

COMING SOON ----- THE SONY ICF-S5W

Gerry Thomas Armand DiFilippo

# THE SONY ICF-S5W

A Side by Side Comparison with the Realistic TRF & the GE Superadio

by Mark Connelly - 30 William Road - Billerica, MA 01821

SONY began test marketing a new radio in the New York City area in May of 1980 and, from what we've been able to learn (from company-released information), this radio appears to have been designed with the BCB DX'er in mind! Yes, you read right. This radio not only appears (on paper, at least) to have the potential to be a great BCB DX machine, but one that actually encourages the casual purchaser to listen to distant stations (and, hopefully, become an inveterate DX'er like the rest of us, hi!). It accomplishes this latter deed by the use of a unique "Zone Selector Dial" which, in essence, is a station log broken down into 10 geographical areas. The way it apparently works is --- First, you identify your geographical zone, then the "Zone Dial Area Selector" is rotated until the selected zone appears on the dial scale; now, across the dial there appears a listing of the stations (at their proper frequency positions) which should be audible in your area. Pretty neat, huh?

The cleverness of the Zone Dial Selector notwithstanding, though, the SONY ICF-S5W will be of little value to the DX'er if its performance doesn't measure up. Because the ICF-S5W has not been officially released (it is due out nationally in early 1981), only speculations about performance, based on SONY literature, can be made at the present time, so here goes.

First, the hard data. The ICF-S5W is an AM/FM radio weighing 2 lbs. 9 oz. (with batteries) and measuring 6-3/8"H x 8-13/16"W x 2-5/16"D. It is powered by either three C-cells, an external AC adaptor (optional), or 12 VDC (with optional adaptor) and uses a dynamic 4" speaker housed in its dark grey cabinet. Semiconductor complement includes 12 transistors, nine diodes, three FET's (yep, an FET front-end), and five LED's. The antenna system is comprised of a telescoping whip and external antenna terminal for FM and an "oversized ferrite bar" for AM. There is also mention of a 4-element ceramic filter which, presumably, is an FM section component. Somewhat surprisingly, there is an RF gain control in the form of a "Local/DX" switch which is operative on the AM band. Other features --- "3 LED indicators (which) show optimum tuning;" a continuously variable tone control; and a detachable carrying strap.

The brochure describes performance in the following manner --- "The ICF-S5W offers outstanding sensitivity and selectivity which means better reception of weak, hard-to-tune signals and clean, clear reception in crowded dial areas." The June, 1980 issue of Consumer Electronics also spoke highly of the ICF-S5W's selectivity. We DX'ers, however, have standards of performance somewhat more stringent than the average consumer, so a thorough test of the unit is what is really required.

Some closing observations might be useful. In the SONY literature, no mention is made of whether the front-end is tuned or un-tuned (i.e., is the ICF-S5W a "TRF"?). In reference to the dial, the tuning scale includes not only the "Zone Selector" feature but also a linear numerical scale (i.e., no bunching of frequencies on the high end!); the resolution of the scale could not be determined from the illustration, however. On the selectivity issue, it appears that IF amplification is accomplished through individual transistors so the emitter by-pass capacitor substitution modification could be readily applicable here. Finally, the operational life of the three C-cells is a question mark.

I guess this is where it is going to have to rest until someone can get their hands on one for a proper performance evaluation. We're told that the ICF-S5W will be (is now?) available from 47th Street Photo, Inc., 67 West 47th St., NY, NY 10036 at a discounted price of \$58.50 (list price, by the way, is \$74.95). A brochure on the ICF-S5W can be obtained by writing to Joan Bardong, Consumer Relations, SONY Corp. of America, 47-47 Van Dam St., Long Island City, NY 11101.

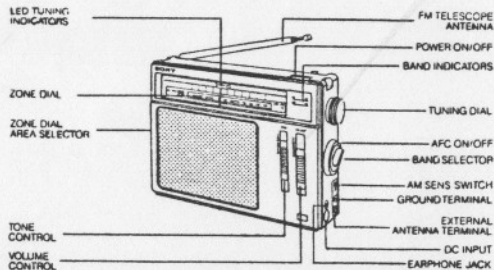
73's and Best of DX!

As part of a recent marketing effort, Sony Corporation made ICF-S5W portable AM/FM radios available to selected DXers for a one-month trial evaluation. I was lucky enough to be chosen as one of the DXers involved in this project.

Before I plunge into the main body of this article, a thorough comparative study of performance of the ICF-S5W versus that of the Realistic TRF (#12-655) and that of the GE Superadio (#7-2880B), I would advise the reader to refer to the article "Coming Soon - the Sony ICF-S5W" by Gerry Thomas and Armand DiFilippo. This article appears in DX News, ← 5 JAN 1981, page 24 and in DX Monitor, 27 DEC 1980, page 16. The Thomas/DiFilippo article gives a rather complete physical description of Sony's latest offering, so there is no reason to repeat it all here. We shall immediately proceed to the results of "hands-on" testing which addresses the following: I - Sensitivity II- Selectivity III - Spurious Responses (Strong Signal Handling) IV-Audio Quality V- Operation with External Aerials VI- Ability to Null (using internal rod antenna) VII- Frequency-readout Accuracy VIII- Special Features IX-Suggested Modifications or Engineering Change Orders ("Proposed ECO's") X. FM Performance Evaluation XI- Conclusions/Overview.

I - STRAIGHT SENSITIVITY: The daytime groundwave signals of stations judged to be weak here in Billerica, MA (about 20mi./32km. NW of Boston) were checked: these stations take in 18 channels throughout the AM band. In addition to the ICF-S5W, a stock TRF, a TRF modified for improved selectivity & improved external aerial performance, and the GE Superadio; the main DX receiver, a Hammarlund HQ180A, fed by an SM2 loop was used as an additional sensitivity reference. All stations used are over land routes.

	ICF-S5W	Stock TRF	Modified TRF	Superadio	HQ180A/SM2
WICC-600, 1kW. Bridgeport, CT	fair/good	poor	poor	fair	S-7½ good
WLBB-620, 5kW. Bangor, ME	poor	poor	poor	poor	S-7/fair-good (o/S5 WVMT VT)
WJR-760, 50kW. Detroit, MI	nil	carrier in noise	nil	nil	S-5 /poor, noisy
WABC-770, 50kW. New York, NY	good	good	fair	fair	S-9/good
WNYC-830, 1kW. New York, NY	in noise/ poor	in noise	nil	high hiss/ nil	S-7/fair
WRCQ-910, 5 kW. New Britain, CT (o/WABI ME SAH)	fair faint 2X455 spur	no good: bad IF Spur	poor/fair slight IF Spur	poor	S-9/good
WINS-1010, 50kW. New York, NY	fair/good	good	fair/good	fair	S-9/good (o/S5 WCNL NH)
WKDR-1070, 1kW. Plattsburgh, NY	in noise/ poor	in noise	nil	nil	S-6½/poor, noisy
WHLI-1100, 10kW. Hempstead, LI, NY	in noise/ poor	in noise	nil	in WILD slop	S-8½/fair
WNEW-1130, 50kW. New York, NY	poor/fair	fair	fair	poor	S9+10/xInt.
WHAM-1180, 50kW. Rochester, NY	nil	nil	nil	nil	carrier in WJMQ/WKDX slop
WCAU-1210, 50kW. Philadelphia, PA	nil	in noise	in noise	nil	S=5 to S=6 poor-fair, noisy
WICE-1290, 5 kW. Providence, RI	good	good	good	fair	S9+ 5 very good





Providing both a 37m/122ft. longwire and a good water-pipe/mains ground gave readily perceptible improvements on weak stations on all portables tested; however, each receiver had idiosyncracies of performance outlined below:

Changes noted between performance with internal rod only and performance with 37m external longwire & a ground connected.

ICF55W: Fair improvement, but receiver could not handle the overloading by WRKO-680, WHDH-850, WCAR-980, WBZ-1030, and WDLN-1330. Spurs and squeals popped up across the dial.

GE Superadio: Good improvement on the lower frequencies, but very little improvement on the higher frequencies. No spurs were introduced, fortunately.

Stock TRF: Good improvement, but some shortwave spurs were introduced. These included RTTY, SSB, CW, and international SWBC signals. (When either the ICF55W or the stock TRF was used with a longwire & no ground, shortwave images/spurs were very objectionable.)

Modified TRF: Excellent improvement; spurs & overload problems negligible at this QTH. Performance with the longwire connected and the ground disconnected was only slightly less than when both aerial & ground were provided.

When a Worcester SM-2 active ferrite loop was connected to any of the four radios, nearly identical improvements in reception occurred (over no-external-antenna levels of performance). In every case, this brought a signal rated "poor" up to a "good" rating and a signal which had been rated "fair" using internal rod only up to "excellent" when the SM-2 was connected, turned on, tuned, and properly positioned for peak signal pickup. This was the only condition for which the external-antenna inputs of all four radios acted identically.

VI - ABILITY TO NULL

The Sony ICF55W and the Realistic TRF could be turned while standing up normally on a non-metallic surface in such a direction that an undesired groundwave or low-angle skip station could be nulled down quite successfully. The GE Superadio had to be tilted more frequently to produce nulls: this is especially inconvenient when you consider the Superadio's bulkiness. If you DX with a Superadio, using an SM-2 loop (fed into the external antenna input ports) is highly recommended for easier nulling of "pests".

VII - FREQUENCY-SET ACCURACY/DIAL CALIBRATION

a. Frequency markings on dial face

ICF55W	- 530	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
TRF	- 54(0)	60(0)	70(0)	80(0)	100(0)	120(0)	140(0)	160(0)				
Superadio	- 55(0)	60(0)	70(0)	80(0)	90(0)	100(0)	120(0)	140(0)	160(0)			

b. Dial length:	bottom to 800kHz.	800-1200kHz.	1200kHz. to top	total
ICF55W	- 2.7cm (1-1/16in)	3.4cm (1-5/16in)	3.8cm (1 1/2 in)	9.9cm (3-7/8in)
TRF	- 4.4cm (1-3/4in)	2.8cm (1-1/8in)	2.8cm (1-1/8in)	10cm (3-7/8in)
Superadio	- 7.4cm (2-7/8in)	4.2cm (1-5/8in)	4.5cm (1-3/4in)	16.1cm (6 1/4in)

c. Accuracy & total tuning range

The dial was set as closely as possible by sight to the indicated frequency. An RF generator nearby was used to couple a signal (through the air) to the receiver under test. The generator drove a digital counter; when the generator signal was adjusted to be in the centre of the receiver passband, the counter reading was recorded.

Dial setting, "eyeballed"	Actual frequency to which receiver under test was tuned			
	ICF55W	Stock TRF	Modified TRF	Superadio
(bottom)	519	514	517	515
600	595	605	603	607
800	797	816	803	808
1000	994	1009	988	1000
1200	1204	1210	1192	1194
1400	1408	1403	1389	1394
1600	1610	1600	1583	1592
(top)	1650	1633	1635	1626

VIII - SPECIAL FEATURES

The ICF55W has a drum-dial mechanism which can display frequency (AM), or one of ten "zone dials" indicating some frequencies and numerous clear-channel stations within that zone. Radio amateurs will recognise the zones as those used for US ham radio call prefixes. Zones only cover the 48 contiguous United States (no Alaska, Hawaii, Canada, or European-oriented listings). The zone charts are useful for the novice DXer and the average AM listener who occasionally tunes out-of-town stations for sports, etc. The charts may help draw users of the radio into a greater involvement with real DXing. For more experienced DXers, it would have been better if Sony had taken the money spent on the zone dial and used it for an LCD digital display accurate to 1 kHz. & continuously-tunable (in other words, Bordeaux-1206 would show as 1206, not as 1210 baubling to 1200).

An LED indicator shows band selected on the ICF55W; this doesn't offer anything a mechanical indication couldn't supply; it just looks snazzier. A tuning light scheme (again using LED's) surmounts the dial cursor: 2 green lights indicate weak signal or no signal and 1 red light indicates a signal of fair to excellent strength. It should not be construed as an accurate centre-tune meter; it works solely on strength. You can be tuned to the unreadable slop of a potent local and get a nice steady red LED indication. This tuning light scheme is less accurate as a tuning aid than is the ear. An LED string (5 or more LEDs) S-meter would be vastly preferable.

IX. SUGGESTED MODIFICATIONS

The following is a "wish list" that is applicable to ALL RECEIVERS TESTED.

- MOD-1: LCD digital readout. A read-out accurate to 1 kHz. or better resolution on AM and to 0.1 MHz. on FM is the ultimate tuning aid. When such a frequency display is combined with an accurate signal strength meter, perfect tuning and accurate frequency measurement are both possible, even with stations on "oddball" channels not conforming to any 9 kHz. multiple, 10 kHz. multiple, or 5-kHz. multiple channelisation plan. (Examples of such oddball freq. stations: RAMI Surinaam- 914, Belize - 834.) LCD's are preferable to LED's for the digital frequency display because their drain on the batteries is much less.
- MOD-2: Record output "RCA phono jack". Such an output would send audio to tape recording equipment, regardless of whether listening was being done with the speaker or with earphone/headphones. A switch could select "High Impedance Out" for home recording equipment or "Low Impedance Out" for the inputs of some portable cassette recorders.
- MOD-3: A well-designed two-position selectivity switch offering a supertight 2.8 kHz. "serious DXing" filter and a 6 to 8 kHz. normal-listening IF bandpass filter.
- MOD-4: An adaptor plug to allow the use of stereo headphones should be included with any top-grade portable radio. The earphones supplied with portable radios are so uncomfortable and have such wretched fidelity that anyone who has been exposed to good audio soon searches for a better method of private radio listening. Radio Shack makes an adaptor which has a mini-phone plug on the end to go to the radio's earphone-out jack and a jack on the other end into which stereo headphones may be plugged for hi-fi mono from your portable. The adaptor is Radio Shack cat. # 274-361 and should be included with better portables; cost is less than \$2.
- MOD-5: Adequate circuitry documentation. The ICF55W instruction pamphlet wasted a whole page on "how to attach the carrying strap", but nowhere was a schematic of the circuit to be found! A radio intended for the hobbyist market should include (1) a schematic (2) a "roadmap" or PC board components-layout drawing and (3) a parts list as minimum documentation. An alignment procedure would also be valuable. The receiver should be considered a component which the user may want to build into a larger operating system.
- MOD-6: Data pins for remote control & outputting of bits which activate frequency readout. It is my belief that a consumer-equipment control buss scheme similar to the "CPIB" or IEEE-488 system used in controlling of instruments in industry will soon be common in first-class portable radios, amateur radio gear, SWL/MWDX communications receivers, and home audio equipment (e. g. cassette decks). Such a data-buss would allow a timer unit to turn a radio & linked tape deck on & off to record music while you are

work or DX while you're asleep. Furthermore, if a home computer could be data-linked to a receiver's "frequency bits in" control pins, complicated scanning, automated DX hunting, and parallel frequency routines could be set into motion. A stereo cassette deck could then be fed audio on one channel and frequency/time/date data pulses on the other channel, the contents of which could be flashed onto the screen of a CRT terminal as the tape was being played back.

MOD -7: Signal strength meter, either mechanical or solid state.

MOD -8: IF-out coax jack for oscilloscope-observation of subaudible heterodynes, analysis of the spectral content of stations received, etc.

#### X -FM PERFORMANCE' Superadio VS. ICFS5W

The differences between the ICFS5W and the GE Superadio with regards to FM reception were slight. The ICFS5W received stations on 46 FM channels with its FM whip fully extended; the Superadio received stations on 50 channels with a fully-extended antenna. The ICFS5W had an image at the bottom of the dial from WKKX-107.9 MHz. This was probably on 86.5 MHz. (107.9 - (2 X 10.7 MHz. IF)). It was not noted on the Superadio; this may have been outside its low-end tuning range. Several stations received poorly on the ICFS5W were given a "fair" rating on the Superadio. So in the FM sweepstakes, the nod goes to the Superadio, although not by a tremendous margin.

#### XI - CONCLUSIONS

##### a. A "Report Card" on the Four Receivers Tested

	ICFS5W	Stock TRF	Modified TRF	Superadio
Sensitivity	B	B	B-	C
Selectivity/domestics	B	B-	A-	C
" /foreign splits	C	B	A-	D
Spurious response rejection	C	B	B	A
Audio Quality	B	D	D	A
Performance w/External Aerials	C	B	A	B
Ease of Nulling	B	B	B	C
Dial Accuracy	B	C	C	B
Extra Features	B	D	D	C
FM Performance	B	N/A	N/A	A
Appearance	A	C	C	B
Portability	A	A	A	C

##### b. Comments

It is up to the reader to weigh the relative importance of each of the above criteria, also taking into account price. The Sony ICFS5W is clearly a wise choice for those looking for an AM/FM receiver of similar size and having AM DXing capabilities like the Realistic TRF #12-655, no longer marketed. It can be inferred from recent reviews of the current #12-656 TRF that the ICFS5W's AM performance would easily surpass that of the presently-marketed. The ICFS5W's audio is vastly superior to that of any of the Realistic TRF's of recent vintage. The Sony surpasses the GE Superadio in most considerations of immediate interest to MW DXers. The only foreseeable problem that could be serious to some ICFS5W users is the mediocre strong-signal handling characteristic. This problem would most obviously manifest itself in terms of spurious responses appearing when the receiver is used in an urban area with many strong locals. The "transmitter alley" area in the N.J. Meadowlands area west of New York City would provide the site for a real acid test of all of the receivers tested above. Until other DXers come forth with the results of such strong-signal "stress-testing", using different ICFS5W's; we cannot say with assurance that the ICFS5W would have more spurious responses than the other radios tested. Overall, the ICFS5W is a hot little receiver in an attractive package at a fair price: it may be the TRF replacement many of us have been looking for, with FM capability to boot in a much more convenient size than the GE Superadio. Now, if they'd only include the schematic for the thing, we could get our hands inside & modify this radio into a real 'DXin' Machine.

## THE SONY ICF-S5W: A SECOND OPINION

by Bruce Portzer

A few weeks ago, Mark Connelly presented an excellent review of Sony's newest DX machine. My own experiences in trying out one of these radios were not unlike his. We did have a few different opinions of this radio, however. So in order to give the DX community as much information as possible on the subject, here are some of my impressions of it.

This report will cover my personal experiences in test DXing one of the ten "loaner" ICF-S5W receivers during the month of March, 1981. My use of the receiver included many hours of general listening; comparisons with a General Electric "Superradio", two "stock" Realistic TRF's (type 12-655), and a TRF modified by Radio West with a Shotgun loop and transfilters; plus tests of the radio's performance when connected to various antennas. During the time I had the receiver, I took it on a one week business trip to Ogden, Utah, where I did a certain amount of DX listening.

This report is divided into three main sections: 1) General comments and impressions of the receiver; 2) Comparisons with the GE Superradio, unmodified TRF, and modified TRF; and 3) Suggestions for improvement.

### General Comments

Sensitivity was excellent. With no external antenna, it received two New Zealand stations (2YC, 657 kHz, and 1YZ, 819 kHz), two Hawaiians (KORL-650 at room level, plus a weaker KIKI-830), and XERPM-660 (Mexico City) here in Seattle. Those stations were in addition to the usual assortment of domestic clears (WCCO, WHAS, WWL, WBAP, etc) and routinely heard west coast stations. I picked up KGO, 810, San Francisco, once during the day, a good feat on any receiver.

While overall sensitivity was impressive, it could be improved greatly by using an external antenna, as will be described later.

The receiver's high/low sensitivity switch was not particularly useful. In fact, it was usually counterproductive. For example, when listening to a station 10 kHz from a local, putting the switch in the "low" position caused the DX station to disappear, leaving the spatter from the local at least as strong as it was in the "high" position.

Selectivity was also very good. It was almost always easier to hear stations 10 kHz from a local station on the Sony receiver than on the unmodified TRF or GE receivers. I'll give some typical examples in the "Comparisons" section.

Audio quality was excellent. My DX was usually of hi-fi quality.

The overall layout of controls, etc was generally good. I liked the location of the tuning knob. It is on the side of the set, making it slightly easier to use than the more common front mounting. I was not all that impressed with the type of "slider" controls used for the volume and tone controls, but felt it was a minor problem. The ICF-S5W has a strap for carrying, which I liked better than the solid handle on the TRF and other radios. The radio has a tuning indicator (of sorts); a red LED with a green LED on either side. I found it better than nothing as an indicator of signal strength --- but not by much. A meter or a series of 5 or more LEDs would have been much more useful.

Dial calibration was good. The radio has markings every 100 kHz and their accuracy was very good. I seldom had a problem telling what frequency I was tuned to (and when I was wrong I was usually only off by 10 kHz). Frequency spacing was linear (i.e. the distance between 1500 and 1600 was about the same as that between 600 and 700 kHz). This made the dial a little easier to use than the more common logarithmic spacing, where signals are scrunched closer together at the upper end of the dial.

The receiver's zone dial, a rotating drum with call letters of stations in ten different zones in the U.S., was interesting, but I'm not sure how useful it is. The feature is useful for travellers who might not be familiar with the radio dial in the area they're visiting. But I think there should be some indication, on the radio, of where

these stations are (aside from being in Zone X). For example, an ICF-S5W owner (a non-DXer) from Chicago might be visiting Yellowstone National Park and wondering what the weather will be like on the next leg of his trip, let's say it's to the Grand Canyon by way of Salt Lake City. The dial for Zone 7 gives him a choice of KOMO, KEX, KBOI, KSL, KTWO, etc. Which one will most likely have a weather forecast for Salt Lake City? For an active DXer, the answer is obvious, but for this poor soul it isn't. Possibly the two-letter postal code for the stations' state could be listed after the call letters (i.e. WWL-LA) or the approximate locations of all the stations on the zone dial could be shown on the map on the back of the radio. Locations (city and state) of all stations are listed in the instruction book, but most owners will probably throw the booklet into a drawer and forget about it. As a final note, KARZ is incorrectly shown as KARC on both the zone dial and in the instruction booklet.

Image Rejection (i.e. signals showing up 910 kHz below where they should) left much to be desired. On most radios I've used lately, image rejection is not a problem. On the ICF-S5W, it was a major drawback. On 680 kHz, powerhouse KNBR (San Francisco) was rendered unlistenable because of an image of local KZOK-1590. During the day, normally easy to hear KARI-550 was wiped out by an image of KGAA-1460. During my trip to Ogden, locals KJQN-1490 and KLO-1430 showed up on 580 and 520, respectively, with good signals.

Spurious Signal Rejection was very good, as far as mixing products caused by strong local AM broadcasters is concerned. I didn't hear any mixing products I couldn't hear on most other receivers here. But the radio had quite a few signals (teletype and code mostly) leaking through from shortwave. Here in Seattle, there were always about a dozen of these annoying things at various locations on the dial. In Ogden, I noticed only one or two during the entire week. It's likely the shortwave signals were of local origin, since Seattle is much larger than Ogden and is a major center of military and maritime communications to Alaska, the Pacific, etc. Whatever the cause, the shortwave signals were annoying and a significant drawback to an otherwise fine DX machine.

FM performance seemed good. The FM dial here (at my house) is a "jungle", with spurious signals from locals all over the dial of any FM receiver (including this one). At the homes of two other DXers, the situation was much better. Several stations in Bellingham (80 miles away) and Vancouver (110 miles) could be heard with good signals. FM performance was judged to be about equal to that of the G.E. Superradio.

Nulling was good when it came to choosing between two stations on the same frequency. I could easily null out local KTAC-850 and hear KOA-Denver at the same strength, with no KTAC interference. And with a bit more difficulty, I could sometimes carefully position the radio to null out 50kw local KING and bring in XEPRS-Tijuana. AGC action on the radio is apparently quite tight. Many times I could not null out a strong station for direction finding purposes. And trying to null splatter from a local 10 or 20 kHz away was almost hopeless.

Power requirements seem reasonable. The ICF-S5W only requires three C-cells, compared to 4 C-cells for the TRF and six D-cells for the Superradio. The AC adapter is less convenient than the built-in line cords in the TRF and Superradio, but the inconvenience is minor. An adapter for a 12 volt car battery is available as an option --- a convenient feature not available on the other two sets.

The radio was used with four different external antennas: a 90 foot longwire, a "Space Magnet" ferrite loop, a four foot square box loop, and an 1800 foot Beverage antenna.

The longwire boosted everything by about the same amount --- locals, DX, images, shortwave feedthrough, and a few spurious signals from AM broadcasters. A couple new spurious signals were noted with the longwire connected, but nothing particularly gross. A couple of legitimate DX stations were also heard using the longwire, which weren't there when there was no external antenna. Overall performance with a longwire antenna was judged acceptable.

The Space Magnet caused a bit of a problem at first. If the ICF-S5W and the Space Magnet were too close together, the radio went dead. The Space Magnet apparently crammed so much signal into the radio that some of it radiated out of the radio and was picked up by the antenna, setting up a feedback loop. Moving the two about four feet apart eliminated the problem. Once the feedback problem was eliminated, the radio worked very well. Images all but disappeared

and many more (legitimate) signals appeared. On 550, I could then hear KARI (Blaine, WA) and KOAC (Corvallis, OR) during the day, instead of a KGAA image. On 680, I could hear KOMW, Omak, WA all day, rather than KZOK audio. On 590, where before there had been a weak carrier, I had KUGN (Eugene, OR) and KHQ (Spokane, WA). And the shortwave feedthrough went away, too.

The radio also worked well with my four foot box loop. It didn't matter whether I connected the antenna's lead-in to the receiver's antenna and ground terminals or simply held the set near the loop --- performance was about the same. As with the Space Magnet, images and shortwave garbage went away, and reception of most stations improved.

The crowning glory of my ICF-S5W experiences was DXing with it on a Beverage antenna. During the Utah trip, IRCA member Bill Harms and I set up an 1800 footer pointing east-west a few miles outside Provo, Utah. WNBC-660 was in at unbelievable strength, Cubans on 640 and 600 cut through domestics quite easily, El Salvador-655 was heard well. And Midwest stations too numerous to mention put in excellent signals. For some odd reason, signals were much stronger when the Beverage lead-in was connected to the ground terminal, rather than the antenna terminal of the radio. When the longwire and the two loops were tried out back here in Seattle, it didn't matter which wire was connected to which terminal.

#### COMPARISONS WITH OTHER RECEIVERS

##### Realistic TRF (Model 12-655), unmodified

The Sony ICF-S5W was much more selective than an off-the-shelf TRF. KGY-1240 in Olympia (50 miles away) and KRPM-1450 in Puyallup (40 miles away) could be easily heard next to strong locals KYAC-1250 and KGAA-1460 on the Sony. Using the TRF, KGY & KRPM were audible only with the locals carefully nulled. Similar situations were noted on other channels. During my visit to Ogden, KFTN-1400 and KEYY-1450 in Provo (70 miles away) were heard during lulls in the splatter from local KLO-1430; on previous trips to Ogden (with the TRF), I couldn't hear KEYY & KFTN under any circumstances.

Sensitivity was also better on the ICF-S5W. When KGO-810 came in on the Sony during the day, no trace of them could be found on the TRF.

Nulling out interference was a little easier on the Sony, but not by much. XEPRS (Tijuana) came in a bit better on the Sony when co-channel KING (Seattle) was carefully nulled --- on the Sony, I could null KING enough to have XEPRS dominating the channel, while on the TRF the best I could do was have them mixing. It was easier to null adjacent channel splatter on the TRF. But selectivity was better on the Sony, and more than made up for the difference.

Dial readout was vastly superior on the Sony radio. The TRF is a real basket case when it comes to telling which frequency I'm tuned to. I usually can't even tell whether I'm listening to local KZAM-1540 or local KZOK-1590 without waiting for an ID or tuning around to get my bearings (the stations have identical sounding album rock formats). With the Sony radio, I always knew within 10 kHz of where I was. As an added plus, the Sony's dial is marked every 100 kHz, compared to every 200 kHz (above 800 kHz) on the TRF.

Audio quality was much better on the Sony. I hadn't realized how mediocre the audio is on the TRF until I'd compared them side-by-side.

The TRF beats out the Sony radio in only one major respect. It has no images or shortwave feedthrough. Apparently, the TRF has a better-front end than the ICF-S5W.

##### Radio West modified TRF

The TRF in question was modified with Transfilters for improved i.f. selectivity, and with a "Shotgun" 12" ferrite loop/tuning capacitor.

Sensitivity seemed to be just a tad better on the Sony. We tuned both portables, plus a Drake SPR-4 with 100 foot longwire to 657 kHz and listened to 2YC (Wellington, NZ) fade in and out. Invariably, 2YC faded in first on the SPR-4 (to no one's surprise), followed by the Sony a few seconds later, followed by the TRF about two seconds after that. Weaker signals, such as KIKI-830, seemed to have a little less background noise on the Sony than on the TRF, but there were no stations we could hear on one that weren't also audible on the other. The Sony won in this category, but not by much.

Selectivity was also a little better on the Sony, but not by enough to matter in terms of listening to a signal next to a strong local. In fact, the TRF's 12" loopstick produced vastly superior nulls, making listening easier when a strong adjacent signal was nulled out. For example, on 990 kHz, XECL was audible with heavy KOMO-1000 splatter on both radios. When the radios were positioned to null out the KOMO splat, XECL was almost splatter-free on the TRF, but had a moderate amount of splatter on the Sony.

The aforementioned comments on audio quality, dial readout, and image/shortwave feedthrough rejection of an unmodified TRF, also apply to the modified TRF. Overall, the Sony ICF-S5W and the modified TRF are about equal in quality and price. It should probably be mentioned, though, that Radio Shack has replaced the 12-655 TRF with a not-as-good model 12-656. So a modified 12-656 might not perform as well as the ICF-S5W.

#### General Electric "Superradio"

Selectivity was much better on the ICF-S5W than on the Superradio. We could tune in KDWN-720(Las Vegas) on the ICF-S5W, with only a small amount of splatter from KIRO-710 (a superlocal). On the Superradio, KDWN was only listenable when the signal peaked --- otherwise it varied from barely audible to inaudible. We noticed the same situation when we tuned 10 kHz from other local stations.

We were unable to make any conclusions regarding sensitivity. The same stations were heard on both radios, except when adjacent channel splatter wiped out a station on the Superradio.

Audio quality was better on the Superradio. This was no surprise. The Superradio has a 5" speaker, compared with a 3-inch on the Sony, and has separate treble and bass controls, rather than a single control.

The two were about equal in dial readout. The Superradio is marked at only 200 kHz intervals at the upper end of the dial, but the pointer isn't as "fat" as the one on the Sony and the tick marks between marked frequencies seem a little easier to use for interpolation. These differences seemed to make the preference a purely subjective matter.

Finally, the Sony radio is only about one-fourth as large as the G.E. set, making it a heck-of-a-lot easier to lug around.

#### RECOMMENDATIONS FOR IMPROVEMENT

1. Please do something to reduce or eliminate the images and shortwave feedthrough. Add a tuned r.f. stage in the set's front end (if there isn't one already) or improve the "Q" of whatever is already there. The images and shortwave signals went away when I used the radio with my loop antennas, so an additional tuned circuit ahead of the mixer stage seems to be all that's needed.
2. As suggested earlier, do something to relate the stations on the rotating "zone dial" to their actual (city or state) location. Change KARC to KARZ.
3. Eliminate the sensitivity switch. It served to useful purpose that I could find.
4. Use a meter or better LED display to show signal strength. I would prefer a meter. It might also be used to test battery quality, as is now done on other consumer grade portable radios, cassette recorders, etc.
5. Add an output jack for a tape recorder. It should have an audio level of about 100mV, independent of the volume control setting.
6. Add a dial light. Much of my listening on this radio was done in bed, late at night, with the lights turned off. I had to tune to a known station and "count channels" to tell where I was, and even then I sometimes wasn't sure if I was tuning up the dial or down the dial. A dial light, controlled by a momentary-contact switch would have eliminated the problem.

In conclusion, the ICF-S5W is a very good portable, considering it's modest (under \$75) price tag. Sensitivity and selectivity are at least as good as that of the popular TRF and Superradio. Some shortwave signals may leak through, depending on your location, and you may be bothered by images. However, a loop should help reduce both problems. I sure hope they do something about them. Overall it's an impressive radio for the price.

## THE SONY ICF-S5W---ANOTHER LOOK

Gerry Thomas

(with help from Charlie Barfield)

As many of you know, Sony recently released a new AM/FM portable and, in an unprecedented move among manufacturers, has sought the help of DX'ers in the evaluation of the radio. Having been selected as one of the ten "monitors," I've had the opportunity to test the ICF-S5W for the past few weeks and offer the following results and impressions.

First of all, according to the letter accompanying the "loaner" ICF-S5W, the availability of the Sony is not limited to the New York City area; in fact, it was released nationwide last fall and should be obtainable through any Sony dealer. As an interesting aside, the ICF-S5W is, at the present time, the most popular Sony portable in Japan, according to the letter.

Because Mark Connelly's superb review of the ICF-S5W covered the radio in significant detail, I submit this article as a supplement to Mark's and will limit my discussion to points of difference between our impressions and to observations not made by Mark.

I would also like to remind the reader that the conditions under which Mark's and my comparison tests were conducted differed in several important ways, not the least of which was the fact that two different samples of the ICF-S5W provided the results. Equally important is the realization that the radios with which I compared the Sony were all optimally aligned for MW DX'ing, whereas the ICF-S5W was untouched, straight out of the box.

The radios with which the Sony was compared were a modified (3 kHz muRata IF filter) FRG-7 with a four-foot passive box loop; an SPR-4 (stock selectivity) with a 30-foot longwire; a General Electric Superradio; an unmodified Realistic TRF 12-655; and an unmodified Realistic TRF 12-656.

#### PERFORMANCE

For the sensitivity and selectivity tests I used a modified "SIO" grading system of the following description:

S (signal strength)	I (adjacent channel interference)	O (overall reception quality)
5 = excellent (local-like)	5 = totally free of splash	5 = entertainment grade
4 = good	4 = weak, minor splash audible well under signal	4 = good, armchair listening quality
3 = fair	3 = moderate splash but not interfering with intelligibility	3 = easily readable but not of a "5" or "4" quality
2 = poor	2 = heavy interference (up to 50% masking of signal)	2 = readable with effort
1 = very weak/barely detectable	1 = splash is intelligible or signal is masked over 50% of the time	1 = marginally readable
0 = not detectable	0 = 100% masking of signal	0 = unreadable

Two types of reception tests were conducted over several sessions---a daytime domestic DX test and a night test of foreign split-frequency reception.

#### Daytime reception---

	FRG-7	SPR-4	ICF-S5W	Superradio	TRF 12-655	TRF 12-656
WSUN-620 (messy local WHYM on 610)	444	433	444	444	433	412
WSB-750	242	343	343	343	232	121
WFLA-970 (local WBOP-980)	444	433	444	434	434	333
WABF-1220 (local WNVY-1230)	101	101	322	000	000	000
WLCY-1380 (WCOA-1370)	455	444	455	333	312	000
WZEP-1460 (WBSR-1450)	322	100	222	100	000	000

As can be seen, the Sony provided reception that was largely equal to or better than any other receiver/antenna combination. Reception on 1220 kHz is usually possible on both the Superadio and TRF 12-655 but for several days running the reported ratings were the norm. An especially impressive sensitivity showing by the Sony occurred at my place of employment. I work in an underground ferroconcrete laboratory where reception on the BCB is abysmal. In fact, the best showing of any portable I own has been the Superadio, which manages to pull in all of my local stations (and nothing more). I was more than a little astonished when I put the Sony to this acid test and it not only provided the best ever reception of my locals but also pulled in a number of stations over 200 miles distant---unheard of!

Of the portables then, the Sony I had was the best performer, with the Superadio second, the TRF 12-655 third, and the TRF 12-656 last.

#### Split-frequency reception---

	<u>FRG-7</u>	<u>SPR-4</u>	<u>ICF-S5W</u>	<u>Superadio</u>	<u>TRF 12-655</u>	<u>TRF 12-656</u>
TICAL-525 (Costa Rica)	353	353	353*	353	253	252
TIRN-575 (Costa Rica)	433	433	343	433	233	222
YSS-655 (El Salvador)	444	433	423	433	343	311
Radio Belize-834	454	454	444	433	354	323
HRIC-1255 (Honduras)	322	211	211	211	222	000
Cayman Islands-1555	354	333	322	322	232	211

\*"Birdie" interfering with reception

Overall, I'd have to rate the TRF 12-655 the best (by a hair) of the portables for foreign DX despite its generally lower signal levels. The ICF-S5W and Superadio were not far behind and, in my opinion, essentially equal. I hasten to remind, however, that my Superadio has been aligned for optimal foreign DX'ing; the Sony would have "beat the pants off" of a stock Superadio.

#### OTHER CHARACTERISTICS AND OBSERVATIONS

##### Spurious responses---

The area where the ICF-S5W really fell down was in its handling of spurious responses and this, in my mind, seriously reduces its desirability. Significant images were evident on 540, 570, 590, and 640 kHz in the RF "normal" attenuator position and the band really came alive with images, mixing spurs, and harmonics when the attenuator was placed in the circuit. In addition, CW and RTTY was audible at night at a few spots on the dial (even without an external antenna attached). Cross-modulation was noted in only one instance (WHYM-610) and only on occasion. Also, pegging the dial pointer at minimum frequency (about 520 kHz) provided WWWW-1430 at a fair level.

As Mark noted in his review, the Superadio and TRF 12-655 are essentially free of these problems (at least at our locations) although IF harmonics do show up on the TRF 12-655 (on the TRF 12-656 too).

Incidentally, my Sony ICF-5900W (which is now in its third year of 40+ hours/week duty at work---totally trouble-free) performs similarly to the ICF-S5W with respect to spurious responses so this is apparently a design problem. Additional front-end selectivity (neither Sony is a "TRF" (as we know it)) would go a long way toward correcting this shortcoming.

##### Attenuator---

This RF gain control feature is operative only on the AM section and can, I found, be useful in some situations. One of its peculiarities, however, is that, for some reason, inserting the attenuator into the circuit adds capacitance to the tuning section. That is, if you are tuned to a weak station adjacent to, and higher in frequency than, a strong local, switching in the attenuator can actually increase the presence of the local (if the tuning isn't re-adjusted). Optimal reception in this kind of situation, then, requires decreasing the capacitance by moving the dial pointer up about 2-3 kHz. As Mark noted, a schematic would have helped explain this problem and shed some light on the increase in spurs that occurs with the attenuator in-line.

##### Zone Dial---

I really like the Zone Dial idea, primarily because it is an excellent vehicle for exposing casual listeners to BCB DX. Stations from all ten zones were audible here in Pensacola but one of the stations listed for my zone is audible at night only on rare

occasions. This is WAPE-690 whose night antenna pattern directs most of its power into the Atlantic---NRC's night pattern book would have been of use to Sony in creating the zone lists. Another station listed for my zone is WKVM-810 which has never been logged here (in western Zone IV) with any receiver. Also, WBT-1110 was positioned at about 1170 kHz on the zone dial. Finally, Sony might consider mentioning in their owner's manual that it is possible to hear stations outside of a listener's designated zone (there's no station overlap between zone listings so the 50 kW clear channel stations appear only in their "home" zone).

Although the monitors were not to remove the back of the ICF-S5W, I obtained permission from Mr. Jon Strom of Sony to examine the inside of the cabinet and noted the following.

##### Ferrite rod antenna---

The Sony's ferrite rod antenna is 6 $\frac{1}{2}$ " x 3/8" in size (slightly longer than the TRF 12-655's, but smaller than the Superadio's) and is not mounted horizontally but rather at a slight (est. 20 degrees) angle. Conceivably, this could result in improved sky-wave nulling though I did not carefully investigate this possibility. Also, instead of using a few turns of wire around the ferrite rod with which to couple an external antenna (as in the TRF's and Superadio), the Sony uses about 70 turns of litz. This tighter coupling provided, in my opinion, the largest external antenna signal "kick" of any of the portables but, unfortunately, also exacerbated the spur and feedthrough problems.

##### Circuitry---

Despite the lack of mention of an integrated circuit in the ICF-S5W's brochure, IF amplification is handled by an IC (there goes the emitter by-pass transfilter modification). Somewhat surprisingly, audio section amplification is provided by discrete components. It would seem that since most of the current draw in a radio circuit is by the audio section, Sony would have used an IC for this function (and kept the discrete components in the IF section, for our benefit), especially since the ICF-S5W draws about twice as much current (40 mA) as, for example, the Superadio. With this current consumption and its three C-cells, the ICF-S5W is not much of a match in the battery life area for the Superadio (and its six D-cells). Speaking of battery life, the ICF-S5W's manual reports an expected life of 50 hours (mine dropped to under 1.4 VDC per cell after about 25 hours).

One thing about the circuitry that really disturbs me is the mounting of the printed circuit boards. They are mounted etching side out with no access to the transformers. So, unless you can find a right-angle alignment tool, removal of one of the circuit boards is necessary if you intend to align the Sony.

##### FM PERFORMANCE

And finally, a few words about the FM section. Whereas Mark reported FM performance largely on par with the Superadio, my Sony performed very poorly in this mode. Sensitivity was well below that of the Superadio but more significant was the presence of my locals all over the dial. Local W0WW-107.3 MHz appeared on no less than 13 spots on the dial and WMEZ-94.1 MHz showed up on seven. Apparently my Sony's FM section needed some work, so I'm reserving judgment pending additional reviews.

##### CONCLUSIONS

Excellent sensitivity and selectivity in a classy, compact package make the ICF-S5W an attractive choice in the DX portable field. It consistently gave the best reception of distant domestic stations of any of the portables tested and provided creditable signals on the foreign splits. Its principal drawbacks included susceptibility to spurious responses, relatively short battery life, and inconvenient circuit board placement. The performance of the Sony ICF-S5W should appeal to a large number of DX'ers and the unique Zone Dial will make it a collector's item in the future.