

Subj: Single Channel Digital
Ref (A) NTP 8 (D)
(B) Central Area Operations Guide

Notes on the Digital Modes

This note is an attempt to place some perspective on the importance of being able to participate in the digital modes in NAVMARCOR MARS operations. The digital modes have come into prominence in MARS as a means to facilitate the handling of a significant volume of traffic accurately, timely, and speedily. The digital modes beginning with CW (no longer used in MARS) and continuing through RTTY, Packet, AMTOR (FEC and ARQ), Factor, Clover, and now the various "sound card" modes have had an interesting history and a number of growing pains. The advent of the electronic terminal and the development of the large scale integrated circuits (UART, modem, microprocessor w/ support chips) have permitted the trend from the mechanical devices used in keying and transmitting information to the personal computer w/ appropriate software and interface to the modern transceiver for these tasks. This note will be divided into two sections; those modes requiring an electronic interface between the personal computer and the transceiver, and those modes, which make use of the internal sound card as the basic interface between the computer and the transceiver. In each section the basic equipment and software necessary to operate will be listed and there will be included some guidance for the beginner in setting up his personal station for operations.

Digital Modes w/ TNC (terminal node controller)

At present there are several modes requiring a TNC for encoding and decoding of the transmission and reception of the data during operations. These include Factor, AMTOR ARQ, and Clover. While the later is only used experimentally in MARS it has some advantages. Currently Factor has the greater throughput with reasonable reliability during reasonable conditions while AMTOR has the greatest reliability under all band conditions. The current MDS (MARS Data System) uses an automated traffic forwarding system consisting of a number of strategically located multi-mode bulletin boards (BBS) using Factor and AMTOR ARQ. Members assigned to access these boards within the Region to collect traffic for Florida need to be able to operate these two modes. Within the general area and regional traffic nets the digital traffic is usually exchanged by the broadcast method using AMTOR FEC as the mode of choice. When conditions are particularly poor then point-to-point traffic may be exchanged using AMTOR ARQ during these general nets.

Equipment needed: Basic Mars Communication Station, a multimode TNC, and a personal computer with the software to communicate with the TNC. There are a number of manufacturers that design, build, and market multimode terminal node controllers. Notably are AEA (and its successor Time Wave) Kantronics, MFJ, and HAL. Each of the units produced by these manufacturers have their own quirks in getting them setup with the associated software but all work reliably with the operations. In the Florida area we have as NNN0GAL TEN, NNN0TOA who is very knowledgeable regard to the use of the AEA/Time wave as he was a member of the design and development team for the PK-232 series of TNC. Additionally there are several members using Kantronics units. These people are available to help

you with your setup.

Software needed: You need a terminal program to talk to the TNC. It may be a simple terminal program such as hyper terminal included in the windows operating system or other similar program. This type program requires that the operator be much more familiar with the internal operation of the tnc and the tnc commands. Most operators prefer to use another terminal program that is designed for their tnc which is capable of issuing the necessary tnc commands to place the tnc in the proper operating mode. The programs may be either DOS or Windows based. For the PK-series TNC members are using PK PacRATT, PKGOLD, and XPWare for windows. The first two are DOS programs while the later is Windows based and will operate in all Windows environments. For the Kam series of TNC members are using KAGOLD, KAWIN, and XPWare for windows. For other TNC types one needs to determine what program will work. XPWare for Windows will work with nearly all units. Each of these programs requires that the operator set up parameter files for initializing the TNC for MARS operations. These files must be tailored to the individual station and loaded to the TNC as the digital operating session begins. Copies of these files may be obtained from members using the program and the particular TNC.

Digital Modes using the Sound Card

The application of the personal computer with a sound card installed to digital signal processing has been around for some years. The first applications for the sound card were developed for the purpose of noise canceling and pass filters to enhance the audio quality if received signals. It was observed by a few astute amateurs that the digital signal processor inherent in all sound cards could be used in the detection of digitally encoded audio signals and could be used to generate those same signals. The first efforts were applied to the packet mode with the AGW sound card packet engine as freeware/ shareware becoming a popular choice for amateurs tinkering with their computer. This success made it rather obvious that the sound card could be used for other digital modes, particularly RTTY. When the "new" mode PSK-31 made its debut as a digital mode using a very narrow band width, it quickly gained popularity with the amateur community and ignited a flurry of development of applications that made it possible for the operator to become involved with a minimum of expense and equipment modification. Various amateurs have enhanced the software to include multi-mode applications for the soundcard. For use in MARS the member needs a program that will receive and transmit the common modes in our operations. In the Florida area this means AMTOR FEC, PSK-31, MT63, and ALE as the area has a weekly net using these modes. For PSK-31 there are a number of programs that will perform very well with the station computer outlined in an earlier member guidance note. For AMTOR FEC there are three applications that will transmit and receive this mode. They are MixW, TruTTY and Multi PSK. They are shareware and may be downloaded from the internet (see url's at the end of this section). A member may download these programs and test them with his station using a simple two or three wire interface between the computer and the transceiver. At the present time there is NO application for the sound card that will operate the ARQ modes used in the MDS The following list of url's is provided for your information.

<http://www.g3vpf.com>

<http://www.nvbb.net/~jaffejim/mixpage.htm>

<http://www.qsl.net/wm2u/psk31.htm>

There are many other url's that you may access for more information. From the addresses you may download the desired programs for trial and use. The WM2U page will give you excellent direction for making up the cables to connect your computer to your transceiver.

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