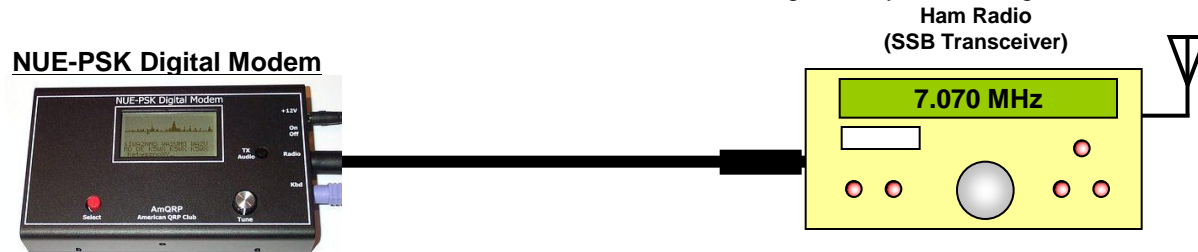


NUE-PSK Digital Modem

Radio Cable Guide

A guide for attaching a connector to the radio cable supplied with the NUE-PSK Digital Modem. Just follow these simple instructions to connect the modem audio and PTT signals to your SSB rig.



| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Type 0 (Stock Cable): Shipped standard with all modems. One end unterminated so you can add your own connector. Our spec defines wiring color codes for "type A" and "type B" versions of the cable.</p> | |
| <p>Type 1 Cable: Icom IC-703, -703Plus, -706MKIIG, -746, -746PRO, -7000, -2820 Kenwood TS-480(SAT) Yaesu FT-817, -857, -897, -450, -100</p> | <p>Type 2 Cable: Icom IC-756, -756PRO (and -II, -III), -707, -725, -725A IC-726, -732, -735, -736, -737, -738, -761, -765, IC-775, -781, -7400, -7800</p> |
| <p>Type 3 Cable: Ten Tec Argonaut 516, Orion (5-pin Aux jack) Yaesu FT-990, -1000, -1000/D, -1000MP, -1000MP Mark-V, -2000</p> | <p>Type 4 Cable: Yaesu FT-890, -900</p> |
| <p>Type 5 Cable: Ten Tec Scout 555</p> | <p>Type 6 Cable: Small Wonder Labs PSK-xx, Warbler</p> |
| <p>Type 7 Cable: Elecraft K2</p> | <p>Type 8 Cable: Ten Tec Orion I (565) and Orion II (566) (8-pin AUX jack for both)</p> |
| <p>Type 9 Cable: Kenwood TS140S, TS-450, TS-570TS-590, TS-690, TS,850, TS-2000</p> | <p>Type 10 Cable: Elecraft K3, Kenwood TS-930</p> |
| <p>Type 11 Cable: SG-2020, Alinco DX70</p> | <p>Type 12 Cable: Yaesu FT-7</p> |
| <p>Type 13 Cable: Icom IC-703, -703Plus, -706, -706MKII, -706MKIIG, -718, -7000, -7200, -9100</p> | <p>Type 14 Cable: Kenwood TS-50</p> |
| <p>Type 15 Cable: Yaesu FT-847</p> | <p>Type 16 Cable: YouKits TJ6A, Kenwood TS-130</p> |
| <p>Type 17 Cable: Ten Tec Eagle 599</p> | <p>Type 18 Cable: Yaesu FT-290R-II</p> |
| <p>Type 19 Cable: Ten Tec Paragon 585, Omni VI 563</p> | <p>Type 20 Cable: Yaesu TT-757</p> |
| <p>Type 21 Cable: Elecraft KX1, YouKits HB1B (both in CW Direct Mode)</p> | |
| <p>Type 23 Cable: Elecraft KX3</p> | <p>Type 24 Cable: Kenwood TS-930</p> |

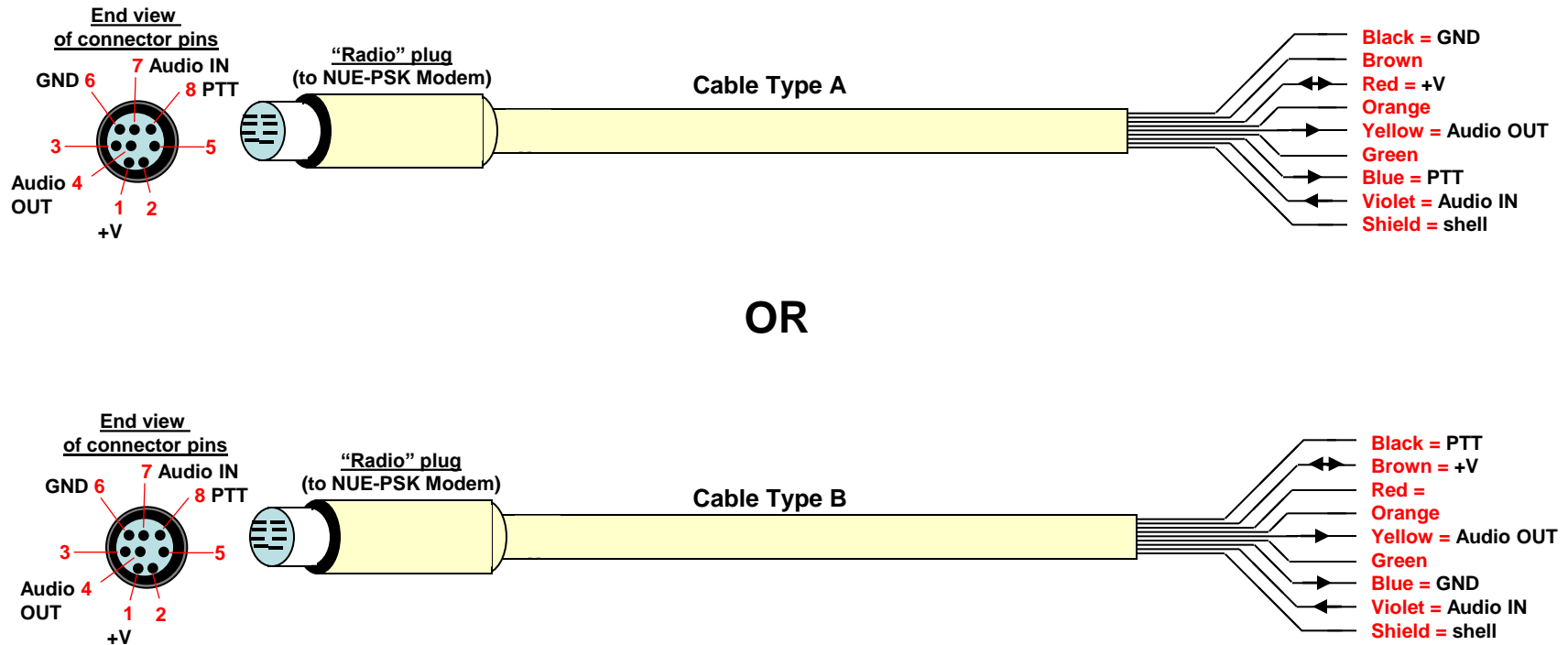
See the following pages for details on each cable type.

(NOTE: A great online resource for pin assignment to various radios can be found at http://usinterface.com/naviusa_007.htm)

Stock Radio Cable (Supplied with all modem purchases)

The cable supplied with the modem purchase will have color-coded wires, as shown in one of the two figures below. You will need to determine which type you have before attaching the connector required for the data connection to your specific radio.

You can easily determine which cable type you have by using a VOM to check for continuity from pin 8 on the molded Radio plug (on the left) to the blue wire on the right end of the cable. If there is continuity, you have Cable Type A. Otherwise, with pin 8 continuity to the black wire, you have Cable Type B



Radio Cable Type 1

for Yaesu FT-817, FT-857, FT-897, FT-450, FT-100
and Icom IC-703, IC-703 Plus, IC-706MKII, IC-746/PRO, IC-7000, IC-2820
and Kenwood TS-480(SAT)

Transmitter Settings Guidance for Digital Mode Operation

(For the FT-817. May be similar on other models.)

- 1) Set the rig to a PSK31 area of the band (e.g., 14.070 MHz) and set the rig operating mode to DIG (use arrow buttons above the display).
- 2) Set the rig's power level to be full 5W output. (Tap the F key, dial to the PWR MTR screen and tap A button repeatedly until you see the 3 bars blinking. Tap the F key again to exit.)
- 3) Select "PSK31-U" in rig menu #26 DIG MODE. (See the "Note" paragraph at bottom.)
- 4) Set the "Digital Mic" level to 50 in rig menu #25 DIG MIC.
- 5) Connect the rig RF output to a power meter with a dummy load attached.
- 6) Put the modem into TUNE (press F8) and adjust the TX Audio control to obtain about 3 watts of output power. Press F8 again to turn off the modem TUNE mode. (Since TUNE produces a CW signal, the BPSK signal will be somewhat lower on average, but will peak to this level at times.)
- 7) Use the CONFIGURE menu of the modem (press-hold the Select pushbutton) to read the Tx Audio level. It should be in the range of 15-20% at the default, power-on modem frequency of 1500 Hz.

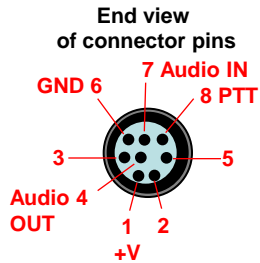
If You Don't Have a Power Meter – You can also adjust the Tx Audio output to the proper level by viewing the ALC meter bars when the modem is in TUNE mode. Starting with the Tx Audio control fully counter-clockwise, turn it up slowly until you just barely see the first ALC bar appear, then back it off slightly until it just disappears. This should also yield the same 15-20% Tx Audio reading in Configuration as obtained in step 7. (Make sure you are still using a dummy load.)

Determining Signal Quality – If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

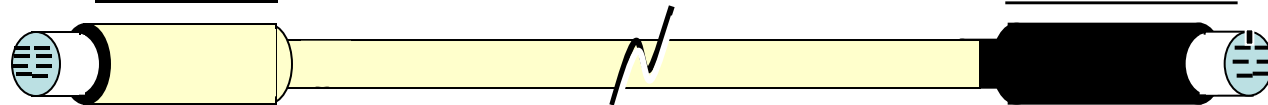
Note: Convention seems to suggest using "PSK31-U", as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the 817. If you use xxx-L, you have to subtract the modem displayed frequency from the frequency on the 817 to get the "true" frequency.

For further detailed descriptions, refer to the Transmitter Operation section of your transceiver manual. For example, see pages 38-40 of the FT-817ND manual. The manual can also be downloaded from the Yaesu website www.yaesu.com and look under Products.

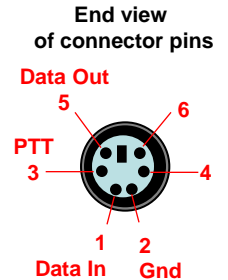
NUE-PSK Digital Modem



8-pin mini-DIN
Digital Modem



6-pin mini-DIN plug
HF TRANSCEIVER



Modem End

Pin 8 (PTT)
Pin 7 (Audio In)
Pin 6 (Ground)
Pin 4 (Audio Out)
Pin 1 (+V)

Radio End

Data Out
Ground
Data In
+V (caution)

Cable Wire Colors

| Type A Cable | or | Type B Cable |
|--------------|-------|--------------|
| blue | | black |
| violet | | violet |
| black | | blue |
| yellow | | yellow |
| red | | brown |

Icom IC-756, -756PRO, -756PRO-III, -707, -7400, -735, -736, -738, -726, -765, -732, -737, -775, -781, -761, -7800

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, if you have a 100 watt PEP rig, set it up for 100 watts on SSB.

Switch to Digital mode (if your rig provides that option, otherwise retain the SSB mode) and press F8 on the keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 15 to 40 watts with a 100 watt rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

If You Don't Have a Power Meter – You can also adjust the Tx Audio output to the proper level by viewing the ALC meter bars when the modem is in TUNE mode. Starting with the Tx Audio control fully counter-clockwise, turn it up slowly until you just barely see the first ALC bar appear, then back it off slightly until it just disappears. This should also yield the same 15-20% Tx Audio reading in Configuration as obtained in step 7. (Make sure you are still using a dummy load.)

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

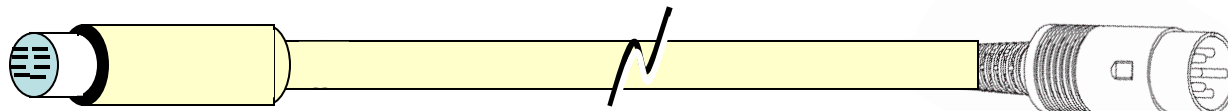
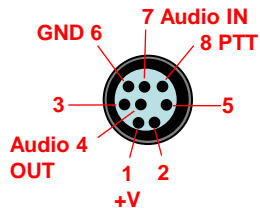
Note: Convention seems to suggest using "PSK31-U", as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the 817. If you use xxx-L, you have to subtract the modem displayed frequency from the frequency on the transceiver to get the "true" frequency.

For further detailed descriptions, refer to the Transmitter Operation section of your transceiver manual. For example, see page 19 of the IC-756 manual. The manual can also be downloaded from the IcomAmerica website <http://www.icomamerica.com/en/products/>

NUE-PSK Digital Modem

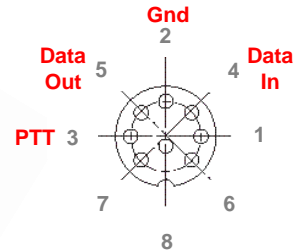


End view of connector pins



8-pin mini-DIN Digital Modem

8-pin DIN plug HF TRANSCEIVER



End view of pins on cable plug

| Modem End | Radio End | Cable Wire Colors |
|-------------------|--------------|------------------------------|
| | | Type A Cable or Type B Cable |
| Pin 8 (PTT) | PTT | blue .....black |
| Pin 7 (Audio In) | Data Out | violet .....violet |
| Pin 6 (Ground) | Ground | black .....blue |
| Pin 4 (Audio Out) | Data In | yellow .....yellow |
| Pin 1 (+V) | +V (caution) | red .....brown |

Ten Tec: Argonaut V 516, Orion 565 (with 5-pin AUX jack on rear panel)
Yaesu FT-990, FT-1000, FT-1000/D, FT-1000MP, FT-1000MP Mark-V, FT-2000

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, if you have a 100 watt PEP rig, set it up for 100 watts on SSB.

Switch to Digital mode (if your rig provides that option, otherwise retain the SSB mode) and press F8 on the keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 15 to 40 watts with a 100 watt rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

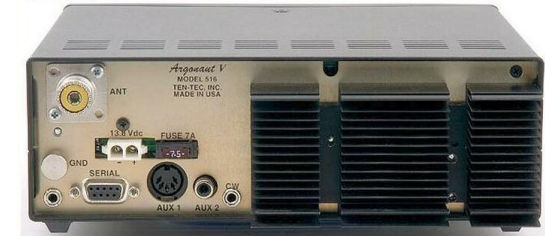
If You Don't Have a Power Meter – You can also adjust the Tx Audio output to the proper level by viewing the ALC meter bars when the modem is in TUNE mode. Starting with the Tx Audio control fully counter-clockwise, turn it up slowly until you just barely see the first ALC bar appear, then back it off slightly until it just disappears. This should also yield the same 15-20% Tx Audio reading in Configuration as obtained in step 7. (Make sure you are still using a dummy load.)

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

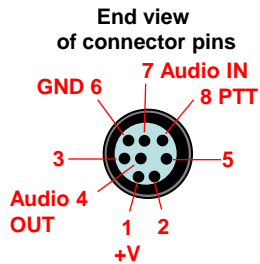
Note: Convention suggests using "PSK31-U", as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the rig. If instead you use the lower sideband, you have to subtract the modem displayed frequency from the frequency on the transceiver to get the "true" frequency.



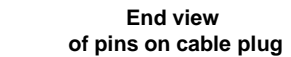
NUE-PSK Digital Modem



**Ten Tec Argonaut
(5-pin AUX jack)**



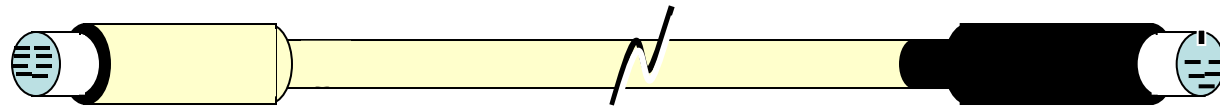
**8-pin mini-DIN
Digital Modem**



5-pin DIN plug

| Modem End | | | Radio End | |
|-------------------|---|--|--------------|---|
| Pin 8 (PTT) | → | | PTT | ← |
| Pin 7 (Audio In) | → | | Data Out | ← |
| Pin 6 (Ground) | → | | Ground | ← |
| Pin 4 (Audio Out) | → | | Data In | ← |
| Pin 1 (+V) | → | | +V (caution) | ← |

| Cable Wire Colors | |
|-------------------|--------------|
| Type A Cable | Type B Cable |
| blue | black |
| violet | violet |
| black | blue |
| yellow | yellow |
| red | brown |



Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, if you have a 100 watt PEP rig, set it up for 100 watts on SSB.

Switch to Digital mode (if your rig provides that option, otherwise retain the SSB mode) and press F8 on the keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 15 to 40 watts with a 100 watt rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

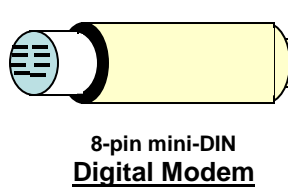
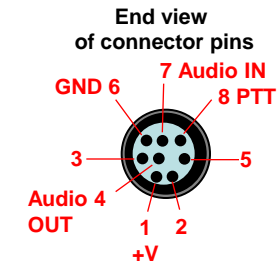
If You Don't Have a Power Meter – You can also adjust the Tx Audio output to the proper level by viewing the ALC meter bars when the modem is in TUNE mode. Starting with the Tx Audio control fully counter-clockwise, turn it up slowly until you just barely see the first ALC bar appear, then back it off slightly until it just disappears. This should also yield the same 15-20% Tx Audio reading in Configuration as obtained in step 7. (Make sure you are still using a dummy load.)

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using "PSK31-U", as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the rig. If instead you use the lower sideband, you have to subtract the modem displayed frequency from the frequency on the transceiver to get the "true" frequency.



NUE-PSK Digital Modem



8-pin mini-DIN Digital Modem

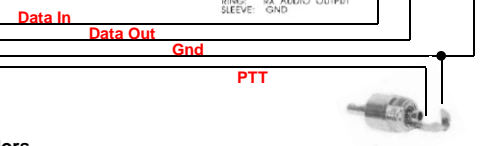
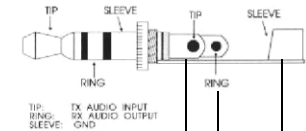
FT-900 TRANSCEIVER (Rear Panel)

Refer to the Digital Mode section of your transceiver manual. (Page 32 of the FT-900 manual.)

NOTE: The hand mic must be disconnected for the PTT jack to put the rig into transmit.



DATA IN / OUT (1/8" stereo plug)



PTT (RCA phono plug)
Mouser p/n: 174-4359-E

Modem End

- Pin 8 (PTT)
- Pin 7 (Audio In)
- Pin 6 (Ground)
- Pin 4 (Audio Out)
- Pin 1 (+V)

Radio End

- PTT
- Data Out
- Ground
- Data In
- +V (caution)

Cable Wire Colors

| | Type A Cable | OR | Type B Cable |
|--------------|--------------|----|--------------|
| PTT | blue | | black |
| Data Out | violet | | violet |
| Ground | black | | blue |
| Data In | yellow | | yellow |
| +V (caution) | red | | brown |

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. You will be using the Tx Audio control on the modem to adjust the audio level sent to the Scout.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation. The Scout is a 50 watt PEP rig, so set it up for 50 watts on SSB.

Still in SSB mode, press F8 on the modem keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone that is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit.

Adjust the Tx Audio control on the modem (just to the right of the display) to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended (about 7 to 20 watts with the Scout). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. Use the rig's power meter when making this setting. Once the power level has been set with

the Tx Audio control, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

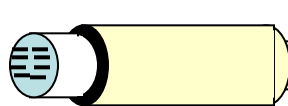
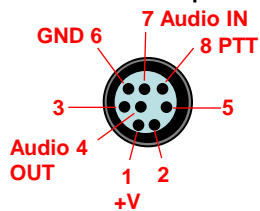
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Note: Convention suggests using "PSK31-U", as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the rig. If instead you use the lower sideband, you have to subtract the modem displayed frequency from the frequency on the transceiver to get the "true" frequency.



NUE-PSK Digital Modem

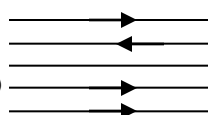
End view of connector pins



8-pin mini-DIN Digital Modem

Modem End

- Pin 8 (PTT)
- Pin 7 (Audio In)
- Pin 6 (Ground)
- Pin 4 (Audio Out)
- Pin 1 (+V)



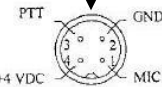
Radio End

- PTT
- Data Out
- Ground
- Data In
- +V (caution)

Cable Wire Colors

| Type A Cable | Or | Type B Cable |
|--------------|----|--------------|
| blue | | black |
| violet | | violet |
| black | | blue |
| yellow | | yellow |
| red | | brown |

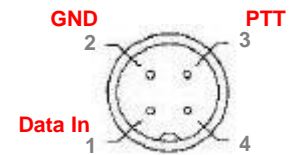
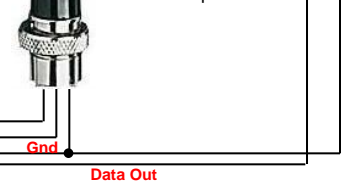
Ten Tec Scout 555



Plug the 4-pin jack into the front panel Mic connector on the Scout. This connection is for the Tx audio and modem Push To Talk lines.

MIC Jack Radio Shack 274-001

Data Out (1/4" stereo phone plug) Mouser p/n: 171-PA62111-1-E



End view of pins on cable plug

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

Press F8 on the keyboard to place the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 1.6 watts with a 4 watt PSK-xx rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

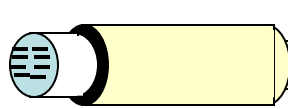
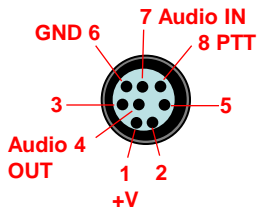
Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

The actual operating frequency of the modem+PSKxx rig is just the sum or difference of the center frequency of the PSK-xx rig and the audio frequency shown on the spectrum display of the modem. For example, for a PSK-40 used with a modem spectrum display indicating 1000 Hz, the actual RF frequency being used is 14.071 - 1000 Hz = 14.070. (It would be an addition on a PSK-20 since upper sideband is used.)

NUE-PSK Digital Modem



End view of connector pins

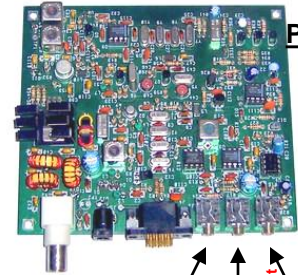


8-pin mini-DIN Digital Modem

An original PSK20 is shown (used RS232 to control the PTT). I modified the PSK-20 PTT line on the DB9 connector circuit is easily modified to allow the PTT line of the modem to key the PSK-20. The modem cable is terminated with 3 stereo plugs--one for audio to the PSK-20, one for audio from the PSK-20 to the modem, and the third for PTT.

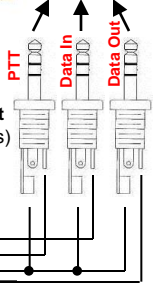
The newer PSK-xx rigs do not have a DB9 serial connector for PTT control since they use VOX. So only the audio in and audio out plugs are required to interface to the modem.

The NUE-PSK modem also must have its internal Hi-Level audio jumper (red shunt) in place to provide enough audio drive for the PSK20.

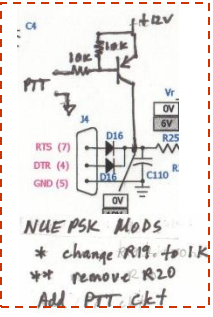


PSK-20

PTT, Data In, Data Out (1/8" stereo phono plugs)



| Modem End | | Radio End | |
|-------------------|---|--------------|---------------------------|
| | | Type A Cable | Type B Cable |
| Pin 8 (PTT) | → | PTT | blue black |
| Pin 7 (Audio In) | ← | Data Out | violet |
| Pin 6 (Ground) | → | Ground | black blue |
| Pin 4 (Audio Out) | → | Data In | yellow yellow |
| Pin 1 (+V) | → | +V (caution) | red brown |



Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

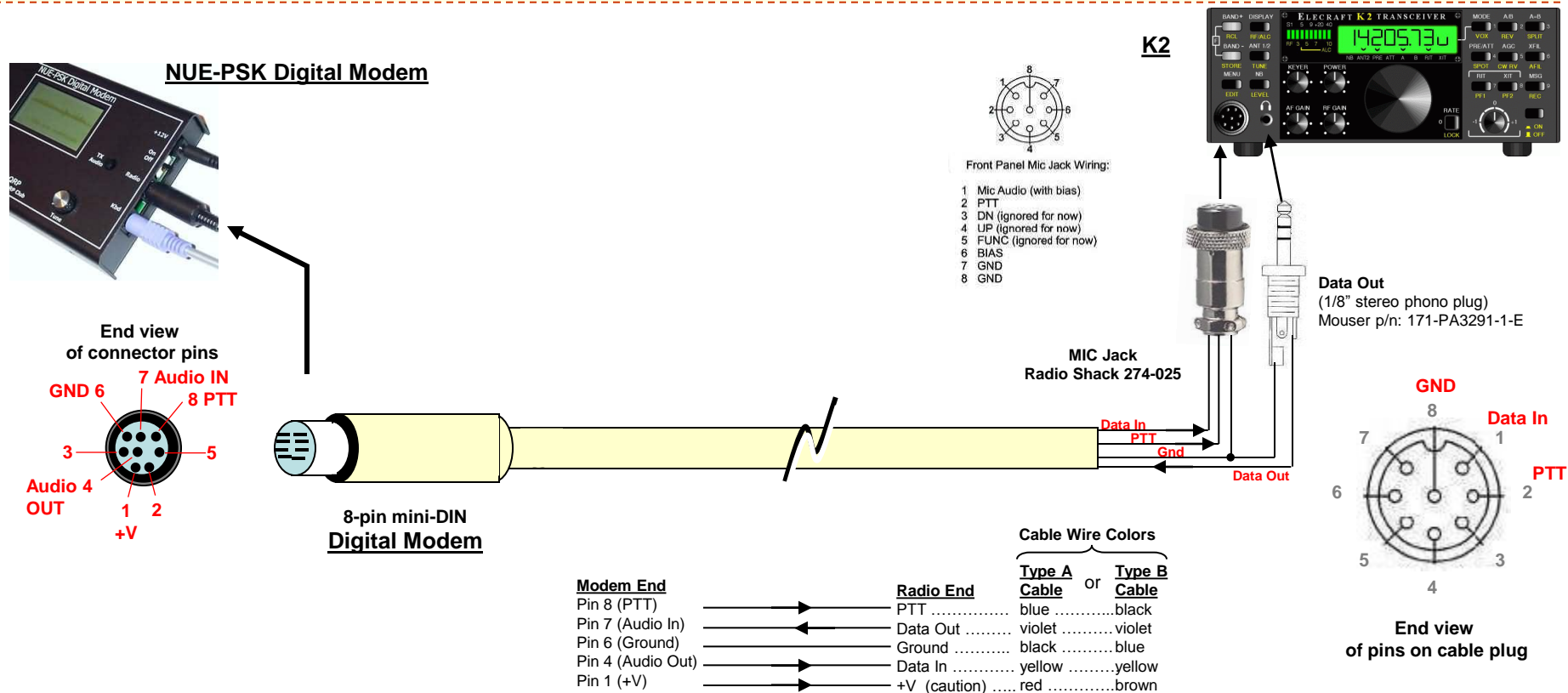
We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, if you have a 10 watt PEP Elecraft rig, set it up for 10 watts on SSB.

Switch to SSB mode and press F8 on the keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 1.5 to 4 watts with a 10 watt rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

Instead of using the power meter on the K2, you can also adjust the Tx Audio output to the proper level by viewing the ALC meter bars when the modem is in TUNE mode. Starting with the Tx Audio control fully counter-clockwise, turn it up slowly until you just barely see the first ALC bar appear, then back it off slightly until it just disappears. This should also yield the same 15-20% Tx Audio reading in Configuration as obtained in step 7. (Make sure you are still using a dummy load.)

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using USB for PSK-31 modes. The actual operating frequency then is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the K2.



for Ten Tec Orion 565 and Orion 566 (both with 8-pin AUX jack)

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, if you have a 100 watt PEP rig, set it up for 100 watts on SSB.

Switch to Digital mode (if your rig provides that option, otherwise retain the SSB mode) and press F8 on the keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 15 to 40 watts with a 100 watt rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

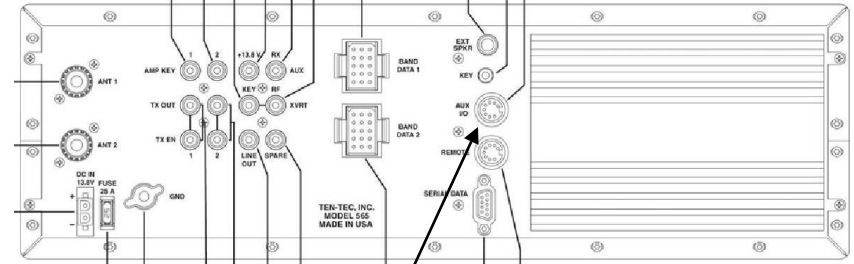
If You Don't Have a Power Meter – You can also adjust the Tx Audio output to the proper level by viewing the ALC meter bars when the modem is in TUNE mode. Starting with the Tx Audio control fully counter-clockwise, turn it up slowly until you just barely see the first ALC bar appear, then back it off slightly until it just disappears. This should also yield the same 15-20% Tx Audio reading in Configuration as obtained in step 7. (Make sure you are still using a dummy load.)

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

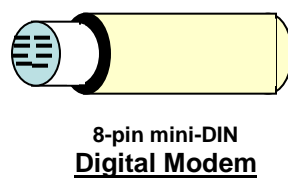
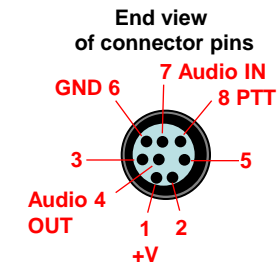
Note: Convention suggests using "PSK31-U", as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the rig. If instead you use the lower sideband, you have to subtract the modem displayed frequency from the frequency on the transceiver to get the "true" frequency.



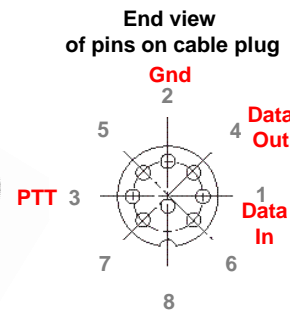
NUE-PSK Digital Modem



**Ten Tec Orion 565
(with 8-pin AUX jack)**



**8-pin mini-DIN
Digital Modem**



**End view
of pins on cable plug**

| Modem End | | Radio End | | Cable Wire Colors | | |
|-------------------|---|------------------|-------|--------------------------|-------------------------|--------|
| | | | | Type A Cable | Type B Cable | |
| Pin 8 (PTT) | → | PTT | ..... | blue | ..... | black |
| Pin 7 (Audio In) | ← | Data Out | ..... | violet | ..... | violet |
| Pin 6 (Ground) | → | Ground | ..... | black | ..... | black |
| Pin 4 (Audio Out) | → | Data In | ..... | yellow | ..... | yellow |
| Pin 1 (+V) | → | +V (caution) | ..... | red | ..... | brown |

For detailed description, refer to the Transmitter Operation section of your transceiver manual.
<http://images.tentec.com/radio/pdf/565%20manual%20revised%20February%202005.pdf>

for Kenwood TS-140S, TS-450, TS-570, TS-590, TS-690 (with 13-pin AUX jack), TS-850, TS-2000

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, using the power setting you usually employ. For example, if you have a 100 watt PEP rig, set it up for 100 watts on SSB.

Switch the rig to SSB mode and press F8 on the keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 15 to 40 watts with a 100 watt rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. Using the built-in meter in the Power Out setting, or an external power meter, is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

You can also adjust the Tx Audio output to the proper level by viewing the ALC meter bars on the rig's meter when the modem is in TUNE mode. Starting with the Tx Audio control fully counter-clockwise, turn it up slowly until you just barely see the first ALC bar appear, then back it off slightly until it just disappears. This should also yield the same 15-20% Tx Audio reading in Configuration as obtained in step 7. (Make sure you are still using a dummy load.)

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using the Upper sideband setting on the rig, as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the rig. If instead you use the lower sideband, you have to subtract the modem displayed frequency from the frequency on the transceiver to get the "true" frequency.

TS-2000 Menu Settings

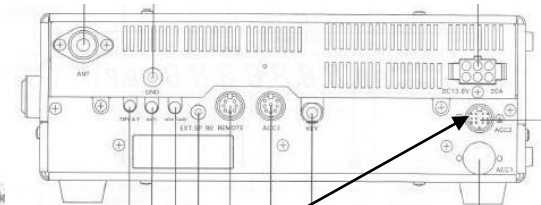
For best modem operation with the TS-2000, the following menu settings are recommended ...

Menu 50B: AF Input Level for Packet = 1 or 2

Menu 50C: Main Band AF Output Level for Packet = 5 or 6

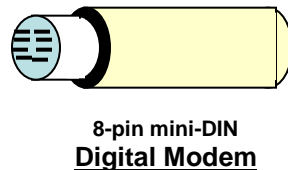
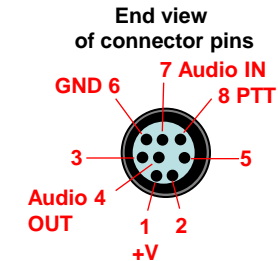


NUE-PSK Digital Modem

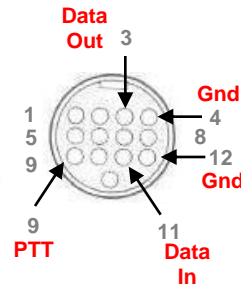


Kenwood TS-140S (with 13-pin AUX jack)

End view of pins on cable plug



8-pin mini-DIN Digital Modem



13-pin plug (Digi-Key CP-1013-ND)

| Modem End | Radio End | Cable Wire Colors |
|-------------------|--------------|------------------------------|
| | | Type A Cable or Type B Cable |
| Pin 8 (PTT) | PTT | blue black |
| Pin 7 (Audio In) | Data Out | violet violet |
| Pin 6 (Ground) | Ground | black blue |
| Pin 4 (Audio Out) | Data In | yellow yellow |
| Pin 1 (+V) | +V (caution) | red brown |

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

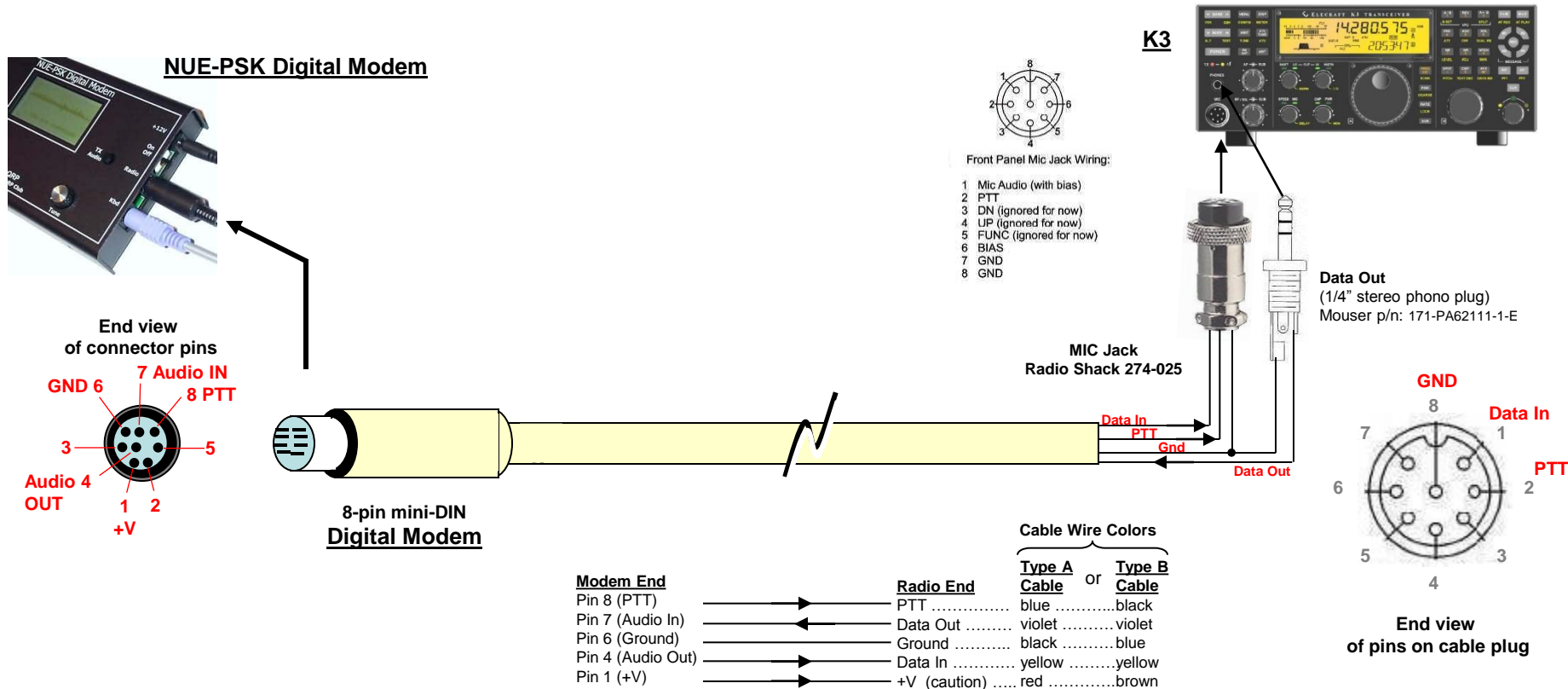
We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, if you have a 10 watt PEP Elecraft rig, set it up for 10 watts on SSB.

Switch to SSB mode and press F8 on the keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 1.5 to 4 watts with a 10 watt rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

Instead of using the power meter on the K3, you can also adjust the Tx Audio output to the proper level by viewing the ALC meter bars when the modem is in TUNE mode. Starting with the Tx Audio control fully counter-clockwise, turn it up slowly until you just barely see the first ALC bar appear, then back it off slightly until it just disappears. This should also yield the same 15-20% Tx Audio reading in Configuration as obtained in step 7. (Make sure you are still using a dummy load.)

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using USB for PSK-31 modes. The actual operating frequency then is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the K3.



Transmitter Settings Guidance for Digital Mode Operation

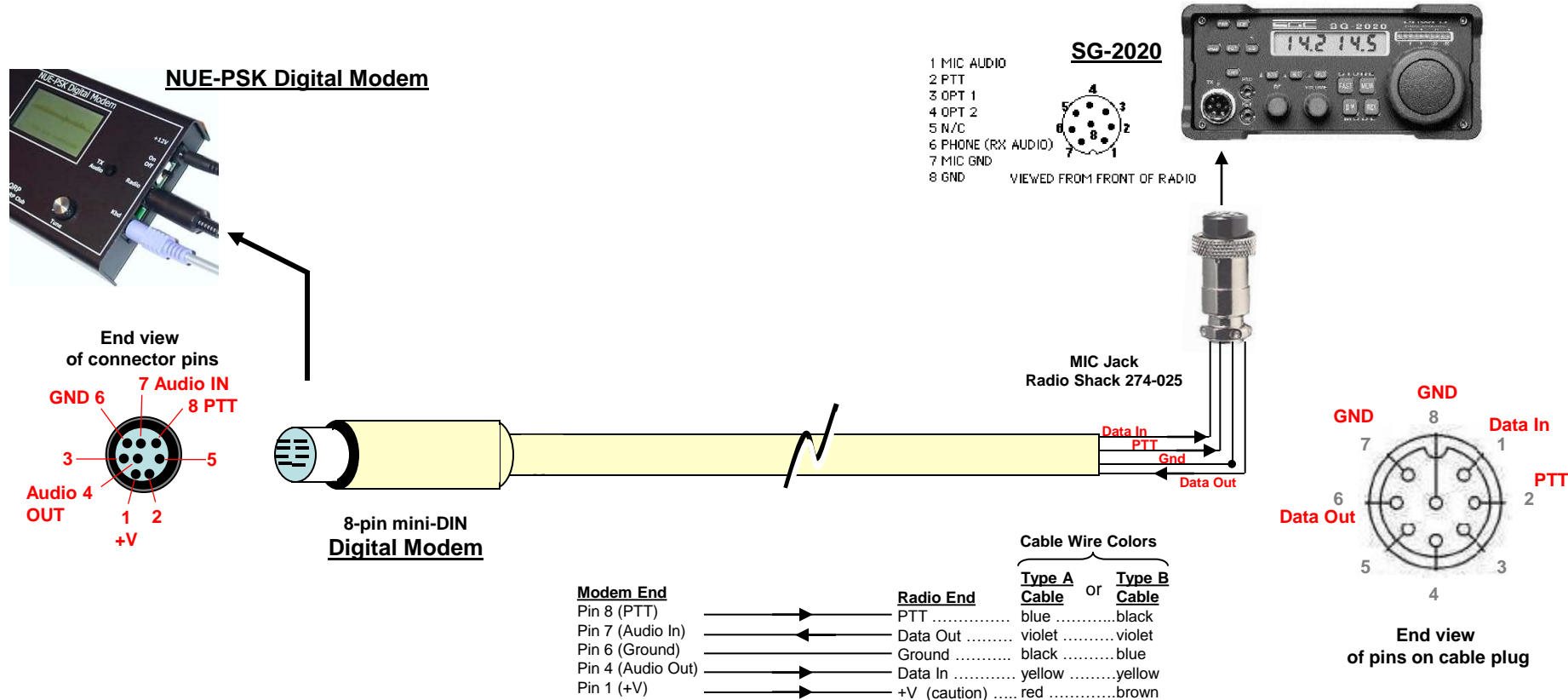
Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future.

The SG-2020 is designed for various HF data transmission modes, such as RTTY, NAVTEX, weatherfax, and packet. Connection to the radio is through the microphone jack on the front panel, using standard audio in, audio out, PTT, and ground. Select either USB for conventional PSK31 data transmission and adjust the bandwidth setting as described in the manual for clear data reception.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, set up the SG-2020 for full 20 W PEP output on SSB. Press F8 on the keyboard to place the modem in the TUNE state, which is denoted by "TUNE" at the top left of the modem display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 3 to 8 watts on the SG-2020). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using USB for PSK-31 modes. The actual operating frequency then is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the K2.



Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. You will be using the Tx Audio control on the modem to adjust the audio level sent to the FT-7.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation. The FT-7 is a 20 watt PEP rig, so set it up for 20 watts on SSB, using the Mic Gain control on the rig.

Still in SSB mode, press F8 on the modem keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone that is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit.

Adjust the Tx Audio control on the modem (just to the right of the display) to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended (about 3 to 8 watts with the FT-7). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. Use the rig's power meter when making this setting. Once the power level has been set with the

Tx Audio control, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

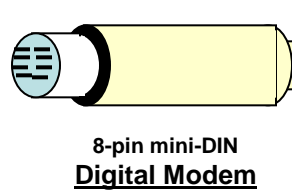
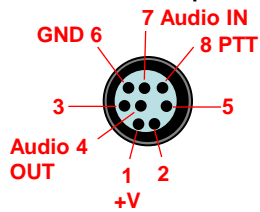
Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using "PSK31-U", as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the rig. If instead you use the lower sideband, you have to subtract the modem displayed frequency from the frequency on the transceiver to get the "true" frequency.



NUE-PSK Digital Modem

End view of connector pins



Modem End

- Pin 8 (PTT)
- Pin 7 (Audio In)
- Pin 6 (Ground)
- Pin 4 (Audio Out)
- Pin 1 (+V)

Radio End

- PTT
- Data Out
- Ground
- Data In
- +V (caution)

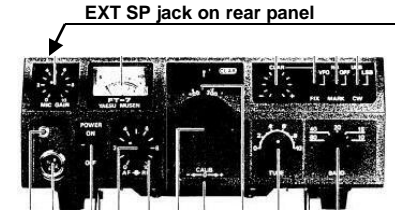
Cable Wire Colors

| | Type A Cable | or | Type B Cable |
|--------------|--------------|----|--------------|
| PTT | blue | | black |
| Data Out | violet | | violet |
| Ground | black | | blue |
| Data In | yellow | | yellow |
| +V (caution) | red | | brown |

FT-7

Plug the 1/8" stereo connector into the EXT SP jack on the rear panel of the FT-7.

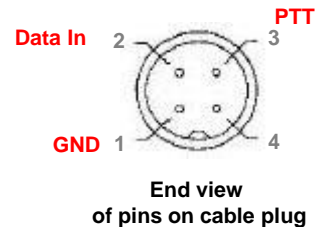
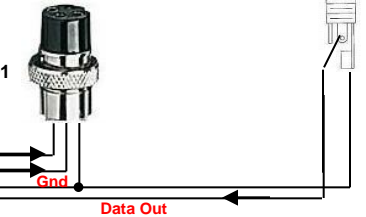
Plug the 4-pin jack into the front panel Mic connector on the FT-7. This connection is for the Tx audio and modem Push To Talk lines.



EXT SP jack on rear panel

MIC Jack
Radio Shack 274-001

Data Out (1/8" stereo phono plug)
Mouser p/n: 171-PA3291-1-E



Icom IC-703, -703Plus, -706, -706MKII, -706MKIIG, -718, -7000, -7200, -9100

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. You will be using the Tx Audio control on the modem to adjust the audio level sent to the FT-7.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation. The FT-7 is a 20 watt PEP rig, so set it up for 20 watts on SSB, using the Mic Gain control on the rig.

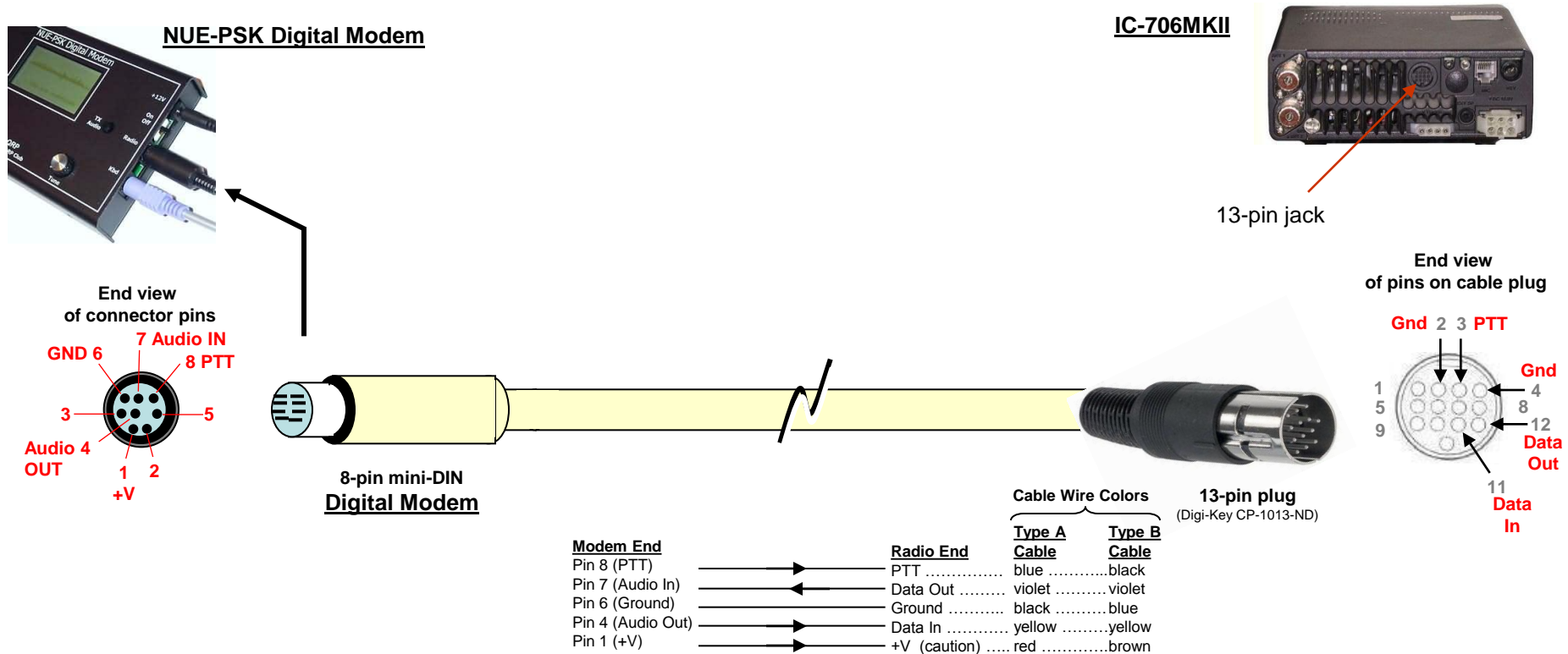
Still in SSB mode, press F8 on the modem keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone that is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit.

Adjust the Tx Audio control on the modem (just to the right of the display) to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended (about 3 to 8 watts with the FT-7). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. Use the rig's power meter when making this setting. Once the power level has been set with the

Tx Audio control, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using "PSK31-U", as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the rig. If instead you use the lower sideband, you have to subtract the modem displayed frequency from the frequency on the transceiver to get the "true" frequency.



Transmitter Settings Guidance for Digital Mode Operation

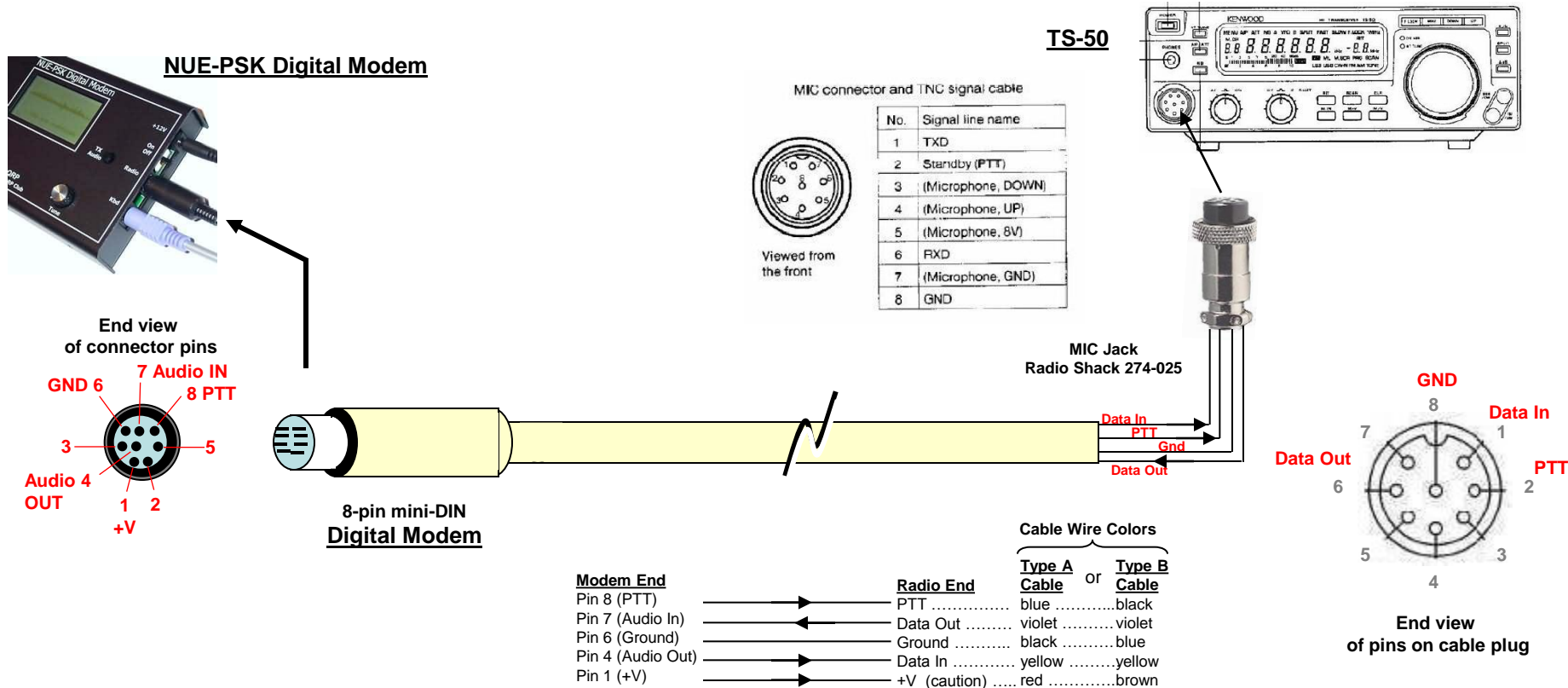
Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

Set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, set it up for 10 watts on SSB. And for initial setup, connect an RF power meter and dummy load to the antenna jack.

Switch to SSB mode and press F8 on the keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 1.5 to 4 watts with a 10 watt rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. Remove the dummy load and you should now be ready for transmitting PSK.

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using USB for PSK-31 modes. The actual operating frequency then is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the transceiver.



Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

Set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, set it up for 10 watts on SSB. And for initial setup, connect an RF power meter and dummy load to the antenna jack.

Switch to SSB mode and press F8 on the keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 1.5 to 4 watts with a 10 watt rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. Remove the dummy load and you should now be ready for transmitting PSK.

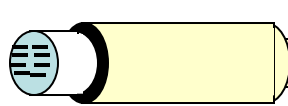
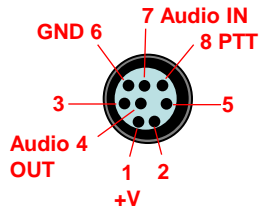
Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using USB for PSK-31 modes. The actual operating frequency then is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the transceiver.



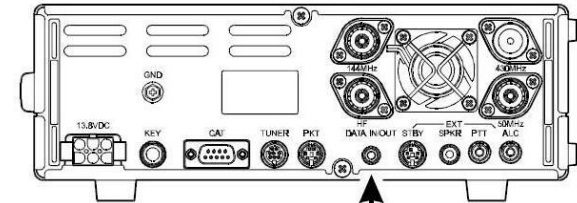
NUE-PSK Digital Modem

End view
of connector pins

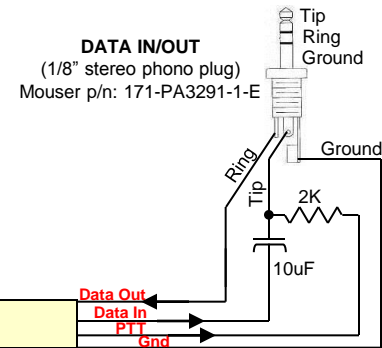


**8-pin mini-DIN
Digital Modem**

FT-847



DATA IN/OUT
(1/8" stereo phono plug)
Mouser p/n: 171-PA3291-1-E



Modem End

- Pin 8 (PTT) →
- Pin 7 (Audio In) ←
- Pin 6 (Ground) →
- Pin 4 (Audio Out) →
- Pin 1 (+V) →

Radio End

- PTT blue
- Data Out violet
- Ground black
- Data In yellow
- +V (caution) red

Cable Wire Colors

| Type A Cable | or | Type B Cable |
|-----------------|-------|-----------------|
| blue | | black |
| violet | | violet |
| black | | blue |
| yellow | | yellow |
| red | | brown |

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. You will be using the Tx Audio control on the modem to adjust the audio level sent to the Scout.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation. With the rig in SSB mode, press F8 on the modem keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone that is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit.

Adjust the Tx Audio control on the modem (just to the right of the display) to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended (about 2-4 watts with the Scout). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. Use the rig's power meter when making this setting. Once the power

level has been set with the Tx Audio control, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

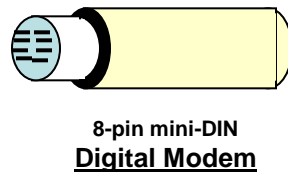
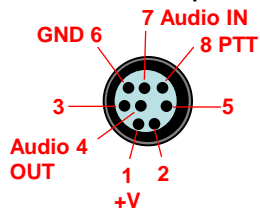
Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using "PSK31-U", as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the rig. If instead you use the lower sideband, you have to subtract the modem displayed frequency from the frequency on the transceiver to get the "true" frequency.



NUE-PSK Digital Modem

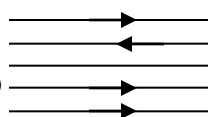
End view of connector pins



8-pin mini-DIN Digital Modem

Modem End

- Pin 8 (PTT)
- Pin 7 (Audio In)
- Pin 6 (Ground)
- Pin 4 (Audio Out)
- Pin 1 (+V)



Radio End

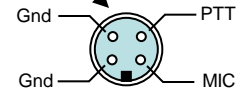
- PTT
- Data Out
- Ground
- Data In
- +V (caution)

Cable Wire Colors

| Type A Cable | or | Type B Cable |
|--------------|----|--------------|
| blue | | black |
| violet | | violet |
| black | | blue |
| yellow | | yellow |
| red | | brown |

The TJ6A does not have a "phones" jack, although you may wish to install one on the rear panel. If you do, the supplied 1/8" stereo plug can plug in to supply the Rx audio to the modem. Otherwise, tap onto the speaker terminals with the Data Out and Ground wires from the modem cable, as shown below.

TJ6A

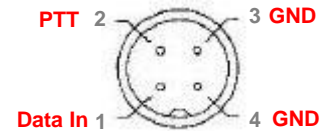
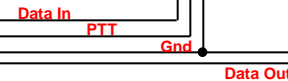


Plug the 4-pin jack into the front panel Mic connector on the TJ6A. This connection is for the Tx audio and modem Push To Talk lines.



Data Out
(1/8" stereo phone plug)
Mouser p/n: 171-PA8291-1-E

MIC Jack
Radio Shack 274-001



End view of pins on cable plug

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

To set up the Eagle for digital communications using the ACC-1 rear connector you must first turn on the ACC-1 line input. Press and hold the MIC button until the word MIC disappears from the front screen and just the gain numbers appear on the screen. You may now adjust the line level gain for the proper levels to your computer or TNC. Pressing the MIC button one more time will toggle the line input off and the microphone input will be turned back on and the display will again show MIC

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, if you have a 100 watt PEP rig, set it up for 100 watts on SSB.

Switch to Digital mode (if your rig provides that option, otherwise retain the SSB mode) and press F8 on the keyboard. This places the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 15 to 40 watts with a 100 watt rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

If You Don't Have a Power Meter – You can also adjust the Tx Audio output to the proper level by viewing the ALC meter bars when the modem is in TUNE mode. Starting with the Tx Audio control fully counter-clockwise, turn it up slowly until you just barely see the first ALC bar appear, then back it off slightly until it just disappears. This should also yield the same 15-20% Tx Audio reading in Configuration as obtained in step 7. (Make sure you are still using a dummy load.)

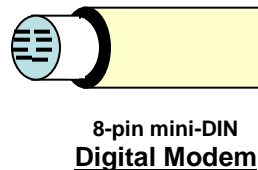
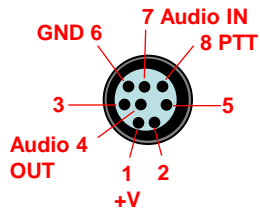
Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using "PSK31-U", as recommended in step 2. This way the actual operating frequency is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the rig. If instead you use the lower sideband, you have to subtract the modem displayed frequency from the frequency on the transceiver to get the "true" frequency.

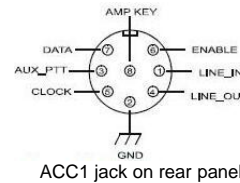


NUE-PSK Digital Modem

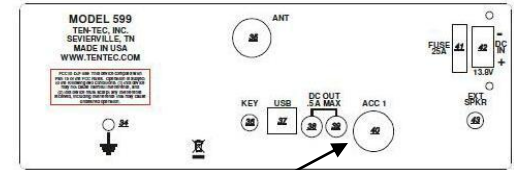
End view of connector pins



8-pin mini-DIN Digital Modem

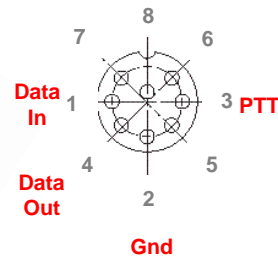


ACC1 jack on rear panel



Ten Tec Eagle 599 (with 8-pin ACC1 jack)

End view of pins on cable plug



| Modem End | Radio End | Cable Wire Colors |
|-------------------|--------------|------------------------------|
| | | Type A Cable or Type B Cable |
| Pin 8 (PTT) | PTT | blue black |
| Pin 7 (Audio In) | Data Out | violet violet |
| Pin 6 (Ground) | Ground | black blue |
| Pin 4 (Audio Out) | Data In | yellow yellow |
| Pin 1 (+V) | +V (caution) | red brown |

Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future.

Connection to the radio is through the microphone jack on the front panel, using standard audio in, audio out, PTT, and ground. Select either USB for conventional PSK31 data transmission.

We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, set up the radio for full output on SSB. Press F8 on the keyboard to place the modem in the TUNE state, which is denoted by "TUNE" at the top left of the modem display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

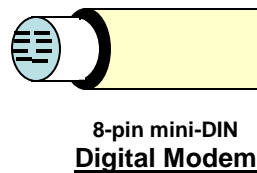
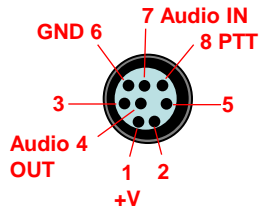
Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

Note: Convention suggests using USB for PSK-31 modes. The actual operating frequency then is just the sum of the audio frequency as shown on the modem, and the frequency shown on the dial of the K2.



NUE-PSK Digital Modem

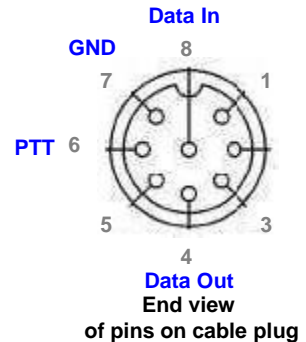
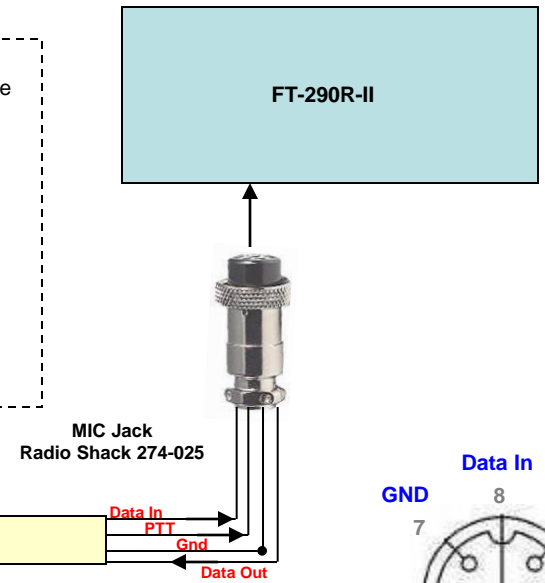
End view of connector pins



From Ken VA3NEK ... The FT-290 is an all mode 2 meter job that I would like to try out the NUE-PSK with. It has an 8 pin mic connector (MH-10F8) that uses;

- Pin 1: Up
- Pin 2: +B
- Pin 3: DWN
- Pin 4: Spkr
- Pin 5: NC
- Pin 6: PTT
- Pin 7: GND
- Pin 8: MIC

Unverified connections.



Modem End

- Pin 8 (PTT)
- Pin 7 (Audio In)
- Pin 6 (Ground)
- Pin 4 (Audio Out)
- Pin 1 (+V)

Radio End

- PTT
- Data Out
- Ground
- Data In
- +V (caution)

Cable Wire Colors

- | Type A Cable | or | Type B Cable |
|--------------|-------|--------------|
| blue | | black |
| violet | | violet |
| black | | blue |
| yellow | | yellow |
| red | | brown |

Transmitter Settings Guidance for Digital Mode Operation

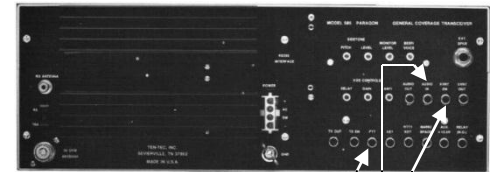
Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

Press F8 on the keyboard to place the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 1.6 watts with a 4 watt PSK-xx rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

The actual operating frequency of the modem+PSKxx rig is just the sum or difference of the center frequency of the PSK-xx rig and the audio frequency shown on the spectrum display of the modem. For example, for a PSK-40 used with a modem spectrum display indicating 1000 Hz, the actual RF frequency being used is 14.071 + 1000 Hz = 14.070. (It would be an addition on a PSK-20 since upper sideband is used.)

TT Paragon, Omni VI



PTT
Data In
Data Out

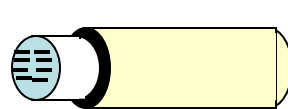
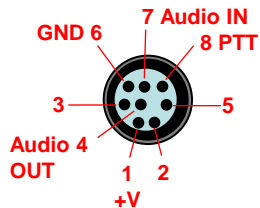


(RCA phono plugs)
Mouser p/n: 174-4359-E

NUE-PSK Digital Modem



End view
of connector pins



8-pin mini-DIN
Digital Modem

Modem End

- Pin 8 (PTT)
- Pin 7 (Audio In)
- Pin 6 (Ground)
- Pin 4 (Audio Out)
- Pin 1 (+V)

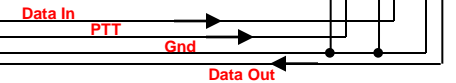
Radio End

- PTT blue
- Data Out violet
- Ground black
- Data In yellow
- +V (caution) red

Cable Wire Colors

Type A Cable or Type B Cable

- PTT blue black
- Data Out violet violet
- Ground black blue
- Data In yellow yellow
- +V (caution) red brown



Transmitter Settings Guidance for Digital Mode Operation

Since PSK signals generated by the modem contain simultaneous multiple frequencies (over a very narrow bandwidth), it is imperative that the audio output from the modem not overdrive the input to the rig, or very poor signal quality will result. To facilitate setting the audio drive to the rig, a potentiometer on the modem may be used to adjust the level. In addition, the modem includes provision for "measuring" the position of the potentiometer, so that it can be easily reset to the same setting in the future. More on this later.

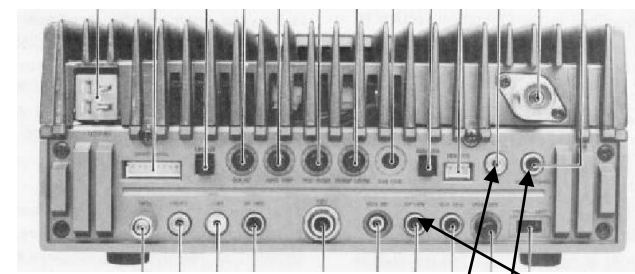
Press F8 on the keyboard to place the modem in the TUNE state, which is denoted by "TUNE" at the top left of the display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. (i.e. 1.6 watts with a 4 watt PSK-xx rig). Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.

The actual operating frequency of the modem+PSKxx rig is just the sum or difference of the center frequency of the PSX-xx rig and the audio frequency shown on the spectrum display of the modem. For example, for a PSK-40 used with a modem spectrum display indicating 1000 Hz, the actual RF frequency being used is 14.071 - 1000 Hz = 14.070. (It would be an addition on a PSK-20 since upper sideband is used.)



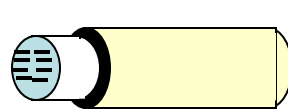
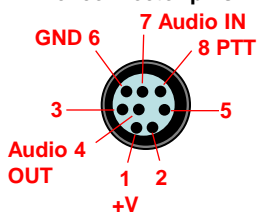
NUE-PSK Digital Modem



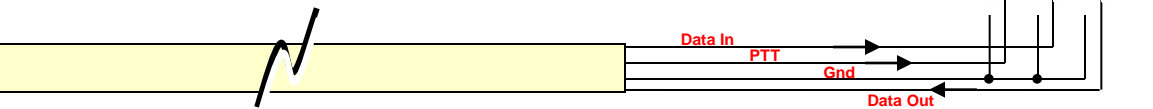
FT-757

PTT
Data In
Data Out

End view of connector pins



8-pin mini-DIN Digital Modem



(RCA phono plugs)
Mouser p/n: 174-4359-E

| Modem End | Radio End | Cable Wire Colors | |
|-------------------|--------------|-------------------|--------------|
| | | Type A Cable | Type B Cable |
| Pin 8 (PTT) | PTT | blue | black |
| Pin 7 (Audio In) | Data Out | violet | violet |
| Pin 6 (Ground) | Ground | black | blue |
| Pin 4 (Audio Out) | Data In | yellow | yellow |
| Pin 1 (+V) | +V (caution) | red | brown |

Connection to CW Transceivers for "CW Direct" Mode

The "CW Direct" mode is used with CW transceivers such as the Elecraft KX1. In this mode, the NUE-PSK toggles its PTT line (blue cable) in Morse code, such that the radio operates as if a straight (manual) key is inserted into its key input jack. (Don't forget to set the KX1 "INP" mode to "Hnd", indicating straight key mode.)

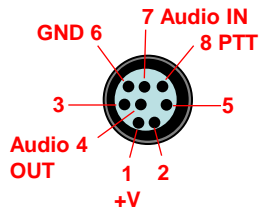
Then, with the "Data Out" line (red cable) plugged into the radio's headphone jack, the modem can will be able to "read" (decode) the CW signals being received.

It will be very helpful to listen to the radio's output at the same time as when the modem is plugged it, as this will assist in finding the CW signals you wish to copy. To do this, a common "1-to-2" earphone splitter jack may be used, available from radio Shack, best Buy, etc., thus enabling you to plug in both your headphones and the modem "Data Out" cable to the KX1. See photo below.

NUE-PSK Digital Modem



End view of connector pins



8-pin mini-DIN Digital Modem



Connections from the NUE-PSK Modem to the Elecraft KX1 CW Transceiver

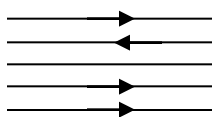
KX1



PTT, Data In, Data Out (1/8" stereo phono plugs) Mouser p/n: 171-PA3291-1-E

Modem End

- Pin 8 (PTT)
- Pin 7 (Audio In)
- Pin 6 (Ground)
- Pin 4 (Audio Out)
- Pin 1 (+V)



Radio End

- PTT blue
- Data Out violet
- Ground black
- Data In yellow
- +V (caution) red

Cable Wire Colors

Type A Cable or Type B Cable

- PTT blue black
- Data Out violet violet
- Ground black blue
- Data In yellow yellow
- +V (caution) red brown

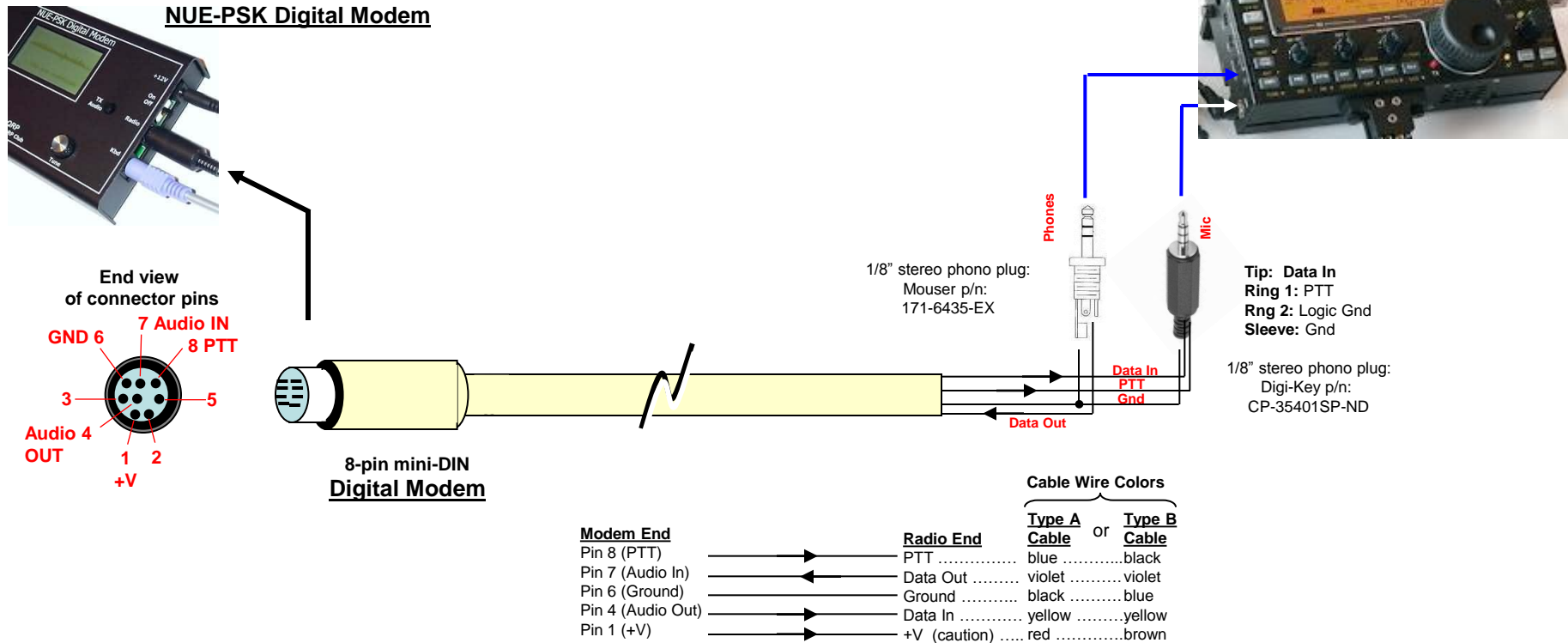
Transmitter Settings Guidance for Digital Mode Operation

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We have found that the best way to set up for PSK operation is to initially set up the transceiver for normal SSB operation, including whatever power setting you usually employ. For example, set up the TS-930 for full output on SSB. Press F8 on the keyboard to place the modem in the TUNE state, which is denoted by "TUNE" at the top left of the modem display. The modem is now generating a continuous tone, which is fed to the audio input of the rig. The PTT signal from the modem should also cause the transceiver to switch to Transmit. At this point, the potentiometer on the modem (just to the right of the display) can be adjusted to set the power level of the transceiver. A transmit power of 15 to 40 per cent of the rig's rated power is recommended. Keeping the power at this level does two things. First, it minimizes distortion due to clipping. Second, it avoids excessive heating in the rig finals, since PSK is a 100% duty cycle mode. A power meter is very handy for making this setting. Once the potentiometer has been set, press F8 again to return to receive mode. You should now be ready for transmitting PSK.

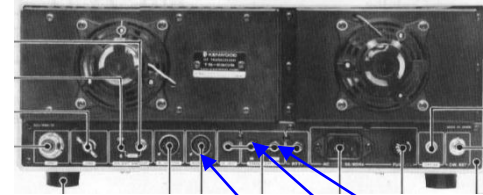
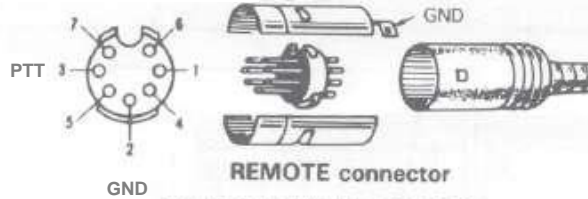
If You Don't Have a Power Meter – You can also adjust the Tx Audio output to the proper level by viewing the ALC meter bars when the modem is in TUNE mode. Starting with the Tx Audio control fully counter-clockwise, turn it up slowly until you just barely see the first ALC bar appear, then back it off slightly until it just disappears. This should also yield the same 15-20% Tx Audio reading in Configuration as obtained in step 7. (Make sure you are still using a dummy load.)

Determining Signal Quality -- If you have an additional receiver, you could use Digipan on it to view the waterfall and get an IMD reading on your modem-generated signal. (Use an attenuator or disconnected the receive antenna to ensure that you are not overloading the receiver.) A reading below -25dB indicates a good setup of the modem and transmitter. You might try adjusting for great power output in step 3 above if you can verify that the signal has an IMD reading of least -20dB and set up to monitor the quality of the BPSK signal, you should not try to go much higher than 3 to 4 watts in TUNE. It might be possible to run higher power, say up to 4 watts in the TUNE set above, but only if you can verify an IMD of -20dB or less.



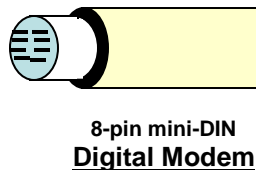
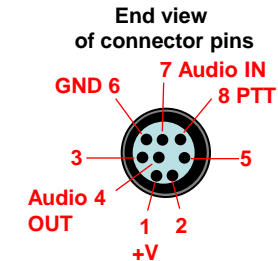
NUE-PSK Digital Modem

Pin view of connector
(and that of socket on rear panel)



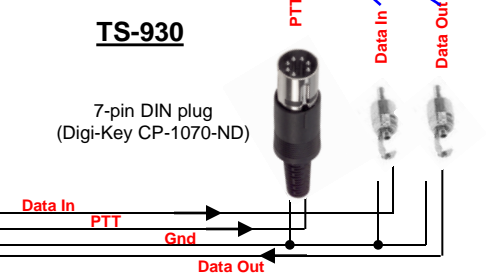
TS-930

7-pin DIN plug
(Digi-Key CP-1070-ND)



**8-pin mini-DIN
Digital Modem**

| PIN | FUNCTION | PIN | FUNCTION |
|-----|----------------------------------------|-----|---------------------------------------------------------|
| 1 | Speaker output | 5 | No connection |
| 2 | Ground | 6 | ALC Input ALC threshold level approx. -6 V |
| 3 | PTT line | 7 | Normally opened, closed in transmit See Fig. 6-3. |
| 4 | Normally opened, closed in transmit | | |



(RCA phono plugs)
Mouser p/n: 174-4359-E

Modem End

- Pin 8 (PTT)
- Pin 7 (Audio In)
- Pin 6 (Ground)
- Pin 4 (Audio Out)
- Pin 1 (+V)

Radio End

- PTT blue
- Data Out violet
- Ground black
- Data In yellow
- +V (caution) red

Cable Wire Colors

Type A Cable or **Type B Cable**

- black
- violet
- blue
- yellow
- brown