

Put A Sony In Your Shack

—the ICF-5900W's not bad!

How about a 3-30 MHz portable receiver in the \$100 price range that has double conversion, frequency readout to 2-3 kHz, a built-in crystal calibrator, a product detector for CW/SSB reception, etc.?

It is not often that a consumer shortwave receiver warrants much attention for amateur usage. Usually such receivers have the barest of essentials for good shortwave reception, either on the amateur bands or on the inter-

national shortwave broadcasting bands. But the Sony ICF-5900W is a bit different. This receiver is the U.S. export version, just being seen here, of the Sony ICF-5900 domestic model, which has been on the Japanese market for more than a year. The ICF-5900, in turn, is the latest in a group of increasingly sophisticated portable shortwave receivers which Sony has brought forth in response to the booming SWL market in Japan. These receivers are all a far cry from the usual cheapie AM portable with a shortwave band added, although competitive factors still make economic design a primary consideration.

The ICF-5900W, with a solid array of features in a 22.3 x 23.4 x 10.2 cm case, and powered by three D cells, will not qualify as a primary station receiver. But, it has a lot to offer as a secondary receiver, for casual monitoring of the amateur or broadcast shortwave bands, as a receiver for QRP portable operation, and as a receiver for signal monitoring and measurement purposes.

Basically, the ICF-5900W is an AM/FM receiver, with three shortwave bands that cover from 3.9 to 10 MHz, 11.7 to 20 MHz, and 20 MHz to 28 MHz. The circuit feature that makes the ICF-5900W exceptionally different is the use of its FM i-f as the *first* i-f on the shortwave bands and the use of a second local oscillator, tuning at a constant rate, to give a calibrated 300 kHz bandspread over any desired 300 kHz portion of the shortwave spectrum. The second i-f is the usual 455 kHz one.

Fig. 1 shows the circuit diagram in simplified form. The circuit switching that goes on between AM/FM and SW could only be devised by an advanced Japanese engineer, working on consumer-priced products. It is best left for a purchaser to ponder over for several weeks, with the service manual in hand. But, on the AM band, the receiver is the usual single conversion affair with a first mixer/oscillator stage working into a 455 kHz i-f chain. On the FM band, the usual separate FM front end is found (rf amplifier and mixer/oscillator stage) working into a 10.7 kHz i-f. Unlike the usual Japanese AM/FM radio, however, the 455 kHz and 10.7 MHz i-f stages are not totally combined, but are initially separate blocks. In reality, this costs only a few extra transistors and RC components. When switched to the SW bands, the incoming signal is first routed to a doubly-balanced first mixer stage, using a bipolar transistor — an unusual type of circuit to be found in any consumer product, as yet, but logical for this application, due to its immunity from overload à la the Atlas transceiver front end approach. This stage is used as either an up or down converter, depending upon the shortwave band involved, to get the signals in a given band converted into the 10.7 MHz i-f range. The first variable local oscillator working



into this stage (controlled by the main tuning dial) is set to zero beat, with the desired marker of a built-in 250 kHz crystal calibrator (for instance, at 7.000 MHz). The built-in bfo is turned on, of course, to obtain the zero beat. The second local oscillator, which converts the 10.7 MHz signal down to the second i-f of 455 kHz, must be set at its "0" position (actually 10,700 kHz) during the above adjustment. This oscillator is variable over the range of 10,550 kHz to 10,850 kHz. Now, when the second local oscillator is tuned (bandspread tuning), it can tune an incoming signal range of ± 150 kHz (from 6,850 to 7,150 kHz, in the example given).

The bandspread tuning dial is calibrated for ± 150 kHz and -150 kHz, with markers on the dial at every 10 kHz. Depending on how carefully one calibrates the main tuning dial, etc., one can come to within several kilohertz of an exact frequency. By further marking divisions on the outer dial on the bandspread tuning, one probably could come down to 1 kHz readout. The bandspread tuning calibration is fine, when working on the low end of any band, but a bit awkward on the upper end of some bands. For instance, if one sets the main tuning to the 250 kHz markers at 21,250 kHz, one has to remember this setting, as the actual received frequency is varied ± 150 kHz

from this setting by the bandspread tuning. The tuning rate is 100 kHz/revolution on the bandspread tuning control, which is not bad at all for even SSB or CW reception with a bit of practice.

The use of the 10.7 MHz i-f as the first i-f does, of course, provide a number of benefits. The frequency is high enough for excellent image rejection, even at 15 and 10 meters — an unusual feature for an expensive receiver. Also, the gain of the first i-f across its bandwidth is flat enough to eliminate the need for complicated multiple-gang tuning circuits. But, the simplified tuning system does have to pay its price at frequencies much above 20 meters. Sensitivity begins to fall off rather rapidly on the highest short-wave band, being in the order of 8-10 μ V.

In spite of the apparent poor sensitivity on the higher frequency bands, the receiver is more than suitable for any casual listening purpose on the higher bands and directly usable as a QRP station receiver on the lower bands.

The selectivity on the shortwave bands is determined by the 455 kHz i-f chain and measured about 4.5 kHz at 3 dB down. This is hardly outstanding selectivity, but, by manipulation of the bandspread tuning and treble and bass tone controls, one can do pretty well even on a crowded band. The product detector, as dis-

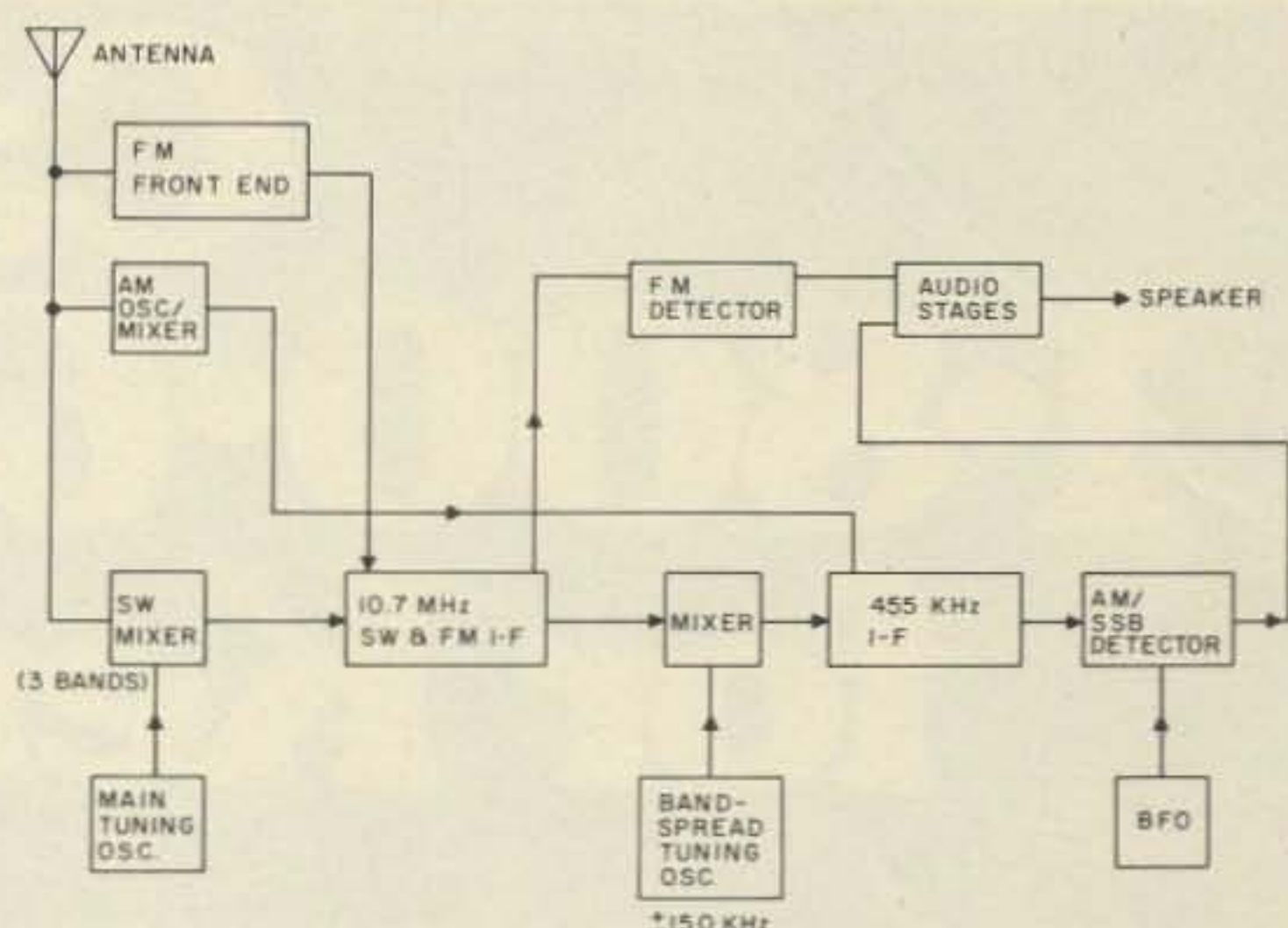


Fig. 1. A functional block diagram of what happens inside the new Sony ICF-5900W receiver. The ICF-5900W is the U.S. export version of a popular AM/FM/SW receiver originally developed for the domestic Japanese market, the ICF-5900.

tinguished from the separate AM diode detector, is automatically switched in the circuit when the bfo is turned on.

As it stands, the ICF-5900W is an interesting receiver to consider, for utility usage around the shack or for a youngster who has developed a serious interest in shortwave. There are, of course, numerous things that could be done to improve its performance, and these are best left to the needs of individual users. For instance, the 250 kHz markers are obtained by dividing down a 500 kHz crystal. This crystal could also be divided down to obtain 100 kHz markers and, therefore, provide more convenient bandspread readout on some bands. An active RC filter could greatly improve selectivity, and the bass/treble tone controls could

easily be converted into the control pots for such a feature. With real skill (it's a pretty well packed chassis), one could even build a QRP transmitter in the radio in the battery compartment area.

The ICF-5900W is becoming available now through U.S. Sony outlets, or, if you have a friend in JA land, he can get it for you for about \$85.00. It is also available through supply houses that cater to SWL buffs. A service manual for it is available at \$1.75 from Sony service outlets (or direct by mail order to Sony Corp. of U.S.A. in NYC). The manual contains very specific alignment information, and one could, if he desired, modify the band coverage to cover the lower end of 80 meters or the complete 10 meter band, by giving up some coverage in the 20-21 MHz area. ■



...de W2NSD/I

EDITORIAL BY WAYNE GREEN

from page 97

training newcomers for their Novice licenses with class meetings, preferably once a week. It is not absolutely necessary to use the 73 training tapes and license study guides, but it sure won't hurt.

General Classes: Getting newcomers

into our crowded CW bands is not enough. Clubs must offer classes to upgrade Novices to General ... at least.

TVI/RFI: As a service to the members and the community, clubs must have a TVI Committee. It is strongly suggested that this committee offer its services not only to the amateurs in

the area, but also to local CB clubs, as a way for amateurs to participate and help the FCC in the reduction of RFI and TVI.

Turkey-Hunting Team: A club must set up a direction-finding team for hunting down any unlicensed operators attempting communications on any amateur band. This team or teams should practice regularly and develop equipment and techniques for the quick location of any illegal station. The team could offer to work with local CB clubs on the location and identification of over-powered CB operators or operators using illegal bands.

Emergency Committee: A club must have an emergency coordinating com-

mittee to prepare the club for disaster service. The EC should know the locations of all emergency equipment, repeaters, HTs, generators, and have liaisons with all other radio services in the area, such as CB clubs, police, fire, taxi, truck, etc., radio systems.

Clubs meeting the above minimum requirements and interested in affiliating with 73 Magazine should have their club secretary send the details in a letter of application to Morgan Godwin, 73 Magazine, Peterborough NH 03458. Newspaper clippings backing up club services won't hurt. Copies of the club newsletter will help, too.

There are no requirements for 73 subscriptions or insistence on the use

Continued on page 125