

# 2018 Alachua County Emergency Communications Reference

NAME / CALLSIGN	
LOCATION	
Begin Service Date/Time	
End Service Date/Time	

Gordon L. Gibby KX4Z NCS521  
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Gordon L. Gibby

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## DEDICATION

This Report of the 2018 Amateur Radio Emergency Communications Symposium is dedicated to all the hard-working volunteers who made this effort possible.



*HF VHF emergency station in a Full Scale Exercise*



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## ACKNOWLEDGMENTS

I'd like to acknowledge all the people who have worked to build such a great group in Alachua County, Florida.

Thanks!!

Gordon Gibby KX4Z NCS521

# 1 ICS 214 ACTIVITY LOG & ICS 309 COMMUNICATIONS LOG

## Start Filling These Out As Soon As You're There

**Purpose.** The Activity Log (ICS 214) records details of notable activities at any ICS level, including single resources, equipment, Task Forces, etc. These logs provide basic incident activity documentation, and a reference for any after-action report.

**Preparation.** An ICS 214 can be initiated and maintained by personnel in various ICS positions as it is needed or appropriate. Personnel should document how relevant incident activities are occurring and progressing, or any notable events or communications.

**Distribution.** Completed ICS 214s are submitted to supervisors, who forward them to the Documentation Unit. All completed original forms must be given to the Documentation Unit, which maintains a file of all ICS 214s. It is recommended that individuals retain a copy for their own records.

**Notes:**

- The ICS 214 can be printed as a two-sided form.
- Use additional copies as continuation sheets as needed, and indicate pagination as used.





Block Number	Block Title	Instructions
1	<b>Incident Name</b>	Enter the name assigned to the incident.
2	<b>Operational Period</b> Date and Time From Date and Time To	Enter the start date (month/day/year) and time (using the 24-hour clock) and end date and time for the operational period to which the form applies.
3	<b>Name</b>	Enter the title of the organizational unit or resource designator (e.g., Facilities Unit, Safety Officer, Strike Team).
4	<b>ICS Position</b>	Enter the name and ICS position of the individual in charge of the Unit.
5	<b>Home Agency (and Unit)</b>	Enter the home agency of the individual completing the ICS 214. Enter a unit designator if utilized by the jurisdiction or discipline.
6	<b>Resources Assigned</b>	Enter the following information for resources assigned:
	1. Name	Use this section to enter the resource's name. For all individuals, use at least the first initial and last name. Cell phone number for the individual can be added as an option.
	2. ICS Position	Use this section to enter the resource's ICS position (e.g., Finance Section Chief).
	3. Home Agency (and Unit)	Use this section to enter the resource's home agency and/or unit (e.g., Des Moines Public Works Department, Water Management Unit).
7	<b>Activity Log</b> Date/Time Notable Activities	<ol style="list-style-type: none"> <li>1. Enter the time (24-hour clock) and briefly describe individual notable activities. Note the date as well if the operational period covers more than one day.</li> <li>2. Activities described may include notable occurrences or events such as task assignments, task completions, injuries, difficulties encountered, etc.</li> <li>3. This block can also be used to track personal work habits by adding columns such as "Action Required," "Delegated To," "Status," etc.</li> </ol>
8	<b>Prepared by</b> 4. Name 5. Position/Title 6. Signature 7. Date/Time	Enter the name, ICS position/title, and signature of the person preparing the form. Enter date (month/day/year) and time prepared (24-hour clock).

# ICS-309 COMMUNICATIONS LOG

**(From SCCo ARES/RACES)**

**Purpose:** The Comm Log records the details of message traffic and is used by either an individual or a Net Control Operator (NCO). These logs provide the basic reference from which to extract communications traffic history.

**Preparation:** The Comm Log is initiated and maintained by the Net Control Operator (NCO) or the individual operator (e.g. a field communicator). Completed logs are submitted to the supervisor who forwards them to the Documentation Unit.

**Distribution:** The Documentation Unit maintains a file of all Comm Logs. All completed original forms MUST be forwarded to the Documentation Unit.

## Instructions for completing the form:

Field #	Field Title	Instructions
1	Incident Name / Number	Enter the name and activation number assigned to the incident
2	Operational Period	Enter the time interval for which the form applies. Record the start and end date and time
3	Net / Position Name	<b>For NCOs:</b> Enter the name of the radio net <b>For Others:</b> Enter the name of the position or tactical call
4	Radio Operator	Enter the name and call sign of the radio operator
5	Communications Log	<b>Time:</b> Enter the local time in 24-hour format <b>From:</b> Enter the <i>From</i> call sign or ID and the message number <b>To:</b> Enter the <i>To</i> call sign or ID and the message number <b>Message:</b> Enter the message
6	Prepared By	Enter the name and call sign of the person completing the log
7	Date & Time Prepared	Enter the date and time the form was prepared (24-hour clock)
8	Page numbers	Enter the page number and number of pages

**Submit this form to your supervisor at the end of your shift.**





SCRATCH PAPER




NOTES

### 3 ARRL RADIOGRAM

Amateur Radio "Radiogram"							
NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
Addressed TO:				Message Received At:			
_____				Station: _____ Phone: _____			
_____				Name/Addr: _____			
_____				_____			
email _____				_____			
phone _____				_____			
<b>&lt;BT&gt;</b>							
_____				_____			
_____				_____			
_____				_____			
_____				_____			
<b>&lt;BT&gt;</b>							
SIGNATURE:							
RCVD FROM		DATE		TIME		SENT TO	
						DATE	
						TIME	

#### TRAINING GUIDES

Radio Relay International Traffic Training Manual	<a href="http://www.qsl.net/nf4rc/2018/RRI-Training-Manual-TR-001-2017-Draft-for-Distribution.pdf">http://www.qsl.net/nf4rc/2018/RRI-Training-Manual-TR-001-2017-Draft-for-Distribution.pdf</a> <a href="http://radio-relay.org/wp-content/uploads/2017/11/RRI-Training-Manual-TR-001-2017-Draft-for-Distribution.pdf">http://radio-relay.org/wp-content/uploads/2017/11/RRI-Training-Manual-TR-001-2017-Draft-for-Distribution.pdf</a>
ARRL Traffic Training Guide	<a href="https://www.arrl.org/files/file/trainingTrafficHandlersGuide.pdf">https://www.arrl.org/files/file/trainingTrafficHandlersGuide.pdf</a>

## RADIOGRAM SEPARATORS / PROWORDS

MEDIUM	Special Notes
CW	AA between lines of address; BT between address/text and text/signature. AR end of message; B if more, N if no further.
RTTY	Same as CW but use extra spaces between address lines instead of AA; line space between text/address/signature instead of BT; add CFM line under signature with repeat of unusual items.
VOICE	Prowords: Figures (to read individual digits of a number); Telephone (before telephone digits); Break between address and text and between text and signature. End of Message, followed by either More or No More. Pause frequently to allow receiving station to interrupt and get fills.

PRECEDENCE	
EMERGENCY	spell out on CW and RTTY
PRIORITY	P on CW
WELFARE	W on CW
ROUTINE	R on CW

HANDLING INSTRUCTIONS	
HXA (followed by number)	Collect landline delivery within X miles. If no number, unlimited authorized.
HXB (followed by number)	Cancel if not delivered within X hours of filing time; service message to originating station
HX C	Report time and date of delivery to originating station
HXD	Report to originating station the identify of station from which received, date and time. Report identity of station to whom relayed, plus date and time, or delivery date time and method.
HXE	Delivering station get reply from addressee, originate message back.
HXF(followed by number)	Hold delivery until date
HXG	Delivery by mail or landline toll call not required; may cancel message and service originating station.

Abbreviation	Meaning
AA	Separator between parts of address or signature
AA	All after (to get fills)
AB	All before (to get fills)
AR	End of message
ARL	Used in Check, indicates use of ARRL numbered messages in text
AS	Stand by/ wait
B	More to follow
BK	Break; quick check on phone
BT	Separation (break) between address and text; between text and signature
C	Correst; yes
CFM	Confirm (Check me on this)
IMI	Repeat; I say again: (“?”)
SIG	signed:
SK	end of communications
TU	Thank you
WA	Word after (used to get fills)
WB	Word before (used to get fills)

### Q Signals

QNA	Answer in prearranged order
QNB*	Act as relay between ____ and ____
QNC	All net stations copy; I have a message for all stations
QND	Net is directed.
QNE	Entire net stand by
QNF	Net is Free
QNG	Take over as net control
QNH	Your frequency is high
QNI	Net stations report in. I am reporting in (Follow with traffic list or QRU)
QNJ	Can you copy me / ____?

QNK	Transmit message for ____ to ____
QNL	Your frequency is low
QNM	Please stand by, you are interfering
QNN	Net control station is ____
QNO	Station is leaving the net
QNP	Unable to copy you / ____
QNQ	Move frequency to ____ and wait for ____ to finish handling traffic; then send him traffic for ____
QNR	Answer ____ and receive traffic
QNS	Following stations are in the net
QNT	Request permission to leave for ____ minutes
QNU	Net has traffic for you; stand by.
QNV	Establish contact with ____ on this frequency; if successful, move to ____ and send him traffic for ____
QNW	How do I route message for ____ ?
QNX	You are excused from the net; Request to be excused from the net
QNY	Shift to another frequency (____) to clear traffic with ____
QNZ	Zero beat your signal with mine
QRG	Your exact frequency is... ? What is my exact frequency?
QRL	I am busy. ?Are you busy?
QRM	Your transmission is being interfered with.
QRN	I am troubled by static
QRS	Send more slowly ____ wpm. ? Shall I send more slowly?
QRT	Stop sending. (or, "I will stop sending") ?Shall I stop sending
QRU	I have nothing for you ? Have you anything for me?
QRV	I am ready ? Are you ready?
QSL	I acknowledge receipt ? Can you acknowledge receipt?
QSM	I will repeat the last message ? Shall I repeat the last message sent?
QSP	I will relay to ____ ?Will you relay to____?
QSY	Change to another frequency _____. ?Shall I change to another frequency?
QTC	I have ____ messages for you. ?How many messages have you to send?
QTH	My location is ____ ?What is your location?

QTR	The time is _____. ?What is the correct time?

### ITU Phonetic Alphabet

Letter	Word
A	Alfa
B	Bravo
C	Charlie
D	Delta
E	Echo
F	Foxtrot
G	Golf
H	Hotel
I	India
J	Juliet
K	Kilo
L	Lima
M	Mike
N	November
O	Oscar
P	Papa
Q	Quebec
R	Romeo
S	Sierra
T	Tango
U	Uniform
V	Victor
W	Whiskey
Y	Yankee
Z	Zulu

## Amateur Radio "Radiogram"

NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
Addressed TO:			Message Received At:				
_____			Station: _____ Phone: _____				
_____			Name/Addr: _____				
_____			_____				
email _____			_____				
phone _____			_____				
<b>&lt;BT&gt;</b>			_____				
_____			_____				
_____			_____				
_____			_____				
_____			_____				
<b>&lt;BT&gt;</b>			_____				
SIGNATURE: _____			_____				
RCVD FROM			DATE	TIME	SENT TO	DATE	TIME

## Amateur Radio "Radiogram"

NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
<p>Addressed TO: _____</p> <p style="text-align: right;">Message Received At:</p> <p style="text-align: right;">Station: _____ Phone: _____</p> <p style="text-align: right;">Name/Addr: _____</p> <p>_____</p> <p>_____</p> <p>email _____</p> <p>phone _____</p> <p><b>&lt;BT&gt;</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p><b>&lt;BT&gt;</b></p> <p>SIGNATURE: _____</p>							
RCVD FROM		DATE		TIME	SENT TO		DATE TIME

## Amateur Radio "Radiogram"

NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
Addressed TO:			Message Received At:				
_____			Station: _____ Phone: _____				
_____			Name/Addr: _____				
_____			_____				
email _____			_____				
phone _____			_____				
<b>&lt;BT&gt;</b>							
_____			_____				
_____			_____				
_____			_____				
_____			_____				
<b>&lt;BT&gt;</b>							
SIGNATURE: _____							
RCVD FROM			DATE	TIME	SENT TO	DATE	TIME

## Amateur Radio "Radiogram"

NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
----	--------	----	---------------	-------	-----------------	------------	------------

Addressed TO: \_\_\_\_\_

Message Received At:  
 Station: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Name/Addr: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

email \_\_\_\_\_  
 phone \_\_\_\_\_

**<BT>**

\_\_\_\_\_

**<BT>**

SIGNATURE: \_\_\_\_\_

RCVD FROM	DATE	TIME	SENT TO	DATE	TIME
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\_\_\_\_\_

## Amateur Radio "Radiogram"

NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
Addressed TO:			Message Received At:				
_____			Station: _____ Phone: _____				
_____			Name/Addr: _____				
_____			_____				
email _____			_____				
phone _____			_____				
<b>&lt;BT&gt;</b>			_____				
_____			_____				
_____			_____				
_____			_____				
_____			_____				
<b>&lt;BT&gt;</b>			_____				
SIGNATURE: _____			_____				
RCVD FROM			DATE	TIME	SENT TO	DATE	TIME

## Amateur Radio "Radiogram"

NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
<p>Addressed TO: _____</p> <p style="text-align: right;">Message Received At:</p> <p style="text-align: right;">Station: _____ Phone: _____</p> <p style="text-align: right;">Name/Addr: _____</p> <p>_____</p> <p>_____</p> <p>email _____</p> <p>phone _____</p> <p><b>&lt;BT&gt;</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p><b>&lt;BT&gt;</b></p> <p>SIGNATURE: _____</p>							
RCVD FROM		DATE		TIME	SENT TO		DATE TIME

## Amateur Radio "Radiogram"

NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
<p>Addressed TO: _____</p> <p>Message Received At: Station: _____ Phone: _____</p> <p>Name/Addr: _____</p> <p>_____</p> <p>_____</p> <p>email _____</p> <p>phone _____</p> <p>&lt;BT&gt;</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>&lt;BT&gt;</p> <p>SIGNATURE: _____</p>							
RCVD FROM		DATE		TIME		SENT TO	

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## Amateur Radio "Radiogram"

NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
<p>Addressed TO: _____</p> <p style="text-align: right;">Message Received At:</p> <p style="text-align: right;">Station: _____ Phone: _____</p> <p style="text-align: right;">Name/Addr: _____</p> <p>_____</p> <p>_____</p> <p>email _____</p> <p>phone _____</p> <p><b>&lt;BT&gt;</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p><b>&lt;BT&gt;</b></p> <p>SIGNATURE: _____</p>							
RCVD FROM		DATE		TIME	SENT TO		DATE TIME

## Amateur Radio "Radiogram"

NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
<p>Addressed TO: _____</p> <p>Message Received At: Station: _____ Phone: _____</p> <p>Name/Addr: _____</p> <p>_____</p> <p>_____</p> <p>email _____</p> <p>phone _____</p> <p><b>&lt;BT&gt;</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p><b>&lt;BT&gt;</b></p> <p>SIGNATURE: _____</p>							
RCVD FROM		DATE		TIME		SENT TO	

## Amateur Radio "Radiogram"

NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
<p>Addressed TO: _____</p> <p style="text-align: right;">Message Received At:</p> <p style="text-align: right;">Station: _____ Phone: _____</p> <p style="text-align: right;">Name/Addr: _____</p> <p>_____</p> <p>_____</p> <p>email _____</p> <p>phone _____</p> <p><b>&lt;BT&gt;</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p><b>&lt;BT&gt;</b></p> <p>SIGNATURE: _____</p>							
RCVD FROM		DATE		TIME	SENT TO		DATE TIME

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Amateur Radio "Radiogram"							
NR	PRECED	HX	Stn of Origin	Check	Place of Origin	Time Filed	Date Filed
Addressed TO:				Message Received At:			
_____				Station: _____ Phone: _____			
_____				Name/Addr: _____			
_____				_____			
email _____				_____			
phone _____				_____			
<BT>				_____			
_____				_____			
_____				_____			
_____				_____			
_____				_____			
<BT>				_____			
SIGNATURE: _____							
RCVD FROM		DATE		TIME		SENT TO	
_____		_____		_____		_____	

## **4 ICS-213 & HICS 213**

### **DHS / FEMA TYPE MESSAGE FORMS**

**GENERAL MESSAGE**

TO:	POSITION:	
FROM:	POSITION:	
SUBJECT:	DATE:	TIME:

MESSAGE:

SIGNATURE:	POSITION:
------------	-----------

REPLY:

DATE:	TIME:	SIGNATURE/POSITION:
-------	-------	---------------------

**GENERAL MESSAGE**

TO:	POSITION:	
FROM:	POSITION:	
SUBJECT:	DATE:	TIME:

MESSAGE:

SIGNATURE:	POSITION:
------------	-----------

REPLY:

DATE:	TIME:	SIGNATURE/POSITION:
-------	-------	---------------------

**GENERAL MESSAGE**

TO:	POSITION:	
FROM:	POSITION:	
SUBJECT:	DATE:	TIME:

MESSAGE:

SIGNATURE:	POSITION:
------------	-----------

REPLY:

DATE:	TIME:	SIGNATURE/POSITION:
-------	-------	---------------------

**GENERAL MESSAGE**

TO:	POSITION:	
FROM:	POSITION:	
SUBJECT:	DATE:	TIME:

MESSAGE:

SIGNATURE:	POSITION:
------------	-----------

REPLY:

DATE:	TIME:	SIGNATURE/POSITION:
-------	-------	---------------------

**GENERAL MESSAGE**

TO:	POSITION:	
FROM:	POSITION:	
SUBJECT:	DATE:	TIME:

MESSAGE:

SIGNATURE:	POSITION:
------------	-----------

REPLY:

DATE:	TIME:	SIGNATURE/POSITION:
-------	-------	---------------------

**GENERAL MESSAGE**

<b>TO:</b>	<b>POSITION:</b>
------------	------------------

<b>FROM:</b>	<b>POSITION:</b>
--------------	------------------

<b>SUBJECT:</b>	<b>DATE:</b>	<b>TIME:</b>
-----------------	--------------	--------------

**MESSAGE:**

<b>SIGNATURE:</b>	<b>POSITION:</b>
-------------------	------------------

**REPLY:**

<b>DATE:</b>	<b>TIME:</b>	<b>SIGNATURE/POSITION:</b>
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**GENERAL MESSAGE**

TO:	POSITION:	
FROM:	POSITION:	
SUBJECT:	DATE:	TIME:

MESSAGE:

SIGNATURE:	POSITION:
------------	-----------

REPLY:

DATE:	TIME:	SIGNATURE/POSITION:
-------	-------	---------------------

**GENERAL MESSAGE**

TO:

POSITION:

FROM:

POSITION:

SUBJECT:

DATE:

TIME:

MESSAGE:

SIGNATURE:

POSITION:

REPLY:

DATE:

TIME:

SIGNATURE/POSITION:

**GENERAL MESSAGE**

TO:	POSITION:	
FROM:	POSITION:	
SUBJECT:	DATE:	TIME:

MESSAGE:

SIGNATURE:	POSITION:
------------	-----------

REPLY:

DATE:	TIME:	SIGNATURE/POSITION:
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SCRATCH PAPER

## **5 OTHER ICS DOCUMENTS**

**ICS-201 INCIDENT BRIEFING**

**ICS-204 ASSIGNMENT LIST**

**ICS-205 FREQUENCIES**

**ICS-205A FREQUENCIES**

**ICS-206 MEDICAL PLAN**









## ICS 201

### Incident Briefing

**Purpose.** The Incident Briefing (ICS 201) provides the Incident Commander (and the Command and General Staffs) with basic information regarding the incident situation and the resources allocated to the incident. In addition to a briefing document, the ICS 201 also serves as an initial action worksheet. It serves as a permanent record of the initial response to the incident.

**Preparation.** The briefing form is prepared by the Incident Commander for presentation to the incoming Incident Commander along with a more detailed oral briefing.

**Distribution.** Ideally, the ICS 201 is duplicated and distributed before the initial briefing of the Command and General Staffs or other responders as appropriate. The “Map/Sketch” and “Current and Planned Actions, Strategies, and Tactics” sections (pages 1–2) of the briefing form are given to the Situation Unit, while the “Current Organization” and “Resource Summary” sections (pages 3–4) are given to the Resources Unit.

#### Notes:

The ICS 201 can serve as part of the initial Incident Action Plan (IAP).

If additional pages are needed for any form page, use a blank ICS 201 and repaginate as needed.

Block Number	Block Title	Instructions
1	<b>Incident Name</b>	Enter the name assigned to the incident.
2	<b>Incident Number</b>	Enter the EON number assigned to the incident, if applicable.
3	<b>Date/Time Initiated</b> Date, Time	Enter date initiated (month/day/year) and time initiated (using the 24-hour clock).
4	<b>Map/Sketch</b> (include sketch, showing the total area of operations, the incident site/area, impacted and threatened areas, overflight results, trajectories, impacted shorelines, or other graphics depicting situational status and resource assignment)	Show perimeter and other graphics depicting situational status, resource assignments, incident facilities, and other special information on a map/sketch or with attached maps. Utilize commonly accepted ICS map symbology.  If specific geospatial reference points are needed about the incident’s location or area outside the ICS organization at the incident, that information should be submitted on the Incident Status Summary (ICS 209).  North should be at the top of page unless noted otherwise.

Block Number	Block Title	Instructions
5	<b>Situation Summary and Health and Safety Briefing</b> (for briefings or transfer of command): Recognize potential incident Health and Safety Hazards and develop necessary measures (remove hazard, provide personal protective equipment, warn people of the hazard) to protect responders from those hazards.	Self-explanatory.
6	<b>Prepared by</b> Name Position/Title Signature Date/Time	Enter the name, ICS position/title, and signature of the person preparing the form. Enter date (month/day/year) and time prepared (24-hour clock).
7	<b>Current and Planned Objectives</b>	Enter the objectives used on the incident and note any specific problem areas.
8	<b>Current and Planned Actions, Strategies, and Tactics</b> Time Actions	Enter the current and planned actions, strategies, and tactics and time they may or did occur to attain the objectives. If additional pages are needed, use a blank sheet or another ICS 201 (Page 2), and adjust page numbers accordingly.
9	<b>Current Organization</b> (fill in additional organization as appropriate) Incident Commander(s) Liaison Officer Safety Officer Public Information Officer Planning Section Chief Operations Section Chief Finance/Administration Section Chief Logistics Section Chief	Enter on the organization chart the names of the individuals assigned to each position. Modify the chart as necessary, and add any lines/spaces needed for Command Staff Assistants, Agency Representatives, and the organization of each of the General Staff Sections. If Unified Command is being used, split the Incident Commander box. Indicate agency for each of the Incident Commanders listed if Unified Command is being used.
10	<b>Resource Summary</b>	Enter the following information about the resources allocated to the incident. If additional pages are needed, use a blank sheet or another ICS 201 (Page 4), and adjust page numbers accordingly.
	Resource	Enter the number and appropriate category, kind, or type of resource ordered.
	Resource Identifier	Enter the relevant agency designator and/or resource designator (if any).

Block Number	Block Title	Instructions
	Date/Time Ordered	Enter the date (month/day/year) and time (24-hour clock) the resource was ordered.
	ETA	Enter the estimated time of arrival (ETA) to the incident (use 24-hour clock).
	Arrived	Enter an "X" or a checkmark upon arrival to the incident.
	Notes (location/assignment/status)	Enter notes such as the assigned location of the resource and/or the actual assignment and status.



(frequency/system/channel) \_\_\_\_\_

/

/

/

/

9. Prepared by: Name: \_\_\_\_\_ Position/Title: \_\_\_\_\_ Signature: \_\_\_\_\_

ICS 204

IAP Page \_\_\_\_\_

Date/Time: \_\_\_\_\_

## ICS 204

### Assignment List

**Purpose.** The Assignment List(s) (ICS 204) informs Division and Group supervisors of incident assignments. Once the Command and General Staffs agree to the assignments, the assignment information is given to the appropriate Divisions and Groups.

**Preparation.** The ICS 204 is normally prepared by the Resources Unit, using guidance from the Incident Objectives (ICS 202), Operational Planning Worksheet (ICS 215), and the Operations Section Chief. It must be approved by the Incident Commander, but may be reviewed and initialed by the Planning Section Chief and Operations Section Chief as well.

**Distribution.** The ICS 204 is duplicated and attached to the ICS 202 and given to all recipients as part of the Incident Action Plan (IAP). In some cases, assignments may be communicated via email/radio/telephone/fax. All completed original forms must be given to the Documentation Unit.

#### Notes:

The ICS 204 details assignments at Division and Group levels and is part of the IAP.

Multiple pages/copies can be used if needed.

If additional pages are needed, use a blank ICS 204 and repaginate as needed.

Block Number	Block Title	Instructions
1	<b>Incident Name</b>	Enter the name assigned to the incident.
2	<b>Operational Period</b> Date and Time From Date and Time To	Enter the start date (month/day/year) and time (using the 24-hour clock) and end date and time for the operational period to which the form applies.
3	<b>Branch</b> <b>Division</b> <b>Group</b>	This block is for use in a large IAP for reference only.  Write the alphanumeric abbreviation for the Branch, Division and Group (e.g., "Branch 1," "Division D," "Group 1A") in large letters for easy referencing.

Block Number	Block Title	Instructions
4	<b>Operations Personnel</b> Name, Contact Number(s) 4. Operations Section Chief 5. Branch Director 6. Division/Group Supervisor	Enter the name and contact numbers of the Operations Section Chief, applicable Branch Director(s), and Division/Group Supervisor(s).
5	<b>Resources Assigned</b>	Enter the following information about the resources assigned to the Division or Group for this period:
	Resource Identifier	The identifier is a unique way to identify a resource (e.g., ENG-13, IA-SCC-413). If the resource has been ordered but no identification has been received, use TBD (to be determined).
	Leader	Enter resource leader's name.
	# of Persons	Enter total number of persons for the resource assigned, including the leader.
	Contact (e.g., phone, pager, radio frequency, etc.)	Enter primary means of contacting the leader or contact person (e.g., radio, phone, pager, etc.). Be sure to include the area code when listing a phone number.
5 (continued)	Reporting Location, Special Equipment and Supplies, Remarks, Notes, Information	Provide special notes or directions specific to this resource. If required, add notes to indicate: (1) specific location/time where the resource should report or be dropped off/picked up; (2) special equipment and supplies that will be used or needed; (3) whether or not the resource received briefings; (4) transportation needs; or (5) other information.
6	<b>Work Assignments</b>	Provide a statement of the tactical objectives to be achieved within the operational period by personnel assigned to this Division or Group.
7	<b>Special Instructions</b>	Enter a statement noting any safety problems, specific precautions to be exercised, dropoff or pickup points, or other important information.

Block Number	Block Title	Instructions
8	<p><b>Communications</b> (radio and/or phone contact numbers needed for this assignment)</p> <p>Name/Function</p> <p>Primary Contact: indicate cell, pager, or radio (frequency/system/channel )</p>	<p>Enter specific communications information (including emergency numbers) for this Branch/Division/Group.</p> <p>Phone and pager numbers should include the area code and any satellite phone specifics.</p> <p>In light of potential IAP distribution, use sensitivity when including cell phone number.</p> <p>Add a secondary contact (phone number or radio) if needed.</p> <p>If radios are being used, enter function (command, tactical, support, etc.), frequency, system, and channel from the Incident Communications Plan (ICS 205).</p>
9	<p><b>Prepared by</b></p> <p>Name</p> <p>Position/Title</p> <p>Signature</p> <p>Date/Time</p>	<p>Enter the name, ICS position, and signature of the person preparing the form. Enter date (month/day/year) and time prepared (24-hour clock).</p>



## ICS 205 Incident Radio Communications Plan

**Purpose.** The Incident Radio Communications Plan (ICS 205) provides information on all radio frequency or trunked radio system talkgroup assignments for each operational period. The plan is a summary of information obtained about available radio frequencies or talkgroups and the assignments of those resources by the Communications Unit Leader for use by incident responders. Information from the Incident Radio Communications Plan on frequency or talkgroup assignments is normally placed on the Assignment List (ICS 204).

**Preparation.** The ICS 25 is prepared by the Communications United Leader and given to the Planning Section Chief for inclusion within the Incident Action Plan.

**Distribution.** The ICS 205 is duplicated and attached to the Incident Objectives (ICS 202) and given to all recipients as part of the Incident Action Plan (IAP). All completed original forms must be given to the Documentation Unit. Information from the ICS205 is placed on Assignment Lists.

### Notes:

- The ICS 205 is used to provide, in one location, information on all radio frequency assignments down to the Division/Group level for each operational period.
- The ICS 205 serves as part of the IAP

Block Number	Block Title	Instructions
1	<b>Incident Name</b>	Enter the name assigned to the incident.
2	<b>Date/Time prepared</b>	Enter date prepared (month/day/year) and time prepared (using the 24-hour clock.)
3	<b>Operational Period Date and time From Date and Time to</b>	Enter the start date (month/day/year) and time (using the 24-hour clock) and end date and time for the operational period to which the form applies.
4	<b>Basic Radio Channel Use</b>	Enter the following information about radio channel use
	Zone Group	
	Channel Number	Use at the Communications Unit Leader's discretion. Channel number (Ch #) may equate to the channel number for incident radios that are programmed or cloned for a specific Communications Plan, or it may be used just as a reference line number on the ICS 205 document.
	Function	Enter the Net function each channel or talkgroup will be used for (Command, Tactical, Ground-to-Air, Air-to-Air, Support, Dispatch)
	Channel name / Trunked Radio System Talkgroup	Enter the nomenclature or commonly used name for the channel or talk group such as the National Interoperability Channels which follow DHS frequency Field Operations Guide (FOG)
	Assignment	Enter the name of the ICS Branch/Division/Group/Section to which this channel/talkgroup will be assigned

	RX (Receive) Frequency (N or W)	<p>Enter the Receive Frequency (RX Freq) as the mobile or portable subscriber would be programmed using xxx.xxxx out to four decimal places, followed by an “N” designating narrowband or a “W” designating wideband emissions.</p> <p>The name of the specific trunked radio system with which the talkgroup is associated may be entered across all fields on the ICS 205 normally used for conventional channel programming information.</p>
	RX Tone/NAC	Enter the Receive Continuous Tone Coded Squelch System (CTCSS) subaudible tone (Rx Tone) or Network Access Code (RX NAC) for the receive frequency as the mobile or portable subscriber would be programmed.
	TX (Transmit) Frequency (N or W)	Enter the Transmit Frequency (TX Freq) as the mobile or portable subscriber would be programmed using xxx.xxxx out to four decimal places, followed by an “N” designating narrowband or a “W” designating wideband emissions.
	TX Tone/NAC	Enter the Transmit Continuous Tone Coded Squelch System (CTCSS) subaudible tone (TX Tone) or Network Access Code (TX NAC ) for the transmit frequency as the mobile or portable subscriber would be programmed.
	Mode (A, D or M)	Enter “A” for analog operation, “D” for digital operation, or “M” for mixed mode operation.
	Remarks	Enter miscellaneous information concerning repeater locations, information concerning patched channels or talkgroups using links or gateways, etc.
5	<b>Special Instructions</b>	Enter any special instructions (e.g. using cross-band repeaters, secure-voice, encoders, private line (PL) tones, etc.) or other emergency communications needs). If needed, also include any special instructions for handling an incident within an incident.
6	<b>Prepared by</b> (Communications unite Leader) <ul style="list-style-type: none"> <li>• Name</li> <li>• Signature</li> <li>• Date/Time</li> </ul>	Enter the name and signature of the person preparing the form, typically the Communications Unite leader. Enter the date (month/day/year) and time prepared (24-hour clock).



# MEDICAL PLAN (ICS 206)

<b>1. Incident Name:</b>		<b>2. Operational Period:</b> Date From: _____ Date To: _____		Time From: _____ Time To: _____		
<b>3. Medical Aid Stations:</b>						
Name	Location	Contact Number(s)/Frequency	Paramedics on Site?			
			<input type="checkbox"/> Yes <input type="checkbox"/> No			
			<input type="checkbox"/> Yes <input type="checkbox"/> No			
<b>4. Transportation:</b>						
Ambulance Service	Location	Contact Number(s)/Frequency	Level of Service			
			<input type="checkbox"/> ALS <input type="checkbox"/> BLS			
			<input type="checkbox"/> ALS <input type="checkbox"/> BLS			
			<input type="checkbox"/> ALS <input type="checkbox"/> BLS			
<b>5. Hospitals:</b>						
Hospital Name	Address	Contact Number(s)	Distance	Trauma Center	Burn Center	Heli pad
				<input type="checkbox"/> Yes Level: _____	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
				<input type="checkbox"/> Yes Level: _____	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
				<input type="checkbox"/> Yes Level: _____	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>6. Special Medical Emergency Procedures:</b>						
<b>7. Prepared by (Medical Unit Leader):</b> Name: _____ Signature: _____						
<b>8. Approved by (Safety Officer):</b> Name: _____ Signature: _____						
ICS 206	IAP Page _____	Date/Time: _____				

## ICS 206

### Medical Plan

**Purpose.** The Medical Plan (ICS 206) provides information on incident medical aid stations, transportation services, hospitals, and medical emergency procedures.

**Preparation.** The ICS 206 is prepared by the Medical Unit Leader and reviewed by the Safety Officer to ensure ICS coordination.

**Distribution.** The ICS 206 is duplicated and attached to the Incident Objectives (ICS 202) and given to all recipients as part of the Incident Action Plan (IAP). Information from the plan pertaining to incident medical aid stations and medical emergency procedures may be noted on the Assignment List (ICS 204). All completed original forms must be given to the Documentation Unit.

#### Notes:

The ICS 206 serves as part of the IAP.

This form can include multiple pages.

Block Number	Block Title	Instructions
1	<b>Incident Name</b>	Enter the name assigned to the incident.
2	<b>Operational Period</b> Date and Time From Date and Time To	Enter the start date (month/day/year) and time (using the 24-hour clock) and end date and time for the operational period to which the form applies.
3	<b>Medical Aid Stations</b>	Enter the following information on the incident medical aid station(s):
	Name	Enter name of the medical aid station.
	Location	Enter the location of the medical aid station (e.g., Staging Area, Camp Ground).
	Contact Number(s)/Frequency	Enter the contact number(s) and frequency for the medical aid station(s).

Block Number	Block Title	Instructions
	Paramedics on Site? <input type="checkbox"/> Yes <input type="checkbox"/> No	Indicate (yes or no) if paramedics are at the site indicated.
4	<b>Transportation</b>	Enter the following information for ambulance services available to the incident:
	Ambulance Service	Enter name of ambulance service.
	Location	Enter the location of the ambulance service.
	Contact Number(s)/Frequency	Enter the contact number(s) and frequency for the ambulance service.
	Level of Service <input type="checkbox"/> ALS <input type="checkbox"/> BLS	Indicate the level of service available for each ambulance, either ALS (Advanced Life Support) or BLS (Basic Life Support).
5	<b>Hospitals</b>	Enter the following information for hospital(s) that could serve this incident:
	Hospital Name	Enter hospital name
	Address	Enter the physical address of the hospital
	Contact Number(s)/ Frequency	Enter the contact number(s) and/or communications frequency(s) for the hospital.
	Distance	Enter the distance in miles to the hospital.
	Trauma Center <input type="checkbox"/> Yes Level: _____	Indicate yes and the trauma level if the hospital has a trauma center.
	Burn Center <input type="checkbox"/> Yes <input type="checkbox"/> No	Indicate (yes or no) if the hospital has a burn center.
	Helipad <input type="checkbox"/> Yes <input type="checkbox"/> No	Indicate (yes or no) if the hospital has a helipad.
6	<b>Special Medical Emergency Procedures</b>	Note any special emergency instructions for use by incident personnel, including (1) who should be contacted, (2) how should they be contacted; and (3) who manages an incident within an incident due to a rescue, accident, etc. Include procedures for how to report medical emergencies.
7	<b>Prepared by</b> (Medical Unit Leader) Name 7. Signature	Enter the name and signature of the person preparing the form, typically the Medical Unit Leader. Enter date (month/day/year) and time prepared (24-hour clock).
8	<b>Approved by</b> (Safety Officer) Name Signature Date/Time	Enter the name of the person who approved the plan, typically the Safety Officer. Enter date (month/day/year) and time reviewed (24-hour clock).

## 6 AD HOC VHF ANTENNAS



*Figure. Very simple VHF antenna made from 2-conductor lampwire (#18, Home Depot). Rope as insulators on both sides, lampwire as transmission line. 34" dipole showed lowest SWR 1.2 around 143 MHz. Adjust as desired, tape center to set dimension.*

by Gordon Gibby

### **BUILDING LOSSES**

A NIST study of losses for radio waves from the insides of typical commercial buildings (concrete / steel ) found astonishing losses at every frequency tested (dB loss from inside to outside):

**Table 27. Mean values of scenarios used for structure/building attenuation statistics.**

Scenario	50 MHz	150 MHz	225 MHz	450 MHz	900 MHz	1.8 GHz	2.4 GHz	4.9 GHz
1	-37.5	-27.9	-33.1	-39.7	-34.2	-34.0	NA	NA
2	-32.8	-39.2	-34.2	-28.7	-27.2	-26.5	NA	NA
3	-58.0	-37.6	-39.5	-30.0	-34.1	NA	NA	NA
4	-43.1	-36.0	-43.0	-29.2	-33.8	-39.3	NA	NA
5	-62.1	-41.6	-44.1	-46.9	-57.7	-55.6	NA	NA
6	-47.2	-46.5	-49.9	-52.8	-44.6	-33.3	NA	NA
7	-63.7	-55.7	-60.3	-52.4	-70.4	-67.2	NA	NA
8	-65.3	-66.0	-62.3	-57.3	-66.4	-58.2	NA	NA
9	NA	-24.9	-25.9	-25.4	-27.0	-25.6	-17.5	-36.3
10	-50.3	-33.7	-34.1	-37.8	-42.7	-39.7	-41.1	-48.5
11	-50.2	-54.8	-43.3	-37.9	-28.9	-26	-62.7	-59.9

- End-fed slim-jim or J-pole (there isn't much difference)

Those losses are enormous. A loss of 30 dB means that a 1000watt VHF transmitter on the inside of a building is equivalent to a 1 watt transmitter when the signal reaches the outside. A loss of 50 dB means the 1000 watts has become only 1/100 of a watt!

That makes it easy to see why in most cases, a handi-talkie antenna is NOT going to make it through 100 feet of concrete and steel inside a hurricane-rated school building!!! So plan on deploying with a healthy length of RG8X or thicker coax, and some sort of antenna that you can hang or attach outside. Some technique for getting up HIGHER is also advisable --- like a slingshot, fishing pole system or other mechanism with which you are comfortable. If you're facing high winds--- make it secure!

You can be well-served with plenty of options for vhf/uhf antennas using just the following simple designs:

- quarter-wave vertical antenna with a car body / metal roof or something else as the groundplane. (stick a magmount on any steel structure you can find outside the building)
- Horizontal or vertical half-wavelength dipole – only a couple feet of wire is required.

VHF/ UHF antennas are so modestly sized that there isn't much demand for complicated matching systems such as are used on HF to make small antennas “tune” like they are bigger antennas or vice-versa. The old standard equations for ¼ wave and ½ wave antennas (of uninsulated wire--- insulated wire might require a 5% shorter length or so) from your license exam studying still apply:

Frequency	¼ wave antenna 234/F <sub>MHz</sub> (in feet)	½ wave antenna 468/F <sub>MHz</sub> (in feet)
146 MHz	19 inches	38 inches
220 MHz	12.75 inches	25.5 inches
440 MHz	6 inches	12 inches

To make a ¼ wave antenna, connect the center wire of the coax to a vertical wire of about the length in the table above, and then either make several radials of the same length going out and down a bit, or else use some capacitive coupling from a 4” square piece of aluminum foil or steel or copper closely approximated to your car body, roof or other piece of large metal.

To make a ½ wave center fed dipole (either vertical or horizontal) just make a center insulator out of anything insulating (a piece of plastic, even from a pop bottle, will work) and run stiff wire out each side, equal lengths, so that the total length of the WIRE is as shown in the table above (e.g., 38” for a 2 meter antenna).

If you have an SWR meter (or better, an antenna analyzer) you can then check it and see if the SWR is below 2:1 or so where you need to operate. If it is better at lower frequencies, the antenna is a bit too long; if it is better at higher frequencies, it is a bit too short. Make small changes (like ½ inch)!

## **EMERGENCY TRANSMISSION LINE**

Believe it or not, common lamp cord for lengths up to maybe 25 feet at two meters isn't a terrible feedline and it also makes the antenna as well! Pull the ends apart, 19" on each side (38 inches total) and tape the middle so it won't separate further, secure everything and connect the "transmitter end" to your transmitter --- and it is likely to work. Due to the insulation, you may find 36" or so might work better.

**VHF/UHF antennas may have broader usable bandwidths than the 3% of center frequency that is common for HF wire antennas, because the thickness of the antenna (wire or tubing) is a greater percentage of the length.**

**EXTENSION CORD:** You can even use a common extension cord as an emergency transmission line – if it is a three-wire line, connect ground and the larger prong/socket to the shield connection of your transmitter (securely) and use the smaller prong/socket for the "center conductor" --- the two wires connected as the shield will make a poor-man's "semi-coax" transmission line. Try to avoid coiling the wire and run it outside and connect to any homemade antenna. This will work better on 2 meters than 70 cm.....but almost ANYTHING beats the 30 to 50 dB loss of trying to transmit through concrete/steel buildings.

## **HOMEMADE DEPLOYABLE ANTENNA**

The Slim Jim antenna is a fascinating end-fed antenna with a built-in matching stub, that turns out to be a bit "hardened" against EMP because the stub frankly shorts out lower frequencies. The matching stub is not really a TRANSFORMER, it is more of a transmission-line based L- C matching system. The latter point is beyond the scope of this book and not important --- but you will need an SWR meter or better yet an antenna tuner to tune these antennas. It can be constructed for less than \$5 and mounted sticking up from any support as long as there isn't metal near the matching stub system. Because it is end fed, the transmission line falls away nicely. Construction information is as follows:

(Material reprinted with permission from: Amateur Radio Digital & Voice Emergency Communications, by Gordon L. Gibby)

## **WOODEN SLIM JIM 2-METER ANTENNA CONSTRUCTION DETAILS:**

### Materials:

- pressure treated 1x2 wood from lumber store
- 14-gauge house wire (THHN style, solid conductor) just over 10 feet long.
- Coax line to connect to the matching network.

**WIRE:** Start with a piece of solid #14 AWG household wire approximately 3 yards and 9 inches long (117") (It is easier to be a couple inches too long and later nip the excess off.) Strip the insulation off of 36" at one end.. It is easiest to do this with a pocketknife while holding the wire against a solid flat surface.

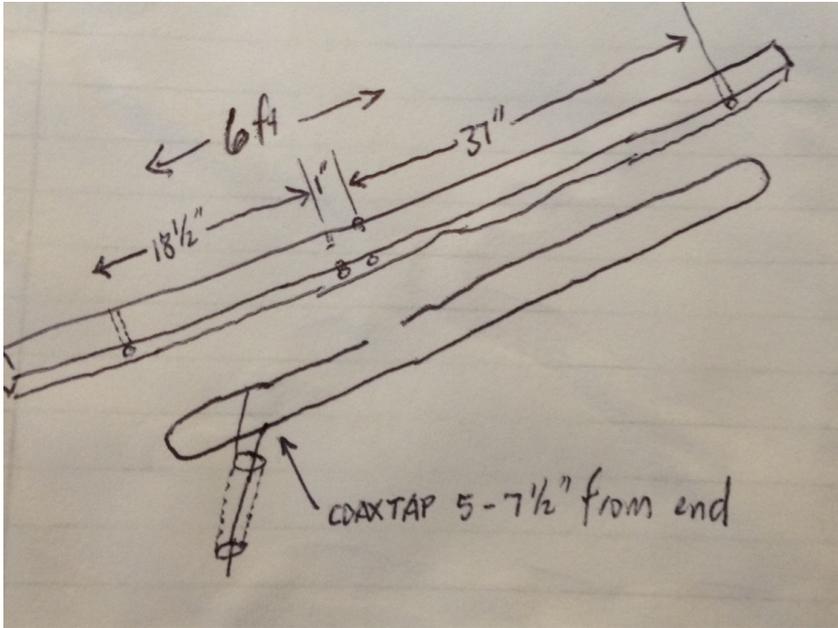


Fig. Drawing of the wood and wire that make up the antenna. The end-fed folded dipole is the longer, righthand portion, while the transmission line matching network is the left hand portion of the wire to which the coax is attached. **Note: Making the matching section 19.5" instead of 18.5" sometimes makes this easier to tune.**

**WOOD:** Start with a pressure-treated 1x2 that is 8 feet long. These are typically less than \$2 at home improvement stores. Leave several inches of space (perhaps 8") at one end to "hang" the antenna by, and drill a 1/4" inch hole through from front to back for later hanging. At 8" from the end (the "top" of the antenna) drill a 1/8" hole clear through from side to side. 37" from that first hole, drill a 1/8" hole just half an inch in to give you a stopping point for the folded dipole. Another 19.5"(up to 20.5") further down the wood, drill another 1/8" hole clear through for the shorting leg of the matching transmission line. The total length between the two through-and-through holes will then be 18.5" (to 19.5") (matching section) + 1" (gap) + 37" (folded end fed dipole) = 56.5 (or 57.5) inches, just a bit under under 6 feet).

**Distances just aren't that critical.** That 37" inch length is simply not critical. I tested 3" longer and 3" shorter and they still would work with just different coaxial cable attachment points, very little difference "shorter" and so with somewhat more difference with "longer". The matching transmission line distance probably isn't terribly critical, either, and increasing it to 19.5" has made better SWR's more easily attainable on several antennas.

**CONSTRUCTION:** Thread the wire through as needed to form the antenna as shown in the drawing, and secure it with electrical tape. Try to pull sections reasonably tight so the wire hugs the sides of the 1x2 wood. **Cut off any excess as needed** so that there is roughly a 1" gap between the free end of the matching line and the far end of the folded dipole end.

**MATCHING:** Using an antenna analyzer (with a very short connection, like 2-3" of wire) or an SWR meter (if possible, with a short connection, or a connection that is 1/2 wavelength (roughly 31" for RG8X) so the impedance isn't altered by your coax line), run the connection up and down the matching section. Use a finger on each side to make the connection, and keep them even with each other. You'll quickly find the point where you get an SWR very near to 1:1, often about 7" from the shorted end. Mark this, and solder the coax to it there, with the center conductor of the coax going to the longer side and the shield going to the side of the matching transformer

that goes nowhere.

**WATERPROOF:** Use a liquid or grease sealant of your choice on the ends of the coax, run the coax either directly away from the matching loop or tape it right down the center. Secure the antenna wires and matching section every 12 inches or so with electrical tape.

### VHF/ UHF FEEDLINE REFERENCE INFORMATION

**Note that losses increase dramatically if the line has an SWR significantly greater than 1:1, and for ladder line, if the line is wet or covered with snow or ice.**

TABLE 7-2. Transmission Line Loss Characteristics

Type of Transmission Line	100 foot loss in dB at 146MHz
RG58A/U (50 ohms)	6.1 dB
RG8X (50 ohms)	4.5 dB
RG 8 /LMR 400 (50 ohms)	1.5-2 dB (LMR is lower loss than RG8)
450 Ohm ladder line	0.4 dB

**Remember!** *These loss values are when the transmission line is operated with a perfect match-- 1:1 SWR. When the SWR is higher, there are points with much higher voltages and much higher currents, resulting in significantly greater losses, particularly for COAX lines. Open wire feeders do much better with high SWR's, but are much more susceptible to losses due to rain, snow, or ice.*

SCREATCH PAPER

## 7 AD-HOC HF ANTENNAS & BALUNS

by Gordon Gibby KX4Z

Teams were sent to Puerto Rico with one 40-meter antenna and an HF transceiver that had some modest tuning abilities. 40 meters is somewhat a “do-everything” band, but reports indicated that other frequencies were also utilized and teams found ways to make their antennas more versatile. Putting together an emergency HF antenna for any required frequency is an important skill for emergency-oriented amateur radio volunteers.

### **MAKE A DIPOLE OF ANY KIND**

The basic resonant dipole is the foundational antenna, with a length (for uninsulated wire) of about  $468/f$ , where  $f$  is in megahertz and the resulting distance is in feet, and the feedline will be attached to an insulator in the middle. If you use insulated wire (like house-wiring), the required length will be a few percent shorter. An SWR meter will help you correct the length; SWR's below 2:1 are preferable, but below 3 works. Insulators can be made out of anything nonconductive --- wood, PVC pipe, plastic, even glass.

Dipoles can be situated horizontally, vertically, or one part vertical and another horizontal, inverted V, or even upright vee --- and they will still work. Horizontal dipoles send their energy out at higher angles of elevation, vertical dipoles at lower angles of elevation. The additive/subtractive effects of the signal that impacts the ground, reflects back up to join the original wave changes the angle of elevation peak; antennas a wavelength or high have lower angles of elevation; antennas more like  $1/8 - 1/4$  wavelength above ground have higher angles, which makes them more useful for NVIS.

Low Dipoles	Higher angle of elevation of maximum energy, work better for hundreds of miles
Really high Dipoles	Lower angle of elevation of maximum energy, work better for thousands of miles
Vertical dipoles	Very long angle of elevation, work better for many thousands of miles

### **FANCIER ANTENNAS**

Simple resonant dipoles tend to have an input impedance in the 50-75 ohm range (depends on height, etc) thus matching coaxial cables well. They will have an acceptable SWR over about a bandwidth of 2% of their center resonant frequency. Changing to an off-center dipole, by moving the feedline to 33% of the length and the input impedance rises and the antenna also become usable on more different bands. Many hams do well with a 4:1 balun at the feedpoint and coax from there to the transceiver. There are several commercially constructed Windom type antennas using this setup. For example: <https://www.amateurradiosupplies.com/windom-antennas-s/55.htm>

Random length: Make the antenna a random length, feed it with balanced feedline and use some sort of antenna tuner (manual or automatic) and you have a very low-loss antenna that with experience can be utilized on a wide range of frequencies. Typically you prefer to have the length of a non resonant antenna  $> 1/2$  wavelength at the lowest frequency of interest. Balanced “window” feedline can be obtained from many sources. I prefer to use stranded 300-ohm feedline because it is easier to work with in portable situations: #562 from thewireman:

<http://www.thewireman.com/antennap.html#562>

or from

DXEngineering:

<https://www.dxengineering.com/search/product-line/dx-engineering-300-ohm-ladder-line>

### **WHICH BAND TO USE?**

HF amateurs should be well versed on the critical frequency and maximum usable frequency and how they vary with the hour of the day. If not, then just listen on various bands until you hear callsigns in the general region you need to contact!

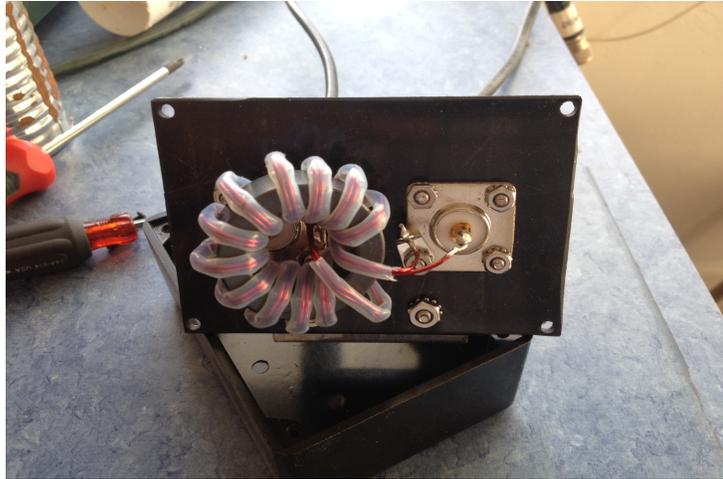
Critical Frequency	The highest frequency that can be reflected from straight vertically UP, to straight vertically DOWN back to the sending station. This is the highest frequency that will work to reach people in your same town without using ground wave, for example. At night-time in northern hemisphere in winter and low sunspots, it may be as low as 2 MHz. The Critical Frequency is measured every few minutes by radio-ionsondes all over the world and reported over the internet. This is the cause of the “chirp” you may occasionally hear moving rapidly through ham bands.
Maximum Usable Frequency	The highest frequency that can be refracted at all – typically just a glancing blow to the ionosphere, coming back to earth many thousands of miles. DX'ers prefer to use a frequency just below the MUF.

It is an important point to know, that as you move to higher frequencies where the length of your wire is more than 2 wavelengths long, the impedance tends to even out, or stabilize, and matching to it becomes much easier with modern matching systems.

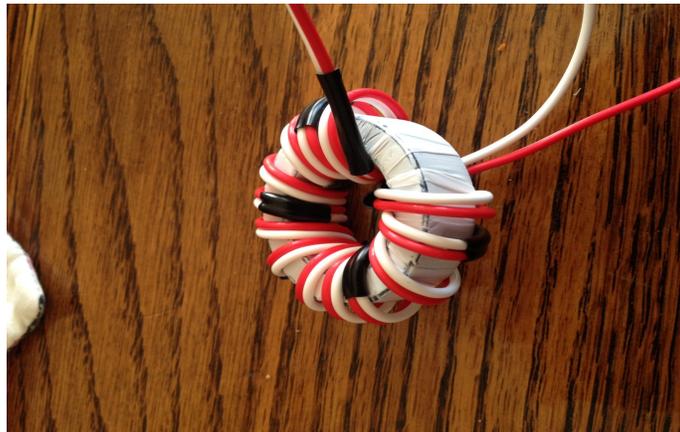
### **The Mysterious BALUN**

Baluns are a way to avoid unwanted radio frequency currents running over what you thought were current-free ground connections, and are generally not that necessary if all you are doing is voice or CW communications. Once a computer is involved, these unexpected currents have a way of causing semiconductor junctions in interface systems (such as USB ports) to be activated at random moments and generally freeze programs, lock transmitters into “transmit” and crash computers. People who do a lot of digital communication become much better at understanding how to use baluns (and their close relative, the ferrite bead) to reduce these unwanted currents by adding inductance in their unwanted paths.

When you're desperate, just having some ferrite toroids around can be helpful --- wrap several turns of any wiring giving you trouble through the ferrite and it will give you a large degree of common mode rejection.



What is inside a popular coax-to-coax balun (or “un-un”)



A homemade current balun that does the same thing.

You can read more about baluns in several places, including:

<http://www.qsl.net/nf4rc/BalunPart1.pdf>

<http://www.qsl.net/nf4rc/BalunPart2.pdf>

<http://www.qsl.net/nf4rc/BalunHowTo.pdf>

If you do digital HF communications and don't wish to homebrew your own baluns, you probably should purchase one or more of the following:

<http://www.mfjenterprises.com/Product.php?productid=MFJ-2912> Isolation balun to insert in coax lines to reduce common mode unwanted RF currents

<http://www.mfjenterprises.com/Product.php?productid=MFJ-911H> Coax to balanced line balun, switching between 1:1 (no impedance change) or 4:1 (4:1 impedance transformer)



## 8 DIGITAL TECHNIQUES FOR HEAVY HAULING

One way of looking at the types of communications required in an emergency is to break them up in a 2x2 box by looking what the nature of the information to be transferred (tactical versus logistical) and the nature of the connections required (broadcast versus 1:1):

<b>Nature of the information:</b>	Tactical Communications – short pithy exchanges of information that don't have to be recorded word for word.	Logistical communications: detailed “record” traffic that may include long sets of data that must be delivered and recorded precisely without error.
<b>Nature of the connections:</b>		
BROADCASTS – need to be sent to many locations at the same time	VOICE – VHF FM (short distance) or SSB (long distance)	PK31 / MT63 / Olivia and other digital techniques come the closest.
1:1 – need to be sent to just one recipient	In difficult propagation circumstances, PSK31, JT65 or other techniques might be utilized.	WINLINK – either via gateway or peer to peer (error free) FLDIGI/FLMSG – error free YAPP via packet – error free

Amateurs have typically excelled at the TACTICAL/BROADCAST solutions, primarily VHF Voice within a city, and SSB Voice to pass information long distances. Both played very important roles in Puerto Rico. The “Force of 50” was sent ostensibly to do one of the lesser-mastered roles in amateur radio: 1:1 / Logistical communications to fill a Safe&Well database (for which WINLINK was selected).

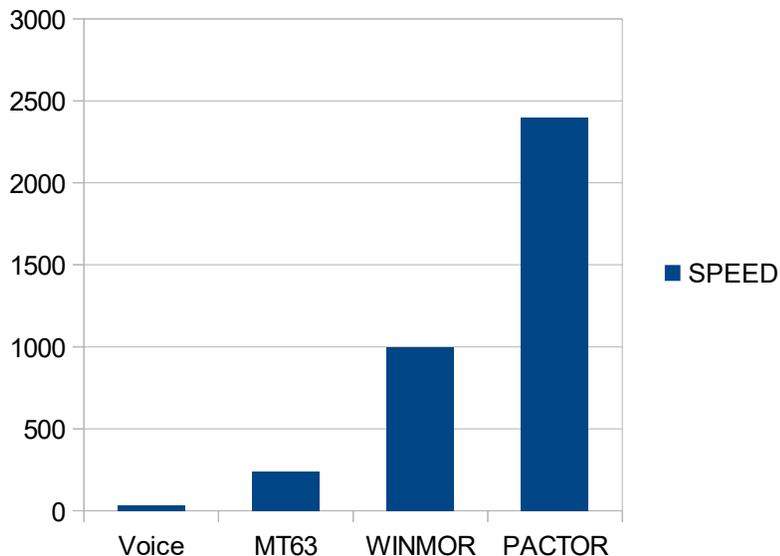
### Everyday Communications

Cell phones handle civilian Tactical communications quite well, and with voice conferencing they even allow for “broadcast” techniques. Web-conferencing also fills that need. Text messaging however has taken a huge bite out of 1:1 tactical communications!

Email is used by the general public to handle the detailed communications, and to some extent text messaging can fill in there also with photos etc.

### Well Rounded Amateur Radio

The expert amateur radio emergency communicator needs to have skills in all quadrants. Some groups espouse “lowest common denominator” communications, but this ends up with amateur radio unable to meet the need until the military arrives with satellite dishes and begins to handle the detailed logistical comms required to handle tens of thousands of deliveries, and personnel. If your ARES or other emergency group misses out on the record logistical comms techniques, you're going to be limited in a larger emergency....



*Figure: Digital techniques vastly outpace voice when larger files or error-free transmission is required. Speeds are for strong signal environments, characters per minute.*

## **DIGITAL TECHNIQUES**

Familiarity with FLDIGI/FLMSG, and WINLINK will fill most of the need for detailed error-free (ARQ, handshake) communications; adding packet YAPP gives yet another technique. These techniques have vastly higher throughput for long messages than does voice, primarily because record voice must be TRANSCRIBED and that is generally limited to 20-30 wpm, whereas digital techniques can easily reach 1000-2000 characters per minute (or, assuming 5 characters per “word”, 200-400 words per minute). Directly transcribed onto screen or computer file, they can run rings around voice transmissions in good propagation, and newer techniques can even deal with difficult propagation conditions.

Your group would be wise to master these techniques. You can start with any of them, and work your way through them. Software for all three is free and not difficult to learn as evidenced by hundreds of thousands of downloads of FLDIGI software, and a hot market for sound-card interfaces that allows prices of simple circuits to rise above \$100.

Note: Sarasota Digital Group has excellent materials: <http://n4ser.org/sdg/#Tutorials>

## **WINLINK**

Download site: on [www.winlink.org](http://www.winlink.org)  
[ftp://autoupdate.winlink.org/User%20Programs/Winlink\\_Express\\_install\\_1-5-10-0.zip](ftp://autoupdate.winlink.org/User%20Programs/Winlink_Express_install_1-5-10-0.zip)  
 (> 20 Mbyte installation file)

For HF you'll also need a propagation program written for the US government to do HF broadcast propagation predictions know as “itshfbc.exe”: Greg Hand has the best download site:

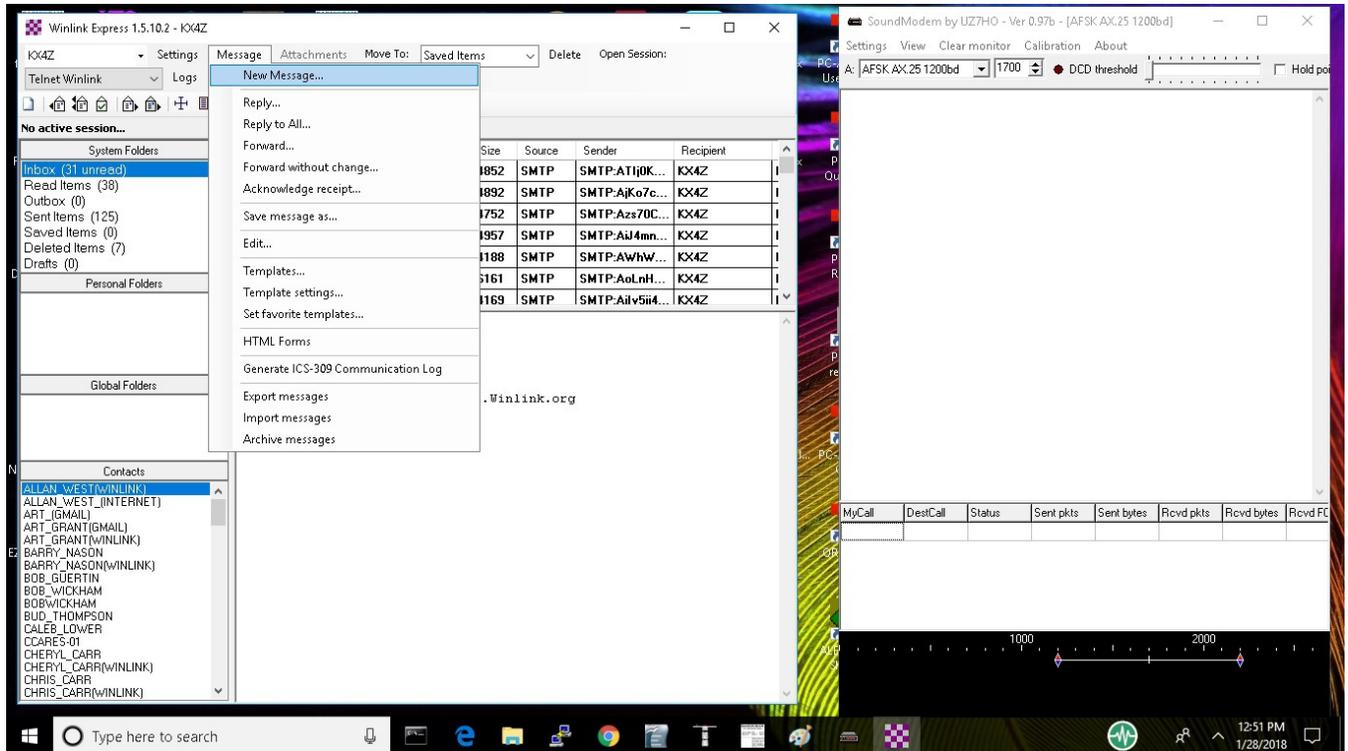
[http://www.greg-hand.com/versions/itshfbc\\_161207.exe](http://www.greg-hand.com/versions/itshfbc_161207.exe)

For VHF packet, you'll also need either a hardware TNC (e.g Kantronics KPC-3) or a soundcard/soundcard interface and some modem program – most of us use UZ7HO's free soundmodem.exe:

[http://uz7.ho.ua/modem\\_beta/soundmodem97.zip](http://uz7.ho.ua/modem_beta/soundmodem97.zip)

While you are there, download his excellent plain-jane terminal program easyterm:

<http://uz7.ho.ua/apps/easyterm39.zip>



For HF sound-card usage (WINMOR-WINLINK) all that is required is to download an updated list of gateways (“channel selection”) --and set the TX and RX gain on the signalink so you can see signals and aren't overdriving your transmitter. Use the test transmission tone to set gains.

For VHF soundcard usage (packet, using soundmodem97.exe) you'll have to work your way through some of the configuration of soundmodem97....this can be tricky. Best to have a mentor, but we have instructions here:

<http://www.qsl.net/nf4rc/UnderstandingAudioChannelConfiguration.pdf>

# FLDIGI

Base program (with the modem protocols) is fldigi. Flarq uses these to send ARQ files and/or text; this corresponds to sending email attachments in WINLINK. . Note that Olivia cannot be used. Flmsg corresponds to templates in WINLINK – has the ability to error free send all kinds of message formats.

Primer on just fldigi: <http://qsl.net/kx4z/FLDIGICheetsheetforVolunteers.pdf>

Download site:

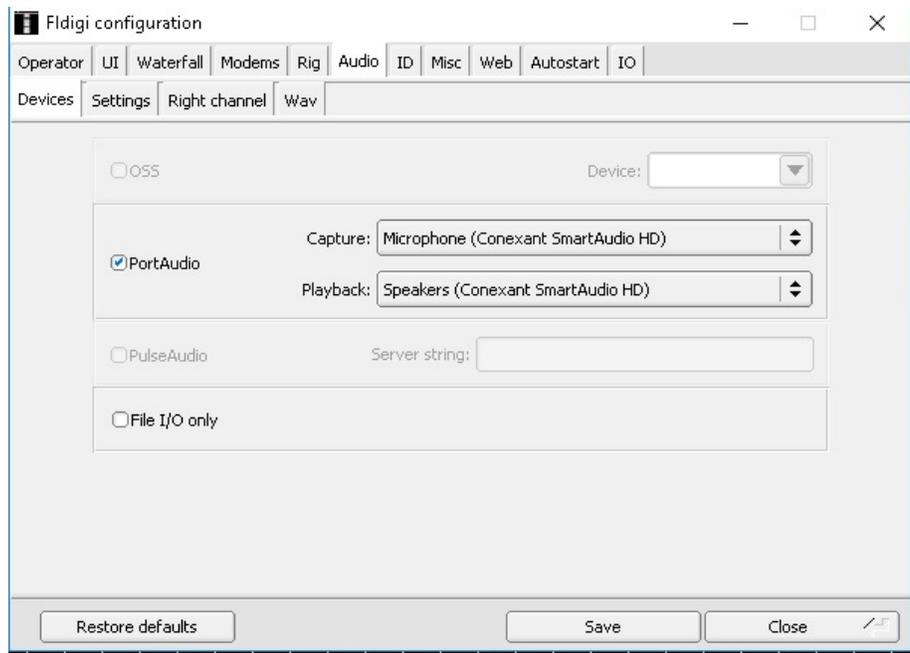
FLDIGI <https://sourceforge.net/projects/fldigi/>

FLMSG <https://sourceforge.net/projects/fldigi/files/flmsg/> (includes versions for multiple operating systems)

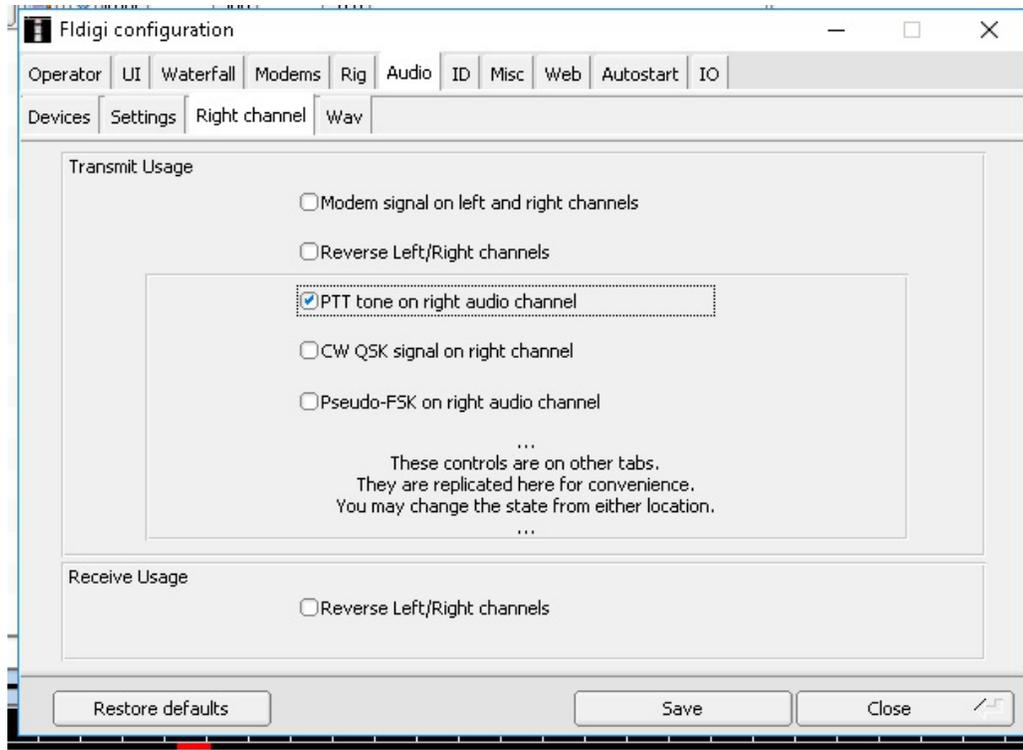
FLARQ:

FLDIGI – very busy configuration choices.

- Pay attention to sound card choices. Typical “port audio” & select sound card.
- Pay attention to the “right channel” for sending continuous tones to activate vox-type PTT in devices such as the Signalink (and the homebrew sound card interface “\$25TNC” that our group uses
- Learn how to recognize the various sounds of different digital signals
- Avoid overdriving your transceiver into compression/distortion – generally below the onset of ALC
- No compression!

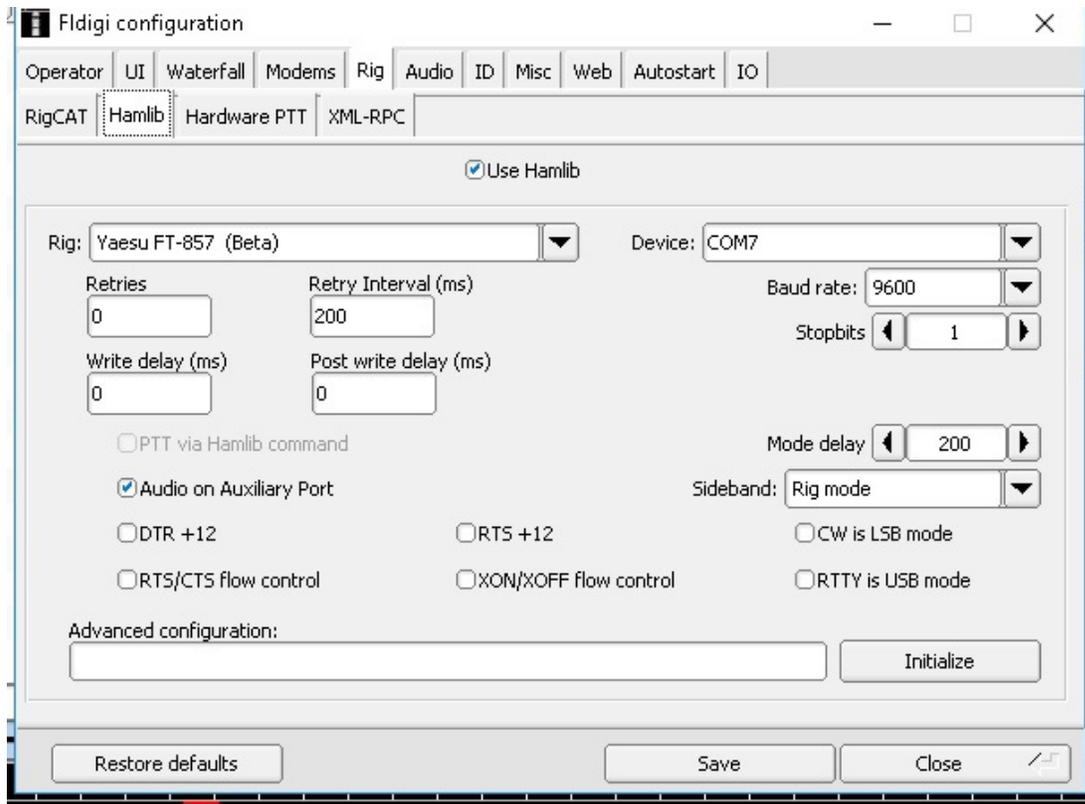


*Figure – here the internal soundcard of the laptop is being selected to demonstrate sounds – but typically you'll be selecting some “USB CODEC” or similar.*



*Figure – typically you will want the PTT on the right channel (versus left) to actuate signalink or similar vox-type PTT soundcard interfaces --- but yours just might be wired backwards!*

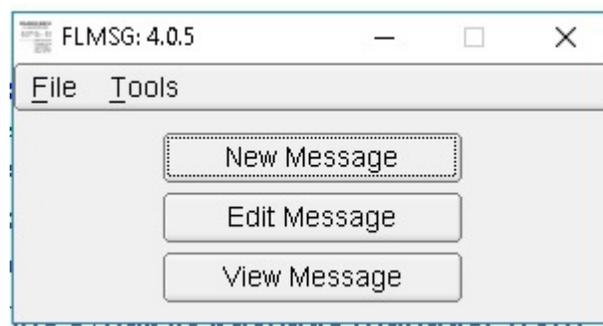
OPTIONAL RIG CONTROL:

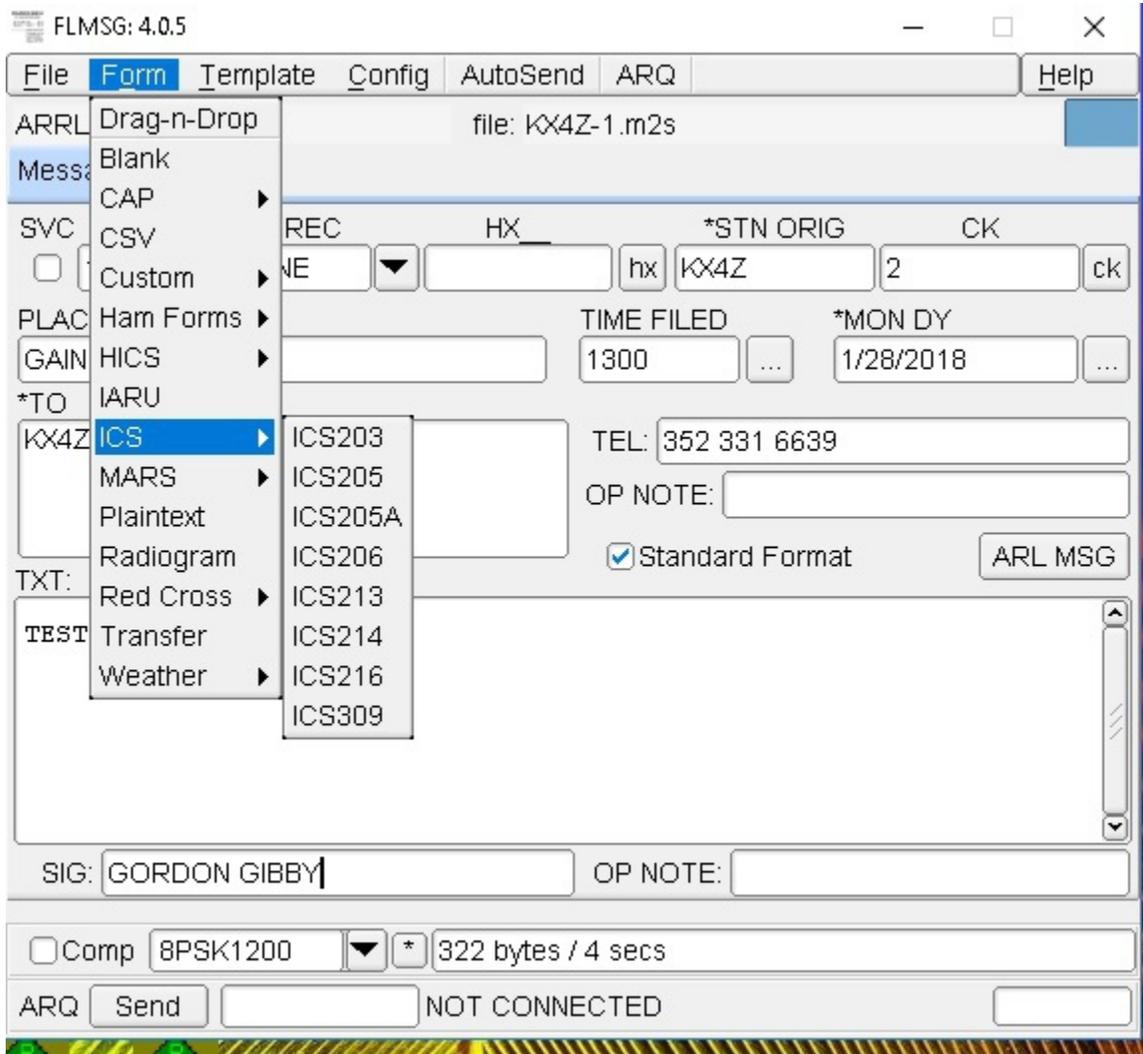


*Figure – RigCAT, Hamlib and other methods are included within FLDIGI to control your transceiver's frequency (and more) if you desire – this is completely optional! I've had more success with HamLib.*

## FLMSG:

When loading flmsg – be certain to select the “expert” interface; the “served agency” interface doesn't do what you need.

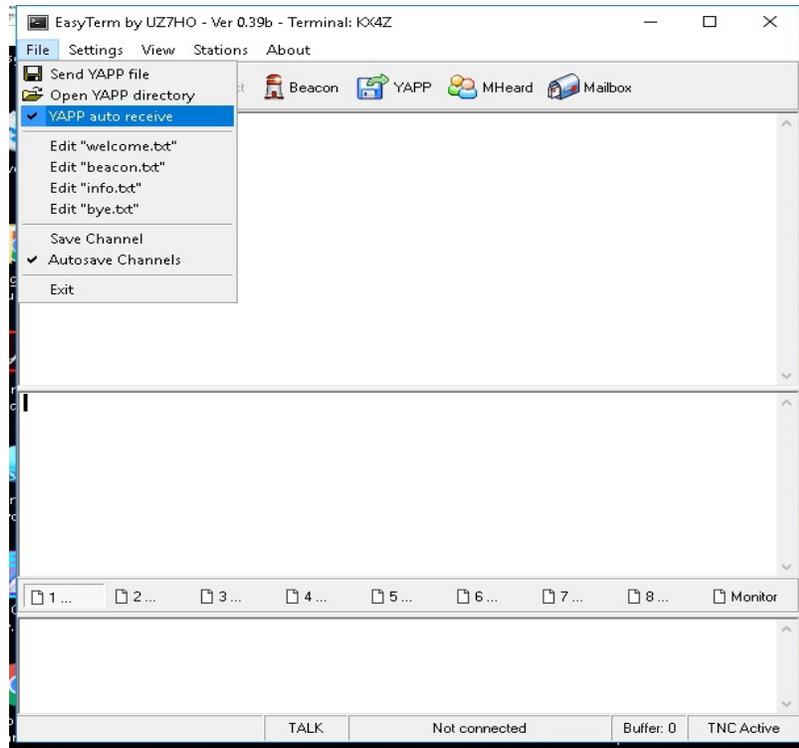




## EASYTERM/ YAPP

Not to be outdone, the free terminal program EASYTERM has a “YAPP” protocol that can do unattended error free file reception – quite useful.

<http://www.qsl.net/nf4rc/EasyTermTutorial.pdf>



# 9 UPLOADING NEW CONTENT TO SHELTER WIFI INFORMATION SYSTEM

Gordon Gibby KX4Z  
April 27 2018 V 1.0



## INTRODUCTORY BACKGROUND

Alachua County ARES has created a prototype Shelter WiFi information system in response to an identified “situational awareness” problem during the 2017 Hurricane IRMA experience. Using an inexpensive Raspberry Pi to operate a simple web server, shelterees as well as shelter management can view updated information and bulletins through a normal home wifi router. (Extenders can be utilized as needed to cover larger areas.)

To access the web server, shelterees would connect to the “SHELTER” wifi server, which requires no password. Either a smartphone or a laptop or notebook computer or iPad can connect.

Once connected, the browser is directed to a very simple URL such as 10.10.10.10, or to a special name, “hamradioband.com” which our group has purchased for the purpose. The home router provides IP names, and the Raspberry Pi not only provides web content services, but also provides name-server services --- enabling the system to continue to function when all other cell phone, internet and other information services have failed.

The web server is pre-loaded with scores of helpful files, manuals and forms for the ham radio shelter radio communications volunteer --- but can also accept updates with late-breaking weather or other news (such as

damage assessments, utility information, food / water / fuel availability, etc).

Ham radio communications volunteers can receive updated .html files as WINLINK email attachments, or using the FLMSG system or even through YAPP packet protocol. Once received, the amateur radio operator then uploads the new file to the Raspberry Pi web server

This document is written to explain how to do that upload process.

## EXPLANATION: FILE TRANSFER PROTOCOL

Long before the beginning of graphical operating systems such as Windows, early users of the Internet in 1971 created a protocol for the error-free transfer of computer files from one computer to another, known as “file transfer protocol” (ftp) document in RFC 114 on April 16, 1971.

([https://en.wikipedia.org/wiki/File\\_Transfer\\_Protocol](https://en.wikipedia.org/wiki/File_Transfer_Protocol) ) The technical details of exactly how this works aren't that complicated, basically a connection on port 21, the two computers involved establishing which port will be used to transfer the file, and the error-corrected transfer of the file. A wrinkle is the “Passive” mode used to deal with obstructing firewalls, but none of this has to concern the volunteer radio amateur.

Instead of the early command-line ftp programs, Windows users can now use an easy point-and-click graphical FTP program. Alachua ARES will be using a free **Coffee Cup FTP** program.

Download this free file here: <https://www.coffeecup.com/free-ftp/> choose the free version.

This program has a standard menu structure at the top. In the upper left half is a display of the contents of the Windows' computer's files (very similar to how Windows Explorer and almost all word processors and other file-oriented programs work). In the upper right half is a similar display of the contents of the Raspberry Pi's folders and files.

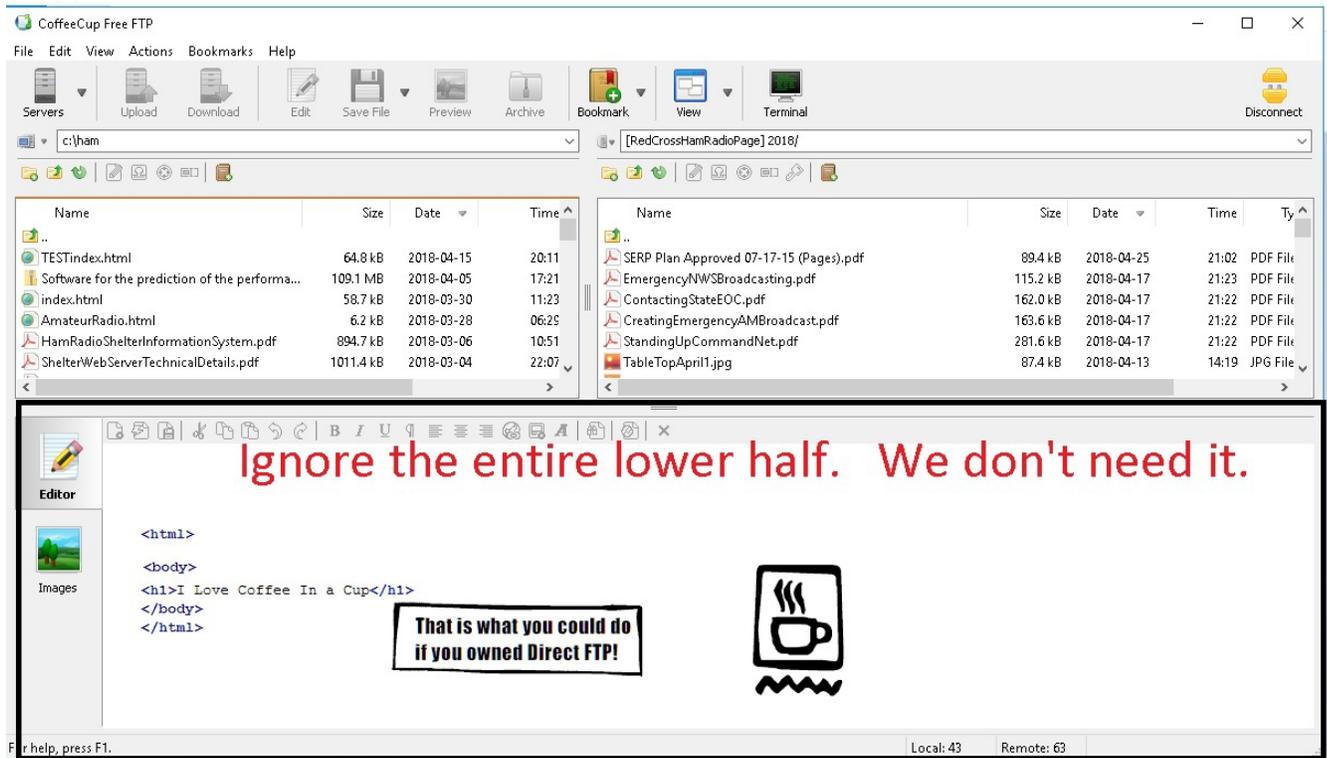
LEFT

Windows computer

RIGHT

Raspberry Pi

The lower half of the screen is advertising and other information from Coffee Cup that can be ignored.



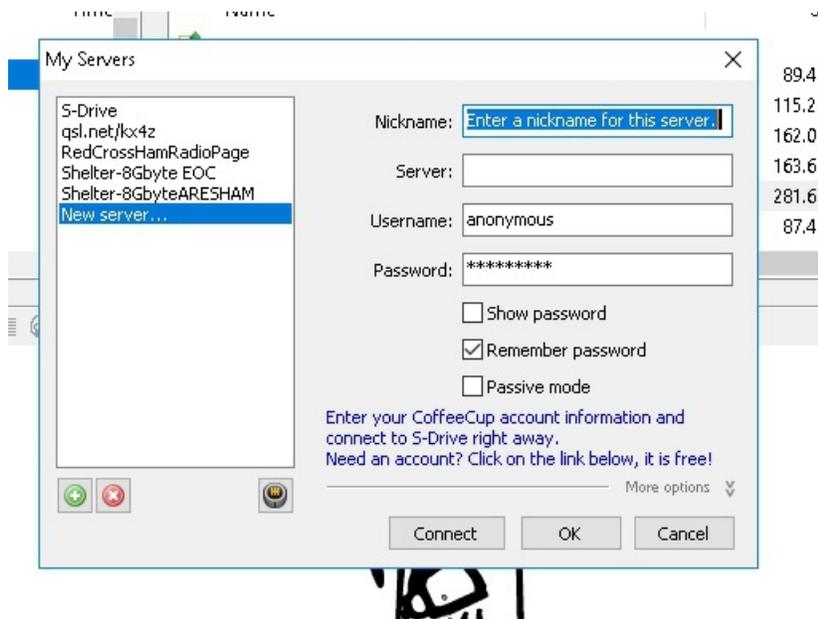
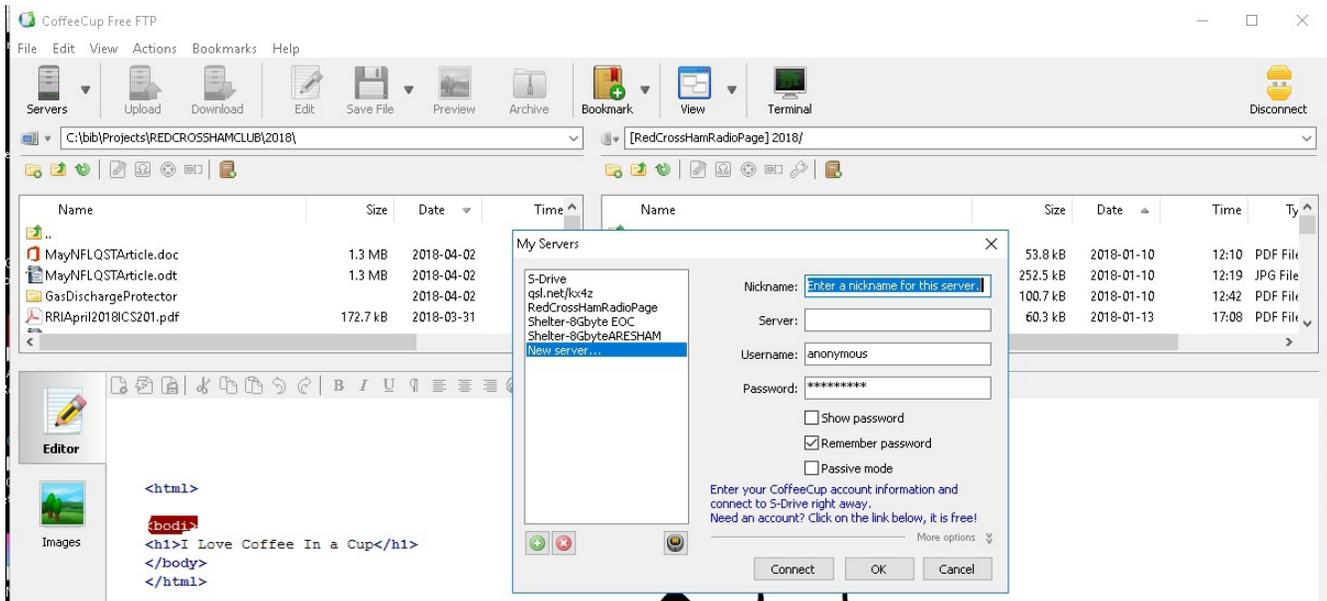
## ONE TIME INITIAL SETUP

The very first time the system is set up the user has to configure to allow a connection to the Raspberry Pi. This is easy, and basically involves storing the required *username* and *password*.

1. In the Menu Bar, click FILE | MANAGE SERVERS ( the Raspberry Pi is your "server"), then click the green "+" button below the list where servers go, and add SHELTER to the nickname list.
2. Fill in the required information:

SERVER: hamradioband.com  
 Username: ARESHAM  
 Password: (will be released at a training meeting)

choose REMEMBER PASSWORD and then **OK**. You should now have the Raspberry Pi server configured, and it will work for ALL of our prototypes. Use **CONNECT** to make the connection.



3. In your LEFT (windows) directory pane, navigate to c:\Ham directory on your computer. Create this with Windows Explorer if it hasn't already been created --- we'll use this for all files on the Raspberry Pi.

4. On your RIGHT (Raspberry) directory pane, it should automatically come up to the directory that already has a lot of files.

## ACTUALLY TRANSFERRING A NEW FILE

1. Over WINLINK or by any other means, you are likely to receive a replacement copy of a file such as  
`AmateurRadio.html`
2. Store that file in [c:\Ham](#)
3. Make sure you are connected to the SHELTER wifi. (This won't work if you aren't!)
4. Bring up Coffee Cup FTP and it will automatically connect to the Raspberry Pi web server.
5. Double click the new file `AmateurRadio.html` in the LEFT pane, and it will almost instantly transfer and overwrite any previous such file on the Raspberry.
6. If you want to check, just look for the date/time on the file in the Right hand Pane (there's a circular "refresh" icon to refresh the information).

You're done.







