NUE-PSK Digital Modem

Using RTTY

General:

Starting with software version 2.10g, the NUE-PSK Digital Modem is now able support full RTTY transmit and receive. Use of the modem for this older-yet-still-popular digital mode is very similar to the other modes we support (PSK, QPSK), and is great for long ragchews, sending "brag files" describing equipment, and contesting. Decoding sensitivity is a bit less than with PSK31 (a mode that has been optimized for low power operation), but tuning in someone calling CQ is a bit easier and some people say there are more RTTY-capable hams around for potential contact, continuing the age-old enjoyment of the hobby.

We are initially supporting 45 baud operation with 170 Hz shift between mark and space frequencies, which classically tends to characterize the majority of RTTY use over the years – especially with the older and original TTY equipment. We also simplify the upper/lower sideband confusion that can exist these days by allowing the user to flip the order of the mark and space frequencies, thus accommodating a variety of users over all the bands.

Hope you enjoy using this new RTTY capability of the NUE-PSK Digital Modem! Stay tuned to our website (www.nue-psk.com) for late-breaking news, tips and software improvements as time goes by. And be sure to let us know on our NUE-PSK Yahoo Group reflector how the modem is working out for you!

RTTY Specs:

- 45 Baud, 170 Hz shift. (Other speeds and shifts may be supported later.)
- Normal operating convention is to use USB for RTTY. In the event that the station that you are attempting to connect with is instead using LSB, you may "reverse" the Mark and Space frequencies to allow this "cross-mode" connection.
- Normal mode, with the lower Mark frequency, is indicated by an N in the upper right corner of the LCD.
- Reverse mode, with the higher Mark frequency, is indicated by an R in the upper right corner of the LCD.
- Normal and Reverse may be toggled by typing Ctrl-R while the modem is in Receive mode. Typical usage of this toggling is to help the modem decode when the transmitter is on a different sideband.
- Generally, Normal mode is used when both transmitting and receiving stations are on the same sideband. (USB-USB or LSB-LSB.) When the stations are on different sidebands (USB-LSB or LSB-USB), type Ctrl-R to toggle to Reverse mode in order to enable proper transmit and receive.
- An L or F is also displayed in the upper right portion of the LCD, corresponding to LTRS or FIGS being received by the modem. The L and F may be toggled by typing Ctrl-C, which is useful if the corresponding LTRS or FIGS character is missing from the incoming data stream. Thus the user can correct such an error condition.

Updating the Modem to full RTTY Support (v2.10g):

- Using a USB Thumb Drive – You must have v1.34f (or later) previously on your modem, and have a USB card for this updating method to work. Transfer the file mem.dat onto your USB drive using your PC. Then place the USB drive into the modem and dial up "Flash Bootload" in the Config menu. Pressing the pushbutton will initiate the updating sequence that takes about 15 seconds, after which the modem automatically reboots and you'll see the new version number displayed in the splash screen.

- Other Methods – You can use a USB cable between your PC and modem (with the optional USB card), or you can use an external serial adapter (if you don't have the USB card option), or you can use the Microchip ICD2 programming pod. Details for using each of these methods can be found on our website page at http://www.nue-psk.com/software/LoadingTheLatestSoftware.html.

Getting Started:

- Select the Mode item in the Config menu. (Press the Select pushbutton for about 2 seconds, release and rotate the Tune encoder one position clockwise.)

- Rotate the Tune dial until the RTTY menu item is shown. Press the Select pushbutton to change to that mode. The press the pushbutton again to exit back to normal modem operation.

- Notice that the spectral display now shows two cursors. These cursors are used when tuning to a RTTY signal that has two characteristic spectral peaks separated by 170 Hz. When the frequency is properly adjusted, each cursor will point to a spectral peak.

- Two techniques may be used for adjusting the frequency to place the cursors beneath the two spectral peaks of the desired incoming signal. The modem's Tune dial may be used in the conventional manner to slide over to the received signal. Otherwise, the receiver's frequency dial may be adjust to move the spectral peaks of the desired signal such that they are positioned over the two cursors.

- If the modem does not immediately start properly decoding the incoming data stream, try pressing Ctrl-R to reverse the mark-space frequencies as described above. The sending operator might be on an opposite sideband from what you are using, and the mark-space frequencies would need to be the same for proper decoding.

RTTY Operating Tips:

- When using RTTY with your transceiver set to USB, the actual RF frequency is simply the addition of the transceiver setting plus the display frequency on the NUE-PSK modem. Further, most Digital modes (with the exception of RTTY) are usually run in USB.

- It should be noted that RTTY will not decode weak signals as well as PSK31. This is because the filters for RTTY are not as narrow. The modem will decode a PSK signal that is about one S-unit lower than what can be decoded with RTTY

- Macros work just fine in RTTY mode – same as in other modes, and is quite convenient for the "brag files" that are commonly used in RTTY.

- Beacon Mode works well with RTTY as well.

- If you wish to use RTTY mode exclusively for a while, it may be convenient to select Save Config from the Configure menu, thus saving your current mode (RTTY) so it comes up by default when you next turn on the modem.
- Before you write to tell us that "some typed characters are not showing up on the LCD", you'll need to remember that the older, 5-bit "Baudot code" used in RTTY communications is limited in the number of characters that are supported. Thus, only capital letters are able to be transmitted, and the only supported "FIGS" include: -, ?, :, &, !, &, #, ', (,), /, ", comma, semicolon and period. *(Characters **not** transmitted or displayed on the modem LCD include: %, @, ^, *, {, }, [,], |, \, +, =, ~, `, _, -, <, and >.)* Thus be careful not to use these characters when doing RTTY communications … otherwise your messages may be received in an unusual manner. (For example: "My email is george verizon.net", "It costs 23.44", "The Dow is up 2.1", "John I went home", etc.)

- Note that we have implemented the US version of Baudot character representation, as shown in the middle column below. For example, someone on a mechanical TTY keyboard (such as the Teletype Model 19) who types a FIGS key followed by the H key, a pound sign (#) will be sent and displayed on the NUE-PSK display. Correspondingly from the NUE-PSK modem keyboard, pressing the # key will transmit the FIGS code followed by the H code (or just the H code if the FIGS code was previously sent) and the # character will be printed on the receive side.

Baudot LTR and FIGS Characters

Letter	U.S. Figures	CCITT No.2 Figures
N/A	N/A	N/A
E	3	3
LF	LF	LF
A	-	-
Space	Space	Space
S	BELL	'
I	8	8
U	7	7
CR	CR	CR
D	$	WRU
R	4	4
J	'	Bell
N	,	,
F	!	!
C	:	:
K	(	(
T	5	5
Z	"	+
L	)	)
W	2	2
H	#	£
Y	6	6
P	0	0
Q	1	1
O	9	9
B	?	?
G	&	&
Figures Shift	Figures Shift	Figures Shift
M	.	.
X	/	/
V	;	=
Letters Shift	Letters Shift	Letters Shift