Noble Radio NRV7 Remote VFO / Station Accessory for the Drake TR-7

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NRV7 Remote VFO Overview

The NRV7 Remote VFO is designed to operate with the Drake TR-7 HF Transceiver. It is a highly stable DDS based VFO that replaces the function of the internal PTO of the TR-7. The remote VFO function can be turned on or off from a front panel pushbutton switch. This will still allow the use of the internal PTO of the TR-7 if desired. The NRV7 VFO function features either a fixed 10 Hz step tuning rate or a variable speed tuning rate (VST mode) determined by how fast the tuning knob is turned. This mode is accessed by a pushbutton switch on the front panel. There is also an RIT and SPLIT mode available plus 20 tunable memories which are accessed by front panel switches. Two VFO frequencies are displayed. One for the transmit frequency and one for the received frequency. They can be tuned independently or tuned together.

In addition to the VFO function the NRV7 contains an electronic keyer and a PC PS/2 Keyboard interface which also will allow CW sending from any PS/2 compatible keyboard. When using this function the bottom line of the display will show up to 16 characters that have been typed and are being sent. The keyer speed is adjustable by front panel switch selection and then turning the main tuning knob to the desired speed.

Also contained in the NRV7 is a sound card and transformer isolated interface to allow digital mode operation (i.e. PSK31, RTTY, etc) using a single USB cable interface to a PC. Receiver audio is sent to the sound card from the AUDIO jack on the back of the TR7 and transmit audio is fed into the TR7 Mic jack via the isolated interface.

The real power of the NRV7 is a second USB port that can connect to a PC and allow frequency control of the VFO from a logging program. The firmware for this function was developed around a very capable freeware program called Winlog32. It works well with the RCW (Rig Control Window) in that program when configured for an FT-857 transceiver. The RCW will display the frequency of the VFO and follow it when the main tuning knob is used. The frequency of the VFO can also be controlled by the frequency buttons in the RCW and also by the memory buttons in the program. This gives the VFO an additional 240 memories. In addition to frequency data the mode information is also pulled from the VFO into the logging program. The VFO gets information about what band the TR-7 is set for by a special interface cable that

must be connected to the top board in the radio, the DR7 Digital Readout board. It is a simple connection that requires no boards to be removed from the radio and can be done in less than one half hour. To round out the features of the VFO a VOGAD (Voice Operated Gain Adjusting Device) speech compressor is also included for SSB operation. This is an AGC controlled speech amplifier that keeps the audio level from the microphone relatively constant over a wide input level range and greatly increases the average talk power with little distortion.

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Introduction to the NRV7

The NRV7 is a powerful DDS based Remote VFO and Station Accessory Module for the Drake TR-7 HF Transceiver. The DDS is driven at a high reference clock frequency of 107.374182 MHz and generates an output between 5.020 MHz and 5.580 MHz. This gives a 500 kHz band segment with an extra 30 kHz on each end. The high reference clock to output frequency ratio provides a low spurious signal for driving the TR-7 electronics. The display on the VFO will not only show the offset frequency from the bandswitch selected 500 kHz boundary but the entire actual operating frequency to match the number shown on the display of the TR-7. To do this the VFO requires the band data information from the TR-7. A special interface cable that is supplied with the NRV7 must be installed in the TR-7. It is a simple operation to do this with the 8 conductor cable being routed through the bottom cover and up to the top corner of the DR7 Digital Readout board. Only the top and bottom covers need to be removed to do the installation. The 8 wires from the cable are soldered to 8 pins on a connector located at the back left corner of the board. The other end of the cable terminates in an RJ45 connector and simply plugs into the back of the NRV7. The NRV7 shows both the transmit and receive frequency on the display. They are normally tuned together but can be independently controlled for special circumstances such as SPLIT mode operation.

An interface cable to match the RV-7 connector on the back of the TR-7 is permanently attached to the NRV7 and exits out of the rear of the enclosure. The other end of the cable simply plugs into the RV-7 connector on the TR-7 to complete the connections required for running the VFO. The remaining cables are used for connecting the sound card and USB control port as well as the PS/2 keyboard, RX audio output to the sound card from the fixed level output connector on the rear of the TR-7, keyer paddles and/or straight key and the patch cable from the TR-7 Mic jack to the Mic output jack on the rear of the NRV7.

The actual connections for these cables will be described in further detail in the following sections.

Front Panel Display and Controls

Transmit Freq

Receive Freq

Memory Number

VST Status

Digital Mode Interface ON

Soundcard Input Lvl Adj

Soundcard Output Lvl Adj

VOGAD ON/OFF & MIC GAIN

Power ON/OFF

Main Tuning

VST ON/OFF

Memory Scroll

RIT ON/OFF

Memory Recall Mode ON/OFF

SPLIT ON/OFF

Digital Mode ON/OFF or Memory Save

Set Keyspeed Mode ON/OFF

Remote VFO ON/OFF

Mic Input Connector

Rear Panel Connections

Mic Patch cable connector to TR-7

Keyer Paddle Jack

PS/2 Keyboard Jack

RX Audio input from AUDIO on TR-7

Straight Key Jack

CW Key Jack for Patch cable to TR-7 Key Jack

USB Control Port Connector

Soundcard USB Connector

For BAND DATA Interface Cable

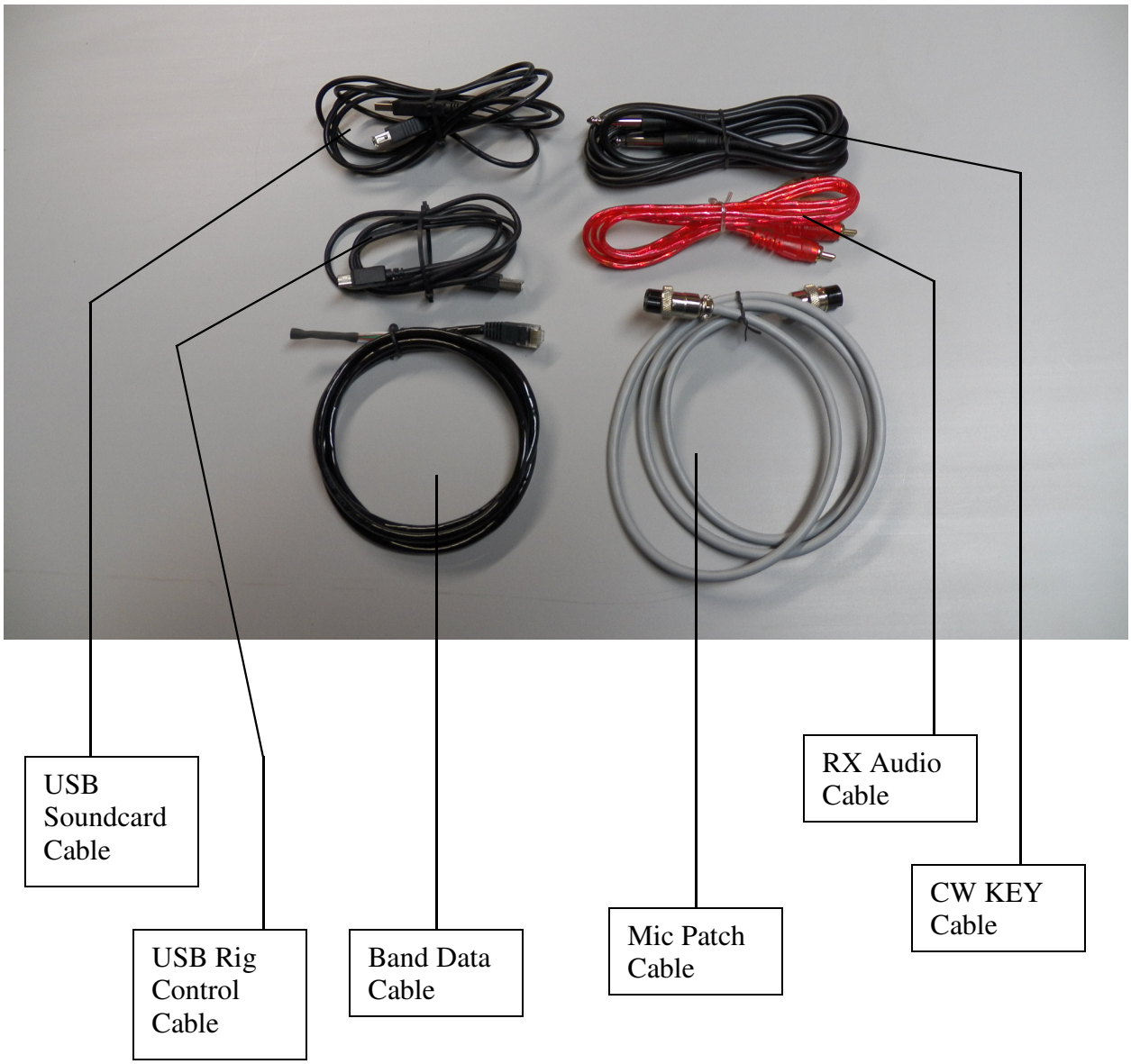
To RV-7 Connector on TR-7

Keyer Paddle Jack – TIP = Dot connection, RING = Dash connection, SLEEVE = Common

MIC OUT follows standard TR7 Microphone wiring as on the TR7 MIC Connector

NRV7 Setup

The NRV7 is supplied with 6 interconnect cables to make it easy to get the VFO up and running. The cables are shown in the photo below. Each is identified in the photo.



The **USB Soundcard Cable** is a Type A Female to Type A Male and plugs from the Soundcard connector in the back of the NRV7 to a USB port on the PC

The **USB Rig Control Cable** is a Type A male to Type B Mini that plugs from the USB port on the back of the NRV7 (Mini B side) to a USB port on the PC

The **Band Data Cable** is a custom cable that must be installed (one end) in the TR7 and the installation procedure will be covered later in this section. It is an 8 conductor cable with one end of stripped wires and covered with a piece of heat shrink tubing while the other end is an RJ-45 connector which will plug into the BAND DATA connector on the back of the NRV7. The heat shrink tubing is on the cable to allow easy threading through the areas of the TR7 chassis and will be removed once the cable is in place in the radio.

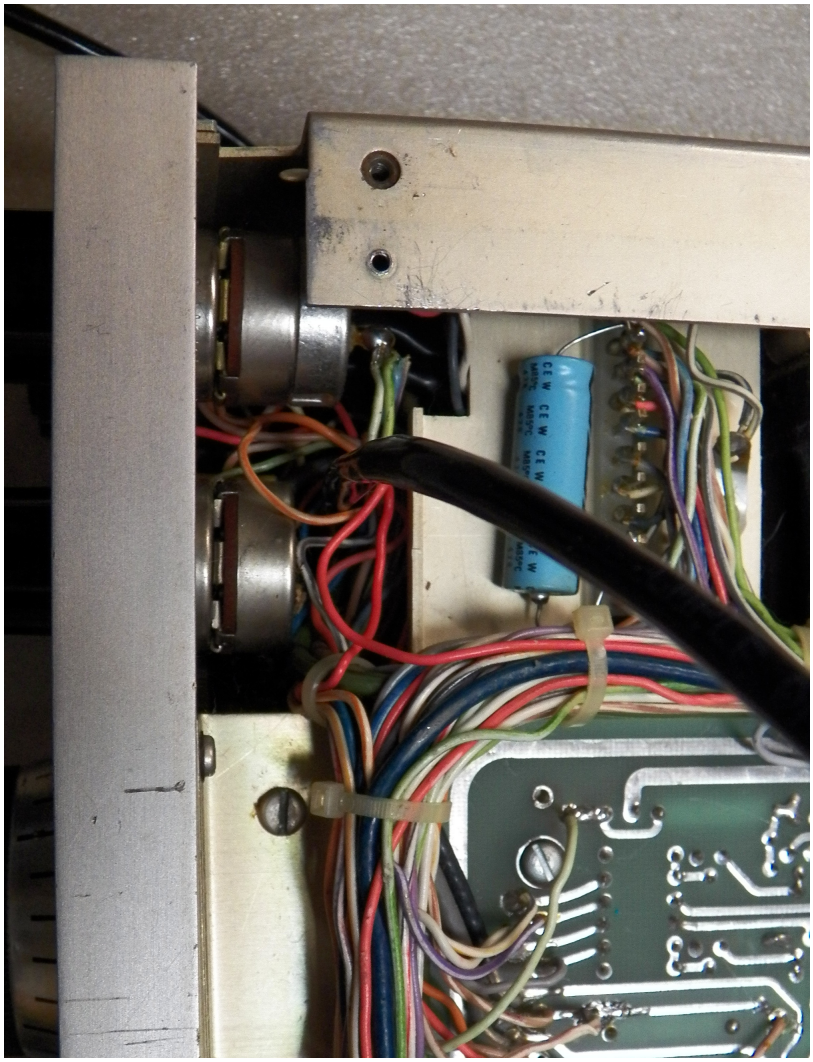
The **Mic Patch Cable** has a 4 pin female Mic connector on each end. One end goes to the MIC OUTPUT connector on the back of the NRV7 and the other end is plugged into the MIC connector on the front of the TR-7. This cable will carry the Microphone audio (either straight through or through the VOGAD speech processor) or the sound card audio if using digital modes and the PTT signal from the VFO to the TR7.

The **RX Audio Cable** has RCA type plugs on both ends and connects from the RCA AUDIO jack on the back of the TR7 to the RX AUD jack on the back of the NRV7. This carries the fixed level audio signal from the TR7 receiver output to the sound card for Digital mode operation. The NRV7 has a transformer isolated interface from the Soundcard to the TR7 on both the received and transmit audio signals.

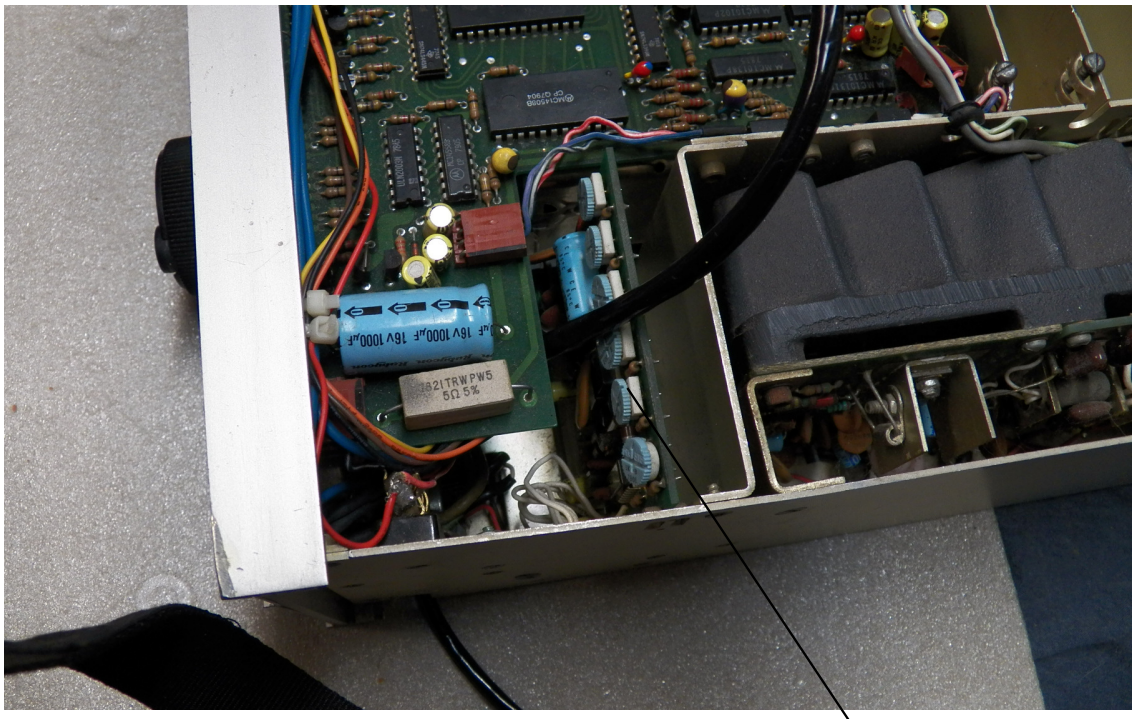
The **CW KEY Cable** has ¼" phone plugs on each end and connects from the TR7 KEY jack on the back of the NRV7 to the KEY jack on the back of the TR7. This cable is used to key the TR7 TX in CW mode.

The first step in setting up the NRV7 for operation with a TR7 is to install the BAND DATA cable into the radio. In order to do this the TOP and BOTTOM covers must be removed. You should also have access to a good quality soldering iron and solder for attaching the wires in the cable to the connector inside the TR7. Be sure that the power supply cable is removed from the radio when performing the installation. Once the covers are removed the cable can be threaded through the first slot (closest to the front of the radio) in the PA vent holes in the bottom cover by pushing the end with the heat shrink tubing through from the outside of the cover (see photo below). Pull about 15 inches of cable through the slot.

Next, thread the cable into the area between the front panel and the compartment where the power supply board is located through the slot on the bottom of the power supply compartment (see photo below).



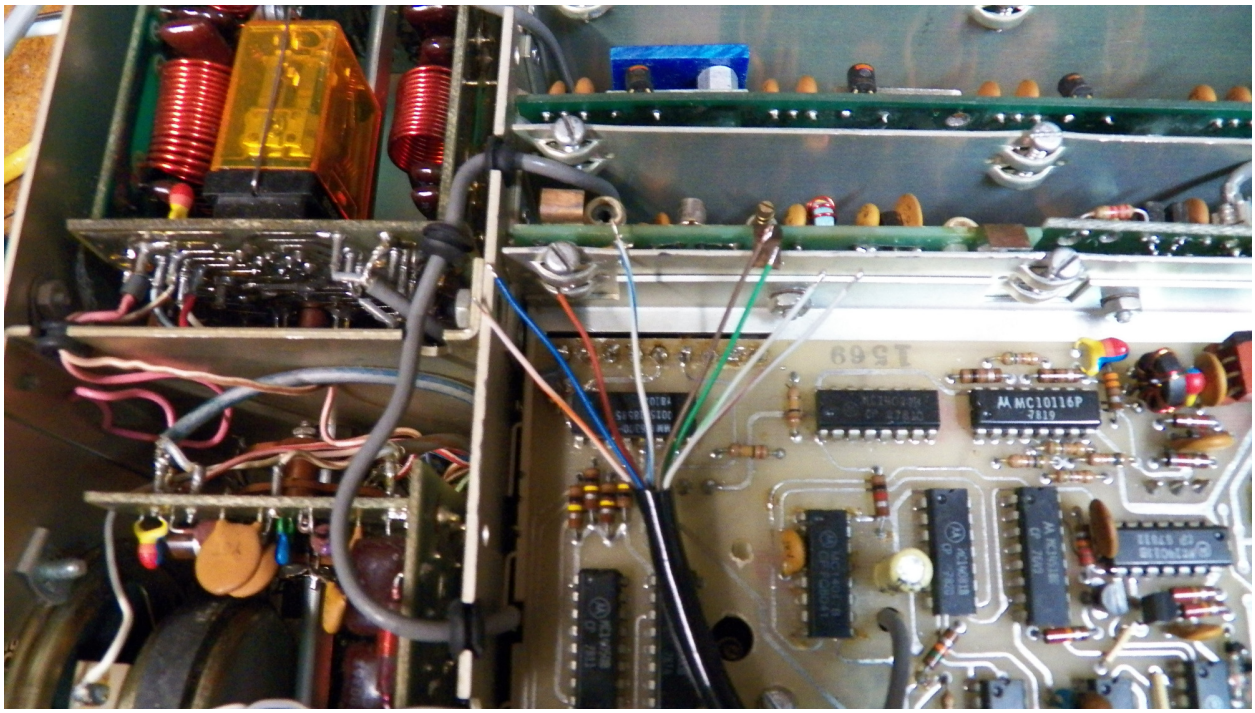
The cable should come up in front of the power supply board as shown below. Be very careful not to turn any of the adjustment pots on the power supply board while bringing the cable through this area. Turning any of these would require resetting the pots for the BFO settings for the individual mode that was moved or an entire re-alignment of the radio if the 10 Volt supply pot were changed. Once the cable is brought up through this area check to be sure there is enough cable to reach to the extreme left back corner of the DR7 Display Readout board (the large board lying flat across the top of the radio with the displays in the front).



Cable coming up in front of Power Supply Board

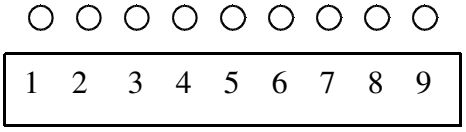
With the cable in position and the length checked, the bottom cover can be put back in place making sure the Band Data cable is not interfering with any of the other wiring / components under the cover. Once the cover is set a couple of screws can be put into the cover to hold it in place. Return to the top of the radio to complete the cable installation.

Pull the heat shrink tubing off the end of the wires to expose the tinned wire ends. Spread out the wires as shown in the photo below. Then following the Chart below the photo solder each of the wires to the connector pins. To make it a bit easier, a small amount of solder can first be added to each pin before the wires are actually attached to the pins.



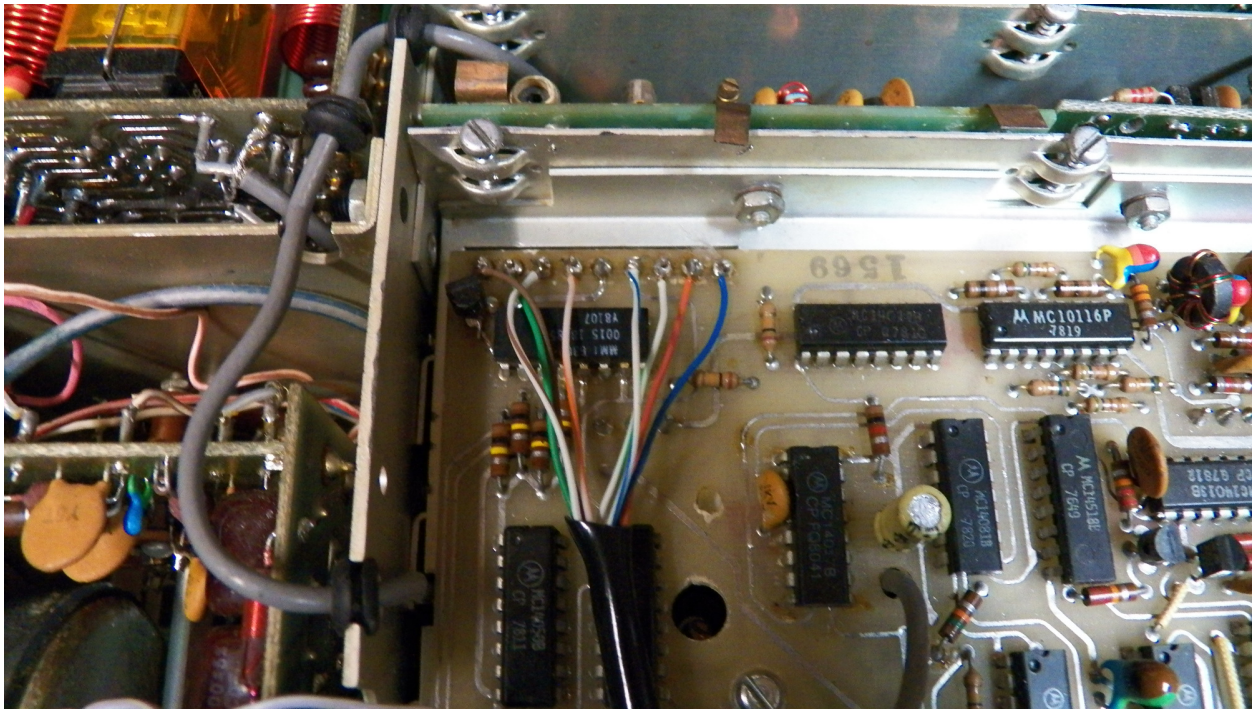
Wires spread out and ready to be soldered to the connector below them.

CONNECTOR WIRING CHART



CONN PIN #	WIRE COLOR
1	Brown
2	Green
3	White/Brown
4	White/Orange
5	DO NOT CONNECT
6	White/Blue
7	White/Green
8	Orange
9	Blue

Double check the wiring of the connector. The final result should look like the picture below.



If everything looks like the picture the installation is just about finished. Leave the top cover off of the radio until the rest of the cables have been connected to the NRV7 so that a final operational check can be made. If everything is working at that point the top cover can be put back on and all the remaining screws replaced in the top and bottom covers.

The next step in setting up the NRV7 is to plug in the main cable into the RV7 connector in the back of the TR7. After that the Power connector can be plugged back into the TR7. Then plug in the RX AUDIO cable between the RX AUD on the NRV7 and the AUDIO jack at the back of the TR-7. Plug in the CW KEY cable from the KEY jack on the back of the TR7 to the TR7 KEY jack on the NRV7. Plug in the sound card cable from the SNDCRD connector on the back of the NRV7 to an unused USB port on the PC. Plug the USB cable into the USB port on the back of the NRV7 but DO NOT plug the other end into a PC USB port at this time. The driver for the USB device must be loaded first. This will be done in a later step. Plug the Band Data cable that was installed in the TR7 into the BAND DATA connector at the back of the NRV7. Note that the clip securing this connector is covered with a small boot. If you need to remove the connector a small screwdriver can be inserted under the clip to lift up when the connector is pulled out.

If a keyboard is to be used with the VFO then plug a PS/2 compatible keyboard into the KBD connector on the back of the NRV7.

Attach the MIC Patch Cable from the TR7 front panel MIC connector to the MIC OUT connector on the back of the NRV7. The cable is long enough to be routed around the left side of the TR7 across the back and into the NRV& if the NRV7 is placed on the right side of the TR7.

If CW operation is anticipated then a paddle can be plugged into the PADDLE jack at the back of the NRV7. A second jack is provided to plug in a straight key but to use the key as a straight key the keyer must be set to MANUAL mode in the KEYER SPEED function. This is explained in more detail in the description of the front panel switches functions.

Once the cables are all connected the TR7 can be powered on. Once the TR7 is running set the bandswitch to 14 MHz then turn the NRV7 on with the front panel POWER switch. The display should light and the startup message should appear on the display for a few seconds.

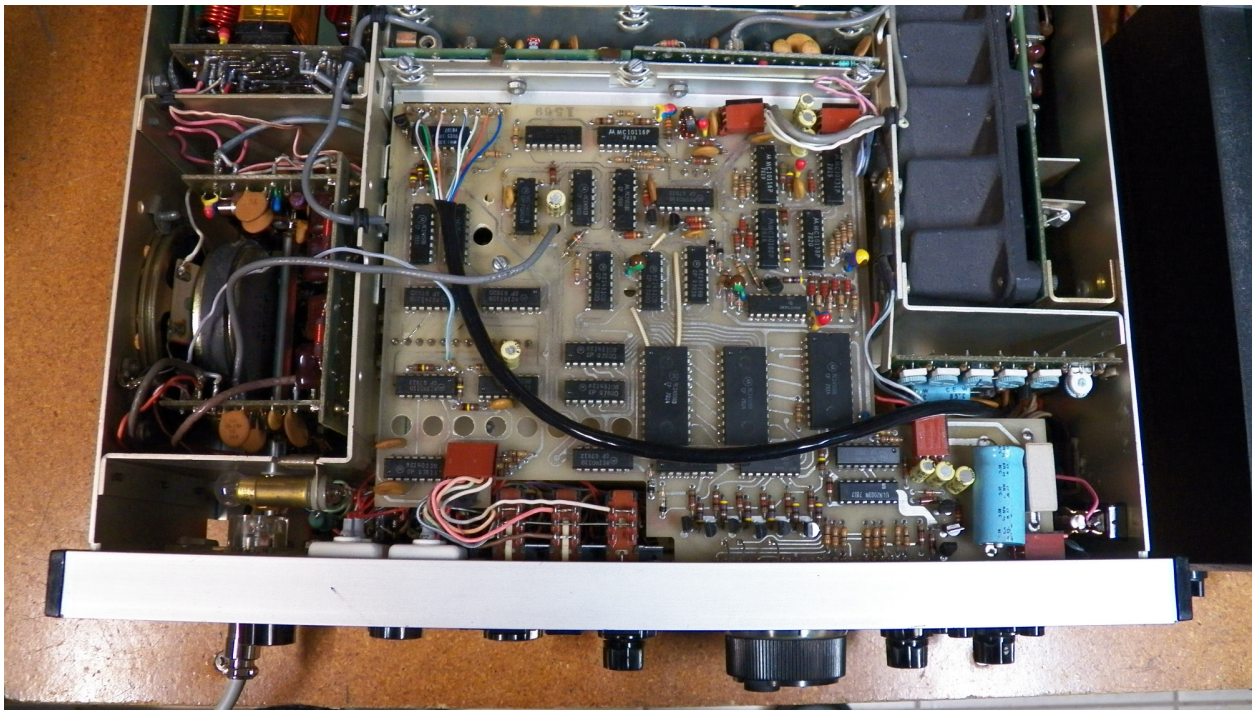
Once the message has timed out the standard display format should appear as below

The actual frequency that will be displayed will depend on what is contained in the last memory that was used in the VFO. In the example above the memory is 02 and contained 14.070 MHz. If all is well at this point the next step is to check that the band data cable is working and wired properly. To do this run the TR7 bandswitch through each position. If the NRV7 is reading the band data properly the frequency display on the VFO should track the bandswitch position. For the example in the photos of 14.070 MHz, the offset from the bottom of the band is 70 kHz. So each band position should indicate a freq 70 kHz up from the band bottom. For this frequency moving the bandswitch through all its positions should give the following result with an initial freq of 14.070 MHz:

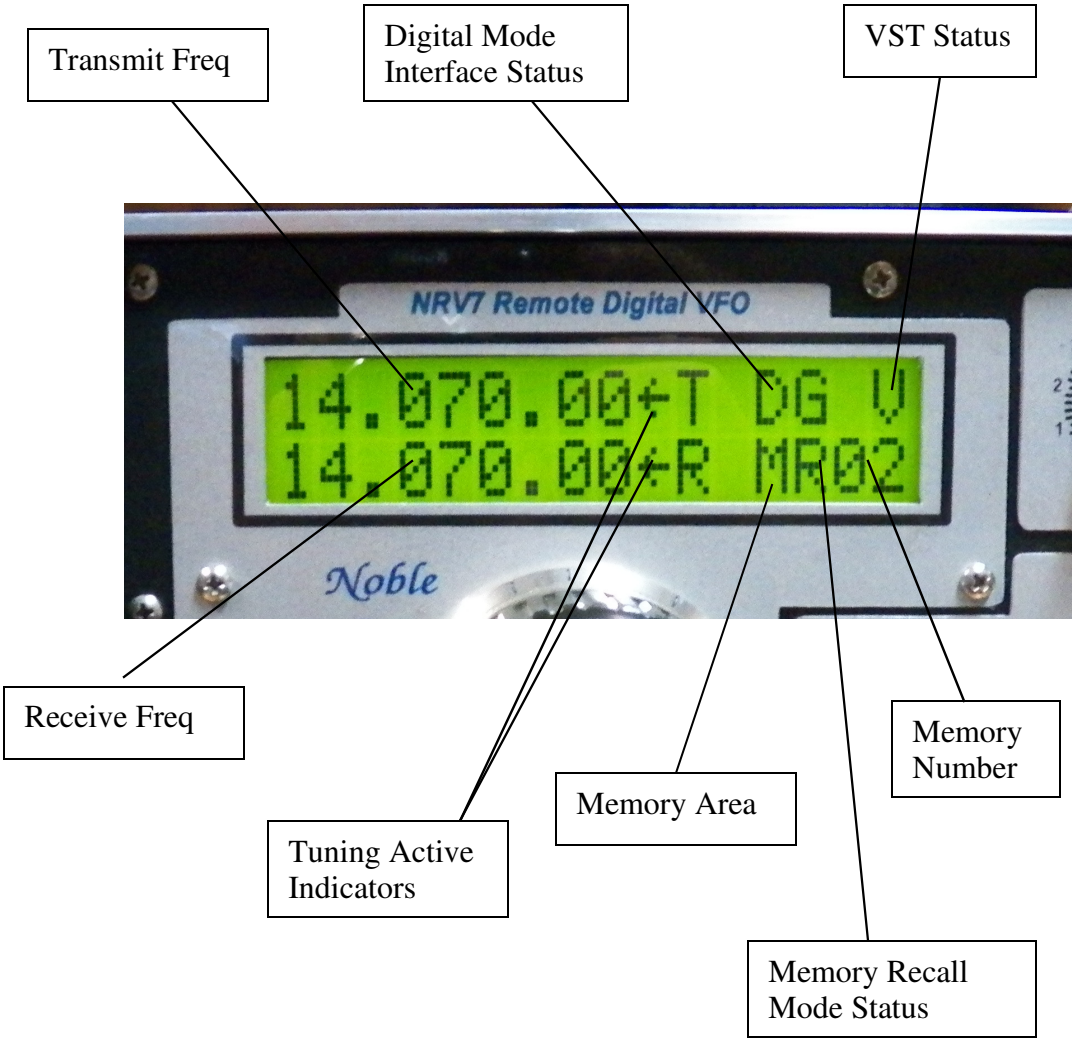
BAND	**FREQ ON DISPLAY**
1.5	**1.570.00**
2.5	**2.570.00**
3.5	**3.570.00**
5	**5.070.00**

7	**7.070.00**
14	**14.070.00**
21	**21.070.00**
28.5	**28.570.00**

Using the UP and DOWN buttons on the TR7 the display should still follow with the 500 kHz step changes from the UP and DOWN buttons. If an AUX board is installed in the TR7 the VFO should also follow the changes using the AUX PROGRAM switch. In all cases the display on the TR7 should show the same frequency as the display on the NRV7. As a last check for the VFO operation turn the main tuning knob up and down the band and be sure that the VFO display responds and that the TR7 display tracks. Note that when you reach the end of a band segment the VFO will stop tuning once it hits 30 kHz below or 30 kHz above the end of the 500 kHz segment. You will not be able to tune any higher or lower than those limits. To go past them you will have to switch to the next segment by either using the bandswitch or the UP DOWN buttons on the TR7. If all of these checks pass then the TR7 can be powered off and the cover and screws can be replaced in the radio. The following picture shows the band data cable routing across the top of the TR7's DR7 board.



Display Description



Transmit & Receive Frequencies – Shows the frequency currently being received and the frequency that will be used for transmit mode.

Tuning Active Indicators – If an arrow is on that means that VFO (TX or RX) will be tuned by the Main Tuning knob. If the arrow is off then that VFO will not be affected.

Digital Mode Interface Status – If a DG is shown in the display the sound card interface is ON for transmission. The receive interface is always connected. If the DG is OFF then the sound card is disabled for transmission and the Mic circuit is connected to the TR7 Mic input instead

Memory Area & Memory Number – The M indicates the memory area of the display. The number shows which memory was selected. If the R is present between the M and the memory number then the **Memory Recall** mode is on and the Memory Scroll and Memory Save buttons will be operational.

Front Panel Switch Functions

A) VST (Variable Speed Tuning)

The VST switch will allow you to tune with progressively larger step sizes based on the speed that the tuning knob is turned. The steps are 10 Hz, 100 Hz, 1 KHz and 10 KHz. This allows quick excursions across the larger bands while still providing fine tuning of a signal once at the desired frequency. When the VST function is active a "**V**" will appear at the end of the top line of the display (see photo).

Pressing the VST button repeatedly will turn the function on then off. When the function is off then the VFO tunes in fixed 10 Hz steps.

B) RIT (Receiver Incremental Tuning)

The RIT function can be used if a received station is off of your transmit freq but you do not want to move the transmit frequency to match. Pressing the RIT will cause the arrow (tuning active indicator) in front of the T frequency to go off. That leaves the receive frequency as the only active VFO. Turning the Main Tuning knob will only change the receive frequency. When the TR7 goes into transmit the T freq will be used and this will be reflected in the frequency display on the TR7. To turn the RIT mode OFF just press the RIT button a second time and the arrow will appear in front of the T frequency and the T frequency will move to match the R frequency. Now both VFO's are tunable and will track when the Main Tuning knob is turned.

C) SPLIT

The SPLIT mode allows independent control of the Transmit and the receive frequencies. To engage the mode press the SPIT button on the front panel. The transmit arrow will go off indicating that any changes made with the tuning knob will only affect the receiver frequency. Press the SPLIT button again and the arrow moves from the receive to the transmit frequency indicating that the tuning knob will only affect the transmit frequency. Whichever frequency the arrow points to is the frequency to which the receiver will be tuned. So if you are monitoring a pileup on a DX station and want to find the frequency of the last station that he was working and call from that point you can use the SPLIT button to move the arrow to the T frequency and then zero beat the station that is working the DX. Then press the SPLIT button again to move back to the RX frequency (to copy the DX station) and when you transmit you will be on the same

frequency of the last station worked. One thing to note is that you will not be able to transmit (TX is locked out) if the arrow is pointing to the TX frequency. You must return the arrow to the RX frequency in order to use the transmitter. To exit the SPLIT Mode press the RIT button. Both arrows will appear and the TX frequency will move to the same as the RX frequency. Note also that when the RX and TX frequencies are split, making a transmission will cause the frequency display on the TR7 will change to the TX frequency set on the NRV7.

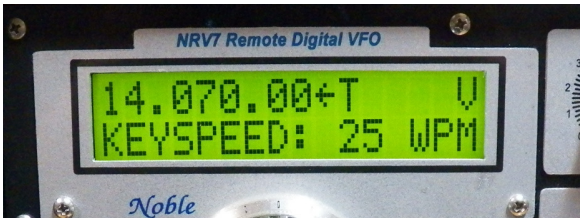
D) REMOTE ON/OFF

This switch will allow the use of either the VFO in the NRV7 or the internal PTO of the TR7 to control the transceiver. When the NRV7 is first powered up it defaults to the remote ON state where the VFO in the NRV7 enabled and controlling the TR7. You get the standard display that was previously shown with the 2 frequencies displayed. When the REMOTE button is pressed the display will change to the following:

Notice that the frequency on the TR7 no longer matches the NRV7 VFO frequency. The TR7 will now be controlled by the PTO in the TR7. To return to remote operation (NRV7 controlling the frequency) just press the REMOTE button again. The REMOTE OFF line will change back to the transmit frequency and the TR7 will show the same frequency as the NRV7 VFO.

E) KEYSPD (Keyer Speed Adjust)

This button will put the NRV7 into the keyer speed adjustment mode. When pressed the display will change to what is shown in the photo below.



The main tuning knob can now be used to set the speed to the desired speed from 5 to 35 WPM. If you want to use a straight key then set the keyer speed to MANUAL by turning to the low end of the range (next step below 5 WPM). Once the speed is set press the KEYSPD button once again and the display returns to the normal dual frequency readout. To work with a straight key the key should be plugged into the KEY jack at the back of the NRV7 (next to the paddle jack) and not directly into the CW KEY jack at the back of the TR7. If it is plugged into the TR7 then SPLIT mode will not work when you key the transmitter.
The NRV7 defaults to a 25 WPM speed when it is powered up.

F) DIGITAL ON/OFF

The DIGITAL ON/OFF button will connect the Mic audio input connection to the TR7 to either the sound card interface or to the Mic interface (either direct Mic connection or through the VOGAD compressor). When DG appears in the top line of the display the sound card is connected. When it is off the Mic circuit is connected.
This switch button has a dual function. It controls the digital mode interface and also serves as a memory save switch when in the memory mode. That will be described in detail along with the MEM RECL and MEM SCRL switches in the section on using the memories.

USING THE MEMORIES

There are 20 tunable memories available in the NRV7. They are initially set to 14.000 MHz and can be change to any other frequency by use of the 3 memory buttons on the front panel.

When the NRV7 is first powered on it will display the frequency of the last memory that was in use. The Memory number is shown on the far right side of the bottom line of the display (see photo in DISPLAY DESCRIPTION section). This frequency is now tunable over any part of the band and will maintain its offset from the lower edge of the 500 kHz band segment if the bandswitch is changed and continue to be tunable in the new band segment. To enter the memory mode the MEM RECL switch button must be pressed. An “R” will appear next to the M in the memory area of the lower display line (see the photo in DISPLAY DESCRIPTION section).
The MEM SCRL button can now be used to sequence through the 20 memories by successive pressing of the button. The frequency and the memory number will change on the display as each

one is selected. If the new memory falls within the same band to which the bandswitch is currently set, the frequency of the TR7 will be changed to that frequency. If the memory is for a different band then the new frequency will be displayed on the top line and a CHANGE BAND message will appear on the bottom line of the display. See photo below.

In the photo we can see that the TR7 was set to the 20M (14 MHz) band and then a memory (#3) was selected that was in the 40M (7 MHz) band. So the NRV7 (and therefore the TR7) remained at the last frequency in the 20M band that was being used. The NRV7 sees that the bandswitch is set to 14 MHz and a 7 MHz frequency is being requested so it tells the operator to change the bandswitch to the 7 MHz position. Once that is done the display changes to display the following information:

The TR7 will now be tuned to 7.035 MHz. At this point the frequency can be tuned with the Main Tuning knob to any other point in the band. If it is anticipated that the memory may want to be overwritten with a new frequency then the VFO should be left in the MEM RCL mode ("R" on in the bottom line of the display). When the new frequency to be saved is on the display, press the MEM SAVE button and the new value will be written into the currently displayed memory number and then the "R" will be removed from the display. If you just want to recall the data that was already in the memory and do not want to change it then as soon as it is on the display just press MEM SAVE and the "R" will be removed and the memory data will be setup in the system.

There is one other useful feature to the memory system. If you want to quickly switch between two frequencies in the same band you can set a memory to one of them then tune to the second frequency. Press the MEM RECL key and you will be tuned to the memorized frequency. If you press it a second time the "R" will go off in the display and you will be back at the last frequency you were tuned to before pressing MEM RECL. You can continually "bounce" back and forth between the two using this technique.

USING THE INTERNAL SOUNDCARD

The NRV7 contains its own sound card that is interfaced to a PC using the supplied USB cable. There are no drivers that need to be loaded into the PC. The soundcard will work with programs such as Digipan and Fldigi. If Winlog32 is to be used as the logging / control program then Fldigi is recommended for the digital modes since it can integrate with Winlog32 and pass logging data directly to the program. To setup for use in Fldigi, open the program and select "Configure" from the top menu and then Soundcard in the drop down menu. Select PortAudio and then in the drop down lists under Capture and Playback select Microphone (USB Audio Device) for capture and Speakers (USB Audio Device) for playback. Click SAVE and then close the windows and you should see the RX output from the TR7 receiver on the waterfall display. If any signals are present using the mode that is selected in Fldigi (i.e. PSK31, RTTY, CW, etc) they should start to decode in the signal browser window on the left side of the screen. Use the RX Gain control in the soundcard area on the front panel of the NRV7 to set the receive level so as not to overload the sound card input. Adjust so there is just a slight amount of background noise in the waterfall with no signals present. This should provide good sensitivity without any overdriving of the sound card. To setup for making a transmission using the soundcard, set the TX Gain control on the front panel of the NRV7 to minimum. Connect the TR7 to a dummy load. Set the Mic Gain on the TR7 to the 3 o'clock position. Set the MODE on the TR7 to USB. Set Fldigi to PSK31 mode. Press the DIGITAL ON/OFF button on the NRV7 (the DG should appear in the top line of the display). Click the TX-F10 button in Fldigi and the TR7 should go into transmit mode with almost no output power. Slowly advance the TX Gain control clockwise and the output power should start to increase. To get maximum output power advance the TX Gain control on the NRV7 until the point where the ALC light just comes on then back off until it is out. That is the maximum power point for the TX without excessive distortion. Never operate PSK modes with the ALC light on. Once the setting has been reached click the RX-F11 button in Fldigi to turn the TX off and return to the receive mode. At these settings the TR7 should show about 45 Watts on an average reading meter which is a full carrier power of 100W. This is a high power level for PSK operation and can also create a lot of heat in the TR7 power amp, especially if it is setup without the optional cooling fan. It is recommended that a lower power level be used for the digital modes down around 40 – 50 W. Use the Mic Gain control on the TR7 to reduce the power level to the lower level. The NRV7 / TR7 is now ready to be used on a digital mode. Follow the operation guide for the program you will be using.

USING THE VOGAD SPEECH PROCESSOR

The NRV7 has a built in VOGAD (Voice Operated Gain Adjusting Device) speech compressor. It is basically a mic amplifier with an AGC system to increase the gain on lower input levels and reduce the gain for higher mic input levels. This tends to keep the average microphone input

level to the transmitter at a relatively constant level and provides a higher average output power level with very low distortion. The compressor is switched on by the MIC GAIN control on the front panel of the NRV7. The control can then be used to set the mic input level to the VOGAD circuitry. A good starting point is to keep the Mic Gain control on the TR7 around the 11 o'clock position and the MIC GAIN on the NRV7 around a 6 to 7 on the scale. If you monitor your output signal with a scope you can use that to set the NRV7 MIC GAIN also. This setting should work with most microphones but some on the air tests will also give a better indication of the optimal settings to use for your particular microphone. The VOGAD compressor can be left on all the time, even when running digital modes since engaging the sound card interface for transmit will disconnect the VOGAD processor automatically. With proper setting of the compressor you should see a noticeable difference in average output power with the compressor on and off.

USING THE NRV7 WITH A PS/2 KEYBOARD

The NRV7 has a PS/2 connector on the rear panel to allow the operator to control the unit with the keyboard in addition to the front panel pushbutton switches. It also will allow CW sending via the keyboard with a 16 character display and buffer of the typed characters. A PS/2 compatible keyboard must be plugged into the NRV7. The function keys on the keyboard are setup to duplicate the functions of the front panel switches as well as add the CW keyboard send function not available from the front panel. The following list defines which function keys are used:

KEY	FUNCTION
F1	RIT ON/OFF
F2	REMOTE ON/OFF
F3	VST ON/OFF
F4	DIGITAL MODE INTERFACE ON/OFF
F5	SET KEYSPEED (ON/OFF)
F6	SPLIT MODE
F7	MEM RECL ON/OFF
F8	MEM SCRL
F9	CW KEYBOARD SEND MODE ON/OFF
F10	CW MESSAGE EDITOR (REV B SOFTWARE)

The ON/OFF functions are just toggled by successive pressing of the function key. To enter the CW keyboard send mode press the F9 key and the bottom line of the display will blank and show a blinking cursor at the first character position awaiting a character to send. Any valid CW character that is typed will immediately be sent out in CW at the set keyspeed. It is not necessary to use caps lock or SHIFT to enter the characters for sending. All characters are displayed as upper case on the display. There are some special characters and control characters that can be used in addition to the normal A-Z and 0 – 9 alphanumeric characters. The following is a list of those characters:

CHAR	FUNCTION/CW CHAR SENT
ESC Key	Halts transmission of any characters left in the buffer
ENTER Key	Resumes transmission of characters remaining in the buffer
@ (SHIFT 2)	AR
+ (SHIFT =)	SK
* (SHIFT 8 or Numeric *)	AS
! (SHIFT 1)	Error (8 dots)
-	BT

Pressing the Esc Key twice will cause anything remaining in the buffer to be erased. The BACKSPACE key may be used to erase characters from the buffer even while it is sending. If the Esc key is pressed once while the buffer is empty characters (up to 16) may be entered and erased with the backspace key for editing and then the contents of the buffer can be sent by pressing the ENTER key. The photo below shows sample text that was entered while the buffer was halted with the Esc key.

The normal paddle keyer is always available to use even while in the keyboard send mode. So you can switch back and forth at any time between keyboard and paddle. To exit the keyboard send mode simply press F9. Note that the keyboard send mode cannot be used while in the SPLIT mode.

OPERATION WITH Winlog32

The NRV7 contains a USB port that will allow limited rig control and auto logging capability with a PC logging program. The program must be configured to operate with an FT-857. The NRV7 uses that rigs command set for frequency and mode information exchange. The interface was designed around the very capable freeware program, Winlog32 written by Colin, G0CUZ. The program will allow for frequency control of the NRV7 VFO from the RCW (Rig Control Window) in the program and will also follow and display the NRV7 VFO frequency when the VFO is tuned from the main tuning knob. Winlog32 has 240 memories available which can also be used to change the frequency of the NRV7 VFO. The VFO can also be changed in discrete step sizes by the use of the UP/DOWN buttons in the RCW. This allows for a very powerful frequency control environment for the TR7 allowing it to be used like many modern day transceivers.

Frequency data from the VFO is automatically entered into the log when a QSO is entered. While the NRV7 does not directly read the MODE information from the TR7 MODE switch, it uses the operators actions to determine which mode is being used and automatically sends that to the logging program for entry into the log. If the Mic PTT switch was activated then it is assumed that the mode is SSB. If the digital mode interface is on it will assume PSK31, if the keyer paddle was the last thing to be used or if the keyboard send mode is on then it assumes it is in the CW mode.
Another very nice feature of the Winlog32 program is that it can be linked to a DXCluster. A DXCluster window can be opened along with the RCW and when a spot comes up that you want to look at simply click the mouse on the frequency of that spot and the program will send that data to the NRV7 VFO and put the TR7 on that frequency. Of course if the TR7 is on a different band that the spot frequency the operator will have to manually turn the bandswitch to complete the QSY. Very easy to catch DX with the TR7 now.
While the NRV7 firmware was designed around Winlog32 it is also possible it will operate with other programs such as HRD. But extensive testing has not been performed with those programs.

In order to use the USB interface, driver routines must be loaded into the PC. The NRV7 interface uses and FTDI chip and the drivers are available from the Parallax website at www.parallax.com/usbdrivers
The current version of the driver for Windows XP/Vista/7/8/8.1 is Ver 2.10.00
Use this site to download and install the current version driver for your system before plugging the USB cable from the NRV7 into the PC. Once the driver has been loaded and run through the installer the USB cable from the NRV7 can be plugged into the PC. You will get a new hardware found message and the hardware install wizard should pop up on the screen. Let it do the automatic installation where it will search for the drivers and complete the install. On the older OS systems like Windows XP you will get messages that the software is not Microsoft Certified as the drivers are being loaded. This is because Microsoft has ended their certification programs for those systems that they do not support any longer. Answer YES to the questions as to whether you want to continue the installation. Once the total install is complete you will find that another COM port has been added to your system. This is a virtual COM port for the USB port in the NRV7. When you setup your logging program you will have to select that port for the communications port to the connected rig. Now that the COM port has been established the next step is to download the latest version of Winlog32 and install that. The program can be found at www.winlog32.co.uk
Place the mouse on the Downloads button at the top of the page and then click on Winlog32 & Updates. That will bring you to the download page where you can get the latest revision. At this time it is 6.3.3. Download and install the program and setup your log according to the instructions for the program.
Once that is setup and the log is running click on the "Rigs" selection on the top menu bar. A drop down menu will appear below that. Select "Yaesu Rig 1". That will open an RCW that shows a blank frequency display and the frequency control buttons and memory buttons. Click on "RIG" in the RCW window and then Setup. Click the arrow on Select Rig and from the drop down menu select the FT-857. Now click on "Settings" in the RCW. Click the "Com Port" tab and then select the port that your system has setup as the virtual COM port for the NRV7 USB port (COM2, COM3,COM4 … etc). If you are not sure what the port is you can find it in the Device Manager for Windows. The window may close at that point so open up the Settings again

and now click the “Advanced” tab. Set the polling period to 500. Turn off the ENABLE RTS and CTS selections and set the Baud rate to 9600. Next select the “Options” tab and here you can set what the default mode for digital operation will be in the logbook by checking off “Change RTTY to” and then select the mode most often used out of JT65, PSK31 or RTTY. That will be the default mode entered in the logbook when you are in the Digital mode with the NRV7. It can always be edited by hand if you want to change it after or as you are making a log entry. But this can save some of that work for the most used mode.
At this point with the NRV7 up and running and connected to the USB port on the PC if you close the window by clicking “Settings” again the normal RCW should appear and it should now be updated with the frequency that is on the display of the NRV7. You should now be able to control the VFO (and the TR7) frequency by clicking the UP/DOWN buttons for the individual frequency digits and also by clicking the memory buttons below the larger frequency display. If that is all working then congratulations, you now have PC rig control of your vintage TR7.
Read the notes from Winlog32 for setting up the DXcluster and then you should be able to open that window by clicking the DXCluster selection on the top menu bar of the main part of the logging program and then DXCluster Start. It will take a few seconds for the cluster spots to start appearing in the window. Once it has filled up you can click on the frequency of one of the spots and it should immediately send the NRV7 VFO to that frequency. If it is in a different band than what you are currently set for, the NRV7 will issue a CHANGE BAND message on the display and you will have to manually change the bandswitch to complete the change.

If digital mode operation is planned using Fldigi then you will want to click on “Options” in the top menu bar and then go down to “Logging Interface” and then to FLDIGI and then finally click “Enable Interface”. Now whenever you click on the Save QSO button in Fldigi while Winlog32 is running all of the QSO data from Fldigi (including things like RST and name and QTH if it was filled in for the Fldigi log fields) program will automatically get passed to Winlog32 and an automatic log entry made. You can go into Winlog32 and make any changes you would like after the entry is there but it saves 95% of the work.

Another option that is available with Winlog32 is to link to one of the callsign databases. One of the database links is HamQTH. That works well with the program. When you enter a callsign in the logbook and hit enter, the program will automatically perform a lookup and the data for the station (name, QTH, etc) will be displayed in a popup window. You can copy and paste the info from that right into the log.

If all of this is working at this point you have brought your TR7 into the 21st Century.

Note: The NRV7 has also been tested and found to work with the DXLab suite of logging, rig control (Commander) and digital mode interface (WinWarbler) software.

ADDITIONS WITH REV B SOFTWARE UPGRADE

The REV B software has made some improvements in operation as well as incorporating new features into the NRV7. The changes are:

1> Improved the com link over the USB control port to allow operation with Ham Radio Deluxe and N1MM contesting software using the FT-857 as the emulation rig. HRD was usable in the A version but the frequency updates to the PC screen were slow. N1MM did not link at all with REV A software.

2> For operating frequencies of 10 MHz and higher the mode will be sent as USB when in SSB and as LSB if below 10 MHz.

3> The intercharacter spacing when in the Keyboard Send mode for CW has been increased to provide better timed CW

4> Six 15 character CW memories have been added to the CW keyer. They must be accessed / controlled with the external PS/2 keyboard.

USING THE CW MEMORIES

The memories must be used with the external PS/2 keyboard. Make sure that is plugged into the connector on the rear panel. There are three sections for using the memories.
1> Pulling up a memory in the editor and changing or deleting it
2> Accessing / sending the memory in the background (no display of the message)
3> Sending a memory while in the keyboard send mode

ACCESSING MEMORIES IN THE MESSAGE EDITOR

The F10 key will put the NRV7 into the editor mode. It will automatically display the current message on the bottom line of the display and it will indicate the message number on the top line After the frequency with CX, where X is the message number 1 – 6.
Once the message is displayed it can be edited by using the backspace key or just typing more characters at the end of the message. When the cursor hits the end of the display it will stop accepting characters. When you are done with the changes you can save the message by either switching to a different memory or by pressing the F10 key to leave the editor mode. **Memories are accessed by using the 1 thru 6 keys on the numeric keypad**. When in the editor mode, pressing a key for a new memory will place the memory contents on the second line of the display and also change the number on the top line. It will save the previous memory to its buffer.

SENDING MESSAGES IN MEMORY

A saved message may be sent in one of two ways. If you are in the Keyboard Send mode (F9 Key) the message will be put up on the display and immediately start to send. You can use the

backspace key to edit as it is sending and retype into the send buffer. You can also immediately type in more characters as the message is sending and they will be appended to the end of the memory message. Be careful to type at a rate that will not cause the cursor to hit the end of the buffer since it will stop accepting characters at that point until something is sent out making more room in the buffer.
The second way to send a memory message is to just hit one of the numeric keys (1 – 6) while you are not in the keyboard send mode. The message will immediately start to send when the key is pressed. You cannot edit it on the fly in this mode
Longer messages may be made up by sending one buffer after another. There is no automatic synchronization of the messages. You must wait for the first message to be completely sent before pressing the key to send the next message. If the second message is pressed before the first one is finished it will erase whatever was left of the first message and start the second as soon as the current character is completed.

Ceratin modes will be blocked when using the message editor. You will not be able to enter the keyboard send mode (F9) while in the editor. All other function keys will not work with the exception of F3 (VST ON/OFF) and F2 (REMOTE ON/OFF).

You can be in the KEYSPEED mode (to adjust the keyer sending speed) and press one of the memory keys. The message will send and you can adjust the speed while it is sending. You can also start sending the message first and then move into the keyspeed mode to change the speed while the message is going out.

SPECIFICATIONS

VFO

Output Frequency: **5.020 – 5.580 MHz**
Output Level: **3 Vp-p**
DDS Generated with 107.374182 MHz Reference

INTERFACE

RV7 Compatible Cable

Transformer Isolated Internal Sound Card with USB Interface to PC using a Type A connector

USB Rig Control Port with Mini Type B connector

PS/2 Keyboard Interface

VOGAD Speech Compressor for SSB operation

5 – 35 WPM Internal Iambic Keyer

DIMENSIONS & WEIGHT

9.625 in W x 8.5 in D x 4.5 in H (24.45 cm x 21.6 cm x 11.43 cm) – Does not include Knobs and feet

4.125 lbs (1.9 Kg)

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