Exhibit No: 1 Item No. of Form: 10

In recent years an improved type of HF data modem has gained wide acceptance by the U.S. military. This type of modem is generally referred to as a "Single Tone" modem, and one common version of such a modem is described in MIL-STD-188-110A. It has demonstrated superior performance on almost all types of HF channels when compared against older types of HF modems. A second advance in military HF data communications is in the area of Automatic Link Establishment (ALE). Specifically, MIL-STD-188-141 describes a slow frequency scanning protocol and voiceband modulation format to achieve ALE.

There are two features of Single Tone modems that contribute to their superior performance. The first of these is that it employs a very nearly constant envelope modulation. As a result, it does not suffer the loss in average power common to older "Multi Tone" modems having the same user data rate. Secondly, Single Tone modems are able to exploit certain advances in signal processing technology made possible by the availability of powerful, inexpensive microprocessors. Specifically, the multipath phenomena that are common to HF channels are actually exploited as a form of diversity reception to improve operation.

General Atronics wishes to engage in an experimental program that would evaluate the capability to transition this technology from military to commercial applications. We have in mind the transmission of low to medium rate digital data (i.e., maximum data rates on the order of 4800 bits per second) over conventional 3-kHz HF voiceband channels. More specifically, we envision these data being transmitted between mobile stations that are on the order of 50 to 200 km apart, and using conventional HF transceivers and antennas. We envision that a reliable, easily established communication link of this capacity may be of great usefulness to police, fire, medical, and postal services.

A mobile station will typically consist of a whip antenna mounted on a van containing the modem, HF single sideband transceiver and antenna coupler. For the transceiver we are considering the Mackay Model MSR8050A or equivalent. This unit has a peak power output that can be adjusted from 25 to 125 Watts.

For the relatively short distances involved, the whip antenna must be oriented so as to launch a relatively high angle beam. One aspect of the experimental study will be determine the best way to do this in a mobile situation where the vehicle operator will not be expected to implement special antenna deployment procedures. Another aspect of the study will be to develop an Automatic Link Establishment procedure. Such a procedure must provide connectivity that is reliable and fast enough for commercial applications, and require no operator training to use.

GENERAL ATRONICS CORPORATION

GA-122 HF Data Modem

MIL-STD-188-110A Single Tone

STANAG-4285

Programmable FSK

Local & Remote Control

CW Interference Supression

Full Duplex

The General Atronics GA-122 HF Modem is a one unit 19 inch rack equipment suitable for ship and shore installations. All modem electronics are contained on a single 6U VME printed circuit card with interfaces for user data, remote control, local control, radio and power. The user data interface, remote control interface, and radio interface all connect to individual multipin connectors on the rear panel of the GA-122. The local control is a Liquid Crystal Display (LCD) / Control assembly mounted to the front panel. The GA-122 is available with either a AC or DC power supply. The AC supply operates from 85 to 264 VAC, 47 to 440 Hz. The DC supply operates from 18 to 36 VDC. A power cable is supplied with the GA-122.

The GA-122 is a digital signal processing hardware engine and all firmware is in flash memory (Flash Prom). Future enhancements are added to the GA-120 by downloading new firmware via the remote control port; therefore, enhancements can be added to the GA-120 in the field. The operational control configuration is stored in non volatile flash memory so the modem is automatically reconfigured after power interruptions.

SPECIFICATIONS

Single Tone Modulation

Modulation types

Single tone per STANAG 4285
Single tone per MIL-STD-188-110A
8-ary Scrambled PSK centered at 1.8 khz

Modulation Bandwidth

300 to 3300 (Per STANAG 4285 Annex A)

Demodulation

Decision feedback equalizer

Interleaving

Short or Long - Annex E (Stanag 4285)
0.0, 0.6 or 4.8 seconds (MIL-STD-188-110A)

Coding, diversity

R=1/2, K=7 Convolutional Code
Repeat Diversity
Viterbi Decoding

Frequency Correction

Up to 75 Hz changing +/- 3.5 Hz per second

Narrowband Interference Excision

Dynamically adjusts for up to three narrow band signals

Synchronization

Synchronize on Preamble
Synchronize on Data

Autobaud

Receiver Autobauds to user rate and interleaver legnth (MIL-STD-188-110A)

FSK Modulation

Modulation types

Programmable (1Hz resolution; center & shift frequencies)

Demodulation

Envelope Detection

User Interface

Operation

Full Duplex (Independent Tx/Rx rates)
Half Duplex (Tx precedence)

Simplex

User Data Rates

Coded

75, 150, 300, 600, 1200, 2400 bps (both 110A and 4285)

Uncoded

1200, 2400, 3600 bps (STANAG 4285)
4800 bps (MIL-STD-188-110A)
50, 75, 150, 300, 600 baud (FSK)

User Data Type

Synchronous (both 110A and 4285)
Asynchronous (both 110A and 4285)
5,6,7,8 bit characters
1.0, 1.5, 2.0 stop bits

User Tx Clock Source

Internal (DCE supplied)
External (DTE supplied)

User Interface

EIA RS-232

Data Sense

Controllable via Front Panel or Remote Control

Clock Polarity

Controllable via Front Panel or Remote Control

Loopback

Operator selectable Digital Loopback

Radio Interface

Transmit

Interface

600 Ohms transformer coupled

Level

Adjustable: -20 dBm to +5 dBm

Keyline 1

+6 volts = no transmit (6mA max)
0 volts = transmit

Keyline 2

Open collector = no transmit (+35V max)
0 volts = transmit (300 mA max)

Receive

Interface

600 Ohms transformer coupled

Dynamic Range

-30 to +5 dBm

Loopback

Operator selectable Audio Loopback

Control Interfaces

Local Control

Front panel backlit Liquid Crystal Display (2 line by 16 character)
Joystick Cursor control

Remote Control

EIA RS-232 ASCII serial interface

Mechanical

Mechanical Configuration

One unit 19 inch rack mountable enclosure
Height = 44 mm
Depth = 270 mm
Weight = 2.5 kg

Environmental

Vibration

Type 1 of MIL-STD-167-1

Shock

40g 6 to 9 ms half sine per MIL-STD-810E
Method 516.4, Procedure 1

EMI/EMC

MIL-STD-461

Power

85/264 Vac, 47-440 Hz, 16 Watts Max
or
18-36 Vdc 16 watts max

Temperature Range

0 degrees C to +50 degrees C operating,
-30 degrees C to +80 degrees C storage

Relative Humidity

90% @ +55 degrees C (noncondensing)

MTBF

12,000 hours per MIL-HDBK-217F, Naval sheltered, 25 degrees C

MTTR

15 Minutes at operational level

Because of constant improvement to our products, specifications are subject to change without notice.

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