

# WASTEGUNNER ON A 525

A Dirty Elbows DX'ers View of Japan's Current Best DX Machine

John H. Bryant

How well I remember the day.... I had some spare cash at the same time that the Japanese Radio Corporation was bringing out their long awaited successor to the vaunted NRD 515. Did I hesitate? Heck, no! Before the unexpected windfall check had even cleared the bank, I had that sucker on order! Ended up having to wait almost six nail-biting months before "my" 525 made it across the Big Water, but it was worth it.

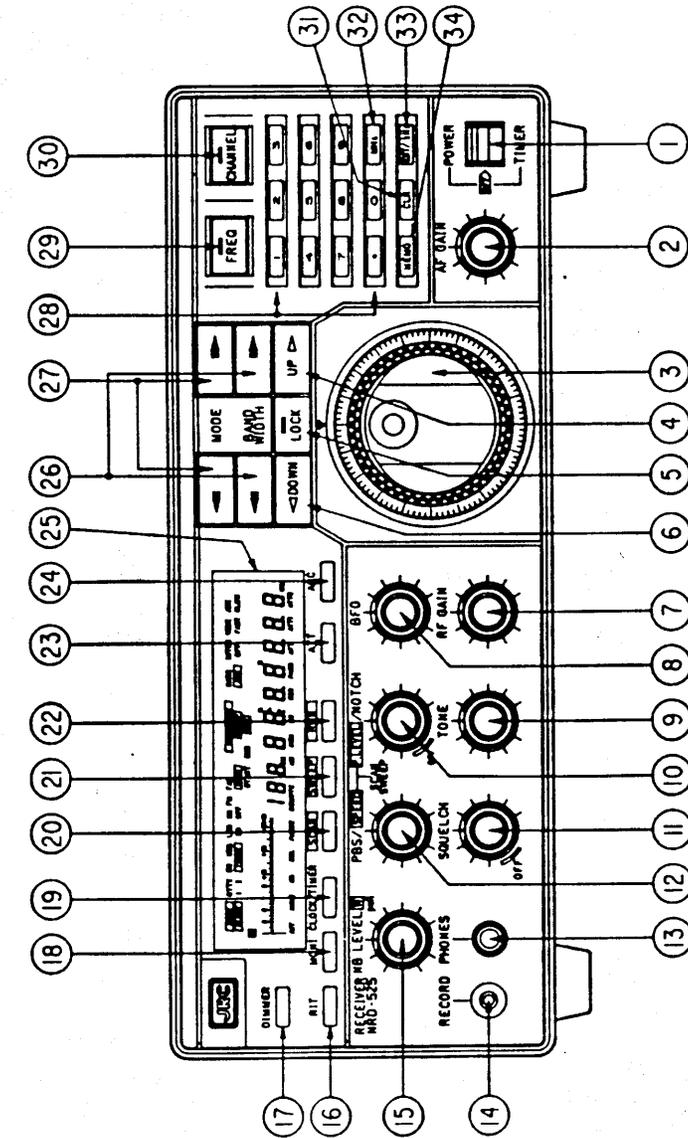
Let me say right now that if you are considering the 525 and haven't yet read Larry Magne's full White Paper review, get one immediately. I am a great admirer of Mr. Magne and of his contributions to the shortwave scene. I would never purchase a radio without knowing, in detail, what Larry has to say about it. With that out of the way, I must confess that, after operating the 525 for close to 1000 hours of pedal-to-the-metal DXing, I differ with Larry over many points, some of them fairly major. Larry's White Papers are available through most of the hobby outlets.

My own credentials: I started DXing while in high school in the 1950's, using a WWII rig - BC something or other. I soon moved up to a Hallicrafters SX-99, and split my time between SW and MW for about five years of serious DXing. When I hit college in 1959 (architecture), DX went out the window. Between 1960 and 1980, I passively kept up with the hobby. In 1980, I got back into SWBC DX in a serious way, using a Sony 2001 and a Yaesu FRG 7700 with Collins mechanical IF filters. The 7700 was my main rig until the 525 came out of its carton. In DXing SWBC since 1981, I have 200 Countries Heard and 184 Countries Verified on SWBC. For several years now, I have specialized in the Pacific, Southeast Asia, and China, with special emphasis on Papua New Guinea and most of all, Indonesia. All of that means that I spend a lot of time crawling around on my knees on the noise floor of my receiver looking under rocks to see what crawls out. It also means that all of the DXing that I really care about is compressed into the 45 to 60 minutes of "dawn enhancement" conditions each morning. Therefore, I care a lot about efficiency of operation - on the few times a season that the Sumaterans make it to Oklahoma, I DON'T WANT TO MISS EVEN A SINGLE ONE. Finally, I am a relatively non-technical DX'er.



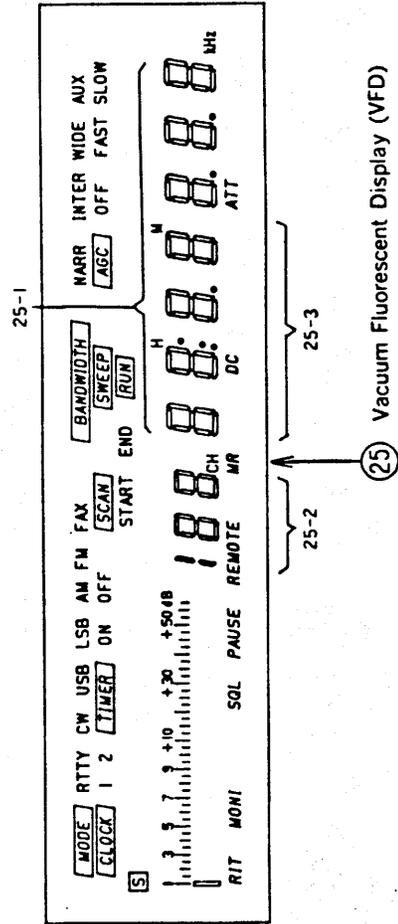
Nomenclature

(While reading the text, you may refer to this page for identification of parts from time to time.)



Front panel

- (1) POWER/TIMER ON-OFF switch
- (2) AF GAIN control
- (3) TUNING control (This control also works as RIT control when characters "RIT" are on.)
- (4) UP switch
- (5) LOCK switch
- (6) DOWN switch
- (7) RF GAIN control
- (8) BFO control
- (9) TONE control
- (10) NOTCH control (It also works as P LEVEL (pause level) control during scan or sweep reception.)
- (11) SQUELCH control
- (12) PBS (pass band shift) (It also works as the SPEED control during scan or sweep reception.)
- (13) PHONES jack
- (14) RECORD jack
- (15) NB LEVEL (noise blanker level) control
- (16) RIT switch
- (17) DIMMER switch
- (18) MONI (monitor) switch
- (19) CLOCK/TIMER switch
- (20) SCAN switch
- (21) SWEEP switch
- (22) RUN switch
- (23) ATT (attenuator) switch
- (24) AGC control
- (25) Vacuum Fluorescent Display (VFD)
- (26) BANDWIDTH switch
- (27) MODE switch
- (28) Numerical keys
- (29) FREQ (frequency) switch
- (30) CHANNEL switch
- (31) CLR (clear) switch
- (32) MHz switch
- (33) ENT/kHz switch
- (34) MEMO (memory) switch



(25) Vacuum Fluorescent Display (VFD)

## ● THE DOWN SIDE

When the great day arrived, and IT came out of the box, my first reaction was "Oh darn! I just paid \$1200 for a Bearcat!" The now "outdated" 515 has a wonderful, no-nonsense, solid professional look about it. The 525 has that somewhat plastic look of most current mid-priced shortwave receivers. I understand the designer's desire to save money on aesthetics and spend them inside the case, but do we really need six colors on the operator's panel? Decor by the worlds oldest profession!

The next disappointment, this time a very major one, was the Owner's Manual. As it happens, I have some insight into this situation since I speak some Japanese. This manual was poorly written in the original Japanese. It was then given one of the least professional translation jobs that I have ever seen. Very unprofessional all around. It makes operating a very complex receiver even more difficult.

The less than mediocre manual is really a serious complaint in some instances. For example: The design engineers thoughtfully provided a shaped female plug for the 12 v DC power input, so that we wouldn't zap the rig by reversing DC polarity. Out of the plug come red and black wires. The designers even provided an integral fuse on the red leg. If I was guessing, I'd guess that red was positive. NONE OF THIS IS DISCUSSED IN THE AWFUL MANUAL. When I went on my first DXpedition with the 525, I had to GUESS that red was positive. (IT IS!!!)

The Manual left me unsure about many things, including how to operate the PBS control and other aspects of the radio. Based on the manual, I'm not even sure whether the 525 employs synchronous detection OR NOT!!! There is just no excuse for this and I do not know why our major vendors and our major reviewers don't address things like this publically.

Well, to get past the Manual, lets fire the thing up. In his original White Paper, Larry spent quite a while lauding the audio quality of the 525, (since modified in the 2.0 version of the Paper) especially when compared to the R-70 and R-71. Boy, the ICOM drivers must be in deep trouble! All in all, using the 525 in the AM mode with the matching speaker, or any other that I own, the audio is mediocre. Too bassy, but not as much as most rigs from Japan seem to be. There is also a good deal of high pitch wide band hiss of the sort usually associated with the cheapest audio amplifiers. Beyond that, things seem to be very muffled on anything but the strongest signals, when using the AM mode. This is a particular problem when you deal a lot with weak Indo's, since the Malay languages are muffled to begin with. Don't misunderstand, I'm judging audio quality while using a first-rate external speaker. The internal so called "speaker" gives poorer performance than whatever is in Texas Instruments "Speak and Spell" toy! Thank goodness, when I'm SWLing rather than DXing, I've got a SONY ICF - 2010. It provides far superior audio in three different detection modes at 1/3 the price. This is really a serious fault if you care about actually hearing the ID on those weak stations which mostly operate with old studio and transmitter equipment. JRC could do much better, and at very little extra cost!

To report the whole audio truth, though, the story is very different when using suppressed carrier SSB mode. The 525 must have truly superior SSB circuitry. I've never heard audio of this quality from the duck-talk bunch! When I was following the Voyager I flight, it was like I was in the cockpit with Dick and Jeanal! Course, the quality of avionics may have had something to do with that, too. However, serious DXers should note that many 525 owners find the receiver most sensitive to weak signals in the AM mode, the reverse of the situation with the 515.... thus making audio quality in the AM mode even more important.

After six months of gritting my teeth about the audio, I bought a set of \$70.00 JRC ST-3 headphones. Wow! They made night and day difference! These particular headphones improved speech intelligibility significantly. I wish that I could be as complimentary about the matching speaker. No way! It's a cheap little speaker in a matching case with the same awful audio!

The ergonomics of the 525 also leave much to be desired. Ergonomics, in this case, are taken to mean how well the front panel and the general receiving system are designed to interface with us human beings. This is something that I know a good deal about as an architect and some-time industrial designer. It is true, on the grossest level that the major controls are in the locations that you would expect. The keypad is on the far right side. The numerical frequency read-out is more or less near the center of the receiver, the knobs are large enough and far enough apart to grab, and the main power switch is on the

lower right. Beyond that, the ergonomics of this rig are absolutely ABOMINABLE.

To wit: First, I **do not** think that any machine, other than a true portable (THIS IS A TRUE TABLE MODEL RADIO, GANG) should have a keypad on the front panel. It's simply unnatural for the human hand to punch something in to a vertical surface. If this were not so, all typewriters and computer keyboards would have vertical rather than horizontal keyboards. Put the keypad on as a remote hooked by cable to the front face, or step into the mid-1980's and remote it with infra-red. Pulling the keypad off the front face would give the designers enough room to do some other things which badly need attention, as well.

If JRC designers must put the bloody keypad on the front face, at least they should have had enough regard for their customers to provide either soft keys or rounded off hard ones. Instead JRC carefully selected hard, sharp-edged keys with front faces sloping about 15° from vertical. If your hand happens to hit the key at the correct angle, it's fine. However, most of the time, my fingers hit wrong and it's about like punching slightly dull knives. Is this a serious design flaw? Putting the keypad on the front face at all certainly is. The shape and hardness of the keys is merely a pain in an already sore posterior.

Next, let me complain bitterly about the general design of the 525's information output to the system operator. This is the area of receiver design where the project team is supposed to be concerned about letting the operator (customer) know about the general conditions of the receiver - what frequency it is on, what mode of detection, etc. This area of concern is absolutely critical for the successful design of a DX receiver, especially one which is so ultimately flexible. It is essential that the operator know - in a flash - the status of every controllable aspect of the receiver. In those rare "super" conditions, or after literally waiting for years for one special signal, two seconds is 8 to 10 words missed, if you are in the wrong mode. With the 525, this happens far too often. What's more, even under normal conditions, the operator is left with eyes wandering around all over the place with unsure fingers following. If JRC is involved in any work for the Self Defense Force, I hope that this design team does not design the avionics for the next generation of Japanese fighter aircraft. Blown out of the sky 'cause the poor guy couldn't find out what was happening in any reasonable amount of time!

I know one of the things that happened to the design team, because it happens to me as an architectural designer. I sometimes wait for years wanting to do something - some new wrinkle - and it's just not yet technically feasible. Then, suddenly, it is technically feasible, but it - this new widget - is still way outside any possible project budget. Tremendous frustration! When the widget's price finally drops so that the thing is suddenly economically feasible, too, IT DOESN'T MAKE THE LEAST DIFFERENCE WHETHER THE CURRENT PROJECT REALLY NEEDS THIS WIDGET OR NOT, I USE IT! I've waited too long, the pressures are too great and besides, it's FUN. (Boy! Look what we can do, now!) That is exactly what is wrong with the basic information transfer design of the 525.

The vacuum fluorescent display allowed the design team to "transfer" a lot of information in new ways. Designing the layout must have been fun. Unfortunately, the thing just doesn't communicate well visually. A case in point is the Detection Mode which is controlled by a pair of rectangular touch pads. The information on detection mode is read in the upper right portion of the "screen." To change mode, your eye first roves across the upper right portion of the fluorescent display until you figure out what mode you are currently in, then you shift your eyes 3" to the right, decide which of two switches (up or down) to hit and how many times to hit it, then you perform the operation, then move your eyes back to the screen and search around until you figure out what mode you are now in. Come on fellows! Quit having fun at our expense! Give us one button, not two, to take the thing through the choices. Give us inexpensive little lights right over the button to tell us the story. One eye movement, one hand movement and a more efficient operation. The same argument can be made about filter selection controls, as well. Too many eye movements, too much confusion. BAD DESIGN! This design flaw is particularly serious because the 525 memories carry filter selection and mode along with frequency memory. Great, but when you go to a new memory channel, you have to decipher the screen every time! The inefficiency of this thoughtless design multiplies and cannot be defeated by "learning the receiver."

I have three other complaints about the fluorescent screen - one minor, two major. First, the "minor" complaint: Sony gave us a real clock that we could see at the same time as the frequency readout in a \$250.00 receiver. Others have done it for even less. If the design team hadn't been doing mental gymnastics with fluorescent displays, they could have given us one in a \$1200 receiver, surely. A very major complaint in this same

general area is the S-meter, also an integral part of the fluorescent display. What they gave us was a 2" row of white and red vertical stripes and another row below the first, one of which turns yellow as it "moves" across the field of vertical lines. The yellow stripe acts as the S-Meter arm. (Zoweel Takeshita-san, look at what we can do now!) The problem is, this thing is digital and seems to respond to any QRN within 3000 kilometers by jumping all over the dial! The darn thing looks like a cricket dropped on a red-hot plate. It is absolutely useless as a meter, at least when using fast AGC in the AM mode.. A normal old-fashioned analog meter damps out most of the effect of distant QRN and, because it is electro-mechanical, gives us an average reading that means something. Anyone who is even nearly crazy enough to consider paying a JRC dealer \$1200 for this pile of aluminum and plastic knows that S-units are virtually meaningless. However, any design team assigned this task by a reputable manufacturer should know that using a working S meter is the only way to peak up the receiver's systems for a particular signal. Even more importantly, it is the only way short of test bench equipment, to peak up peripheral equipment like antenna tuners and such for a particular frequency and signal. Your excitement over fluorescent displays has robbed us of one of the essential pieces of gear to run the receiver. Thanks a lot fellows!

This flaw should cause JRC to offer their project manager the chance to apologize in the traditional fashion. You simply do not offer the public a \$1200 receiver without a working S-meter - a piece of gear that is essential to its operation. At least you don't at the top end of the market and maintain any customer base.

The last items on information transfer: The two most common operator errors are leaving the PBS tuning control off-center while tuning to a new signal and then forgetting that it is not in the normal position. Boy, that would knock a few units off the S-meter, if you could read it! The second most common error is doing the same thing with the IF notch filter. Have you ever tried to DX on the noise floor with your IF notch centered and the PBS shifted clear to one side? You can hardly hear a thing down there under those conditions! I've committed one or both of these operator errors plenty of times. JRC: Give us a knob that makes it very obvious where the control is positioned on these two functions or put a cheap little light over the knob which lights up when the control is NOT in the default position. This one was easy to predict and solve during design.

Just a three more major complaints: First, the IF filters are very mediocre! Two things are wrong (the two main parameters of filters, of course): Filter Width and Shape Factor. As it comes from the factory, the 525 provides a 4khz filter (@ 6db, 10khz @ 60db down) in the WIDE position and a 2khz filter (@ 6db, 6khz @ 60db) in the INTER position. The intermediate filter is marginally acceptable in true SSB, but it is too narrow and at the same time, too mushy with ECSS techniques. It is almost useless in AM mode. The WIDE filter is, of course, useless in SSB and is so wide that it is only useable in AM mode with the VERY strongest signals. With any thing less than the strongest signals, the wide filter lets all sorts of QRM under the filter skirts from both sides. Customers have every right to expect at least one filter which is sized properly for standard AM reception with normal level signals. Either a 3khz filter with the same shape factor or a better filter at 4khz would have been appropriate. The filter width selection indicates a shocking lack of knowledge of general DX and SWL use of a receiver. Selecting the proper width has nothing to do with manufacturing budget constraints.

The Shape Factors of the filters are pedestrian, at best. I will admit being absolutely spoiled by the Collins mechanical filters in my previous rig. However, these now retail for about \$150 each, so I am sure that the design team could not afford them in their budget. However, what we have in the 525 is Ford filters in a radio that purports to be a Bentley or a Lamborghini. Come on JRC! At least you could have provided us a choice of filters at the time of purchase.

Sherwood and Magne attribute the pedestrian ultimate rejection figure not to poor IF filters, but to "cross coupling of the matching networks of the IF stage..." My own feeling is that both factors contribute to the degradation of ultimate rejection. My Collins filters, now installed in the 525, make a clear and noticeable improvement in this area of performance. Some recent experiments, by ESKAB/EDVIS among others, suggests that simple add-on shielding of some components can also add significantly to ultimate rejection. This leads credulity both to the Sherwood/Magne statement and to the idea that both the filters themselves and the shielding are less than optimum.

Another serious complaint concerns the design of the SWEEP function: The design team thoughtfully gave us the ability to define a lower and an upper frequency limit and then sweep between them automatically. You can fully control the speed of this sweep

from a few kilohertz per minute to blindingly fast, and you can stop the sweep manually or with a fully adjustable squelch control. Marvelous, stupendous! Just what I always dreamed about! What most MW & SWBC DXers would want to use this function for is to throw the thing in USB, turn the squelch off, control it manually, watch the frequency counter and listen for unusual whistles. This is particularly useful when wanting to search quickly when a band is fading in or out or when looking for "split" frequency signals on MW. The only problem is that in the SWEEP mode, the receiver only tunes in one KHZ increments. Many carriers are too weak and narrow to even appear in a one khz sweep! This thing may work very well for marine radio uses -- JRC's real forte. The tragedy is, there are plenty of other modes of this receiver which tune in either .1khz or .01 khz increments - meaning that the 1.0 khz increment probably is a simple wiring decision by the designers. This decision more than any other convinces me that no one on the design team has ever been a serious DX'er. After a season of using the SWEEP function, I must admit that I've never missed a signal which was strong enough to give me audio. However, I have missed a bunch of "carrier hetrodynes" - the very weak signals which I would like to know about to make all sorts of DXing judgement. This wiring decision seriously flawed what would have been a superb DXing attribute of this receiver. What a shame.

The final complaint is only of major concern to some MW DXers. As has been reported in the MW press, some 525s (most???) do emit some Radio Frequency Interference (RFI). I rush to point out that this interference is detectable under very special circumstances: at least one MW DXer has reported picking up serious levels of RFI when using an amplified ferrite core loop antenna which was sitting directly atop his 525. Although I don't own such a loop, I was able to trace the RFI using the meter long whip of a highly amplified active antenna. I found the noise by placing the whip directly against the fluorescent screen of the 525's front panel. The digital circuit noise, running from MW to 5 MHz, was not detectable even one foot away from the front panel. The noise appears to come from a single integrated circuit located on the circuit board directly behind the front panel. Possibly additional shielding could be added around the offending component and solve the problem quite nicely. In fairness, let me re-emphasize that I have NEVER detected this noise when DXing even with bare wire antennas running directly to the rear of the receiver. This is true even on medium wave where I only DX with Beverages.

So that's about it on the "down-side". Do I like my \$1200 aluminum and plastic Bearcat? Can you read English - I hate the darn thing! But just a minute....ask me if I love it! Is the sky blue? If my beloved wife of 25 years were held and the 525 was the ransom demand, would I swap? I'm not real sure. I know that I'd negotiate like crazy and stall as long as possible, but ultimately I'd probably give up the 525 to recover the spouse. Why do I love this awkward, semi - useful, screwed-up excuse for a top of the market receiver? Well, let me tell you!

## ● THE UPSIDE

### A) GENERAL CONCEPT OF THE RECEIVER.

JRC deserves real accolades for being courageous enough to adapt the "plug-in" modular circuit board concept long used in military and computer gear to the shortwave receiver market. The advantages of this approach to the OWNER/OPERATOR are numerous and rather obvious. The most obvious advantage is that the concept, and the provision of extra board slots, allows us each to partly design our own receiver, rather than relying on sometimes questionable "after-market" modifications. JRC has already provided boards to give us a super UHF scanner, if we wish, and has also given us the first internally mounted RTTY demodulator in receiver history, if we are into UTES. They have also thoughtfully provided a computer interface for true automated reception, if someone would develop the software. The plug-in modular board concept also allows JRC, if they wish, to bring out up-dated replacement boards - at a tidy profit - to keep the rig up to the state of the art of receiver design. Finally, the modular concept also allows smaller, specialized manufactures to bring out after-market boards, as well. ESKAB-EDVIS from Denmark brought a PLAM board out for the 525 in 1988. This board, already available in a non-modular fashion for a few other receivers, offers PLL synchronous detection and

several other important circuit improvements and is reviewed elsewhere in Proceedings 1989 by Chuck Bolland.

## B) RECEIVER STABILITY

JRC is known throughout the industry for producing rock steady receivers. The frequency drift of the receiver is rated at 3 parts per million. I don't know what that means in useful terms. What I do know is frequency drift, always a worry in even the most recent generation of solid state gear, is a thing of the past with the 525. Even reading down to the .01 kilohertz (as in 4973.07 khz), I simply flip the rig on, set the dial and FORGET IT! This degree of frequency stability is super for timed and tape recorded reception, when I'm not around. It must be really super for the UTE gang. I'll bet that this is the first receiver that they can use to monitor RTTY on a crowded band in the timer mode. THANK YOU VERY MUCH, JRC!

## C) CONTROLLABILITY

The HQ - 180A is still a highly prized receiver, even though it is "hollow - state" and has not been produced since 1970. The main reason for the level of reverence given these HQ's is the fact that an operator can almost redesign the circuits of the receiver from the front panel to fit the particular reception needs of the moment. The NRD-525 is the first "modern" receiver to attain this same level of controllability. The operator can modify just about every single important parameter of the receiver's circuits right from the front panel. It is even possible to change the output level of the "Record" output without having to open the case. WOW! This level of controllability is very thoughtful and very useful to the serious DX'er!

There is a negative aspect to all of this flexibility, however. There are so many knobs and buttons and so many configurations of the receiver possible that "operator error" becomes a serious factor, as does the long learning curve that most of us have to go through before we can get the very best out of the 525.

I might add that this thing is so flexible that it is even possible to confuse the 525's own microprocessor. There is some sequence of knob twisting and button pushing that freezes EVERY control on the front panel except (THANK GOD!) the main power switch. It is **not** the LOCK button. The sequence is complex enough that I have only hit it about once a month or so. JRC's designers have even provided for this eventuality. If you confuse the thing so badly that it "goes on strike," all you need to do is cycle the power switch off and back on! The receiver then defaults into a normal reception mode and you are back in business. A bit scary, to say the least!

In the general area of Controllability, the JRC design team and management also deserve real credit for providing total control of the AGC (Fast, Slow and OFF) as well as providing the IF notch filter. I only wish that they had also provided an AF notch, as well. There are many conditions where the IF notch will just not get rid of a het, but an AF notch would.

## D) EXTENT, DESIGN AND SCOPE OF THE MEMORIES

Two hundred memories may seem like overkill to folks who haven't been exposed to a receiver with any memories at all. Let me tell you, after using this thing for three years, I'd really like to have 1000 memories set up like the 525's.

Unlike the first generation of receivers with memories, the 525's memories store much more than just the frequency when you input to Memory. Each channel records frequency, mode (AM, FM, USB, LSB, etc) IF filter width (Narrow Intermediate, Wide and Auxiliary), AGC and attenuator settings. Further, when you access a different memory channel, you basically "pole vault" the entire receiver to the new frequency. All controls including the main VFO, driven by the tuning knob, are brought to and are active on the new frequency.

This memory ability can increase operator efficiency enormously. For example, I have a band scanning pattern which I use at the beginning of dawn enhancement each morning, looking for Indo's. I start at 2360 (hit memory 100 to get there) and band scan manually to 2500. I then hit 1 up on the memory button to check 2582 khz, which is stored on memory 101. I then almost immediately hit memory up again several times to check each of several scattered out of banders "located" on memories 102, 103, and 104. Memory

105 remembers 2900 khz for a scan continuously to 3405. Then I hit 1 up in memory to skip on up the band. Basically, using ten memories I can link together just those parts of the tropical bands that I know to contain potential Indo's which I am after. I tune continuously with one hand and punch the memories with the other. With the 525, I can cover the Indo zones in less than a minute during peak conditions. If I hit something which might be interesting, I **do not stop**. I simply pause long enough to store the frequency in my "active file" (memories 1 to 10). When I have completed the scan, I then evaluate the three or four hot prospects now filed in the active file and get down to serious Indo hunting. The point is that, at peak conditions, I can evaluate the entire situation in less than 2 minutes and then go for the best! I don't know of another receiver that would enable me to do this...

When I decided to also go for the active Bolivians last spring, I used the memories in a completely different way. I programmed each of forty - odd Bolivian stations into memories 150 to 193. When looking for the Bolivians, I simply started at memory 150 and went up the memories one at a time, manually. Over the weeks, as I heard/reported various Bolivians, I would simply mark that memory off my chart and "punch through" that position as I went up the memories. Of course, I could scan those memories using the SCAN function, but heck, a fella has to do some work or he feels like he's not even DXing!!!

#### E) TUNING RATES AND INCREMENTS

Although it may seem a minor point, I really like the tuning rates - both of them! As far as I know, no one has mentioned, in print, that changing the Tuning Rate changes the Tuning INCREMENT. At the 20 khz per revolution Rate, the Increment is .1 kilohertz - plenty fine enough for most general uses, and on SSB you get that "bagpiping" that many of us love. At the 2 kilohertz per revolution rate, the increment is .01 kilohertz - must be super for the UTE guys! Besides, in SSB, it sounds just like an analog receiver!

With all of what I consider to be very serious complaints about operator efficiency, serious design flaws in information display and input/output efficiency, this darn thing is almost a miracle in getting me around a lot of band in a very flexible and sophisticated way and, most of all, in a heck of a HURRY! The Operator efficiency of the 525 is truly very high compared to any other receiver with which I am even marginally familiar.

#### F) HEARABILITY

The engineers and manufacturers have co-opted the word "sensitivity" to mean a specific set of measurements which are really only part of the story of how well you can hear weak signals with a receiver. Some well meaning folks suggest that we make up our own word "hearability." Instead, I'd suggest that the engineers give Mr. Webster and the rest of us our word back. (I contend that "gay" means happy and joyous, too!)

Thus having defined terms, I am very pleased with the "useable sensitivity" of the NRD 525. I have not measured it against the highly modified versions of the R-70 (a'la Don Moman) but I did operate my 525 for a season in parallel with the HQ - 180A (a'la Steve Bohac), and the 525 tied or won every sensitivity battle. It is far more sensitive than any of the other receivers that I have used. Except for the noted audio hiss, it is an inordinately quiet set. The ratio between QRN and signal level seems excellent and, bluntly, I can hear things with the 525 that most other radios can't touch and thanks to all the automation, I can hear more of them - and the best of them - in those few fleeting minutes of truly exceptional conditions.

Am I sorry I bought this \$1,200 Bearcat? No Way!! Would I recommend it to other "general" SWBC DX'ers. Yes, but only if they clearly understand that the rig has serious design flaws as well as tremendous capabilities.

Aw well, I suppose most Bentley or Lamborgini owners have things that they gripe to each other about, too.

● POST SCRIPT:

In the two years since I began this review, I have managed several modifications to the NRD-525 which have addressed many of the complaints voiced in the first part of this review:

A. The continual errors of DXing with the PBS and IF Notch controls misplaced was largely solved very simply. I got some two small bottles of modelers enamel, one bright yellow, on "fluorescent orange". The NRD knobs have a small part cylindrical valley at the "top" of the barrel of the knob to denote where the knob is pointed. The PBS knob valley is now bright yellow, matching some of the rest of the front panel... it draws my attention, each time I visually sweep the front panel. The IF Notch knob valley is now glowing, vibrating orange. Thankfully, it is normally out of sight, being rotated down unless I am actively notching something. No more operator errors in this area.

B. The resident genius with a soldering iron at Universal Shortwave, Dwayne Jones, was kind enough to tap into the AGC board. He grabbed off the AGC current and ran it out the back to an outboard 3" diameter milliamp meter. VOILA, a working signal strength meter!!! I would caution the reader that this modification ought only be done at Universal, since they are an official North American repair center for JRC. Even when done at Universal, this mod may void the Warranty.

C. While the 525 was at Universal, Dwayne pirated a 1.9 khz and a 2.9 khz Collins top-of-the-line filters from my old FRG-7700. Oh my, what a difference! Absolutely wonderful! 'Course, at \$150 per filter, they ought to work. I recommend this modification very highly.

D. The AGC mod developed by Craig Seigenthaler of KIWA Electronics and described by G. Atkins in this volume has really improved the performance of my 525 , as well.

E. Just as this review was going through final editing, I received my MAP unit. My, what a difference!!! Audio like the angels must hear and a smidgen more useable sensitivity or hearability or what ever, too. I understand that Chuck Bolland feels the same was about the ESKAB/EDVIS board as well. Both are reviewed elsewhere in Proceedings 1989.