

# THE ESKAB/EDVIS PLAM BOARD

For The NRD-525 Receiver

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How do you turn "good" into better? When you are the proud owner of Japan Radio Company NRD525 General Coverage Receiver, what can you do to improve it? One very good answer - install an ESKAB/EDVIS Synchronous Phase Locked AM and IF Filter Board.

When the NRD525 receiver was first introduced, many reviewers felt that it was lacking because it could not receive in the Synchronous Phase Locked Mode. At the time I didn't pay much attention. After all, I had spent a thousand dollars on my NRD525 which meant that I had the best and there wasn't any need for modifications to improve it.

After the newness had worn off, I began to notice flaws in my NRD525. The first was the continual wideband hissing noise that was present all the time. The only way the hiss could be eliminated was to hook up an RF amplifier and reduce the RF gain on the receiver. This of course, defeated the receiver's excellent dynamic range.

The second problem was the erratic AGC performance. The NRD525 is equipped with a digital "S" meter. In the fast position, the digital meter's indicator bounced all over the place from zero to 10 for a signal which should have been only five or six "S" units. This became very frustrating when comparing antennas or adjusting tuners. I always had trouble. Eventually, I ignored the "S" meter altogether.

Part of the problem with the erratic AGC performance was the distortion that occurred in the receiver when the received signal would peak to a level high enough to put a strain on the AGC. I observed this often. I found I could eliminate this problem by reducing the RF gain a few notches, but com'on, I paid a thousand dollars for this rig!

Finally, even though the NRD525 has Synchronous AM detection, this does not eliminate the distortion that occurs during selective fading periods either in the AM mode or in the Single Sideband Modes (selective fading has been described as when the carrier of an AM signal drops in strength in respect to the side bands).

Comparing these problems with the many positive qualities of the NRD525 should make them insignificant. Even so, there was a group who felt that eliminating them was worth the trouble. That group was ESKAB/EDVIS of Sweden. ESKAB/EDVIS developed an AGC modification kit and a Synchronous Phase Locked AM and IF Filter Board for the NRD525.

## ●THE AGC KIT●

Installing the AGC kit eliminated the following shortcomings

1. According to ESKAB the AGC attack time is much too fast on the stock NRD525 to be of any benefit in the fast mode for either AM or SSB. Short, strong electrical noises - static - causes the AGC to

react drastically and deafen the receiver momentarily. ESKAB claims that with the kit the attack time is changed to 5 milliseconds instead of 0.2 milliseconds in both the fast and slow modes. In this way the AGC does not react on electrical noise pulses anymore.

2. The "S" meter continually overshoots before it settles to its final value. This can be very annoying when trying to judge a signal strength. The overshooting has been reduced by changing the value of R107 (slow mode) and R103 (fast mode) of the AGC circuitry.

3. In the fast mode the AGC is not adequate for either AM or SSB because the response time is too fast. The AGC in the slow mode is more suited for AM and SSB. Therefore, the fast mode has been changed to a "Medium" mode by changing the value of C77 of the AGC circuitry which gives a fall time of approximately two seconds. The slow mode is marginally slower to approximately four seconds. These speeds can be adjusted to personal preference by reducing the values of the components replaced in the AGC circuit which is explained in the AGC kit manual.

4. The AGC voltage in the stock NRD525 is not clean. The cleaning of the AGC voltage has been accomplished with the AGC Kit circuit. This circuit is installed between IC9 Pin 1 and IC9 Pin 5 while in series with R112. Distortion and voltage noise has thus been eliminated.

### ● THE PHASED LOCKED AM CIRCUIT ●

Even though I have owned quality receivers such as the ICOM/R70 and the ICOM/R71A, the Synchronous Phase Locked AM feature in USB and LSB is a new feature that I hadn't experienced before. Some may feel that it is a frivolous addition to a receiver; I used to think that way too: However, since I have modified my NRD525 with the Synchronous Phase Locked AM circuit board, I have come to feel that this feature should have been part of the original design of the NRD525. It greatly improves the over all performance of the receiver.

There may be those who do not entirely understand what Synchronous Phase Locked AM does in the USB or LSB modes. I know I had trouble understanding that from the different descriptions which had circulated around the hobby. In lay terms, this is how I understand it to work: First, when tuning in an AM broadcast signal using the USB or LSB modes (some have referred to this as exalted-carrier selectable-sideband or ECSSB), it is necessary to tune precisely to the center of the signal between the sideband carriers. If this is not done, one will be listening to distorted audio. The audio sounds like "Donald Duck" talking. Sometimes the distortion isn't terribly obvious unless the program is music. Then it sounds as if someone was playing the tune at a slower than normal speed on the turntable. This gives the music a "wobblier" effect. Even with the NRD525, it was necessary to be within a few hertz of the signals center frequency to hear the audio correctly.

Synchronous Phase Locked AM detection eliminates this problem in the receiver. This circuit with its locking feature gives the receiver the capability of tuning a signal in the USB or LSB modes correctly while actually being off tuned by thirty or forty Hertz (ESKAB/EDVIS says thirty to forty hertz, but my receiver locks in at 85 Hertz on either side). So what? Well, in the DX'ers world, the

majority of the stations that are of interest are really quite weak signals. Many times, the stations are so weak while simultaneously being interfered with by other stations, that tuning into the center of their frequency is impossible. So, the DX'er must tune off the center frequency. The Synchronous Phased Locked AM detection system allows us to do this and still hear undistorted audio.

Try this experiment with your receiver. First, imagine an AM signal consisting of three parts. They are the carrier and the two sideband signals which contain the information. The carrier transports the sideband signals. The sideband signals are identical but opposite reflection of each other. To hear the information contained in either of the sidebands using either USB or LSB, it is necessary to tune the receiver to exactly the frequency of the carrier. Now find a signal and tune it as described. After getting it tuned in where it is clear, tune up 20 or down 20 Hertz depending on whether you are in LSB or USB. Notice the distortion? With this detector you do not have that distortion. The ESKAB/EDVIS Synchronous Phase Locked AM circuit produces its own carrier frequency and locks onto the AM signal when you tune within 30 to 40 Hertz of the carrier frequency of the AM signal that is being tuned with LSB or USB. This is a very real advantage when DXing.

For example: suppose two stations are almost on the same frequency. The weaker station is the one you want to log, but because it is being covered by the other station, there is no way of hearing it using ECSSB techniques. With the ESKAB/EDVIS Synchronous Phase Locked AM circuit, tuning off the center frequency a few hertz is possible without losing the weaker station to distortion. Now the two stations should be far enough apart to allow you to notch the stronger station without losing the weaker station. This is not as easy without the ESKAB/EDVIS Synchronous Phase Locked AM Circuit in the receiver.

Besides the Synchronous Phase Locked AM capabilities of this modification, the circuit comes with three options. The first is the basic Option for Listeners. This option is fitted with two filters which are the same band width as the stock filters in the NRD525. The second option is the Broadcast Listeners version. This option has three filters mounted, two the same as the NRD525 stock filters and another of your choice. Finally the last option is the DXers Option. This is the option that comes with four filters; two are the same as the NRD525 stock filters and two are filters of your choice. All these filter additions are in conjunction with the filters already in the NRD525. Therefore, when ordering the board, it is necessary to provide the number of filters in your NRD525, the width of each and in which position each is placed.

The ESKAB/EDVIS Synchronous Phase Locked AM detector circuit board and the AGC kit for the NRD525 is produced by ESKAB & EDVIS, P.O. BOX 32001, S-200 64 MALMOE, SWEDEN. It would be best to write for current prices since it has been over a year since I purchased my board for \$200.

You may wonder how the circuit board gets into the receiver and if soldering is necessary? Yes, you must heat your iron; but with clear instructions and illustrations to aid in installation, it is not difficult. The entire process can be completed in three hours.

I feel that the cost of this modification is very reasonable considering the improvement over the stock NRD525. ESKAB also includes a number of circuit modifications in their correspondence which are easy to make with parts bought at your local Radio Shack Store.

I am very content with my NRD525 now. I feel that I have the ultimate DXing and shortwave listening machine available today, now that it has been upgraded with the ESKAB/EDVIS integrated Synchronous Phase Locked AM and IF Filter Board. I am sure if you install it in your NRD525, You'll feel the same.

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