

Narrowband Emergency Messaging System (NBEMS) Basics

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What is NBEMS?

- NBEMS 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*
- NBEMS uses the FLDIGI suite of software routines
 - FLDIGI (Fast Light Digital Modem Software Modem Emulation)
 - FLWRAP (Fast Light Wrapper File Encapsulation)
 - FLMSG (Fast Light Msg Forms Manager)
- FLDIGI is able to operate many popular digital modes
 - We use MT-63 2KL for UHF/VHF messaging
- NBEMS works with Windows, Linux and Mac computers and can be used on HF too
- There is even a variant for Android phones and tablets
- What more could you ask for?



Why NBEMS?

- Some disaster response traffic is better suited for digital mode than voice.
 - Voice is too slow and error prone for long or involved messages
- Such traffic may include:
 - City Situation Reports (SitReps)
 - Detailed Damage Assessment
 - Numbers and Types of Injuries
 - Resource requests for provisions/supplies/medication/personnel
 - Directions to field locations
- NBEMS can handle this traffic at 20 characters/second ... and without error



How NBEMS Works

- Computer does all the work, no need for a hardware TNC
- Sound card generates and decodes signals
- PC's sound goes into radio's microphone
- Radio's sound goes into PC's microphone
- Any radio with a microphone and speaker
- Any computer
 - No need for a powerful new computer
 older machines work just fine



- Hold the radio's speaker up to the computer's microphone and the message is automatically decoded.
- Hold the radio microphone up to the computer speaker press PTT and play the message from the PC!
- You can of course use a computer electrical interface for permanent installations:
 - Rigblaster, SignaLink







Getting Started

- Author's web site <u>http://w1hkj.com</u>
- Download the two components of NBEMS for your OS
 - From the author's site or: <u>http://sourceforge.net/projects/fldigi/files/</u>
 - fldigi digital modem emulation version 4.1.08 *
 - flmsg forms manager version 4.0.14
- Install these programs following the instructions
 - Accept the defaults
- Setup the configuration parameters
 - For FLDIGI and FLMSG
 - Once configured you are ready to go
- The author's web site has links to On-line Help and pdf Users Manuals for each program.
- FLDIGI also has an extensive Beginner's Guide under the help menu

* **Note:** flwrap – file encapsulation / compression – version 1.3.4 is contained in the zipped fldigi archive



- Receive Pane text from decoded incoming signals displayed
- Transmit Pane text to transmit when not using forms
- Waterfall pane spectrogram of audio signal strength versus frequency over time
- Control group of buttons between the transmit and waterfall panes execute macros

FLDIGI Main Window





Allow Access for fldigi

🔐 Windows Secu	urity Alert		×			
Windows Firewall has blocked some features of this program						
Windows Firewall has blocked some features of Fast Light Digital Modem Application on all public						
2	Name:	Fast Light Digital Modem Application				
	Publisher:	Unknown				
	Pat <u>h</u> :	C:\program files (x86)\fldigi-3.23.21\fldigi.exe				
Allow Fast Light D	igital Modem App works, such as m	lication to communicate on these networks: ny home or work network				
Public networks, such as those in airports and coffee shops (not recommended because these networks often have little or no security)						
What are the risks of allowing a program through a firewall?						
		Allow access Canc	el			

• The first time you run the program tell the O/S that it is OK



FLDIGI Configuration

2	Fldigi configuration wizard	<u></u>		\times
	Fldigi configuration wizard			
	The wizard will guide you through the basic fldigi settings:			
	- Operator - Sound Card Interface - Transceiver control - Miscellappeous Data Files			
	Feel free to skip any pages or exit the wizard at any time. All settings shown here can be change menu.	ed later vi	a the Cor	figure
		А	ack N	evt

• You will see the Configuration Wizard when you do a clean install of FLDIGI



FLDIGI Configuration

Fldigi configuration	Fldigi configuration
Operator UI Waterfall Modems Rig Audio ID Misc Web Autostart IO PSM	Operator UI Waterfall Modems Rig Audio ID Misc Web Autostart IO PSM
Station / Operator	CW Dom Feld FSQ IFKP MT-63 Oliv Cont PSK TTY Thor Other
Station Callsign: N5DQ	
Operator Callsign: N5DQ	 8-bit extended characters (UTF-8)
Operator Name: Deane Bouvier	 Long receive integration
Antenna:	
Station QTH: Torrance, California	 Transmit lower start tone
Station Locator: DM03TT	
State California	3 Tone Duration (secs)
	CLow tone at 500 Hz
	Centered at 1500 Hz (SHARES)
	Manual tuning
Restore defaults Close	Restore defaults Close /
 Operator 	 MT-63 modem

- Operator
 - Enter your information

- 5 check boxes

After each configuration change click save



FLDIGI Configuration

Fldigi	onfiguration		Fldigi configuration	X
Operator Devices	UI Waterfall Modems Rig Audio ID Misc Web Autostart IO PSM		Operator UI Waterfall Modems Rig Audio ID Misc Web Autostart IO PSM CPU NBEMS Pskmail Spotting Sweet Spot Text i/o DTMF WX KML	
	OSS Device: PortAudio Capture: Microphone (Realtek High Definition Audio) Playback: Speakers / Headphones (Realtek High Definition / Playback: PulseAudio Server string: File I/O only Server string:	↓ ↓ Audio) ↓	NBEMS data file interface Image: Open message folder Reception of fimsg files Selection of transfer direct takes precedence over all other fimsg reception settings Image: Open with fimsg Image: Open with fimage: Open with fimsg <t< td=""><td></td></t<>	
	Device supports full duplex		2.0 Timeout (secs)	
R	store defaults Save	Close /	Restore defaults Close	1

- Audio
 - Check Port Audio
 - Select sound card to use for Capture and Playback
- Misc
 - NBEMS
 - Check 5 boxes
 - Locate of flmsg.exe



<u>*Turn Off*</u> Windows 7 & 8 Microphone & Speaker Enhancements

Disable all sound effects

Microphone Properties	Speakers / Headphones Properties
General Listen Levels Enhancements Advanced	General Levels Enhancements Advanced
Select the sound effects to apply for your current listening configuration. Changes may not take effect until the next time you start playback.	Select the sound effects to apply for your current listening configuration. Changes may not take effect until the next time you start playback.
☑ Immediate mode	Immediate mode
DC Offset Cancellation Noise Suppression Microphone Focus Echo Cancellation Sound Effect Properties	Environment Voice Cancellation Pitch Shift Equalizer Sound Effect Properties
Provider : Realtek Description : DC Offset Cancellation makes input signal operated at the right level.	Provider : Realtek Description : Simulates multiple playback environments.
	Setting : Generic 💌
OK Cancel Apply	OK Cancel Apply



Windows 10 Specific

- Make sure fldigi has access to your microphone
 - Settings/System/Sound/Microphone
 Privacy Settings
 - Allow apps to access your microphone

- Speaker Properties
 - Settings/System/Sound/Output
 - Device Properties
 - Spatial sound format = Off
 - Additional device properties/ Enhancements

A	Microphone	 Disable all sound effects 						
W Home	Microphone	\leftarrow Settings – \Box \times	D Speakers Properties X					
Find a setting ,D Privacy	Allow desktop apps to access your microphone Some apps and Windows features need to access your microphone		General Levels Enhancements Advanced Spatial sound Select the sound effects to apply for your current latening					
Windows permissions	desktop apps and Windows can do.	Speakers Rename	Configuration. Changes may not save effect una the next time you start playtool. Configuration Configuration					
🔒 General	Some desktop apps might not appear in the following list or are	L Usable	Voice Cancellation					
R [®] Speech	not affected by this setting. Find out why	Spatial sound	Sound Effect Properties					
Inking & typing personalization	C:\Program Files (x86)\Fildigi-4.1.08\fildigi.exe Currently in use	Spatial sound format	Provider : Realiteix Description : Simulates multiple playback environments.					
R Diagnostics & feedback	Google Chrome	Select your spatial sound format for an immersive audio experience that simulates a more realistic environment.						
Activity history	Last accessed 8/29/2019 21:23:32							
App permissions	Last accessed 9/18/2019 18:04:10	Balance	setting i None 🗸					
备 Location	Know your privacy options	R 100	OK Cancel Apply					
🖾 Camera	Learn how this setting impacts your privacy.							
4 Microphone	Learn more Privacy dashboard Privacy dashboard	Related Settings						
Voice activation	Privacy statement	Additional device properties	10					



- Set the Op Mode to MT63-2000L
 - Long interleave
- Set the center of the processing window to 1500 Hz

Op Mode MT63 2KL

fldigi - N5DQ	1											- 0	x
Eile Op Mode	Configure	View	Logbook	Help					∫ ⊂ Spot	RxID	TxID		
CW		\wedge	200	S Frq 15	500 On	Off 0	413 In	0	ut				
Contestia	•	U.(ЛЛ						47	<u> </u>			
DominoEX	· ·	011					\square						
USB FSQ	▶ 00		- 12 1	Qth			St Pr	Loc					
Hell	•												
IFKP	•												
MFSK	•												
MI63	MI6.	3-5005											
DEK	MT6	3-10005											
OPSK	MTG	3-1000L											
8PSK	MT6	3-20005											
PSKR	MT6	3-2000L											
RTTY			1										
THOR													
Throb	*												
WEFAX													
Navtex/Site	orB ►												<u> </u>
wwv			T										
Freq Scan													
Freq Analys	sis		9										
SSB													
Show all m	odes												
													1
CQ													
3.1		🏷 Clear											<u> </u>
CQ 🗎 🛛 🗚	NS M	QSO 🕨	KN I	SK I	Me/Qth	Brag	DE AFA9DB	T/R	Tx	₩	Rx 📕	M XT	1
	. 500		100	0	1500	20	00	25	00		3000		
WF -2		70	• x1			1500		QSY .	Store	Lk	Rv	T/R	
MT63-2KL								- 1	3.0	₩ ♦ E A	FC E	SQL I K	PSQL



MT- 63 2KL

- MT63 2K long interleave chosen for portable, mobile and fixed station operations on FM channels (repeater or simplex)
 - Effective, even under poor RF conditions
 - Accurate decoding (major duplication of data and forward error corrected)
 - Very forgiving on sound levels and requires no tuning when used on FM

	500 1000		1500	2000	2500	3000
Mode	Symbol Rate	Speed	Duty Cycle	Modulation	Bandwidth	ITU Designation
MT63-2000	20 baud	20.0 cps (200 wpm)	80%	64 x 2-PSK	2000 Hz	2K00J2DEN

- Orthogonal Frequency Division Multiplexed mode
 - 64 parallel carriers differential BPSK modulated, each carrying part of the transmitted signal
 - Requires linear transmitter, overdriving creates excessive bandwidth and poor reception
- Highly redundant Forward Error Correction system
 - Robustness in the face of interference and fading
 - Can lose up to 25% of signal and still copy
- Sounds like a buzz saw



Squelch

_

, i		•	Squelch
			stops fldigi
	0.000 Frq 1500 On Off 0410 In Out Az		from
	USB 3000 V 2 0 Qth St Pr Loc		processing ambient noise
		•	Click the button and set the level
		•	Set it too
	I		high and you get no signals
		•	Set it just above
	CQ H ANS H QSO H KN II SK II Me/Qth Brag DE AFA9DB T/R Tx H Rx II TX H 1 500 1000 1500 2000 2500 3000 1 1		where the
			noise stops
	WF -20 -20 -70 x1 - NORM - 1500 >>>> QSY Store FLk FRv FT/R MT63-2KL -3.0 >>>> >>> - <td></td> <td>15</td>		15





Configure FLMSG

 When flmsg is run for the very first time the user will be prompted to select a default user interface.

?	FLMSG: Select Default User Interface
Servic	e Agency / Simple /- Communicator / Expert
	e vigency / ompie

- The simple user interface is designed for the non-communicator or served agency personnel
- The communicator / expert, user interface is designed for the amateur radio operator and provides access to all of the flmsg functions
- Select Communicator / Expert



Configure FLMSG

• Click the Config drop down menu

FLMSG: 4.0.14			
File Form Template	Config AutoSend Utilities	Help	Tel: 2568283105
LCS-213 report	Personal data w.213		Name: David Freese
Originator Responder	Date/Time Files/Formatting		Addr: 106 Whitfield Drive
Inc:	Radiogram		City/St/Zip: Toney AL 35773
То	ARQ interface Pos.		
Fm	Pos.		close
Sub.	Date <u>S</u> Time		YYYY-MM-DD
App'd Comp MT63-2KL ARQ Send	Pos.		 Config personal data Set the date time formation



Configure FLMSG

FLMSG: 4.0.14	- 100			FLN	ISG: 4.0.14					- 0 X
File Form Template	Config AutoSer	nd Utilities	Help	File	Form Temp	olate Con	fig AutoSend	Utilities		Help
JCS-213 report	Personal data	w.213		ĮCS-2	Drag-n-Drop		file: new.2	213		
Originator Responder	Date/Time			Origin	Blank	er				
	Files/Formatting				CSV					
Inc:	Radiogram			Inc:	Custom I					
То	ARQ Interface	Pos.		То	Ham Forms	-	F	Pos.		
Fm	User interlace	Pos.	i	Fm	HICS I	•	F	Pos.		
Sub.			í	Sub.	IARU		1			
	Date	Time		Messa		ICS203	pate	🖻	Time	
Message:	Date				Plaintext	ICS205				
			n		Radiogram	ICS206				
					Red Cross	ICS213				
	fimsa con	fiq.			Transfer	ICS214				1
	Personal	Date/Time Files Radiogram ARQ			Weather	ICS216				
						105309	1			
		✓User Interface = expert								U.
App'd				App'	d[]t		P	os.]
					MT63-2		*			
Comp MT63-2KL				100	Cond U			2750		
ARQ Send	N			ARQ				JIED		
				•	Select	ICS	213 on	the Fo	rm dro	n
										۲
					aown	menu				

Select Expert User Interface •

Set MT63-2KL at the bottom of the • form



Second & Third Exercise

- Receive a General Message
- Send an ICS 213 Message



Where are the Message Files?

		FLMSG: 2	FLMSG: 2.0.15								
COMMUNIC			File Fo	rm <u>T</u>	emplate	Config	Autos	Send	Help		
On the File>Fo	flmsg menu Iders	open	Folders New Open	Ctrl+ Ctrl+	N O		file: defa	ault.213			
 In the ICS folder you find the html files In the messages subfolder 			<u>Save</u> Save <u>As</u> View Q-forms Wrap	Ctrl+	S			Pos.			
vou find the flmsa files			Exit message:	Ctrl+	X	Date			E	Time	
You car from flm	n open thos nsg	e files			$\mathbf{\hat{b}}$						
Name	Date modified	Туре	Size		Name		^			Date modified	Ту
🎳 ARQ	3/17/2016 4:36 PM	File folder			3015 👔	-09-26 DC	S COMEX	(html		9/26/2015 3:46 PM	Fil
👪 CSV	4/6/2016 2:51 PM	File folder			퉬 mes	sages				4/6/2016 8:09 PM	File
CUSTOM	2/20/2015 1:50 PM	File folder			🐌 tem	plates				11/9/2015 1:24 PM	File
🔒 ICS	4/6/2016 8:09 PM	File folder			📄 1.htr	ml				6/3/2015 9:30 PM	Ch
🌡 temp_files	2/20/2015 1:50 PM	File folder			📄 19.h	tml				6/17/2015 7:13 PM	Ch
TRANSFERS	2/20/2015 1:50 PM	File folder			2015	-09-26_DC	S_3rdQtr	COME	(.html	9/26/2015 9:42 PM	Ch
🎳 WRAP	2/20/2015 1:28 PM	File folder			<u>A160</u>	F-58.html				5/11/2015 8:08 PM	Ch
debug_logtxt	4/13/2016 12:51 PM	Text Document	2 K	В	<u>A160</u>	F-75.html				11/4/2015 7:59 PM	Ch
FLMSG.prefs	4/13/2016 12:50 PM	PREFS File	1 KI	в	<u>A160</u>	F-87.html				4/6/2016 7:58 PM	Ch
	4/C (201C 2 2C DM	C20 E1	1.1/1		ALCO					1/C (201C 0 04 DM	0



Other Configuration Options

- Morse Code ID
- Monitor Tx Signal
- Reed Solomon Identifier



Morse Code Identification

- Configure
 - ID
 - CW
 - Checkbox
- Sends your call sign at the end of the transmission and keeps you legal

Fldigi configuration	
Operator UI Waterfall Modems Rig Audio ID Misc We	b Autostart IO
RsID Video CW	
CW Postamble ID	
	CW ID modes
Speed (WPM):	
Restore defaults	Save Close /



- Helps to monitor operation while transmitting
- Configure > Waterfall
- Check Monitor transmit signal box

Monitor Transmit Signal

Fldigi con	figuration			
Operator UI	Waterfall Modems	Rig Audio ID Mis	c Web Autostart IO	
Display FFT	Processing Mouse			
Colo	ors and cursors fault.pal			
				Load Save
Ba	andwidth	Center line	Signal tracks	Notch
C	ON (⊘ ON	⊘ON	
	Color	Color	Color	Color
C	Wide	○Wide	◯Wide	
Free	quency scale		1	
Ø	Always show audio fre	equencies	Font	
Tra	nsmit signal	anal	Signa	al level
	monitor a ansnitted si	gira	<u>[0.20]</u>	
Resto	re defaults		Save	Close /=



Reed Solomon Identifier (RSID)

- The RSID (automatic mode detection and tuning) feature uses a special sequence of tones transmitted at the beginning of each transmission to identify and tune in the signals received.
- This is helpful when you are using FLDIGI for more than one mode
- For this feature to work, not only do you need to enable the feature in the receiver, but in addition the stations you are wishing to tune in need to have this feature enabled on transmission.
- Use the menu Configure→IDs item to set whether you wish to transmit RSID data at the start of each over (this is for the benefit of others and does not affect RSID reception).
- If you plan to regularly use the RSID feature on receive, you should deselect the option that starts new modems at the "sweet spot" frequencies in Misc→Sweet Spot.



RS ID on Rx & Tx





Another Exercise

- From flmsg navigate to a comma separated values (CSV) spreadsheet
 - Right click > Insert File
 - Navigate to the file and highlight it
 - It gets loaded into flmsg
 - Click AutoSend
 - Saves file and transmits via fldigi
- Receive spreadsheet
 - Html file can be printed in typical spreadsheet format
- Anyone else want to send a message?



s07

J. Kendrick, NG6R, T-03, May 2018



Questions/Comments?

This presentation and other references can be found at http://w6LMT.net and click the NBEMS lnfo link

