

# National Incident Radio Support Cache User's Guide

2021



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**NFES# 000968**

## **National Incident Radio Support Cache (NIRSC) User's Guide:**

During the historic 2020 all-risk season the National Incident Radio Support Cache (NIRSC) supported approximately 650 separate incidents with frequencies and equipment.

Throughout this unprecedented year, while many were sheltering in place, the NIRSC continued to come to work and provide the best support possible for personnel deployed to wildfires, hurricanes, training exercise and special events. The NIRSC:

- Issued 125 Starter Systems and over 21,000 handheld radios
- Built 229 special non-standard repeaters for incidents
- The personnel in infrared detection and mapping successfully flew 696 missions.

As always, it is extremely important that all personnel involved in incident communications keep themselves updated regarding changes in the equipment deployed by the NIRSC. In FY21 we will be deploying some new kits such as the 4381KP (KNG2-P150 radios), 4244K2 (KNG-P400 radios), 4330KP (KNG-P150S and KNG2-P400). We will also be reintroducing the 4281 Crossband Link Kits as well as increasing the number of 4330EX kits available. All incident communications personnel should review the National Interagency Incident Communications Division (NIICD) Hotsheet at <https://www.nifc.gov/NIICD/hotsheet/hotsheet.html> for up to date information on all NIRSC equipment.

I encourage all Communications Unit Leaders (COML) and Communications Technicians (COMT) who want first-hand experience with the equipment to contact Kirk Maskalick at 208-387-5861 or [kirk.maskalick@usda.gov](mailto:kirk.maskalick@usda.gov) for information on communications courses being offered this year.

Thank all of you for the work you do in incident communications. Your role is vital and brings together all of the functions in the Incident Command System. You play an important role in ensuring the safety of all personnel on incidents.

If you have any questions for the National Interagency Incident Communications Division, please feel free to call me at 208-387-5856, or you can contact the Communications Duty Officer at 208-387-5644.

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Sincerely,

/s/ Kim McCutchan

Kim McCutchan  
Chief, National Interagency Incident Communications Division

**This publication is revised annually by the National Interagency Incident Communications Division, at the National Interagency Fire Center at Boise, Idaho.**

**Additional copies of this publication may be ordered from:**

**National Interagency Fire Center  
ATTN: Great Basin Cache Supply Office  
3833 S. Development Ave.  
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**Order NFES# 000968**

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# INTRODUCTION

The National Incident Radio Support Cache (NIRSC) User's Guide is designed to assist communications personnel with reference material and guidelines when ordering and utilizing frequencies and equipment from NIRSC. The NIRSC User's Guide is available on-line at:

[www.nifc.gov/NIICD/docs/2021NIRSCUsersGuide.pdf](http://www.nifc.gov/NIICD/docs/2021NIRSCUsersGuide.pdf)

Copies of the printed version are available in each NFES # 4312 Command Repeater Kit or can be ordered directly through the Great Basin Cache Supply office (GBK) as NFES # 000968.

The policies/guidelines and procedures contained in the NIRSC User's Guide are revised annually by NIRSC personnel based on field updates and/or current management policy/guidelines changes from each department. Please utilize the latest version of the guide when ordering/installing/utilizing NIRSC equipment or frequencies.

## **How to use this guide:**

1. Read the descriptions from the “**General Communications Conditions and Solutions**” tab starting on page 39 of this guide. Find the condition that most closely reflects the needs of the incident. The “**Solutions**” provide lists of **recommended** equipment to support the condition.
2. When ordering equipment from the NIRSC, use the National Fire Equipment Supply (**NFES**) catalog number indicated on the drawings or in the “**Equipment Descriptions**” section of this guide.  
All NIRSC equipment is ordered under a resource order. One request number per equipment item.
3. The National Interagency Incident Communications Division Communications Duty Officer (NIICD-CDO) is available 24 hours a day, year-round. CDO personnel provide ordering and planning assistance and are an information resource for field communications personnel. At a minimum, communications personnel should check in with the CDO upon arrival at the incident to provide frequency assignment, equipment location and contact information. All provided information is logged and updated daily. Contact the CDO at 208-387-5644 or NIICD@firenet.gov.
4. The “**Equipment Descriptions**” tab provides a description and purpose of each piece of equipment issued from the NIRSC.
5. The “**Equipment Inventories**” tab provides an inventory list for each kit broken down by NFES #.  
Inventory lists are also provided in each kit shipped from NIRSC.
6. The “**Equipment Installation**” tab provides step-by-step instructions including diagrams for installing all equipment issued by the NIRSC. Installation instructions are also provided in each kit shipped from NIRSC.
7. Appendix Tabs:
  - Appendix Tab A, contains the Voice Board operating instructions along with wiring diagrams.
  - Appendix Tab B, contains information on NIRSC batteries and configuration diagrams.
  - Appendix Tab C, contains antenna installation instructions including diagrams for quick reference.
  - Appendix Tab D, contains the switch settings for quick reference for each piece of Daniels equipment in normal operation.
  - Appendix Tab E, contains quick reference material on programming of each NIRSC radio.
  - Appendix Tabs F and G, contain incident diagrams and communications plans to allow the communications users to document the equipment locations and frequencies needed by the CDO.

*Note: Communications personnel not familiar with NIRSC equipment or, those who are not experienced are required to contact the CDO for frequency and equipment assistance.  
See NIRSC and NIICD contacts on page 4 of this guide for all contact information.*

# NATIONAL INCIDENT RADIO SUPPORT CACHE

The National Incident Radio Support Cache (NIRSC) is a national resource composed of multi-channel radio systems, frequencies, and speciality radio communications equipment available for supporting complex incident communications. The purpose of NIRSC is to provide portable emergency communication services in a professional, prompt, customer-oriented manner while optimizing resources and minimizing risk.

NIRSC major focus is wildland fire suppression, but NIRSC equipment, personnel, and frequencies can be deployed and utilized on hurricanes, floods, earthquakes, volcanic eruptions, oil spills, and other man-made and natural disasters where federal assistance is required.

The information outlined below must be considered when ordering and using NIRSC equipment. All NIRSC frequencies, both UHF and VHF, must be assigned and cleared by the Communication Duty Officer (CDO) or Communications Coordinator (COMC) for use BEFORE shipment is made.

## **NIRSC EQUIPMENT AND FREQUENCY ORDERING PROCESS**

All NIRSC equipment and frequency requests shall be processed using the Interagency Resource Ordering Capability (IROC) system. Equipment will not be shipped without having a resource order request. All frequencies will not be issued or assigned without having a resource order request started or in the system. NIRSC equipment and frequencies will be requested by the incident and the request sent to NIRSC via the local ordering process. All radio communications equipment orders must contain a valid financial code with override, a valid street address and contact name for delivery of equipment. All equipment orders need to provide a realistic date/time needed. If equipment is being ordered from NIRSC, please allow a minimum of 12 hours for delivery. If equipment is being filled from pre-position please allow a minimum of 8 hours for delivery. Please contact the CDO before placing any requests for frequencies or equipment.

### **Equipment ordering process consists of the following:**

***Incident--->Dispatch Center/Expanded (IROC)--->GACC--->NICC--->NIRSC--->GBK (Shipping)***

### **FM Frequency ordering process consists of the following:**

***Incident--->Dispatch Center/Expanded (IROC)--->GACC--->NIRSC***

### **AM Frequency ordering process consists of the following:**

***Incident--->Dispatch Center/Expanded (IROC)--->GACC--->NIRSC--->FAA***

## **NIRSC STARTER SYSTEMS (NFES# 004390)**

The NFES 004390 Starter System is designed to be the initial system issued to support incident communications requirements. The system supplies equipment which will establish immediate communications for command, tactical, logistics, and air operation requirements. A Starter System consists of 11 assorted pieces of equipment with 7 sets of antenna masts, and is ordered as a system.

When ordering a Starter System, appropriate frequency assignments must be obtained by contacting the CDO or, when assigned, the appropriate COMC. To insure proper frequency coordination, please provide the latitude and longitude of the incident to de-conflict with existing incidents or other agency frequency assignments. Please contact the CDO before placing a request for a 004390 Starter System.

NIRSC accommodates each GACC with up to four (4) Starter Systems in pre-position during their established fire season. This is to provide faster delivery time of the equipment to the incidents located within the GACC. The CDO **must** be contacted by the GACC when an order for a Starter System is received for an incident. The CDO or COMC will identify which pre-positioned Starter System (if any) will be assigned to the incident, based on availability and **frequency conflicts**. **All 4390's, 4312's and 4248's contain pre-programmed frequencies that must be coordinated and de-conflicted by the CDO or COMC before deploying to minimize interference from other agencies.** A replacement (backfill) Starter System may be requested by the GACC after commitment of a pre-positioned Starter System. Replacement Starter Systems orders may not be filled where congestion of spectrum is an issue. In these instances, special frequency Starter Systems will be built on an as needed basis and shipped directly to the incident from NIRSC.

Not all incidents require a 4390 Starter System to provide incident communications. Contact the CDO or COMC to determine the required and appropriate incident communications needs.

## **ADDITIONAL FREQUENCIES AND EQUIPMENT**

Individual kits are available to supplement the Starter System or to provide support for smaller incidents. The CDO or COMC can provide assistance in determining a specific incident's communications requirements.

Consult with the CDO or COMC if additional frequencies or equipment is needed. The CDO/COMC may want to review the system design in order to verify the need in areas with extreme frequency congestion. If the CDO/COMC can fill the request, the CDO/COMC will inform the incident COML/COMT of assigned frequencies or equipment. Repeaters and Frequencies are ordered as a single resource item.

- Command Repeater/Link - NFES# 004312
- Logistics Repeater - NFES# 004248
- Air-to-Air FM Frequency (California Specific)
- Air-to-Air AM Frequency
- Air-to-Ground FM Frequency
- Air-to-Ground AM Frequency
- Tactical Frequency
- Deck Frequency
- Take-Off-Land-Control (TOLC) Frequency

NIRSC frequencies are both Forest Service (FS) and Department of Interior (DOI) frequencies that are not “cleared” nationally. Other agencies use these frequencies and in some cases, in very critical and sensitive areas. All frequencies must be approved for the areas where they are intended for use. None of the national frequencies are to be used without prior coordination with the CDO.

## **EQUIPMENT AND FREQUENCY DEMOBILIZATION**

Temporary frequencies and any radio equipment with temporary frequencies must be released first due to licensing requirements. All National Incident Radio Support Cache (NIRSC) communications equipment should be inventoried, sealed and returned to NIRSC at NIFC immediately after the incident is turned over to the local jurisdictional agency.

***Coordination and approval is required from the CDO or COMC if equipment or frequencies are to be utilized after the transition.***

NIRSC communications equipment shall **NOT** be moved from one incident to another without being returned to NIRSC for refurbishment. Unused and red-sealed equipment may be moved, but only upon approval and coordination with the CDO or COMC for frequency de-confliction.

NIRSC assigned frequencies shall **NOT** be moved or transferred from one incident to another without approval and coordination with the CDO or COMC due to frequency conflicts within the area or GACC's.

## **FIELD ASSISTANCE:**

The CDO is available 24/7 throughout the year to fill equipment and frequency orders. The CDO is available to help with incident system designs and radio propagation. Field users should coordinate directly with the CDO before ordering any equipment or frequencies from NIRSC.

The CDO can be contacted at: Phone: (208) 387-5644  
Toll-Free: (877) 775-3451  
FAX: (208) 387-5892  
Email: [niicd@firenet.gov](mailto:niicd@firenet.gov)

# COMMUNICATIONS DUTY OFFICER (CDO) COMMUNICATIONS COORDINATOR (COMC) DUTIES

National level coordination and assignments for incident frequencies and equipment is the responsibility of the National Interagency Incident Communications Division (NIICD) and is managed by the National Interagency Fire Center Communications Duty Officer (NIFC-CDO).

## **CDO Duties and Responsibilities include:**

- *Determines technical compatibility between proposed incident radio systems and radio frequency assignments for the interagency fire and aviation community, on a national basis.*
- *Coordinates with the Geographic Area Coordination Centers (GACC) in assigning tactical, command and air frequencies.*
- *Resolves incident radio frequency interference issues related to incident radio systems within the United States and coordinates international interference issues with Mexico and Canada.*
- *Tracks all frequencies assigned to GACCs and incident projects.*
- *Coordinates with the USDA-FS, Department of Interior and Federal Aviation Administration Spectrum Managers for temporary frequency assignments.*
- *Maintains and updates a database of all air, tactical, command and logistics frequencies, communications equipment, and personnel (Communications Technicians, Communications Unit Leaders, and Communications Coordinators).*
- *Helps solve incident communications equipment and frequency issues during incidents.*

When communications requirements exceed normal operations, the CDO may request that the GACCs assign a Communications Coordinator (COMC) to facilitate geographic area frequency management. The GACC will coordinate filling the request with the NIFC CDO. The COMC reports to the CDO and directly supports the assigned geographic area.

## **COMC Duties and Responsibilities include:**

- *Manages the allocation of communications resources at the geographic area level. This includes communications equipment, frequencies, communications personnel, and associated supplies.*
- *Manages the frequency resources for all incidents under assigned jurisdiction.*
- *Maintains an accurate inventory of all communications equipment, frequencies, and personnel assigned to incidents under their control.*
- *Keeps current on the availability of communications resources for future geographic area and national requirements. The COMC should be current on procedures needed to obtain such resources.*
- *Provides problem-solving recommendations and advice on communications issues to the respective Geographic Area Coordinators, Area Command Teams, and/or to Incident Management Teams within a complex or single incident. National, as well as geographic area priorities will be considered when making recommendations and/or providing advice.*
- *Assists incidents with communications system designs and with obtaining specialized communications equipment.*

*Note: During complex situations the COMC will request additional qualified personnel to be assigned as field COMCs and roving COMTs. Any situation involving complex air operations will require that the COMC request an Aviation COMC specifically for air operations.*

*The COMC will not be assigned to specific incidents or to an Area Command Team. Situations may occur when communications coordination is required between multiple geographic areas. Under these circumstances, a COMC may be assigned to a NICC Resource Order to provide overall coordination and support to COMCs assigned to the affected geographic areas.*

## NIRSC AND NIICD CONTACTS

For assistance, the staff of the National Interagency Incident Communications Division (NIICD) and the National Incident Radio Support Cache (NIRSC) may be reached at the numbers listed below.

### **DIVISION CONTACTS:**

### **PHONE:**

### **E-MAIL:**

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#### **Infrared:**

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#### **Communications Duty Officer Coordinator:**

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kimberly.albracht@usda.gov

#### **Communications Duty Officer (CDO):**

(208) 387-5644

niicd@firenet.gov

# NEW or CONTINUING FOR 2021/NIICD HOTSHEET

**New, KNG2-P150 VHF and KNG2-P400 UHF Radios:** NIICD will gradually replace all NIRSC VHF and UHF handheld radios with the KNG2-P150 and KNG2-P400 within the next few years.

**New, 4330EX Remote Expansion Kits** *(See page 27 for more information on the 4330EX)*

**New, 4281 Crossband VHF/UHF Kits** *(See Page 21 for more information on the 4281)*

**New, Shore Power Adapter Cable:** A shore power adapter cable has been added to the 4100 Kit. This is a fused pigtail with ring terminals that enables shore power to be connected to the repeater kits in place of a solar panel kit.

**Shore power requirements: 12.2 - 16.0 Vdc and be able to supply at least 4 amps.**

**New, Microsoft Access and Excel NIRSC Incident Radio Inventory Databases:**

*(Available for download at NIICD website 2021)*

**VHF and UHF Ground Plane:** Ground Planes contain self-locking radials that eliminate the need for fiber tape to keep the radials in place. *(See Antenna Installation Instructions in Appendix C for more information)*

**RF Coax Cables:** All NIRSC coax cables now use "N" type connectors. Any NIRSC antenna or component manufactured with a UHF connector has had an N adapter permanently attached to that UHF connector.

**Reusable Zip Ties:** Reusable Zip Ties have been provided to eliminate the need for fiber tape to secure the coax cables to the mast.

**NIRSC Frequency Scheme:** All NIRSC equipment has been reprogrammed to meet the National Telecommunications and Information Administrations (NTIA) 2019 requirements. **DO NOT** use old frequency pocket cards.

**Voice Board (4312, 4248, 4370 and 4281 Only):** *(See Appendix A for detailed information on the Voice Boards)*

**Connector Bulkhead (4312, 4248, 4370 and 4281 Only):** The connector bulkhead provides a weatherproof interface to connect external cables to internal equipment without having to penetrate the side of the enclosure.

**Battery Cover:** A removable terminal cover will be installed on the alkaline batteries to help prevent batteries from shorting.

**Radio Passwords:** All NIRSC radio passwords will continue to be all zeros for programming via the keypad

**Tones:** All incidents will be assigned an incident tone by the CDO or COMC for all Command Repeaters and tactical channels.

**Power Connector:** All NIRSC equipment internal power connectors have been changed to an Anderson Power Pole connectors. (PP15-45)

**Fuses:** All NIRSC equipment with accessible fuses have been replaced with blade style mini-automotive fuses.

**Desiccant Packs:** To keep moisture and humidity down, desiccant packs will be included in 4248, 4312, 4281, and 4370 equipment.

**NFES# 004100 Mountain Top Accessory Kit:** Due to airline shipping weight restrictions, the 4312's, 4281 and 4370's will be shipped as 2 separate kits each. Each kit will now contain a Shore Power Adapter. When ordering a standalone 4312, 4182 and/or a 4370 you must also order a 004100 Mountain Top Accessory Kit.

For up-to-date information on multi-mode (P25) radios, training, infrared operations, incident operations, CDO/COMC, new NIRSC equipment, Radio Instructions, updated User's Guide, Incident Radio Diagrams, forms, fire approved radios, Radio Inventory Databases and more, visit the National Interagency Incident Communications Division (NIICD) web site @ [www.nifc.gov/NIICD](http://www.nifc.gov/NIICD).

# NATIONAL FREQUENCY GUIDELINES

These guidelines are intended to clarify the use of the national VHF-FM air frequencies, the VHF-AM (Victor) frequencies, the fire tactical frequencies, and the Government-wide Common User frequencies. Each frequency is authorized for specific uses, even though they are listed as “**National**”.

## **NATIONAL AIR GUARD: 168.6250 MHz**

The National Air Guard frequency is used for emergency aviation communications. Continuous monitoring of this frequency is mandatory by interagency dispatch centers, interagency and contracted aircraft assigned to the incident. Transmission on this frequency must include the Continuous Tone Code Squelch System (CTCSS) tone of 110.9 Hz. The National Air Guard frequency is pre-programmed on the last channel of all NIRSC VHF radios.

The National Air Guard Frequency 168.6250 MHz is authorized for:

- *Emergency air-to-air initial communications*
- *Emergency ground-to-air communications*
- *Initial call, recall, and redirection of aircraft when no other frequency is available*

*Note: The National Air Guard frequency is **REQUIRED** in the last channel of the ICS-205 Incident Radio Communications Plan on all fire incidents per the “Interagency Standards for Fire and Fire Aviation Operations”.*

## **NATIONAL FLIGHT FOLLOWING: 168.6500 MHz**

The National Flight Following frequency is used to monitor interagency and contract aircraft. This frequency is used for flight following official aircraft flying point-to-point. It is not intended to be used during mission flights or incident operations. All dispatch centers/offices will monitor this frequency at all times. A CTCSS tone of 110.9 Hz must be placed on the transmitter **AND** receiver of the National Flight Following frequency.

The National Flight Following frequency 168.6500 MHz is restricted to the following uses:

- *Flight following, dispatch, and/or re-direction of aircraft*
- *Air-to-Ground and Ground-to-Air administrative traffic*
- *This frequency is NOT authorized for ground-to-ground traffic*

## **NATIONAL INTERAGENCY AIR TACTICS**

The National Interagency Air Tactics frequencies are used to support air-to-air or air-to-ground communications on incidents. The National Interagency Air Tactics are pre-programmed in GROUP 3 of the NIRSC VHF radios. Prior to use, the user **MUST** contact and coordinate with the CDO to minimize possible interference. These frequencies must be ordered through the established ordering process and are assigned by the CDO or COMC, in coordination with the local unit if an Radio Frequency Assignment (RFA) is in effect.

The Air Tactics frequencies are restricted to the following uses or restrictions:

- *They shall be used only for air-to-air and air-to-ground communications*
- *They are NOT to be used as ground tactical operational frequencies*
- *Transmit power output shall be limited to under 10 Watts*
- *Use of these frequencies in base stations and repeaters are prohibited*
- *When issued they are authorized for 20 NM and 3000 ft AGL from incident center point service volume, as per the Radio Frequency Assignment (RFA) unless otherwise specified in the request.*

## **GOVERNMENT WIDE-AREA COMMON USE: 163.1000 MHz and 168.3500 MHz**

The Government Wide Common User frequencies are used on a non-interference basis and are not exclusive to any user. These frequencies are not to be used for Air-to-Ground operations and are prohibited by DOI and USDA from use as a frequency during operations involving the protection of life and property.

**NATIONAL INTERAGENCY FIRE TACTICAL:**

The National Interagency Fire Tactical frequencies are used to support ground tactical operations (line of sight) on incidents. Only six (6) tactical frequencies are available nationally. Prior to use, the user must contact and coordinate with the CDO or COMC to minimize possible interference. These frequencies are pre-programmed in Group 4 of all NIRSC VHF radios. All Tactical frequencies should utilize a TX and RX Tone to minimize possible interference. Please contact the CDO or COMC for an assigned Tone.

The National Interagency Fire Tactical frequencies are **NOT** authorized for:

- *Air-to-Air communications*
- *Air-to-Ground communications*
- *Mobile radios with more than 30 watts output power*
- *Base stations or repeaters*

**AM AIR-to-AIR (Victor): Federal Aviation Administration (FAA) Assigned**

The use of AM frequencies is restricted to Air Operations only. All AM frequency assignments will be authorized and assigned only by the CDO (or COMC, if assigned). It is the responsibility of the incident COML to place requests and ensure immediate release of frequency assignments upon completion of incident. All Victor AM frequency assignments must be requested by the CDO office from the FAA on an incident-specific basis. It is imperative to place requests early in order to have AM frequency assignments available for the next operational period.

*The typical service volume for a FAA AM fire fighting frequency is 20 NM and 5000 ft AGL.*

**Note:**

- *All aviation frequency orders will be placed through the dispatch ordering system to the CDO.*
- *Any frequency coordinated by the FAA for fire fighting should be used only temporarily as the need arises, and only within the designated operational airspace. If the operational airspace changes due to fire expansion, the new requirements must be communicated to the NIFC Communications Duty Officer (CDO) who will properly coordinate with the FAA.*
- *As a result, the original frequency provided by the FAA may change to eliminate the possibility of interference to ATC or other fire fighting efforts.*

**FREQUENCY ORDERING PROCESS:**

Dedicated incident Air-to-Air and Air-to-Ground frequencies will be ordered by incidents through the established ordering process. All frequency requests are to be sent by the GACCs directly to the National Interagency Radio Support Cache (NIRSC) where the NIFC-CDO then coordinates with appropriate agencies and fills the frequency request in IROC. The CDO coordinates all National FS and DOI frequencies, as well as any additional frequencies released by other agencies for wildland fire support. All aviation frequencies are to be ordered on an Aircraft Order as an "A" Request Number in IROC. The COML will request, assign, and report all frequencies used on the incident to the CDO or COMC. Frequencies will be documented on the ICS-205 Incident Radio Communications Plan and on the ICS-220 Air Operations Summary forms. If additional frequencies are required, the COML will coordinate and order them through the established ordering process (through the GACC to NIRSC and filled by the CDO or COMC).

Additional frequencies may be available on a temporary basis, and may be requested by the CDO from the Washington Office Spectrum managers when:

- *All NIRSC national frequencies are committed within a specific geographic area*
- *New incidents within a specific complex create a need for additional frequencies*
- *The fire danger rating is extreme and the potential for additional new incidents is high*
- *Frequency congestion is occurring due to significant numbers of incidents in close proximity*

Assigned incident frequencies should be released immediately after the incident is turned over to the local jurisdictional agency. Coordination and approval is required from the CDO or COMC if frequencies are to be utilized after the transition.

NIRSC assigned frequencies shall **NOT** be moved or transferred from one incident to another without approval by and coordination with the CDO or COMC.

# NIRSC VHF RADIO CHANNEL PLAN

4381 VHF Command Tactical Radio Kit Channel Plan

CH	Group 1	Group 2	Group 3	Group 4	Groups 5-25
1	C1 Talk Around	C1 TX Simplex	Air-to-Ground	Tactical	Common Use
2	C1 RPRT Access	C2 TX Simplex	Air-to-Ground	Tactical	Common Use
3	C2 Talk Around	C3 TX Simplex	Air-to-Ground	Tactical	Empty
4	C2 RPTR Access	C4 TX Simplex	Air-to-Ground	Tactical	Empty
5	C3 Talk Around	C5 TX Simplex	Air-to-Ground	Tactical	Empty
6	C3 RPTR Access	C6 TX Simplex	Empty	Tactical	Empty
7	C4 Talk Around	C1 RPTR Config	Empty	Empty	Empty
8	C4 RPTR Access	C2 RPTR Config	Empty	Empty	Empty
9	C5 Talk Around	C3 RPTR Config	Empty	Empty	Empty
10	C5 RPTR Access	C4 RPTR Config	Empty	Empty	Empty
11	C6 Talk Around	C5 RPTR Config	Empty	Empty	Empty
12	C6 RPTR Access	C6 RPTR Config	Empty	Empty	Empty
13	Empty	Empty	Empty	Empty	Empty
14	Empty	Empty	Empty	Empty	Empty
15	Empty	Empty	Empty	Empty	Empty
16	National Air Guard	National Air Guard	National Air Guard	National Air Guard	National Air Guard
<b>Note: Air Guard frequency is pre-programmed on the last channel of all groups with a transmit tone of 110.9</b>					

**Group 1:** Contains the NIRSC **VHF Repeater access** and **talk-around receive simplex** frequencies and must be coordinated through the CDO or COMC before use.

**Group 2:** Contains the NIRSC **VHF Command Repeater transmit simplex** frequencies (Ch 1 through Ch 6).  
Contains the NIRSC **VHF Repeater Configuration** frequencies (Ch 7 through Ch 12).

**Group 3:** Contains the **National Air Tactics frequencies** and must be coordinated and ordered through IROC from the CDO or COMC before use.

**Group 4:** Contains the NIRSC **National Fire Tactical** frequencies and must be coordinated prior to use with the CDO or COMC.

**Group 5:** Contains **government-wide common use** frequencies (to be used on a non-interference basis).  
***Not to be used for Air-to-Ground operations.***

NIRSC frequencies are both Forest Service (FS) and Department of Interior (DOI) frequencies that are not “cleared” nationally. Other agencies use these frequencies and in some cases, in very critical and sensitive areas. All frequencies must be approved for the areas where they are intended for use. None of the national frequencies are to be used without prior coordination with the CDO or COMC when in place.

**Note:**

- All NIRSC VHF frequencies are narrow band.
- NIRSC VHF frequency list is located in each 4381 Command/Tactical Radio Kit..

# NIRSC UHF RADIO CHANNEL PLAN

4244 UHF Logistics Radio Kit Channel Plan					
CH	Group 1	Group 2	Group 3	Group 4	Groups 5
1	L1 Talk Around	L1 TX Simplex	L1 RPTR Access	A/C Link Simplex 1	Camp 1
2	L1 RPTR Access	L2 TX Simplex	L2 RPTR Access	A/C Link Simplex 2	Camp 2
3	L2 Talk Around	L3 TX Simplex	L3 RPTR Access	A/C Link Simplex 3	Camp 3
4	L2 RPTR Access	L4 TX Simplex	L4 RPTR Access	A/C Link Simplex 4	Camp 4
5	L3 Talk Around	L5 TX Simplex	L5 RPTR Access	A/C Link Simplex 5	Camp 5
6	L3 RPTR Access	L6 TX Simplex	L6 RPTR Access	A/C Link Simplex 6	Empty
7	L4 Talk Around	L7 TX Simplex	L7 RPTR Access	A/C Link Simplex 7	Empty
8	L4 RPTR Access	L1 RPTR Config	L1 RX Simplex	A/C Link Simplex 8	Empty
9	L5 Talk Around	L2 RPTR Config	L2 RX Simplex	L8 Talk Around	Empty
10	L5 RPTR Access	L3 RPTR Config	L3 RX Simplex	L8 RPTR Access	Empty
11	L6 Talk Around	L4 RPTR Config	L4 RX Simplex	L9 Talk Around	Empty
12	L6 RPTR Access	L5 RPTR Config	L5 RX Simplex	L9 RPTR Access	Empty
13	L7 Talk Around	L6 RPTR Config	L6 RX Simplex	L10 Talk Around	Empty
14	L7 RPTR Access	L7 RPTR Config	L7 RX Simplex	L10 RPTR Access	Empty
15	Empty	Empty	Special Use 1	L11 Talk Around	Empty
16	Empty	Empty	Special Use 2	L11 RPTR Access	Empty
<b>Note: Groups 6 through 25 are empty.</b>					

**Group 1:** Contains the NIRSC **Logistics Repeater** access and Talk Around frequencies.

**Group 2:** Contains the NIRSC **Logistics Repeater TX Simplex** frequencies (**Channel 1 through Channel 7**).  
Contains the NIRSC **Logistics Repeater Configuration** frequencies (**Channel 8 through Channel 14**).

**Group 3:** Contains the NIRSC **UHF Command Link** frequencies.

- Channel 1 through Channel 7 are the RPTR Access frequencies
- Channel 8 through Channel 16 are the RX Simplex frequencies.

**Group 4:** Contains the NIRSC **UHF Aircraft Link** frequencies.

- Channel 1 through Channel 8 are simplex UHF.
- Channel 9 through Channel 14 are the Talk Around and RPTR Access frequencies for L8 through L11.

**Group 5:** Contains NIRSC UHF frequencies that can be used for camp net, security, etc.

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*Note:*

- All NIRSC UHF frequencies are narrow band.
- NIRSC UHF frequency list is located in each 4244 Logistics Radio Kit.

# NIRSC UHF LINK MODULE CHANNEL PLAN

4312 Command Repeater Tone and UHF Link Module Channel Plan				
Switch A Tone Selection	TX/ RX Tone		Switch B UHF Channel	UHF Channel Assignment
A-1	TONE 1: 110.9		B-1	L1 Repeater Access
A-2	TONE 2: 123.0		B-2	L2 Repeater Access
A-3	TONE 3: 131.8		B-3	L3 Repeater Access
A-4	TONE 4: 136.5		B-4	L4 Repeater Access
A-5	TONE 5: 146.2		B-5	L5 Repeater Access
A-6	TONE 6: 156.7		B-6	L6 Repeater Access
A-7	TONE 7: 167.9		B-7	L7 Repeater Access
A-8	TONE 8: 103.5		B-8	L1 Simplex
A-9	TONE 9: 100.0		B-9	L2 Simplex
A-10	TONE 10: 107.2		B-10	L3 Simplex
A-11	TONE 11: 114.8		B-11	L4 Simplex
A-12	TONE 12: 127.3		B-12	L5 Simplex
A-13	TONE 13: 141.3		B-13	L6 Simplex
A-14	TONE 14: 151.4		B-14	L7 Simplex
A-15	TONE 15: 162.2		B-15	Special Use Simplex 1
A-16	NO TONE		B-16	Special Use Simplex 2
<b>Note: Selecting a tone on the VHF Repeater will enable the Tone on both the TX and RX frequencies.</b>				

**Switch A (Ch A-1 through A-16):** Contains the NIRSC TX/RX Tones for the VHF Command Repeaters.

**Switch B (Ch B-1 through B-7):** Contains the NIRSC UHF Command Duplex Linking frequencies.

**Switch B (Ch B-8 through B-14):** Contains the NIRSC UHF Command Simplex Linking frequencies.

**Switch B (Ch B-15 through B-16):** Contains the NIRSC UHF Linking special use simplex frequencies.

NIRSC frequencies are both Forest Service (FS) and Department of Interior (DOI) frequencies that are not “cleared” nationally. Other agencies use these frequencies and in some cases, in very critical and sensitive areas. All frequencies must be approved for the areas where they are intended for use. None of the national frequencies are to be used without prior coordination with the CDO or COMC when in place.

**Note:**

- All NIRSC UHF Link frequencies are narrow band.
- NIRSC UHF Link frequency list is located in each 4312 Command Repeater-Link Kit.

# NIRSC A/C LINK RADIO CHANNEL PLAN

4370 A/C Link AM UHF Link Module Channel Plan				
Switch A AM Channel	AM TX/ RX		Switch B UHF Channel	UHF Channel Assignment
A-1	Special Use Only		B-1	A/C Simplex 1
A-2	Special Use Only		B-2	A/C Simplex 2
A-3	Special Use Only		B-3	A/C Simplex 3
A-4	Special Use Only		B-4	A/C Simplex 4
A-5	Special Use Only		B-5	A/C Simplex 5
A-6	Not Used		B-6	A/C Simplex 6
A-7	Not Used		B-7	A/C Simplex 7
A-8	Not Used		B-8	A/C Simplex 8
A-9	Not Used		B-9	L8 Simplex
A-10	Not Used		B-10	L8 RPTR Access
A-11	Not Used		B-11	L9 Simplex
A-12	Not Used		B-12	L9 RPTR Access
A-13	Not Used		B-13	L10 Simplex
A-14	Not Used		B-14	L10 RPTR Access
A-15	Not Used		B-15	L11 Simplex
A-16	User Programmable		B-16	L11 RPTR Access

**Switch A (Ch A-1 through A-5):** Contains the NIRSC Special Use Air-to-Air FAA frequencies.

**Switch A (Ch A-16):** Contains the only user programmable channel for FAA issued Air-to-Air AM frequencies.

**Switch B (Ch B-1 through B-8):** Contains the NIRSC **A/C Link UHF simplex** frequencies.

**Switch B (Ch B-9 through B-16):** Contains the NIRSC **A/C Link UHF L8 - L11 simplex and duplex** frequencies.

NIRSC frequencies are both Forest Service (FS) and Department of Interior (DOI) frequencies that are not “cleared” nationally. Other agencies use these frequencies and in some cases, in very critical and sensitive areas. All frequencies must be approved for the areas where they are intended for use. None of the national frequencies are to be used without prior coordination with the CDO or COMC when in place.

*Note:*

- All AM frequencies are ordered in IROC and issued by the FAA through the CDO or COMC.
- All NIRSC UHF Link frequencies are narrow band.
- NIRSC UHF A/C Link frequency list is located in each 4370 A/C Link Kit.

# NIRSC EQUIPMENT DESCRIPTIONS

## **000968 NIRSC USER'S GUIDE**

The NFES# 000968 NIRSC User's Guide is designed to assist communications personnel with reference material and guidelines when ordering and utilizing NIRSC frequencies and equipment.

The NIRSC User's Guide is shipped with all Command Repeater/Link Kits (NFES #004312) and can also be ordered through the Great Basin Cache Supply Office (GBK). This guide is published and updated yearly and all COMLs and COMTs should maintain a current copy of the guide as part of their personal COML/COMT kit. The NIRSC User's Guide is available for download on-line at:

[www.nifc.gov/NIICD/docs/2021NIRSCUsersGuide.pdf](http://www.nifc.gov/NIICD/docs/2021NIRSCUsersGuide.pdf)

*Note: For complete kit content please see "Equipment Inventories" tab for each individual kit.*

## National Incident Radio Support Cache User's Guide



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**NFES# 000968**

## **004080 SOLAR PANEL KIT**

The NFES# 004080 Solar Panel kit allows NIRSC equipment to operate off a 12 Volt rechargeable battery. It contains a 60 watt flexible solar panel, and a 12 Volt 35 Amp-Hour sealed lead acid battery. The system should power a repeater indefinitely, provided the solar panel is illuminated with full sunlight most of the day. In the event there is no sunlight, the internal battery will give approximately two days backup power (for a repeater under moderate use).

For greater energy reserves, an additional battery can be purchased at the incident and connected to the system (a cable is included in the kit for doing this). The backup battery must be a deep cycle 12V sealed lead acid (preferably gel cell or AGM) of the largest capacity that can be safely maneuvered. Use caution when moving batteries since batteries are heavy, each battery can weigh up to 50 lbs. A fully charged 12 Volt 75 Amp-Hr battery should last at least four days under moderate use.

### ***Equipment Note:***

- Do not transport a sealed lead acid battery unless it is strapped down so as to be immobile and the terminals are covered to prevent a short circuit.*
- Using a Solar Panel Kit in conjunction with a Voice Board allows the equipment to run using both the supplied alkaline batteries and the solar panel kit rechargeable battery.*
- If using both solar and alkaline, the voice board monitors the solar voltage and will automatically switch to alkaline power when the solar voltage falls below 10 Volts. When the solar voltage rises above 12 Volts, it will switch back to solar power. This conserves the alkaline batteries, allowing the equipment to run off one set of batteries for extended periods of time without the need to change them.*



**NFES# 004080 Solar Panel Kit Components**

## **004100 Mountain Top Accessory KIT**

The NFES# 004100 Mountain Top Accessory Kit contains several key components to properly install an antenna mast on some of the NIRSC equipment.

**New, Shore Power Adapter Cable:** A shore power adapter cable has been added to the 4100 Kit. This is a fused pigtail with ring terminals that enables shore power to be connected to the repeater kits in place of a solar panel kit.

**Shore power requirements: 12.2 - 16.0 Vdc and be able to supply at least 4 amps.**

### ***Equipment Note:***

- A 004100 Mountain Top Accessory Kit is required for the following NIRSC equipment kits and must be ordered separately when are ordered.
  - \* NFES 004312 Command Repeater Kit
  - \* NFES 004370 Ground Aircraft/Link Radio Kit
  - \* NFES 004281 Crossband Link Kit



**NFES# 004100 Mountain Top Accessory Kit Components**

### **004120 JPS ACU-1000**

The NFES# 004120 JPS ACU-1000 kit allows wireless communication systems to be combined through each systems baseband audio. It can simultaneously cross-connect different radio systems into multiple systems or branches, and/or connect radio systems to telephone or satellite systems. The NIRSC ACU-1000 is capable of interconnecting a total of six (6) radio networks and two (2) phone/satellite systems.

The ACU-1000 can operate on 115 Volts AC and/or external +12 Volts DC. Batteries are not provided in the kit and must be purchased locally on the incident.

NIRSC will provide a NIRSC technician for proper programming and setup of the equipment. These units are **NOT** to be used for fire operations and are reserved for special FEMA/Military operations, Law Enforcement or special projects. Only three (3) kits are available in the NIRSC inventory. Please contact the CDO before placing an order.

Each 004120 Radio is sent pre-loaded with a fresh set of AA batteries for each radio. The kit also contains a spare replacement set of AA batteries for each radio. This should allow the radios to be utilized for the first operational period before needing to replace the batteries.

Cables are provided for the following radios in each kit:

- *Relm BK DPH, GPH, and KNG*
- *Datron*
- *Racal*
- *Motorola XTS 2500 and XTS 5000 (Radios and cables Included)*
- *EFJ (51xx)*
- *Military 5 and 6 pin (Harris and Sincgars)*



**NFES# 004120 JPS ACU-1000 Kit Components**

## **004240 AIRBASE ACCESSORIES KIT**

The NFES# 004240 Airbase Accessories Kit is for aircraft communications by ground personnel at airports and heli-bases. This kit provides a means to communicate with aircraft in noisy environments.

The kit comes with five (5) sets of handheld ICOM VHF-AM radios, headsets, and helmet adapters to connect a headset/helmet to the ICOM radio allowing ramp personnel to communicate directly with each other and aircraft on the ramp utilizing an assigned AM frequency.

Each 004240 ICOM Radio is sent pre-loaded with a fresh set of AA batteries for each radio. The kit also contains a spare replacement set of AA batteries for each radio. This should allow the radios to be utilized for the first operational period before needing to replace the batteries.

### ***Equipment Note:***

- *All AM frequencies must be cleared for use from the FAA.*
- *Contact the CDO or COMC for appropriate AM frequency assignment.*



**NFES# 004240 Airbase Accessories Kit Components**

## **004244 UHF (LOGISTICS) RADIO KIT**

The NFES# 004244 Logistics Radio Kit contains 16 UHF radios for use by incident support personnel (i.e. Plans, Logistics, and Finance). The UHF radio allows two-way line-of-sight communications utilizing UHF Radio Frequency (RF) propagation. The UHF radios can operate independently or in conjunction with UHF Repeater Kit NFES# 004248.

All NIRSC UHF Logistics radios are multichannel/multi-group-capable. Each radio has 16 channels per group/zone available for programming user frequencies. All NIRSC UHF radios are front panel programmable via the keypad to allow end user to customize channel and frequency plans for each incident. They can be operated in either Wide/Narrowband Analog and Digital P25 depending on incident requirements.

The radios are pre-programmed with NIRSC UHF frequencies, including all simplex and repeater pair frequencies, to be compatible with each system in which they are included. Updated frequency sheets are provided in each kit, as well as T-Cards for radio checkout and tracking. The radios in each kit are of the same manufacturer and model.

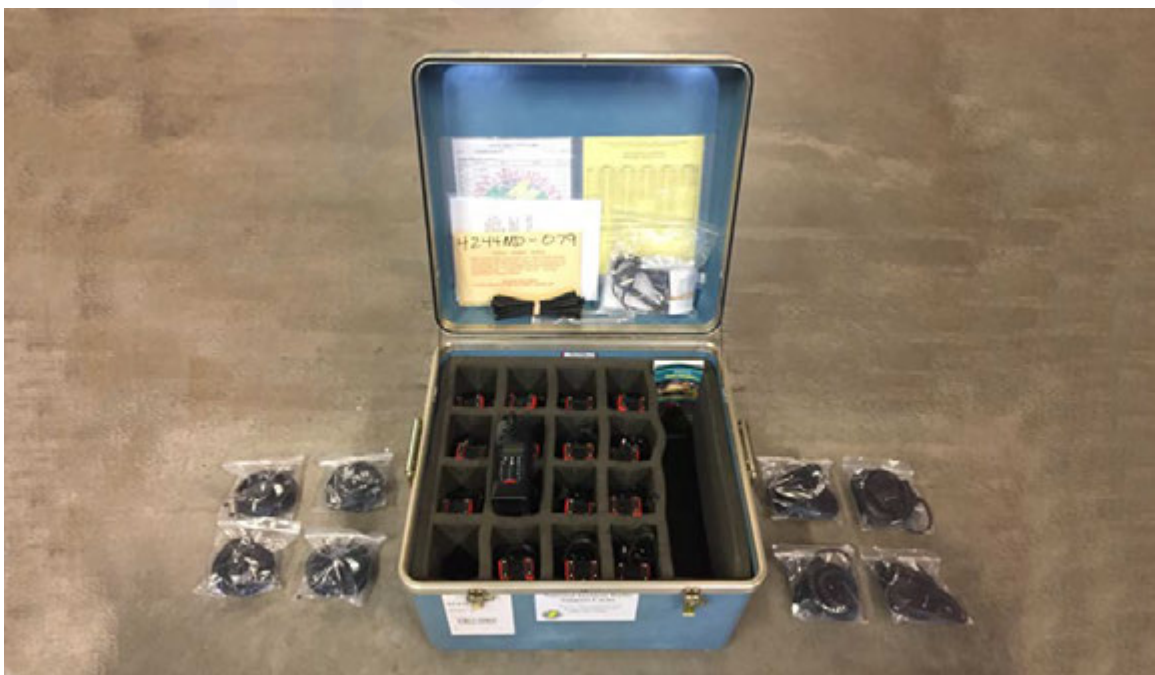
Each 004244 UHF Radio Kit are sent pre-loaded with a fresh set of AA batteries for each radio. The kit also contains a spare replacement set of AA batteries for each radio. This should allow the radios to be utilized for the first operational period before needing to replace the batteries.

The NFES # 004244 kit boxes are labeled on the outside to indicate the type of radios contained within, according to the following convention:

- **4244MD - Midland STP404A** (Example: 4244MD-FCK-xxx)
- **4244X2 - Motorola XTS2500** (Example: 4244X2-FCK-xxx)
- **4244K2 - BK KNG P400** (Example: 4244K2-FCK-xxx)

### ***Equipment Note:***

- *All UHF frequencies must be cleared for use BEFORE shipment.*
- *Call the CDO for assignments for camp, logistics, and link network.*
- *When placing the order do not specify the manufacture using the sub-kit numbers.*
- *Refer to the frequency charts and diagrams provided in each kit for additional information.*
- *NIRSC recommends that users limit the number of scanned channels to no more than three (3) and to use the HIGH POWER TX mode sparingly. These options increase the load on the batteries and will rapidly reduce battery life.*
- *A cloning cable is provided in each UHF radio kit. Please return the cloning cable with each kit.*



**NFES# 004244 UHF Logistics Radio Kit Components**

### **004245 FLATLAND KIT**

The NFES# 004245 Flatland kit is designed to help improve radio coverage by increasing the height of the antenna. The kit includes a flexible cable antenna, 60 feet of coax, adapters to connect to handheld radios, and parachute cord and weight for tossing into a tree and hoisting the antenna up.



**NFES# 004245 Flatland Kit Components**

## **004248 UHF (LOGISTICS) REPEATER**

The NFES# 004248 Logistics Repeater is a battery-operated unit used to extend radio coverage in mountainous terrain or where line of sight between portable radios is not possible. The Logistics repeater is used in conjunction with a Logistics Radio Kit, NFES# 004244 or the Remote Kit (NFES# 004330) with an appropriate UHF radio installed.

All UHF fire approved radios in the UHF band 404-420 are capable of communicating through a 4248 UHF repeater if programmed with the appropriate frequencies.

The Logistics Repeater can also be utilized to link two or more Command Repeater/Links (NFES# 004312) together as a central hub in the command network. When linking multiple Command Repeaters through the Logistics Repeater, all of the linked Command Repeaters must have line of sight back through the Logistics Repeater central hub. Additionally, the Logistics Repeater can be used to expand the flight following network on an incident when linked through an Aircraft Link (NFES# 4370).

The Logistics Repeater can be operated from the supplied alkaline batteries at 15 VDC or from an external 12 VDC power source (i.e. heavy duty car battery, DC power supply, or solar panels). If a 12 VDC power supply is used, it should have a minimum 5 Amp continuous duty capability.

This unit also contains the Voice Board which allows the user to monitor battery voltage, temperature, and solar output over the air via DTMF tones. **(See Appendix A for detailed information on the Voice Board)**

### ***Equipment Note:***

- *The CDO or COMC will assign all UHF Logistics frequency network assignments.*
- *NIRSC UHF repeater frequencies must be cleared for use by the CDO.*
- *UHF Logistic Repeaters are delivered pre-programmed from NIRSC and cannot be programmed or tuned in the field.*
- *NIRSC UHF Repeaters are currently NOT CTCSS tone-control capable.*



**NFES# 004248 UHF Logistics Repeater Kit Components**

### **004281 CROSSBAND LINK KIT w/ 004100 MOUNTAIN TOP ACCESSORY KIT**

The NFES# 004281 Crossband Link Kit is designed to provide support for special incident operations on an incident requiring UHF frequency to VHF frequency conversion. This unit contains both a UHF and VHF transmitter/receiver modules that can be programmed with special frequencies and tones if needed. Supplies are limited, please call the CDO before ordering to coordinate system design, location, frequencies and tones. This is NOT a repeater.

The Crossband Link can be operated from the supplied alkaline batteries at 15 VDC or from an external 12 VDC power source (i.e. heavy duty car battery, DC power supply, or solar panels). If a 12 VDC power supply is used, it should have a minimum 5 Amp continuous duty capability.

This unit contains the Voice Board which allows the user to monitor battery voltage, temperature, and solar output over the air via DTMF tones. *(See Appendix A for detailed information on the Voice Board)*

#### ***Equipment Note:***

- *The 004281 Crossband Link requires a 004100 Mountain Top Accessories Kit for proper installation.*
- *Frequencies must be coordinated and programmed at NIRSC before shipment.*

**NO PICTURE AVAILABLE AT TIME OF PRINT**

**NFES# 004281 Crossband Link Kit Components with NFES# 004100 Mountain Top Accessory Kit**

## **004300 GROUND VHF-AM BASE STATION KIT**

The NFES# 004300 Ground VHF-AM Base Station Kit is a portable 760 Channel VHF-AM base station. **This kit cannot be linked.** The 4300 kits are used primarily as base stations to contact aircraft on non-fire projects or fire incidents. Base stations transmit at 7 watts, are capable of 10 preset channels, scan, and use 115 VAC or 12 VDC through an automobile accessory plug-in as a power source.

Four (4) handheld ICOM VHF-AM radios are included, as well as T-cards for radio checkout. If this kit is to be used as an FAA control tower, the NFES# 004300 order MUST be placed by an incident COML.

Each 004300 ICOM Radio is sent pre-loaded with a fresh set of AA batteries for each radio. The kit also contains a spare replacement set of AA batteries for each radio. This should allow the radios to be utilized for the first operational period before needing to replace the batteries.

### ***Equipment Note:***

- *All AM frequencies must be cleared for use from the FAA.*
- *Contact the CDO or COMC for appropriate AM frequency assignment.*



**NFES# 004300 Ground VHF-AM Base Station Kit Components**

## **004305 ANTENNA MAST**

Antenna masts are automatically issued with several specific pieces of NIRSC equipment to allow the radio antenna to be elevated above the surrounding terrain. Maximum antenna elevation is 15ft with each set of (three) masts. The following kits come with at least one (1) set of three (3) 5ft long mast sections that do not need to be ordered separately:

- **004248 UHF Logistics Repeater Kit**
- **004300 Ground VHF-AM Base Station Kit**
- **004312 VHF Command Repeater/Link Kit (2 sets)**
- **004330 Remote Kit**
- **004370 Ground Aircraft Radio/Link Kit (2 sets)**
- **004390 Starter System (7 sets)**
- **004660 Airbase Kit (2 sets)**

### ***Equipment Note:***

- *Shipping them individually back to NIRSC is not recommended, mast should be returned with their associated kits.*
- *Do not return masts that are bent, squashed, badly out-of-round, or otherwise not readily reusable.*



**NFES# 004305 Antenna Mast Bundle**

## **004312 VHF COMMAND REPEATER/LINK KIT w/ 004100 MOUNTAIN TOP ACCESSORY KIT**

The NFES# 004312 Command Repeater/Link is a portable unit used to extend radio coverage in mountainous terrain or where line of sight between portable radios is not possible. The Command Repeater is used in conjunction with a Command/Tactical Radio Kit, NFES# 004381 or the Remote Kit (NFES# 004330) with an appropriate VHF radio installed. Any VHF fire approved radio in the VHF band 136-173 Mhz are capable of communicating through a NFES# 4312 VHF Command repeater if programmed with the appropriate frequencies and tones.

The Command Repeater can be used as a stand-alone VHF Command network repeater. Additionally, the Command Repeater can be linked to two or more Command Repeater/Links through the UHF link modules provided in each kit. The UHF Links are used to link UHF-FM and VHF-FM together to extend area coverage for larger incidents. If an additional repeater is necessary to provide coverage, a separate Command Repeater/Link (NFES# 004312) must be ordered. Orders will be filled based on priority needs and frequency availability.

NIRSC Command Repeaters can be linked by only two methods:

***Simplex:*** Command Repeaters are linked via a simplex UHF frequency.

***Each Command Repeater in the system must be in line-of-sight with each other.***

***Duplex:*** Command Repeaters are linked via a duplex UHF frequency using a Logistics Repeater as a hub.

***Each Command Repeater in the system must be in line-of-sight with the Logistics Repeater Hub.***

All Command Repeaters are capable of being CTCSS tone-controlled on both Receive and Transmit frequencies. Call the CDO for more information on tone-control applications. The CDO or COMC will assign a CTCSS tone to each Starter System when the system is assigned to an incident. The incident will be advised to use this tone on all VHF repeaters and tactical frequencies assigned to the incident.

The Command Repeater can be operated from the supplied alkaline batteries at 15 VDC or from an external 12 VDC power source (i.e. heavy duty car battery, DC power supply, or solar panels). If a 12 VDC power supply is used, it should have a minimum 5 Amp continuous duty capability.

This unit contains the Voice Board which allows the user to monitor battery voltage, temperature, and solar output over the air via DTMF tones. ***(See Appendix A for detailed information on the Voice Board)***

### ***Equipment Note:***

- The 004312 Command Repeater requires a 004100 Mountain Top Accessories Kit for proper installation.
- The 004100 Mountain Top Accessory Kit **MUST be ordered separately** from the 4312 Kit.
- The CDO or COMC will assign all Command Repeater and Link frequency network assignments.
- Command Repeaters and Link modules come pre-programmed from NIRSC and can not be programmed or tuned in the field.



**NFES# 004312 VHF Command Repeater/Link Kit w/ NFES# 004100 Mountain Top Accessory Kit**

## **004320 COML KIT**

The NFES# 004320 COML kit assists the COML with cloning of handheld radios from multiple agencies and manufactures. The kit consists of one radio, clamshell and cloning cable for every type of handheld available at NIRSC. The COML Kit comes with a Legacy Cloning cable to clone between the RELM KNG and DPH model radios. This kit does not come with antennas, holsters or any other radio accessories. These radios are not to be swapped out for broken kit radios. The contents of this kit are the responsibility of the COML and must be returned to NIRSC once the incident is transferred to the local unit.

Each 004320 Radio is sent pre-loaded with a fresh set of AA batteries for each radio. The kit also contains a spare replacement set of AA batteries for each radio. This should allow the radios to be utilized for the first operational period before needing to replace the batteries.

The COML Kit contains the following radios with cloning cables:

- **King Relm DPHx, KNG-P150S**
- **Motorola XTS 2500/5000**
- **Midland STP404A (UHF), STP105B (VHF)**



**NFES# 004320 COML Kit Components**

### **004330 REMOTE KIT**

The NFES# 004330 Remote Kit is an auxiliary base station used to control either the Command Repeater (4312), UHF Logistics Repeater (4248), Crossband Link (4281), or the Aircraft Link (4370) when direct line of sight is not possible. Use of this kit in conjunction with NIRSC radios, allows a remote base station to be installed up to 1/4 of a mile away from the ICP, camp, heli-base, etc.

The radio, chassis, and battery are enclosed in a steel box which is removable from the shipping container. This allows for placement of the box at the base of the antenna while running only a wire pair to the desk set location. VHF and UHF Radios are included in the chassis box, eliminating the need for multiple interface cables.

Each Kit is labeled on the outside to indicate the type of radios contained within, according to the following convention:

- **4330K2 - ReIm BK KNG/KNG2 (Example: 4330K2-FCK-XXX)**



**NFES# 004330 Remote Kit Components**

### **4330EX REMOTE EXPANSION KIT**

The NFES# 4330EX Remote Expansion Kit allows users to place multiple base stations in conjunction with a 004330 Remote Kit radios. Each kit contains two (2) remote handsets that can tie in parallel with the original 004330 Remote Kit. Both handsets can run on either DC or A/C power. The 4330EX can not operate as stand alone and are tuned specifically to operate in conjunction with a 004330 Remote Kit. Up to 10 4330EX Expansion Handsets can be tied into the 004330 Remote Kit.

Do not mix and match 4330EX Expansion handsets with the handsets in the 004330 Remote Kits.



**NFES# 4330EX Remote Expansion Kit Components**

### **004370 GROUND AIRCRAFT RADIO/LINK KIT w/ 004100 MOUNTAIN TOP ACCESSORY KIT**

The NFES# 004370 Ground Aircraft Radio/Link Kit is a portable, battery-operated, all-in-one, VHF-AM aircraft base station and UHF-FM link used for helibase personnel to communicate or coordinate rotor wing aircraft operations on the incident. All aircraft kits operate as a base station or as a crossband link. There are two (2) sets of antennas (VHF-AM and UHF-FM) for use in the link configuration. All kits include four (4) handheld ICOM VHF-AM programmable radios.

The Ground Aircraft Radio/Link Kit uses a 12 Volt DC power source. The unit can be operated from the supplied alkaline batteries at 15 Volts DC or from an external 12 Volt DC power source (i.e. heavy duty car battery, DC power supply, or solar panels). If a 12 Volt DC power supply is used, it should have a minimum 5 Amp continuous duty capability.

This unit also contains the Voice Board which allows the user to monitor battery voltage, temperature, and solar output over the air via DTMF tones. *(See Appendix A for detailed information on the Voice Board)*

This unit requires a 004100 Mountain Top Accessory Kit for proper installation.

#### ***Equipment Note:***

- The 004100 Mountain Top Accessory Kit **MUST be ordered separately** from the 004370 Kit.
- Additional ICOM radios can ordered if needed.
- Call the CDO or assigned COMC for ordering assistance and availability.



**NFES# 004370 Ground Aircraft Radio/Link Kit Components w/ 4100 Mountain Top Accessory Kit**

## **004381 VHF COMMAND TACTICAL RADIO KIT**

The NFES# 004381 Command Tactical Radio Kit contains 16 VHF radios designed for supporting the command and tactical operations of an incident to allow direct communications with field personnel that are within line of sight. The VHF radio allows two-way line-of-sight communications utilizing VHF Radio Frequency (RF) propagation. The VHF radios can operate independently or in conjunction with the VHF Repeater/Link Kit NFES# 004312.

All NIRSC VHF Command radios are multichannel/multi-group-compatible. Each radio has 16 channels per group/zone available for programming user frequencies. All NIRSC VHF radios are front panel programmable via the keypad to allow the end user to customize channel and frequency plans for each incident. They can be operated in either Wide/Narrowband Analog and Digital P25 operations, depending on incident requirements.

The radios are pre-programmed with NIRSC VHF frequencies, including tactical, command, and National Air frequencies. Updated frequency charts are included in each kit, as well as T-cards for radio checkout and tracking. The radios in each kit are of the same manufacturer and model. VHF Command Tactical Radios are programmed by the NIRSC to be compatible with each system in which they are included.

Each 004381 VHF Radio Kit are sent pre-loaded with a fresh set of AA batteries for each radio. The kit also contains a spare replacement set of AA batteries for each radio. This should allow the radios to be utilized for the first operational period before needing to replace the batteries.

The NFES# 004381 VHF Command Tactical radio kits are labeled on the outside to indicate the type of radios contained within, according to the following convention:

- **4381KD - King DPHx** (Example: 4381KD-FCK-XXX)
- **4381K2 - King KNG2** (Example: 4381K2-FCK-XXX)

### ***Equipment Note:***

- *The CDO or COMC will assign all Command Repeater, tactical, and air-to-ground network assignments.*
- *When placing the order do not specify the manufacturer using the sub-kit numbers.*
- *Refer to frequency charts and diagrams provided in each kit for additional information.*
- *A cloning cable is provided in each VHF radio kit. Please return the cloning cable with each kit.*
- *The NIRSC recommends that users limit the number of scanned channels no more than three (3) and to use the HIGH POWER TX mode sparingly. These options increase the load on the batteries and will rapidly reduce battery life.*



**NFES# 004381 VHF Command Tactical Radio Kit Components**

## **004390 STARTER SYSTEM - COMMAND/LOGISTICS RADIO SYSTEM**

The NFES# 004390 Starter System is designed to be the initial system issued to support incident communications requirements. The system is comprised of equipment which can be used to establish immediate communications for command, tactical, logistical, and air operation requirements. A Starter System consists of 11 boxes of assorted equipment with 7 sets of masts, and is ordered as a system.

### **The Starter System consists of:**

- 1 each (NFES# 004312)- VHF Command Repeater/Link
- 1 each (NFES# 004248)- UHF Logistics Repeater
- 3 each (NFES# 004381)- VHF Command Tactical Radio Kits - Total of 48 VHF radios
- 1 each (NFES# 004244)- UHF Logistics Radio Kit - Total of 16 UHF radios
- 1 each (NFES# 004370)- Ground Aircraft Radio/Link Kit - 4 ICOM AM radios included
- 2 each (NFES# 004100)- Mountain Top Accessory Kit
- 2 each (NFES# 004330)- Remote Kits *(1 each when NIRSC is low on equipment inventory)*

When ordering a Starter System, appropriate frequency assignments must be obtained by contacting the CDO or, when assigned, the appropriate COMC. To insure proper frequency coordination, please provide the latitude and longitude of the incident to de-conflict with existing incidents or other agency frequency assignments.

NIRSC accommodates each GACC with up to four (4) Starter Systems in pre-position during their established fire season. This is to provide faster delivery time of the equipment to the incidents located within the GACC. The CDO **must** be contacted by the GACC when an order for a Starter System is received for an incident. The CDO or COMC will identify which pre-positioned Starter System (if any) will be assigned to the incident, based on availability and ***frequency conflicts. All 4390s contain pre-programmed frequencies that must be coordinated and de-conflicted by the CDO or COMC before deploying to minimize interference from other agencies.***

Not all incidents require a 4390 Starter System to provide incident communications. Contact the CDO or COMC to determine the required and appropriate incident communications needs.

NIRSC frequencies are both Forest Service (FS) and Department of Interior (DOI) frequencies that are not “cleared” nationally. Other agencies use these frequencies and in some cases, in very critical and sensitive areas. All frequencies must be approved for the areas where they are intended for use. None of the national frequencies are to be used without prior coordination with the CDO or COMC when in place.



**NFES# 004390 Starter System Pallet**

### **004410 PUBLIC ADDRESS KIT**

The NFES# 004410 Public Address Kit allows for broadcasting information or paging from a central point and is primarily used at the ICP or in staging areas which house large numbers of personnel. The PA kits contains both wireless and wired microphones for convenience. Each PA unit can operate independently or can be operated together via a wireless transmitter.

The kits can be powered by either AC or DC batteries. The Kit also contains a fresh set of batteries to operate each unit and wireless microphone and transmitter.



**NFES# 004410 Public Address Kit Components**

## **004420 MAFFS PRINTER NETWORK KIT**

The NFES# 004420 MAFFS Printer Network Kits are designed to provide a common wireless printer and internet access for MAFFS activations and trainings with personnel from various agencies. This kit may be used on other incidents but only when other incident use will not impact possible MAFFS use. The MAFFS Printer Network Kit comes in two boxes: Printer and Accessories. Both boxes are required for system operation. The kit comes with a HP printer/scanner/fax and Verizon MiFi. It also comes with spare ink cartridges, two reams of paper and a USB drive.

### *Equipment Note:*

- *All users access the internet and printer through the wireless network.*



**NFES# 004420 MAFFS Printer Network Kit Components**

## **004499 AIR ATTACK KIT**

The NFES# 004499 Air Attack Kit is built to supplement communications in contracted fixed-wing aircraft for missions ranging from reconnaissance to complex air attack. This kit can fit between the pilot and copilot seats in some aircraft (i.e. Cessna) and slightly behind front seats in other aircraft. This kit creates an interface between the aircraft's existing audio system/radios and the Air Attack Kit radios. All kits have the capability to operate two (2) Technisonic Industries radios. Each kit will have two (2) TDFM-136 radios.

The NFES# 004499 Air Attack Kit has a Dual Audio Control (COM/FM1/FM2/AUX1/AUX2/SC) for the pilot and copilot/ATGS, connectors for two (2) AUX-FM-type portable radio adapters, and two (2) passenger headset adapters. Kit headset jacks are 600-ohm impedance using standard audio and mic-type connectors. The pilot and copilot/ATGS utilize case mounted headsets. Both passengers can operate all radios through the copilot/ATGS's transmitter selector. The "SC" position is simulcast transmissions on both COM (aircraft VHF-AM) and FM1. Each kit includes two (2) passenger headset adapters, two (2) PT-300 PTT adapters, two (2) BNC barrel connectors (for AUX-FM antenna connections), and instructions. Two (2) externally mounted VHF-FM antennas are also required.

The Air Attack kit will ONLY be installed in aircraft meeting National Air Tactical/Reconnaissance Standards and passing an avionics inspection by a qualified Forest Service/OAS Avionics Inspector.

The NFES# 004499 Air Attack Kit AUX-FM portable radio adapter connectors accept the same adapter connections used in all helicopters. Contact the NIRSC-CDO for availability of King AUX-FM adapter cables.



**NFES# 004499 Air Attack Kit Components**

### **004545 Aviation Radio Kit**

The NFES# 004545 Aviation Radio Kit contains a Technisonic TDFM-136 or TDFM-136B enclosed in a pelican shipping case. Contact the NIRSC-CDO or the Avionics Branch for further information.



**NFES# 004545 Aviation Radio Kit Components**

### **004604 AIR ATTACK TRAINING KIT**

The NFES# 004604 Air Attack Training kit contains the necessary equipment to operate an Air Attack (NFES# 004499) in a classroom environment. There is a 12 Volt DC power supply plus adapters and cables to connect an ICOM A3 or A6 portable radio, to simulate an aircraft VHF-AM transceiver, and two headsets. The kit can be connected to two antenna dummy loads (student radio programming training) or two small antennas (student simulations requiring transmissions), depending on classroom needs. The kit also includes a BK/King GPH/DPH headset adapter for sandbox exercises.



**NFES# 004604 Air Attack Training Kit Components**

## **004660 AIRBASE KIT**

The NFES# 004660 Airbase Kit is for MAFFS activations and temporary tanker bases. This kit provides a means to communicate with aircraft in noisy environments. It comes with a portable VHF-AM/VHF-FM base station radio, 10 handheld ICOM VHF-AM radios, and eight (8) sets of headsets, helmet adapters, and adapters to connect a headset/helmet to the ICOM radio. The VHF-FM base station can monitor both a main frequency and Air Guard. The base station radio is configured to operate on 115 Volts AC but, when requested, 12 Volts DC or 24 Volts DC power cables can be included for use with a deep cycle automotive/marine battery (Not supplied. Will need to be purchased locally). When additional handheld VHF-AM radios are needed, order the NFES# 004240 Airbase Accessories Kit.



**NFES# 004660 Airbase Kit Components**

### **004670 SATELLITE PHONE KIT**

The NFES# 004670 is a Motorola mobile phone that connects audio calls via an Low Earth Orbiting (LEO) satellite network when local cellular service is unavailable or has restricted coverage.

NIRSC has available a limited supply of Motorola Satellite Phones that operate on the Iridium network. These portable handsets run on rechargeable batteries and AC/DC chargers are included.



**NFES# 004670 Satellite Phone Kit Components**

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**GENERAL  
COMMUNICATIONS  
CONDITIONS AND SOLUTIONS**

# GENERAL COMMUNICATIONS CONDITIONS AND SOLUTIONS

CONDITIONS	EQUIPMENT SOLUTIONS	NFES #	DRAWING #
A new or growing incident needs Command, Logistics, and tactical communications.	<p><b>Starter System</b></p> <p>Contains sufficient equipment to initially support a new incident which has potential for increasing in size.</p> <p><u>Starter System includes the following Kits:</u></p> <p>NFES# 004312 - CMD Repeater/Link (1)            NFES# 004381 - CMD/TAC Radio Kits (3)            NFES# 004370 - Ground Aircraft Link Kit (1)            NFES# 004330 - Remote Kit (2)            NFES# 004248 - Logistics Repeater (1)            NFES# 004244 - Logistics Radio Kit (1)            NFES# 004100 - Mountain Top Accessory Kit (2)</p>	004390	NA
Incident areas are not within line-of-sight of each other.	<p><b>VHF Command Repeater/Link</b>  <b>VHF CMD/TAC Radio Kit</b>  <b>Remote Kit</b>  <b>Mountain Top Accessory Kit</b></p> <p>Use of a repeater generally allows more flexibility and gives wider coverage.            Remote kit will allow ICP/ICC radio to be installed at a location up to one (1/4) mile away, where line-of-sight exists, but be controlled from the ICP/ICC through a remote desk-set.</p>	004312 004381 004330 004100	1
Logistics areas are not within line-of-sight of each other.	<p><b>UHF Logistics Radio Kit</b>  <b>UHF Logistics Repeater Kit</b>  <b>Remote Kit</b></p> <p>To be used to tie logistics areas together if not within line-of-sight.            Remote kit will allow ICP/ICC radio to be installed at a location up to one (1/4) mile away, where line-of-sight exists, but be controlled from the ICP/ICC through a remote desk-set.</p>	004244 004248 004330	2
Need to back haul CMD Repeater to reach ICP/ICC due to obstructing terrain.	<p><b>VHF Command Repeater/Link</b>  <b>UHF Logistics Repeater</b>  <b>Remote Kit</b>  <b>Mountain Top Accessory Kit</b></p> <p>When terrain limits line-of-sight access from the CMD Repeater to ICP, a UHF Logistics repeater can be used to link the CMD network back to ICP through the Logistics Repeaters Hub.</p>	004312 004248 004330 004100	3

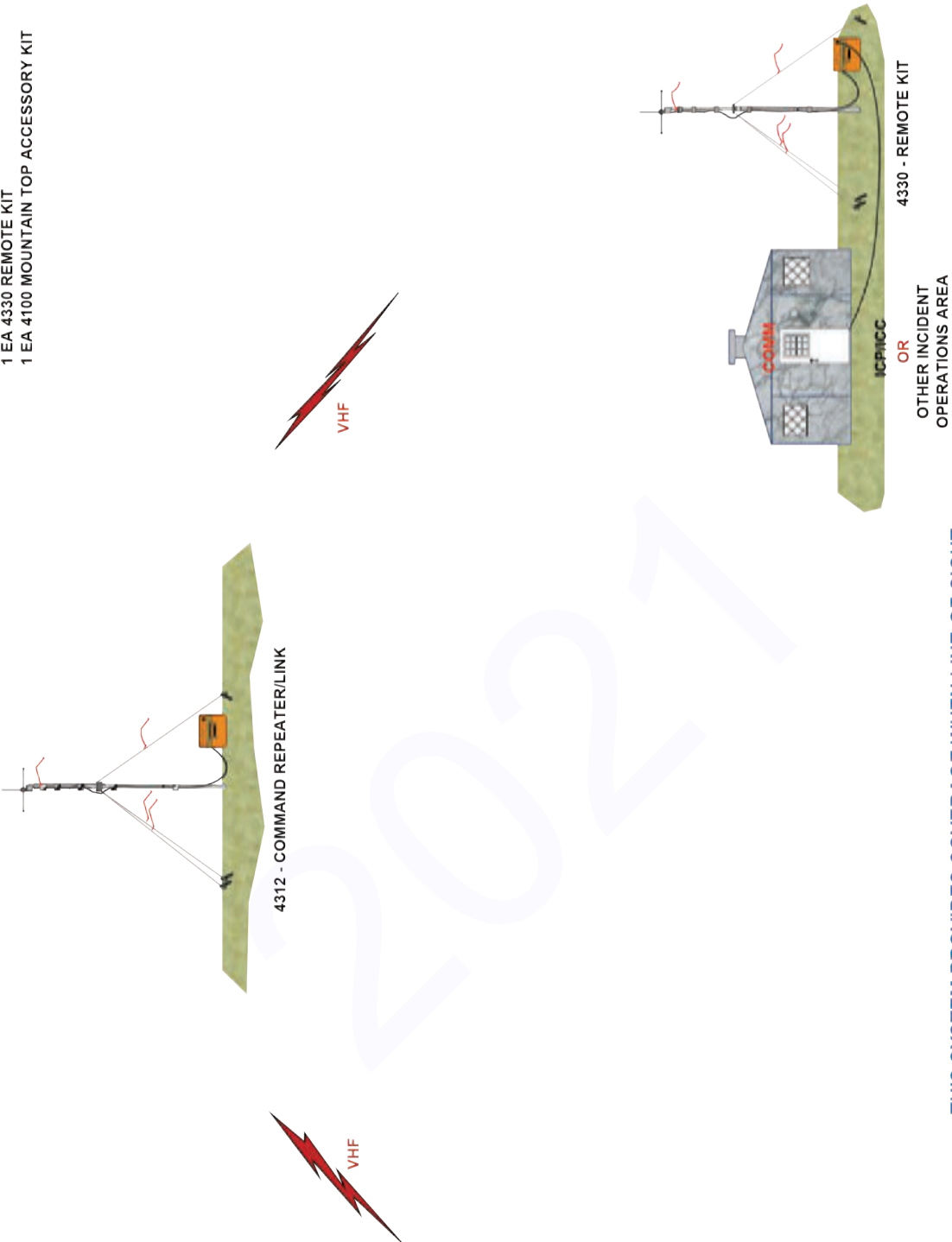
# GENERAL COMMUNICATIONS CONDITIONS AND SOLUTIONS

CONDITIONS	EQUIPMENT SOLUTIONS	NFES #	DRAWING #
Need to link two ends of an incident which has considerable linear distance or terrain obstructions.	<b>Two VHF Command Repeater/Links</b> <b>Remote Kit</b> <b>Two Mountain Top Accessory Kits</b>  CMD Repeaters can be linked via a UHF Simplex frequency to cover different areas on incidents. CMD Repeaters must be line-of-sight from each other for UHF Simplex Link to work properly. Each CMD Repeater is on a different frequency.	<b>004312</b> <b>004330</b> <b>004100</b>	4
Need to link more than two (2) CMD Repeaters to cover large incidents or multiple small incidents.	<b>Three or more VHF Command Repeater/Links</b> <b>Remote Kit</b> <b>The or more Mountain Top Accessory Kits</b>  CMD Repeaters can be linked via a UHF Simplex frequency to cover expanded area on incidents. All CMD Repeaters MUST be in line-of-sight with each other for UHF Simplex Link to work properly. Each CMD Repeater is on a different frequency.	<b>004312</b> <b>004330</b> <b>004100</b>	5
Need to link two ends of an incident over long distance and neither CMD Repeater can reach ICP/ICC.	<b>Two VHF Command Repeater/Links</b> <b>UHF Logistics Repeater</b> <b>Remote Kit</b> <b>Two Mountain Top Accessory Kits</b>  A UHF Repeater can be used as a Hub to linked CMD Repeaters to the ICP/ICC. All CMD Repeater must be line-of-sight with the UHF Repeater Hub. ICP/ICC can be tied in through one of the CMD Repeaters or through the UHF Repeater. Each CMD Repeater is on a different frequency.	<b>004312</b> <b>004248</b> <b>004330</b> <b>004100</b>	6
Need to link more than two (2) CMD Repeater/Links. UHF Links are not within line-of-sight of each other. Needed to link a large incident or multiple small incidents.	<b>Three or more VHF Command Repeater/Links</b> <b>UHF Logistics Repeater</b> <b>Remote Kit</b> <b>Three or more Mountain Top Accessory Kits</b>  A UHF Repeater can be used as a Hub to linked CMD Repeaters to the ICP/ICC. All CMD Repeaters MUST be in line-of-sight with the UHF Repeater Hub. ICP/ICC can be tied in through one of the CMD Repeaters or through the UHF Repeater. Each CMD Repeater is on a different frequency.	<b>004312</b> <b>004248</b> <b>004330</b> <b>004100</b>	7

COMMAND/TACTICAL RADIO KIT AND COMMAND REPEATER KIT WITH REMOTE KIT

SUGGESTED EQUIPMENT:

- 1 EA 4312 COMMAND REPEATER KIT
- 1 EA 4381 CMD/TAC RADIO KIT
- 1 EA 4330 REMOTE KIT
- 1 EA 4100 MOUNTAIN TOP ACCESSORY KIT



THIS SYSTEM PROVIDES COVERAGE WHEN LINE-OF-SIGHT DOES NOT EXIST FROM THE OPERATIONS AREA TO ICP.

NOTE: THIS SYSTEM REQUIRES ONE (1) VHF FREQUENCY PAIR

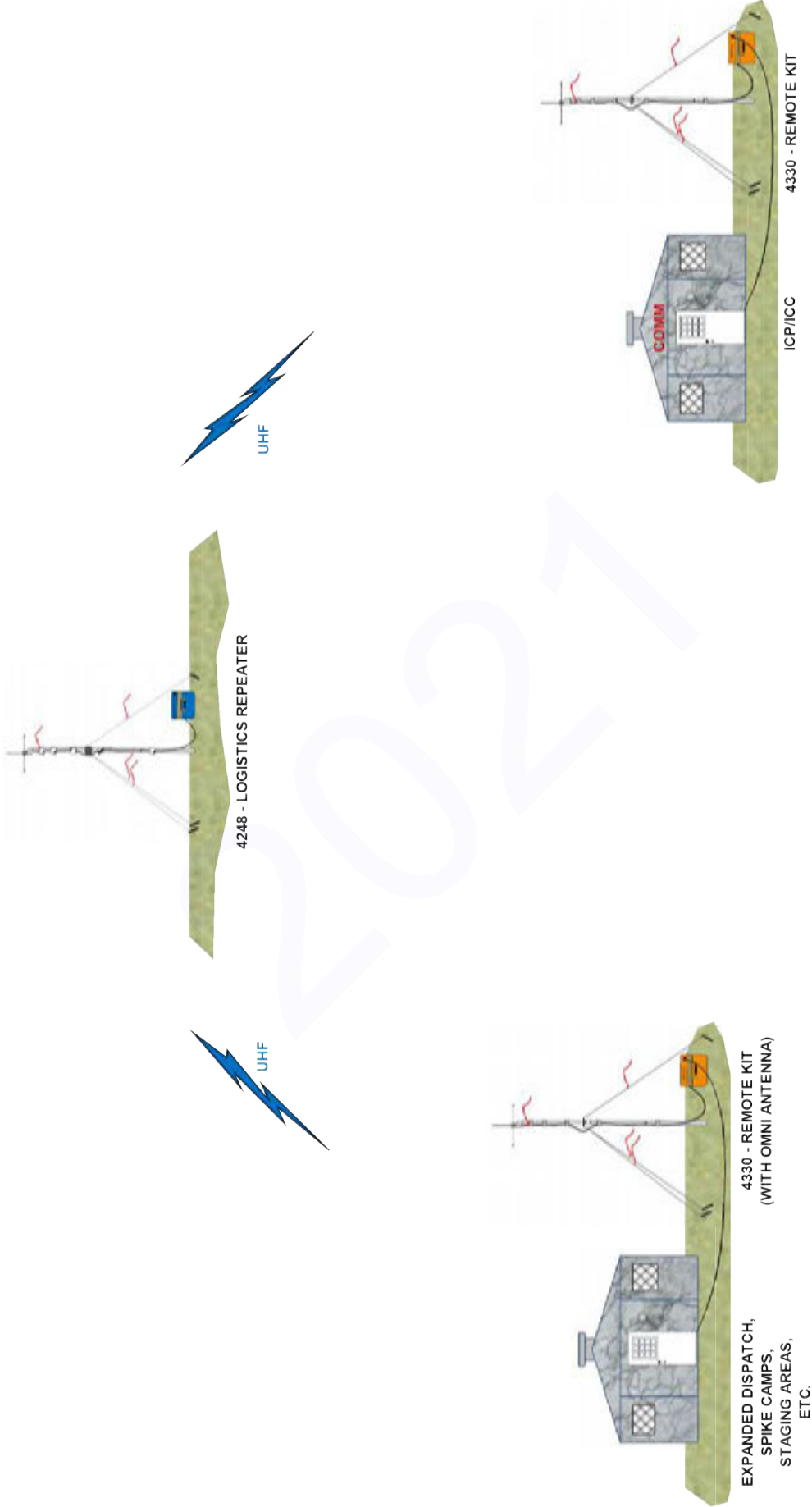


INCIDENT OPERATIONS AREA

DRAWING 1

UHF LOGISTICS REPEATER WITH UHF LOGISTICS RADIO KIT

- SUGGESTED EQUIPMENT:
- 1 EA 4248 LOGISTICS REPEATER KIT
  - 1 EA 4244 LOGISTICS RADIO KIT
  - 2 EA 4330 REMOTE KIT



THIS SYSTEM IS USED WHEN THE LOGISTICS AREA OR (ICP) IS NOT WITHIN LINE-OF-SIGHT OF EXPANDED/SPIKE CAMP OR THE ICP IS TO LARGE TO COVER.

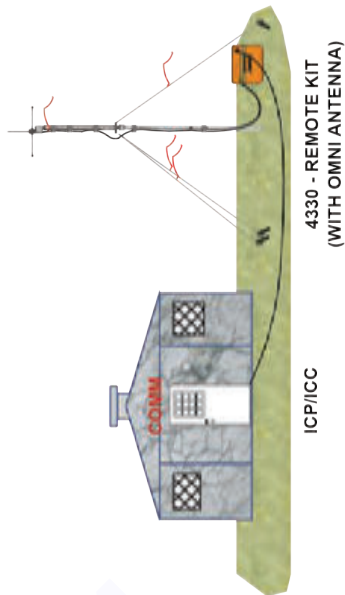
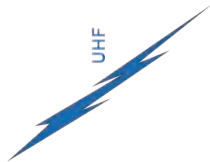
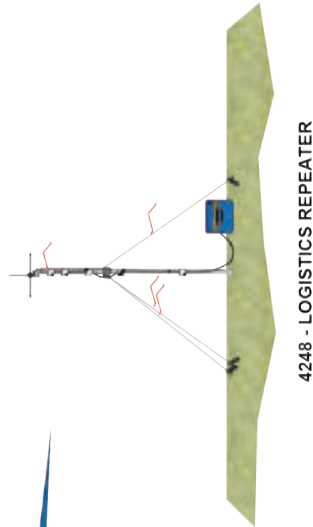
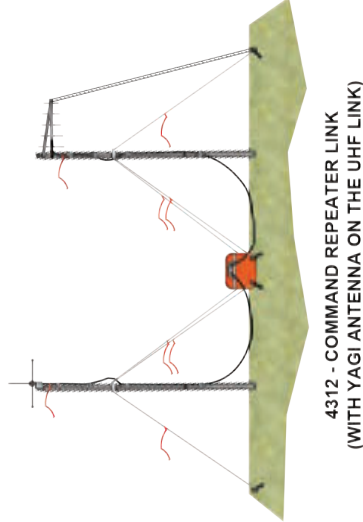
NOTE: THIS SYSTEM REQUIRES ONE (1) UHF FREQUENCY PAIR.

DRAWING 2

# INCIDENT OPERATIONS AREA TO ICP/ICC BACKBONE

## SUGGESTED EQUIPMENT:

- 1 EA 4312 COMMAND REPEATER KIT
- 1 EA 4248 LOGISTICS REPEATER KIT
- 1 EA 4330 REMOTE KIT
- 1 EA 4381 CMD/TAC RADIO KIT
- 1 EA 4100 MOUNTAIN TOP ACCESSORY KIT



THIS SYSTEM IS USED WHEN TERRAIN LIMITS LINE-OF-SIGHT ACCESS FROM THE COMMAND REPEATER TO THE ICP/ICC. INSTALLING A LOGISTICS REPEATER AS A HUB LINKED FROM ICP TO THE COMMAND REPEATER PROVIDES ADDITIONAL COVERAGE.

NOTE: THIS SYSTEM REQUIRES ONE (1) VHF FREQUENCY PAIR  
AND ONE (1) UHF FREQUENCY PAIR.

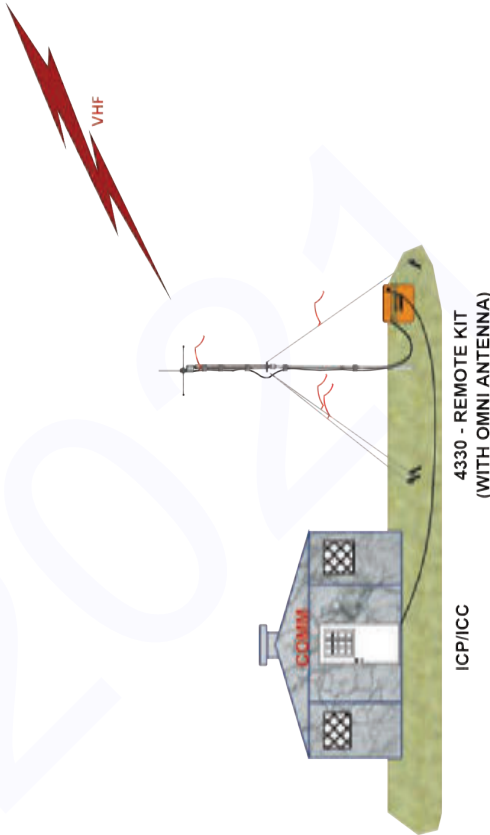
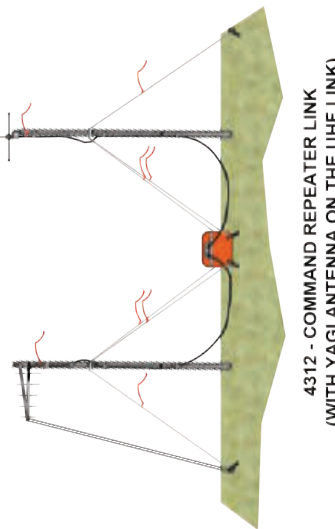
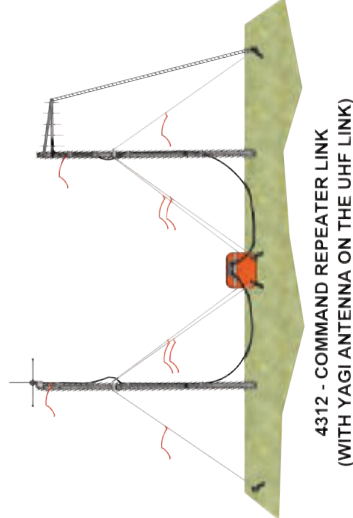


INCIDENT OPERATIONS AREA

# LARGE INCIDENT OPERATIONS AREA LINKING SYSTEMS

## SUGGESTED EQUIPMENT:

- 2 EA 4312 COMMAND REPEATER KITS
- 1 EA 4381 CMD/TAC RADIO KIT
- 1 EA 4330 REMOTE KIT
- 2 EA 4100 MOUNTAIN TOP ACCESSORY KIT

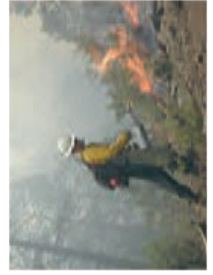


THIS SYSTEM CAN BE USED TO LINK THE COMMAND NETWORKS OF TWO ENDS OF AN INCIDENT WHICH HAS CONSIDERABLE LINEAR DISTANCE OR TERRAIN OBSTRUCTIONS BETWEEN THEM.

NOTE: THIS SYSTEM LINKS TWO (2) SEPARATE VHF COMMAND FREQUENCY PAIRS TOGETHER USING ONE (1) UHF SIMPLEX FREQUENCY.



INCIDENT OPERATIONS AREA 1



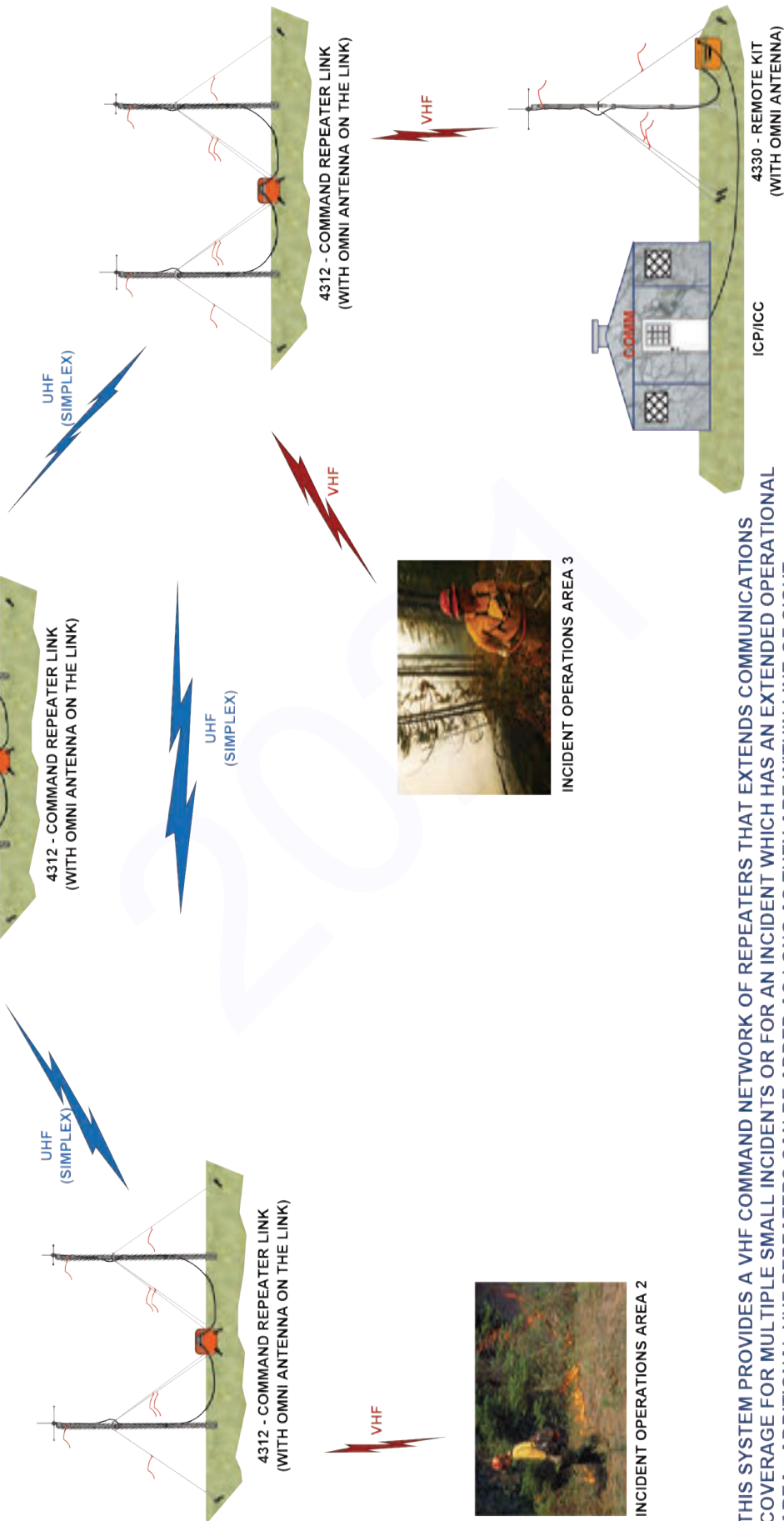
INCIDENT OPERATIONS AREA 2

DRAWING 4

EXTENDED OR MULTIPLE INCIDENT OPERATIONS AREA LINKING SYSTEM

SUGGESTED EQUIPMENT:

- 3 EA 4312 COMMAND REPEATER KIT
- 1 EA 4330 REMOTE KIT
- 1 EA 4381 CMD/TAC RADIO KIT
- 3 EA 4100 MOUNTAIN TOP ACCESSORY KIT



THIS SYSTEM PROVIDES A VHF COMMAND NETWORK OF REPEATERS THAT EXTENDS COMMUNICATIONS COVERAGE FOR MULTIPLE SMALL INCIDENTS OR FOR AN INCIDENT WHICH HAS AN EXTENDED OPERATIONAL AREA. ADDITIONAL VHF REPEATERS CAN BE ADDED AS LONG AS THEY ARE WITHIN LINE-OF-SIGHT WITH ALL OTHER VHF REPEATERS.

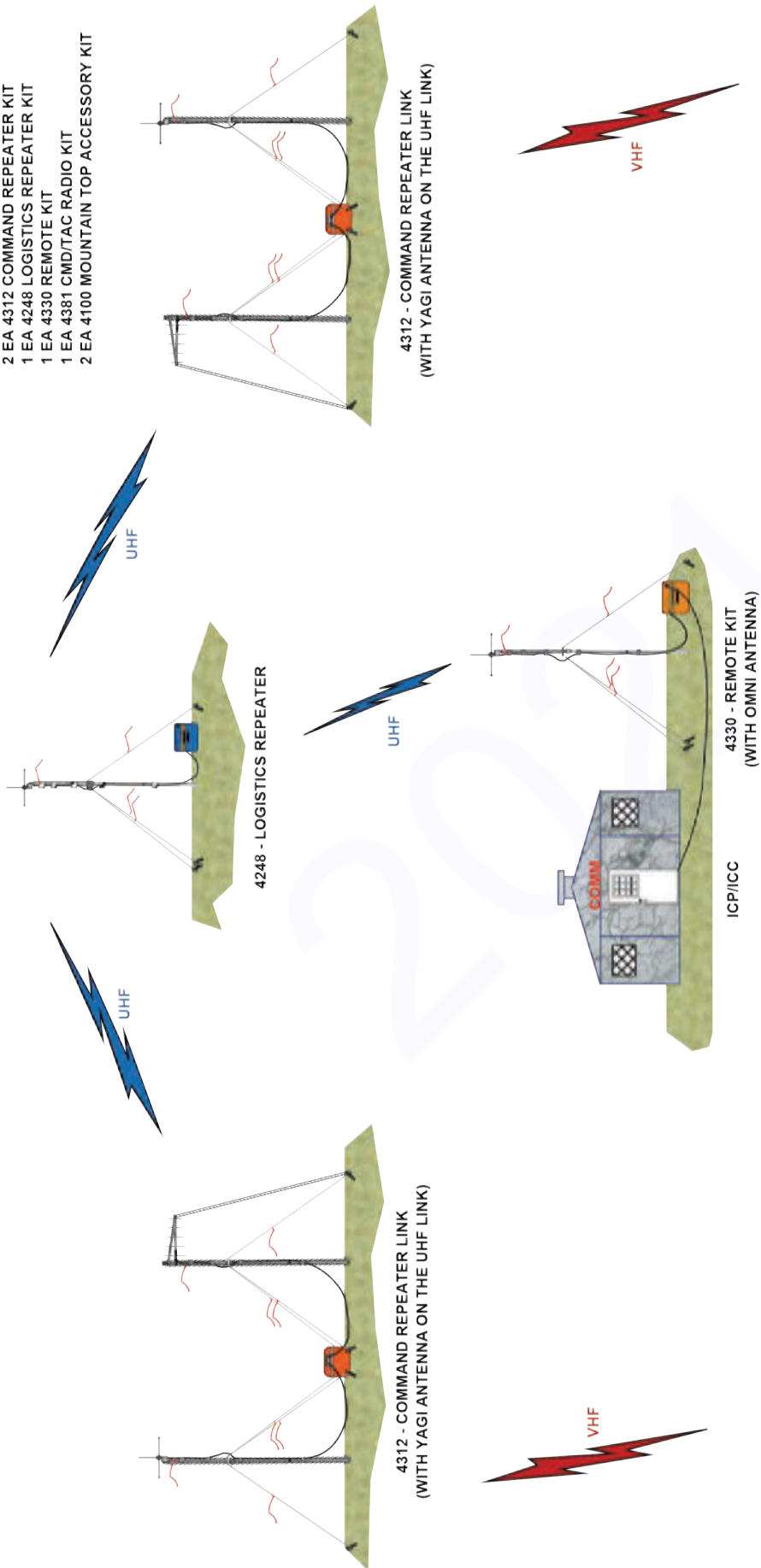
NOTE: THIS SYSTEM LINKS THREE (3) SEPARATE VHF COMMAND FREQUENCY PAIRS TOGETHER USING ONE (1) UHF SIMPLEX FREQUENCY.

DRAWING 5

# EXTENDED INCIDENT OPERATIONS AREA LINKING SYSTEM

## SUGGESTED EQUIPMENT:

- 2 EA 4312 COMMAND REPEATER KIT
- 1 EA 4248 LOGISTICS REPEATER KIT
- 1 EA 4330 REMOTE KIT
- 1 EA 4381 CMD/TAC RADIO KIT
- 2 EA 4100 MOUNTAIN TOP ACCESSORY KIT



INCIDENT OPERATIONS AREA 2



INCIDENT OPERATIONS AREA 1

THIS SYSTEM LINKS TWO ENDS OF AN INCIDENT OVER LONG DISTANCE WHERE NEITHER VHF REPEATERS ARE WITHIN LINE-OF-SIGHT. A UHF REPEATER HUB CAN LINK BOTH VHF REPEATERS BACK TO ICP. EACH VHF COMMAND REPEATER MUST HAVE LINE-OF-SIGHT BETWEEN THE UHF REPEATER HUB.

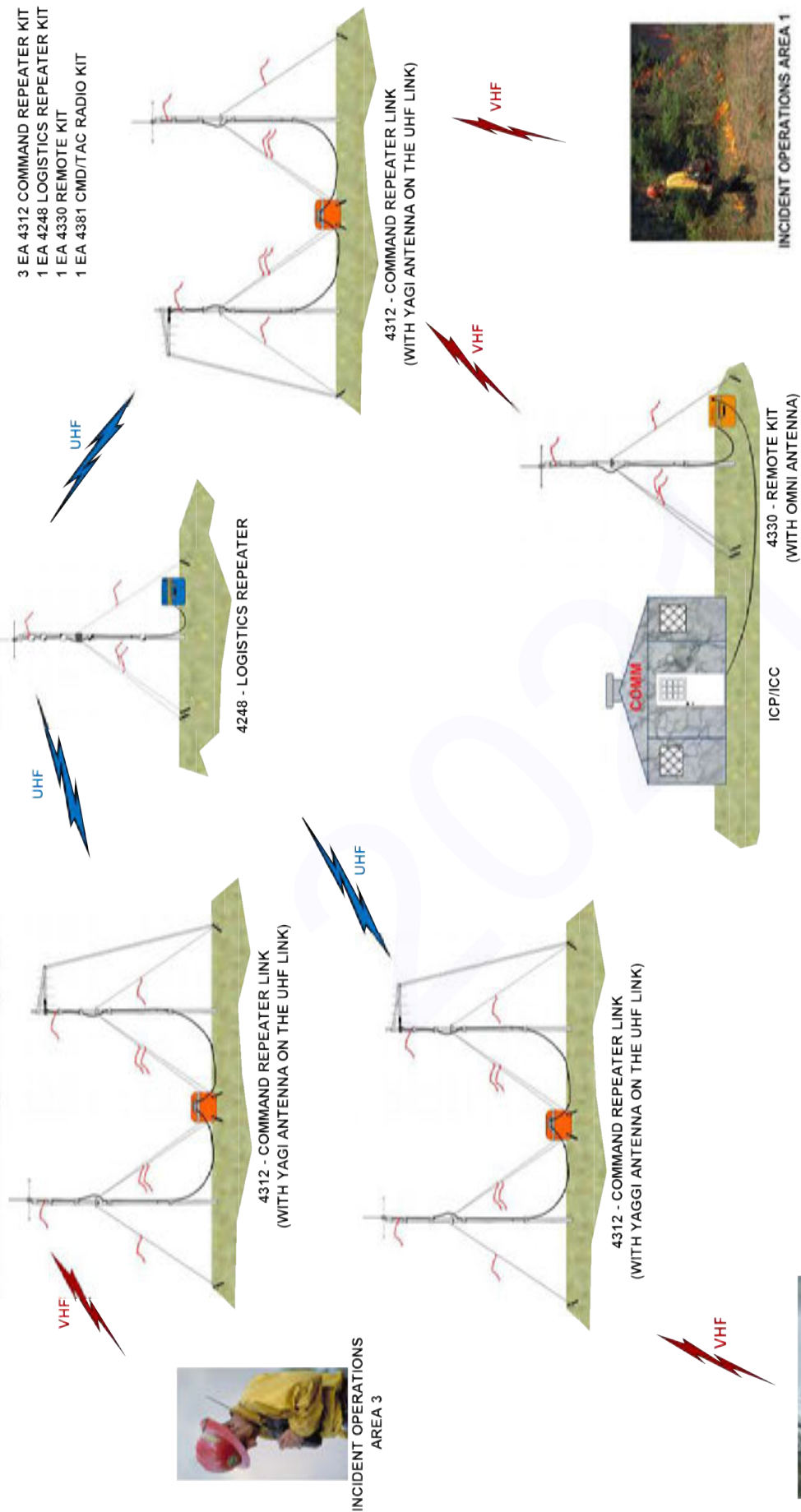
**NOTE: THIS SYSTEM LINKS TWO (2) DIFFERENT VHF COMMAND FREQUENCY PAIRS AND ONE (1) UHF LOGISTICS FREQUENCY PAIR.**

DRAWING 6

# EXTENDED OR MULTIPLE INCIDENT OPERATIONS AREA LINKING SYSTEM

SUGGESTED EQUIPMENT:

- 3 EA 4312 COMMAND REPEATER KIT
- 1 EA 4248 LOGISTICS REPEATER KIT
- 1 EA 4330 REMOTE KIT
- 1 EA 4381 CMD/TAC RADIO KIT



WHEN AN INCIDENT REQUIRES TWO (2) OR MORE VHF COMMAND REPEATERS TO PROVIDE COVERAGE OVER LONG DISTANCE WHERE NEITHER VHF REPEATERS ARE WITH IN LINE-OF-SIGHT, A UHF REPEATER HUB CAN LINK ALL VHF REPEATERS BACK TO ICP. EACH VHF REPEATER MUST HAVE LINE-OF-SIGHT BETWEEN THE UHF REPEATER HUB.

NOTE: THIS SYSTEM LINKS THREE (3) DIFFERENT VHF COMMAND FREQUENCY PAIRS AND ONE (1) UHF LOGISTICS FREQUENCY PAIR.

# **AVIATION COMMUNICATIONS CONDITIONS AND SOLUTIONS**

# AVIATION COMMUNICATIONS CONDITIONS AND SOLUTIONS

CONDITIONS	EQUIPMENT SOLUTIONS	NFES#	DWG#
Need helibase/airport ground-to-aircraft communications (VHF-AM).	<p><b>Ground VHF-AM Base Station Kit</b> or <b>Ground to Aircraft Radio/Link Kit</b> <b>Mountain Top Accessory Kit</b></p> <p><b>Base Station Use Only:</b></p> <p>Projects or incidents needing VHF-AM base station capabilities.</p> <p>Will communicate directly with aircraft, without modification, on VHF-AM frequencies.</p> <p>Dedicated AM frequency should be ordered through dispatch and issued by the CDO or COMC.</p> <p>Each kit include four (4) programmable ICOM radios that can be used by ground personnel at the helibase or airport.</p>	<p><b>004300</b> or <b>004370</b> <b>004100</b></p>	<b>8</b>
Helibase/heli-spot personnel must communicate with incident aircraft in remote locations as well as flight follow to/from the operations area and the helibase or heli-spots. (UHF-FM to VHF-AM.)	<p><b>Ground to Aircraft Radio/Link Kit (Linking)</b> <b>Mountain Top Accessory Kit</b></p> <p>Allows heli-base personnel using VHF-AM ICOM or UHF-FM radios to communicate with aircraft on VHF-AM frequencies. Kit also enables non-contract or military aircraft to communicate with other incident aircraft and heli-spot personnel via VHF-AM frequencies and helibase personnel via UHF-FM through the link.</p> <p>Dedicated VHF-AM and UHF-FM frequencies must be ordered through dispatch and issued by the CDO or COMC</p> <p>Each kit includes four (4) programmable ICOM radios.</p>	<p><b>004370</b> <b>004100</b></p>	<b>9</b>

# AVIATION COMMUNICATIONS CONDITIONS AND SOLUTIONS

CONDITIONS	EQUIPMENT SOLUTIONS	NFES#	DWG#
Extensive flight-following needs require expansion of Radio/Link system utilizing two (2) kits.	<p><b>Two Ground Aircraft Radio/Link Kits</b>  <b>Two Mountain Top Accessory Kits</b></p> <p>By using two (2) Ground Aircraft Radio/Link Kits linked through a UHF-FM repeater frequency, flight-following capabilities can be greatly expanded.</p> <p>This design uses one (1) UHF-FM repeater pair and two (2) VHF-AM frequencies. Helibase must flight-follow using the UHF-FM side of the system through the logistics repeater.</p> <p>Dedicated VHF-AM and UHF-FM frequencies must be ordered through Expanded Dispatch.</p> <p>Each kit includes four (4) handheld programmable ICOM radios.</p>	<p><b>004370</b>  <b>004100</b></p>	<b>10</b>
MAFFS Activation or Temporary Tanker Base	<p><b>Airbase Kit</b>  <b>Airbase Accessories Kit</b></p> <p>Allows personnel to communicate with aircraft from a VHF-AM/VHF-FM base station and/or via a handheld VHF-AM radio. The NFES# 004660 Airbase Kit comes with 10 handheld Icom VHF-AM radios and eight (8) sets of headsets, helmet adapters, and adapters to connect a headset to the VHF-AM radios. The VHF-FM base station can monitor both a main frequency and Air Guard.</p> <p>For additional radio capabilities, an NFES# 004240 Airbase Accessories Kit can be ordered. The NFES 4240 Airbase Kit has 5 sets of handheld Icom VHF-AM radios, headsets, helmet adapters, and adapters to connect a headset to the VHF-AM radios.</p> <p>Dedicated VHF-AM and VHF-FM frequencies must be ordered through dispatch. Air Guard (168.6250 MHz) does not need to be ordered.</p>	<p><b>004660</b>  <b>004240</b></p>	<b>11</b>

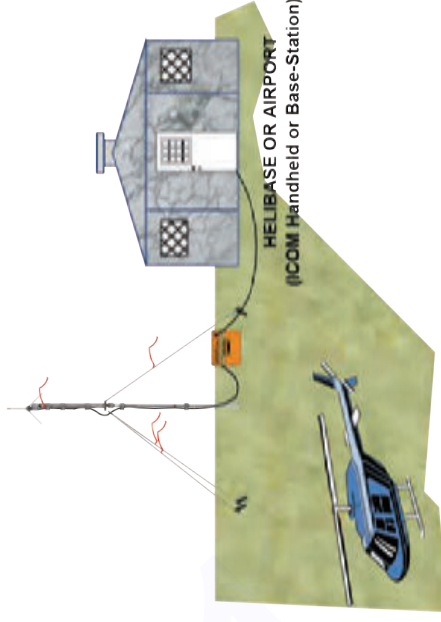
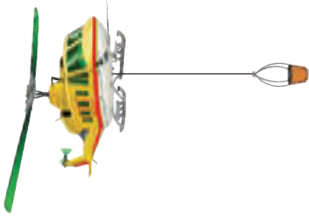
## GROUND VHF-AM BASE STATION KIT

### SUGGESTED EQUIPMENT:

1 EA 4370 GROUND AIRCRAFT RADIO LINK KIT  
(INCLUDES 4 EA ICOM AM HANDHELD RADIOS)  
1 EA 4100 MOUNTAIN TOP ACCESSORY KIT

OR

1 EA 4300 GROUND VHF-AM RADIO/BASE KIT  
(INCLUDES 4 EA ICOM AM HANDHELD RADIOS)



THIS SYSTEM PROVIDES FLIGHT FOLLOWING AT THE SURROUNDING HELI-BASE.

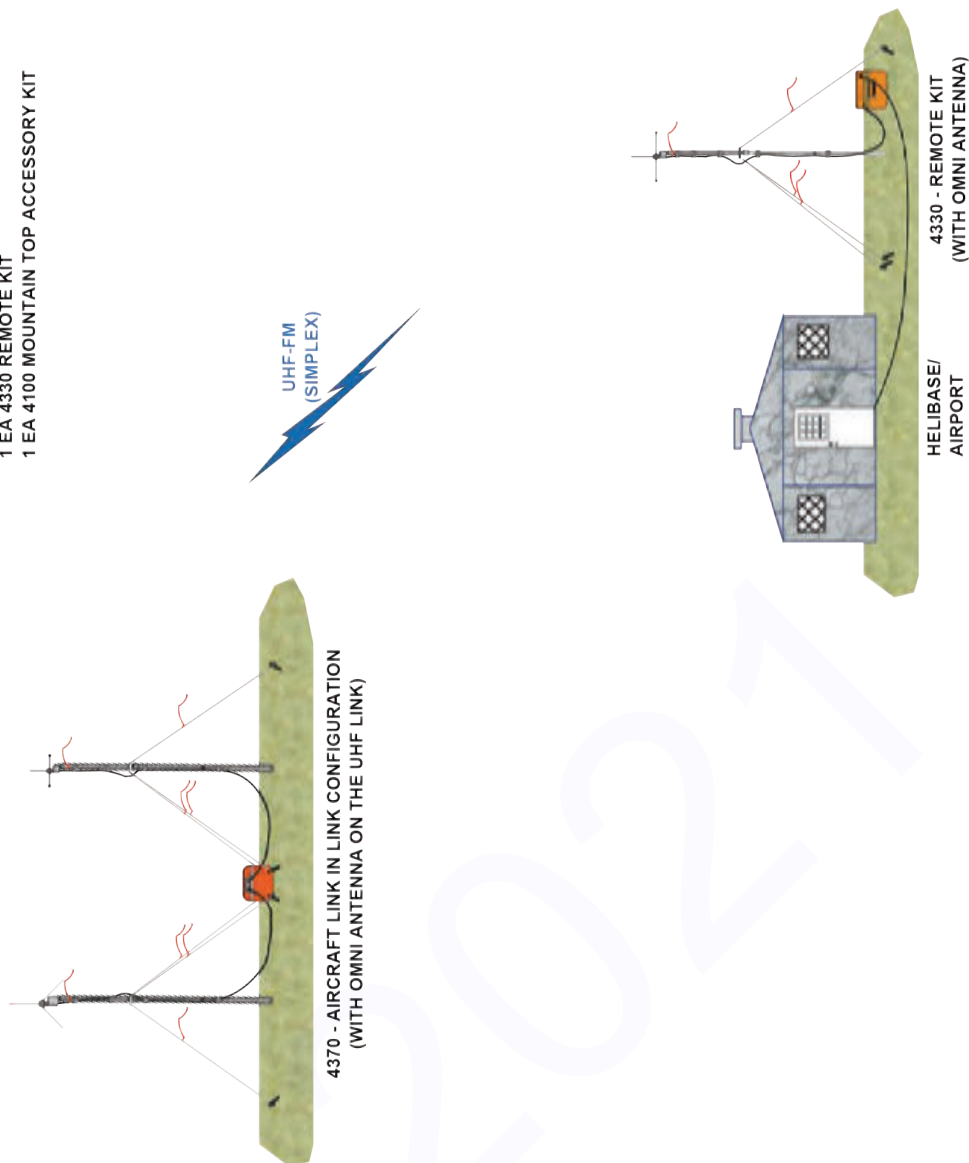
NOTE: THIS SYSTEM REQUIRES ONE (1) AM SIMPLEX FREQUENCY.  
AM FREQUENCY IS ISSUED FROM THE FAA THROUGH THE CDO OR COMC.

DRAWING 8

# GROUND TO AIRCRAFT RADIO/LINK KIT (USING LINKING)

## SUGGESTED EQUIPMENT:

- 1 EA 4370 GROUND AIRCRAFT RADIO LINK KIT  
(INCLUDES 4 EA ICOM AM HANDHELD RADIOS)
- 1 EA 4330 REMOTE KIT
- 1 EA 4100 MOUNTAIN TOP ACCESSORY KIT



THIS SYSTEM EXTENDS FLIGHT FOLLOWING COVERAGE BACK TO THE HELI-BASE WHEN  
LINE-OF-SIGHT IS NOT POSSIBLE BETWEEN THE AIRCRAFT ON THE INCIDENT AND HELI-BASE.

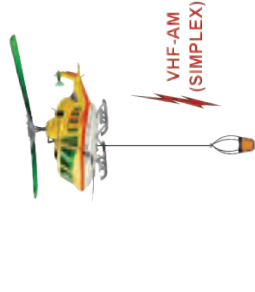
NOTE: THIS SYSTEM REQUIRES ONE (1) AM SIMPLEX FREQUENCY AND ONE (1) UHF SIMPLEX FREQUENCY.  
AM FREQUENCY IS ISSUED FROM THE FAA THROUGH THE CDO OR COMC.  
UHF FREQUENCY IS ISSUED FROM THE CDO OR COMC.

DRAWING 9

# GROUND TO AIRCRAFT RADIO/LINK KIT (USING LINKING)

## SUGGESTED EQUIPMENT:

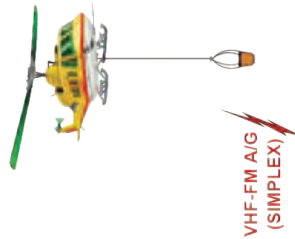
- 2 EA 4370 GROUND AIRCRAFT RADIO LINK KIT (INCLUDES 4 EA ICOM AM HANDHELD RADIOS)
- 1 EA 4248 LOGISTICS REPEATER
- 1 EA 4330 REMOTE KIT
- 2 EA 4100 MOUNTAIN TOP ACCESSORY KIT



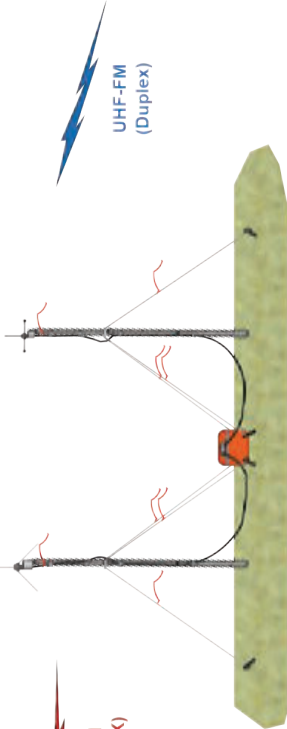
VHF-AM  
(SIMPLEX)



HELI-SPOT  
(ICOM Handheld)



VHF-FM A/G  
(SIMPLEX)

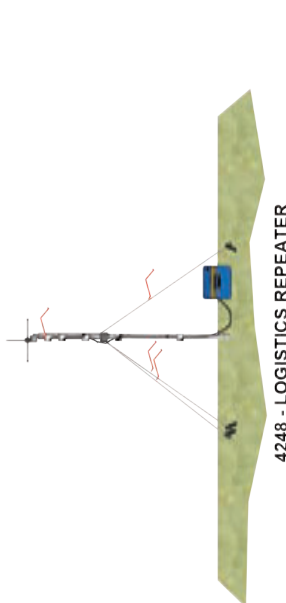


4370 - AIRCRAFT LINK IN LINK CONFIGURATION  
(WITH OMNI ANTENNA ON THE UHF LINK)

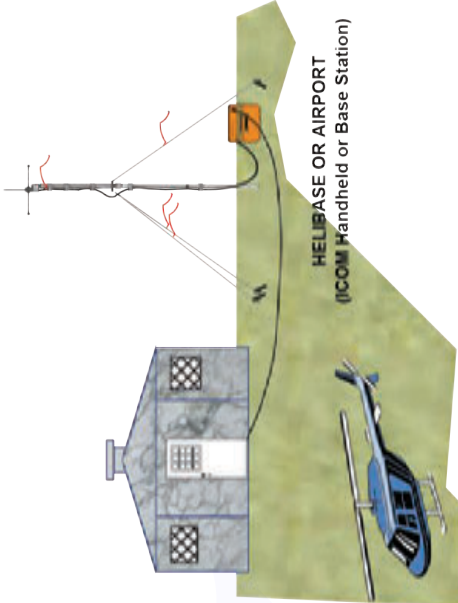
UHF-FM  
(Duplex)



UHF-FM  
(Duplex)



4248 - LOGISTICS REPEATER



HELIBASE OR AIRPORT  
(ICOM Handheld or Base Station)

THIS SYSTEM EXTENDS FLIGHT FOLLOWING BACK TO THE HELI-BASE WHEN LINE-OF-SIGHT IS NOT POSSIBLE BETWEEN AIRCRAFT ON SEPARATE BRANCHES OR COMPLEXES.

NOTE: THIS SYSTEM REQUIRES TWO (2) AM SIMPLEX FREQUENCIES AND ONE (1) UHF FREQUENCY PAIR. AM FREQUENCIES ARE ISSUED FROM THE FAA THROUGH THE CDO OR COMC.



INCIDENT DIVISION  
OPERATIONS

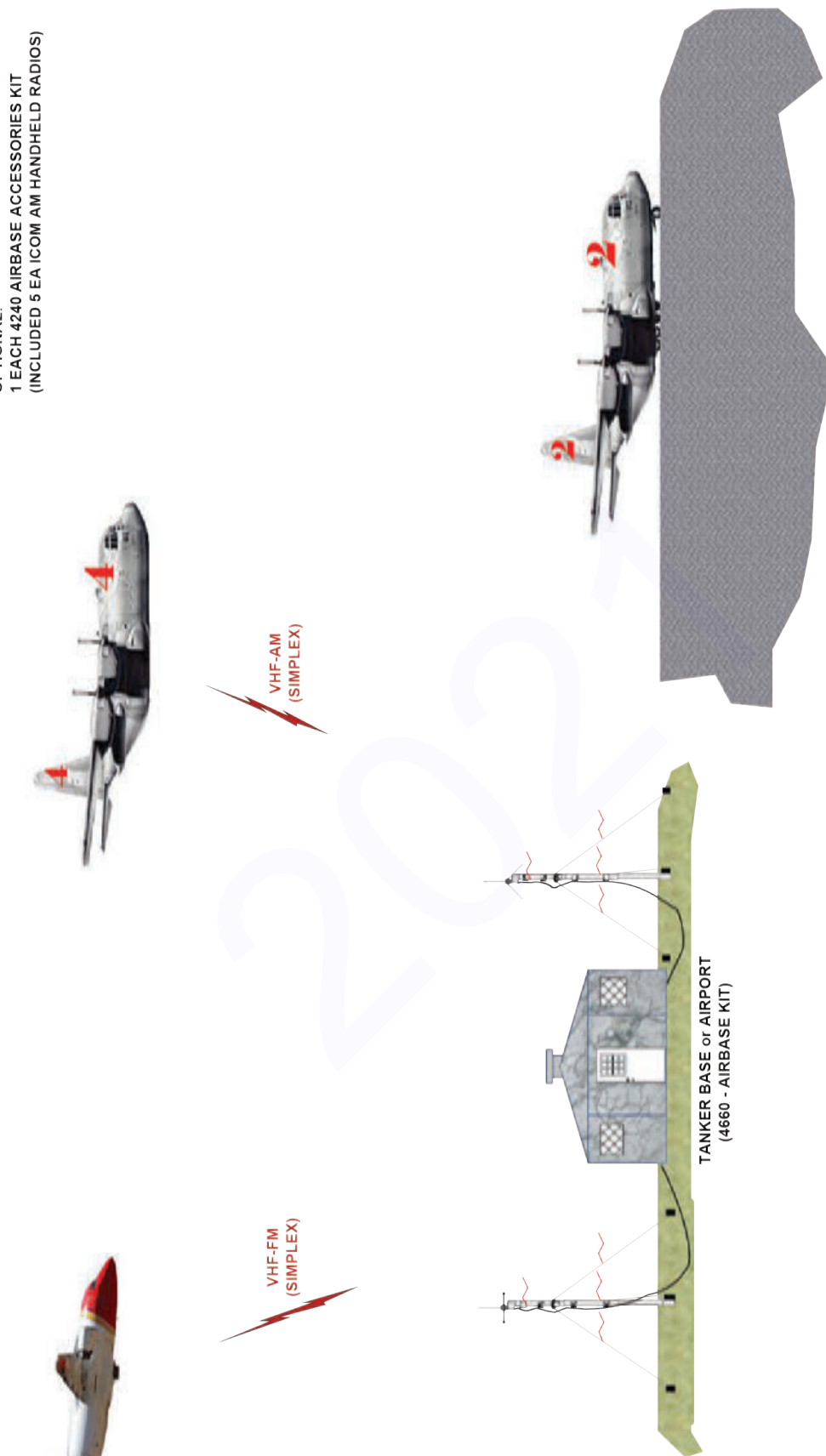
# MAFFS ACTIVATION or TEMPORARY TANKER BASE

## SUGGESTED EQUIPMENT:

1 EACH 4660 AIRBASE KIT  
(INCLUDES 10 EA ICOM AM HANDHELD RADIOS)

## OPTIONAL:

1 EACH 4240 AIRBASE ACCESSORIES KIT  
(INCLUDED 5 EA ICOM AM HANDHELD RADIOS)



THIS SYSTEM ALLOWS RAMP PERSONNEL TO COMMUNICATE WITH AIRCRAFT ASSIGNED TO THE TANKER BASE.

NOTE: THIS SYSTEM REQUIRES ONE (1) AM SIMPLEX FREQUENCY FOR RAMP USE, AND ONE (1) VHF SIMPLEX FLIGHT FOLLOWING FREQUENCY. AM FREQUENCIES ARE ISSUED FROM THE FAA THROUGH THE CDO OR COMC.

DRAWING 11

2021

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# **NIRSC EQUIPMENT INSTALLATION INSTRUCTIONS**

# 004080 - SOLAR PANEL KIT SETUP PROCEDURE

## Setup:

- Remove the Flexible Solar Panel from the Kit.
- Orient the solar panel to get the most sunlight throughout the day.
- Keep it away from the shade.
- Hammer the tent stakes at a 45 degree angle and secure the ropes or zip ties to each eyelet of the solar panel.

## Connections:

Connect the cables as shown on the block diagram. *(See Figure 1)*

- **Cable 120:** Connects from the solar panel Kit “REP” output directly to the equipment bulkhead external power connector on the back of the equipment box.
- **Cable 100:** Connects from the Solar Panel Kit “SOL” input directly to the solar panel connector.
- If there is sunlight, observe the charging light on the charge controller. It turns on when the battery is charging and off when it is fully charged.

The solar panel kit contains a sealed lead acid (SLA) battery that will provide 2 to 3 days of backup power in the event there is no sunlight.

*Note: These batteries weigh 50 lbs. Battery voltage will vary between 14 Volts and 10 Volts. The battery is nearly depleted if the voltage falls below 10.5 Volts with the repeater keyed.*

## External Battery: (Optional)

For additional backup power, purchase another battery at the incident. The spare must be a 12 Volt SLA (preferably a gel cell or AGM deep cycle marine battery). A battery of at least 75 Amp-Hr is recommended.

- **Cable 110:** Connects from the Solar Panel Kit “BAT” input/output to an external deep cycle marine battery.

*Note: When repacking the solar kit ensure there is no loose metal that can shift and short the battery terminals while in transport.*

The Solar Panel Kit is recommended for use with the following NIRSC equipment:

- **004312 - Command Repeater/Link**
- **004248 - Logistics Repeater**
- **004370 - Ground Aircraft Link**

## Voice Board: (See Appendix A for more information on the Voice Board)

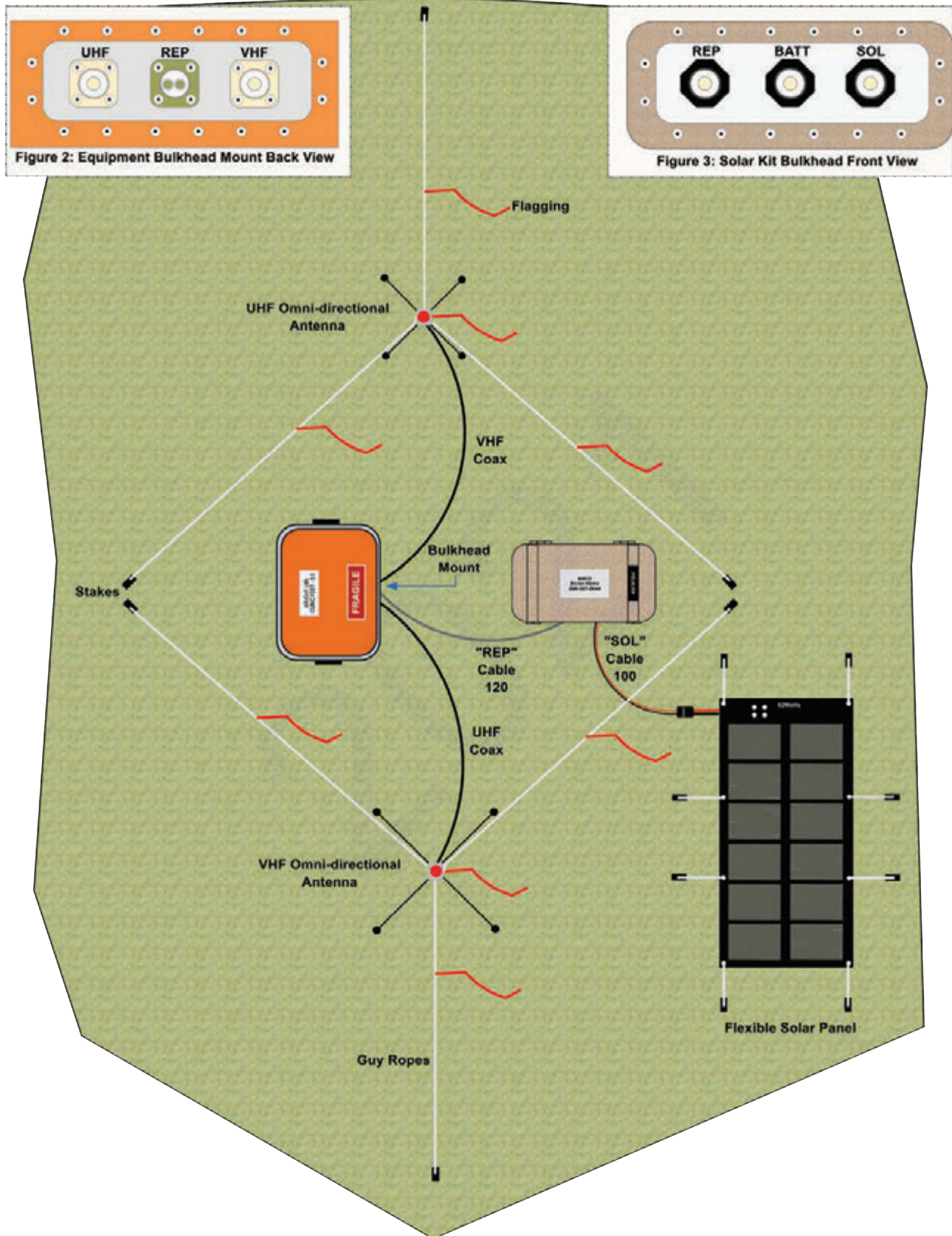
The Voice Board (installed on most of the NIRSC equipment) performs two functions:

1. It reads the battery voltage and temperature over the air via DTMF tones.
2. It allows the repeater to run using the following power sources:
  - A. Only alkaline batteries.
  - B. Only the solar panel.
  - C. Both the alkaline batteries and the solar panel.

*Note: If using both solar and alkaline, the voice board monitors the solar voltage and will automatically switch to alkaline power when the solar voltage falls below 10 Volts. When the solar voltage rises above 12 Volts, it will switch back to solar power. This conserves the alkaline batteries, allowing the equipment to run off one set of batteries for extended periods of time without the need to change them.*

**If any questions arise during installation, please call the CDO at (208)387-5644**

## 004080 - SOLAR PANEL KIT SETUP PROCEDURE OVERHEAD VIEW



**Figure 1: Solar Panel Installation (Overhead View)**

# 004248 UHF REPEATER SETUP PROCEDURE

## 1. **Antenna Installation** (See Figure 1)

Setup the UHF Omni-Directional antenna according to the illustration.

- Attach one end of the UHF coax cable to the UHF Antenna Base, before erecting the antenna mast.

*Note: For detailed antenna installation instructions see the “Antenna Installation Instructions” included in Appendix C.*

## 2. **Coaxial Cable** (See Figure 1)

Attach the other end of the UHF coax to the appropriate connector on the bulkhead mount on the back of the fiberglass box.

- The bulkhead mount connectors are clearly marked to facilitate proper installation.

## 3. **Battery Supply** (See Appendix B: Battery Configurations)

Connect the supplied batteries to the repeater power adapter.

- The battery and equipment are configured with a **POLARIZED** interconnect plug.

*Note: Reversing polarity will result in an inoperative repeater. The repeater kits are shipped with the polarized plug disconnected and it should be connected before the repeater is turned on.*

Turn the main power switch located on the **SYSTEM MONITOR** Module, to the “**ON**” position.

- If it becomes necessary to replace the batteries, follow the 15 volt battery configuration. (See Appendix B)

## 4. **Tone Selection** (See the Switch Settings Diagram in Appendix D for more details)

The UHF Repeater (4248) has no tone capability.

- Both Switch A and Switch B rotary select switches on the **REPEATER CONTROL MODULE** have been disabled.

## 5. **Switch Settings and Testing** (See the Switch Settings Diagram in Appendix D for more details)

Ensure that the **UHF TRANSMITTER** and **RECEIVER** Module switches on the 4248 are in the correct “**NORM**” position as per the “**4248 UHF Repeater Switch Settings Diagrams**” in Appendix D.

After installation is complete, test the repeater using the appropriate portable radios. Back away from the repeater box a minimum of 25 feet before testing.

## 6. **Final Test**

Close the lid tightly to prevent weather and rodent damage to the equipment.

**Test one FINAL time before leaving the site, to make sure the switches have not been accidentally moved.**

**NIRSC recommends testing with the field units or ICP if possible before leaving the site.**

*Note: A whole system test is preferred, if possible.*

**If any questions arise during installation, please call the CDO at (208)387-5644**

# 004248 UHF REPEATER SETUP PROCEDURE

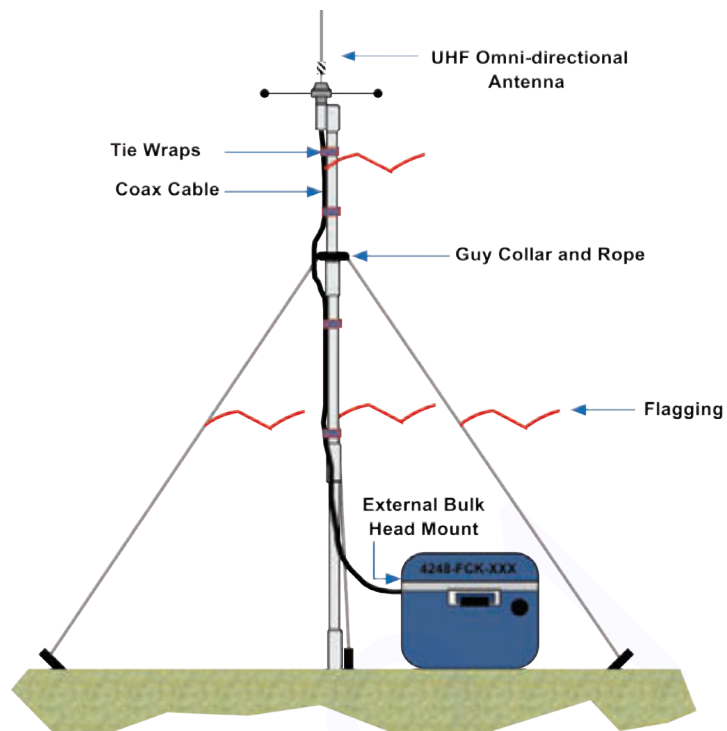


Figure 1:  
4248 - UHF REPEATER ANTENNA SETUP

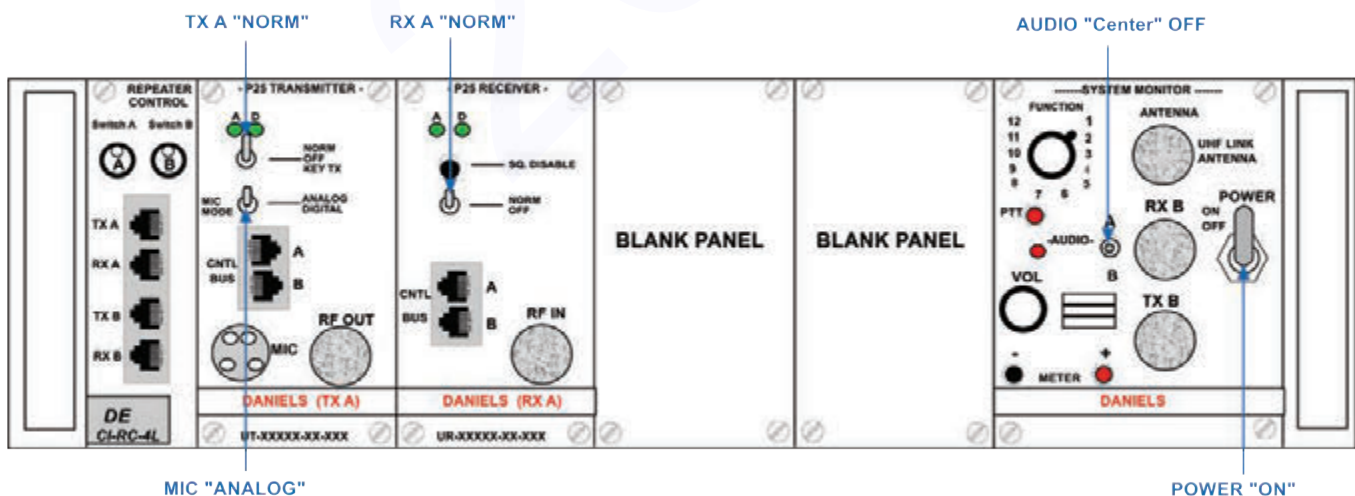


Figure 2:  
4248 - UHF REPEATER SWITCH SETTINGS

# 004281 - CROSSBAND LINK KIT SETUP PROCEDURE

## 1. **Antenna Installation** (See Figure 1)

Setup the VHF and UHF Link antenna according to the Crossband Antenna illustration.

*Note: For detailed antenna installation instructions see the "Antenna Installation Instructions" included in Appendix C.*

## 2. **Coaxial Cable** (See Figure 1)

Attach the VHF coax cable to the appropriate VHF connector on the bulkhead mount on the back of the fiberglass box. Attach the UHF coax cable to the appropriate UHF connector on the bulkhead mount on the back of the fiberglass box.

- The bulkhead mount connectors are clearly marked to facilitate proper installation.

## 3. **Battery Supply** (See Appendix B: Battery Configurations)

Connect the supplied batteries to the crossband power adapter.

The battery and equipment are configured with a POLARIZED interconnect plug.

*Note: Reversing the polarity will result in a inoperative crossband. The crossband kits are shipped with the polarized plug disconnected and it should be connected before the equipment is turned on.*

*There is not master power switch. Once the power cable is connected, all modules are receiving voltage but each module needs to be individually turned "ON" to operate.*

## 4. **Tone Selection**

- Contact the CDO for an appropriate tone
- All tones are coordinated and assigned by the CDO or COMC.
- Tones are not selectable on the crossband
- If a tones is required for operation, it must be pre-programmed in each module by NIRSC before shipment to the incident.

## 5. **Switch Settings and Testing** (See the Switch Settings Diagram in Appendix D for more details)

- Contact the CDO for appropriate VHF and UHF frequencies.
- Frequencies and Tones must be programmed by NIRSC before shipment of equipment.
- All frequencies are assigned by the CDO or COMC.
- Ensure that the VHF and UHF modules are in the correct "**NORM**" position as per the "**4281 Switch Setting Diagrams**" in Appendix D.
- Both the VHF and UHF TX/RX frequencies are set by selecting the proper position using the 16-position rotary switches on the **AUDIO CONTROL** Module.
  - The rotary "**Switch A**" selects both the TX and RX frequencies on the VHF modules.
  - The rotary "**Switch B**" selects both the TX and RX frequencies on the UHF modules.

See the VHF and UHF frequency selection list provided. "**Straight UP**" is Position 1.

After installation is complete, test the crossband using the appropriate portable radios. Back away from the crossband a minimum of 25 feet before testing.

## 6. **Final Test**

Close the lid tightly to prevent weather and rodent damage to the equipment.

**Test one FINAL time before leaving the site, to make sure the switches have not been accidentally moved.**

**NIRSC recommends testing with the field units or ICP if possible before leaving the site.**

*Note: A whole system test is preferred, if possible.*

**If any questions arise during installation, please call the CDO at (208)387-5644**

# 004281 - CROSSBAND LINK KIT SETUP PROCEDURE

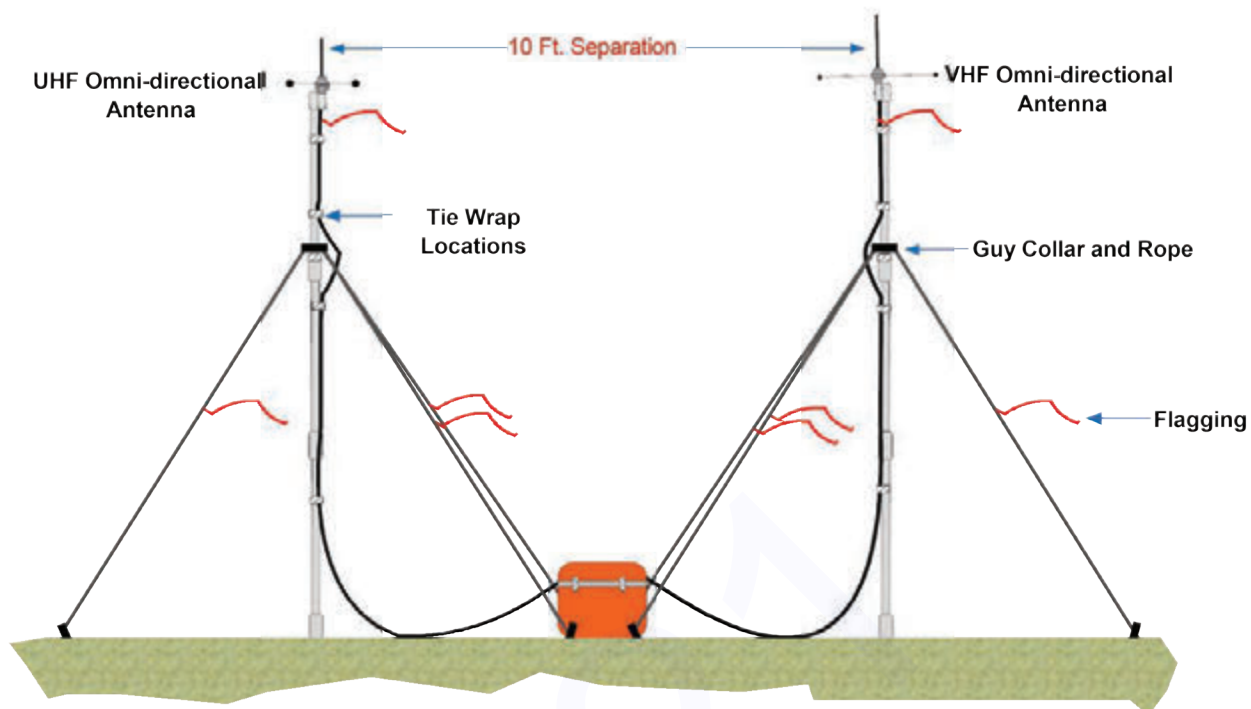


Figure 1:  
4281 - CROSSBAND LINK ANTENNA SETUP

Switch A - VHF Frequency Select	
Position 1	C1 RPTR
Position 2	C2 RPTR
Position 3	C3 RPTR
Position 4	C4 RPTR
Position 5	C5 RPTR
Position 6	C6 RPTR
Position 7	C1 RPTR
Position 8	C1 RX SIMPLEX
Position 9	C2 RX SIMPLEX
Position 10	C3 RX SIMPLEX
Position 11	C4 RX SIMPLEX
Position 12	C5 RX SIMPLEX
Position 13	C6 RX SIMPLEX
Position 14	C1 RX SIMPLEX
Position 15	Special Use
Position 16	Special Use



Switch B - UHF Frequency Select	
Position 1	L1 RPTR
Position 2	L2 RPTR
Position 3	L3 RPTR
Position 4	L4 RPTR
Position 5	L5 RPTR
Position 6	L6 RPTR
Position 7	L7 RPTR
Position 8	L1 RX SIMPLEX
Position 9	L2 RX SIMPLEX
Position 10	L3 RX SIMPLEX
Position 11	L4 RX SIMPLEX
Position 12	L5 RX SIMPLEX
Position 13	L6 RX SIMPLEX
Position 14	L7 RX SIMPLEX
Position 15	Special Use
Position 16	Special Use

Figure 2:  
4281 - CROSSBAND LINK  
AUDIO CONTROL CARD

# 004312 VHF COMMAND REPEATER/LINK SETUP PROCEDURE STAND-ALONE CONFIGURATION

## 1. **Antenna Installation** (See Figure 1)

Setup the VHF Omni-Directional antenna according to the illustration.

- Attach one end of the VHF coax cable to the VHF antenna base, before erecting the antenna mast.

*Note: For detailed antenna installation instructions see the “Antenna Installation Instructions” included in Appendix C.*

## 2. **Coaxial Cable** (See Figure 1)

Attach the VHF coax cable to the appropriate VHF connector on the bulkhead mount on the back of the fiberglass box.

- The bulkhead mount connectors are clearly marked to facilitate proper installation.

## 3. **Battery Supply** (See Appendix B: Battery Configurations)

Connect the supplied batteries to the repeater power adapter.

- The battery and equipment are configured with a **POLARIZED** interconnect plug.

*Note: Reversing polarity will result in an inoperative repeater. The repeater kits are shipped with the polarized plug disconnected and it should be connected before the repeater is turned on.*

Turn the main power switch located on the **SYSTEM MONITOR** Module, to the “**ON**” position.

- If it becomes necessary to replace the batteries, follow the 15 volt battery configuration. (See Appendix B)

## 4. **Tone Selection** (See the Switch Settings Diagram in Appendix D for more details)

Contact the CDO for an appropriate tone.

- **All tones are assigned by the CDO or COMC.**
- Tones are selected for the **VHF TRANSMITTER** and **VHF RECEIVER** modules by selecting the proper position using the “**Switch A**” 16 - position rotary select switch on the **REPEATER CONTROL MODULE**.
- The rotary switch changes **BOTH** the transmit and receive tone on each VHF module.
- **See the Tone Selection List on page 128. “Straight UP” is Position 1. (See Figure 2)**

## 5. **Switch Settings and Testing** (See the Switch Settings Diagram in Appendix D for more details)

Ensure that the **VHF TRANSMITTER** and **RECEIVER** Module switches on the 4312 are in the correct “**NORM**” position as per the “**4312 - VHF Repeater Switch Settings Diagrams**” in Appendix D. While in stand alone configuration, ensure that the **UHF TRANSMITTER** and **UHF RECEIVER** Module switches on the 4312 are in the “**OFF**” position as per the “**4312 - VHF Repeater Switch Settings Diagrams**” in Appendix D. (See Figure 2)

After installation is complete, test the repeater using the appropriate portable radios. Back away from the repeater box a minimum of 25 feet before testing.

## 6. **Final Test**

Close the lid tightly to prevent weather and rodent damage to the equipment.

**Test one FINAL time before leaving the site, to make sure the switches have not been accidentally moved.**

**NIRSC recommends testing with the field units or ICP if possible before leaving the site.**

*Note: A whole system test is preferred, if possible.*

**If any questions arise during installation, please call the CDO at (208)387-5644**

# 004312 VHF COMMAND REPEATER/LINK SETUP PROCEDURE STAND-ALONE CONFIGURATION

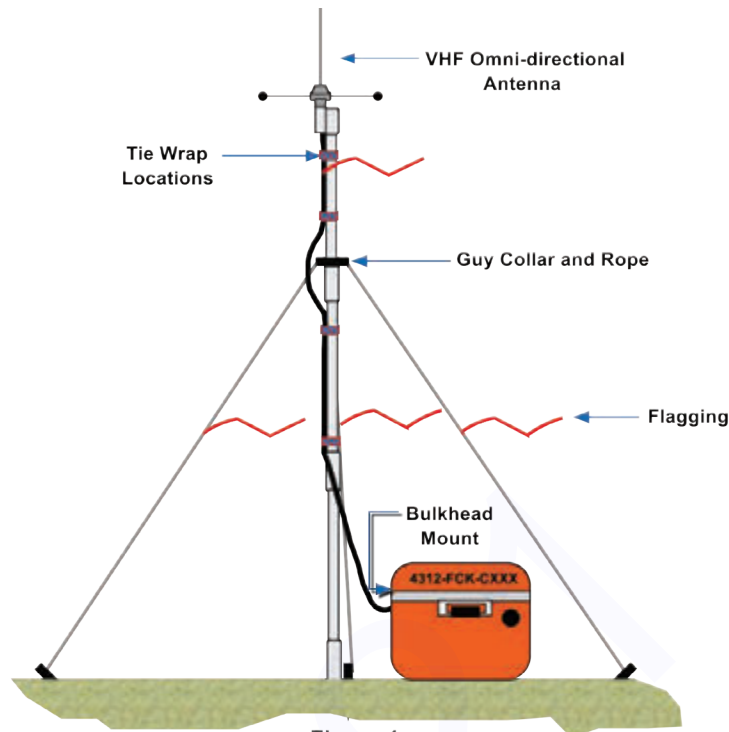


Figure 1:  
4312 - VHF REPEATER ANTENNA SETUP  
STAND-ALONE CONFIGURATION

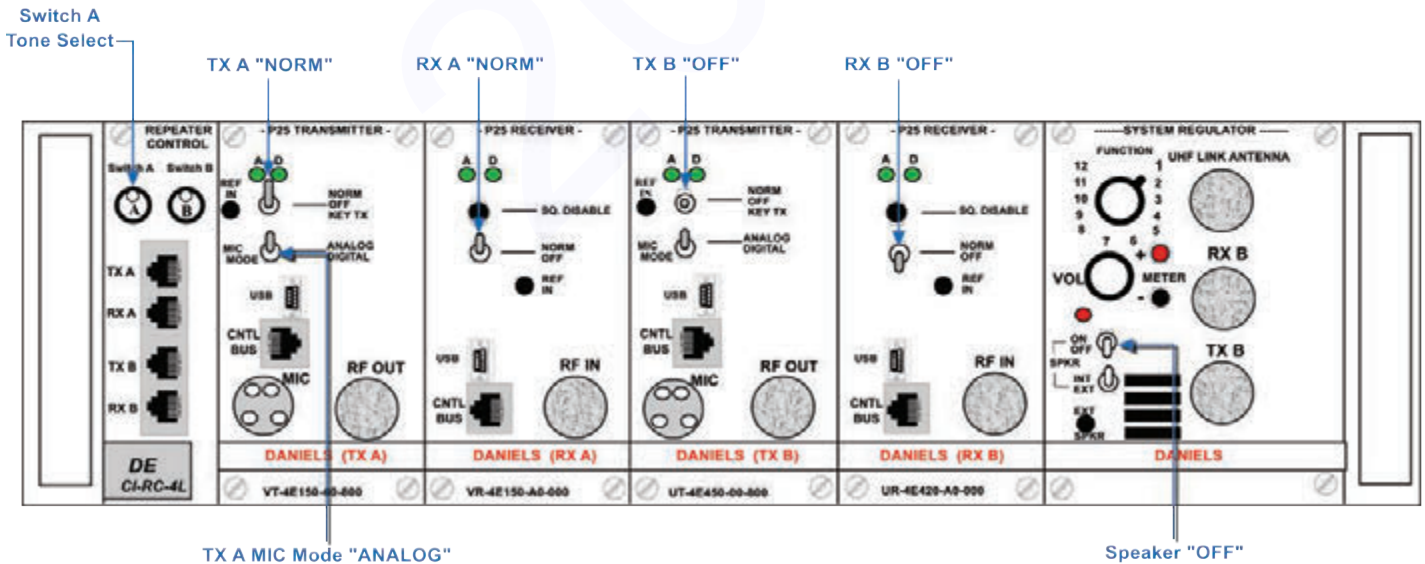


Figure 2:  
4312 - VHF COMMAND REPEATER SWITCH SETTINGS  
STAND-ALONE CONFIGURATION

# 004312 VHF COMMAND REPEATER/LINK SETUP PROCEDURE

## LINK CONFIGURATION

### 1. **Antenna Installation** (See Figure 3)

Setup the VHF Omni-Directional antenna according to the illustration.

- Attach one end of the VHF coax cable to the VHF antenna base, before erecting the antenna mast.

Set up the UHF (Omni-Directional or Yagi) antenna according to the illustration.

- Attach one end of the UHF coax cable to the UHF antenna base, before erecting the antenna mast.

*Note: For detailed antenna installation instructions see the “Antenna Installation Instructions” in Appendix C.*

*Both a Yagi and Omni-directional UHF antenna are provided for linking in each 4312 kit.*

*If more than two VHF repeaters are linked together, NIRSC recommends using the Omni-directional antenna on the UHF links.*

### 2. **Coaxial Cable** (See Figure 3)

Attach the VHF coax cable to the appropriate VHF connector on the bulkhead mount on the back of the fiberglass box.

Attach the UHF coax cable to the appropriate UHF connector on the bulkhead mount on the back of the fiberglass box.

- The bulkhead mount connectors are clearly marked to facilitate proper installation.

### 3. **Battery Supply** (See Appendix B: Battery Configurations)

Connect the supplied batteries to the repeater power adapter.

- The battery and equipment are configured with a **POLARIZED** interconnect plug.

*Note: Reversing polarity will result in an inoperative repeater. The repeater kits are shipped with the polarized plug disconnected and it should be connected before the repeater is turned on.*

Turn the main power switch located on the **SYSTEM MONITOR** Module, to the “ON” position.

- If it becomes necessary to replace the batteries, follow the 15 volt battery configuration. (See Appendix B)

### 4. **Tone Selection** (See the Switch Settings Diagram in Appendix D for more details)

Contact the CDO for an appropriate tone:

- **All tones are coordinated and assigned by the CDO or COMC.**
- Tones are selected for the **VHF TRANSMITTER** and **VHF RECEIVER** modules by selecting the proper position using the “**Switch A**” 16 - position rotary select switch on the **REPEATER CONTROL MODULE**.
- The rotary switch changes **BOTH** the transmit and receive tone on each VHF module.
- **See the Tone Selection List on page 129. “Straight UP” is Position 1. (See Figure 4)**

### 5. **Switch Settings and Testing** (See the Switch Settings Diagram in Appendix D for more details)

Contact the CDO for an appropriate UHF Link frequency.

- **All UHF link frequencies are coordinated and assigned by the CDO or COMC.**

Ensure that the **UHF Transmitter** and **UHF Receiver** Module switches are in the correct, “**NORM**” position as per the “**4312 VHF Repeater Switch Settings Diagrams**” in Appendix D.

- The **UHF TX** and **UHF RX** frequencies are set by selecting the proper position using the “**Switch B**” 16 - position rotary select switch on the **REPEATER CONTROL MODULE**.
- The switch changes **BOTH** the transmit and receive **UHF** frequencies on each UHF module.
- **See the UHF Frequency Selection List on page 129. “Straight UP” is Position 1. (See Figure 4)**

After installation is complete, test the repeater using the appropriate portable radios. Back away from the repeater box a minimum of 25 feet before testing.

### 6. **Final Test**

Close the lid tightly to prevent weather and rodent damage to the equipment.

**Test one FINAL time before leaving the site, to make sure the switches have not been accidentally moved.**

**NIRSC recommends testing with the field units or ICP if possible before leaving the site.**

*Note: A whole system test is preferred, if possible.*

**If any questions arise during installation, please call the CDO at: (208)387-5644**

# 004312 VHF COMMAND REPEATER/LINK SETUP PROCEDURE LINK CONFIGURATION

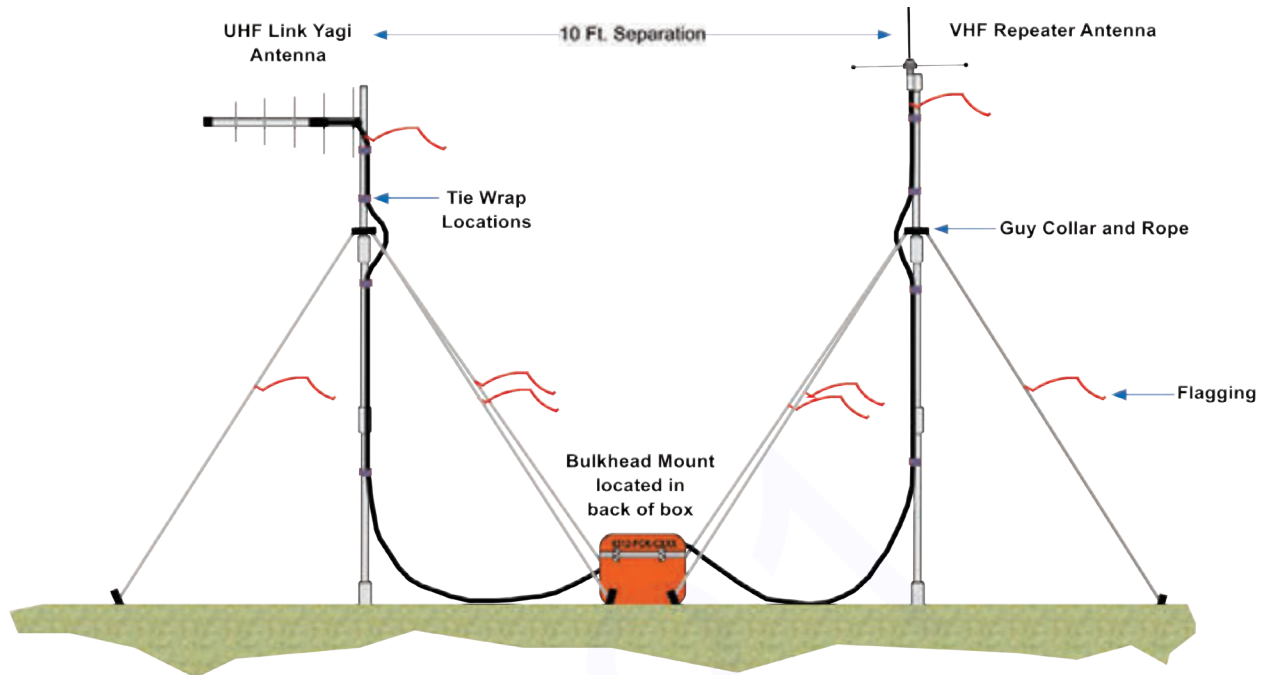


Figure 3:  
4312 - VHF COMMAND REPEATER ANTENNA SETUP  
LINK CONFIGURATION

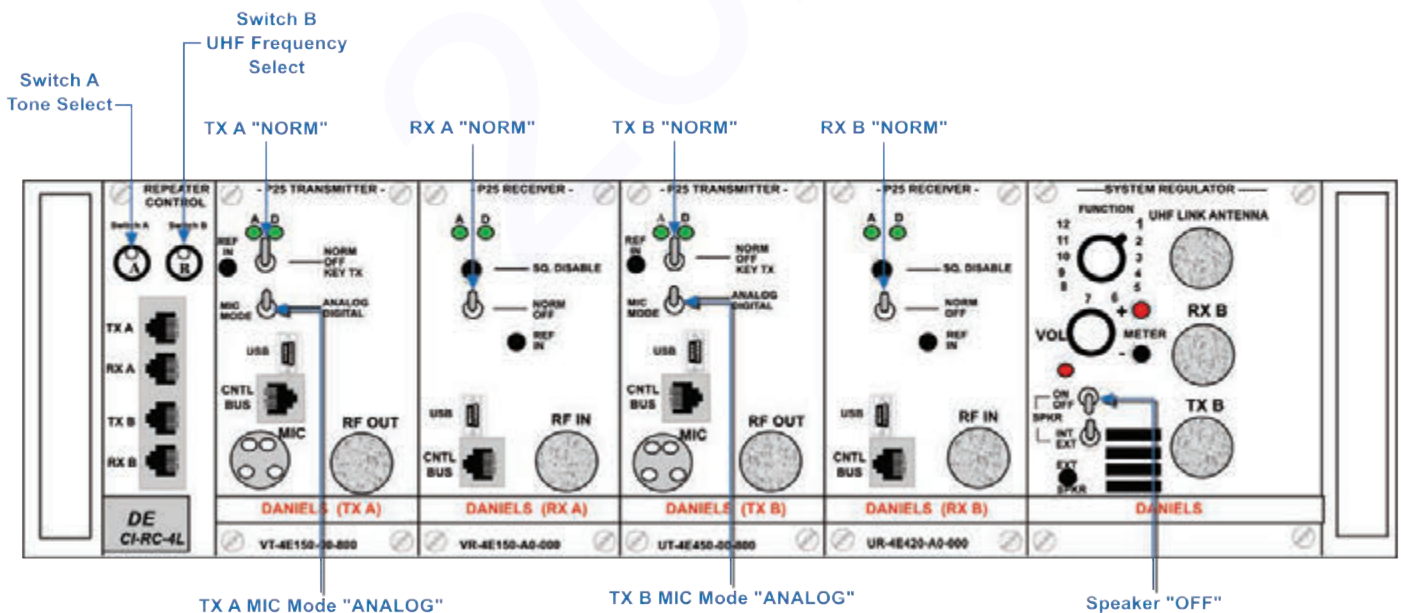


Figure 4:  
4312 - VHF COMMAND REPEATER SWITCH SETTINGS  
LINK CONFIGURATION

# 004300 GROUND VHF-AM BASE STATION SETUP PROCEDURE

## 1. **Antenna Installation:** (See Figure 2)

Connect one end of the antenna cable to the base station antenna. Erect the base station antenna and mast using guy ropes and stakes. Connect the other end of antenna cable to the TBS-150 Ground VHF-AM Base Station.

*Note: For detailed antenna installation instructions, see the "Antenna Installation Instructions" in Appendix C.*

## 2. **Voltage Selection:** (See Figure 1)

The TBS-150 can operate on 115 Volt AC or external 13 Volt DC.

*Note: Never connect both 115 Volt AC and 13 Volt DC at the same time.*

### **For 115 Volt AC:**

- Connect AC power cord to the TBS-150 and 115 Volt AC outlet.
- Turn the TBS-150 AC "ON/OFF" switch to "ON"
- Turn the 91-DE Power "ON/OFF" switch to "ON"

### **For external power/cigarette lighter operation:**

- Connect the 3 pin/cigarette lighter DC power cable into the TBS-150 and to the supplied batteries or cigarette lighter.
- Turn the 91-DE power "ON/OFF" switch to "ON"

*Note: The TBS-150 "AC ON/OFF" switch only operates when 115 Volt AC is used.*

## 3. **Microphone Connection:** (See Figure 1)

Connect the hand mic's 3-pin connector to the 91-DE MIC connector.

PTT operation is from the hand mic.

*Note: DO NOT transmit without the antenna connected.*

## 4. **91-DE Radio Use:** (See Figure 1)

The 91-DE radio is a 760 channel VHF-AM transceiver capable of 10 preset channels plus scanning.

Frequency selection is via the keypad.

Set volume knob to mid-range.

Adjust the squelch knob until squelch just quiets.

*Note: See Operating Instruction book included with the kit for more information.*

## 5. **Other Information:** The TBS-150 has 4 fuses:

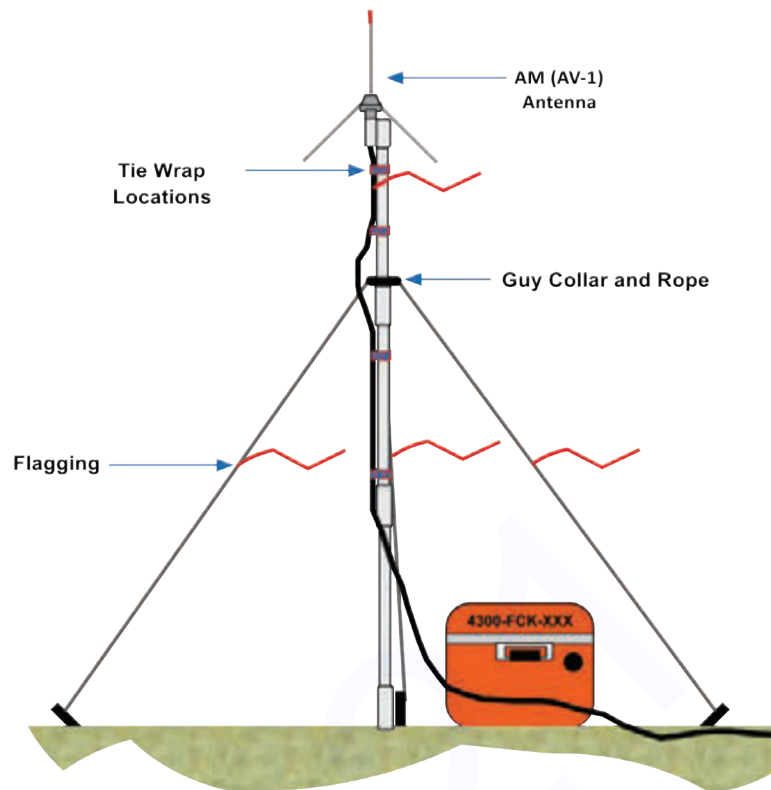
- The 91-DE's fuse is a standard 5 AMP.
- The TBS-150's fuse is a 2.5 AMP MDL.
- THE TBS-150 DC fuse is a mini 5 AMP
- The DC power cord fuse is an overrated 10 AMP fuse and is basically unused, with the TBS-150 relying on the mini 5 A fuse for DC protection.

## 6. **Remote Operation:**

A standard tone remote desk set (not included) will operate the TBS-150.

*Note: This kit is designed for base station use only and shall not be operated in aircraft.*

# 04300 GROUND VHF-AM BASE STATION SETUP PROCEDURE



**Figure 1:**  
4300 - GROUND VHF-AM BASE STATION  
ANTENNA SETUP



**Figure 2:**  
TBS-150 Base Station  
(Located in building or Tent)

# 004330 - REMOTE KIT SETUP PROCEDURE

## 1. Antenna Installation: (See Figure 1)

- Select an antenna installation location within line-of-sight of the target Repeater or Link
- Setup the appropriate antenna (UHF omni, VHF omni, or UHF Yagi) according to the illustration.
- Attach one end of the coax cable to the appropriate antenna base before erecting the antenna mast.

*Note: For detailed antenna installation instructions, see the "Antenna Installation Instructions" in Appendix C.*

## 2. Radio Setup:

- Remove the grey metal remote chassis enclosure from the fiberglass box and determine the appropriate radio to use.
- Connect power to the appropriate radio by using either the provided 7.5 Volt batteries or an external battery source. (See Figure 3 and 4)
- Connect the male BNC side of the radio RF adapter cable to the female BNC side mount.
- Connect the male MIL-Spec connector to the corresponding female side mount.
- Turn the radio on and select the appropriate group and channel to operate on.
- Adjust the radio volume to set the **pre-designated mark** on the top of the radio, adjust the squelch to desired level if necessary.
- Use the low power transmit setting to conserve batteries and over-heating of the radio.
- Strap the radio into place on top of the black DC Termination Panel with the provided straps.
- Connect the other end of the antenna coax cable from step one to the RF connector on the outside of the grey chassis enclosure.

*Note: A fused DC 5 AMP, 2-Prong cable is provided for external power. This cable connects directly to the outside of the enclosure. All NIRSC VHF or UHF radios used in the remote require +10.0 volts to +15.0 volts to operate.*

## 3. Remote Desk Set Setup:

- Remove the CPI remote desk set from the fiberglass box, along with 2 each 7.5 Volt batteries (NFES# 1023, the power cables, and the external speaker.
- Find a desired location to set up the remote desk set.
- Connect power to the desk set. (DC Power or AC Power)
  - **DC power** - connect the 7.5 Volts batteries to the CPI remote desk set using the provided wire assembly (Fused DC 5 AMP, 2-Prong Cable). (See Figure 2)
  - **AC power** - use the provided AC-DC Transformer to power the CPI remote desk set.
- Connect the external speaker directly to the side audio jack of the CPI remote desk set, if desired.

*CAUTION: Observe correct polarity when using batteries.*

*The CPI remote desk set operates on + 12.0 V and up to +15.0 Volts.*

## 4. Field Wire Setup: (See Figure 4)

- String the communications field from the grey chassis enclosure back to the remote desk set location.
- Strip and attach the wires directly to the binding on the back on the CPI remote set (**not polarity dependent**).
- Strip and attach the wires directly to the bindings on the front of the grey chassis enclosure.

## 5. Final Test:

- Adjust the volume on the remote desk set to desired level.
- Test and verify proper operation of the remote with field units.

*Note: It is preferred to keep the enclosure inside the fiberglass box during normal operation to further protect the enclosure from the elements.*

If questions arise during installation, please contact the CDO at: (208)387-5644

# 004330 - REMOTE KIT SETUP PROCEDURE

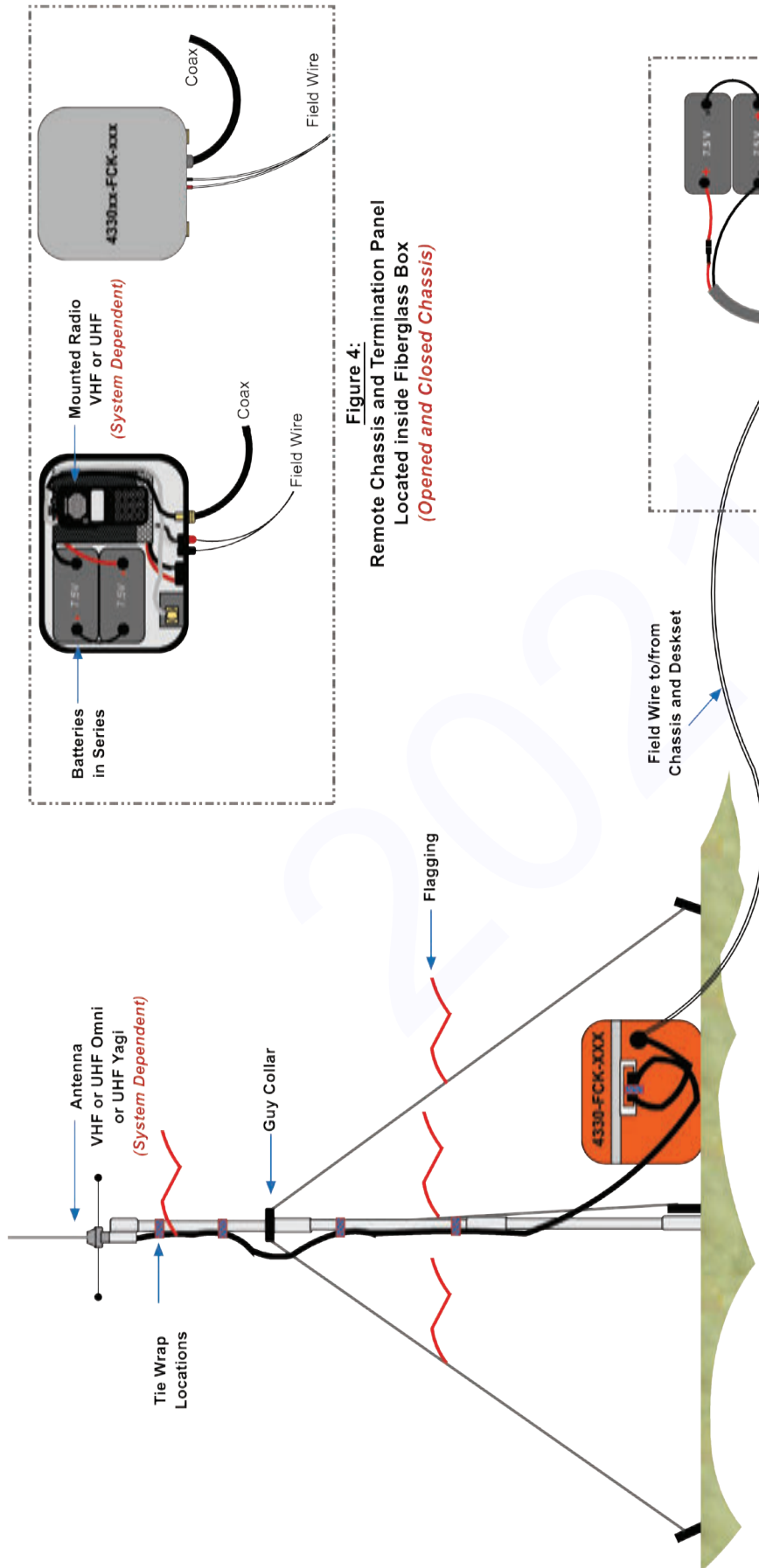


Figure 1:  
4330 - Complete Remote Setup

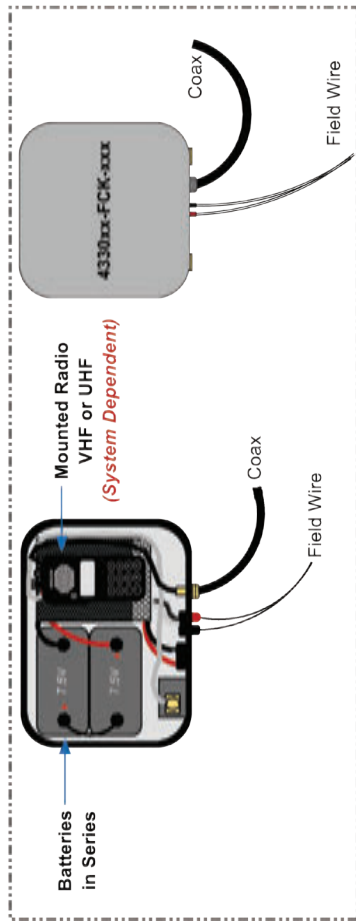


Figure 4:  
Remote Chassis and Termination Panel  
Located inside Fiberglass Box  
(Opened and Closed Chassis)

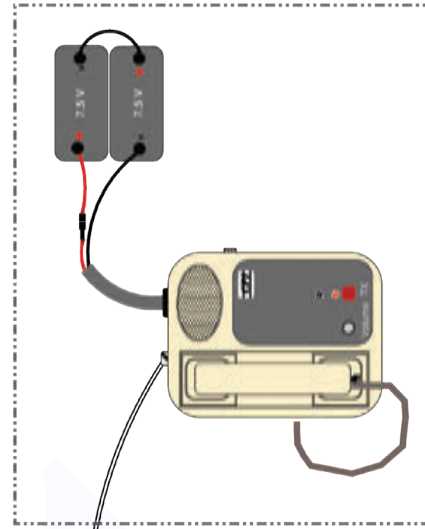


Figure 2:  
CPI DC Remote Connections Located in COMM  
Operating on DC Power

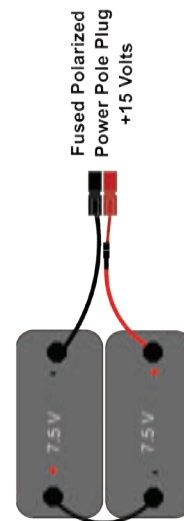


Figure 3:  
Two 7.5 Volt Batteries in Series

# 4330EX - REMOTE EXPANSION KIT SETUP PROCEDURE SCENARIO 1

## 1. Antenna Installation: (See Figure 1)

- Set up the antenna according to the 4330 Remote Kit Setup Procedure documentation  
*Note: For detailed antenna installation instructions, see the "Antenna Installation Instructions" in Appendix C.*

## 2. Radio Setup:

- Set up the radios according to the 4330 Remote Kit Setup Procedure documentation.

## 3. Remote Desk Set Setup:

- Set up the Remote Desk set according to the 4330 Remote Kit setup procedure.

## 4. Field Wire Setup: (See Figures 1, 2, 3 and 4)

- String the communications field wire from the grey chassis enclosure back to each remote desk set location.
- Strip and attach each field wire directly to the binding on each of the CPI remote desk sets (**not polarity dependent**).
- Strip and attach the field wires in parallel directly to the binding posts on the front of the grey chassis enclosure.

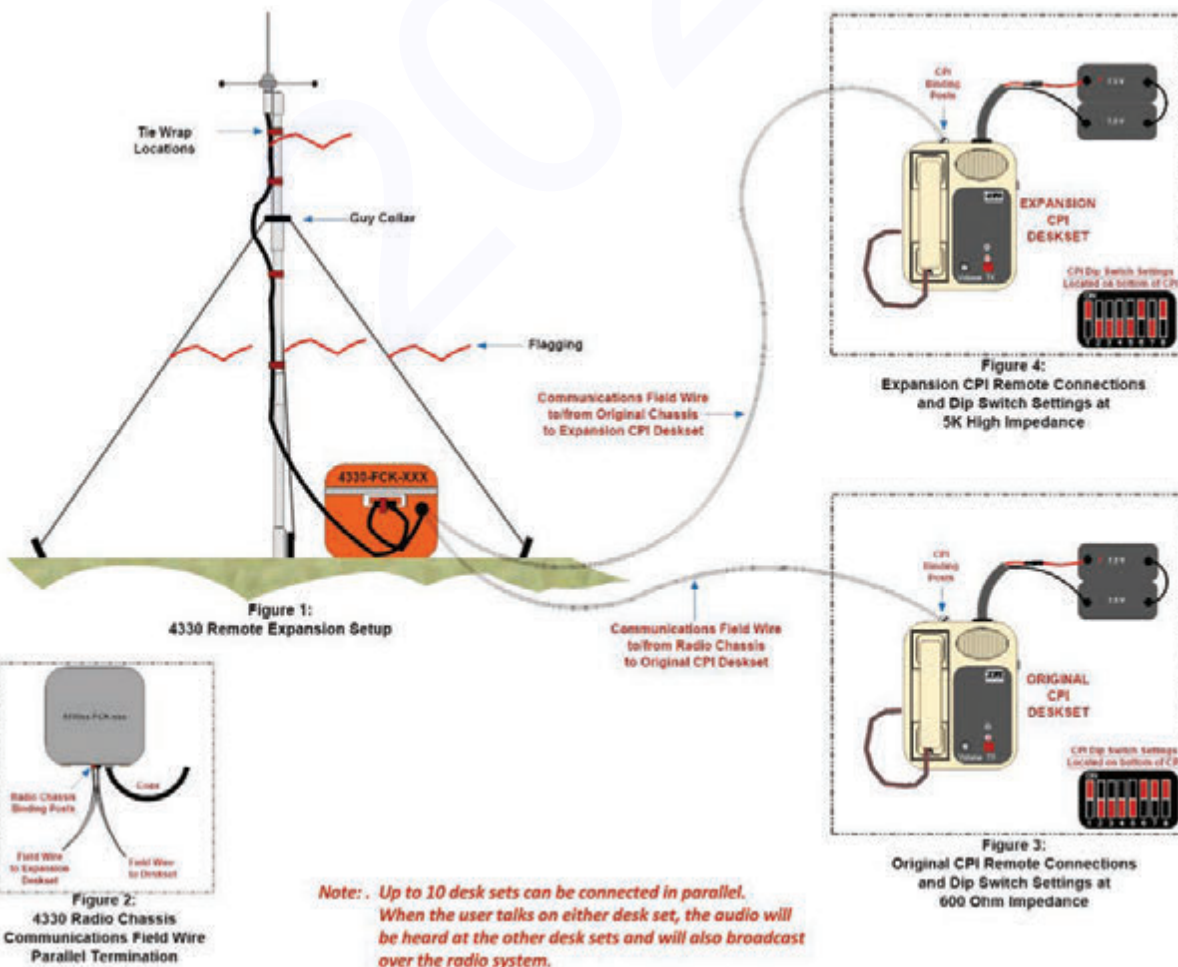
## 5. Deskset Switch Settings:

- Verify the original 4330 desk set dip switches, located on the bottom of the CPI, are set to 600 Ohm Impedance operation. (See Figure 3)
- Verify the 4330EX desk set dip switches, located on the bottom of the EX CPI, are set to 5K High Impedance operation. (See Figure 4)

## 6. Final Test:

- Adjust the volume on the remote desk set to desired level.
- Test and verify proper operation of the remote with field units.

If questions arise during installation, please contact the CDO at: (208)387-5644



# 4330EX - REMOTE EXPANSION KIT SETUP PROCEDURE SCENARIO 2

## 1. Antenna Installation: (See Figure 1)

- Set up the antenna according to the 4330 Remote Kit Setup Procedure documentation

## 2. Radio Setup:

- Set up the radios according to the 4330 Remote Kit Setup Procedure documentation.

## 3. Remote Desk Set Setup:

- Set up the Remote Desk set according to the 4330 Remote Kit setup procedure.

## 4. Field Wire Setup: (See Figures 1, 2, 3 and 4)

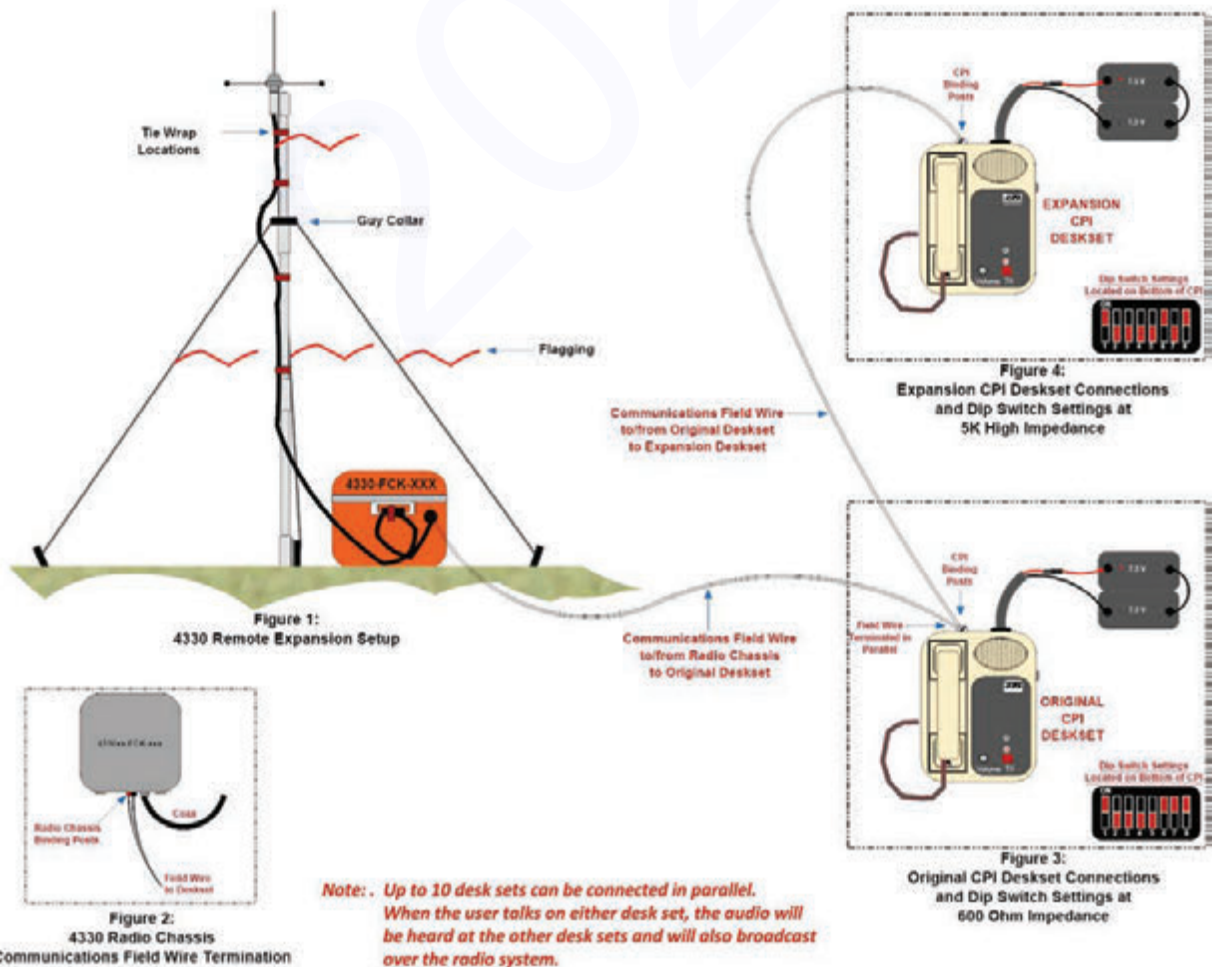
- String the communications field from the grey chassis enclosure back the original 4330 remote desk set location.
- Strip and attach the field wire directly to the binding post on the front of the grey chassis enclosure (not polarity dependent). (See Figure 2)
- String communications field wire from the original desk set location to the expansion desk set location.
- Strip and attach the field wire in parallel to the binding post of the Original CPI remote desk set. (See Figure 3)
- Strip and attach the field wire to the binding post of the Expansion CPI desk set (not polarity dependent). (See Figure 4)

## 5. Deskset Switch Settings:

- Verify the original 4330 desk set dip switches, located on the bottom of the CPI, are set to 600 Ohm Impedance operation. (See Figure 3)
- Verify the 4330EX desk set dip switches, located on the bottom of the EX CPI, are set to 5K High Impedance operation. (See Figure 4)

## 6. Final Test:

- Adjust the volume on the remote desk set to desired level.
- Test and verify proper operation of the remote with field units.



# 004370 - GROUND AIRCRAFT RADIO/LINK KIT SETUP PROCEDURE BASE CONFIGURATION

## 1. Antenna Installation:

Setup the AV-1 (AM) aircraft antenna according to the illustration. *(See Figure 1)*

- Attach one end of the AM coax cable to the AM antenna base, before erecting the antenna mast.

*Note: For detailed antenna installation instructions see the "Antenna Installation Instructions" in Appendix C.*

## 2. Coaxial Cable:

Attach the AM coax cable to the appropriate AM connector on the bulkhead mount on the back of the fiberglass box.

- The bulkhead mount connectors are clearly marked to facilitate proper installation.

## 3. Battery Supply:

Connect the supplied batteries to the Air Craft Link power adapter.

- The battery and equipment are configured with a **POLARIZED** interconnect plug.

*Note: Reversing polarity will result in an inoperative repeater. The repeater kits are shipped with the polarized plug disconnected and it should be connected before the repeater is turned on.*

- If it becomes necessary to replace the batteries, follow the 15 volt battery configuration. *(See Appendix B)*

*Note: There is no master power switch. Once the power cable is connected, all modules are receiving voltage but each module needs to be individually turned "ON" to operate.*

## 4. Switch Settings:

- Keep both **CTCSS** switches located on the **Audio Control Module** in the "OFF" (**down**) position.
- Keep the power switches on both the **TX A** and **RX A** in "NORM" position.
- Keep the power switches on both the **TX B** and **RX B** in "OFF" position.
- Keep the **Audio Select Switch** on the **System Monitor Module** in the "A" position to activate the internal speaker and place the rotary switch on the **System Monitor to position # 1**.

*Note: The External Speaker may be used by connecting the speaker leads to the System Monitor "METER" jacks. Observe correct polarity. Place the rotary switch on the System Monitor to position #1 for External Speaker ONLY, and turn the System Monitor rotary volume knob to desired level.*

## 5. AM Frequency Select:

Select the authorized assigned **AM** frequency for **TX A** and **RX A** using the 16-position rotary **Switch A** (top rotary switch) on the **Audio Control Module**. *(See Figure 2)*

### Manual AM Frequency Programming: (Channel 16 only)

*Note: The Communications Duty Officer (CDO) will assign the authorized FAA-issued AM Frequency. Channel 16 is the only channel available for manual programming.*

- Turn rotary **Switch A** (top 16-position rotary switch) on the **Audio Control Module** to Channel 16.
- Unlock each unit by pressing the " \* " button and, before the "Locked" display goes blank, press the "DOWN" arrow button. The display should now show "Unlocked".
- Wait for the display to go blank, then press either the "UP" or "DOWN" arrow button to display the current programmed frequency.
- While the display is showing the frequency, press and hold either the "UP" or "DOWN" arrow button until the desired frequency is reached.

*Note: The longer the "UP" and "DOWN" arrow buttons are held, the faster the unit will scroll through the frequencies.*

- Lock each unit by pressing the " \* " button, and before the "Unlocked" display goes blank, press the "UP" arrow button. The display should now show "Locked".

*Note: The AM transmitter and receiver modules must each be individually programmed.*

## 6. Connect the microphone to the "MIC" jack on the **AM TX A**.

## 7. Close the lid tightly to prevent weather and rodent damage to the equipment.

**Test one FINAL time before leaving the site, to make sure the switches have not been accidentally moved. NIRSC recommends testing with the field units or ICP if possible before leaving the site.**

**If questions arise during installation, please contact the CDO at: (208)387-5644**

# 004370 - GROUND AIRCRAFT RADIO/LINK KIT SETUP PROCEDURE BASE CONFIGURATION

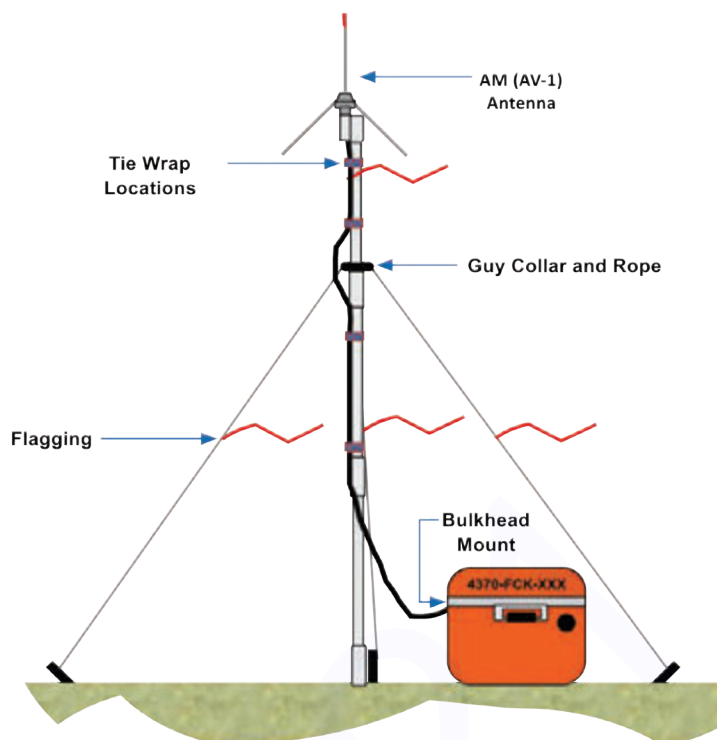


Figure 1:  
4370 GROUND AIRCRAFT RADIO/LINK AM ANTENNA SETUP  
BASE CONFIGURATION

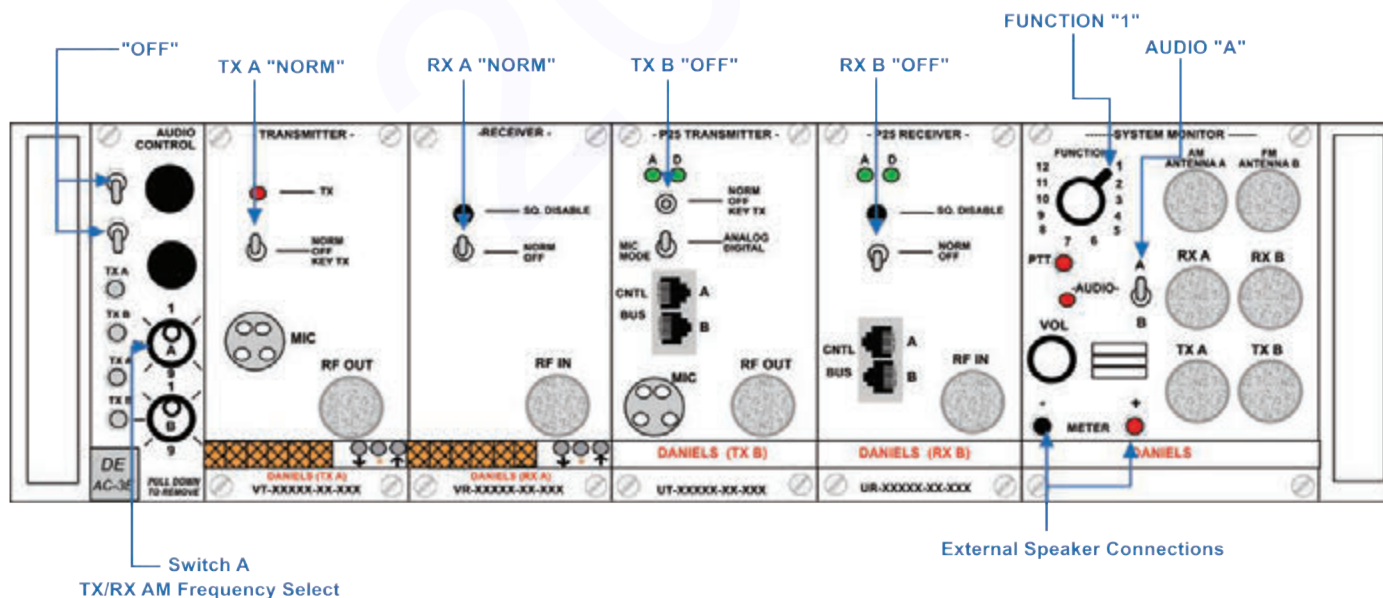


Figure 2:  
4370 GROUND AIRCRAFT RADIO/LINK SWITCH SETTINGS  
BASE CONFIGURATION

# 004370 - GROUND AIRCRAFT RADIO/LINK KIT SETUP PROCEDURE

## LINK CONFIGURATION

### 1. **Antenna Installation:**

Setup the AV-1 (**AM**) Antenna according to the illustration. *(See Figure 3)*

Setup the UHF omni-directional antenna according to the illustration. *(See Figure 3)*

*Note: For detailed antenna installation instructions see the "Antenna Installation Instructions" in Appendix C.*

### 2. **Coaxial Cable** *(See Figure 3)*

Attach the AM coaxial cable to the appropriate connector on the bulkhead mount on the back of the fiberglass box.

Attach the UHF coaxial cable to the appropriate connector on the bulkhead mount on the back of the fiberglass box.

- The bulkhead mount connectors are clearly marked to facilitate proper installation.

### 3. **Battery Supply:**

Connect the supplied batteries to the Air Craft Link power adapter.

- The battery and equipment are configured with a **POLARIZED** interconnect plug.

*Note: Reversing polarity will result in an inoperative repeater. The repeater kits are shipped with the polarized plug disconnected and it should be connected before the repeater is turned on.*

- If it becomes necessary to replace the batteries, follow the 15 volt battery configuration. *(See Appendix B)*

*Note: There is no master power switch. Once the power cable is connected, all modules are receiving voltage but each module needs to be individually turned "ON" to operate.*

### 4. **Switch Settings:**

- Keep both the **CTCSS** switches located on the **Audio Control Module** in the "**OFF**" (**down**) position.
- Keep the power switches on the **TX A**, **RX A**, **TX B**, and **RX B** in the "**NORM**" position.
- Keep the **MIC MODE** on the **TX B** in the "**ANALOG**" position.
- Keep the **A/B Audio** Select Switch on the **System Monitor Module** at the center position.

### 5. **AM Frequency Select:**

Select an authorized assigned **AM frequency** for both the **TX A** and **RX A** using the 16-position rotary **Switch A** (top rotary switch) on the **Audio Control Module**. *(See Figure 4)*

#### **Manual AM Frequency Programming: (Channel 16 Only)**

*Note: The Communications Duty Officer (CDO) will assign the authorized FAA-issued AM Frequency.*

- Turn rotary **Switch A** (top 16-position rotary switch) on the **Audio Control Module** to Channel 16.
- Unlock each unit by pressing the "\*" button and, before the "**Locked**" display goes blank, press the "**DOWN**" arrow button. The display should now show "**Unlocked**".
- Wait for the display to go blank, then press either the "**UP**" or "**DOWN**" arrow button to display the current programmed frequency.
- While the display is showing the frequency, press and hold either the "**UP**" or "**DOWN**" arrow button until the desired frequency is reached.
- Lock each unit by pressing the "\*" button and before the "**Unlocked**" display goes blank, press the "**UP**" arrow button.

*Note: The AM transmitter and receiver modules must be individually programmed.*

### 6. **UHF Frequency Select:**

Select the authorized assigned **FM UHF Link frequency** for both the **TX B** and **RX B** using the 16-position rotary **Switch B** (bottom rotary switch) on the **Audio Control Module**. *(See Figure 4)*

*Note: The Communications Duty Officer (CDO) will assign the appropriate FM UHF link frequency.*

*See the frequency chart for corresponding UHF channel locations, included in the kit.*

### 7. **Final Test:**

Close the lid tightly to prevent weather and rodent damage to the equipment.

**Test one FINAL time before leaving the site, to make sure the switches have not been accidentally moved.**

**NIRSC recommends testing with the field units or ICP if possible before leaving the site.**

**If questions arise during installation, please contact the CDO at: (208)387-5644**

# 004370 - GROUND AIRCRAFT RADIO/LINK KIT PROCEDURE LINK CONFIGURATION

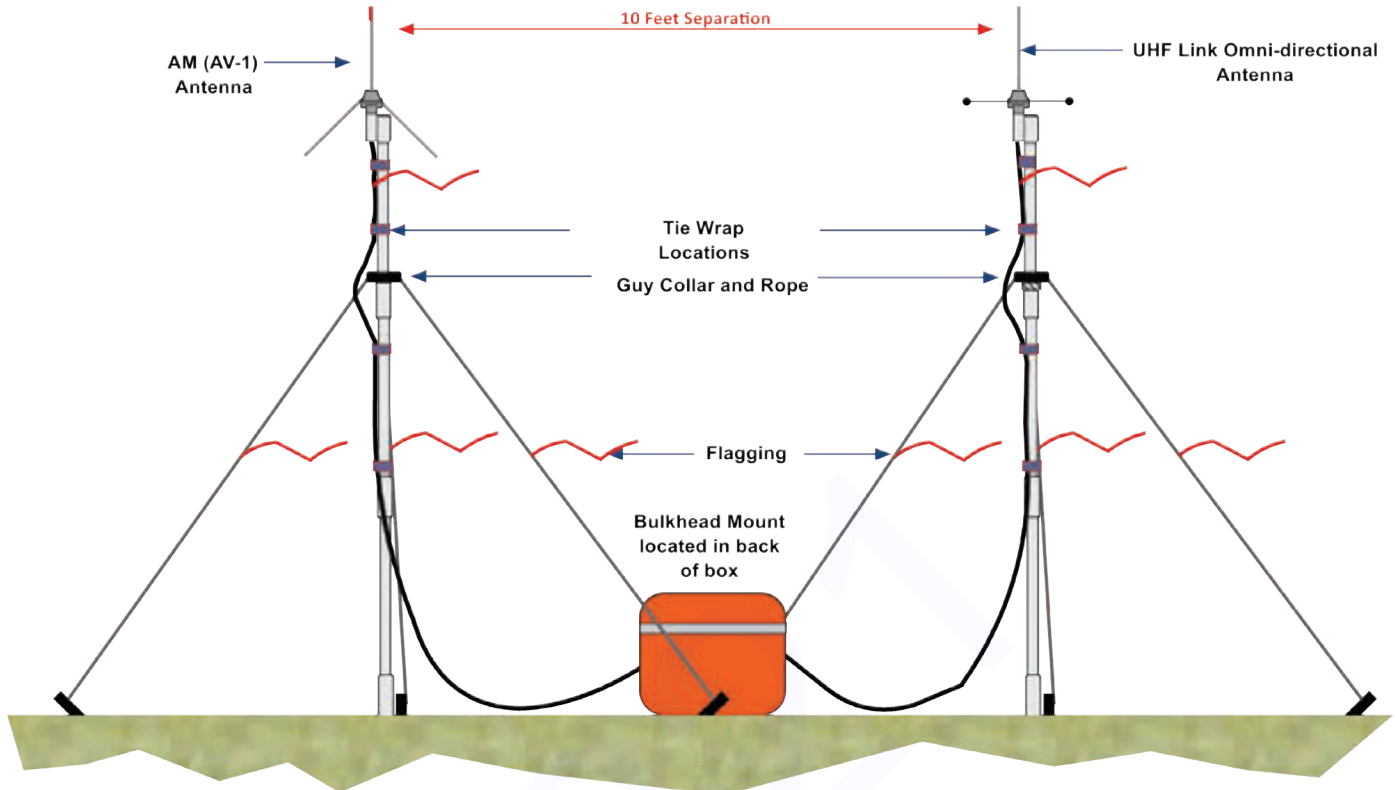


Figure 3:  
4370 GROUND AIRCRAFT RADIO/LINK ANTENNA SETUP  
LINK CONFIGURATION

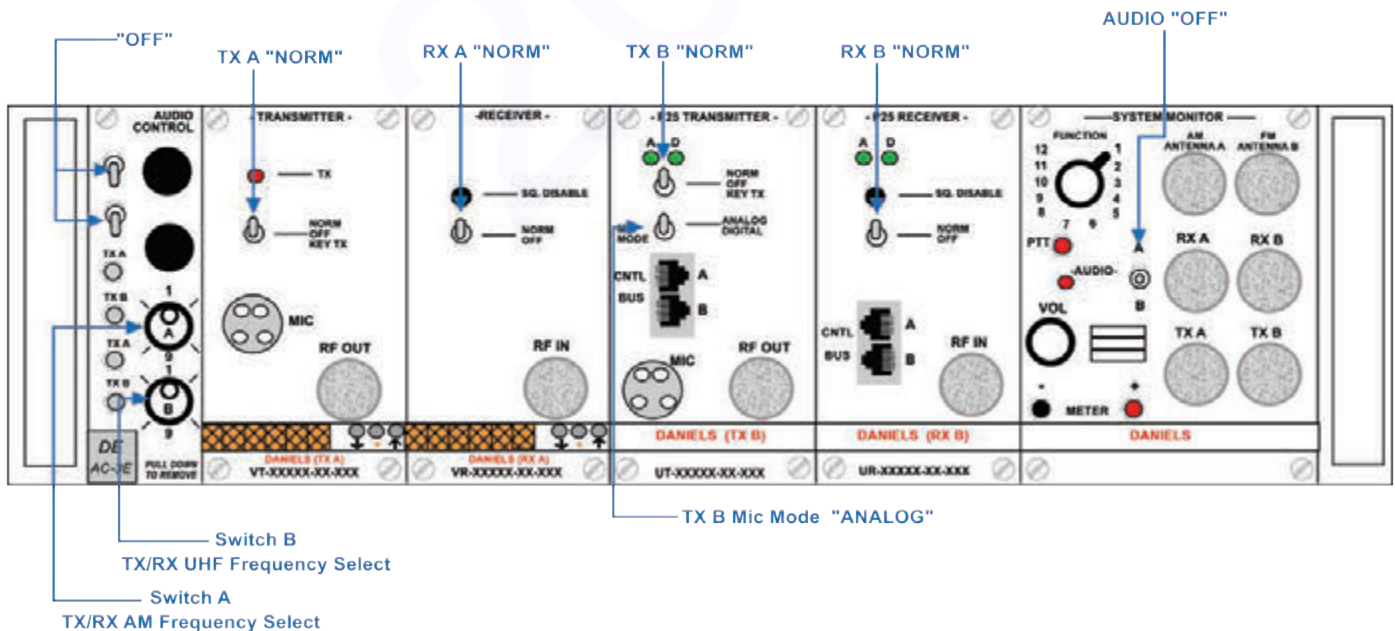
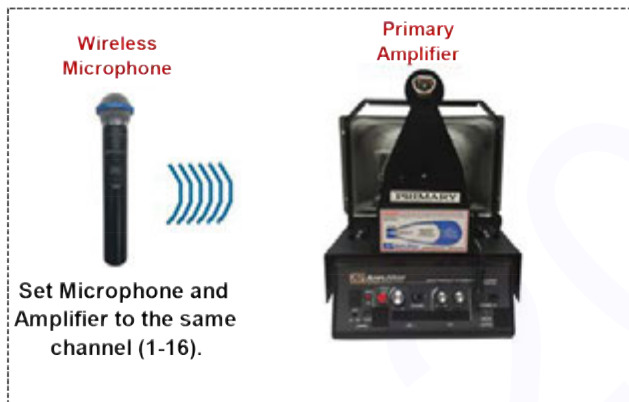


Figure 4:  
4370 GROUND AIRCRAFT RADIO/LINK SWITCH SETTINGS  
LINK CONFIGURATION

# 004410 PUBLIC ADDRESS KIT SETUP PROCEDURE

## Primary Amplifier Only:

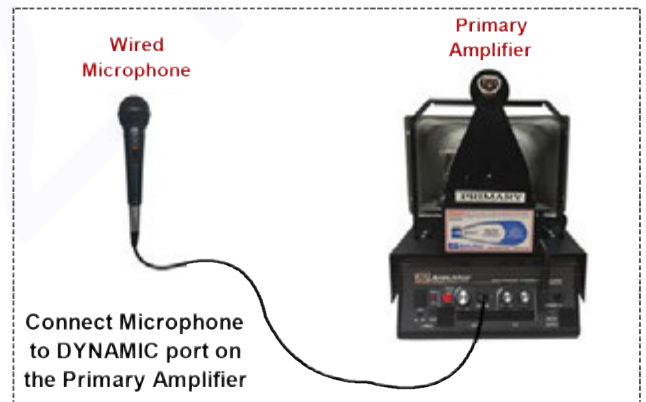
1. Power
  - Use **EITHER** AC power supply **OR** 10 D Cell batteries for power.  
*Note: For AC power supply, plug cable into the “DC IN” port on the Primary Amplifier.*
2. Wireless Option *(See Figure 1)*
  - Set UHF WIRELESS RECEIVER on Primary Amplifier and Microphone to the same channel.  
*Note: The channel selector for the UHF WIRELESS RECEIVER is located on the side of the Primary Amplifier.*
  - Move Primary Amplifier “AUX” switch to the “ON” position.
  - On wireless microphone, press and hold “POWER/MUTE” button to turn ON or OFF.  
*Note: To change channels on the wireless microphone, remove the battery cover, press and hold “SELECT” button until “CHANNEL” is selected on the display, and then press “SELECT” button to select channel. Once the desired channel is selected, wait a few second for the display to stop blinking.*
  - Adjust “MIC VOLUME” to desired level while voice testing.
3. Wired microphone option *(See Figure 2)*
  - Plug wired microphone cable into the “DYNAMIC” port.
  - Move Primary Amplifier “AUX” switch to the “ON” position.
  - Adjust “MIC VOLUME” to desired level while voice testing.



**Figure 1**

**Primary Amplifier Using Wireless Microphone**

OR

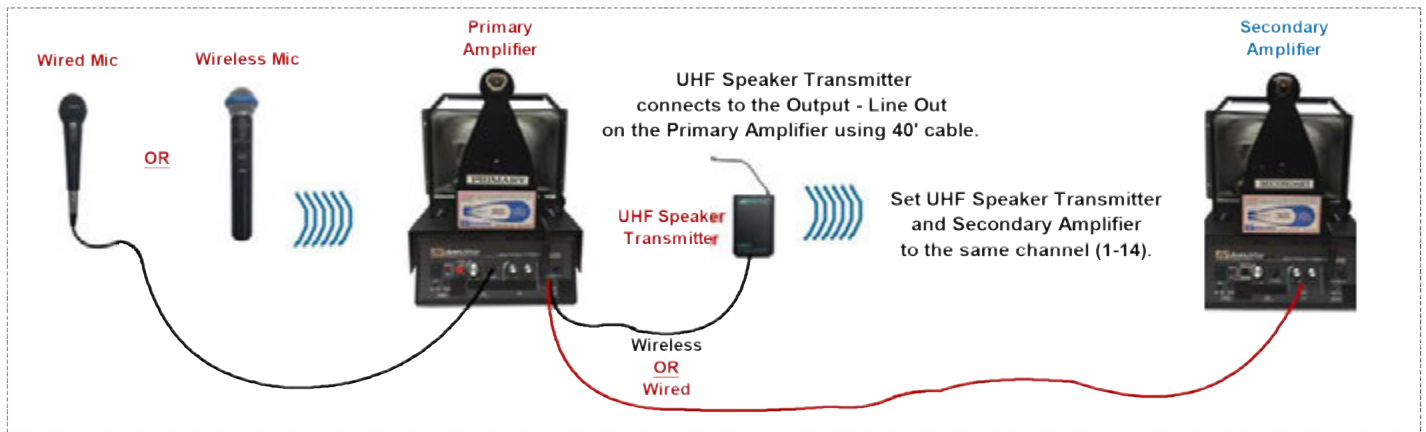


**Figure 2**

**Primary Amplifier Using Wired Microphone**

## Adding A Secondary Amplifier

1. Power
  - Use **EITHER** AC power supply **OR** 10 D Cell batteries for power on each Primary and Secondary Amplifier.  
*Note: For AC power supply, plug cable into the “DC IN” port on each Amplifier.*
2. Wireless Option *(See Figure 3)*
  - Connect the UHF Speaker Transmitter to the “LINE OUT” on the Primary Amplifier using the 40’ cable
  - Set the UHF Speaker Transmitter and Secondary Amplifier to the same channel (1-14), and switch both units on.  
*Note: The switches for the Secondary Amplifier’s UHF WIRELESS RECEIVER are located on the side of the unit.*
  - Move Secondary Amplifier “AUX” switch to the “ON” position.
  - Adjust the “MIC VOLUME” on the Secondary Amplifier to desired level while voice testing
3. Wired microphone option *(See Figure 3)*
  - Connect Primary Amplifier “LINE OUT” to Secondary Amplifier “LINE IN” using the 40’ cable.
  - Move Secondary Amplifier “AUX” switch to the “OFF” position.
  - Adjust the “AUX VOLUME” and “TONE” on the Secondary Amplifier to desired levels while voice testing.



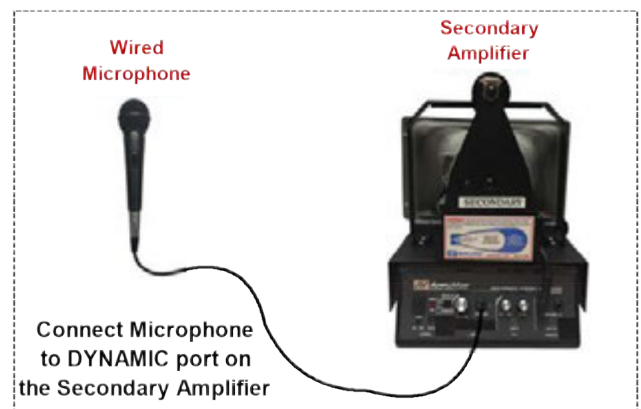
**Figure 3**  
Adding a Wireless or Wired Secondary Amplifier

### Using Both Amplifiers Independently

1. Power
  - Use EITHER AC power supply OR 10 D Cell batteries for each Amplifier.  
*Note: For AC power supply, plug cable in "DC IN" on the Primary and Secondary Amplifier.*
2. Primary Amplifier with wireless microphone *(See Figure 4)*
  - Set UHF WIRELESS RECEIVER on Primary Amplifier and Microphone to the same channel.  
*Note: The channel selector for the UHF WIRELESS RECEIVER is located on the side of the Primary Amplifier.*
  - Move Primary Amplifier "AUX" switch to the "ON" position.
  - On wireless microphone, press and hold "POWER/MUTE" button to turn ON or OFF.  
*Note: To change channels on the wireless microphone, remove the battery cover, press and hold "SELECT" button until "CHANNEL" is selected on the display, and then press "SELECT" button to select channel. Once the desired channel is selected, wait a few second for the display to stop blinking.*
  - Adjust "MIC VOLUME" to desired level while voice testing.
3. Secondary Amplifier with wired microphone *(See Figure 5)*
  - Plug wired microphone into the "DYNAMIC" port on Secondary Amplifier
  - Move Secondary Amplifier "AUX" switch to the "OFF" position.
  - Adjust the Secondary Amplifier "MIC VOLUME" to desired level while voice testing



**Figure 4**  
Independently Primary Amplifier  
with Wireless Microphone



**Figure 5**  
Independently Secondary Amplifier  
with Wired Microphone

# 004499 - AIR ATTACK KIT SETUP PROCEDURE

The NFES# 004499 Air Attack Kit is compact slip-in radio kit providing multiple VHF-FM radios for missions ranging from simple reconnaissance to complex Air Attack. The kit has two VHF-FM radios, two AUX-FM connections, and supports up to four operators. The kit operates on either 14 Volts DC or 28 Volts DC. Storage compartments in the kit hold no equipment.

## 1. **Kit Security:**

The NFES# 004499 Air Attack Kit must be secured for safe flight using the kit's two silver "D" handles and the supplied adjustable straps. Secure the kit to any rigid structure in the cockpit (using common sense and keeping safety in mind).

## 2. **Voltage Selection:**

The NFES# 004499 Air Attack Kit has automatic voltage selection for 14 Volts DC or 28 Volts DC. Automatic voltage selection is dependent upon the aircraft's power connector supplying the correct voltage to the Air Attack Kit.

## 3. **Aircraft Power and Audio Connections:**

Aircraft must have an MS3112E12-3S (female) power connector (ground on pin B, and 14 Volts on pin C or 28 Volts on pin A). Only 14 or 28 Volts DC need be wired in the aircraft, **never wire both**. Attach power jumper cable from kit to MS3112E12-3S power connector in aircraft. Attach audio/mic jumper cable from kit to pilot's audio and mic jacks. **Aircraft mic jack must have PTT capability.**

## 4. **Antenna Connections:**

Aircraft must have a minimum of two broadband VHF-FM aviation antennas installed (Comant type CI 177-1 or equivalent), using RG-58 A/U or better coax cable terminated with male BNC connectors. Connect the first two aircraft VHF-FM antenna cables to the kit's RADIO 1 ANT and RADIO 2 ANT connectors. A third or fourth aircraft VHF-FM antenna(s) connected to the AUX1 and AUX2 connections.

## 5. **TDFM-136 Radio Use:**

Operation and programming instructions are provided with the kit. Visit NIICD's website for up-to-date radio instructions at: [www.nifc.gov/NIICD/documents.html](http://www.nifc.gov/NIICD/documents.html)

*Note: FM 1 MAIN/GUARD (upper radio) and FM 2 MAIN (lower radio) may be reprogrammed to suit user needs. FM 2 GUARD preset is locked out and must never be reprogrammed. FM 2 GUARD is dedicated to Air Guard operation (168.6250 - the emergency frequency).*

## 6. **AUX-FM Connections:**

Two AUX-FM connectors are located at the rear of the kit.

*Note: These connectors allow handheld radios to be operated through the kits's audio selector panels as AUX1 and AUX2. The user must supply a handheld radio and matching AUX-FM adapter cable. Use the supplied female BNC barrel connectors to mate the AUX-FM radio adapter to aircraft antenna cable for AUX-FM operation. Any type handheld radio using any frequency band may be used (dependent upon the installed aircraft antenna's frequency band capability).*

## 7. **Audio Selector Panel:**

The TAC-250 is a dual audio selector panel for the pilot (left) and ATGS (right). Two observer positions operate off the ATGS's audio selector panel. Attach observer headset adapter cord assemblies at the rear of the kit. Observer positions have the same radio receive, transmit, and VOX capability as selected by the ATGS's audio selector panel.

# 004499 - AIR ATTACK KIT SETUP PROCEDURE

## 7. Audio Selector Panel Continued:

### Transmitter Radio Selections:

1. **COM** uses the aircraft's audio control system selector via the kit's audio/mic jumper cable
2. **FM1** is for upper VHF-FM radio (beside the TAC-250)
3. **FM2** is for the lower VHF-FM radio
4. **AUX1** is for the AUX-FM 1 connector
5. **AUX2** is for the AUX-FM 2 connector
6. **SC** is simulcast transmissions using **COM** and **FM1** radios. SC transmits on both radios simultaneously.

*Note: The pilots' audio selector panel has transmit priority over the ATGS's audio selector panel when they both have the same radio selected on their respective transmitter selector switches.*

*Keep in mind there are three transmitter selector switches:*

- (1) TAC-250 transmitter selector knob;*
- (2) TDFM-136 radio MAIN & GUARD switch; and*
- (3) the aircraft's audio control selector panel switch.*

### Receiver Audio Selections:

1. **COM** uses the aircraft's audio control system selector via the kit's audio/mic jumper cable
2. **FM1** is for upper VHF-FM radio (beside the TAC-250)
3. **FM2** is for the lower VHF-FM radio
4. **AUX1** is for the AUX-FM 1 connector
5. **AUX2** has no receiver selector (transmitter selector must be set on AUX2 to hear AUX2 audio)
6. **SC** "simulcast" receives both **COM** and **FM1** simultaneously at a reduced audio level

### Audio Level:

A receiver is automatically selected when its companion transmitter is selected on the audio selector panel. Receive (RX) volume is the inner knob, with VOX volume level being the outer knob.

### VOX (Voice Activated Intercom):

For no intercom, rotate the VOX knob fully CCW. Rotating vox knob CW adjusts VOX activation level accordingly. VOX volume level is the outer, knob with RX volume level being the inner knob.

### NORMAL / EM / ISOL Switch:

1. **NORMAL** provides normal operation of VOX and amplified radio audio to all headset positions.
2. **EM** is emergency. The EM position operates in the same manner as the NORMAL position.
3. **ISOL** isolates the pilot's audio from the ATGS and both observers. The pilot will not be able to hear the ATGS or observers; however, the ATGS and observers will be able to hear the pilot and have normal intercom among themselves.

## 8. Other Information:

- Radio programming "D" connectors are located in the front of the kit.
- Both pilot and ATGS MICS jacks have PTT capability using supplied PT-300 adapters.
- 28 Volts DC power input uses the 7.5 amp circuit breaker and normally draws 3 amps while transmitting.
- 14 Volts DC power input uses the 15 amp circuit breaker and normally draws 8 amps while transmitting.

# 004670 - IRIDIUM SATELLITE PHONE KIT SETUP PROCEDURE

*Note: To get adequate reception from the satellite phone, it must be operated in an open area with no overhead obstructions blocking the phone's line-of-sight communications with the satellite. The antenna must be fully extended while receiving and placing phone calls.*

1. Power the unit on by pressing the **"Power"** soft key on the lower left corner of the keypad.  
The unit will display **"Enter PIN:"** after it boots up.
2. Enter the PIN number, **1111**, via the keypad and press the **"OK"** soft key.  
Wait about 10-15 seconds for phone to register with the satellite.  
Once the phone is registered with the satellite it will display **"Iridium"**.  
At this time the phone is ready to receive and place phone calls.
3. **To place a phone call From the Satellite Phone To a Land Line or Cell Phone:**  
Press and hold the **"0+"** soft key until the **"+"** icon appears in the upper corner of the display.  
Dial 1, and the area code and number. **(Example: 1-208-387-5644)**  
Press the **"OK"** soft key to connect the call.  
*Note: When finished with the call, pressing the "OK" soft key ends the call.*
4. **To place a phone call From the Satellite Phone To Another Satellite Phone:**  
Dial the 12-digit satellite phone number. **(Example: 8816-414-89079)**  
Press the **"OK"** soft key to connect the call.
5. **To place a phone call To the Satellite Phone from a Land Line or Cell Phone:**  
Dial 011 and the 12-digit satellite phone number (located on the side of the box and on the phone).  
**(Example: 011-8816-414-89078)**  
*Note: The end user must have the international access option enabled on their Land Line or Cell Phone to call the satellite number.*
6. **Two-Stage Dialing To the Satellite Phone From a Land Line or Cell Phone without International Access enabled:**  
Dial 1-480-768-2500.  
When prompted, enter the 12-digit Iridium phone number and wait to be connected. **(Example: 8816-414-89078)**  
*Note: Satellite Phones will be charged \$1.65 per minute.*

**If questions arise during setup, please call the CDO at: (208)387-5644**



Figure 1: 4670 Motorola Iridium Satellite Phone (Front View)

# **NIRSC EQUIPMENT KIT INVENTORIES**

## 004080 SOLAR PANEL KIT INVENTORY LIST

KIT WEIGHT	CU FT	DIMENSIONS (INCHES)
50 LBS	1.7	23 x 14 x 9

KIT COMPONENTS AND INVENTORY			
NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
000538	Stakes, Tent, 8" Pin Panel	8 ea.	
004132	Charger Controller, 12Volt, 8Amp, (ASC12/8A)	1 ea.	
004133	Battery - Sealed Lead Acid, 35 Amp-Hr, PS-12350	1 ea.	
004184	Solar Panel, Flexible 60 Watt, (P3-62)	1 ea.	
004807	Case, Pelican 1510NF	1 ea.	
004082	Cable, CAB100, Solar to charge controller	1 ea.	
004084	Cable, CAB110, Charge controller to spare battery	1 ea.	
004085	Cable, CAB120, Charge controller to repeater	1 ea.	
004083	Mounting Bracket, Metal (Solar Panel)	1 set	
004081	Mounting Bracket, Plastic (Solar Panel)	1 Set	
	Cable Tie - Black, 15"	8 ea.	
	Handbroom	1 ea.	
	Rope, 1/4" Low-Stretch Polyester, 10'	8 ea.	
	Fuses, Mini ATC, 10Amp	3 ea.	
	Setup drawings and instructions	1 ea.	
	Sand Bags	8 ea.	
	Sand Bag Holder	2 ea.	
	Lead Box Seals	2 ea.	
	Kit, Inventory Worksheet	3 ea	

## 004100 MOUNTAIN-TOP ACCESSORIES KIT INVENTORY LIST

KIT WEIGHT	CU FT	DIMENSIONS (INCHES)
26 LBS	2.0	21 x 17 x 8

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000825	Stakes - Tent, Metal	6 ea.	
004303	Hammer - 5 lb.	1 ea.	
004308	Guy Assembly - Antenna with collar	2 ea.	
005085	Case - Pelican Box, 1550NF	1 ea.	
004094	Liner - Foam, Pelican, 1550	1 ea.	
	Battery Straps, 15 Volt	3 ea.	
	Battery Terminal Cover, Rubber	1 ea.	
	Box Knife	1 ea.	
	Battery Jumpers (1 - red, 1 - black)	2 ea.	
	Reusable Zip Ties	5 ea.	
	Cable Assembly, Shore Power	1 ea.	

**Note:** When ordering a NFES# 004312 Command Repeater/Link Kit, NFES# 004181 Cross-Band Link, or the NFES# 004370 Ground Aircraft Radio/Link Kit, a NFES# 004100 Mountain Top Accessory Kit **MUST** also be ordered.

## 004240 AIRBASE ACCESSORIES KIT INVENTORY LIST

KIT WEIGHT	CU FT	DIMENSIONS (INCHES)
32 LBS	3.6	25 X 20 X 9

KIT COMPONENTS AND INVENTORY			
NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
001086	Harness - Radio, Chest	5 ea.	
004059	Adapter - Headset to Radio, Icom, OPC-499	5 ea.	
004061	Headset - Aviation, David Clark, H10-21	5 ea.	
004062	Adapter, Helmet, U-92A/U to M642/5-1 & M642/4-1	5 ea.	
004138	PTT Switch - Remote, Icom, PTT SW	5 ea.	
004147	Belt Clip, ICOM IC-A6	5 ea.	
004321	Radio, Aviation Handheld, Icom, IC-A6	5 ea.	
004405	Speaker Mic, Icom, HM-173	2 ea.	
004491	Holder, Battery, AA, Icom, BP-208N	5 ea.	
004492	Antenna, Icom, FA-B02AR	6 ea.	
004830	Battery- Individual, Size AA, 1.5 Volt (NIRSC Only)	60 ea.	
005088	Case, Pelican-1600	1 ea.	
	Radio Quick Reference Card, Icom, IC-A6	5 ea.	
	Frequency Sheet, Icom	2 ea.	
	T-Cards, Radio Tracking	25 ea.	
	Pads, Alcohol, Headset Cleaning	15 ea.	
	Lead Box Seals	2 ea.	

## 4244K2 UHF RADIO KIT INVENTORY LIST (KNG2 P400)

KIT WEIGHT	CU FT	DIMENSIONS (INCHES)
75 LBS	3.5	20 X 21 X 15

KIT COMPONENTS AND INVENTORY			
NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
004130	Adapter-Mobile Mag, SMA (m) to UHF (f)	4 ea	
004306	Liner, foam, radio kit 16PCK	1 ea	
004309	Box, fiberglass, 21' X 20" X 15"	1 ea	
004331	Radio-King, Digital, KNG2-P400 (Capitalized)	16 ea	
004352	Antenna -UHF, KNG2-P400	19 ea	
004355	Antenna, mobile mag	4 ea	
004146	Holder-Battery, AA, KNG	16 ea	
004187	Case-Leather, KNG	16 ea	
004241	Speaker-Microphone, KNG	4 ea	
004238	Cable-Cloning, KNG	1 ea	
004830	Battery - Individual, Size AA, 1.5 Volt (NIRSC Only)	256 ea	
	T-cards, radio tracking	32 ea	
	Kit inventory worksheets	3 ea	
	Lead box seals	2 ea	
	Radio tracking sheets	3 ea	
	Frequency sheets	3 ea	
	Radio Programming Guide	1 ea	

## 4244MD UHF RADIO KIT INVENTORY LIST (MIDLAND)

KIT WEIGHT	CU FT	DIMENSIONS (INCHES)
75 LBS	3.5	20 X 21 X 15

KIT COMPONENTS AND INVENTORY			
NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
004075	Case, radio, Midland	16 ea	
004076	Antenna, UHF, Midland	19 ea	
004077	Holder, battery, AA, Midland	16 ea	
004078	Speaker/mic, Midland, ACC-720G	4 ea	
004079	Cloning Cable, Midland, ACC-2305G	1 ea	
004169	Radio, Midland, UHF	16 ea	
004130	Adapter - Mobile Mag, SMA (M) to UHF (F)	4 ea	
004306	Liner, foam, radio kit 16PCK	1 ea	
004309	Box, fiberglass, 21" X 20" X 15"	1 ea	
004355	Antenna, mobile mag.	4 ea	
004830	Batteries - Individual, Size AA, 1.5 Volt (NIRSC Only)	192 ea	
	T-cards, radio tracking	32 ea	
	Kit inventory worksheets	3 ea	
	Lead box seals	2 ea	
	Radio tracking sheets	3 ea	
	Frequency sheets	3 ea	
	Radio Programming Guide	1 ea	

## 4244X2 UHF RADIO KIT INVENTORY LIST (MOTOROLA XTS 2500)

KIT WEIGHT	CU FT	DIMENSIONS (INCHES)
75 LBS	3.5	20 X 21 X 15

KIT COMPONENTS AND INVENTORY			
NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
004242	Adapter - Mobile Mag, SMA (F) to UHF (F)	4 ea	
004306	Liner, foam, radio kit 16PCK	1 ea	
004309	Box, fiberglass, 21' X 20" X 15"	1 ea	
004355	Antenna, mobile mag	4 ea	
004535	Radio, Motorola, UHF, XTS-2500 (capitalized)	16 ea	
004537	Holder, battery, AA, for Motorola XTS-2500 Radio	16 ea	
004540	Antenna, UHF, Motorola XTS-2500	19 ea	
004542	Holster - Leather, Motorola XTS-2500	16 ea	
004543	Speaker/mic, Motorola XTS-2500	4 ea	
004544	Cable, cloning, Motorola XTS series Radio	4 ea	
004830	Battery - Individual, Size AA, 1.5 Volt (NIRSC Only)	384 ea	
	T-cards, radio tracking	32 ea	
	Kit inventory worksheets	3 ea	
	Lead box seals	2 ea	
	Radio tracking sheets	3 ea	
	Frequency sheets	3 ea	
	Radio Programming Guide	1 ea	

## 4245 FLATLAND KIT

KIT WEIGHT	CU FT	DIMENSIONS (INCHES)
3 LBS		12 X 12

[illegible]

# 004248 UHF LOGISTICS REPEATER KIT INVENTORY LIST

WEIGHTS	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT & CU FT
(KIT) 80 LBS (MAST) 9 LBS	(KIT) 3.5 (MAST) 0.3	(KIT) 20 X 21 X 15 (MAST) 60 X 3 X 3	89 LBS 3.8 CU FT

KIT COMPONENTS AND INVENTORY			
NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
000825	Stakes - Tent, Metal	3 ea	
001023	Battery - Radio, Repeater, Alkaline, 7.5 Volt	4 ea	
004171	Screwdriver, 4"	1 ea	
004186	Cable - Antenna, Coaxial, 20', N-Type	1 ea	
004189	Cable - Duplexer to Radio, 8"	1 ea	
004297	Duplexer, UHF	1 ea	
004303	Hammer, 5 lb	1 ea	
004304	Antenna, UHF, Whip P/O 4250	1 ea	
004305	Antenna - Antenna Mast, Lance H-518	3 ea	
004308	Guy assembly, antenna w/collar	1 ea	
004309	Box, fiberglass, 21" X 20" X 15"	1 ea	
004489	Base antenna, UHF w/ground planes	1 ea	
004648	Card, Audio Control, (C1-RC-4L-10)	1 ea	
004651	Subrack - w/Motherboard (SR-39-1)	1 ea	
004652	Monitor, System (SM-3-HO-014-00)	1 ea	
004659	Microphone, RPTR, Daniels, A-MIC-01	1 ea	
004676	Cable, UHF duplexer to radio, 24"	2 ea	
004682	Transmitter, UHF, Digital (UT-4R420-00-000)	1 ea	
004683	Receiver, UHF, Digital (UR-4R420-00-000)	1 ea	
004690	Screwdriver, for Daniels Modules	1 ea	
	Power cord, with Powerpole Connector	1 ea	
	Battery straps, 15 volt	3 ea	
	Fuse - 7.5 amp, mini ATC	1 bx	
	Battery jumpers, 1-red, 1-black	2 ea	
	Battery Terminal Cover, Plastic	1 ea	
	Battery Terminal Cover, Rubber	1 ea	
	Garbage bag	1 ea	
	Filament tape	1 ro	
	Flagging tape	1 ro	
	Allen wrench	1 ea	
	Kit inventory worksheets	3 ea	
	Switch setting diagram (laminated)	1 ea	
	Battery & antenna set-up sheets (plus 1 laminated)	3 ea	
	Double Battery Setup (laminated)	1 ea	
	Lead box seal	2 ea	
	Voice Board Operating Instructions	1 ea	
	Resuable Zip Ties	5 ea	

# 004281 VHF-UHF CROSSBAND LINK KIT INVENTORY LIST

WEIGHTS	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT & CU FT
(KIT) 80 LBS (MAST) 9 LBS	(KIT) 3.5 (MAST) 0.3	(KIT) 20 X 21 X 15 (MAST) 60 X 3 X 3	89 LBS 3.8 CU FT

## KIT COMPONENTS AND INVENTORY

NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
000968	Guide - NIRSC User's Guide	1 ea	
001023	Battery - Radio, Repeater, Alkaline, 7.5 Volt	4 ea	
004171	Screwdriver - 4"	1 ea	
004304	Antenna - UHF Whip	1 ea	
004305	Antenna - Antenna Mast, Lance H-518	6 ea	
004309	Box - Fiberglass, 21 x 20 x 15	1 ea	
004186	Cable - Antenna, Coaxial, 20', N-Type	2 ea	
004464	Antenna - Gain Whip, VHF	1 ea	
004489	Base - Antenna, UHF w/gnd planes	1 ea	
004498	Base - Antenna, VHF w/gnd planes	1 ea	
004659	Microphone - RPTR, Daniels, A-MIC-01	1 ea	
004690	Screwdriver - (For Daniel Modules)	1 ea	
004651	Subrack, Daniels (19")	1 ea	
004665	Monirtor, System	1 ea	
004668	Cable, RX, A Side	1 ea	
004669	Cable, TX, A Side	1 ea	
004675	Card, Control, Audio	1 ea	
004678	Cable, RX, B Side	1 ea	
004679	Cable, TX, B Side	1 ea	
004682	Transmitter, UHF, Digital	1 ea	
004683	Receiver, UHF, Digital	1 ea	
004684	Transmitter, VHF, Digital	1 ea	
004685	Receiver, VHF, Digital	1 ea	
005208	Antenna - UHF Yaggi	1 ea	
	Power cord with Powerpole Connector	1 ea	
	Adapter - N (f) to UHF (m)	2 ea	
	Battery Terminal Cover, Plastic	1 ea	
	Battery straps, 15V	3 ea	
	Fuse - 7.5 amp, mini ATC	5 ea	
	Garbage Bag	1 ea	
	Filament Tape	1 ro	
	Flagging Tape	1 ro	
	Allen Wrench	1 ea	
	Switch Setting Diagrams (Laminated)	2 ea	
	Battery & Antenna Set-Up Sheets	3 ea	
	Double Battery Set up (Laminated)	1 ea	
	Frequency Sheets for UHF Link (Plus 1 Lमितated)	3 ea	
	Voice Board Oeprating Instructions	1 ea	

# 004300 GROUND VHF-AM BASE STATION KIT

WEIGHTS	CU FT	DIMENSIONS INCHES	TOTAL WEIGHTS AND CU FT
(KIT) 80 LBS (MAST) 9 LBS	(KIT) 3.5 (MAST) 0.3	(KIT) 20 X 21 X 15 (MAST) 1 each @ 60 X 3 X 3	89 LBS 3.8 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000332	Wrench, adjustable, 6"	1 ea	
000825	Stakes - Tent, Metal	3 ea	
001023	Battery - Radio, Repeater, Alkaline, 7.5 volt	4 ea	
004171	Screwdriver, 4"	1 ea	
004147	Belt Clip, Icom, IC-A6	4 ea	
004186	Cable - Antenna, coaxial, 20', N-Type	2 ea	
004303	Hammer, 5 lb	1 ea	
004305	Antenna - Antenna Mast, Lance H-518	3 ea	
004307	Liner - Foam, A/C 5-pocket	1 ea	
004308	Guy assembly, antenna w/collar	1 ea	
004309	Box, fiberglass, (radio & rprr)	1 ea	
004321	Radio, Icom, IC-A6(capitalized)	4 ea	
004343	Antenna, A/C, Wideband	1 ea	
004476	Radio, Technisonic, VHF-AM, #TBS-150	1 ea	
004491	Holder, Battery, AA, Icom	4 ea	
004492	Antenna, Icom, FA B02AR	5 ea	
004830	Battery - Individual, Size AA, 1.5 Volt (NIRSC Only)	48 ea	
005066	Mic. (Telex) w/three pin male connector	1 ea	
	N. male to UHF female adapter	1 ea	
	Connector - N Barrel, Coaxial, Female	1 ea.	
	120 volt ac power cord (TBS-150)	1 ea	
	Battery jumpers, 1-red, 1-black	8 ea	
	Battery straps, 15-volt	6 ea	
	Fuses, 2AG, 5 amp mini (1 box)	5 ea	
	Fuses, 3AG, 5 amp (1 box)	5 ea	
	Fuses MDL, 2.5 amp (1 box)	5 ea	
	Kit inventory worksheets	3 ea	
	Battery & antenna set-up sheets	3 ea	
	Installation instruction sheets	3 ea	
	Frequency sheets for Icoms	4 ea	
	Lead box seal	2 ea	
	Garbage bag	1 ea	
	Filament tape	1 ro	
	Flagging tape	1 ro	
	Instruction manual (TBS-150)	1 ea	
	Operating booklet, Icom	1 ea	
	T-cards, radio tracking	8 ea	

# 004312 VHF COMMAND REPEATER/LINK KIT

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHTS AND CU FT
(KIT) 95 LBS (MAST) 18 LBS	(KIT) 3.5 (MAST) 0.6	(KIT) 20 X 21 X 15 (MAST) 2 EACH @ 60 X 3 X 3	113 LBS 4.1 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000968	Guide, NIRSC User's Guide	1 ea	
001023	Battery - Radio, Repeater, Alkaline, 7.5 Volt	4 ea	
004171	Screwdriver, 4"	1 ea	
004186	Cable, Antenna, Coaxial, 20', N-Type	2 ea	
004304	Antenna, UHF whip	1 ea	
004305	Antenna - Antenna Mast, Lance H-518	6 ea	
004309	Box, fiberglass, 21" X 20" X 15"	1 ea	
004342	Duplexer - TXRX , Part # 30-37-98102TXLO	1 ea	
004464	Antenna, Gain Whip, VHF	1 ea	
004489	Base antenna, UHF w/grnd planes	1 ea	
004498	Base antenna, VHF w/grnd planes	1 ea	
004648	Card, Audio Control, Model C1-4L-10	1 ea	
004651	Subrack - Motherboard, SR-39-1	1 ea	
004652	System Monitor, SM-3-HO-014-00	1 ea	
004659	Microphone, RPTR, Daniels, A-MIC-01	1 ea	
004676	Cable, VHF duplexer to radio 27"	4 ea	
004678	Cable, B-Side - UHF TX to Antenna Relay, 14"	1 ea	
004679	Cable, B-Side - UHF RX to Antenna Relay, 12"	1 ea	
004682	Transmitter, UHF, Digital UT-4R420-00-000	1 ea	
004683	Receiver, UHF, Digital UR-4R420-00-000	1 ea	
004684	Transmitter, VHF, Digital VT-4R160-00-800	1 ea	
004685	Receiver, VHF, Digital VR-4R150-00-000	1 ea	
004690	Screwdriver, Daniels	1 ea	
005208	Antenna, Yagi, w/ u-bolt, clamp, nuts	1 ea	
	Adapter - N-type (Female) to UHF (Male)	2 ea	
	Power cord with Powerpole Connector	1 ea	
	Battery Terminal Cover, Plastic	1 ea	
	Battery straps, 15 volt	3 ea	
	Fuses, 7.5 amp, mini ATC	5 ea	
	Garbage bag	1 ea	
	Filament tape	1 ro	
	Flagging tape	1 ro	
	Allen wrench	1 ea	
	Kit inventory worksheets	3 ea	
	Switch setting diagrams (laminated)	2 ea	
	Battery & antenna set-up sheets (plus 1 laminated)	3 ea	
	Voice Board Operating Instructions	1 ea	

## 004312 COMMAND REPEATER/LINK KIT (CONTINUED)

KIT COMPONENTS AND INVENTORY			
	Frequency sheets for UHF link	3 ea	
	Lead box seal	2 ea	
	Double Battery Set-up (Laminated Cards)	1 ea	
	Reusale Zip Ties	10 ea	

## 004320 COML KIT

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
30 LBS	1.63	20.62 X 16.87 X 8.12

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004810	Case, Pelican, 1520, Orange	1 ea	
004239	Radio - Kin, - VHF, KNG-P150s	2 ea	
004311	Radio - King, VHF, KNG2-P150	2 ea	
004247	Cable - Cloning, King-KNG/Legacy	1 ea	
004146	Holder, Battery, AA, KNG	4 ea	
004830	Battery, AA	64 ea	
	Programming/Cloning Instructions For King KNG	4 ea	
	Kit Inventory Worksheets	3 ea	
	Lead Seals	2 ea	



## 4330KP KNG REMOTE KIT

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(KIT) 98 LBS (MAST) 9 LBS	(KIT) 3.5 (MAST) 0.3	(KIT) 20 X 21 X 15 (MAST) 60 X 3 X 3	107 LBS 3.8 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000325	Pliers, lineman, 6"	1 ea	
000825	Stakes - Tent, Metal	3 ea	
001023	Battery, Radio, Repeater, Alkaline, 7.5 volt	4 ea	
004091	Wire Assy-Fused, Batt Power, 12 V w/ powerpole connector	1 ea	
004239	Radio - King, VHF, P150S	1 ea	
004171	Screwdriver, 4"	1 ea	
004186	Cable - Antenna, Coaxial, 20', N-Type	1 ea	
004148	Battery eliminator, KNG	1 ea	
004331	Radio, King, Digital, KNG2-P400	1 ea	
004274	Transformer - A/C 120V to 12VCD	1 ea	
004302	Wire Assembly - Fused, 1 Amp 3 Prong	1 ea	
004303	Hammer, 5 lb	1 ea	
004304	Antenna, UHF whip	1 ea	
004305	Masts, antenna Mast, Lance H-518	3 ea	
004308	Guy assembly, antenna w/collar	1 ea	
004309	Box, fiberglass, 21" X 20" X 15"	1 ea	
004332	Wire, field telephone, 1/2 mile reel	1 ro	
004409	Speaker, external, 8-ohm, 10 Watt	1 ea	
004464	Antenna, VHF whip	1 ea	
004471	Box, Remote Chassis	1 ea	
004473	Deskset, Remote	1 ea	
004489	Base antenna, w/ grnd planes - UHF	1 ea	
004498	Base antenna, w/ grnd planes - VHF	1 ea	
005208	Antenna, Yagi, w/u-bolt, clamp, nuts	1 ea	
005338	Box, aluminum - (5 3/4 x 3 3/4 x 2)	1 ea	
005342	Panel termination, DC-Line	1 ea	
004149	Cable Connector - Assembly, KNG	1 ea	
	Kit inventory worksheets	3 ea	
	Frequency sheet (VHF/ UHF )	1 ea	
	Battery & Antenna set-up (Laminated Sheet)	1 ea	
	Allen wrench	1 ea	
	Lead box seal	2 ea	
	Garbage bag	1 ea	
	Fuses 1 amp (for telephone only)	1 bx	
	Wire nuts	6 ea	
	Battery jumpers, 3 Red, 3 Black	6 ea	
	Filament tape	1 ro	

## 4330KP KNG REMOTE KIT (CONTINUED)

KIT COMPONENTS AND INVENTORY			
	Flagging tape	1 ro	
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
	Fuse, 7.5 amp Mini ATC	1 ea	
	KNG Radio Programming Guide	1 ea	
	Adapter N- Type (Female) to UHF (Male)	3 ea	
	Reusable Zip Ties	5 ea	

# 004370 GROUND AIRCRAFT RADIO/LINK KIT

WEIGHTS	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(KIT) 69 LBS (MAST) 18 LBS	(KIT) 3.5 (MAST) 0.6	(KIT) 20 X 21 X 15 (MAST) 2 each @ 60 X 3 X 3	87 LBS 4.1 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000332	Wrench, Adjustable, 6"	1 ea.	
001023	Battery, Radio, Repeater, Alkaline 7.5 volt	4 ea	
004171	Screwdriver, 4"	1 ea.	
004186	Cable, Antenna, Coaxial, 20', N-Type	2 ea.	
004243	Holster - Radio, ICOM, LC-159, Icom A-6	4 ea	
004304	Antenna - UHF, whip	1 ea	
004305	Masts, Antenna Mast, Lance H-518	6 ea	
004307	Liner, foam, A/C 5-pocket	1 ea	
004309	Box, Fiberglass, 21" X 20" X 15"	1 ea	
004343	Antenna, A/C Wideband	1 ea	
004321	Radio - Aviation, Handheld, ICOM, IC-A6	4 ea	
004409	Speaker, external, 8-ohm, 10 Watt	1 ea	
004489	Base antenna, UHF w/gnd planes	1 ea	
004491	Holder, battery, AA, Icom, BP208N	4 ea	
004492	Antenna, Icom FA - B02AR	5 ea	
004651	Sub-rack, with motherboard, SR39-1	1 ea	
004659	Microphone, RPTR, Daniels, A-MIC-01	1 ea	
004665	Monitor, System	1 ea	
004666	Transmitter, synthesized, VHF-AM	1 ea	
004667	Receiver, synthesized, VHF-AM	1 ea	
004668	Cable, receiver, A-side	1 ea	
004669	Cable, transmitter, A-side	1 ea	
004675	Card, control, audio(AC-3E)	1 ea	
004676	Cables, Duplexer to Radio, 27"	2 ea	
004678	Cable, B-Side, TX to Antenna Relay, 14"	1 ea	
004679	Cable, B-Side, RX to Antenna Relay, 12"	1 ea	
004682	Transmitter, UHF, Digital, UT-4R420-00-200	1 ea	
004683	Receiver, UHF, Digital, UR-4R420-00-000	1 ea	
004690	Screwdriver, Daniels	1 ea.	
004830	Battery - Individual, Size AA, 1.5 Volt (NIRSC ONLY)	48 ea.	
	Adapter - N (f) to UHF (f)	1 ea	
	Adapter - N (f) to UHF (m)	1 ea	
	Power cord with Powerpole connector	1 ea	
	Battery straps, 15 volt	3 ea	
	Battery Terminal Cover, Plastic	1 ea.	
	Fuses, 7.5 AMP, Mini ATC (5 each)	1 bx	
	Filament Tape	1 ro.	

# 004370 GROUND AIRCRAFT RADIO/LINK KIT CONTINUED

KIT COMPONENTS AND INVENTORY			
	Flagging Tape	1 ro.	
	Garbage bag	1 ea.	
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
	Allen wrench	1 ea	
	Lead box seal	2 ea	
	Operating booklet, Icom	1 ea	
	Frequency sheet for Icom	4 ea	
	Frequency sheet, UHF Link Side	3 ea	
	Battery & antenna set-up sheets	3 ea	
	Kit inventory worksheet	3 ea	
	T-card, radio tracking	8 ea	
	Installation Instruction sheet	3 ea	
	Switch setting diagrams, base/link laminated	2 ea	
	Voice Board Operating Instructions (Laminate)	2 ea	
	Reusable Zip Ties	5 ea	

## 4381KD KING DPHX COMMAND/TACTICAL RADIO KIT

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
85 LBS	3.5	20 X 21 X 15

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
001034	Holder, Radio Battery, for 9 each AA Alkaline, King	16 ea	
004306	Liner, foam, radio, 16pck	1 ea	
004309	Box, fiberglass, 21" X 20" X 15"	1 ea	
004355	Antenna, mobile mag	4 ea	
004601	Antenna, VHF, King Digital #LAA0818	19 ea	
004602	Cloning Cable, King DPHx #E/GCC	1 ea	
004603	Radio King, VHF, Digital, Model DPHx	16 ea	
004830	Battery, Individual, Size AA, 1.5 Volt (NIRSC ONLY)	288 ea	
005330	Speaker/mic, King	4 ea	
005331	Case - Radio, Leather, with cover	16 ea	
005350	Antenna adapter, mobile mag, King	4 ea	
	T-cards, radio tracking	32 ea	
	Kit inventory worksheets	3 ea	
	Lead box seals	2 ea	
	Radio tracking sheets	3 ea	
	Frequency sheets	3 ea	
	Radio discipline pamphlet	4 ea	
	Radio switch settings and programming sheet	1 ea	
	Key pad programming and cloning instructions	1 ea	
	Frequency reminder (laminated)	1 ea	

## 4381K2 KING KNG2 COMMAND/TACTICAL RADIO KIT

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
85 LBS	3.5	20 X 21 X 15

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004130	Adapter, Mobile Mag SMA (m) to UHF (f)	4 ea	
004145	Antenna, VHF, KNG	19 ea	
004187	Case, Leather, KNG	16 ea	
004146	Holder, Battery, AA, KNG	16 ea	
004241	Speaker Microphone, KNG	16 ea	
004238	Cloning Cable, King KNG P150	1 ea	
004311	Radio King, Digital, KNG2-P150 (capitalized)	16 ea	
004306	Liner, foam, radio, 16pck	1 ea	
004309	Box, Fiberglass, 21" X 20" X 15"	1 ea	
004355	Antenna, mobile mag	4 ea	
004830	Battery, Individual, Size AA, 1.5 Volt (NIRSC ONLY)	256 ea	
	T-cards, radio tracking	32 ea	
	Kit inventory worksheets	3 ea	
	Lead box seals	2 ea	
	Radio tracking sheets	3 ea	
	Frequency sheets	3 ea	
	Radio discipline pamphlet	4 ea	
	Radio switch settings and programming sheet	1 ea	
	Key pad programming and cloning instructions	1 ea	
	Frequency reminder (laminated)	1 ea	

## 004390 STARTER SYSTEM

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(KITS) 783 LBS (MAST) 63 LBS	(KITS) 32.8 (PELICAN) 1.7 (MASTS) 2.1	9 EACH @ 20 X 21 X 15 2 EACH @ 21 X 17 X 18 7 EACH @ 60 X 3 X 3	846 LBS 36.6 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004100	MOUNTAIN TOP ACCESSORY KIT	2 ea	
004244	LOGISTICS RADIO KIT	1 ea	
004248	LOGISTICS REPEATER	1 ea	
004305	MASTS, ANTENNA 5 FT SECTIONS	21 ea	
004312	COMMAND REPEATER/LINK	1 ea	
004330	REMOTE KIT	2 ea	
004370	GROUND AIRCRAFT RADIO/LINK KIT	1 ea	
004381	CMD/TAC RADIOS	3 ea	

## 004410 PUBLIC ADDRESS KIT

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
22 LBS	3.5	20 X 21 X 15

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000033	Battery, Size D, 1.5 volt, Alkaline	2 PKG	
004170	Transmitter, Wireless (S1691T)	1 ea	
004176	Cable, PA 40 ft (C200-0025)	1 ea	
004177	AC Adapter (S1460)	2 ea	
004178	Battery Pack/Holder, D Cell (A550-0005)	2 ea	
004181	PA, Wireless Amp w/horn and wireless receiver (SW615A)	1 ea	
004182	PA, Wireless, Secondary w/horn (S1244-70)	1 ea	
004183	Microphone, Wireless (S1605)	1 ea	
004307	Liner, Foam, A/C 5-Pocket	1 ea	
004309	Box, Fiberglass , 21" X 20" X 15"	1 ea	
004313	Microphone, Wired, (S203A)	1 ea	
004830	Battery, Individual, Size AA, 1.5 volt (NIRSC ONLY)	6 ea	
	Garbage Bag	1 ea	
	Kit Inventory Worksheets	3 ea	
	Lead Box Seal	2 ea	
	Installation Instructions (laminate)	1 ea	

## 004420 MAFFS PRINTER NETWORK KIT (BOX 1 OF 2)

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(BOX 1) 76 LBS (BOX 2) 41 LBS	(BOX 1) 6.52 (BOX 2) 2.56	33.36 X 28.44 X 18.23 24.64 X 19.39 X 13.78	117 LBS 9.08 CU FT

### KIT COMPONENTS AND INVENTORY

NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004340	Printer, MAFFS	1 ea.	
004808	Case, Pelican, 1690	1 ea.	
004105	Liner - Foam, Pelican, 1690	1 ea.	
	Kit Instruction Binder	1 ea.	
	Printer Driver CD	1 ea.	
	Inventory Sheet	2 ea.	
	Lead Box Seal	2 ea.	
	Power Cord, Printer	1 ea.	
<u>Hotspot (includes the following items)</u>			
004523	Wi-Fi, Verizon AC791L(accountable)	1 ea.	
	Case, Pelican, 1060, Yellow	1 ea.	
	Power Adapter, AC/DC, Verizon Wi-Fi	1 ea.	
	Cable, Micro USB	1 ea.	

## 004420 MAFFS PRINTER NETWORK KIT (BOX 2 OF 2)

004185	Extension Cord, 16 AWG/3, 25 ft.	1 ea.	
004233	USB Drive, 16 GB	1 ea.	
004254	Ink Cartridge, MAFFS Printer, Black	2 ea.	
004255	Ink Cartridge, MAFSS Printer, Cyan	2 ea.	
004256	Ink Cartridge, MAFSS Printer, Magenta	2 ea.	
004257	Ink Cartridge, MAFFS Printer, Yellow	2 ea.	
004809	Case, Pelican, 1620	1 ea.	
004104	Liner - Foam, Pelican, 1620	1 ea.	
	Paper Ream, Letter	2 ea.	
	Telephone Cord, 8 ft.	1 ea.	
	Telephone Cord, 6 ft.	1 ea.	
	Inventory Sheet	2 ea.	
	Lead Box Seal	2 ea.	
	Power Adapter, 3 Way	1 ea.	

## 004499 AIR ATTACK KIT

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
35 LBS	3.35	24.5 X 14 X 17

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004141	Connector, Barrel, BNC	2 ea	
004066	Radio, TDFM-136B, P25	2 ea	
004479	Chassis, Air Attack ( Model TAK 100 ) Capitalized	1 ea	
004490	Strap, Tie Down, 5 1/2'	2 ea	
005086	Pelican Case, Tan, 1650	1 ea	
	Adapter, PTT, PT-300	2 ea	
	Cable, Power	1 ea	
	Cable, Audio/Mic	1 ea	
	Adapter, Headset, 6 Pin	2 ea	
	Operator's Guide, TDFM-136B	1 ea	
	Information Sheet, Air Attack	2 ea	
	Information Sheet, TDFM-136B Quick Ref. Guide	2 ea	

# 004604 AIR ATTACK TRAINING KIT

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
55 LBS	4.5	20 X 32 X 12

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004059	Adapter - Headset to Radio, Icom, OPC-449	1 ea.	
004110	Adapter - BNC 90 Degree	1 ea.	
004141	BNC Barrel Adapter	1 ea.	
004228	Power Supply, Astron, RS-20M or SS-25M	1 ea.	
005086	Case - Pelican, 1650	1 ea.	
005328	Headset - Adapter, King	1 ea.	
	Cable - Power, Astron	1 ea.	
	Antenna, VHF, BNC	2 ea.	
	Cable, RF, 12 inch	1 ea.	
	Cable, RF, 6 inch	2 ea.	
	Dummy Load, 25 Watt or 35 Watt	2 ea.	
	Instruction Booklet	1 ea.	
	Lead Seals	2 ea.	
004095	Foam, Pelican, 1650	1 ea.	
<u>Headset Options</u>			
004060	Headset, Aviation, David Clark, H10-66 or H10- 60	1 ea.	
004061	Headset, H10-21	1 ea.	
004062	Adapter, Helmet, U-92A/U to M642/5-1 & M642/4-1	2 ea.	
<b>OR</b>			
004060	Headset, Aviation, David Clark, H10-66 or H10- 60	2 ea.	
004062	Adapter, Helmet, U-92A/U to M642/5-1 & M642/4-1	2 ea.	

## 004660 AIRBASE KIT (IC-A6 RADIOS) BOX 1 OF 2

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(BOX 1) 51 LBS (BOX 2) 35 LBS (MAST) 18 LBS	(BOX 1) 3.5 (BOX 2) 3.5 (MAST) 0.6	33.36 X 28.44 X 18.23 24.64 X 19.39 X 13.78 2 each @ 60 X 3 X 3	104 LBS 7.6 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
001086	Harness- Radio, Chest	8 ea.	
004059	Adapter, Headset to Radio, Icom, OPC-499	8 ea.	
004061	Headset, Aviation, David Clark, H10-21	8 ea.	
004062	Adapter, Helmet, U-92A/U to M642/5-1 & M642/4-1	8 ea.	
004138	PTT Switch - Remote, Icom, PTT SW	8 ea.	
004147	Belt Clip, ICOM A-6	10 ea.	
004306	Liner, Foam, Radio, 16 PCK	1 ea.	
004309	Box, Fiberglass, 21" X 20" X 15"	1 ea.	
004321	Radio - Aviation, Handheld, Icom, IC-A6 (capitalized)	10 ea.	
004405	Speaker Mic, Icom, HM-173	2 ea.	
004491	Holder, Battery, AA, Icom, BP-208N	10 ea.	
004492	Antenna, Icom, FA-B02AR	11 ea.	
004830	Battery, AA	120 ea.	
	Radio Quick Reference Card, Icom, IC-A6	10 ea.	
	T-Cards, Radio Tracking	25 ea.	
	Pads, Alcohol, Headset Cleaning	24 ea.	
	Lead Box Seal	2 ea.	

## 004660 AIRBASE KIT (TAF-550) BOX 2 OF 2

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(BOX 1) 51 LBS (BOX 2) 35 LBS (MAST) 18 LBS	(BOX 1) 3.5 (BOX 2) 3.5 (MAST) 0.6	33.36 X 28.44 X 18.23 24.64 X 19.39 X 13.78 2 each @ 60 X 3 X 3	104 LBS 7.6 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000825	Tent Stakes	6 ea.	
004066	Radio, Aviation, TDFM-136B (capitalized)	1 ea.	
004134	Headset, Single Dome, David Clark	1 ea.	
004303	Hammer, 5 Lb.	1 ea.	
004305	Mast, Antenna, 5 Ft. Section	6 ea.	
004308	Guy Assembly, Antenna w/collar	2 ea.	
004309	Box, Fiberglass , 21" X 20" X 15"	1 ea.	
004323	Radio, Airbase VHF-FM/AM, TAF-550 (capitalized)	1 ea.	
004326	Cable, Antenna Coaxial, 20', N-Type	4 ea.	
004343	Antenna, A/C, Wideband	1 ea.	
004464	Antenna, Gain Whip, VHF	1 ea.	
004489	Base - Antenna, VHF W/ Ground Planes	1 ea.	
	Adapter, BNC (M) to N (F)	2 ea.	
	Adapter, UHF (M) to N (F)	1 ea.	
	Adapter, UHF (F) to N (F)	1 ea.	
	Connector - N (F) Barrel, Coaxial	2 ea.	
	Information Sheet, TDFM-136B, Quick Reference Guide	1 ea.	
	Information Booklet, TAF-550	1 ea.	
	Flagging tape	1 ro.	
	Filament tape	1 ro.	
	Allen wrench	1 ea.	
	Garbage bag	1 ea.	
	Fuse, 5A-AGC (Rear of TAF-550)	1 ea.	
	Fuse, 7.5A-MDL (Rear of TAF-550)	1 ea.	
	Fuse, 3A-MDL (Rear of TAF-550)	1 ea.	
	Fuse, 2A-MDL (Rear of TAF-550)	1 ea.	
	Cable - Power, 115V (Rear of TAF-550)	1 ea.	
	Microphone, Handheld (Rear of TAF-550)	1 ea.	

## 004670 SATELLITE PHONE KIT (MOTOROLA)

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
4.80	0.32	10 X 11 X 5

KIT COMPONENT AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004072	Radio, Motorola - 9505A, Sat. Phone	1 ea.	
004172	Adapter, Cigarette Lighter	1 ea.	
004173	Charger, A/C-D/C, Adapter	1 ea.	
004175	Battery, Li-Ion, Iridium, 3.7V	1 ea.	
004611	Antenna, Extendable, Iridium	1 ea.	
004612	Antenna - Mobile Mag, Iridium Phone	1 ea.	
004613	Adapter - Phone to Mobile Mag, Iridium Phone	1 ea.	
004614	Holster, Iridium Phone	1 ea.	
005087	Box, Pelican, 1200	1 ea.	
	Earphones	1 ea.	
	Instruction Sheet	1 ea.	
	Unblock Info Sheet	1 ea.	

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### VOICE BOARD OPERATING INSTRUCTIONS

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*Note: These operating instructions are also located inside each kit that has a voice board installed.*

# VOICE BOARD OPERATING INSTRUCTIONS

## Voice Board Functions:

1. It reads the battery voltage and temperature over the air via DTMF tones.
2. It allows the repeater to run using the following power sources:
  - A. Only alkaline batteries.
  - B. Only the solar panel kit.
  - C. Both the alkaline batteries and the solar panel kit.

*Note: If using both solar and alkaline, the voice board monitors the solar voltage and will automatically switch to alkaline power when the solar voltage falls below 10 Volts. When the solar voltage rises above 12 Volts, it will switch back to solar power. This conserves the alkaline batteries, allowing the equipment to run off one set of batteries for extended periods of time without the need to change them and provides a backup if the solar system fails.*

## Voice Board Power Supply:

The voice board is powered by the 12 volt system and is hard wired to the Daniels Rack.

1. To power the voice board, connect the supplied batteries to the equipment power adapter.
  - The battery and equipment are configured with a **POLARIZED** Power Pole interconnect connector.  
*Note: Reversing polarity will result in a blown fuse. All NIRSC equipment are shipped with the polarized connector disconnected and it should be connected before the equipment is turned on.*
2. Turn the main power switch located on the **SYSTEM MONITOR** Module, to the “ON” position.
  - If it becomes necessary to replace the batteries, follow the 15 volt battery configuration. *(See Appendix B)*

## Voice Board Activation:

The Voice Board is activated by a **5-digit DTMF** pin.

### 1st Digit - Equipment Type DTMF Digit:

The first DTMF digit of the pin corresponds to the equipment type:

- 1 = Command Repeaters (4312)**
- 2 = Logistics Repeaters (4248)**
- 3 = Aircraft Links (4370)**

### 2nd, 3rd, 4th Digit - Equipment ID DTMF Digits:

These 3 DTMF digits of the pin are associated with the equipment “ID” number.

- For example: The ID number for a **4312-FCK-C112** would be “**112**”.

### 5th Digit - Equipment Command DTMF Digit:

The fifth DTMF digit is for available voice board commands are:

- 1 = Battery voltage**
- 2 = Temperature**

*Note: If an incorrect DTMF and command code are entered, there is no need to un-key the equipment before re-entering the correct code.*

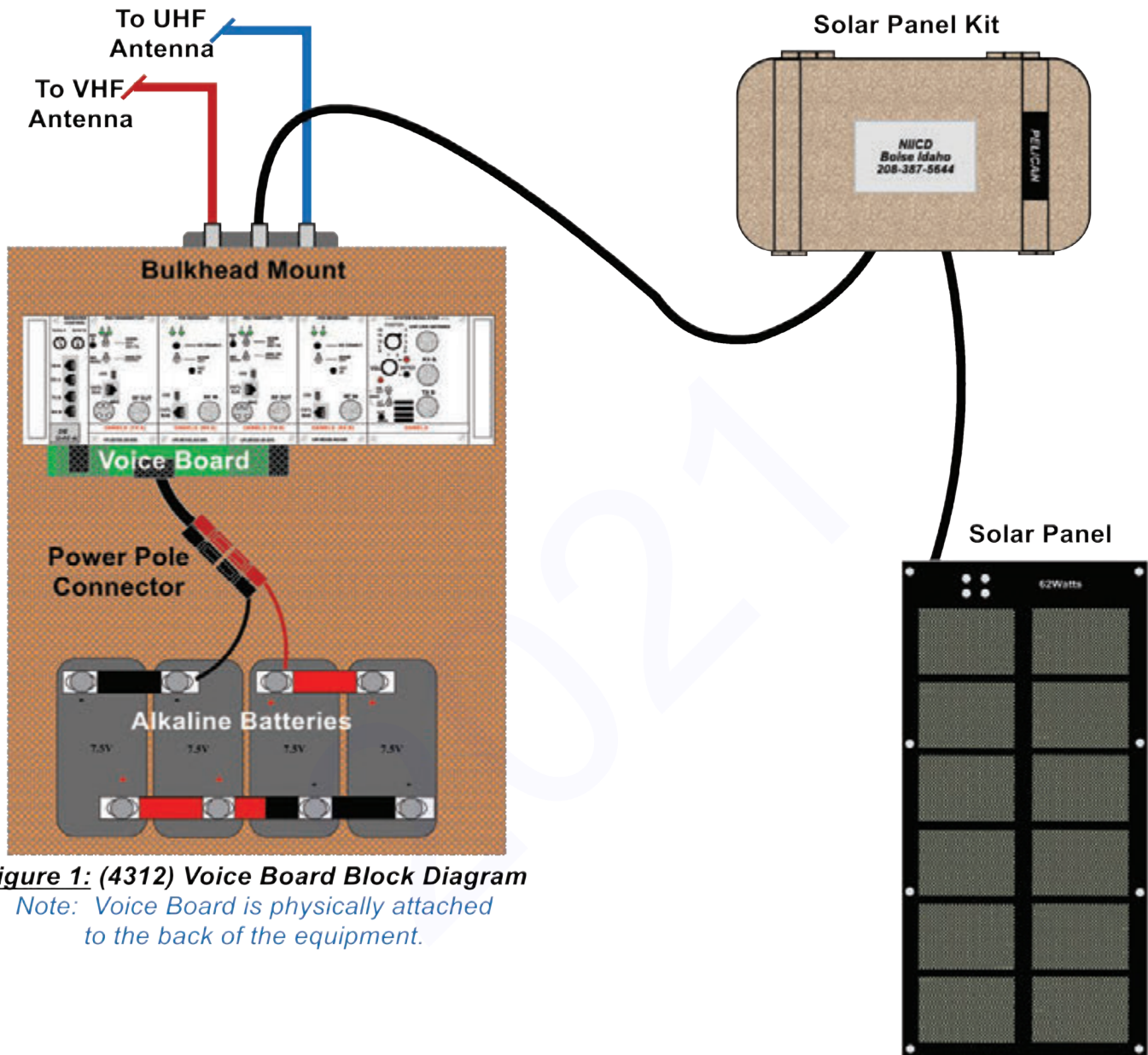
## EXAMPLE:

To hear the **equipment’s battery voltage** over the air, follow the following steps. *(Example for a 4312-FCK-C112)*

- 1. Ensure the handheld is on the correct frequency and that DTMF tones are enabled.**
- 2. Key the handheld, and using the DTMF keypad, enter the following pin: 1 - 1 - 1 - 2 - 1**
- 3. Un-key the handheld.**

The repeater will key and respond with “**Powered from solar 13.2 Volts; open circuit alkaline 14.5 Volts**”. This indicates the repeater is being powered by the solar panel and the alkaline is currently disconnected from the circuit. When the solar voltage falls below the switch-point, the alkaline battery will automatically switch in and when the repeater is again keyed up with the pin, the message will indicate the repeater is being powered from alkaline and solar is open circuit.

# VOICE BOARD OPERATING INSTRUCTIONS



**Figure 1: (4312) Voice Board Block Diagram**

*Note: Voice Board is physically attached to the back of the equipment.*

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**BATTERY INFORMATION  
AND MATRIX**

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# GENERAL RADIO BATTERY INFORMATION

When ordering batteries, round the order to the next full STANDARD PACK. (See Standard Pack entry in the Radio and Equipment Kit Battery Matrix or see listing in the GENERAL SECTION of the NFES Catalog, under Battery, Radio.)

All NIRSC radios utilized alkaline technology batteries. Alkaline batteries should have a shelf life of two years with only about 10% degradation in power. The batteries used in NIICD equipment and applications can probably be stored for four years, however the life will be noticeably shorter.

Battery life with the clamshell-type battery holder will depend upon the AA cells installed, type of radio used, whether the radio is in “scan” mode, and the power output setting on the radio. P25 radios drain batteries more quickly than analog radios. **(See Radio and Equipment Battery Matrix)**

## **Battery Testing:**

Using a voltmeter to determine the state of an alkaline battery can yield very inconsistent results. A battery that no longer works on a repeater and which has not had a load placed on it for a few days may read “good” on a voltmeter (a voltmeter does not apply the proper current load). To correctly test the batteries in a repeater with a voltmeter, put the repeater in transmit condition to apply a load to the batteries. **(See Figure 1)**

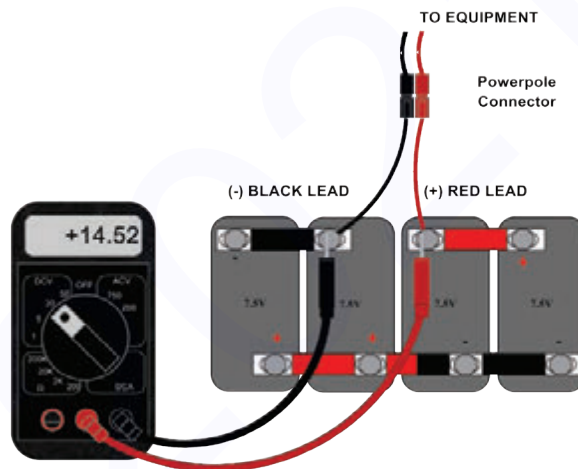


Figure 1: Sample Voltmeter Test on Series Parallel Battery Configuration

**Repeaters:** Replace batteries if the voltage is at 10.5 volts with the transmitter keyed up. Starting voltage is about 15 volts with the transmitter operating. Repeater batteries should last 5-7 days under heavy usage.

**(See Radio and Equipment Battery Matrix)**

*Note: NIRSC recommends testing the polarity of each battery before installation.*

*Some batteries have been known to come labeled incorrectly from the manufacture.*

**Radios:** The transmit LED is the best indicator of battery life. If the light holds bright for 3 seconds while transmitting on high power, the battery should be in good shape. Don't rely on the battery gauge on any radio since they are designed for use with rechargeable batteries. Radio batteries should easily last a shift (usually 12 hours).

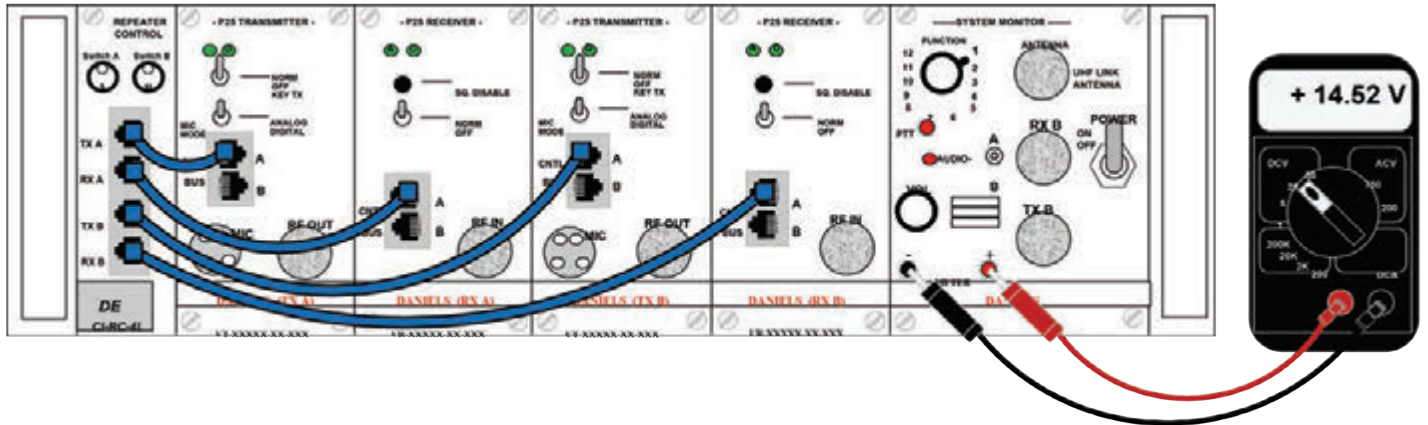
**(See Radio and Equipment Battery Matrix)**

*Note: Alkaline batteries are not considered hazardous waste, except in California. These batteries should be disposed of at the incident to save on shipping costs.*

*Remove battery straps from the batteries prior to disposal and return them with the kits.*

# GENERAL EQUIPMENT BATTERY TESTING

## System Monitor Battery Testing



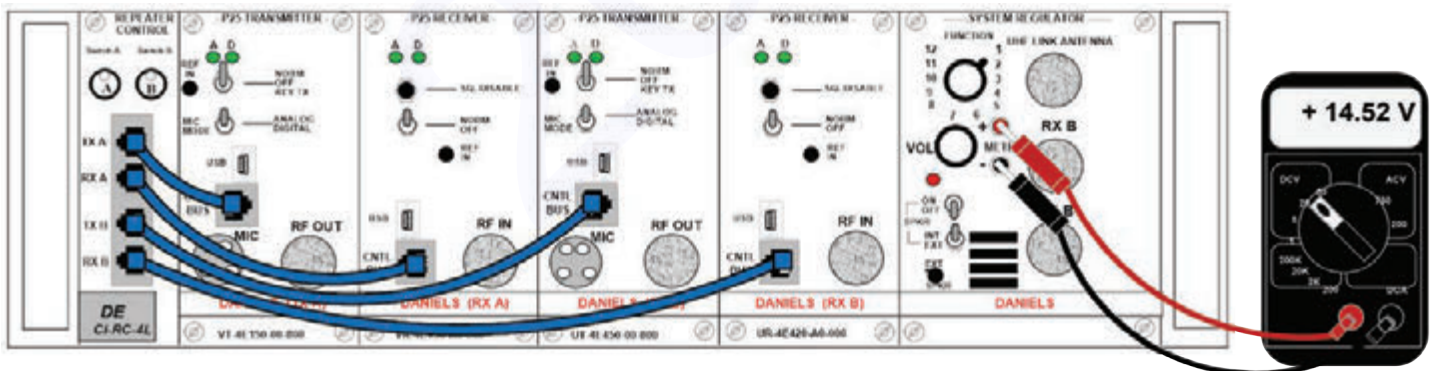
### Testing the Equipment Batteries under load on equipment with a System Monitor

- Connect the supplied batteries to the equipment.  
*Note: If new batteries are being installed, test each battery voltage and connect accordingly by following the battery diagrams for each piece of equipment.*
- Assure that **all power switches** on each module are turned to the "NORM" position.
- Connect a Volt Meter to the Meter Jacks on the **System Regulator Module**.
- Adjust the **Function Switch** on the **System Regulator** to position **2**.
- Press the "PTT" button on the **System Monitor** to key up the Transmitters to test the battery voltage under a load condition.
- Replace the batteries if the voltage is at or falls below **+10.5 volts** while under load.

#### System Monitor Switch Functions

2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
1, 4-12	NIRSC Testing

## System Regulator Battery Testing



### Testing the Equipment Batteries under load on equipment with a System Regulator

- Connect the supplied batteries to the equipment.  
*Note: If new batteries are being installed, test each battery voltage and connect accordingly by following the battery diagrams for each piece of equipment.*
- Assure that **all power switches** on each module are turned to the "NORM" position.
- Connect a Volt Meter to the Meter Jacks on the **System Regulator Module**.
- Adjust the **Function Switch** on the **System Regulator** to position **1**.
- Key up the Transmitters by either using a VHF or UHF handheld to test the battery voltage under a load condition.
- Replace the batteries if the voltage is at or falls below **+10.5 volts** while under load.

#### System Regulator Switch Functions

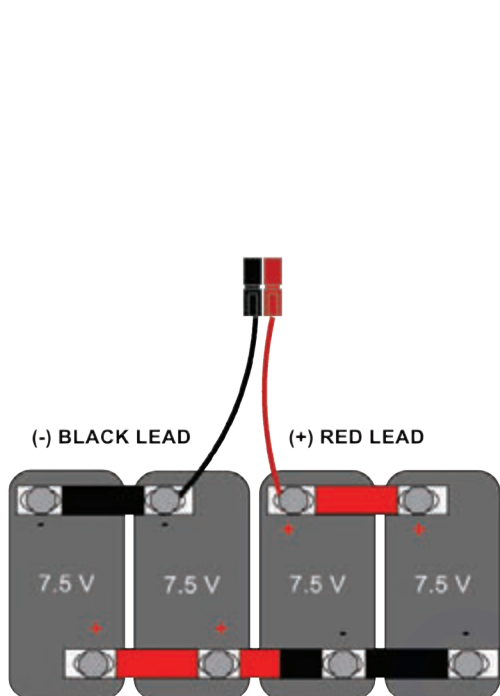
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3-12	NIRSC Testing

*Note: The equipment voltage can also be tested on both the System Regulator and System Monitor equipment by utilizing the Voice Board. See Voice Board Instructions*

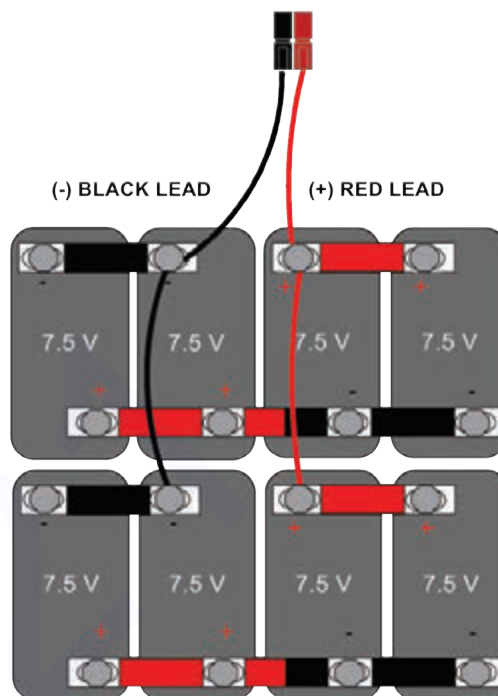
# BATTERY CONFIGURATIONS

In situations when there is heavy voice traffic on the system or where access to the site is limited, NIRSC recommends a double-battery system to avoid power failure during the incident. Even with a double battery system, voltage should be checked or batteries replaced every 7 days. *(See Figure 2)*

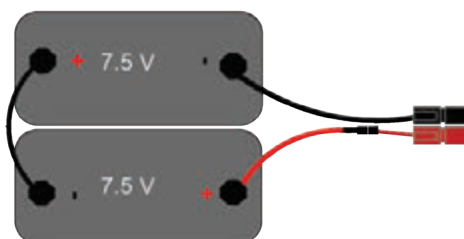
Solar Panel Kits (NFES# 004080) are available from NIRSC and are recommended for use at sites with limited access. Contact the CDO for Solar Panel Kit availability before ordering.



**Figure 1:**  
**+15 VOLT Standard Battery Configuration**  
Series/Parallel configuration requires two (1)  
set of 7.5 Volt Batteries (NFES # 1023)



**Figure 2:**  
**+15 VOLT Double Battery Configuration**  
Series/Parallel configuration requires two (2)  
sets of 7.5 Volt Batteries (NFES # 1023)



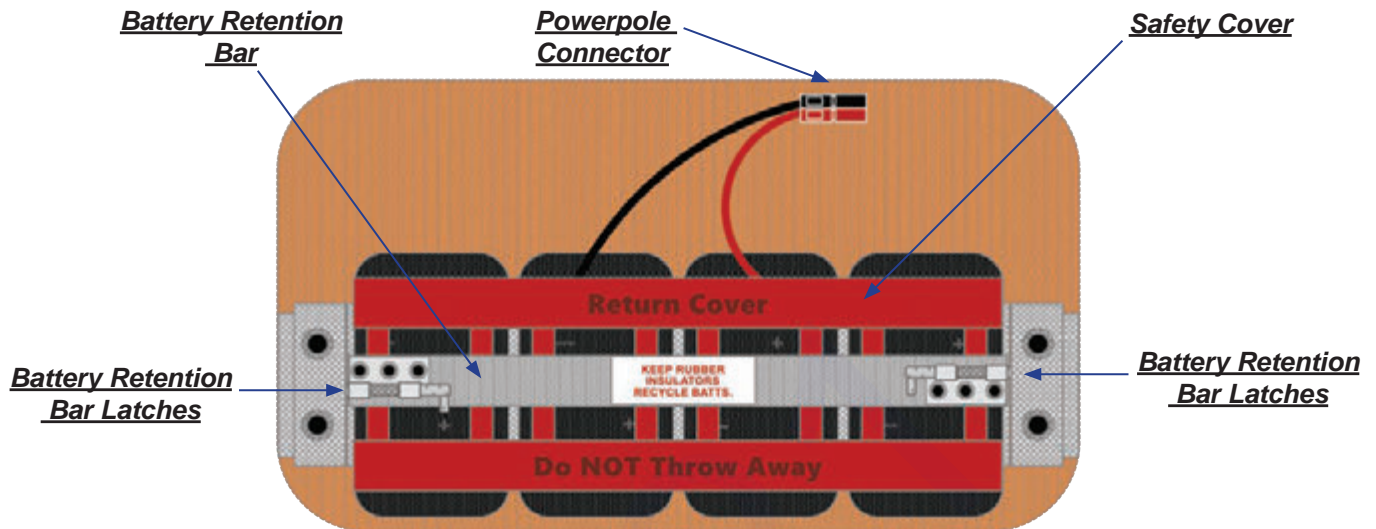
**Figure 3:**  
**+15 VOLT Series Battery Configuration**  
Series configuration requires two (2) each of 7.5 Volt Batteries

*Note: NIICD recommends that a deep cycle RV/marine battery and charger be purchased and utilized once three or more sets of batteries are needed at the site.*

# DOUBLE BATTERY STACK INSTALLATION

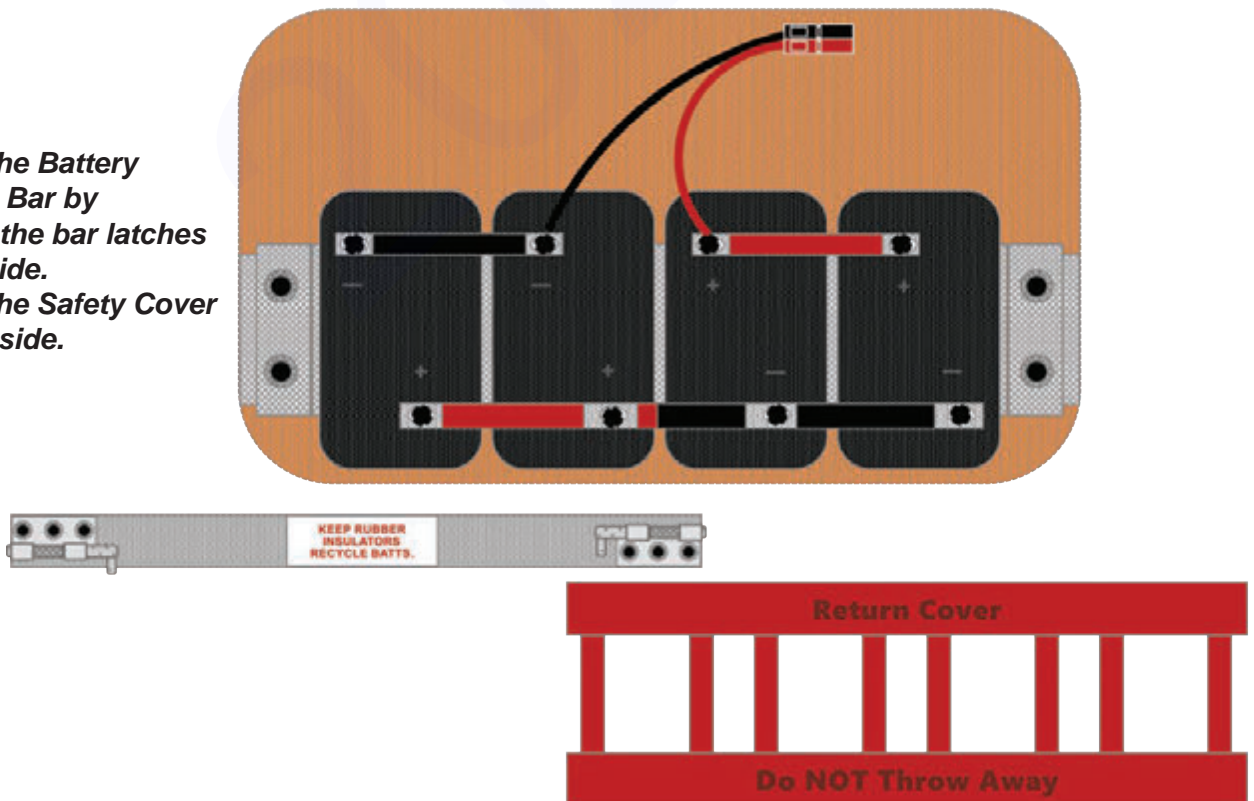
When installing a double battery stack within the equipment box, please following the following instructions to insure no metal is exposed and minimize the possibility of battery shorts and equipment failure due to improper wiring.

***\*WARNING: DO NOT TRANSPORT EQUIPMENT WITH DOUBLE BATTERY STACK\****



**Figure A:**  
**Standard Battery Configuration Sent from NIRSC**

1. Remove the Battery Retention Bar by releasing the bar latches and set aside.
2. Remove the Safety Cover and set a side.

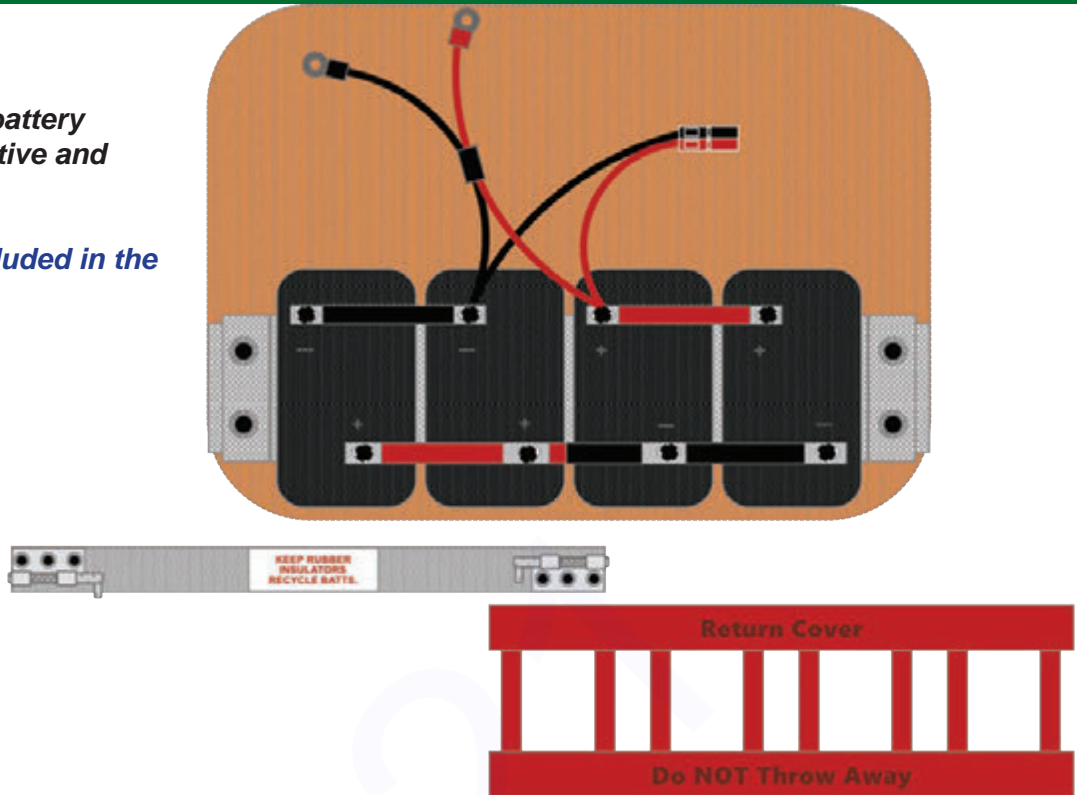


**Figure B:**  
**Retention Bar and Safety Cover Removal**

## DOUBLE BATTERY STACK INSTALLATION CONT.

3. Secure secondary battery jumpers to the positive and negative terminals.

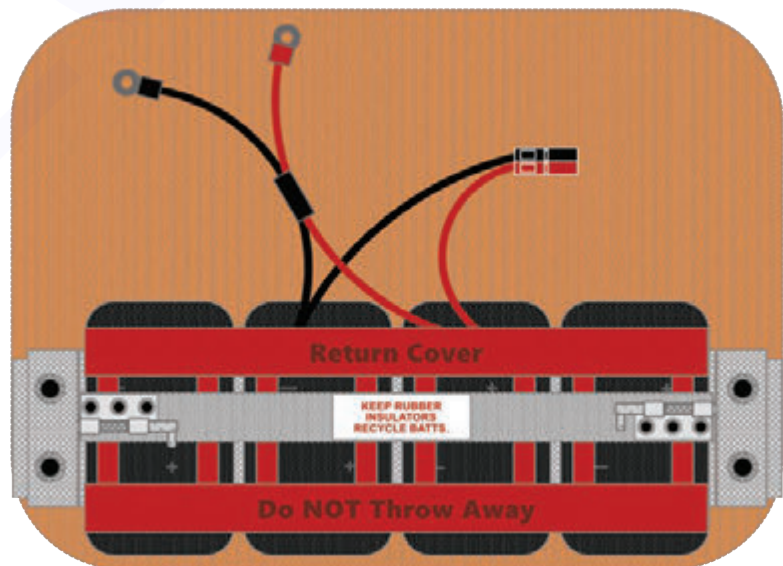
*Note: Jumpers are included in the 4100 kits.*



**Figure C:**  
**Battery Jumper Attachment**

4. Install the Safety Cover. Insure the wiring fits through the cutout slots on the bottom of the Safety Cover.
5. Install the Battery Retention Bar by engaging latches on both ends.

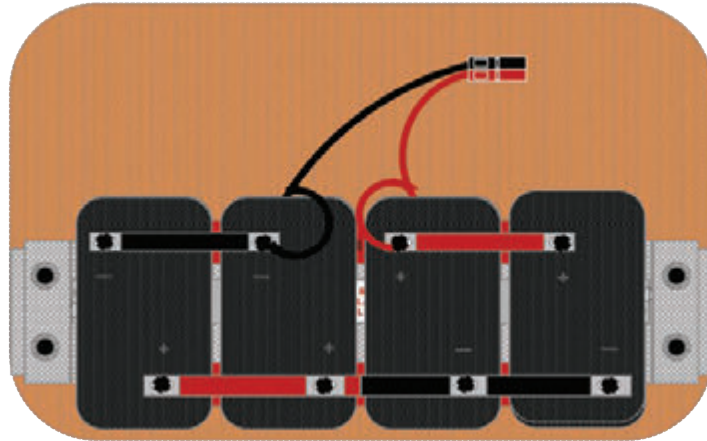
*Note: Ensure nothing inadvertently touches the bare battery terminals during these steps.*



**Figure D:**  
**Retentions Bar and Safety Cover Re-installment**

## DOUBLE BATTERY STACK INSTALLATION CONT.

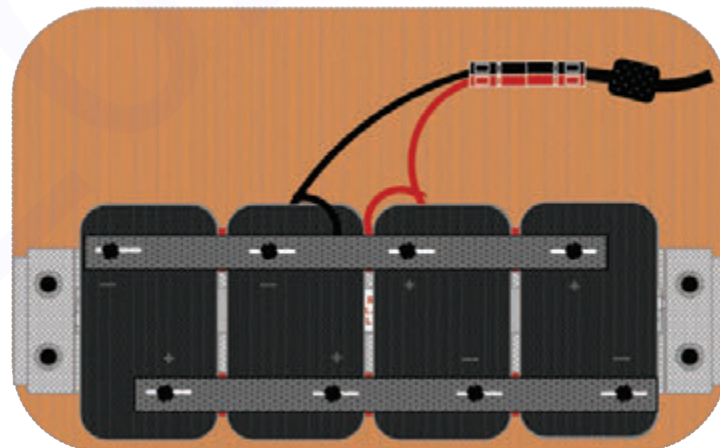
6. Add a second battery stack on top of the first stack using included battery straps.
7. Check battery voltage on the secondary battery to insure proper connections.
8. Attach the secondary battery jumpers from step 3 to the corresponding positive and negative terminals on the second battery stack.
9. Check the voltage on the Power-pole Connector to verify the proper voltage before connecting to the equipment.



**Figure E:**  
**Secondary Battery Stack**

10. Attach the black plastic terminal covers.
11. Attach the Battery Power Pole Connector to the Equipment Power Pole Connector.
12. Turn on equipment and verify operation.

**Note:** Black plastic terminal covers are located in the 4100 kits.



**Figure F:**  
**Final Connections**

**\*WARNING: DO NOT TRANSPORT EQUIPMENT WITH DOUBLE BATTERY STACK\***  
**\*\*\*REMOVE ALL BATTERIES FROM EACH KIT BOX BEFORE TRANSPORTING IN HELICOPTER\*\*\***

# RADIO AND EQUIPMENT BATTERY MATRIX

BATTERY TYPES				
NFES#	000030	000033	001023	001241
VOLTAGES	1.5Volts (AA)	1.5Volts (D)	7.5Volts	9Volts
STANDARD CACHE PACKAGE	24/PG	12/PG	4/BX	24/BX

HANDHELD RADIO CLAMSHELL BATTERY REQUIREMENTS					
RADIO TYPE	000030 (AA)	000033 (D)	001023 (7.5 V)	001241 (9 V)	Replacement Cycle
4381KD (KING DPH)	*9				**Every 12 Hours Max
4381K2 (KING KNG2)	*8				**Every 8 to 12 Hours Max
4244X2 (MOTOROLA XTS)	*12				**Every 8 to 12 Hours Max
4244K2 (KING KNG2)	*8				**Every 8 to 12 Hours Max
4244MD (MIDLAND)	*6				**Every 8 to 12 Hours Max
ICOM IC-A6 (AM)	*6				**Every 12 Hours Max

\* Note: Numbers reflect batteries required per clamshell.

\*\* Note: Replacement Cycle is under ideal normal usage and is only a NIRSC recommendation.

Battery consumption is directly dependant on channels scanned, priority mode, light operation, digital mode, and (PTT) Push-To-Talk cycles and duration.

EQUIPMENT KIT BATTERY REQUIREMENTS					
EQUIPMENT TYPE	000030 (AA)	000033 (D)	001023 (7.5 V)	001241 (9 V)	Replacement Cycle
4248 - UHF REPEATER			*4		** Every 5 Days Max
4281 - CROSSBAND LINK			*4		** Every 5 Days Max
4312 - VHF REPEATER			*4		** Every 5 Days Max
4300 - AM BASE STATION	*40		*4		** Every 5 Days Max
4370 - GROUND A/C LINK	*40		*4		** Every 5 Days Max
4330 - REMOTE			*4		** Every 5 Days Max
4330EX - REMOTE EXPANSION			*4		** Every 5 Days Max
4410 - PA SYSTEM	*3	*48			

\* Note: Numbers reflect batteries required per equipment kit .

\*\* Note: Replacement Cycle is under heavy usage and is only a NIRSC recommendation.

4390 STARTER SYSTEM BATTERY REQUIREMENTS		
SYSTEM TYPE	000030 (AA - 1.5 Volts)	001023 (7.5 Volts)
4390 w/DPH VHF/Motorola UHF Radios	*648 (27 Standard Packages)	**20 (5 Standard Boxes)
4390 w/DPH VHF /Midland UHF Radios	*552 (23 Standard Packages)	**20 (5 Standard Boxes)
4390 w/KNG VHF/KNG UHF Radios	*536 (23 Standard Packages)	**20 (5 Standard Boxes)
4390 w/KNG VHF/Midland UHF Radios	*600 (25 Standard Packages)	**20 (5 Standard Boxes)
4390 w/KNG VHF/Motorola UHF Radios	*504 (21 Standard Packages)	**20 (5 Standard Boxes)

\* Note: AA Battery requirements are per Replacement Cycle of one (1) per shift.

\*\* Note: 7.5 Volt Battery requirements are per Replacement Cycle of 5 days max

### ANTENNA INSTALLATION INSTRUCTIONS

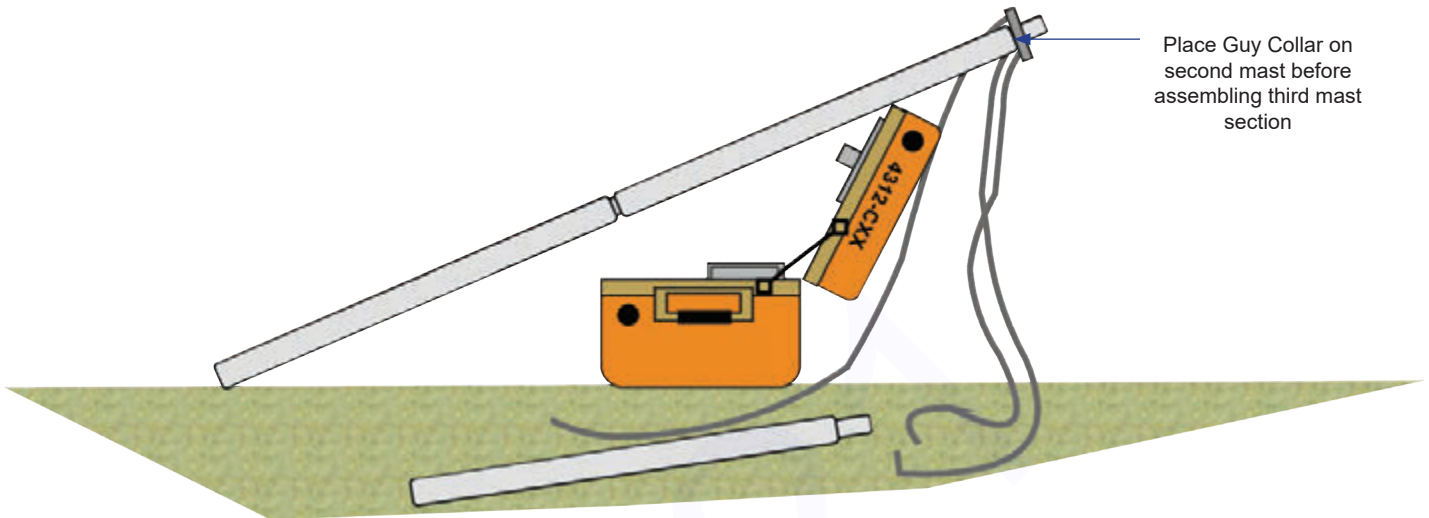
These diagrams are also available for download online at:

[www.nifc.gov/NIICD/documents.html](http://www.nifc.gov/NIICD/documents.html)

# ANTENNA INSTALLATION INSTRUCTIONS

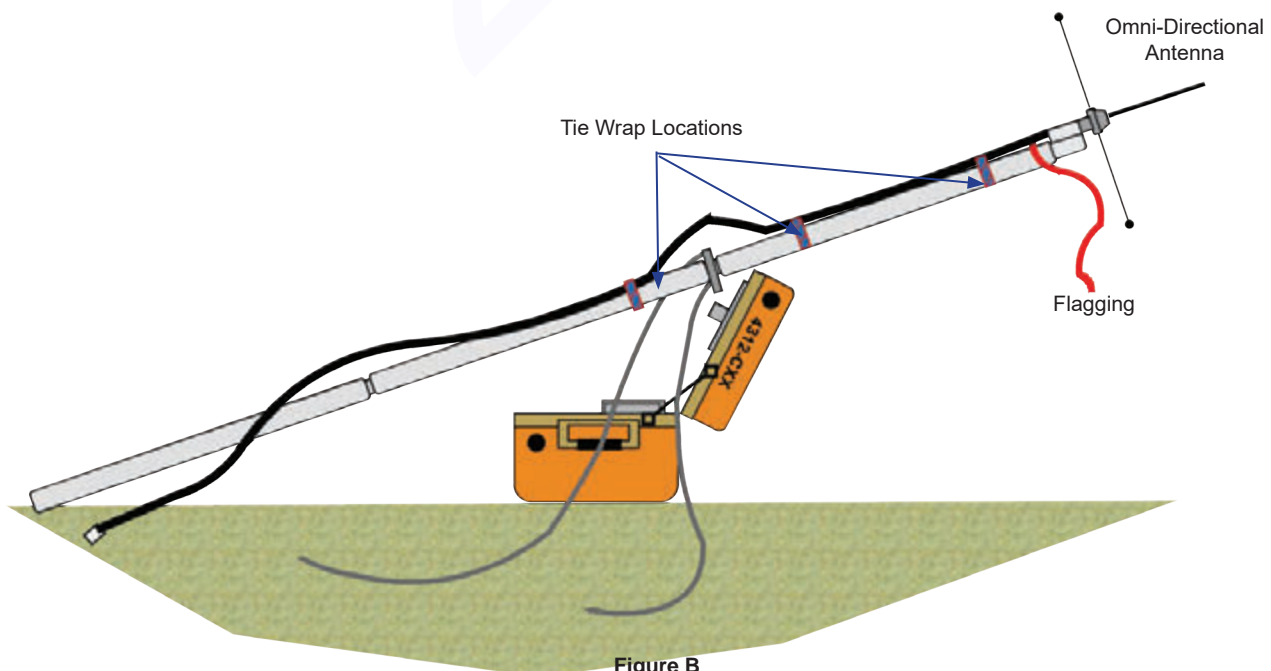
*Note: If setting up a linked system, NIRSC recommends starting with the Link antenna first.*

1. Place the equipment/box at the desired antenna location.
2. Assemble the two (2) mast sections first.
3. Place the guy collar on the end of the second mast before assembling the third mast section. **(See Figure A)**



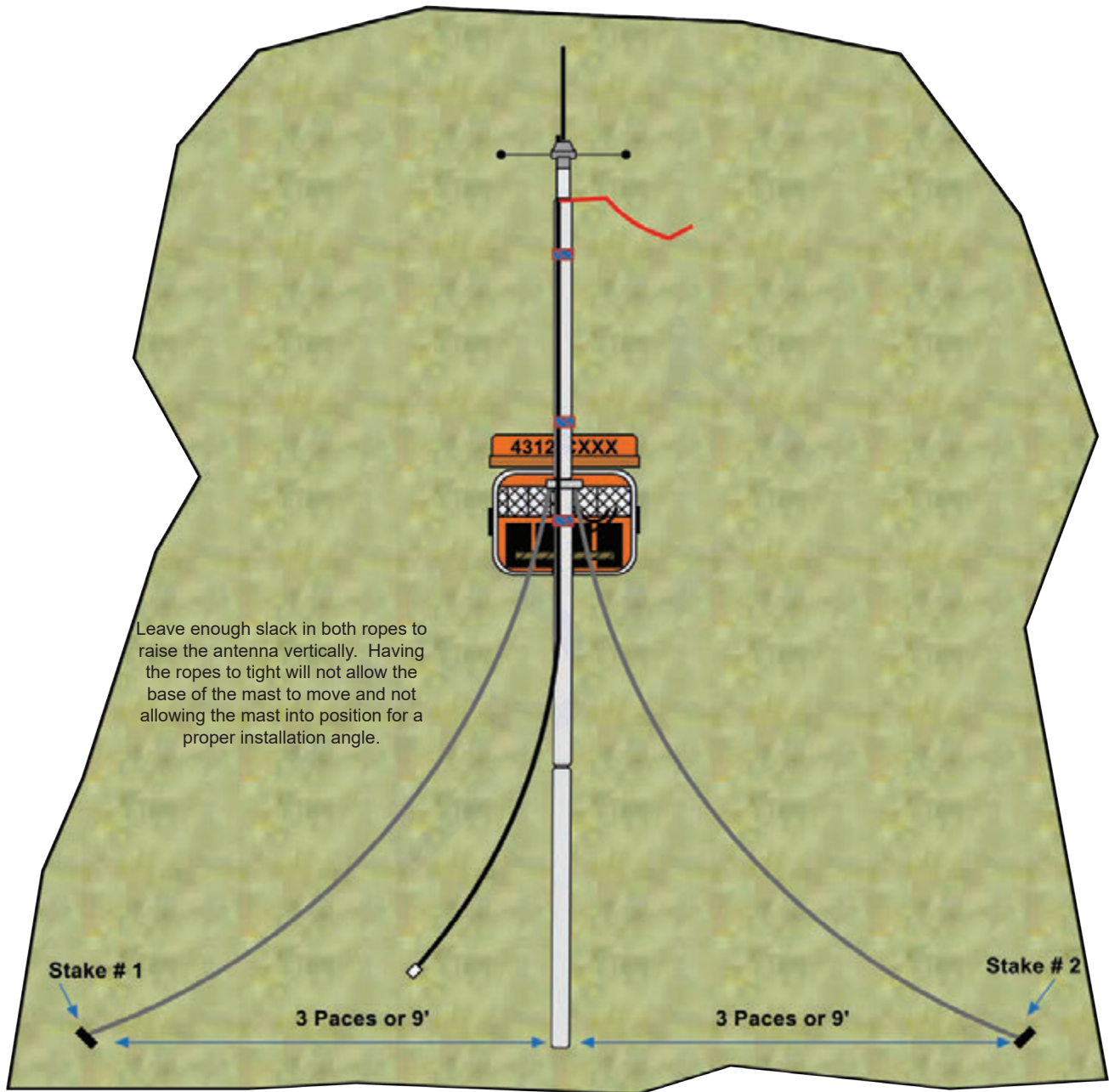
**Figure A**

4. Lay the assembled mast on the opened lid of the equipment/box with half of the 3rd section of the mast protruding beyond the lid of the equipment box. **(See Figure B)**
5. Install the antenna base onto the 3rd mast section. Raise all radial elements to the set holes and slide into groove to lock into place.
6. Connect the coax to the antenna base and secure the coax to the mast at three (3) places with provided tie wraps, 12 inches below the top of the mast and 12 inches above and below the guy collar, with a loop around the guy collar to prevent chafing the coax. **(See Figure B)**
7. Install the appropriate antenna whip (UHF or VHF) onto the antenna base.
8. Tear off a 2-3ft. long piece of flagging and tie it around the coax just below the antenna base.



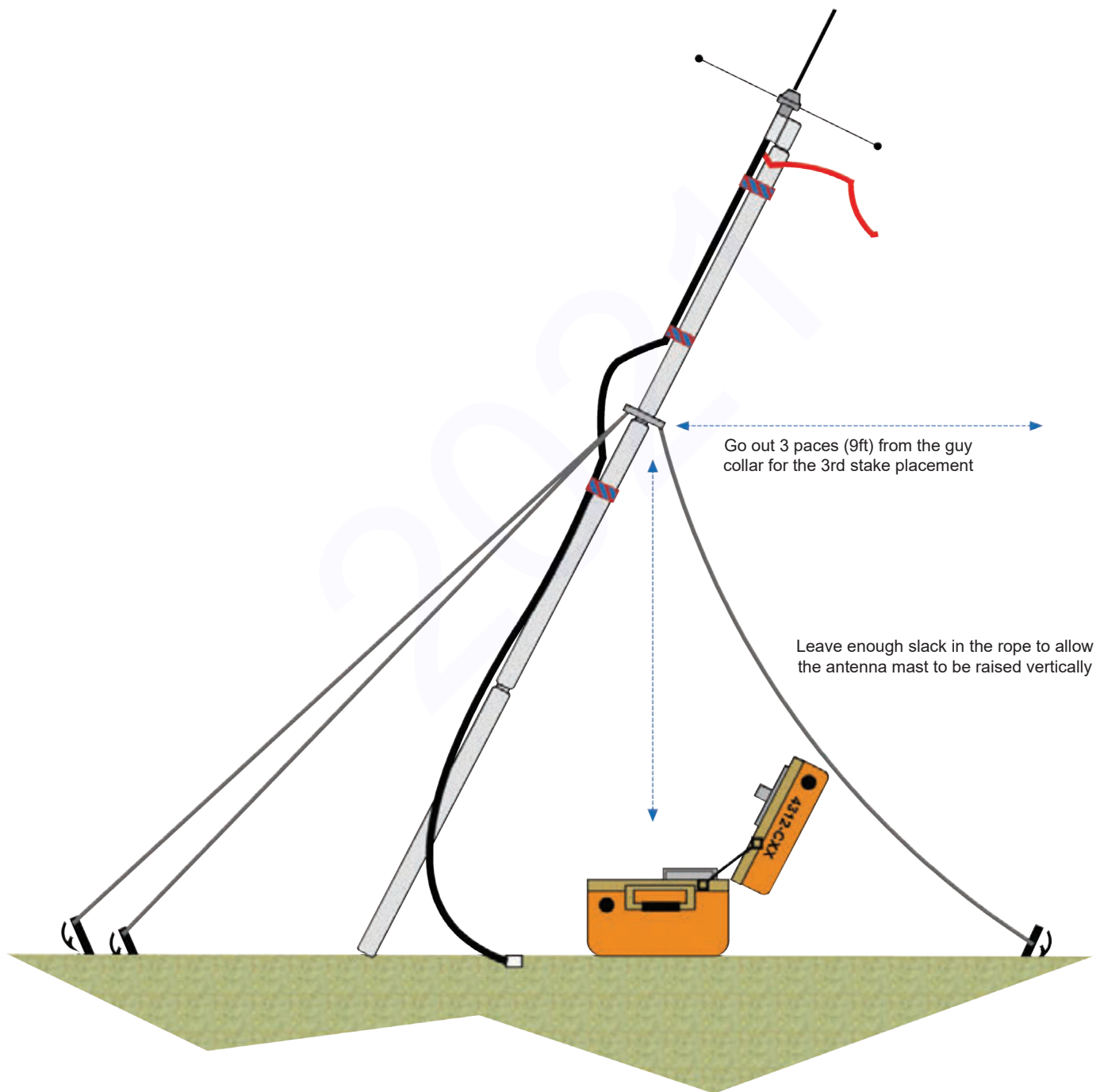
**Figure B**

9. Place two steel tent stakes, each 9 ft. (3 normal paces) perpendicular from the base of the antenna mast.
- Note: Drive the tent stakes in at an angle, with top end sloping away from the area where the equipment box and the antenna base will be located. Don't drive the tent stakes all the way down until all the guy ropes are secure in the following steps.*
10. Securely tie the ropes from the guy collar to each of the two tent stakes with either a trucker's hitch or a taut line hitch, leaving enough slack in the rope to raise the antenna vertically.
- Note: Use a knot that you are most comfortable with.*



**Figure C**

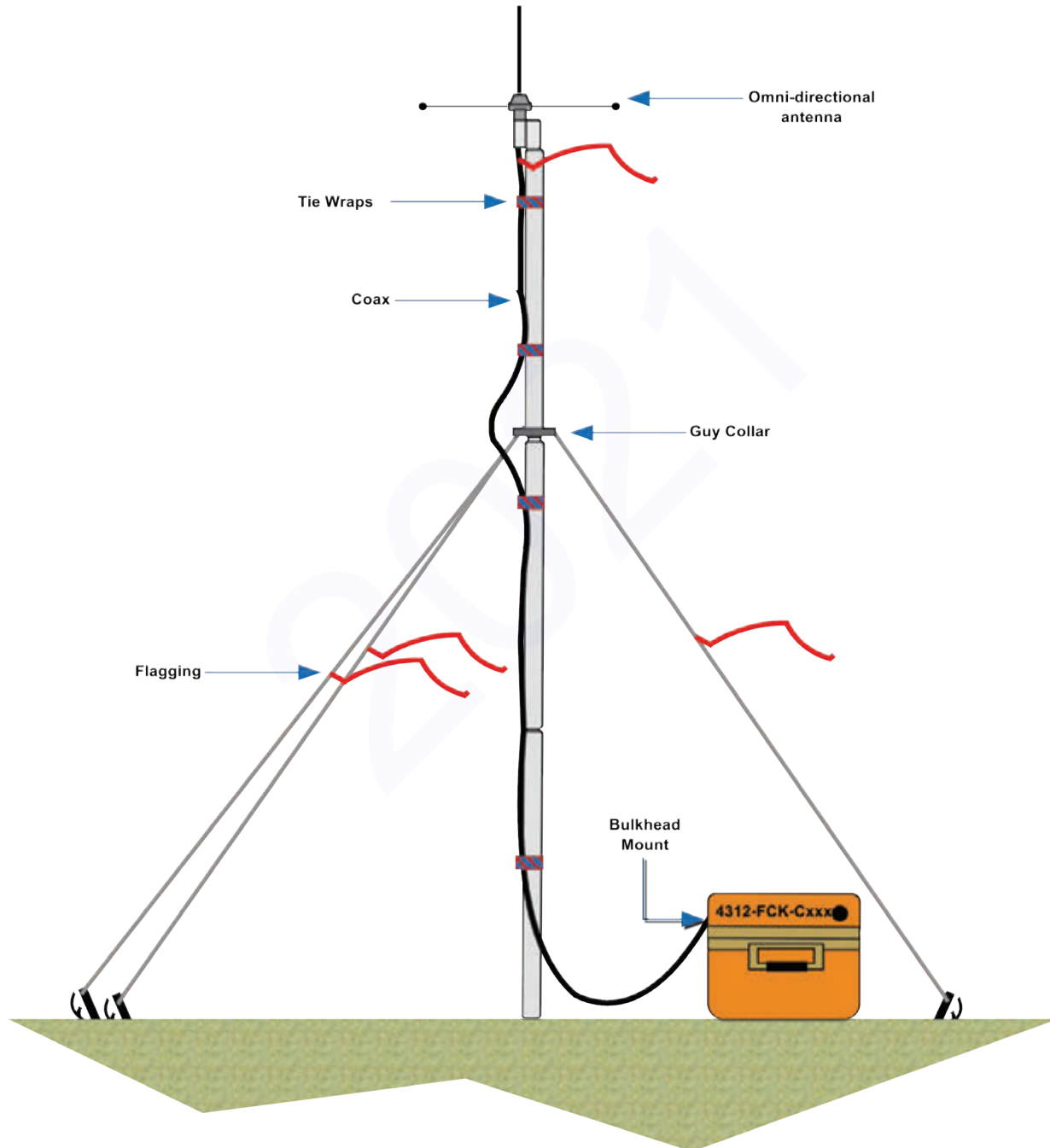
11. Stand the antenna up to nearly vertical by picking up the base of the mast and dragging it towards the equipment box. The antenna should stand alone which allows the installer to finish the install without the help of another individual. **(See Figure D)**  
*Note: In high wind situations, make sure the antenna is leaning away from the wind and not into the wind.*
12. Straight down from the guy collar, walk out 3 paces or 9 feet to find the placement of the 3rd tent stake. Place the 3rd tent stake at a location equidistant from the other two tent stakes and drive it in at an angle away from the antenna base.
13. Tie the remaining rope from the guy collar to the 3rd tent stake using either a trucker's hitch or taut line hitch. Leave enough slack in the rope of the 3rd stake to allow the antenna mast to be raised vertically.



**Figure D**

14. Stand the antenna vertically and tighten all three guy ropes if necessary. *(See Figure E)*  
*Note: Rope tension may need to be slightly eased in order to stand the antenna vertically.*
15. Hammer the 3 tent stakes down until the hook is flush with the ground.
16. Install at least 1, 2-3ft. long strip of flagging at eye level on each guy rope.
17. Attache the other end of the coax cable to the appropriate connector on the Bulkhead mount located on the back of the fiberglass box.  
*Note: The bulkhead mount connectors are clearly marked to facilitate proper installation.*
18. Attach a fourth tie wrap on the bottom mast section to secure the coax to the mast.
19. Secure the box by taping all uncovered box holes to prevent moisture and rodents from entering.

*Note: The antenna may be lowered by slightly lifting up the base and moving it towards the perimeter.*



**Figure E**

# LINK ANTENNA INSTALLATION INSTRUCTIONS

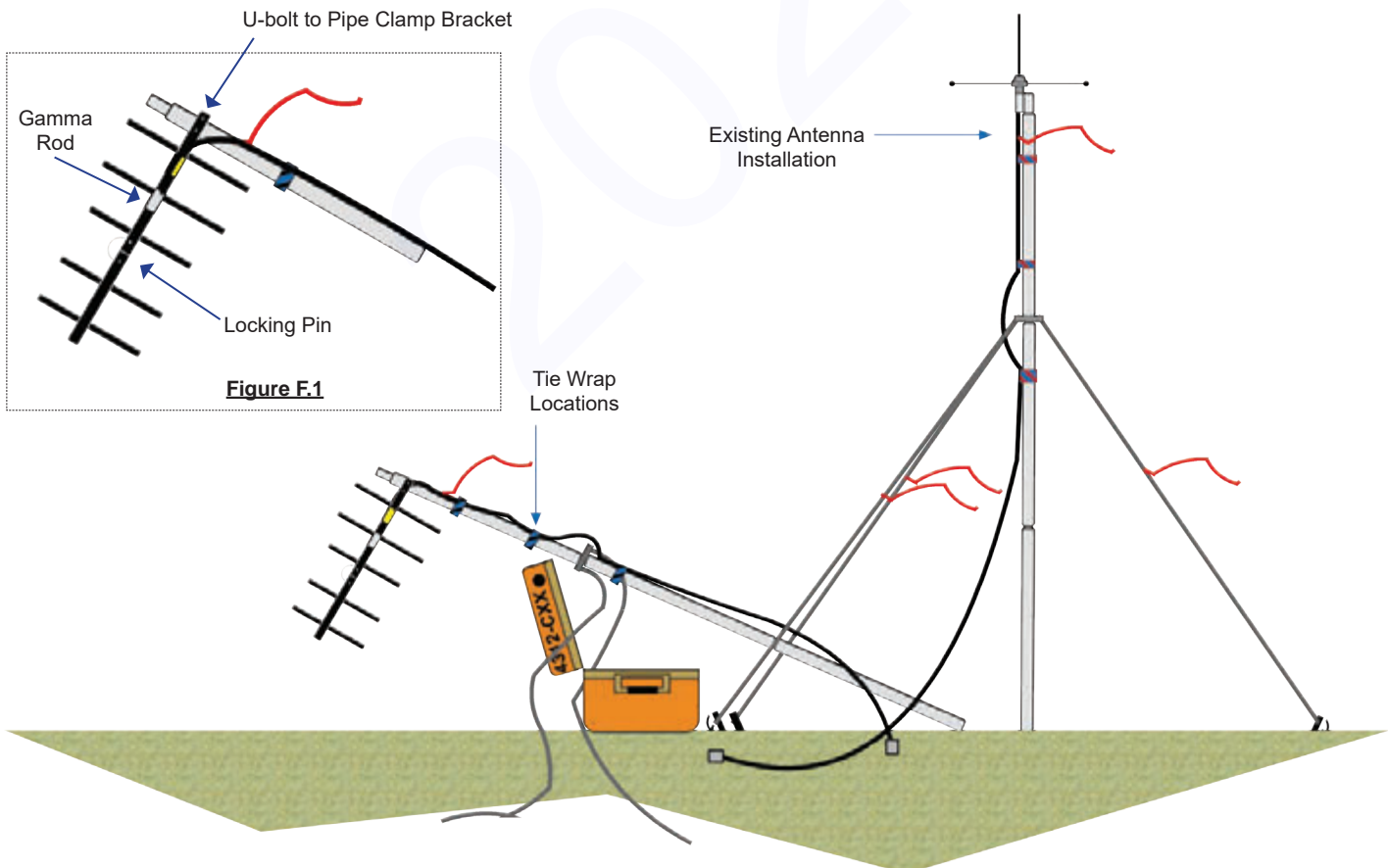
*Note: The Link Antenna Installation Instructions are assuming that the Omni-directional Antenna has been previously installed at the site.*

1. Disconnect the coax from the bulkhead connector and move the equipment box about 3 paces from the existing mast.
2. Rotate the equipment box and open the lid so that the opened lid will accommodate placing the mast in line with the desired target, and in line with the two other tent stakes placed earlier in the first antenna setup.
3. Assemble the two (2) mast sections first.
4. Place the guy collar on the end of the second mast before assembling the third mast section.
5. Lay the assembled mast on the opened lid of the equipment/box with half of the third section of the mast protruding beyond the lid of the equipment box. **(See Figure F)**
6. Install the appropriate antenna on the 3rd mast section. If an omni-directional antenna is being used, be sure to match the proper antenna base and to raise and lock the radials. If a Yagi is being used, assemble the antenna and ensure the locking pin is in place before clamping the pipe clamp bracket to the top of the mast. **(See Figure F.1)**

**Note: The Gamma Rod must be facing down for weather considerations.**

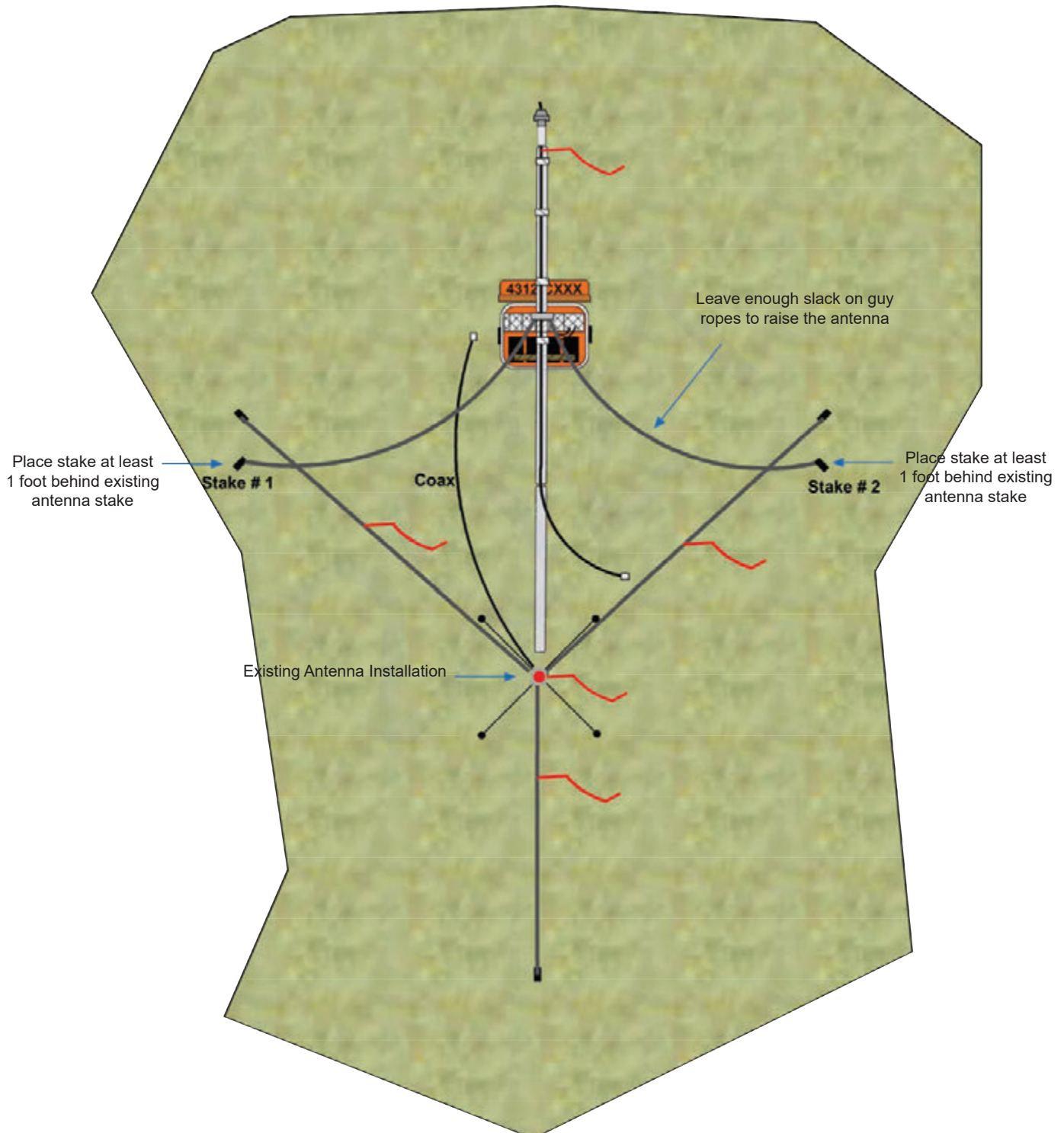
**NIRSC Yagi Antennas have a 50 degree Vertical and 60 Degree Horizontal beam widths.**

7. Connect the coax to the selected antenna base or Yagi.
8. Secure the coax to the antenna mast at three places with provided tie wraps, 12 inches below the antenna base and 12 inches above and below the guy collar, with a loop around the guy collar to prevent chafing the coax.
9. Tear off a 2-3ft piece of flagging and tie it around the coax just below the antenna base.



**Figure F**

10. Place two tent stakes in-line with the existing two antenna stakes. **(See Figure G)**  
*Note: Drive the tent stakes in at an angle, with stake tops sloping away from the area where the equipment box and the antenna base will be located. Don't drive the tent stakes all the way down until all the guy ropes are secured in the following steps.*
11. Securely tie the ropes from the guy collar to each of the two tent stakes with either a trucker's hitch or a taut line hitch, leaving enough slack in the ropes to raise the antenna vertically.  
*Note: Use a knot that you are most comfortable with.*
12. Tent stake #3 should be in line with the end of the antenna whip and should be marked at this time.



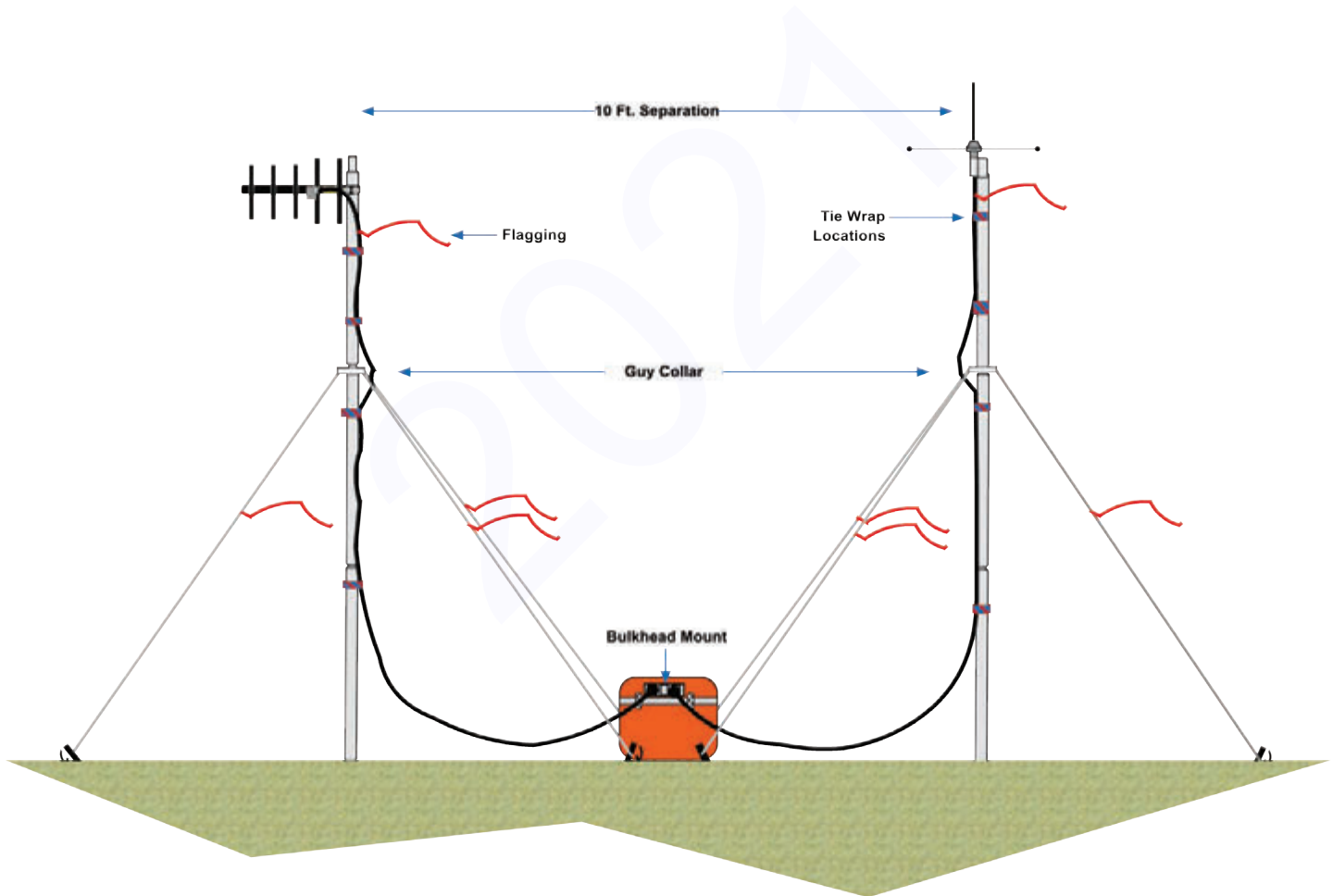
**Figure G**

13. Stand the antenna up to nearly vertical by picking up the base of the mast and dragging it towards the equipment box. The antenna should stand alone which allows the installer to finish the install without the help of another individual. **(See figure D on previous pages for reference)**
14. Straight down from the guy collar, walk out 3 paces or 9 feet to find the placement of the 3 tent stake. Place the 3rd tent stake at a location equidistant from the other two tent stakes and drive it in at an angle away from the antenna base. **(See figure D on previous pages for reference)**
15. Tie the remaining rope from the guy collar to the 3rd tent stake using either a trucker's hitch or a taut line hitch.
16. Stand the antenna vertically, and tighten any loose ropes. **(See Figure H)**
17. Install at least 1, 2-3ft long strip of flagging at eye level on each guy rope.
18. Attache the coax cables to the appropriate connectors on the Bulkhead mount located on the back of the fiberglass box.

*Note: The bulkhead mount connectors are clearly marked to facilitate proper installation.*

19. Tie wrap the remaining bottom portion of the coax cables to the bottom mast.
20. Close the equipment box and secure the box by covering any holes with filament tape to prevent moisture and rodents from entering.

*Note: The antenna may be lowered by slightly lifting up the base and moving it towards the perimeter. It may be desirable to put flagging around the perimeter of the stakes or around the entire area. Be sure to pick up all flagging, tape, and other debris when removing the equipment.*

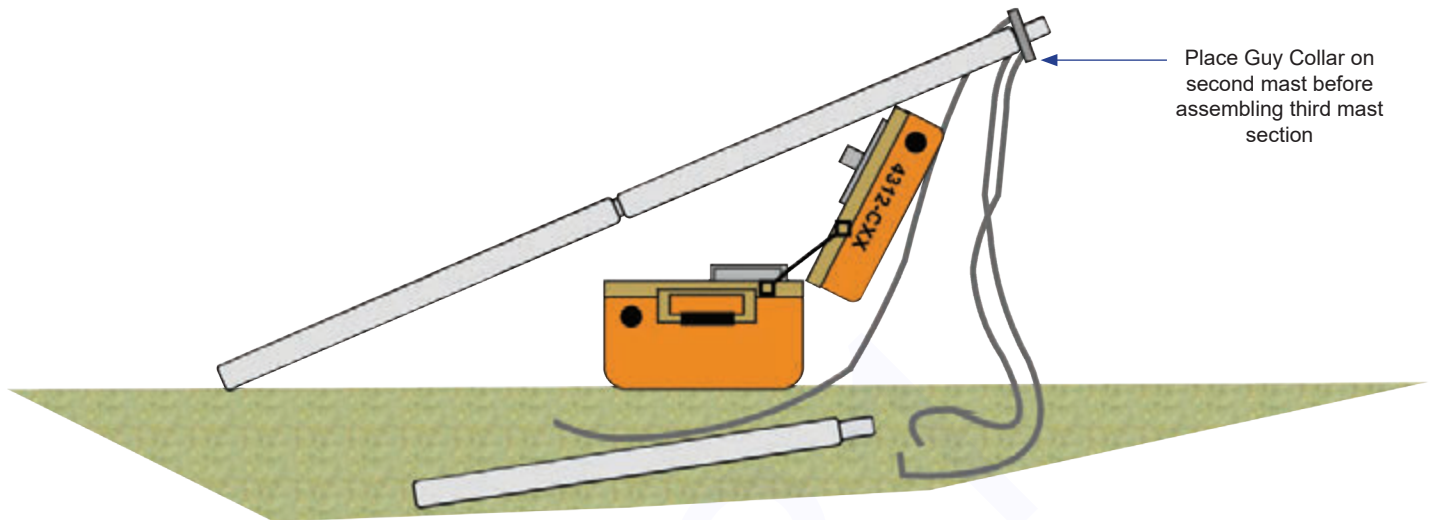


**Figure H**

# ONE MAST LINK ANTENNA INSTALLATION INSTRUCTIONS

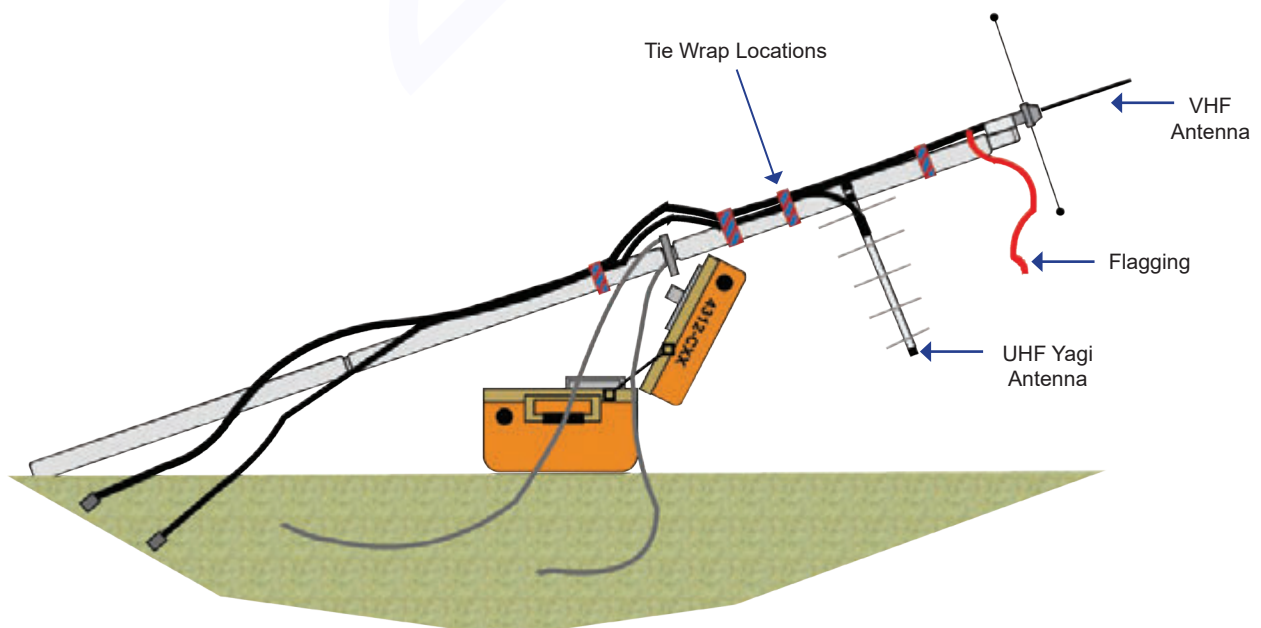
Due to terrain or other limitations, it might be necessary to place both VHF and UHF Yagi antennas on one set of mast.

1. Place the equipment/box at the desired antenna location.
2. Assemble the two (2) mast sections first.
3. Place the guy collar on the end of the second mast before assembling the third mast section. **(See Figure A)**



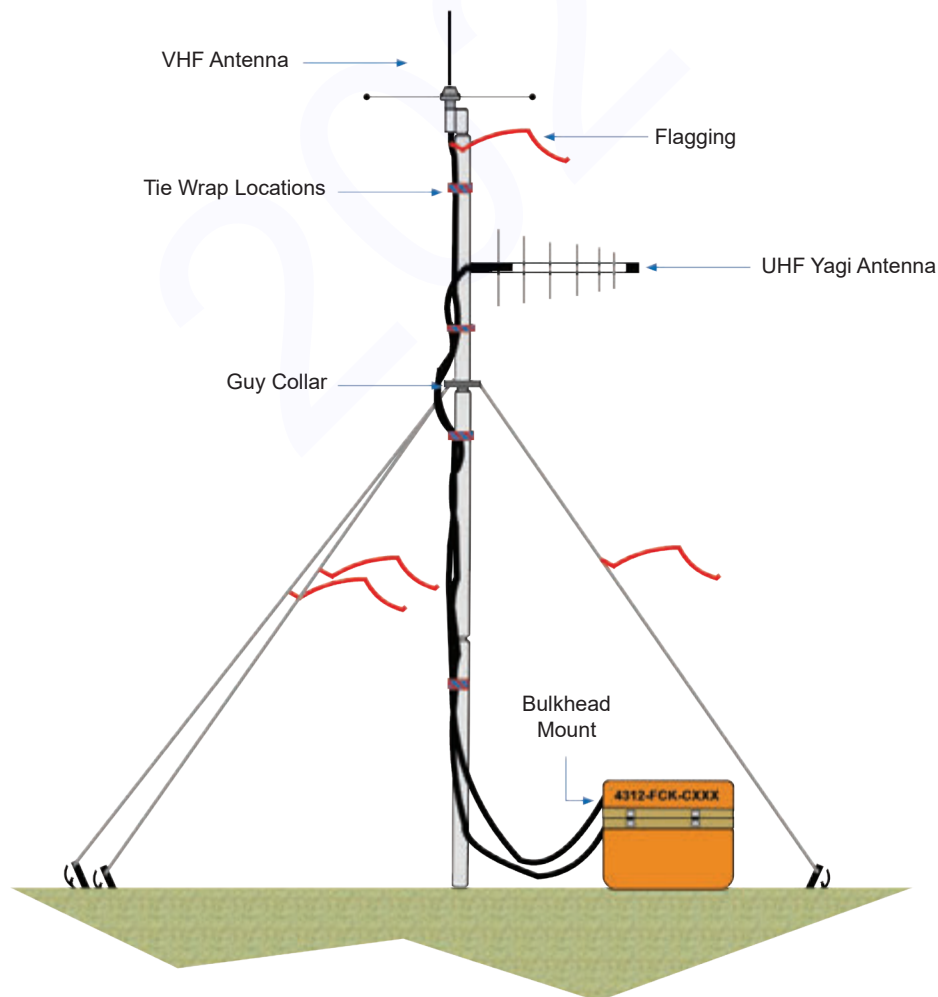
**Figure A**

4. Lay the assembled mast on the opened lid of the equipment/box with half of the 3rd section of the mast protruding beyond the lid of the equipment box.
5. Assemble the Yagi antenna and install it half way down the 3rd mast section. **(See Figure B)**  
**Note: The Gamma Rod must be facing down for weather considerations.**  
**NIRSC Yagi Antennas have a 50 degree Vertical and 60 Degree Horizontal beam widths.**
6. Install the VHF antenna base and appropriate VHF whip onto the 3rd mast section. Raise all radials and lock into place.
7. Connect the coax to the VHF antenna Base. Connect the second coax to the Yagi antenna. Secure both coax cables to the mast at four places with tie wraps adding a loop around the guy collar to prevent chafing the coax cables.



**Figure B**

8. Place two steel tent stakes, each 9 ft. (3 normal paces) perpendicular from the base of the antenna mast.  
*Note: Drive the tent stakes in at an angle, with top end sloping away from the area where the equipment box and the antenna base will be located. Don't drive the tent stakes all the way down until all the guy ropes are secure in the following steps.*
9. Securely tie the ropes from the guy collar to each of the two tent stakes with either a trucker's hitch or a taut line hitch, leaving enough slack in the rope to raise the antenna vertically. *Note: Use a knot that you are most comfortable with.*
10. Stand the antenna up to nearly vertical by picking up the base of the mast and dragging it towards the equipment box. The antenna should stand alone which allows the installer to finish the install without the help of another individual. **( See Figure D from previous pages )**  
*Note: In high wind situations, make sure the antenna is leaning away from the wind and not into the wind.*
11. Straight down from the guy collar, walk out 3 paces or 9 feet to find the placement of the 3rd tent stake. Place the 3rd tent stake at a location equidistant from the other two tent stakes and drive it in at an angle away from the antenna base. **( See Figure D from previous pages )**
12. Tie the remaining rope from the guy collar to the 3rd tent stake using either a trucker's hitch or taut line hitch. Leave enough slack in the rope of the 3rd stake to allow the antenna mast to be raised vertically.
13. Stand the antenna vertically and tighten all three guy ropes if necessary. **( See Figure C )**
14. Hammer the 3 tent stakes down until the hook is flush with the ground.
15. Install at least 1, 2-3ft. long strip of flagging at eye level on each guy rope.
16. Attache the other ends of the coax cables to the appropriate connector on the Bulkhead mount located on the back of the fiberglass box.
- Note: The bulkhead mount connectors are clearly marked to facilitate proper installation.*
17. Tie wrap the remaining bottom portion of the coax cables to the bottom mast.
19. Secure the box by taping all uncovered box holes to prevent moisture and rodents from entering.



**Figure C**

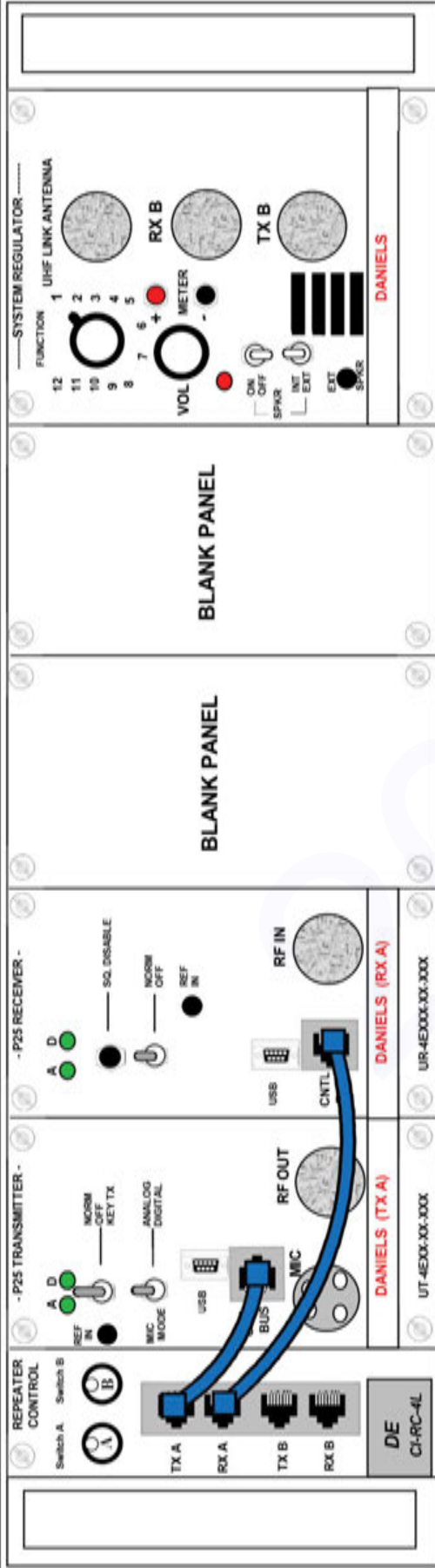
### DANIELS SWITCH SETTINGS

2021

These diagrams are also available for download online at:

[www.nifc.gov/NIICD/documents.html](http://www.nifc.gov/NIICD/documents.html)

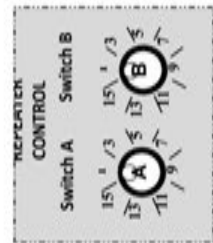
# 4248 - UHF REPEATER SWITCH SETTINGS (E - MODELS ONLY)



## 4248 - UHF REPEATER CONFIGURATION:

- Set up UHF Omni-Directional antenna and attach one end of the coaxial cable to the UHF base of the antenna mount. (See Antenna Instructions in User's Guide for detailed setup information)
- Attach the other end of UHF coaxial cable to the appropriate CONNECTOR on the back of the fiberglass box.
- Connect the power cable to the batteries using the provided POLARIZED fused cable.
- Once power cable is connected, all modules are active. (No master power switch)
- Keep the power switches on both the "TX A and RX A" modules in the "NORM" position.
- Keep the "MIC Mode" on the "TX A" in the "ANALOG" position.
- Keep the speaker audio OFF by switching the Speaker switch on the System Regulator to the "OFF" position.
- Test with two UHF handhelds to verify the repeater is operating correctly. (NIRSC recommends testing with the field units or ICP if possible before leaving the site.)

Note: No tones are available on the NIRSC UHF Repeaters unless specified by the field and programmed by NIRSC before shipment.



Close-Up View  
Switch A, Switch B  
Repeater Control Module

System Regulator Switch Functions (4248 -UHF Repeater) E-Models Only	
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
4, 6-12	NIRSC Technician Testing
Revised 2020	

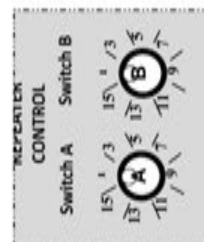
# 4248 - UHF REPEATER SWITCH SETTINGS



## 4248 - UHF REPEATER CONFIGURATION:

- Set up UHF Omni-Directional antenna and attach one end of the coaxial cable to the UHF base of the antenna mount. (See Antenna Instructions in User's Guide for detailed setup information)
- Attach the other end of UHF coaxial cable to the appropriate connector on the bulkhead mount located on the back of the Fiberglass box.
- Connect the power cable to the batteries using the provided POLARIZED fused cable.
- Turn the POWER switch to the "ON" position on the "System Monitor Module".
- Keep the power switches on both the "TX A and RX A" modules in the "NORM" position.
- Keep the "MIC Mode" on the "TX A" in the "ANALOG" position.
- Keep the speaker audio OFF by switching the A/B Speaker switch on the System Monitor to the "Center" position
- Test with two UHF handhelds to verify the repeater is operating correctly. (NIRSC recommends testing with the field units or ICP if possible before leaving the site.)

Note: No tones are available on the NIRSC UHF Repeaters unless specified by the field and programmed by NIRSC before shipment.



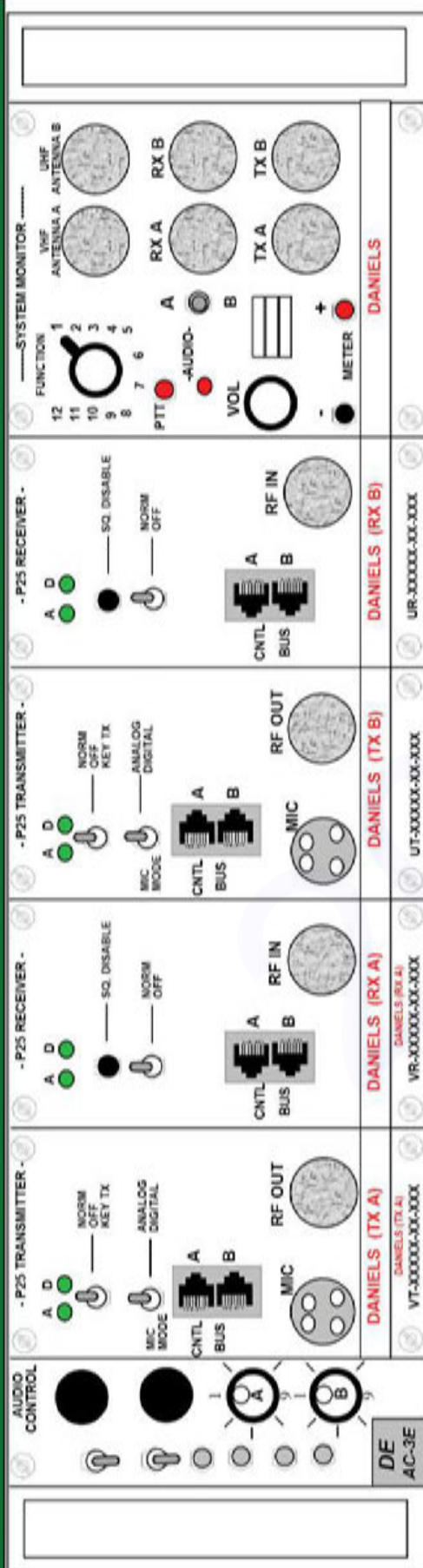
Close-Up View  
Switch A, Switch B  
Repeater Control Module

System Monitor Switch Functions (4248 -UHF Repeater Configuration)	
2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
1, 4-12	NIRSC Technician Testing
Revised 2018	

## Enabling Internal Speaker for Troubleshooting

- Enable the speaker Audio A by switching the Speaker A/B switch located on the System Monitor, to the "A" position.

# 4281 - CROSSBAND LINK SWITCH SETTINGS



## 4281 - CROSSBAND LINK CONFIGURATION: (Link Configuration)

1. Connect the power cable to the batteries using provided POLARIZED fused cable.

2. Turn on each module "ON" by flipping the module switches to the "NORM" position on the TX A, RX A, TX B, and RX B.

3. Keep both CTSS switches, located on the Audio Control Module, in the "OFF" (Down) position.

4. Keep the MIC MODE switch on both the TX A and TX B in the ANALOG position.

5. Select the assigned VHF frequency for both the TX A and RX A by turning the 16-position rotary Switch A on the Audio Control Module.

6. Select the assigned UHF frequency for both the TX B and RX B by turning the 16-position rotary Switch B on the Audio Control Module.

Note: The Communications Duty Officer (CDO) will assign the appropriate VHF and UHF frequency based on the assigned system configuration.

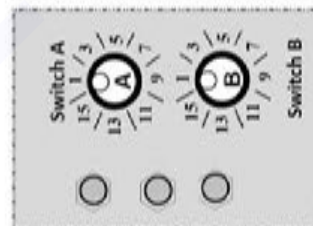
All Crossband Link Modules must be programmed at NIRS with assigned VHF, UHF and tones before shipping to an incident.

Switch A - VHF Frequency List

Position 1	C1 RPTR
Position 2	C2 RPTR
Position 3	C3 RPTR
Position 4	C4 RPTR
Position 5	C5 RPTR
Position 6	C6 RPTR
Position 7	C7 RPTR
Position 8	C1 RX SIMPLEX
Position 9	C2 RX SIMPLEX
Position 10	C3 RX SIMPLEX
Position 11	C4 RX SIMPLEX
Position 12	C5 RX SIMPLEX
Position 13	C6 RX SIMPLEX
Position 14	C7 RX SIMPLEX
Position 15	SPECIAL USE
Position 16	SPECIAL USE

Switch B - UHF Frequency List

Position 1	L1 RPTR
Position 2	L2 RPTR
Position 3	L3 RPTR
Position 4	L4 RPTR
Position 5	L5 RPTR
Position 6	L6 RPTR
Position 7	L7 RPTR
Position 8	L1 RX SIMPLEX
Position 9	L2 RX SIMPLEX
Position 10	L3 RX SIMPLEX
Position 11	L4 RX SIMPLEX
Position 12	L5 RX SIMPLEX
Position 13	L6 RX SIMPLEX
Position 14	L7 RX SIMPLEX
Position 15	SPECIAL USE
Position 16	SPECIAL USE



Close Up View  
Switch A and Switch B  
Audio Control Module

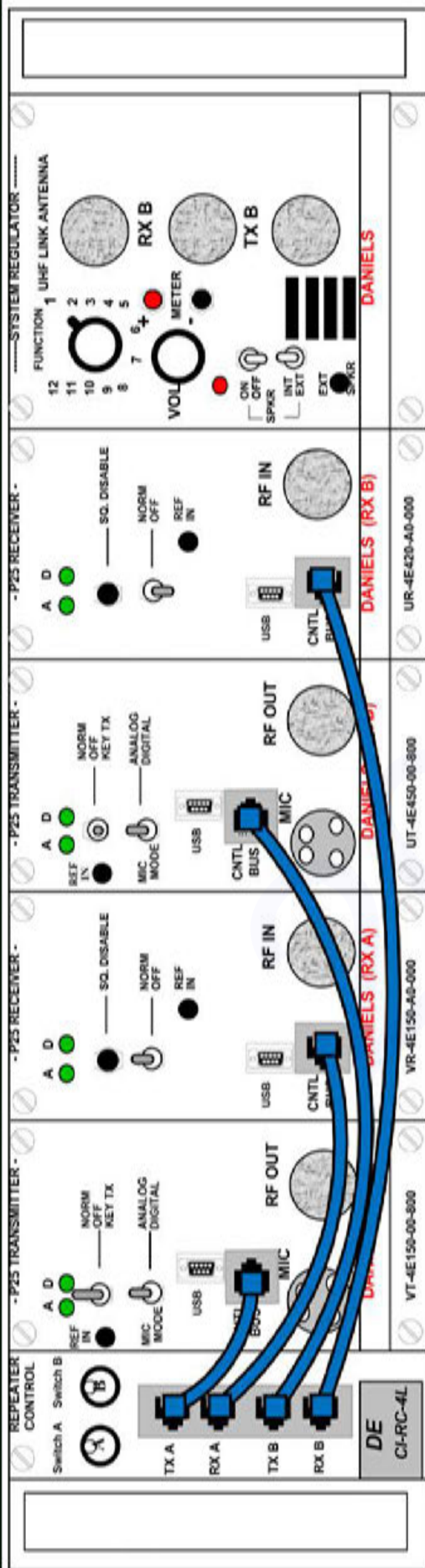
## Enabling Internal Speaker for Troubleshooting

- Enable the speaker Audio A by switching the Speaker A/B switch located on the System Monitor, to the "A" position.
- Enable the speaker Audio B by switching the Speaker A/B switch located on the System Monitor, to the "B" position.
- Default position is "Center" to turn speaker audio to OFF.

## System Monitor Switch Functions (4182 - Crossband Link Configuration)

2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
1, 4-12	NIRS Technician Testing
Revised 2020	

# 4312 - VHF REPEATER SWITCH SETTINGS (E - MODELS ONLY)



## 4312 - VHF REPEATER CONFIGURATION: (E-Models Only)

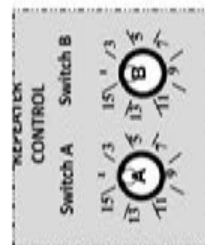
- Set up the VHF Directional antenna and attach the coaxial cable to the appropriate VHF Base antenna mount. *(See Antenna Instructions in User's Guide for detailed setup information)*
- Attach the other end of the VHF coaxial cable to the appropriate connector on the bulkhead mount located on the back of the fiberglass box.
- Connect the power cable to the batteries using the provided **POLARIZED** fused cable. Once power cable is connected, all modules are active. *(No master power switch)*
- Keep the power switches on both the "TX A" and "RX A" in the "NORM" position.
- Keep the "MIC Mode" on the "TX A" in the "ANALOG" position.
- Keep the speaker audio off by switching the Speaker switch on the System Regulator to the "OFF" position
- Select the assigned tone by turning Switch A knob, located on the top portion of the Repeater Control Module, to assigned tone. *(See Switch A - Tone Selection Table)*
- [This is a 16 Position Knob, Position 1 is straight up]*
- Test with two VHF handhelds to verify the repeater is operating correctly. *(NIRSC recommends testing with the field units or ICP if possible before leaving the site.)*

Note: Selecting a tone will enable the tone on both the TX A and RX A Modules.

The Communications Duty Officer (CDO) will assign the appropriate tone for each incident.

Contact the CDO for a tone assignment @ 208-387-554

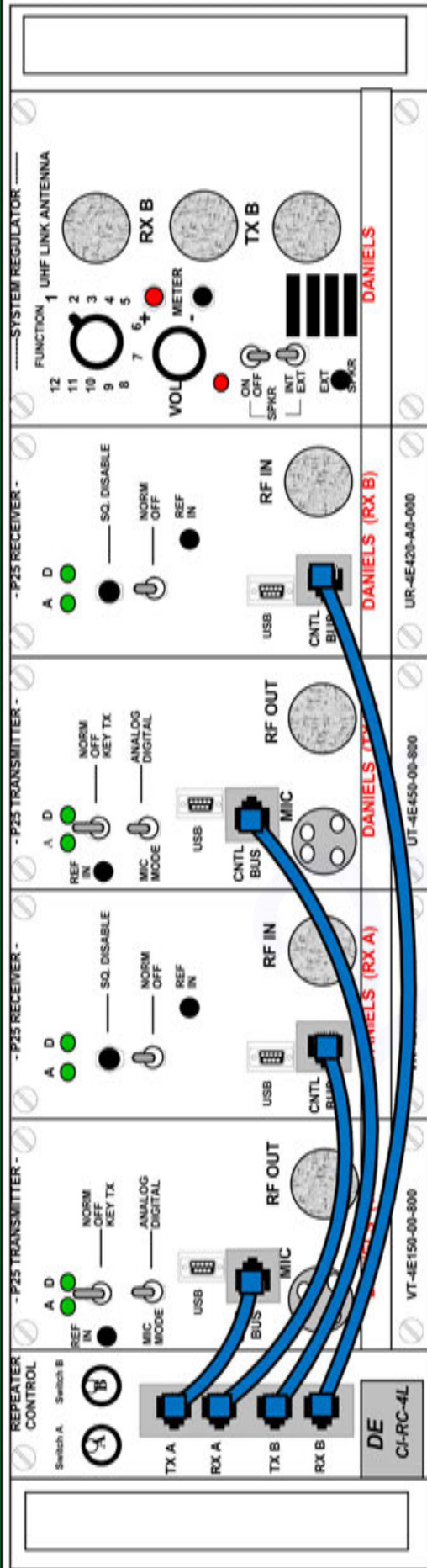
Switch A - Tone Selection Table	
Position 1 - Tone 1 (110.9)	
Position 2 - Tone 2 (123.0)	
Position 3 - Tone 3 (131.8)	
Position 4 - Tone 4 (136.5)	
Position 5 - Tone 5 (146.2)	
Position 6 - Tone 6 (156.7)	
Position 7 - Tone 7 (167.9)	
Position 8 - Tone 8 (103.5)	
Position 9 - Tone 9 (100.0)	
Position 10 - Tone 10 (107.2)	
Position 11 - Tone 11 (114.8)	
Position 12 - Tone 12 (127.3)	
Position 13 - Tone 13 (141.3)	
Position 14 - Tone 14 (151.4)	
Position 15 - Tone 15 (162.2)	
Position 16 - No Tone	



Close-Up View  
Switch A, Switch B  
Repeater Control Module

System Regulator Switch Functions (4312 -VHF Repeater/Link Configuration) E-Models Only	
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
4, 6-12	NIRSC Technician Testing
Revised 2018	

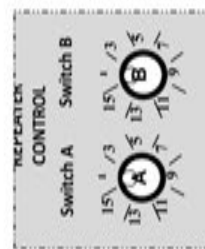
# 4312 - VHF REPEATER/LINK SWITCH SETTINGS (E - MODELS ONLY)



## 4312 - VHF REPEATER/LINK CONFIGURATION: (E-Models Only)

- Set up the VHF antenna and attach the coax to the appropriate VHF base and connector on the bulkhead mount located on the back of the fiberglass box. *(See Antenna Instructions in User's Guide)*
- Set up the UHF antenna and attach the coax to the appropriate UHF base and connector on the bulkhead mount located on the back of the fiberglass box.
- Connect the power cable to the batteries using the provided POLARIZED fused cable. Once power cable is connected, all modules are active. *(No master power switch)*
- Keep the power switches on all Modules "TX A", "RX A", "TX B", "TX A" in the "ANALOG" position.
- Keep the "MIC Mode" on the "TX A" and "TX B" in the "ANALOG" position.
- Keep the speaker audio off by switching the Speaker switch on the System Regulator to the "OFF" position
- Select the assigned tone by turning Switch A knob, located on the top portion of the Repeater Control Module, to assigned tone. *(See Switch A - Tone Selection Table)*
- (This is a 16 Position Knob, Position 1 is straight up)*
- Select the assigned UHF Frequency by turning the Switch B knob to assigned UHF Frequency. *(See Switch B - UHF Link Frequency Selection Table)*
- (This is a 16 Position Knob, Position 1 is straight up)*
- Test with Two VHF Handhelds and One UHF Handheld to verify Repeater/Link is operating correctly. *(NIRSC recommends testing with the field units or ICP before leaving the site)*

Note: Selecting a tone will enable the tone on both the TX A and RX A Modules.  
The Communications Duty Officer (CDO) will assign the appropriate tone and UHF Frequency for each incident. Contact the CDO for Tone and UHF Frequency assignment @ 208-387-5644.



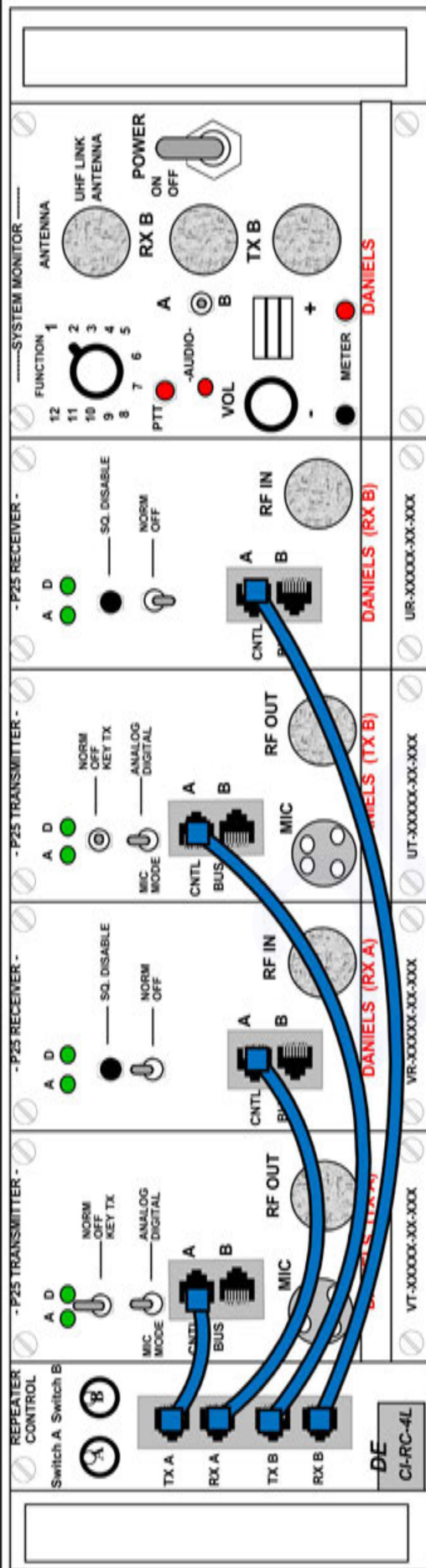
Close-Up View  
Switch A, Switch B  
Repeater Control Module

Switch A - Tone Selection Table	Switch B - UHF Link Frequency
Position 1 - Tone 1 (110.9)	Position 1 - L1 RPT Access
Position 2 - Tone 2 (123.0)	Position 2 - L2 RPT Access
Position 3 - Tone 3 (131.8)	Position 3 - L3 RPT Access
Position 4 - Tone 4 (136.5)	Position 4 - L4 RPT Access
Position 5 - Tone 5 (146.2)	Position 5 - L5 RPT Access
Position 6 - Tone 6 (156.7)	Position 6 - L6 RPT Access
Position 7 - Tone 7 (167.9)	Position 7 - L7 RPT Access
Position 8 - Tone 8 (103.5)	Position 8 - L1 RX Simplex
Position 9 - Tone 9 (100.0)	Position 9 - L2 RX Simplex
Position 10 - Tone 10 (107.2)	Position 10 - L3 RX Simplex
Position 11 - Tone 11 (114.8)	Position 11 - L4 RX Simplex
Position 12 - Tone 12 (127.3)	Position 12 - L5 RX Simplex
Position 13 - Tone 13 (141.3)	Position 13 - L6 RX Simplex
Position 14 - Tone 14 (151.4)	Position 14 - L7 RX Simplex
Position 15 - Tone 15 (162.2)	Position 15 - Special 1 - Simplex
Position 16 - No Tone	Position 16 - Special 2 - Simplex

## System Regulator Switch Functions (4312 -VHF Repeater/Link Configuration) E-Models Only

1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3-12	NIRSC Technician Testing
Revised 2018	

# 4312 - VHF REPEATER SWITCH SETTINGS



## 4312 - VHF REPEATER CONFIGURATION:

- Set up the VHF Omni-Directional antenna and attach one end of the coaxial cable to the base of the VHF antenna base mount. (See [Antenna Instructions in User's Guide](#))
- Attach the other end of the VHF coaxial cable to the appropriate connector on the bulkhead mount located on the back of the fiberglass box.
- Connect the power cable to the batteries using the provided **POLARIZED** fused cable.
- Turn the **Power Switch** to the "ON" position on the **System Monitor Module**.
- Keep the power switches on both the "TX A" and "RX A" modules in the "NORM" position.
- Keep the power switches on both the "TX B" and "RX B" modules in the "OFF" position. (Stand-alone Repeater Configuration - No Linking)
- Keep the "MIC Mode" on the "TX A" in the "ANALOG" position.
- Keep the speaker audio OFF by switching the A/B Speaker switch on the **System Monitor** to the "Center" position
- Select the assigned tone by turning **Switch A** knob, located on the top portion of the Repeater Control Module, to assigned tone. (See [Switch A - Tone Selection Table](#))
- (This is a 16 Position Knob, Position 1 is straight up)
- Test with two VHF handhelds to verify the repeater is operating correctly. (NIRPSC recommends testing with the field units of ICP if possible before leaving the site.

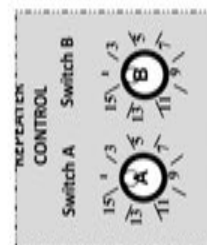
Note: Selecting a tone will enable the tone on both the TX A and RX A Modules.

The Communications Duty Officer (CDO) will assign the appropriate tone for each incident.

Contact the CDO for a Tone assignment @ 208-387-5644.

Switch A - Tone Selection Table	
Position 1 - Tone 1 (110.9)	
Position 2 - Tone 2 (123.0)	
Position 3 - Tone 3 (131.8)	
Position 4 - Tone 4 (136.5)	
Position 5 - Tone 5 (146.2)	
Position 6 - Tone 6 (156.7)	
Position 7 - Tone 7 (167.9)	
Position 8 - Tone 8 (103.5)	
Position 9 - Tone 9 (100.0)	
Position 10 - Tone 10 (107.2)	
Position 11 - Tone 11 (114.8)	
Position 12 - Tone 12 (127.3)	
Position 13 - Tone 13 (141.3)	
Position 14 - Tone 14 (151.4)	
Position 15 - Tone 15 (162.2)	
Position 16 - No Tone	

- Enable the speaker Audio A by switching the Speaker A/B switch located on the System Monitor, to the "A" position.
- Enable the speaker Audio B by switching the Speaker A/B switch located on the System Monitor, to the "B" position.

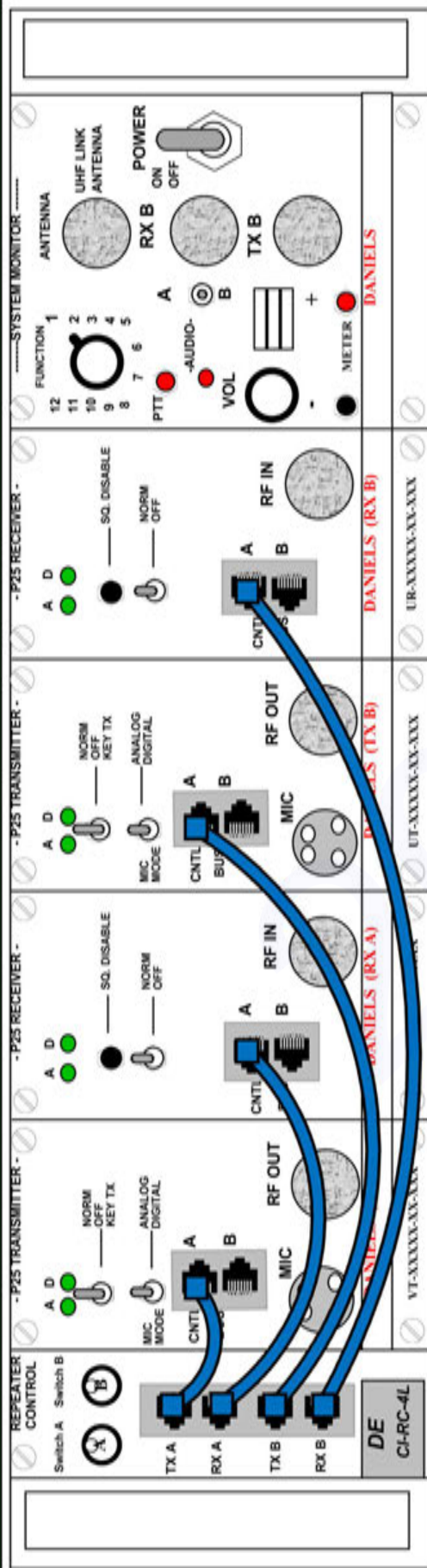


Close-Up View  
Switch A, Switch B  
Repeater Control Module

## System Monitor Switch Functions (4312 -VHF Repeater Configuration)

2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
1, 4-12	NIRPSC Technician Testing
Revised 2018	

## 4312 - VHF REPEATER/LINK SWITCH SETTINGS

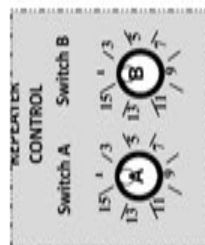


### 4312 - VHF REPEATER/LINK CONFIGURATION:

- Set up the VHF Omni-Directional antenna and attach the coaxial cable to the appropriate antenna base and bulkhead connector located on the back of the fiberglass box.
- Set up the UHF antenna and attach the coaxial cable to the appropriate antenna base and bulkhead connector located on the back of the fiberglass box. *(See Antenna Instructions in User's Guide)*
- Connect the power cable to the batteries using the provided POLARIZED fused cable.
- Turn the Power Switch to the "ON" position on the System Monitor Module.
- Keep the "MIC Mode" on the "TX A" in the "ANALOG" position.
- Keep the "MIC Mode" on the "TX A" in the "ANALOG" position.
- Keep the speaker audio OFF by switching the A/B Speaker switch on the System Monitor to the "Center" position.
- Select the assigned tone by turning Switch A knob, located on the top portion of the Repeater Control Module, to assigned tone. *(See Switch A - Tone Selection Table)*
- (This is a 16 Position Knob, Position 1 is straight up)*
- Select the assigned UHF Frequency by turning the Switch B knob to assigned UHF Frequency. *(See Switch B - UHF Link Frequency Selection Table)*
- (This is a 16 Position Knob, Position 1 is straight up)*
- Test with two VHF handhelds to verify the repeater is operating correctly. *(NIRSC recommends testing with the field units or ICP if possible before leaving the site.)*

Note: Selecting a tone will enable the tone on both the TX A and RX A Modules.

The Communications Duty Officer (CDO) will assign the appropriate tone and UHF Frequency for each incident. Contact the CDO for Tone and UHF Frequency assignment @ 208-387-5644.



Close-Up View  
Switch A, Switch B  
Repeater Control Module

### Switch B - UHF Link Frequency

Position 1 - L1 RPTR Access
Position 2 - L2 RPTR Access
Position 3 - L3 RPTR Access
Position 4 - L4 RPTR Access
Position 5 - L5 RPTR Access
Position 6 - L6 RPTR Access
Position 7 - L7 RPTR Access
Position 8 - L1 RX Simplex
Position 9 - L2 RX Simplex
Position 10 - L3 RX Simplex
Position 11 - L4 RX Simplex
Position 12 - L5 RX Simplex
Position 13 - L6 RX Simplex
Position 14 - L7 RX Simplex
Position 15 - Special 1 - Simplex
Position 16 - Special 2 - Simplex

### Switch A - Tone Selection Table

Position 1 - Tone 1 (110.9)
Position 2 - Tone 2 (123.0)
Position 3 - Tone 3 (131.8)
Position 4 - Tone 4 (136.5)
Position 5 - Tone 5 (146.2)
Position 6 - Tone 6 (156.7)
Position 7 - Tone 7 (167.9)
Position 8 - Tone 8 (103.5)
Position 9 - Tone 9 (100.0)
Position 10 - Tone 10 (107.2)
Position 11 - Tone 11 (114.8)
Position 12 - Tone 12 (127.3)
Position 13 - Tone 13 (141.3)
Position 14 - Tone 14 (151.4)
Position 15 - Tone 15 (162.2)
Position 16 - No Tone

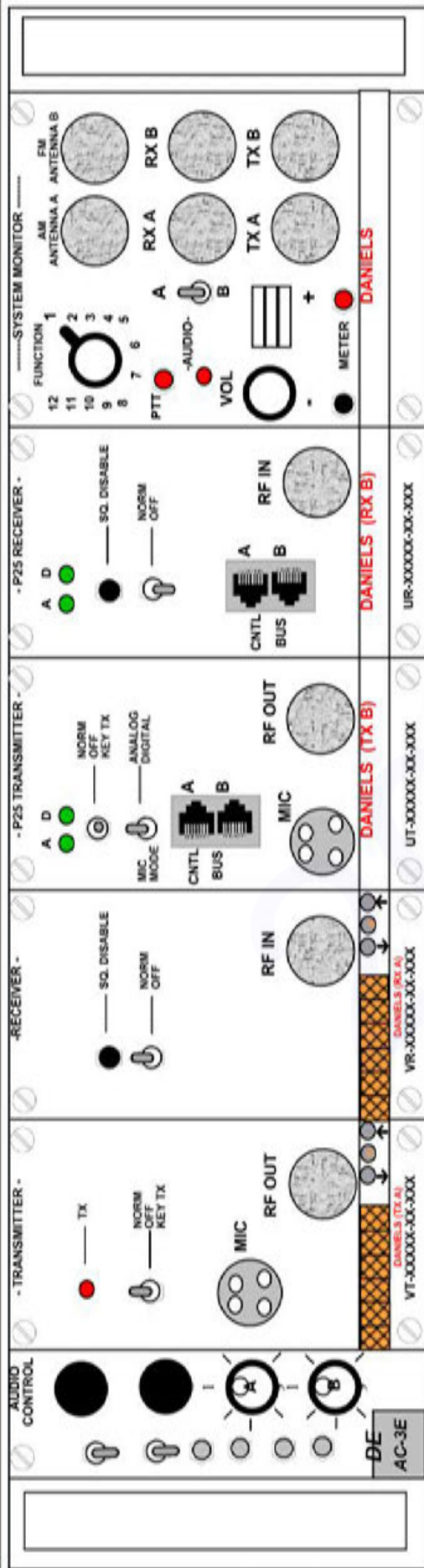
### Enabling Internal Speaker for Troubleshooting

- Enable the speaker Audio A by switching the Speaker A/B switch located on the System Monitor, to the "A" position.
- Enable the speaker Audio B by switching the Speaker A/B switch located on the System Monitor, to the "B" position.

### System Monitor Switch Functions (4312 - VHF Repeater/Link Configuration)

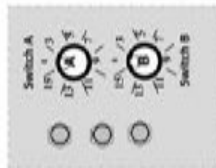
2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
1, 4-12	NIRSC Technician Testing
Revised 2018	

# 4370 - AIRCRAFT RADIO SWITCH SETTINGS (BASE CONFIGURATION)



## 4370 - AIRCRAFT RADIO BASE CONFIGURATION:

- Set up the VHF-AM antenna and attach the coaxial cable to the appropriate AM antenna base mount. (See *Antenna Instructions in User's Guide*)
- Attach the other end of the AM coaxial cable to the appropriate connector on the bulkhead mount located on the back of the fiberglass box.
- Connect the power cable to the batteries using the provided POLARIZED fused cable. Once power is connected, all modules are active. (No Master Power Switch)
- Keep both "CTCSS" switches located on the Audio Control Module in the "OFF" (Down) position.
- Keep the power switches on both the "TX A" and "RX A" in the "NORM" position.
- Keep the power switches on both the "TX B" and "RX B" in the "OFF" position.
- Place the Audio Select Switch on the System Monitor Module in the "A" position to activate the internal speaker for the AM Module.
- Place the Function Switch on the System Monitor Module to Position #1 to direct audio to meter jacks.
- Connect the external speaker to the Meter Jacks on the System Monitor Module, observing the correct polarity, and adjust the Volume to desired level.
- Select the assigned AM frequency for the "TX A" and "RX A" using the 16 position rotary Switch A on the Audio Control Module. (Switch A - AM Frequency Selection)
- Note: If the AM frequency is not listed, the user must program the AM frequency in Channel A-16 of both the "TX A" and "RX A". (See Manual AM Frequency Programming)*
- Connect the provided Microphone to the "MIC" jack on the "AM TX A Module".
- Test through the Microphone and a field unit or AM handheld to verify proper operation.



Close-Up View  
Switch A, Switch B  
Audio Control Module

## Manual AM Frequency Programming: (Channel 16 Only)

*Note: Both the AM transmitter and AM receiver modules must be individually programmed.*  
The Communications Duty Officer (CDO) will assign the appropriate FAA-issued AM Frequency.

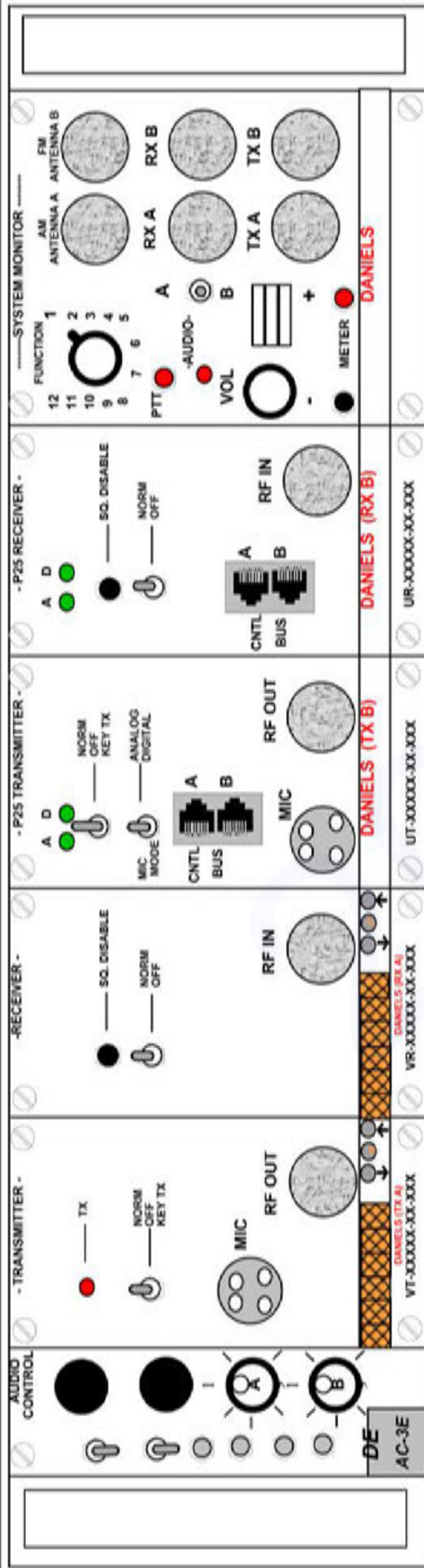
- Turn the rotary Switch A on the Audio Control Module to Channel 16.
- Unlock each unit by momentarily pressing the "\*" button, then before the "Locked" display goes blank, press the "Down" button to unlock the unit.
- The display should now show "Unlocked".
- Wait for the display to go blank, momentarily press either "UP" or "Down" button to display current frequency.
- While the frequency is displayed, press and hold either the "UP" or "Down" until the assigned frequency is reached.
- Lock each unit by momentarily pressing the "\*" button, then before the "Unlocked" display goes blank, press the "UP" button to lock the unit.
- The display should now show "Locked".
- The Aircraft Radio is now ready for base operation on that AM programmed frequency.

Switch A - AM Frequency List	
Position 1 - Channel 1	
Position 2 - Channel 2	
Position 3 - Channel 3	
Position 4 - Channel 4	
Position 5 - Channel 5	
Position 6 - Channel 6	
Position 7 - Channel 7	
Position 8 - Channel 8	
Position 9 - Channel 9	
Position 10 - Channel 10	
Position 11 - Channel 11	
Position 12 - Channel 12	
Position 13 - Channel 13	
Position 14 - Channel 14	
Position 15 - Channel 14	
Position 16 - Programmable	

System Monitor Switch Functions (4370-Aircraft Radio Base Configuration)	
1	External Speaker
2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
4-12	NIRSC Technician Testing
Revised 2018	

- Enabling Internal Speaker for Troubleshooting
- Enable the speaker Audio A by switching the Speaker A/B switch located on the System Monitor, to the "A" position.
- Enable the speaker Audio B by switching the Speaker A/B switch located on the System Monitor, to the "B" position.

# 4370 - AIRCRAFT RADIO SWITCH SETTINGS (LINK CONFIGURATION)



## 4370 - AIRCRAFT RADIO LINK CONFIGURATION:

- Set up the VHF-AM antenna and attach the coax to the appropriate antenna base and bulkhead connector located on the back of the fiberglass box.
- Set up the UHF antenna and attach the coax to the appropriate antenna base and bulkhead connector located on the back of the fiberglass box.
- Connect the power cable to the batteries using the provided POLARIZED fused cable. Once power is connected, all modules are active. *(No Master Power Switch)*
- Keep both "CTCSS" switches located on the Audio Control Module in the "OFF" (Down) position.
- Keep the power switches on both the "TX A", "RX A", "TX B", and "RX B" in the "NORM" position.
- Keep the Audio Select Switch on the System Monitor Module in the "center" position to deactivate internal speaker.
- Select the assigned AM frequency for the "TX A" and "RX A" using the 16 position rotary Switch A on the Audio Control Module. *(Switch A - AM Frequency Selection)*
- Note: If the AM frequency is not listed, the user must program the AM frequency in Channel A-16 of both the "TX A" and "RX A". (See Manual AM Frequency Programming)*
- Select the assigned UHF frequency for the "TX B" and "RX B" using the 16 position rotary Switch B on the Audio Control Module. *(Switch B - UHF Frequency Selection)*
- Test with an AM and UHF radio to verify the A/C link is operating correctly. *(NIRSC recommends testing with the field units or helibase before leaving the site.)*

*Note: The AM Frequency and UHF Frequency is assigned by the Communications Duty Officer (CDO). Contact the CDO @ 208-387-5644 for the assigned AM and UHF Frequency.*

## Manual AM Frequency Programming: (Channel 16 Only)

- Note: Both the AM transmitter and AM receiver modules must be individually programmed.*
- Turn the rotary Switch A on the Audio Control Module to Channel 16.
- Unlock each unit by momentarily pressing the "\*" button, then before the "Locked" display goes blank, press the "Down" button to unlock the unit.
- The display should now show "Unlocked".
- Wait for the display to go blank, momentarily press either "UP" or "Down" button to display current frequency.
- While the frequency is displayed, press and hold either the "UP" or "Down" until the assigned frequency is reached.
- Lock each unit by momentarily pressing the "\*" button, then before the "Unlocked" display goes blank, press the "UP" button to lock the unit.
- The display should now show "Locked".
- The Aircraft Radio is now ready for base operation on that AM programmed frequency.

Switch A - AM Frequency List	Switch B - UHF Frequency List
Position A1 - Channel 1	Position B1 - A/C 1 Simplex
Position A2 - Channel 2	Position B2 - A/C 2 Simplex
Position A3 - Channel 3	Position B3 - A/C 3 Simplex
Position A4 - Channel 4	Position B4 - A/C 4 Simplex
Position A5 - Channel 5	Position B5 - A/C 5 Simplex
Position A6 - Channel 6	Position B6 - A/C 6 Simplex
Position A7 - Channel 7	Position B7 - A/C 7 Simplex
Position A8 - Channel 8	Position B8 - A/C 8 Simplex
Position A9 - Channel 9	Position B9 - A/C 9 (L8 Simp)
Position A10 - Channel 10	Position B10 - A/C 10 (L8 RPTR)
Position A11 - Channel 11	Position B11 - A/C 11 (L9 Simp)
Position A12 - Channel 12	Position B12 - A/C 12 (L9 RPTR)
Position A13 - Channel 13	Position B13 - A/C 13 (L10 Simp)
Position A14 - Channel 14	Position B14 - A/C 14 (L10 RPTR)
Position A15 - Channel 15	Position B15 - A/C 15 (L11 Simp)
Position A16 - Programmable	Position B16 - A/C 16 (L11 RPTR)

- Enabling Internal Speaker for Troubleshooting**
- Enable the speaker Audio A by switching the Speaker A/B switch located on the System Monitor, to the "A" position.
- Enable the speaker Audio B by switching the Speaker A/B switch located on the System Monitor, to the "B" position.

System Monitor Switch Functions (4370-Aircraft Radio Link Configuration)	
1	External Speaker
2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
4-12	NIRSC Technician Testing
Revised 2018	

### RADIO PROGRAMMING GUIDES

2021

These diagrams are also available for download online at:

[www.nifc.gov/NIICD/documents.html](http://www.nifc.gov/NIICD/documents.html)

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## ICOM IC-A6



# ICOM IC-A6 PORTABLE RADIO BASIC OPERATION & CONTROLS

1. Press and Hold the **"PWR"** softkey for **3 seconds** until the power turns **"ON"**.
2. Select a valid AM frequency from one of the memory locations or direct enter a valid AM frequency via the keypad.
3. Adjust the volume by turning the Volume Knob to the desired level.
4. Adjust the Squelch by pushing the **"SQL"** softkey, then rotate the tuning dial to desired squelch level (**00 - 24**).

(See Figure 1)

*Note: "SQL -- 0" is open squelch and "SQL -- 24" is tight squelch.*

*If the Squelch control is set too high, squelch may not open for weak signals.*

5. Press the **"ANL"** softkey to reduce pulse noise caused by engine ignitions or other outside interference.

**The radio is ready to operate on the selected frequency.**

6. To Transmit, press and hold the Push-To-Talk (PTT).

*Note: The display will indicate the radio is transmitting by displaying a **"TX"** icon on the top portion of the LCD.*

(See Figure 2)

7. Pause 1 second and talk in a normal voice into the microphone.

*Note: Try to shield the microphone from wind and other loud background noises for clearer transmissions.*

8. Release the PTT to stop transmitting and receive incoming transmissions.

*Note: The display will indicate the radio is receiving by displaying a **"RX"** icon on the top portion of the LCD.*

(See Figure 3)

SQL --20  
M1 5

Figure 1

TX  
132.250

M1 5

Figure 2

RX  
132.250

M1 5

Figure 3



**ICOM A-6 Front View**

# ICOM IC-A6 PORTABLE RADIO SETTINGS/OPTIONS

## MANUAL FREQUENCY ENTRY USING THE KEYPAD

- Press and Hold the "PWR" softkey for **3 seconds** until the power turns "ON".
- Press the "CLR" softkey to select **Frequency Mode**.
- Enter a valid 6 digit AM frequency and press the "ENT" key. Display will indicate the current selected frequency. *(See Figure 1)*

*Note: Only "2", "5", "7", and "0" can be entered as the 5th and final digit.*

## MANUAL FREQUENCY ENTRY USING THE TUNING DIAL

- Press and Hold the "PWR" softkey for **3 seconds** until the power turns "ON".
- Push the "CLR" softkey to select **Frequency Mode**.
- Rotate the tuning dial to set the desired frequency. *(See Figure 1)*

*Note: To select 1Mhz tuning step, press the "F" softkey once, push the "F" softkey again to return to normal tuning.*

## PROGRAMMING A MEMORY CHANNEL

- Set the desired frequency using the keypad, the radio must be in frequency mode to enter new frequency.
- Press the "F" softkey, followed by the "MR" softkey. The LCD will flash the "Mx xx" in the lower display. *(See Figure 2)*
- Select a memory bank (0-9) to program by pressing the "F" softkey followed by the "0" softkey, then selecting a desired Bank using the tuning dial. Press the "ENT" softkey once the desired bank is located.

*Note: Default is Bank-0 (See Figure 3)*

- Select a memory channel (00-19) to be programmed using the tuning dial.
- Press the "ENT" key to enter that frequency into the selected memory location. *(See Figure 4)*

## MEMORY CHANNEL SELECTION

- Press the "MR" key to select **Memory Mode**.
  - Select the desired memory location by rotating the tuning dial to desired memory channel and press "ENT".
  - Display will indicate the corresponding frequency of the memory location including bank location. *(See Figure 4)*
- Note: To CLEAR the memory contents, select the recall channel to be cleared. Press the "F" softkey, then press and hold the "CLR" softkey for 2 seconds.*

## SELECTING A BANK

- Press the "F" softkey, followed by the "0" softkey.
- Select the desired bank (0-9) using the top tuning dial.
- Press the "ENT" softkey to make the selected bank active.

## RECALL FUNCTION *Recall stores the last 10 frequencies used in the radio.*

- To recall a used frequency, press the "◀▶" softkeys to find the desired used frequency. (See Figure 5)
- Note: To CLEAR the recall contents, select the recall channel to be cleared. Press the "F" softkey, then push and hold the "CLR" softkey for 2 seconds.*

## KEYPAD LOCK FUNCTION

**To Enable Key Lock**, press the "F" key, then press the "7" key (Key Lock) to turn "ON" the function. *(See Figure 6)*

- Display indicates that the key Lock functions is enabled by displaying the "0" icon in the upper part of the LCD.

**To Disable Key Lock**, repeat the process.

*Note: The lock function prevents accidental frequency changes & accidental function activation.*

## AUTOMATIC NOISE LIMITER (ANL) FUNCTION

**To Enable ANL**, press the "ANL" softkey.

- Display indicates that the ANL function is enabled by displaying "ANL" icon in the lower part of the LCD. *(See Figure 7)*

**To Disable ANL**, press the "ANL" softkey.

*Note: The ANL function reduces pulse noise such as ignition noise, computer, lights and other outside interference.*

## BACK LIGHT FUNCTION

**To Enable the LCD Back Light**, press the Light side button. *(Bottom side button)*

**To Disable the LCD Back Light**, Press the Light side button.

*Note: The Light button turns on the LCD back light and the keypad lighting. The light will stay on until it is disabled.*

## SETTING SQUELCH LEVEL *(See Figure 8)*

**To Set Squelch Level**, press the "SQL" softkey, then rotate the tuning dial to desired squelch level (00 - 24).

*Note: "SQL -- 0" is open squelch and "SQL -- 24" is tight squelch. (NIICD suggested level is 20)*

125.550

Figure 1

125.550

M0 0

Figure 2

BANK - - 0

Figure 3

125.550

M2 5

Figure 4

122.900

r 3

Figure 5

125.550

ANL  
M2

Figure 6

125.550

ANL  
M2 5

Figure 7

SQL - - 20

M2 5

Figure 8

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## KING DPH/DPHx

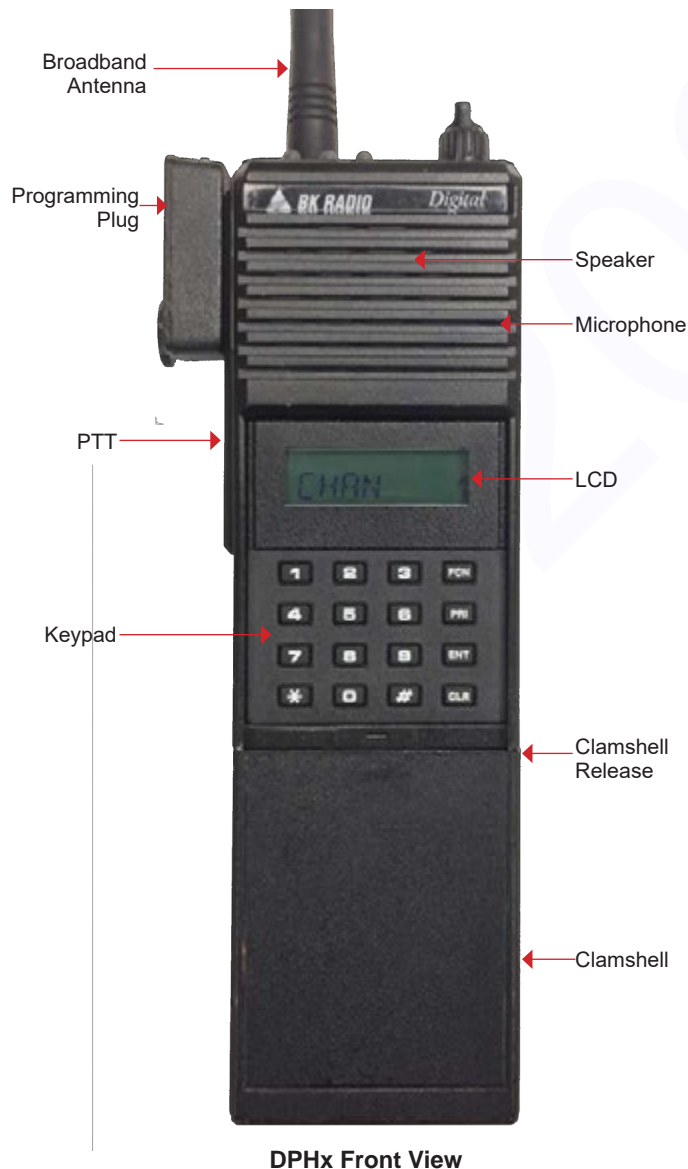


# DPH/DPHx PORTABLE RADIO BASIC OPERATION & CONTROLS

1. Turn power ON by turning the ON/OFF Volume Knob clockwise.  
*Note: A beep indicates the radio is operational. The LCD will briefly indicate the current group before indicating the current channel.*
2. Select a group number by pressing the "#" key and entering a 2-digit number followed by the "ENT" key.
3. Select a channel by turning the **Channel Select Knob** to one of the 16 available positions.
4. Adjust the volume by turning the **Squelch Knob clockwise** to open the squelch and setting the volume to a desired level.
5. Adjust the Squelch by turning the Squelch Knob counterclockwise until the squelch closes.  
*Note: This is the Threshold Squelch Setting.*  
*Turn the squelch Knob fully counterclockwise into the detent position to place the RX in Code Guard. RX must have a tone programmed in order for RX Code Guard to function properly. Putting the RX in Code Guard, will enable the RX not to open squelch unless it receives the correct RX tone.*

**The radio is now ready to RECEIVE on the selected group and channel.**

6. To transmit, press and hold the Push-To-Talk (PTT) button on the side of the radio.  
*Note: The Transmit Indicator Light should glow red while transmitting. If not, the battery may be low or the channel is RX only or busy.*
7. Pause 1 second and talk in a normal voice into the microphone.  
*Note: Try to shield the microphone from wind and other loud background noises for clearer transmissions.*
8. Release the PTT to stop transmitting and receive incoming transmissions.



# DPH/DPHx PORTABLE RADIO SETTINGS/OPTIONS

## ADD/REMOVE CHANNELS FROM SCAN LIST

To **ADD channel to Scan List**, select a channel to scan with the channel select knob and press the "ENT" key.

- LCD will display "SCN" in the upper section, indicating that the current displayed channel is in the scan list.

(See Figure 1)

To **REMOVE channel from Scan List**, select the channel to remove with the channel select knob and press the "CLR" key.

- "SCN" will be removed from the upper section of the LCD.

*Note: Scan must be disabled in order to add or remove channels from the scan list, by toggling the "SCAN" and "PRI" toggle switches in the down position. (Toward the front of the radio)*

## ADD PRIORITY SCAN CHANNEL *NIICD default is set to all PRI off.*

To **select a channel as a Priority Scan Channel**, select a channel and press the "PRI" key. (See Figure 2)

- LCD will display "PR" in the upper section, indicating that the current displayed channel is now the Priority 1 Channel.

*Note: Scan must be disabled in order to add or remove the Priority 1 Channel, by toggling the "SCAN" and "PRI" toggle switches in the down position. (Toward the front of the radio)*

*Priority 2 Channel can only be changed in the "CH 00" parameters. (See "CH 00" Settings)*

*Note: Enabling PRI Scan will only scan the Priority Channel(s). In order to scan the scan list channels and the Priority Channel(s), both the Scan and PRI Toggle switches must be enabled.*

## ENABLE/DISABLE SCAN/PRIORITY SCAN

To **Enable Scan**, by toggling the **Scan Toggle Switch** to the up position. (Toward the back of the radio)

- LCD will indicate scan is enabled by flashing "-- --" in the right side of the display if alphanumeric mode is disabled.

(See Figure 3)

or

- LCD will indicate scan is enabled by flashing "SCN" in the upper part of the display if alphanumeric mode is enabled.

To **Disable Scan**, by toggling the Scan Toggle Switch to the down position. (Toward the front of the radio)

To **Enable Priority Scan**, by toggling the **PRI Toggle Switch** to the up position. (Toward the back of the radio)

- LCD will indicate Priority Scan is enabled by flashing "-- --" in the right side of the display and with a "PR" icon in the top portion of the display if alphanumeric mode is disabled. (See Figure 4)

or

- LCD will indicate Priority Scan is enabled by flashing "SCN" in the upper part of the display if alphanumeric mode is enabled.

To **Disable Priority Scan**, by toggling the **PRI Toggle Switch** to the down position. (Toward the front of the radio)

*Note: Depending on what type of Priority Scan Mode is enabled, the LCD will display and operate differently for each priority mode. Check the priority mode in the "CH 00" Group Settings.*

*NIICD Default is set to Priority Mode A, Priority Channels follows the selected channel.*

## CHANGING GROUPS

To **Change Groups**, press the "#" key followed with the 2-digit number of the desired group and press "ENT" or wait 3 seconds. (See Figure 5)

*Note: All DPH/DPHx NIICD model radios have a 25 group capacity.*

*Groups 1-5 contain the Standard NIICD Frequencies.*

## TX USER SELECTABLE TONES

To **Enable Selectable Tone**, press one of number keys (1-9) to select a pre programmed TX User Selectable Tone.

- Display will indicate a TX User Selectable Tone is enabled by displaying the "CG" icon in the top portion of the LCD.
- If Alphanumeric Mode is Disabled, display will also indicate the selected TX User Tone. (See Figure 6)

To **Disable Selectable Tone**, press the "0" key on the keypad.

*Note: NIICD default is TX User Selectable Tones Disabled and can be enabled through the "CH 00" functions.*

## HI/LOW POWER SETTINGS

To **Select Low Power**, toggle the LO/HI Toggle Switch to the up position. (Toward the back of the radio)

To **Select High Power**, toggle the LO/HI Toggle Switch to the down position. (Toward the front of the radio)

*Note: NIICD Low Power setting is set to 2.0 Watts, High Power setting is set to 5.0 Watts.*

*(Current draw dependent)*

## ENABLE/DISABLE KEYPAD

To **Disable keypad**, press and hold the "FNC" key until the LCD displays "LOCKED". (See Figure 7)

To **Enable keypad**, press and hold the "FNC" key until the LCD displays "UNLOCKED". (See Figure 8)



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8

# DPH/DPHx PORTABLE RADIO ANALOG PROGRAMMING GUIDE

1. Turn on the radio and select the desired group before accessing the program mode.
2. **Access Program Mode** (See Figure 1)
  - Insert a programming plug into the side accessories connector of the radio.
  - **Press and hold** the red Master Switch on the programming plug.
  - Simultaneously **press and hold** the "FCN" key for approximately three seconds until the LCD displays "-- -- ID".
  - Enter a valid password. *NIICD default password is set to "000000"*
  - Press the "ENT" key to proceed into the programming mode.
  - If the correct password was entered, the LCD displays "CH 00". (See Figure 2)
3. From the "CH 00" mode, select a 2-digit channel number (01-16) to program using the keypad.  
*Note: Once a channel is entered, pressing the "FNC" key will scroll through that particular channel parameters.*
4. **Channel Bandwidth Setting**, press the "#" key to toggle between Wide-Band and Narrow-Band. (See Figure 3)
  - Once the Bandwidth is set, press the "FCN" key to scroll to the next programming parameter.  
*Note: The "N" indicates that the channel is set for Narrow-Band operation, No indication for Wide-Band operation.*
5. **Channel Receive Frequency**, press the "CLR" key to clear the current frequency and enter a valid VHF RX frequency and press the "ENT" key to save the RX frequency and scroll to the next parameter. (See Figure 4)
6. **Channel Receive Mode**, press the "PRI" key to toggle between "A", "D", or "M". Select "A" for Analog Mode and press the "ENT" key to save the RX mode and scroll to the next parameter. (See Figure 5)  
*Note: A=Analog Channel, D=Digital Channel, and M=Mixed Mode Channel*
7. **Channel Receive Code Guard**, press the "CLR" key to clear the tone and enter a valid tone using the keypad and press the "ENT" key to save the RX Tone and scroll to the next parameter. (See Figure 6)  
*Note: Enter "000.0" for no tone.*
8. **Channel Receive NAC**, used for programming the RX Network Access Code.  
 This is a **Digital** Channel Function, press the "ENT" key to skip to the next programming parameter.
9. **Channel Squelch Mode**, press the "PRI" key to toggle between "NRM", or "SEL". Select "NRM" for analog settings and press the "ENT" key to save the Squelch Mode and scroll to the next parameter. (See Figure 7)  
*Note: "SEL" is used only in Digital or Mixed Mode to use Talk Groups or Individual Call Functions.*
10. **Channel Transmit Frequency**, press the "CLR" key to clear the current frequency and enter a valid VHF TX frequency and press the "ENT" key to save the TX Frequency and scroll to the next parameter. (See Figure 8)
11. **Channel Transmit Mode**, press the "PRI" key to toggle between "A", "D", or "M". Select "A" for Analog Mode and press the "ENT" key so save the TX Mode and scroll to the next parameter. (See Figure 9)  
*Note: A=Analog Channel, D=Digital Channel, and M=Mixed Mode Channel*
12. **Channel Transmit Code Guard**, press the "CLR" key to clear the current tone and enter a valid tone using the keypad and press the "ENT" key to save the TX Tone and scroll to the next parameter. (See Figure 10)  
*Note: Enter "000.0" for no tone.*
13. **Channel Transmit NAC**, used for programming the TX Network Access Code.  
 This is a **Digital** Channel Function, press the "ENT" key to scroll to the next programming parameter.
14. **Channel Talk Group ID**, used for programming the TX Talk Group ID.  
 This is a **Digital** Channel Function, press the "ENT" key to scroll to the next programming parameter.
15. **Channel Label**, press the "ENT" key to keep name/label and finish programing the channel or press the "CLR" key to change the name/label for that channel. (See figure 11)  
Changing Channel Label
  - Press the "CLR" key to clear the label.
  - Press the "PRI" key to scroll through available Alphanumeric Characters.
  - Press the "FCN" key to enter a character and shift to the left for the next character.
  - Repeat the process until desired name/label is entered and press the "ENT" key when complete.*Note: LCD is an 8 character display. NIICD default is set to display the numeric characters only in the "CH 00" parameters.*
16. Once the label is entered and saved, the program will bring the first channel parameter up, channel programming is complete and saved at this point. The user may select another channel to program by starting on **step 3** or exit the program mode by cycling power to the radio.

PRG  
-- -- ID

Figure 1

PRG  
CH 00

Figure 2

PRG  
CH 01N

Figure 3

PRG RX  
XXX.XXXX

Figure 4

PRG RX  
MODE -- A

Figure 5

PRG RX CG  
000.0

Figure 6

PRG RX ID  
SQL -- NRM

Figure 7

PRG TX  
XXX.XXXX

Figure 8

PRG TX CG  
MODE -- A

Figure 9

PRG TX CG  
000.0

Figure 10

PRG  
CMD 8

Figure 11

# DPH/DPHx PORTABLE RADIO "CH 00" SETTINGS

1. Select a **group** you wish to program and Access the **Program Mode** to enter the "CH 00 " Settings. *(See Figure 1)*  
*(See Access Program Mode)*  
*Note: Once "CH 00" is displayed, press the "FNC" key to scroll to the first "CH 00" parameter.*
2. **Group Password**, press the "ENT" and advance to the next programming parameter. *(See Figure 2)*  
*Note: NIICD does not recommend changing the group password. NIICD default password is set to "P000000"*
3. **Group Automatic Numeric Identification** parameter (ANI): This is used as either a radio management number or transmitted as a DTMF tone. Press the "ENT" or "FNC" key to advance to the next parameter.  
*NIICD default is set to "0000000" (See Figure 3)*
4. **Transmit Tim-Out Timer** (TOT) duration: To change the TOT, press the "PRI" key to increase the TOT duration and press the "ENT" to store the value and advance to the next parameter.  
*NIICD default is set to "120 SEC", A TOT value of 0.0 Seconds, disables the TOT. (See Figure 4)*
5. **Scan Delay Time**: To change the Scan Delay Time, press the "PRI" key to increase the duration and press the "ENT" key to store the value and advance to the next parameter.  
*NIICD default is set to "2.0 SEC" (See Figure 5)*
6. **Priority 1 Channel**: To enable a **Priority 1 Channel**, press the "PRI" key to select a channel or turn OFF the function and press the "ENT" key to store the value and advance to the next parameter.  
*NIFC Default is set to "OFF" (See Figure 6)*  
*Note: Priority 1 Channel can be programmed as a fixed channel, selected by the channel select knob, or OFF. If the PRI 1 is set as fixed, it can be changed through the front keypad by pressing the "PRI" key.*
7. **Priority 2 Channel**: To enable the **Priority 2 Channel**, press the "PRI" key to select a channel or turn OFF the function and press the "ENT" key to store and advance to the next field.  
*NIFC Default is set to "OFF" (See Figure 7)*  
*Note: Priority 2 Channel can only be changed via the "CH 00" parameters.*
8. **"Ch 00" Group One, Two, Three Functions** *(See Figure 8)*  
*Note: The group functions can be enabled or disabled by pressing the number key corresponding to that function.*

## **CH 00 Group 1 Functions** *NIICD default is "1-12345" (See Figure 8)*

- 1-12345.....**Battery Saver Inhibit** (Disables the Battery Saver Function for current drain on battery life.)
- 1-12345.....**Group Scan** (Enables the current group to be scanned while in Group Scan Mode.)
- 1-12345.....**TX on PRI 1** (Enables transmission on PRI 1 when PRI Scan is Enabled.)
- 1-12345.....**Priority 1 Lock** (Enables the Lock out of the "PRI" key, so user can not change the Priority 1 Channel.)
- 1-12345.....**Scan List Lock** (Enables the Scan List Lock out, so user can not add/remove channels from the scan list.)

## **CH 00 Group 2 Functions** *NIICD default is "2-12345" (See Figure 9)*

- 2-12345.....**User CH Code Guard** (Enables keypad to independently select a Channel Code Guard value from programmed channels.)
- 2-12345.....**Busy Channel Indicator** (Yellow LED illuminates when signal is received on selected channel.)
- 2-12345.....**Busy Channel Lockout** (Yellow LED illuminates and PTT is disabled when a signal is received on selected channel.)
- 2-12345.....**Busy Channel Lockout/Over-ride** (Same as Busy Channel Lockout, but PTT can be activating the Squelch Code Guard.)
- 2-12345.....**ANI** (Enables the ANI ID number to be transmitted with each press of the PTT as a DTMF tone.)
- 2-12345.....**Manual DTMF Encoder** (Enables keypad for manual DTMF operation.)
- 2-12345.....**Manual DTMF/ANI Encoder** (Enables the ANI ID number to be transmitted only after the "ENT" key is pressed during TX.)

## **CH 00 Group 3 Functions** *NIICD default is "3-12345" (See Figure 10)*

- 3-12345.....**Reserved**
- 3-12345.....**Reserved**
- 3-12345.....**LCD Back light ON Display Change** (LCD back light will illuminate each time the display receives an input.)
- 3-12345.....**LCD Back light ON Key Press** (LCD back light will illuminate each time a key is pressed.)
- 3-12345.....**Alphanumeric Mode** (LCD will display Alphanumeric Characters.)

9. **Back Light Duration**: To change the back light duration, press the "PRI" key to select an available setting and press the "ENT" key to store the value and advance to the next parameter.  
*NIICD default is "OFF" (See Figure 11)*

10. **Group Label**: Press the "ENT" key to advance back to the "CH 00" starting point. *(See Figure 12)*  
At this point, pressing the "FNC" key repeatedly will scroll down each value parameter of the "CH 00" settings for that group.  
If no changes are needed, exit the program mode by cycling power to the radio or continue with channel programming.

PRG  
CH 00

Figure 1

PRG  
P000000

Figure 2

PRG ID  
0000000

Figure 3

PRG TX  
160 SEC

Figure 4

PRG SCN  
2.0 SEC

Figure 5

PRG  
PRI 1 OFF

Figure 6

PRG  
PRI 2 OFF

Figure 7

PRG  
1 -- 12345

Figure 8

PRG  
2 -- 12345

Figure 9

PRG  
3 -- 12345

Figure 10

PRG  
LITE OFF

Figure 11

PRG  
GROUP XX

Figure 12

# DPH/DPHx PORTABLE RADIO CLONING GUIDE

1. Assure that the Master and Clone radios are off.
  - Attach the Master end of the cloning cable to the side connector of the Master radio.
  - Attach the Clone/Slave end of the cloning cable to the side connector of the radio being cloned.
2. Turn both radios on.
  - Assure each radio is in the corresponding group before continuing with the cloning process.
3. Access the Programming Mode on the Master radio by holding down the Master Switch and simultaneously pressing the "FCN" key on the Master radio until the LCD displays (-- -- -- ID). *(See Figure 1)*
4. Enter a valid password and press the "ENT" key. *(NIICD default Password is set to "000000")*
  - The LCD will display "CH 00" if the correct password was entered. *(See Figure 2)*
5. Press the "\*" key on the Master radio keypad.
  - The LCD will flash "PROG", indicating that the radio is ready to download the clone. *(See Figure 3)*
6. Press the "FCN" key to download the clone to the clone/slave radio.
  - If the clone was successful, the Master radio will resume flashing "PROG" on the display.
  - If the clone was not successful, the Master radio will flash "FAIL" followed by continuous beeps. *(See Figure 4)*



Figure 1

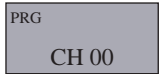


Figure 2



Figure 3



Figure 4

*When the Master radio downloads to a clone, the Scan List and Priority Channel designations are also downloaded to the clone radio.  
Group Password are also downloaded between DPH and GPH Model radios, NIICD recommends not modifying the Group Password when programming radios.*



DPHx Cloning Connections

## RELM BK KING KNG2-P150/P400



# KNG2 P150/P400 PORTABLE RADIO BASIC OPERATION & CONTROLS

1. Turn the power **ON** by turning the "**VOL**" Knob clockwise.
  - The LCD will indicate the current Zone and Channel label.
2. Select a zone number by pressing the "**Zone**" softkey. Enter the zone number via the keypad and press the "**ENT**" softkey.  
**OR**  
Press the "**Zone**" softkey then press the **PREV/NEXT** soft keys to highlight desired zone and press the "**ENT**" softkey.
3. Select a channel by turning the **Channel Select Knob** to one of the 16 available positions.
4. Adjust the volume by pressing and holding the "**Monitor**" button once to open the squelch and set the volume to desired level, press the "**Monitor**" key once more to close the Squelch.

**The radio is now ready to operate on the selected group and channel.**

6. To transmit, press and hold the Push-To-Talk (PTT) button on the side of the radio.  
*Note: The Transmit Indicator Light should glow red while transmitting.  
If not, the battery may be low or the channel is RX only or busy.*
7. Pause 1 second and talk in a normal voice into the microphone.  
*Note: Try to shield the microphone from wind and other loud background noises for clearer transmissions.*
8. Release the **PTT** to stop transmitting and receive incoming transmissions.



**KNG2 P150 Front View**



**KNG2 P150 Top View**

# KNG2 P150/P400 PORTABLE RADIO SETTINGS/OPTIONS

## CHANGING ZONES

- To change groups, press the "Zone" softkey.
- Enter the zone number via the key pad and press the "ENT" softkey. (See Figure 1 & 2)
- OR
- Press the "Zone" softkey. Press the PREV/NEXT keypad keys to desired zone and press the "ENT" softkey. (See Figure 1 & 2)



Figure 1

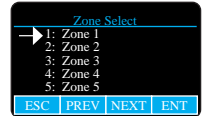


Figure 2

## ENABLING/DISABLING CHANNEL SCAN (See Figure 3)

- To Enable Scan - Toggle the "Scan Toggle" switch towards the front of the radio. The display will indicate the radio is in Scan Mode by displaying a "C" icon on the LCD.
- To Disable Scan - Toggle the "Scan Toggle" switch towards the back of the radio.



Figure 3

## ENABLING/DISABLING PRIORITY SCAN

- To Enable Priority Scan - Toggle the "PRI Toggle" switch towards the front of the radio. The display will indicate the radio is in Priority Scan Mode by displaying a flashing "SCN" icon on the LCD.
- To Disable Priority Scan - Toggle the "PRI Toggle" switch towards the back of the radio.

*Note: A priority scan channel must be enabled via programming or the radio will display "No Priority Channels Selected"*

## ADD/REMOVE CHANNEL FROM SCAN LIST (See Figure 4)

- To Add a Channel to Scan List - Press the "Menu" softkey, scroll down to "Chan Scan List" and press the "ENT" softkey.
  - Select the channel/channels to scan using the "PREV/NEXT" softkeys, then press the "+/-" softkey to add or delete the channel from the scan list. (See Figure 5)
  - Press the "ESC" softkey when complete to save settings. Press "ESC" softkey to reach main menu.
- Note: An "+" next to the select channel indicates the Channel is in the Scan List. Press the "ESC" softkey twice to return to normal operation.*
- Note: A small check mark icon "✓" will appear on the LCD indicating that channel is in the scan list.*
- To Remove a Channel from Scan List - Repeat the process and select "-".

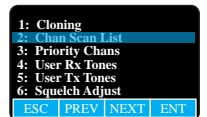


Figure 4

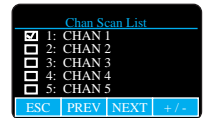


Figure 5

## TX POWER SELECTION (See Figure 6 and 7)

- To Enable Low or HighPower - Press the "PWR" softkey to toggle between High and Low power setting. Once enabled, a "H" for High Power or "L" for Low Power is displayed on the LCD.



Figure 6



Figure 7

## LOCKING KEYPAD

- To Lock Keypad - Turn the top bezel button located on the top of the radio to the "Ø" position. If any keys on the front panel are pushing while the keypad is locked, the LCD will display the following "Controls Locked" message. (See Figure 8)
- To Unlock the Keypad - Turn the top bezel button to the "○" position.



Figure 8

# KNG2 P150/P400 PORTABLE RADIO ANALOG PROGRAMMING GUIDE

1. Turn on the radio.
2. Access the Program Mode
  - Press the **"Menu"** softkey. *(See Figure 1,2,3)*
  - Scroll down using the **PREV/NEXT** softkeys to highlight **"Keypad Prog"** and press the **"ENT"** softkey.
  - Enter the 6-digit NIICD password and press the **"ENT"** softkey. *NIICD password is set to "000000"*
  - Highlight **"Keypad"** and press the **"ENT"** softkey.
  - Highlight **"Channel"** and press the **"ENT"** softkey.
  - Highlight **"Edit Channel"** and press the **"ENT"** softkey.
  - Highlight the appropriate Zone and Channel to program and press the **"ENT"** softkey.
4. Once in Channel Program Mode, scroll using **PREV/NEXT** to highlight **"RX Frequency"** and press **"ENT"**.
  - Press the **"CLR"** or **"EDIT"** softkey and enter a valid **RX Frequency** and press **"ENT"**. *(See Figure 4)*
5. Highlight **"Rx Mode"** and press **"ENT"**, highlight **"Analog"** and press **"ENT"**. *(See Figure 5)*  
*Note: Analog, Digital, or Mix Mode available*
6. Highlight **"Rx Guard"** and press **"ENT"**. Select **"OFF"** if NO tone is used on RX. *(See Figure 6)*
  - Highlight **"Tone"** and press **"ENT"**.
  - Press the **"CLR"** or **"EDIT"** softkey and enter a valid **RX Tone** and press **"ENT"**.  
*Note: OFF - Operates on carrier squelch mode.*  
*Tone - CTCSS tones.*  
*Digital - DSC value tones.*
7. Highlight **"Bandwidth"** and press **"ENT"**, highlight **"Narrowband"** and press **"ENT"**. *(See Figure 7)*
8. Highlight **"TX Power"** and press **"ENT"**. *(See Figure 8)*
  - Select **"Low Power"**, **"High Power"**, **"Selectable Low"**, or **"Selectable High"** and press **"ENT"**.  
*Note: Low Power - Locks Channel to low power mode.*  
*High Power - Locks Channel to high power mode.*  
*Selectable - Allows High/Low TX power selection from assigned button.*
9. Highlight **"TX Frequency"** and press **"ENT"**.
  - Press the **"CLR"** or **"EDIT"** softkey and enter a valid TX Frequency and press **"ENT"**. *(See Figure 9)*
10. Highlight **"TX Mode"** and press **"ENT"**, highlight **"Narrowband"** and press **"ENT"**. *(See Figure 10)*  
*Note: Analog, Digital, or Selectable available.*
11. Highlight **"TX Guard"** and press **"ENT"**. Select **"OFF"** if NO tone is used on TX. *(See Figure 11)*
  - Highlight **"Tone"** and press **"ENT"**.
  - Press the **"CLR"** or **"EDIT"** softkey and enter a valid **TX Tone** and press **"ENT"**.  
*Note: OFF - Operates on carrier squelch mode.*  
*Tone - CTCSS tones.*  
*Digital - DSC value tones.*
12. Highlight **"DTMF Live Dial"** and press **"ENT"**, highlight **"ON"** and press **"ENT"**. *(See Figure 12)*
13. Highlight **"Channel Label"** and press **"ENT"** to edit the channel name.
  - Press the **"CLR"** or **"EDIT"** softkey and enter a new channel name and press the **"ENT"**.  
*Note: Up to 16 characters on the display are allowed.*
14. Press **"ESC"** once to edit another channel or **"ESC"** all the way back to the main menu.



Figure 1

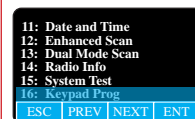


Figure 2

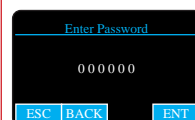


Figure 3

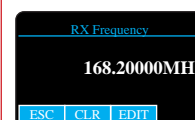


Figure 4

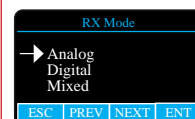


Figure 5

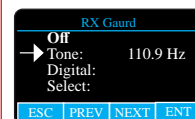


Figure 6



Figure 7

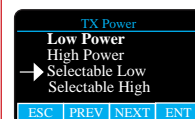


Figure 8

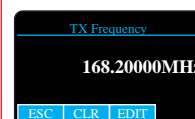


Figure 9

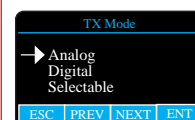


Figure 10

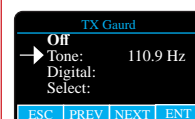


Figure 11

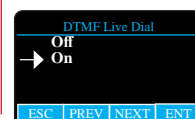


Figure 12

# KNG2 P150/P400 PORTABLE RADIO CLONING GUIDE

1. Assure that both radios are off and attach the cloning cable to both the Source and Target radios.  
*Note: If using the KAA0701 KNG/Legacy Cloning cable, the source/master radio must be connected to the single ended cable end. (See Figure 1)*
2. Turn both radios on.
3. Select a Source Group/Zone on the source/master radio. (See Step 2 on Basic Operation and Controls)
4. Select a Target Group/Zone on the target/slave radio. (See Step 2 on Basic Operation and Controls)
5. Place the Target radio in Cloning Mode by pressing the "Menu" softkey, highlight "Cloning" and press "ENT". (See Figure 2)
6. On the Target/Slave radio select "Enter Dest Clone" to allow cloning information from the Master radio. The LCD will display "Distination Clone Mode Waiting...". (See Figure 3, 4)
7. Place the Source/Master radio in cloning mode by pressing the "Menu" softkey, then highlight "Cloning" and press "ENT". (See Figure 2)
8. On the Source/Master radio select "Clone Active Zone" to clone active group/zone to active group/zone on Target/Slave Radio. (See Figure 5)  
The LCD on Master radio will display "Cloning in Progress". (See Figure 6)  
The LCD on the Target radio will display "Destination Clone Start". (See Figure 7)
9. Once clone is complete the Target/Slave radio will recycle power and return to the Main Operating Menu screen.
10. Once the clone is complete the Master/Source radio will display "Source Clone Complete" momentarily and return to the cloning menu. At this point an other slave/target radio can be cloned by repeating steps 4, 5, 6, and 7.

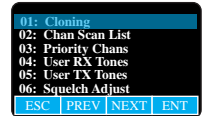


Figure 2

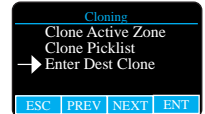


Figure 3

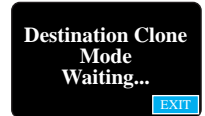


Figure 4

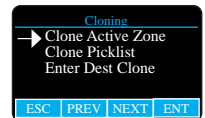


Figure 5

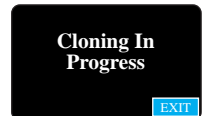


Figure 6

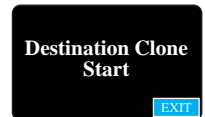


Figure 7



**Figure 1**  
**KNG P150s Cloning Connections**

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## KING KNG-P150s



# KNG P150s PORTABLE RADIO BASIC OPERATION & CONTROLS

1. Turn the power **ON** by turning the "**VOL**" Knob clockwise.
  - The LCD will indicate the current Zone and Channel label.
2. Select a zone number by pressing the "**Zone**" softkey. Enter the zone number via the keypad and press the "**OK**" softkey.  
 Press the "**Zone**" softkey then press the **UP/Down** soft keys to highlight desired zone and press the "**OK**" softkey.
3. Select a channel by turning the **Channel Select Knob** to one of the 16 available positions.
4. Adjust the volume by pressing the "**Monitor**" button once to open the squelch and set the volume to desired level, press the "**Monitor**" key once more to close the Squelch.

**The radio is now ready to operate on the selected group and channel.**

6. To transmit, press and hold the Push-To-Talk (PTT) button on the side of the radio.  
*Note: The Transmit Indicator Light should glow red while transmitting.  
 If not, the battery may be low or the channel is RX only or busy.*
7. Pause 1 second and talk in a normal voice into the microphone.  
*Note: Try to shield the microphone from wind and other loud background noises for clearer transmissions.*
8. Release the **PTT** to stop transmitting and receive incoming transmissions.



**KNG P150s Front View**



**KNG P150s Top View**

# KNG P150s PORTABLE RADIO SETTINGS/OPTIONS

## CHANGING ZONES

- To change groups, press the "Zone" softkey.
- Enter the zone number via the key pad and press the "ENT" softkey. (See Figure 1 & 2)
- OR
- Press the "Zone" softkey. Press the UP/Down keypad keys to desired zone and press the "ENT" softkey. (See Figure 1 & 2)

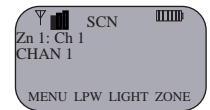


Figure 1

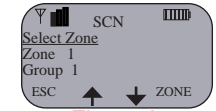


Figure 2

## ENABLING/DISABLING SCAN (See Figure 1)

- To Enable Scan - Toggle the "Scan Toggle" switch towards the front of the radio. The display will indicate the radio is in Scan Mode by displaying a flashing "SCN" icon on the LCD.
- To Disable Scan - Toggle the "Scan Toggle" switch towards the back of the radio.

## ENABLING/DISABLING PRIORITY SCAN

- To Enable Priority Scan - Toggle the "PRI Toggle" switch towards the front of the radio. The display will indicate the radio is in Priority Scan Mode by displaying a flashing "SCN" icon on the LCD.
- To Disable Priority Scan - Toggle the "PRI Toggle" switch towards the back of the radio.

## ADD/REMOVE CHANNEL FROM SCAN LIST (See Figure 3)

- To Add a Channel to Scan List - Press the "Menu" softkey, scroll down to "Scan List" using the UP/DOWN softkeys and press the "ENT" softkey.
- Select the channel to scan using the UP/DOWN softkeys, then press the "+/-" softkey to add or delete the channel from the scan list.  
*Note: An "+" next to the select channel indicates the Channel is in the Scan List. Press the "ESC" softkey twice to return to normal operation.*
- To Remove a Channel from Scan List - Repeat the process and select "-".

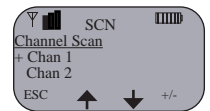


Figure 3

## TX POWER SELECTION (See Figure 4)

- To Enable Low Power - Press the "LPW" softkey to enable low power setting. Once enabled, a black background around the "LPW" display will be outlined.
- To Enable High Power - Press the "LPW" softkey to disable low power setting.

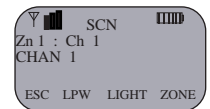


Figure 4

## LOCKING KEYPAD

- To Lock Keypad - Turn the top bezel button located on the top of the radio to the "Ø" position. If any keys on the front panel are pushing while the keypad is locked, the LCD will display the following "Keys Locked" message. (See Figure 5)
- To Unlock the Keypad - Turn the top bezel button to the "○" position.

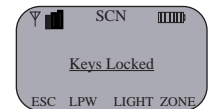


Figure 5

# KNG P150s PORTABLE RADIO ANALOG PROGRAMMING GUIDE

1. Turn on the radio.
2. Access the Program Mode *(See Figure 1 and 2)*
  - Press the **"Menu"** softkey.
  - Scroll down using the **Up/Down** softkeys to highlight **"Keypad Prog"** and press the **"ENT"** softkey.
  - Highlight **"Keypad Prog"** and press the **"ENT"** softkey.
  - Enter the 7-digit NIICD password and press the **"ENT"** softkey. *NIICD password is set to "0000000"*
3. Once in Program Mode, scroll **up/down** to highlight **"Channels"** and press **"ENT"**.
4. Scroll to the desired Zone/Group using the **up/down** softkeys and press **"ENT"**.
5. Scroll to the desired Channel using the **up/down** softkeys and press **"ENT"**.
6. Highlight **"Rx Freq"** and press **"ENT"**. *(See Figure 6)*
  - Press the **"CLR"** softkey and enter a valid **RX Frequency** and press **"ENT"**.
7. Highlight **"Rx Mode"** and press **"ENT"**, highlight **"Analog"** and press **"ENT"**. *(See Figure 7)*
8. Highlight **"Rx Guard"** and press **"ENT"**. *(See Figure 8)*
  - Press the **"CLR"** softkey and enter a valid **RX Tone** and press **"ENT"**.

*Note: "RX NAC" is a Digital function and should be skipped while programming an Analog channel.*  
*Note: "Squelch Mode" can not be changed while programming an Analog Channel.*
9. Highlight **"Tx Freq"** using the up/down softkeys and press **"ENT"**. *(See Figure 9)*
  - Press the **"CLR"** softkey and enter a valid **TX Frequency** and press **"ENT"**.
10. Highlight **"Tx Mode"** and press **"ENT"**, highlight **"Analog"** and press **"ENT"**. *(See Figure 10)*
11. Highlight **"Bandwidth"** and press **"ENT"**, highlight **"12.5 Khz"** for Narrowband and press **"ENT"**.  
*(See Figure 11)*
12. Highlight **"Tx Guard"** and press **"ENT"**. *(See Figure 12)*
  - Press the **"CLR"** softkey and enter a valid **TX Tone** and press **"ENT"**.

*Note: "TX NAC" is a Digital function and should be skipped while programming an Analog channel.*  
*"TGID" is a Digital function and should be skipped while programming an Analog channel.*
13. Highlight **"Secure Mode"** and press **"ENT"**, highlight **"Clear"** and press **"ENT"**. *(See Figure 13)*  
*Note: "Key" and "Key Lock" options are for Encryption only, and should be skipped while programming an Analog Channel.*
14. Highlight **"Low Pow Lock"** and press **"ENT"**, highlight **"OFF"** and press **"ENT"**. *(See Figure 14)*  
*Note: Selecting "ON" will enable low power at all times for that particular channel.*
15. Highlight **"Plist Disable"** using the up/down softkey and press **"ENT"**, select **"OFF"** and press **"ENT"**.
16. Press **"ESC"** once and select another channel to program repeat steps 6 through 15, or press **"ESC"** several times to exit the programming mode.



Figure 1



Figure 2

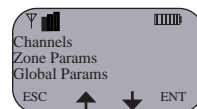


Figure 3

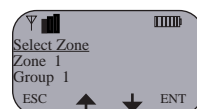


Figure 4

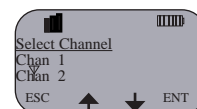


Figure 5



Figure 6

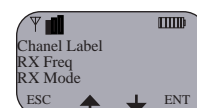


Figure 7



Figure 8

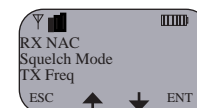


Figure 9



Figure 10

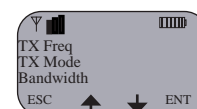


Figure 11

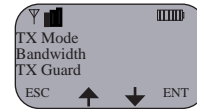


Figure 12

# KNG P150s PORTABLE RADIO CLONING GUIDE

1. Assure that both radios are off and attach the cloning cable to both the Source and Target radios.
2. Turn both radios on.  
*Note: Determine which group needs to be cloned from the Source radio, and to which group on the target radio will be cloned.*
3. Place the Master radio in Cloning Mode by pressing the "Menu" softkey, highlight "Cloning" and press "ENT".  
**(See Figure 1)**



Figure 1

4. Select the type of clone to be preformed by the Master radio. **(See Figure 2)**
  - **Active Zone** - Information from the current selected zone in the source radio will be sent to the current active zone on the target radio.
  - **Zone-to-Zone** - User selects the source and target zones to be cloned.
  - **Entire Radio** - All information from the Source radio will be cloned to the target radio.  
*Note: Radios programmed with blocked zones will not receive cloning information when a Entire Radio clone is selected. Entire radio cloning transfers all radio information except the following:*
    - Radio Serial Number
    - P25 Identification Number
    - Encryption Keys
    - Passwords

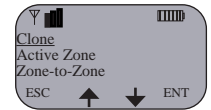


Figure 2

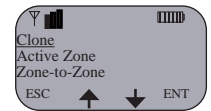


Figure 3

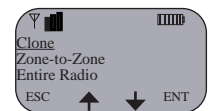


Figure 4

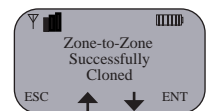


Figure 5

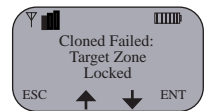


Figure 6

## Active Zone: **(See Figure 2)**

- Highlight "Active Zone" and press "ENT".

## Zone-to-Zone: **(See Figure 3)**

- Highlight "Zone-to-Zone" and press "ENT".
- Scroll and select the "Source Zone" and press "ENT".
- Scroll and select the "Destination Zone" and press "ENT".

## Entire Radio: **(See Figure 4)**

- Highlight "Entire Radio" and press "ENT".

5. Once the cloning is complete press "ESC" on the Source radio for normal operation. **(See Figure 5)**  
*Note: If cloned failed, its possible that the Target zone is blocked from accepting any incoming clone. **(See Figure 6)***



KNG P150s Cloning Connections

# KNG PORTABLE RADIO QUICK CLONING GUIDE

## KNGs to KNGs

1. Assure that both radios are off and attach the cloning cable to both the Source and Target radios.
2. Turn both radios on and select desired zone to clone on each Source and Target radios.
3. Place the Master radio in Cloning Mode by pressing the **"Menu"** softkey, highlight **"Cloning"** and press **"ENT"**.
4. Select the type of clone to be performed by the Master radio, (**"Active Zone"**, **"Zone-to-Zone"** or **"Entire Radio"**), then press the **"ENT"** key.
  - **Active Zone** - Information from the current selected zone in the source radio will be sent to the current active zone on the target radio.
  - **Zone-to-Zone** - User selects the source and target zones to be cloned.
  - **Entire Radio** - All information from the Source radio will be cloned to the target radio
5. Once the cloning is complete press **"ESC"** on the Source radio for normal operation.

## KNG to KNGs

1. Assure that both radios are off and attach the cloning cable to both the Source and Target radios.
2. Turn both radios on and select desired zone to clone on each Source and Target radios.
3. On Source/Master radio, press the **"Menu"** softkey.
  - Select **"Cloning"** using the Up/Down softkeys, then press the **"ENT"** softkey.
  - Select **"Clone Active Zone"** using the Up/Down softkeys, then press the **"ENT"** softkey to send clone.
4. Once the cloning is complete, press **"ESC"** on the Source radio for normal operation.

## KNG to KNG

1. Assure that both radios are off and attach the cloning cable to both the Source and Target radios.
2. Turn both radios on and select desired zone to clone on each Source and Target radios.
3. On Target radio, press the **"Menu"** softkey.
  - Select **"Cloning"** using the Up/Down softkey, then press the **"ENT"** softkey.
  - Select **"Enter Dest Clone"** using the Up/Down softkeys, then press the **"ENT"** softkey to send clone.
4. On the Source radio, press the **"Menu"** softkey.
  - Select **"Cloning"** using the up/down softkeys, then press the **"ENT"** softkey.
  - Select **"Clone Active Zone"** using the up/down softkeys, then press the **"ENT"** softkey.
4. Once the cloning is complete, press **"ESC"** on the Source radio for normal operation.

## KNG to DPH/DPHx

1. Assure that both radios are off and attach the cloning cable to both the Source and Target radios.
2. Turn both radios on and select desired zone to clone on each Source and Target radios.
3. On the Source radio, press the **"Menu"** softkey.
  - Select **"Cloning"** using the up/down softkeys, then press the **"ENT"** softkey.
  - Select **"Clone Active Zone"** using the up/down softkeys, then press the **"ENT"** softkey.
4. Once the cloning is complete, press **"ESC"** on the Source radio for normal operation.

## DPH/DPHx to KNG/KNGs

1. Assure that both radios are off and attach the cloning cable to both the Source and Target radios.
2. Turn both radios on and select desired zone to clone on each Source and Target radios.
3. On the Source radio, access the program mode by holding down the Master Switch and simultaneously pressing the **"FCN"** key until the LCD displays **-- -- ID**.
  - Enter a valid password and the **"ENT"** key.
4. Press the **"\*"** key on the master radio.
  - The LCD will flash **"PROG"**, indicating the radio is ready to download the clone.
5. Press the **"FCN"** key to download the clone to the Target radio.
6. Once the cloning is complete, cycle power on the Target radio.

*Note: Radios programmed with blocked zones will not receive cloning information when a Entire Radio clone is selected.*

*Note: If cloned failed, its possible that the Target zone is blocked from accepting any incoming clone.*

*Entire radio cloning transfers all radio information except the following:*

- Radio Serial Number
- P25 Identification Number
- Encryption Keys
- Passwords

## MIDLAND STP105B/404A



# MIDLAND PORTABLE RADIO BASIC OPERATION & CONTROLS

1. Turn power **ON** by turning the **ON/OFF Volume Knob** clockwise.
  - The LCD will indicate the current channel label.
2. **Select a zone** number by pressing the appropriate the "Zone" softkey.
  - Enter the zone number via the key pad and press the "OK" softkey.
  - **OR**
  - Press the "Zone" softkey. Press the UP/Down keypad keys to desired zone and press the "OK" softkey.
3. **Select a channel** by turning the Channel Select Knob to one of the 16 available positions. (**Channel 01-16**)
4. **Adjust the volume** by pressing the "**F2 Squelch**" button once to open the squelch.
  - Set the volume to desired level, press the "**F2 Squelch**" key once more to close Squelch.
  - The radio will display "**CHANNEL MONITOR ON or OFF**".
  - To exit, press the "**Exit**" softkey or wait 3 seconds and the radio will return to it's default operating display.

**The radio is now ready to operate on the selected group and channel.**

*Note: Holding down the "**F2 Squelch**" button will open the "**Squelch Adjust**" parameter of the radio. This setting allows the user to adjust the squelch setting for each individual channel. To exit, press the "**Exit**" softkey or wait 3 seconds and the radio will return to it's default operating display. (See **Radio Settings** for more detail)*

5. **To transmit**, press and hold the **Push-To-Talk (PTT)** button on the side of the radio.

*Note: The Transmit Indicator Light should glow red while transmitting.  
If not, the battery may be low or the channel is RX only or busy.*
6. **Pause 1 second** and talk in a normal voice into the microphone.

*Note: Try to shield the microphone from wind and other loud background noises for clearer transmissions.*
7. **Release the PTT** to stop transmitting and receive incoming transmissions.



**Midland Front View**



**Midland Top View**

# MIDLAND PORTABLE RADIO SETTINGS/OPTIONS

## CHANGING ZONES

**To change groups** - press the "Zone" softkey.

- Enter the zone number via the key pad and press the "OK" softkey. *(See Figure 1)*  
OR
- Press the "Zone" softkey.
- Press the UP/Down keypad keys to desired zone and press the "OK" softkey. *(See Figure 2)*

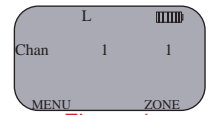


Figure 1

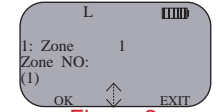


Figure 2

## ENABLING/DISABLING SCAN

**To Enable Scan** - press the "Scan" softkey.

The display will indicate the radio is scanning by a "T" icon in the upper right corner. *(See Figure 3)*

**To Disable Scan** - press the "Scan" softkey.

*Note: Pressing the "Menu" softkey while scanning will also disable scan.*

*If no channels are in the scan list, the user will get the following error "Enter Scan List" on the display.*

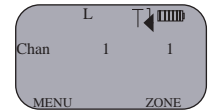


Figure 3

## ADD/REMOVE CHANNEL FROM SCAN LIST

**To Add a Channel** - press the "Menu" softkey. *(See Figure 4)*

- Scroll down to "Channel Parameter" using the up/down softkeys and press the "Select" softkey.
- Scroll to "Channel Scan" and press the "Select" softkey.
- Scroll down/up to desired channel and press the "Select" softkey.
- Scroll to "Add to List", "1st Priority" or "2nd Priority" and press the "OK" softkey. *(See Figure 5)*
- Press the "Exit" softkey, and continue adding more channels to the scan list.
- Once complete, press "Exit" twice to close scan edit list.

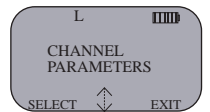


Figure 4

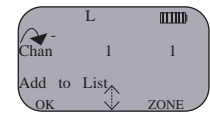


Figure 5

**To Remove a Channel** - Repeat the process and select "Remove". *(See Figure 6)*

*Note: Holding down the "#" key will also bring up the Edit Scan List menu.*

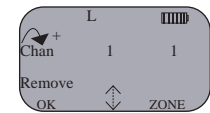


Figure 6

## TX POWER SELECTION

**To Change Power Settings** - press the "F1" side button to cycle between HI/MID/LOW power settings.

*Note: H= HI Power/ M=Medium Power/ L=Low Power (See Figure 7)*

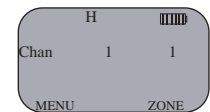


Figure 7

## LOCKING KEYPAD

**To Lock the Keypad** - press the "Lock" softkey once to lock the key pad.

- LCD momentarily displays "Key Lock Active"

**To Unlock the Keypad** - press the "Lock" softkey once.

- Then press the "Unlock" softkey to unlock keypad.
- LCD momentarily displays "Key Lock Inactive"

## SQUELCH ADJUSTMENT *(See Figure 8)*

**To Adjust Squelch** - press and hold the "F2 Squelch" button to open the "Squelch Adjust" parameter.

- Adjust the squelch setting by using the up/down softkeys and press the "OK" softkey.

*Note: Setting squelch to the far left, completely opens the squelch sensitivity setting (Open Squelch).*

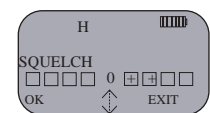


Figure 8

# MIDLAND PORTABLE RADIO ANALOG PROGRAMMING GUIDE

1. Select the group you wish to program *(See Basic Operation and Controls)*
2. Select the "Menu" softkey, scroll down/up to "Channel Parameters" and press the "Select" softkey. *(See Figure 1)*
3. Scroll down/up to "Channel" and press the "Select" softkey to enter channel programming mode.
4. Enter the 5-Digit Password and press the "OK" softkey. **NIICD Password is "00000"** *(See Figure 2)*
5. Scroll up/down to desired channel to program and press the "Select" softkey to enter the channel parameters. *(See Figure 3)*  
**Channel Parameters:** *Scroll up/down to edit each of the following channel parameters*
6. **Channel Mode:** Default is set to "Analog". *(See Figure 4)*
  - To change Channel Mode, press the "Edit" softkey and scroll up/down to select "Analog, Digital, or Multi" and press the "OK" softkey.
7. **RX Frequency:** Press the "Edit" softkey to edit the **Receive Frequency**.
  - To change Receive Frequency, press the "↶" key several times to clear the frequency and enter the new Receive Frequency and press the "OK" softkey. *(See Figure 5)*
8. **TX Frequency:** Press the "Edit" softkey to edit the **Transmit Frequency**.
  - To change Transmit Frequency, press the "↶" key several times to clear the frequency and enter the new Transmit Frequency and press the "OK" softkey. *(See Figure 6)*
9. **TX Power:** Default is set to **Medium** (2 Watts).
  - To change power, press the "Edit" softkey and scroll up/down to select "Low, "Medium", or "High" Power and press the "OK" softkey.
10. **Channel Name:** Default is channel numbers.
  - To change the Channel Name, press the "Edit" softkey and press the "↶" key several time to clear the channel name. Enter a new channel name via the numeric key pad and press the "OK" softkey.
11. **TX Timeout:** Default is set to "Yes". *(Timer is set to 120 seconds)*
  - To change TOT, press the "Edit" softkey and scroll up/down to select "No or Yes" and press the "OK" softkey.
12. **RX Tone Type:** Default is set to "CCS".
  - To change Receive Tone Type, press the "Edit" softkey and scroll up/down to select "CCS" or "DCS" and press the "OK" softkey.
13. **RX Tone:** Default is set to "None".
  - To change Receive Tone, press the "Edit" softkey and scroll up/down to select desired tone from list and press the "OK" softkey.
14. **TX Tone Type:** Default is set to "CCS".
  - To change Transmit Tone Type, press the "Edit" softkey and scroll up/down to select "CCS" or "DCS" and press the "OK" softkey.
15. **TX Tone:** Default is set to "None".
  - To change Transmit Tone, press the "Edit" softkey and scroll up/down to select desired tone from list and press the "OK" softkey.
16. **Chan Spacing:** Default is set to Narrowband "12.5Khz".
  - To change Channel Spacing, press the "Edit" softkey and scroll up/down to select either "12.5Khz" or "15Khz" and press the "OK" softkey.
17. **ANI Type:** Default is set to "None".
  - To change ANI, press the "Edit" softkey and scroll up/down to select either "None, "5-Tone", or "DTMF" and press the "OK" softkey.
18. **Selcall Type:** Default is set to "None".
  - To change Selcall, press the "Edit" softkey and scroll up/down to select "None", "2-Tone", or "5-Tone" and press the "OK" softkey.
19. Once all parameters are entered, press the "Exit" softkey. *(See Figure 7)*
  - Display will show "Save Changes Permanently?", press the "Yes" softkey key to save all parameters.

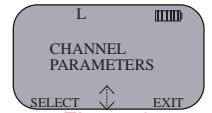


Figure 1

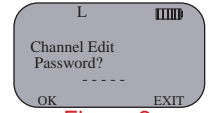


Figure 2

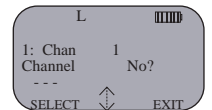


Figure 3

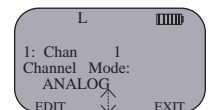


Figure 4

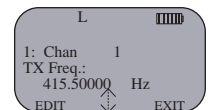


Figure 5

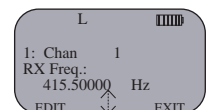


Figure 6

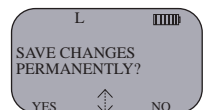


Figure 7

# MIDLAND PORTABLE RADIO CLONING GUIDE

1. Turn both radios ON.
2. Attach each end of the cloning cable to each Accessories Jack on top of the radio.  
(See **Midland Cloning Connections**)
  - There is no master or slave connections on the cloning cable.  
*Note: The Master radio will clone from it's current group into the Slaves current group, verify the Master and the Slave radios are in the appropriate groups before cloning.*
3. On the Master radio, select **"Menu"** using the left radio softkey. (See **Figure 1**)
  - Scroll down to **"Channel Parameters"** via the up/down arrow softkeys and press the **"Select"** softkey. (See **Figure 2**)
  - Scroll down to **"Clone"** and press the **"Select"** softkey. (See **Figure 3**)
  - Select **"Single Zone"** or **"All Zones"** via the up/down arrow softkeys and press the **"Select"** softkey. (See **Figure 4**)
  - Press the **"Prog"** softkey to send the clone over to the Slave radio. (See **Figure 5**)
  - The Master radio will communicate with the slave radio and write the cloned group. (See **Figure 6**)
4. Once the cloning is successful, press the **"Exit"** softkey three times to exit out of the programming/cloning mode. (See **Figure 7**)

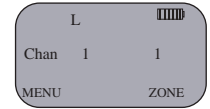


Figure 1

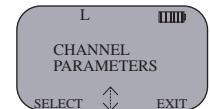


Figure 2

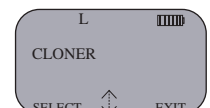


Figure 3

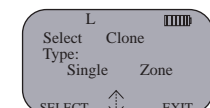


Figure 4

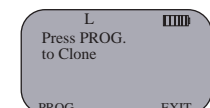


Figure 5

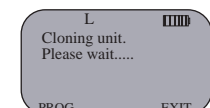


Figure 6

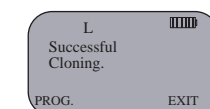


Figure 7



Midland Cloning Connections

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## MOTOROLA XTS 2500 and XTS 5000



# MOTOROLA XTS 2500 PORTABLE BASIC OPERATION & CONTROLS

1. Turn power **ON** by turning the **ON/OFF Volume Knob** clockwise.
  - The LCD will indicate the current group and channel label.
2. Select a zone number by pressing the appropriate Menu Select soft key labeled "ZONE".
  - Select a zone by pressing the 4-Way Navigation switch to the right or left.
  - or**
  - Direct enter a 2 digit group/zone number via the keypad.
  - Press the "Home" key when finished.
3. **Select a channel** by turning the **Channel Select Knob** to one of the **16 available positions**. (*Channel 01-16*)
4. Adjust the volume by pressing and holding the **"Monitor"** key until it beeps and the squelch stay open.
  - Set the volume to desired level.
  - Press the **"Monitor"** key once more to close Squelch.

The radio is now ready to RECEIVE on the selected group and channel.

6. **To transmit**, press and hold the Push-To-Talk (**PTT**) button on the side of the radio.
 

*Note: The Transmit Indicator Light should glow red while transmitting.  
If not, the battery may be low or the channel is RX only or busy.*
7. **Pause 1 second** and talk in a normal voice into the microphone.
 

*Note: Try to shield the microphone from wind and other loud background noises for clearer transmissions.*
8. **Release the PTT** to stop transmitting and receive incoming transmissions.



XTS 2500 Front View



# MOTOROLA XTS 5000 PORTABLE BASIC OPERATION & CONTROLS

1. Turn power **ON** by turning the **ON/OFF Volume Knob** clockwise.
  - The LCD will indicate the current group and channel label.
2. Select a zone number by pressing the appropriate Menu Select soft key labeled "ZONE".
  - Select a zone by pressing the 4-Way Navigation switch to the right or left.
  - or**
  - Direct enter a 2 digit group/zone number via the keypad.
  - Press the "Home" key when finished.
3. **Select a channel** by turning the **Channel Select Knob** to one of the **16 available positions**. (*Channel 01-16*)
4. Adjust the volume by pressing and holding the **"Monitor"** key until it beeps and the squelch stay open.
  - Set the volume to desired level.
  - Press the **"Monitor"** key once more to close Squelch.

**The radio is now ready to RECEIVE on the selected group and channel.**

6. **To transmit**, press and hold the Push-To-Talk (**PTT**) button on the side of the radio.
 

*Note: The Transmit Indicator Light should glow red while transmitting.  
If not, the battery may be low or the channel is RX only or busy.*
7. **Pause 1 second** and talk in a normal voice into the microphone.
 

*Note: Try to shield the microphone from wind and other loud background noises for clearer transmissions.*
8. **Release the PTT** to stop transmitting and receive incoming transmissions.



# MOTOROLA XTS 2500/5000 PORTABLE SETTINGS/OPTIONS

## CHANGING ZONES/GROUPS

To change zones/groups, press the "ZONE" softkey from the default screen/display. (See Figure 1)

- Select the desired zone/group by scrolling right/left with the 4-Way Navigation Switch **or** direct enter a 2 digit zone/group number via the key. (See Figure 2)
- Once a desired zone/group is selected, press the "HOME" button to make that zone/group active.



Figure 1

## ENABLE/DISABLE SCAN/PRIORITY SCAN

To Enable Scan, turn the 3-Position Rotary/Toggle Switch to the "B" or "C" position.

*Note: LCD will indicate the radio is in scan mode, by displaying an ( Z ) icon on the upper part of the LCD.*

(See Figure 3)

To Disable Scan, turn the 3-Position Rotary/Toggle Switch to the "A" position.

*Note: If no channels are in the Scan List, the radio will beep and indicate empty scan list on the LCD when scan is enabled.*



Figure 2



Figure 3

## ADD/REMOVE CHANNELS FROM SCAN/PRIORITY LIST

To add a channel to the Scan List, press the "PROG" softkey from the default screen/display. (See Figure 4)

- Press the "SCAN" softkey to enter into the scan list. (See Figure 5)
- Select the desired channel to scan using the top 16 Channel Select Knob.
- Press the "SEL" softkey once to enter that selected channel in the scan list. (See Figure 6)  
*Note: LCD will indicate the channel is in the scan list, by displaying an ( Z ) icon on the upper part of the LCD.*
- Press the "SEL" softkey once more to enter that selected channel as the scan **priority 1** channel.  
*Note: LCD will indicate the radio is **PRI 1** by displaying an ( Z . ) icon on the upper part of the LCD.*
- Press the "SEL" softkey once more to enter that selected channel as the scan **priority 2** channel.  
*Note: LCD will indicate the radio is **PRI 2** by displaying an ( Z . ) icon on the upper part of the LCD. Note the flashing DOT on the end.*
- Press the "SEL" softkey once more to **remove the channel from the scan list completely** Or press the "DEL" softkey **to remove the channel from the scan list.**
- Press the "HOME" button to return to the main screen.



Figure 4



Figure 5



Figure 6

# MOTOROLA XTS 2500 PORTABLE ANALOG PROGRAMMING GUIDE

1. Turn radio ON and select a Zone/Group you wish to program.
2. Press the **4-Way Navigation** key to the right once or until the **"FPP"** softkey is visible on the display.
  - Press the **"FPP"** softkey to proceed into **programming mode**. (See figure 1)
  - Radio will indicate or ask for programming password, press the **"OK"** softkey to enter program mode. (See Figure 2)
  - Radio will display active zone, **select the desired zone** by pressing the 4-Way Navigation key left or right. (See Figure 3)
  - Once the desired zone is reached, press the **"VIEW"** softkey to change the channel programming information. (See Figure 4)
3. Select the desired channel to program, by pressing the 4-Way Navigation key left or right.
  - Once the desired channel is reached, press the **"VIEW"** softkey to change the **Channel Parameters**.

## Channel Parameters:

4. **"TX:xxx.xxxxxx"**, press the **"EDIT"** softkey to change the **Transmit Frequency**. (See Figure 5)
  - Enter the valid **Transmit Frequency** and press the **"OK"** softkey, then press the 4-Way Navigation key to the right to the next parameter.
5. **"RX:xxx.xxxxxx"**, press the **"EDIT"** softkey to change the **Receive frequency**. (See Figure 6)
  - Enter the valid **RX frequency** and press the **"OK"** softkey, then press the 4-Way Navigation key to the right to the next parameter.
6. **"TX PL: 0 CSQ"**, press the **"EDIT"** softkey to change the **Transmit Tone**. (See Figure 7)
  - Enter a **valid Transmit Tone** via the keypad and press the **"OK"** softkey, **or**
  - Press the 4-Way Navigation key up or down and select the desired tone and press the **"OK"** softkey.
  - Press the 4-Way Navigation key to the right to the next parameter.  
*Note: "0 CSQ" is default for NO TONE.*
7. **"RX PL: 0 CSQ"**, press the **"EDIT"** softkey to change the **Receive Tone**. (See Figure 8)
  - Enter a valid RX tone via the keypad and press the **"OK"** softkey, **or**
  - Press the 4-Way Navigation Key up or down and select the desired tone and press the **"OK"** softkey.
  - Press the 4-way Navigation key to the right to the next parameter.  
*Note: "0 CSQ" is default for NO TONE.*
9. **"TX DPL: 0 CSQ"**, is a digital function do not change for Analog Programming.
10. **"RX DPL: 0 CSQ"**, is a digital function do not change for Analog Programming.
11. **"TX NAC: \$293"**, is a digital function do not change for Analog Programming.
12. **"RX NAC: \$293"**, is a digital function do not change for Analog Programming.  
*Note: Do not change TX/RX DPL, or TX/RX NAC for analog channels, these parameters are used for digital channels only. TX/RX DPL and TX/RX NAC will display analog equivalent information.*
13. **"RX Type: ANALOG"**, press the **"EDIT"** softkey to change the **Receive Type**. (See Figure 9)
  - Toggle between **"ANALOG"**, **"MIXED"**, or **"DIGITAL"** by pressing the 4-Way Navigation Switch up or down.
  - For Analog channels, select **"ANALOG"** and press the **"OK"** softkey, then press the 4-Way Key to the right to the next parameter.
14. **"TX Type: ANALOG"**, press the **"EDIT"** softkey to change the **Transmit Type**. (See Figure 10)
 *Note: The Transmit Type can not be changed if Receive Mode is set to Analog.*
15. **"Bandwidth: 12.5 KHz"**, press the **"EDIT"** softkey to change the **Channel Bandwidth**. (See Figure 11)
  - Toggle between either **"12.5 KHz"** for Narrowband or **"25.0 KHz"** for Wideband by pressing the 4-Way Navigation Switch up or down and press the **"OK"** key.
  - Press the 4-Way Navigation Key to the right to the next parameter.  
*Note: UHF models are capable of selecting "20.0 KHz" for bandwidth, DO NOT SELECT THIS OPTION.*
16. **"Chan Name: CHAN 1"**, press the **"EDIT"** softkey to change the **Channel Label**.
  - Enter the desired channel name using the alpha numeric keypad and press the **"OK"** softkey when done.
  - Press the 4-Way Navigation Key to the right, to the next parameter.  
*Note: For Space Character, press the 4-Way Navigation Switch to the Right.*
17. **"Zone Name: Z1"**, press the **"EDIT"** softkey to change the **Zone Label**.
  - Enter the desired Zone Name using the alpha numeric keypad and press the **"OK"** softkey when done.  
*Note: NIICD does not recommend changing the Zone Name.*
18. Once the Zone Name is edited, pressing the 4-way Navigation Switch to the right will scroll back to the **Transmit Frequency** parameter, programming for that particular channel is complete.
  - Once all the programming parameters have been entered for that channel press the **"DONE"** softkey and select another channel to program or press the **"HOME"** Button to exit programming mode.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5

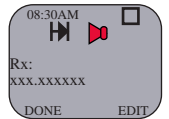


Figure 6



Figure 7

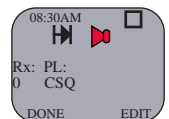


Figure 8

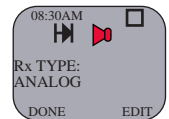


Figure 9

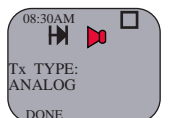


Figure 10

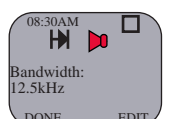


Figure 11

# MOTOROLA XTS 2500/5000 PORTABLE CLONING GUIDE

1. Connect the cloning cable to both the Master and Slave radios. *(See Motorola Cloning Connections)*
2. Turn both radios on.
3. On the **MASTER RADIO**, press the “**CLON**” softkey from the default screen to bring up the cloning menu. *(See Figure 1)*
  - The Master radio will momentarily display “**TARGET RADIO CONNECTED**” if a slave radio is connected correctly.
  - The Slave radio will display “**CLONE MODE**” on the LCD.
4. Select a desired **zone/group** by pressing the 4-Way Navigation Key to the left or right. *(See Figure 2)*
5. Once a zone is selected, press the “**SEL**” softkey to enable that zone to be sent over to the slave radio.
  - The display will indicate the zone is enabled by an “**C**” icon on the right side of the LCD. *(See Figure 3)*
6. Press the “**DONE**” softkey to select a target zone/group. *(See Figure 4)*
7. The display will indicate “**Target: Zx:**”, select a desired group/zone that the Master radio will write/clone over the Slave radio.
  - Press the “**SEL**” softkey when desired target group/zone is selected.
  - The display will indicate the target zone is enabled by an “**C**” icon on the right side of the LCD. *(See Figure 4)*
8. Press the “**OK**” softkey to begin cloning.
  - Display on Master will indicate “**Wait: Cloning.....**”.
  - Display on Master will indicate “**CLONE SUCCESSFUL**” once clone is complete. *(See Figure 6)*
9. Press the “**EXIT**” softkey to exit clone mode and return to default screen.



Figure 1



Figure 2

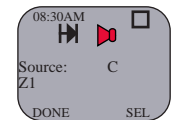


Figure 3



Figure 4



Figure 5

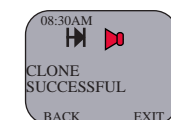


Figure 6



**Motorola Cloning Connections**

# MOTOROLA XTS 2500/5000 PORTABLE CLAMSHELL REMOVAL

1a. Squeeze Clamshell Cover Release Tabs



Figure 1

1b. Push the radio with thumb through the bottom opening of the clamshell cover

2a. Slide the Clamshell Cover down until removed from the Clamshell Magazine



Figure 2

*Note: Once the Clamshell cover is removed, batteries can be easily replaced without removing the Clamshell Magazine*

3a. Slide down the Clamshell Magazine Release Latches



Figure 3

4a. Pull the top end of the Clamshell Magazine slightly away from the radio



Figure 4

5a. Push the radio slightly down and out to release from the bottom portion of the Clamshell Magazine



Figure 5

6a. Pull the radio from the Clamshell Magazine and replace the batteries if needed



Figure 6

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### NIICD RADIO SYSTEM DIAGRAMS

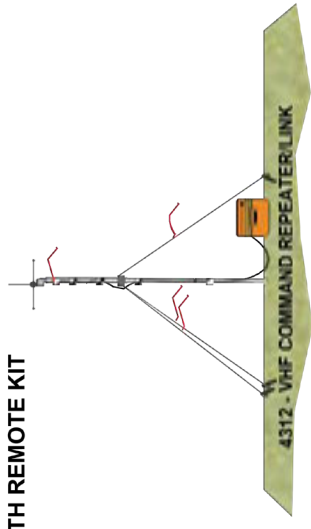
2021

These diagrams are also available for download online at:

[www.nifc.gov/NIICD/documents.html](http://www.nifc.gov/NIICD/documents.html)

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ONE VHF COMMAND REPEATER STAND-ALONE WITH REMOTE KIT



RX RPTR FREQ: \_\_\_\_\_

TX RPTR FREQ: \_\_\_\_\_

KIT#: \_\_\_\_\_

LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_

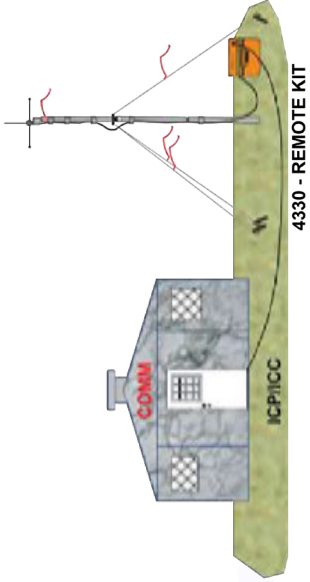
REMARKS: \_\_\_\_\_

RX TONE/NAC: \_\_\_\_\_

TX TONE/NAC: \_\_\_\_\_

RPTR ID: \_\_\_\_\_

LONG.: \_\_\_\_\_



RX FREQ: \_\_\_\_\_

TX FREQ: \_\_\_\_\_

GROUP #: \_\_\_\_\_

LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_

REMARKS: \_\_\_\_\_

RX TONE/NAC: \_\_\_\_\_

TX TONE/NAC: \_\_\_\_\_

CHANNEL #: \_\_\_\_\_

KIT #: \_\_\_\_\_

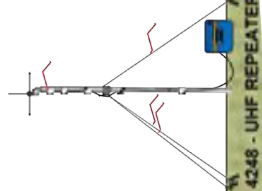
LONG.: \_\_\_\_\_

DRAWING 1

INCIDENT:

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ONE UHF REPEATER WITH TWO REMOTE KITS



4248 - UHF REPEATER

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_


TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

LOCATION: \_\_\_\_\_

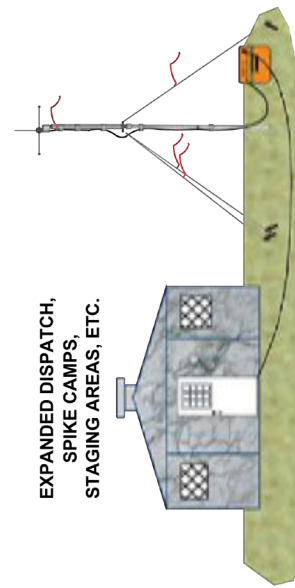
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



UHF

EXPANDED DISPATCH,  
SPIKE CAMPS,  
STAGING AREAS, ETC.



4330 - REMOTE KIT

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

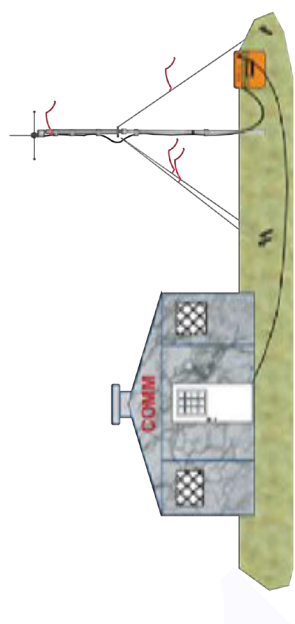
GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_

KIT #: \_\_\_\_\_

LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



ICP/ICC

4330 - REMOTE KIT

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_

KIT #: \_\_\_\_\_

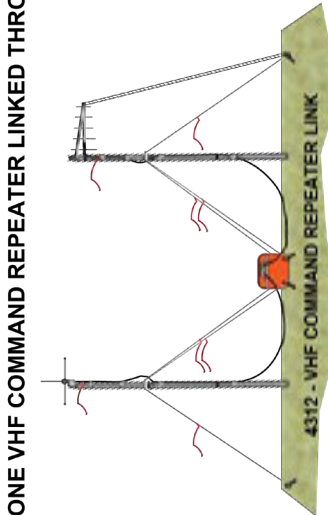
LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

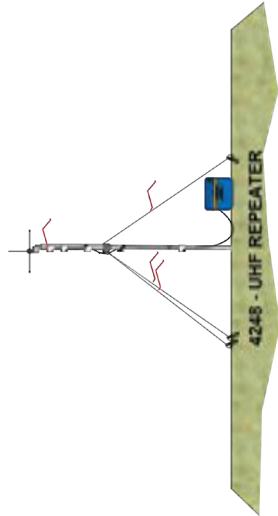
REMARKS: \_\_\_\_\_

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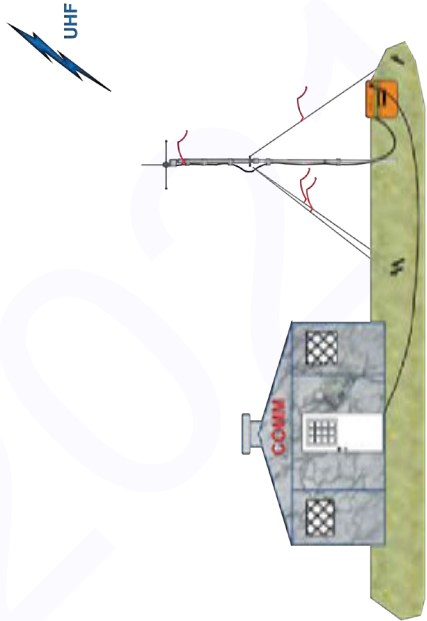
ONE VHF COMMAND REPEATER LINKED THROUGH UHF REPEATER HUB



RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT: \_\_\_\_\_ LONG: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



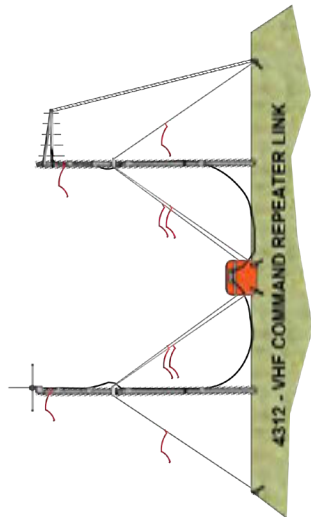
RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT: \_\_\_\_\_ LONG: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



ICP/ICC 4330 - REMOTE KIT  
RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT: \_\_\_\_\_ LONG: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

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TWO (2) VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX



RX RPTR FREQ: \_\_\_\_\_

RX TONE/NAC: \_\_\_\_\_

TX RPTR FREQ: \_\_\_\_\_

TX TONE/NAC: \_\_\_\_\_

RX LINK FREQ: \_\_\_\_\_

TX LINK FREQ: \_\_\_\_\_

UHF LINK CH #: \_\_\_\_\_

KIT#: \_\_\_\_\_

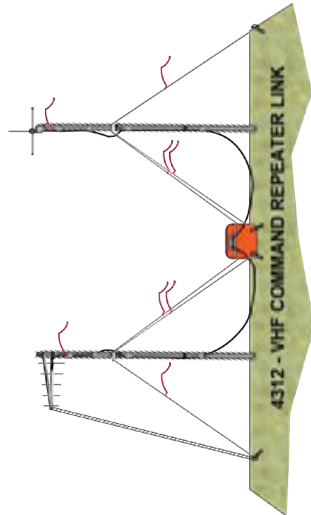
RPTR ID: \_\_\_\_\_

LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_

LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



RX LINK FREQ: \_\_\_\_\_

TX LINK FREQ: \_\_\_\_\_

UHF LINK CH #: \_\_\_\_\_

KIT#: \_\_\_\_\_

RPTR ID: \_\_\_\_\_

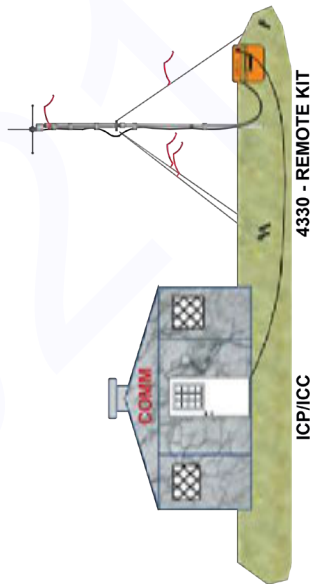
LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_

LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_





RX FREQ: \_\_\_\_\_

TX FREQ: \_\_\_\_\_

GROUP #: \_\_\_\_\_

KIT #: \_\_\_\_\_

LOCATION: \_\_\_\_\_

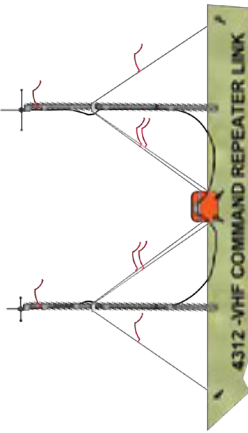
LAT.: \_\_\_\_\_

LONG.: \_\_\_\_\_

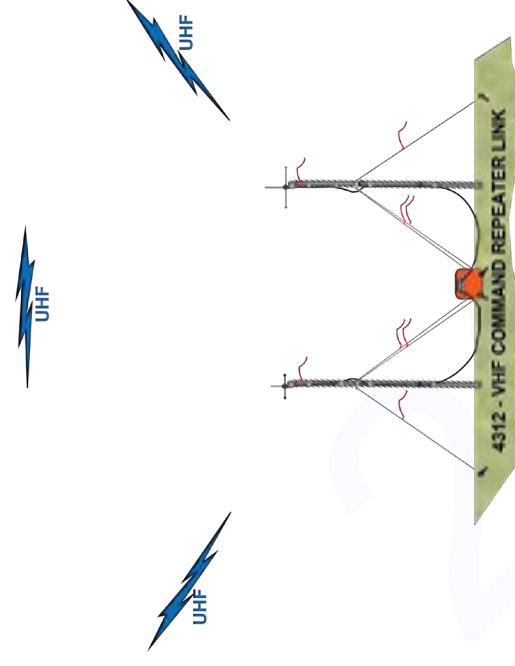
REMARKS: \_\_\_\_\_

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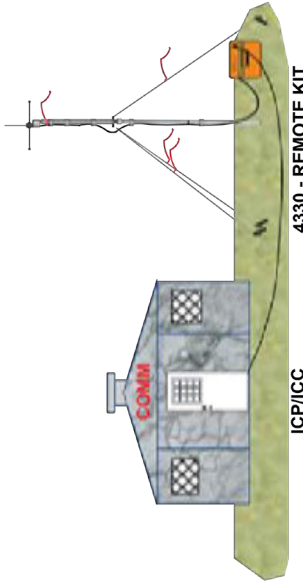
THREE (3) VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX



RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_ REMARKS: \_\_\_\_\_



RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_ REMARKS: \_\_\_\_\_



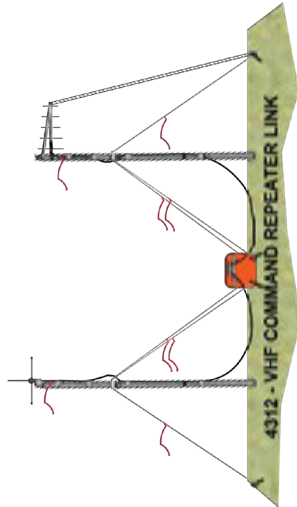
RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_ REMARKS: \_\_\_\_\_

DRAWING 5

INCIDENT:

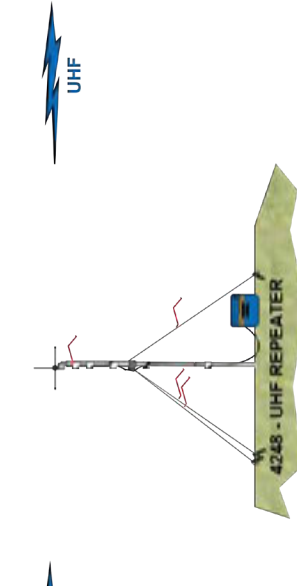
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TWO (2) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



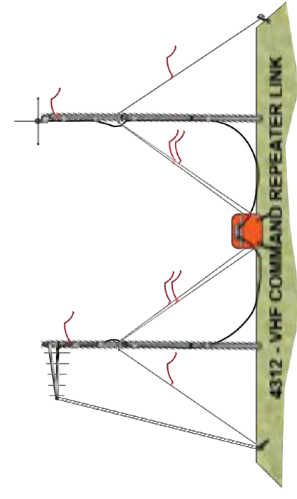
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
KIT#: \_\_\_\_\_ LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



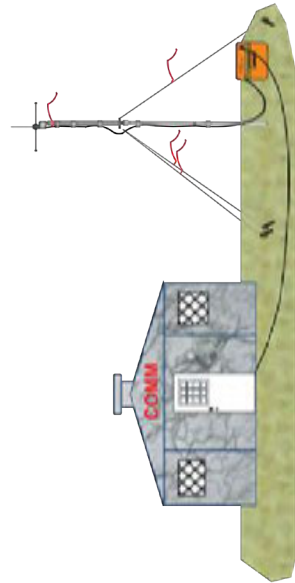
4248 - UHF REPEATER

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_ REMARKS: \_\_\_\_\_



4312 - VHF COMMAND REPEATER LINK

RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
TX LINK FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
UHF LINK CH #: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
KIT#: \_\_\_\_\_ LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

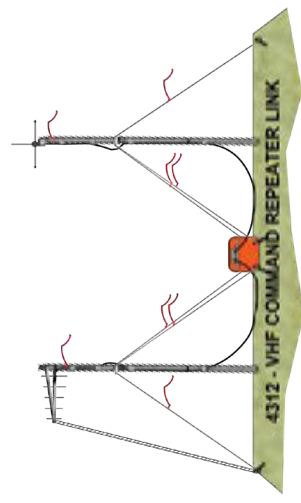


ICP/ICC 4330 - REMOTE KIT

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

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THREE (3) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_

RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_


TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

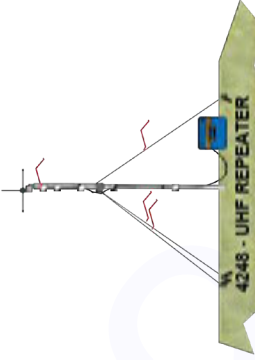
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_

LAT.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



UHF



4248 - UHF REPEATER

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_


TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

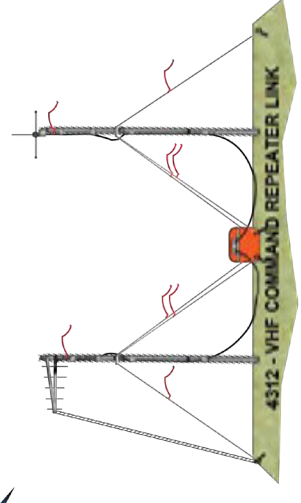
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_

LAT.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



UHF



4312 - VHF COMMAND REPEATER LINK

RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_

TX LINK FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

UHF LINK CH #: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_


TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_

LAT.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



UHF



4330 - REMOTE KIT

ICP/ICC

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_

KIT #: \_\_\_\_\_

LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_

LAT.: \_\_\_\_\_

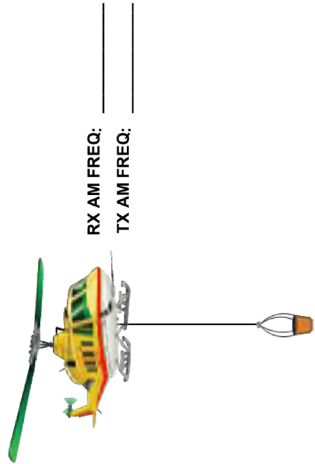
REMARKS: \_\_\_\_\_

DRAWING 7

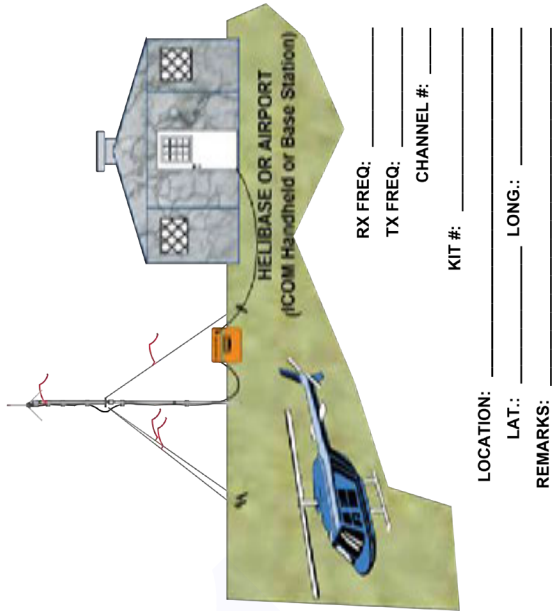
INCIDENT:

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AIRCRAFT LINK SYSTEM (BASE CONFIGURATION) GROUND TO AIRCRAFT COMMUNICATIONS



VHF- AM  
(SIMPLEX)

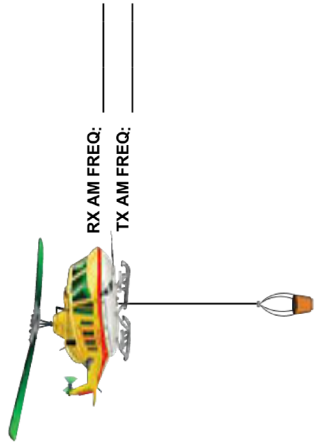


DRAWING 8

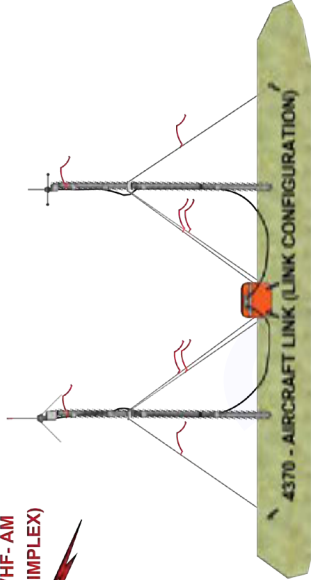
INCIDENT:

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AIRCRAFT LINK SYSTEM (LINK CONFIGURATION) WITH REMOTE AT HELIBASE



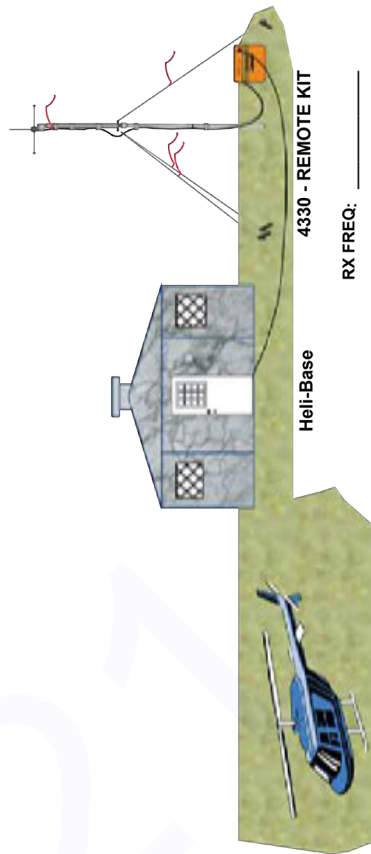
VHF- AM  
(SIMPLEX)



RX AM FREQ: \_\_\_\_\_ RX UHF FREQ: \_\_\_\_\_  
TX AM FREQ: \_\_\_\_\_ TX UHF FREQ: \_\_\_\_\_  
AM CHANNEL #: \_\_\_\_\_ FM UHF CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

UHF  
(SIMPLEX)




RX FREQ: \_\_\_\_\_  
TX FREQ: \_\_\_\_\_  
CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

DRAWING 9

INCIDENT:


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MULTIPLE AIRCRAFT LINK SYSTEM (LINK CONFIGURATION) LINKED THROUGH UHF REPEATER HUB



VHF- AM  
(SIMPLEX)


RX AM FREQ: \_\_\_\_\_  
TX AM FREQ: \_\_\_\_\_



4370 - AIRCRAFT LINK (LINK CONFIGURATION)

RX AM FREQ: \_\_\_\_\_ RX UHF FREQ: \_\_\_\_\_  
TX AM FREQ: \_\_\_\_\_ TX UHF FREQ: \_\_\_\_\_  
AM CHANNEL #: \_\_\_\_\_ FM UHF CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_


LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



4248 - UHF REPEATER


RX RPTR FREQ: \_\_\_\_\_ RX TONE/NA: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX TONE/NA: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



VHF- AM  
(SIMPLEX)

RX AM FREQ: \_\_\_\_\_  
TX AM FREQ: \_\_\_\_\_





4370 - AIRCRAFT LINK (LINK CONFIGURATION)

RX AM FREQ: \_\_\_\_\_ RX UHF FREQ: \_\_\_\_\_  
TX AM FREQ: \_\_\_\_\_ TX UHF FREQ: \_\_\_\_\_  
AM CHANNEL #: \_\_\_\_\_ FM UHF CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_


SECONDARY EXPANDED A/C LINK SYSTEM





VHF- AM  
(SIMPLEX)


RX AM FREQ: \_\_\_\_\_  
TX AM FREQ: \_\_\_\_\_



4370 - AIRCRAFT LINK (LINK CONFIGURATION)

RX AM FREQ: \_\_\_\_\_ RX UHF FREQ: \_\_\_\_\_  
TX AM FREQ: \_\_\_\_\_ TX UHF FREQ: \_\_\_\_\_  
AM CHANNEL #: \_\_\_\_\_ FM UHF CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_

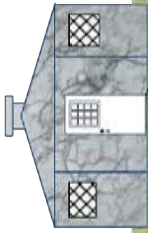
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



4330 - REMOTE KIT

RX FREQ: \_\_\_\_\_  
TX FREQ: \_\_\_\_\_  
CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



Helibase

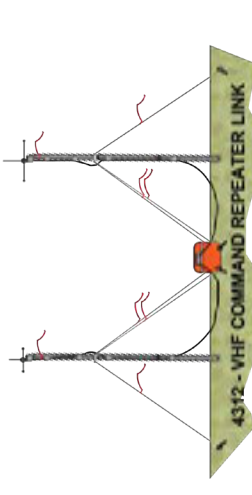
DRAWING 10

INCIDENT:

203

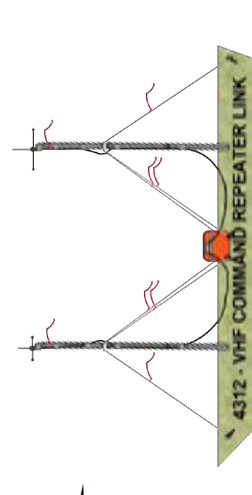
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FOUR (4) VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX



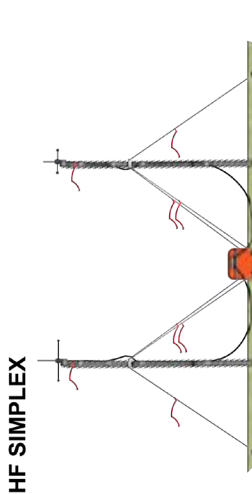
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

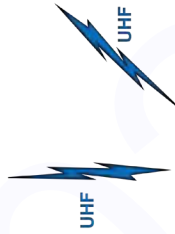
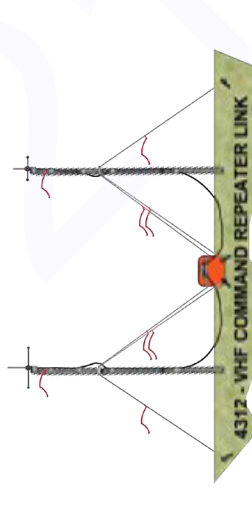
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_



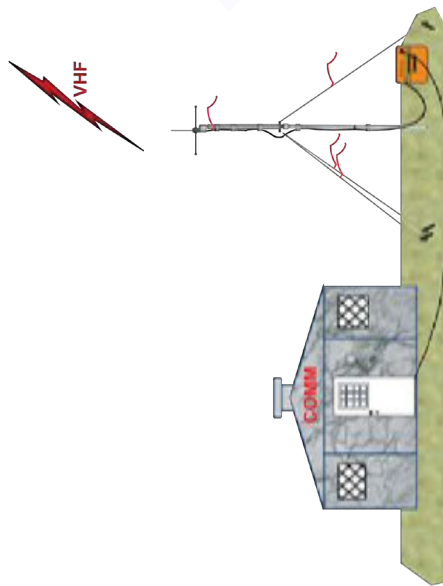
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_



4330 - REMOTE KIT

ICP/ICC

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
 KIT #: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

DRAWING 11

INCIDENT:

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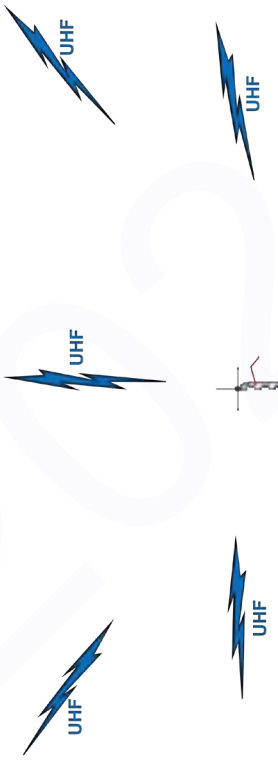
FOUR (4) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB

4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

4312 - VHF COMMAND REPEATER LINK

RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
 TX LINK FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 UHF LINK CH #: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_



ICP/ICC 4330 - REMOTE KIT

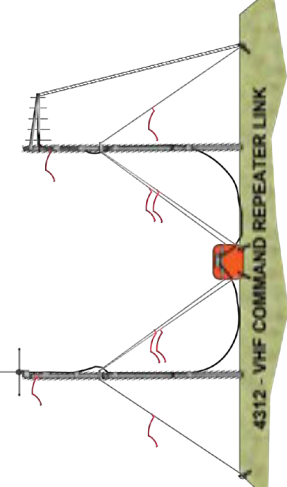
RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
 KIT #: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

4248 - UHF REPEATER

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

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FIVE (5) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



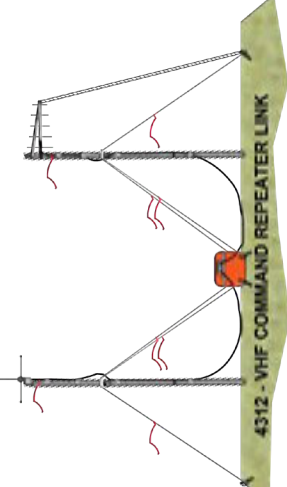
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_

KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



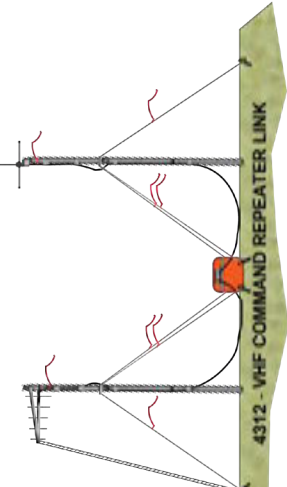
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_

KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



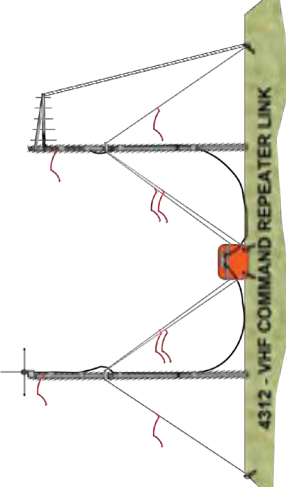
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_

KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_

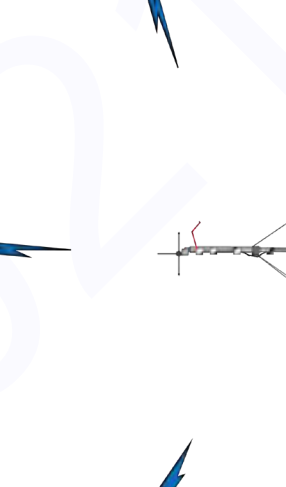
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_

KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_

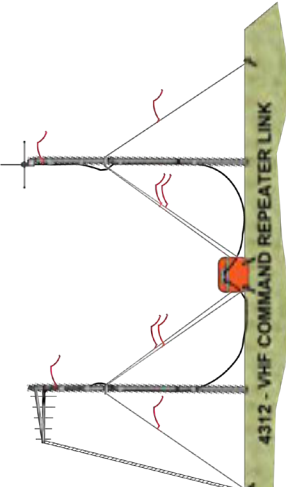


4243 - UHF REPEATER

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_

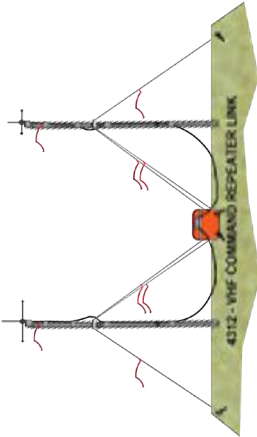
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_

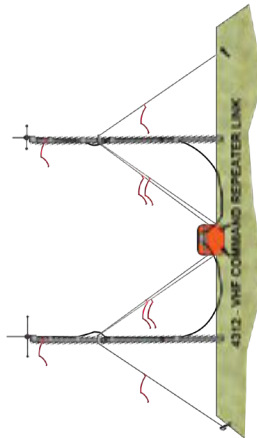
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SIX (6) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



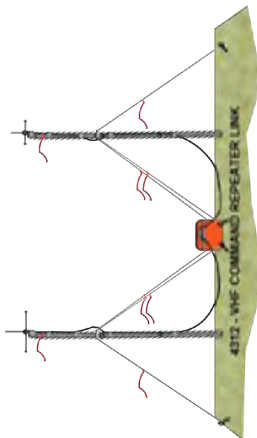
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



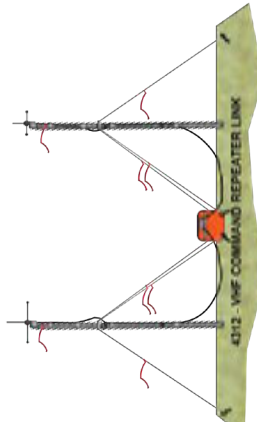
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



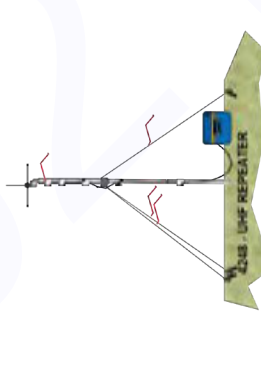
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



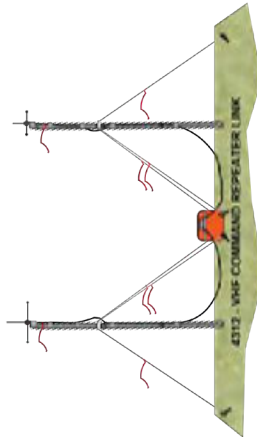
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



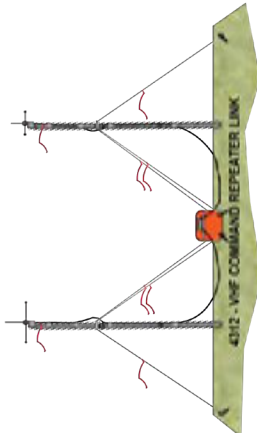
4318 - UHF REPEATER

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

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SEVEN (7) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB

4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

4312 - UHF REPEATER

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

4312 - UHF REPEATER

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ UHF LINK CH #: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ LONG.: \_\_\_\_\_  
LAT.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

DRAWING 15

INCIDENT:

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**COML/COMT CHECKLIST  
ICS-205 RADIO COMMUNICATIONS PLAN**

2021

# COML/COMT CHECKLIST

1. **Contact the CDO: (208)387-5644 CDO E-mail: niicd@firenet.gov**
  - ☐ Equipment assignments
  - ☐ Frequency assignments (repeaters, links, aircraft, tactical, tones)
  - ☐ Status of orders (pre-orders)
  - ☐ Adjacent incident information (interoperability issues, frequency assignments, locations, COML)
  - ☐ Equipment availability (pre-positioned, cache locations, shortages)
  - ☐ Is a Communications Coordinator (COMC) assigned?
  - ☐ Exchange contact information with CDO or COMC
2. **Attend Agency Administrator Briefing**
  - ☐ Identify local contact for finding possible repeater sites
  - ☐ Local communications personnel
  - ☐ Is local Admin/Fire Net available for traffic routes/emergency contact?
  - ☐ Name/contact for local phone company
  - ☐ Are phone sets available from the local sponsoring unit?
3. **Meet with Operations and Determine Their Needs**
  - ☐ How many divisions for tactical channels?
  - ☐ Area of operations (coverage)
  - ☐ Is team responsible for Initial Attack? What areas?
  - ☐ Interoperability issues
  - ☐ If communicating with other agencies, will their frequencies be programmed in NIRSC radios?
4. **Meet with Air Operations and Determine Their Needs**
  - ☐ How many Air-to-Air AM frequencies are required?
  - ☐ Will fixed wing and rotor wing be on separate frequencies?
  - ☐ Has a Heli-base been established?
  - ☐ Will an Aircraft Link be needed for incident flight following?
  - ☐ How many Air-to-Ground FM frequencies are required?
  - ☐ How many Air-to-Air FM frequencies are required? (mostly in California)
  - ☐ Is there a need for Heli-base Deck Frequency?
  - ☐ Is there a need for Heli-base Takeoff and Landing Control Frequency (TOLC)?
5. **Meet with the Logistics Chief**
  - ☐ Teams policy and Incident Objectives
  - ☐ Will a night shift be required?
  - ☐ Where will the ICC be located? (Check with Facilities, locate at quiet location close to medical)
  - ☐ Will a staging area be established? What are their needs? (radio, phone, internet)
  - ☐ Who will need telephones, fax service and internet? Determine priorities for lines.
  - ☐ Crew phones?
  - ☐ Will a spike camp be established? What are their needs? (radio, phone, internet)
  - ☐ Will a Public Address system be needed for briefings?
  - ☐ Field ordering process, tie in with supply. Will Communications Unit take all orders?
  - ☐ Meeting schedule.
  - ☐ Have any communications personnel been ordered?
  - ☐ Have any equipment, frequencies or services been ordered?

# COML/COMT CHECKLIST

6. **Design the Communications System**
- ☐ Check map for possible repeater locations
  - ☐ Order radio equipment if needed
  - ☐ Order communications personnel if needed (RADO, INCM, COMT)
  - ☐ Order supplies (batteries, telephone/internet service, forms)
  - ☐ Build ICS-205 (Communications Plan)
  - ☐ Fill out incident diagrams
  - ☐ Prepare incident and cell phone list
  - ☐ If needed, coordinate with CDO or COMC.
  - ☐ Send ICS-205, ICS-220 and incident diagrams to CDO or COMC.
7. **Install Radio System**
- ☐ Test (voice check) equipment in camp.
  - ☐ Determine means of transportation and arrange.
  - ☐ Technicians assigned?
  - ☐ Is land use agreement required?
  - ☐ Install and voice test.
  - ☐ Voice check complete system
  - ☐ Document locations
  - ☐ Adhere to safety standards
  - ☐ Develop battery replacement/maintenance plan
  - ☐ Clone radios
8. **Taking Over an Existing Incident**
- ☐ Current IAP
  - ☐ Current ICS-205 (Communications Plan)
  - ☐ Current System Diagram
  - ☐ Current ICS-220 (Aviation Summary)
  - ☐ Equipment inventory and locations
  - ☐ Battery inventory
  - ☐ Radio site locations and means of travel
  - ☐ Current personnel and status
  - ☐ Adjacent incident information
  - ☐ Local contact (Radio Tech)
  - ☐ Contact information

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INCIDENT RADIO COMMUNICATIONS PLAN				1. Incident Name		2. Date Time Prepared		3. Operational Period Date/Time	
4. Basic Radio Channel Utilization									
Mode: Wide= Analog Wideband, Narrow= Analog Narrowband, Digital= Digital Narrowband, Mixed= Analog/Digital									
CH #	Function	Frequency	Tone/NAC	Mode	TGID	Assignment	Remarks		
1		RX:							
		TX:							
2		RX:							
		TX:							
3		RX:							
		TX:							
4		RX:							
		TX:							
5		RX:							
		TX:							
6		RX:							
		TX:							
7		RX:							
		TX:							
8		RX:							
		TX:							
9		RX:							
		TX:							
10		RX:							
		TX:							
11		RX:							
		TX:							
12		RX:							
		TX:							
13		RX:							
		TX:							
14		RX:							
		TX:							
15		RX:							
		TX:							
16	National Air Guard	RX: 168.6250				All Divisions			Emergency Air to Air/Air to Ground Communications
		TX: 168.6250	110.9	Narrow					
5. Prepared By (Communications Unit):									

Note: This is not a standard NWCG ICS205 Form

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INCIDENT RADIO COMMUNICATIONS PLAN				1. Incident Name		2. Date Time Prepared		3. Operational Period Date/Time	
4. Basic Radio Channel Utilization									
Mode: Wide= Analog Wideband, Narrow= Analog Narrowband, Digital= Digital Narrowband, Mixed= Analog/Digital									
CH #	Function	Frequency	Tone/NAC	Mode	TGID	Assignment	Remarks		
1	RX:								
	TX:								
2	RX:								
	TX:								
3	RX:								
	TX:								
4	RX:								
	TX:								
5	RX:								
	TX:								
6	RX:								
	TX:								
7	RX:								
	TX:								
8	RX:								
	TX:								
9	RX:								
	TX:								
10	RX:								
	TX:								
11	RX:								
	TX:								
12	RX:								
	TX:								
13	RX:								
	TX:								
14	RX:								
	TX:								
15	RX:								
	TX:								
16	National Air Guard	168.6250				All Divisions	Emergency Air to Air/Air to Ground Communications		
		168.6250	110.9	Narrow					
17									
18									
19									
20	National Air Guard	168.6250				All Divisions	Emergency Air to Air/Air to Ground Communications		
		168.6250	110.9	Narrow					
5. Prepared By (Communications Unit):									

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## NOTES

2021

## NOTES

2021

2021

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**2021 NIRSC User's Guide**

CDO Phone: (208) 387-5644

Toll Free: (877) 775-3451

FAX: (208) 387-5892

E-mail: [niicd@firenet.gov](mailto:niicd@firenet.gov)

Web: [www.nifc.gov/NIICD](http://www.nifc.gov/NIICD)