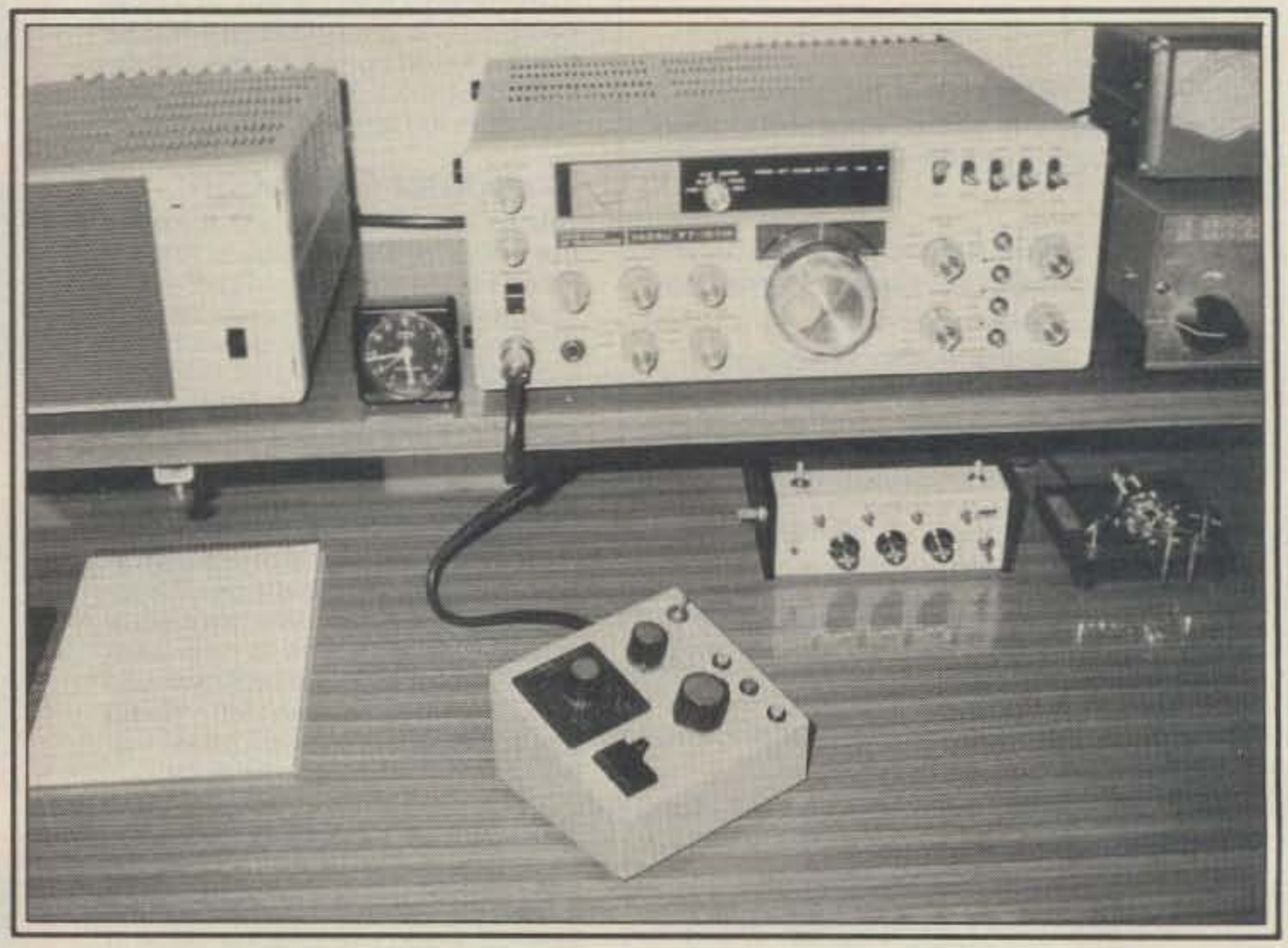
CQ Reviews:

THE YAESU FT-107M WITH DIGITAL MEMORY SHIFT

BY JOHN J. SCHULTZ*, W4FA

The FT-107M is a completely solid-state h.f. transceiver with a number of advanced features. However, my first impression of the unit had to do with its "styling" rather than with its technical features. "Styling" may seem like a strange word to use in relation to amateur equipment and hints of a Detroit-like product marketing snare. But, nonetheless, the FT-107M has a very pleasing appearance. Its off-white front panel combined with a medium brown enclosure, soft yellow digital frequency display, knobs just a shade darker than the front panel, brushed aluminum switches, etc., all combine to create a very harmonious design. In fact, it has proven to be one of the least eye fatiguing transceivers to operate over an extended period of time that I have ever used.



The FT-107M with the FP-107E power supply on the left. The small control box in the foreground basically duplicates the push-buttons found on the optional Yaesu YM-35 mobile scanning microphone so one can effect scanning operation in a home station situation using any microphone.

General

Setting aside the impression created by the appearance of the FT-107M, what does it really offer as a transceiver? First of all, the FT-107M is a complicated piece of equipment. Fig. 1, a block diagram of the stages in the FT-107M which will be discussed later, gives one just a glimpse of the complexity of the FT-107M circuitry. However, if one strips everything down to the basic essentials, the FT-107M turns out to be about the ultimate design of a single conversion h.f. transceiver using the 9 MHz i.f. principle. This approach to the design of an all-band h.f. transceiver has been well proven by many designs over the years from many manufacturers. It does not allow the easy inclusion of general coverage receiving capabilities as is the case with transceivers having a first i.f. in the v.h.f. range. However, just about every other feature known these days can be and is included in the FT-107M.

Table I lists the essential specifications for the FT-107M. It is a fully solid-state 6 band transceiver (160–10 meters) with provisions for two auxiliary bands and a 5 MHz WWV receive only capability (later model FT-107's, Serial No. 60001 and up, come with the new WARC bands factory installed). Each band is fully covered in 500 kHz segments and there is at least a 50 kHz overrange above and below each band. The input power rating is 240 watts on s.s.b. and c.w. and 80 watts on FSK and a.m. VOX is built-in as well as a true r.f. type speech processor. On receive, a variable i.f. bandwidth system is used which allows a continuous variation of the i.f. bandwidth from 300 to 2400 Hz. An active peak/notch audio filter variable from 300 to 1400 Hz is also included as well as RIT. Both digital and analog frequency readouts are available. The LED digital readout has six digits and is of a soft yellow color. The analog readout is performed by an inner dial with markings every 50 kHz and by a skirt dial on the tuning knob with markings every 1 kHz. Spacing between the 1 kHz markers is

*c/o CQ Magazine

General

Frequency Coverage: Full coverage of 160–10 meters plus 5 MHz receive. Two auxiliary bands can be retrofitted; serial 06001 and up have WARC bands installed.

Modes: LSB, USB, CW, AM, and FSK (170 Hz shift).

Stability: Less than 100 Hz drift after 30 minute warmup.

Transmitter

Power Input: 240 watts DC on SSB, CW; 80 watts on AM, FSK. Variable from 0 watts up.

Power Output: Not specified but ¾ power still available at 1:3 load SWR.

Frequency Response: Shaped 350–2700 Hz (–6 dB points).

Carrier and Unwanted Sideband Suppression, Spurious Radiation: all 40–50 dB down.

IMD, 3rd Order: 31 dB down.

RF Speech Processor: RF clipper type, 6 dB average "talk power" gain.

Receiver

Sensitivity: 0.25 uV for 10 dB S/N all modes except AM (1.0 uV).

Dynamic Range: typical 90 dB, CW bandwidth, 20 kHz tone spacing.

Selectivity: 2.4 kHz/–6 dB to 4.0 kHz/–60 dB (SSB), variable 300 Hz to 2.4 kHz.

AF Notch/Peaking Filter: Variable 300 Hz to 1.4 kHz.

Image, IF Rejection: 50–70 dB, depending on band.

Audio Output: 3 watts, 10% THD, 4–16 ohm, built-in speaker.

Optional DMS Unit

Construction: plugs into internal space provided.

Frequency Memory Channels and Shift: 12; each shiftable ±500 kHz in 100 Hz steps.

Scanning: two speed, up/down when using scanning type microphone.

Physical/Power Requirements

Size/Weight: 334 × 129 × 400 mm (incl. heat sink); 12.5 kg.

Power: 13.5 volts ± 10%, 2 amp receive, 20 amp transmit (at max. input).

Table I– Summarized specifications for the FT-107.

generous and one can read down to a fraction of a kHz even from the analog dial. The frequency readout shows the true transmit or receive frequencies regardless of mode, RIT setting, etc., and the analog dial follows the same frequency rotation on each band. Tuning can, of course, be done by the main tuning dial or if one buys the optional DMS (Digital Memory Shift) unit, one can also tune the transceiver by means of scanner type push-buttons.

The FT-107M is truly a "no-tune" transceiver since there are no drive, peaking, or other adjustments necessary for either transmit or receive. Full metering is provided including output s.w.r., although one must go through the usual "forward set" procedure to set the meter and then switch it to read s.w.r. A nice touch on a transceiver of this class would have been a "computing" type s.w.r. meter. As can be seen from the physical size notes in Table I, the FT-107M is not a miniature transceiver. However, it can be a fully self-contained unit if one wants to use it for portable or mobile operation. It has a built-in speaker and an effective noise blanker. Also, two power supplies are available—one that can be inserted into the transceiver enclosure (FT-107M) or an external one which includes a better speaker (FP-107E). Both supplies can accommodate line voltages ranging from 100 to 234 v.a.c. Especially when one considers the convenience of the built-in supply, the FT-107M as a total portable package may still compare favorably as far as convenience is concerned to separate transceiver/power supply combinations.

Circuit Description

Referring to fig. 1, it might be interesting to follow through the basic circuitry of the transmit and receive chains and then later some comments will be made on actual measurements and results using the transceiver. The s.s.b. transmit chain is conventional with audio and carrier signal being fed to ring modulator D5003-D5006. The resultant 8.9875 MHz d.s.b. signal is then buffered and reaches the 2.4 kHz s.s.b. filter XF3002 and the following buffer stage Q3005. At this point, the s.s.b. signal can either go through the r.f. speech processor or bypass the processor. As mentioned before, the speech processor is a true r.f. type and is shown in fig. 2. When it is in use, the s.s.b. signal is routed through a variable gain FET input stage, Q6001; a symmetrical hard clipping IC amplifier, Q6002; another s.s.b. filter, XF6001; and a FET output amplifier stage, Q6003. The s.s.b. signal, processed or unprocessed, continues to a double balanced mixer stage, D1034-1037, which is the same mixer stage used for the receive input signal. At this point, the s.s.b. signal is translated to its output frequency and amplified by a series of stages up to the final power amplifier stage.

These stages are all broad-banded and so the final power amplifier stage is followed by a low-pass filter unit which switches in a separate low-pass filter for each band. The individual filters are switched in or out by an elaborate grouping of 12 relays which also provides for the grounding of the input and output of each filter which is not in use. The bandswitch in the FT-107M controls only d.c. voltages and all of the switching of r.f. filters, oscillator stages, etc., is done either by relays for high-level r.f. circuits or by diode switching for low-level r.f. circuits. The same is true for other switches in the FT-107M; they only control d.c. control voltages.

To digress for a moment, this probably accounts for the extremely smooth feel and operation of all the switches since quality switches could be used which do

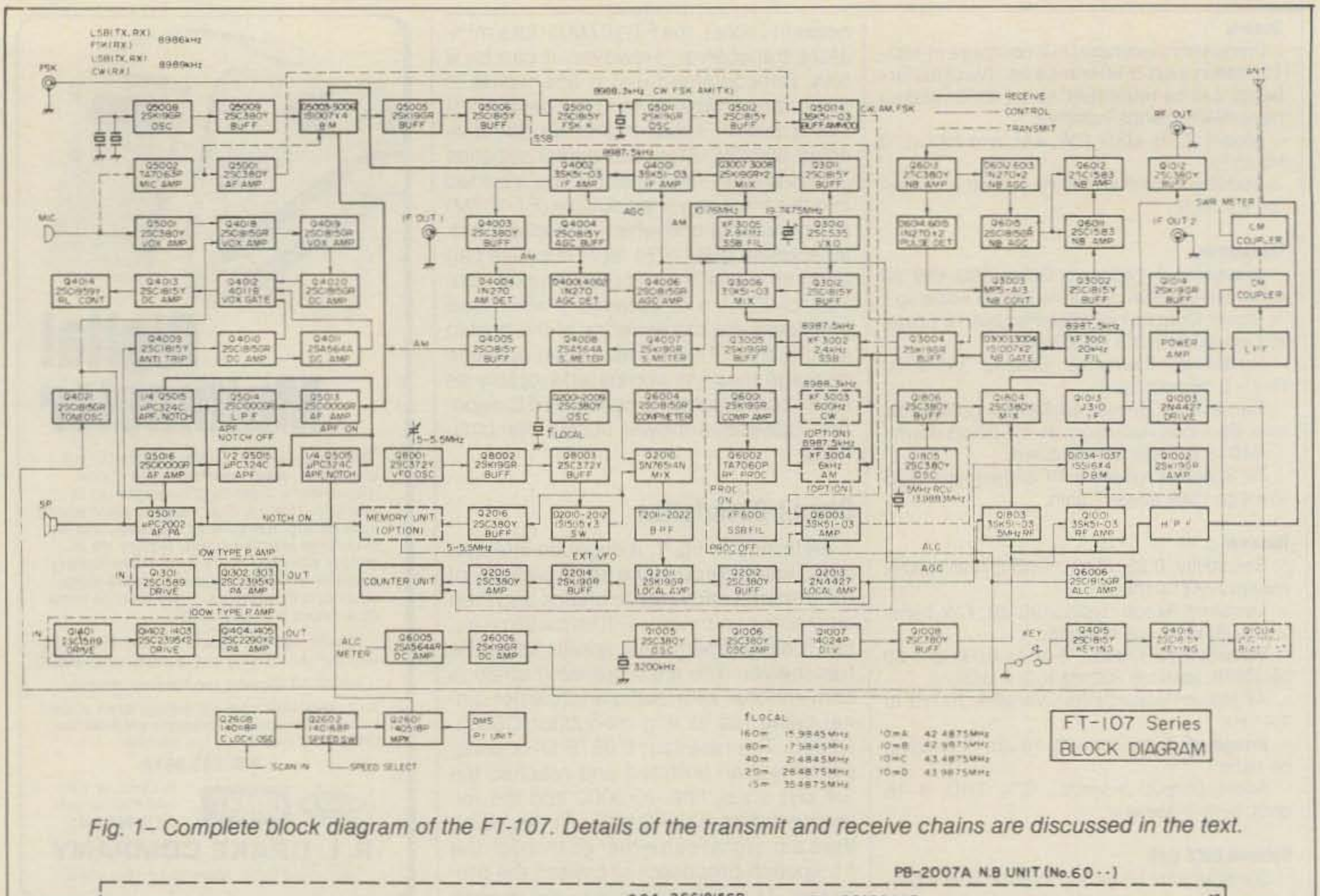


Fig. 1– Complete block diagram of the FT-107. Details of the transmit and receive chains are discussed in the text.

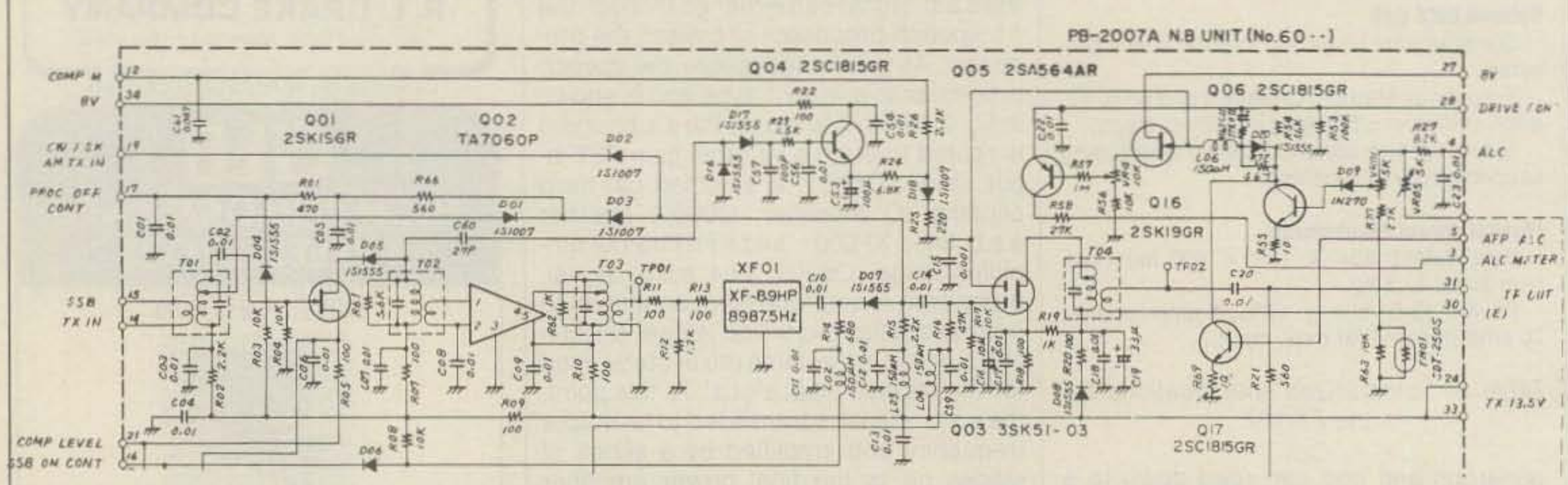


Fig. 2– The r.f. speech processor of the FT-107 is a straightforward, neatly executed design as explained in the text.

not have to directly switch any significant current. The only disadvantage to this approach is that various relays are activated even in the receive mode so a standby current drain of over 2 amperes is necessary.

After filtering, the r.f. signal is routed through two directional couplers, one being used for a.l.c. voltage generation and s.w.r. shut-down protection sensing, and the other for s.w.r. metering, and then to a relay for transmit/receive antenna transfer. A separate carrier oscillator on 8988.3 kHz, Q5011, is used in the c.w., FSK, and a.m. modes. On FSK the carrier oscillator signal is shifted 170 kHz when keyed and on a.m. the carrier signal is low level a.m. modulated in buffer stage Q5004. The rest of the signal path is the same as for s.s.b. In any mode, a carrier level control is effective which allows the input power to be varied continuously from zero to full input power. A conventional VOX circuit is used and a sidetone oscillator which is active on c.w. has part of its output routed to the VOX circuitry to allow for semi-break-in operation.

In the receive mode, the input is first routed through a lamp fuse and then to a fixed 1.7 MHz high-pass filter. Light coupling is then made into a fixed frequency 5 MHz crystal-controlled front-end for WWV reception. This separate front-end consists of the stages Q1803-Q1806 as shown in fig. 1. The main signal path is to r.f. amplifier stage Q1001, a dual-gate FET stage. This stage is quite elaborate and has diode switched bandpass networks inserted in its input and output for each band as shown in fig. 3. The signal then goes to the same double balanced mixer stage as used on transmit, D1034-D1037, for translation to the 8987.5 kHz i.f. frequency.

An i.f. buffer stage, Q1013, feeds the signal first into a broad 20 kHz i.f. filter, XF3001. This filter provides the necessary delay time for matching noise pulses to a blanking signal provided by the noise-blanker circuitry, Q6011, etc. The time constants in this circuitry are chosen to distinguish between very short duration, high amplitude noise pulses, and slower, amplitude varying input signals. The threshold level at which the blanker becomes effective is adjustable. After the buffer Q3004, the signal is routed through

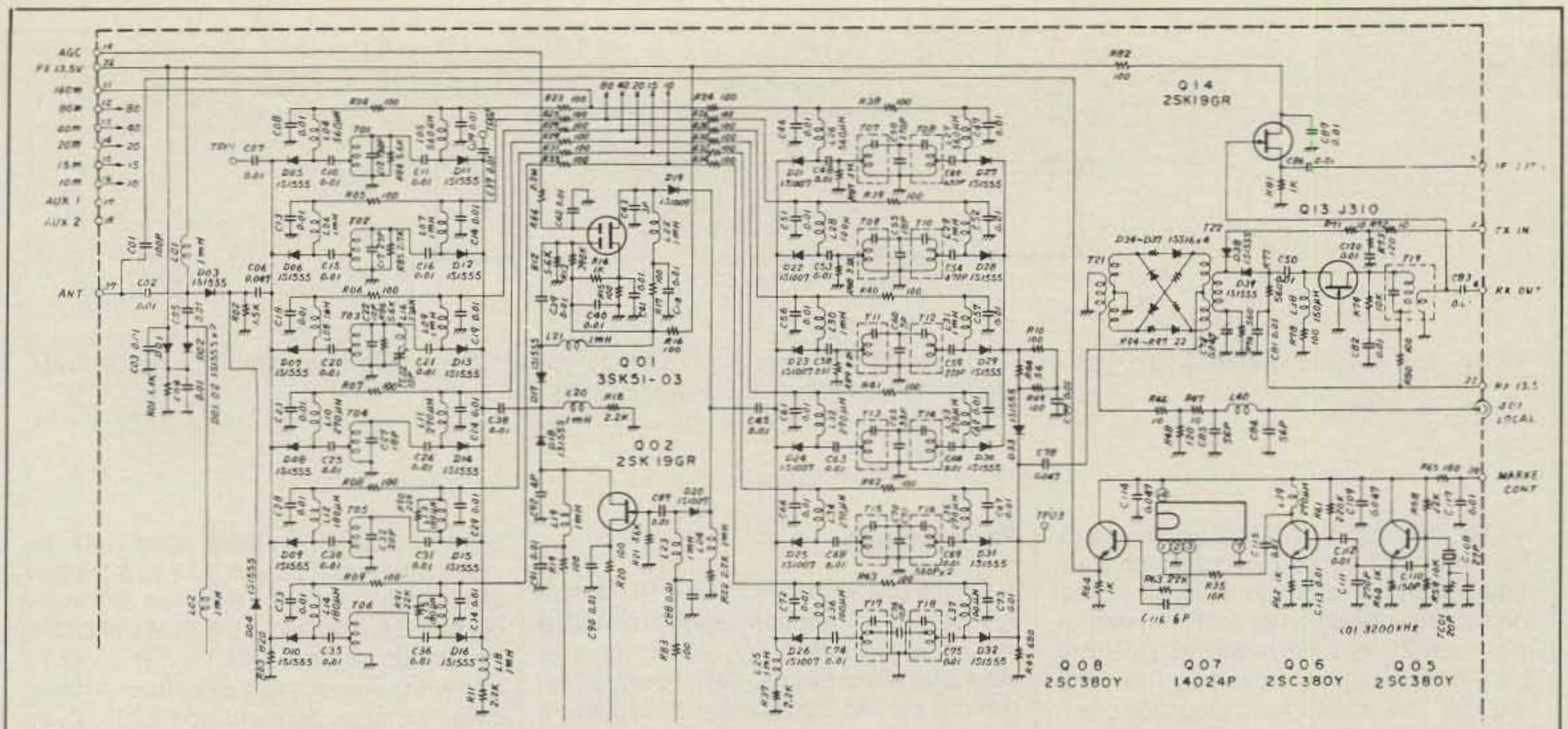


Fig. 3– The "front-end" of the receiver portion of any new transceiver is always of interest. The FT-107 uses a dual-gate MOSFET r.f. amplifier with diode-switched, tuned input and output circuits for each band. The mixer stage following the r.f. amplifier is a ring mixer type using Shottky diodes. The circuitry at the lower right is that of the 25 kHz marker oscillator which uses a divided-down 3200 kHz crystal oscillator.

the 2.4 kHz s.s.b. filter, XF3002, and then to the variable i.f. bandwidth circuitry. This circuitry, which consists of stages Q3006-Q3008, Q3010-Q3012, and s.s.b. filter XF3005, is one of the most interesting features of the FT-107M. It is clarified a bit more in fig. 4. Basically, it is a true i.f. bandwidth control system where the passband of one s.s.b. filter is moved across the passband of another s.s.b. filter without producing a change in the main i.f. frequency. The principle is not new but is neatly executed in the FT-107M. Of course, it is a very superior approach to that of simple i.f. notching or shifting filters.

Referring to fig. 4, the s.s.b. signal following the first s.s.b. filter is fed to mixer Q3006 which has an output at 10.76 MHz. This output passes through a fixed 2.8 kHz wide crystal filter at 10.76 MHz and then to mixer Q3007/3008 where the signal is translated back to 8987.5 kHz. A common oscillator at 19.7475 kHz feeds both mixers. If the oscillator frequency is left on its center frequency, the incoming signal is "framed" by the first 2.4 kHz s.s.b. filter. If the oscillator frequency is moved up or down from the center frequency, the "frame" of the 2.8 kHz s.s.b. filter moves across that of the 2.4 kHz filter in either an up or down frequency direction. The result is that the incoming signal is "framed" by the overlapping filter responses. In effect, a variable bandwidth of 300 to 2400 Hz is achieved. Since the output i.f frequency is not changed, a c.w. signal when it later goes to a product detector stage does not change in tone as long as it remains in the bandwidth set. S.s.b. signals act as though their high or low frequency content is being increasingly cut off depending upon whether the bandwidth control is varied in an up or down frequency direction.

The rest of the receiver chain is fairly conventional with additional i.f. amplification, detection in a balanced mixer (a separate diode detector is provided for a.m.), and audio amplification up to the 3 watt level. I.f. a.g.c. is provided with the front panel selection of "fast," "slow," or "off" options. The a.f. selection does include a fixed active 2.7 kHz low-pass filter and an active peak/notch filter which provides roughly for a selectable 20–30 dB peaking or notching of any frequency from 300 to 1400 Hz. Finally, a 3.2 MHz crystal oscillator, which has its frequency divided down, is used to supply 25 kHz markers so one can calibrate the analog frequency readout (the skirt on the main tuning knob can be rotated to line up its frequency markers when zero beat with the calibration signal is achieved by tuning the main tuning knob).

Common to both transmit and receive operation is the v.f.o. circuitry. It starts out with a conventional, variable 5–5.5 MHz v.f.o. oscillator, Q8001, feeding a mixer stage which then finally provides the correct injection signal to double balanced mixer, D1034-1037, which is active on both transmit and receive. The basic mixer stage between the v.f.o. and the balanced mixer is quite an elaborate affair with 9 separate crystal oscillators (one for each 500 kHz band segment to include full 10 meter coverage) and individual bandpass output filters for each band.

The DMS (**D**igital **M**emory **S**hift) option essentially takes the place of the 5–5.5 MHz v.f.o. when it is in use. The DMS circuitry includes a counter which always counts the v.f.o. frequency that is set. If desired, one can then enter the frequency into any one of 12 selectable memories. The DMS circuitry is that of a 5–5.5 MHz frequency synthesizer with the usual VCO and phase-locked loop referenced to an internal crystal oscillator. A programmable divider is controlled by a front panel memory shift control so any recalled frequency can be shifted up or down in frequency in 100 Hertz steps over the entire simulated v.f.o. range. The same action can be remotely controlled by push-buttons and some additional circuitry in the FT-107M, but not in the DMS unit, allows the push-buttons to also initiate a slow or fast speed up/down scanning action when using any memory channel. Besides the 100 Hertz step shift control, there is a memory fine tuning control which shifts any recalled memory frequency ±500 Hertz continuously. If a greater frequency shift is desired, the "clarifier" (RIT) control can also be brought into play with any recalled memory frequency although it is a standard feature and not part of the DMS option. It will shift the memory or v.f.o. frequency about ±4 kHz. Since the DMS unit in essence replaces the v.f.o. when it is used for frequency control, it doesn't matter how the memories are used. That is, they can store frequencies all in one band of interest or be split up among the bands as desired. However, the memories don't know for which band a frequency was stored. So, one has to note which memo-

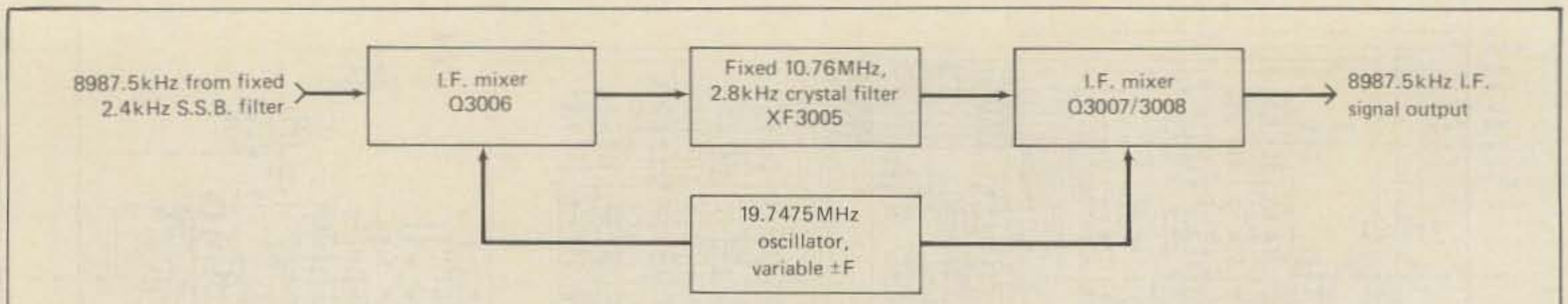


Fig. 4– The variable i.f. bandwidth system used in the FT-107. The 19.7475 MHz oscillator is a crystal controlled type that is "rubbered" a few kHz by a varactor diode.

ry channels one is using for a given band. The DMS unit can be switched so a recalled memory channel controls transmit/receive operation or just transmit or receive with the v.f.o. retaining control of the function not controlled by the DMS unit. So, this allows for transmit/receive frequency splits when desired up to the extreme ends of any band.

The 6 digit frequency counter provides resolution to 100 Hz. Basically, it counts the injection frequency supplied to the double balanced mixer used for frequency translation in both the receive and transmit modes. Internal presets are provided so the counter displays the correct carrier frequency for the mode of operation being used.

Performance

On the transmit side, the FT-107M easily meets all of its specifications related to the usual factors such as carrier and sideband suppression, IMD, spurious radiation, etc. An input power of 240 watts could be achieved on all bands. Yaesu doesn't quote a minimum output power and this was found to vary a bit—from almost 120 watts on 160 meters to slightly less than 90 watts on 10 meters. Such efficiency is acceptable but not spectacular. However, one must note that the FT-107M does have a greater tolerance towards s.w.r. than many solid-state rigs. About 70-75% of the output power was still available when the load s.w.r. was between 1:2 to 1:3. In many solid-state designs the output power falls to a third or less with a 1:3 s.w.r. There is a thermally operated fan built into the heat sink of the PA. In normal operation on c.w. or s.s.b. and when working into a flat load, it never came on after hours of operation. It did cycle on and off, however, when the FT-107M was worked into a mis-matched load. It was not tried on RTTY, but at its rated input of 80 watts for that mode, there is no reason to believe that the FT-107M couldn't remain "key-down" indefinitely.

Transmit operation is extremely simple since there are no tuning controls. For tune up purposes, one can set the mode switch to FSK, key the carrier, and use the drive control to vary the output power as desired. However, as simple as this sounds, it can be a bit tedious after doing it a few hundred times. As described later, there is a very simple external control box one can build to use the frequency scanning functions for home station use. I incorporated into this control box a simple RC sine-wave oscillator with a variable amplitude output which feeds an auxiliary microphone input.[1] A DPST switch on the output potentiometer switches the oscillator on and keys the PTT line. In this way, while tuning up an antenna coupler or linear, the mode switch on the FT-107M can be left in an s.s.b. position. The oscillator potentiometer needs only to be turned on and as the oscillator output is increased, the carrier level will increase for tuning purposes.

The r.f. speech processor proved to be extremely effective in operation. Various tests showed the use of the processor to add no noticeable distortion to the audio and usually an "S" unit or so increase in signal strength was reported. The most satisfying, however, was to receive unsolicited reports that the audio has "good punch" or sounds "very punchy and clear." The microphone used, by the way, is a D-104 with a preamplifier for im-

[1]A full discussion of this control box appeared in "Taking the Chore Out of Tuning Up," by Schultz, CQ, January 1982, p. 50.

pedance conversion into the low-impedance microphone input of the FT-107M. On c.w., the keying waveform appeared to be quite clean and sharp. Unfortunately, the VOX "delay" control is located on the back panel of the transceiver. So, when using semi-break-in by having the sidetone activate the VOX circuitry, it is a bit inconvenient to change the delay time to suit different keying speeds.

On the receive side, the FT-107M easily meets its published specifications. Yaesu does publish a dynamic range specification (90 dB) related to certain test conditions, but really there is no universally agreed upon method to state this factor. Still, it is one of the most important factors to consider with a solid-state receiver. The best that can be said is that the FT-107M seemed to perform as good or better in this regard as any transceiver yet tried. The acid test in this regard in the European area, where I am located, is trying to work c.w. DX on the low end of 40 in competition with the 250 and 500 kw BC stations that are present. A number of European amateurs have commented that the FT-107M has one of the best designed front-ends they have encountered. Apparently, the gain distribution between the dual-gate FET r.f. amplifier and the i.f. chain, use of Schottky diode double-balanced ring mixer, etc., has struck about the best compromise possible between sensitivity and dynamic range. There will probably never be a perfect receiver front-end, of course, and external accessories such as super low-noise preamplifiers and sharp bandpass filters will always prove useful in specialized situations. However, they should not be necessary for any usual station installation using the FT-107M. In spite of its good front-end, Yaesu must be given credit for still putting a switchable 20 dB attenuator in the receive antenna line. Some designs avoid this because it creates the "impression" of some deficiency in the design. But, in reality, any receiver front-end can be overloaded if one connects it to "enough" antenna and signals are very strong.

Tuning "feel" is pleasant with the main tuning knob covering 25 kHz per revolution. The clarifier (RIT) control, as mentioned, covers about ±4 kHz which is a bit too broad. There is, however, a way to "vernier" the RIT action if a DMS unit is installed since the memory fine tune control shifts only ±500 kHz. This requires, however, that a received frequency be temporarily placed in a memory. The RIT feature is a bit unusual in that a push-button is provided to select this action on either receive or transmit. Being able to select it on transmit also makes some sense after a while. If one tunes in a station, especially on c.w., using the clarifier control, and wants to quickly get right on its frequency to transmit, one need only press the "TX Clarify" button. It saves a considerable amount of time as compared to retuning the transceiver for transmit using the v.f.o. tuning.

The performance of the variable bandwidth feature is excellent. It can really make the difference between a solid or dismal QSO on either c.w. or s.s.b. Being able to continuously vary the i.f. bandwidth without having to do any v.f.o. retuning is quite an experience if one has been only used to simpler i.f. notching or shifting techniques. Yaesu does supply as optional a 600 Hz fixed bandwidth c.w. crystal filter. But, there would hardly seem to be any need for it since the variable bandwidth feature can reduce the i.f. bandwidth down to 300 Hz. An exception might be for avid c.w. DX'ers since the fixed 600 Hz filter does have steeper "skirts," but I would still predict poor sales for the 600 Hz filter!

The audio peaking and notching circuits provided can help a bit under QRM conditions, but nothing like the action of the variable bandwidth feature. The peaking circuit is useful only on c.w. and its use will reduce background noise while peaking a selected frequency. No "ringing" is present. The notching feature can be useful in any mode, but it is difficult to adjust since it is quite sharp. In practice, it was found easiest to set the control switch to "peak," peak tune an undesired tone, and then put the control switch in its "notch" position. Used in this manner, the notching action was found to be very effective in eliminating heterodyne tones. Between the use of the variable i.f. bandwidth control and the audio peak/notch filter just about any QRM situation can be handled. There would not seem to be any need for any accessory items to help in the selectivity area.

The noise blanker would appear to be quite effective although the FT-107M was not used mobile. Ignition noise from passing vehicles was easily eliminated and the blanker would even on occasion do a good job of reducing the effect of the Russian "woodpecker."

All the controls are conveniently arranged, and being right-handed, at least I was glad to see a rig again with the a.f. and r.f. gain controls to the left of the main tuning knob. It is true that the a.g.c. in the FT-107M is very good and one does not often reach for a gain control. But, when really concentrating on tuning a weak signal, I usually end up with my right hand on the tuning knob and my left hand on one of the gain controls. The only fault that an avid c.w. operator might find with the controls is that the r.f. gain control is concentric with the a.f. gain control. It does make for slightly awkward adjustment if one continuously wishes to adjust r.f. gain.

The main option available with the FT-107M is the DMS unit. It provides 12 memory channels and is very easy to use. If one wishes to store a frequency set to by the v.f.o., one simply presses the

"M" button and it is stored in the memory to which the memory channel switch is set. One can go on tuning with the v.f.o. and store other frequencies as desired. When a new frequency is stored in a memory channel, the formerly stored frequency is erased. Two AA cells provide memory retention when the transceiver is turned off. To recall a memory channel, one sets the memory channel switch to the desired memory and turns the v.f.o. select switch to either MR or MR RX or MR TX. In the MR position the recalled memory frequency controls transceive operation while in RX or TX positions it controls only one function with the v.f.o. retaining control of the other function.

If one has recalled a memory channel and now wants to tune that channel up or down, the M Shift control is used, after depressing the "M Shift" button. It is a notched control that moves the frequency up or down in 100 Hz steps over a range of 500 kHz. The Memory Fine control provides a continuous ± 500 Hz shift. The clarifier control (RIT) is also fully functional when a memory channel is in use. If after using the shift control one wants to return to the original memory frequency, one simply releases the M Shift button. If one wants to memorize the new frequency to which the memory channel has been shifted, one presses the momentary M button. All the controls function very smoothly. The only thing that seemed a bit redundant was an "M" LED lamp which apparently was meant to indicate whether or not a frequency is stored in memory as the memory channel selector switch is rotated. But once one stores a frequency in all the memories, it is on all the time. Since any memory is free at any time to be "written over" with a new frequency, the indicator does not help. Perhaps it was intended somehow to indicate what memory channels were stored with frequencies depending on how the bandswitch is set. But, it doesn't appear to work that way.

The uses to which the memory channels can be put will vary with one's operating interests. The instruction book for the FT-107M gives a rather fanciful illustration of chasing a DX station which is constantly shifting its operating procedures frequency-wise. More mundane uses present themselves such as searching for a clear frequency while holding another one in memory, storing net frequencies, etc. Those forced to operate QRP with perhaps a poor antenna situation thrown in will find the memory possibilities very helpful. My experience in such situations has been that the best way to make contacts is to call stronger stations as they finish a QSO. With the memories one can tune through a band, store QSO frequencies of interest, and then check through them for the best opportunity to make a call. It saves an awful, awful lot of tuning. In any case, the 12 available memory channels should suffice for almost anyone's needs and all the versatility possible in using them is noteworthy.

The accessory YM-35 microphone has push-buttons on it for frequency scanning when a DMS unit is installed. Actually, the microphone contains only simple push-buttons. All the electronics for scanning are in the FT-107M/DMS and to have the scanning feature one simply has to use any sort of accessory enclosure with three simple, single circuit push-buttons. I constructed a simple scanning control "head" in a small sloping front metal enclosure which also contains the audio tune-up oscillator previously mentioned. Using the push-buttons takes the place of using the M Shift control on the FT-107M when a memory channel is recalled. Depressing the Up or Down button momentarily changes the memory frequency in 100 Hz steps. If either button is left depressed, scanning action starts at about 5 kHz/10 sec. If one of the buttons is depressed along with the Fast button, scanning is speeded up to about 100 kHz/10 sec. Perhaps Yaesu felt the scanning option was mainly useful for mobile operation. But, I find it also quite useful for home station operation. Once one gets the feel of using it, it becomes quite relaxing to lean back in the operating chair and scan over a band to check for activity.

Final Notes

There are various accessories available for the FT-107M, but it is actually a quite complete station in itself and extremely versatile with the DMS option. However, Yaesu certainly didn't forget those who will be connecting various accessories. The back panel of the FT-107M is virtually covered with various sorts of jacks for external connections. There are the usual jacks for an external speaker, separate v.f.o., a.l.c. out, linear amplifier switching, keyer, etc. In addition there are phone-patch jacks, a separate receive antenna jack, v.h.f. transverter connections, and a regulated 8 volt output. The latter was intended for a lamp in the matching Yaesu antenna tuner but actually comes in quite handy for powering all sorts of small station accessories that normally might use a 9 volt battery (keyer, mic-preamp, etc.).

The construction of the FT-107M appears quite rugged. Basically, it is constructed with all of the main circuitry on plug-in type PC boards except for the PA module and some small hard-mounted circuit boards. The main PC boards are individually shielded and well thought out so almost all internal adjustments are near the top of the board. The shielding over the board provides access holes and labeling for the adjustment of trim pots or capacitors on the boards. Looking at it, it would almost appear the Yaesu is making it easy for one to service the unit. This is true to a good degree and leads one to look at the instruction manual. The manual is a nicely organized, glossly stock production befitting the price class of the FT-107M. It contains all the usual instructions about usage of controls, connecting accessory units, operating precautions, etc. It is clearly written and one should have no difficulty putting the unit into use including DMS operation. However, more heartening is the fact that the manual goes into good detail about each circuit board, including diagrams of each and photographs of the component layout on each major board. There is a good deal of service and adjustment information so the amateur with some technical "savy" and reasonable test equipment can help himself to correct most simple mis-adjustments that might develop. The only board that is not covered in great detail is the DMS unit because of its specialized circuitry. There is a complete parts list for the transceiver, except for the DMS, and ordering information for spare parts. The only fault with the instruction manual centers about one amusing aspect and one frustrating aspect. The amusing aspect is that the "transceiver" is referred to as a "transformer" in several instances, which is quite a surprise in an otherwise technically competent translation. The frustrating aspect is that the diagram for removal of the top cover fails to note that the screws holding the carrying handle also should be removed. Not wanting to ruin the top cover by brute force removal, it took me about a half-hour to figure out the situation.

The FT-107M tested did not include the WARC bands as later models do (serials 06XXXX and up). However, the bandswitch does include provisions for two auxiliary bands in the sense that the wiring from the switches is carried to the PC board connectors. One or two boards containing the frequency translation and filtering circuits would probably have to be exchanged with Yaesu to implement operation on at least two of the new bands. Yaesu has advised that they will be introducing suitable conversion kits approximately six months ahead of the official availability date of each new band or bands.

Editor's Note

There are several versions of the FT-107 currently on the market. The units will vary slightly with regard to options. These units show differences with respect to country of purchase. In the United States, FT-107M units come with WARC provision and the DMS unit is included in the purchase price and factory installed. The author obtained his unit in Germany where he resides. Other specifications and findings in this review are consistent with units purchased in the United States.