

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

2023



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**NFES# 000968**

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

During the 2022 all-risk season the National Incident Radio Support Cache (NIRSC) supported approximately 456 separate incidents with frequencies and equipment.

Throughout the year the NIRSC continued to provide the best support possible for personnel deployed to wildfires, hurricanes, training exercise and special events. The NIRSC:

- Issued 97 Starter Systems and over 11,400 handheld radios
- Built 115 special non-standard repeaters for incidents
- The personnel in infrared detection and mapping successfully fulfilled 637 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. Please refer to the NIRSC User's Guide for more information on the changes to multiple kit inventories. 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

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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. For any discrepancies or errors please contact the editor or the CDO.**

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

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**Order NFES# 000968**

# NIRSC TABLE OF CONTENTS

<b>INTRODUCTION</b>	<b>1</b>
<b>NATIONAL INCIDENT RADIO SUPPORT CACHE (NIRSC) ORDERING PROCESS</b>	<b>2</b>
<b>NIRSC/NIICD CONTACTS</b>	<b>5</b>
<b>COMMUNICATIONS DUTY OFFICER/COMMUNICATIONS COORDINATOR</b>	<b>6</b>
<b>NEW OR CONTINUING FOR 2023/NIICD HOTSHEET</b>	<b>7</b>
<b>NATIONAL FREQUENCY GUIDELINES</b>	<b>9</b>
<b>NIRSC VHF RADIO CHANNEL PLAN</b>	<b>11</b>
<b>NIRSC UHF RADIO CHANNEL PLAN</b>	<b>12</b>
<b>NIRSC UHF LINK MODULE CHANNEL PLAN</b>	<b>13</b>
<b>NIRSC A/C LINK AM/UHF LINK MODULE CHANNEL PLAN</b>	<b>14</b>
 <b><u>NIRSC EQUIPMENT DESCRIPTIONS</u></b>	 <b>15</b>
000968 NIRSC User's Guide	15
004080 Solar Panel Kit	16
004150 Sealed Lead Acid (SLA) Battery Kit	17
004120 JPS ACU-1000	18
004240 Airbase Accessories Kit	19
004244 UHF Radio Kit	20
004245 Flatland Kit	21
004248 UHF Repeater Kit	22
004281 Crossband Link Kit	23
004300 Ground VHF-AM Base Station Kit	24
004305 Antenna Mast	25
004312 VHF Repeater/Link Kit	26
004320 COML Kit	27
004330 Remote Kit	28
4330EX Remote Expansion Kit	29
004370 Ground Aircraft Radio/Link Kit	30
004381 VHF Radio Kit	31
004390 Starter System - VHF/UHF Radio System	32
004420 Aviation Printer Kit	33
004499 Air Attack Kit	34
004545 Aviation Radio	35
004604 Air Attack Training Kit	36
004605 Technisonic TDFM-136 Test Jig (Single)	37
004606 Technisonic TDFM-136 Test Jig (Dual)	37
004607 Technisonic TDFM-9000 Test Jig	38
004608 Cobhan NPX136D Test Jig	38
004660 Airbase Kit	39
004670 Satellite Phone Kit	40

<b><u>GENERAL COMMUNICATIONS CONDITIONS AND SOLUTIONS</u></b>	41
(1) Command/Tactical Radio Kit and Command Repeater/Link w/Remote Kit	44
(2) One-Hop Logistics Repeater with Logistics Radio Kit	45
(3) Incident Operations Area to ICP/ICC Backbone	46
(4) Large Incident Operations Area Linking System	47
(5) Extended or Multiple Incident Operations Area Linking System	48
(6) Extended Incident Operations Area Linking System	49
(7) Extended or Multiple Incident Operations Area Linking System	50
 <b><u>AVIATION COMMUNICATIONS CONDITIONS AND SOLUTIONS</u></b>	51
(8) Ground to Aircraft Radio/Link Kit (Used as a Base Station)	54
(9) Ground to Aircraft Radio/Link Kit (Using Linking)	55
(10) Ground to Aircraft Radio/Link Kit	56
(11) MAFFS Activation & Temporary Tanker Base	57
 <b><u>KIT INSTALLATION INSTRUCTIONS</u></b>	59
004080 Solar Panel Kit	60
004248 UHF Logistics Repeater	62
004281 Crossband Link Kit	64
004312 VHF Repeater Setup Procedure Stand-Alone Repeaters	66
004312 VHF Repeater Setup Procedures Repeater/Link Configuration	68
004300 Ground VHF-AM Base Station Kit	70
004330 Remote Kit	72
4330EX Remote Expansion Kit	74
004370 Ground Aircraft Radio/Link Kit (Base Mode)	76
004370 Ground Aircraft Radio/Link Kit (Link Mode)	78
004499 Air Attack Kit	80
004670 Satellite Phone Kit	82
 <b><u>KIT INVENTORIES</u></b>	83
004080 Solar Panel Kit	84
004150 Sealed Lead Acid (SLA) Battery Kit	85
004240 Airbase Accessories Kit	86
4244K2 UHF Radio Kit (KNG2 Radios)	87
4244MD UHF Radio Kit (Midland UHF Radios)	88
4244X2 UHF Radio Kit (Motorola XTS2500 UHF Radios)	89
004245 Flatland Kit	90
004248 UHF Repeater	91
004281 Crossband UHF/VHF Kit	92
004300 Ground VHF- AM Base Station Kit	94
004312 VHF Repeater/Link	95
004320 COML Kit	97
4330EX Remote Expansion Kit (KNG2 Radios)	98
4330KP Remote Kit (KNG2 Radios)	99
4330MD Remote Kit (Midland Radios)	101
004370 Ground Aircraft Radio/Link Kit	103
4381KD VHF Tactical Radio Kit (King DPHx Radios)	105
4381K2 King KNG2 P-150	106
4381KR King BKR5000	107
004390 Starter System (VHF/UHF System)	108
004420 Aviation Printer Kit	109
004499 Air Attack Kit	110
004604 Air Attack Training Kit	111
004605 Technisonic TDFM-136 Test Jig (Single)	112
004606 Technisonic TDFM-136 Test Jig (Dual)	113
004607 Technisonic TDFM-9000 Test Jig	114
004608 Cobhan NPX136D Test Jig	115
004660 Airbase Kit	116
004670 Satellite Phone Kit	118



<b><u>APPENDIX A: Voice Board Installation Instructions</u></b>	119
<b><u>APPENDIX B: Battery Information and Matrix</u></b>	123
<b><u>APPENDIX C: Antenna Installation Instructions</u></b>	131
<b><u>APPENDIX D: NIRSC Daniels Switch Settings</u></b>	141
Normal Switch Settings (UHF Repeater Configuration, E Models Only)	142
Normal Switch Settings (UHF Repeater Configuration)	143
Normal Switch Settings (VHF Repeater Configuration)	144
Normal Switch Settings (VHF Repeater/Link Configuration)	145
Normal Switch Settings (VHF Repeater Configuration, E Models Only)	146
Normal Switch Settings (VHF Repeater/Link Configuration, E Models Only)	147
Normal Switch Settings (Aircraft Base Configuration)	148
Normal Switch Settings (Aircraft Link Configuration)	149
Normal Switch Settings (Aircraft Base Configuration, E Models Only)	150
Normal Switch Settings (Aircraft Link Configuration, E Models Only)	151
Normal Switch Settings (Crossband Link)	152
<b><u>APPENDIX E: NIRSC Radio Programming Guides</u></b>	153
ICOM IC-A6	155
King BKR5000	159
King DPH/DPHx	165
King KNG2 P150/P400	171
Midland STP105B/404A	177
Motorola XTS 2500/5000	183
<b><u>APPENDIX F: NIICD Radio System Diagrams</u></b>	191
Drawing 1 - Command Repeater With Remote Kit	193
Drawing 2 - UHF Repeater With Two Remote Kits	195
Drawing 3 - VHF Command Repeater Linked Through UHF Repeater	197
Drawing 4 - Two VHF Command Repeaters Linked Via UHF Simplex	199
Drawing 5 - Three VHF Command Repeaters Linked Via UHF Simplex	201
Drawing 6 - Two VHF Command Repeaters Linked Through UHF Repeater	203
Drawing 7 - Three VHF Command Repeaters Linked Through UHF Repeater	205
Drawing 8 - Aircraft Link System (Base Configuration)	207
Drawing 9 - Aircraft Link System (Link Configuration) With Remote At Helibase	209
Drawing 10 - Two A/C Linked Systems Linked Through UHF Repeater	211
Drawing 11 - Four VHF Command Repeaters Linked Via UHF Simplex	213
Drawing 12 - Four VHF Command Repeaters Linked Through UHF Repeater	215
Drawing 13 - Five VHF Command Repeaters Linked Through UHF Repeater	217
Drawing 14 - Six VHF Command Repeaters Linked Through UHF Repeater	219
Drawing 15 - Seven VHF Command Repeater Linked Through UHF Repeater	221
<b><u>APPENDIX G: Miscellaneous Documentation</u></b>	223
COML/COMT Checklist	224
Form: ICS-205 Incident Radio Communications Plan (16 Channel)	227
Form: ICS-205 Incident Radio Communications Plan (20 Channel)	229
Form: ICS-205 Incident Radio Communications Plan (Multi-Group)	231
<b><u>NOTES</u></b>	233

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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/resources/NIICD/2023NIRSCUsersGuide.pdf](http://www.nifc.gov/resources/NIICD/2023NIRSCUsersGuide.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](mailto: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 and cloning 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. They are also available for download as a PDF from the NIRSC website ([www.nifc.gov/resources/NIICD](http://www.nifc.gov/resources/NIICD))

*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 5 of this guide for all contact information.*

# NATIONAL INCIDENT RADIO SUPPORT CACHE ORDERING PROCESS

The National Incident Radio Support Cache (NIRSC) is a national resource composed of multi-channel radio systems, frequencies, and specialty 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 24 hours for delivery. If equipment is being filled from pre-position please allow a minimum of 12 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 14 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 federal 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.

## **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.

***To meet the high demand for NIRSC communications equipment during peak fire seasons, please follow the following NIRSC Basic Operating Procedure when shipping communications equipment back to NIFC:***

**National PL 1-2:** Return communications equipment by lowest cost

- Return any unused or broken equipment to NIRSC.

**National PL 3-4:** Expedite communications equipment return by best means

- Return any unused or broken equipment to NIRSC
- Ground Freight if possible
- Should arrive at NIRSC within 4-5 days

**National PL 5:** Return communications equipment by fastest means

- Return any unused or broken equipment to NIRSC
- Overnight NIRSC equipment if possible
- Utilize local drivers for GACC's within 8 hour drive time from NIRSC

***Note: The ordering incident is responsible for returning and/or coordinating all NIRSC radio equipment directly back to Boise by; arranging shipping through the local buying team (Fedex, UPS...), by arranging shipping through the local district offices, or by arranging shipping through the local supply caches.***

**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. COML's and COMT's should be coordinating with the CDO or COMC before ordering equipment or frequencies for incidents.

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)

# 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:**

### **Division Chief:**

### **National Interagency Incident Communications Division:**

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### **Infrared:**

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

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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 as a name request. 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.*

# NEW or CONTINUING FOR 2023/NIICD HOTSHEET

## **New, 4381 Relm BKR Kits, 4381KR**

NIRSC will be sending out VHF BKR5000 radio kits for 2023 fire season. NIRSC is currently in the process of replacing all VHF DPHx radios with new VHF BKR5000 radios from Relm BK.

*NOTE: 4381 DPHx and 4381 KNG2 radio kits will also be utilized until the replacement is complete.*

## **New, 4150 SLA Battery Kit**

All 4150 SLA Battery Kits will come with a Pre-Wired Plug & Play connector that allows user's to quickly connect the batteries to the equipment. This connector also allows the batteries to be daisy chained together.

Due to 7.5V Alkaline batteries shortages, NIRSC is replacing all 7.5V alkaline batteries with a 12V Sealed Lead Acid batteries. Shipping and weight regulations does not allow the SLA batteries to be shipped in each kit. A separate kit will be shipped and is required (NFES# 004150 SLA Battery Kit) to properly operate the NIRSC equipment.

Due to airline shipping weight restrictions, the 4248's, 4330, 4330EX's 4312's , 4281's and 4370's will be shipped as 2 separate kits each. When ordering a standalone 4248, 4330, 4330EX, 4312, 4281 or a 4370 you must also order a NFES# 004150 SLA Battery Kit.

## **New, 4330EX Remote Expansion Kits in Pelican Cases**

*(See page 29 for more information on the 4330EX)*

## **New Shore Power Adapter Cable:**

A shore power adapter cable has been added to each of the following equipment; NFES# 004248 UHF Repeater Kit, NFES# 004281 Crossband Kit, NFES# 004312 Command Repeater Kit, NFES# 004370 Aircraft Link Radio Kit. This is a fused pigtail with Anderson Power Pole connectors 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, 4410 PA Systems no longer supported**

NIRSC will discontinue the use of all 4410's PA Systems currently in stock. If incident management teams require a PA system please consider a local purchase.

## **RF Cable Wrench:**

To help install and remove the coaxial cables from the bulkhead mount connectors, NIRSC is including one RF Cable Wrench in each 4248, 4312, 4370 and 4281 kits. Please return wrenches back with the kits.

## **SLA Battery Charger:**

A battery charger will be included in each of the 4248, 4281, 4330, 4330EX, 4312, and 4370 kits to keep any spare batteries charged in the field.

## **Antenna Poly-Phaser:**

NIRSC is implementing an antenna poly-phaser to help minimize possible RF surges from lightning and ungrounded equipment. The Poly-Phaser is located in line with the duplexer and should not be removed or tampered with in the field.

## **4390 Additional Kits:**

Due to the replacement of the 7.5 Alkaline batteries with the SLA batteries, each 4390 will now be shipped with 5 each NFES# 4150 SLA Battery Kit to accommodate the power needs of all the equipment. This will bring the total boxes to 14 kit boxes to each 4390 order. NIRSC recommends ordering one additional spare 4150 SLA Battery Kit to keep charging and hot swaps.

## **All UHF Link Modules will contain a TX/RX tone of 110.9:**

To help mitigate possible interference in the field from UHF radio signals, NIRSC will be implementing a TX/RX tone of 110.9 on all UHF modules. That includes the 4312 UHF Link Modules, the 4248 Repeater, the 4370 UHF Link Modules and all the UHF handheld radios. The UHF TX/RX tone is hard programmed from NIRSC and can not be changed in the field.

### **2022 NIRSC Frequency Scheme:**

Due to several conflicts on the C6 repeater, NIRSC has obtained new frequencies for the C-6 repeater which will allow for greater geographical area utilization.

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

### **4381 Kits Mag Mounts:**

NIRSC will now include 8 Mag Mounts in each 4381 kits. Please use the established check out procedure and have all mag mounts accounted for and returned to NIRSC with each kit.

### **KNG2-P150 VHF and KNG2-P400 UHF Radio Kits:**

NIRSC will more than likely be sending out VHF and UHF KNG2 radio kits for 2023 fire season. NIRSC is currently in the process of replacing all VHF DPHx radios with new VHF BKR5000 radios from Relm BK.

### **Microsoft Access and Excel NIRSC Incident Radio Inventory Databases:**

***Please contact the CDO or Incident Communications Operations if files are not able to be downloaded from the NIICD website. (Available for download at NIICD website)***

### **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.

### **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 all 4312, 4248, 4370 and 4281 kits to help prevent batteries from shorting. Please return the terminal cover with each kit back to NIRSC.

### **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.  
***Do not select a tone without coordinating with the CDO or COMC. It is highly recommend that all incidents use assigned tones on the command repeaters and tactical channels.***

### **Power Connector:**

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

### **Desiccant Packs:**

To keep moisture and humidity down, desiccant packs will be included in all 4248, 4281, 4330, 4312 and 4370 equipment.

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/resources/NIICD](http://www.nifc.gov/resources/NIICD).

# NATIONAL FREQUENCY GUIDELINES

These National Frequency 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

**Note: Air Guard frequency is pre-programmed on the last channel of all groups with a transmit tone of 110.9**

**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.

***Not to be used for Air-to-Air or Air-to-Ground operations.***

**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).

***Not to be used for Air-to-Air or Air-to-Ground operations.***

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

**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 or Tactical 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: All UHF Channels contain a RX/TX tone of 110.9</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.

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 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	VHF RX/ TX Tone		Switch B UHF Channel	UHF Channel Assignment	UHF RX/TX Tone
A-1	TONE 1: 110.9		B-1	L1 Repeater Access	TONE 1: 110.9
A-2	TONE 2: 123.0		B-2	L2 Repeater Access	TONE 1: 110.9
A-3	TONE 3: 131.8		B-3	L3 Repeater Access	TONE 1: 110.9
A-4	TONE 4: 136.5		B-4	L4 Repeater Access	TONE 1: 110.9
A-5	TONE 5: 146.2		B-5	L5 Repeater Access	TONE 1: 110.9
A-6	TONE 6: 156.7		B-6	L6 Repeater Access	TONE 1: 110.9
A-7	TONE 7: 167.9		B-7	L7 Repeater Access	TONE 1: 110.9
A-8	TONE 8: 103.5		B-8	L1 Simplex	TONE 1: 110.9
A-9	TONE 9: 100.0		B-9	L2 Simplex	TONE 1: 110.9
A-10	TONE 10: 107.2		B-10	L3 Simplex	TONE 1: 110.9
A-11	TONE 11: 114.8		B-11	L4 Simplex	TONE 1: 110.9
A-12	TONE 12: 127.3		B-12	L5 Simplex	TONE 1: 110.9
A-13	TONE 13: 141.3		B-13	L6 Simplex	TONE 1: 110.9
A-14	TONE 14: 151.4		B-14	L7 Simplex	TONE 1: 110.9
A-15	TONE 15: 162.2		B-15	Special Use Simplex 1	TONE 1: 110.9
A-16	NO TONE		B-16	Special Use Simplex 2	TONE 1: 110.9
<b>Note: Selecting a tone on the VHF Repeater will enable the Tone on both the TX and RX frequencies.</b>					
<b>Note: All UHF Modules contain a RX/TX tone of 110.9</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 Tones and UHF Link Frequencies must be coordinated prior to use with the CDO or COMC.
- 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 RX/ TX		Switch B UHF Channel	UHF Channel Assignment	UHF RX/TX Tone
A-1	Special Use Only		B-1	A/C Simplex 1	TONE 1: 110.9
A-2	Special Use Only		B-2	A/C Simplex 2	TONE 1: 110.9
A-3	Special Use Only		B-3	A/C Simplex 3	TONE 1: 110.9
A-4	Special Use Only		B-4	A/C Simplex 4	TONE 1: 110.9
A-5	Special Use Only		B-5	A/C Simplex 5	TONE 1: 110.9
A-6	Not Used		B-6	A/C Simplex 6	TONE 1: 110.9
A-7	Not Used		B-7	A/C Simplex 7	TONE 1: 110.9
A-8	Not Used		B-8	A/C Simplex 8	TONE 1: 110.9
A-9	Not Used		B-9	L8 Simplex	TONE 1: 110.9
A-10	Not Used		B-10	L8 RPTR Access	TONE 1: 110.9
A-11	Not Used		B-11	L9 Simplex	TONE 1: 110.9
A-12	Not Used		B-12	L9 RPTR Access	TONE 1: 110.9
A-13	Not Used		B-13	L10 Simplex	TONE 1: 110.9
A-14	Not Used		B-14	L10 RPTR Access	TONE 1: 110.9
A-15	Not Used		B-15	L11 Simplex	TONE 1: 110.9
A-16	User Programmable		B-16	L11 RPTR Access	TONE 1: 110.9
<b>Note: All UHF Modules contain a RX/TX Tone of 110.9</b>					

**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/coordinated by the FAA through the CDO or COMC.
- All NIRSC UHF Link frequencies must be coordinated prior to use with 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/resources/NIICD/2023NIRSCUsersGuide.pdf](http://www.nifc.gov/resources/NIICD/2023NIRSCUsersGuide.pdf)

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

# National Incident Radio Support Cache (NIRSC) 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**

## **004150 SEALED LEAD ACID (SLA) BATTERY KIT**

The NFES# 004150 Sealed Lead Acid Battery Kit contains rechargeable batteries that allow NIRSC equipment to function properly. It contains two 12 Volts SLA batteries that need to be configured in parallel to provide voltage to the NIRSC equipment. When ordering a 4390 starter system all 4150 SLA kits will be provided with the Starter System and do not need to be ordered separately.

**See Appendix B for proper wiring installation diagrams.**

**New, Pre-Wired Plug and Play Connector:** All 4150 SLA Battery Kits will come with a Pre-Wired Plug & Play connector that allows user's to quickly connect the batteries to the equipment. This connector also allows the batteries to be daisy chained together.

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

- *A 004150 Sealed Lead Acid Battery Kit is required for the following NIRSC equipment kits and must be ordered separately when not part of the 4390 Starter System.*
  - \* *NFES 004248 Logistics Repeater Kit*
  - \* *NFES 004312 Command Repeater Kit*
  - \* *NFES 004330 Remote Kit*
  - \* *NFES 4330EX Remote Expansion Kit*
  - \* *NFES 004370 Ground Aircraft/Link Radio Kit*
  - \* *NFES 004281 Crossband Link Kit*



**NFES# 004150 Sealed Lead Acid Battery 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 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 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 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.*
- *All UHF frequencies will come pre-programmed with a RX/TX tone of 110.9*
- *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.*



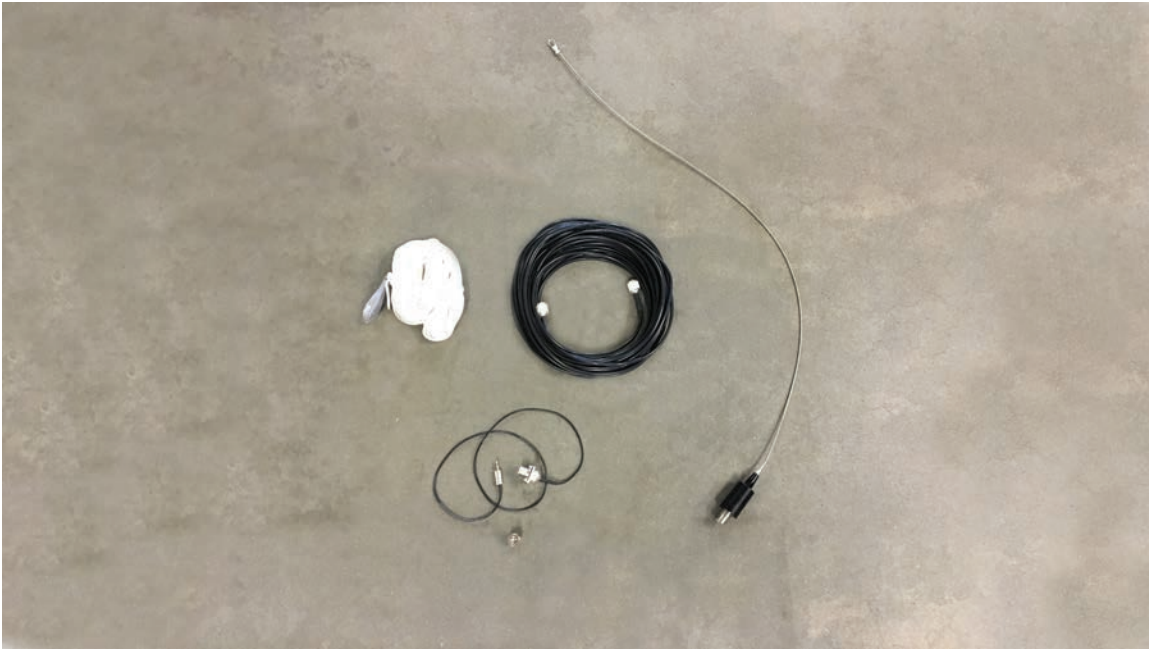
**NFES# 004244 UHF Logistics Radio Kit Components**

### **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, parachute cord and weight for tossing into a tree for hoisting the antenna up.

*Note: Supports the following radios adaptors:*

- *DPH Series*
- *KNG Series*
- *BKR Series*



**NFES# 004245 Flatland Kit Components**

## **004248 UHF (LOGISTICS) REPEATER w/ 004150 SEALED LEAD ACID BATTERY KIT**

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 NFES 004150 SLA Battery Kit at 12 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.

**Note: If the Logistics Repeater NFES 4248 is ordered separately and not part of the Starter System NFES 4390, the end user must order a SLA Battery Kit NFES 4150 to power the kit. See Appendix B for proper battery configurations.**

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)**

A shore power adapter cable has been added to the NFES# 004248 UHF Repeater 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:***

- *NIRSC UHF repeater frequencies must be cleared for use by the CDO.*
- *All UHF repeater frequencies will contain a RX/TX tone of 110.9*
- *The 00424 Logistics Repeater requires a 004150 Sealed Lead Acid Battery Kit for proper installation.*
- *The 004150 Sealed Lead Acid Battery Kit **MUST be ordered separately** from the 4248 Kit.*
- *UHF Logistic Repeaters are delivered pre-programmed from NIRSC and cannot be programmed or tuned in the field.*



**NFES# 004248 UHF Logistics Repeater Kit Components with NFES# 004150 Sealed Lead Acid Battery Kit**

## **004281 CROSSBAND LINK KIT w/ 004150 SEALED LEAD ACID BATTERY 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 NFES 004150 SLA Battery Kit at 12 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.

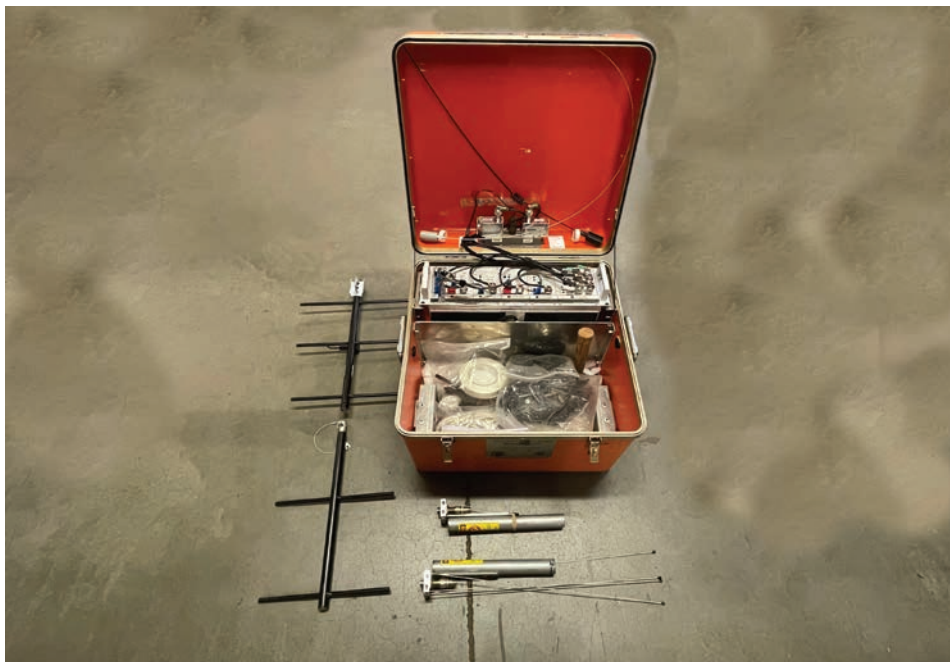
This unit contains the Voice Board which allows the user to monitor battery voltage, temperature, and solar output over the air via DTMF tones. **(See Appendix A for detailed information on the Voice Board)**

A shore power adapter cable has been added to the NFES# 004281 Crossband Link 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:***

- *The 004281 Crossband Link requires a 004150 Sealed Lead Acid Battery Kit for proper installation.*
- *The 004150 Sealed Lead Acid Battery Kit **MUST be ordered separately** from the 4281 Kit.*
- *Frequencies must be coordinated and programmed at NIRSC before shipment.*



**NFES# 004281 Crossband Link Kit Components**



## **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. 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.

**Note:** *This kit cannot be linked to any other NIRSC equipment.*

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 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.*
- *All AM frequencies must be ordered through the IROC ordering process.*
- *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/ 004150 SEALED LEAD ACID BATTERY 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: Simplex UHF.***

***Duplex: Duplex UHF using a Logistics Repeater as a hub.***

All Command Repeaters are capable of being CTCSS tone-controlled on both Receive and Transmit frequencies. 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 NFES 004150 SLA Battery Kit at 12 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. ***(See Appendix B for proper battery configurations)***

A shore power adapter cable has been added to the NFES# 004312 Command Repeater 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.***

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 NFES# 004150 Sealed Lead Acid Battery Kit for proper installation.*
- The 004150 Sealed Lead Acid Battery Kit **MUST be ordered separately** from the 4312 Kit.*
- The CDO or COMC will assign all Command Repeater and Link frequency network assignments.*
- The 004312 modules are delivered pre-programmed from NIRSC and can not be programmed or tuned in the field.*



**NFES# 004312 VHF Command Repeater/Link Kit w/ NFES# 004150 Sealed Lead Acid Battery 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 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:

- **2 each VHF King Relm KNG2-P150**
- **2 each VHF King Relm BKR-5000**



**NFES# 004320 COML Kit Components**

### **004330 REMOTE KIT w/NFES# 004150 SEALED LEAD ACID BATTERY 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 and chassis 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.

The remote radios and handset kit can be operated from the NFES 004150 SLA Battery Kit at 12VDC or from an external 12 VDC power source or (i.e. heavy duty car battery, or DC power supply).

***Note: If the Remote Kit NFES 4330 is ordered separately and not part of the Starter NFES 4390, the end user must order a SLA Battery Kit NFES# 004150 to power the remote kit.  
(See Appendix B for proper battery configurations)***

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

- **4330KP - Relm BK KNG2** (Example: 4330KP-FCK-XXX)
- **4330MD - Midland** (Example: 4330MD-FCK-XXX)



**NFES# 004330 Remote Kit Components w/ NFES# 004150 Sealed Lead Acid Battery Kit**

### **4330EX REMOTE EXPANSION KIT w/NFES# 004150 SEALED LEAD ACID BATTERY 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.

The remote expansion handsets kit can be operated from the NFES 004150 SLA Battery Kit at 12VDC or from an external 12 VDC power source or (i.e. heavy duty car battery, or DC power supply).

***Note: The end user must order a SLA Battery Kit NFES# 4150 to power the remote expansion kit.  
(See Appendix B for proper battery configurations)***

***Note: Do not mix and match 4330EX Expansion handsets with the handsets in the 004330 Remote Kits. Each 4330EX Expansion handsets are tuned at NIRSC for proper line impedance.***



**NFES# 4330EX Remote Expansion Kit Components without NFES# 004150 Sealed Lead Acid Battery Kit**



## **004370 GROUND AIRCRAFT RADIO/LINK KIT w/ 004150 SEALED LEAD ACID BATTERY 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 NFES 4150 SLA Battery Kit 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.

**Note: If the Ground Aircraft Radio/Link NFES 4370 is ordered separately and not part of the Starter System NFES 4390, the end user must order a SLA Battery Kit NFES# 004150 to power the kit.**  
**(See Appendix B for proper battery configurations)**

A shore power adapter cable has been added to the NFES# 004370 Ground Aircraft Radio/Link 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.**

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 004150 Sealed Lead Acid Battery Kit for proper installation.

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

- The 004150 Sealed Lead Acid Battery Kit **MUST be ordered separately** from the 004370 Kit.
- All UHF frequencies contain a RX/TX tone of 110.9
- Additional ICOM radios can ordered if needed, check with CDO for availability.
- Call the CDO or assigned COMC for ordering assistance and availability.



**NFES# 004370 Ground Aircraft Radio/Link Kit Components w/ 004150 Sealed Lead Acid Battery 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 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)
- **4381KR - King BKR5000** (Example: 4381KR-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 14 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
- 5 each (NFES# 004150)- Sealed Lead Acid (SLA) Battery 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 incidents or 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**

## **004420 AVIATION PRINTER KIT**

The NFES# 004420 Aviation Printer 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 Aviation Printer 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 with drivers and software.

***Note: Data on the MiFi is limited at 5G per month, once the limit is reached data is slowed by Verizon until the end of the billing cycle.***

### *Equipment Note:*

- *All users access the internet and printer through the wireless network.*
- *Agency laptops can have the printer drivers updated in the field without admin rights.*
- *Please load any printer drivers before assignment.*



**NFES# 004420 Aviation Printer 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**

### **004605 TECHNISONIC TDFM-136 TEST JIG (SINGLE)**

The NFES# 004605 Technisonic TDFM-136 Test Jig contains the necessary equipment to operate the TDFM136 radio in a classroom environment. The Technisonic TDFM-136 is a P25 U.S. compliant airborne VHF/FM transceiver. The Technisonic TDFM-136 transceiver is panel-mounted (standard Dzus) and completely self-contained in a plug and play power supply and RF chassis for student/pilot radio in class simulation. It also contains student exercise sheets for manual front keypad programming reference.

***Note: Supplies are limited so please coordinate with the CDO or NIRSC Avionics Branch before placing orders.***



**NFES# 004605 Technisonic TDFM-136 Single Test Jig Components**

### **004606 TECHNISONIC TDFM-136 TEST JIG (DUAL)**

The NFES# 004606 Technisonic TDFM-136 Dual Test Jig contains two separate pieces of equipment to operate two independent TDFM136 radios in a classroom environment in a single pelican case. The Technisonic TDFM-136 is a P25 U.S. compliant airborne VHF/FM transceiver. Each TDFM-136 transceiver is panel-mounted (standard Dzus) and completely self-contained in a plug and play power supply and RF chassis for student/pilot radio in class simulation. It also contains student exercise sheets for manual front keypad programming reference.

***Note: Supplies are limited so please coordinate with the CDO or NIRSC Avionics Branch before placing orders.***



### **004607 TECHNISONIC TDFM-9000 TEST JIG**

The NFES# 004607 Technisonic TDFM-9000 Test Jig contains the necessary equipment to operate the TDFM136 radio in a classroom environment in a single pelican case. The Technisonic TDFM-9000 is a Project 25 Analog/Digital/Encrypted/ Multi-band AM/FM radio transceiver. The TDFM-9000 transceiver is panel-mounted and completely self-contained in a plug and play power supply and RF chassis for student/pilot radio in class simulation. It also contains student exercise sheets for manual front keypad programming reference.

***Note: Supplies are limited so please coordinate with the CDO or NIRSC Avionics Branch before placing orders.***



**NFES# 004607 Technisonic TDFM-9000 Test Jig Components**

### **004608 COBHAM NPX136D TEST JIG**

The NFES# 004608 Cobham NPX-136D Test Jig contains the necessary equipment to operate the NPX136D radio in a classroom environment. The Cobham NPX-136D is a P25 U.S. compliant airborne VHF/FM transceiver. The NPX136D transceiver is panel-mounted (standard Dzus) and completely self-contained in a plug and play power supply and RF chassis for student/pilot radio in class simulation. It also contains student exercise sheets for manual front keypad programming reference.

***Note: Supplies are limited so please coordinate with the CDO or NIRSC Avionics Branch before placing orders.***



**NFES# 004608 Cobham NPX136D Single Test Jig 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**

**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# 004150 - Sealed Lead Acid Battery Kit (5)</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>Two Sealed Lead Acid Battery Kits 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 004150	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>  <b>Two Sealed Lead Acid Battery 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 004150	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>Three Sealed Lead Acid Battery Kits</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.</p>	004312 004248 004330 004150	3



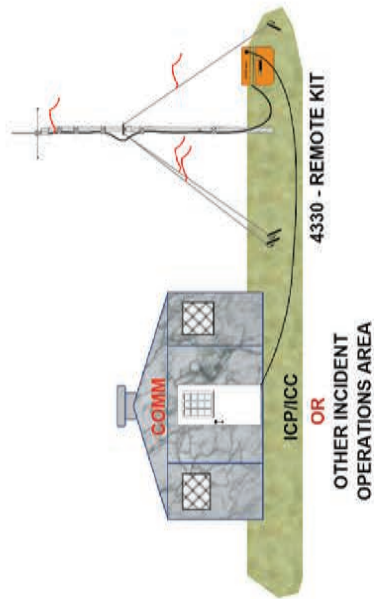
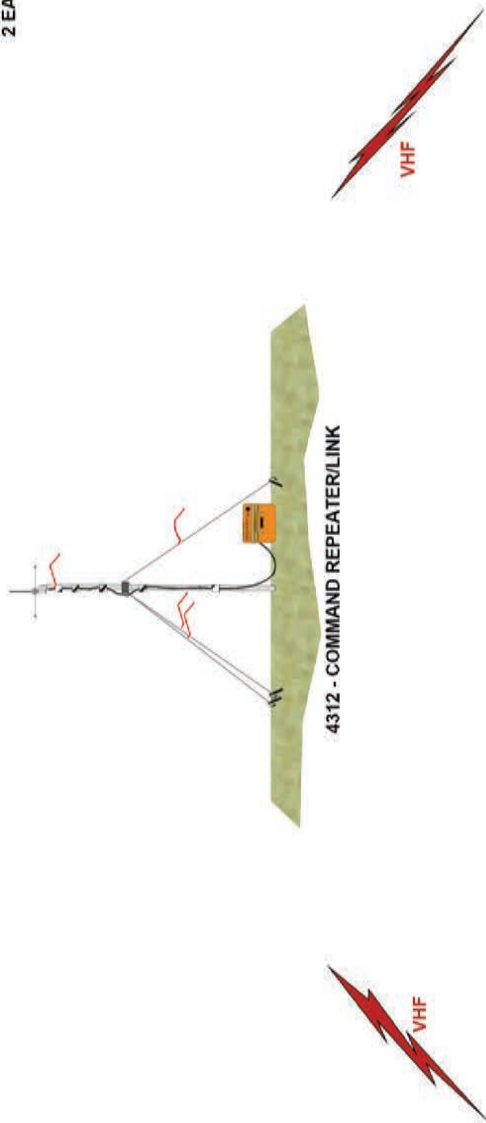
# GENERAL COMMUNICATIONS CONDITIONS AND SOLUTIONS

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>Three Sealed Lead Acid Battery 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 pair.	004312 004330 004150	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>Four or more SLA Battery 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 pair.	004312 004330 004150	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>Four Sealed Lead Acid Battery 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 pair.	004312 004248 004330 004150	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>Five or more SLA Battery 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 pair.	004312 004248 004330 004150	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
  - 2 EA 4150 SLA BATTERY KIT



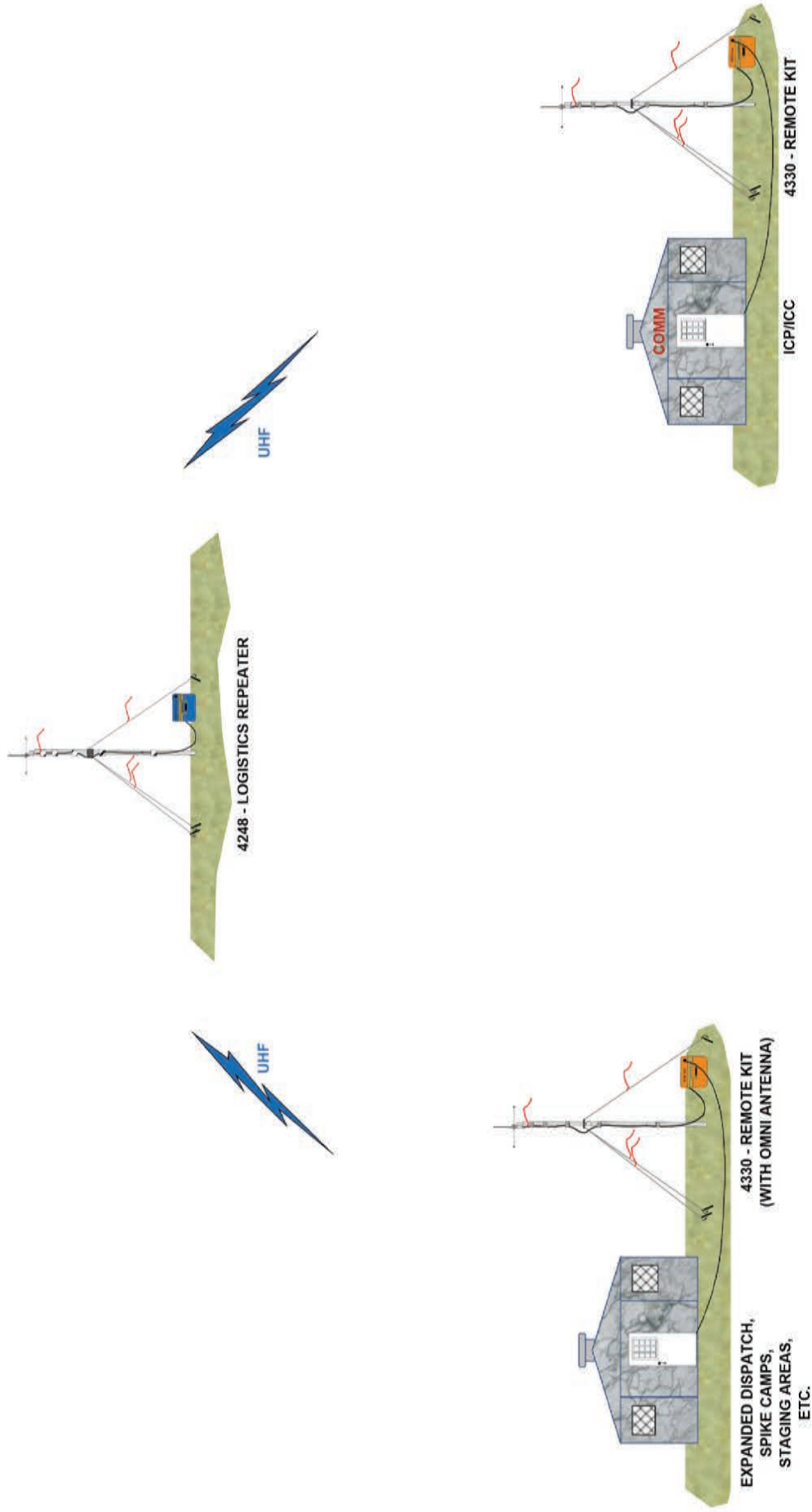
THIS SYSTEM PROVIDES COVERAGE WHEN LINE-OF-SIGHT DOES NOT EXIST FROM THE OPERATIONS AREA TO ICP.

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

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  
 3 EA 4150 SLA BATTERY KIT



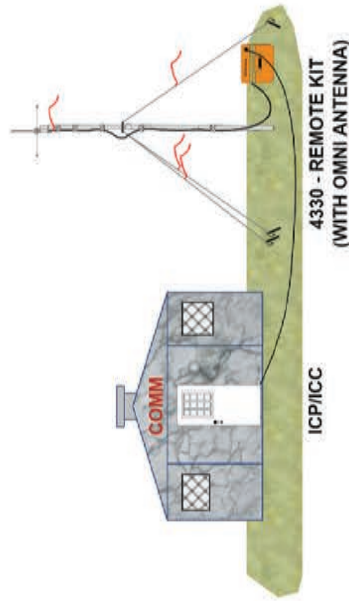
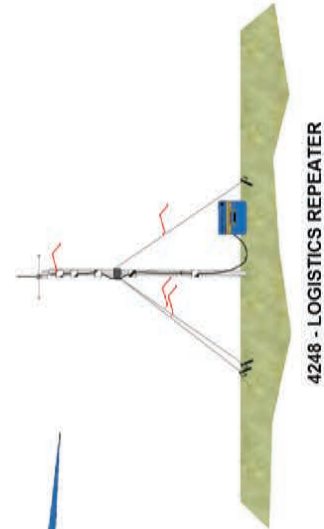
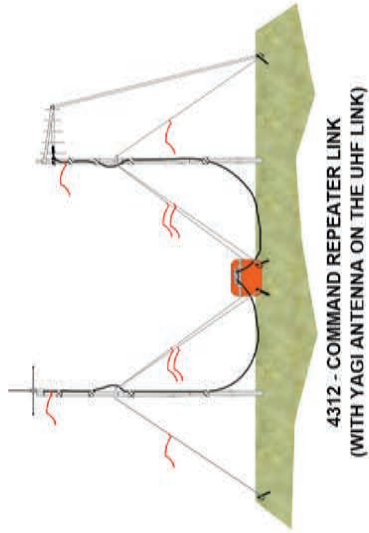
THIS SYSTEM IS USED WHEN THE LOGISTICS AREA OR (ICP) IS NOT WITHIN LINE-OF-SIGHT OF EXPANDED/SPIKE CAMP OR THE ICP IS TOO LARGE TO COVER.

**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
  - 3 EA 4150 SLA BATTERY KIT



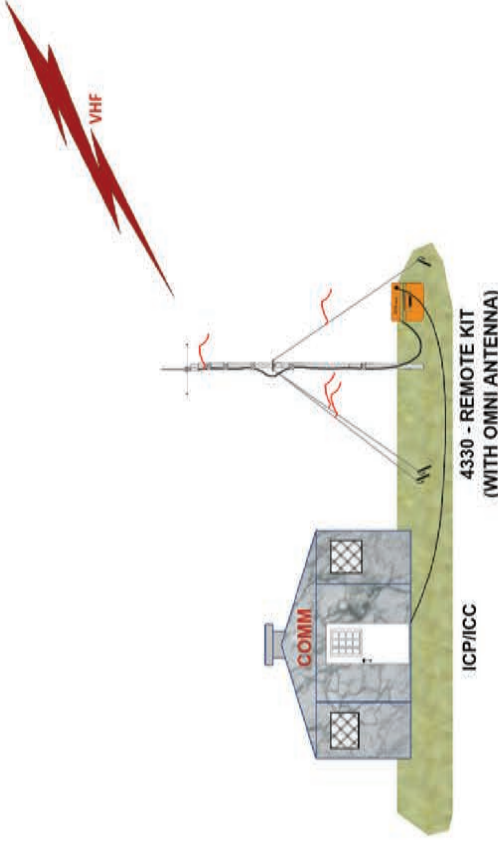
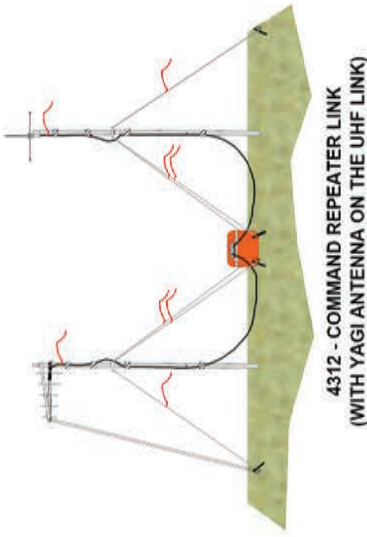
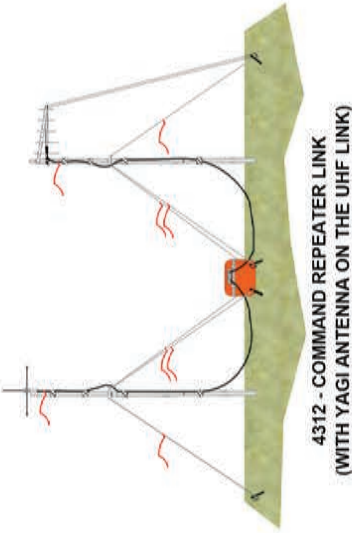
THIS SYSTEM IS USED WHEN TERRAIN LIMITS LINE-OF-SIGHT ACCESS FROM THE COMMAND REPEATER TO THE ICP/ICC. INSTALLING A LOGISTICS REPEATER AS A HUB LINKED FROM ICP TO THE COMMAND REPEATER PROVIDES ADDITIONAL COVERAGE.

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

DRAWING 3

# 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
  - 3 EA 4150 SLA BATTERY 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.

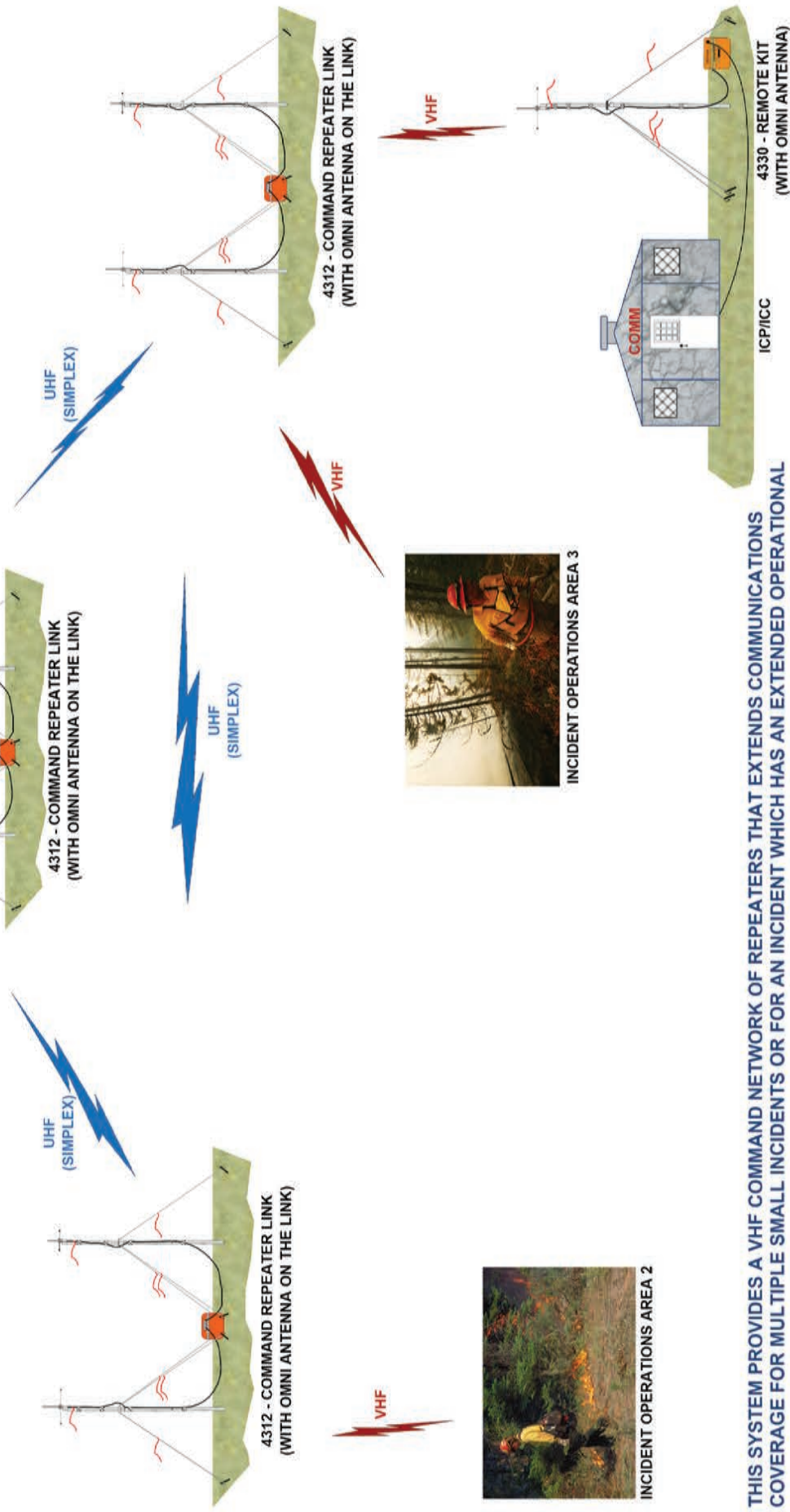
DRAWING 4



## 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
- 4 EA 4150 SLA BATTERY KIT



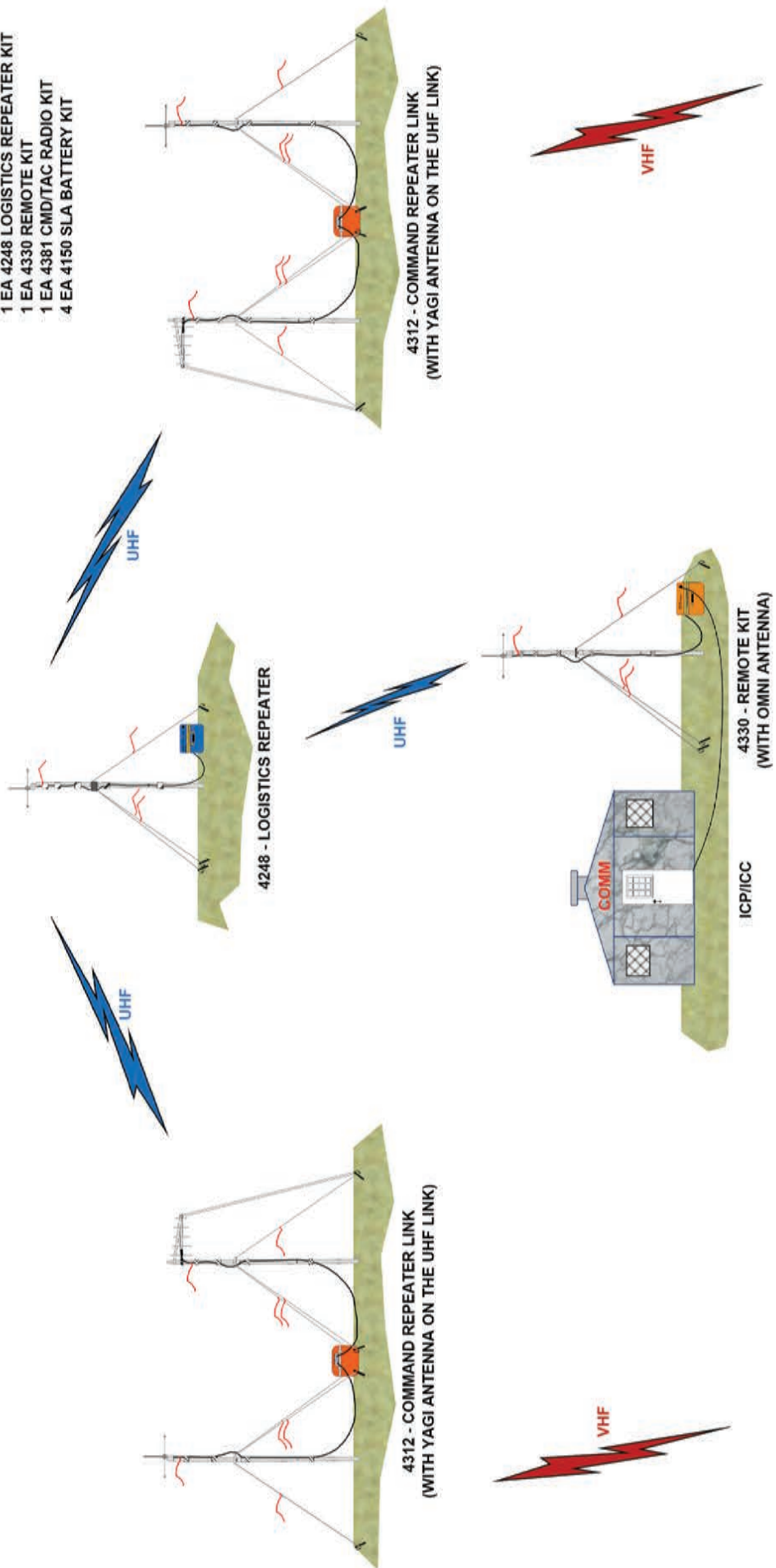
THIS SYSTEM PROVIDES A VHF COMMAND NETWORK OF REPEATERS THAT EXTENDS COMMUNICATIONS COVERAGE FOR MULTIPLE SMALL INCIDENTS OR FOR AN INCIDENT WHICH HAS AN EXTENDED OPERATIONAL AREA. ADDITIONAL VHF REPEATERS CAN BE ADDED AS LONG AS THEY ARE WITHIN LINE-OF-SIGHT WITH ALL OTHER VHF REPEATERS.

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



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
  - 4 EA 4150 SLA BATTERY KIT



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.

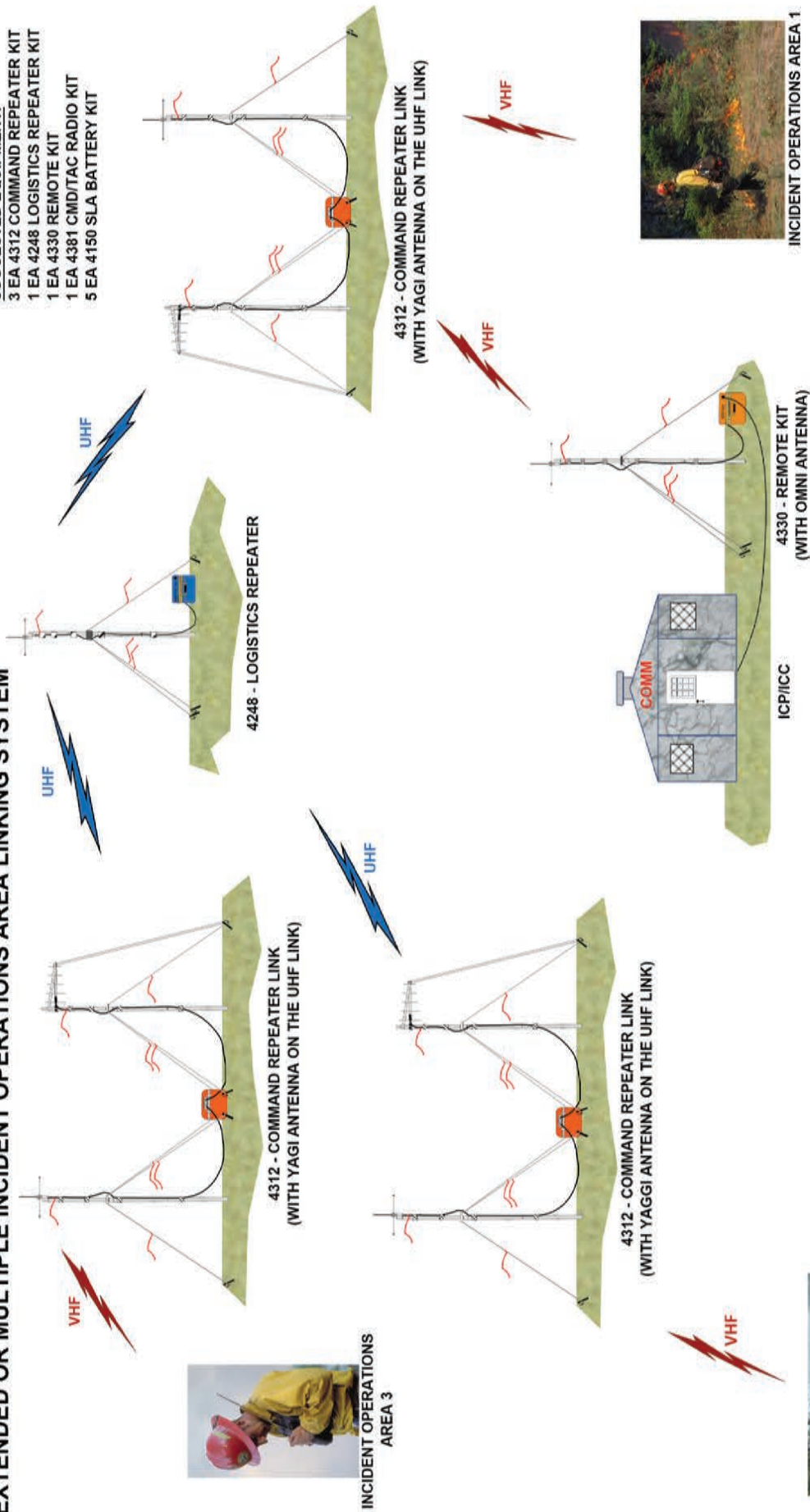
NOTE: THIS SYSTEM LINKS TWO (2) DIFFERENT VHF COMMAND FREQUENCY PAIRS AND ONE (1) UHF LOGISTICS FREQUENCY PAIR.



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  
 5 EA 4150 SLA BATTERY 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.**

DRAWING 7

# **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>Sealed Lead Acid Battery 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>004150</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>Sealed Lead Acid Battery 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>004150</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 Sealed Lead Acid Battery 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>004150</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>

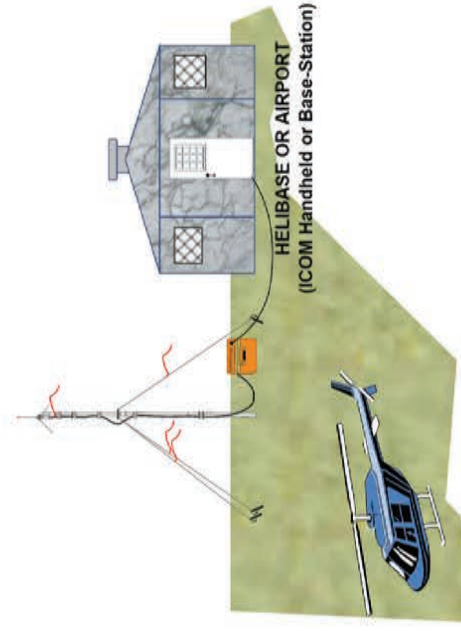


## GROUND VHF-AM BASE STATION KIT

SUGGESTED EQUIPMENT:  
1 EA 4370 GROUND AIRCRAFT RADIO LINK KIT  
(INCLUDES 4 EA ICOM AM HANDHELD RADIOS)  
1 EA 4150 SLA BATTERY KIT

OR

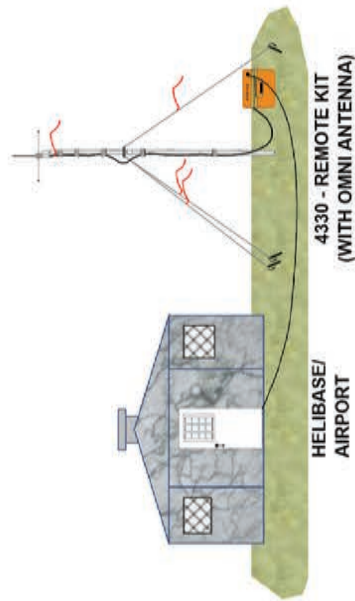
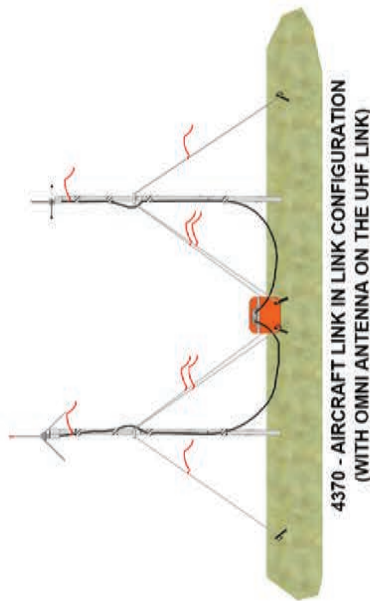
1 EA 4300 GROUND VHF-AM RADIO/BASE KIT  
(INCLUDES 4 EA ICOM AM HANDHELD RADIOS)



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.

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



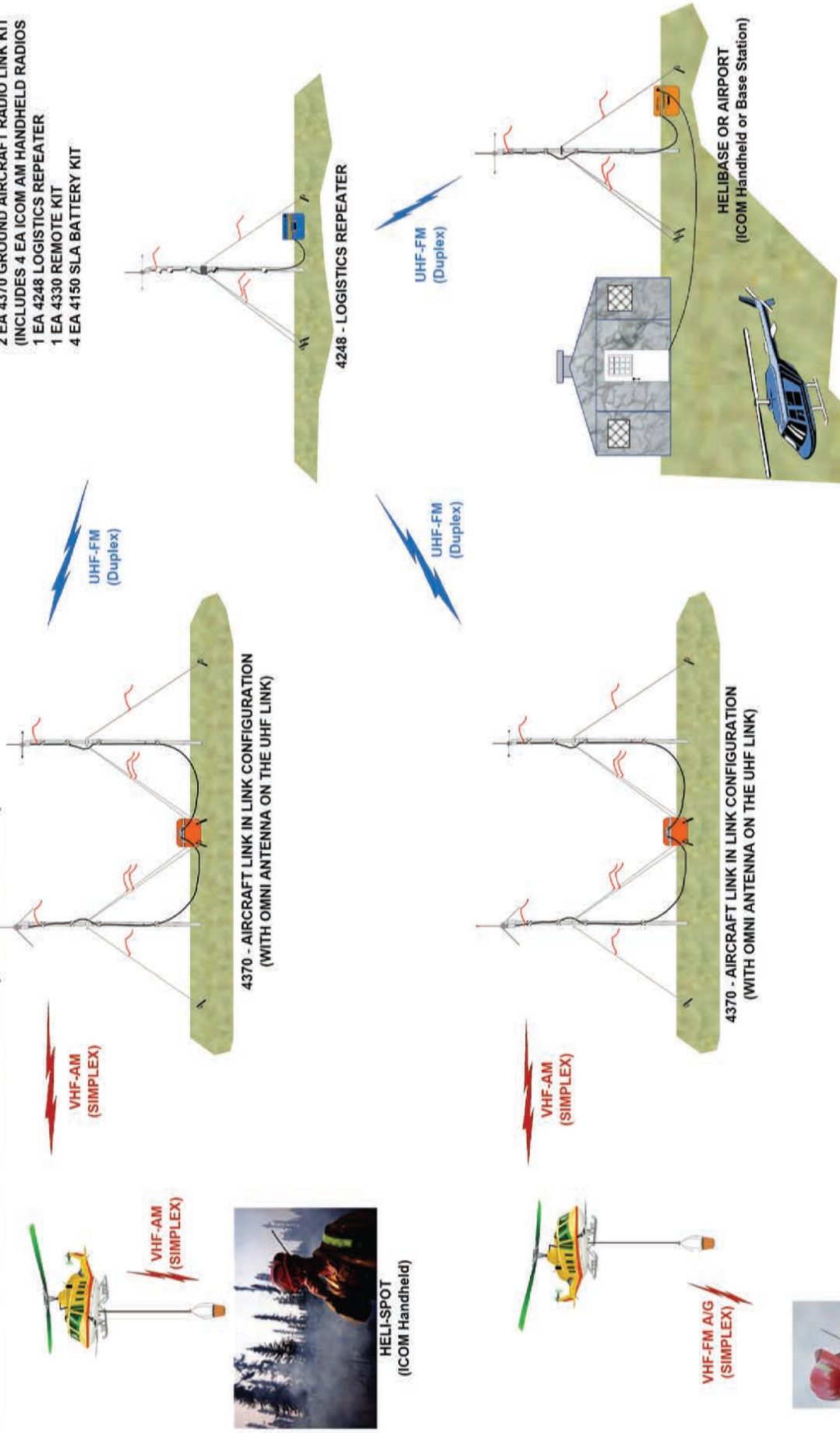
**SUGGESTED EQUIPMENT:**  
 1 EA 4370 GROUND AIRCRAFT RADIO LINK KIT  
 (INCLUDES 4 EA ICOM AM HANDHELD RADIOS  
 1 EA 4330 REMOTE KIT  
 2 EA 4150 SLA BATTERY KIT

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.**

## 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  
 4 EA 4150 SLA BATTERY KIT



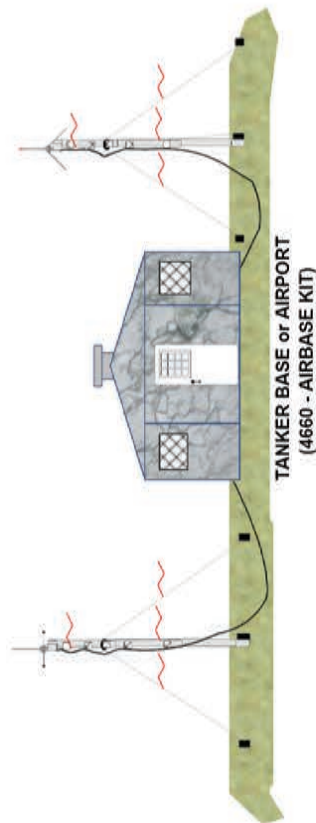
THIS SYSTEM EXTENDS FLIGHT FOLLOWING BACK TO THE HELI-BASE WHEN LINE-OF-SIGHT IS NOT POSSIBLE BETWEEN AIRCRAFT ON SEPARATE BRANCHES OR COMPLEXES.

**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.**

# 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  
(INCLUDES 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

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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.
- **Cable 110:** Connects from the Solar Panel Kit “BAT” input/output to an external 12V SLA Battery or equivalent.

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 to charge the SLA battery.

*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 12V SLA Battery or equivalent.

*Note: When both the Solar Kit and an External Batteries are used, the solar panel will charge **BOTH** the internal Solar Panel Kit SLA battery and the External battery connected.*

*The Solar Panel Kit will NOT charge the internal SLA batteries inside the equipment.*

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

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

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

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

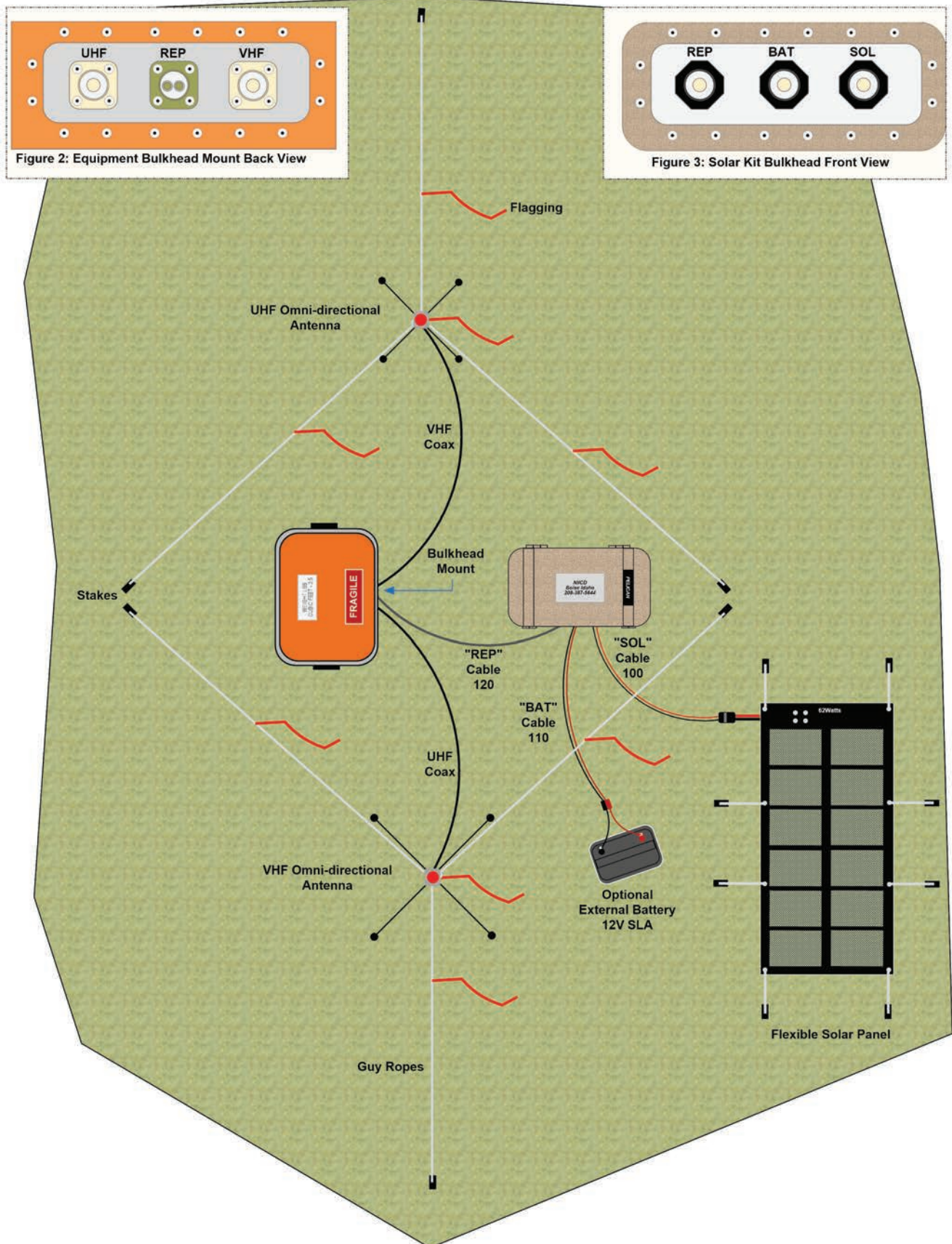
The Voice Board (installed on most of the NIRSC equipment) performs two functions:

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 internal SLA battery, the voice board monitors the solar voltage and will automatically switch to internal SLA 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 internal SLA 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. (See Figure 2)

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

Connect the supplied batteries to the repeater power adapter from the NFES# 004150 SLA Battery Kit.

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

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 12 volt battery configuration. (See Appendix B)

*Note: If the 4248 UHF Repeater was ordered separately and not part of the 4390 kit, a separate NFES# 4150 SLA Battery Kit must be ordered to properly power up the unit. The 4248 does not contain batteries in the kit when shipped from NIRSC unless it is part of the 4390 Starter System.*

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

All UHF Repeaters (4248) are pre-programmed with a RX/TX Tone of 110.9

- 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. (See Figure 3)

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.**

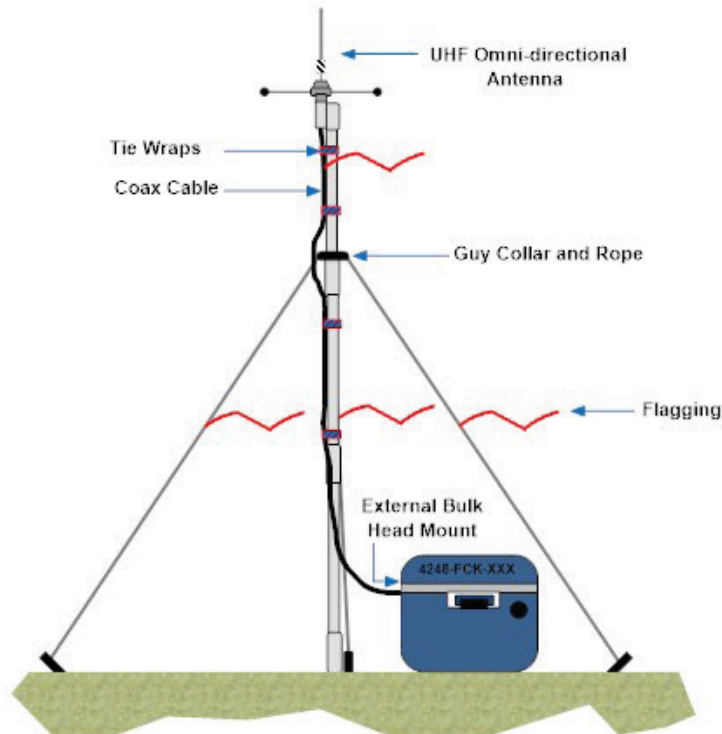
*Note: A whole system test is preferred, if possible.*

**Note: See “NIRSC Daniels Switch Settings” in Appendix D for E-Model Switch Settings**

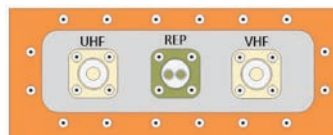
**If any questions arise during installation, please call the CDO at (208)387-5644**



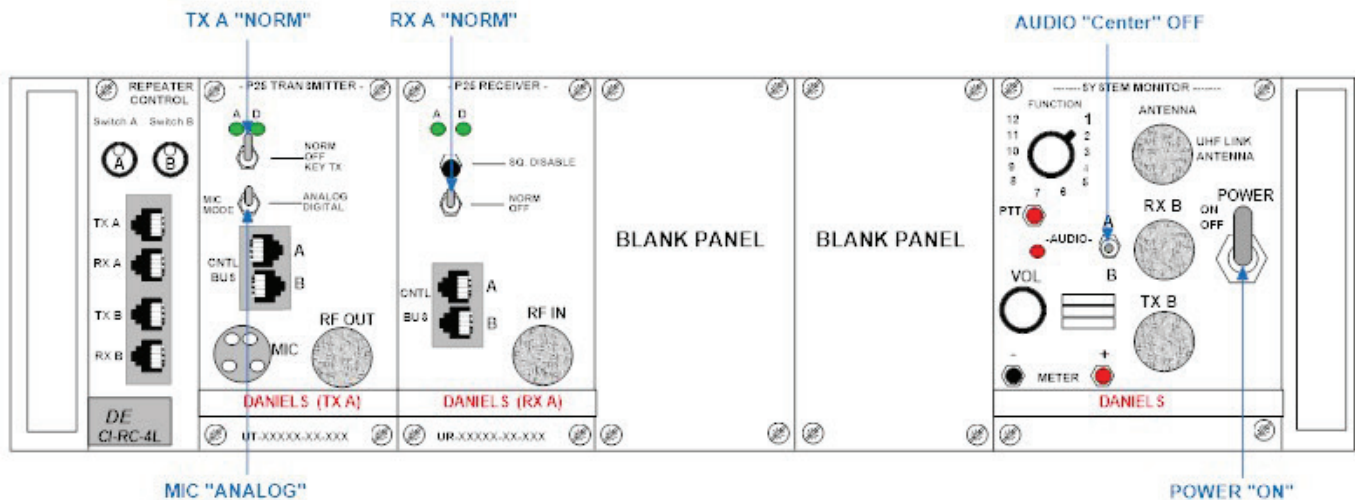
# 004248 UHF REPEATER SETUP PROCEDURE



**Figure 1:**  
4248 - UHF Repeater Antenna Setup



**Figure 2:**  
4248 - UHF Repeater Bulkhead Mount Connectors (N-Type)



**Figure 3:**  
4248 - UHF Repeater Switch Settings



# 004281 CROSSBAND LINK SETUP PROCEDURE

## 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.

Set up 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” 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. (See Figure 2)

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

Connect the supplied batteries to the Crossband Link power adapter from the NFES# 004150 SLA Battery Kit.

- The battery and equipment are configured with a **POLARIZED** interconnect plug.
- If it becomes necessary to replace the batteries, follow the 12 Volt SLA 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.*

*Note: For each 4281 Crossband Link kit, a separate NFES# 4150 SLA Battery Kit must be ordered to properly power up the unit. The 4281 does not contain batteries in the kit when shipped from NIRSC.*

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

Contact the CDO for an appropriate VHF Frequency: Each 4281 will come pre-programmed from NIRSC

- ALL VHF frequencies and tones are coordinated and assigned by the CDO or COMC.
- VHF Channel and Tone is 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 Frequency/Tone on each VHF module.
- “**Straight UP**” is Position 1.

## 5. **UHF Channel/Tone Selection** (See the Switch Settings Diagram in Appendix D for more details)

Contact the CDO for an appropriate UHF Frequency: Each 4281 will come pre-programmed from NIRSC

- ALL UHF frequencies and tones are coordinated and assigned by the CDO or COMC.
- UHF Channel and Tone is selected for the **UHF TRANSMITTER** and **UHF RECEIVER** modules by selecting the proper position using the “**Switch B**” 16 - position rotary select switch on the **REPEATER CONTROL MODULE**.
- The rotary switch changes **BOTH** the transmit and receive Frequency/Tone on each UHF module.
- “**Straight UP**” is Position 1.

## 6. **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 4281 are in the correct “**NORM**” position as per the “**4281 - Crossband Link Switch Settings Diagrams**” in Appendix D.
- Ensure that the **UHF TRANSMITTER** and **RECEIVER** Module switches on the 4281 are in the correct “**NORM**” position as per the “**4281 - Crossband Link Switch Settings Diagrams**” in Appendix D. (See Figure 3)

After installation and switch settings are complete, test the link using the appropriate portable radios. Back away from the equipment box a minimum of 25 feet before testing.

## 7. **Final Test**

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

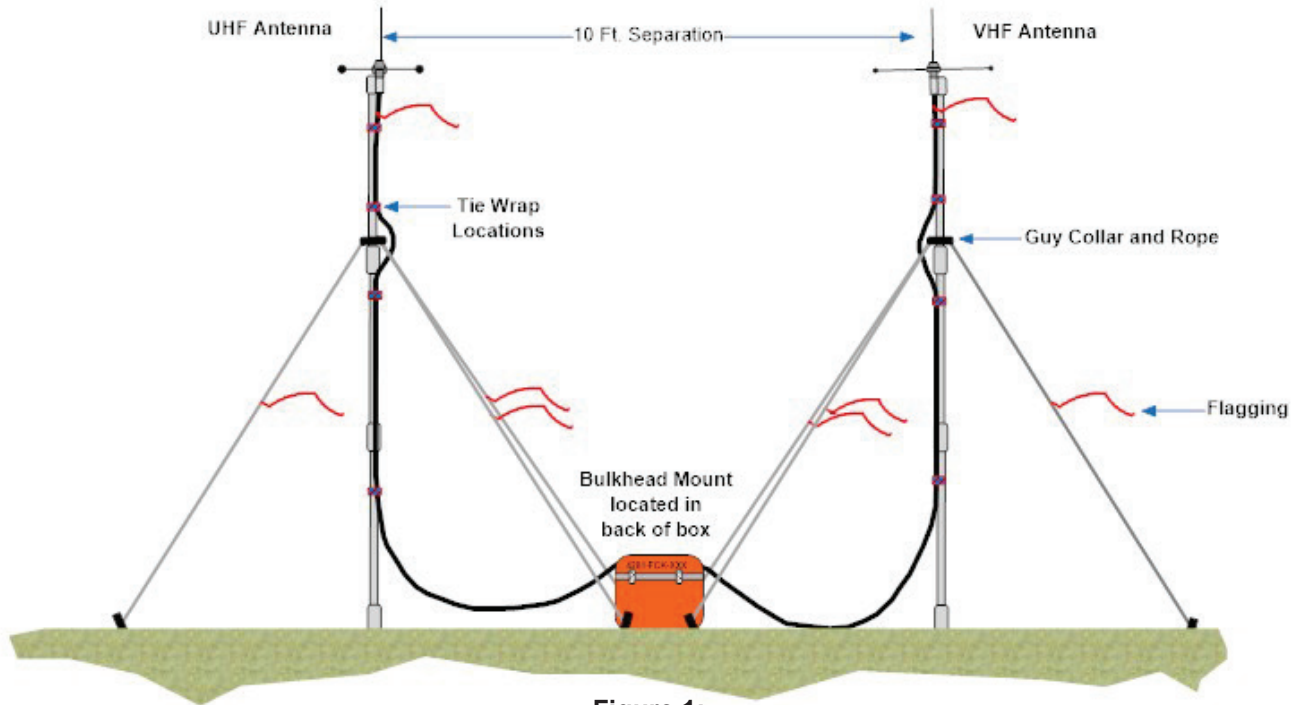
**Test one FINAL time before leaving the site, to make sure the switches have not been accidentally moved.**

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

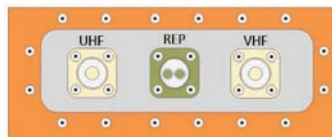
*Note: A whole system test is preferred, if possible.*

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

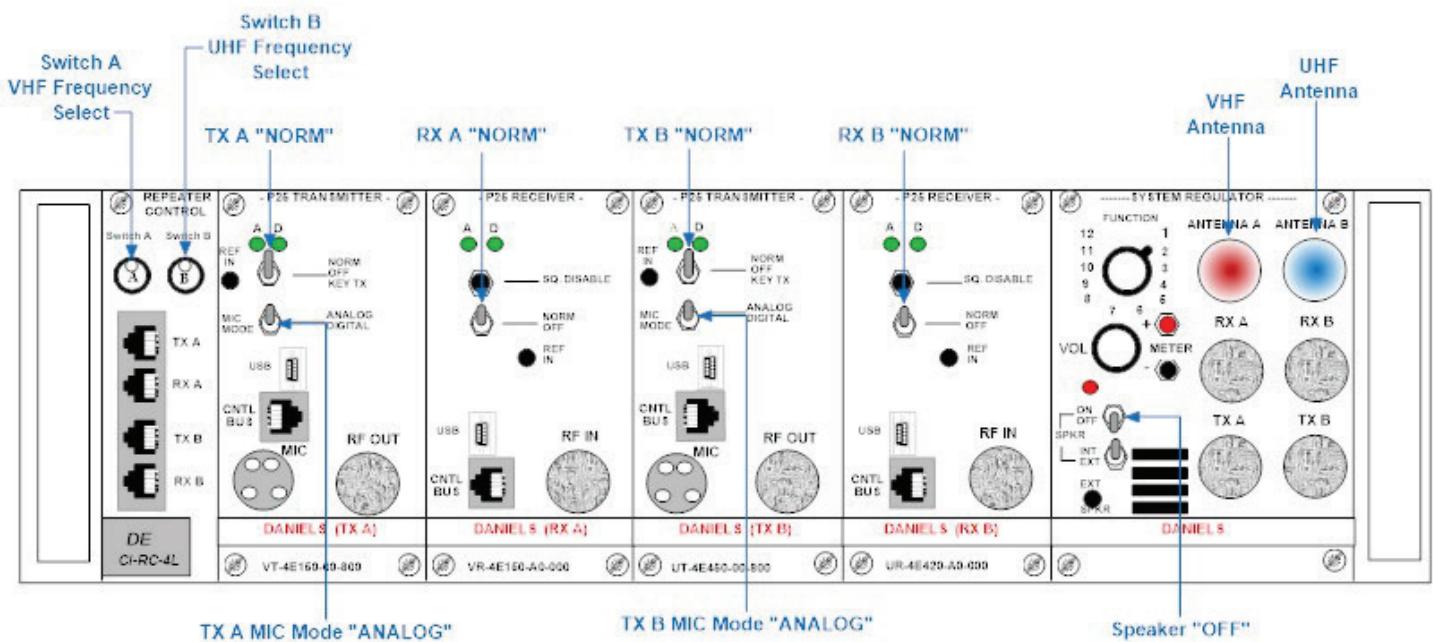
# 004281 CROSSBAND LINK SETUP PROCEDURE



**Figure 1:**  
4281 - Crossband Link Antenna Setup



**Figure 2:**  
4281 - Crossband Link Bulkhead Mount Connectors (N-Type)



**Figure 3:**  
4281 - Crossband Link Switch Settings

# 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. (See Figure 2)

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

Connect the supplied batteries to the repeater power adapter from the NFES# 004150 SLA Battery Kit.

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

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)

*Note: If the 4312 VHF Repeater was ordered separately and not part of the 4390 kit, a separate NFES# 4150 SLA Battery Kit must be ordered to properly power up the unit. The 4312 does not contain batteries in the kit when shipped from NIRSC unless it is part of the 4390 Starter System.*

## 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 3)

## 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 3)

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.**

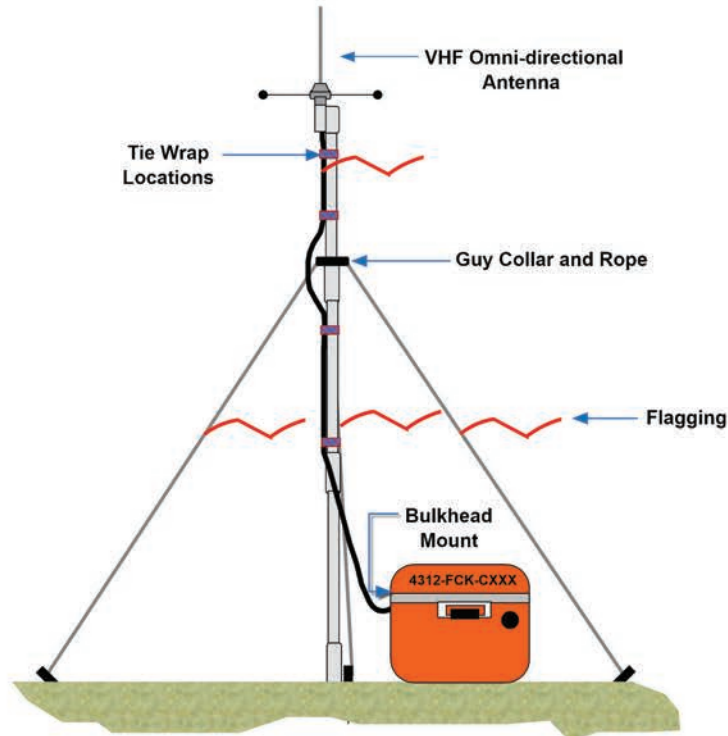
**NIRSC recommends testing with the field units or ICP if possible before leaving the site.**

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

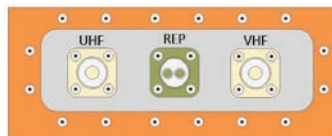
**Note: See "NIRSC Daniels Switch Settings" in Appendix D for E-Model Switch Settings**

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

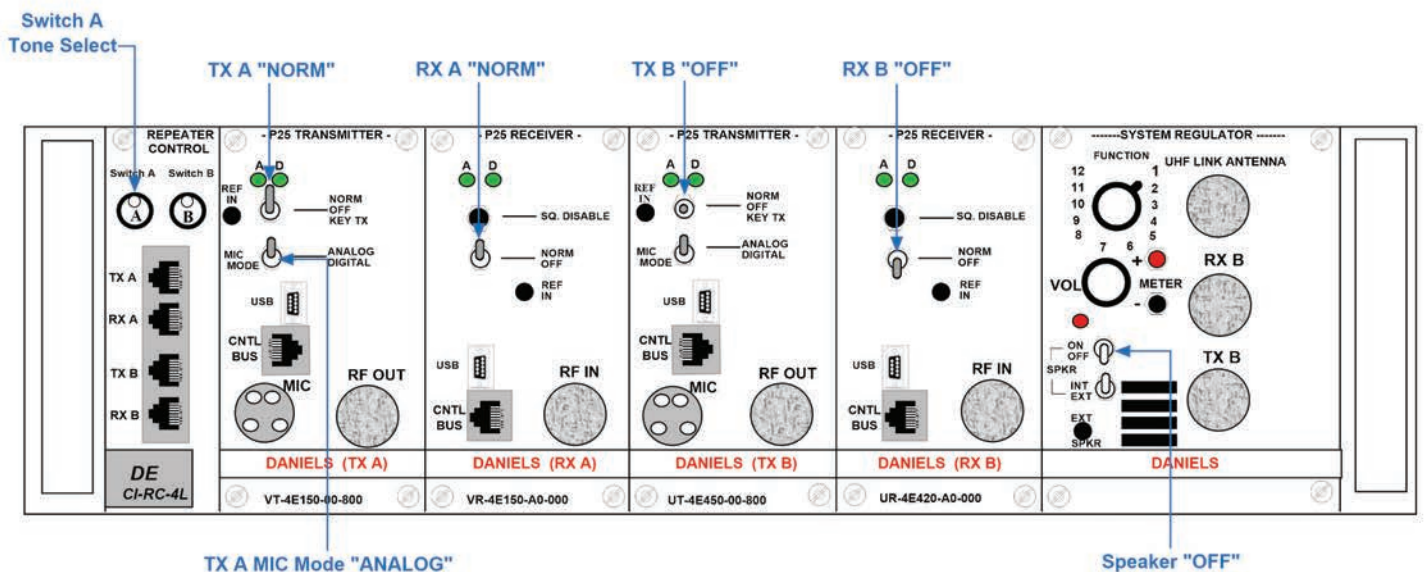
# 004312 VHF COMMAND REPEATER/LINK SETUP PROCEDURE STAND-ALONE CONFIGURATION



**Figure 1:**  
4312 - VHF Repeater Antenna Setup (Stand Alone)



**Figure 2:**  
4312 - VHF Repeater Bulkhead Mount Connectors (N-Type)



**Figure 3:**  
4312 - VHF Repeater Switch Settings (Stand Alone)



# 004312 VHF COMMAND REPEATER/LINK SETUP PROCEDURE

## LINK CONFIGURATION

### 1. **Antenna Installation** (See Figure 4)

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 4)

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. (See Figure 5)

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

Connect the supplied batteries to the repeater power adapter from the NFES# 004150 SLA Battery Kit.

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

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)

*Note: If the 4312 VHF Repeater was ordered separately and not part of the 4390 kit, a separate NFES# 4150 SLA Battery Kit must be ordered to properly power up the unit. The 4312 does not contain batteries in the kit when shipped from NIRSC unless it is part of the 4390 Starter System.*

### 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 6)**

### 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 6)**
- **All UHF Modules are pre-programmed with a RX/TX Tone of 110.9**

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.**

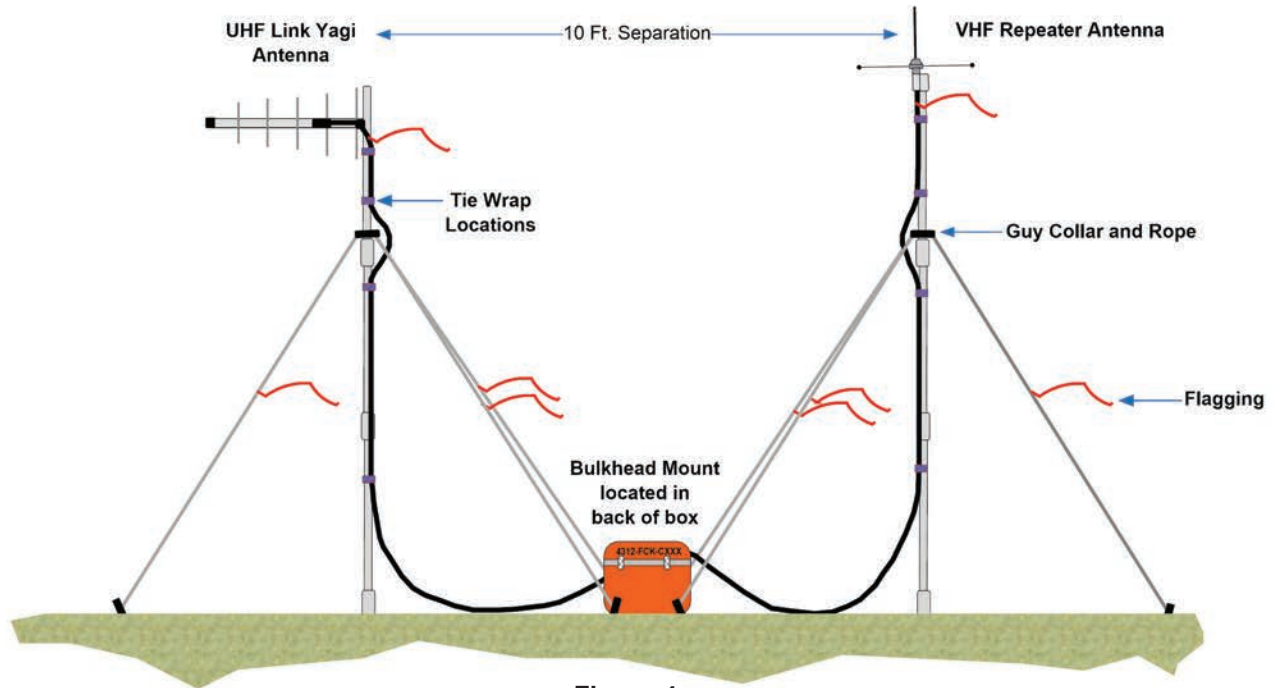
*Note: A whole system test is preferred, if possible.*

**Note: See "NIRSC Daniels Switch Settings" in Appendix D for E-Model Switch Settings**

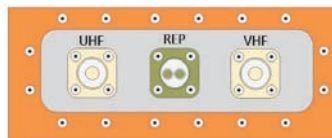
**If any questions arise during installation, please call the CDO at: (208)387-5644**



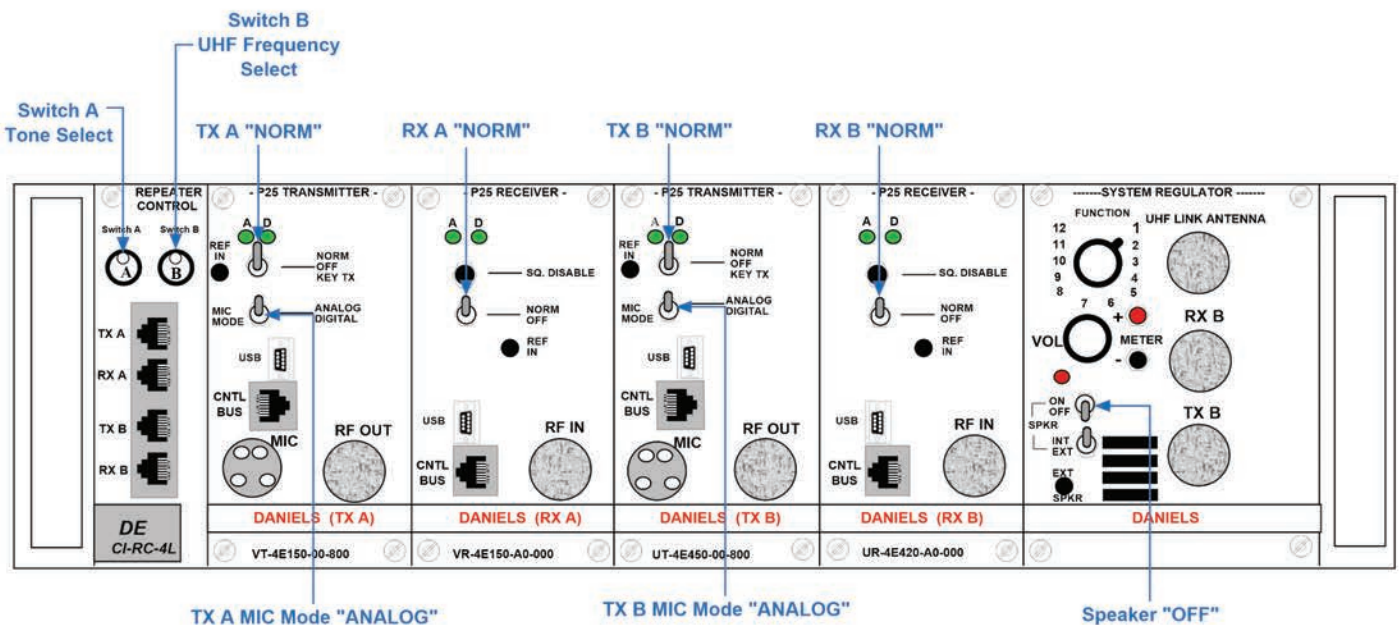
# 004312 VHF COMMAND REPEATER/LINK SETUP PROCEDURE LINK CONFIGURATION



**Figure 4:**  
4312 - VHF Repeater/Link Antenna Setup (Link Configuration)



**Figure 5:**  
4312 - VHF Repeater/Link Bulkhead Mount Connectors (N-Type)



**Figure 6:**  
4312 - VHF Repeater/Link 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:

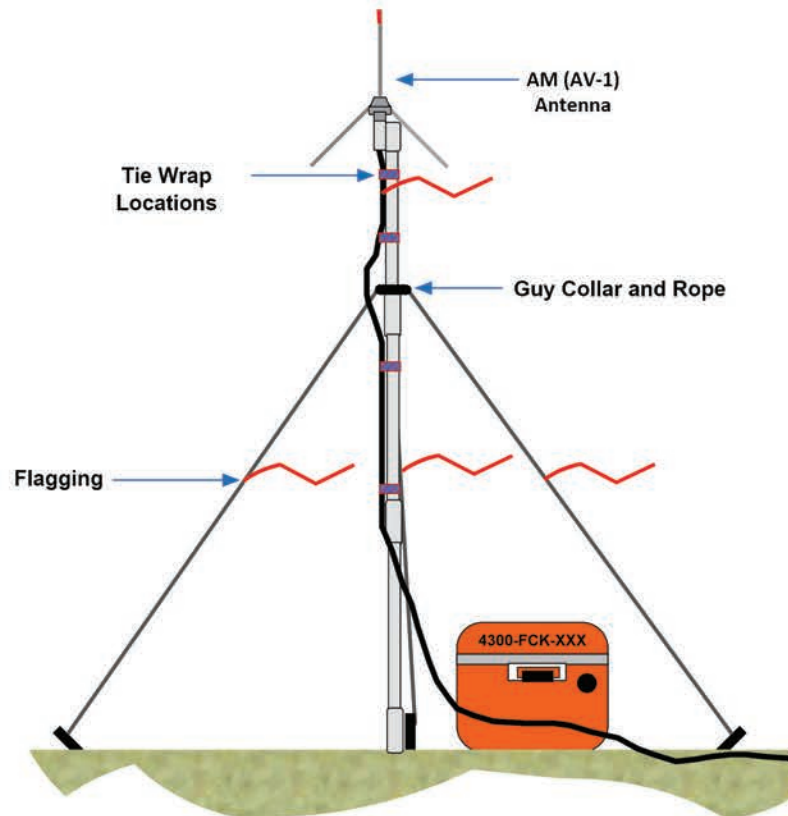
- The 91-DE's fuse is a standard 5 AMP.
- The TBS-150's fuse is a 2.5 AMP MDL.
- THE TBS-150 DC fuse is a mini 5 AMP
- The DC power cord fuse is an overrated 10 AMP fuse and is basically unused, with the TBS-150 relying on the mini 5 A fuse for DC protection.

## 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 a 12 Volt SLA battery to appropriate power connector on the front of the chassis. (See Figure 2 and 3)
- 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: If the 4330 was ordered separately and not part of the 4390 kit, a separate NFES# 4150 SLA Battery Kit must be ordered to properly power up the unit. The 4330 does not contain batteries in the kit when shipped from NIRSC unless it was part of the 4390 Starter System.*

## 3. Remote Desk Set Setup:

- Remove the CPI remote desk set from the fiberglass box, along with 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 a 12 SLA Volt battery to the CPI remote desk set using the provided wire assembly (**Fused DC 5 AMP, 2-Prong Cable**). (See Figure 3)
  - **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.*

*Note: If the 4330 was ordered separately and not part of the 4390 kit, a separate NFES# 4150 SLA Battery Kit must be ordered to properly power up the unit. The 4330 does not contain batteries in the kit when shipped from NIRSC unless it was part of the 4390 Starter System.*

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

- 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 tot he bindings on the front of the grey chassis enclosure.

## 5. Final Test:

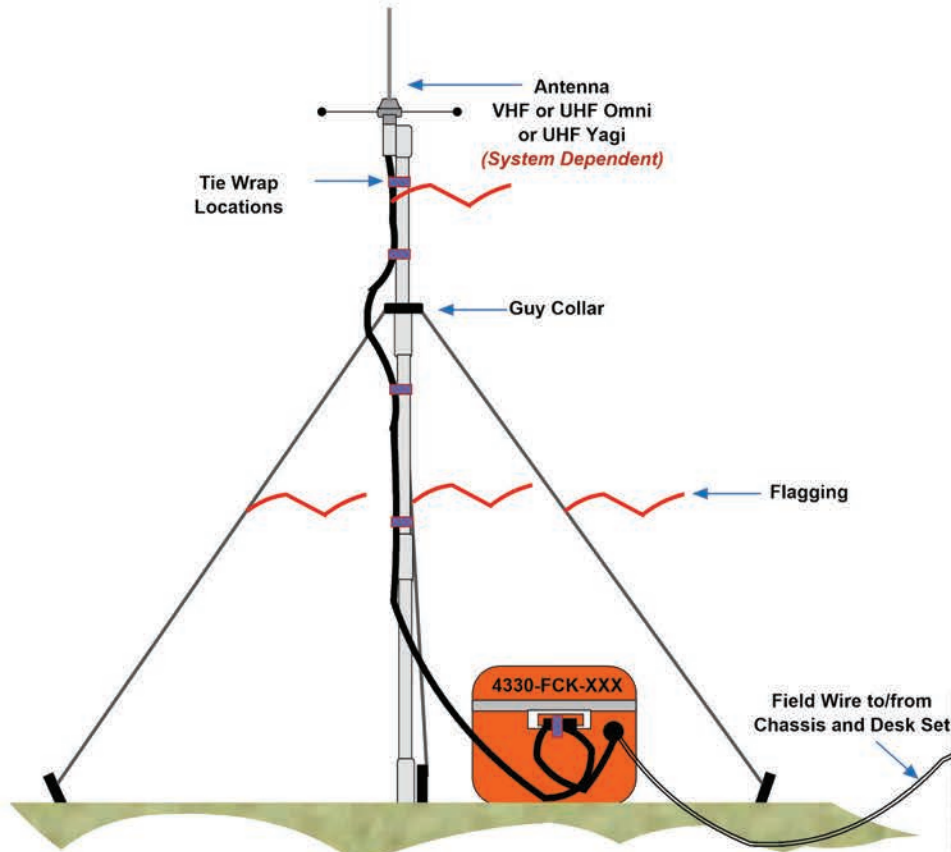
- Adjust the volume on the remote desk set to desired level.
- Test and verify proper operation of the remote with field units.

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

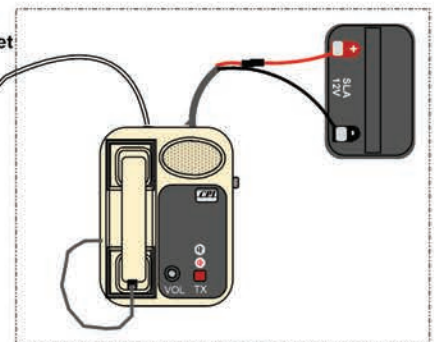
**If questions arise during installation, please contact the CDO at: (208)387-5644**



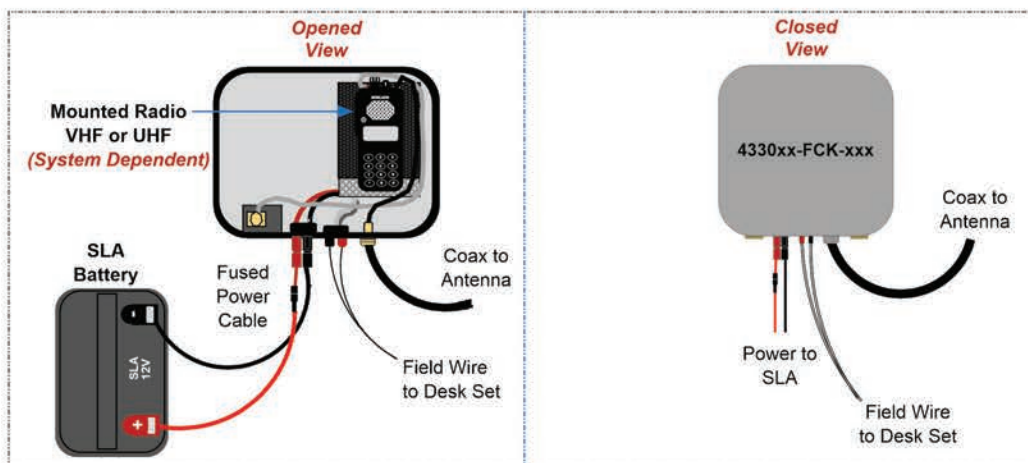
# 004330 - REMOTE KIT SETUP PROCEDURE



**Figure 1:**  
4330 - Complete Remote Setup



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



**Figure 3:**  
Remote Chassis and Termination Panel  
Located inside Fiberglass Box  
(Opened and Closed Chassis)



# 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 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

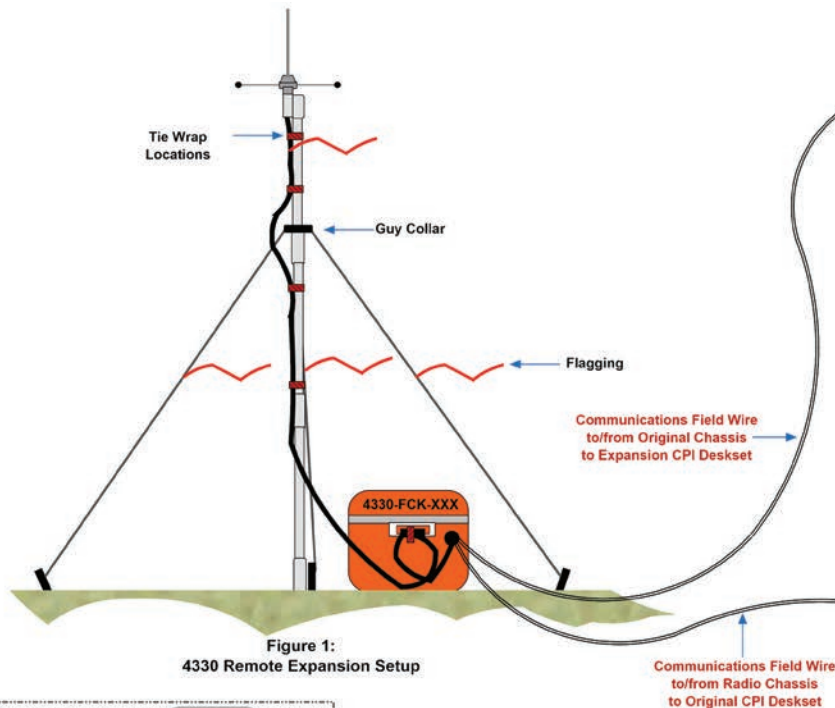


Figure 1:  
4330 Remote Expansion Setup

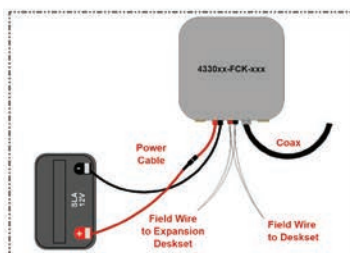


Figure 2:  
4330 Radio Chassis  
Communications Field Wire  
Parallel Termination

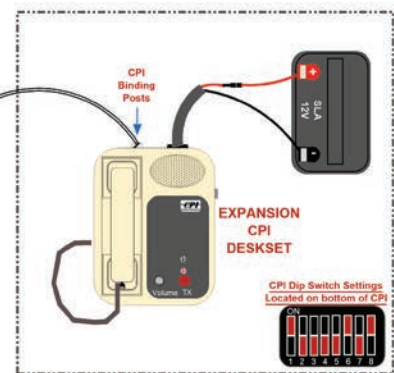


Figure 4:  
Expansion CPI Remote Connections  
and Dip Switch Settings at  
5K High Impedance

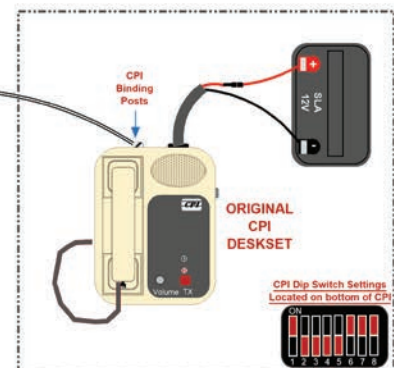


Figure 3:  
Original CPI Remote Connections  
and Dip Switch Settings at  
600 Ohm Impedance

# 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)

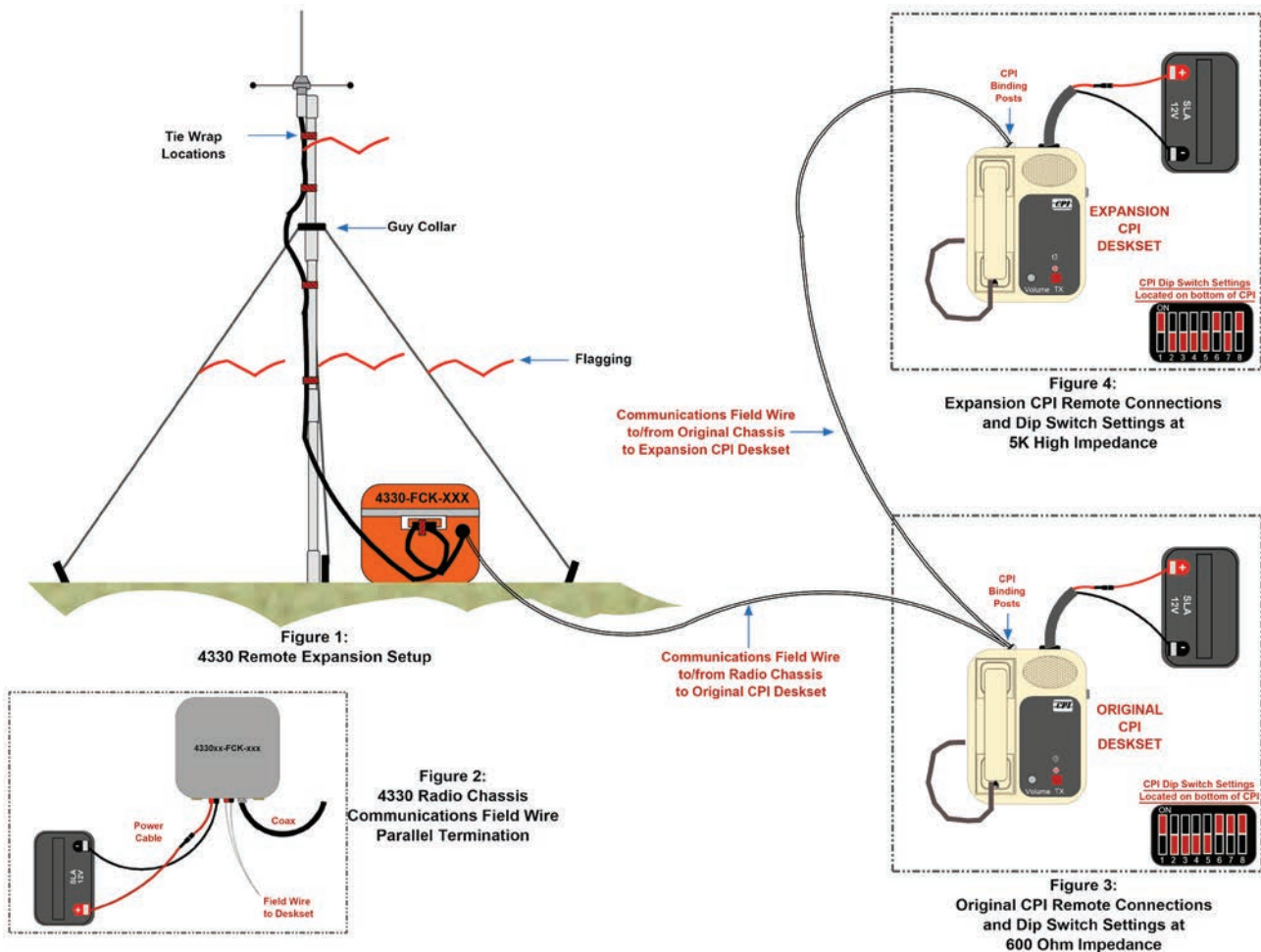
- String the communications field from the grey chassis enclosure back the original 4330 remote desk set location.
- Strip and attach the field wire directly to the binding post on the front of the grey chassis enclosure (not polarity dependent). (See Figure 2)
- String communications field wire from 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:** *For detailed antenna installation see the "Antenna Installation Instructions" in Appendix C.*

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.

### 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 from the NFES# 004150 SLA Battery Kit.

- The battery and equipment are configured with a **POLARIZED** interconnect plug.
- If it becomes necessary to replace the batteries, follow the 12 Volt SLA 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.*

*Note: If the 4370 was ordered separately and not part of the 4390 kit, a separate NFES# 4150 SLA Battery Kit must be ordered to properly power up the unit. The 4330 does not contain batteries in the kit when shipped from NIRSC.*

### 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 select **RX A Audio**.

*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. The AM TX and RX modules must each be individually programmed.*

- 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"

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

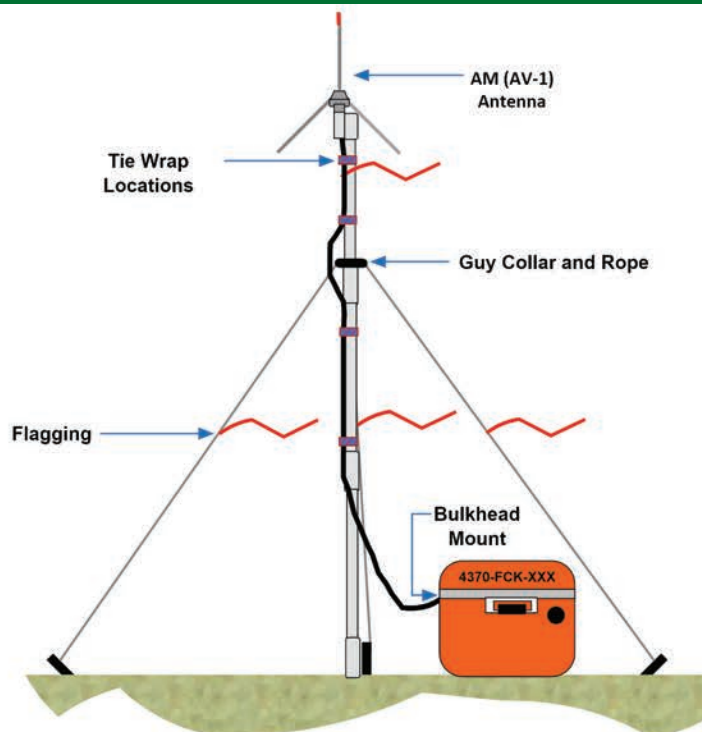
### 7. Close the lid tightly to prevent weather and rodent damage to the equipment.

**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.**

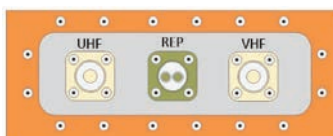
**Note: See "NIRSC Daniels Switch Settings" in Appendix D for E-Model Switch Settings**

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

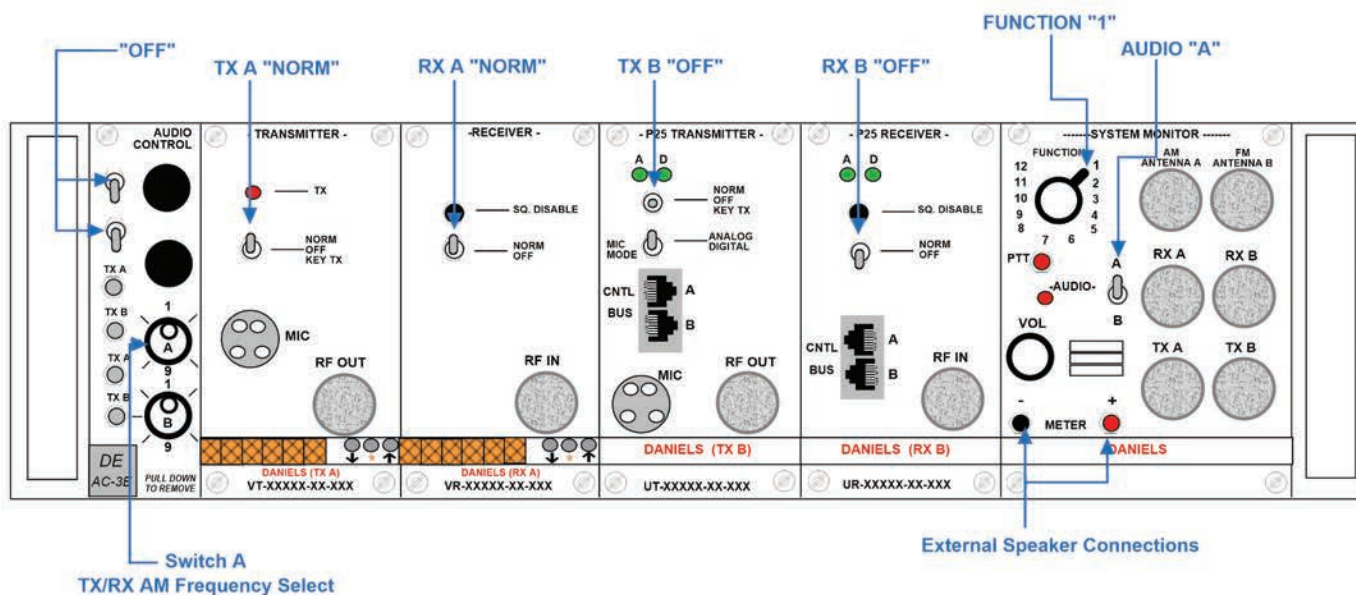
# 004370 - GROUND AIRCRAFT RADIO/LINK KIT SETUP PROCEDURE BASE CONFIGURATION



**Figure 1:**  
4370 - Ground Aircraft Radio/Link Antenna Setup (Base Configuration)



**Figure 5:**  
4370 - Ground Aircraft Radio/Link Bulkhead Mount Connectors (N-Type)



**Figure 6:**  
4370 - Ground Aircraft Radio/Link Switch Settings (Base Configuration)



# 004370 - GROUND AIRCRAFT RADIO/LINK KIT SETUP PROCEDURE

## LINK CONFIGURATION

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

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)*

### 2. **Coaxial Cable** *(See Figure 4)*

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.
- If it becomes necessary to replace the batteries, follow the 12 volt SLA 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.*

*Note: If the 4370 was ordered separately and not part of the 4390 kit, a separate NFES# 4150 SLA Battery Kit must be ordered to properly power up the unit. The 4330 does not contain batteries in the kit when shipped from NIRSC.*

### 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 to disable audio to the speaker.

### 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 5)*

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

*Note: The Communications Duty Officer (CDO) will assign the authorized FAA-issued AM Frequency. The AM TX and RX modules must be individually programmed.*

- 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.

### 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 5)*

*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.*

*All UHF FM frequencies are pre programmed with a RX/TX tone of 110.9*

### 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.**

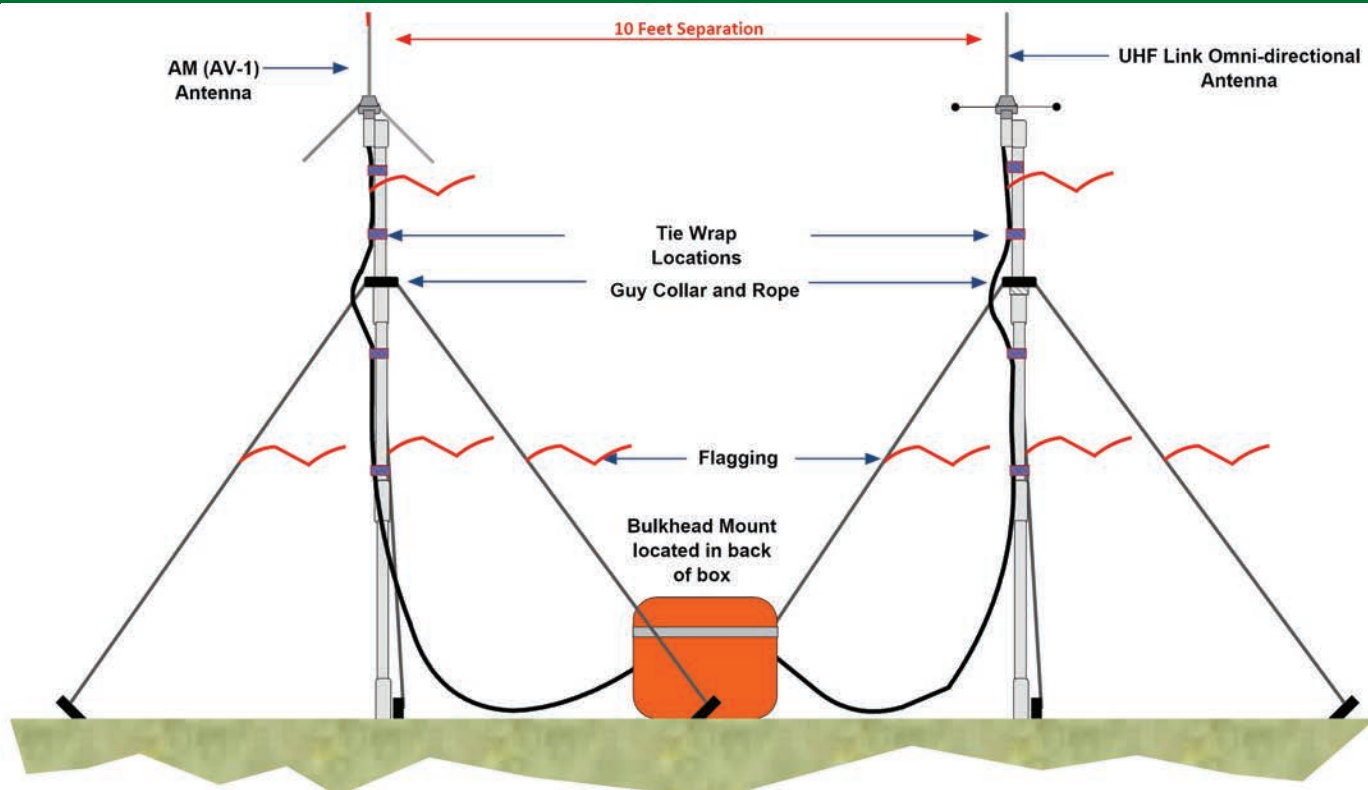
*NIRSC recommends testing with the field units or ICP if possible before leaving the site.*

**Note: See "NIRSC Daniels Switch Settings" in Appendix D for E-Model Switch Settings**

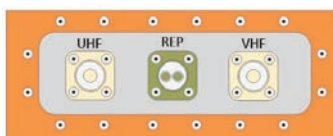
If questions arise during installation, please contact the CDO at: (208)387-5644



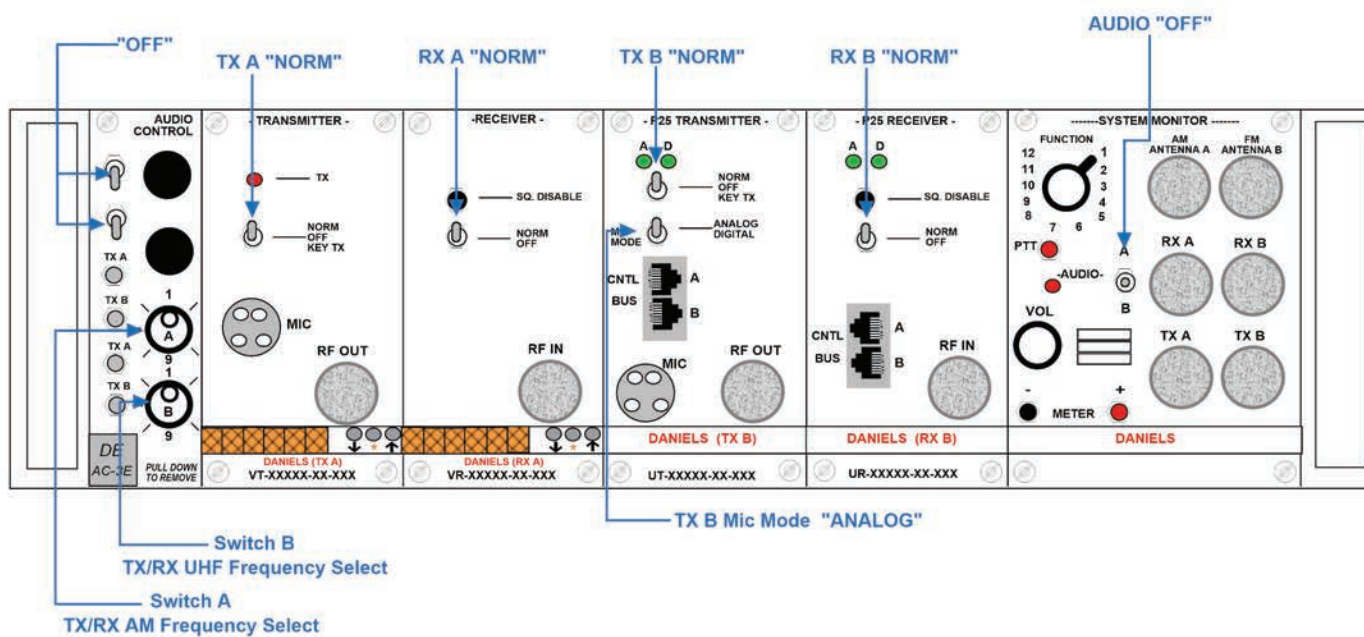
# 004370 - GROUND AIRCRAFT RADIO/LINK KIT SETUP PROCEDURE LINK CONFIGURATION



**Figure 3:**  
4370 - Ground Aircraft Radio/Link Antenna Setup (Link Configuration)



**Figure 4:**  
4370 - Ground Aircraft Radio/Link Bulkhead Mount Connectors (N-Type)



**Figure 5:**  
4370 - Ground Aircraft Radio/Link Switch Settings (Link Configuration)

# 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)
47 LBS	1.67	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.	
	Lead Box Seals	2 ea.	
	Kit, Inventory Worksheet	3 ea	

## 004150 SEALED LEAD ACID (SLA) BATTERY KIT INVENTORY LIST

KIT WEIGHT	CU FT	DIMENSIONS (INCHES)
55 LBS	2.6	21 x 17 x 8

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004133	Battery - Sealed Lead Acid, 35AMP-HR	2 ea.	
005085	Case - Pelican Box, 1550NF	1 ea.	
004094	Liner - Foam, Pelican, 1550	1 ea.	
	Thumb Screws	4 ea.	
	Nuts	4 ea.	
	Washers	4 ea.	
	Battery Jumpers (1 - red, 1 - black)	2 ea.	
	Pre-Wired Plug & Play connector	2 ea.	

**Note:** A NFES# 004150 Sealed Lead Acid Battery Kit must be ordered separately with the following equipment when order from NIRSC and not part of the 4390 Stater System.

- NFES# 004248 Logistics Repeater
- NFES# 004312 Command Repeater/Link Kit
- NFES# 004281 Cross-Band Link
- NFES# 004370 Ground Aircraft Radio/Link Kit
- NFES# 004330 Remote Kit
- NFES# 4330EX Remote Expansion Kit

## 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)
65 LBS	3.6	20 X 21 X 15

KIT COMPONENTS AND INVENTORY			
NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
004237	Adapter-Antenna, SMA (m) to UHF (f) 12"	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, Acct. Property	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)
55 LBS	3.6	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	3.6	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 INVENTORY LIST

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) 84 LBS (MAST) 17 LBS	(KIT) 3.6 (MAST) 1.0	(KIT) 20 X 21 X 15 (MAST) 60 X 3 X 3	101 LBS 4.6 CU FT

KIT COMPONENTS AND INVENTORY			
NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
000825	Stakes - Tent, Metal	3 ea	
004144	Board - Voice	1 ea	
004171	Screwdriver, 4"	1 ea	
004186	Cable - Antenna, Coaxial, 20', N-Type	1 ea	
004189	Cable - Duplexer to Radio, 8"	1 ea	
004249	Cable, Power, Repeater, Octopus	1 ea	
004297	Duplexer, UHF	1 ea	
004303	Hammer, 5 lb	1 ea	
004301	Charger - Battery, 12V, 4A, SLA and Li-Ion	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	
004677	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	
	RF Cable Wrench	1 ea	
	Adapter - N (f) to UHF (m)	2 ea	
	Power cord, with Powerpole Connector	1 ea	
	Fuse - 7.5 amp, mini ATC	1 bx	
	Power Shore Cable	1 ea	
	Battery Terminal Cover, Plastic	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 (1 laminated)	3 ea	
	Double Battery Setup (laminated)	1 ea	
	Lead box seal	2 ea	
	Voice Board Operating Instructions	1 ea	
	Reusable 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) 34 LBS	(KIT) 3.6 (MAST) 2.0	(KIT) 20 X 21 X 15 (MAST) 60 X 3 X 3	94.6 LBS 5.6 CU FT

KIT COMPONENTS AND INVENTORY			
NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
000825	Stakes - Tent, Metal	6 ea	
000968	Guide - NIRSC User's Guide	1 ea	
004144	Board - Voice	1 ea	
004171	Screwdriver - 4"	1 ea	
004186	Cable - Antenna, Coaxial, 20', N-Type	2 ea	
004249	Cable - Power, Repeater, Octopus	1 ea	
004301	Charger -Battery, 12V, 4A, SLA & Li-Ion	1 ea	
004303	Hammer - 5 Lbs	1 ea	
004304	Antenna - UHF Whip	1 ea	
004305	Antenna - Antenna Mast, Lance H-518	6 ea	
004308	Guy Assy-Antenna w/ Collar	2 ea	
004309	Box - Fiberglass, 21"X20"X 15"	1 ea	
004403	Polyphaser	2 ea	
004464	Antenna - Gain Whip, VHF	1 ea	
004489	Base - Antenna, UHF w/ Ground Planes	1 ea	
004498	Base - Antenna, VHF w Ground Planes	1 ea	
004648	Card - Audio Control, Model C1-4L-10	1 ea	
004651	Subrack - Motherboard, SR-39-1	1 ea	
004659	Microphone - RPTR, Daniels, A-MIC-01	1 ea	
004665	Monitor - System, SM-3-HO-014-00	1 ea	
004668	Cable -Receiver, A-Side	1 ea	
004669	Cable-Transmitter, A-Side	1 ea	
004677	Cable - Duplexer to Radio, 24"	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-4R420-00-000	1 ea	
004683	Receiver - UHF, Digital UR-\$r420-00-000	1 ea	
004684	Transmitter - VHF, DigitalVT-4R160-00-800	1 ea	
004685	Receiver - VHF, Digital VR-4R150-00-000	1 ea	
004690	Screwdriver - (For Daniels Models)	1 ea	
005208	Antenna - UHF Yagi	1 ea	
	Power Cord with Powerpole Connector	1 ea	
	RF Cable Wrench	1 ea	
	Adapter - N (f) to UHF (m)	2 ea	
	Battery Terminal Cover, Plastic	1 ea	
	Reusable Zip-Ties	5 ea	
	Fuse - 7.5 Amp, Mini ATC	5 ea	
	Garbage Bag	1 ea	

## 004281 VHF-UHF CROSSBAND LINK KIT INVENTORY LIST (CONT)

KIT COMPONENTS AND INVENTORY			
NFES#	DESCRIPTION	QTY ISSUED	QTY RETURNED
	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	3 ea	
	Frequency Sheets For Uhf Link (1 Laminate)	3 ea	
	Voice Board Operating Instructions	1 ea	
	Lead Box Seal	2 ea	



# 004300 GROUND VHF-AM BASE STATION KIT INVENTORTY LIST

WEIGHTS	CU FT	DIMENSIONS INCHES	TOTAL WEIGHTS AND CU FT
(KIT) 61 LBS (MAST) 17 LBS	(KIT) 3.6 (MAST) 1.0	(KIT) 20 X 21 X 15 (MAST) 1 each @ 60 X 3 X 3	78 LBS 4.6 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000332	Wrench, adjustable, 6"	1 ea	
000825	Stakes - Tent, Metal	3 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 & rptr)	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 (RFN-1035-1)	1 ea	
	120 volt ac power cord (TBS-150)	1 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 INVENTORY LIST

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHTS AND CU FT
(KIT) 90 LBS (MAST) 34 LBS	(KIT) 3.6 (MAST) 2.0	(KIT) 20 X 21 X 15 (MAST) 2 EACH @ 60 X 3 X 3	93 LBS 5.6 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000968	Guide, NIRSC User's Guide	1 ea	
000825	Stakes - Tent, Metal	6 ea	
004144	Board - Voice	1 ea	
004171	Screwdriver, 4"	1 ea	
004186	Cable, Antenna, Coaxial, 20', N-Type	2 ea	
004249	Cable - Power, Repeater, Octopus	1 ea	
004301	Charger - Battery, 12V, 4A, SLA & li-Ion	1 ea	
004303	Hammer - 5 LBS	1 ea	
004304	Antenna, UHF whip	1 ea	
004305	Antenna - Antenna Mast, Lance H-518	6 ea	
004308	Guy Assy-Antenna w/Collar	2 ea	
004309	Box, fiberglass, 21" X 20" X 15"	1 ea	
004342	Duplexer - TXRX , Part # 30-37-98102TXLO	1 ea	
004403	Polyphaser	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	
004677	Cable, VHF duplexer to radio 24"	2 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	
	RF Cable Wrench	1 ea	
	Power cord with Powerpole Connector	1 ea	
	Battery Terminal Cover, Plastic	1 ea	
	Fuses, 7.5 amp, mini ATC	5 ea	
	Garbage bag	1 ea	

## 004312 COMMAND REPEATER/LINK KIT (CONTINUED)

KIT COMPONENTS AND INVENTORY			
	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 (1 laminated)	3 ea	
	Voice Board Operating Instructions	1 ea	
	Frequency sheets for UHF link	3 ea	
	Lead box seal	2 ea	
	Reusable Zip Ties	5 ea	
	Shore Power Cable	1 ea	

## 004320 COML KIT INVENTORY LIST

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
18 LBS	0.90	18 X 12 X 7

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004810	Case, Pelican, 1520, Orange	1 ea	
004040	Radio - King, - VHF, BKR5000	2 ea	
004311	Radio - King, VHF, KNG2-P150	2 ea	
004247	Cable - Cloning, King-KNG/Legacy	2 ea	
004044	Cable - Cloning, King-BKR	2 ea	
004146	Holder, Battery, AA, KNG	2 ea	
<b>004045</b>	Holder, Battery, AA, BKR	2 ea	
004830	Battery, AA	64 ea	
	BKR Cloning Adapter	1 ea	
	Programming/Cloning Instructions for King KNG2-150	4 ea	
	Programming/Cloning Instructions for King BKR5000	4 ea	
	Kit Inventory Worksheets	3 ea	
	Lead Seals	2 ea	

## 4330EX REMOTE EXPANSION KIT INVENTORY LIST

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(KIT) 35 LBS	(KIT) 1.02	(KIT) 18 X 14 X 7	35 LBS 1.02 CU FT

[illegible]



## 4330KP KNG REMOTE KIT INVENTORY LIST

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(KIT) 70 LBS (MAST) 17 LBS	(KIT) 3.6 (MAST) 1.0	(KIT) 20 X 21 X 15 (MAST) 60 X 3 X 3	87 LBS 4.6 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000325	Pliers, lineman, 6"	1 ea	
000825	Stakes - Tent, Metal	3 ea	
004091	Wire Assy-Fused, Batt Power, 12 V w/ powerpole connector	1 ea	
004171	Screwdriver, 4"	1 ea	
004186	Cable - Antenna, Coaxial, 20', N-Type	1 ea	
004148	Battery eliminator, KNG	1 ea	
004149	Cable Connector - Assembly, KNG	1 ea	
004239	Radio - King, VHF, P150S	1 ea	
004274	Transformer - A/C 120V to 12VCD	1 ea	
004301	Charger - Battery, 12V, 4A SLA & Li-Ion	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	
004331	Radio, King, Digital, KNG2-P400	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	
004480	Handset - DC- w/DTMF Keypad	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 ¾ x 3 ¾ x 2)	1 ea	
005342	Panel termination, DC-Line	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	
	Filament tape	1 ro	
	Flagging tape	1 ro	

## 4330KP KNG REMOTE KIT (CONTINUED)

KIT COMPONENTS AND INVENTORY			
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)	2 ea	
	Reusable Zip Ties	5 ea	

## 4330MD MIDLAND REMOTE KIT INVENTORY LIST

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(KIT) 72 LBS (MAST) 17 LBS	(KIT) 3.6 (MAST) 1.0	(KIT) 20 X 21 X 15 (MAST) 60 X 3 X 3	89 LBS 4.6 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000325	Pliers, lineman, 6"	1 ea	
000825	Stakes - Tent, Metal	3 ea	
004091	Wire Assy-Fused, Batt Power, 12 V w/ powerpole connector	1 ea	
004169	Radio, Midland, UHF	1 ea	
004171	Screwdriver, 4"	1 ea	
004186	Cable - Antenna, Coaxial, 20', N-Type	1 ea	
004234	Battery eliminator, Midland	1 ea	
004236	Cable Connector - Assembly, Midland	1 ea	
004235	Radio - Midland, VHF	1 ea	
004274	Transformer - A/C 120V to 12VCD	1 ea	
004301	Charger - Battery, 12V, 4A SLA & Li-Ion	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	
004480	Handset - DC- w/DTMF Keypad	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	
	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	
	Filament tape	1 ro	

## 4330MD MIDLAND REMOTE KIT (CONTINUED)

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
	Flagging tape	1 ro	
	Fuse, 7.5 amp Mini ATC	1 ea	
	Midland 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 INVENTORY LIST

WEIGHTS	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(KIT) 94 LBS (MAST) 34 LBS	(KIT) 3.6 (MAST) 2.0	(KIT) 20 X 21 X 15 (MAST) 2 each @ 60 X 3 X 3	128 LBS 5.6 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
000332	Wrench, Adjustable, 6"	1 ea	
000825	Stakes - Metal, Tent	6 ea	
004144	Board - Voice	1 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	
004249	Cable, Power, Repeater, Octopus	1 ea	
004301	Charger - Battery, 12V, 4A, SLA & Li-Ion	1 ea	
004303	Hammer - 5 LBS	1 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	
004308	Guy Assy-Antenna w/Collar	2 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	
004403	Polyphaser	1 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	
004677	Cable - Duplexer to Radio, 24"	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	



## 004370 GROUND AIRCRAFT RADIO/LINK KIT CONTINUED

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
	RF Cable Wrench	1 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 Terminal Cover, Plastic	1 ea	
	Fuses, 7.5 AMP, Mini ATC (5 each)	1 bx	
	Filament Tape	1 ro	
	Flagging Tape	1 ro	
	Garbage bag	1 ea	
	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	
	Shore Power Cable	1 ea	

## 4381KD KING DPHX COMMAND/TACTICAL RADIO KIT

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
77 LBS	3.6	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	
004237	Adapter-Antenna, SMA (m) to UHF (f), 12'	4 ea	
004306	Liner, foam, radio, 16pck	1 ea	
004309	Box, fiberglass, 21" X 20" X 15"	1 ea	
004355	Antenna, mobile mag	8 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	8 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 (lamine)	1 ea	

## 4381K2 KING KNG2 COMMAND/TACTICAL RADIO KIT

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
65 LBS	3.6	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	
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	
004237	Adapter-Antenna, SMA (m) to UHF (f), 12'	8 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	8 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	
	Foam Insert, Lid	1 ea	

## 4381KR KING BKR5000 COMMAND/TACTICAL RADIO KIT

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
85 LBS	3.6	20 X 21 X 15

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004242	Adapter, Mobile Mag SMA (f) to UHF (f)	8 ea	
004040	Radio King, Digital, BKR5000 T-3 (capitalized)	16 ea	
004041	Speaker Microphone, BKR	4 ea	
004042	Case, Leather, BKR	16 ea	
004043	Antenna, VHF, BKR	19 ea	
004044	Cloning Cable, King BKR	1 ea	
004045	Holder, Battery, AA, BKR	16 ea	
004306	Liner, foam, radio, 16pck	1 ea	
004309	Box, Fiberglass, 21" X 20" X 15"	1 ea	
004355	Antenna, mobile mag	8 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 discipline pamphlet	4 ea	
	Radio switch settings and programming sheet	1 ea	
	Key pad programming and cloning instructions	1 ea	
	Frequency reminder (lamine)	1 ea	

## 004390 STARTER SYSTEM INVENTORY LIST

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(KITS) 883 LBS (MAST) 119 LBS	(KITS) 32.4 (PELICAN) 8.0 (MASTS) 14.0	9 EACH @ 20 X 21 X 15 5 EACH @ 21 X 17 X 18 7 EACH @ 60 X 3 X 3	1002 LBS (Max Configuration) 54.4 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004150	SEALED LEAD ACID (SLA) BATTERY KIT	5 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	



## 004420 AVIATION PRINTER KIT (BOX 1 OF 2)

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(BOX 1) 67 LBS (BOX 2) 37 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	104 LBS 9.08 CU FT

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004105	Liner - Foam, Pelican, 1690	1 ea.	
004254	Ink Cartridge, Aviation Printer, Black	1 ea	
004255	Ink Cartridge, Aviation Printer, Cyan	1 ea	
004256	Ink Cartridge, Aviation Printer, Magenta	1 ea	
004257	Ink Cartridge, Aviation Printer, Yellow	1 ea	
004340	Printer, Aviation	1 ea.	
004808	Case, 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 AVIATION PRINTER KIT (BOX 2 OF 2)

004104	Liner - Foam, Pelican, 1620	1 ea.	
004185	Extension Cord, 16 AWG/3, 25 ft.	1 ea.	
004233	USB Drive, 16 GB	1 ea.	
004254	Ink Cartridge, Aviation Printer, Black	2 ea.	
004255	Ink Cartridge, Aviation Printer, Cyan	2 ea.	
004256	Ink Cartridge, Aviation Printer, Magenta	2 ea.	
004257	Ink Cartridge, Aviation Printer, Yellow	2 ea.	
004809	Case, 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 INVENTORY LIST

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
56 LBS	3.6	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 )	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 INVENTORY LIST

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
38 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	1 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	1 ea.	

## 004605 TECHNISONIC TDFM-136 TEST JIG (SINGLE)

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
15 LBS	1.75	19 X 16 X 10

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004066	Radio TDFM-136, P25	1 ea.	
004107	Radio Test Jig, DTFM-136X	1 ea.	
004088	Power Cord, Test Jig, TIL	1 ea.	
004108	Case-Pelican, 1557	1 ea.	
004109	Liner, Foam, Pelican, 1557	1 ea.	
	Kit Inventory worksheets	3 ea.	
	Lead box seals	2 ea.	
	Radio Programming Exercise Sheet	2 ea.	
	TDFM-136B Quick Reference Guide, NIICD	2 ea.	

## 004606 TECHNISONIC TDFM-136 TEST JIG (DUAL)

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
35 LBS	5.0	32 X 21 X 13

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004066	Radio TDFM-136, P25	2 ea.	
004107	Radio Test Jig, TIL	2 ea.	
004088	Power Cord, Test Jig, TIL (2 pcs)	2 ea.	
005086	Case-Pelican, 1650	1 ea.	
004095	Liner, Foam, Pelican, 1650	1 ea.	
004093	Load, Dummy, N (m)	2 ea.	
004087	Adapter, N (f) to BNC (f)	2 ea.	
004086	Cable-RF, BNC (m)	2 ea.	
	Kit Inventory worksheets	3 ea.	
	Lead box seals	2 ea.	
	Radio Programming Exercise Sheet	4 ea.	
	TDFM-136B Quick Reference Guide, NIICD	4 ea.	



## 004607 TECHNISONIC TDFM-9000 TEST JIG

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
25 LBS	2.3	22 X 18 X 10

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004086	Cable-RF, BNC (m)	4 ea	
004087	Adapter, N (f) to BNC (f)	4 ea	
004093	Load-Dummy, N (m)	4 ea	
004096	Case-Pelican, 1560	1 ea	
004097	Liner, foam, Pelican, 1560	1 ea	
004098	Dongle, Audio Grounding, TDFM-9000	1 ea	
004099	Radio, Test Jig, TDFM-9000	1 ea	
004101	Power Cord, Test Jig, TDFM-9000	1 ea	
004102	Radio-TDFM-9000, Multi-band	1 ea	
	Kit Inventory worksheets	3 ea.	
	Lead box seals	2 ea.	
	Radio Programming Exercise Sheet	2 ea.	
	TDFM-9000 Quick Reference Guide, NIICD	2 ea.	
	TDFM-9000 Radio Operations Guide, NIICD	2 ea.	

## 004608 COBHAM NPX136D TEST JIG

TOTAL WEIGHT (KIT)	CU FT	DIMENSIONS (INCHES)
20 LBS	1.9	19 X 16 X 11

KIT COMPONENTS AND INVENTORY			
NFES #	DESCRIPTION	QTY ISSUED	QTY RETURNED
004103	Radio NPX136D, P25	1 ea.	
004107	Radio Test Jig, TIL	1 ea.	
004088	Power Cord, Test Jig, TIL	1 ea.	
004108	Case-Pelican, 1557	1 ea.	
004109	Liner, Foam, Pelican, 1557	1 ea.	
	Kit Inventory worksheets	3 ea.	
	Lead box seals	2 ea.	
	Radio Programming Exercise Sheet	2 ea.	
	NPX136D Operational Supplement	2 ea.	
	NPX136D Programming Block Diagram	2 ea.	
	Cable-Adapter, TIL to NPX	1 ea.	

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

WEIGHT	CU FT	DIMENSIONS (INCHES)	TOTAL WEIGHT AND CU FT
(BOX 1) 55 LBS (BOX 2) 75 LBS (MAST) 32 LBS	(BOX 1) 3.6 (BOX 2) 3.6 (MAST) 2.0	33.36 X 28.44 X 18.23 24.64 X 19.39 X 13.78 2 each @ 60 X 3 X 3	162 LBS 9.2 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) 55 LBS (BOX 2) 75 LBS (MAST) 32 LBS	(BOX 1) 3.6 (BOX 2) 3.6 (MAST) 2.0	33.36 X 28.44 X 18.23 24.64 X 19.39 X 13.78 2 each @ 60 X 3 X 3	162 LBS 9.2 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)
4.8	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.	



### **VOICE BOARD OPERATING INSTRUCTIONS**

*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 SLA, the voice board monitors the solar voltage and will automatically switch to SLA 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 SLA 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)**
- 4 = Cross-Band Link (4281)**

### 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.*

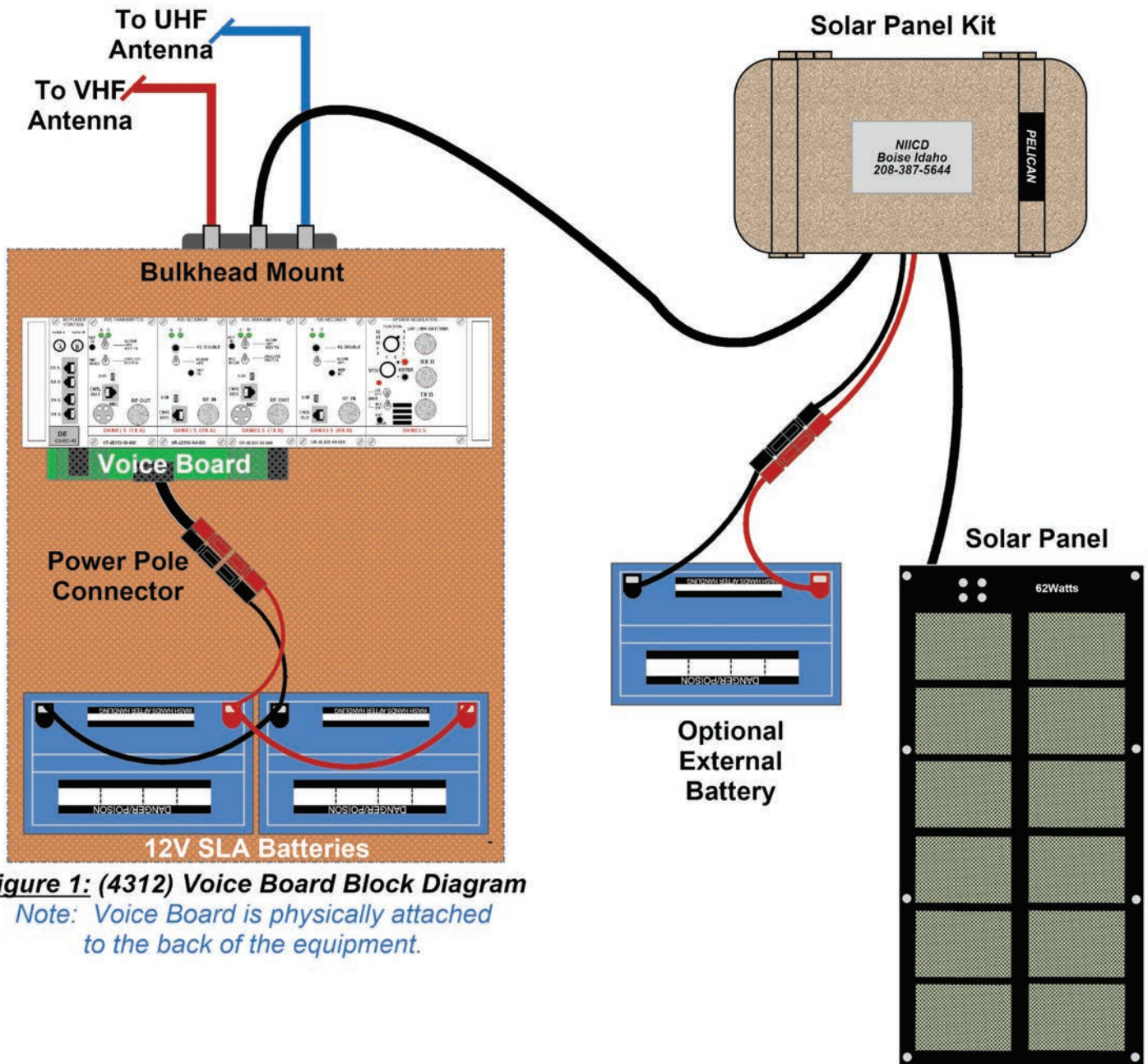
## EXAMPLE:

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**

# 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)*

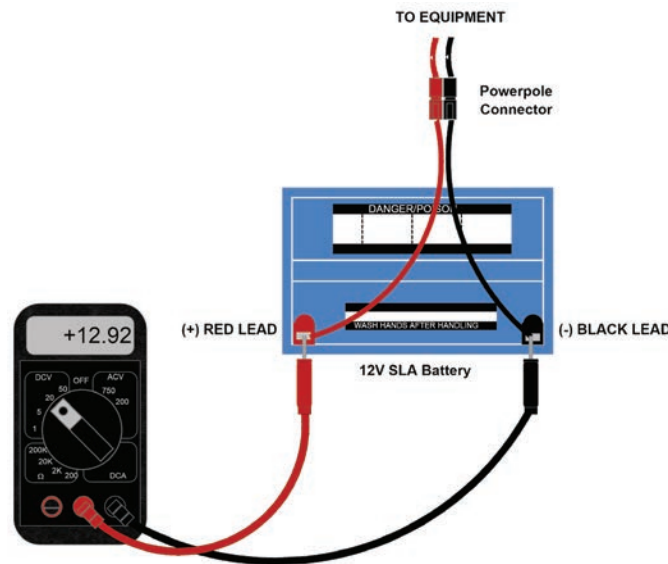


Figure 1: Sample Voltmeter Test on Standalone SLA Battery Configuration

**Repeaters:** Replace batteries if the voltage is at 10.5 volts with the transmitter keyed up. Starting voltage is about 14 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)*

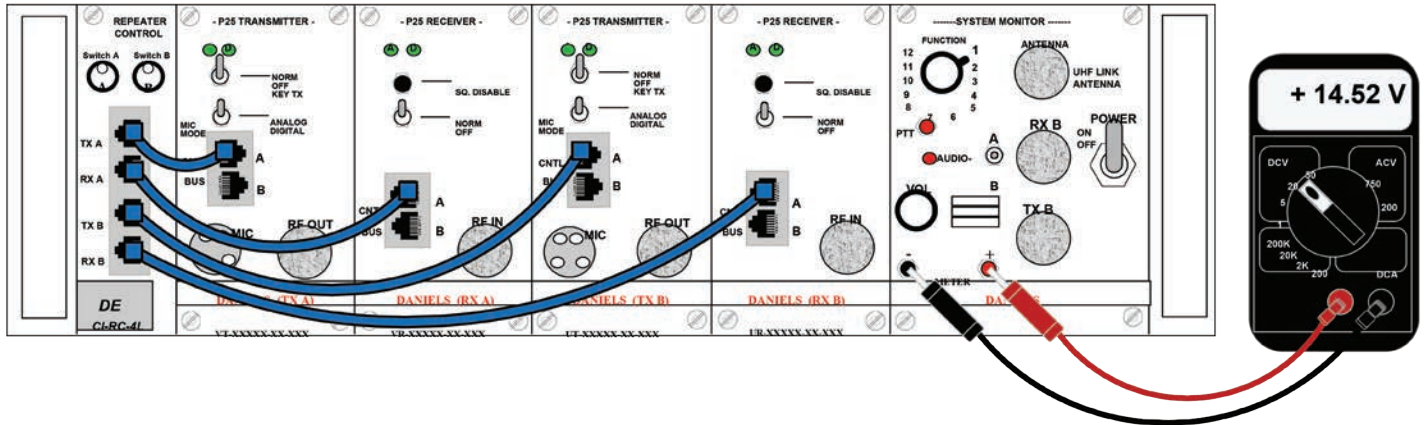
*Note: Alkaline batteries are not considered hazardous waste, except in California. These batteries should be disposed of at the incident to save on shipping costs.*

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



# GENERAL EQUIPMENT BATTERY TESTING

## System Monitor Battery Testing



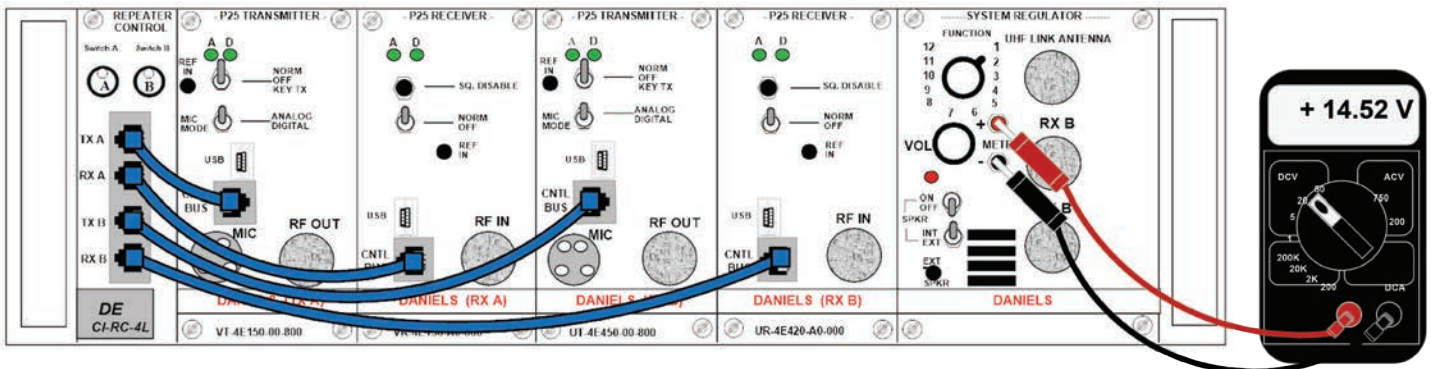
### Testing the Equipment Batteries under load on equipment with a System Monitor

- 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

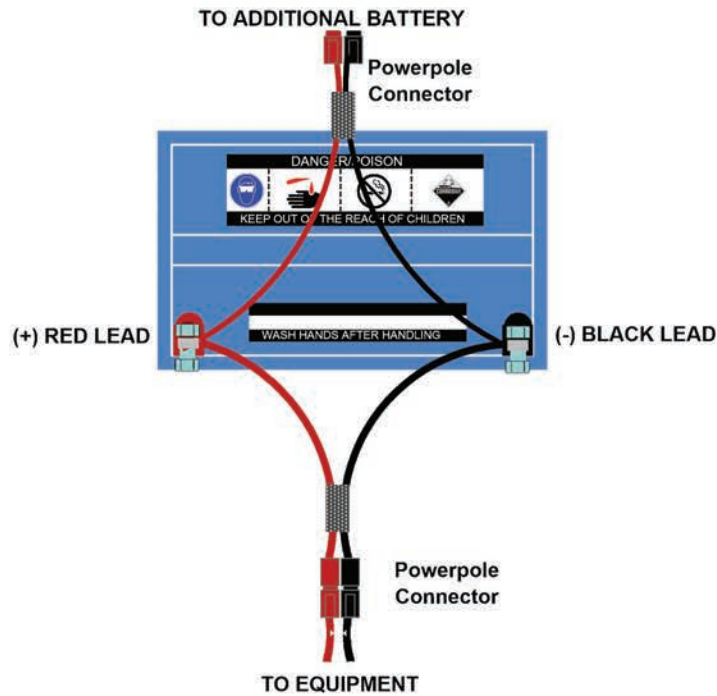
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3-12	NIRSC Testing

*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*

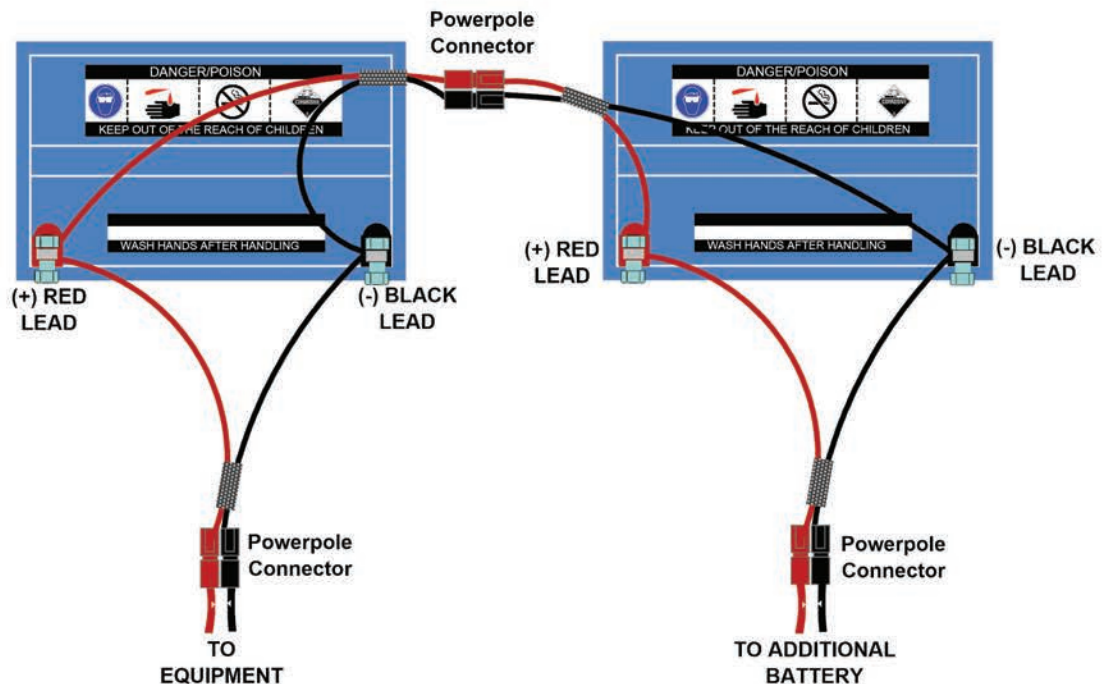
# SLA BATTERY CONFIGURATIONS

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 5-7 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:**  
**+12V Single SLA Battery Configuration**



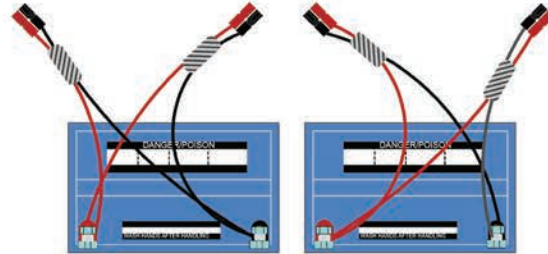
**Figure 2:**  
**+12V Double SLA Battery Parallel Configuration**

# 4312, 4248 and 4370 SLA BATTERY INSTALLATION

All 4312, 4248, 4330, 4370 and 4248 kits will be sent from NIRSC without any batteries physically connected to the equipment. The user must install the batteries from the NFES# 4150 SLA Battery Kit to make them operational. Please following the appropriate battery configuration and installation procedure for each piece of equipment.

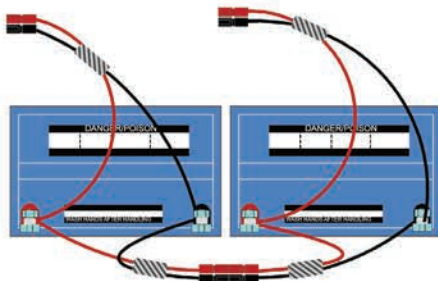
## 1. Supplied Materials

- 1 each 4150 - SLA Battery Kit
- 35 AMP-HR SLA Battery X 2
- Red and black jumpers
- Pre-Wired Power-Pole Cable Assembly with Connecting hardware
- Electrical Tape (not shown)

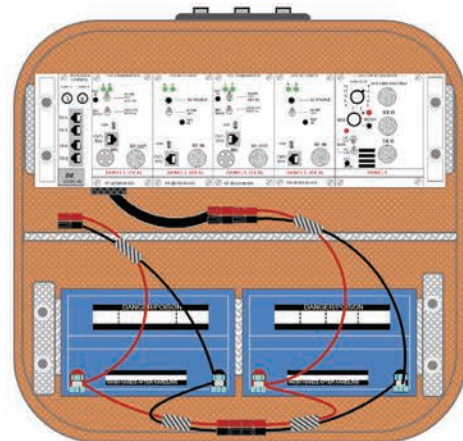


## 2. Configuring the batteries (See Figure)

- Ensure both batteries are fully charged
- Place both SLA batteries inside the kit as shown
- Configure the SLA batteries in parallel with pre-assembled Power-Pole cable assembly
- Connect one end of the Power-Pole cable assembly to Equipment Power-Pole cable assembly.



12 Volt SLA Battery Configuration in Parallel



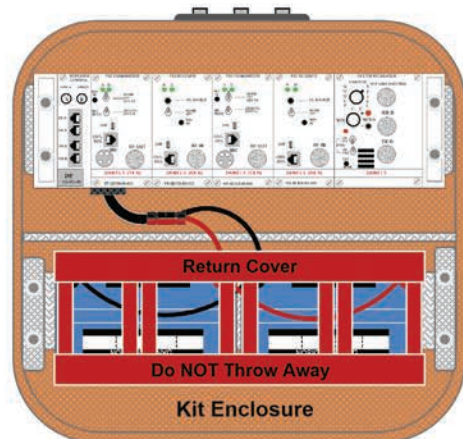
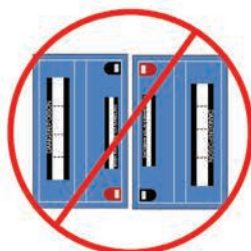
Equipment Kit Enclosure  
12 Volt SLA Battery Configuration

## 3. Battery Protection (See Figure)

Cover the terminals with supplied cover to prevent accidental short circuits.

**Note:** Always remove the batteries from each kit before transporting or shipping back to NIRSC.

**!!!!WARNING!!!!**  
Never install batteries with the terminals facing each other!



Equipment Kit Enclosure  
12 Volt SLA Battery Configuration  
With Battery Cover



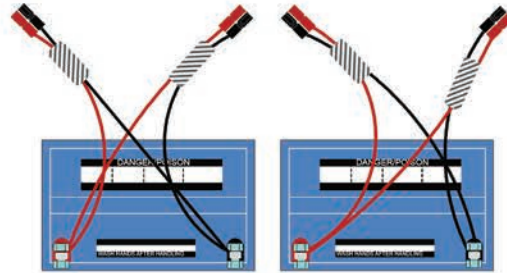
# 4330/4330EX SLA BATTERY INSTALLATION

All 4312, 4248, 4330, 4370 and 4248 kits will be sent from NIRSC without any batteries physically connected to the equipment. The user must install the batteries from the NFES# 4150 SLA Battery Kit to make them operational. Please following the appropriate battery configuration and installation procedure for each piece of equipment.

## 1. Supplied Materials

- 1 each 4150 - SLA Battery Kit
- 35 AMP-HR SLA Battery X 2
- Red and black jumpers
- Power-Pole Cable Assembly with Connecting Hardware
- Electrical Tape (not shown)

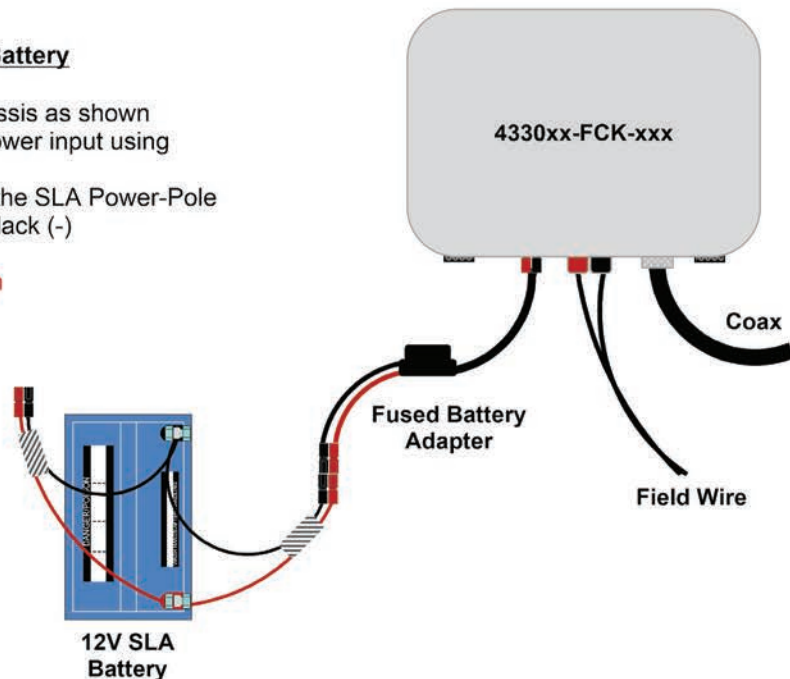
*Note: Fused Battery adapter are included in each 4330 kit*



## 2. Configuring 4330 Radio Chassis Battery

- Ensure SLA battery is fully charged
- Place the SLA battery outside the chassis as shown
- Connect the SLA battery to chassis power input using the provided fused battery adapter
- Connect the fused battery adapter to the SLA Power-Pole battery cable as shown Red (+) and black (-)

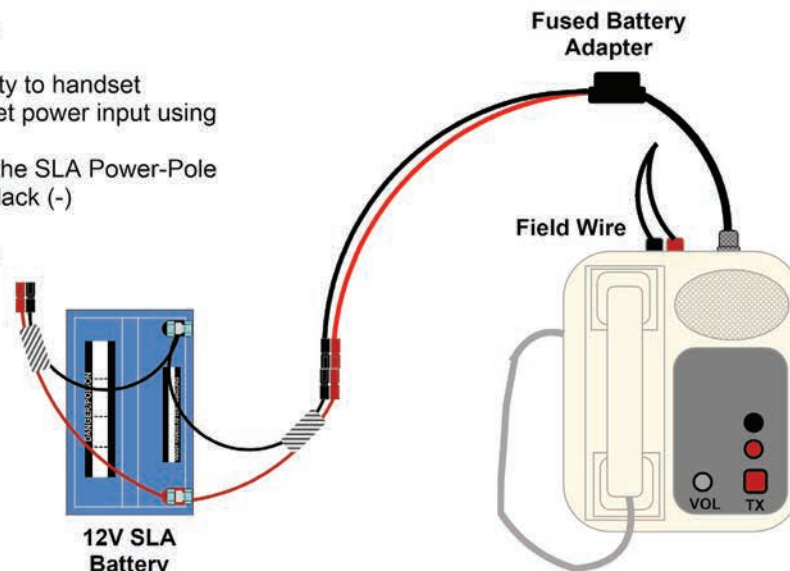
*Note: Always remove the batteries from each kit before transporting or shipping back to NIRSC.*



## 3. Configuring 4330 Handset Battery

- Ensure SLA battery is fully charged
- Place the SLA battery in close proximity to handset
- Connect the SLA battery to the handset power input using the provided fused battery adapter
- Connect the fused battery adapter to the SLA Power-Pole battery cable as shown Red (+) and black (-)

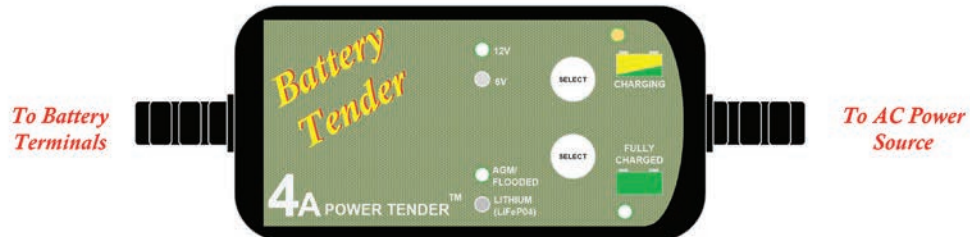
*Note: Always remove the batteries from each kit before transporting or shipping back to NIRSC.*



# SLA BATTERY CHARGING AND WARNINGS

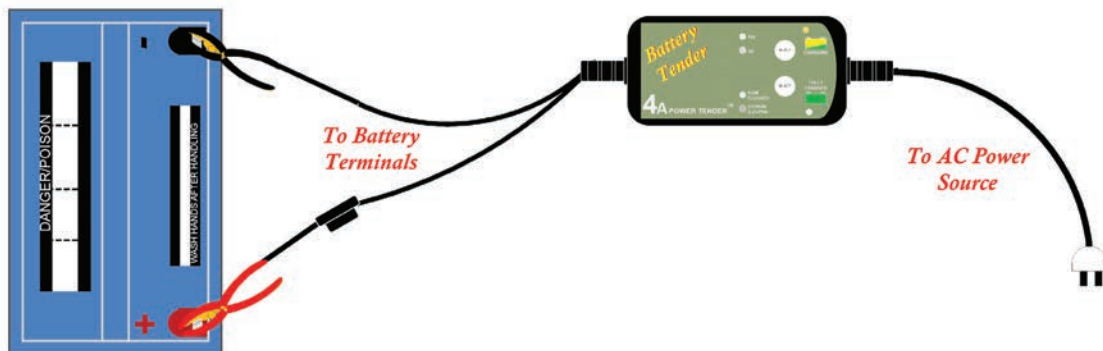
## 1. Battery Charger Configuration

- Plug A/C Plug on battery charger to electrical outlet
- Select "12V" using the upper "SELECT" button
- Select "AGM/FLOODED" using the lower "SELECT" Button



## 2. Battery Terminal Configuration

- Connect the charging clips to the SLA Battery  
*Note the Polarity, Red Clip (+) and Black Clip (-)*
- A completely discharged battery will take about 10-hours to fully charge.
- Battery is charged when the charge indicator light is green



### !!!!!!WARNING!!!!!!

- The terminals on the SLA batteries are exposed and can be prone to accidental short circuiting during transportation.
- SLA batteries will discharge much more violently in the event of a short circuit compared to alkaline batteries.
- Always take appropriate precautions to ensure the terminals are protected with electrical tape, covers or other non-conductive material to prevent short circuits while transporting SLA batteries.
- **DO NOT** transport repeaters or other equipment with SLA batteries installed. Use original packaging to transport SLA batteries to and from mountain top locations.
- When transporting SLA batteries, remove all jumper wires and cables.
- **DO NOT** connect a dead battery to a fully charged battery.

# RADIO AND EQUIPMENT BATTERY MATRIX

BATTERY TYPES				
NFES#	000030	000033	004150	001241
VOLTAGES	1.5Volts (AA)	1.5Volts (D)	12Volts	9Volts
STANDARD CACHE PACKAGE	24/PG	12/PG	2/Kit	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
4381KR (KING BKR5000)	*12				**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)	004150 (12 V)	001241 (9 V)	Replacement Cycle (Without Solar Panel Kits)
4248 - UHF REPEATER			*2		** Every 5 Days Max
4281 - CROSSBAND LINK			*2		** Every 5 Days Max
4312 - VHF REPEATER			*2		** Every 5 Days Max
4300 - AM BASE STATION	*40		*2		** Every 5 Days Max
4370 - GROUND A/C LINK	*40		*2		** Every 5 Days Max
4330 - REMOTE			*2		** Every 5 Days Max
4330EX - REMOTE EXPANSION			*2		** Every 5 Days Max

\* 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)	004150 (12 Volts)
4390 w/DPH VHF/Motorola UHF Radios	*648 (27 Standard Packages)	**20 (5 Kits Included)
4390 w/DPH VHF /Midland UHF Radios	*552 (23 Standard Packages)	**20 (5 Kits Included)
4390 w/KNG VHF/KNG UHF Radios	*536 (23 Standard Packages)	**20 (5 Kits Included)
4390 w/KNG VHF/Midland UHF Radios	*600 (25 Standard Packages)	**20 (5 Kits Included)
4390 w/KNG VHF/Motorola UHF Radios	*504 (21 Standard Packages)	**20 (5 Kits Included)

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

\*\* Note: 12 Volt Battery requirements are per Replacement Cycle of 5 days max without solar panel kit installed.



# ANTENNA INSTALLATION INSTRUCTIONS

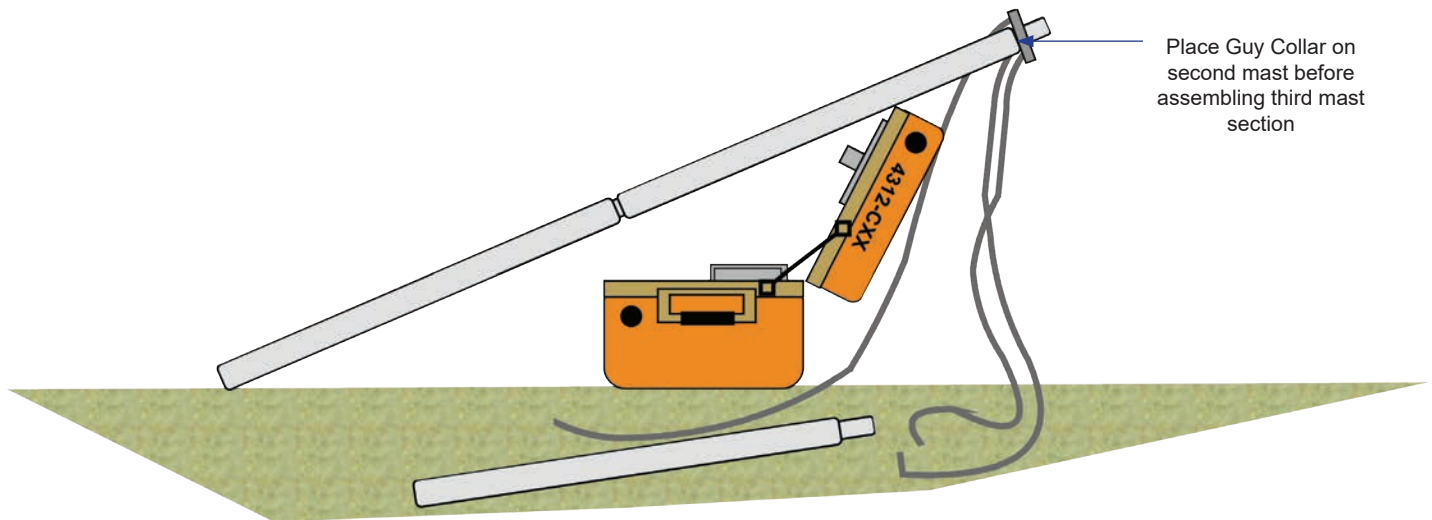
These diagrams are also available for download online at:

<https://www.nifc.gov/resources/NIICD>

# ANTENNA INSTALLATION INSTRUCTIONS

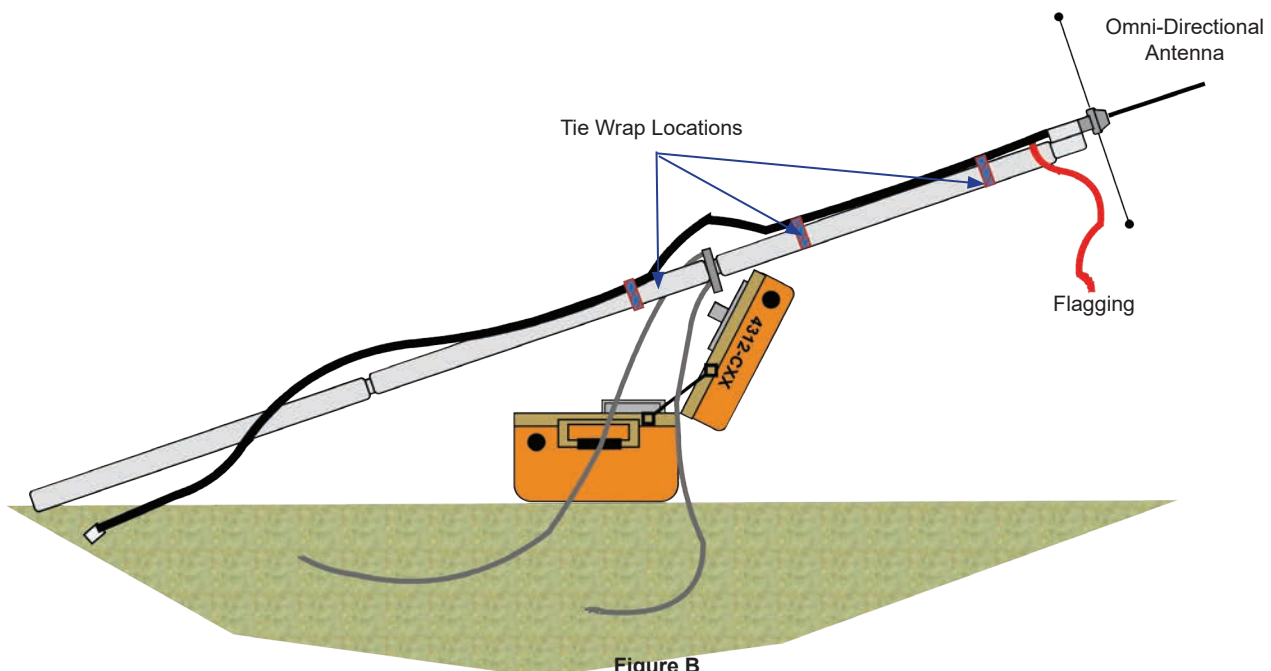
*Note: If setting up a linked system, NIRSC recommends starting with the Link antenna first.*

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)**



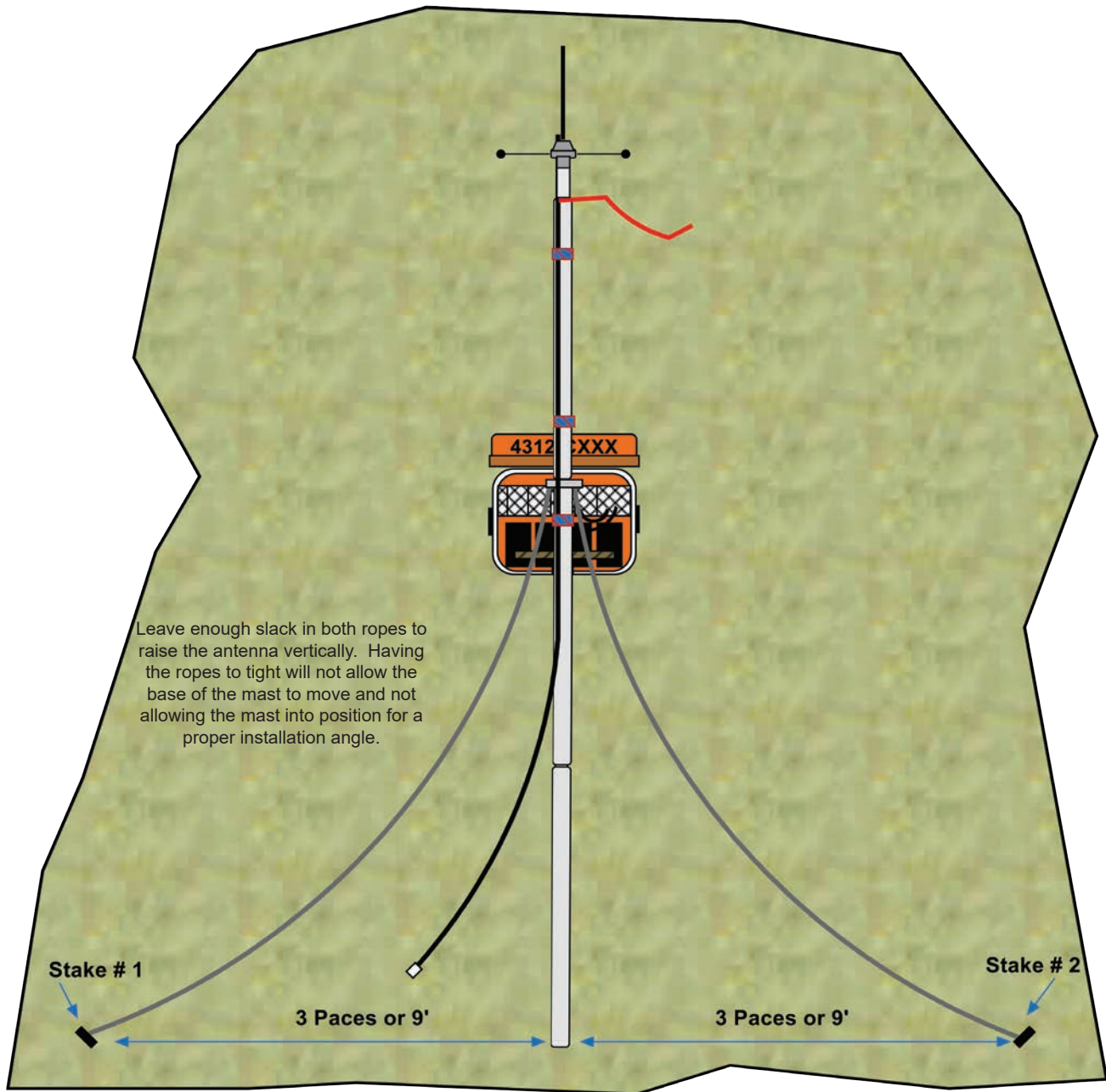
**Figure A**

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.



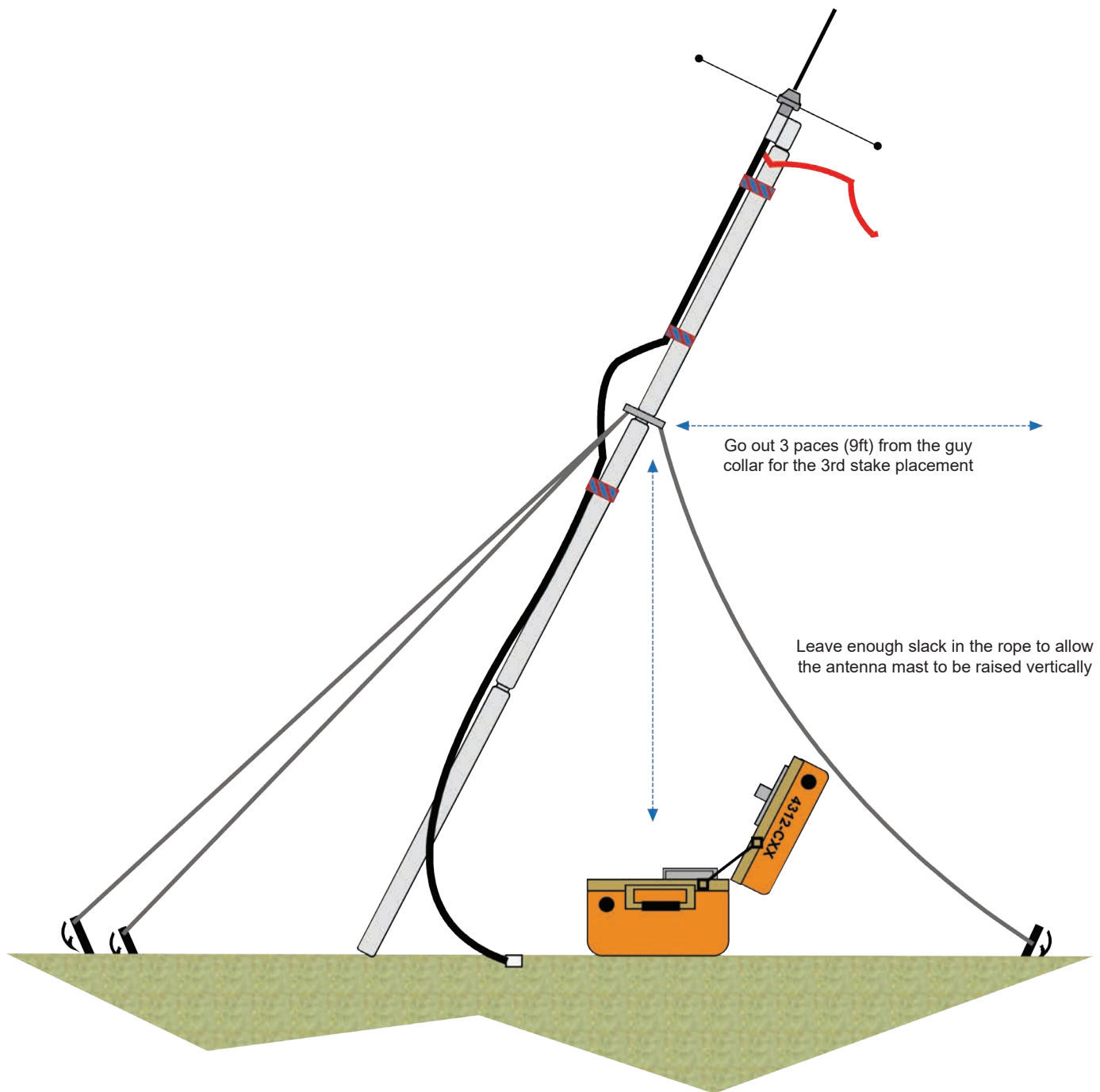
**Figure B**

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**

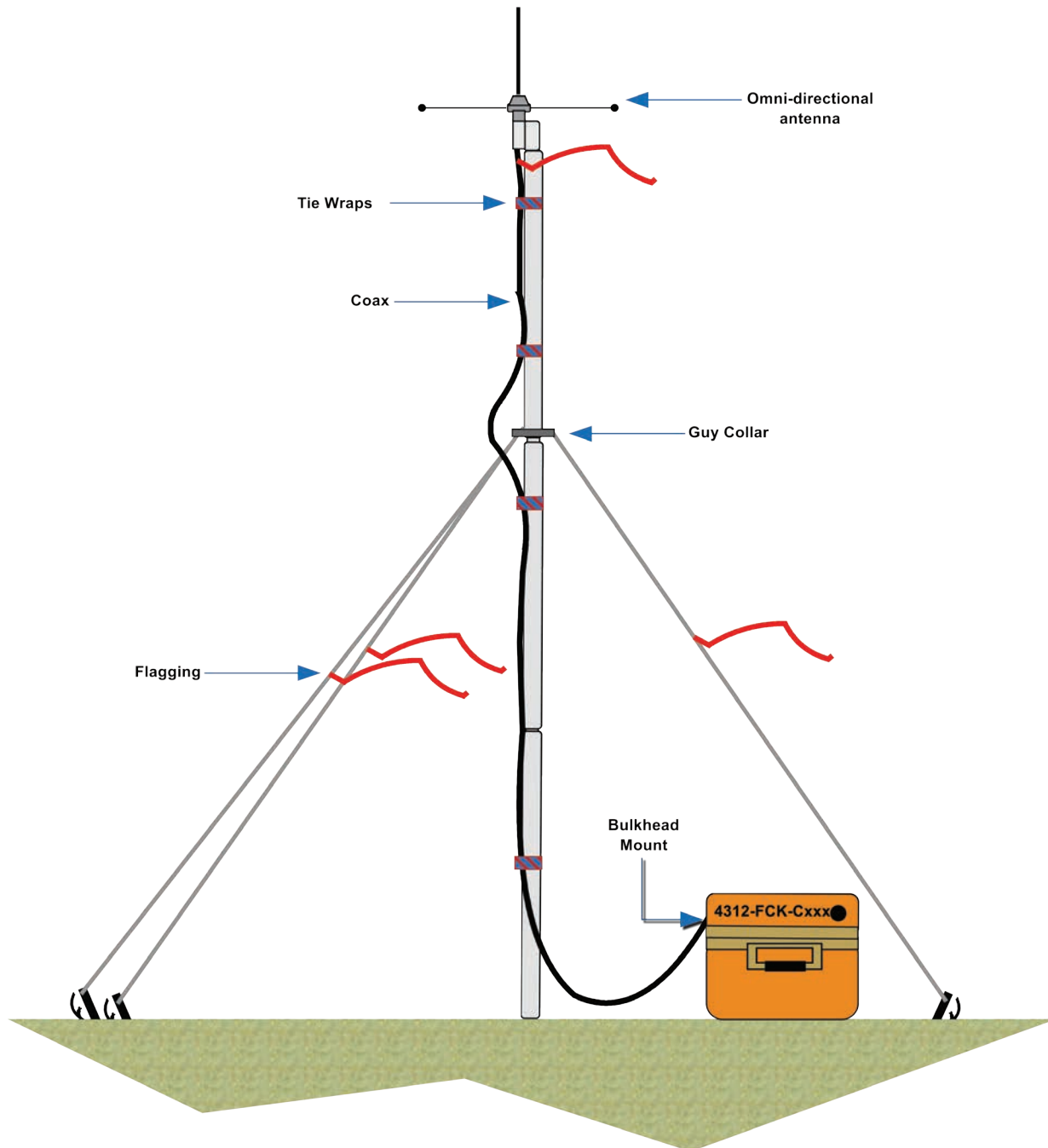
11. Stand the antenna up to nearly vertical by picking up the base of the mast and dragging it towards the equipment box. The antenna should stand alone which allows the installer to finish the install without the help of another individual. **(See Figure D)**  
*Note: In high wind situations, make sure 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. Attach 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. Close the lid and test the system before leaving the site.

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



**Figure E**

# LINK ANTENNA INSTALLATION INSTRUCTIONS

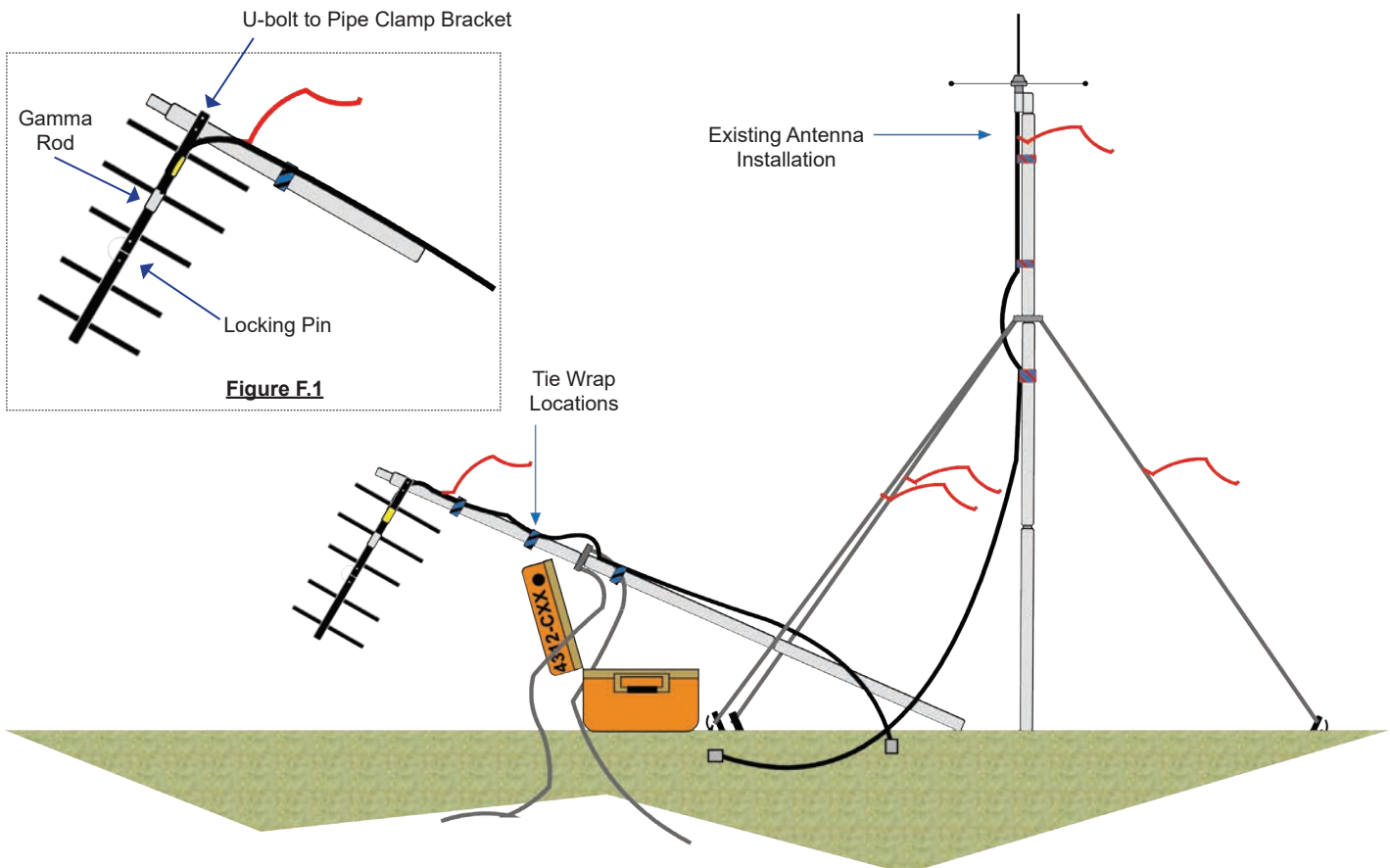
*Note: The Link Antenna Installation Instructions are assuming that the Omni-directional Antenna has been previously installed at the site.*

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.**

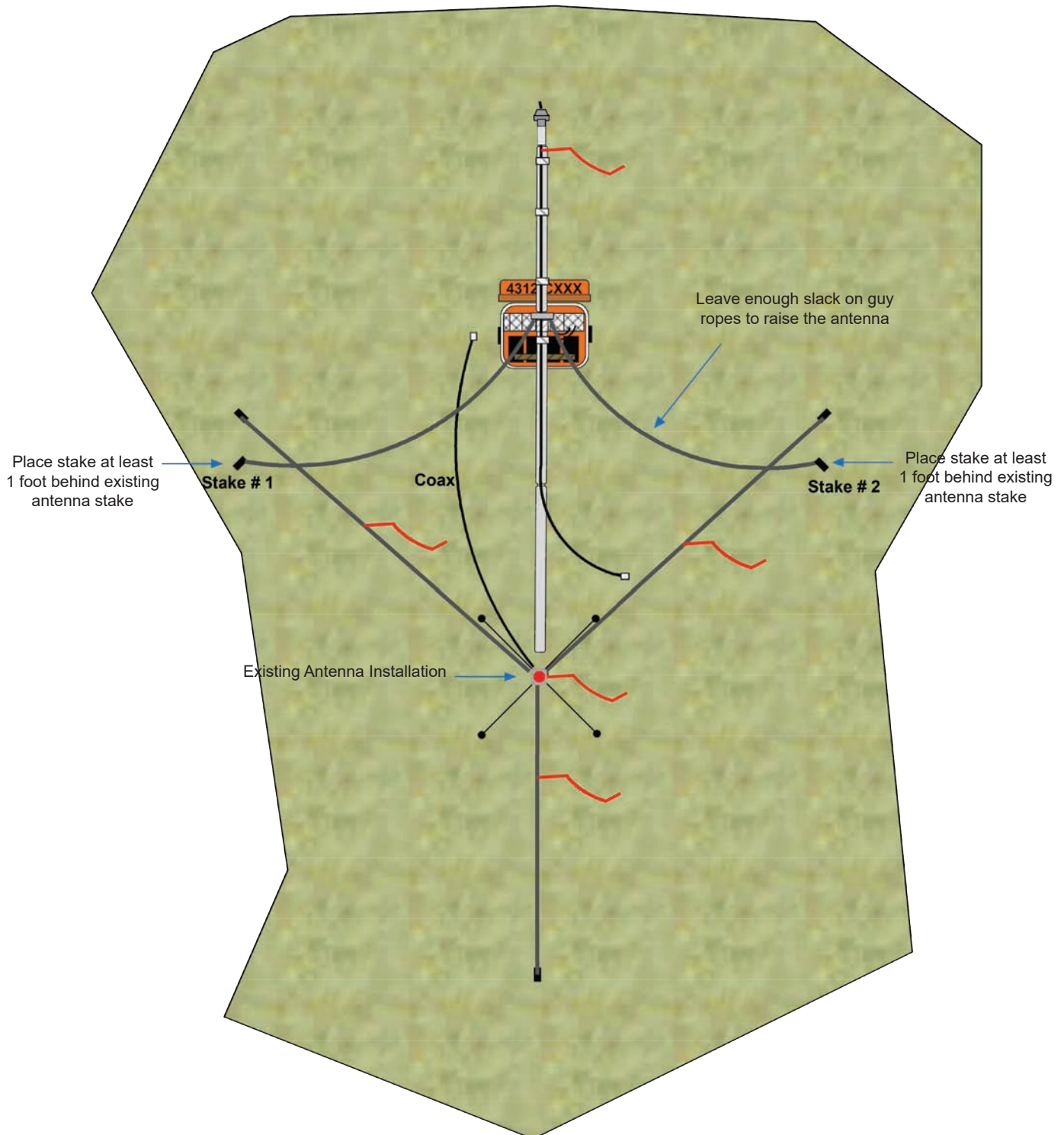
7. Connect the coax to the selected antenna base or Yagi.
8. Secure the coax to the antenna mast at three places with provided tie wraps, 12 inches below the antenna base and 12 inches above and below the guy collar, with a loop around the guy collar to prevent chafing the coax.
9. Tear off a 2-3ft piece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



**Figure F**



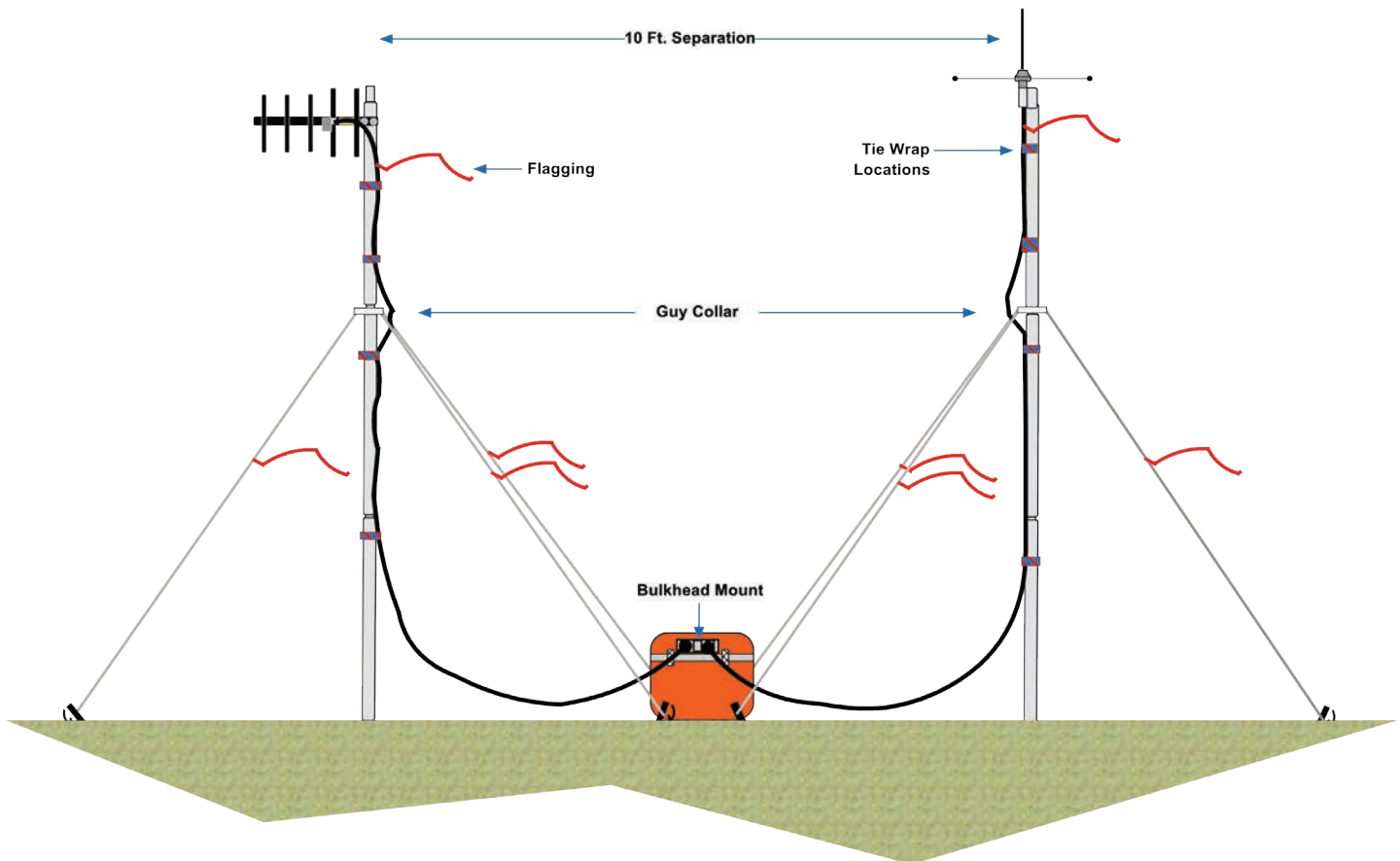
10. Place two tent stakes in-line with the existing two antenna stakes. **(See Figure G)**  
*Note: Drive the tent stakes in at an angle, with stake tops sloping away from the area where the equipment box and the antenna base will be located. Don't drive the tent stakes all the way down until all the 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. Attach 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 test the system before leaving the site.

*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.*

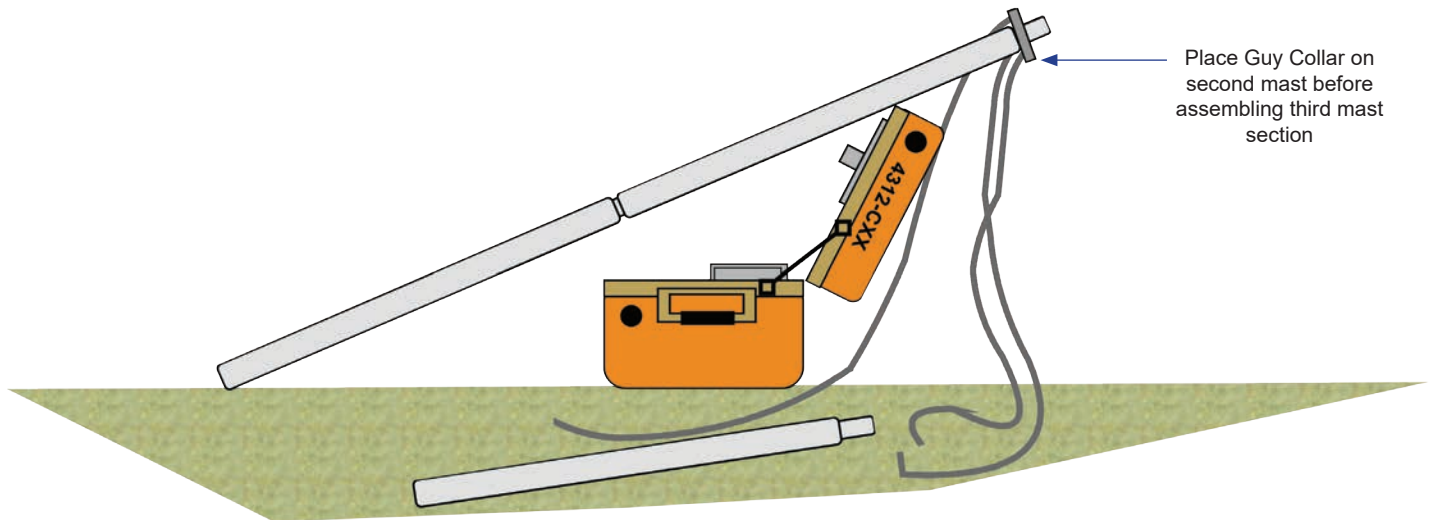


**Figure H**

# ONE MAST LINK ANTENNA INSTALLATION INSTRUCTIONS

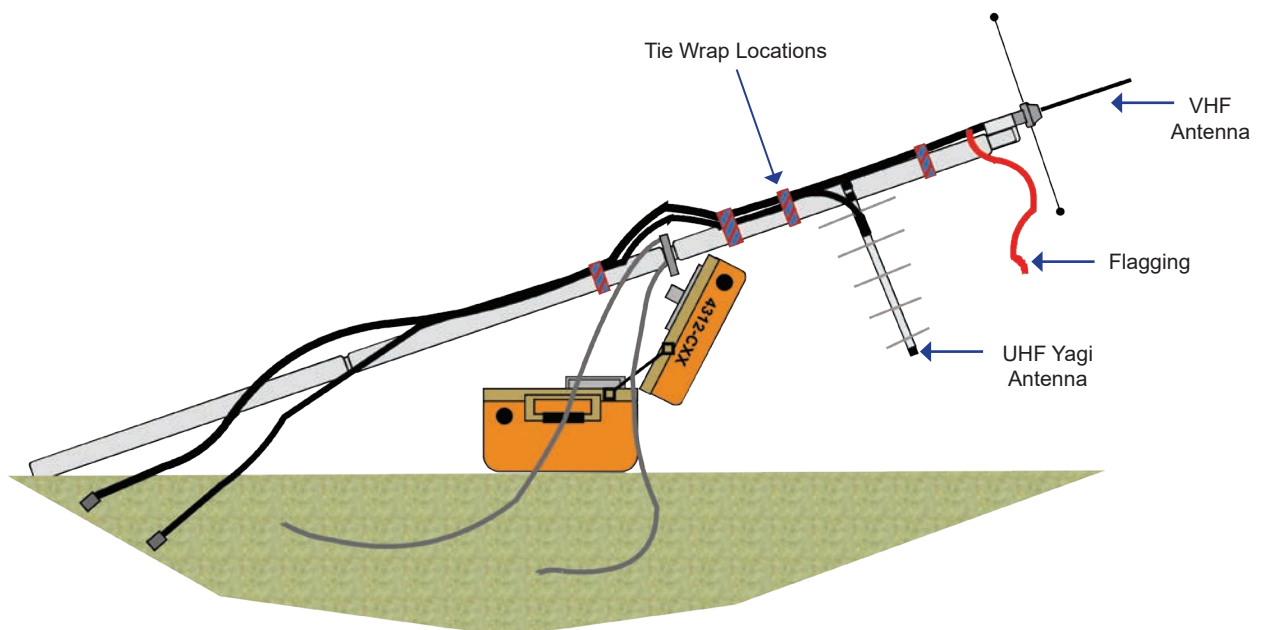
Due to terrain or other limitations, it might be necessary to place both VHF and UHF Yagi antennas on one set of mast.

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)*



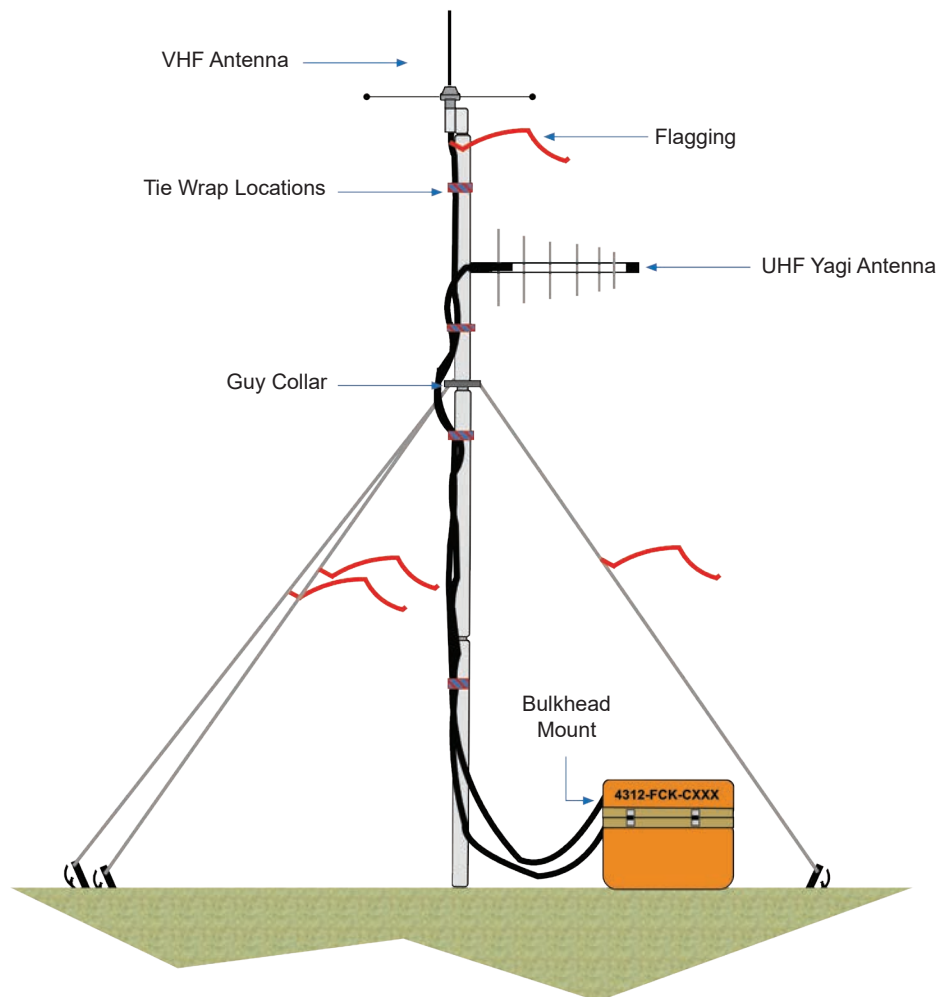
**Figure A**

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. Attach 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. Close the lid and test the system before leaving the site.



**Figure C**

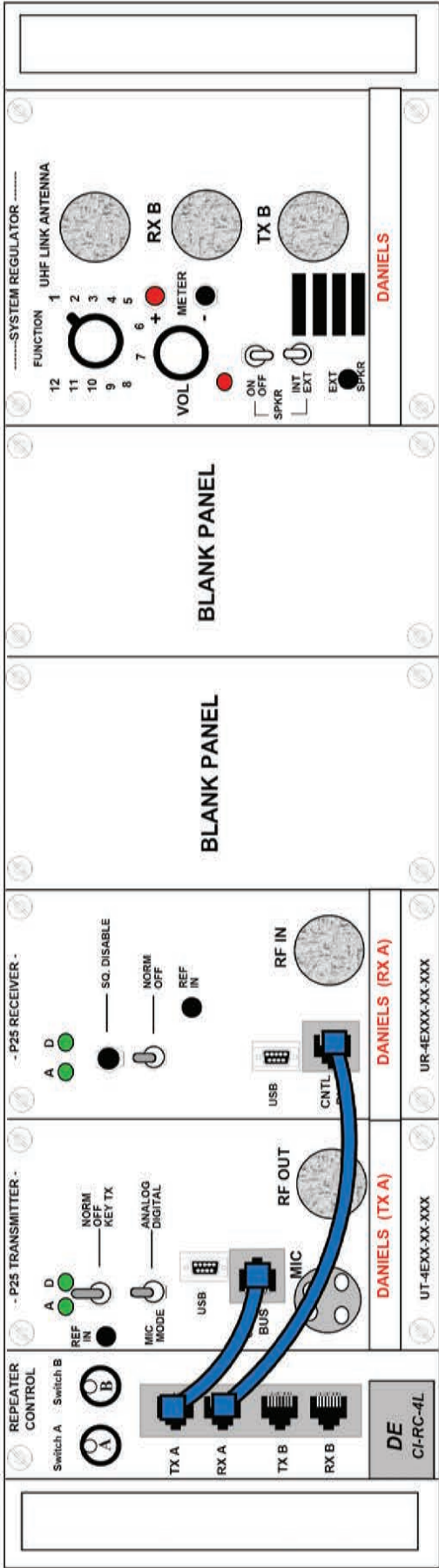
### **NIRSC DANIELS SWITCH SETTINGS**

These diagrams are also available for download online at:

<https://www.nifc.gov/resources/NIICD>

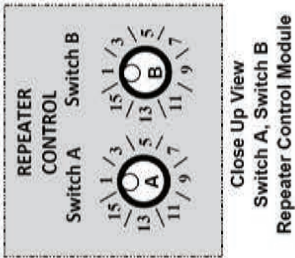


# 4248 - UHF REPEATER SWITCH SETTINGS (E-MODELS ONLY)



- 4248 - UHF REPEATER CONFIGURATION: (E-MODELS ONLY)**
- Set up the UHF Omni-Directional antenna and attach on end of the coaxial cable to the UHF base of the antenna mount. (See *Antenna Instructions in User's Guide for detailed setup*)
  - Attach the other end of the 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.
  - Once power 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:** NIRSC has implemented a RX/TX Fixed Tone of 110.9 on all UHF Frequencies to help minimize possible interference on UHF signals.

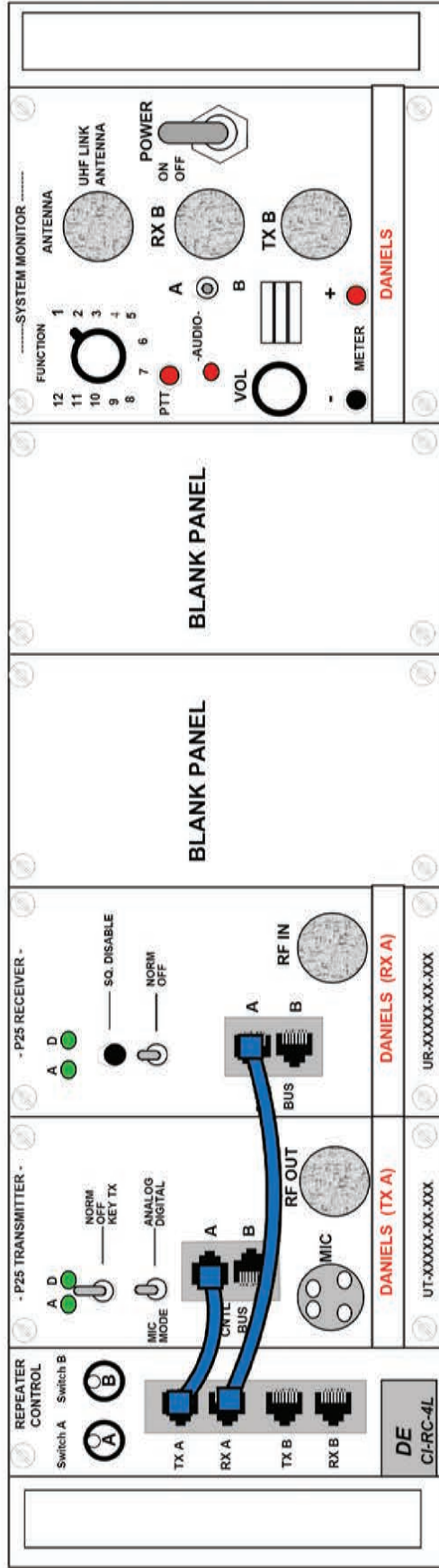


- To Enable Audio to Internal Speaker for Troubleshooting:**
1. Enable the speaker by switching the Speaker switch located on the System Regulator Module, to the "ON" position.
  2. Select the receiver A by turning the Function Switch located on the System Regulator Module to position 3 for RX A Audio.
- Note:** Select "INT" on the System Regulator Module to enable the audio to the internal speaker and "EXT" for the external speaker.

System Regulator Switch Functions (4248 -UHF Repeater) E-Models Only	
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3-12	NIRSC Technician Testing
Revised 2022	



# 4248 - UHF REPEATER SWITCH SETTINGS

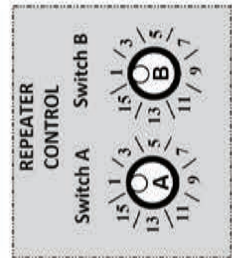


## 4248 - UHF REPEATER CONFIGURATION:

- 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 "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: NIRSC has implemented a RX/TX Fixed Tone of 110.9 on all UHF Frequencies to help minimize possible interference on UHF signals.



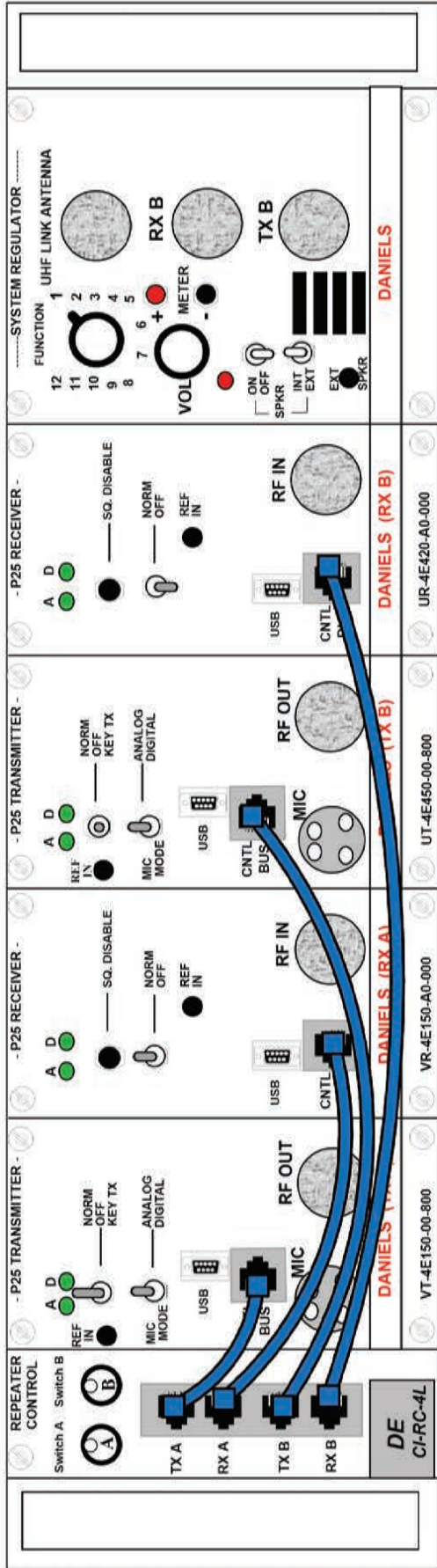
Close-Up View  
Switch A, Switch B  
Repeater Control Module

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 2021	

## 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.

# 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 the 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 power switches on both the TX B and RX B in the "OFF" position. (Stand-alone Repeater Configuration - No Linking)
- Keep the MIC MODE switch on both 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 associated position. (Switch A - VHF Tone Selection) 16-Position Switch, 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)

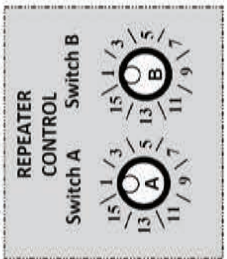
Note: Selecting a tone will enable the tone on both the TX A and RX A modules.

The Communications Duty Officer (CDO) or COMC will assign the appropriate tone for each incident. Contact the CDO for a tone assignment @ 208-387-5644

The Function Switches on the System Monitor Module are only for shop testing and used in conjunction with the meter leads.

Switch A - VHF Tone Table	
Position A1	Tone 1: 110.9
Position A2	Tone 2: 123.0
Position A3	Tone 3: 131.8
Position A4	Tone 4: 136.5
Position A5	Tone 5: 146.2
Position A6	Tone 6: 155.7
Position A7	Tone 7: 167.9
Position A8	Tone 8: 103.5
Position A9	Tone 9: 100.0
Position A10	Tone 10: 107.2
Position A11	Tone 11: 114.8
Position A12	Tone 12: 127.3
Position A13	Tone 13: 141.3
Position A14	Tone 15: 151.4
Position A15	Tone 15: 162.2
Position A16	No Tone

Close Up View  
Switch A, Switch B  
Repeater Control Module



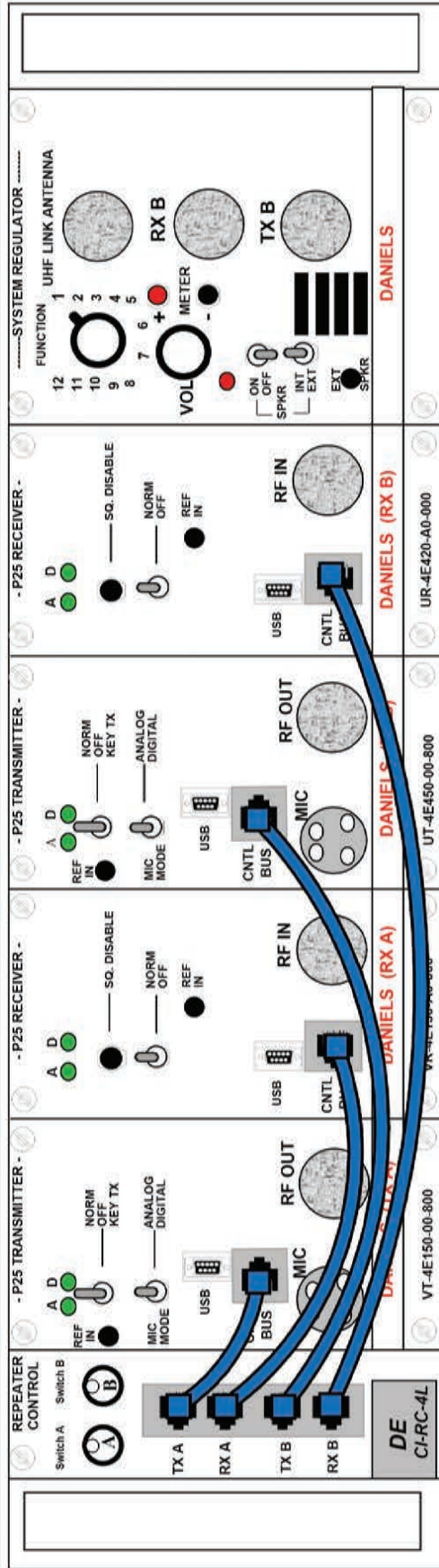
## To Enable Audio to Internal Speaker for Troubleshooting:

1. Enable the speaker by switching the Speaker switch located on the System Regulator Module, to the "ON" position.
2. Select the desired receiver audio, A or B, by turning the Function Switch located on the System Regulator, to position 3 for RX Audio A or position 5 for RX audio B.  
Note: Select "INT" on the System Regulator Module to enable the audio to the internal speaker or "EXT" for the external speaker if connected.

System Regulator Switch Functions (4312-VHF Repeater Configuration) E-Model Only	
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3-12	NIRSC Technician Testing
Revised 2022	



# 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 the User's Guide for more info)
- 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 provided POLARIZED fused cable. Once the power cable is connected, all modules are active. (No master power switch)
- Turn each module "ON" by keeping the switches on the TX A, RX A, TXB, and RXB in the "NORM" position.
- Keep the speaker audio off by switching the Speaker Switch on the System Regulator Module to the "OFF" position.
- Keep the MIC MODE switch on both the TX A and TX B in the ANALOG position.
- Select assigned tone by turning the Switch A knob, located on the top portion of the Repeater Control Module, to associated position. (Switch A - VHF Tone Table)
- Select assigned UHF frequency by turning the Switch B knob, located on the top portion of the Repeater Control Module, to associated position. (Switch B - UHF Link Frequency and Tone Table)
- Note: NIRSC has implemented a fixed RX/TX tone of 110.9 on all UHF frequencies to help minimize interference on incoming UHF signals.
- Test with two VHF and one UHF handheld to verify both the repeater and link are 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 TX A and RX A modules.

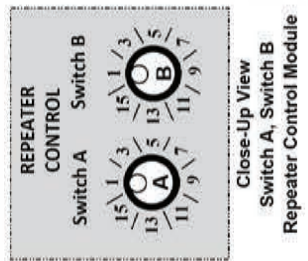
The Communications Duty Officer (CDO) or COMC will assign the appropriate tone and UHF frequency for each incident. Contact the CDO for a tone and UHF frequency assignment @ 208-387-5644

Both Switch A and Switch B is a 16 position rotary switch, with Position 1 being straight up.

The Function Switches on the System Monitor Module are only for shop testing and used in conjunction with the meter leads.

Switch A - VHF Tone Table	
Position A1	Tone 1: 110.9
Position A2	Tone 2: 123.0
Position A3	Tone 3: 131.8
Position A4	Tone 4: 136.5
Position A5	Tone 5: 146.2
Position A6	Tone 6: 156.7
Position A7	Tone 7: 167.9
Position A8	Tone 8: 103.5
Position A9	Tone 9: 100.0
Position A10	Tone 10: 107.2
Position A11	Tone 11: 114.8
Position A12	Tone 12: 127.3
Position A13	Tone 13: 141.3
Position A14	Tone 14: 151.4
Position A15	Tone 15: 162.2
Position A16	No Tone

Switch B - UHF Link Frequency/Tone Table	
Position B1	L1 RPTR Access Tone: 110.9
Position B2	L2 RPTR Access Tone: 110.9
Position B3	L3 RPTR Access Tone: 110.9
Position B4	L4 RPTR Access Tone: 110.9
Position B5	L5 RPTR Access Tone: 110.9
Position B6	L6 RPTR Access Tone: 110.9
Position B7	L7 RPTR Access Tone: 110.9
Position B8	L1 RX Simplex Tone: 110.9
Position B9	L2 RX Simplex Tone: 110.9
Position B10	L3 RX Simplex Tone: 110.9
Position B11	L4 RX Simplex Tone: 110.9
Position B12	L5 RX Simplex Tone: 110.9
Position B13	L6 RX Simplex Tone: 110.9
Position B14	L7 RX Simplex Tone: 110.9
Position B15	Special Use 1 Tone: 110.9
Position B16	Special Use 2 Tone: 110.9

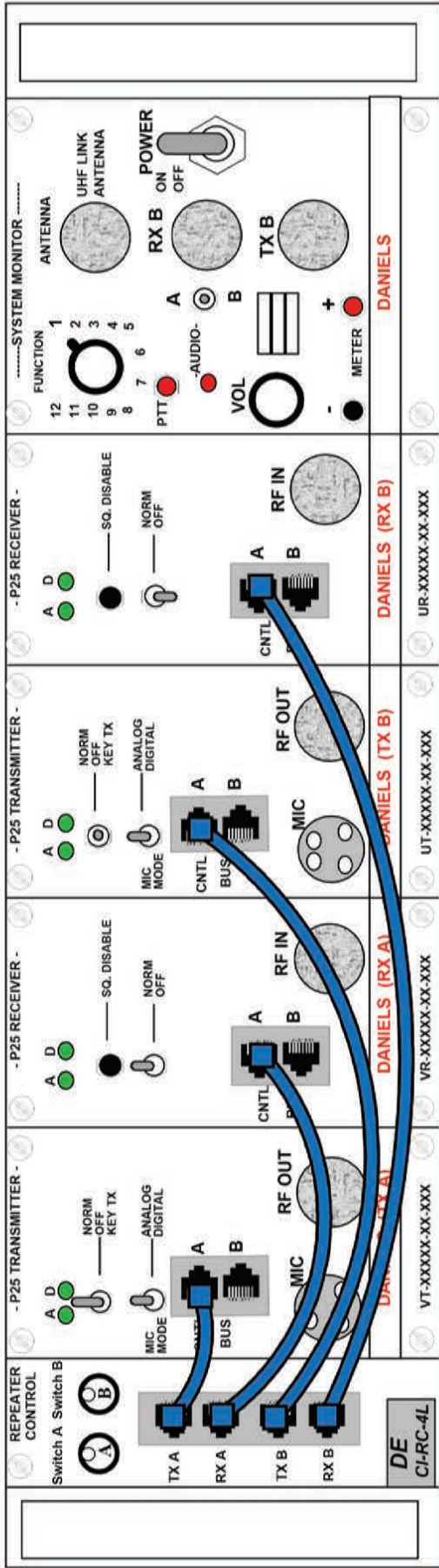


- To Enable Audio to Internal Speaker for Troubleshooting:**
- Enable the speaker by switching the Speaker switch located on the System Regulator Module, to the "ON" position.
  - Select the desired receiver audio, A or B, by turning the Function Switch located on the System Regulator, to position 3 for RX Audio A or position 5 for RX audio B.
- Note: Select "INT" on the System Regulator Module to enable the audio to the internal speaker or "EXT" for external speaker if connected.

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 2022	



# 4312 - VHF REPEATER SWITCH SETTINGS



## 4312 - VHF REPEATER CONFIGURATION:

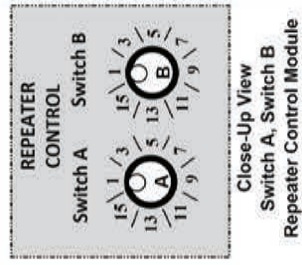
- Set up the VHF Omni-Directional antenna and attach one end of the coaxial cable to the base of the VHF antenna base mount. (See Antenna Instructions in the User's Guide for detailed setup information)
- Attach the other end of the VHF coaxial cable to the appropriate connector on the bulkhead mount located on the back of the fiberglass box.
- Connect the power cable to the batteries using the provided POLARIZED fused cable.
- 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 in the "NORM" position.
- Keep the MIC MODE switch on both TX B and RX B in the "OFF" position. (Stand-alone Repeater Configuration- No Linking)
- Keep the MIC MODE switch on both TX A and RX A in the "ANALOG" position.
- Keep the A/B Audio Select Switch on the System Monitor Module at the center position.
- Select the assigned tone by turning the Switch A knob, located on the top portion of the Repeater Control Module, to the associated position. (Switch A - Tone Selection) 16 Position Switch, 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 @ 208-387-5644

The Function Switches on the System Monitor Module are only for shop testing and used in conjunction with the meter leads.

Switch A - VHF Tone Table	
Position A1	Tone 1: 110.9
Position A2	Tone 2: 123.0
Position A3	Tone 3: 131.8
Position A4	Tone 4: 136.5
Position A5	Tone 5: 146.2
Position A6	Tone 6: 155.7
Position A7	Tone 7: 167.9
Position A8	Tone 8: 103.5
Position A9	Tone 9: 100.0
Position A10	Tone 10: 107.2
Position A11	Tone 11: 114.8
Position A12	Tone 12: 127.3
Position A13	Tone 13: 141.3
Position A14	Tone 14: 151.4
Position A15	Tone 15: 162.2
Position A16	No Tone

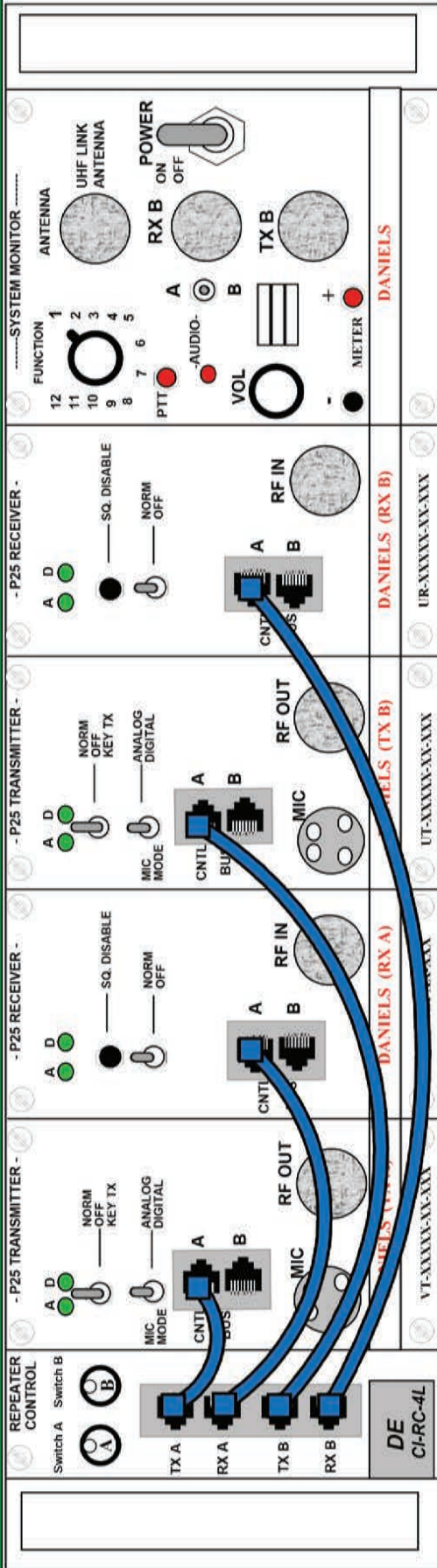


System Monitor Switch Functions (4312-VHF Repeater Configuration)	
2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
1, 4-12	NIRSC Technician Testing
Revised 2022	

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.	



# 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 the User's Guide for more info)*
- Connect the power cable to the batteries using the provided fused POLARIZED cable.
- Turn the Power Switch to the "ON" position on the System Monitor.
- Keep the A/B Audio Select Switch on the System Monitor Module at the center position.
- Keep the MIC MODE switch on both the TX A and RX A, TX B, and RX B in the "NORM" position.
- Select the assigned UHF link frequency by turning the Switch A knob, located on the top portion of the Repeater Control Module, to the associated position. *(Switch A - Tone Table)*
- Select the assigned UHF link frequency by turning the Switch B knob, located on the top portion of the Repeater Control Module, to the associated position. *(Switch B - UHF Link Frequency and Tone Table)*
- Test with two VHF and one UHF handheld to verify the repeater and link are operating correctly. *(NIRSC recommends testing with the field units or ICP if possible before leaving the site)*

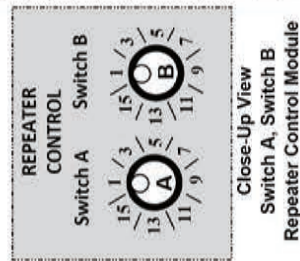
**Note:** NIRSC has implemented a fixed RX/TX Tone of 110.9 on all UHF frequencies to help minimize interference on incoming UHF signals.

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

The Communications Duty Officer (CDO) or COMC will assign the appropriate tone and UHF frequency. Contact the CDO for a tone and UHF frequency assignment @ 208-387-5644

Both Switch A and Switch B are a 16 position rotary switch with position 1 being straight up.

The Function Switches on the System Monitor Module are only for shop testing and used in conjunction with the meter leads.



Switch A - VHF Tone Table	
Position A1	Tone 1: 110.9
Position A2	Tone 2: 123.0
Position A3	Tone 3: 131.8
Position A4	Tone 4: 136.5
Position A5	Tone 5: 146.2
Position A6	Tone 6: 156.7
Position A7	Tone 7: 167.9
Position A8	Tone 8: 103.5
Position A9	Tone 9: 100.0
Position A10	Tone 10: 107.2
Position A11	Tone 11: 114.8
Position A12	Tone 12: 127.3
Position A13	Tone 13: 141.3
Position A14	Tone 14: 151.4
Position A15	Tone 15: 162.2
Position A16	No Tone

Switch B - UHF Link Frequency/Tone Table	
Position B1	L1 RPTR Access Tone: 110.9
Position B2	L2 RPTR Access Tone: 110.9
Position B3	L3 RPTR Access Tone: 110.9
Position B4	L4 RPTR Access Tone: 110.9
Position B5	L5 RPTR Access Tone: 110.9
Position B6	L6 RPTR Access Tone: 110.9
Position B7	L7 RPTR Access Tone: 110.9
Position B8	L1 RX Simplex Tone: 110.9
Position B9	L2 RX Simplex Tone: 110.9
Position B10	L3 RX Simplex Tone: 110.9
Position B11	L4 RX Simplex Tone: 110.9
Position B12	L5 RX Simplex Tone: 110.9
Position B13	L6 RX Simplex Tone: 110.9
Position B14	L7 RX Simplex Tone: 110.9
Position B15	Special Use 1 Tone: 110.9
Position B16	Special Use 2 Tone: 110.9

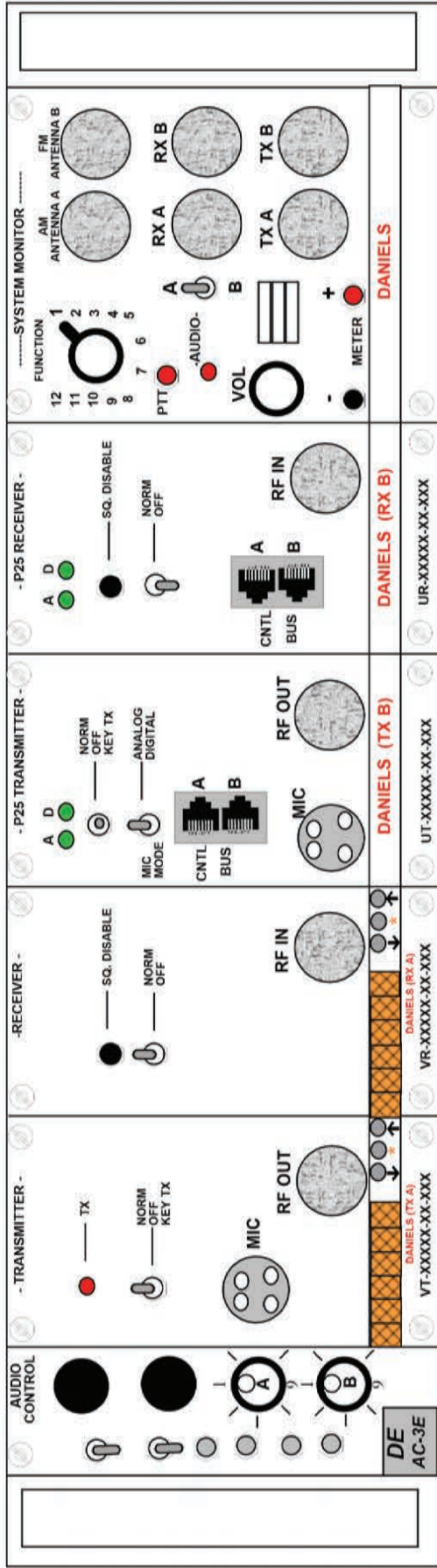
System Monitor Switch Functions (4312 - VHF Repeater/Link Configuration)	
2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
1, 4-12	NIRSC Technician Testing
Revised 2022	

## 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.

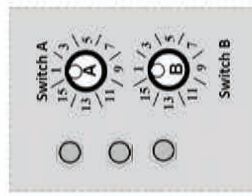


# 4370 - AIRCRAFT RADIO/LINK SWITCH SETTINGS (BASE CONFIGURATION)



## 4370 - AIRCRAFT RADIO/LINK (BASE CONFIGURATION):

- Set up the VHF-AM antenna and attach the coaxial cable to the appropriate AM antenna base mount. (See *Antenna Instructions In the User's Guide for more info*)
- 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. One 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 "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 RX A Audio.
- Place the rotary switch on the System Monitor Module to Position # 1 to activate the External Speaker.
- 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 Channel)
- 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)**
- Note: The CDO or COMC will assign the appropriate AM frequency. Contact the CDO for an assigned AM frequency at 208-387-5644**
- Connect the provided Microphone to the "MIC" jack on the "AM TX A Module"
- Test through the Microphone and AM handheld to verify proper operation. (NIRSC recommends testing with the field units or Heli-Base before leaving the site)



Close-Up View of Switch A and Switch B on the 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.

## Switch A - AM Frequency CH

Position A1	Channel 1
Position A2	Channel 2
Position A3	Channel 3
Position A4	Channel 4
Position A5	Channel 5
Position A6	Channel 6
Position A7	Channel 7
Position A8	Channel 8
Position A9	Channel 9
Position A10	Channel 10
Position A11	Channel 11
Position A12	Channel 12
Position A13	Channel 13
Position A14	Channel 14
Position A15	Channel 15
Position A16	Programmable

## 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.**

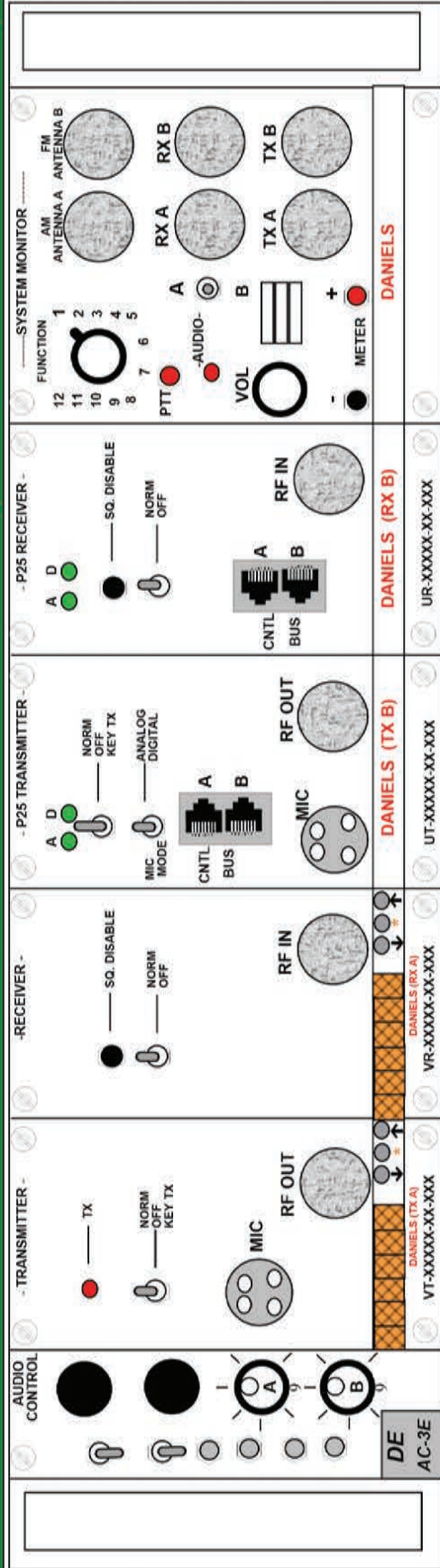
- Turn the rotary Switch A on the Audio Control Module to Channel 16.
- Unlock each unit by momentarily pressing the " " button and, before the "Locked" display goes blank, press the "down" button.
- The display should now show "Unlocked".
- Wait for the display to blank, then press either the "up" or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

## System Monitor Switch Functions (4370 - Aircraft Radio Base Configuration)

1	External Speaker
2	+13.8 V Regulated
3	+9.5 V Regulated
4-12	NIRSC Technician Testing
Revised 2022	

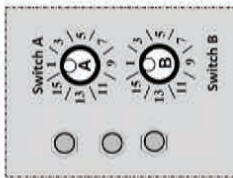


# 4370 - AIRCRAFT RADIO/LINK SWITCH SETTINGS (LINK CONFIGURATION)



## 4370 - AIRCRAFT RADIO/LINK: (LINK CONFIGURATION)

- Set up the VHF-AM antenna and attach to the appropriate antenna base and bulkhead connector located on the back of the fiberglass box. (See Antenna Instructions in the User's Guide for info)
- Set up the UHF antenna and attach 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" 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.
- Select the assigned AM frequency for both TX A and RX A using the 16-position rotary Switch A on the Audio Control Module. (Switch A - AM Frequency Channel)
- 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)
- The CDO or COMC will assign the appropriate AM frequency. Contact the CDO for an assigned AM frequency @ 208-387-5644
- Select the assigned FM UHF link frequency for both the TX B and RX B using the 16-position rotary Switch B on the Audio Control Module. (Switch B - UHF Link Frequency and Tone Table)
- Note: The NIRSC has implemented a fixed RX/TX tone of 110.9 on all UHF frequencies to help minimize interference on incoming UHF signals.
- The Communications Duty Officer (CDO) will assign the FM UHF Link frequency.
- Test with one AM and one UHF radio to verify link is operating correctly. (NIRSC recommends testing with the field units or Heil-Base is possible before leaving the site)



Close-Up View of  
Switch A and 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 (top rotary switch) on the Audio Control Module to Channel 16.
- Unlock each unit by momentarily pressing the "\*" button and, before the "Locked" display goes blank, press the "down" button.
- The display should now show "Unlocked".
- Wait for the display to go blank, then press either the "up" or "down" button to display the current programmed frequency.
- While the display is showing the frequency, press and hold either the "up" or "down" scrolling until the desired frequency is reached.
- Lock each unit by momentarily pressing the "\*" button and before the "Unlocked" display goes blank, press the "up" button.
- The display should now show "Locked"
- The Aircraft radio is now ready to operate on that AM programmed frequency.

Switch A - AM Frequency CH	
Position A1	Channel 1
Position A2	Channel 2
Position A3	Channel 3
Position A4	Channel 4
Position A5	Channel 5
Position A6	Channel 6
Position A7	Channel 7
Position A8	Channel 8
Position A9	Channel 9
Position A10	Channel 10
Position A11	Channel 11
Position A12	Channel 12
Position A13	Channel 13
Position A14	Channel 14
Position A15	Channel 15
Position A16	Programmable

Switch B - UHF Frequency/Tone Table	
Position B1	A/C 1 Simplex Tone 1: 110.9
Position B2	A/C 2 Simplex Tone 1: 110.9
Position B3	A/C 3 Simplex Tone 1: 110.9
Position B4	A/C 4 Simplex Tone 1: 110.9
Position B5	A/C 5 Simplex Tone 1: 110.9
Position B6	A/C 6 Simplex Tone 1: 110.9
Position B7	A/C 7 Simplex Tone 1: 110.9
Position B8	A/C 8 Simplex Tone 1: 110.9
Position B9	A/C 9 (L8 RPT) Tone 1: 110.9
Position B10	A/C 10 (L8 RPT) Tone 1: 110.9
Position B11	A/C 11 (L9 RPT) Tone 1: 110.9
Position B12	A/C 12 (L9 RPT) Tone 1: 110.9
Position B13	A/C 13 (L10 RPT) Tone 1: 110.9
Position B14	A/C 14 (L10 RPT) Tone 1: 110.9
Position B15	A/C 15 (L11 RPT) Tone 1: 110.9
Position B16	A/C 16 (L11 RPT) Tone 1: 110.9

## 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	+9.5 V Regulated
3-12	NIRSC Technician Testing
Revised 2022	



## 4370 - AIRCRAFT RADIO/LINK SWITCH SETTINGS (E-MODEL BASE CONFIGURATION)



- 

### Close-Up View of Switch A and Switch B on the Audio Control Module

- **Enable the speaker** by switching the speaker switch located on the **System Regulator**, to the **"ON"** position.
- **Enable the RX A Audio** by selecting **position 3** on the Function Switch located on the **System Regulator** for **RX A Audio**.
- **Enable the Internal or External Speaker** by switching the SPKR switch to the **"INT"** or **"EXT"** position.

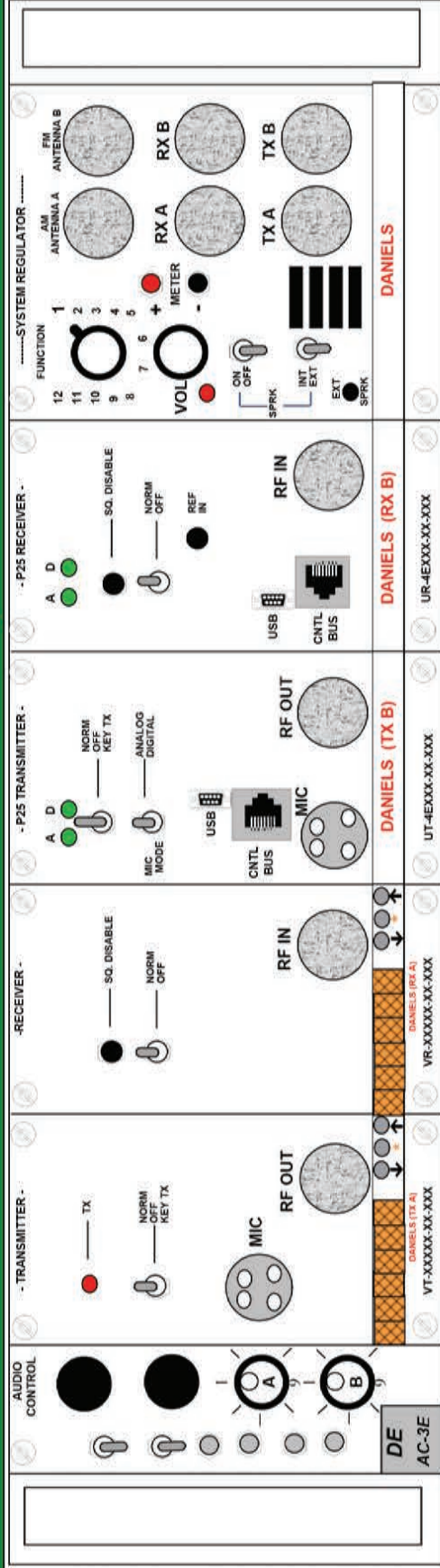
Switch A - All Frequency CH	
Position A1	Channel 1
Position A2	Channel 2
Position A3	Channel 3
Position A4	Channel 4
Position A5	Channel 5
Position A6	Channel 6
Position A7	Channel 7
Position A8	Channel 8
Position A9	Channel 9
Position A10	Channel 10
Position A11	Channel 11
Position A12	Channel 12
Position A13	Channel 13
Position A14	Channel 14
Position A15	Channel 15
Position A16	Programmable

**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.

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

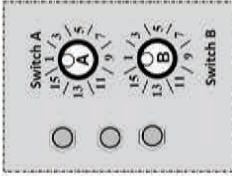


# 4370 - AIRCRAFT RADIO/LINK SWITCH SETTINGS (E-MODEL LINK CONFIGURATION)



## 4370 - AIRCRAFT RADIO/LINK IN LINK CONFIGURATION: (E-MODELS ONLY)

- Set up the VHF-AM antenna and attach to the appropriate antenna base and bulkhead connector located on the back of the fiberglass box. (See Antenna Instructions in the User's Guide for info)
- Set up the UHF antenna and attach 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" 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 Speaker Select Switch on the System Regulator Module to the "OFF" position.
- Select the assigned AM frequency for both TX A and RX A using the 16-position rotary Switch A on the Audio Control Module. (Switch A - AM Frequency Channel)
- Note: If the AM frequency is not listed, the user must program the AM frequency in Channel A-16 on both the "TX A" and "RX A". (See Manual AM Frequency Programming)
- The CDO or COMC will assign the appropriate AM Frequency. Contact the CDO for an assigned AM frequency @ 208-387-5644
- Select the assigned FM UHF link frequency for both the TX B and RX B using the 16-position rotary Switch B on the Audio Control Module. (Switch B - UHF Link Frequency and Tone Table)
- Note: The NIRSC has implemented a fixed RX/TX tone of 110.9 on all UHF frequencies to help minimize interference on incoming UHF signals.
- The Communications Duty Officer (CDO) will assign the FM UHF Link frequency.
- Test with one AM and one UHF radio to verify link is operating correctly. (NIRSC recommends testing with the field units or Heli-Base is possible before leaving the site)



Close-Up View of  
Switch A and Switch B  
Audio Control Module

## Enabling Internal Speaker for Troubleshooting

- Enable the speaker by switching the speaker switch located on the System Regulator, to the "ON" position.
- Enable the RX Audio by selecting position 3 on the Function Switch located on the System Regulator for RX A Audio. Use position 5 for RX B Audio.
- Enable the Internal or External Speaker by switching the SPKR switch to the "INT" or "EXT" position.

## System Regulator Switch Functions (4370 - Aircraft Radio Link Configuration)

1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3	RX A Audio
5	RX B Audio
Revised 2022	

## Switch A - AM Frequency CH

Position A1	Channel 1
Position A2	Channel 2
Position A3	Channel 3
Position A4	Channel 4
Position A5	Channel 5
Position A6	Channel 6
Position A7	Channel 7
Position A8	Channel 8
Position A9	Channel 9
Position A10	Channel 10
Position A11	Channel 11
Position A12	Channel 12
Position A13	Channel 13
Position A14	Channel 14
Position A15	Channel 15
Position A16	Programmable

## Switch B - UHF Frequency and TX/RX Tone Table

Position B1	A/C 1 Simplex	Tone 1: 110.9
Position B2	A/C 2 Simplex	Tone 1: 110.9
Position B3	A/C 3 Simplex	Tone 1: 110.9
Position B4	A/C 4 Simplex	Tone 1: 110.9
Position B5	A/C 5 Simplex	Tone 1: 110.9
Position B6	A/C 6 Simplex	Tone 1: 110.9
Position B7	A/C 7 Simplex	Tone 1: 110.9
Position B8	A/C 8 Simplex	Tone 1: 110.9
Position B9	A/C 9 (L8 Simp)	Tone 1: 110.9
Position B10	A/C 10 (L8 RPT)	Tone 1: 110.9
Position B11	A/C 11 (L9 Simp)	Tone 1: 110.9
Position B12	A/C 12 (L9 RPT)	Tone 1: 110.9
Position B13	A/C 13 (L10 Simp)	Tone 1: 110.9
Position B14	A/C 14 (L10 RPT)	Tone 1: 110.9
Position B15	A/C 15 (L11 Simp)	Tone 1: 110.9
Position B16	A/C 16 (L11 RPT)	Tone 1: 110.9

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

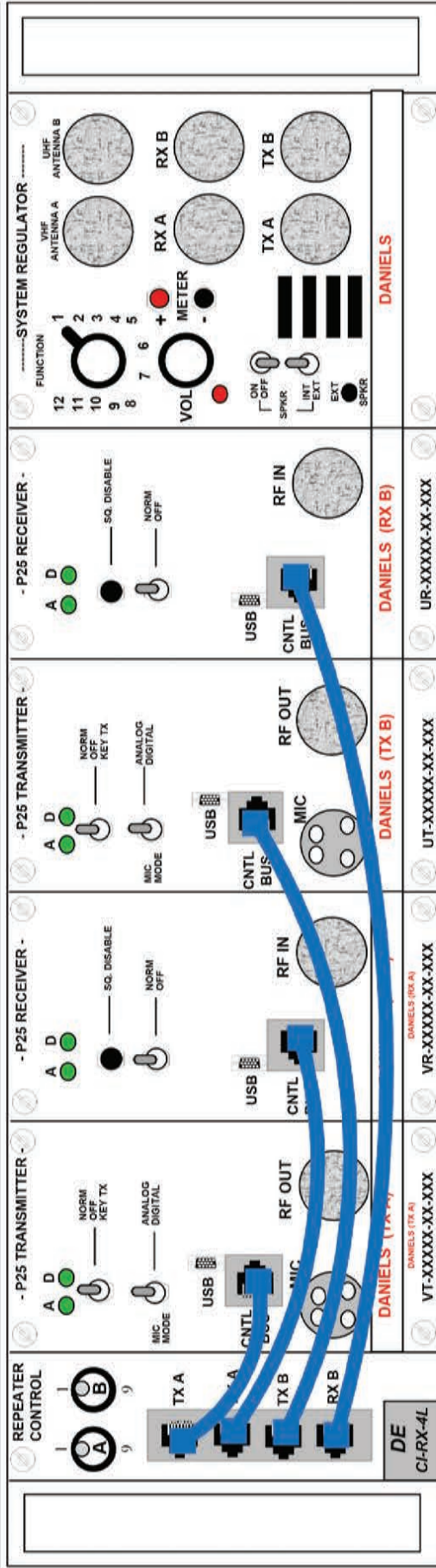
Note: Both the AM transmitter and AM receiver modules must be individually programmed.

The Communications Duty Officer (CDO) will assign the appropriate FAA-issued AM Frequency.

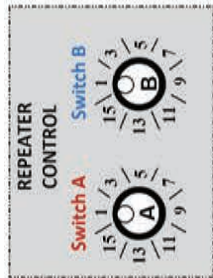
- Turn the rotary Switch A (top rotary switch) on the Audio Control Module to Channel 16.
- Unlock each unit by momentarily pressing the "\*" button and, before the "Locked" display goes blank, press the "down" button.
- The display should now show "Unlocked".
- Wait for the display to go blank, then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



# 4281 - CROSSBAND LINK SWITCH SETTINGS



- 4281 Crossband Link: (Link Configuration)**
- 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 the User's Guide for more info)
  - 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 the power cable is connected, all modules are active. (No master power switch)
  - Turn each module "ON" by keeping the power switches on the TX A, RX A, TX B, and RX B in the "NORM" position.
  - Keep both Mic Mode on 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 VHF frequency/tone for both the TX A and RX A modules using the 16-position rotary Switch A on the Repeater Control Module. (Switch A, VHF Frequency Select)
  - Select the assigned UHF frequency/tone for both the TX B and RX B modules using the 16-position rotary Switch B on the Repeater Control Module. (Switch B, UHF Frequency Select)
  - Note: NIRSC has implemented a fixed RX/TX tone of 110.9 on all UHF frequencies to help minimize interference on incoming UHF signals.
  - Test with the appropriate handhelds to verify the link is operating correctly. (NIRSC recommends testing with the field units or ICP if possible before leaving the site)
  - Note: The Communications Duty Officer (CDO) will assign both the VHF and UHF frequencies or tone based on the incident system design and available frequencies.
  - Contact the CDO or COMC before placing an order to NIRSC @ 208-387-5644.



Close-Up View of Switch A and Switch B on the Repeater Control Module

Switch A - VHF Frequency List	
Position A1	C1 RPTR
Position A2	C2 RPTR
Position A3	C3 RPTR
Position A4	C4 RPTR
Position A5	C5 RPTR
Position A6	C6 RPTR
Position A7	C1 RPTR
Position A8	C1 RX Simplex
Position A9	C2 RX Simplex
Position A10	C3 RX Simplex
Position A11	C4 RX Simplex
Position A12	C5 RX Simplex
Position A13	C6 RX Simplex
Position A14	C1 RX Simplex
Position A15	Special Use
Position A16	Special Use

Switch B - UHF Frequency List	
Position B1	L1 RPTR
Position B2	L2 RPTR
Position B3	L3 RPTR
Position B4	L4 RPTR
Position B5	L5 RPTR
Position B6	L6 RPTR
Position B7	L7 RPTR
Position B8	L1 RX Simplex
Position B9	L2 RX Simplex
Position B10	L3 RX Simplex
Position B11	L4 RX Simplex
Position B12	L5 RX Simplex
Position B13	L6 RX Simplex
Position B14	L7 RX Simplex
Position B15	Special Use
Position B16	Special Use

## To Enable Audio to Internal Speaker for Troubleshooting:

- Enable the speaker by switching the Speaker switch located on the System Regulator Module, to the "ON" position.
- Select the desired receiver audio, A or B, by turning the Function Switch located on the System Regulator, to position 3 for RX Audio A or position 5 for RX audio B.  
Note: Select "INT" on the System Regulator Module to enable the audio to the internal speaker or "EXT" for the external speaker

System Regulator Switch Functions (4281 - Crossband Link VHF to UHF)	
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3-12	NIRSC Technician Testing
Revised 2022	

### NIRSC RADIO PROGRAMMING GUIDES

These diagrams are also available for download online at:

<https://www.nifc.gov/resources/NIICD>

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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 "r 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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## RELM BKR 5000

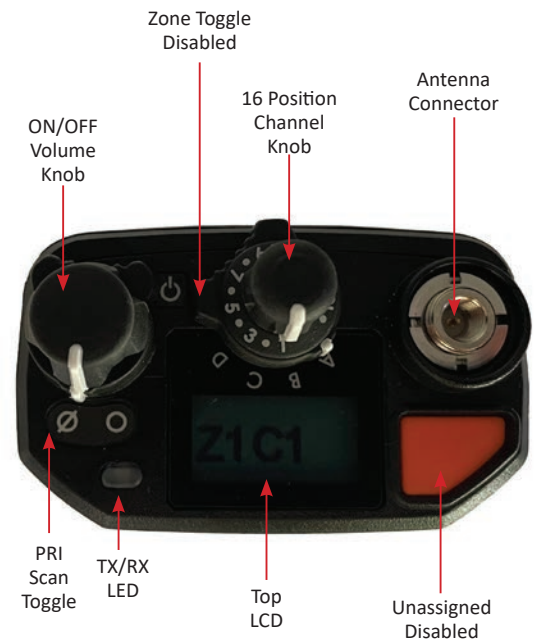


# BKR 5000 PORTABLE RADIO BASIC OPERATIONS & CONTROLS

1. Turn the power **ON** by turning the “**VOL**” Knob clockwise.  
The LCD will indicate the current Zone and Channel label after the main boot up process.
2. Select a zone number by pressing the “**ZONE**” softkey. Enter the zone number via the key pad and press the “**ENT**” softkey.  
**OR**  
Press the “**ZONE**” softkey. 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 Toggle/Squelch**” button to open the squelch and set the volume to desired level.  
Press the “**Monitor Toggle/Squelch**” button once more to close Squelch and return to normal operation.

**The radio is now ready to operate on the current 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, 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.*
8. Release the **PTT** to stop transmitting and receive incoming transmission





# BKR 5000 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 softkeys to the desired zone and press the “ENT” softkey. (See Figure 1 & 2)

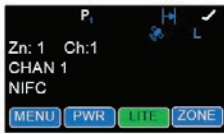


Figure 1

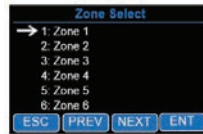


Figure 2

## ENABLING/DISABLING SCAN:

To Enable Scan - Press the “Scan ON/OFF Toggle” button on the side of the radio.

- The display will indicate the radio is in Scan Mode by displaying a flashing “” icon on the LCD. (See Figure 3)

To Disable Scan - Press the “Scan ON/OFF Toggle” button on the side of the radio.




Figure 3

## ENABLING/DISABLING PRIORITY SCAN:

To Enable Priority Scan - Toggle the “PRI SCAN Toggle” switch to the “” on the top of the radio.

- The display will indicate the radio is in Priority Scan Mode by displaying a flashing “P1” icon on the LCD.

To Disable Priority Scan - Toggle the “PRI SCAN Toggle” switch to the “” on the top of the radio.

Note: A priority channel must be set up first before Pri Scan is Enabled. (See Figure 3)

## ADD/REMOVE CHANNEL FROM SCAN LIST:

To Add a Channel - Press the “MENU” softkey, scroll down to “Chan Scan List” using the PREV/NEXT softkeys and press the “ENT” softkey. (See Figure 4)

Select the channel to scan using the PREV/NEXT 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. (See Figure 5)

Note: An “✓” in the upper LCD on that selected channel indicates the Channel is in the Scan List. (See Figure 6)

Press the “ESC” softkey twice to return to normal operation.

To Remove a Channel - Repeat the process and remove the “✓” from the selected channel.

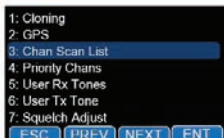


Figure 4

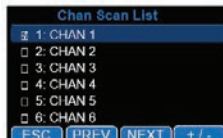


Figure 5



Figure 6

## TX POWER SELECTION:

Power Selection - Press the “PWR” toggle softkey to enable between low and high power setting.

- LCD will indicate Low Power with a “L” and High Power with a “H” on the LCD. (See Figure 7 and 8)

Note: LCD will momentarily display “Tx Power Low” and “Tx Power High” when toggling between low and high power.

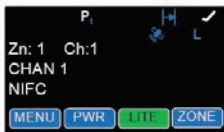


Figure 7



Figure 8

## KEYPAD LOCKING:

Open the Control Lock Menu by pressing the number 2 side programmable button.

Select either “Unlocked”, “Lock Keypad Only” or “Lock All Controls”. (See Figure 9)

Unlocked: Unlocks the keypad, buttons and switches.

Lock Keypad Only: Locks only front panel keypad operations.

Lock All Controls: Locks all buttons and switches as determined by radio programming.

Note: NIRSC does not lock all buttons and switches with “Lock All Controls”, it will only lock keypad and top collar switch.



Figure 9

# BKR 5000 PORTABLE RADIO ANALOG PROGRAMMING GUIDE

1. Turn on the radio.

2. Access the Program Mode (See Figures 1, 2 and 3)

- Press the “Menu” softkey.
- 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 default password is set to “000000”*
- Scroll down using the “PREV/NEXT” softkeys to highlight “Keypad” and press the “ENT” softkey.
- Scroll down using the “PREV/NEXT” softkeys to highlight “Channel” and press the “ENT” softkey.
- Scroll down using the “PREV/NEXT” softkeys to highlight “Edit Channel” and press the “ENT” softkey.

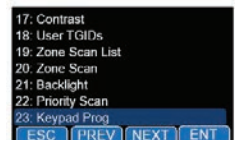


Figure 1

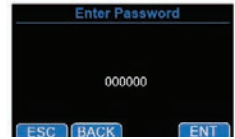


Figure 2

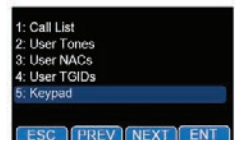


Figure 3

3. Once in Program Mode, using the “PREV/NEXT” softkeys highlight the desired **Zone** to program and press “ENT”.

4. Using the “PREV/NEXT” softkeys highlight the desired **Channel** to program and the press the “ENT” softkey.

5. Scroll to the desired **Channel** using the “PREV/NEXT” softkeys and press “ENT”.

## Individual Channel Settings:

- 1: Channel Label** - Allows user to change the Alphanumeric label of currently selected channel.
- 2: Rx Frequency** - Allows user to change the Receive Frequency of currently selected channel.
- 3: Rx Mode** - Allows user to change the Receive Mode of currently selected channel.
- 4: Rx Guard** - Allows user to change the Receive Tone or NAC of currently selected channel.
- 5: Bandwidth** - Allows user to change the Bandwidth of the currently selected channel.
- 6: Tx Power** - Allows the user to change the Transmit Power settings of currently selected channel.
- 7: Tx Frequency** - Allows the user to change the Transmit Frequency of currently selected channel.
- 8: Tx Mode** - Allows the user to change the Transmit Mode of the currently selected channel.
- 9: Tx Guard** - Allows the user to change the Transmit Tone or NAC of currently selected channel.
- 10: DTMF Live Dial** - Allows the user to use Dual Tone Multi Frequency signaling via the radio keypad.

6. Highlight “RX Frequency” and press “ENT”, press “EDIT” or “CLR” and enter a **valid RX Frequency** and press “ENT” to save new frequency.  
*Note: Receive Frequencies must be divisible by 1.25kHz.*

7. Highlight “Rx Mode” and press “ENT”, highlight “Analog” and press “ENT”.

*Note: “Digital” and “Mixed” are Digital functions and are not used while programming an Analog Channel.*

8. Highlight “Rx Guard” and press “ENT”, highlight “OFF” or “Tone” and press “ENT”.

- For Analog CTCSS Tones select “Tone” and press “ENT”, then press “EDIT” or “CLR” and enter a **valid RX Tone** and press “ENT” to save new RX tone.

*Note: “Digital” and “Select” are Digital functions and are not used while programming an Analog Channel.*

9. Highlight “Bandwidth” and press “ENT”, highlight “Narrowband” and press the “ENT” softkey.

*Note: Narrowband is 12.5kHz spacing when operating in analog.*

10. Highlight “Tx Power” and press “ENT”, highlight “Selectable Low” and press “ENT”.

*Note: “Selectable” Allows high/low transmit power selection form assigned button, switch or menu item.*

*Low Power is set to 2 Watts*

*High Power is set to 4 Watts*

11. Highlight “TX Frequency” and press “ENT”, press “EDIT” or “CLR” and enter a **valid TX Frequency** and press “ENT” to save new frequency.

*Note: Transmit Frequencies must be divisible by 1.25kHz.*

12. Highlight “Tx Mode” and press “ENT” highlight “Analog” and press “ENT”.

*Note: “Digital” and “Selectable” are Digital functions and are not used while programming an Analog Channel.*

13. Highlight “TX Guard” and press “ENT”, highlight “OFF”, “Tone”, “Digital” or “Select” and press “ENT”.

- For Analog CTCSS Tones select “Tone” and press “ENT”, then press “EDIT” or “CLR” and enter a **valid TX Tone** and press “ENT” to save new TX tone.

*Note: “Digital” and “Select” are Digital functions and are not used while programming an Analog Channel.*

14. Highlight “DTMF Live Dial” and press “ENT”, highlight “On” and press “ENT”.

*Note: Selecting “ON” will enable keypad keys to send out DTMF while pressed during transmit.*

15. Press “ESC” once and select another channel to program and repeat steps 5 through 14, or press “ESC” several times to exit the programming mode and return to the main operating screen.

# BKR 5000 PORTABLE RADIO CLONING GUIDE

1. Assure that both radios are off and attach the cloning cable to both the **Master** and **Target** radios. (See Figure 1)
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. Set each radio to determined group.*
3. Place the **Master** radio in Cloning Mode by pressing the “Menu” softkey, highlight “Cloning” and press “ENT”.  
(See Figure 2)  
**Cloning Options:**
  - **Clone Active Zone**- Master radio clones over the selected group information.
  - **Clone Picklists** - Master radio clones over the selected Tone Pick List.
  - **Enter Dest Clone** - Reserved for Target Radio operation.
4. Place the **Target** radio in Cloning Mode by pressing the “Menu” softkey, highlight “Cloning” and press “ENT”.  
(See Figure 4)  
*Note: Radios programmed with blocked zones will not receive cloning information. The Target radio will assume the Master radio channel structure when cloned.*
5. On the Target Radio Highlight “Enter Dest Clone” and press the “ENT” softkey. (See Figure 3)
  - LCD will display “Destination Clone Mode Waiting” on the Target radio. (See Figure 5)
6. On the Master Radio Highlight “Clone Active Zone” and the press the “ENT” softkey. (See Figure 3)
  - LCD will display “Cloning in Progress” on the Master radio. (See Figure 6)
  - LCD will change to “Destination Clone Start” on the Target radio. (See Figure 7)
7. Once the cloning is successfully complete, the **master** radio will momentarily display “Source Clone Complete” and return to the main cloning display. (See Figure 8 and Figure 3)  
Once the cloning is successfully complete the **target** radio will restart and boot up on the selected zone and channel.  
*Note: If cloned failed, the Master Radio will momentarily “Source Clone Error” or “Destination Clone Locked” its possible that the Target zone is blocked from accepting any incoming clone. (See Figure 9)*  
*Possible cloning fail causes are, Zone Programmed to block clone, Target radio not on, Cloning Cable unplugged or not connected correctly or Incompatible Radio.*
8. After the clone is complete, disconnect the cloning cable from the target radio and connect a new target radio to clone. Repeat the steps to clone to another target radio.
9. After all clones are complete, remove the cloning cable on both radios press the “ESC” key twice on the **Master** radio to exit out of the programming menu and return to normal operation. (See Figure 10)



Figure 1: BKR 5000 Cloning Connections

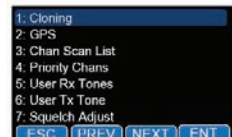


Figure 2

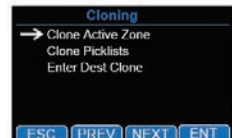


Figure 3

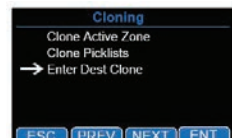


Figure 4



Figure 5

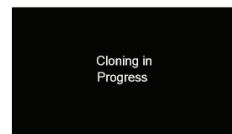


Figure 6



Figure 7

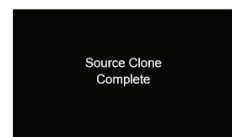


Figure 8

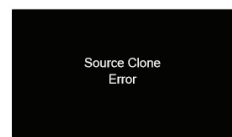


Figure 9

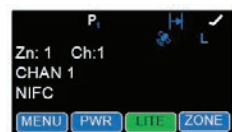


Figure 10

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## RELM DPH/DPHx



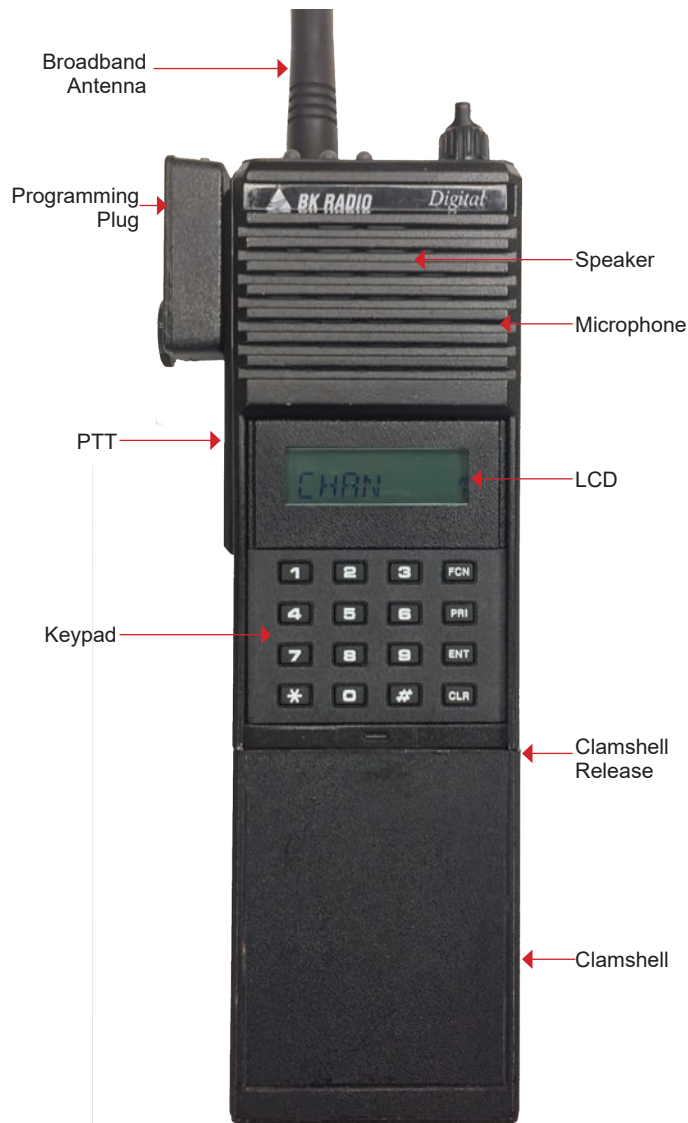


# DPH/DPHx PORTABLE RADIO BASIC OPERATION & CONTROLS

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.



**DPHx Front View**



**DPHx Top View**

# 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)

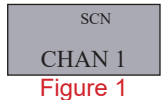


Figure 1

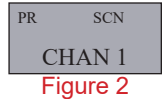


Figure 2

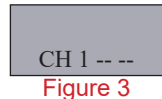


Figure 3

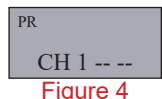


Figure 4

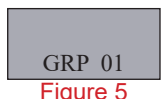


Figure 5



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)*

PRG  
-- -- -- ID

Figure 1

PRG  
CH 00

Figure 2

PRG  
PROG

Figure 3

PRG  
FAIL

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

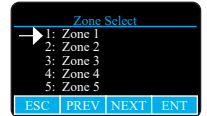


Figure 2

## 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 "-".

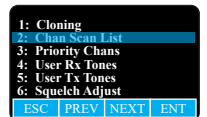


Figure 4

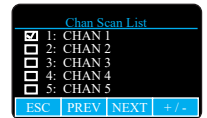


Figure 5

## 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

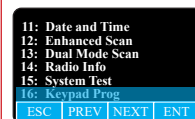


Figure 2

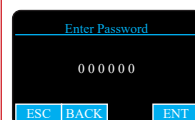


Figure 3

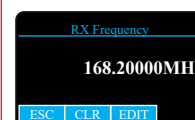


Figure 4

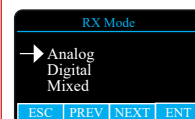


Figure 5

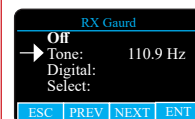


Figure 6



Figure 7

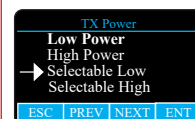


Figure 8

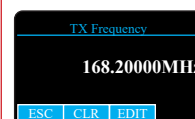


Figure 9

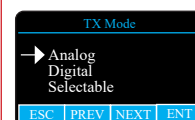


Figure 10

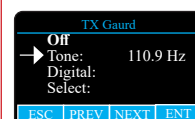


Figure 11

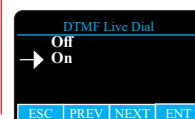


Figure 12



# 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.

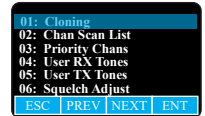


Figure 2

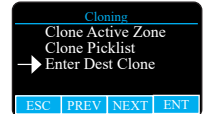


Figure 3

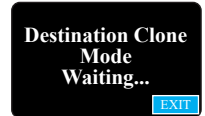


Figure 4

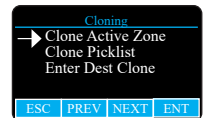


Figure 5

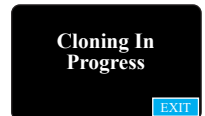


Figure 6

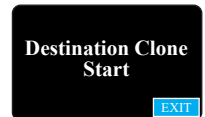


Figure 7



**Figure 1**  
**KNG2 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)

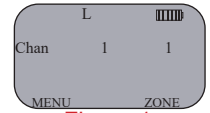


Figure 1

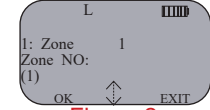


Figure 2

## 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.*

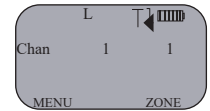


Figure 3

## 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.

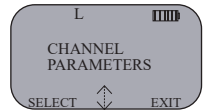


Figure 4

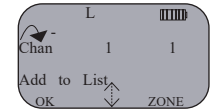


Figure 5

**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.*

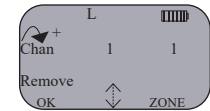


Figure 6

## 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)*

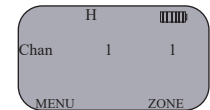


Figure 7

## 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).*

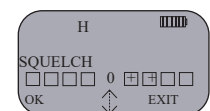


Figure 8

# 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.

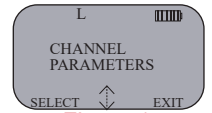


Figure 1

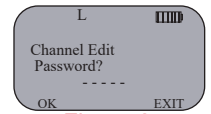


Figure 2

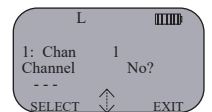


Figure 3

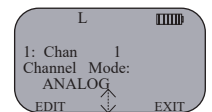


Figure 4

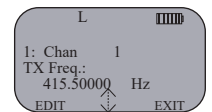


Figure 5

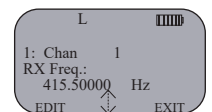


Figure 6

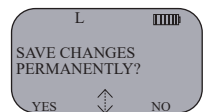


Figure 7



# 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**)

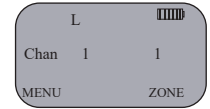


Figure 1

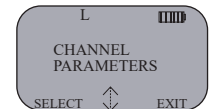


Figure 2

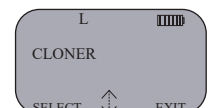


Figure 3

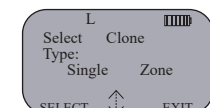


Figure 4

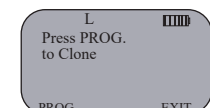


Figure 5

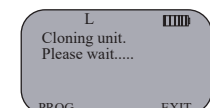


Figure 6

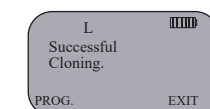


Figure 7



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**



**XTS 2500 Top View**



**XTS 2500 Side 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

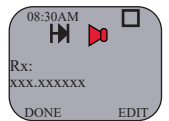


Figure 6

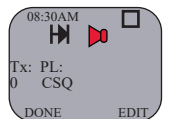


Figure 7

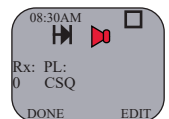


Figure 8

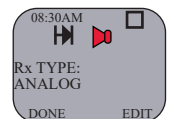


Figure 9

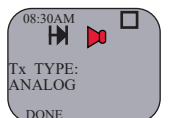


Figure 10

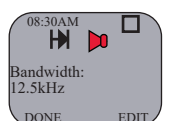


Figure 11

# 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

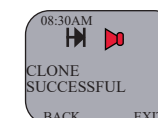


Figure 6



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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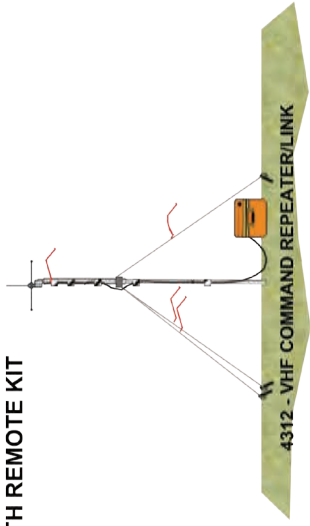
### NIICD RADIO SYSTEM DIAGRAMS

These diagrams are also available for download online at:

<https://www.nifc.gov/resources/NIICD>

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ONE VHF COMMAND REPEATER STAND-ALONE WITH REMOTE KIT



RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

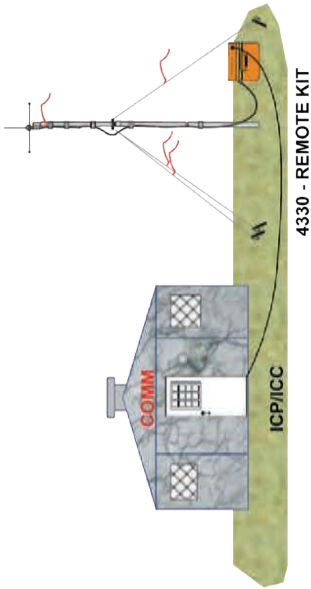
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_

KIT #: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_

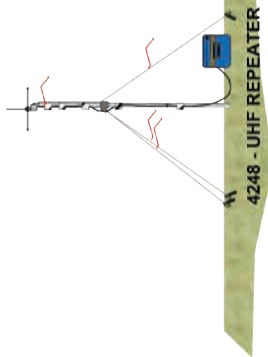
LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_

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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: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_

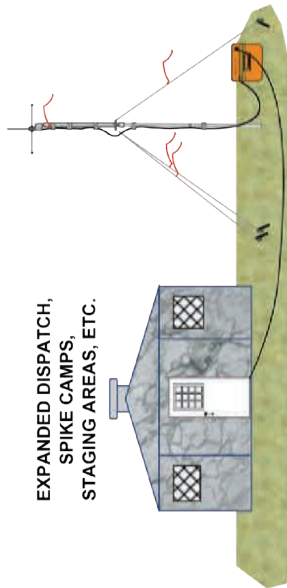
LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



EXPANDED DISPATCH,  
SPIKE CAMPS,  
STAGING AREAS, ETC.



4330 - REMOTE KIT

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_

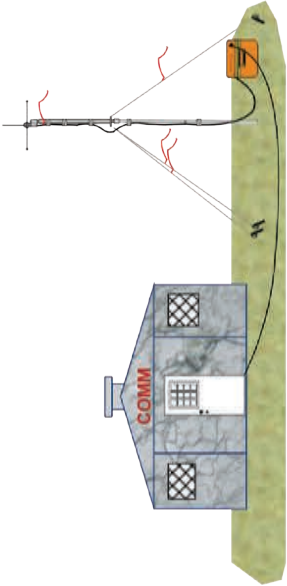
KIT #: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



ICP/ICC

4330 - REMOTE KIT

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_

KIT #: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

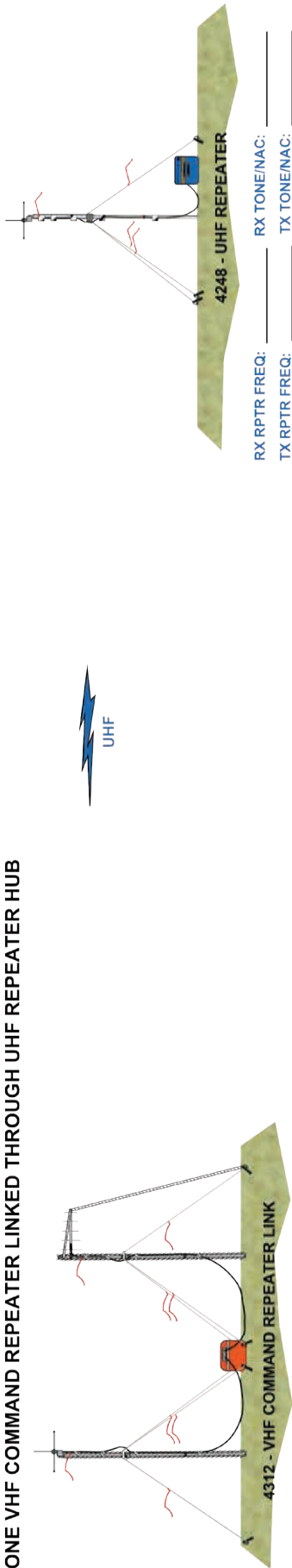
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



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ONE VHF COMMAND REPEATER LINKED THROUGH UHF REPEATER HUB



RX RPTR FREQ: \_\_\_\_\_

RX TONE/NAC: \_\_\_\_\_

TX RPTR FREQ: \_\_\_\_\_

TX TONE/NAC: \_\_\_\_\_

SWITCH A TONE: \_\_\_\_\_

KIT#: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_

REMARKS: \_\_\_\_\_

RX LINK FREQ: \_\_\_\_\_

RX TON/NAC: \_\_\_\_\_

TX LINK FREQ: \_\_\_\_\_

TX TONE/NAC: \_\_\_\_\_

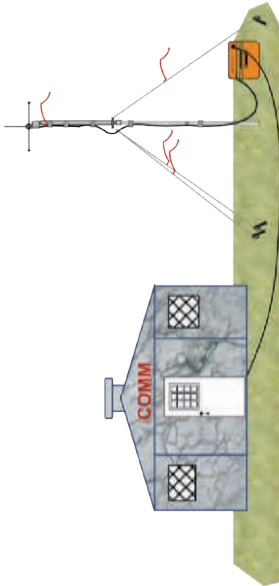
SWITCH B CH: \_\_\_\_\_

RPTR ID: \_\_\_\_\_

SLA KIT: \_\_\_\_\_

LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



RX FREQ: \_\_\_\_\_

RX TONE/NAC: \_\_\_\_\_

TX FREQ: \_\_\_\_\_

TX TONE/NAC: \_\_\_\_\_

GROUP #: \_\_\_\_\_

KIT #: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_

REMARKS: \_\_\_\_\_

ICP/ICC

4330 - REMOTE KIT

RX TONE/NAC: \_\_\_\_\_

TX TONE/NAC: \_\_\_\_\_

CHANNEL #: \_\_\_\_\_

SLA KIT: \_\_\_\_\_

LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_

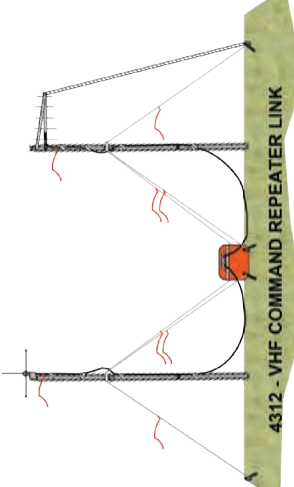
DRAWING 3

INCIDENT: \_\_\_\_\_

197

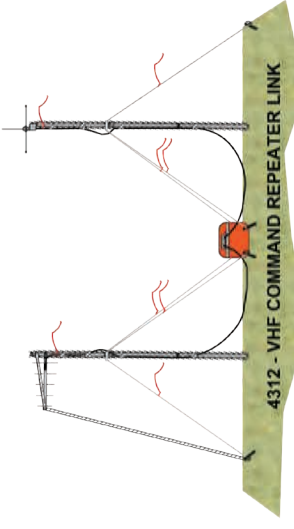
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TWO (2) VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX



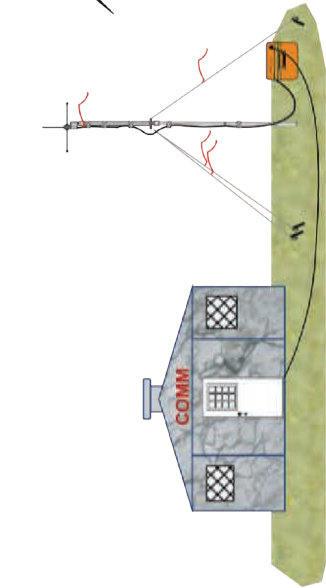
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT #: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



4312 - VHF COMMAND REPEATER LINK

RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX LINK FREQ: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH B CH: \_\_\_\_\_ SWITCH A TONE: \_\_\_\_\_  
KIT #: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



ICPI/CC 4330 - REMOTE KIT

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

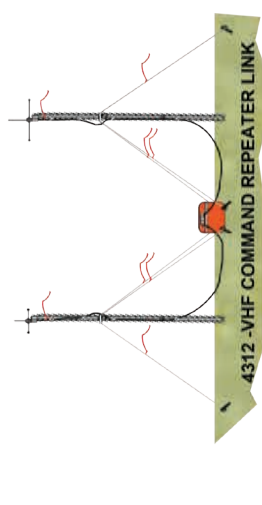
INCIDENT: \_\_\_\_\_

DRAWING 4

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THREE (3) VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX



4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_

RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_

TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_


KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_

RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_

TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_

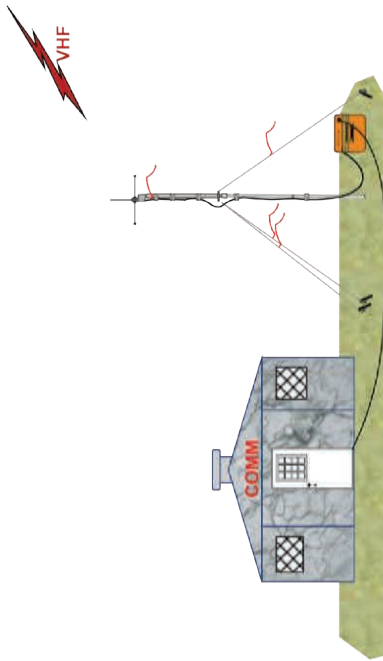
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

REMARKS: \_\_\_\_\_



ICP/ICC 4330 - REMOTE KIT

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_

KIT #: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_

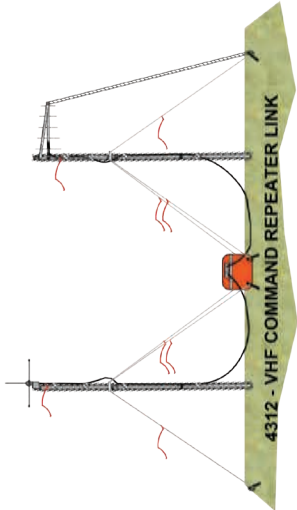
LOCATION: \_\_\_\_\_

LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_

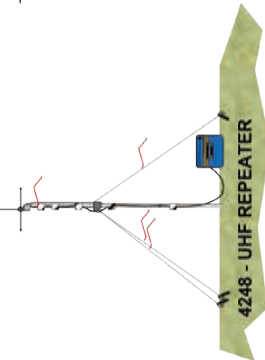
REMARKS: \_\_\_\_\_

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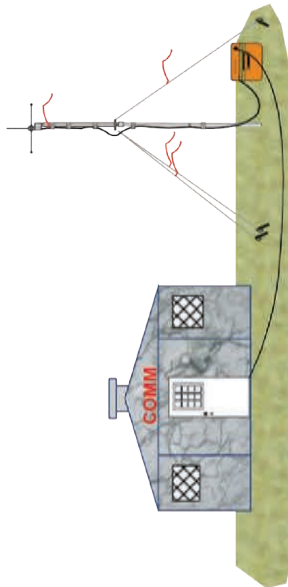
TWO (2) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



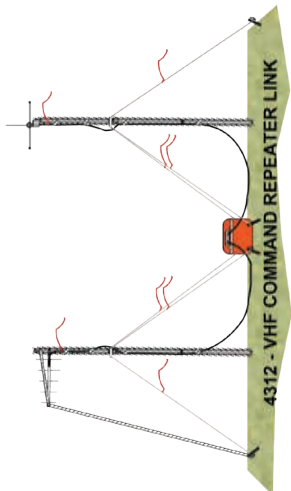
RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



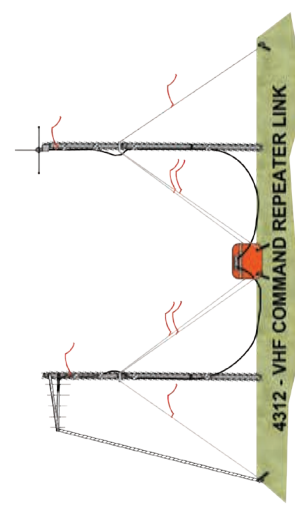
ICP/ICC  
RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX LINK FREQ: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

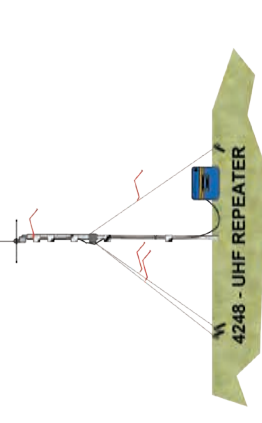
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THREE (3) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



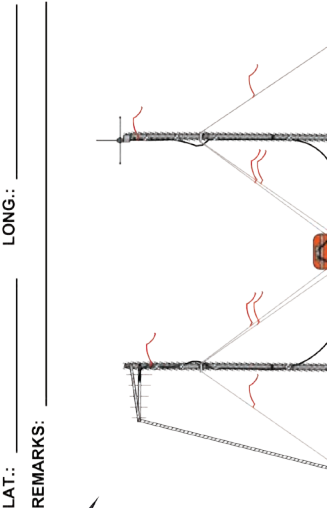
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_ SWITCH A TONE: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



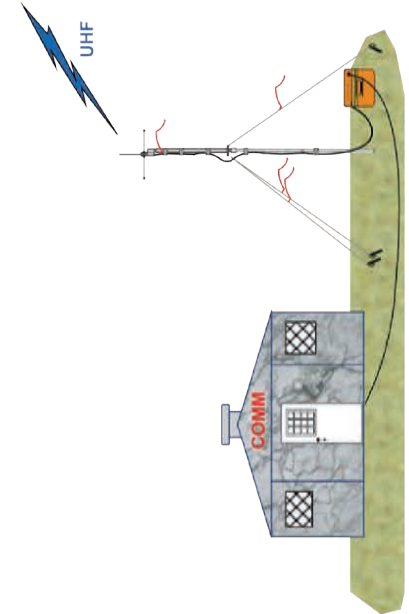
4248 - UHF REPEATER

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_ SWITCH A TONE: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



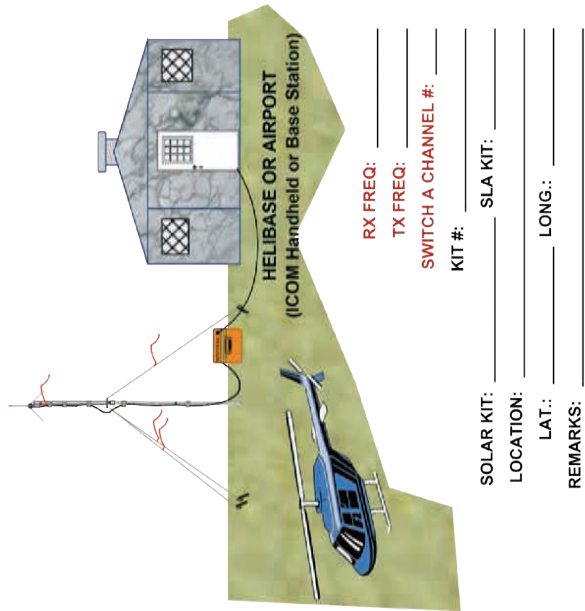
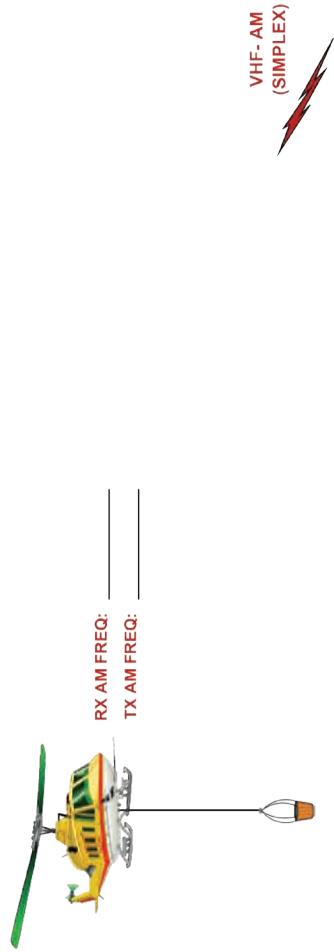
4330 - REMOTE KIT

ICP/ICC

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

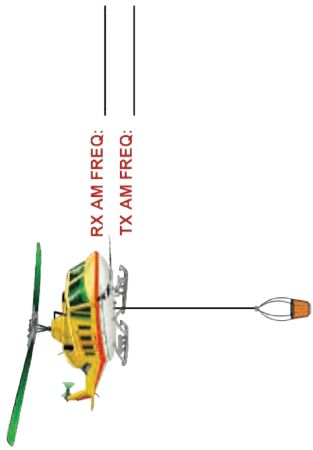


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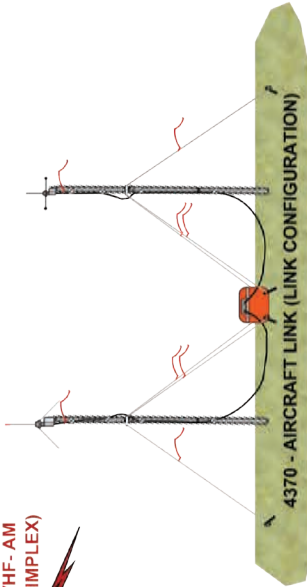


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AIRCRAFT LINK SYSTEM (LINK CONFIGURATION) WITH REMOTE AT HELIBASE

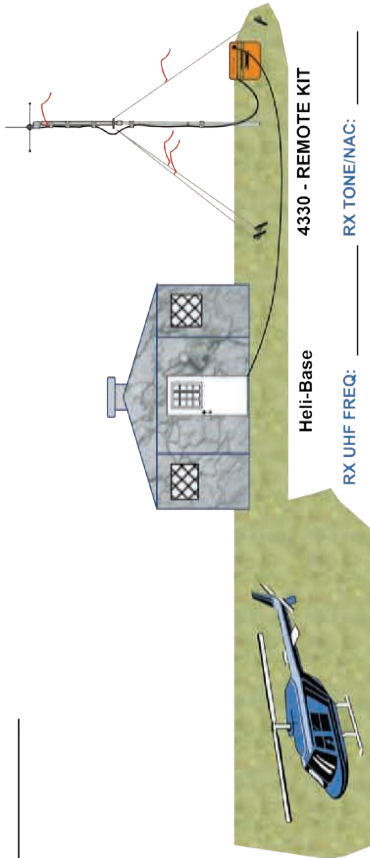


VHF - AM  
(SIMPLEX)



RX AM FREQ: \_\_\_\_\_ RX UHF FREQ: \_\_\_\_\_  
TX AM FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
SWITCH A CH: \_\_\_\_\_ TX UHF FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_  
KIT #: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

UHF  
(SIMPLEX)

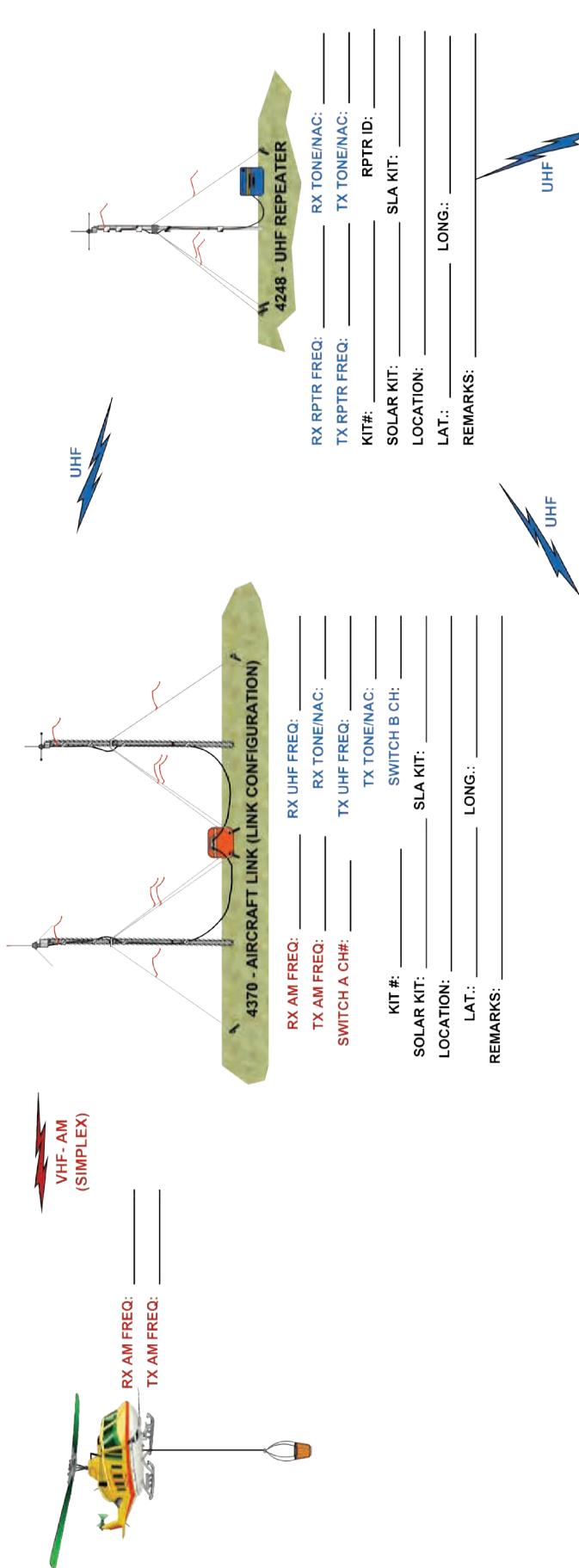


RX UHF FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX UHF FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

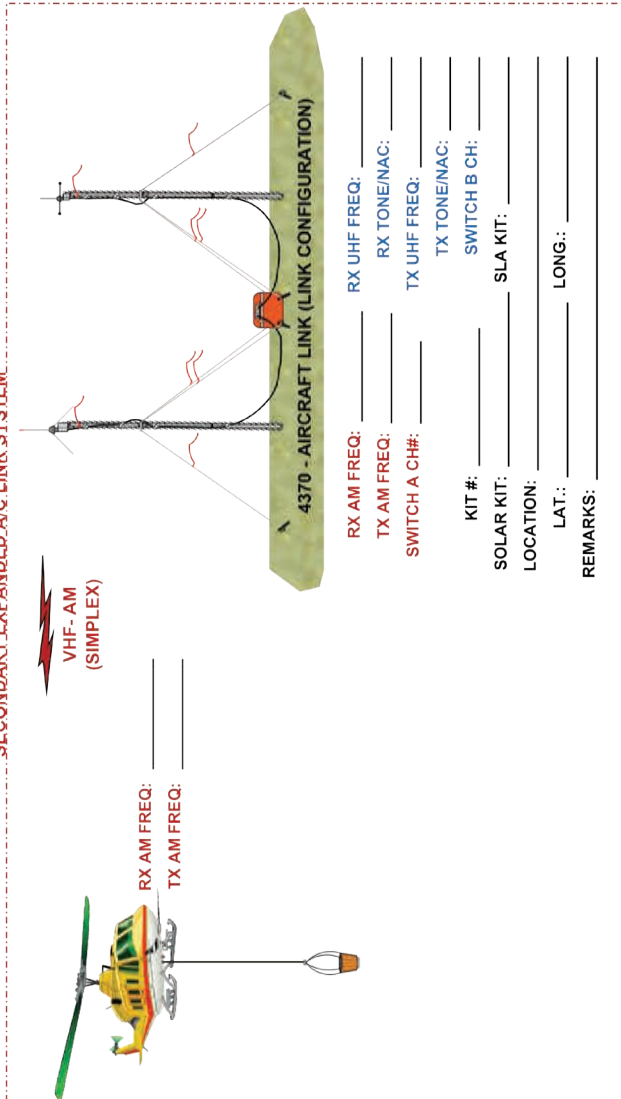
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MULTIPLE AIRCRAFT LINK SYSTEM (LINK CONFIGURATION) LINKED THROUGH UHF REPEATER HUB



SECONDARY EXPANDED A/C LINK SYSTEM

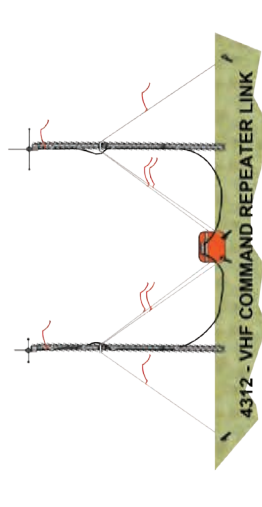


DRAWING 10

INCIDENT: \_\_\_\_\_

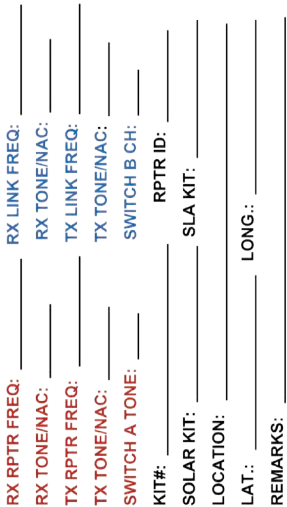
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FOUR (4) VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX



4312 - VHF COMMAND REPEATER LINK

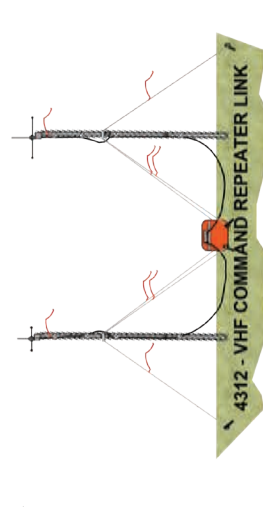
RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



4312 - VHF COMMAND REPEATER LINK


RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_





4312 - VHF COMMAND REPEATER LINK

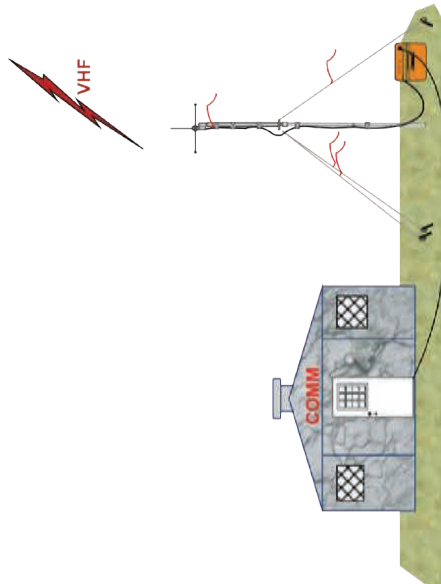
RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



4312 - VHF COMMAND REPEATER LINK

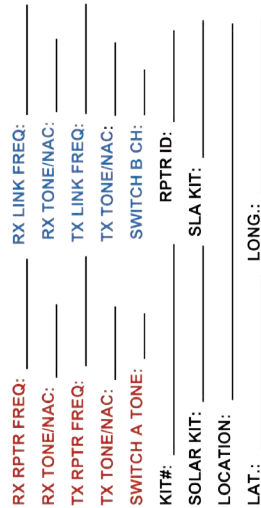
RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

INCIDENT: \_\_\_\_\_



ICP/ICC 4330 - REMOTE KIT

RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



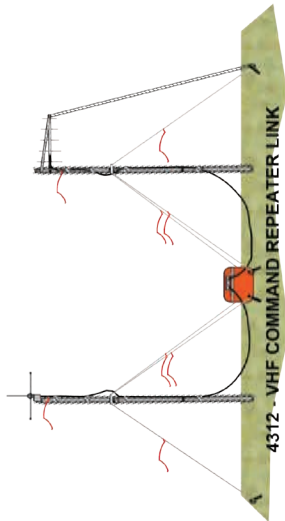
4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

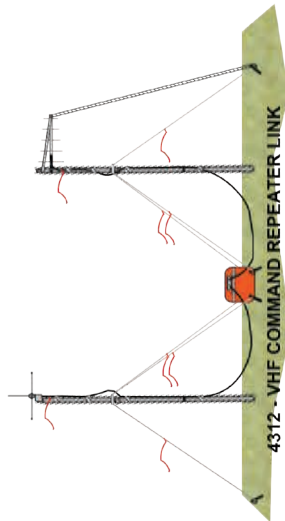
DRAWING 11

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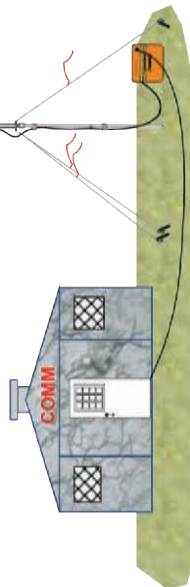
FOUR (4) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



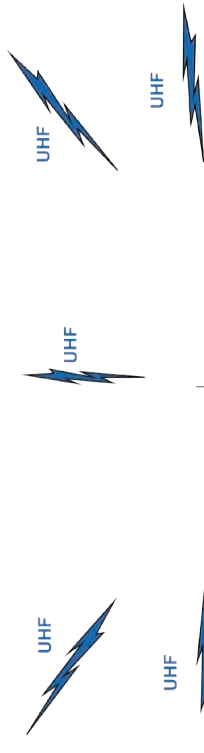
RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

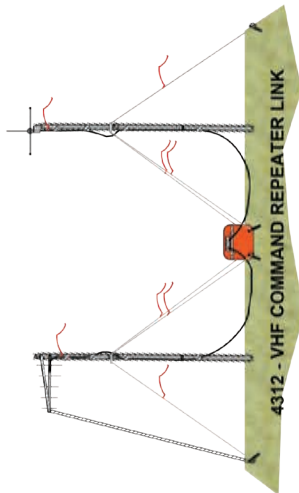


ICP/ICC  
RX FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
GROUP #: \_\_\_\_\_ CHANNEL #: \_\_\_\_\_  
KIT #: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

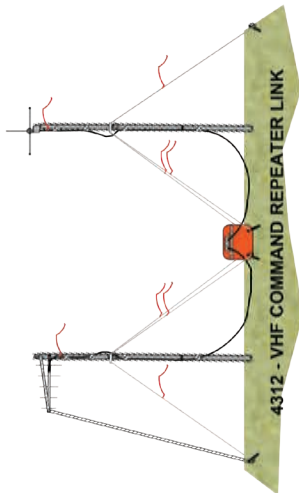


RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

DRAWING 12



RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX LINK FREQ: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH B CH: \_\_\_\_\_ SWITCH A TONE: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX LINK FREQ: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH B CH: \_\_\_\_\_ SWITCH A TONE: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

INCIDENT:



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FIVE (5) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB

**4312 - VHF COMMAND REPEATER LINK**

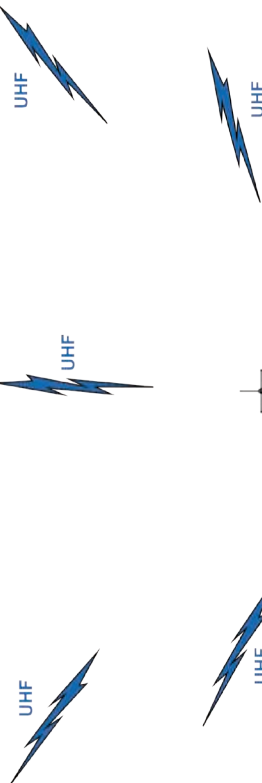
RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

**4312 - VHF COMMAND REPEATER LINK**

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

**4312 - VHF COMMAND REPEATER LINK**

RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX LINK FREQ: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 SWITCH B CH: \_\_\_\_\_ SWITCH A TONE: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_



**4312 - VHF COMMAND REPEATER LINK**

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

**4248 - UHF REPEATER**

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

**4312 - VHF COMMAND REPEATER LINK**

RX LINK FREQ: \_\_\_\_\_ RX RPTR FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX LINK FREQ: \_\_\_\_\_ TX RPTR FREQ: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 SWITCH B CH: \_\_\_\_\_ SWITCH A TONE: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
 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: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

**4312 - VHF COMMAND REPEATER LINK**

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

**4312 - VHF COMMAND REPEATER LINK**

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

**4312 - VHF COMMAND REPEATER LINK**

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_



**4312 - VHF COMMAND REPEATER LINK**

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

**4248 - UHF REPEATER**

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

**4312 - VHF COMMAND REPEATER LINK**

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
REMARKS: \_\_\_\_\_

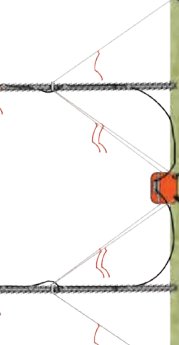
**4312 - VHF COMMAND REPEATER LINK**

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
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 TONE/NAC:** \_\_\_\_\_

**TX RPTR FREQ:** \_\_\_\_\_

**TX TONE/NAC:** \_\_\_\_\_

**SWITCH A TONE:** \_\_\_\_\_

**KIT#:** \_\_\_\_\_

**SOLAR KIT:** \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**LAT.:** \_\_\_\_\_

**RX LINK FREQ:** \_\_\_\_\_

**RX TONE/NAC:** \_\_\_\_\_

**TX LINK FREQ:** \_\_\_\_\_

**TX TONE/NAC:** \_\_\_\_\_

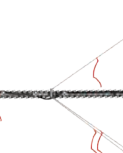
**SWITCH B CH:** \_\_\_\_\_

**RPTR ID:** \_\_\_\_\_

**SLA KIT:** \_\_\_\_\_

**LONG.:** \_\_\_\_\_

**REMARKS:** \_\_\_\_\_



4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_  
 RX TONE/NA: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_  
 TX TONE/NA: \_\_\_\_\_  
 SWITCH A TONE: \_\_\_\_\_  
 KIT#: \_\_\_\_\_  
 SOLAR KIT: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_

RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NA: \_\_\_\_\_  
 TX LINK FREQ: \_\_\_\_\_  
 TX TONE/NA: \_\_\_\_\_  
 SWITCH B CH: \_\_\_\_\_  
 RPTR ID: \_\_\_\_\_  
 SLA KIT: \_\_\_\_\_  
 LONG.: \_\_\_\_\_

The diagram illustrates a VHF Command Repeater Link. It features two vertical towers, each with a horizontal arm extending from the top. A cable runs between the ends of these arms, supported by a central radio unit (depicted as a red box with two antennas). Red wavy lines represent radio signals being transmitted from the towers to the central unit and then to the other tower. The entire setup is labeled '4312 - VHF COMMAND REPEATER LINK'.

**4312 - VHF COMMAND REPEATER LINK**

**RX RPTR FREQ:** \_\_\_\_\_

**RX TONE/INAC:** \_\_\_\_\_

**TX RPTR FREQ:** \_\_\_\_\_

**TX TONE/INAC:** \_\_\_\_\_

**SWITCH A TONE:** \_\_\_\_\_

**SWITCH B CH:** \_\_\_\_\_

**RPTR ID:** \_\_\_\_\_

**SLA KIT:** \_\_\_\_\_

**SOLAR KIT:** \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**LAT.:** \_\_\_\_\_

**LONG.:** \_\_\_\_\_

4312 VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_

RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_

TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_

TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_

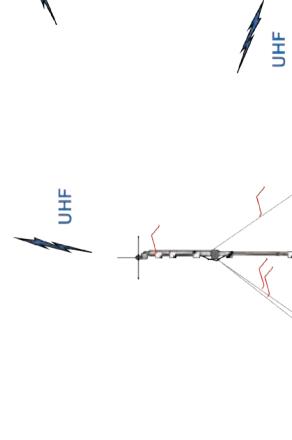
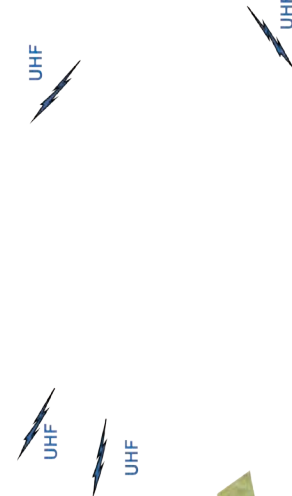
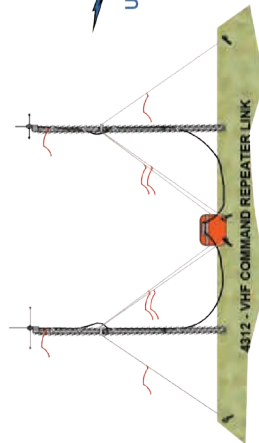
SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_

KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_

LOCATION: \_\_\_\_\_


LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_



RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/AC: \_\_\_\_\_ RX TONE/AC: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX TONE/AC: \_\_\_\_\_ TX TONE/AC: \_\_\_\_\_  
 SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT: \_\_\_\_\_ LONG: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/NAC: \_\_\_\_\_ RX TONE/NAC: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX TONE/NAC: \_\_\_\_\_ TX TONE/NAC: \_\_\_\_\_  
 SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_



4248 - UHF REPEATER

RX RPTR FREQ: \_\_\_\_\_ RX TONE/NAAC: \_\_\_\_\_

TX RPTR FREQ: \_\_\_\_\_ TX TONE/NAAC: \_\_\_\_\_

KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_

SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_

LOCATION: \_\_\_\_\_ LAT: \_\_\_\_\_ LONG: \_\_\_\_\_

REMARKS: \_\_\_\_\_

4312 - VHF COMMAND REPEATER LINK

RX RPTR FREQ: \_\_\_\_\_ RX LINK FREQ: \_\_\_\_\_  
 RX TONE/AC: \_\_\_\_\_ RX TONE/AC: \_\_\_\_\_  
 TX RPTR FREQ: \_\_\_\_\_ TX LINK FREQ: \_\_\_\_\_  
 TX TONE/AC: \_\_\_\_\_ TX TONE/AC: \_\_\_\_\_  
 SWITCH A TONE: \_\_\_\_\_ SWITCH B CH: \_\_\_\_\_  
 KIT#: \_\_\_\_\_ RPTR ID: \_\_\_\_\_  
 SOLAR KIT: \_\_\_\_\_ SLA KIT: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 LAT.: \_\_\_\_\_ LONG.: \_\_\_\_\_  
 REMARKS: \_\_\_\_\_

221

## DRAWING 15

**INCIDENT:**

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## **NIRSC MISC DOCUMENTATION**

### **COML/COMT CHECKLIST ICS-205 RADIO COMMUNICATIONS PLAN**

These documents are also available for download online at:

<https://www.nifc.gov/resources/NIICD>

# 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		RX:							
		TX:							
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:							
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6		RX:							
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7		RX:							
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8		RX:							
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9		RX:							
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11		RX:							
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15		RX:							
		TX:							
16		RX:							
		TX:							
17		RX:							
		TX:							
18		RX:							
		TX:							
19		RX:							
		TX:							
20		RX:							
		TX:							
5. Prepared By (Communications Unit):									

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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		Assignment		Remarks	
Radio/Group	CH #	Function	Frequency	Tone/NAC	Mode	TGID									
			RX:												
			TX:												
			RX:												
			TX:												
			RX:												
			TX:												
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			TX:												
5. Prepared By (Communications Unit):															

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NOTES

This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal grey lines across its entire width, providing a guide for handwriting or typing. The background is a solid off-white color.

NOTES

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**2023 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/resources/NIICD](http://www.nifc.gov/resources/NIICD)