Calibration notes for the JRC-NRD 515

Check-up

These notes are ONLY about frequency readjustment of the receiver. They should be used ONLY when necessary or the performance is not 100%. Some of the adjustments are also sensitive to temperature drift.
For example: the asymmetrical effect from very narrow filters (300 Hz) or more seriously when the exact indicated frequency display does not agree with a good sender.
To test: check in the CW mode, using the narrowest filter, known VLF senders or LW broadcasters Rugby (60 kHz), BBC radio 4 (198 kHz), or others that are probably already frequency locked to a standard. Data on the carrier is NOT a problem. Medium wave transmitters do NOT necessarily have to be exact on frequency, so don’t use them if you are not sure. The indicated reading must agree exactly with zero beat. Tuning to zero beat is NOT needed for the next test, leave main tune in position and choose a nice offset with the BFO pot. and use -10/-20dB switch to set the signal strength to about S9. When you tune up and down a few 100 Hz until the S reading declines 6 or 12 dB; this frequency offset has to be symmetric on both sides of the (zero beat) frequency from the “book”. If the error is only marginal, you can use the delta-f switch to compensate the misreading, and leave that pot henceforward in that position. Setting depends on temperature!!

Set-up

To carry out adjustments a very accurate and calibrated frequency counter is required. Preferably a calibrated professional model like Rhode & Schwarz, Racal/Dana Instruments Marconi, etc. If you are using a self-build version you certainly have to check or calibrate this instrument first before attempting to do ANY adjustment. Even better if this counter is connected to an external locked frequency reference.
Have your receiver and your counter warmed up and stable. If possible feed counter harmonics outside the cabinet and check with zero beat with a standard frequency sender.
If you are not very sure that your measuring equipment is reliable it is unwise to tamper with your receiver frequency settings.

Measuring Probes

It is important that a LOW CAPACITY x10 probe is used. Do not use a x1 probe, as the loading capacity will affect the readings. Preferably use a probe with a build in pre-amplifier with at least 20dB gain. I’m using a self-build pre-amplifier with a fet input (almost the same circuit as an 1 Meg oscilloscope input), gain control with pin diodes and gain stage with MMIC amplifiers and 50 Ohm output drive.

Adjustments sequence

Test-point	measuring what	adjust with	more information
TP15	10.000.000 Hz	CV1	The 10 MHz signal remains stable and does not drift
TP31	70.000.000 Hz	CV2	The 70 MHz signal is very sensitive to temperature drift and adjustment is critical
TP19	5.000.000 Hz	RV3	Mode switch must NOT be in AM mode and PBT exactly in middle of its range. It drifts easily
TP19	5.000.000 Hz	RV4	Mode switch MUST be in AM mode, PBT is then disabled
TP11	38.000.000 Hz	RV2	Delta-f switch MUST be ON and delta-f pot. MUST be exactly in the middle of its range
TP11	38.000.000 Hz	RV1	Delta-f switch must be OFF
TP30	455.000 Hz	RV8	Set mode CW and BFO pot. exactly in the middle, recheck TP19 first for drifting away.
TP30	456.500 Hz	RV5	Set mode USB
TP30	453.500 Hz	RV6	Set mode LSB
TP30	decoder or program dependant	RV7	Set mode RTTY. Adjust the RTTY f = 455.000 – f centre decoder. 1700 or 1750 for Hoka Code3.

RTTY f example: When using (wide) SSB filters and a universal (fixed) tuning for mark: 455.000 – 2125 (old mark frequency for old decoders) or 455.00 – 1275 (new mark frequency)
It is NOT 100% in the centre of the bandpass of the filter, but a compromise.
It suits the settings for 170, 425 and 850 Hz for a RTTY decoder with the old mark-f and when using 600 and 2400 Hz filters and without using the PBT. It becomes 455.000 – 425/2 – 2125 = 452.662 Hz.

Work it out graphically for yourself …….

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