Using NBEMS
(this pdf is also on n6nnw.net & www.scirainc.org)

NBEMS is a simple and easy way to send error-free digital messages. You don't have to buy an expensive modem or software. You don't even need a dedicated connection to your radio. The speaker and microphone on the computer and radio will do, and the software is free. What more could you ask for?

NBEMS uses the FLDIGI suite of software routines that emulate the hardware modem, compute the error correction and format many standard message forms. FLDIGI emulates many modems for different applications. We use the MT-63, 2000L for VHF messaging. It works with Windows, Linux and Mac computers and can be used on HF too.

How MT-63 works:

MT63 is an Orthogonal Frequency Division Multiplexed (OFDM) mode consisting of 64 parallel carriers each carrying part of the transmitted signal. The tones are differential BPSK modulated. MT63 employs a unique highly redundant Forward Error Correction system which contributes to robustness in the face of interference and fading.
The tones generate synchronous symbols, and are raised cosine modulated. The mode requires a very linear transmitter. Over-driving leads to excessive bandwidth and poorer reception. The mode is unpopular with some operators because of the bandwidth used.

The mode is very tolerant of tuning, as most software will handle 100Hz mistuning. The mode was designed by Pawel SP9VRC.

Introduction to NBEMS

> Log on to http://w6lmt.net
> In the center of the blue bar, click on "NBEMS Info"
>> Watch the top video on the right (Note that YouTube might be blocked)
>> Click on "NBEMS Configuration Tutorial" (a pdf)
>> Click on "Norm Thorn and Diana Feinberg's Presentation to the PVARC"
>> For advanced discussion (Note that the two ARRL links don't work)
>>> Log onto http://www.arrl.org/nbems
>>> Download "Intro to NBEMS"
>>> Download "Advanced NBEMS"

Installing NBEMS

Simplified Fldigi / Flmsg installation:

> You can find the required software at   http://w1hkj.com/download.html
1. Download Fldigi from the link provided above.
2. Install the application and accept all the defaults.
3. Launch Fldigi and walk through the configuration wizard setting up your personal data. Click "Next".
4. Select the "PortAudio" devices connected to your computer, where capture device is your microphone, and playback your speakers. Click "Next" – 3 times.   (Don't make any other changes unless you have a dedicated cable for you radio.)   Then click "Finish". (But Fldigi remains running.)   (over)

5. Select "Configure", then "Misc".
6. Select "Modems" on the top tab. Then select "MT-63″. Check "long receive integration". The other boxes are already checked.. Then click "Save". Click "Close".
7. Click "Op-Mode". Click "MT63". Click "MT63-2000L".
   Move the lower boundary in the waterfall to 500. Click "Configure". Click "save config".
8. Close the application then install Flmsg (download from the same location above). When installing accept all the defaults and just click "Next".
9. Launch Flmsg and fill out your personal data, and click the red backed X.
10. You can close Flmsg for now.
11. Launch Fldigi and select "Configure" in the upper tab then "Misc".
12. Select "NBEMS". Check "Enable", "Open message folder", "Open with Flmsg", "Open in browser".
13. Click on Locate Flmsg and point to the Flmsg executable, "C:\ProgramFiles\flmsg-2.0.4\flmsg.exe". (This could vary, depending on operating system and release.) Click on "Save". Click "Close".
14. Launch Flmsg. Click "Config". Click "Fldigi connection". Check "Sync modem to Fldigi. Unclick "Change Modem with Autosend". Click the red backed X.
15. Click "Form". Click "Plaintext". Click the red backed X.
14. Download and install Flwrap. No further configuration is needed.

All required software is now configured and ready to use.

Running FLMSG/FLDIGI to send a message

Start FLDIGI.exe
The waterfall should show red boundries from 500 to almost 2500.
"SQL" (Squelch, at the bottom right) should be on.
The Squelch level (to the right of the waterfall) should be low, near the bottom.
(When receiving, the green signal level bar should rise above the Squelch level.)
Move FLDIGI (it must remain running) so you can start FLMSG.exe.
Start FLMSG. Click "Form". Click "Plaintext". Fill in the data blocks. Click "Autosend".
Then click "Save" (saves the data in a file). You should hear the transmit sounds. Watch the waterfall in FLDIGI.

Experience:
I have been able to receive NBEMS messages on UHF FM without error even though the signals are unreadable on voice.

Forms:
Flmsg has dozens of predefined forms, but none are like the ERC message forms.
However, MBEMS can "Transfer" binary files. ERC message forms could be handled this way, but it requires extra steps, which -- starting with a word processor -- are:
    (1) Define a "Template" for the ERC message form.
    (2) Operator fills in the blanks in the "Template"
    (3) Operator "Saves" a binary of (2)
    (4) Use NBEMS to "Transfer" the binary (3) (The "Transmit file")
    (5) Receiving operator "Saves" the "Received File" (4)
    (6) Receiving operator uses a word processor to "Display" (5)