

DSK-MODEM V1.00

DSK-MODEM (c) Johan Forrer KC7WW 1993,1994

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CIS id: 70730,3472

#### Shareware notice

This program is distributed as a Shareware product. You may freely copy and share the program with your friends, associates and other radio amateurs. DSK-MODEM is a collection HF digital modems using the finest DSP algorithms, all written in hand-crafted DSP assembly language that delivers uncompromising performance. This program is intended to be used with the author's companion programs, PCTOR, and PC-PACTOR. Compatibility with other programs is not guaranteed. DSK-MODEM may not be sold or distributed with another product without the express written permission of the author. The author, Johan Forrer, KC7WW will only support unmodified copies of this software.

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## 1. DSP modem background

The TI 320C26 digital signal processor starter's kit (DSK) is used as a platform for implementing a number of DSP modems. For those not too familiar with this little unit, the DSK is a 2" x 3" PCB containing a 40MHz DSP and associated circuitry. The DSK module is available from TI distributors as part no. TMDS3200026, and costs only \$99. Please note that the schematic for a simple interface containing a tuning display and PTT driver is included as a separate plot file in this package.

**IMPORTANT NOTE:** Soldering on the DSK PCB will void your warrentee. The author is not liable in any way for damages that may result in such modifications. Also please note that there is a minor hardware fault on the DSK PCB. A simple fix for this fault is described in the TI DSK newsletter. The fault amounts to a missing trace that connects a resistor SIP package to VCC. Without this trace, external interfaces will not work properly.

The DSK connects to a PC computer's COM port and communicates with the PC at 115200 baud. DSK-MODEM contains all the code necessary to communicate with the DSK. Once a particular modem is selected, DSP code is downloaded silently to the DSK's on-chip memory. This operation only takes a second or so to complete. The DSP then performs all signal processing operations in real time using its 10 MIPS engine. The resulting output from the DSP is a stream of data bits that is sent to the PC for further processing by programs such as PCTOR or PC-PACTOR.

In addition to the RS 232 connection, an audio signal from your transceiver is fed to the DSK's analog to digital convertor. If PCTOR is to be used to transmit data over the air, additional wiring to the transceiver PTT and FSK control is also required.

All the DSP modems used in this package uses non-coherent detection principles to recover digital signals. The operation may be summarized as follows:

The audio signal is first digitized by an A/D convertor and then applied to two parallel discriminator filters. The envelopes of the outputs of the discriminator filters recified and then low-pass filtered. The output of the low pass filter are thresholded and the corresponding 0/1 output applied to the TxD serial line (the FLAG output of the 320C26). In addition, the output of the low pass filter is written to a D/A convertor. This signal is useful as a tuning aid when an an oscilloscope is used. Just tune for maximum positive to negative transitions.

## 2. RS232 Connections

For a minimal interface, Rd, Td, DTR, RTS, DCD, and Ground, is required. This will allow operation on RTTY and AMTOR.

For a 25-pin serial connector:

pin 2 (TD) - output data bits (mark -12V, space +12V)  
pin 3 (RD) - input data (also connected to pin 8 (DCD))  
pin 4 (RTS) - PTT (off -12V, on +12V)  
pin 8 (DCD) - input data bits (mark -12V, space +12V)  
pin 7 (Ground)

For a 9-pin serial connector:

pin 3 (TD) - output data bits (mark -12V, space +12V)  
pin 2 (RD) - input data (also connected to pin 1 (DCD))  
pin 7 (RTS) - PTT (off -12V, on +12V)  
pin 1 (DCD) - input data bits (mark -12V, space +12V)  
pin 5 (Ground)

If this program is to be used with the popular BAYCOM packet program, an additional wire link between RD and CTS is needed.

### 3.0 Special modems

Four modems are provided

## 7.0 Disclaimer

The author, Johan Forrer KC7WW is not responsible for any damage, injury, loss of profit or gain associated with the use, installation, or application of this software.

November 1993  
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