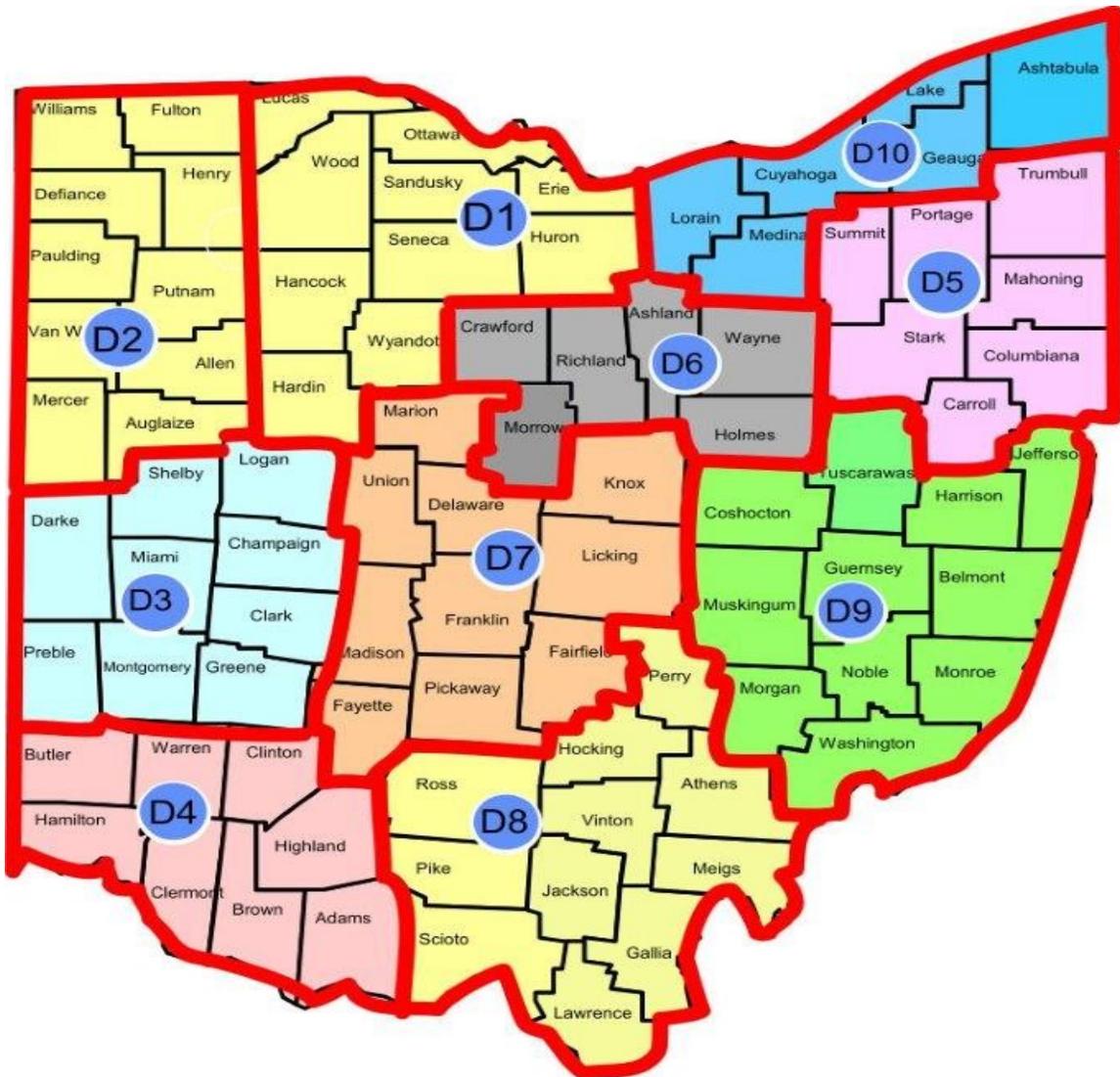




Ohio
Section

OHDEN STANDARD OPERATING GUIDE (SOG)

Version 1.3.6



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Foreword

The Ohio Digital Emergency Network (OHDEN) is part of the Ohio ARES program of amateur radio (ham) operators who provide a backbone structure to transfer digital messages from county to county and on to the Ohio Emergency Management Agency "or other served agencies when all else fails". All Ohio county emergency communications teams are encouraged to have a representative on OHDEN.

OHDEN communicates using the digital modes using software referred to as Narrow Band Emergency Messaging Software (NBEMS). This is synonymous with Fast Light Digital (FLDIGI) and developed by Dave Freese (W11HKJ) and others. Refer to <http://www.w1hkj.com/NBEMS/PublicService.pdf> for additional information. A digital communication mode in this context refers to one that communicates text or images as opposed to voice.

Note that text in **this color** represents cross references within this document and the left mouse button will take you to the destination.

OHDEN Philosophy and Purpose

The purpose of OHDEN is to provide the vital digital link when the normal communication channels are compromised or overloaded between Ohio county Emergency Management Agencies (EMA's) and other organizations but, primarily, the state EMA. In support of that purpose, those relying upon the effectiveness of OHDEN require training. Providing the communications channel and the training are integrated elements of OHDEN – it's a training net until it isn't.

All disasters are local. The state EMA serves the counties coordination resources needed by the county from resources at the state level, from other Ohio counties, or from federal resources. Thus, the ownership of OHDEN must lie in the counties and the responsibility of assuring that it is effective lies squarely on those participating in the net.

Checking into the OHDEN while operating as a training net serves to test the effectiveness of radio equipment, frequencies used, and digital modes of communication. Effectiveness is gauged by the following list of metrics. Digital messages between the county and state EMA's must be delivered:

- without error
- without loss of information
- to the correct function
- with all the associated information such as sender, priority, date, time, etc.
- and, in a timely manner.

The ability to effectively handle messages requires practice; it doesn't appear with the FCC awarding of the call sign.

In contrast to the ARRL National Traffic System (NTS), OHDEN does not typically operate in the real world¹ environment. In addition, disasters are always chaotic and experience shows that a disaster is significantly different than that you've trained for. To conquer chaos, and in addition to training and practice, the operating processes for OHDEN must, as much as possible, be simple, intuitive, and easily referenced. This can only be accomplished by engaging those that participate in the net in the development and improvement of those processes. Ownership in the process is key and the Standard Operating Guide defines the process.

OHDEN Standard Operating Guide

The purpose of the OHDEN Standard Operating Guide (SOG) is to provide uniform guidance to the Ohio Section regarding the special purpose high frequency digital network. This is a living document and periodically updated to reflect new processes and technology as the situation merits. The local stations whose served agencies rely on the state EMA are the owners of OHDEN and are thus the owners of this document. All are encouraged to suggest changes for improvement and participate in review of changes. Contact the Net Manager to discuss changes at any time or discuss them on the Facebook group page, <https://www.Facebook.com/groups/OHDEN> .

The SOG is arranged to first provide some quick information to configure your radio and computer to participate in OHDEN radio communications. The Quick Start is not intended to be complete and additional information exists elsewhere in the document, NBEMS documentation and the Internet. The majority of the document contains the information needed to be an effective participant in OHDEN . Lastly, there are a number of appendices that provide reference information, background information or information at a greater depth.

The document makes heavy use of hyperlinks to Internet sources and other locations within this document. A mouse click will take you there if you are viewing the electronic copy.

Quick Reference

This section is designed to be a quick start for new operators or a quick reference to those experienced. More detail is elsewhere in this document.

Hardware

There is a variety of hardware that is effective at OHDEN communication. This section covers the major common points. OHDEN operators must apply the information to their own hardware. If needed, seek the help of other operators through the Facebook group page <https://www.Facebook.com/groups/OHDEN>.

- Computer – almost any recent operating system
- Radio and Antenna – OHDEN uses High Frequency (HF), typically 80-meters and 160-meters and the upper single sideband (Upper SSB).
- Sound Card – There are two basic options.

¹ Real world in this context pertains to an operational environment for which a specific system was designed. OHDEN was designed to handle messages in times of disaster or other critical situation, which are rare. The NTS is sending real world messages in each session.

- Computer internal sound device – Some have had success but there may be grounding issues and an external method must be used to assert push-to-talk (PTT) on the radio.
- External USB sound card – Some are using an inexpensive sound card (sound dongle) but, again, there may be grounding issues and, again, another method must be used to assert PTT. Most operators are using an external sound card specifically designed for the digital modes of Amateur Radio such as the [Signalink USB](#).

Software

NBEMS software is available for download for free from <http://www.w1hkj.com/>. The packages you'll need are:

- fldigi (the setup.exe if you're running Windows)
- flmsg (the setup.exe if you're running Windows)

FLRIG is an application that operates with FLDIGI to provide computer control of most radios and you might find it useful.

In earlier versions of FLDIGI there were issues of compatibility of other version but that problem has not been seen recently; there have been no reports of issues in keeping up with the latest versions of FLDIGI and FLMSG.

OHDEN Checking In

- Frequency, Date and Time (training net)
 - During Daylight Savings Time – 80-meters **3584.5kHz. +1500 USB Olivia 8-500; Tuesday 1945hrs.** local.
 - During Standard Time – 160-meters **1804.5kHz. +1500 USB Olivia 8-500; Tuesday 1945hrs.** local. Plus:
 - During Standard Time – 80-meters **3584.5kHz. +1500 USB Olivia 8-500; Sunday 1600hrs.** local.
- Check-in protocol as it would appear as a FLDIGI macro –


```
<TX><enter><enter>
OHDEN de, <MYCALL>,<MYNAME>,D<ARES district number>,
<county three letter abbreviation> ,<QTC/QRU status>,<[optional items
separated by tabs]>, <MYCALL> ,bt
<RX>
```
- Stations are asked to enter the MACRO string exactly as specified, comma delimited and without spaces. The spaces can make the reporting more difficult and the spaces require time to transmit.
- The two carriage returns <enter><enter> at beginning of the message allows the digital decoding software within FLDIGI to synchronize quicker and with lower loss at the beginning of a transmission.
- Additional information is provided in [Check In Syntax](#).

NBEMS Modes for OHDEN

The various modes or modems are selected from the OpMode drop down menu at the top left in FLDIGI and the mode in use is displayed at the bottom left.

- OHDEN default mode is Olivia 8-500
- OHDEN default high speed mode is MT63-1000L – used for message transfer when signal conditions are favorable.
- THOR22 as an optional mode for conversational keyboard to keyboard
- Both of these modes use 1500Hz data carrier center frequency offsets.
- Note MT63-2000 modes have been shown to be unreliable on 80 and 160 meters and should not be used for normal net operations on HF.
- 1500 Hz has become the NBEMS standard for offset frequency. It provides best spectrum management and the best frequency to minimize intermodulation distortion in transmitted signals.
- Mode and frequency changes are at the prerogative of NCS.
- The NCS transmits several seconds of Tune at the beginning of the net.
 - This establishes the Net frequency that all stations should tune to.
 - The NCS is also the only station that checks the TXID check box.
 - Other stations should not transmit TXID since that can cause the entire net to start drifting if they are not exactly zero beat with the NCS.
 - Use of AFC is never advisable in a net situation since it can cause stations to drift away from the master frequency.
- The use of RXID is explained under traffic handling related mode changes. It should only be used two stations are passing one to one traffic between each other.

Responsibilities

This section describes the responsibilities of those involved with OHDEN.

Net Manager

1. Maintains the OHDEN SOG, keeping it up to date to reflect current operation and solicits changes to the SOG from the net members².
2. Liaison between net members and the Section Emergency Coordinator (SEC).
3. Tracks the metrics for the net:
 - Number of check ins by district and county
 - Total number of checkins
 - Checkins by call sign
 - Traffic or bulletins handle, training or real-world
 - Time duration of the net
 - Messages handled by quantity, type, and priority
4. Provides a weekly report of the metrics to the SEC
5. Maintains the Facebook Group page
6. Schedules the Net Control Station (NCS) operators
7. Provides the leadership for OHDEN improvement

Net Control

1. Operates the Net Control Station
2. Calls the net to order at the assigned date and time
3. Maintains control of the use of the frequency
4. Maintains a list of those checking in, their district, and their traffic status
5. Prioritizes traffic
6. Initiates the communication of traffic by priority (sets the traffic precedence)
7. Closes the net when all traffic is communicated .
8. Reports the roster to the Net Manager

Net Members

(Net Members are merely those checking into OHDEN. See the footnote.)

1. Comply with the SOG
2. Follow the instructions of Net Control
3. Facilitate NCS's ability to maintain control of the frequency
4. Stay on station and monitoring until the net is closed unless an "early out" or "short time" is requested at check in. Net Control must always know what resources are available.

² The term, "net member" does not imply any sort of membership application. It is merely a term used as a reference to those that check into the net, are currently checked in to the net during any given session or are waiting in the wings to check in. It is those who take ownership of OHDEN.

5. Keep track of other stations signal quality and be prepared to relay if requested by NCS.
6. Maintain the logs of all messages passing through your station
7. Step into the roll of Net Control if needed.

NBEMS Basics

This section is most meaningful once you have an operational digital radio station that can decode other stations and other stations can decode you. This section of the document is somewhat specific to OHDEN and the more general aspects of the digital radio system are not discussed.

FLDIGI

In the **OHDEN Checking In** section, the frequency and mode of 3584.5kHz. +1500 Olivia 8-500 are mentioned. This means that the actual frequency is centered on 3584.5kHz + 1500Hz for 3586kHz. and that the signal should appear at the 1500Hz. position on the waterfall display of FLDIGI. For most radios, the dial frequency is set to 3584.5 with the exception being some Yaesu radios which may have a configuration setting for the offset in the digital modes of SSB. FLDIGI transmissions are centered on the 1500Hz audio frequency by using the mouse cursor to place the waterfall red cursor centered at 1500Hz. OHDEN always assumes that station's audio are centered at 1500Hz. Olivia 8-500 is an audio frequency shift keying (AFSK) protocol using eight separate audio frequency tones spaced over a bandwidth of 500Hz. Refer to **Appendix A – Hints and Kinks** for more information.

Near the top right on the FLDIGI screen are three buttons that each toggle functionality within FLDIGI. The TUNE button is discussed in **Data Output Level Settings and Adjustments**. The TxID button, if set (indicated by a green color), will transmit signals that identify your modulation mode at the start of the transmission. The RxID button, if set, will cause your FLDIGI to automatically switch to that modulation mode. For OHDEN, it is recommended that only net control switches on the TxID button thus they control the mode. Switching on RxID is operator choice and it's good net procedure for all stations to always announce any switch in mode. Having RxID switched on may cause an unexpected change in mode if a station transmits on frequency and in a different mode and they have their TxID on.

FLMSG

FLMSG is the preferred method of handling messages by OHDEN whether it is training or real world. The Net Manager may use regular text for bulletins as may the SEC but, as a general rule, the use of general text over FLDIGI (without using FLMSG) is an opportunity lost as it could have provided training.

There are two user interfaces for FLMSG, expert and regular. Regular is designed for use by the served agency. It provides the ability for a message form to be completed, edited and saved to a media available to the radio operator³ such as a USB memory stick or attached to an email. The regular user interface lacks the ability to transmit the message

³ Be sure your served agency is aware that information transmitted by an Amateur Radio operator is not encrypted and thus does not meet the privacy component of the Health Insurance Portability and Accountability Act (HIPAA).

via FLDIGI. The expert user interface has the same ability as the regular user interface plus the ability to send it via FLDIGI using the AutoSend button. Note that you set the mode of transmission in FLMSG independently from that of FLDIGI. FLMSG can be configured to open automatically and display any message received via FLMSG. The message form can be saved to a media available to the served agency and passed forward to the proper EOC function.

Importantly, know where completed forms are saved for transmit and know where received forms are stored as well as the file naming convention so that they can be identified. The default locations are listed below.

- Windows: Users/<your user ID>/NBEMS.files/ICS/messages
- Linux: .nbems/ICS/messages

The file naming convention is <Call>-<date/time stamp><serial number>.<ICS message form number>.

For example, KG6DI-20200617-104701L-5.206

A message created:

- By KG6DI
- On 2020 06 17
- At 10:47:01
- The 5th file created
- An ICS-206

Note that the defaults can be overridden.

An important aspect of FLMSG is that it calculates a checksum and delivers it along with the message in the message header. If the checksum is presented to the receiving station it is safe to assume there are no errors. When a message is corrupted and the checksum fails, a checksum value is not presented to the receiving station. Still, it's good message handling practice for sender and receiver to have an exchange after a successful message transmission as a double check of success.

Lastly, FLMSG will embed a chain of possession of a message within the message header. Thus, the receiver can see all the stations through which the message was passed. Note that this will change the value of the checksum with each relay.

OHDEN Activation

Activation for Training

Under the control of the Net Control Station operator assigned by the Net Manager, OHDEN is called for training under the following schedule.

- Frequency, Date and Time (training net)
 - During Daylight Savings Time – 80-meters **3584.5kHz. +1500 USB Olivia 8-500; Tuesday 1945hrs.** local.
 - During Standard Time – 160-meters **1804.5kHz. +1500 USB Olivia 8-500; Tuesday 1945hrs.** local. Plus:
During Standard Time – 80-meters **3584.5kHz. +1500 USB Olivia 8-500; Sunday 1600hrs.** local.

Be aware that the frequency may change due to QRM. Use the radio dial frequency to change frequency rather than the waterfall. Setting the waterfall too low may allow audio harmonics in the transmitter audio chain to pass to the modulator and too high may exceed the audio pass band. 1500 is the sweet spot and the default for OHDEN.

Activation During a Disaster

The ARES SEC, an ARES District Emergency Coordinator, an Ohio county Emergency Coordinator or the Ohio County EMA through the AUXCOM function of the Communications Unit (COMMU) of the Incident Command System (ICS) can activate OHDEN in response to a disaster or similar incident.

OHDEN Disaster Activation

Activation of OHDEN stations in the event they are needed to support a disaster is a challenge. A disaster may be local and unknown in another part of Ohio. The **OHDEN Watch**, described below is one method but has significant limitations. Refer also to the *Amateur Radio Emergency Service Ohio Sections Emergency Response Plan (OSERP)*. Contact your EC if you don't have a copy.

OHDEN Check In Process

Preface any message you transmit with two carriage returns, <enter><enter>. This places your message at the start of the line in FLDIGI's receive text window.

Check In Syntax

All stations are encouraged use this as the standard syntax for checking in to OHDEN. It is presented below as it appears as a FLDIGI macro.

```
<TX><enter><enter>
```

```
OHDEN de, <MYCALL>, <MYNAME>, D<ARES district number>, <county three letter  
abbreviation>, <QTC/QRU status>, <[optional items separated by tabs]>, <MYCALL>, bt  
<RX>
```

- Items between < > are variable names. Those all capitalized are filled in by FLDIGI. Those in lower case are completed with the value specific to the station.
- The county abbreviations are in **Appendix E -- County Abbreviations**.
- The optional items between the brackets [] are any combination of items such as local ARES affiliation, Red Cross or location, or liaison assignments. Commas should separate these items.
- <TX> and <RX> will set the radio into Tx or Rx.
- The two <enter> commands are present to improve receiver lock on to a new signal stream
- The QTC/QRU status field contains your traffic to list. Refer to **Traffic**. If no traffic then it should contain QRU or “no traffic”.

Real World Examples for listing traffic:

- “One routine ICS-206 for W8SGT”
- “One routine ICS-206 for Franklin County and one priority ICS-213 for W8SGT”
- “Two routine ICS for W8SGT”

Training Example for listing traffic:

- “One routine ICS-214 for K8ABC for training and one routine ICS-309 for the net for training”

Examples putting it all together (without <TX><RX>):

- “OHDEN de, K8ABC,Bill,D2,FUL,one routine ICS-203 for the net for training,K8ABC,bt”
- “OHDEN de, K8XYZ,Tom,D7,WAY,QRU,[EC, Winlink Liaison],K8XYZ,bt”

The standard format provides a much easier task for net control and makes it easier to read. Note the absence of spaces after the commas. This allows the string to be imported directly into a spreadsheet.

Traffic on OHDEN

OHDEN traffic are messages; some information of importance to the served agency. Traffic is the heart of OHDEN.

Traffic exists in two formats:

1. Message forms completed using FLMSG templates and,
2. Bulletins of interest to all OHDEN members from either the ARES SEC or the Net Manager.

Generally, OHDEN members don’t provide bulletins unless authorized by the Net Manager. They may interfere with training planned for the current session of OHDEN.

Traffic exists in one of the following lifecycle states.

1. In generation by a served agency or person creating a training situation
2. In queue by communications personnel for transmission to the recipient(s)
3. In the communication medium (air waves)
4. In queue by communications personnel for delivery to the recipient

5. Delivered
6. Logged along with its metadata for later analysis.

OHDEN directly deals only with 2 through 4 and with 6. It's easy to forget 6. Fortunately, NBEMS software keeps a log of all messages. Archive the logs for safekeeping after and event especially if you are not using your own computer. The logs will be important in after-disaster evaluation.

In OHDEN, each piece of traffic transitions through two stages:

1. Listing of traffic – the station announces its traffic and,
2. Passing of traffic – NCS prioritizes the traffic and calls on the station with traffic to proceed.

OHDEN may have traffic of two Priority Types:

1. Routine and,
2. High Priority identified by “priority”, “emergency” or “time sensitive”

The Priority Type defines if NCS immediately transitions to facilitate the handling of traffic or delays it. Note that the three High Priority designations help NCS in setting precedence among this type.

Traffic is for the purposes of:

1. Communicating real world messages between agencies or organizations served or,
2. Communicating information between ARES leadership and OHDEN or,
3. Training

Listing Traffic

The listing of traffic is the announcement of the existence of the message(s) by the station holding them. This is generally done when checking into the net during roll call but could happen at any time especially during OHDEN activation for an extended operational period. Either way, the same syntax is used for listing traffic and is described in **Check In Syntax**.

To effectively list traffic the following information must be provided.

1. Who has the traffic?
2. How many pieces of traffic are there?
3. What is the Priority Type of each piece? (And if the traffic is for training or exercise.)
4. In what format is each item of traffic?
5. Who/where is the destination of each?

Traffic Priority

The important points are:

Traffic may be High Priority or Routine. High priority is identified as: as “priority”, “emergency” or “time sensitive”. The priority is usually specified by the served agency when created. Routine is just that, “routine”.

- All traffic must be identified regarding its Priority Type so that NCS can set precedence.
- NCS will facilitate the passing of High Priority as it is listed. (Note that there could be more than one High Priority message needing to be listed.)
- NCS will facilitate the passing of Routine traffic typically after roll call and facilitate it in the order of descending level of precedence base upon his or her judgment.
- The specification of traffic Priority Type is augmented using “training” or “exercise” if it is for training or an exercise. Refer to **Traffic for Training** below.
- Net Control will always call for High Priority type traffic before roll call of a training net. This traffic is identified as “priority”, “emergency” or “time sensitive”. This is a call for real world High Priority traffic but, be prepared, training can exist even here.
 - A station may check in during the call for High Priority traffic:
 - “OHDEN de WB8DEF, Richard, D9, BEL, one, emergency ICS-205 for Knox County EOC for Exercise, WB8DEF, bt”. Refer to **Traffic for Training**.
- Routine traffic whether real world or training is listed at check in or roll call but prioritized and passed under the directions of the NCS usually after roll call is completed.
- Note the possibility of a training net transitioning in mid stride to an activation of OHDEN. In that case, identify traffic as “no play” to emphasize the condition.

Traffic for Training

The important points about traffic for the purpose of training are:

- As described above, when traffic for training is listed, its specification of Priority Type is augmented by the words, “training” or “exercise”. This is important to prevent anyone from interpreting it as real world. For example:
 - “OHDEN de, K8ABC, Bill, D2, FUL, one time-sensitive ICS-203 for training for all, K8ABC, bt” (All are participating in the training.)
- During a training net the traffic identified as a High Priority type and for training is facilitated just as if it were real world.
- In addition to augmenting the Priority Type with “training” or “exercise” during the listing process, one of these same identifying words must appear early in the message form (typically ICS form) itself. Refer to **Appendix F – Training Message Form Example**.
- Again, note the possibility of a training net transitioning in mid stride to an activation of OHDEN. In that case, identify traffic as “no play” to emphasize the condition.
- It is common for training messages addressed to all on the net to have a few defects by a few stations. This is expectable in regular training but roger the message as a partial print if asked by NCS. There may be the expectation of perfect copy in special exercises such as SET. NCS may or may not choose to ask for fills in a regular training message. With bulletins from the Net Manager or the ARES Ohio SEC, the request for fills and questions is common. If that bulletin is

of type High Priority and for Training, perfect copy and understanding may be expected.

Passing Traffic

Bulletins (QNC) are generally of Priority Type Routine and are generally handled after more important OHDEN business, such as roll call, is complete.

NCS facilitates the passing of traffic. NCS first decides if the traffic is to be passed on OHDEN frequency or if QSY is needed. The general flow of passing traffic is always the same.

- NCS determines if the listing and receiving stations can copy each other.
 - a. The two stations negotiate a mode with a high probability of success⁴.
 - b. The receiving station will propose the mode.
- If NCS calls for the traffic to be passed QSY
 - c. NCS asks the receiving station to temporarily leave the frequency and select a different one for the traffic.
 - d. The receiving station returns to the net and reports the QSY frequency
 - e. The listing and receiving stations are asked to QSY to that frequency
- Pass the traffic until all items are passed
- Roger or QSL each item but only complete and ungarbled real world messages should be allowed. (Training messages can tolerate errors.) Using FLMSG handles this automatically using checksums.
- All stations return to the net when complete and listing station reports the status of listed traffic.

If the two station cannot establish good copy, NCS will establish a relay station that does have good copy with both.

- NCS determines that the copy between listing and receiving stations is inadequate to transfer the traffic and calls for a relay station that can copy both.
- NCS determines that both listing and receiving stations have good copy with relay.
- Pass the traffic through the relay. (NCS may call for all three to QSY.)

The following examples illustrate some typical scenarios in table format. The tables move from left to right then top to bottom. Some are a continuation from previous example tables. The column heading indicates who is transmitting. The Notes/Conditions column indicates conditions and motivations and may present changes in the scenario.

N8LST – the listing station

N8REC – the receiving station

N8RLY – the relay station

⁴ As message traffic can be lengthy, if the faster mode of MT63-1000L can be used, it should be.

Example of Mode Negotiations for Traffic Passed on OHDEN Frequency

| NCS | Listing Station | Receiving Station | Notes/Conditions |
|-------------------------------------|-----------------------------------|--|---|
| N8LST call N8REC with two ICS-205 k | N8REC de N8LST how do you copy? k | QRV MT63-1000? de N8REC | Very good conditions. N8REC is requesting a mode change to MT63-1000. Go to Example of Switching Mode for Passing Traffic |
| | | QRV stay in OLIVIA k | OK conditions. N8REC believes that staying in Olivia is best. |
| | | NCS de N8REC Poor copy. Request relay. | Poor conditions. Go to Example of a Relay Needed for the Traffic |

Example of Switching Mode for Passing Traffic

(Continuing from very good conditions above.)

| NCS | Listing Station | Receiving Station | Notes/Conditions |
|-----|-------------------------------------|-------------------------|---|
| | Roger N8REC. Switching to MT63-1000 | | Both stations switch modes to MT63-1000L. |
| | N8REC de N8LST QRV? | N8LST de N8REC Ready. k | Negotiated mode is good and ready to receive traffic. Go to Example of the Passing of the Traffic |

Example of the Passing of the Traffic

(Continuing from previous example.)

| NCS | Listing Station | Receiving Station | Notes/Conditions |
|------------------|---|--|---|
| | | | Listing station sends first ICS-205 using FLMSG |
| | | N8LST de N8REC QSL ICS-205 with checksum 3D4F. QRV the second one. k | Success. Ready for the second message. |
| | N8REC de N8LST roger. Here is second ICS-205 | | Listing station sends second ICS-205 using FLMSG |
| | | N8LST de N8REC Just a couple glitched chars PSE try again. k | Near miss |
| | N8REC de N8LST roger. Here it is again. | | Listing station sends second ICS-205 using FLMSG |
| | | N8LST de N8REC QSL ICS-205 with checksum 296C k | Success |
| | Roger. N8LST QSY back to net | N8LST de N8REC QSL, QSY | Return to net. Both frequency and original mode if change was made. |
| | NCS de N8LST | | Now back on net |
| N8LST go | Two ICS-205 success to N8REC de N8LST bt | | |
| QSL N8LST de NCS | | | |

Example of NCS Request of QSY for the Traffic

| NCS | Listing Station | Receiving Station | Notes/Conditions |
|---|--|---|--|
| N8LST establish contact with N8REC in prep for traffic but prep for QSY. k | NCS de N8LST Roger. N8REC how do you copy? k | N8LST de N8REC good copy but stay in OLIVIA k | N8REC chooses to stay in OLIVIA |
| N8REC de NCS Leave the net and select a freq for traffic then return and call NCS. QSL? k | | NCS de N8REC roger | N8REC leaved the frequency and chooses a frequency that is clear based upon the bandwidth of OLIVIA plus appropriate guard bands |
| | | NCS de N8REC k | Back on net. |
| N8REC go ahead | | NCS de N8REC 3587.5 k | It is safe to assume that the standard 1500Hz audio offset is used. |
| N8REC de NCS QSL on freq of 8587.5 N8LST QSY to 3587.5 and call N8REC for your traffic k | NCS de N8LST QSL and QSY to 8587.5 bt | | N8LST and N8REC QSY and N8LST calls N8REC on 8587.5 and asks if ready. |

Example of a Relay Needed for the Traffic

(Continuing from poor conditions in the first example **E**xample of Mode Negotiations for **Traffic Passed on OHDEN Frequency**.)

| NCS | Listing Station | Receiving Station | Notes/Conditions |
|--|----------------------------------|----------------------------------|---|
| Roger, N8REC de NCS OHDEN, I need a relay station with good copy on N8LST and N8REC Bt | | | N8RLY responds: “NCS de N8RLY +25s/n on both. k” |
| Roger, N8RLY. N8REC de NCS how do you copy N8RLY? k | | Good copy of N8RLY de N8REC k | |
| Roger N8REC pse standby. N8LST de NCS how do you copy N8RLY k | Good copy on N8RLY de N8LST k | | |
| N8LST de NCS Call N8RLY for two ICS-205. pse return control to NCS after each success or failure. | | | Subsequently, and similarly, NCS will direct N8RLY to call N8REC. NCS asks for a return to NCS after each to maintain control of the frequency as there could be higher priority traffic that develops. |

Note that stations sometimes use Q-signals in the examples and sometimes they spell it out. Either is acceptable. When in doubt, spell it out. The goal is communication.

OHDEN Watch

The OHDEN watch is the fallback method of informing the net of activation. The watch meets at the regular OHDEN time and frequency on the days the net is not called.

Facebook Group Page

There is a Facebook Group page of OHDEN at <https://www.facebook.com/groups/OHDEN> The page is administered by the OHDEN Net Manager and is a place of discussion, announcements, and file sharing. The latest version of the SOG can be found there.

Net Control Techniques

There is both a mechanical process and an intellectual process involved with being OHDEN NCS. This section deals only with the mechanical process. This process consists of adding text to the FLDIGI Tx window for transmission and recording text that appears in the FLDIGI Rx window. The four methods to do this are typing, FLDIGI macros, recording to paper, and copy-and-paste. Which of the four to use in any given situation is governed by typing skills, size or quantity of computer monitors, and personal preference. Below are some options but FLDIGI offers many variations.

Text that is moved in and out of the FLDIGI windows can be classified as static, recycle, and dynamic. Each is further described.

Static text is just that. The standard check-in syntax with no listing of traffic is the classic example of static text and the FLDIGI macro is the de facto method of handling it. The vast majority of the text sent to the net by NCS is also static. It could be handled either by FLDIGI macro or by copy-and-paste.

Recycle text, or, more correctly, text needing to be recycled, is the check-in text from the stations. The call signs at the very least need to be recorded then “played back” to QSL the checkins. Here the macros aren’t practical and either paper recording or copy-and-paste could be used.

Dynamic text cannot be avoided and pertains to the complexities of the NCS task and sometime you just need to type into the Tx box. Asking for a station to retransmit after a double is an example. This level of typing skill marks the lower boundary but it can still be accomplished by a two-finger typist.

The process of copy-and-paste needs more discussion. Text in the Rx window may be highlighted by holding down the left mouse button then copied by the use of ^C (hold down the Ctrl key then depress the “C” key⁵). This places the highlighted text in a text buffer in the computer. Then place the cursor somewhere else and use ^V and the buffer is copied to the location of the cursor. That “somewhere else” is significant and is typically a text file like a Word Pad file. Most conveniently and before you need it, you open a text file and place it on another monitor. Otherwise, shrink the FLDIGI application a little and place the text file so that you have access to both depending upon which application receives a left mouse click.

Using copy-and-paste, the large body of static text to be sent by NCS can be pre-recorded in a text file then copy-and-pasted piece by piece (D1 check in, D2 check in, etc.) from the text file into the Tx Window of FLDIGI. Similarly, as stations, check in, their call signs can be copy-and-pasted from the Rx window to a text file then later copy-and-pasted to the Tx window call sign by call sign.

Regardless of the techniques used, there are a couple of helpful points.

⁵ FLDIGI will also present a window with a COPY option by using the right mouse button.

1. Use the Rx macro key provided by default in FLDIGI and use it at the end of the text entered into the Tx window. This is needed to end the transmission.
2. Watch the location of your cursor in the Tx window. FLDIGI will pause transmission when it hits the cursor even if there is text after it. Just move the cursor below the text if you encounter this.
3. Be careful not to move the Rx window scroll bar from the very bottom of the window. It will appear that there is no Rx activity when, in fact, it's happening out of view. If you use it to view text that has scrolled off the top of the screen, remember to put it back. (It's less of a problem if you keep your audio volume up.)

You can become proficient at NCS without ever having performed the task. Practice the activity including all the moving of the text but don't hit the Tx key to transmit. This is also a method of being ready to help NCS with relays. The station's check-in text is always ready if needed.

Appendix A – Hints and Kinks

Data Output Level Settings and Adjustments

The amplitude of the sound levels from the sound card (such as the Signalink USB) have a profound affect on the success of communication. If the amplitudes are too low you may not be copied. If too high, they may exceed the linear range of the radio circuitry from audio to final RF amplifier. This section provides some guidance.

- Place your radio in CW mode and find that rusty old key or the manual transmit control.
- Always set your radio RF drive up to maximum CW RF output (usually 100 watts) when tuning into your dummy load and leave it there. Adjusting this control to lower levels to cut back your digital output power can introduce major distortion into your data signal. Modern SSB transceivers are designed to be the most linear at full CW setting of this control with processing upstream to limit the actual non cw output to proper values. There are some exceptions to this rule for newer Software Defined Radios which allow you to set RF level to any power level you want to operate and use active ALC when your audio is higher than necessary for that % setting. This does not eliminate the requirement to make sure that all gain stages in the transmit or receive chain are not operating in a saturated region (adjustments always should be in mid range of the control).
- Turn off all your Compression and Speech Processor features on your radio. This can be done by using the data mode or manually if required on some radios. This processing can actually make your data signal worse instead of better. Many newer radios do this for you.
- Turn off the CW mode. Use the TUNE button on FLDIGI to adjust your Power Output to ~ 40% of that maximum or the maximum power output recommended by your users manual for **AM mode**. This equates to maximum RF forward power meter reading of about **40 watts** for a typical 100 watt SSB transmitter. You may have up to four data output level controls on your system to adjust the first time. These are in order:
 - The FLDIGI unique sound slider (Windows 7-10) visible from Task Bar
 - Windows Master Volume Control for that Sound Channel.
 - The Hardware TRANSMIT potentiometer on MODEMs such as Signal Link.
 - The Rig Microphone gain control (only if you are coming in to radio via the mike connector)
- Tier these levels down from source to destination path. Start at 50% on each one and gradually tier these up or down to allow the lowest ranking control to have maximum effect on power output range. If you have, for instance, the transceiver mike gain on 100% , it picks up much more (noise + signal) as it passes through the other software and hardware gain controls. Like wise if you have it near zero, the other stages of signal processing may have to be pressed to output more than they are designed for again distorting your signal. The good news is that you only need to do this once and while on a dummy load.

- A much better solution than coming into HF radio mike connector is to use the data connector on rear panel of radio along with the kit from MODEM vendor. This provides access to a fixed gain audio input which allows you to keep your mike plugged in (and no need to adjust mike gain when going to digital.
- Check your radio manual. Many of the newer radios require a manual or CAT control to switch between the mic (usb mode) and data connector (usb-D) mode.
- Warning: If you are using normal SSB modes on radio, your mike connector may still be active but you can disable it by setting mike gain to zero when on digital . You can also select appropriate data mode on transceiver and it will automatically disable the mike. Signal Link provides modules to provide proper interface with each modem. Use them if possible. ALWAYS include one or two clamp on rf chokes on all interface lines between modem, computer and transceiver to keep RF from getting into the audio, control, and PTT lines.
- Once you have determined the proper settings on the dummy load, make a schedule with a local mentor that can help you make the final adjustments before going on the air.
- Attenuate these local contacts as much as possible to prevent receiver overload from giving you a false impression of bad transmit audio.
- Remember that Olivia is a high duty cycle mode and you must make sure you do not overheat your Power Amplifier in Radio. Use maximum duty cycle recommendations for AM in your manual and be prepared to back your output even further if you can and still maintain communications.
- Never try to set your waterfall data carrier below 650 Hz or above 1500 Hz . You can always adjust your VFO to reach signals not centered in the audio passband of your transceiver. FLDIGI does not know what the transmitter passband is and parts of your data transmission may be chopped off. On OHDEN we always choose, data carrier offsets with mode depended bandwidths in mind.
- Some hams homebrew interfaces and this a a great leareing experience to understand how the signals get in and out of FLDIGI. The most critical part is RF shielding and use of proper differential modes (via transformer coupling) near the devices. High SWR on feedlines compound the need for shielded signal lines. Use what your vendor supplies and be ready for extra filtering.

Data Input Level Settings and Adjustments

Although less critical than output levels to the transmitter, this section provides some guidance in the adjustment from your sound card to the FLDIGI digital signal processing.

- Data input (from Receiver via modem to FLDIGI) is much easier to setup and these mis-adjustments will only effect your optimal reception and not the entire network.
- Start at signal source (speaker or headphone output, Rear Panel Fixed Volume Output) and jot down signal levels you see on scope or rms AC multimeter when listening to something like 14.070 MHz PSK31. This is almost always a good source of signals of various levels. Olivia signals except on nets are rare and adjusting your receive with PSK31 is a good first step. This step may be useful if your system quits working later.

- These signals should be transformer coupled like the transmitter inputs. This is usually taken care of in modern modems.
- Set up your station per the FLDIGI recommendations. Use default audio input sensitivity on FLDIGI and save settings.
- Bear in mind that different data modes require different IF bandwidth settings on receiver for optimum signal to noise.
- Adjust all Input controls to center of range if they are adjustable.
- Set up the IF bandwidth on radio to fade out the waterfall on frequencies outside the data passband for mode being used. Depending on your receiver, this may be a brick wall or very broad.
- Many radios have the ability to set the IF bandwidth. For Olivia 8-500 the optimum setting would be 500Hz. The IF bandwidth setting would show only occasional flashes of noise outside of the data passband in the waterfall. If you see constant grass outside the data band, this only adds to the noise the decoder has to process to see the actual data.
- For example, OHDEN uses a data carrier offset of 1500 Hz on Olivia 8-500. This means the data needs to be filtered for maximum pass between 1250 -1750 Hz above your upper sideband suppressed carrier. Anything you can do to make that region show water falling there alone helps the software decode the signal. If you are seeing traces below 1250 Hz or above 1750 Hz, back off on RX gain (software slider on FLDIGI window) or tighten the radio IF filter. Also remember that wider modes will require opening up the IF filter appropriately.
- Remember, strong signal conditions will likely not need this optimization, but to achieve maximum signal to noise ratio, these slight tweaks may allow you to hear better and avoid double transmissions when weaker stations are transmitting.

Computer Operating System

Many problems in establishing effective NBEMS communication can be attributed to the peculiarities between the operating system and sound system and between the operating system and the USB. It is important to be familiar with the following.

- The location of the software controls of your audio system
- If you have an OEM sound control system (often located at the right hand side of the task bar in Windows) that may conflict with that of the operating system.
- How Universal Serial Bus (USB) channels are used and shared on the computer.
- How other applications installed on the computer now or in the future may alter any of the configuration settings used for NBEMS.
- Try to keep your USB physical ports from changing if at all possible. If you change the bus configuration (i.e. a new printer etc), use Device Manager utility to verify proper COM assignments.
- One hint to prevent confusion over which COM port is your sound card is using is to use Device Manager to change the Title of generic ports when you install your Signal Link or Rig Blaster ports. You will have to reboot after you make the name change but it will stick from then on.

Appendix B – NVIS Propagation and Band and Mode Selection

As of February 25, 2019 , OHDEN is operating on Primary channel of 3584.500 MHz USB in Olivia 8-500 mode between 1500-1600 each Sunday for training. We use 1500 Hz tone offset resulting in a data signal centered on 3586.000 KHz. This higher tone offset helps prevent second harmonics passing through the transmitter voice filters on most radios. These harmonics get triggered when the signal is even slightly overdriven so always use this offset on all our modes and adjust your VFO as necessary. During the Standard Time Months, 80 meter short skip can become very long thus making in-state NVIS contacts next to impossible at times after dark. We may have to use our 160 meter frequency during evening or night time operations. During the 2018-2019 winter months , we are conducting an experimental net to study the propagation conditions on one of all alternate frequencies on 160 mwrwea. We will post any different frequencies for missions or training exercises on the FACEBOOK page. We also encourage any operators with 160 meter antennas to help check out point to point Olivia coverage on 160 meters on the OHDEN network.

This Appendix contains information on selecting the appropriate frequency (ies) for best intra Ohio data transfer based on Time of Day, Season, location of net, and ionospheric conditions. The **OHDEN Frequency Selection Tables** show the standard rule of thumb default values to choose (from a technical standpoint) the best band to use at given situation. These decisions must be tempered by the ASEC or Net Manager to include other practical drivers including resources that can operate on those frequencies in a given situation. The tables are intended only to be a starting point, OHDEN encourages member input on success and failures of other frequencies at the ranges we operate under. The white paper <http://www.FACEBOOK.com/groups/OHDEN> data on f0F2 and on why a given NVIS frequency band is optimum at a give time and variables we must considered using frequency agile operations. We do not propose sophisticated Agile Link Enable (ALE) technology which the military uses, but with some care we can use a down to earth KISS system to avoid where the skip is either too long or D layer absorption is simply too high to provide useful results.

Figure I shows the vast variations in the ionosphere that cause our optimum frequency (f0F2) to shift with seasonal, sunspot numbers, and daily variations. We are not expected to understand all the physics behind this magic, but learning to operate within the cards the sun deals us is important in being a good communicator on HF bands. OHDEN intends on paying much more attention to f0F2 variations in the future.

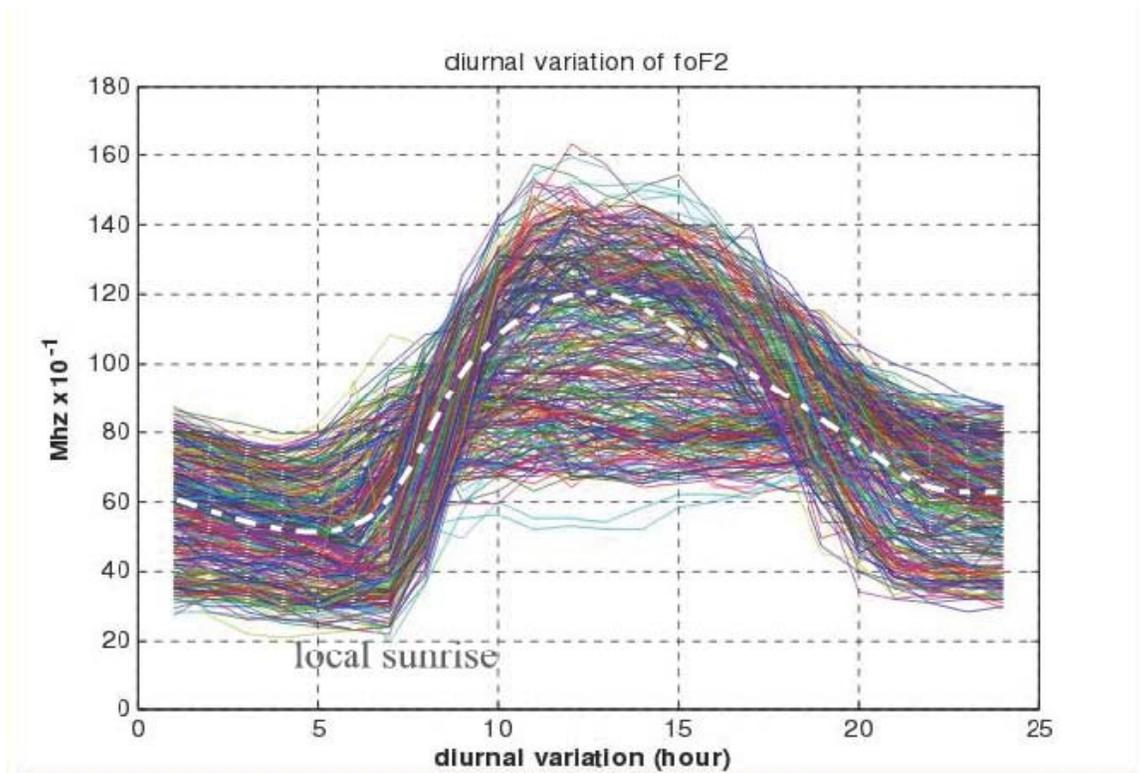


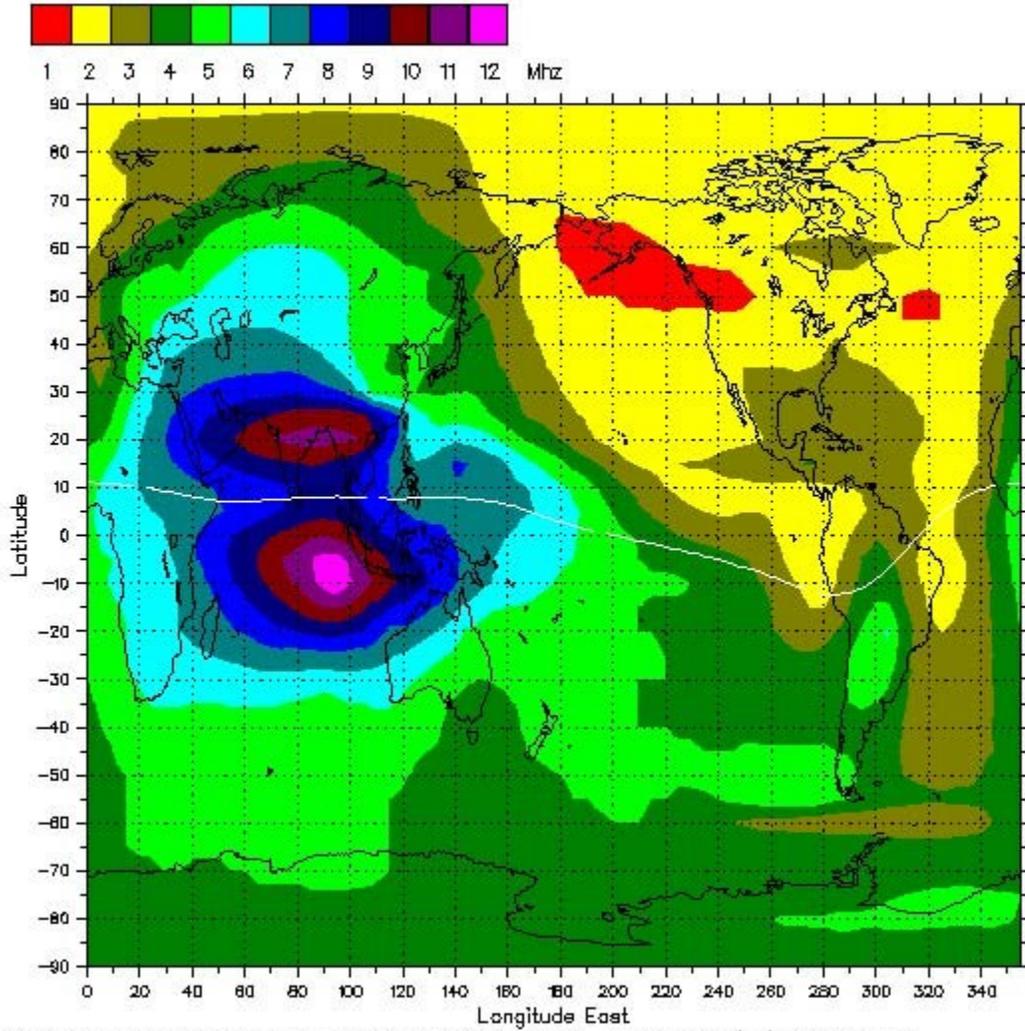
Figure 1

Each colored line represents a given long term sunspot number driving f0F2 variation as a baseline. The dotted line gives a median value of the entire eleven year set of data in last solar cycle and validates why we are seeing poor 40 meter nighttime and even 80 meter performance at times. At this point in time (2017) the median value of diurnal (daily) modulation is from about 2.5 MHz at sunrise to about 7 Mhz late in the afternoon. It changes faster in morning hours than evening as sun is illuminating the F layer with UV radiation. It reaches a maximum around local noon time at all points in the eleven year cycle.. This chart is only a tool in understanding the variation and is not a substitute for using real time observations and predictions from the Internet available from sites such as <http://www.hamqsl.com/solar3.html#f0f2>

Observing the charts at this site for a few days before an event will help forecast what conditions will be for day zero.

The snapshot in Figure 2 shows 80 meters would be very poor on the day and time shown. 160 meters would be great proving QRN was low. Guess why the CQ 160 meter contest is conducted on the date shown!

Global Real Time Ionospheric foF2 Map 29 January 2017 Hour:07 UT



Copyright Commonwealth of Australia 2017, Bureau of Meteorology Created at 29/01/2017 07:04:28UT

Figure 2

OHDEN Frequency Selection Tables

160 Meters

| | | | | | |
|--|--|-------------------------------|---------------|---------------------------|-----------------|
| Frequency (kHz) Suppressed Carrier | 1804.500 USB Data Carriers at 1500Hz | | | | |
| Characteristics for Optimal Communication | Sunspot Cycle Phase | Time of Day | Season | K Index Limits | Ap Index |
| | Low | Sunset to sunrise local | Winter | 0-3 | H or L |
| Comments | Good choice when 80 meter skip is too long. Very underutilized. Poor during thunderstorms. | | | | |

80 Meters

| | | | | | |
|--|---|---------------------------------|-------------------|---------------------------|-------------------------------------|
| Frequency (kHz) Suppressed Carrier | 3584.500 USB Data Carriers at 1500Hz. Optimized to allow MT-63-1000 to remain inside transmitter bandwidth and for receiver IF well above 0hz | | | | |
| Characteristics for Optimal Communication | Sunspot Cycle Phase | Time of Day | Season | K Index Limits | Ap Index |
| | Low to Mid | 2 hour before 10 AM local | Summer is Best | 1-8 | Lower the better on this band |
| Comments | Default for OHDEN to accommodate operators' schedules. Degraded by lighting crashes. Long skip may prevent effective NVIS due to higher F-layer altitude. Poorest at sundown due to greyline phenomena. | | | | |

60 Meters

| | | | | | |
|--|---|--|-------------------|---------------------------|-----------------|
| Frequency (kHz) Suppressed Carrier | Ch 1: 5330.5kHz Ch 2: 5346.5kHz Ch 3: 5357.5kHz Ch 4: 5373.0kHz Ch 5: 5403.5kHz VFO suppressed carrier frequencies. Set Data offset at 1500Hz to allow +/- 250Hz (Olivia 8-500) and +/- 500Hz modes (MT63-1000L) to lie within the maximum 2.8kHz bandwidth | | | | |
| Characteristics for Optimal Communication | Sunspot Cycle Phase | Time of Day | Season | K Index Limits | Ap Index |
| | Low to High | 24 hr. although best during daylight hours for in state | Winter is best | 1-3 | |
| Comments | <p>During low sunspot activity, this band has the best and worst characteristics of 80 and 40 but is sometimes overcrowded due to limited channels. It is most useful between 10 AM and 4 PM when 80 goes dead due to absorption in D layer and when skip may be too long on 40 meters.</p> <p>All OHDEN members are encouraged to develop capability and practice on this band.</p> <p>OHDEN tries to routinely avoid using this overcrowded band despite its technical advantages. We usually will leave it for Regional and Agency activities > 500 miles and try to avoid putting county-to-county traffic on when it is not absolutely necessary. This band is also a secondary amateur allocation and care must be taken to avoid interference to Military and Government Agency users unless specific authority is granted in a special use permit for the exercise.</p> <p>Be very careful to keep your continuous data transmissions less than 10 minute ID periods when you should listen for any other primary users who may require the frequency. See http://www.arrl.org/60m-channel-allocation for additional information.</p> | | | | |

40 Meters

| | | | | | |
|--|---|------------------------|-------------------|---------------------------|-----------------|
| Frequency (kHz) Suppressed Carrier | 7055.5kHz USB with 1500Hz data offset | | | | |
| Characteristics for Optimal Communication | Sunspot Cycle Phase | Time of Day | Season | K Index Limits | Ap Index |
| | All | Daytime only | Summer is best | 1-2 | 1-15 |
| Comments | Best default daytime band during normal and low sunspot activity. It is most useful between 10 AM and 4 PM when 80 goes dead and magnetic disturbances are not causing long skip. | | | | |

30, 20, 17, 15, 12 and 10 Meters

| | | | | | |
|--|--|------------------------|---------------|---------------------------|-----------------|
| Frequency (kHz) Suppressed Carrier | All | | | | |
| Characteristics for Optimal Communication | Sunspot Cycle Phase | Time of Day | Season | K Index Limits | Ap Index |
| | Low | N/A | N/A | N/A | N/A |
| Comments | These HF bands are out of range for any effective NVIS mode communication. They may be used for point-to-point troposphere, ground wave, or back scatter at times but should not be relied on outside the county even when skip is not present like during low point in the sunspot cycle. | | | | |

6 Meters

| | | | | | |
|--|---|------------------------|---------------|---------------------------|-----------------|
| Frequency (kHz) Suppressed Carrier | 50.5 USB or 5kHz deviation FM. All FLDIGI modes up to 1kHz bandwidth. This is a special ARRL band plan frequency that allows voice, CW, and data. | | | | |
| Characteristics for Optimal Communication | Sunspot Cycle Phase | Time of Day | Season | K Index Limits | Ap Index |
| | All | All | All | 1-3 | All |
| Comments | This is a magic band that can be pressed into service to fill those point-to-point 1-100 mile hops that NV IS and VHF/UHF links miss. A good OHDEN station should have a beam pointed to W8SGt to provide this secondary path. Six Meters in general is not practical for a stat wide net except for direct communications with the State EOC due to the directional antennas required. | | | | |

Appendix C – Alternative Modes for NBEMS

Tests were made in 2017 that determined Olivia 8-500 provided the best overall success data transfer. It has thus been adopted as the default QNI (check in) mode.

Metrics Included:

1. Data Transfer Speed in ASCII bytes per second
2. Protocol sync up time.
3. Channel Bandwidth
4. Error Detection at bit levels
5. Error Detection and Correction at protocol levels.
6. Ease of set up.
7. Compatibility with the NBEMS suite of message transfer co programs.

The main deficiency in Olivia Mode is lack of a rapid turnaround between transmissions. The lock in delay at beginning of a block can be up to five seconds making rapid checkins impractical.

MT-63-2000L used widely on VHF is usually to error prone on our HF channels. It can be effective on short hops. Tests on six meters indicate that even on that band, the wider bandwidth causes bit dropouts at about the S2 level.

MT-63-1000L is half as fast and half the bandwidth provides a robust compromise between 2000L and Olivia 8-500. MT-63-1000L is the OHDEN standard for traffic if the band conditions permit it.

K1JT is working on enhancements to the popular FT-8 package more suitable for field day , contests, and other non DX contacts. These enhancements are being watched closely for QNI use on a fast check in net like OHDEN. The combination of using Olivia with this MFSK mode will be watched closely in 2019 for use in OHDEN. Envision a waterfall separated by ten district channels where up to 10 checkins are processed in a minute time using frequency and time diversity and closely synchronized station clocks..

Challenges include having two distinct software packages running at same time, frequency challenges, and development of check in to message passing paradigms. Any OHDEN member wishing to experiment with this concept are asked to contact the Net Manager.

Appendix D -- OHDEN Abbreviations and Pro Words

At member and served-agency request, OHDEN uses a minimum of abbreviations, Q-Signals, and other ham lingo that are frequently used in CW traffic nets. However, Amateur Radio operators are generally familiar with the common signals and are acceptable for use but not required. The following lists contain those common signals. If not on the list, avoid its use or ask the Net Manager to add it. When in doubt, spell it out!

The heading for each list indicates its origin as this may facilitate a more rapid reference.

Abbreviations and Pro Words Common to OHDEN

| | |
|--|---|
| QNI | checkin |
| QRU | no traffic |
| QNC | Bulletin Traffic for the net or all listening stations. |
| QST | Calling all radio amateurs. Typically sent at beginning of a Bulletin to get everyone's attention for an upcoming one-way message. |
| QTC | I have message |
| QTC? | Do you have traffic |
| QSY | Frequency change request or declaration |
| OHDEN | Ohio Digital Emergency Net |
| NCS | Net Control |
| ANCS | Alternate Net Control |
| SARGE or W8SGT - State EOC Station W8SGT | State EOC Station W8SGT |
| EC | Emergency Coordinator County Level in Ohio. |
| DECx | District Emergency Coordinator (x = 1..10 in Ohio) See map on cover sheet |
| SEC | Section Emergency Coordinator |
| ASEC | Assistant SEC various functions |
| OHDEN NM | Net Manager W5UHQ reports to SEC |
| SCM | Section Communications Manager |
| BT | Break on Voice or _..._ on CW. We use this symbol between paragraphs |
| | BK Break IN/OUT - _..._ on CW. We use this during contacts to signify OVER and sending station is going into RX mode. It is not always possible to determine the over like on VHF or voice. |
| SK | End of series of transmissions. Sending station is clear. |
| NNNN- | Military designation at the end of a digital message set to signify nothing follows. |
| RYRY - | A carry over baudot tradition to send at beginning of a RTTY |

| | |
|--|--|
| | transmission to allow proper tuning. This pattern contains alternate mark and space tones only on RTTY and is of no technical merit on any of the newer digital modes. . Some stations for nostalgia reasons send it on preamble as an attention getter. |
|--|--|

ARRL QN Signals for a CW Net

| | |
|------|--|
| QNG | Take over as net control station |
| QNI | Net stations report in * I am reporting into net (Follow with a list or traffic or QRU) |
| QNM* | Your transmissions are interfering with the net. Standby. |
| QNS* | The following list of stations are in the net. * Requesting list of stations in the net |

* For use by NCS only

International Q Signals

| | |
|-----|--|
| QRM | Is my transmission being interfered with? |
| QRN | Are you troubled by static? |
| QRT | Shall I stop sending? |
| QRU | Have you anything for me? (Answer in negative) |
| QRV | Are you ready? |
| QRX | When will you call again? |
| QRZ | Who is calling me? |
| QSB | Are my signals fading? |
| QSL | Can you acknowledge receipt? |
| QSO | Can you communicate with _____ direct? |
| QSY | Shall I change frequency? |
| QTC | How many messages have you to send? |
| QTH | What is your location? |
| QTV | Shall I stand guard for you _____? |

A Q signal followed by a ? asks a question. A Q signal without the ? answers the question affirmatively, unless otherwise indicated.

CW and Phone Abbreviations, Prosigns, and Prowords

| | |
|-----------|---|
| AA | All after (use to get fills) |
| AB | All before (used to get fills). |
| <u>AS</u> | Stand by; wait |
| <u>BT</u> | Separation (break) between address and text; between text and signature |

| | |
|----|----------------------------------|
| WA | Word after (used to get fills.) |
| WB | Word before (used to get fills.) |

Appendix E -- County Abbreviations

| COUNTY NAME | ABBR | COUNTY NAME | ABBR |
|-------------|------|--------------|-----------------|
| Adams | ADA | Holmes | HOL |
| Allen | ALL | Huron | HUR |
| Ashland | ASD | Jackson | JAC |
| Ashtabula | ATB | Jefferson | JEF |
| Athens | ATH | Knox | KNO |
| Auglaize | AUG | Lake | LAK |
| Belmont | BEL | Lawrence | LAW |
| Brown | BRO | Licking | LIC |
| Butler | BUT | Logan | LOG |
| Carroll | CAR | Lorain | LOR |
| Champaign | CHP | Miami | MIA |
| Clark | CLA | Monroe | MOE |
| Clermont | CLE | Montgomery | MOT |
| Clinton | CLI | Morgan | MRG |
| Columbiana | COL | Morrow | MRW |
| Coshocton | COS | Muskingum | MUS |
| Crawford | CRA | Noble | NOB |
| Cuyahoga | CUY | Ottawa | OTT |
| Darke | DAR | Paulding | PAU |
| Defiance | DEF | Perry | PER |
| Delaware | DEL | Pickaway | PIC |
| Erie | ERI | Pike | PIK |
| Fairfield | FAI | Portage | POR |
| Fayette | FAY | Preble | PRE |
| Franklin | FRA | Putnam | PUT |
| Fulton | FUL | Richland | RIC |
| Gallia | GAL | Ross | ROS |
| Geauga | GEA | Sandusky | SAN |
| Greene | GRE | Scioto | SCI |
| Guernsey | GUE | Seneca | SEN |
| Hamilton | HAM | Shelby | SHE |
| Hancock | HAN | Stark | STA |
| Hardin | HAR | Summit | SUM |
| Harrison | HAS | Trumbull | TRU |
| Lucas | LUC | Tuscarawas | TUS |
| Madison | MAD | Union | UNI |
| Mahoning | MAH | Van Wert | VAN |
| Marion | MAR | Vinton | VIN |
| Medina | MED | Warren | WAR |
| Meigs | MEG | Washington | WAS |
| Mercer | MER | Wayne | WAY |
| Henry | HEN | Williams | WIL |
| Highland | HIG | Wood | WOO |
| Hocking | HOC | Wyandot | WYA |
| | | Out of State | State Abbrev |

Appendix F – Training Message Form Example

KG6DI-21

file:///home/robin/_nbems/ICS/KG6DI-21.html

| INCIDENT RADIO COMMUNICATIONS PLAN | | 1. Incident Name TRAINING TRAINING TRAINING | | 2. Date/Time Prepared 141459L JUN 2020 | | 3. Operational Period from: 141459L JUN 2020 to: 141459L JUN 2020 | | |
|---|----------|---|------------|---|---------|---|---------|---------------|
| 4. Basic Radio Channel Utilization | | | | | | | | |
| LN # | Function | Channel | Assignment | Rx Freq | Rx Tone | Tx Freq | Tx Tone | Mode A/D/M |
| 1 | Tactical | MC-12 | Unit A | 168.885 | 88.5 | 164.885 | 88.5 | A |
| Remark: TRAINING | | | | | | | | |
| 2 | | | | | | | | |
| Remark: | | | | | | | | |
| 3 | | | | | | | | |
| Remark: | | | | | | | | |
| 4 | | | | | | | | |
| Remark: | | | | | | | | |
| 5 | | | | | | | | |
| Remark: | | | | | | | | |
| 6 | | | | | | | | |
| Remark: | | | | | | | | |
| 7 | | | | | | | | |
| Remark: | | | | | | | | |
| 8 | | | | | | | | |
| Remark: | | | | | | | | |
| 9 | | | | | | | | |
| Remark: | | | | | | | | |
| 10 | | | | | | | | |
| Remark: | | | | | | | | |
| 11 | | | | | | | | |
| Remark: | | | | | | | | |
| 12 | | | | | | | | |
| Remark: | | | | | | | | |
| 13 | | | | | | | | |
| Remark: | | | | | | | | |
| 14 | | | | | | | | |
| Remark: | | | | | | | | |
| 15 | | | | | | | | |
| Remark: | | | | | | | | |
| 16 | | | | | | | | |
| Remark: | | | | | | | | |
| 17 | | | | | | | | |
| Remark: | | | | | | | | |
| 18 | | | | | | | | |
| Remark: | | | | | | | | |
| 19 | | | | | | | | |
| Remark: | | | | | | | | |
| 20 | | | | | | | | |
| Remark: | | | | | | | | |
| 6. Prepared by (Communications unit) An EOC Logistics Head | | | | 8. Incident Location County: Washington State; OH Lat: 85.4938626N Lon: 22.2424783W | | | | |

Revision History

| Version | Name | Date | Description |
|----------------|-------------|-------------|---|
| 1.2 | E. Peterson | 2/27/2019 | |
| 1.3.2 | R. Kinney | 6/16/2020 | Initial review release for Gary and Eldon |
| 1.3.3 | R. Kinney | 6/19/2020 | Incorporate Eldon's changes of 1.3.2 review |
| 1.3.4 | R. Kinney | 7/21/2020 | Incorporate Gary's changes of 1.3.3 review |
| 1.3.5 | R. Kinney | 7/31/2020 | Incorporated Gary's updated pro words lists |
| 1.3.6 | R. Kinney | 8/14/2021 | Incorporate changes from OHDEN stations reviews that took place over the past months. |