

Net Frequencies

1. Introduction

This document defines pre-designated frequencies that may be used by Tippecanoe County, Indiana Amateur Radio Emergency Service® (ARES®) for a variety of communications needs, including emergency deployments, training, exercises, and other operations.

2. Responsibilities

The Assistant Emergency Coordinator for Operations and the Assistant Emergency Coordinator for Network Operations, jointly responsible for Net Management, are the developers and maintainers of this document.

Each participant in Tippecanoe County ARES nets is responsible for thoroughly reviewing and following the procedures defined in this document. Each member of Tippecanoe County ARES should consider programming these frequencies into the memory channels of their radios to permit rapid frequency changes during ARES operations.

3. Related Publications

NET 1-1	Net Management (Net Control Station Procedures)
NET 1-2	Net Operations
NET 1-4	Net Formats

4. Definition of Terms

AEC	Assistant Emergency Coordinator
APRS	Automatic Packet Reporting System
D-STAR	Digital Smart Technology for Amateur Radio (digital voice and data)
EC	Emergency Coordinator
FCC	Federal Communications Commission
NCS	Net Control Station
UHF	Ultra High Frequency – generally considered from 300 MHz to 3000 MHz. This includes the 440 MHz, 900 MHz, 1.2 GHz, and 2.4 GHz amateur radio bands, as well as the 450 MHz and 700/800 MHz public service bands. It is more commonly considered as referring to the 70 cm (440-450 MHz) amateur band.
VHF	Very High Frequency – generally considered from 30 MHz to 300 MHz. This includes the 6-meter, 2-meter, and 1.25-meter (222 MHz) amateur radio bands. It is more commonly considered as referring to the 2-meter (144-148 MHz) amateur band.

5. Guidelines

5.1 Frequencies

The following frequencies, as well as those prescribed by an approved operating plan, are among those that may be used by Tippecanoe County ARES.

Frequency (MHz)	CTCSS / Mode	Alpha Tag (8 character)	Alpha Tag (6 character)	Usage / Notes	Mem Ch.
147.135 (+)	88.5/FM	WIRES V1	WIRSV1	Primary Repeater for ARES Operations	1
146.760 (-)	88.5/FM	W9YB V	W9YB V	Alternate Repeater for ARES Operations	4
443.500 (+)	88.5/FM	WIRES U2	WIRSU2	Alternate Repeater for ARES Operations	12 (2)
443.775 (+)	88.5/FM	KA9VXS/R	KA9VXS	Alternate Repeater for ARES Operations	13 (3)
444.500 (+)	88.5/FM	W9YB U	W9YB U	Alternate Repeater for ARES Operations	14 (4)
146.520	FM	VCALL	VCALL	National 2M calling frequency	9
446.000	FM	UCALL	UCALL	National 70cm calling frequency	19 (9)
145.500	100.0/FM	VTAC-A	VTAC-A	Primary Tactical 2M FM simplex for ARES Operations	5
146.595	100.0/FM	VTAC-B	VTAC-B	Tactical 2M FM simplex	6
147.585	100.0/FM	VTAC-C	VTAC-C	Tactical 2M FM simplex	7
146.415	100.0/FM	VTAC-D	VTAC-D	Tactical 2M FM simplex	8
445.500	100.0/FM	UTAC-1	UTAC-1	Primary Tactical 70cm FM simplex for ARES Operations	15 (5)
446.200	100.0/FM	UTAC-2	UTAC-2	Tactical 70cm FM simplex	16 (6)
446.975	100.0/FM	UTAC-3	UTAC-3	Tactical 70cm FM simplex	17 (7)
445.000	100.0/FM	UTAC-4	UTAC-4	Tactical 70cm FM simplex	18 (8)
147.420	FM	VTAC-RC	VTACRC	ARES / American Red Cross Mutual Aid (Nationwide)	
146.490	FM	VTAC-IN	VTACIN	Indiana ARES VHF Simplex	
446.100	FM	UTAC-IN	UTACIN	Indiana ARES UHF Simplex	
144.390	Packet	V-APRS	V-APRS	National APRS network	
145.010	Packet	VPKT01	VPKT01	Packet Network (1200 baud)	
145.050	Packet	VPKT05	VPKT05	Tippecanoe County ARES Packet PBBS/Node (Primary)	
145.610	Packet	VPKT61	VPKT61	IN ARES WinLink Frequency (1200 baud)	
145.770	Packet	VPKT77	VPKT77	Tippecanoe County ARES Packet (Secondary)	
440.150	Packet	UPKT15	UPKT15	UHF Packet Network (Secondary) (1200/9600 baud)	
441.850	Packet	UPKT85	UPKT85	UHF Packet Network (Primary) (1200/9600 baud)	
444.300 (+)	D-STAR	W9ARP BG	W9ARPB	D-STAR Repeater for Indiana ARES Communications	D01
146.730 (-)	D-STAR	W9ARP CG	W9ARPC	D-STAR Repeater for local ARES Communications	D02
145.670	D-STAR	VTAC-AD	VTACAD	Primary 2M D-STAR simplex	D05
147.480	D-STAR	VTAC-BD	VTACBD	Tactical 2M D-STAR simplex	D06
144.900	D-STAR	VTAC-CD	VTACCD	Tactical 2M D-STAR simplex	D07
441.000	D-STAR	UTAC-1D	UTAC1D	Primary 70cm D-STAR simplex	D08
445.670	D-STAR	UTAC-2D	UTAC2D	Tactical 70cm D-STAR simplex	D09
434.000	D-STAR	UTAC-3D	UTAC3D	Tactical 70cm D-STAR simplex	D10
3.900	LSB	H3900	H3900	Indiana ARES Primary HF Net frequency (voice)	
7.280	LSB	H7280	H7280	Indiana ARES Backup HF Net frequency (voice)	

5.2 Frequency Usage

Actual frequency usage for ARES operations will be defined in the appropriate operating plans, or as assigned by the EC, Operations AEC, Network Operations AEC, or Planning AEC, as needed, using form ICS 205 (Incident Radio Communications Plan).

Tactical CTCSS tones are 100.0 Hz (primary), 156.7 Hz (secondary) and 167.9 Hz (tertiary), and will be assigned as needed. If other frequencies or signaling requirements are needed for specific functions, they will be announced and coordinated at the time required, if not included in the specific operating plans.

Very limited use will be made of the national 2-meter calling frequency (146.520 MHz, VCALL) by Tippecanoe County ARES, and then only under certain circumstances. As time and resources allow during a net, it should be monitored for transient operators by ARES personnel, who can respond to calls and provide information on the frequency(s) to be used.

5.3 Repeater Recovery

With the heavy dependency on repeaters for broad geographic coverage in the VHF and UHF bands, consideration must be given to the possibility that a repeater may fail or become unusable for a variety of reasons. The following procedure is to be used in the event a repeater becomes inoperable:

- A. The Net Control Station (NCS) will begin operating in simplex mode on the output frequency of the failed repeater. That is the frequency being listened to by the net participants.
- B. The NCS should request a station with optimal simplex coverage to assume net control responsibilities. This will provide maximum coverage to members of the net. If the new NCS does not have a roster of stations involved in the net, the net roster (by tactical call signs, if used) will be provided to the new NCS by the NCS relinquishing net control responsibilities.
- C. The new NCS will attempt to contact each station in the net. If problems exist in contacting every station, stations located in positions that may be able to relay will be asked to determine if they can contact the station(s) that cannot communicate directly with the NCS. This process will continue until all stations are accounted for. (NOTE: Any emergency or priority communication must be handled, if at all possible, and takes precedence.)
- D. If another local repeater is available (preferably on the same band, but depends on the situation), the original NCS should move to it after transferring control of the original repeater's output frequency to the new NCS. The NCS operating in simplex mode on the original repeater frequency will begin moving stations one at a time to the alternate repeater, beginning with the ones that must have a relay to contact the NCS. This will verify the transition of all stations to the alternate repeater, and do so in a controlled fashion.

5.3.1 Special Considerations to Repeater Recovery

5.3.1.1 Stations Out of Simplex Range

Participants that may not be able to hear instructions from the NCS, or its relays, should periodically monitor any alternate repeater frequency(s) that may be designated in the applicable operating plan to determine if the net has moved. If not successful, the net participant should attempt to contact someone on any working repeaters within range, or on 146.520 MHz, the 2M calling frequency (VCALL). Other amateurs may be able to make contact with the station, and provide information on the frequency(s) to be used.

5.3.1.2 Repeater Unusable, but still Transmitting

Should a situation occur that renders the repeater unusable, yet it is still transmitting (due to deliberate or unintentional interference, technical problems, etc.), its output frequency may not be able to be used for simplex operation, even for a temporary operation such as an orderly movement of participants to an alternate repeater. In this case, the NCS should immediately move to another local repeater (preferably in the same band, but depends on the situation) and continue net operations there. The NCS should attempt to contact each station in the net once the move to the alternate repeater has occurred.

5.3.1.3 Widespread Repeater Failure

Should none of the local 2M or 70cm FM repeaters be operational, the NCS will begin operating in simplex mode on the output frequency of the primary ARES repeater. That is assumed to be the frequency being listened to by ARES members and other local amateurs. The NCS should transmit the CTCSS tone the repeater normally requires, but should operate with NO tone (carrier squelch) on receive. Simultaneously, another NCS should attempt to contact ARES members on the "fail-safe" simplex frequency of 146.520 MHz, and move them to the simplex net on the primary repeater output frequency.

The NCS may continue to conduct simplex net operations on the primary repeater output frequency, or move the net to a designated Tactical simplex frequency. If the net moves to a designated Tactical simplex frequency, details should be announced multiple times on both the primary repeater output frequency and 146.520 MHz before and after moving.

In addition to the new net frequency, a number of stations should continue to monitor 146.520 MHz (and the primary repeater input and output frequencies, if applicable), ready to respond to any calls for information. As long as all local repeaters continue to remain out of service, an announcement should be made on 146.520 MHz (and the primary repeater output frequency, if applicable) at regular intervals, informing stations of the frequency(s) being used for ARES net operations.

NOTE: Long-duration transmissions and extended conversations must NOT be allowed to take place on the calling frequency of 146.520 MHz (VCALL) during any major emergency or disaster. The NCS should quickly establish communications with a few net participants and immediately move them to the main net frequency. 146.520 MHz must be kept relatively clear, particularly during times of disaster, to allow for emergency and priority calls to be made, monitored, and responded to. Its primary ARES use should be for responding to questions about the net and directing stations to the appropriate frequency(s). ARES personnel should monitor 146.520 MHz, whenever practical, during any ARES operation.

5.4 Remote Station Control Frequencies

Based on band plans established by the ARRL and repeater coordinators, the following UHF frequencies may be assigned for use in temporary remote station operation. This often takes the form of a dual-band mobile transceiver being used to cross-band a low power 70cm radio to a 2M frequency, or vice versa. Care should be taken to avoid interference to and from other stations. Individual operators are responsible for proper identification and compliance with FCC rules, particularly with respect to remote control operation.

Frequency (MHz)	Alpha Tag (8 character)	Alpha Tag (6 character)
144.450	VXBD4450	VX4450
145.540	VXBD5540	VX5540
145.580	VXBD5580	VX5580
145.640	VXBD5640	VX5640
146.445	VXBD6445	VX6445
146.565	VXBD6565	VX6565
147.450	VXBD7450	VX7450
147.540	VXBD7540	VX7540

Frequency (MHz)	Alpha Tag (8 character)	Alpha Tag (6 character)
445.7375	UXBD7375	UX7375
445.7625	UXBD7625	UX7625
445.7750	UXBD7750	UX7750
445.7875	UXBD7875	UX7875
445.8125	UXBD8125	UX8125
445.8250	UXBD8250	UX8250
445.8375	UXBD8375	UX8375
445.8500	UXBD8500	UX8500
445.8625	UXBD8625	UX8625
445.8750	UXBD8750	UX8750
445.8875	UXBD8875	UX8875
445.9000	UXBD9000	UX9000

The use of frequencies for remote operation should be coordinated through the EC, Operations AEC, Network Operations AEC, or Planning AEC. They may, at their discretion, assign temporary use of designated tactical frequencies, rather than the choices listed in this sub-section. Also, be sure to reference any applicable operating plan for pertinent frequency assignments, and consult form ICS 205 (Incident Radio Communications Plan) for details specific to the particular operation.

5.5 Memory Channel Programming

Specific memory channel assignments have been developed for optional implementation by Tippecanoe County ARES members when programming their transceivers. While not required, the suggested common memory channel scheme will facilitate a certain degree of familiarity when ARES personnel find themselves using a transceiver model that they may not be used to operating. Tippecanoe County ARES encourages its members to implement this radio programming scheme. In addition, a printed list of all frequencies and tones that are programmed into each transceiver should be kept with the radio for quick reference.

Only local repeaters, calling frequencies, and tactical simplex channels are included in this suggested memory channel scheme. Users may program whatever contents they choose into the memory channels not specified here.

Memory Channel # (Dual-band radios with shared memory channels)	Channel Contents	Memory Channel # (2M-only radios)	Memory Channel # (70cm-only radios, or dual-band non-shared memories)
1	WIRES V1	1	
2	(Reserved)	2	
3	(User choice)	3	
4	W9YB V	4	
5	VTAC-A	5	
6	VTAC-B	6	
7	VTAC-C	7	
8	VTAC-D	8	
9	VCALL	9	
10	(User choice)	10	
11	(Reserved)		1
12	WIRES U2		2
13	KA9VXS/R		3
14	W9YB U		4
15	UTAC-1		5
16	UTAC-2		6
17	UTAC-3		7
18	UTAC-4		8
19	UCALL		9

Consult section 5.1 (Frequencies) of this document for the specific frequencies and tones of the referenced channel contents.

Those with D-STAR capable transceivers should contact the Operations AEC for suggested memory channel programming of specific D-STAR frequencies.

5.5.1 Memory Channel Names (Alpha Tags)

There is a common naming protocol for public safety's interoperability frequencies. This channel naming scheme is in use today in radios of local, state, and federal public safety agencies across the country. A document called the "Standard Nomenclature for the Public Safety Interoperability Channels" lists the specific frequencies and assigns a unique channel designator to each, following the naming convention that was developed for this purpose. (This document is available on the Tippecanoe County ARES web site.) This common set of channel names is used so that responders to an incident are able to easily communicate with other agencies, or with responders from other jurisdictions. The 8 (or 6) character channel name indicates the band and primary use for that frequency.

ARES is certainly not a public safety agency, but does work with such entities on a regular basis. And while ARES personnel will not be transmitting in the public safety bands with amateur equipment, served agencies may occasionally authorize an ARES member to use a radio (which they provide) that operates on the public safety frequencies. ARES personnel should at least be aware of the standard channel nomenclature and understand the concept, should they encounter it.

As part of the Tippecanoe County ARES memory channel programming scheme, names (alpha tags) are suggested for each. While this naming protocol does not exactly mirror that of the public safety community, it is modeled after it. This helps provide at least a small degree of familiarity with a standard naming convention. As with the memory channel frequencies, this naming convention is not required of TCARES personnel, but offered as a suggested method of programming to promote interoperability.

The naming convention for VHF/UHF channels is as follows:

Band designators are: V=2M, U=440, L=6M, 2=222, 9=900, D=1.2 GHz, E=2.4+ GHz, H=HF

If the first character is A, K, N, or W (first characters of U.S. amateur call signs), then it is a:

- Repeater channel (Examples: W9YB U, KA9VXS U, WIRES V1)
 - repeater call sign, or part of it, as the first part of the memory name
 - last character (or 2nd to last) indicates the band (V=2M, U=440)
 - if same call sign is used by repeaters at multiple locations, the last character will identify each site with a different number (1, 2, etc.)

If the first character is not A/K/N/W, then it is a simplex memory channel:

- Simplex Frequencies (Tactical channels, packet, cross-band frequencies, etc.)
 - 1st character indicates the band
 - next 3 characters indicate channel usage (TAC, PKT, XBD, etc.)
 - remaining characters indicate a unique channel name, number, or frequency
- Calling Frequencies (Examples: VCALL, UCALL)
 - 1st character indicates the band
 - next 4 characters are "CALL"

HF channels are designated with an "H" followed by the frequency in kHz. A few exceptions to this naming scheme do occur in this implementation.

6. Release Information

The date of publication for this document is 05 DEC 2011.

Change log:

- | | |
|-------------|---|
| 05 DEC 2011 | In section 5.1, "Frequencies", several changes were made to "Alpha Tags" (8 and 6 character tags now assigned), and Usage/Notes. Memory channel assignments were also changed. Section 5.5.1, "Memory Channel Names (Alpha Tags)", was added. Several other changes were made throughout the document. |
| 08 APR 2010 | Section 5.5, "Suggested Memory Channel Programming", was added. Changes to frequencies in Section 5.4, "FM Cross-band Repeater Frequencies". In section 5.1, "Frequencies", changed UHF packet frequencies, added a Memory Channel column, and updated some of the notes. |
| 03 JAN 2010 | In section 5.1, "Frequencies", tactical simplex frequencies were added. Removed a VHF simplex frequency in section 5.4, "FM Cross-band Repeater Frequencies". Removed a reference to a document in section 3, "Related Publications". Removed section 5.5. |
| 12 NOV 2009 | In section 5.1, "Frequencies", some tactical simplex frequencies were changed. Packet frequencies were changed and added. Changed usage/notes of various frequencies. Significant changes to section 5.3.1.3, "Widespread Repeater Failure". |
| 18 JUN 2009 | In section 5.1, "Frequencies", changed one VHF packet frequency and added two UHF packet frequencies. Changed usage/notes of various frequencies. |
| 11 NOV 2008 | In section 5.1, "Frequencies", added Packet frequencies, renamed Packet channel designators, and clarified usage of Packet frequencies. |
| 01 SEP 2008 | In section 5.1, "Frequencies", changed the frequency for channel "DV TAC-B". Added nationwide ARES mutual aid frequency (147.420 MHz) for American Red Cross. Removed two frequencies from section 5.4 to help avoid potential co-channel interference. |
| 31 AUG 2008 | In section 5.1, "Frequencies", changed the channel designators for the two local D-STAR repeaters to indicate RPT2 gateway programming. Changed minor wording in section 5.4, "FM Cross-band Repeater Frequencies", to clarify use of cross-band repeater operation. Added section 5.5, "Frequency Lists and Charts". |