    | 3200 Hz                                                      | -               | -                        | -                |
| 20                        | 3000 Hz    | 3500 Hz                                                      | -               | -                        | -                |
| 21                        | 3200 Hz    | 4000 Hz                                                      | -               | -                        | -                |
| 22                        | 3500 Hz    | -                                                            | -               | -                        | -                |
| 23                        | 4000 Hz    | -                                                            | -               | -                        | -                |

\*(The default bandwidth varies depending on the selected mode.)

| SM     | S-METER READING |   |    |    |    |    |   |   |   |    |
|--------|-----------------|---|----|----|----|----|---|---|---|----|
| Set    | 1               | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        |                 |   |    |    |    |    |   |   |   |    |
| Read   | 1               | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | S               | M | P1 | ;  |    |    |   |   |   |    |
| Answer | 1               | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | S               | M | P1 | P2 | P2 | P2 | ; |   |   |    |

P1 0: MAIN-side  
 1: SUB-side  
 P2 000 - 255

| SQ     | SQUELCH LEVEL |   |    |    |    |    |   |   |   |    |
|--------|---------------|---|----|----|----|----|---|---|---|----|
| Set    | 1             | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | S             | Q | P1 | P2 | P2 | P2 | ; |   |   |    |
| Read   | 1             | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | S             | Q | P1 | ;  |    |    |   |   |   |    |
| Answer | 1             | 2 | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 |
|        | S             | Q | P1 | P2 | P2 | P2 | ; |   |   |    |

P1 0: MAIN-side  
 1: SUB-side  
 P2 000 - 255

# CAT (Computer Aided Transceiver) Operation

| SS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SPECTRUM SCOPE |   |    |    |    |    |    |    |    |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---|----|----|----|----|----|----|----|----|
| Set                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1              | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | S              | S | P1 | P2 | P3 | P4 | P5 | P6 | P7 | ;  |
| Read                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1              | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | S              | S | P1 | P2 | ;  |    |    |    |    |    |
| Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1              | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | S              | S | P1 | P2 | P3 | P4 | P5 | P6 | P7 | ;  |
| <p>P1 0: (Fixed)</p> <p>P2 0: SPEED 1: PEAK 2: MARKER 3: COLOR 4: LEVEL 5: SPAN<br/>6: MODE 7: AF-FFT/OSCILLOSCOPE</p> <p>P2=0 (SPEED):<br/>P3 0: SLOW1 1: SLOW2 2: FAST1 3: FAST2 4: FAST3 5: STOP<br/>P4 - P7: 0: (Fixed)</p> <p>P2=1 (PEAK):<br/>P3 0: LV1 1: LV2 2: LV3 3: LV4 4: LV5<br/>P4 - P7: 0: (Fixed)</p> <p>P2=2 (MARKER):<br/>P3 0: MARKER "OFF" 1: MARKER "ON"<br/>P4 - P7: 0: (Fixed)</p> <p>P2=3 (COLOR):<br/>P3 0: COLOR-1 - A: COLOR-11<br/>P4 - P7: 0: (Fixed)</p> <p>P2=4 (LEVEL):<br/>P3 - P7: -30.0 - -00.0 or +00.0 - +30.0 (0.5 dB steps, 5 bytes)</p> <p>P2=5 (SPAN):<br/>P3 0: - 1: - 2: 5 kHz 3: 10 kHz 4: 20 kHz 5: 50 kHz<br/>6: 100 kHz 7: 200 kHz 8: 500 kHz 9: 1 MHz<br/>P4 - P7: 0: (Fixed)</p> <p>P2=6 (MODE):<br/>P3 0: 3DSS CENTER 1: 3DSS CURSOR 2: 3DSS FIX<br/>3: - 4: W/F CENTER (NORMAL) 5: -<br/>6: - 7: W/F CURSOR (NORMAL) 8: -<br/>9: - A: W/F FIX (NORMAL) B: -<br/>P4 - P7: 0: (Fixed)</p> <p>P2=7 (AF-FFT/OSCILLOSCOPE):<br/>P3 0: AF-FFT (ATT=0dB) 1: AF-FFT (ATT=10dB) 2: AF-FFT (ATT=20dB)<br/>P4 0: OSC Level RX (0dB) 1: OSC Level RX (10dB) 2: OSC Level RX (20dB)<br/>P5 0: OSC Time (1 msec) 1: OSC Time (3 msec) 2: OSC Time (10 msec)<br/>3: OSC Time (30 msec) 4: OSC Time (100 msec) 5: OSC Time (300 msec)<br/>P6 0: OSC Level TX (0dB) 1: OSC Level TX (10dB) 2: OSC Level TX (20dB)<br/>P7 0: (Fixed)</p> |                |   |    |    |    |    |    |    |    |    |

| ST                                         | SPLIT |   |    |   |   |   |   |   |   |    |
|--------------------------------------------|-------|---|----|---|---|---|---|---|---|----|
| Set                                        | 1     | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                            | S     | T | P1 | ; |   |   |   |   |   |    |
| Read                                       | 1     | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                            | S     | T | ;  |   |   |   |   |   |   |    |
| Answer                                     | 1     | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                            | S     | T | P1 | ; |   |   |   |   |   |    |
| <p>P1 0: SPLIT "OFF"<br/>1: SPLIT "ON"</p> |       |   |    |   |   |   |   |   |   |    |

| SV                                 | SWAP VFO |   |   |   |   |   |   |   |   |    |
|------------------------------------|----------|---|---|---|---|---|---|---|---|----|
| Set                                | 1        | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                    | S        | V | ; |   |   |   |   |   |   |    |
| Read                               | 1        | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                    |          |   |   |   |   |   |   |   |   |    |
| Answer                             | 1        | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                    |          |   |   |   |   |   |   |   |   |    |
| Changes the MAIN-side and SUB-side |          |   |   |   |   |   |   |   |   |    |

| TS                                     | TXW |   |    |   |   |   |   |   |   |    |
|----------------------------------------|-----|---|----|---|---|---|---|---|---|----|
| Set                                    | 1   | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                        | T   | S | P1 | ; |   |   |   |   |   |    |
| Read                                   | 1   | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                        | T   | S | ;  |   |   |   |   |   |   |    |
| Answer                                 | 1   | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                        | T   | S | P1 | ; |   |   |   |   |   |    |
| <p>P1 0: TXW "OFF"<br/>1: TXW "ON"</p> |     |   |    |   |   |   |   |   |   |    |

| TX                                                                                                                       | TX SET |   |    |   |   |   |   |   |   |    |
|--------------------------------------------------------------------------------------------------------------------------|--------|---|----|---|---|---|---|---|---|----|
| Set                                                                                                                      | 1      | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                                                                                                          | T      | X | P1 | ; |   |   |   |   |   |    |
| Read                                                                                                                     | 1      | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                                                                                                          | T      | X | ;  |   |   |   |   |   |   |    |
| Answer                                                                                                                   | 1      | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|                                                                                                                          | T      | X | P1 | ; |   |   |   |   |   |    |
| <p>P1 0: RADIO TX "OFF", CAT TX "OFF"<br/>1: RADIO TX "OFF", CAT TX "ON"<br/>2: RADIO TX "ON", CAT TX "OFF" (Answer)</p> |        |   |    |   |   |   |   |   |   |    |

# CAT (Computer Aided Transceiver) Operation

| UP     | MIC UP |   |   |   |   |   |   |   |   |    |
|--------|--------|---|---|---|---|---|---|---|---|----|
| Set    | 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | U      | P | ; |   |   |   |   |   |   |    |
| Read   | 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |        |   |   |   |   |   |   |   |   |    |
| Answer | 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |        |   |   |   |   |   |   |   |   |    |

| VD     | VOX DELAY TIME / DATA VOX DELAY TIME |   |    |    |   |   |   |   |   |    |
|--------|--------------------------------------|---|----|----|---|---|---|---|---|----|
| Set    | 1                                    | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | V                                    | D | P1 | P1 | ; |   |   |   |   |    |
| Read   | 1                                    | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | V                                    | D | ;  |    |   |   |   |   |   |    |
| Answer | 1                                    | 2 | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 |
|        | V                                    | D | P1 | P1 | ; |   |   |   |   |    |

P1 00: 30 msec 01: 50 msec 02: 100 msec 03: 150 msec 04: 200 msec  
05: 250 msec 06: 300 msec - 33: 3000 msec (06 - 33: 10 msec multiples)

**NOTE:** VD command sets individual parameter values with the setting values "MIC" and "USB or BLUETOOTH" in the menu items [OPERATION SETTING] → [TX GNRL] → → [VOX SELECT].

| VE     | FIRMWARE VERSION |   |    |    |    |    |    |   |   |    |
|--------|------------------|---|----|----|----|----|----|---|---|----|
| Set    | 1                | 2 | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 |
|        |                  |   |    |    |    |    |    |   |   |    |
| Read   | 1                | 2 | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 |
|        | V                | E | P1 | ;  |    |    |    |   |   |    |
| Answer | 1                | 2 | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 |
|        | V                | E | P1 | P2 | P2 | P2 | P2 | ; |   |    |

P1 0: MAIN CPU 1: DISPLAY CPU 2: SDR 3: DSP 4: SPA-1 5: FC-80  
P2 XX-XX (Binary Coded Decimal)

| VG     | VOX GAIN |   |    |    |    |   |   |   |   |    |
|--------|----------|---|----|----|----|---|---|---|---|----|
| Set    | 1        | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | V        | G | P1 | P1 | P1 | ; |   |   |   |    |
| Read   | 1        | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | V        | G | ;  |    |    |   |   |   |   |    |
| Answer | 1        | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | V        | G | P1 | P1 | P1 | ; |   |   |   |    |

P1 000 - 100

| VM     | MAIN-SIDE TO MEMORY CHANNEL |   |   |   |   |   |   |   |   |    |
|--------|-----------------------------|---|---|---|---|---|---|---|---|----|
| Set    | 1                           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | V                           | M | ; |   |   |   |   |   |   |    |
| Read   | 1                           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                             |   |   |   |   |   |   |   |   |    |
| Answer | 1                           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        |                             |   |   |   |   |   |   |   |   |    |

| VM     | VFO / MEMORY CHANNEL |   |    |    |    |   |   |   |   |    |
|--------|----------------------|---|----|----|----|---|---|---|---|----|
| Set    | 1                    | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | V                    | M | P1 | P2 | P2 | ; |   |   |   |    |
| Read   | 1                    | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | V                    | M | P1 | ;  |    |   |   |   |   |    |
| Answer | 1                    | 2 | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
|        | V                    | M | P1 | P2 | P2 | ; |   |   |   |    |

P1 0: MAIN-side  
1: SUB-side  
P2 00: VFO 10: MT 11: Memory 20: PMS  
21: P-01L - P-50U 51: 5MHz Band Memory 91: EMG

| VS     | VFO SELECT |   |    |   |   |   |   |   |   |    |
|--------|------------|---|----|---|---|---|---|---|---|----|
| Set    | 1          | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | V          | S | P1 | ; |   | ; |   |   |   |    |
| Read   | 1          | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | V          | S | ;  |   |   |   |   |   |   |    |
| Answer | 1          | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | V          | S | P1 | ; |   |   |   |   |   |    |

P1 0: MAIN-side TX/RX, SUB-side RX  
1: MAIN-side RX, SUB-side TX/RX

| VX     | VOX STATUS |   |    |   |   |   |   |   |   |    |
|--------|------------|---|----|---|---|---|---|---|---|----|
| Set    | 1          | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | V          | X | P1 | ; |   | ; |   |   |   |    |
| Read   | 1          | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | V          | X | ;  |   |   |   |   |   |   |    |
| Answer | 1          | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|        | V          | X | P1 | ; |   |   |   |   |   |    |

P1 0: VOX "OFF"  
1: VOX "ON"

# CAT (Computer Aided Transceiver) Operation

| ZI     | ZERO IN |   |    |   |   |   |   |   |   |    | (CW AUTO ZERO IN Function)<br>P1 0: MAIN-side<br>1: SUB-side |
|--------|---------|---|----|---|---|---|---|---|---|----|--------------------------------------------------------------|
| Set    | 1       | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                                              |
|        | Z       | I | P1 | : |   |   |   |   |   |    |                                                              |
| Read   | 1       | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                                              |
|        |         |   |    |   |   |   |   |   |   |    |                                                              |
| Answer | 1       | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                                                              |
|        |         |   |    |   |   |   |   |   |   |    |                                                              |

# ***YAESU***

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***Radio for Professionals***

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