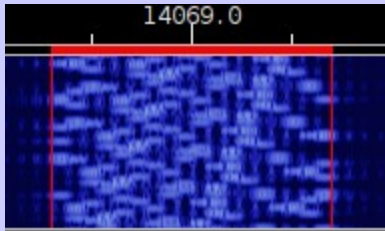
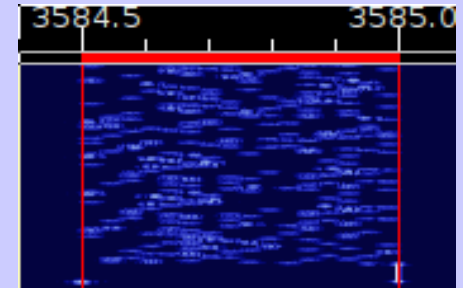


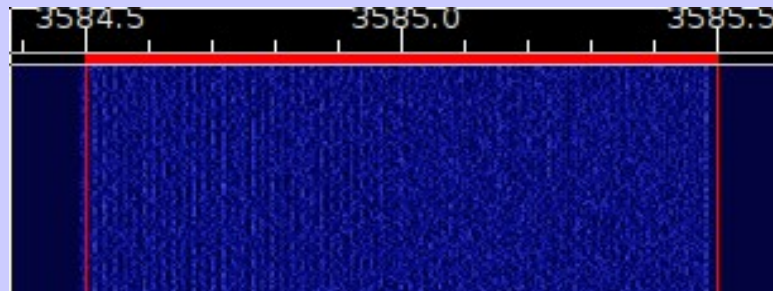
NBEMS Preferred Modes



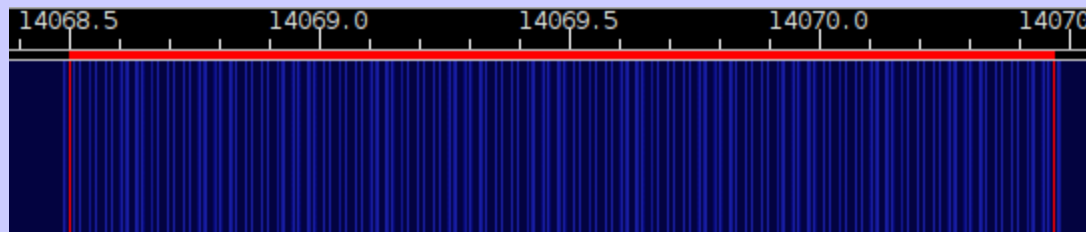
THOR-16



Olivia 16/500

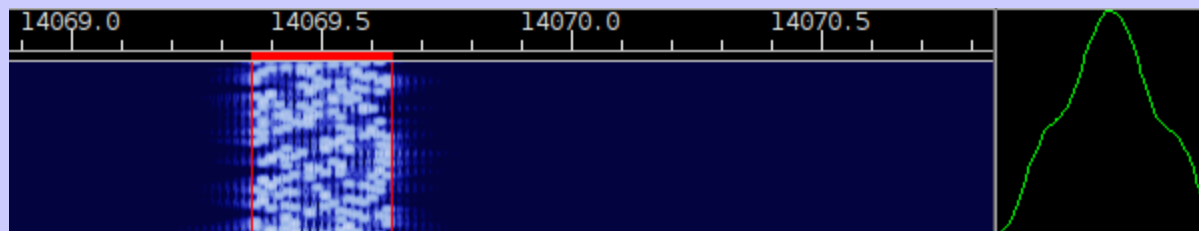


MT63-1000



MT63-2000

THOR-16

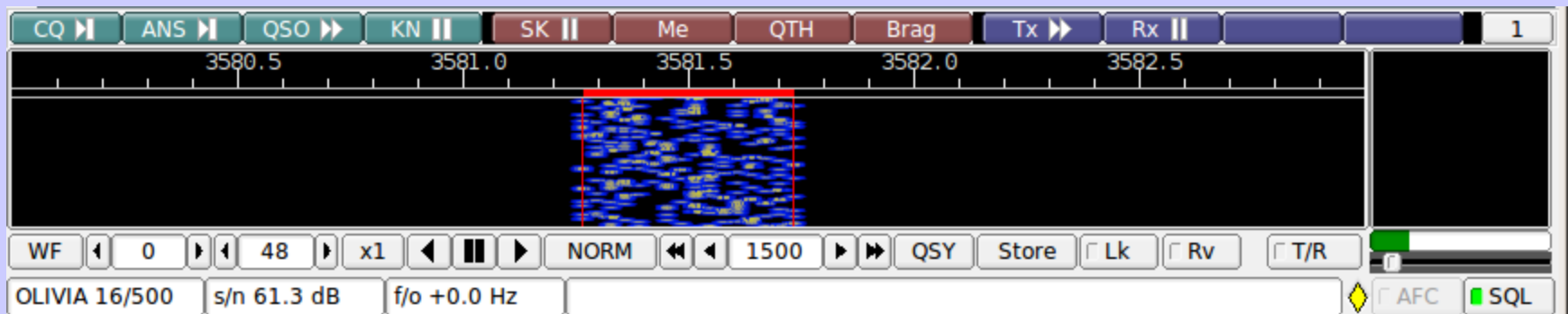


THOR16 is a multi-frequency signal. It has low symbol rate and a single carrier of constant amplitude which is stepped differentially between 16 tones. As a result, no unwanted sidebands are generated, and no special amplifier linearity requirements are necessary.

This is one of the few modes that you can overdrive without fear of splatter.

This mode uses full-time Forward Error Correction, so it is very robust. Since differential tones are transmitted the tuning does not have to be accurate. The mode was designed for long path HF DX, and due to its immunity to phase distortion is one of the best for long distance QSOs and schedules.

Olivia 16/500



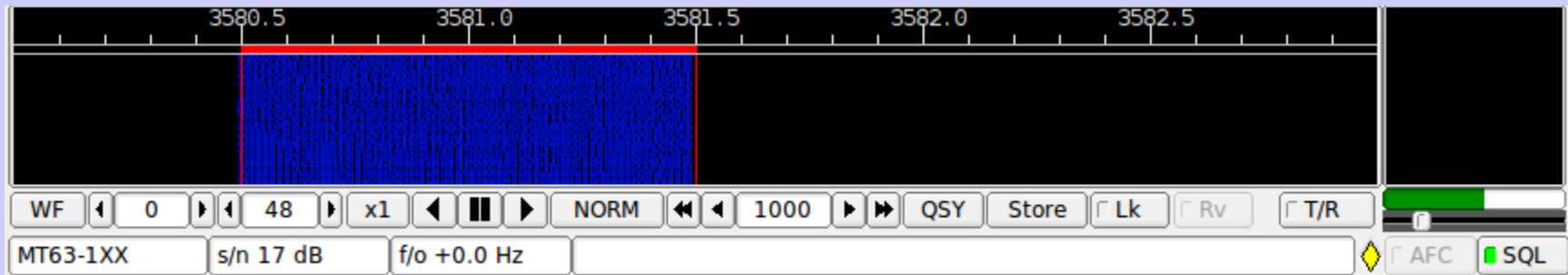
Olivia 16 tones, 500 Hz mode is good for formal short message handling. Although the mode is relatively slow (about writing speed), it is very accurate, even under extremely poor conditions. Accurate decoding can occur when the signal can be neither seen nor heard.

A large amount of forward error correction is utilized in this mode, making it suitable for mission critical messaging when used by properly trained operators.

Sound card calibration is critical, but once the proper calibration procedures are performed, the settings are saved and accuracy is retained without the need for further adjustments, unless the sound card is replaced.

See the QST article in the December 2008 issue for a very good explanation of just how well this mode performs under even the worst HF conditions.

MT63 1k, Long Interleave



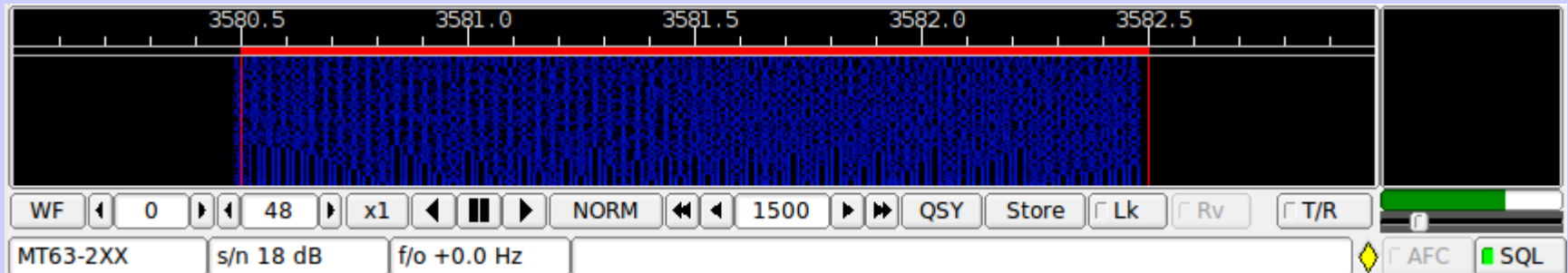
MT63 1k long is ideal for portable, mobile and fixed station operations on HF and for use with VHF/UHF ssb. It provides good decoding under moderate to good s/n conditions. It can be used detailed situation reports and database transmissions on VHF for the following reasons:

- Very effective under moderate to good RF conditions
- Extremely accurate decoding (major duplication of data and forward error corrected)
- Works extremely well under QRM and QRN conditions
- Can be used with audio coupling but direct interfacing is recommended for all digital HF operations

Tuning procedures and sound card calibration are critical with MT63 on HF, so the mode requires some training and practice. But once the use of the mode is mastered, it is extremely efficient. The speed at which MT63 1k long operates, makes it possible to send detailed reports that would not be practical using voice transmissions at writing speed.

This mode required a very linear transmit / receive transmission path.

MT63 2k, Long Interleave



MT63 2k long is an excellent choice for local portable, mobile and fixed station operations on FM channels (repeater or simplex). It is extremely well suited for detailed situation reports and database transmissions for the following reasons:

- Can be used very effectively without a sound card interface (audio coupling)
- Extremely effective, even under very poor simplex RF conditions
- Extremely accurate decoding (major duplication of data and forward error corrected)
- Very forgiving on sound levels and requires no tuning when used on FM
- Excellent for sending larger situation reports or databases

MT63 2k long has been in use in Western Pennsylvania in several drills and public service events since 2005. The mode performs extremely well even under very adverse conditions. The fact that all one needs is a hand held transceiver and a computer (no need for sound card interface or any other hardware) makes the widespread adoption of this mode, for use on FM simplex and repeaters, a very attainable goal.

This mode requires a very linear transmit / receive transmission path.

What is Audio Coupling...

Audio coupling simply means that there is no direct wired interface between the transceiver and the computer. Transmitted audio is picked up from the computer speakers by manually keying the transceiver microphone. Received audio is picked up by the computer microphone from the received audio of the transceiver.

While this method can be used with limited success on HF on various digital modes, it is most effective using MT63 2k long over FM channels and MT63 1k long on HF.

Always be aware that background noise will be transmitted using this method!



Mode Comparison

Mode	Speed	Duty Cycle	Bandwidth	Linear Path
THOR-16	58 wpm	100 %	316 Hz	No (1)
Olivia 16/500	19.5 wpm	100 %	500 Hz	Yes (2)
MT63-1000	100 wpm	80 %	1000 Hz	Yes (3)
MT63-2000	200 WPM	80 %	2000 Hz	Yes (3)

- (1) a non-linear amplifier can be used for these modes
 - (2) required to maintain corrected phase transitions between tones
 - (3) required to maintain correct amplitude/phase in signal
- MT63 is essentially 64 simultaneous PSK signals spread across the bandwidth of the signal.



Wrap

- File encapsulation for broadcast transmissions.
- A single application both wraps and unwraps transmitted files
- Allows for unattended reception of broadcast
- Ideal for transferring columnar data such as a spreadsheet
- Enables the transfer of plain text, image and binary files
- Verification of accuracy occurs at each receiving station

- Very simple to use – drag and drop files for wrap / unwrap

- Fldigi can automatically capture and save “wrapped” files as they are received.

Here are some useful links to sites with more information on NBEMS:

Official NBEMS Site:

<http://www.w1hkj.com>

WPA NBEMS Site:

<http://www.pa-sitrep.com/NBEMS>

CheckSR Sound Card Calibration Application:

<http://www.pa-sitrep.com/checksr/CheckSR.exe>

Fldigi on-line help:

<http://www.w1hkj/FldigiHelp>

Fldigi on-line mode identification – sight and sound

<http://www.w1hkj.com/FldigiHelp/Modes>

NBEMS official email list:

<http://groups.yahoo.com/group/NBEMSham/>