

Major Features:

- * The RC Pack enables you to control the AR2002 (or AR2001) receiver via a home computer.
- * Built-in software program provides instant access to your home computer/AR2002 (or AR2001) system.
- * Alphanumeric information (MEMO) can be stored in all 50 built-in channels, and displayed on the computer screen along with other information such as frequency, mode and channel step. (Stored information is retained by back-up battery)
- * Each channel can be individually designated to Scan or Priority mode.
- * High speed UP/DOWN tuning by [↑], [↓], [+], [-] keys. (70mS adjustable) Remarks: [↑], [↓] keys are usable on computers using standard ASCII control codes.
- * Selectable UP/DOWN steps.
- * 10 programmable search ranges.
- * Adjustable delay time for search/scan/priority mode.
- * Up to 20 Lock-out channels can be used.
- * Directory display for MEMO and Lock-out channel information.

The RC Pack is a highly sophisticated remote controller which consists of an 8-bit CPU and non-volatile memory chip, and enables control of the AR2002 (2001) receiver via a home computer. You can write and display information (MEMO) such as name of radio station and location in all 50 channels for quick reference. Your desired channel can be instantly recalled. Also channel scan and search (max. 10 search ranges) in desired steps and speed are possible.

Connection to home computer

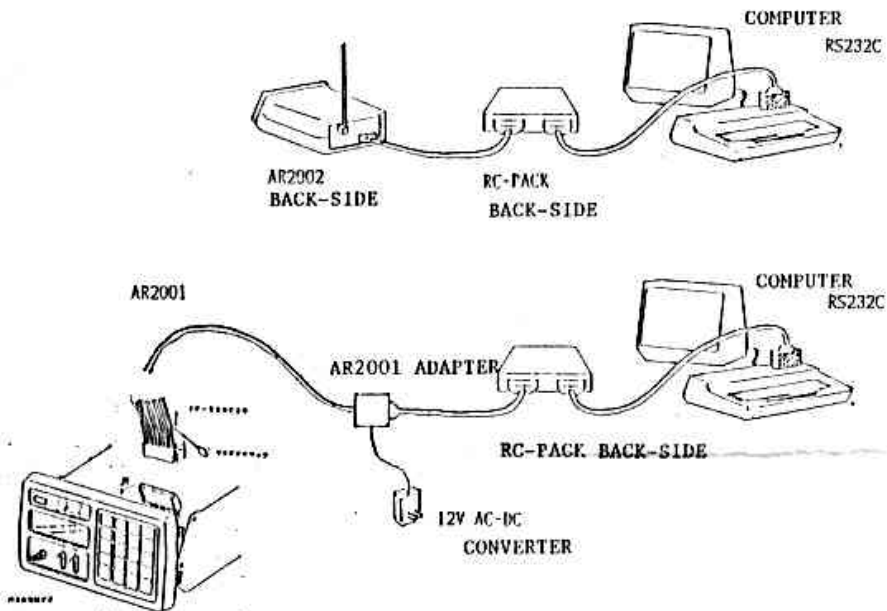
Use the RS232C interface to connect the RC Pack to the computer. (A different type of the RS232C is required for use with a MSX computer)

Consult your computer dealer if your computer has no built-in RS232C.

See the diagram for connection with the AR2002 and AR2001.

Disconnect J1 on the CPU-LCD PCB and connect the socket from the RS232C. Connect a crocodile clip to R125. (AR2001 only)

Diagram for connection



Operation

1. The AR2002 will continue to operate as a receiver if the RC Pack is switched off.
2. When the RC pack is switched on, the AR2002 will show the time on the LCD display to confirm the system is ready.
3. Use the following parameter to set your computer for the terminal mode (See the computer operating manual for terminal mode);

RS232C characteristics : 9600 baud/8 bit/Non parity/1 stop bit

Baud rate (9600 factory setting,4800,2400) is selectable by the internal dip switch.

Position 1 = 9600
2 = 4800
3 = 2400
4 = not used

MSX Computer

```
SCREEN 0
WIDTH 39
10 CALL COMINI ("0:8N1NNNNN",9600,9600) ]-Programming
20 CALL COMTERM ("0:")
RUN ----- Terminal mode
EC
RS 5
```

NEC PC8001 mk2

```
Make 9600 using back side baud rate switch.
Switch on
term a,0,1,0
ec
rs 10
```

NEC PC8201

```
Move TELCOM
STAT 8N81NN
TERM
EC
RS 5
```

NEC PC8801 (mk2/RS)

```
Make 9600 using baud rate switch.
TERM "COM:N81NN"
EC
RS 5
```

NEC PC9801

```
MON                               Changing to basic monitor mode
]SSW1                             ]
]00-8C                             ] Unneeded after setting SW2-5 (DOWN)
]SSW2                             ]
]00-68                             ]
CTRL-B ----- Return from mnitor mode
TERM "COM:N81NN"
EC
```

4. Your computer is now in the terminal mode. Press "E C [RETURN]" keys. The computer screen should display the following message;

```
***** AR-2002 PC-SCANNER *****
-----
//WFM//          .OK STEP
                  SIGNAL      >H:HELP
>                .0000M      BUSY
```

If you pressed wrong keys, use [BACK SPACE] or [] for correction. If you have failed to correct, press [RETURN] key several times. If trouble persists, switch off and on both computer and receiver.

5. If the message on the computer screen is garbled because of mismatched operating speed between the computer and the RC Pack, enter RS 10 [RETURN], for example. The number following RS is intended to vary the operating speed of the RC Pack. Choose smallest possible number from 0 - 255 to obtain optimum speed for your computer.

Your RC Pack is now fully operational. Enter frequency for example, N [RETURN] 420 [RETURN]. The computer screen should show the following message;

```
***** AR-2002 PC-SCANNER *****  
-----  
(NFM) .OK STEP  
> 420.0000M SIGNAL >H:HELP  
      BUSY  
      S meter
```

6. Alteration of baud rate

A D.I.P. switch is provided next to the power switch inside case. Select appropriate baud rate if required.

Position 1 = 9600
2 = 4800
3 = 2400
4 = not used

7. Memory Back-up

MEMO, Lock-out channel and search frequencies stored in memory are retained by back-up battery. Back-up battery is constantly charged by low current regardless of power switch position as long as the RC Pack and receiver are plugged in to AC mains.

Switch off the RC Pack before you disconnect the cable from the receiver.

Do not cut the power while the RC Pack remains switched on.

Stored information may be lost if such situations occur.

Command

Enter H [RETURN]. (HELP Command)

```

//WFM//
>
> H
> EC :ECHO ON/OFF
> N :NFM
> W :WFM
> A :A M
> 123.4 :FRQ 123.4 MHZ
> ST 12.5 :UP/DN STEP 12.5 KHZ
> + :FRQ UP
> [UP] :FRQ UP
> - :FRQ DN
> [DN] :FRQ DN
> SE 4 :SEARCH NO.4 (1-10)
> M :WRITE MEMO 1-50
> M 7 :SET MEMO 7 TO SCANNER
> M X7 :CLEAR MEMO 7
> M L :MEMO LIST
> M Z :MEMO ALL CLEAR
> SC 5 :MEMO 5 IS SCAN CHANNEL
> SC X5 :MEMO 5 IS NOT SCAN CHAN
PRESS [SPACE]=CONT [RET]=STOP

```

Command List will be shown as above in 18 lines per page. Press [SPACE] to display further pages. Press [RETURN] to end this mode.

1. "EC" Command (Echo ON/OFF)

EC Command (E C [RETURN]) is used to achieve internal connection between the RC Pack and home computer. The computer screen shows information from the RC Pack when EC Command is engaged. EC Command can be disengaged either by repeating entry of "E C [RETURN]" or switching off the RC Pack. EC OFF (Echo off) mode is used to operate the receiver by home computer program directly. CLEAR Command (CL) can also disengage EC mode.

2. "N" Command

This is used to obtain NFM (Narrow FM) mode on the receiver.

```

***** AR-2002 PC-SCANNER *****
-----
//NFM// .OK STEP
          SIGNAL      >H:HELP
> 420.0000M === BUSY

```

3. "W" Command

This is used to obtain WFM (Wide FM) mode on the receiver.

```

***** AR-2002 PC-SCANNER *****
-----
//WFM// .OK STEP
          SIGNAL      >H:HELP
> 420.0000M === BUSY

```

4. "A" Command

This is used to obtain AM mode on the receiver.

```
***** AR-2002 PC-SCANNER *****
-----
//A M// .OK STEP
          SIGNAL      >H:HELP
>        420.0000M === BUSY
```

5. "123.4 [RETURN]" (frequency)

Desired frequency can be entered by pressing numeral keys as above.

```
***** AR-2002 PC-SCANNER *****
-----
//A M// .OK STEP
          SIGNAL      >H:HELP
>        123.4000M === BUSY
```

6. "ST" Command (frequency step)

This is used to enter any desired frequency step in kHz order for search mode as well as for UP/DOWN by means of [], [], [+], [-] keys. Remarks: [], [] keys are usable on computers using standard ASCII control codes.

```
***** AR-2002 PC-SCANNER *****
-----
//A M// .OK STEP
          SIGNAL      >H:HELP
>        12.5K STEP
          123.4000M === BUSY
```

7. [], [], [+], [-] keys

these keys are used to change operating frequencies (UP/DOWN) in the step selected by ST Command. Depress the key for a few seconds, and frequency will continuously move until the receiver squelch opens. (See the receiver operating manual for squelch) Frequency display may be garbled depending on UP/DOWN speed. Frequency display can be stabilised by delaying UP/DOWN speed (See RS Command, WT Command). Remarks: [], [] keys are usable on computers using standard ASCII control codes.

8. "SE" Command (Search Command)

This is used to search frequencies within a programmed band. 10 search bands are available, and each band can be specified by number, eg SE 5. Note that search steps are not displayed.

Example: Search Between 150MHz and 200MHz in 10Khz step.

***** AR-2002 PC-SCANNER *****

```
-----  
//A M//      12.5K STEP  
              SIGNAL      >H:HELP  
>           123.4000M ----- BUSY  
>SE 4  
  
>ENTER LO FRQ FROM 150.0000M  
(NULL=NOT CHANGE) (:100)  
>ENTER HI FRQ TO 250.0000M  
(NULL=NOT CHANGE) (:200)  
>ENTER STEP 12.5K  
(NULL=NOT CHANGE) (:5)
```

** SEARCHING ** [RET]=STOP

Search does not take place if [E] is entered.

Press S E 4 and [RETURN] key 4 times to repeat searching between 150MHz and 200MHz as they are stored in memory.

Search will stop when the squelch opens, and the following message is displayed;

```
[+]=UP SEARCH [-]=DN SEARCH [RET]=STOP  
109.2700M      BUSY
```

Press [], [], [+], [-] key to resume searching. Search will stop immediately when [RETURN] is depressed. Search will automatically resume 10 seconds after the signal disappears. (Delay function) Initial delay time is 10 seconds when the RC Pack is switched on, or "CL" Command is used. "DL" Command is used to alter delay time or to cancel search resumption. Remarks: [], [] keys are usable on computers using standard ASCII control codes.

9. "M" Command (Channel/MEMO entry)

Press "M [RETURN]" to write and store MEMO in memory for each channel.

Example: Write WFM80MHz [FM TOKYO] in channel 15.

```
***** AR-2002 PC-SCANNER *****  
-----  
//NFM//      10.OK STEP  
              SIGNAL      >H:HELP  
>           109.2700M      BUSY  
>M  
  
>ENTER NO. 1-50 (:15)  
>ENTER NFM/WFM/AM (NULL=NFM) (:W)  
>ENTER FRQ MHZ (NULL= 109.2700M)  
(:80)  
  
>ENTER MEMO-----  
FM TOKYO  
-----
```

Do not enter [E] here.

Example: Write MEMO [FOUND X] in channel 25 at 432.1MHz which you have been monitoring.

```
***** AR-2002 PC-SCANNER *****
-----
//NFM//      10.OK STEP
              SIGNAL      >H:HELP
>           432.1000M     BUSY
>M
>ENTER NO. 1-50 :25
>ENTER NFM/WFM/AM (NULL=NFM):
>ENTER FRQ MHZ (NULL= 432.1000M)
:
>ENTER MEMO-----
              FOUND X
```

Press only [RETURN] to automatically store mode and frequency being used at present.

10. "M Entry" Command (Channel entry)

Press M 25 [RETURN], for example, to obtain channel 25.

```
***** AR-2002 PC-SCANNER *****
MEMO 25: FOUND X
-----
//NFM//      10.OK STEP
              SIGNAL      >H:HELP
>           432.1000M     ==== BUSY
```

11. "M Clear" Command (Channel clear)

Press "M X25 [RETURN]", for example, to clear channel 25.

12. "ML" Command (Channel/MEMO Directory)

Press "M L [RETURN]" to obtain Directory for stored channel and MEMO information. Memory information may crash if the RC Pack is used for the first time, or the receiver remains Unplugged from mains for more than approx. one month. Use "MZ" Command (All channel clear) in such cases.

```
***** AR-2002 PC-SCANNER *****
-----
//A M//      10.OK STEP
              SIGNAL      >H:HELP
>           125.5000M     BUSY
```

```
>M L
MEMO 01: AIR XXX           A M 125.5000M
MEMO 02: AIR XXX           A M 125.7000M
MEMO 03: AIR XXX           A M 125.8000M
MEMO 06: AIR XXX           A M 126.7000M
MEMO 07: AIR XXX           A M 126.5000M
MEMO 08: AIR XXX           A M 126.6000M
MEMO 09: AIR XXX           A M 126.7000M
MEMO 10: AIR XXX           A M 126.8000M
MEMO 11: AIR XXX           A M 126.9000M
PRESS: [SPACE]=CONT [RET]-STOP
```

Directory is shown in 18 lines per page. Press [SPACE] for further pages. Press[RETURN] to end this mode. Hard copy of the directory (18 lines per page) can be obtained if Screen Copy function is available with your computer.

13. "MZ" Command (All channel clear)

If either you use the RC Pack for the first time or the receiver has remained unplugged from mains for more than approx. One month, use "MZ" Command to clear memory contents as explained in Section 12. "M Z [RETURN]".

***** AR-2002 PC-SCANNER *****

```
-----
//A M//      10.0K STEP
                SIGNAL      >H:HELP
>            125.500M      BUSY
>M Z
>Z=CLEAR:
```

Press [Z] [RETURN] to reconfirm all channel clear.

** S mark and P mark

'S' for programmed scan and 'P' for priority scan are indicated with each channel if so designated.

Channel	1	2	3	4	5	6	7	8	9	10	11	. . .	50
S mark	S	S	S				S			S			
P mark		P	P		P			P		P			

Scan over 'S' channels only.

Scan over 'P' channels with 10 seconds interval. (20 seconds interval from the last 'P' channel back to the first 'P' channel.)

14. "SC Channel" Command (Programmed Scan)

This is used to designate the scan channels. Enter "SC 5 [RETURN]", for example, to make channel 5 as programmed scan channel. (Programmed scan takes place only between programmed channels with appropriate information stored.) Enter SC X5 to cancel programmed scan on channel 5.

15. "SC" Command (Channel scan)

Enter "SC [RETURN]" to commence scanning.

Example: Start scan

***** AR-2002 PC-SCANNER *****
MEMO 01: AIR XXX S

```
-----
//A M//      10.0K STEP
                SIGNAL      >H:HELP
>            125.500M
```

> SC

** SCANNING ** [RET]=STOP

When the receiver squelch opens, scan will stop and the following message will be displayed.

```
***** AR-2002 PC-SCANNER *****
MEMO 02: AIR XXX S
-----
//A M// 10.0K STEP **SCAN BSY**
          SIGNAL    >H:HELP
> [SPACE]=CONT [RET]=STOP SCAN
> 125.7000M = BUSY
```

Press [SPACE] to resume scanning. Press [RETURN] to stop scanning, and the frequency when scan stopped is displayed. Scan will automatically resume 10 seconds after the receiver squelch closes. (Delay function) Initial delay time is 10 seconds (when the RC Pack is switched on, or "CL" Command is used). "DL" Command (Delay command) is used to alter delay time or cancel scanning.

16. "SC Z" Command

This is used to cancel all programmed scan channels.

17. "PR" Channel Command (Program Priority channels)

This is used to designate the Priority channels. For example, enter "PR 5 [RETURN]" to make channel 5 as priority channel. (Priority scan takes place only between priority channels with appropriate information stored.) Enter "PR X5 [RETURN]" to cancel priority scan on channel 5.

Example: Enter "PR 1[RETURN]" to make channel 1 as priority channel.

```
***** AR-2002 PC-SCANNER *****
MEMO 01: AIR XXX P
-----
//A M// 10.0K STEP
          SIGNAL    >H:HELP
> 125.5000M BUSY
```

18. "PR" Command (Priority Scan ON)

Enter "PR [RETURN]" to commence scanning over 'P' channels with 10 seconds interval. Initial scan interval is 10 seconds (when the RC Pack is switched on, or "CL" Command is used), but is adjustable by "PI" Command. "CL" Command retrieves original 10 seconds interval. It will take 20 seconds to scan from the last priority channel back to the first priority channels.

```
***** AR-2002 PC-SCANNER *****
//WFM// 10.0K STEP PRI ON
          SIGNAL    >H:HELP
> 80.0000M =====
```

When the receiver squelch opens, the following message is displayed.

```
***** AR-2002 PC-SCANNER *****
MEMO 01: AIR XXX P
-----
//A M//      10.0K STEP  **PRI BSY**
                SIGNAL    >H:HELP
> [SPACE]=CONT [RET]=STOP SCAN
>      125.5000M      BUSY
```

Press [SPACE] to return to the original priority channel. Priority mode remains engaged. Press[RETURN] to stop scanning. Scan will automatically resume 10 seconds after the receiver squelch closes. (Delay function) Priority mode remains engaged during scanning and searching, but is disengaged during BUSY position.

19. "PR Z" Command

This is used to clear all Priority channels.

20. "PA NUMBER" Command (Lock-out channel)

This is used to designate up to 20 Lock-out channels. Lock-out channel numbers are given, eg PA 1, PA 2, ... (PA =Pass).

Example: Designate 825.75MHz as PA 1.

```
***** AR-2002 PC-SCANNER *****
-----
//A M//      10.0K STEP
                SIGNAL    >H:HELP
> 125.5000M      BUSY
>PA 1
>ENTER PASS FREQ .0000M
(NULL=NOT CHANGE 0=CLEAR) :825.75
```

Example: Retrieve the frequency stored in PA 1, and change.

```
***** AR-2002 PC-SCANNER *****
-----
//A M//      10.0K STEP
                SIGNAL    >H:HELP
> 125.5000M      BUSY
>PA 1
>ENTER PASS FREQ 825.7500M
(NULL=NOT CHANGE 0=CLEAR) :
```

If you press [RETURN] only at this position, Lock-out frequency will remain unchanged. To clear Lock-out frequency on PA 1, enter "0" (zero), or "PA X1 [RETURN]".

21. "PA L" Command (Directory of Lock-out channels)

Enter "PA L [RETURN]" to display the directory in 18 lines per page. Use "PA Z" Command (All lock-out channels clear) if the RC Pack is used for the first time, or the receiver remains unplugged from mains for more than approx. One month.

***** AR-2002 PC-SCANNER *****

```
-----  
//A M//          10.0K STEP  
                SIGNAL      >H:HELP  
> 125.500M          BUSY  
>PA L  
PASS 01: 825.750M  
PASS 02: 860.250M  
PASS 03: 865.750M  
PRESS [SPACE]=CONT [RET]=STOP >
```

Press [SPACE] to scroll the page. Press [RETURN] to end this mode.

22. "PA Z" Command (All lock-out channels clear)
This is used to clear all lock-out channels.
23. "WT" Command
This is used to alter the response time of the RC Pack in ms in order to detect the squelch position of the receiver. Minimum values are as follows;
Search/Scan range up to 100kHz: "WT 30"
" 250kHz: "WT 50"
" 700kHz: "WT 70"
more than 700kHz: "WT 150"
Choose any appropriate number between 70 and 150. A longer time is necessary if the squelch is set deeply. Initial setting is 70 ms (when the RC Pack is switched on, or "CL" is used).
24. "DL" Command (Delay time adjustment)
This is used to alter the delay time for search/scan/priority mode. Initial delay time is 10 seconds (DL 10) when the RC Pack is switched on, or "CL" Command is used. To cancel resumption of search/scan, enter "DL X[RETURN]".
25. "PI" Command (Priority scan interval)
This is used to alter the interval of the Priority scan in seconds. Initial interval is 10 seconds (PI 10).
26. "RS" Command (Response time)
A message on the computer screen may be garbled, if the operating speed between the RC Pack and home computer is mismatched. Choose any appropriate (smallest possible) number between 0 and 255, and enter RS 10, for example.
27. "RF" Command (Frequency reading)

This is used in ECHO OFF mode to display a frequency from the receiver.

28. "AK" Command (Acknowledgement)

This is used in ECHO OFF mode to verify if the key entry is correct or not. Enter "AK [RETURN]" once, then ACK=CH\$(\$06) is displayed for correct entry, and NACK=CHR\$(\$15) for wrong entry.

29. "SQ" Command (Squelch ON/OFF)

Enter "SQ [RETURN]". 1 is displayed when the squelch is open, and 0 when the squelch is closed.

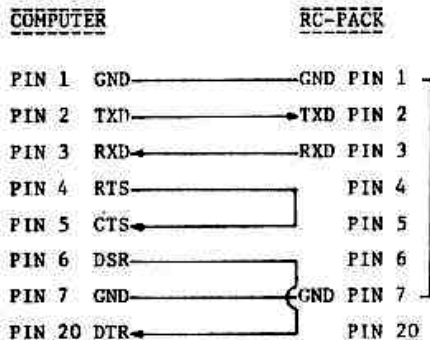
30. "CL" Command (Clear)

Enter "CL [RETURN]" to reset the RC Pack to initial position. (ECHO OFF and no display) Enter "EC [RETURN]" to restart operation. Search/Channel/Lock-out information is not cleared by "CL" Command.

Position of each mode after "CL" Command will be as follows;

DL 10, PI 10, WT 70, RS 0, ECHO OFF, PRIORITY OFF, ACK/NACK OFF

RS-232C INTERFACE CONNECTION



***** AR-2002 PC-SCANNER *****
MEMO 02: XXXXXXXXXXXX S P

//NFH// 5.0K STEP PRI ON
SIGNAL >H:HELP
> 147.2000M ===== BUSY

>H

>EC :ECHO ON/OFF
>N :NFH
>W :WFM
>A :A M
>123.4 :FRQ 123.4 MHZ
>ST 12.5 :UP/DN STEP 12.5 KHZ
>+ :FRQ UP
> [UP] :FRQ UP
>- :FRQ DN
> [DN] :FRQ DN
>SE 4 :SEARCH NO.4 (1-10)
>M :WRITE MEMO 1-50
>M 7 :SET MEMO 7 TO SCANNER
>M X7 :CLEAR MEMO 7
>M L :MEMO LIST
>M Z :MEMO ALL CLEAR
>SC 5 :MEMO 5 IS SCAN CHANNEL
>SC X5 :MEMO 5 IS NOT SCAN CHAN
>SC :SCANNING
>SC Z :NO SCAN CHANNEL
>PR 5 :MEMO 5 HAS PRIORITY
>PR X5 :MEMO 5 DOES NOT HAVE PRI
>PR :ON/OFF PRIORITY
>PR Z :TAKE OFF ALL PRIORITY
>PA 4 :CHECK PASS-FRQ 4 (1-20)
>PA X4 :CLEAR PASS-FRQ 4
>PA Z :CLEAR ALL PASS-FRQ
>PA L :PASS-FRQ LIST
>WT 40 :WAIT TIME DEFEND ON STEP
>DL 5 :DELAY 5 SEC (1-127)
>DL X :NO DLY. BUSY=STOP
>PI 8 :PRIORITY INTERVAL 8S (1-127)
> [RS] :BACK SPACE
> [DEL] :BACK SPACE
> [LEFT] :BACK SPACE
>RS 10 :RESPONCE 0-255
>RF :READ FRQ (ECHO-OFF MODE)
>AK :ACK/NAK ON/OFF (ECHO OFF)
>AG :AGC MIN=255 MAX=0
>SD :1=BUSY 0=NOT
>LK :1=LOCK 0=NOT
>CL :CLEAR : DL10 PI10 WT10 RS0
ECHO=OFF PRI=OFF AK=OFF
PRESS [SPACE]=CONT [RET]=STOP >

EC :ECHO ON/OFF
N :NFM
W :WFM
A :A M
123.4 :FRQ 123.4 MHZ
ST 12.5 :UP/DN STEP 12.5 KHZ
+ :FRQ UP
 [UP] :FRQ UP
- :FRQ DN
 [DN] :FRQ DN
SE 4 :SEARCH NO.4 (1-10)
M :WRITE MEMO 1-50
M 7 :SET MEMO 7 TO SCANNER
M X7 :CLEAR MEMO 7
M L :MEMO LIST
M Z :MEMO ALL CLEAR
SC 5 :MEMO 5 IS SCAN CHANNEL
SC X5 :MEMO 5 IS NOT SCAN CHAN
SC :SCANNING
SC Z :NO SCAN CHANNEL
PR 5 :MEMO 5 HAS PRIORITY
PR X5 :MEMO 5 DOES NOT HAVE PRI
PR :ON/OFF PRIORITY
PR Z :TAKE OFF ALL PRIORITY
PA 4 :CHECK PASS-FRQ 4 (1-20)
PA X4 :CLEAR PASS-FRQ 4
PA Z :CLEAR ALL PASS-FRQ
PA L :PASS-FRQ LIST
WT 40 :WAIT TIME DEPEND ON STEP
DL 5 :DELAY 5 SEC (1-127)
DL X :NO DLY. BUSY=STOP
PI 8 :PRIORITY INTERVAL 8S (1-127)
 [BS] :BACK SPACE
 [DEL] :BACK SPACE
 [LEFT] :BACK SPACE
RS 10 :RESPONCE 0-255
RF :READ FRQ (ECHO-OFF MODE)
AK :ACK/NAK ON/OFF (ECHO OFF)
AG :AGC MIN=255 MAX=0
SQ :1=BUSY 0=NOT
LK :1=LOCK 0=NOT
CL :CLEAR : DL10 PI10 WT70 RS0
 ECHO=OFF PRI=OFF AK=OFF