JAPAN RADIO NRD-515

Sales Department, Japan Radio Co., Ltd., Mori Building Fifth, 17-1, Toranomon 1-chome, Minato-ku, Tokyo 105, Japan; Tel: (03) 591-3451. Details on overseas liaison, sales, and service facilities available upon request. Suggested Retail Price (USA): US$1,399.00. Warranty (USA): Warranty and service conditions established by individual dealer or distributor. Accessories: NDH-515 24-channel memory unit (US$249.00); NDH-518 96-channel memory unit (price not established); NVA-515 speaker (US$44.95); nominal 0.6 kHz bandwidth filter (US$49.95); 0.3 kHz bandwidth filter (US$74.95).

HIGHLIGHTS:

Advantages: Combination of up to 96 channel memories, frequency slewing, MHz/kHz knob tuning, and analog fine tuning (RIT) make for unusually versatile and easy operation. Very good and unusually well-balanced listening and DX performance throughout the SW spectrum and most of the MW spectrum. Very good dynamic range. Very good skirt selectivity. Very good physical and electrical stability. Passband tuning (SSB/CW modes). Noise blanker somewhat effective against Soviet "Pulser". IF output. Reportedly capable of incorporating Sherwood SE-3 product detector.

Disadvantages: Limited number of voice bandwidth filter values. MW preselector operates only from 0.6 – 1.6 MHz. Reduced MW sensitivity between 1.55 – 1.6 MHz. Fine tuning (RIT) control does not alter frequency readout. Circuit aging necessitates realignment after initial period of use. 0.1 kHz synthesizer resolution produces "bagpiping" during SSB/CW tuning (except with RIT). Signal meter performance suboptimal. No heterodyne rejection facility. Reversible top cover. Plastic front panel easily scratched. No factory warranty.

Overall: The Japan Radio NRD-515 incorporates a well-balanced design which results in very good SWL and SWDX performance, generally superior MW performance, and yet with unusually easy and flexible operation.

The Japan Radio NRD-515 incorporates a combination of features and performance that makes it one of the most versatile communications receivers available. Consequently, it has become a favorite of serious SWLs. It also performs commendably as a DX receiver; only the Drake R-7A scores better in the semi-professional and popular categories.

The NRD-515 is synthesizer tuned conventionally via a large MHz knob, with detents, complimented by a single-speed (10 kHz/revolution) continuous-turning kHz knob to cover the 1.0 −999.9 kHz range within each MHz segment. To compensate for the lack of variable-speed kHz tuning, a frequency slewing switch is included for rapid tuning; when activated, this facility automatically tunes over 100 kHz/second. The synthesizer tunes in 0.1 kHz increments, which results in a minor annoyance, popularly known as "bagpiping", whenever the BFO is on during tuning (e.g., for SSB/ECSS/CW reception; "bagpiping" results from incremental, rather than continuous, shifts in frequency, and thus in beat notes between the receiver's BFO and transmitted carriers). The analog RIT ("Delta F") control allows for fine tuning between 0.1 kHz points—a necessity for proper reception of SSB/ECSS signals. Unfortunately, the RIT, which tunes ±3.0 kHz, does not adjust the frequency readout to indicate the correct received frequency. Additionally, the NRD-515 may be equipped with an optional outboard memory unit that stores up to 24 channels; another memory unit (not tested), currently available in Japan, stores up to 96 channels. Indeed, the only tuning device not present on the NRD-515 is of the touch-pad variety.

The NRD-515's synthesizer is generally free from the significant "birdies" sometimes found on fully-synthesized receivers. Exact MHz "pips", often found on synthesized receivers, are completely absent on the NRD-515. The synthesizer is unusually good for a receiver in this price range.

Also good is the NRD-515's dynamic range, which is only slightly less than that of the Drake R-7A. For all practical SWL/DX purposes, overloading does not exist (however, just to be sure, a 10/20 dB attenuator is front-panel switchable). The combination of good dynamic range and slightly reduced MW sensitivity makes overloading almost equally absent for MW DXing.

The standard NRD-515 comes equipped with two voice bandwidth filters—measuring 4.7 kHz (nominally 6.0 kHz) and 2.2 kHz (nominally 2.4 kHz) @ −6 dB. This is adequate for many applications, but pales when compared with the Drake R-7A's choice of up to five voice bandwidths. This lack of bandwidth flexibility is the NRD-515's most pressing drawback; fortunately, it is largely rectified in a modified version (cf. Japan Radio NRD-515/Gilfer, following). Two CW filters are available as options: 0.7 kHz (nominally 0.6 kHz) and 0.3 kHz (not tested). The NRD-515's filters are a mixture of types: the 4.7 kHz is a hand-selected ceramic, the 2.2 kHz and 0.7 kHz are mechanical (Kokusai), whereas the 0.3 kHz is crystal-lattice. All filters tested perform well.

The NRD-515's noise blanker, which is included as standard equipment, acts marginally acceptably against ignition and related pulse noises. However, what makes this noise blanker appealing is its relative effectiveness in reducing interference from the notorious and omnipresent Soviet "Pulser" OTH-b radar. The NRD-515's blanker sometimes reduces "Pulser" interference in excess of 20 dB—a very real help. As the equivalent U.S. "Hum" OTH-b radar system has not been found to disrupt shortwave communications or broadcasts significantly, blanker efficacy against these signals is moot.

Two AGC release times, plus off, allow for reasonable flexibility; only the Racal and Drake models offer a wider choice. Overall AGC performance is satisfactory. The signal meter, which is calibrated in "S" units and dB over S-9, does not commence reading when weak, but audible, signals are being received; once readings commence, the meter rises rapidly to just above S-9, at which point readings begin to become somewhat more accurate.

As compared with the Drake R-7A and R4245, the NRD-515 operates with relatively low distortion in narrow AM bandwidth positions, even with the "fast" AGC switched in. As a result, those who tune conventionally tend to find the NRD-515 more pleasant for listening. The accessory speaker is well-balanced to reduce the NRD-515's tendency to produce bassy audio.

On the other hand, the NRD-515 (and, indeed, all other non-Drake receivers tested) does not utilize synchro-phase AM detection. Consequently, the only means by which AM mode signals may be received one sideband at a time is via ECSS tuning (for details, refer to the report on the Drake R-7A). The NRD-515's ECSS performance is not outstanding. However, unlike the Drake R-7A, the NRD-515 is exceptionally stable—even more so than the Drake R4245. This all but eliminates retuning during ECSS reception. The Sherwood SE-3 phase-locked AM detector is to be made available for the NRD-515 in the near future to allow for what should be improved-fidelity ECSS SWLing. As the SE-3's BFO injection level is to be controllable, it should allow for better ECSS results than are obtainable with the NRD-515's existing level of BFO injection.

MW reception is very good, thanks in part to the inclusion of a tunable preselector. Although this complicates MW tuning and injects minor circuit losses that reduce sensitivity slightly, the preselector does diminish the possibility of spurious responses. Unfortunately, the preselector does not operate below 0.6 MHz. From about 1550 kHz to exactly 1599.9 kHz, sensitivity slopes off, even though the preselector continues to peak.

The analog CW BFO offset is variable (±3 kHz) and tuned via a front panel knob which also serves to control the MW preselector. Accordingly, between 0.6 −1.6 MHz, when the MW preselector is automatically switched in, the CW pitch becomes a function of the preselector setting. Of course, there are no CW signals in this range. However, MW DXers accustomed to utilizing a "centered" (non-offset) BFO to zero-beat for exact frequency readings must utilize, instead, either the LSB or USB setting, with the passband tuning slightly offset, to mimic what ordinarily would be accomplished via the CW setting.

ECSS/SSB reception is aided by the NRD-515's passband tuning control. As the NRD-515 does not utilize synchro-phase AM detection, the passband filter does not function for conventional reception of AM mode signals. The NRD-515's passband tuning, unlike that of the Drake R-7A and R4245, is not expected to function when the SE-3 accessory is in use, according to Sherwood Engineering.

RF (static) protection is provided by four arrester diodes. Although these are a valuable safety feature, they may precipitate cross modulation when the receiver is used in areas of high signal strength. The instruction manual gives directions on how to remove these diodes. This is a risky alteration unless accompanied by the use of substitute RF protection via one of the few such de-

vices available that will not also induce cross-modulation (for further information on RF static protection, refer to "Japan Radio NRD-515/Gilfer").

The latest production versions of the NRD-515 incorporate a limited-period (less than one day) frequency "keep alive" that allows the receiver to be switched on to the frequency that was last tuned when the set was switched off. For longer-term "keep alive", Japan Radio has recently revealed that an internal battery may be installed. Japan Radio offers no parts for this, and the instruction manual's procedure on how to effectuate such an installation is not thorough (indeed, the instruction manual as a whole is written in such fractured English that it is difficult—sometimes impossible—to comprehend). Installation is sufficiently complicated to buffalo most nontechnical individuals.

As with the earlier NRD-505, the NRD-515 is prone to circuit aging and drift during the first months of use. The most obvious manifestations are minor frequency readout errors and the need to retune slightly when switching between LSB and USB. After a hundred hours or so of use, the circuitry may be given final realignment.

Unlike the Drake R-7A, but in common with most other receivers tested, the NRD-515 does not incorporate heterodyne rejection facilities. Although the front panel and cabinet are sensibly laid out and attractive, the plastic front panel is relatively easily scratched, and the top cabinet cover on recent production versions may be installed backwards (however, unlike the Drake R4245, which has a similar problem, the NRD-515 runs relatively cool; thermal damage thus is not likely even should the NRD-515's top cover be installed backwards).

The NRD-515, as with the Racal RA6790/GM, contains a rear panel IF output (455 kHz) to be used with a variety of ancillary devices, including the Sherwood SE-3 AM product detector. Unlike the NRD-505, the NRD-515 does not incorporate quick-release circuit boards for ease in servicing; nevertheless, the NRD-515 should not be difficult to service. To date, most "glitches" in individual NRD-515 units have appeared early in the ownership period, thus allowing for in-warranty correction. However, as Japan Radio informs us that they have no overseas factory warranty or service facilities (at least within the U.S.), prospective purchasers of the NRD-515 should ensure that the dealer from which the purchase is contemplated is able to provide a suitable written warranty and has adequate repair facilities.

Although the Drake R-7A may be the *ne plus ultra* of DX receivers, the NRD-515 also has found favor among DXers for several reasons. First, it is easier to operate than is the R-7A. In particular, it is not an "exalted carrier receiver", as is the R-7A, and thus is more familiar to tune for those used to conventional radio designs. Second, the numerous memory channels allow for split-second ID checks on the hour or half-hour. Third, the memory option also allows for *in absentia* DXing. One noted DXer presets "most wanted" frequencies before leaving for work, then has his wife operate the receiver in his absence, taping the output for listening after he returns home (those lacking a cooperative spouse or friend for such assistance should note that the slow synthesizer lock-in time is suboptimal for computer-controlled remote operation). Finally, the NRD-515 and R-7A compliment each other unusually well—ofttimes, one's shortcoming is the other's virtue. It's hard to conceive of a more estimable DX "shack" than one equipped with a Drake R-7A plus a Japan Radio NRD-515 (or, if money is no object, the similar Drake R4245 paired alongside the Rockwell/Collins 451S-1, which is in many respects an upgraded version of the NRD-515).

The Japan Radio NRD-515 is the best performing of the easy-to-operate receivers we have tested in the under-US$2,000 range. Almost anyone can operate it successfully from the initial day of use to obtain enviable reception of distant radio signals. It is a pleasure to use.

JAPAN RADIO NRD-515/GILFER

Gilfer Shortwave, P.O. Box 239, Park Ridge NJ 07656 USA; Tel: (201) 391-7887. Suggested Retail Price (USA): US$1,435.95. Warranty (USA): 90 days. Accessories: NDH-515 24-channel memory unit (US$239.75); NDH-518 96-channel memory unit (US$269.00); NVA-515 speaker (US$44.50); 0.3 kHz bandwidth filter (US$57.00, net); 24 vdc power input (US$25.00).

HIGHLIGHTS:

Advantages (over standard NRD-515): 3.4 kHz bandwidth filter compliments standard 4.7 and 2.2 kHz filters for AM/ECSS/SSB reception. 0.7 kHz (nominal 0.6 kHz) filter included for CW reception. Modified RF protection eliminates possibility of protective-diode-induced cross-modulation when high signal strengths present. Frequency "keep alive" system installed. Units aged and realigned before shipment. 24 vdc power input optional for maritime operation.

Disadvantages: Brief warranty period.

Overall: The Japan Radio NRD-515/Gilfer provides much-needed bandwidth flexibility for improved reception of voice signals, thus eliminating the chief drawback of the standard NRD-515.

Gilfer Shortwave, which has long been in the business of modifying new receivers, has upgraded the Japan Radio NRD-515. The primary improvement, from the viewpoint of most users, is the addition of a 3.4 kHz (@ −6 dB) ceramic bandwidth filter to compliment the 2.2 kHz and 4.7 kHz filters supplied by the factory. Although this brings the total number of voice bandwidth choices up to three, as opposed to five on the Drake R-7A, this is generally adequate, as the NRD-515 does not incorporate the unusual "off tuning" capabilities of the R-7A. The Gilfer version of the NRD-515 also includes the 0.7 kHz (nominal 0.6 kHz) CW filter as standard equipment. For active CW users, Gilfer can install as an extra-cost option the 0.3 kHz crystal lattice CW filter (not tested) in lieu of the 3.4 kHz ceramic filter.

The second significant improvement is that each unit is aged, then realigned and tested, before shipment. This should serve to alleviate the need to return the unit for realignment.

In order to eliminate the possibility of cross-modulation from diode rectification under conditions of high signal strength, the RF protective diodes are disabled. To reactivate RF protection lost via diode removal, a "Transi-Trap" RF protector (Model R-T) is included as standard equipment with each receiver. This device utilizes a replaceable gas cartridge, rather than diodes or a spark gap, to achieve protection against antenna static discharge (diodes, of course, may generate cross-modulation, whereas spark gaps do not provide sufficient protection for solid-state equipment). The Transi-Trap did not generate cross-modulation during high signal strength tests. More importantly, it succeeded in discharging a number of static surges brought about by inductive current from nearby lightning strikes (note, however, that no lightning arrestor should be depended upon to protect against direct lightning strikes; best is to disconnect the antenna entirely, placing the lead-in wire outdoors several meters away; too, should the outdoor power wires be of the overhead variety, the receiver's power cord also should be disconnected). The Transi-

Trap also discharges antenna static commonly built up during local snowstorms and sandstorms.

Gilfer's version of the NRD-515 comes standard with the "keep alive" battery system installed (kudos to Gilfer, but why can't the manufacturer of an item of equipment in this price category include this as standard from the factory?). The battery should be replaced once a year. According to Gilfer, they will retrofit the battery "keep alive" for customers who purchased earlier versions of the NRD-515. For others with earlier NRD-515's, the Japan Radio instructions are as follows: "a cell can be connected to the CMG-62 synthesizer unit, such as TP35 to the + terminal of cell, E to the − terminal of cell. Use a silver-oxide or alkali cell of 3 to 4.5V."

Finally, Gilfer offers a 24vdc power input option (not tested) to allow the NRD-515 to be used in maritime and certain other applications, e.g., in areas where AC power is subject to interruption. Although the NRD-515 is not suitable for rough-useage applications, it is very stable under conditions of physical shock and vibration. Consequently, with the 24vdc input it may be useful for certain light-duty mobile applications.

Gilfer advises that they have made arrangements to import the NDH-518 96-channel memory from Japan. Gilfer also advises that, at present, the warranty for the Japan Radio NRD-515/Gilfer is only 90 days.

The Japan Radio NRD-515 benefits audibly from the Gilfer improvements—notably the added 3.4 kHz bandwidth filter. The standard 4.7 kHz filter provides pleasant audio under clear reception conditions, whereas the standard 2.2 kHz filter produces somewhat muffled audio for most shortwave listeners' ears (although it is fine for DX purposes). The 3.4 kHz filter thus becomes a narrow SWL, as well as wide DX/wide ECSS/wide SSB, filter—generally the most useful on the receiver.