CW Operation

CW transmission with the FT-840 requires that you have a CW straight key or electronic keyer unit connected to the **KEY** jack on the rear panel. There are no critical adjustments for the transmitter: you just use the **RF PWR** control to set your output power.

- ❒ With the CW mode selected, begin by pressing the **METER** button (▁ **PO** position).
- ❒ Now you can adjust the **RF PWR** control for the desired power output. Note that if you select less than maximum power output and set the **METER** button to the ▬ **ALC** position, the meter will deflect beyond the ALC zone. This is perfectly normal, and does not indicate a degraded signal.
- ❒ Release the key to return to receive.

Courtesy of the internal circuitry, you are now using semi break-in CW, in which the transmitter remains keyed except during pauses in your sending. You can set the "hang time" during which the transmitter remains on after you stop sending, by adjusting the **DELAY** trimpot on the rear panel (see *Rear Panel Connections*).

Reverse CW Sideband

When you switch modes between CW and USB, you may notice that the frequency of the received signal stays the same (even though the panel frequency display may change slightly). Also notice that in both CW and USB, the pitch of a received signal *decreases* as you *increase* the dial frequency.

However, switching between LSB and CW normally requires retuning the desired signal. This can be especially inconvenient if you enjoy working the lower HF bands (40 meters and below) where LSB mode is used.

CW Pitch and Sidetone Monitor

In the FT-840, the BFO offset (or CW "pitch" as it is sometimes called) can be varied from 400~1000 Hz (700 Hz default). This means a CW signal tuned for a pitch corresponding to this offset will be centered in your receiver's IF passband.

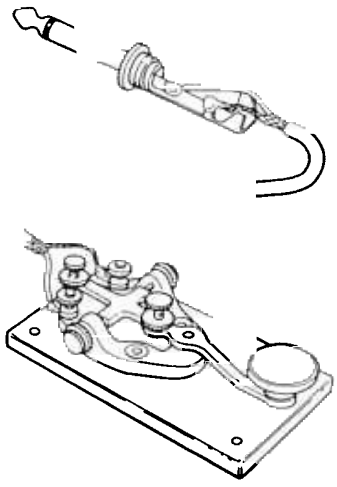
The displayed frequency offset for CW mode, and the sidetone heard from the speaker while your CW key is closed, are also adjusted to match the BFO offset. If you are using a multi-mode TNC or CW decoder, you will want to set the BFO offset to match that used by your unit (some multi-mode controllers require an 800-Hz pitch for optimum CW reception).

To change the CW offset and sidetone, hold the **FAST** button while pressing the **CW/N** key, to display the current offset ("pitch").

You can then use the **DIAL** knob or **BAND-UP/DOWN** keys to select the desired offset. Press **CW/N** again to save the entry and return to the normal display.

Note: sidetone volume can be adjusted using the small trimpot labeled "**SIDE TONE**" on the rear panel.

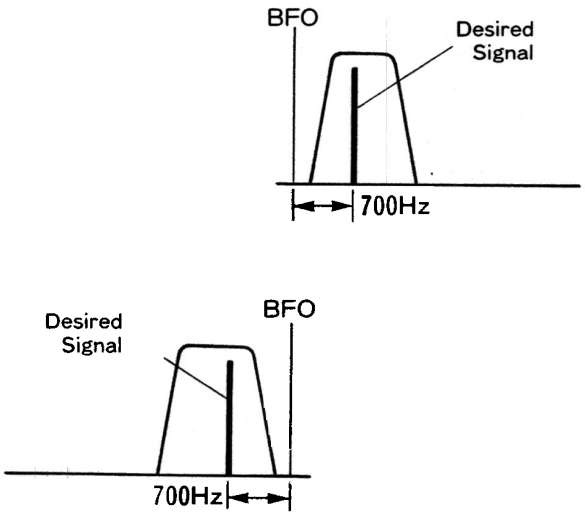
As an operating convenience to eliminate the need for retuning in this situation, the receiver CW carrier injection side can be switched to the high-side (same as used for LSB mode) by holding the



CW Key Connections

CW/N button while turning the transceiver on. When using the "reverse" sideband for CW reception, you can freely switch between LSB and CW after tuning a desired station without having to re-tune. Note that in LSB and CW modes the received signal pitch now *increases* with dial frequency (a good way to confirm you are using the reverse sideband). To return the receiver to the default (upper) sideband for CW reception, repeat the power-on sequence (**POWER** + **CW/N** key).

An important benefit also realized from this feature is QRM rejection. If you are experiencing QRM on a CW station, try using the "reverse" sideband and re-tuning the signal.



Reverse CW Sideband Operation

AM Transmission

Transmitter output power in the AM mode is limited to 25 watts (carrier), and attempting to adjust it for a higher level will have no effect. After setting the power level, you may you need to adjust the **MIC** control to avoid over-modulating. This setting will be lower than the optimum SSB setting.

- ❒ The speech processor can be used in the AM mode, but for now, make sure the **PROC** button is off, so as not to confuse adjustments.
- ❒ With the **AM** mode selected, press the **METER** button (▁ **PO** position). Squeeze the PTT and rotate the **RF PWR** control for the desired level (remember transmitter power output is limited to 25 watts in the AM mode).
- ❒ While speaking into the microphone, adjust the **MIC** control just to the point where the meter *begins to deflect slightly.* Do not set the **MIC** control further clockwise than this, or your signal will be distorted.
- ❒ Reduce the **RF PWR** control, as necessary, for the desired output level.

Carrier Offset Display

When changing between SSB and CW modes the displayed frequency will normally change by an amount determined by the BFO (carrier) offset for each particular mode (1.5 kHz for SSB and 700 Hz for CW, for example).

If you prefer the frequency display *to remain the same* when switching modes, hold the **BAND-DOWN** button while turning the set on. The display will now show your true (suppressed) carrier frequency (without reflecting the BFO offset). Repeat this step to return to the default display.

FM Transmission

For FM transmission, the only control to be concerned about is **RF PWR**. Microphone gain for FM is preset internally and normally needs no adjustment after leaving the factory. Just set the **METER** selector to the ▁ **PO** position, and adjust the **RF PWR** control for the desired output while transmitting. To avoid overheating, if you need full power, keep your transmissions to *three minutes or less,* with the same time for reception.

FM Repeater Operation

The FT-840 includes several features specifically intended for operation on FM repeaters above 29 MHz. To locate these repeaters, you can ask around the calling channel (29.6 MHz), or try 20-kHz frequency multiples from 29.62 to 29.68 MHz.

When you find a repeater, press the **FM** button once for "–" shift (to transmit below your receiving frequency), "**TONE**" will also appear, indicating the subaudible CTCSS tone encoder is automatically activated. Pressing **FM** again selects "+" shift, but this is not commonly used above 29.6 MHz. Press it once more to return to simplex.

Try a quick ID transmission to make sure you have the shift right (by default, the FT-840 also automatically transmits a low-level 88.5-Hz

subaudible tone during FM Repeater transmissions, to access repeaters that require it).

After you make contact through a repeater, you can store frequency, mode and repeater shift/CTCSS settings in memory (page 24) for later recall.

If a repeater uses an offset other than the standard 100 kHz, you can change the FT-840 offset by turning it off and then back on while holding the **FM** button. This displays the offset, which can be set between 0 and 500 kHz using the tuning knob (see below). Press **FM** once more when done.

If you find a repeater that requires a CTCSS tone other than 88.5 Hz, you can select another tone by holding the **FAST** button while pressing **FM**, turning the tuning knob, and pressing **FM** again (to accept).

The tone you select applies only to the current VFO, but can be stored in memory.

CTCSS Tones (Hz)				
67.0	100.0	131.8	173.8	218.1
71.9	103.5	136.5	179.9	225.7
77.0	107.2	141.3	186.2	233.6
82.5	118.8	146.2	192.8	241.8
88.5	123.0	151.4	203.5	250.3
94.8	127.3	162.2	210.7	

Clarifier (Receiver Offset Tuning)

The **CLAR** button and knob near the upper-right side of the front panel let you offset the receiving frequency ± 1.25 kHz from that originally displayed (and used for transmission), in 10-Hz steps (see box).

Perform the following steps, if you like, to familiarize yourself with the clarifier controls:

- ❒ Press the **CLAR** button and notice that "CLAR" appears at the bottom right of the display. If any clarifier offset has been tuned before, the frequency display shifts accordingly. Turn the **CLAR** knob and notice that the frequency display changes. Now press the **CLAR** button again several times: the operating frequency returns to its "unclarified" setting when the clarifier is off, and adds the offset (to the receive frequency only) when the clarifier is on.
- ❒ With the clarifier on, press the PTT switch and notice that the transmit frequency remains the same as the original (that is, non-offset) frequency display.

A typical application for the clarifier is when you are in contact with a station whose transmitter drifts (or perhaps you were not both precisely tuned to the same frequency when you started). You don't want to change your transmitting frequency, as that would force them to retune — you just want to adjust your receiver. To do this, you can press the **CLAR** button to activate the clarifier, and carefully retune their signal with the **CLAR** knob.

After you finish your conversation, you must remember to press the **CLAR** button again to turn off the clarifier. You also might want to clear the offset (by adjusting the **CLAR** knob) before turning it off.

Clarifier Range & Display Options

The default clarifier tuning range(±1.25 kHz in 10-Hz steps) can be *doubled* to ±2.50 kHz (in 20-Hz steps) by holding the **MEM-UP** key while turning the transceiver on. To turn the **CLAR** rx offset display on/off, hold the **CLAR** key while powering the radio on. Repeat the above steps to toggle the functions and return to default settings

VFO B & Split Frequency Operation

VFO-B works exactly like **VFO-A**, although each is totally independent of the other. You can use **VFO-B** as a general-purpose "instant recall" memory. In the FT-840, **VFO-B** has two important purposes: to double memory storage capacity (described in the next section), and to facilitate split-frequency operation (receiving on one VFO, and transmitting on the other). The special case of

split-frequency FM repeater operation uses some features of its own, as described on the previous page. Also, if the difference in transmit and receive frequencies is less than 2.5 kHz, using the clarifier function is likely to be the easiest approach.

Use the **A/B**, **A=B**, **SPLIT** and **M►VFO** buttons at the right end of the display to set up the two VFOs:

- ❒ **A/B** toggles operation between the two VFOs, without affecting the contents of either.
- ❒ **A=B** copies the contents of the currently displayed **VFO-** (**A** or **B**) to the other (**B** or **A**, respectively), overwriting the contents of the non-displayed VFO.
- ❒ **SPLIT** toggles the "hidden" VFO for transmission.
- ❒ **M►VFO** copies the pair of frequencies stored in a memory into the VFOs, by pressing it for ½ second (until the double-beep sounds). This is described in the next section on memory storage and recall.

For split operation, you need to first load the VFOs with the desired transmit and receive frequencies and modes. Set your mode and frequency for transmission, then press **A/B** and set your mode and frequency for reception. You can use the **A/B** button to check your transmit frequency while receiving (to avoid transmitting unnecessarily). Once the two VFOs are set up, just press the **SPLIT** button. "**SPLIT**" appears in a box at the left edge of the display, and when you transmit, the display frequency shifts to the other VFO (and mode indicator, if different). The contents of both VFOs can be stored in a memory for future operation with the same frequency pair, as described next.

Memory Features

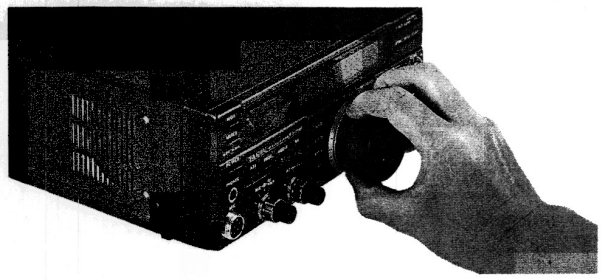
The 100 memories in the FT-840, labeled 01 through 50, and P1 through P0, each store a pair of frequencies and modes, plus wide/narrow IF selections (for CW and AM modes), clarifier on/off and offset settings, plus split frequency status. When you recall a memory, one set of these operating parameters is displayed, and the other set is hidden. For simplicity, we will refer to the displayed set of parameters as the *front half* of the memory, and the hidden set as the *rear half*. The front and rear halves can be toggled by the **A/B** button, just as you can toggle **VFO-A** and **VFO-B** when operating on a VFO (although the display gives no indication of which half is which, as it does with the VFOs). Like VFO operation, you can operate split with the two halves, receiving on the front and transmitting on the rear; and you can

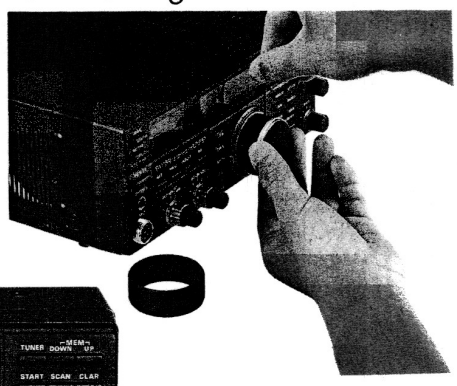
English

Tuning Knob Torque Adjustment

If the tuning knob is too tight or too loose for your preference, and if you have a 2-mm (5/64") Allen wrench, you can adjust the torque.

- ❒ Pull the knurled rubber ring off of the tuning knob.
- ❒ Locate the hole in the edge of the tuning knob, and use the Allen wrench to loosen the set screw accessible through the hole, just enough to allow the knob to be pulled off the shaft.
- ❒ Turn the exposed shaft tension spring counter-clockwise to loosen the torque, or clockwise to tighten.
- ❒ Replace the knob, tighten the set screw, and replace the rubber ring.





freely tune and change the mode or clarifier settings of whichever half is displayed while receiving. You can also copy a pair of settings from one memory to another. In fact, you can do nearly anything with the two halves of a memory that you can with the A/B VFOs, except for a few differences in tuning steps, scanning (only the front can be scanned) and special-purpose memories P1~P9, described later.

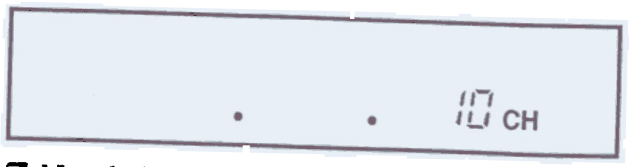
Memory Storage

The FT-840 enables you to store the settings of one *or both* VFOs into the memory channel (front and rear halves) indicated by small numbers at the right of the display. To store only the displayed VFO, just press and hold the **VFO►M** button for ½ second (two beeps sound). The front half of the memory will contain your entry, while the rear half holds any previous entry (or the factory default setting of 7.000 MHz).

To copy the contents of *both* VFOs (A and B) into both "halves" of the current memory number, first press the **SPLIT** button ("SPLIT" displayed) before holding the **VFO►M** button as before. We'll begin with a simple example of storing only the currently displayed frequency into the front half of a memory (we'll describe how to store the non-displayed VFO in the rear half later).

Example: to store 14.250 MHz from a VFO into memory 10.

- ❒ First press **VFO/M**, if necessary, so that either "**VFO-A**" or "**VFO-B**" appears at the left. Select the desired mode, then tune the display to the desired frequency (14.250.00) using the **HAM/GEN** and **BAND-DOWN/UP** buttons to change bands and tune in 100-kHz steps, and then the tuning knob as needed.
- ❒ Next press the **MEM-DOWN** or **UP** buttons momentarily so that "**MEM**" appears blinking in the lower left of the frequency display, and within 3 seconds use the **MEM-DOWN** or **UP** buttons to step through the memory channels until "10" (the desired memory) appears in small digits at the far right. If nothing was stored there before, the frequency display will be blank (as shown).



- ❒ Now hold the **VFO►M** button for ½-second until two beeps sound. To confirm the entry was stored, you can press the **VFO/ M** button to display the memory (below).

Although we ignored it, keep in mind that when we stored the displayed VFO, the hidden one was not stored in the rear half of the same memory. You could have pressed the **SPLIT** button after setting up both VFOs to the desired frequencies before storing them in a memory. Both are then written to memory, overwriting whatever may have been stored there previously. In addition, the clarifier on/off state and offset for both VFOs are also stored in the memory (whether or not the clarifier is activated).

Checking Memory Contents

Before storing or recalling a memory, you will usually want to check its contents. If you are operating on a VFO, you can of course just press **VFO/M** to recall the last-used memory, but this has disadvantages: any current operation is interrupted as

Panel & Microphone DOWN/UP Key Functions

MODE	Front panel BAND-[DOWN▼/UP▲] key	Front panel MEM-[DOWN/UP] key	Mic. UP/DWN key
VFO-A or VFO-B	HAM mode: HAM band stepping GEN mode: 100 kHz/1 MHz steps	enters memory-check mode ("**MEM**" indicator blinks) steps mem. channels up/down	duplicates main DIAL for VFO tuning VFO scanning**
MEM	M-TUNE VFO-A or VFO-B	memory channel stepping (up/down)	memory ch. stepping Memory scanning**
M-TUNE	same as VFO-A or VFO-B	enters memory-check mode ("**MEM**" indicator blinks) steps mem. channels up/down	duplicates main DIAL for memory frequency tuning
PMS	same as VFO-A or VFO-B		Same as **MEM** key

** press and hold the microphone **UP/DWN** key(> ½ sec.) to begin scanning.

your frequency changes, the antenna tuner retunes (if installed), and you'll have to press **VFO/M** again to get back to the VFO. Also, this will not work if you are operating on a re-tuned memory: you will lose any changed settings entirely! So, the FT-840 offers a way to display the (front) contents of memories without affecting current VFO (or re-tuned memory) operation, and requiring only one key press. We call it *memory checking*, and you already did it in the preceding example.

You activate memory checking by momentarily pressing either the **VFO►M**, **M►VFO** or **MEM-DOWN/UP** buttons. As you saw above, "**MEM**" blinks at the left of the display as the frequency and mode indicators change to show the contents of the last-selected memory. If you touch nothing else, the display reverts to your current operating parameters automatically after 3 seconds. By pressing the front panel **MEM-DOWN** or **UP** buttons before the 3 seconds expires, you can select for display the front half of each of the 100 memories. Pressing these buttons restarts the 3-second timer, so as long as you are changing channels, memory checking mode persists.

While checking memories, the memory number shows at the right end of the display (instead of the 10-Hz frequency digit, if you have it enabled). Also, when you select a vacant memory, the mode indicators and frequency display go blank (except the decimals).

Still, memory checking does not show you everything you've stored; it only shows the visible *front half* of the memory. To display the frequency, mode and clarifier settings stored from the other VFO you have to recall the memory and press the **A/B** button. So, when storing memories with the intention of using both halves (front and rear), it is a good idea to have them related in some way so that you can recognize both later when only the contents of the front half appear.

Memory Recall & Operation

To recall data stored in a memory for operation, you can either copy it into the VFOs, or you can switch operation from the VFOs to the memories. Since you can freely tune any memory, copying it to the VFOs only gives you the advantage of **VFO-A** or **VFO-B** display indication.

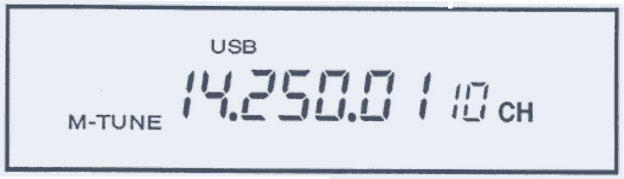
Holding the **M►VFO** button for ½ second copies the current memory channel data into the VFOs. Pressing it only momentarily shows you the contents of the memory, without actually overwriting the VFO data. Otherwise, when you press and hold this button, you lose the previous contents of both VFOs, and if you were receiving on a VFO,

Frequency Display Modes

VFO display with 10-Hz digit activated (page 15)

Press **VFO/M** to switch to MEM mode.
MEM mode display of memory 10 with same frequency:

Touch the tuning knob or microphone **UP/DWN** button to switch to M-TUNE mode:



M-TUNE mode display of re-tuned memory 10 (+10 Hz). Press **VFO/M** once to cancel changes and revert to MEM mode, and press it again to return to VFO mode.

operation shifts to the frequency and mode copied from the memory (and now in the VFO).

In most situations you may find it more convenient simply to switch operation from the VFO to the memory, by pressing the **VFO/M** button. This method allows you to leave any settings in the VFOs undisturbed, so you can instantly recall them just by pressing **VFO/M** again.

When actually operating on a memory (if you haven't re-tuned it), "**MEM**" is displayed at the left (instead of "**VFO-A**" or "**VFO-B**"), and you can press the **DOWN/UP** buttons on the panel (or the microphone buttons) to select any previously stored memory for operation. You cannot activate mem-

Memory Channel Display

In the default setting, the current memory channel selection is displayed at the lower right corner of the LCD during *both* VFO and memory operation. If you prefer to have the channel display only appear during memory operation, hold the **VFO►M** button while turning the transceiver on. Repeat the same procedure to cancel the change.

English

ory checking or copy the recalled memory directly to another memory, as the function of the **VFO►M** button changes as described later under *Memory Blanking*.

However, there is an easy way to get this button to work the same as it does on the VFOs, and to regain the memory checking feature: if you change frequency, mode or clarifier settings, or if you press **A/B** to switch front and back halves, "**MEM**" on the display is replaced with "**M TUNE**". In this *memory tuning* mode, the functions of several buttons differ from the ordinary memory recall mode: the **DOWN/UP** buttons select ham bands or 100-kHz steps (as when operating on the VFOs), the microphone buttons duplicate the tuning knob function instead of the front panel **DOWN/UP** buttons, and the **VFO/M** button cancels any changes to the memory and returns you to the memory recall mode ("**MEM**" displayed again), instead of switching to the VFOs. See the table at the bottom of page 24 for the various function of the **DOWN/UP** buttons.

The memory tuning mode makes operation on memories 01 to 90 just as flexible as the VFOs. If you want to save changes to a memory channel, use the same procedure you use to store the VFOs to memory: Press **VFO►M** momentarily and the **MEM-DOWN/UP** buttons to select another memory (if desired), or just hold **VFO►M** for ½-second until the double beep sounds (to overwrite the current memory with the re-tuned data). The labeling of the **VFO►M** button is somewhat deceptive here: the VFO settings, which are hidden at this point, are not involved in this operation at all, since those of the recalled memory have taken their place.

As mentioned above, if you just want to cancel any changes you have made to a recalled memory, press **VFO/M** once ("**MEM**" is displayed again), and press it again if you want to return to the VFOs. The display mode changes are summarized on the previous page.

Split operation can be enabled and stored in a memory, in which case the rear half of the memory is used for transmission. Similarly, pressing the **A/B** button while receiving on a memory switches operation between the front and rear halves of the memory (don't forget both of these functions also activate memory tuning).

Scanning Features

After you have programmed several memory channels, you will probably want to scan them later to check for activity on those frequencies. The 100 memories in the FT-840 are organized into 10 groups, with 10 channels in each group (see below). You have several choices with regards to scanning these memories, and after the following brief explanation, you can determine which mode is best for your operating needs. There are two basic scan modes in the FT-840: *Memory Scan* or *Group Scan*. In addition, you can choose how scanning resumes: after either a *carrier-* or *time-delay*. Scan speed is also adjustable. Scanning features are summarized in the table on the next page.

Memory Scanning (normal)

Normal scanning sequentially checks all memories *programmed with data* (vacant or masked memories will be skipped over). Memory channels P1~P0 have a dual purpose, and are used with the PMS (*Programmed Memory Scan*) feature explained later. However, they are still selected and scanned the same way as the other 90 memories. When receiving on a recalled memory (with "**MEM**" displayed), you can scan the front halves of all stored memories by *momentarily* pressing the **SCAN** button (< ½ sec.), or *holding* the microphone **DWN** or **UP** button for ½ second to start. If you want scanning to pause on signals, you must first adjust the **SQL** control to silence the receiver ("**BUSY**" indicator off) on a clear channel.

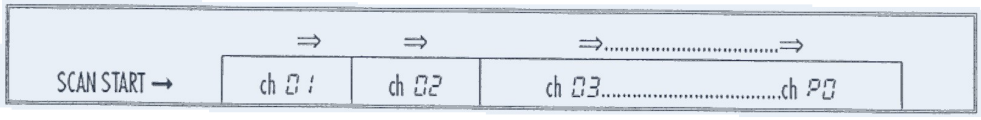
Scan Resume

When a signal strong enough to open the receiver squelch is found, scanning will pause on that channel, and the two decimal points on the frequency display will blink. By default, *carrier delay* scan is active and scanning will resume again

Memory Channel Organization

GROUP 1	GROUP 2	GROUP 3	GROUP 4.....GROUP 9	GROUP 10
ch-01~10	ch-11~20	ch-21~30	ch-31~40.....ch-81~90	ch-P1~P0

Memory Scanning



Scanning Feature Summary

Scan Mode/Feature	Description	Enabled by:
Channel Scanning (normal)	Sequentially scans up to 100 available memory channels (from 01 ~ 20). Blanked memories or those marked for scan skip are passed over during the scanning sequence.	With any memory channel displayed, press **SCAN** momentarily (< ½ second).
Selected Group Scanning	Sequentially scans only those selected memory channels (max. 10) within a single selected group (blanked and scan skip rule still applies).	With any memory channel within the desired group displayed, press and hold **SCAN** > ½ second (two beeps sound).
Scan Resume Mode: Carrier Delay	Pauses on active memory channel, resumes 5 seconds after carrier drops	Hold **SCAN** button while turning the transceiver on to toggle between *carrier*/-*time*-delay scan resume (*carrier*-delay is default).
Scan Resume Mode: Time Delay	Pauses on active memory channel for 5 secs., then resumes scanning.	
PMS (Programmed Memory Scan)	Stores up to ten upper and lower frequency limit pairs in special-purpose memories P1 ~ P0. Memory-tuning and scanning is then confined within these limits.	Program both VFO settings into the front and rear halves of any special-purpose memory (P1~P0). Enable M-TUNE, then press the **SCAN** button to start/stop.
Scan Speed Adjust (for M-TUNE & PMS)	Adjusts scan speed for above modes, value ranges from 01(fastest) ~ 200 (slowest). Default speed set at 10. **FAST** key function and tuning steps for each operating mode are not affected.	Press **VFO/M** while holding the **FAST** key.

shortly only after the signal (carrier) is no longer received.

Alternately, you can select *time-delay* scan by holding the **SCAN** button while turning the transceiver on. Scanning will continue to pause on an active channel as before, but immediately resume after 5 seconds have elapsed, regardless of any signal on that channel. Note that the memory channels can still be scanned even if the receiver is un-squelched (scanning will move from channel to channel, "sampling" each for 5 seconds. This is useful if you want to hear weak signals that otherwise might not be strong enough to open receiver squelch during *carrier-delay* scanning. To return to default carrier-delay scan resume, simply repeat the power-on procedure (**SCAN + POWER**).

Group Scan

This permits selecting any single channel-*group* (group 1 ~ group 10), and only scanning channels (up to 10) within that group. To perform a group scan, simply select *any memory channel within the desired group*, then press and hold the **SCAN** button for ½ sec. (until two beeps sound). For example, selecting any memory channel from 31 ~ 40 will result in scanning group 4 (see below). Group scanning is especially useful if you wish to organize your 100 memory channels into "blocks" of interest (i.e. group 1-FM repeater frequencies, group 2-SSB contest calling channels, group 3-AM broadcast frequencies, etc.).

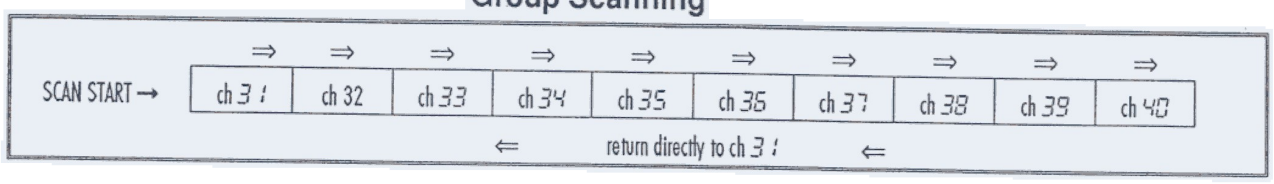
In both scanning modes, you may need to readjust the **SQL** control to prevent scanning from stopping on only background noise.

To stop scanning, press **SCAN**, the PTT switch (no transmission will occur), or a microphone button again. When scanning, keep in mind that the **ATT** button also affects the squelch threshold.

Memory Scan Skip

Once you have stored many memories, you may not want to scan some of them. You can mark some of them to be skipped *during either Channel or Group Scanning* (see below). To do this, recall the memory to be skipped, and hold the **FAST** button below the left side of the tuning knob (or on the microphone) while pressing **SCAN** momentarily. The "**SCAN**" indicator disappears below the memory number at the right.

Group Scanning



English

If you have set a memory to be skipped, and later want to include it, just repeat the **FAST** + **SCAN** procedure.

Memory Blanking

After storing many memories, you may want to completely hide some from normal operation, to simplify selection of the others. To blank a displayed memory, while "**MEM**" is displayed at the left of the frequency, press and hold the **VFO►M** button for ½-second until the double beep sounds. But be careful: if you do this instead while "**M TUNE**" is displayed — that is, after retuning the memory, the re-tuned data will overwrite the original memory data, but it will not be blanked. So, if you have re-tuned the memory and don't want to save the changes, cancel them first by pressing **VFO/M** once, and then hold **VFO►M** for ½ second.

While a memory is blanked, no frequency digits appear. As long as you don't overwrite a blanked memory, you can un-blank it simply by repeating the same procedure you used to blank it.

PMS Scanning: Special-Purpose Memories P1~P0

As you probably have noticed, when operating on a VFO or re-tuned memory, if you press **SCAN**, or hold either the **DWN** or **UP** button on the microphone for ½ second, scanning starts, and pressing one of these buttons again stops it. By setting the **SQL** control so that the receiver is just silenced on a clear frequency, scanning will pause when it finds a signal, and resume according to the *Scan Resume* selection described above under *Memory Scanning*.

You can also increase the scanning step size by 10, by pressing the **FAST** button while scanning (or toggling it on, if you have set it to work that way — see page 16).

Scan Speed

VFO and PMS frequency scanning speed can be adjusted by pressing **VFO/M** while holding the **FAST** key.

Use the main **DIAL** knob to adjust the scan speed value from 01 (fastest) to 200 (slowest), (10 is the factory default). Press **VFO/M** to save your entry and return to the frequency display.

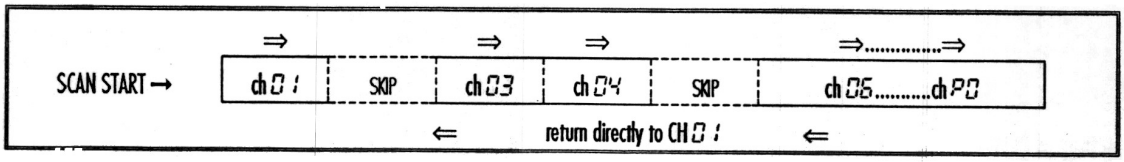
Note: frequency tuning steps for each mode and the **FAST** button function, described earlier, are not affected.

If you let scanning continue indefinitely, it will loop around when it reaches 100 kHz or 30 MHz, including the entire range of receiver coverage. To limit scanning to a particular frequency range, you will want to make use of the programmable scanning limit (we call it *PMS*) facility provided with the ten special-purpose memories: P1~P0.

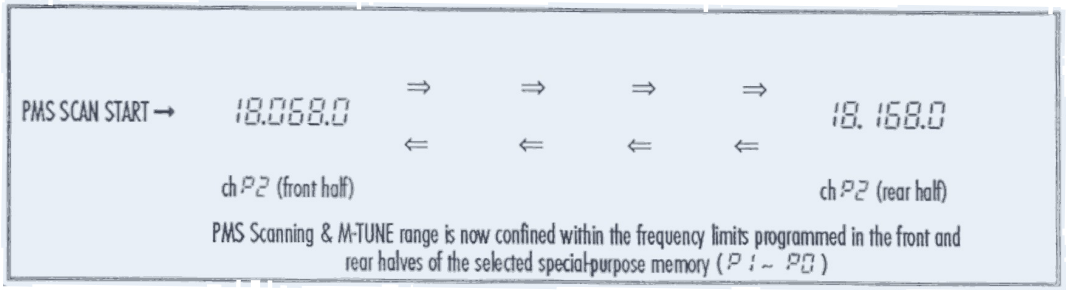
To limit the tuning range to a particular subband, store the upper and lower edge of the frequency range in the front-and rear-halves of one of memories P1 through P0. Then recall the desired memory and activate memory tuning. Tuning and scanning now loop around the ends of the stored range, keeping operation inside the programmed memory subband (see bottom of previous page).

You can change modes and use the clarifier as when retuning any other memory, but don't bother to press **A/B** to switch halves of the memory, or to press the **DOWN/UP** buttons: as soon as you try to tune with the knob or microphone buttons, operation instantly switches back to the subband. Also,

Memory Scan Skip



PMS Scanning and M-TUNE



if you activate split transmit/receive, your transmit frequency will be whatever you stored in the back half of the memory you started on (P1 ~ P0).

Example: Use memory P2 to limit memory-tuning and PMS scanning to the 17-m WARC band.

- ☐ Press **VFO/M** once or twice, if necessary, to display either "**VFO-A**" or "**VFO-B**" at the left. Then tune to the low edge of the 17-m band: 18.068 MHz. Also select the mode you expect to use most often (here, USB or CW).
- ☐ Press **A/B** to select the other VFO, and tune to the high edge of the 17-m band: 18.168 MHz. Again, select a mode you expect to use (it does not need to be the same), then press **SPLIT** (to select both VFOs).
- ☐ Press **VFO►M** momentarily to activate memory checking, and press the **DOWN/UP** buttons to select memory P2 at the right, then hold **VFO►M** for ½ second to write the two VFOs into both front and rear memory halves.
- ☐ Press **VFO/M** to recall memory P2, then *turn the tuning knob* (to activate memory tuning), or press the **SCAN** button.

Memory tuning and scanning are now limited to the 18.068- to 18.168-MHz range until you press **VFO/M** to return to memory channel operations, **VFO►M** to copy the displayed frequency to a memory, or **M► VFO** to write the displayed frequency to a VFO.

In this example, note that we overwrote the rear half of each memory with data we didn't need. For this reason, you may want to use the P1 ~ P0 memories only for subband-limited operation. In fact, if you want to make optimum use of this feature with the band-independent VFOs, you could keep all **VFO-A**s (that is, on each amateur band) set to the low edge of the subband you use, and all **VFO-B**s set to the high edge. By using the above procedure to load memories P1 ~ P0 when you change bands, and operating only in the memory tuning mode on the P1 ~ P0 memories, you can have the subband limits always enabled and never need the VFOs (except for storing the band limits).

Of course you don't have to use the VFOs to set up or store subband limits all the time, and for non-amateur-band subbands, such as the shortwave broadcast bands, you indeed cannot store the subband limits in the VFOs. Fortunately, since the **VFO►M** button lets you copy between memories when memory tuning is active, you can use any of the regular memories (01 through 99) for storing any subband limits.

Digital Modes

In addition to SSB and CW operation, digital amateur modes such as RTTY, AMTOR, Packet and the new PacTOR and CLOVER data protocols offer an exciting variety of operating possibilities to explore. Use of these modes requires connecting your transceiver with a special modem commonly known as a TNC - "Terminal Node Controller" and a personal computer.

Terminal Unit/TNC Interconnections

While modem hardware configurations vary between TNC models and manufacturers, interfacing is basically the same. You need to provide receiver audio from your transceiver to the TNC, a PTT line to key the transmitter, and transmit audio line from the TNC to the transceiver. This requires constructing a special patch cable (check the documentation supplied with your TNC for its requirements).

The FT-840 provides the **PTT** phono jack on the rear panel for external transmitter activation (ground to transmit), and the **AF OUT** phono jack for constant line-level receiver audio (you can also use audio from the headphone or external speaker jack, but this is not recommended, since the audio level varies with the **VOL** control setting). Peak line-level audio at the **AF OUT** jack is about 100 mV at 600 Ω, so you may need to adjust the input level inside your TNC.

The FT-840 uses AFSK (Audio Frequency Shift Keying) tone input for RTTY, Packet and AMTOR operation. AFSK tones for transmission from your TNC must be injected via the front panel **MIC** jack. Therefore, a simple wiring scheme is to utilize pins 8 & 6 of the **MIC** jack for PTT control and transmit audio from the TNC, and use the rear-panel **AF OUT** jack for receive audio output to the TNC (see next page). In this case, the **PTT** phono jack on the rear panel is not used.

The schematic on the next page shows the transmitter audio input at the **MIC** jack. Input impedance at pin 8 is about 600 Ω, and peak input voltage should be 20 to 40 mV, so you may need to adjust the output level from your TNC to provide proper modulation level with the **MIC** gain control in the same position you use for voice operation. You still have to disconnect the microphone during data mode operation. To eliminate having to swap microphone and TNC plugs, you may want to construct a simple switch box to which you can connect both your TNC and microphone.

English