

# FM/AM - 1500

## PROGRAMMING REFERENCE CARD

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1700 East 17th Street, Suite 100, Lincoln, NE 68502

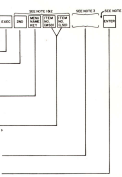
FM/AM-1500

### EXECUTION & OPERATION

#### A. SIMPLE EXECUTION STRING

##### Key entry sequence:

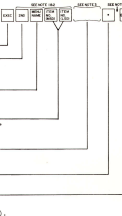
1. Press EXEC Key. This entry defines the beginning of an execution string.
2. Press ZND Key (Except for RF MEMORY Menu).
3. Press desired menu name key. Choices are:  
RF    DTMF    DCS  
F SWP    SCAN (Ref Note 2)  
T SWP    T. SEQ. (Ref Note 2)
4. Key in desired menu item number (or line number) corresponding to desired operation. (DSB is most significant digit of item number, LSB to least significant digit).
5. Additional menu names and item numbers to be included in execution string (if desired) may be inserted here.
6. Press ENTER Key to start execution of string.



#### B. LOOPING EXECUTION STRING

##### Key entry sequence:

1. Press EXEC Key. This entry defines the beginning of an execution string.
2. Press ZND Key (Except for RF MEMORY Menu).
3. Press desired menu name key. Choices are:  
RF    DTMF    DCS  
F SWP    SCAN (Ref Note 4)  
T SWP    T. SEQ. (Ref Note 4)
4. Key in desired menu item number (or line number) corresponding to desired operation. (DSB is most significant digit of item number, LSB to least significant digit).
5. Additional menu names and item numbers to be included in execution string (if desired) may be inserted here.
6. Press decimal point key. This entry will allow the FM/AM-1500 to continuously repeat the execution string.
7. Press ENTER Key to begin execution.
8. To stop looping execution, press any Function Key (F1, F2, OFFSET, RF, ZND DTMF or EXEC ZND).



### NOTE

1. This entry sequence sets the operating parameters of the FM/AM-1500 generator, receiver or tone generator functions to the most useful values programmed into the selected menu.
2. A start and stop number separated by the "-" key is required whenever entering menu item numbers for the RF SCAN or T. SEQ. menu. The FM/AM-1500 will execute item numbers sequentially from the start number to the stop number.

Example: 

1	2	3	4	5
---	---	---	---	---

3. Additional operations on the same menu or on other menus may be entered into the string at this point, by keying in the appropriate menu name(s) and item number(s). (Maximum number of key-strokes allowable is 128).
4. If an entry error is made prior to this point, the operator may use the < Key to backspace as necessary. (For purposes of correcting errors, pressing the < Key will not affect the previous key entry).

#### C. OPERATION INTERSECTION

A key entry of ZND, STEP causes the execution sequence to stop; control of the execution string is now transferred to the cursor > and < Keys as follows:

1. A < Key entry allows the FM/AM-1500 to step to the next operation in the execution string. (For example, in the DTMF menu control is stopped and the < Key is pressed, the next "number" in the sequence will be executed).
2. A > Key entry allows the FM/AM-1500 to step to the preceding operation in the execution string. (For example, if the DTMF execution string is stopped and the > Key is pressed, the preceding "number" in the sequence will be executed).
3. A < Key entry allows the FM/AM-1500 to continue execution in item at the < Key is held in a depressed position. Releasing the < Key will "stop" the execution sequence.
4. A > Key entry allows the FM/AM-1500 to continue execution in reverse order at item at the > Key is held in a depressed position. Releasing the > Key will "stop" the execution sequence.
5. Press ENTER Key to resume execution.
6. When using DCS MENU, halt execution of menu by pressing F1, F2, DTMF or RF Key. (This differs from all other automatic functions in that it is not time dependent.)
7. When using DCS MENU, stop code may be generated by pressing 2nd Step. The < or > Key may be used to move the selected code on or off. When either < or > is pressed, the selected code is generated. When released the stop code is generated. Press ENTER Key to restore normal operation.

### SELECTING APPROPRIATE MENU

- | STEP | ACTION  |
|------|---|
| 1A.  | Place front panel DISPLAY Control (S1) to "FREQU" position for RF MEMORY, RF or SCAN, RF SWEEP or CABLE FAULT MENU. |
| 1B.  | Place front panel DISPLAY Switch (S1) to "TONE" position for TONE SEQUENCE, DTMF, TONE SWEEP or DCS MENU.           |
| 2.   | If the menu of interest is now displayed, menu is selected. Otherwise, press menu key.                              |
| 3.   | Press < or > Key to scroll through menu pages, to display desired menu on CRT.                                      |
| 4.   | Press ENTER Key. Desired menu is now selected and ready for programming.  |

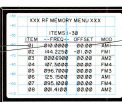
### SELECTING ITEM NUMBER

- | STEP | ACTION   |
|------|--|
| 1.   | Press < or > Key to scroll through RF MEMORY MENU line numbers. Stop scrolling when desired line number is positioned on top line of item numbers.<br>..... Alternate Method .....<br>a. Enter desired line number using numbered keys.<br>b. Press ENTER Key. |

### PROGRAMMING DATA FIELDS AND MENU DESCRIPTION

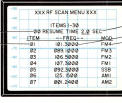
#### A. RF MEMORY MENU

- | STEP | ACTION   |
|------|--|
| 1.   | Press < Key to position CRT cursor to FREQ data field.   |
| 2.   | Enter desired frequency, using numeric and decimal point keys.   |
| 3.   | Press < Key to position CRT cursor to DSB OFFSET (if polarity) data field.   |
| 4.   | Press < Key to enter desired polarity.   |
| 5.   | Press < Key to position CRT cursor to OFFSET data field of desired DSB offset frequency, using numeric and decimal point keys.   |
| 6.   | Enter desired DSB offset frequency, using numeric and decimal point keys.  |
| 7.   | Press < Key to position CRT cursor to MOD data field.  |
| 8.   | Press < or > Key to scroll through the selection of demodulation mode (AM, DMC, SSB, PM, PM, PM, FM). Stop scrolling when desired demodulation mode appears in MOD data field. |
| 9.   | Press ENTER Key to enter programmed data into user memory.   |



#### B. RF SCAN MENU

- | STEP | ACTION   |
|------|--|
| 1.   | Press < Key to position CRT cursor to FREQ data field.   |
| 2.   | Enter desired frequency, using numeric and decimal point keys.   |
| 3.   | Press < or > Key to position CRT cursor to MOD data field.   |
| 4.   | Press < or > Key to scroll through the selection of demodulation mode (AM, DMC, SSB, PM, PM, PM, FM). Stop scrolling when desired demodulation mode appears in MOD data field. |
| 5.   | Press ENTER Key to enter programmed data into user memory.   |



#### C. RF SWEEP MENU

- | STEP | ACTION  |
|------|---|
| 1.   | Press < Key to position CRT cursor to START FREQ data field.                                      |
| 2.   | Enter desired start frequency, using numeric and decimal point keys.                              |
| 3.   | Press < Key to position CRT cursor to STOP FREQ data field, using numeric and decimal point keys. |
| 4.   | Press < Key to position CRT cursor to INCR STEP data field.                                       |
| 5.   | Enter desired increment (step), using numeric and decimal point keys.                             |
| 6.   | Press < Key to position CRT cursor to INCR RATE data field, using numeric and decimal point keys. |
| 7.   | Enter desired increment rate, using numeric and decimal point keys.                               |
| 8.   | Press ENTER Key to enter programmed data into user memory.  |



**D. CABLE FAULT MENU**

- | STEP | ACTION  |
|------|---|
| 1.   | Press $\Phi$ key to position CRT cursor to START FREQ #1 Frequency, using numeric and decimal point keys. |
| 2.   | Press $\Phi$ key to position CRT cursor to START FREQ #2 Frequency, using numeric and decimal point keys. |
| 3.   | Press $\Phi$ key to position CRT cursor to START FREQ #3 Frequency, using numeric and decimal point keys. |
| 4.   | Press $\Phi$ key to position CRT cursor to START FREQ #4 Frequency, using numeric and decimal point keys. |
| 5.   | Press $\Phi$ key to position CRT cursor to START FREQ #5 Frequency, using numeric and decimal point keys. |
| 6.   | Press $\Phi$ key to position CRT cursor to START FREQ #6 Frequency, using numeric and decimal point keys. |
| 7.   | Press ENTER key to display computed cable fault distances.  |

ITEM NO.	CABLE FAULT DISTANCE (FEET)	CABLE FAULT DISTANCE (METERS)	VEL FACTOR
1	0000.00	0000.00	0.9999
2	0000.00	0000.00	0.9999
3	0000.00	0000.00	0.9999
4	0000.00	0000.00	0.9999
5	0000.00	0000.00	0.9999
6	0000.00	0000.00	0.9999

**ERROR CORRECTION**  
Before the FREQ #1, FREQ #2 & VEL FACTOR parameters are entered into memory, any entry errors can be corrected as follows:  
Press  $\Phi$  key as necessary to return CRT cursor to data field where error is located in order to make error correction.

**E. TONE SEQUENCE MENU**

- | STEP | ACTION  |
|------|---|
| 1.   | Press $\Phi$ key to position CRT cursor to TONE 1 & TONE 2 FREQ.  |
| 2.   | Enter desired T1 Frequency, using numeric and decimal point keys. |
| 3.   | Press $\Phi$ key to position CRT cursor to TONE 1 & TONE 2 FREQ.  |
| 4.   | Enter desired T2 Frequency, using numeric and decimal point keys. |
| 5.   | Press $\Phi$ key to position CRT cursor to TONE 1 & TONE 2 FREQ.  |
| 6.   | Enter desired T1 Deviation, using numeric and decimal point keys. |
| 7.   | Press $\Phi$ key to position CRT cursor to TONE 1 & TONE 2 FREQ.  |
| 8.   | Enter desired T2 Deviation, using numeric and decimal point keys. |
| 9.   | Repeat steps 1 through 4 for T2 data fields.                      |
| 10.  | Press ENTER key to enter programmed data into user memory.        |

ITEM NUMBER	TONE 1 & TONE 2 FREQ.	DEVIATION	TONE 1 & TONE 2 TIME
1	0000.00	0000.00	0000.00
2	0000.00	0000.00	0000.00
3	0000.00	0000.00	0000.00
4	0000.00	0000.00	0000.00
5	0000.00	0000.00	0000.00
6	0000.00	0000.00	0000.00
7	0000.00	0000.00	0000.00
8	0000.00	0000.00	0000.00
9	0000.00	0000.00	0000.00
10	0000.00	0000.00	0000.00

**ERROR CORRECTION**  
Before the FREQ #1, FREQ #2 & VEL FACTOR parameters are entered into memory, any entry errors can be corrected as follows:  
Press  $\Phi$  key as necessary to return CRT cursor to data field where error is located in order to make error correction.

**F. DTMF MENU**

- | STEP | ACTION  |
|------|---|
| 1.   | Press $\Phi$ key to position CRT cursor to TELEPHONE NUMBER data field. |
| 2.   | Enter desired telephone number, using numeric and decimal point keys.   |
| 3.   | Press $\Phi$ key to position CRT cursor to TELEPHONE NUMBER data field. |
| 4.   | Enter desired start frequency, using numeric and decimal point keys.    |
| 5.   | Press $\Phi$ key to position CRT cursor to TELEPHONE NUMBER data field. |
| 6.   | Enter desired stop frequency, using numeric and decimal point keys.     |
| 7.   | Press ENTER key to enter programmed data into user memory.              |

ITEM NUMBER	START FREQUENCY	STOP FREQUENCY	DTMF DEVIATION
1	0000.00	0000.00	0000.00
2	0000.00	0000.00	0000.00
3	0000.00	0000.00	0000.00
4	0000.00	0000.00	0000.00
5	0000.00	0000.00	0000.00
6	0000.00	0000.00	0000.00

**ERROR CORRECTION**  
Before the FREQ, OFFSET & MOD parameters are entered into memory, any entry errors can be corrected as follows:  
Press  $\Phi$  key as necessary to return CRT cursor to data field where error is located in order to make error correction.

**G. TONE SWEEP MENU (Cont'd)**

- | STEP | ACTION  |
|------|---|
| 1.   | Press $\Phi$ key to position CRT cursor to MODE data field.                                     |
| 2.   | Enter desired sweep mode (1 for linear, 2 for hyperbolic) using numeric and decimal point keys. |
| 3.   | Press $\Phi$ key to position CRT cursor to MODE data field.                                     |
| 4.   | Enter desired start frequency, using numeric and decimal point keys.                            |
| 5.   | Press $\Phi$ key to position CRT cursor to MODE data field.                                     |
| 6.   | Enter desired stop frequency, using numeric and decimal point keys.                             |
| 7.   | Press $\Phi$ key to position CRT cursor to MODE data field.                                     |
| 8.   | Enter desired increment rate, using numeric and decimal point keys.                             |
| 9.   | Press $\Phi$ key to position CRT cursor to MODE data field.                                     |
| 10.  | Enter desired increment rate, using numeric and decimal point keys.                             |
| 11.  | Press ENTER key to enter programmed data into user memory.                                      |

ITEM NUMBER	START FREQUENCY	STOP FREQUENCY	SWEEP RATE
1	0000.00	0000.00	0000.00
2	0000.00	0000.00	0000.00
3	0000.00	0000.00	0000.00
4	0000.00	0000.00	0000.00
5	0000.00	0000.00	0000.00
6	0000.00	0000.00	0000.00
7	0000.00	0000.00	0000.00
8	0000.00	0000.00	0000.00
9	0000.00	0000.00	0000.00
10	0000.00	0000.00	0000.00
11	0000.00	0000.00	0000.00

**ERROR CORRECTION**  
Before the FREQ, OFFSET & MOD parameters are entered into memory, any entry errors can be corrected as follows:  
Press  $\Phi$  key as necessary to return CRT cursor to data field where error is located in order to make error correction.

**H. DCS MENU**

- | STEP | ACTION   |
|------|--|
| 1.   | Press $\Phi$ key to position CRT cursor to CODE NUMBER data field.                                     |
| 2.   | Enter desired code number using numeric keys 0 thru 9.   |
| 3.   | Press $\Phi$ key to position CRT cursor to POLARITY data field.  |
| 4.   | Enter desired polarization (0000 for normal polarity and 1111 for reversed polarity) using $\Phi$ key. |
| 5.   | Press $\Phi$ key to position CRT cursor to MANDEV data field.  |
| 6.   | Enter desired deviation using numeric and decimal point keys.  |
| 7.   | Press ENTER key to enter programmed data into user memory.   |

ITEM NUMBER	CODE NUMBER	POLARITY	MAN DEV	RECEIVE CODES
1	0000	0000	0000.00	0000
2	0000	0000	0000.00	0000
3	0000	0000	0000.00	0000
4	0000	0000	0000.00	0000
5	0000	0000	0000.00	0000
6	0000	0000	0000.00	0000

**ERROR CORRECTION**  
Before the FREQ, OFFSET & MOD parameters are entered into memory, any entry errors can be corrected as follows:  
Press  $\Phi$  key as necessary to return CRT cursor to data field where error is located in order to make error correction.

**PROGRAMMING SPECIAL CHARACTER FIELDS**

The RF SCAN and DTMF menus have special character fields. Once the menu is selected, these special character fields may be programmed as follows:

- | STEP | ACTION   |
|------|--|
| 1.   | Press $\Phi$ key, followed by ENTER key.   |
| 2.   | Enter desired resume time, using numeric and decimal point keys (0.0 to 9.9).  |
| 3.   | Press ENTER key to save data. Press ENTER key again to return to item #1. If SCAN Menu, resume time is now programmed into memory. |
| 4.   | Press ENTER key to enter programmed data into user memory.   |

**ERROR CORRECTION**  
Before the RESUME TIME parameter is entered into memory, any entry errors can be corrected as follows:  
Press  $\Phi$  key to return or/going data or press  $\Phi$  key to return CRT cursor to beginning of resume time field. Then re-enter correct data.

**DTMF MENU SPECIAL CHARACTER FIELDS**

- | STEP | ACTION   |
|------|--|
| 1.   | Press $\Phi$ key, followed by ENTER key.   |
| 2.   | Press $\Phi$ key to position CRT cursor to MANUAL DEV data field.                  |
| 3.   | Enter desired manual deviation, if required, using numeric and decimal point keys. |
| 4.   | Press $\Phi$ key to position CRT cursor to DTMF MARK data field.                   |
| 5.   | Enter desired mark time using numeric and decimal point keys.                      |
| 6.   | Press $\Phi$ key to position CRT cursor to DTMF SPACE data field.                  |
| 7.   | Enter desired space time using numeric and decimal point keys.                     |
| 8.   | Press ENTER key to save data. Press ENTER key again to return to item #1.          |
| 9.   | Press ENTER key to enter programmed data into user memory.                         |

**ERROR CORRECTION**  
Before the MANUAL DEV, DTMF MARK & DTMF SPACE parameters are entered into memory, any entry errors can be corrected as follows:  
Press  $\Phi$  key as necessary to return CRT cursor to data field where error is located in order to make error correction.

**SUMMARY OF MENU PARAMETER BOUNDARIES**

MENU	DISPLAY SWITCH POSITION	ITEM NO.	FIELD	PARAMETER BOUNDARIES
RF	FREQS	1 thru 30	Frequency Offset Mod	000.0000 to 999.9999 kHz 0.001 to 99.999 Hz AML, AMI, FMI, FMI, FMI, FMI, or SSB
		0 thru 30	Resume Time Frequency Mod	0.0 to 9.9 seconds 0.001 to 999.9999 Hz AML, AMI, FMI, FMI, FMI, FMI, or SSB
		1 thru 4	Start Freq., Stop Freq., Incre. Step Incre., Rate	000.0000 to 999.9999 MHz 0.001 to 999.9999 Hz 0.001 to 9.9999 Hz
Tone Sequence	TONES	1 thru 99	Time 1 Deviation Time 2 Freq. Time 2 Deviation	00.0 to 25.5 kHz 0.001 to 9.999 seconds 0000.0 to 29999.9 Hz 00.0 to 25.5 kHz
		1 thru 10	Code Number Polarity A and Deviation B Receive Fields	0000(g) to 777(g) Normal/Inverted 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 000(g) to 777(g)
		0 thru 15	Manual Deviation DTMF Mark Time Response No. DTMF Deviation	00.0 to 25.5 kHz 0.001 to 9.999 seconds 0.001 to 9.999 seconds 2, 3, 4, 5, 6, 7, 8, 9 and 0 00.0 to 25.5 kHz
Tone Sweep	TONES	1 thru 4	Start Freq., Stop Freq., Sweep Rate, Incre. Step, Incre. Rate	0000.00 to 29999.9 Hz 0000.00 to 29999.9 Hz Linear (L) or Log (A) 0000.0 to 29999.9 Hz 0.001 to 9.999 seconds
		1 thru 2	Freq. 1, Freq. 2, Vel Factor	000.0000 to 999.9999 MHz 000.0000 to 999.9999 MHz 0 to 999
		1 & 2	Distance (Feet) Cable Fault Distance (Meters)	000.0 to 999.9 Feet 000.0 to 999.9 meters