2025

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NFES# 000968

NATIONAL INTERAGENCY INCIDENT COMMUNICATION DIVISION (NIICD) User's Guide:

During the 2024 all-risk season the National Interagency Incident Communications Division (NIICD) supported approximately 651 separate incidents with frequencies and equipment.

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

- Over 603 incidents equipped with radio equipment
- Over 977 Air to Air FAA frequencies filled
- NIICD borrowed a total of 1126 frequencies for special repeaters and aviation support
- The personnel in infrared detection and mapping successfully fulfilled 2343 missions

Big thank you to the DOI/USDA, FAA, NTIA, Department of Commerce and the US Postal Service for their dedication in supporting wildland fire frequency needs

As always, it is extremely important that all personnel involved in incident communications keep themselves updated regarding changes in the equipment deployed by the NIICD. Please refer to the NIICD 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/resources/NIICD/hotsheet for up-to-date information on all NIICD 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 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 the NIICD Chief at 208-387-5856, or you can contact the Communications Duty Officer at 208-387-5644.

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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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Order NFES# 000968

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INTRODUCTION TO THE NIICD USER'S GUIDE

The National Interagency Incident Communications Division (NIICD) User's Guide is designed to assist communications personnel with reference material and guidelines when ordering and utilizing frequencies and equipment from the National Incident Radio Support Cache (NIRSC) that is a branch of the NIICD.

The NIICD User's Guide is available on-line at the following link for download:

https://www.nifc.gov/resources/NIICD/niicd-documents

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 NIICD User's Guide are revised annually by NIICD 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 NIICD equipment or frequencies.

How to use this guide:

1. Read the descriptions from the "**General Communications Conditions and Solutions**" tab starting on page 43 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 NIICD, use the National Fire Equipment Supply (**NFES**) catalog number indicated on the drawings or in the "**Equipment Descriptions**" section of this guide.
   All NIICD equipment and frequencies **MUST** be ordered under a resource order.
   Note: One supply request number per equipment item and one aircraft request per frequency order.

3. The National Interagency Incident Communications Division Communications Duty Officer (NIICD-CDO) is available 24 hours a day, year-round. CDO personnel provide ordering and planning assistance and are an information resource for field communications personnel. At a minimum, communications personnel should check in with the CDO upon arrival at the incident to provide frequency assignment, equipment location and contact information. All provided information is logged and updated daily. Contact the CDO at 208-387-5644 or NIICD@firenet.gov.

4. The "**Equipment Descriptions**" tab provides a description and purpose of each piece of equipment issued from the NIICD.

5. The "**Equipment Inventories**" tab have been removed from the 2025 guide. For an updated inventory list for each kit, contact the cdo or download from the NIICD website.
   Inventory lists are also provided in each kit shipped from NIICD.

6. The "**Equipment Installation**" tab provides step-by-step instructions including diagrams for installing all equipment issued by the NIICD. Installation instructions are also provided in each kit shipped from NIICD.
   Note: NIICD VHF/UHF repeaters and links require a qualified COMT or COML for ordering and installation.

7. Appendix Tabs:
   - Appendix Tab A, contains the Voice Board operating instructions along with wiring diagrams.
   - Appendix Tab B, contains information on NIICD 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 NIICD equipment in normal operation.
   - Appendix Tab E, contains quick reference material on programming and cloning of each NIICD supported 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 NIICD website (https://www.nifc.gov/resources/NIICD/niicd-documents)

Note: Communications personnel not familiar with NIICD equipment or those who are not experienced, are required to contact the CDO for frequency and equipment assistance before placing order from NIICD.
See NIICD contacts on page 3 of this guide for all contact information.

NEW AND CONTINUING FOR 2025/NIICD HOTSHEET

New 4390 Starter Systems update:

- (3) - 4080 Flexible Solar Panel Kits will be included in each 4390 Starter System. The 4080 solar panel kit will power each 4312 VHF Repeater Kit, 4248 UHF Repeater Kit and 4370 Aircraft Link Kit in each Starter System. If additional 4080 kits are required please contact the CDO for availability before placing an order or additional 4080 kits.
- (1) - 4330 Remote will be issued with each 4390 order. Oder additional remotes as needed, please contact the CDO on availability before ordering additional remote kit. Limited supply and parts available.

Note: The 4390 Starter System will now contain 16 kits and 6 sets of masts when ordered from NIICD or preposition.

New BKR and KNG 4381 Radio Kit updates:

- Each BKR and KNG 4381 Radio Kits will be supplied with 16 belt clips to accommodate users not utilizing the leather cases.
- Each 4381 kit will contain one Universal Cloning Cable for Legacy to KNG and a BKR adapter.
- Reduced number of leather cases from 16 to 4 to help accommodate space for misc items added to each kit.
- Reduced mobile mag mounts from 8 to 4. Additional mag mounts can be ordered through NIICD. Please contact the CDO for availability and NFES #.
- Additional mag mounts and antennas can be found in each 4244 UHF Radio Kits if needed.
- Included both male and female mobile mag adapters to support either DPH, KNG or BKR radios.
- Updated default VHF channel plan.

Note: Please return all NIICD issued equipment to NIICD once incident is complete.

New 4312's 5 Watts Output Power:

As of 2025 all 4312 VHF Repeaters Kits will be changed to 5 Watts out put power based on the battery technology and the availability of having solar panel kits on each 4390 Starter System. All UHF modules will continue to operate at 2 Watts output power.

New 4312 and 4248 MT5 Modules

NIICD is in the process of replacing most modules with the new MT5 Codan/Zetron modules. Please see instruction on setting up equipment with MT5 modules.

New 4370 Aircraft Link with MT5 Modules and ICOM Mobile Radio

NIICD is currently replacing the 4370 with new MT5 Modules and ICOM Mobile Radio Link. Please see instructions on setting up the 4370 with MT5 modules and the ICOM Mobile Radio.

New 32 Tone Pick List:

All 4381 VHF Radio Kits will be pre-programmed with the National Tone/NAC codes Pick List.

See page 17 for the National Tone/NAC list.

New 4670 End of Life:

NFES 4670 Satellite Phone Kits are no longer supported by NIICD. Sat Phones can be procured through local rental companies. For more information please contact the CDO.

New 4150 New Internal Foam:

All 4150 SLA Battery Kits "pick and pluck" foam is in the process of getting replaced with High Density custom foam to help with moisture, internal structure and durability.

DO NOT ship any 4150 batteries back to NIICD without foam or spacers or within other NIICD radio equipment boxes or kits. This could cause a potential fire hazard during shipping.

New VHF Frequency Sheet Amended:

As of 2025 VHF frequencies list and programming have been amended in all 4381 VHF Radio Kits. To obtain a list of frequencies please contact the CDO for access to the fire net share point folder.

Note: Frequencies must be ordered for each incident and assigned/authorized by the CDO prior to use to minimize possible interference with other agencies, this includes all National Tactical and Common Use frequencies.

New VHF Air Tactics and Tactical Frequency Removal:

As of 2025 all air tactics and tactical VHF frequencies will no longer be pre programmed in each 4381 VHF Radio Kits.

Note: Frequencies must be ordered for each incident and authorized by the CDO prior to use to minimize possible interference with other agencies, this includes all National Tactical and Common Use frequencies.

New Reusable Zip Ties:
Kits will now include only 12" reusable zip ties to eliminate the need for fiber tape to secure the coax cables to the mast and other structures.

New Guy Rope Replacement:
All guy ropes in each 4312, 4248, 4370, and 4281 will be replaced as needed with 1/4" polyester rope that does not stretch when wet.

4381KR Relm BKR Kits
NIICD is currently still in the process of replacing all VHF DPHx radios with new VHF BKR5000 radios from Relm BK. This process could potentially take a few years.
Note: 4381 DPHx and 4381 KNG2 radio kits will also be continued to be utilized until the replacement is complete.

Pre-Wired Plug and Play Y-Cable Connector: The 4150 batteries now come with a pre-installed Y-Cables. The Y-Cable is equipped with two power pole connectors. One connector plugs into the equipment, while the other connector allows additional batteries to connect in parallel or provide a charging access point. Please do not remove the Y-Cable. Each battery terminal comes protected with a plastic terminal cover to minimize/prevent shorts during transportation.

4330EX Remote Expansion Kits in Pelican Cases
All 4330EX Remote Expansion Kits will be enclosed in a new Pelican Case instead of the SkyDyne Fiberglass boxes.
(See page 31 for more information on the 4330EX)

GE/ECC Smart Cloning Cable End Of Life:
The G/ECC cloning cable is no longer being manufactured. Starting immediately, the NIICD will be replacing missing or damaged G/ECC cables with LAA0700 Same Series cloning cables when refurbishing kits. Therefore, depending on the kits you receive you may get either cloning cable.

Lead Seals replaced by TSA Security Labels
All kits will no longer be sent out with lead seals to seal kits before shipping to NIICD. The lead seals will be replaced with TSA security labels located in the kit inventory envelope.

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

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:
A surge protection device has been added to the UHF side of all repeater equipment at NIICD. The surge protection device provides a DC short between the center pin and ground to prevent static build up on the UHF antenna. On the VHF side there is a built in DC short to ground provided by the VHF antenna and VHF duplexer so a separate device is not needed. Static buildup is the suspected cause for repeated failures in the UHF transmitters. The surge protection device is pre installed and requires no changes to existing setup procedures.

All UHF Link Modules will contain a TX/RX tone of 110.9:
A fixed CTCCS tone of 110.9 has been added to the transmit and receive of all UHF equipment in the cache. This includes the UHF link side of the command repeater, aircraft link and cross band link. Additionally the UHF logistics radio kits default channel plan now has a transmit and receive tone of 110.9. This change prevents repeater system lock ups and noise caused by interference opening unprotected repeater UHF side receivers inadvertently. Strong interference can still affect receiver sensitivity so site placement remains critical. For best performance, avoid deploying repeaters adjacent to other transmitting antennas.

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

Midland STP404A, Motorola XTS2500 and KNG2-P400 UHF Radio Kits:
NIICD will more than likely still be sending out UHF Midland STP404A, UHF XTS2500 and UHF KNG2-P4000 radio kits for 2025 fire season. NIICD is currently in the process of looking for a replacement UHF radio.

2025 Microsoft Access and Excel NIICD 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 NIICD coax cables now use "**N**" type connectors. Any NIICD antenna or component manufactured with a UHF connector has had an N adapter permanently attached to that UHF connector.

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.

Radio Passwords:
All NIICD 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.
Note: 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 NIICD 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 NIICD 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.

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NATIONAL INTERAGENCY INCIDENT COMMUNICATIONS DIVISION

Welcome to the National Interagency Incident Communications Division (NIICD). NIICD is located on the National Interagency Fire Center base in Boise Idaho. The NIICD is supported by several branches that offer our field customers a variety of services. NIICD maintains overs 20,000 pieces of electronic radio equipment and is one of the largest civilian radio cache in the country.

The NIICD 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 NIICD is to provide portable emergency communication services in a professional, prompt, customer-oriented manner while optimizing resources and minimizing risk.

NIICD major focus is wildland fire suppression, but NIICD 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.

Communications Duty Officer (CDO): The CDO coordinates national frequencies with interagency partners and agencies to support temporary incident frequency needs, tanker base AM frequencies and Initial Attack Air-to Air and Air-to-Ground zone frequencies to the field. All NIICD frequencies and equipment must be coordinated through the CDO prior to use.

Communications Operations: The Communications Operations Branch provides all-risk incident support as a Communications Coordinator (COMC) or Subject Matter Experts (SME) to wildland fire, law enforcement and natural or man-made disasters. The branch is involved with the engineering branch on researching and testing new technologies to incorporate into the NIICD and assist with development of national communications operations policies and procedures.

Engineering and Development: The Engineering branch tests and designs communications systems and remote sensing design and equipment available for support of interagency incident support. The engineering staff is part of the US Department of the Interior (DOI) government-wide radio testing group.

Maintenance: The Branch of Communication Maintenance maintains at all times enough "ready for issue" radio communications equipment to support incident requests from the field. The branch is responsible for maintaining and repairing over 20,000 pieces of radio equipment including portable radios, repeaters, radio links, and remote radios used on all-risk incidents.

Rework/Supply: Rework is responsible for issuing, returning, tracking and refurbishing all NIICD incident communications equipment, accessories and kits.

Technical Training: The Technical Training branch provides up to date training on the latest NIICD equipment and technologies though the Communications Technician (S258) and Communications Unit Leader (S358) courses throughout the country.
See the following link for updated classes being offered by NIICD:
https://www.nifc.gov/resources/niicd/technical-training

Avionics: NIICD's Avionics shop is a Federal Aviation Administration (FAA) certified repair station supporting wildland fire fighting and homeland defense missions. NIICD Avionics works with other interagency cooperators on developing standards and guidance to contractors, federal and state agencies.

Infrared: The Infrared Branch provides accurate high-quality infrared imagery to national fire incidents. Incidents can initiate an Infrared Flight Order Request in IROC through the Geographic Are Coordination Centers (GACC) or use the on-line form on the NIROPS site.
https://fsapps.nwcg.gov/nirops/

CDO/COMC

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 Initial Attack zones 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 assigned to incidents).*
- *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 through the National Interagency Coordination Center (NICC). 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.

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 NIICD. Incident COML's and COMT's should be coordinating with the CDO or COMC before ordering equipment or frequencies for incident support.

NIICD CONTACTS

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

DIVISION CONTACTS:

NAME:	**PHONE:**	**E-MAIL:**
NIICD Division Chief:		
Mark Hilton	(208) 387-5856	mark.hilton@usda.gov
Deputy NIICD Division Chief:		
Jason Bruce	(208) 387-5852	jwbruce@blm.gov
Communications Duty Officer Coordinator:		
Kim Albracht	(208) 387-5707	kimberly.albracht@usda.gov
Communications Duty Officer (CDO):	(208) 387-5644	niicd@firenet.gov
Incident Communications Operations:		
Jose M. Lopez	(208) 387-5858	jose.lopez2@usda.gov
Albert Karnowski	(208) 387-5826	albert.karnowski@usda.gov
Kirk Maskalick	(208) 387-5861	kirk.maskalick@usda.gov
Technical Training:		
Kirk Maskalick	(208) 387-5861	kirk.maskalick@usda.gov
Engineering and Development:		
Bill Forsyth	(208) 387-5720	bill.forsyth@usda.gov
Bob Dukart	(208) 387-5852	bdukart@blm.gov
Avionics:		
Ken Tillbrook	(208) 387-5648	kenneth.tillbrook@usda.gov
Rework:		
Rework Duty Officer (RDO)	(208) 387-5630	
Jason Phipps	(208) 387-5601	jason.phipps@usda.gov
Ron Honea	(208) 387-5681	rhonea@blm.gov
Oscar Sanchez	(208) 387-5866	oscar.sanchez@usda.gov
Infrared:		
Charles Kazimir	(208) 387-5647	charles.kazimir@usda.gov
Michael Mann	(208) 387-5667	michael.mann@usda.gov

NIICD SUPPORT FOR FIRE TRAINING COURSES

The National Interagency Incident Communications Division (NIICD) supports fire training courses nationwide with frequencies and radio kits. Due to fire activity, annual equipment maintenance, etc., NIICD is not able to fulfill all training requests.

Note: Please contact the NIICD CDO or Chief in advance with any concerns or questions regarding the use of equipment or frequencies for training or classes.

General Requirements:

- The training's course coordinator should contact NIICD as far in advance as possible to best ensure availability of frequencies and NIICD radio kits. A contact name and phone number, as well as the specific dates and location of the training, must be provided.
- If any frequencies or repeaters are requested for training, the accurate latitude and longitude of the training location must be provided as well. Frequencies and repeaters may only be used at the location provided and only during the specified duration of the training exercise.
- All NIICD radio kit requests must be made through IROC. A valid charge code able to cover the costs of shipping, refurbishment, and full replacement of any lost or damaged equipment is required.
- All kits must be returned to NIICD immediately following the end of the training exercise.

Frequencies:

- NIICD has a very limited number of frequencies assigned to the Division that can be made available for training purposes. They must be coordinated and assigned by the NIICD Communications Duty Officer (CDO).
- Air-to-Air AM frequencies will be coordinated with the FAA by the NIICD CDO and require at least two weeks advance notice.
- If there are active incidents (fire or all-hazard) in the region, NIICD will not be able to support the training. If frequencies are needed by an emerging incident, the training must stop their use immediately upon notification from the NIICD CDO.

Radio Kits: Limited based on incident activity

- All requests must be coordinated through the NIICD CDO.
- NIICD will be able to support most training requests for handheld radios throughout the year:
    - 4381 VHF Command Tactical Radio Kit
    - 4244 UHF (Logistics) Radio Kit
- All other NIICD radio kits are available for training purposes on a very limited basis and can only be requested between the dates of December 1st – March 31st.
- Only NIICD radio kits listed below may be requested for training courses during the dates of December 1st through March 31st:
    - 4080 Solar Panel Kit
    - 4150 Sealed Lead Acid Battery Kit ***(required for operation with all *starred items)***
    - *4248 UHF Logistics Repeater Kit
    - *4312 VHF Command Repeater Kit
    - *4330 Remote Kit
    - *4370 Ground Aircraft Radio/Link Kit

Avionics Radio Kits:

- Avionics radio training kits are in very limited supply and must be coordinated with the NIICD Avionics Branch before placing orders. These kits include:
    - 4240 Airbase Accessories Kit
    - 4300 Ground VHF-AM Base Station Kit
    - 4420 Aviation Printer Kit (for MAFFS only)
    - 4499 Air Attack Kit
    - 4545 Aviation Radio Kit
    - 4604 Air Attack Training Kit
    - 4605 Technisonic TDFM-136 Test Jig (single) (MAFFS priority)
    - 4606 Technisonic TDFM-136 Test Jig (dual) (MAFFS priority)
    - 4607 Technisonic TDFM-9000 Test Jig
    - 4608 Cobham NPX136D Test Jig
    - 4660 Airbase Kit

NIICD EQUIPMENT ORDERING PROCESS

The National Interagency Incident Communications Division (NIICD) is a national resource composed of multi-channel radio systems, frequencies, and specialty radio communications equipment available for supporting complex incident communications requirements.

The information outlined below must be considered when ordering and using NIICD equipment. All NIICD 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.

NIICD EQUIPMENT ORDERING PROCESS

All NIICD equipment requests shall be processed using the Interagency Resource Ordering Capability (IROC) system. Equipment will not be shipped without having a resource order request. NIICD equipment will be requested by the incident and the request sent to NIICD via the local ordering process. All NIICD equipment is to be ordered on an Supply Order as an "**S**" Request Number in IROC. ***All radio communications equipment orders must contain a valid financial code with override, a valid street address and contact name for delivery of equipment.*** A valid financial code is needed to cover the costs of shipping, refurbishment, and full replacement of any lost or damaged equipment is required. All equipment orders need to provide a realistic date/time needed. If equipment is being ordered from NIICD, please allow a minimum of 24 hours for delivery. If equipment is being filled from pre-position cache please allow a minimum of 12 hours for delivery. Please contact the CDO before placing any requests for equipment.

Equipment ordering process consists of the following:

Incident Order Request--->Dispatch Center/Expanded (IROC)--->GACC--->NICC--->NIICD---->NIICD Filled--->GBK (Shipping)

Pre-Position Equipment ordering process consists of the following:

Incident Order Request--->Dispatch Center/Expanded (IROC)--->GACC--->NICC--->NIICD--->Fire Cache (Shipping)

NIICD 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 and frequencies which will establish immediate communications for command, tactical, logistics, and air operation requirements. A Starter System consists of 16 assorted pieces of equipment with 6 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 ensure proper frequency coordination, please provide the latitude and longitude of the incident to de-conflict with existing incidents or other agency frequency assignments.

NIICD 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.*** It is very important that dispatch not assign or move a 4390 starter system in pre-position without prior coordination with the CDO or COMC.
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 NIICD.

Note: 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.

NIICD frequencies in all radio equipment 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.

The following GACC Fire Caches usually contain 4390's during their established fire season:

*Alaska Incident Support Cache (AKK)
*Coeur d'Alene Interagency Incident Support Cache (CDK)
*Northern California Incident Support Cache (NCK)
*Northern Rockies Area Support Cache (NRK)
*Northeast Area Incident Support Cache (NEK)
*Billings Interagency Incident Support Cache (BFK)
*Northwest Area Incident Support Cache (NWK)
*Southern Area Incident Support Cache (SAK)
*Southern California Incident Support Cache (LSK)
*SW Prescott Incident Support Cache (PFK)
*SW Silver City Incident Support Cache (SFK)
*Wenatchee Incident Support Cache (WFK)

Note: Pre-Position Starter Systems orders may not be filled where congestion of spectrum or equipment availability is an issue. In these instances, special frequency Starter Systems will be built as needed and shipped directly to the incident from GBK.

ORDERING ADDITIONAL 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 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 or available resources. If the CDO/COMC can fill the request, the CDO/COMC will inform the incident COML/COMT of assigned equipment.

Note: All NIICD equipment must be ordered on an individual Supply Order as an "S" Request Number in IROC. Multiple quantities of equipment on one supply order will NOT be accepted or filled at NIICD.

Due to the scarcity of available frequencies CIMT pre-orders must limit requests to what is contained within the 4390 Radio Starter System. Due to frequency constraints and limitations, any additional repeater needs beyond the 4390 should be discussed with the CDO or COMC prior to placing additional orders. This discussion also ensures that the CDO or COMC is better able to obtain and assign frequencies for the incident in a timely manner.

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 NIICD. Incident COML's and COMT's should be coordinating with the CDO or COMC before ordering equipment or frequencies for incident support.

NIICD FREQUENCY ORDERING PROCESS

The information outlined below must be considered when ordering and using NIICD frequencies. NIICD 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.

NIICD 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 Incident Communications Division (NIICD) where the NIFC-CDO then coordinates with appropriate agencies and fills the frequency requests 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 NIICD 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 NIICD 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*

The Spectrum Engineering group at the Federal Aviation Administration (FAA) supports the National Interagency Fire Center by engineering and providing coordination for the use of specific AM frequencies for incident and training support.

Any frequency coordinated by the FAA for fire fighting or training should only be used temporarily as the need arises and within the designated service volume. If the operational airspace expands beyond the assigned service area, the new requirement must be communicated to the NIFC CDO and coordinated with the FAA. As a result. the original frequency provided by the FAA may have to change to eliminate the possibility of interference to Air Traffic Control (ATC) or other fire fighting efforts,.

Only the NIFC CDO will request/coordinate incident, training, tanker base, and initial attack frequencies directly from the FAA. The FAA has the right to terminate or modify the transmit authorization on frequencies coordinated for fire fighting at any time if needed to support an ATC requirement that cannot be met by any other means.

> ***Note: Per the Coordination Procedures for Aeronautical Frequencies to Support Emergency Fire fighting Requirements, the FAA has up to 12 hours to respond to any Project Fire Frequency Requests. In most cases a FAA frequency is filled within 2-5 hours in most GACCs.***

FM Frequency ordering process consists of the following:

Incident Order Request--->Dispatch Center/Expanded (IROC)--->GACC--->NIICD Filled in IROC

AM Frequency ordering process consists of the following:

Incident Order Request--->Dispatch Center/Expanded (IROC)--->GACC--->NIICD--->FAA--->NIICD Filled in IROC

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 NIICD. Incident COML's and COMT's should be coordinating with the CDO or COMC before ordering equipment or frequencies for incident support.

FREQUENCY TYPES/SERVICE VOLUMES & PARAMETERS

Air-to-Air AM (FQAA): Communications between aircraft using an AM (Victor) frequency
- Authorized up to 5000' AGL by Radio Frequency Authorization (RFA)
- 10 Watts max transmission
- Incident specific usage is within 20 NM radius from provided center point
- Initial Attack usage is within the authorization frequency zone only

Air-to-Air FM (FQFM): Communications between aircraft using an FM frequency *(CA Specific Only)*
- Authorized up to 3000' AGL by Radio Frequency Authorization (RFA)
- 10 Watts max transmission
- Incident specific usage is within 20 NM radius from provided center point
- Initial Attack usage is within the authorization frequency zone

Air-to-Ground AM (FQFF): Airtanker Base Ramp frequency and for communications between ATB and aircraft
- Authorized up to 5000' AGL by Radio Frequency Authorization (RFA)
- 10 Watts max transmission
- Base usage is within 40 NM radius from provided center point
- Special needs must specify the Lat/Long of the ATB

Air-to-Ground FM (FQAG): Communications between aircraft and ground personnel
- Authorized up to 3000' AGL by Radio Frequency Authorization (RFA)
- 10 Watts max transmission
- Incident specific usage is within 20 NM radius from provided center point
- Initial Attack usage is within the authorization frequency zone

Ground Tactical (FQTA): Intra-Division ground communications within incident operations area
- Frequency authorized for ground use only; NOT to be used in the air
- Incident specific usage is within 20 NM radius from provided center point

Deck (FQDE): Helibase flight deck logistics frequency for ground use only
- Frequency authorized for ground use only; NOT to be used in the air
- Incident specific usage is within 5 NM radius of provided center point (helibase)
- Special needs must specify the Lat/Long of the Helibase or airport

Take-Off-Landing Control (TOLC) - AM (FQTL): Air to Ground AM frequency for helibase air traffic control
- Authorized up to 2000' AGL
- 10 Watts max transmission
- Incident specific usage is within 5 NM radius from Helibase or provided center point
- Special needs must specify the Lat/Long of the Helibase or airport

Take-Off-Landing Control (TOLC) - FM (FQTO): Air to Ground FM frequency for helibase air traffic control
- Authorized up to 2000' AGL
- 10 Watts max transmission
- Incident specific usage is within 5 NM radius from Helibase or provided center point
- Special needs must specify the Lat/Long of the Helibase or airport

ORDERING ADDITIONAL FREQUENCIES

Consult with the CDO or COMC if additional frequencies are 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.

NATIONAL FREQUENCY GUIDELINES

The 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 NIICD VHF radios.

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.

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. These frequencies must be ordered through the established ordering process and are assigned by the CDO or COMC.

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. For use on incidents, these frequencies must be ordered through the established ordering process and are assigned by the CDO or COMC.

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. These frequencies must be ordered through the established ordering process and are assigned by the CDO or COMC. All Tactical frequencies should utilize a TX and RX Tone to minimize possible interference. Please contact the CDO or COMC for an assigned Tone.

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

- *Air-to-Air communications*
- *Air-to-Ground communications*
- *Mobile radios with more than 10 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 assigned service volume. If the operational airspace expands beyond this service volume, the new requirements must be communicated to the NIFC Communications Duty Officer (CDO) or COMC if assigned 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.*

NIICD EQUIPMENT & FREQUENCY DEMOBILIZATION

EQUIPMENT DEMOBILIZATION /RELEASE

Temporary frequencies and any radio equipment with temporary frequencies must be released first due to licensing requirements. All National Interagency Incident Communications Division (NIICD) communications equipment should be inventoried, sealed and returned to NIICD 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 to local Type III or below.

Note: The following equipment must have a COMT/COML or local radio technician to maintain the NIICD radio system after a transition to local unit or type III and below.

- ***4312 - VHF Repeater Kit***
- ***4281 - Crossband Link Kit***
- ***4248 - UHF Repeater Kit***
- ***4330 - Remote Kit***
- ***4330EX - Remote Expansion Kit***
- ***4370 - Ground Aircraft Link Kit***

NIICD communications equipment shall **NOT** be moved from one incident to another without being returned to NIICD 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.

Incident communications personnel are responsible for returning all radio equipment to NIICD and making sure equipment is released through expanded/dispatch channels. All equipment must be released through dispatch with their corresponding S# associated with each piece of equipment. If needed, please contact the CDO or COMC for this information.

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

National Preparedness Level 1-2:

- Return communications equipment by lowest cost
- Return any unused or broken equipment directly back to NIICD.

National Preparedness Level 3-4:

- Expedite communications equipment return by best means
- Return any unused or broken equipment directly back to NIICD
- Ground Freight if possible
- Should arrive at NIICD within 4-5 days

National Preparedness Level 5:

- Return communications equipment by fastest means possible
- Return any unused or broken equipment directly back to NIICD
- Overnight NIICD equipment if possible
- Utilize local drivers for GACC's within 8 hour drive time from NIICD

Note: The ordering incident is responsible for returning and/or coordinating all NIICD radio equipment directly back to Boise by the following methods;

- ***Arranging shipping through the local buying team (Fedex, UPS, ground transport).***
- ***Arranging shipping through the local district offices.***
- ***Arranging shipping through the local supply caches.***
- ***Arranging drop off with local drivers/vehicles directly to NIICD/NIRSC***

FREQUENCY DEMOBILIZATION/RELEASE

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.

NIICD 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.

Each incident is responsible for releasing all NIICD frequencies and making sure frequencies are released through expand/dispatch. All frequencies must be released through dispatch with their corresponding A# associated with each frequency. If needed, please contact the CDO or COMC for this information.

NIICD VHF RADIO CHANNEL PLAN

4381 VHF Command Tactical Radio Kit Channel Plan					
CH	**Group 1**	**Group 2**	**Group 3**	**Group 4**	**Group 5**
1	C1 Talk Around	C1 TX Simplex	Empty	Tactical	Empty
2	C1 RPRT Access	C2 TX Simplex	Empty	Tactical	Empty
3	C2 Talk Around	C3 TX Simplex	Empty	Tactical	Empty
4	C2 RPTR Access	C4 TX Simplex	Empty	Tactical	Empty
5	C3 Talk Around	C5 TX Simplex	Empty	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 NIICD **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 NIICD **VHF Command Repeater transmit simplex** frequencies (Ch 1 through Ch 6).
Contains the NIICD **VHF Repeater Configuration** frequencies (Ch 7 through Ch 12).
Not to be used for Air-to-Air or Air-to-Ground operations.

Group 3: Not programmed, please coordinated any **Air Tactics frequencies** needs with the CDO or COMC.
All **Air Tactics** Frequencies must be ordered through IROC and assigned by the CDO or COMC.

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

Group 5: Not programmed, please coordinated any **deck frequency** needs with the CDO or COMC.
All **Deck** Frequencies must be ordered through IROC and assigned by the CDO or COMC.
Not to be used for Air-to-Ground or Tactical operations.

NIICD frequencies 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 NIICD VHF frequencies are narrow band.*
- *A NIICD VHF frequency list is located in each 4381 Command/Tactical Radio Kit.*

NIICD UHF RADIO CHANNEL PLAN

4244 UHF Logistics Radio Kit Channel Plan					
CH	**Group 1**	**Group 2**	**Group 3**	**Group 4**	**Group 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
Note: All UHF Channels contain a RX/TX tone of 110.9					

Group 1: Contains the NIICD **Logistics Repeater** access and Talk Around frequencies and must be coordinated prior to use with the CDO or COMC.

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

Group 3: Contains the NIICD **UHF Command Link fr**equencies and must be coordinated prior to use with the CDO or COMC.
- Channel 1 through Channel 7 are the RPTR Access frequencies
- Channel 8 through Channel 16 are the RX Simplex frequencies.

Group 4: Contains the NIICD **UHF Aircraft Link** frequencies and must be coordinated prior to use with the CDO or COMC.
- 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 NIICD UHF frequencies that can be used for camp net, security, etc frequencies and must be coordinated prior to use with the CDO or COMC.

NIICD frequencies 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 NIICD UHF frequencies are narrow band.*
- *A NIICD UHF frequency list is located in each 4244 Logistics Radio Kit.*

NIICD 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
Note: Selecting a tone on the VHF Repeater will enable the Tone on both the TX and RX frequencies.					
Note: All UHF Modules contain a RX/TX tone of 110.9					

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

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

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

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

NIICD frequencies 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 and assigned prior to use by the CDO or COMC.*
- *All NIICD UHF Link frequencies are narrow band.*
- *A NIICD UHF Link frequency list is located in each 4312 Command Repeater-Link Kit.*

NIICD 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
Note: All UHF Modules contain a RX/TX Tone of 110.9					

Switch A (Ch A-1 through A-5): Contains the NIICD 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 NIICD **A/C Link UHF simplex** frequencies.

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

NIICD frequencies 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 NIICD UHF Link frequencies must be coordinated and assigned prior to use by the CDO or COMC.*
- *All NIICD UHF Link frequencies are narrow band.*
- *A NIICD UHF A/C Link frequency list is located in each 4370 A/C Link Kit.*

NATIONAL STANDARD TONES/NACS

The Continuous Tone Coded Squelch System, commonly referred to as CTCSS, is known by a number of different names such as Private Line (PL) /Code Guard/Channel Guard (CG), or just Tone.

CTCSS is the use of a sub-audible tone that is transmitted along with the speech portion of the transmission to unlock or open a receiver. CTCSS are commonly used on wildfire incidents mostly to access repeater systems and tactical channels. Enabling CTCSS allows multiple users to communicate on the same frequency/channel without receiving radio traffic from each other, and is employed to improve radio operation in high Radio Frequency (RF) noise environments, interference and congested areas. This allows agencies to reuse the limited amount of available frequency resources to support wildland fire incidents.

The operation of a receiver without CTCSS enabled is known as “open carrier squelch” or simply “carrier squelch.” Operating a receiver in open-carrier mode allows the radio operator to monitor and receive any traffic on that particular frequency/channel.

Network Access Code (NAC) is a feature of P25 digital radios similar to CTCSS for analog radios. A NAC is digital code transmitted along with speech portion of the transmitting to unlock or open a receiver of a digital system. Since the NAC is a 3 digit hexadecimal it allows for 4096 possible codes for programming which far exceeds the analog CTCSS tones available.

NIICD recommends all NIICD VHF Command repeaters, UHF Logistics Repeaters, and tactical frequencies used in wildland incidents to be toned on both RX/TX. Some incidents will utilize local frequencies along with NIICD frequencies. Please verify the use of tones or NACs with the incidents current communications plan (ICS205).

NOTE: For all NIICD equipment the CDO or COMC will assigned an appropriate Tone or NAC for each incident. Contact the CDO or COMC if unsure of proper incident tone.

Below is a chart of the standard tones used in the wildland fire agencies.

STANDARD NATIONAL TONES					
TONE #	CTCSS (Hz)	NAC (HEX)	TONE #	CTCSS (Hz)	NAC (HEX)
1	110.9	$455	17	67.0	$29E
2	123.0	$4CE	18	71.9	$2CF
3	131.8	$526	19	74.4	$2E8
4	136.5	$555	20	77.0	$302
5	146.2	$5B6	21	79.7	$31D
6	156.7	$61F	22	82.5	$339
7	167.9	$68F	23	85.4	$356
8	103.5	$40B	24	88.5	$375
9	100.0	$3E8	25	91.5	$393
10	107.2	$430	26	94.8	$3B4
11	114.8	$47C	27	97.4	$3CE
12	127.3	$4F9	28	118.8	$4A4
13	141.3	$585	29	173.8	$6CA
14	151.4	$5EA	30	179.9	$707
15	162.2	$656	31	186.2	$746
16	192.8	$788	32	203.5	$7F3

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000968 NIICD USER'S GUIDE

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

The NIICD 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 NIICD User's Guide is available for download on-line at:

www.nifc.gov/resources/NIICD/2025NIICDUsersGuide.pdf

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NFES# 000968

004080 SOLAR PANEL KIT

The NFES# 004080 Solar Panel kit allows NIICD 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 equipment SLA batteries and the solar panel kit SLA battery.*
- *If using the both solar panel kit and SLA battery kit, the voice board monitors the solar voltage and will automatically switch to the internal SLA battery power when the solar voltage falls below 10 Volts. When the solar voltage rises above 12 Volts, it will switch back to solar panel battery power. This conserves the internal equipment SLA 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 NIICD equipment to function properly. It contains two 12 Volts SLA batteries that need to configured in parallel to provide voltage to the NIICD 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 Equipment Note below when ordering equipment separately)

See Appendix B for proper wiring installation diagrams.

DO NOT ship any 4150 batteries back to NIICD without foam or spacers or within other NIICD radio equipment boxes or kits. This could cause a potential fire hazard during shipping.

Pre-Wired Plug and Play Y-Cable Connector: The 4150 batteries now come with a pre-installed Y-Cables. The Y-Cable is equipped with two power pole connectors. One connector plugs into the equipment, while the other connector allows additional batteries to connect in parallel or provide a charging access point. Please do not remove the Y-Cable. Each battery terminal comes protected with a plastic terminal cover to minimize/prevent shorts during transportation.

Equipment Note:

- A 004150 Sealed Lead Acid Battery Kit is required for the following NIICD 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

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 tow-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 NIICD UHF Logistics radios are multichannel/multi-group-capable. Each radio has 16 channels per group/zone available for programming user frequencies. All NIICD 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 NIICD 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 (Exmaple: 4244K2-FKC-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.*
- *NIICD 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.*

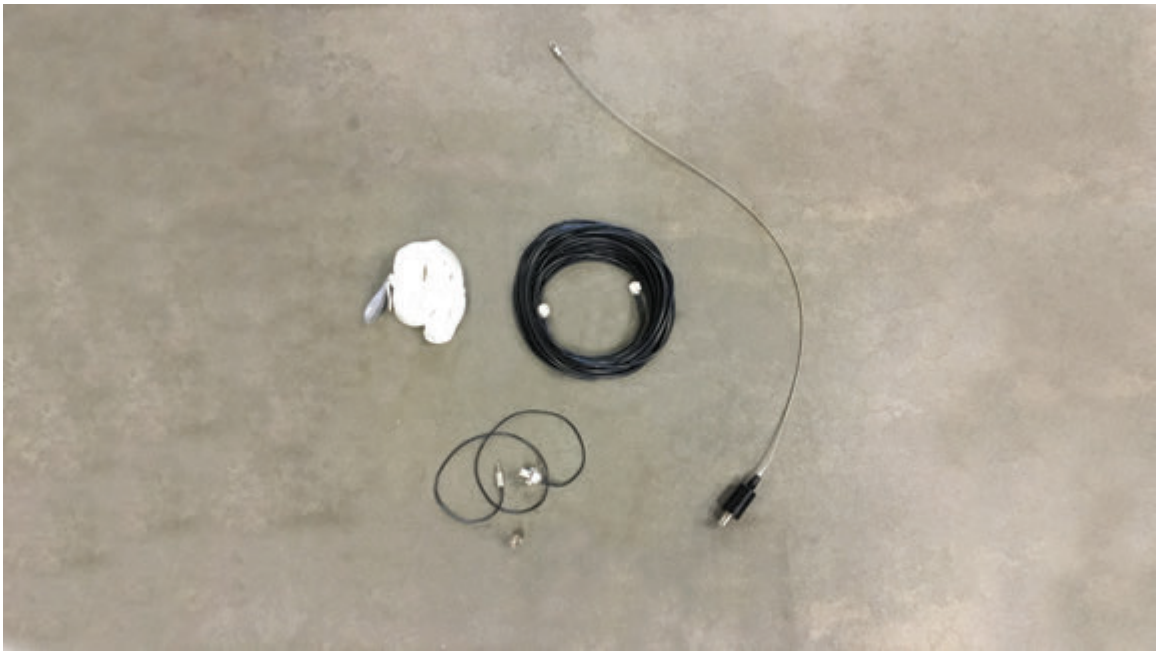
NFES# 004244 UHF Logistics Radio Kit Components

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

The NFES# 004248 Logistics Repeater is a battery-operated unit operating in the UHF Band between 404-420Mhz and is 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. This kit also includes one set of Antenna Masts NFES# 004305 which do not need to be ordered separately.

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 contains a 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 cable 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:

- *NIICD 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 004248 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.*
- *All 004248 Logistics Repeaters include a battery charger with power pole connectors*
- *UHF Logistic Repeaters are delivered pre-programmed from NIICD and cannot be programmed or tuned in the field.*

NFES# 004248 UHF Logistics Repeater Kit Components

004281 CROSSBAND LINK 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.***
This kit also includes two sets of Antenna Masts NFES# 004305 which do not need to be ordered separately.

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 a 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.*
- *All NFES# 004281 Crossband Links include a battery charger with power pole connectors*
- *Frequencies must be coordinated and programmed at NIICD 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. This kit also includes two sets of Antenna Mast NFES# 004305 which do not need to be order separately.

Note: This kit cannot be linked to any other NIICD 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 thought the IROC ordering process.*
- *Contact the CDO or COMC for appropriate AM frequency assignment.*

NFES# 004300 Ground VHF-AM Base Station Kit Components

004312 VHF COMMAND REPEATER/LINK KIT

The NFES# 004312 Command Repeater/Link is a portable unit operating on VHF Band between 136-173 Mhz that is 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. This units comes with two sets of NFES# 4305 Antenna Mast and does not need to ordered separately.

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.

NIICD Command Repeaters can be linked by only two methods:

Simplex: Simplex UHF, All VHF repeaters in the system MUST have line-of-sight back to each VHF repeater.

Duplex: Duplex UHF using a Logistics Repeater as a hub, each VHF repeater in the system MUST have line-of-sight back to the UHF repeater 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 0404150 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)***

Note: If the Command Repeater NFES 4312 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.

A shore power adapter cable has been added to the NFES# 004312 Command Repeater Kit. This is a fused cable 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 a 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.*
- *All NFES# 4312 Kits include a battery charger with power pole connectors.*
- *The 004312 modules are delivered pre-programmed from NIICD and must not be programmed or tuned in the field.*

NFES# 004312 VHF Command Repeater/Link Kit Components

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 NIICD. 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 NIICD 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**
- **2 each, BKR Cloning Adapters**

NFES# 004320 COML Kit Components

004330 REMOTE KIT

The NFES# 004330 Remote Kit is an auxiliary base station used to control either the Command Repeater (4312), UHF Logistics Repeater (4248), Crossband Link (4281), or the Aircraft Link (4370) when direct line of sight is not possible. Use of this kit in conjunction with NIICD radios, allows a remote base station to be installed up to 1/4 of a mile away from the ICP, camp, heli-base, etc. Each kit includes one set of NFES# 004305 Antenna Mast and do not need to be ordered separately.

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).
Each NFES# 004330 includes a battery charger with power pole connectors.

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)**
- **4330X2 - Motorola** **(Example: 4330X2-FCK-XXX)**

NFES# 004330 Remote Kit Components

4330EX REMOTE EXPANSION KIT

The NFES# 4330EX Remote Expansion Kit allows users to placed 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).
Each NFES# 4330EX includes a battery charger with power pole connectors.

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 NIICD for proper line impedance.

NFES# 4330EX Remote Expansion Kit Components

004370 GROUND AIRCRAFT RADIO/LINK 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. This kit comes with two sets of NFES#004305 Antenna Masts and do not need to be ordered separately. Each kit 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 cable 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 a 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.*
- *All NFES#004370 Kits include a battery charger with power pole connectors.*

NFES# 004370 Ground Aircraft Radio/Link Kit Components

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 NIICD VHF Command radios are multichannel/multi-group-compatible. Each radio has 16 channels per group/zone available for programming user frequencies. All NIICD 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 NIICD 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 NIICD 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 NIICD 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 16 boxes of assorted equipment with 6 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**
- **1 each (NFES# 004330)- Remote Kits**
- **3 each (NFES# 008080)- Flexible Solar Panel Kits**
- ***6 each (NFES# 004305) - Antenna Mast***

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.

NIICD 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.

NIICD 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.*
- *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 NIICD-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 NIICD-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 NIICD 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 NIICD 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 NIICD 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 NIICD 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

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GENERAL

COMMUNICATIONS

CONDITIONS AND SOLUTIONS

GENERAL COMMUNICATIONS CONDITIONS AND SOLUTIONS

CONDITIONS	EQUIPMENT SOLUTIONS	NFES #	DRAWING #
A new or growing incident needing Command, Logistics, and tactical communications.	**Starter System** Contains sufficient equipment to initially support a new incident which has potential for increasing in size. <u>Starter System includes the following Kits:</u> NFES# 004312 - CMD Repeater/Link (1) NFES# 004381 - CMD/TAC Radio Kits (3) NFES# 004370 - Ground Aircraft Link Kit (1) NFES# 004330 - Remote Kit (1) NFES# 004248 - Logistics Repeater (1) NFES# 004244 - Logistics Radio Kit (1) NFES# 004150 - Sealed Lead Acid Battery Kit (5) NFES# 004080 - Flexible Solar Panel Kit (3)	**004390**	**NA**
Incident areas are not within line-of-sight of each other.	**VHF Command Repeater/Link** **VHF CMD/TAC Radio Kit** **Remote Kit** **Two Sealed Lead Acid Battery Kits Kit** 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.	**004312** **004381** **004330** **004150**	**1**
Logistics areas are not within line-of-sight of each other.	**UHF Logistics Radio Kit** **UHF Logistics Repeater Kit** **Remote Kit** **Two Sealed Lead Acid Battery Kit** 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.	**004244** **004248** **004330** **004150**	**2**
Need to back haul CMD Repeater to reach ICP/ICC due to obstructing terrain.	**VHF Command Repeater/Link** **UHF Logistics Repeater** **Remote Kit** **Three Sealed Lead Acid Battery Kits** 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.	**004312** **004248** **004330** **004150**	**3**

GENERAL COMMUNICATIONS CONDITIONS AND SOLUTIONS

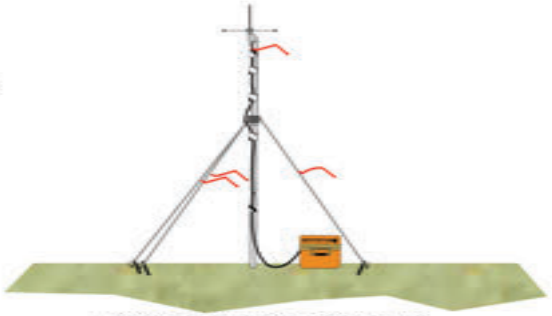
CONDITIONS	EQUIPMENT SOLUTIONS	NFES #	DRAWING #
Need to link two ends of an incident which has considerable linear distance or terrain obstructions.	**Two VHF Command Repeater/Links** **Remote Kit** **Three Sealed Lead Acid Battery Kits** CMD Repeaters can be linked via a UHF Simplex frequency to cover 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.	**Three or more VHF Command Repeater/Links** **Remote Kit** **Four or more SLA Battery Kits** 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.	**Two VHF Command Repeater/Links** **UHF Logistics Repeater** **Remote Kit** **Four Sealed Lead Acid Battery Kits** 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.	**Three or more VHF Command Repeater/Links** **UHF Logistics Repeater** **Remote Kit** **Five or more SLA Battery Kits** 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**

DRAWING 1 - ONE VHF COMMAND REPEATER STAND-ALONE WITH REMOTE

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

INCIDENT OPERATIONS AREA

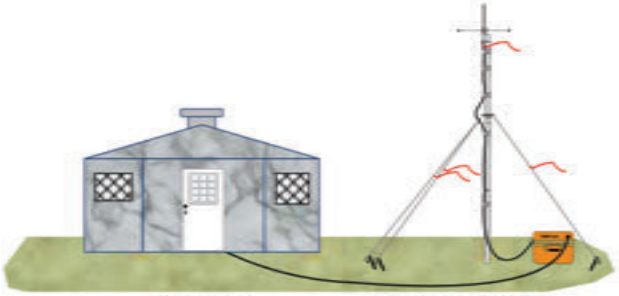
VHF



4312 - COMMAND REPEATER/LINK

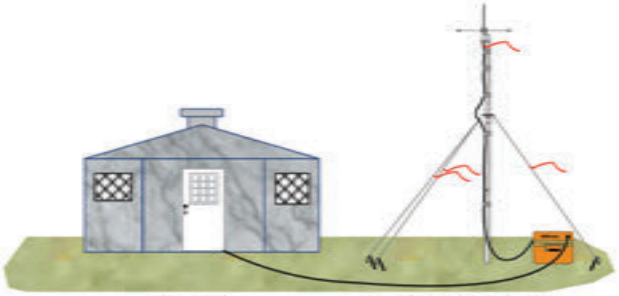
VHF

VHF



OPS/MED

4330 - REMOTE KIT



ICP/ICC
OR
OTHER INCIDENT
OPERATIONS AREA

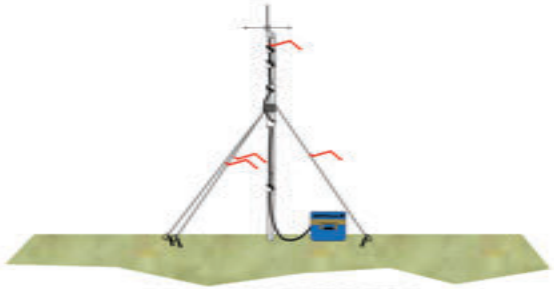
4330 - REMOTE KIT

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 2 - ONE UHF REPEATER STAND-ALONE WITH REMOTES

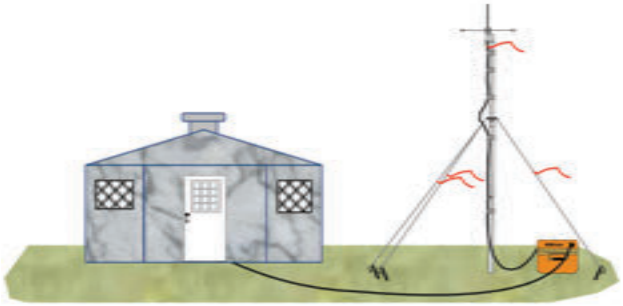
SUGGESTED EQUIPMENT:
1 EA 4248 LOGISTICS REPEATER KIT
1 EA 4244 LOGISTICS RADIO KIT
2 EA 4330 REMOTE KIT
3 EA 4150 SLA BATTERY KIT



4248 - LOGISTICS REPEATER

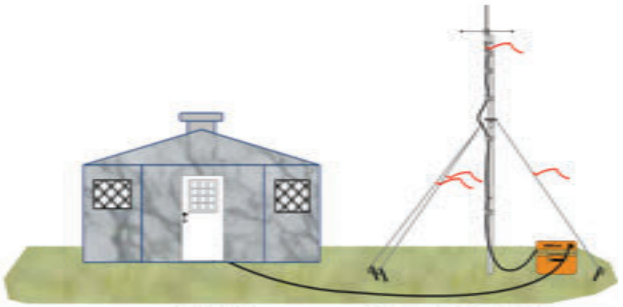
UHF

UHF



EXPANDED DISPATCH, SPIKE CAMPS, STAGING AREAS, ETC.

4330 - REMOTE KIT (WITH OMNI ANTENNA)



ICP/ICC

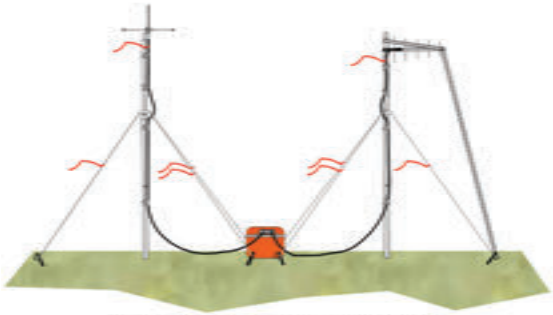
4330 - REMOTE KIT

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

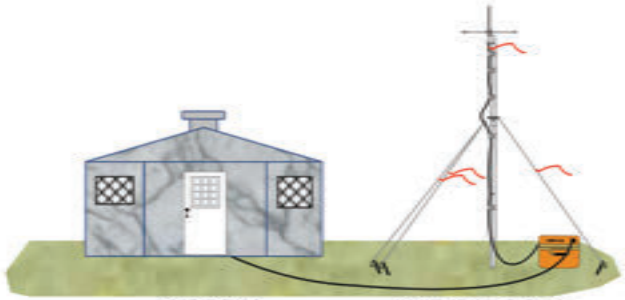
NOTE: THIS SYSTEM REQUIRES ONE (1) UHF FREQUENCY PAIR.

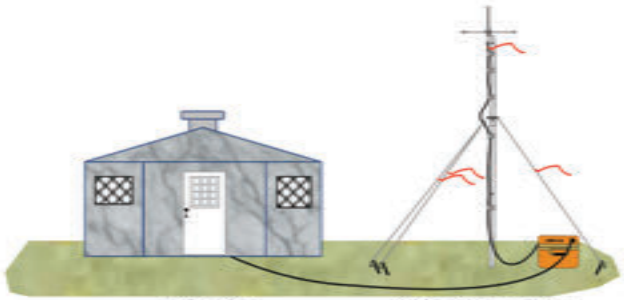
DRAWING 3 - ONE VHF COMMAND REPEATER LINKED THROUGH UHF REPEATER HUB

SUGGESTED EQUIPMENT:
1 EA 4312 COMMAND REPEATER KIT
1 EA 4248 LOGISTICS REPEATER KIT
2 EA 4330 REMOTE KIT
1 EA 4381 CMD/TAC RADIO KIT
4 EA 4150 SLA BATTERY KIT




INCIDENT OPERATIONS AREA



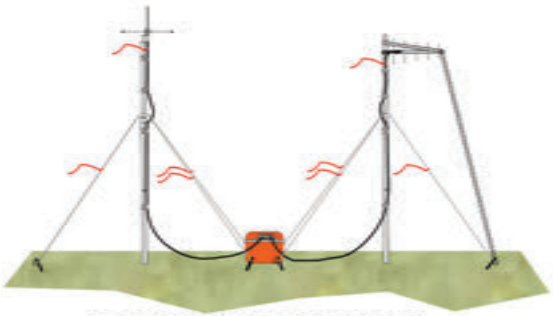


THIS SYSTEM IS USED WHEN TERRAIN LIMITS LINE-OF-SIGHT ACCESS FROM THE COMMAND REPEATER TO THE ICP/ICC. INSTALLING A LOGISTICS REPEATER AS A HUB LINKED FROM ICP TO THE COMMAND REPEATER PROVIDES ADDITIONAL COVERAGE.

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

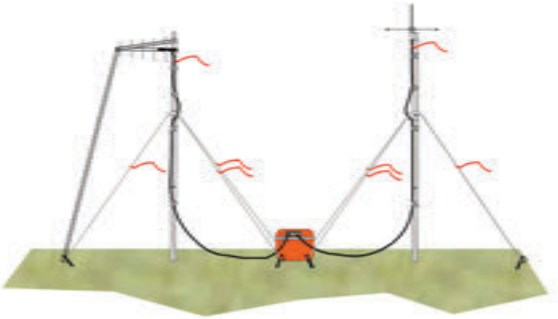
DRAWING 4 - TWO VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX

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



4312 - COMMAND REPEATER LINK
(WITH YAGI ANTENNA ON THE UHF LINK)

UHF
SIMPLEX



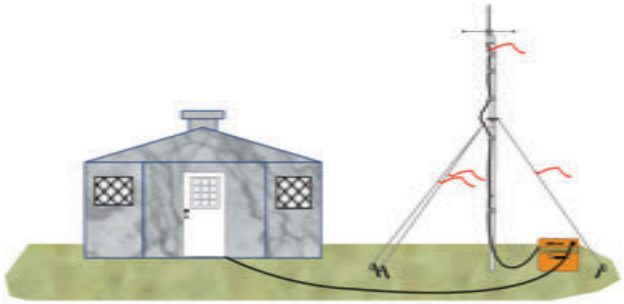
4312 - COMMAND REPEATER LINK
(WITH YAGI ANTENNA ON THE UHF LINK)

VHF

VHF

VHF

INCIDENT OPERATIONS AREA 1



ICP/ICC

4330 - REMOTE KIT
(WITH OMNI ANTENNA)

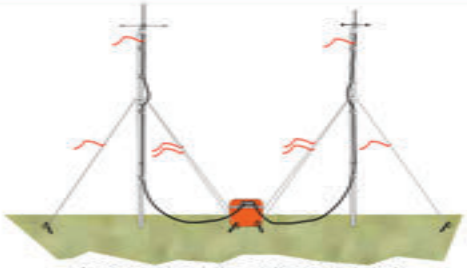
INCIDENT OPERATIONS AREA 2

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 5 - THREE VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX

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

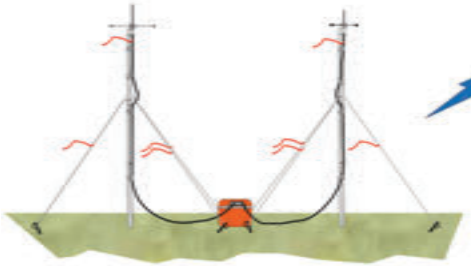


4312 - COMMAND REPEATER LINK
(WITH OMNI ANTENNA ON THE LINK)

VHF

INCIDENT OPERATIONS AREA 1

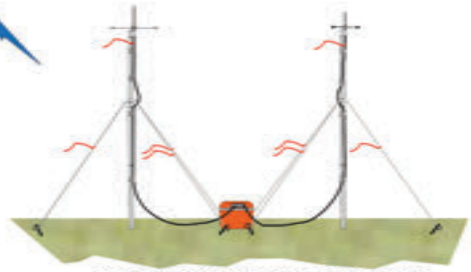
UHF
(SIMPLEX)



4312 - COMMAND REPEATER LINK
(WITH OMNI ANTENNA ON THE LINK)

UHF
(SIMPLEX)

UHF
(SIMPLEX)



4312 - COMMAND REPEATER LINK
(WITH OMNI ANTENNA ON THE LINK)

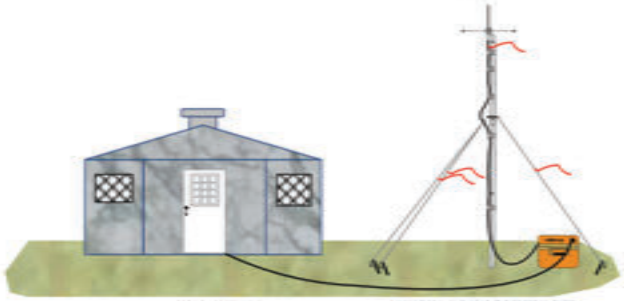
VHF

VHF

VHF

INCIDENT OPERATIONS AREA 2

INCIDENT OPERATIONS AREA 3



ICP/ICC

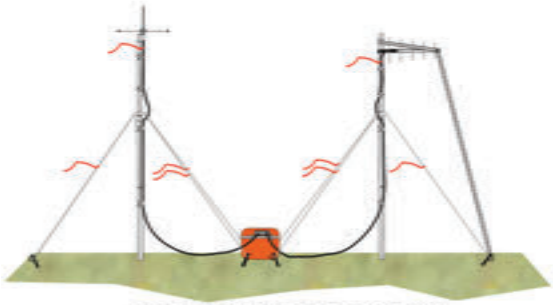
4330 - REMOTE KIT
(WITH OMNI ANTENNA)

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

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

DRAWING 6 - TWO VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB

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



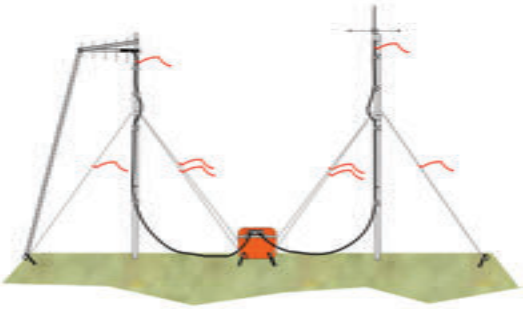
4312 - COMMAND REPEATER LINK
(WITH YAGI ANTENNA ON THE UHF LINK)

UHF

4248 - LOGISTICS REPEATER

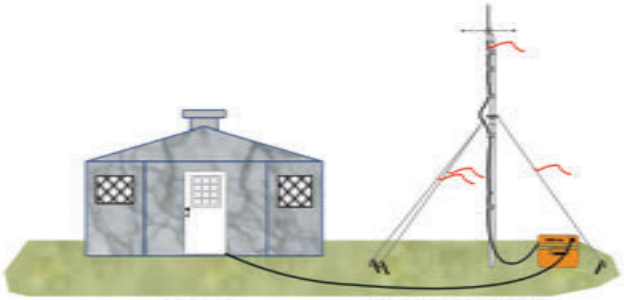
UHF

UHF



4312 - COMMAND REPEATER LINK
(WITH YAGI ANTENNA ON THE UHF LINK)

VHF



ICP/ICC

4330 - REMOTE KIT
(WITH OMNI ANTENNA)

VHF

INCIDENT OPERATIONS AREA 2

INCIDENT OPERATIONS AREA 1

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

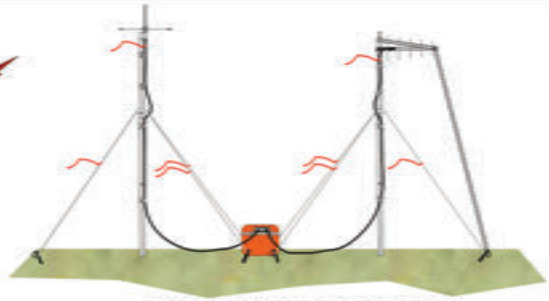
NOTE: THIS SYSTEM LINKS TWO (2) DIFFERENT VHF COMMAND FREQUENCY PAIR AND ONE (1) UHF LOGISTICS FREQUENCY PAIR.

DRAWING 7 - THREE VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB

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

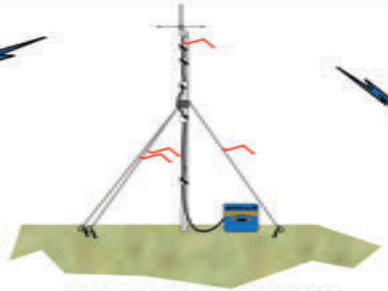
INCIDENT OPERATIONS AREA 3

VHF



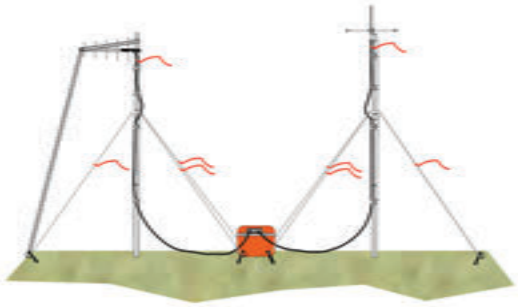
4312 - COMMAND REPEATER LINK
(WITH YAGI ANTENNA ON THE UHF LINK)

UHF



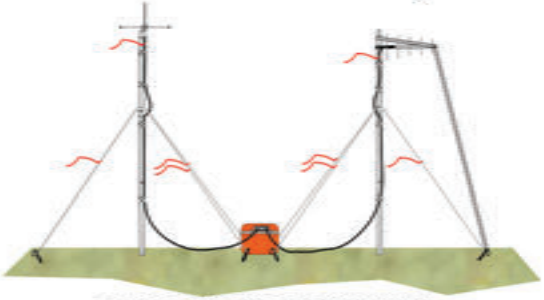
4248 - LOGISTICS REPEATER

UHF



4312 - COMMAND REPEATER LINK
(WITH YAGI ANTENNA ON THE UHF LINK)

UHF



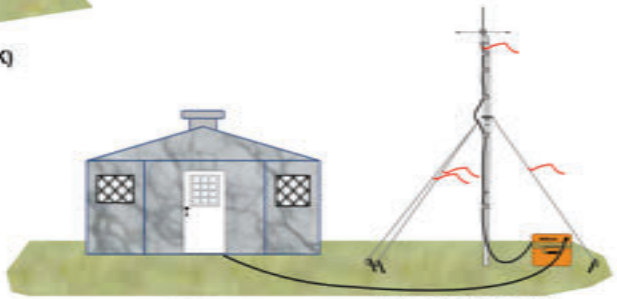
4312 - COMMAND REPEATER LINK
(WITH YAGGI ANTENNA ON THE UHF LINK)

VHF

VHF

VHF

INCIDENT OPERATIONS AREA 2



ICP/ICC

4330 - REMOTE KIT
(WITH OMNI ANTENNA)

INCIDENT OPERATIONS AREA 1

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 PAIR AND ONE (1) UHF LOGISTICS FREQUENCY PAIR.

AVIATION

COMMUNICATIONS

CONDITIONS AND SOLUTIONS

AVIATION COMMUNICATIONS CONDITIONS AND SOLUTIONS

CONDITIONS	EQUIPMENT SOLUTIONS	NFES#	DWG#
Need helibase/airport ground-to-aircraft communications (VHF-AM).	**Ground VHF-AM Base Station Kit** **or** **Ground to Aircraft Radio/Link Kit** **Sealed Lead Acid Battery Kit** **Base Station Use Only:** Projects or incidents needing VHF-AM base station capabilities. Will communicate directly with aircraft, without modification, on VHF-AM frequencies. Dedicated AM frequency should be ordered through dispatch and issued by the CDO or COMC. Each kit include four (4) programmable ICOM radios that can be used by ground personnel at the helibase or airport.	**004300** **or** **004370** **004150**	**8**
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.)	**Ground to Aircraft Radio/Link Kit (Linking)** **Sealed Lead Acid Battery Kit** 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. Dedicated VHF-AM and UHF-FM frequencies must be ordered through dispatch and issued by the CDO or COMC Each kit includes four (4) programmable ICOM radios.	**004370** **004150**	**9**

AVIATION COMMUNICATIONS CONDITIONS AND SOLUTIONS

CONDITIONS	EQUIPMENT SOLUTIONS	NFES#	DWG#
Extensive flight-following needs require expansion of Radio/Link system utilizing two (2) kits.	**Two Ground Aircraft Radio/Link Kits** **Two Sealed Lead Acid Battery Kits** By using two (2) Ground Aircraft Radio/Link Kits linked through a UHF-FM repeater frequency, flight-following capabilities can be greatly expanded. 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. Dedicated VHF-AM and UHF-FM frequencies must be ordered through Expanded Dispatch. Each kit includes four (4) handheld programmable ICOM radios.	**004370** **004150**	**10**
MAFFS Activation or Temporary Tanker Base	**Airbase Kit** **Airbase Accessories Kit** 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. 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. Dedicated VHF-AM and VHF-FM frequencies must be ordered through dispatch. Air Guard (168.6250 MHz) does not need to be ordered.	**004660** **004240**	**11**

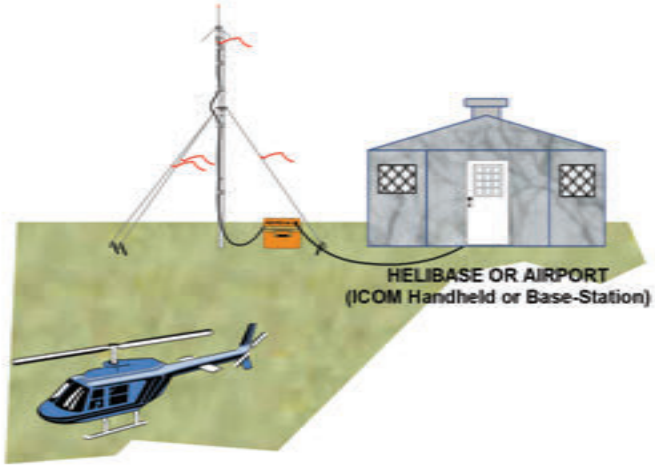
DRAWING 8 - AIRCRAFT LINK SYSTEM (BASE CONFIGURATION) GROUND TO AIRCRAFT COMMUNIATIONS

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)

VHF-AM
(SIMPLEX)



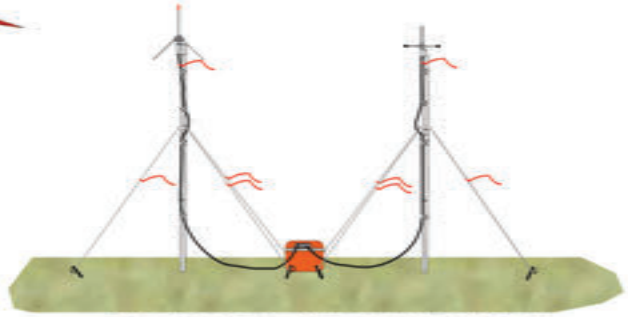
THIS SYSTEM PROVIDES LOCAL FLIGHT FOLLOWING AT THE SURROUNDING INCIDENT HELI-BASE.

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

DRAWING 9 - AIRCRAFT LINK SYSTEM (LINK CONFIGURATION) WITH REMOTE AT HELIBASE

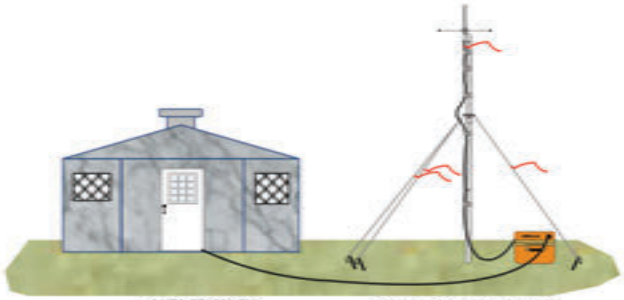
SUGGESTED EQUIPMENT:
1 EA 4370 GROUND AIRCRAFT RADIO LINK KIT
(INCLUDES 4 EA ICOM AM HANDHELD RADIOS
1 EA 4330 REMOTE KIT
2 EA 4150 SLA BATTERY KIT

VHF-AM
(SIMPLEX)



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

UHF-FM
(SIMPLEX)



HELIBASE/
AIRPORT

4330 - REMOTE KIT
(WITH OMNI ANTENNA)

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

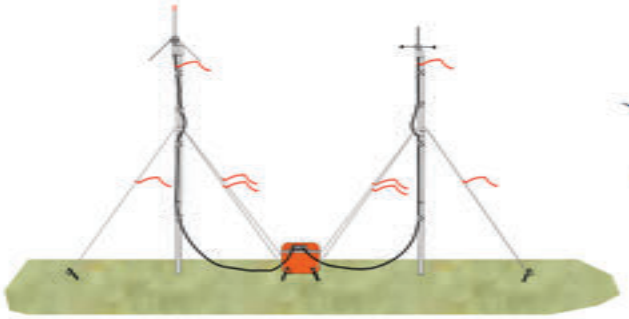
**NOTE: THIS SYSTEM REQUIRES ONE (1) AM SIMPLEX FREQUENCY AND ONE (1) UHF SIMPLEX FREQUENCY.
AM FREQUENCY IS ISSUED FROM THE FAA THROUGH THE CDO OR COMC AND MUST BE ORDERED THROUGH IROC.
UHF FREQUENCY IS ISSUED FROM THE CDO OR COMC.**

DRAWING 3 - ONE VHF COMMAND REPEATER LINKED THROUGH UHF REPEATER HUB

VHF-FM A/G (SIMPLEX)

VHF-AM (SIMPLEX)

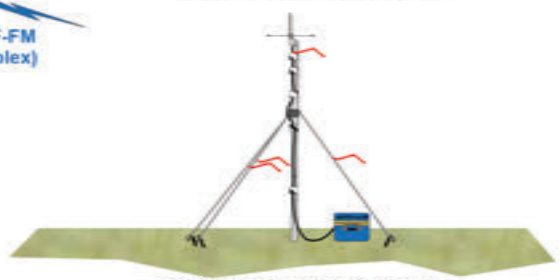
BRANCH 1
DIVISION OPERATIONS



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

UHF-FM (Duplex)

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



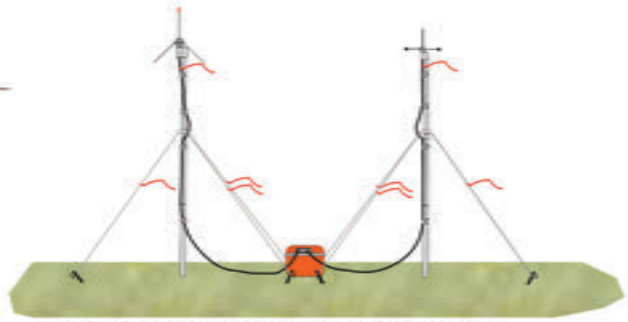
4248 - LOGISTICS REPEATER

UHF-FM (Duplex)

UHF-FM (Duplex)

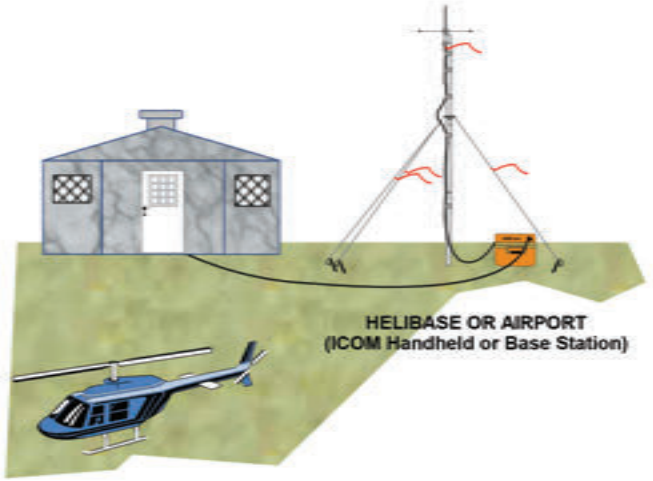
VHF-FM A/G (SIMPLEX)

VHF-AM (SIMPLEX)



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

BRANCH 2
DIVISION OPERATIONS



HELIBASE OR AIRPORT
(ICOM Handheld or Base Station)

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

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 AND MUST BE ORDERED THROUGH IROC.

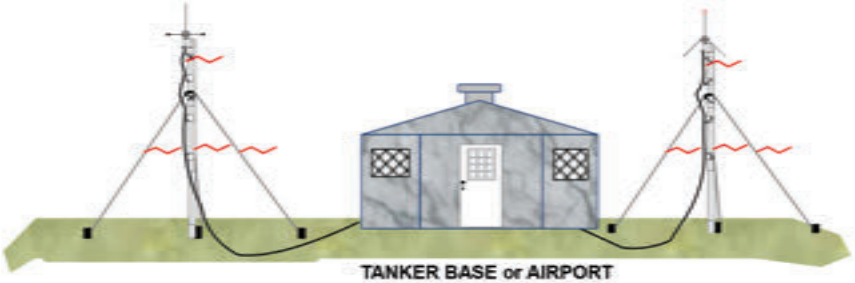
DRAWING 11 - MAFFS ACTIVATION OR TEMPORARY TANKER BASE OPERATIONS

SUGGESTED EQUIPMENT:
1 EACH 4660 AIRBASE KIT
(INCLUDES 10 EA ICOM AM HANDHELD RADIOS AND HEADSETS)

OPTIONAL:
1 EACH 4240 AIRBASE ACCESSORIES KIT
(INCLUDED 5 EA ICOM AM HANDHELD RADIOS AND HEADSETS)

VHF-AM VICTOR
(SIMPLEX)

VHF-FM
NATIONAL FLIGHT FOLLOWING
(SIMPLEX)



TANKER BASE or AIRPORT
(4660 - AIRBASE KIT)

VHF-AM VICTOR
(SIMPLEX)

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 NATIONAL FLIGHT FOLLOWING FREQUENCY OR NATIONAL AIR GUARD FREQUENCY FOR EMERGENCY COMMUNICATIONS.
AM FREQUENCIES ARE ISSUED FROM THE FAA THROUGH THE CDO OR COMC AND MUST BE ORDERED THROUGH IROC.

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NIICD 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.

Equipment Note:
SLA batteries kits weigh 50 lbs.
Battery voltage will vary between 11 Volts and 14 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.

Equipment Note:
*When both the Solar Panel Kit and Optional External Batteries are used, the solar panel will charge **BOTH** the Solar Panel Kit SLA battery and the Optional External battery connected as a parallel battery configuration.*
The Solar Panel Kit will NOT charge the equipment internal SLA batteries inside the equipment.

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

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

Equipment 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 all of the NIICD mountain top 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.

Equipment Note:
If using both solar panel kit and equipment internal SLA batteries, the voice board monitors the solar voltage and will automatically switch to the internal SLA power when the solar voltage falls below 10 Volts. When the solar voltage rises above 12 Volts, it will switch back to the solar power kit SLA battery and/or optional external battery if attached. This conserves the equipment internal SLA batteries, allowing the equipment to run off one set of batteries for extended periods of time without the need to change them more frequently.

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

004080 - SOLAR PANEL KIT SETUP PROCEDURE (OVERHEAD VIEW)

Figure 2: Equipment Bulkhead Mount Back View

Figure 3: Solar Kit Bulkhead Front View

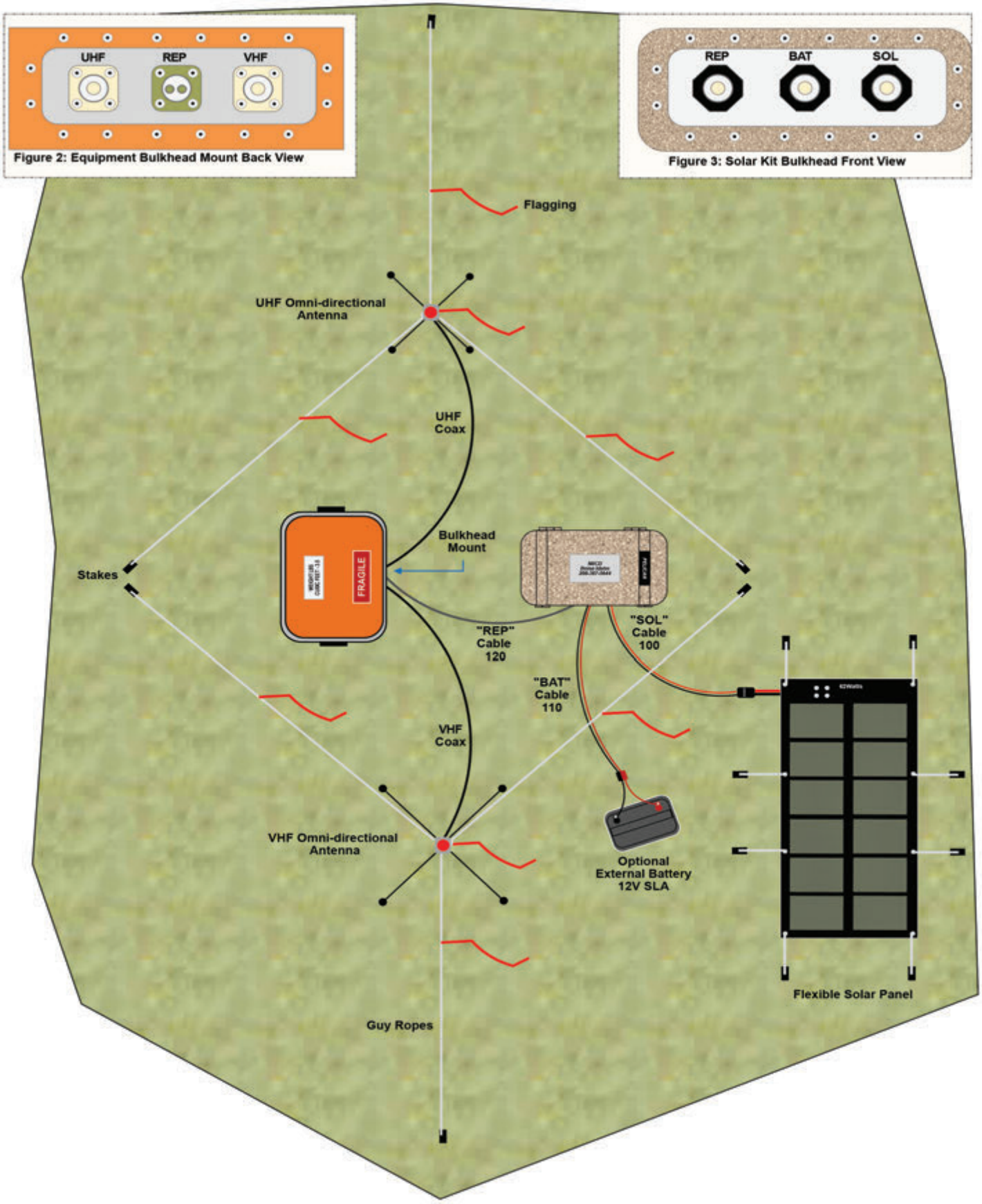

Figure 1: Solar Panel Installation (Overhead View)

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.
     Equipment 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)***
     Equipment Note:
     To prevent damage to the bulkhead mount connectors, do not attach base antennas directly to the bulkhead connectors without using the coax cables.

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)***

     Equipment 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 NIICD 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.
   NIICD recommends testing whole system with the field units or ICP if possible before leaving the site.

Note: See "NIICD Equipment Switch Settings" in Appendix D for MT-5 and E-Model Switch Settings

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

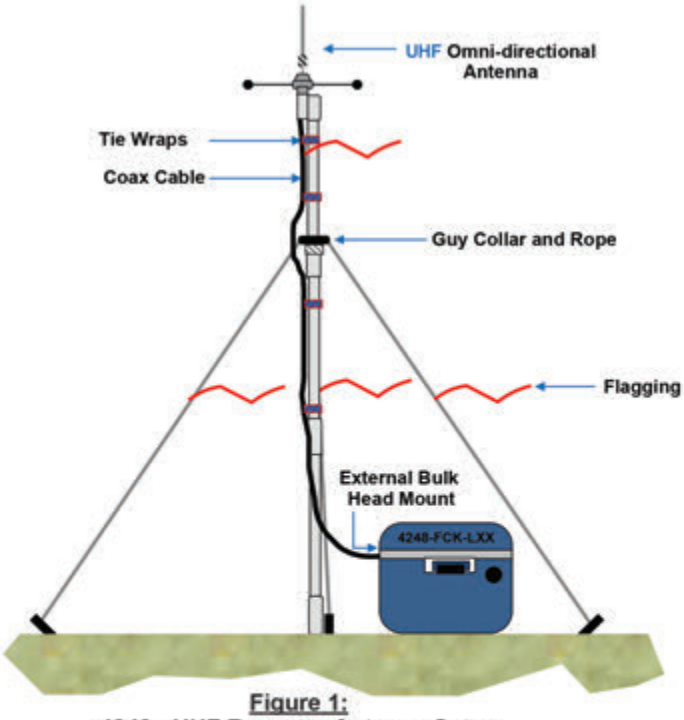

Figure 1:
4248 - UHF Repeater Antenna Setup

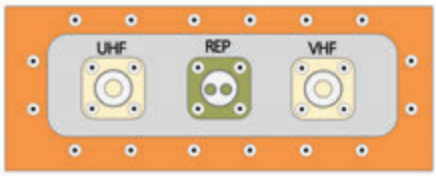

Figure 2:
4248 - UHF Repeater Bulkhead Mount Connectors (N-Type)

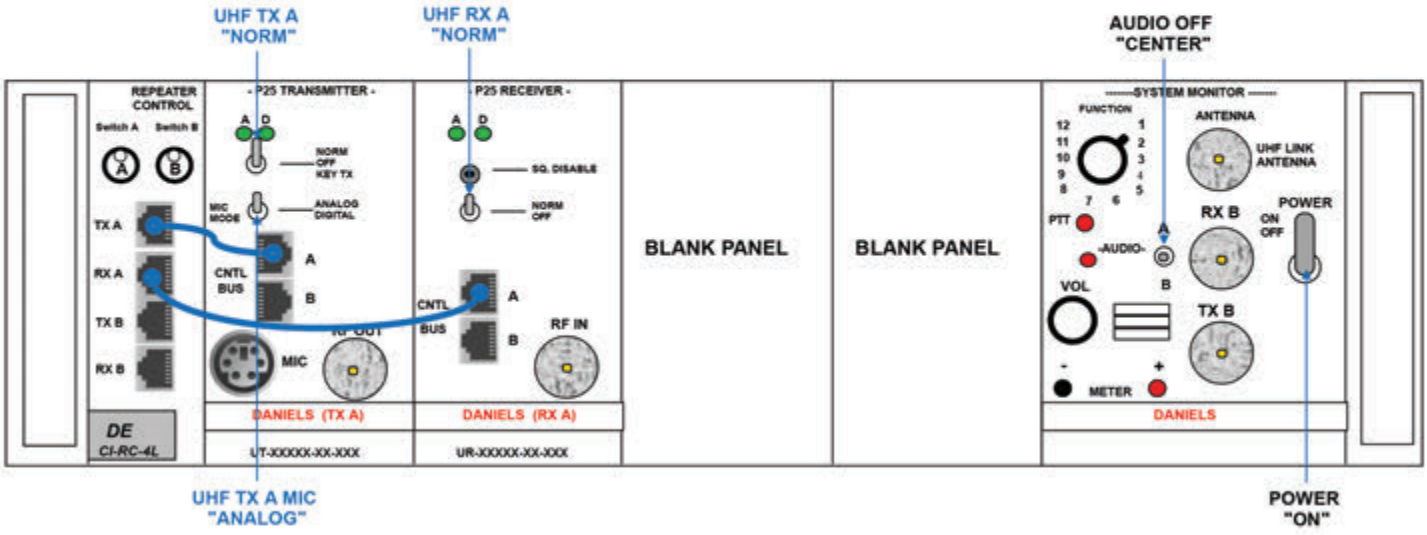

Figure 3:
4248 - UHF Repeater Switch Settings

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.

   Equipment 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)***

   Equipment Note:
   To prevent damage to the bulkhead mount connectors, do not attach base antennas directly to the bulkhead connectors without using the coax cables.

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)***

   Equipment 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.
   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 NIICD.

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 NIICD
   - 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 NIICD
   - 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.
   NIICD recommends testing whole system with the field units or ICP if possible before leaving the site.

Note: See "NIICD Equipment Switch Settings" in Appendix D for MT-5 and E-Model Switch Settings

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

004281 CROSSBAND LINK SETUP PROCEDURE

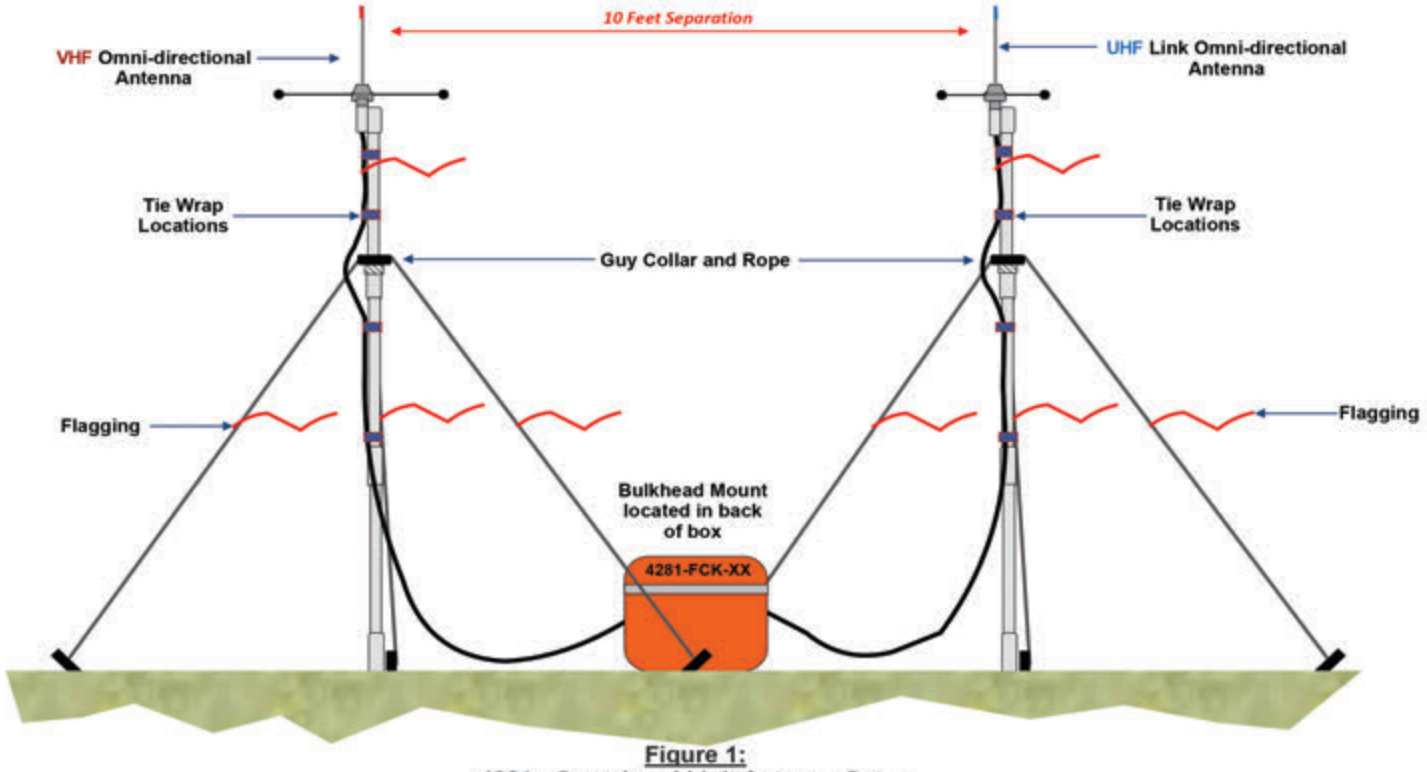

Figure 1:
4281 - Crossband Link Antenna Setup

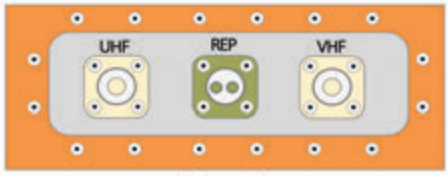

Figure 2:
4281 - Crossband Link Bulkhead Mount Connectors (N-Type)

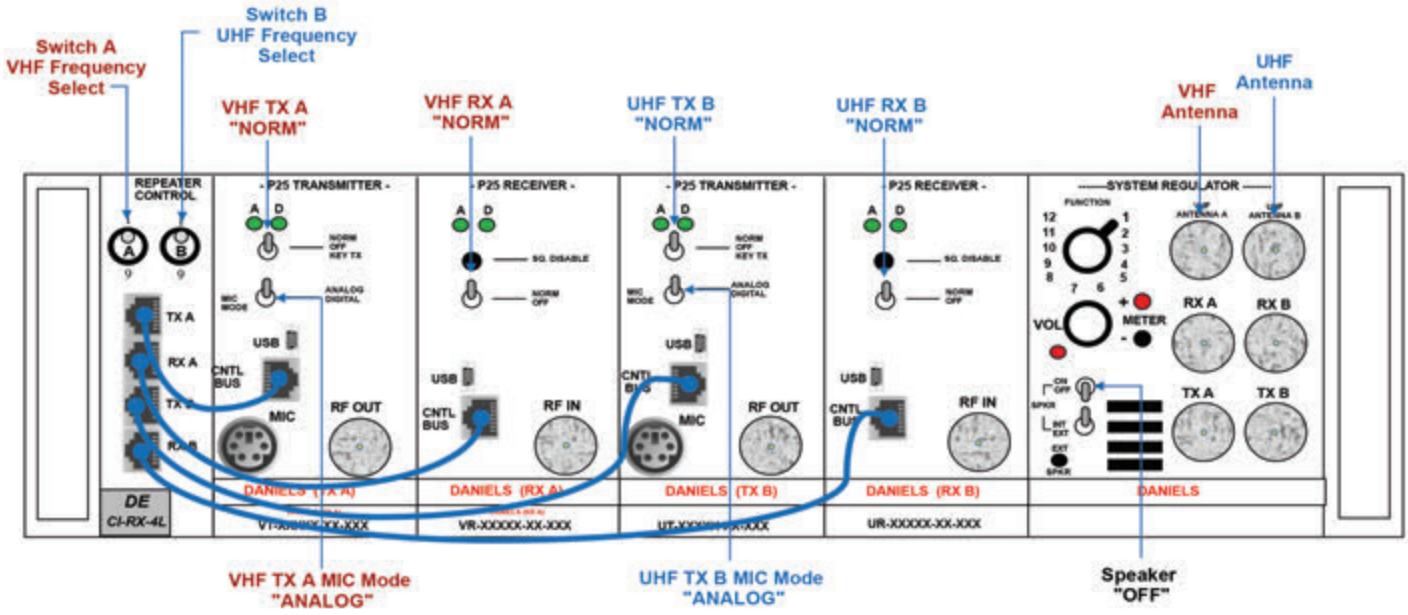

Figure 3:
4281 - Crossband Link Switch Settings

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.
     Equipment 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)***
     Equipment Note:
     To prevent damage to the bulkhead mount connectors, do not attach base antennas directly to the bulkhead connectors without using the coax cables.

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)***

     Equipment 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 NIICD 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.
   NIICD recommends testing whole system with the field units or ICP if possible before leaving the site.

Note: See "NIICD Equipment Switch Settings" in Appendix D for MT-5 and 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

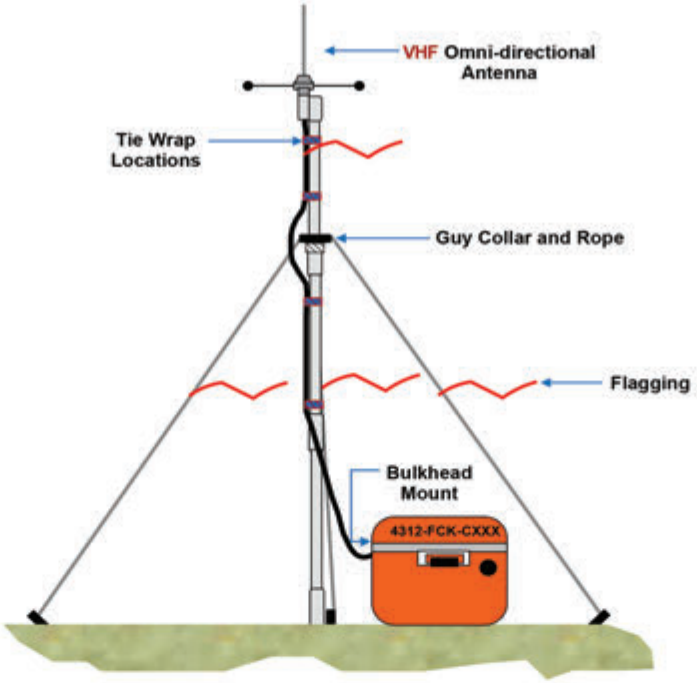

Figure 1:
4312 - VHF Repeater Antenna Setup (Stand Alone)

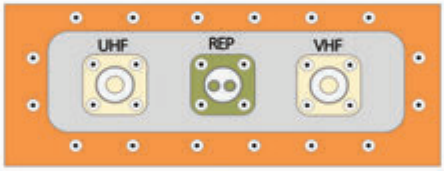

Figure 2:
4312 - VHF Repeater Bulkhead Mount Connectors (N-Type)

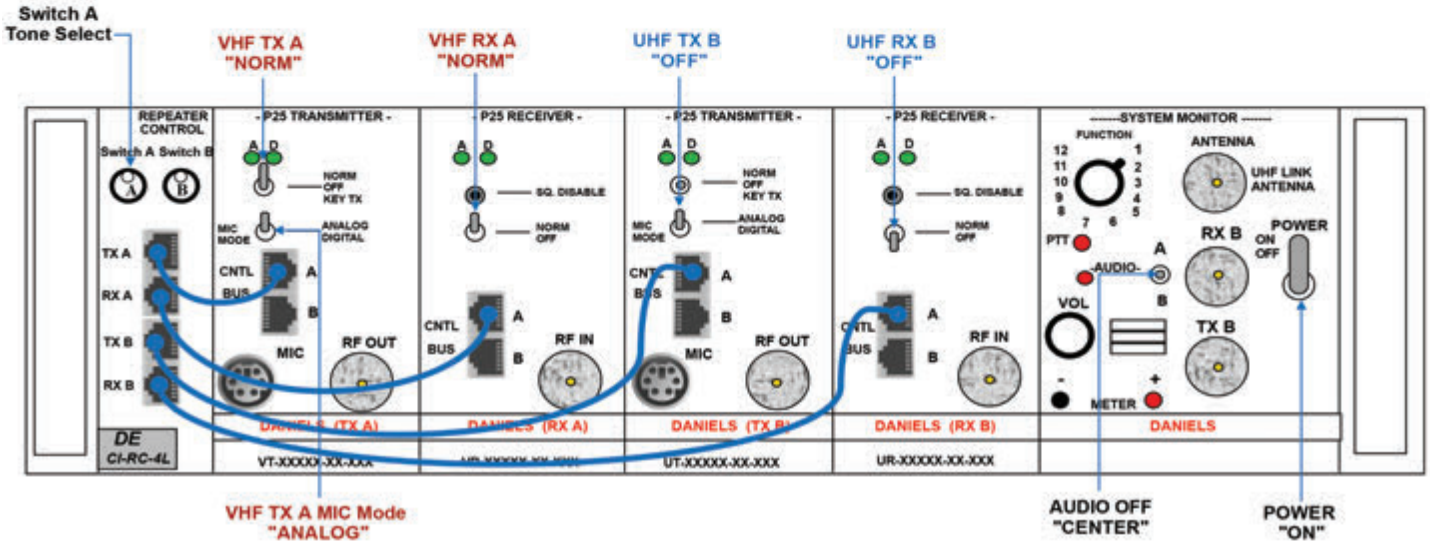

Figure 3:
4312 - VHF Repeater Switch Settings (Stand Alone)

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.

Equipment 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, NIICD 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)***

Equipment Note:
To prevent damage to the bulkhead mount connectors, do not attach base antennas directly to the bulkhead connectors without using the coax cables.

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)***

Equipment 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 NIICD 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.
NIICD recommends testing whole system with the field units or ICP if possible before leaving the site.

Note: See "NIICD Equipment Switch Settings" in Appendix D for MT-5 and 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

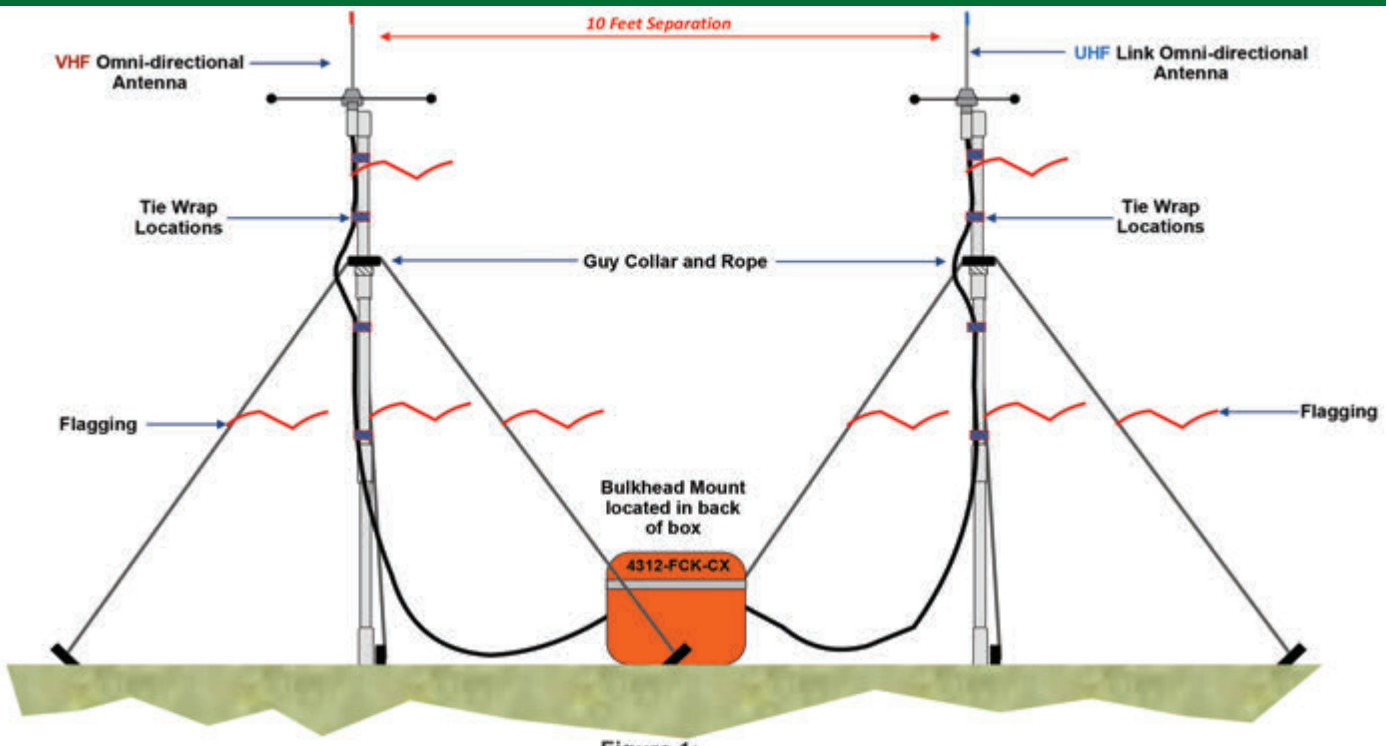

Figure 1:
4312 - VHF Repeater/Link Antenna Setup (Link Configuration)

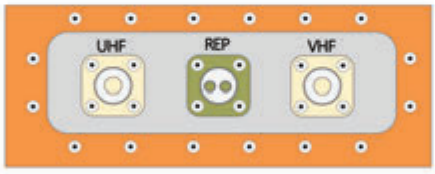

Figure 2:
4312 - VHF Repeater/Link Bulkhead Mount Connectors (N-Type)

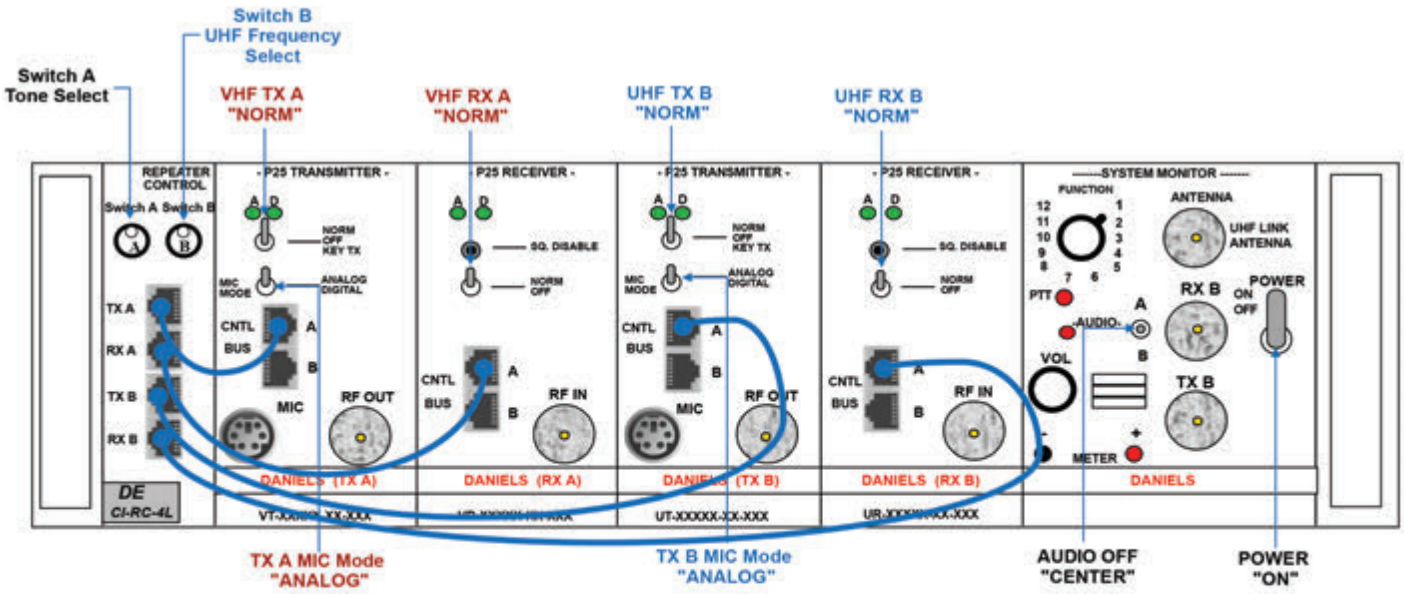

Figure 3:
4312 - VHF Repeater/Link Switch Settings (Link Configuration)

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

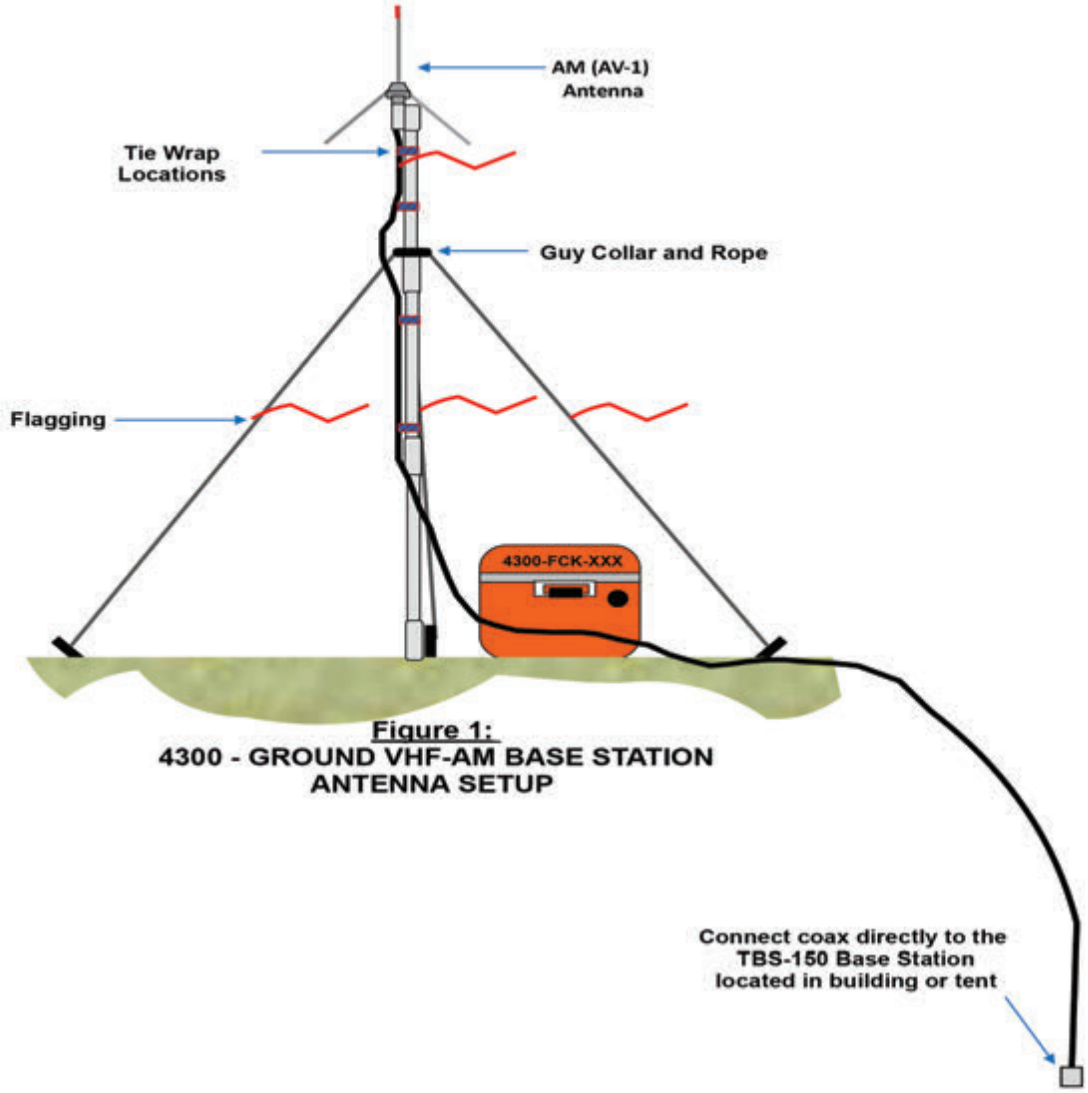

Figure 1:
4300 - GROUND VHF-AM BASE STATION ANTENNA SETUP

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. The 4330 Remote Kit contains both a **VHF** and **UHF** radio.
   - Connect power to the appropriate radio by using a 12 Volt SLA battery to the appropriate power connecter 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.

     Equipment Note:
     Some systems may require the user to program the RX/TX frequency and tone, see Appendix E for detailed information on radio programming.
   - 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.

     Equipment 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 NIICD 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 and 4)***
     - **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.
   - Verify the correct dip switch setting on the CPI. ***(See Figure 5)***

   CAUTION: Observe correct polarity when using batteries.
   The CPI remote desk set operates on + 12.0 V and up to +15.0 Volts.

4. **Field Wire Setup:** ***(See Figure 1, 2 and 3)***
   - String the communications field wire from the grey chassis enclosure back to the remote desk set location.
   - Strip and attach the wires directly to the bindings on the back on the CPI remote set (***not polarity dependent***).
   - Strip and attach the wires directly to the bindings on the front of the grey chassis enclosure.

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

     Equipment Note:
     It is preferred to keep the metal chassis 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

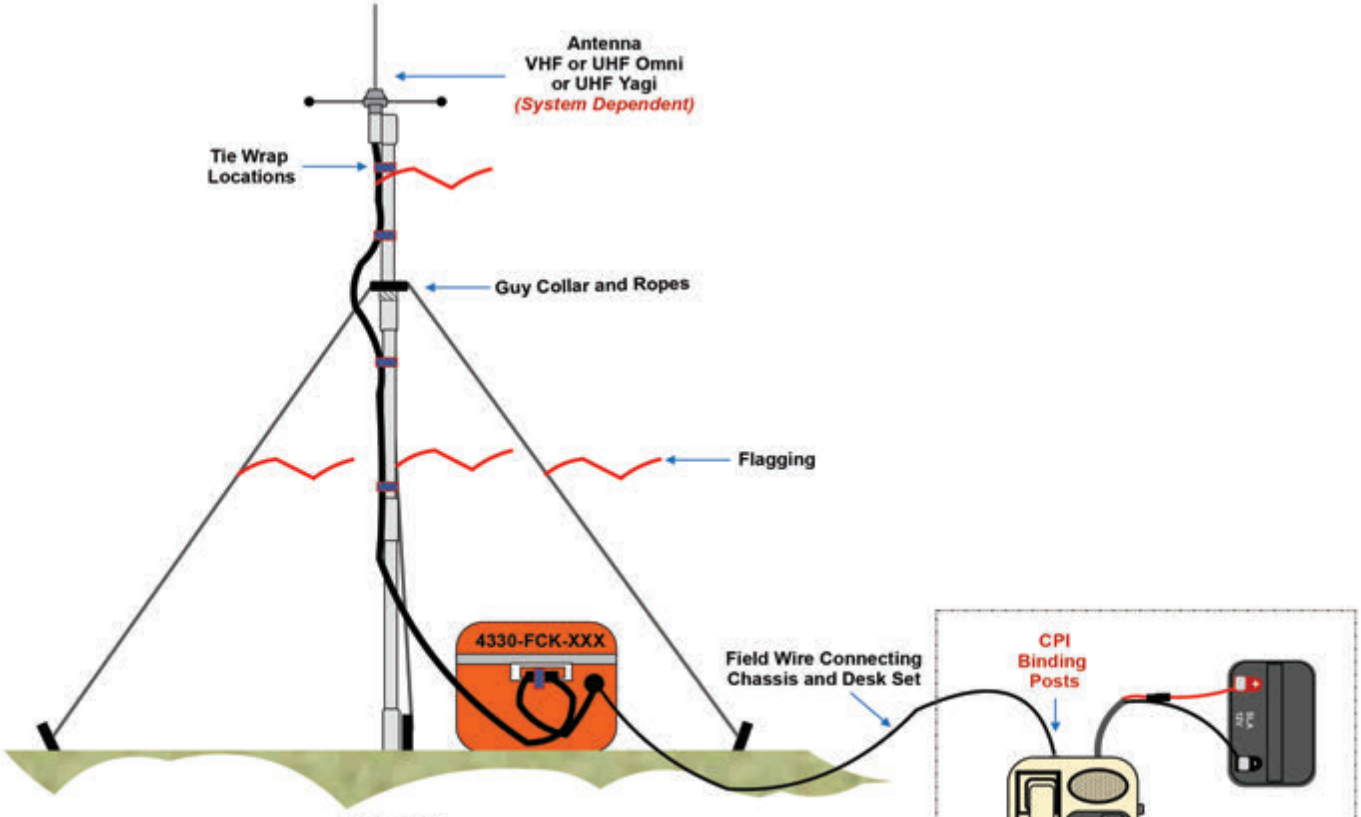

Figure 1:
4330 - Complete Remote Setup

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

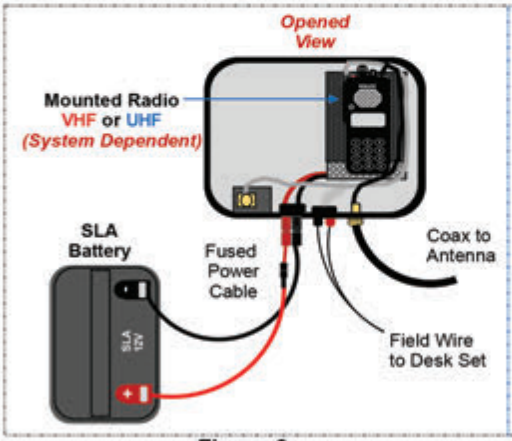

Figure 3:
Remote Chassis and Termination Panel Located inside Fiberglass Box
(Opened Chassis)

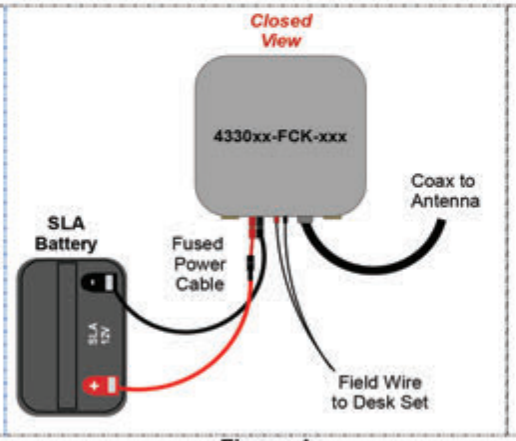

Figure 4:
Remote Chassis and Termination Panel Located inside Fiberglass Box
(Closed Chassis)

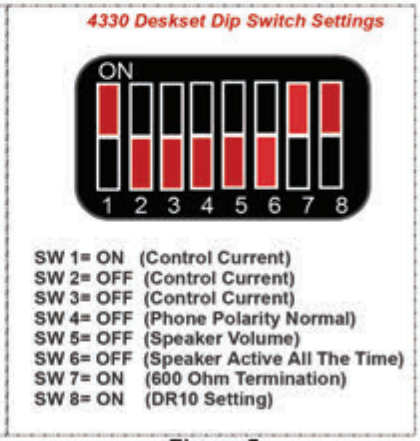

Figure 5:
4330 Deskset Dip Switch Settings

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 documentation.

4. **Field Wire Setup:** ***(See Figures 1, 2, 3 and 4)***
   - String the communications field wire from the grey chassis enclosure back to each remote desk set location.
   - Strip and attach each field wire directly to the binding on each of the CPI remote desk sets (***not polarity dependent***).
   - Strip and attach the field wires in parallel directly to the binding posts on the front of the grey chassis enclosure.

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

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.

     Equipment Note:
     It is preferred to keep the metal chassis 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

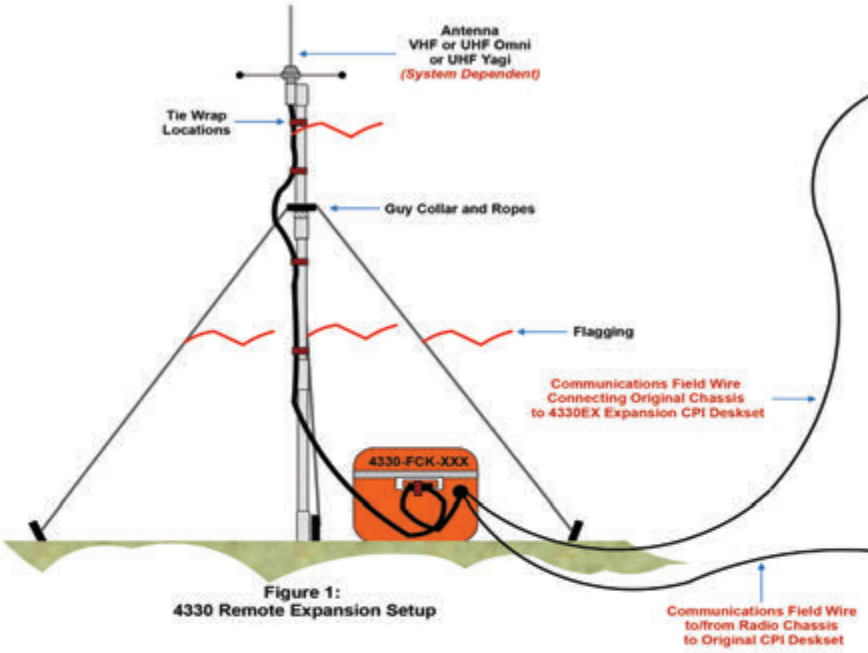

Figure 1:
4330 Remote Expansion Setup

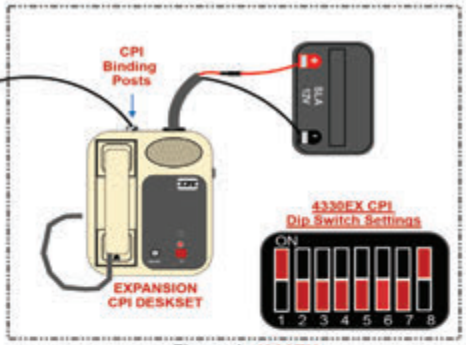

Figure 4: 4330EX
Expansion CPI Remote Connections and Dip Switch Settings at 5K High Impedance

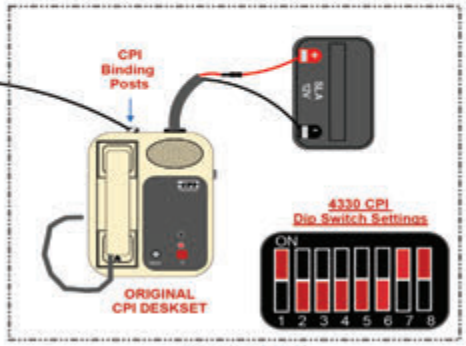

Figure 3: 4330
Original CPI Remote Connections and Dip Switch Settings at 600 Ohm Impedance

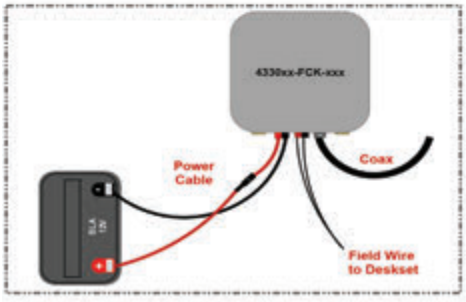

Figure 2:
4330 Radio Chassis
Communications Field Wire
Parallel Termination

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 documentation.

4. **Field Wire Setup:** ***(See Figures 1, 2, 3 and 4)***
   - String the communications field wire 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).
   - 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:** ***(See Figure 3 and 4)***
   - Verify the original 4330 desk set dip switches, located on the bottom of the CPI, are set to **600 Ohm** Impedance operation.
   - Verify the 4330EX desk set dip switches, located on the bottom of the EX CPI, are set to **5K Ohm** Impedance operation.

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.

Equipment Note:
It is preferred to keep the metal chassis 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

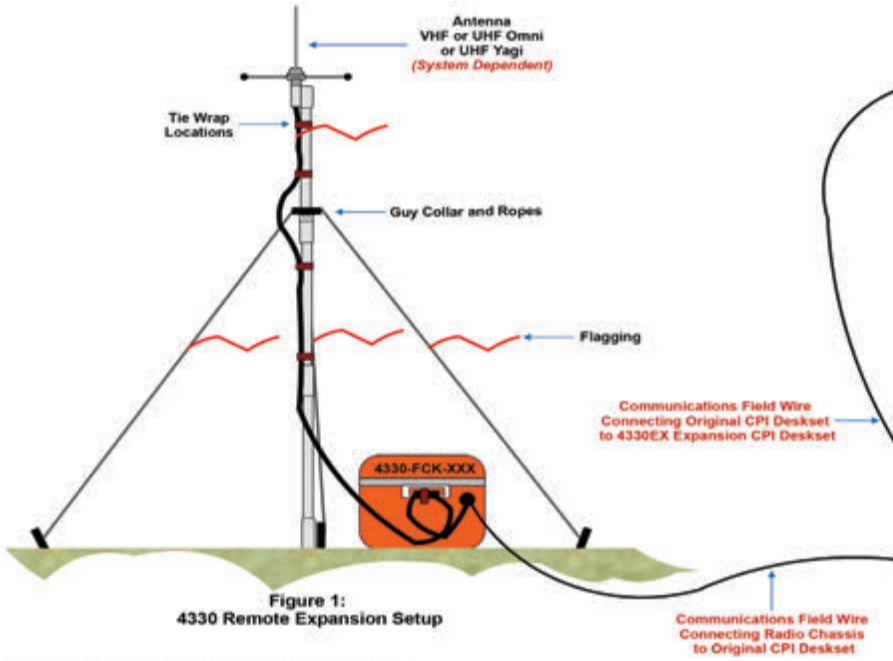

Figure 1:
4330 Remote Expansion Setup

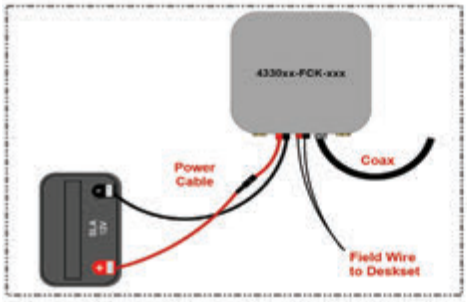

Figure 2:
4330 Radio Chassis
Communications Field Wire
Parallel Termination

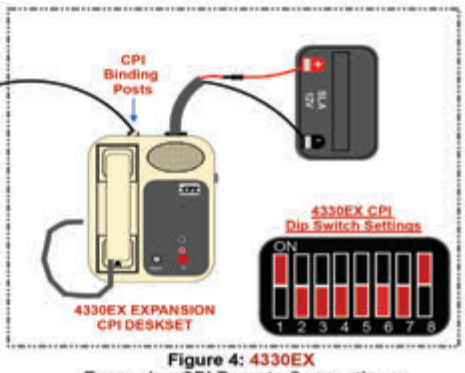

Figure 4: 4330EX
Expansion CPI Remote Connections
and Dip Switch Settings at
5K High Impedance

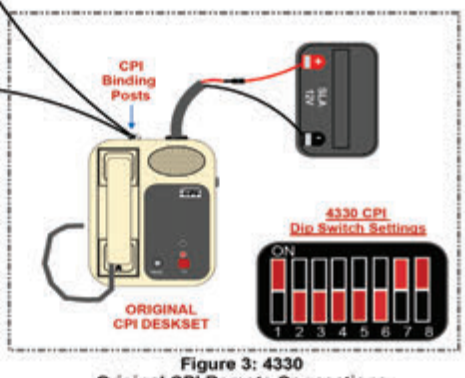

Figure 3: 4330
Original CPI Remote Connections
and Dip Switch Settings at
600 Ohm Impedance

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.

   Equipment Note:
   To prevent damage to the bulkhead mount connectors, do not attach base antennas directly to the bulkhead connectors without using the coax cables.

3. **Battery Supply:**
   Connect the supplied batteries to the Aircraft 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)***

   Equipment 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 NIICD.

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**.

   Equipment 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)

   Equipment 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.
   NIICD recommends testing with the field units or ICP if possible before leaving the site.

Note: See "NIICD Equipment Switch Settings" in Appendix D for MT-5 and 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

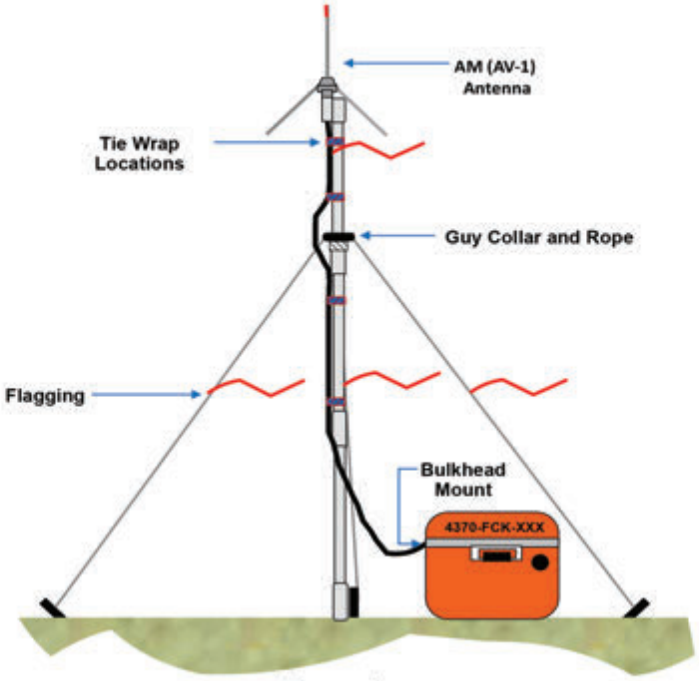

Figure 1:
4370 - Aircraft Link Antenna Setup (Base Mode)

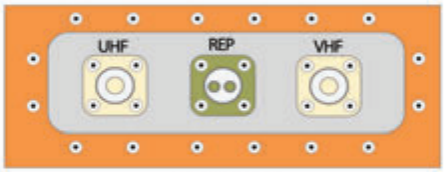

Figure 2:
4370 - Aircraft Link Bulkhead Mount Connectors (N-Type)

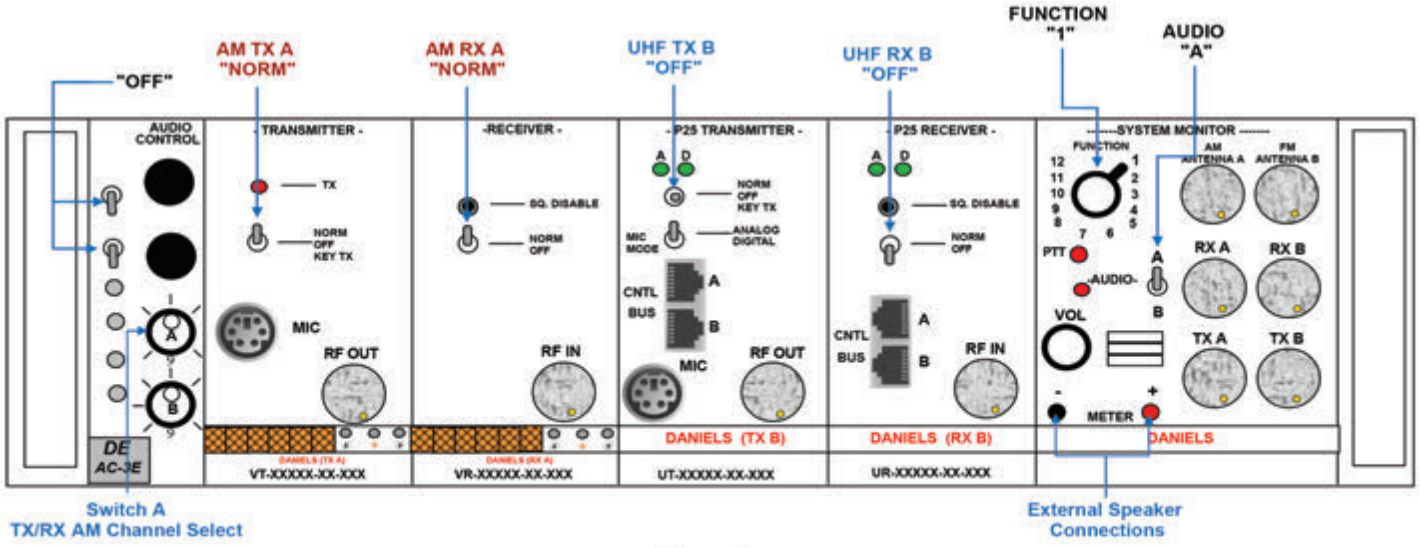

Figure 3:
4370 - Aircraft Link Switch Settings (Base Mode)

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.

     Equipment Note:
     To prevent damage to the bulkhead mount connectors, do not attach base antennas directly to the bulkhead connectors without using the coax cables.

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)***

     Equipment 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.*
     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 NIICD.

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):

   Equipment 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)***

   Equipment Note:
   The Communications Duty Officer (CDO) will assign the appropriate FM UHF link frequency.
   See the frequency chart for corresponding assigned UHF channel, 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.
   NIICD recommends testing with the field units or ICP if possible before leaving the site.

Note: See "NIICD Equipment Switch Settings" in Appendix D for MT-5 and 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

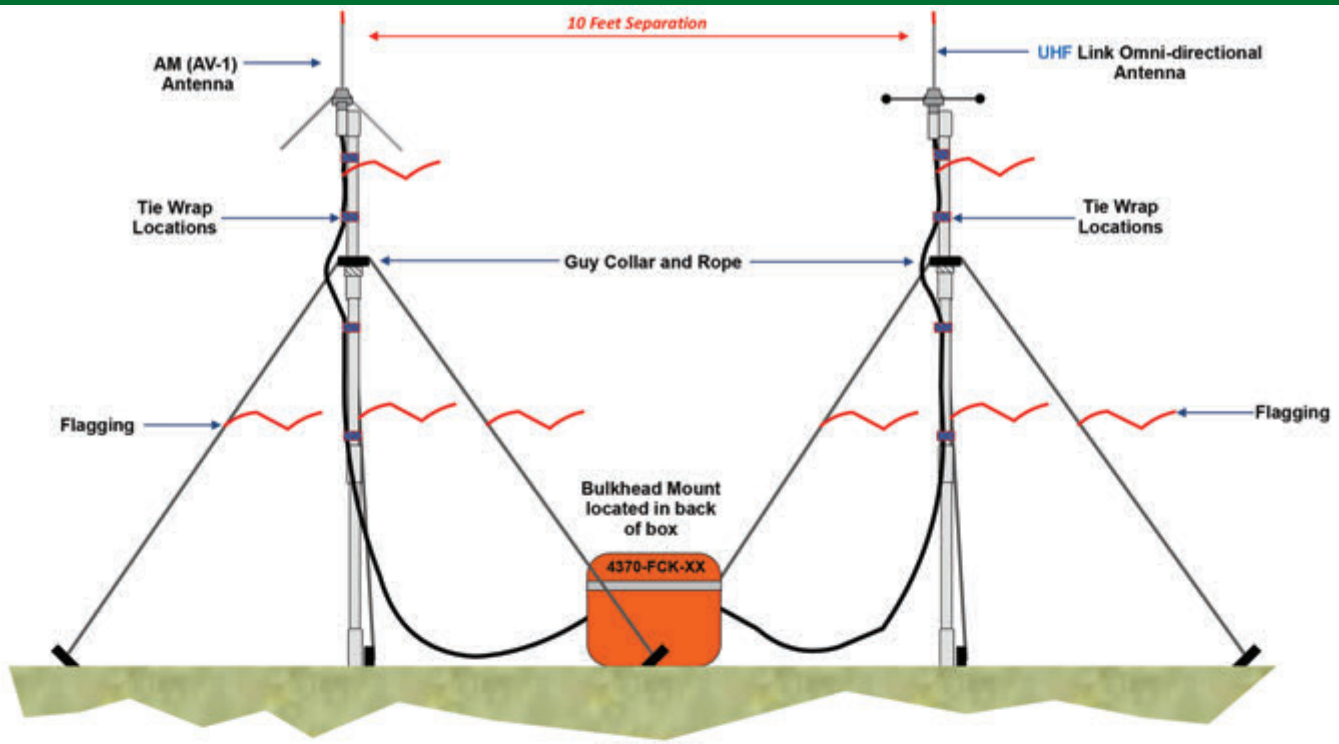

Figure 1:
4370 - Aircraft Link Antenna Setup (Link Configuration)

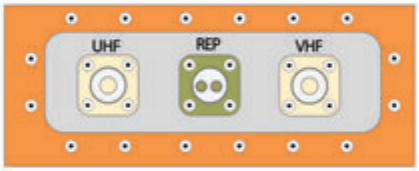

Figure 2:
4370 - Aircraft Link Bulkhead Mount Connectors (N-Type)

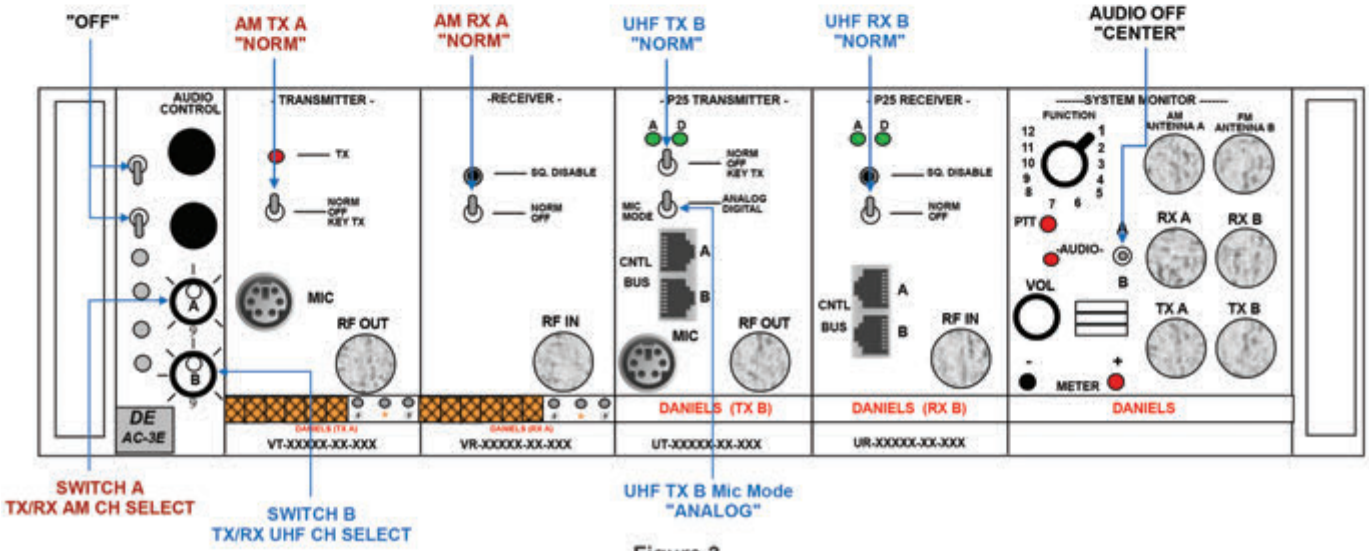

Figure 3
4370 - Aircraft Link Switch Settings (Link Configuration)

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***

   Equipment 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.

   Equipment 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.

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.

Equipment 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.

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NIICD EQUIPMENT KIT INVENTORIES HAVE BEEN REMOVED FROM THE USER'S GUIDE.

THE LATEST EQUIPMENT KIT INVENTORY LIST CAN BE LOCATED AT THE NIICD WEBSITE.

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

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APPENDIX A - 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 Internal SLA batteries.
    B. Only the solar panel kit.
    C. Both the internal SLA batteries and the solar panel kit.

Equipment Note:
If using both solar and internal SLA batteries, the voice board monitors the solar voltage and will automatically switch to the 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 more frequently 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 either a SLA Battery Kit or Solar Panel Kit to the equipment power adapter.
- The battery kits and equipment are configured with a **POLARIZED** Power Pole interconnect connector.

Equipment Note:
Reversing polarity will result in a blown fuse.
All NIICD 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

Equipment 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 to hear the battery voltage over the air.

Equipment Note:
Querying the equipment voice board will broadcast the information over the whole system including any equipment linked via UHF simplex or UHF repeater hub. Users should not query the voice board during high fire or operational activity.

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 SLA battery and the internal SLA battery is currently disconnected from the circuit. When the solar voltage falls below the switch-point, the internal SLA 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 internal SLA battery and solar SLA battery is open circuit.

APPENDIX A - VOICE BOARD OPERATING INSTRUCTIONS

Voice Board Troubleshooting: "***Stop***" condition

If the voice board message ends with "***stop***" it means the voice board detected that the external power source (usually a solar kit) is unable to support the load of the repeater and the voice board has defaulted to the internal power source.

This can happen if the battery in the solar kit becomes damaged from rough handling, or repeated over charging under high temperatures because of faulty temperature compensation in the charge controller. A damaged solar kit battery will have high internal resistance and will show a good voltage (above 12.2 Volts) with no load, but when a load is applied the voltage immediately falls towards zero. A damaged solar kit battery will exceed the voice boards hysteresis (2V) and cause the voice board to oscillate rapidly between the external and internal power source. The voice board detects this oscillation and enters the stop condition where it stays on internal power and ignores the external power source.

To clear the stop condition, replace the faulty external power source, then remove all power to the repeater (internal and external) for at least 60 seconds. This resets the voice board and resumes normal operation, the voice board message will no longer end with "***stop***" condition.

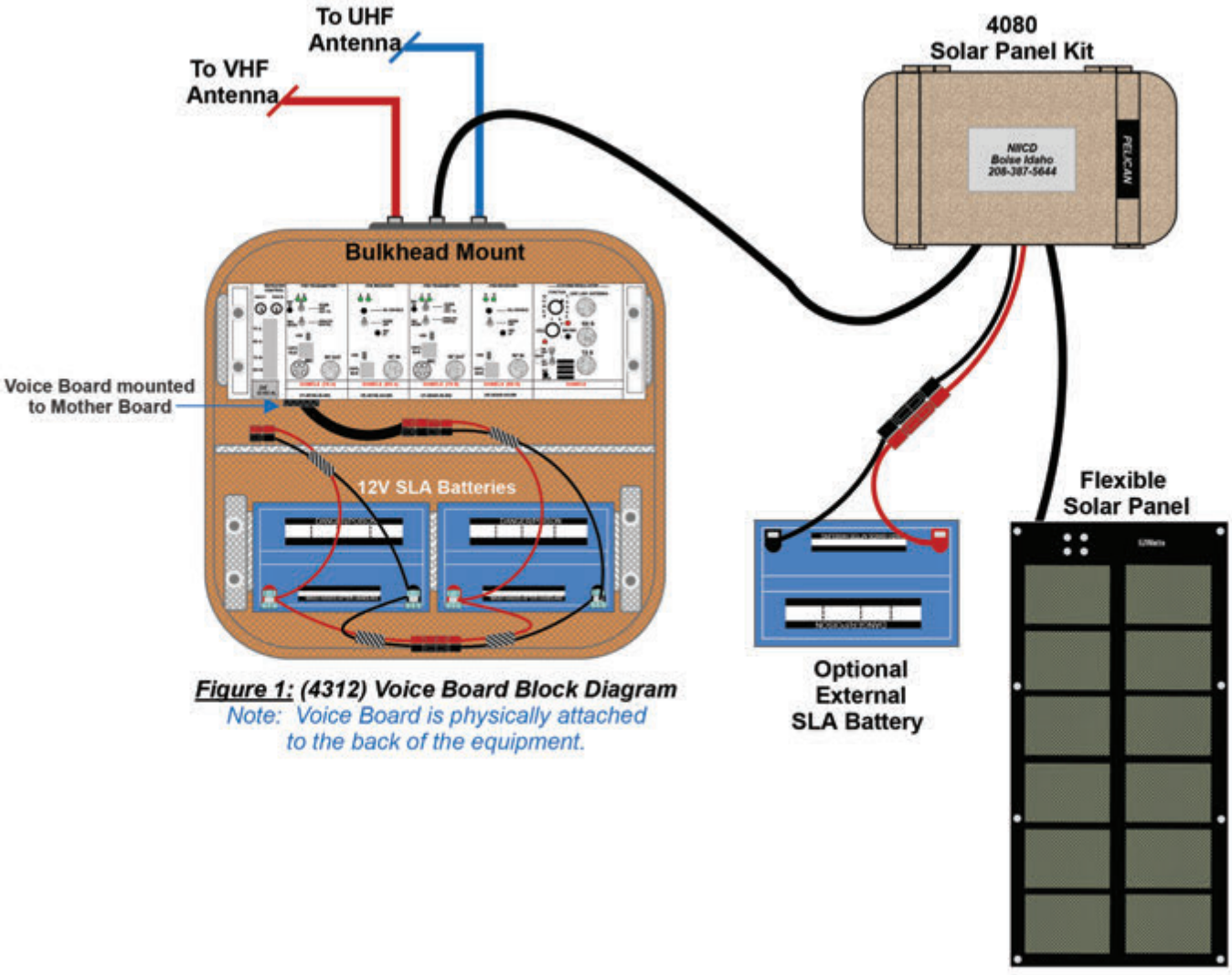


Figure 1: ***(4312) Voice Board Block Diagram***
Note: Voice Board is physically attached to the back of the equipment.

APPENDIX B - GENERAL BATTERY INFORMATION

When ordering radio 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 NIICD radios utilize 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)

Equipment Battery Testing:
Using a voltmeter to determine the state of an SLA 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)***

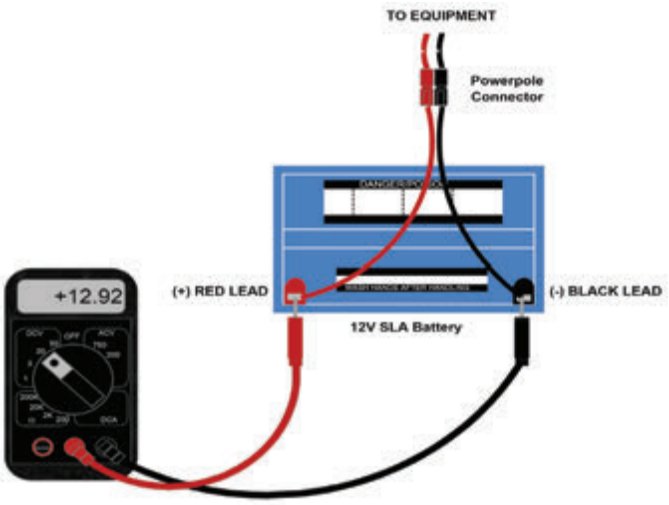


Figure 1: Sample Voltmeter Test on Standalone SLA Battery Configuration

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:
NIICD recommends testing the polarity of each battery before installation.
Some batteries have been known to come labeled incorrectly from the manufacture.

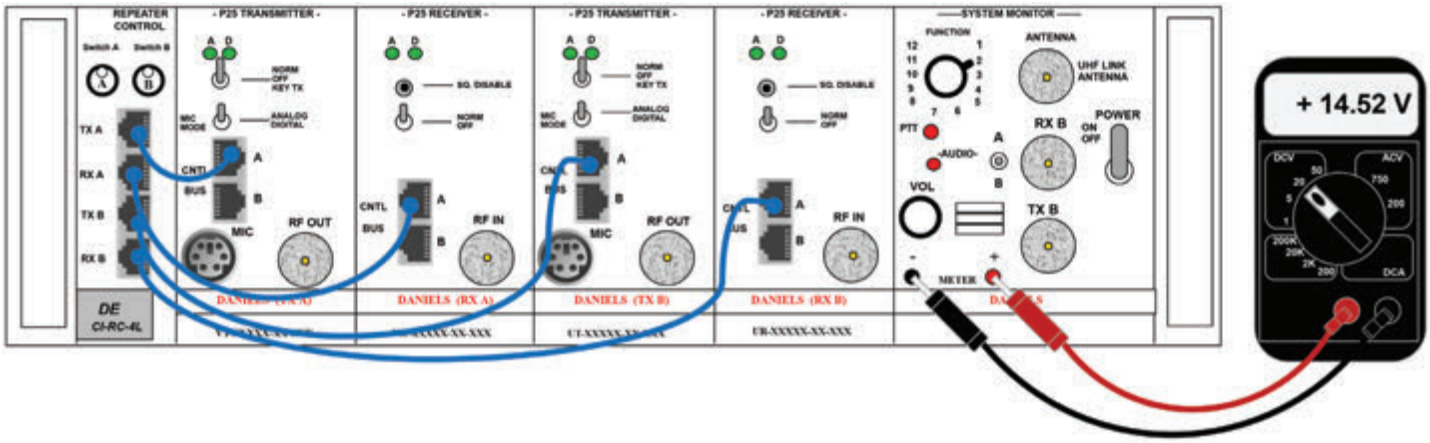
Radios: The transmit LED is the best indicator of battery life. If the light holds bright for 3 seconds while transmitting on high power, the battery should be in good shape. Don't rely on the battery gauge on any radio since they are designed for use with rechargeable batteries. Radio batteries should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

Return all SLA battery kits to NIICD. Ensure battery terminals are covered during transportation. Keep all foreign items out of the kit such as tools and stakes. Do not transport if the 4150 pelican case foam is damaged or missing.
(See SLA 4150 Transportation Instructions)

APPENDIX B - GENERAL EQUIPMENT BATTERY TESTING

System Monitor Battery Testing



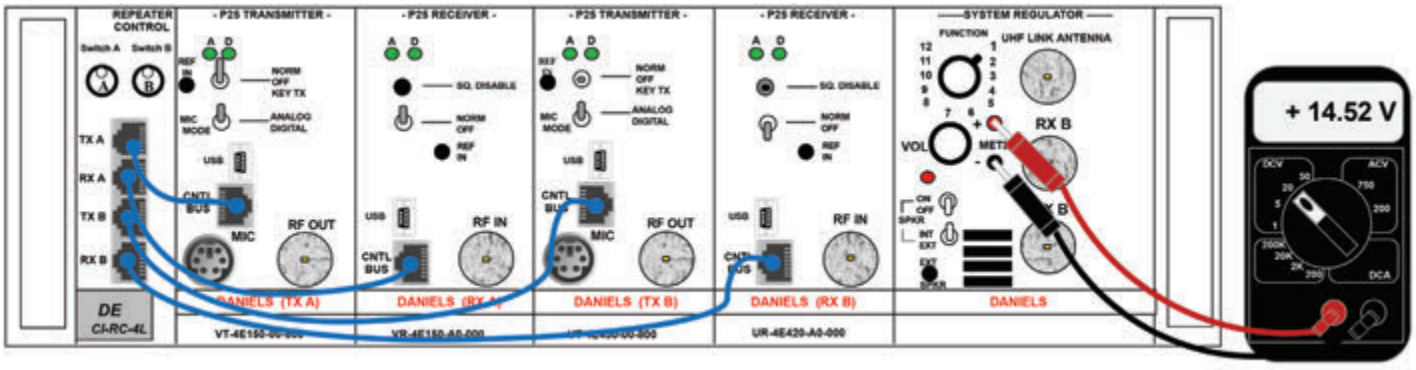
Testing the Equipment Batteries under load on equipment with a System Monitor

- Connect the SLA batteries or Solar Panel Kit 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 Monitor Module**.
- Adjust the **Function Switch** on the **System Monitor 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.

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

System Monitor Switch Functions	
2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
1, 4-12	NIICD Testing

System Regulator Battery Testing



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

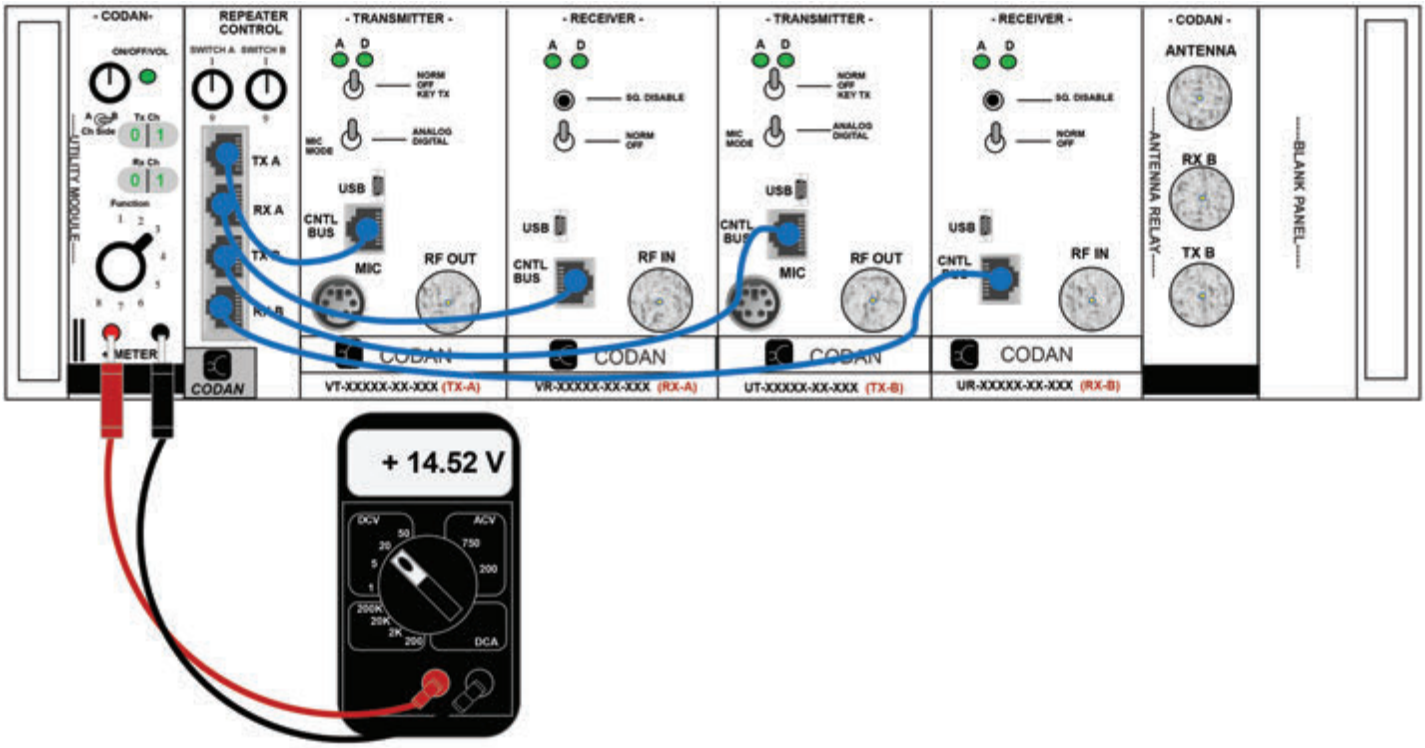
- Connect the SLA batteries or Solar Panel Kit to the equipment.
  Note: If new batteries are being installed, test each battery voltage and connect accordingly by following the battery diagrams for each piece of equipment.
- Assure that **all power switches** on each module are turned to the "**NORM**" 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.

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

System Regulator Switch Functions	
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3-12	NIICD Testing

APPENDIX B - GENERAL EQUIPMENT BATTERY TESTING

Utility Module Battery Testing



Testing the Equipment Batteries under load on equipment with a Utility Module

- Connect the SLA batteries or Solar Panel Kit 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 **Utility Module**.
- Adjust the **Function Switch** on the **Utility Module 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.

Note: The equipment voltage can also be tested on the Utility Module equipment by utilizing the Voice Board. See Voice Board Instructions

Utility Module Switch Functions	
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3-12	NIICD Testing

APPENDIX B - SLA BATTERY CONFIGURATIONS

In situations when there is heavy voice traffic on the system or where access to the site is limited, NIICD 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 NIICD and are recommended for use at sites with limited access. Contact the CDO for Solar Panel Kit availability before ordering.

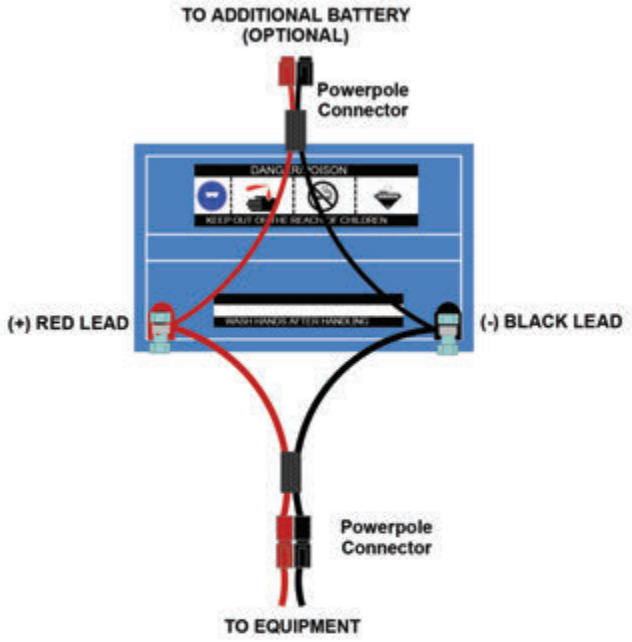


Figure 1:
+12 Volt Single SLA Battery Configuration

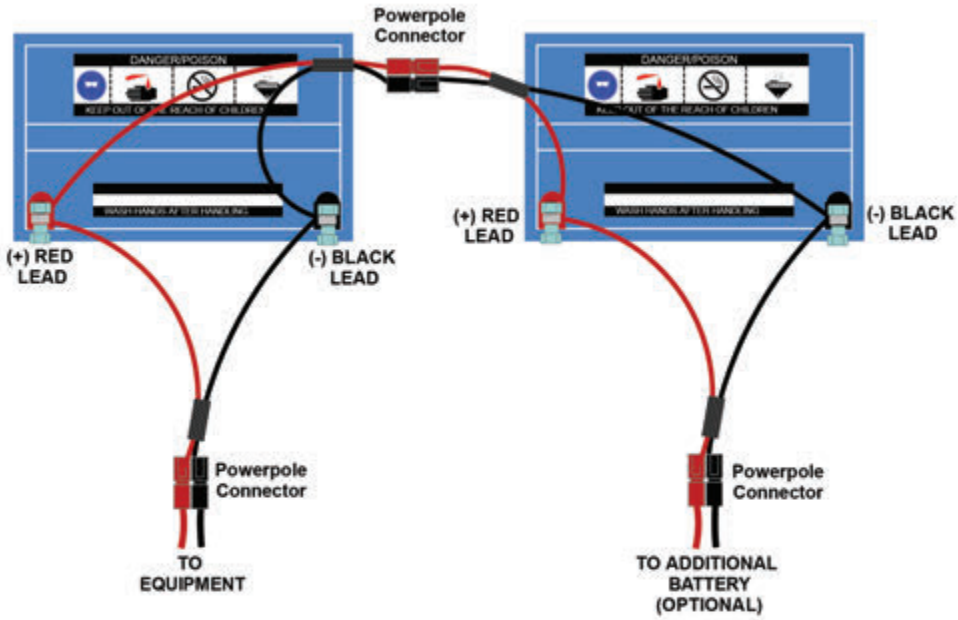


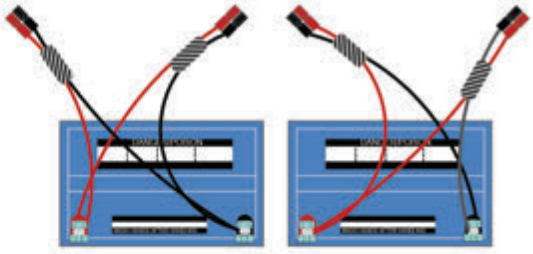
Figure 2:
+12 Volt Single SLA Battery Parallel Configuration

APPENDIX - 4312, 4248 and 4370 SLA BATTERY INSTALLATION

All 4312, 4248, 4330, 4370 and 4248 kits will be sent from NIICD without any batteries physically connected to the equipment. The user must install the batteries from the NFES# 4150 SLA Battery Kit or NFES# 4080 Solar Panel Kit to make them operational. Please following the appropriate battery configuration and installation procedure for each piece of equipment.

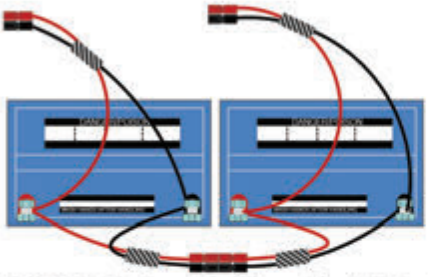
1. 4150 SLA Kit Supplied Materials

- 1 each 4150 - SLA Battery Kit
- 2 each 35 AMP-HR SLA Battery
- 2 each Pre-Wired and connected Power-Pole Y-Cables

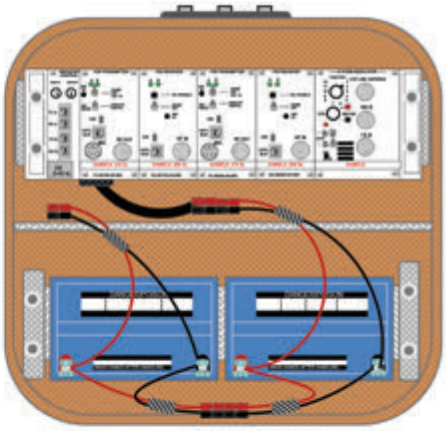


2. Configuring the batteries ***(See SLA Battery Configuration)***

- 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



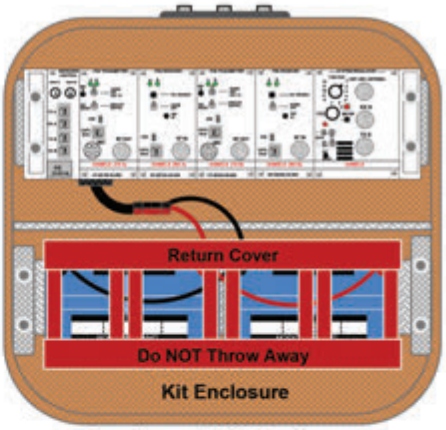
Equipment Kit Enclosure
12 Volt SLA Battery Configuration

3. Battery Protection ***(See Equipment Kit Enclosure)***

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 NIICD.
******See Transportation Instructions******

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



Equipment Kit Enclosure
12 Volt SLA Battery Configuration
With Battery Cover

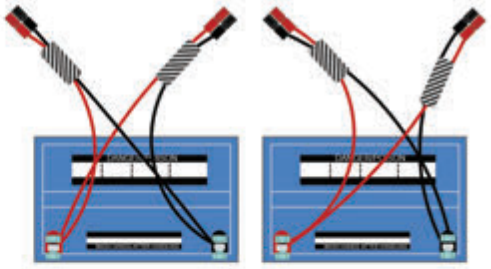
APPENDIX B - 4330/4330EX SLA BATTERY INSTALLATION

All 4312, 4248, 4330, 4370 and 4248 kits will be sent from NIICD without any batteries physically connected to the equipment. The user must install the batteries from the NFES# 4150 SLA Battery Kit or NFES# 4080 Solar Panel Kit to make them operational. Please following the appropriate battery configuration and installation procedure for each piece of equipment.

1. 4150 SLA Kit Supplied Materials

- 1 each 4150 - SLA Battery Kit
- 2 each 35 AMP-HR SLA Battery
- 2 each Pre-Wired and connected Power-Pole Y-Cable

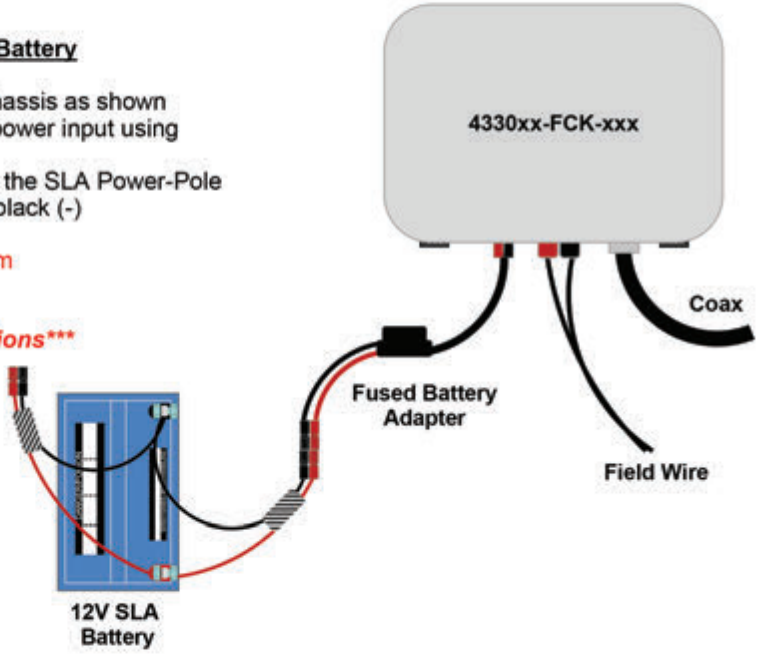
Note: Fused Battery Power-Pole adapter are included in each 4330 kit



2. Configuring 4330 Radio Chassis Battery

- Ensure SLA battery is fully charged
- Place one 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 (-)

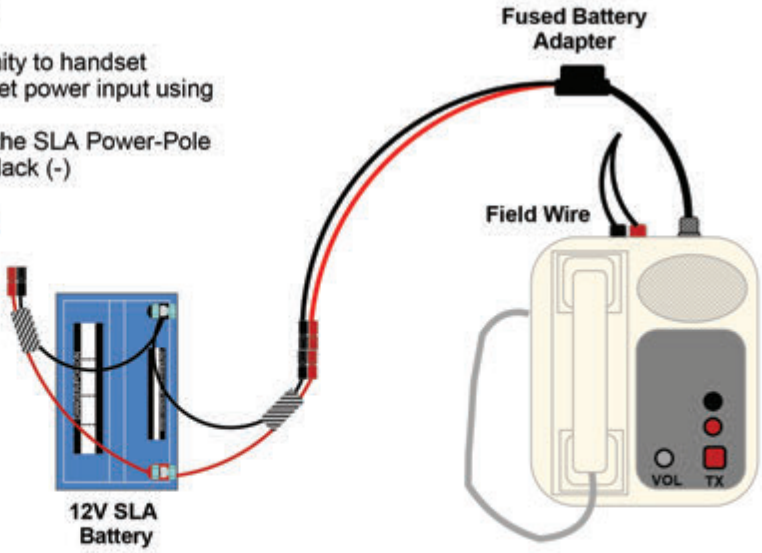
Note: Always remove the batteries from each kit before transporting or shipping back to NIICD.
******See Transportation Instructions******



3. Configuring 4330 Handset Battery

- Ensure SLA battery is fully charged
- Place one 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 NIICD.
******See Transportation Instructions******



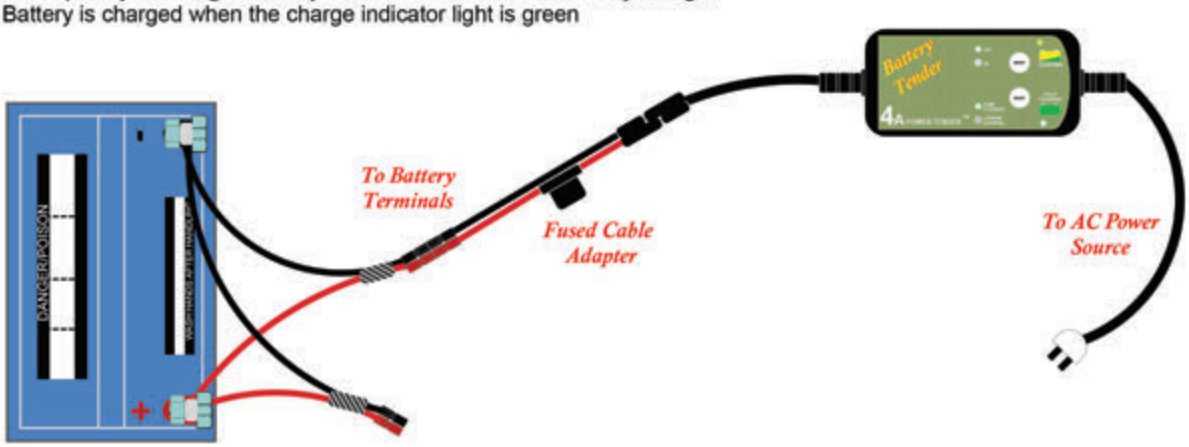
APPENDIX B - SLA BATTERY CHARGING AND WARNINGS

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 provided Fused Cable Adapter to the SLA Battery
  Note the Polarity, Red Cip (+) 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

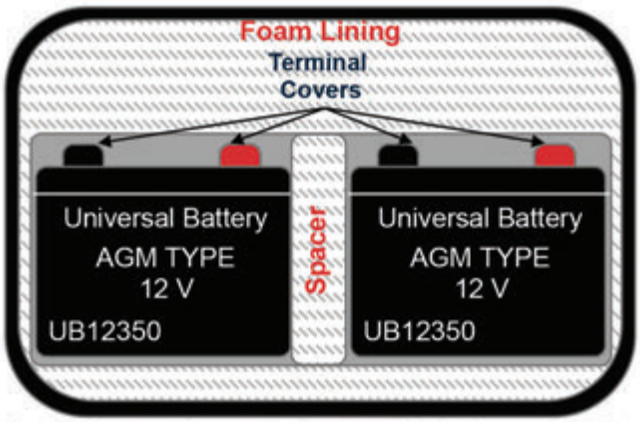


!!!NOTE!!!
Battery voltage must be greater than 3V for the battery charger to recognize the battery and begin charging.

SLA 4150 TRANSPORTATION INSTRUCTIONS

- Ensure battery terminals are covered during transportation.
  - If the plastic terminal covers are missing, cover the terminals with tape to prevent shorts.
- If spacer separating each battery is loose, secure batteries together with fiber tape to prevent movement and place the spacer to the side.
- Do not transport if 4150 pelican case foam is damaged or missing.
- Keep all foreign items out of the kit such as tools or stakes.

4150 SLA Battery Kit
Pelican Case Interior



Note: Diagram does not show terminal wires or handles.

APPENDIX B - 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 channel activity, 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 without solar kit 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, NIICD 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)***

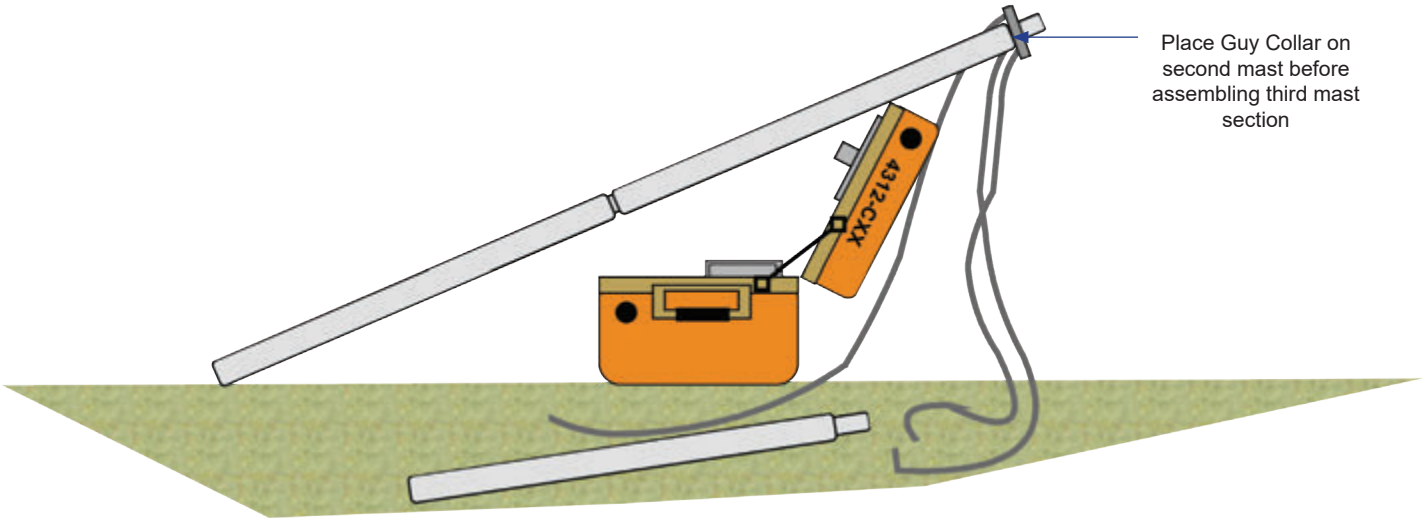


Figure A

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.

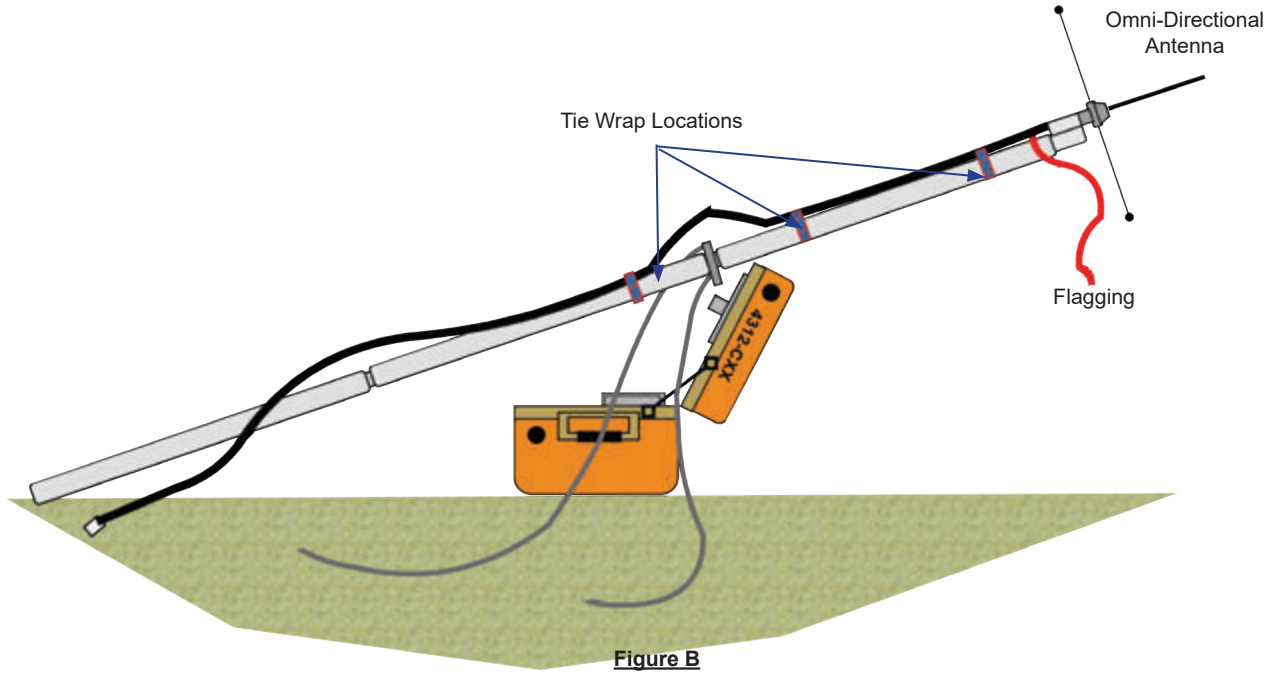


Figure B

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.

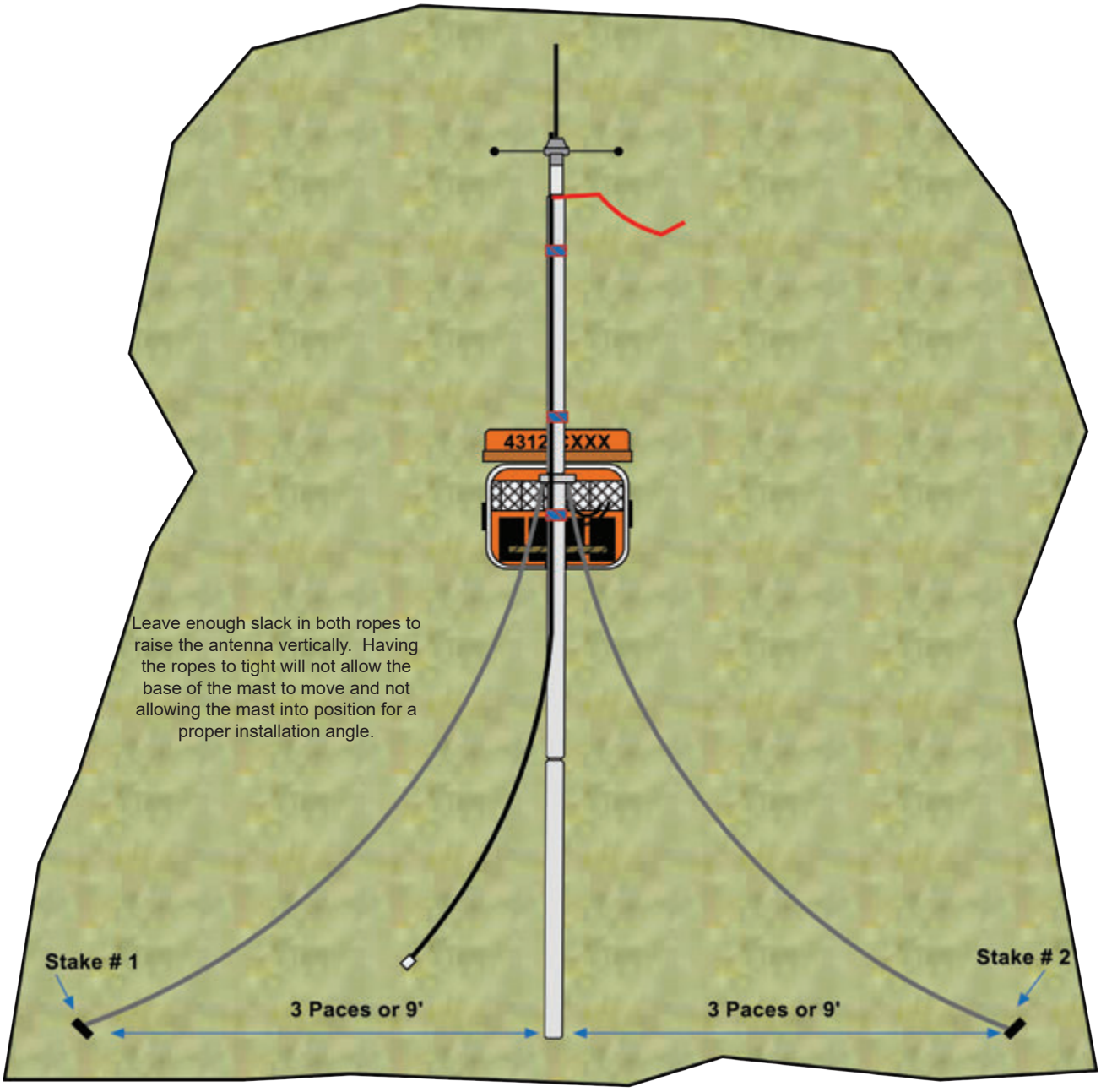


Figure C

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.

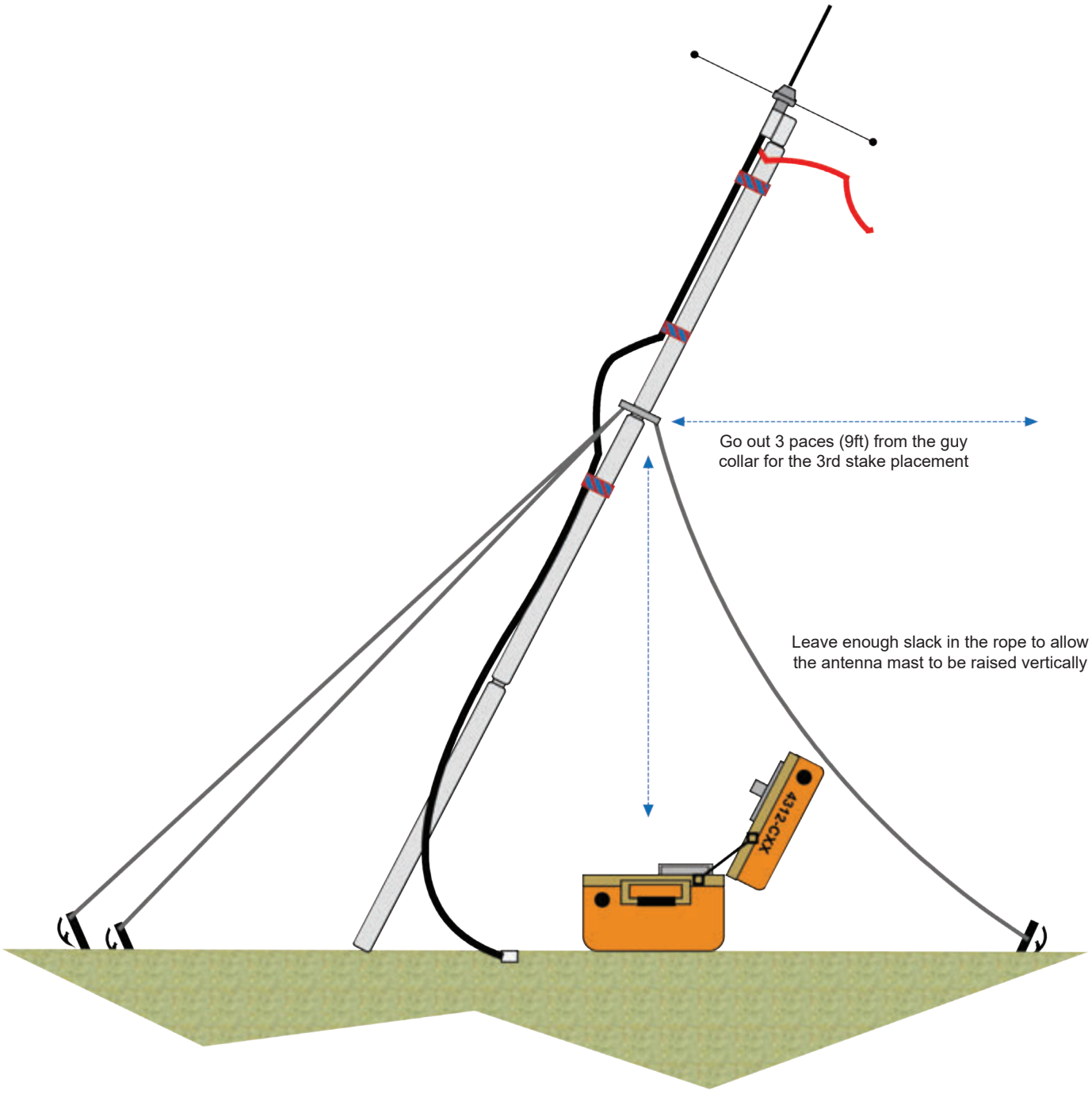


Figure D

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.

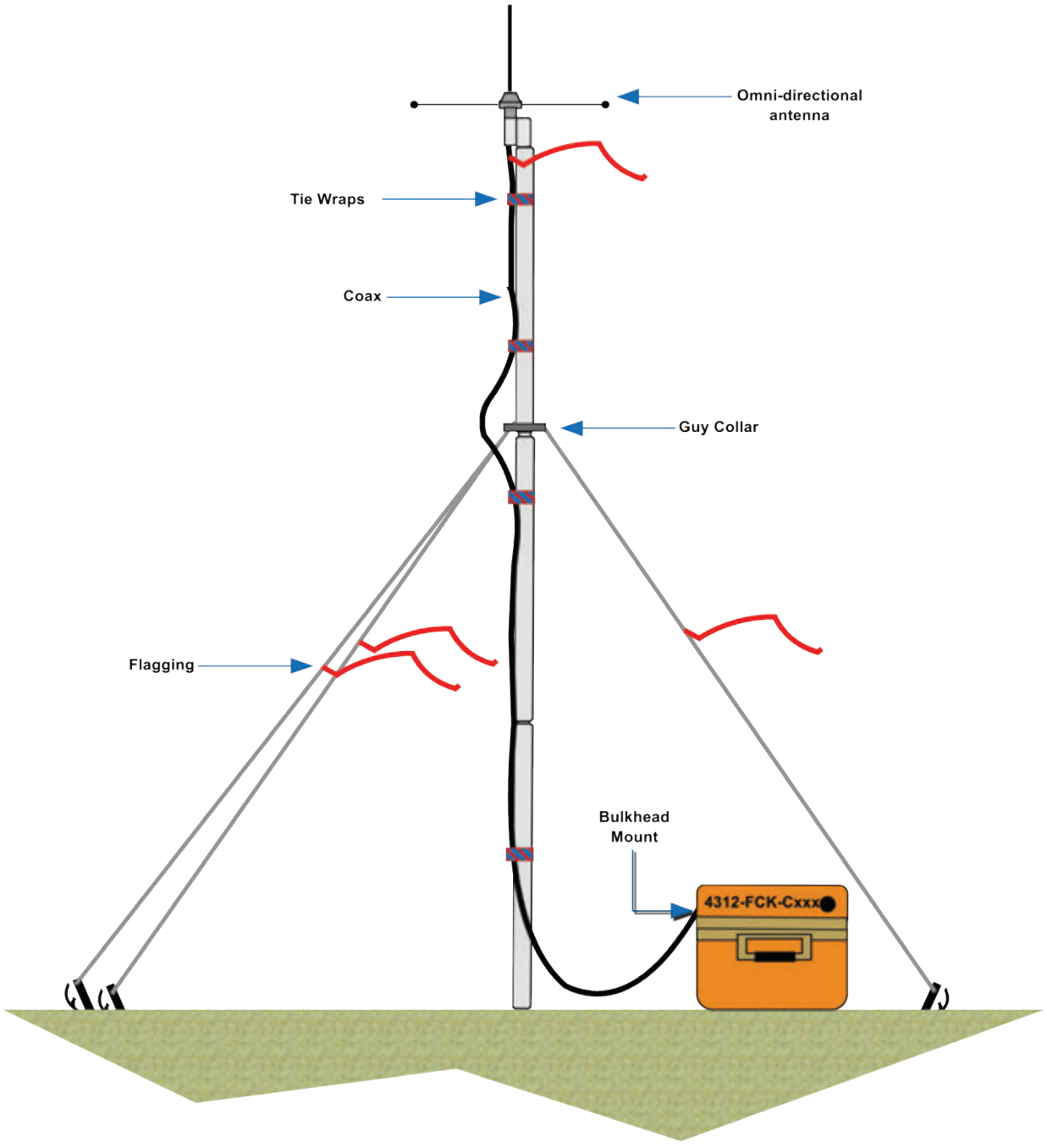


Figure E

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.
   NIICD 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.1

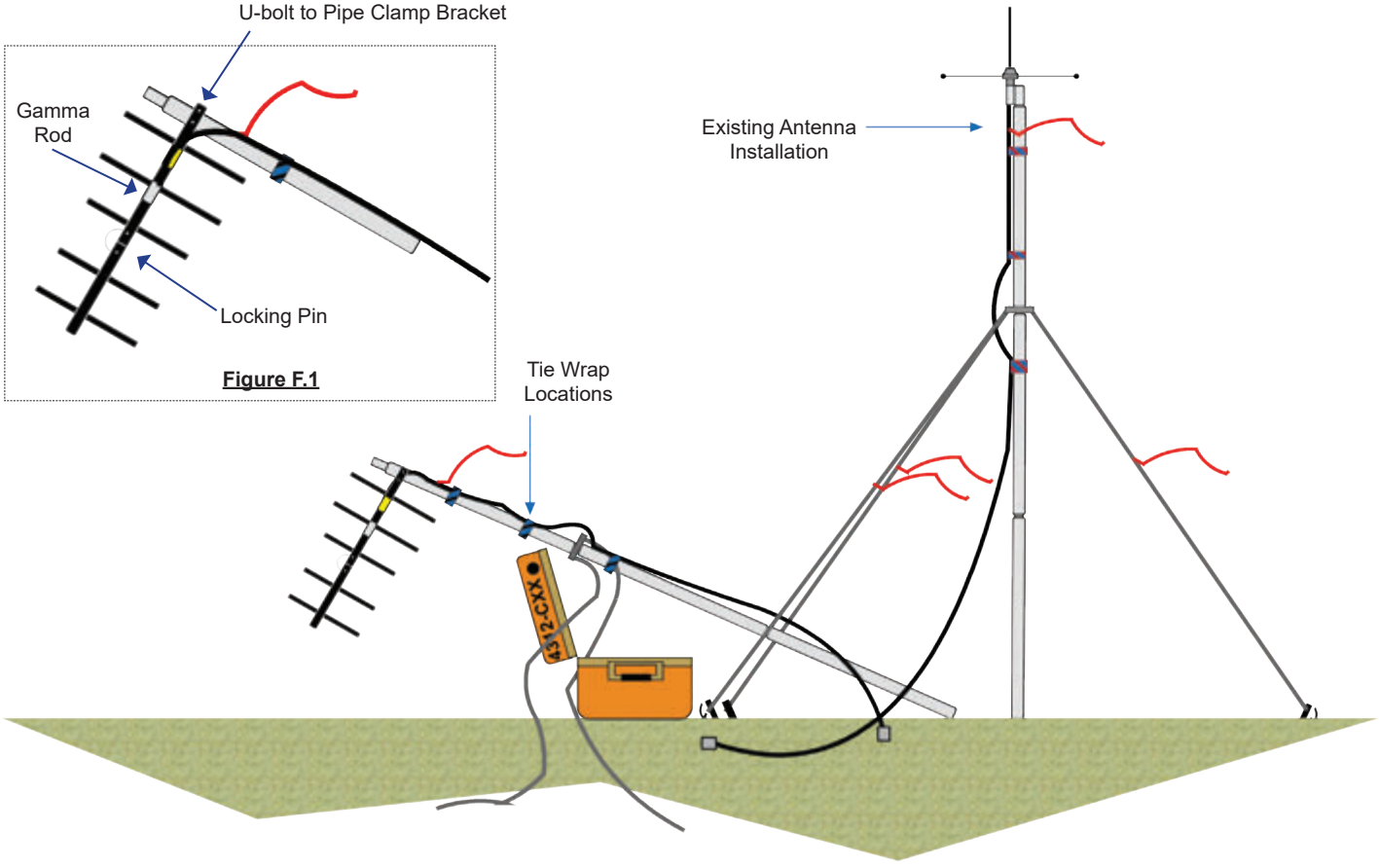


Figure F

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 topes 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.

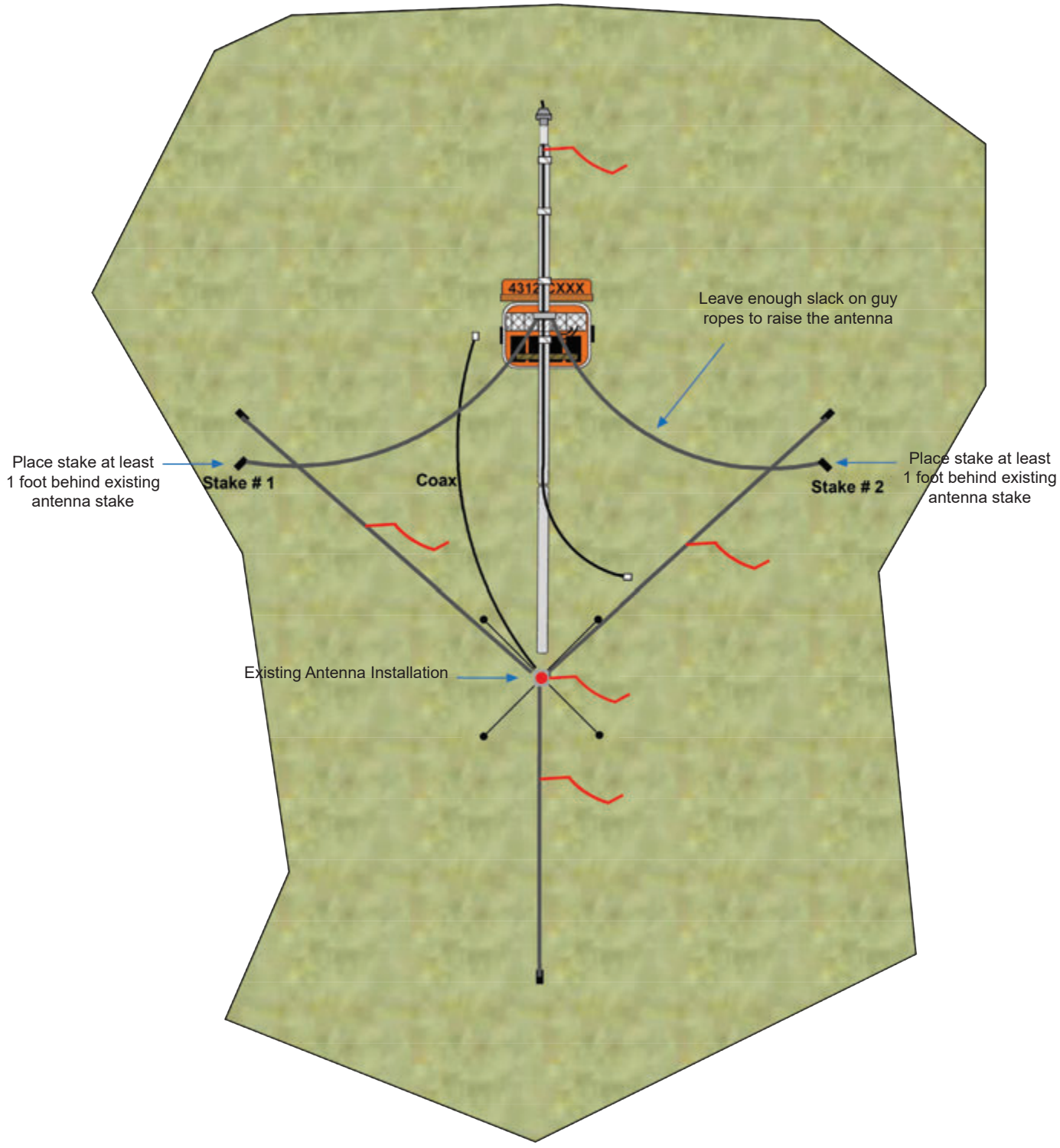


Figure G

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.

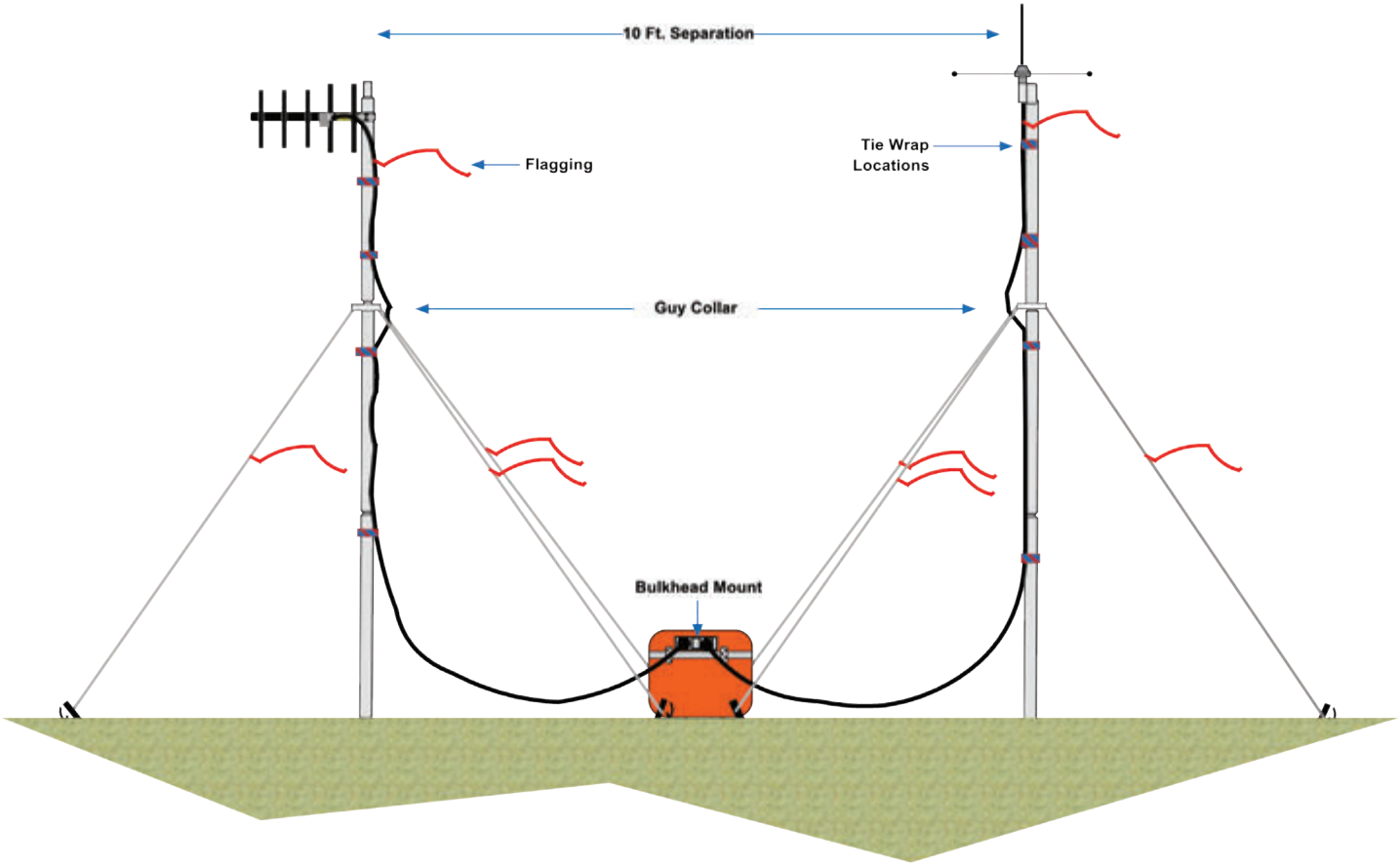


Figure H

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)***

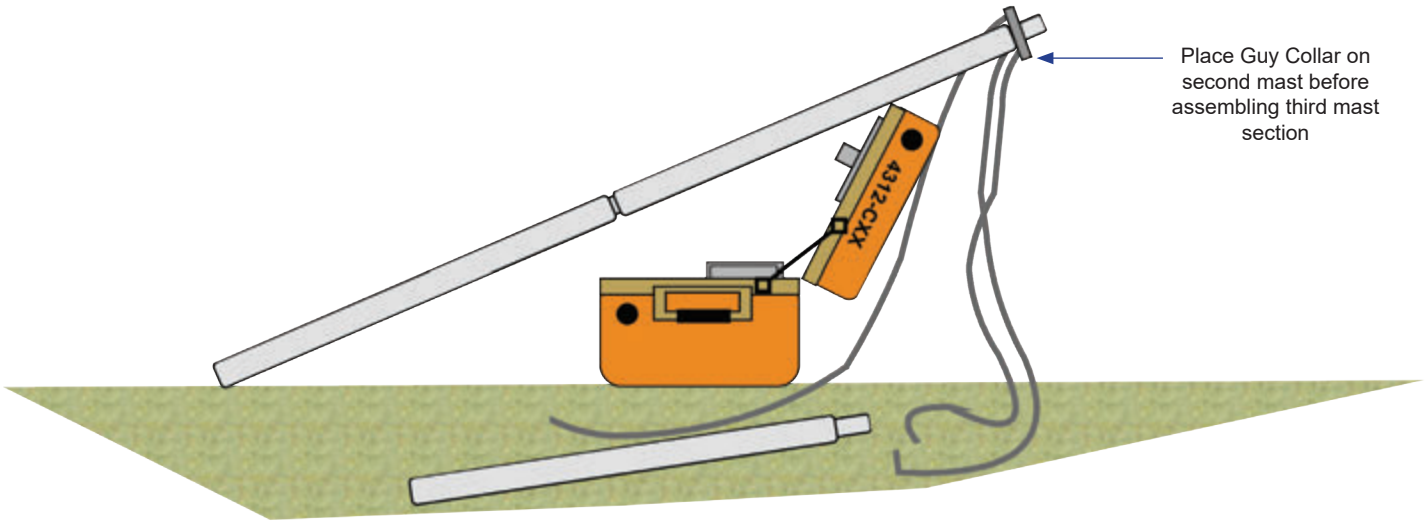


Figure A

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.
   NIICD 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.

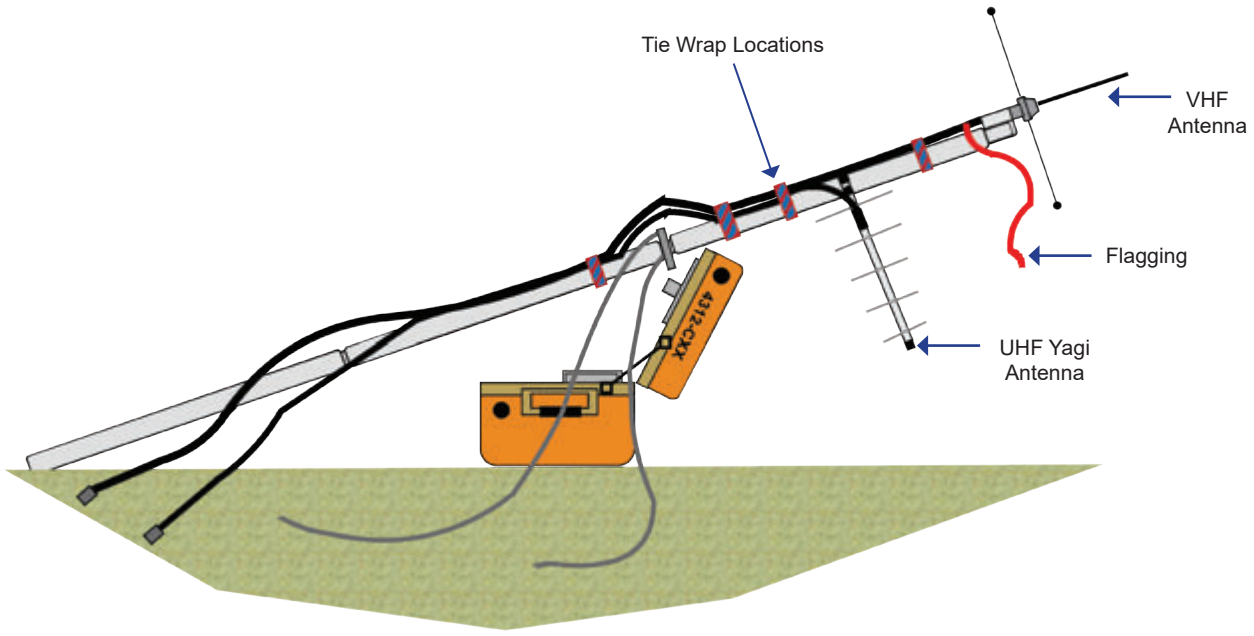


Figure B

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.

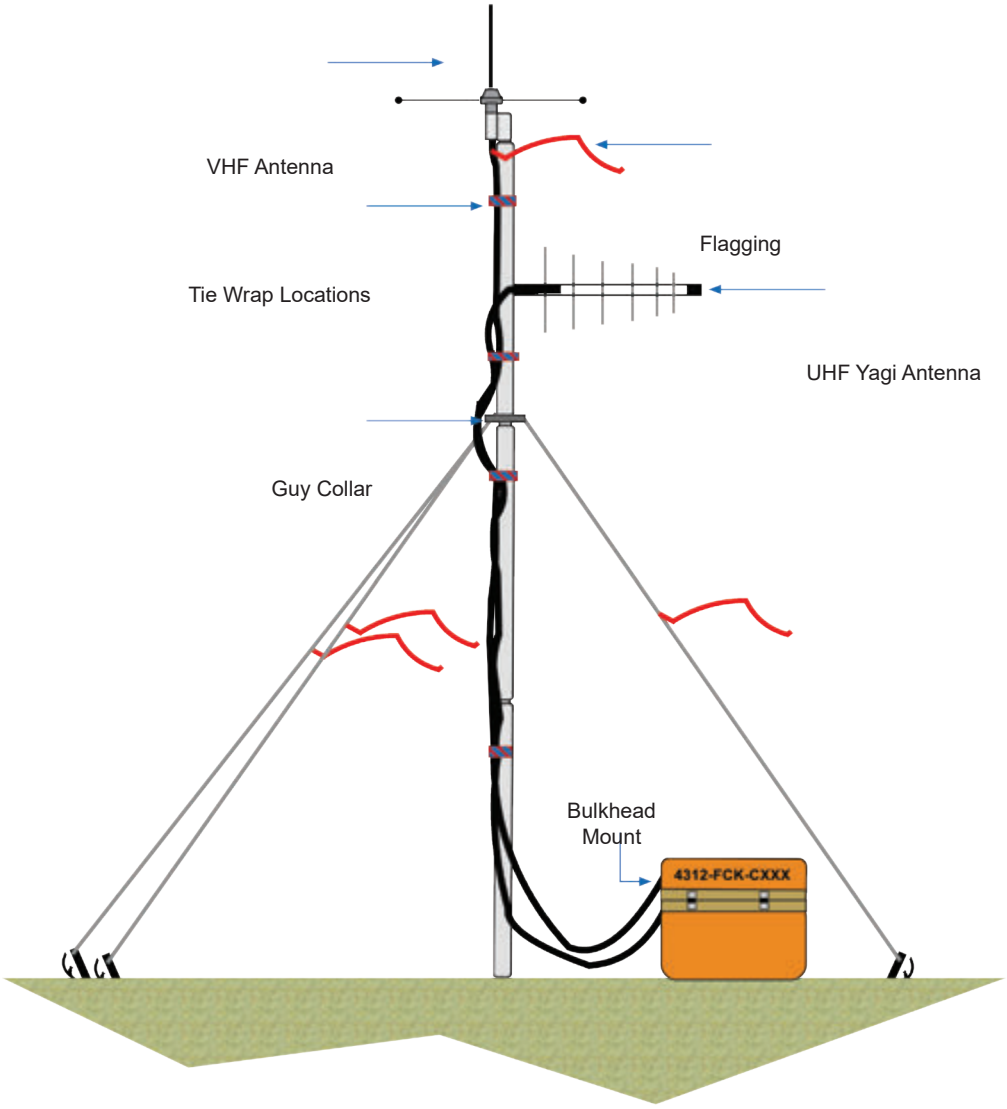


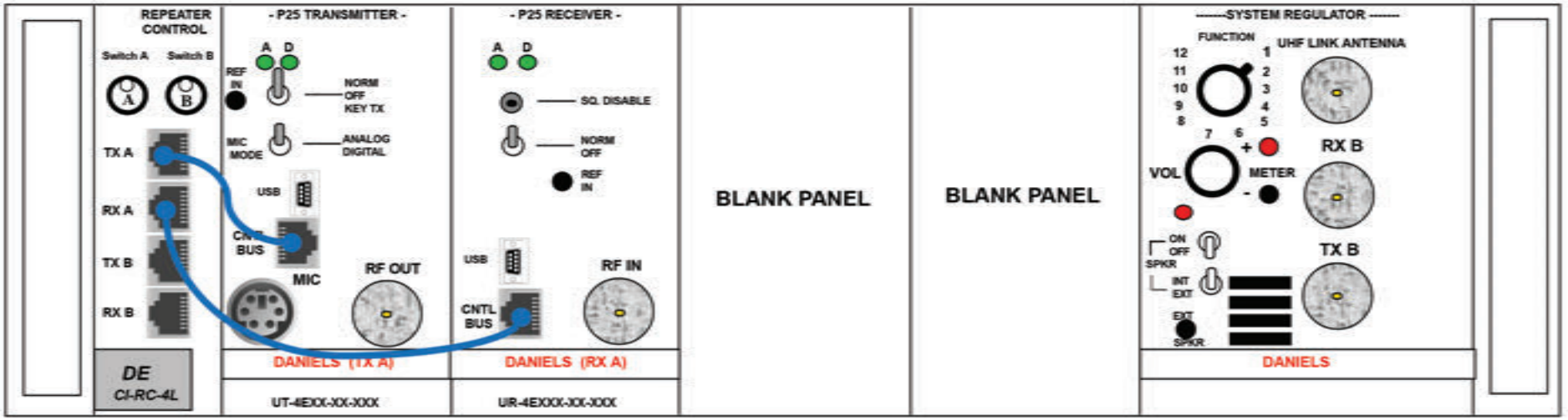
Figure C

NIICD EQUIPMENT 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)



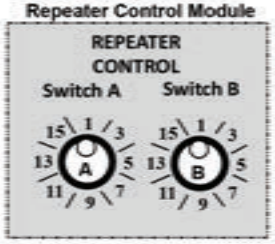
4248 - UHF REPEATER CONFIGURATION: (E-MODELS ONLY)

- Set up the UHF **Omi-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 subrack power cable to the SLA batteries using the provided **Polarized** fused cable. *(SLA Battery-4150 Kit or Solar Panel-4080 Kit is required to power up NIICD equipment.)*
- 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. *(NIICD recommends testing with the field units or ICP if possible before leaving the site.)*

Equipment Note:

- *NIICD has implemented a RX/TX Fixed Tone of **110.9** on all UHF Frequencies to help minimize possible interference on UHF signals.*
- *The Function Switches on the System Monitor Module are only for shop testing and used in conjunction with the meter leads.*
- ***Switch A** and **Switch B** on the **Repeater Control Module** have no effect on the operation of the UHF Stand Alone Repeater.*

Close Up View
Switch A, Switch B
Repeater Control Module



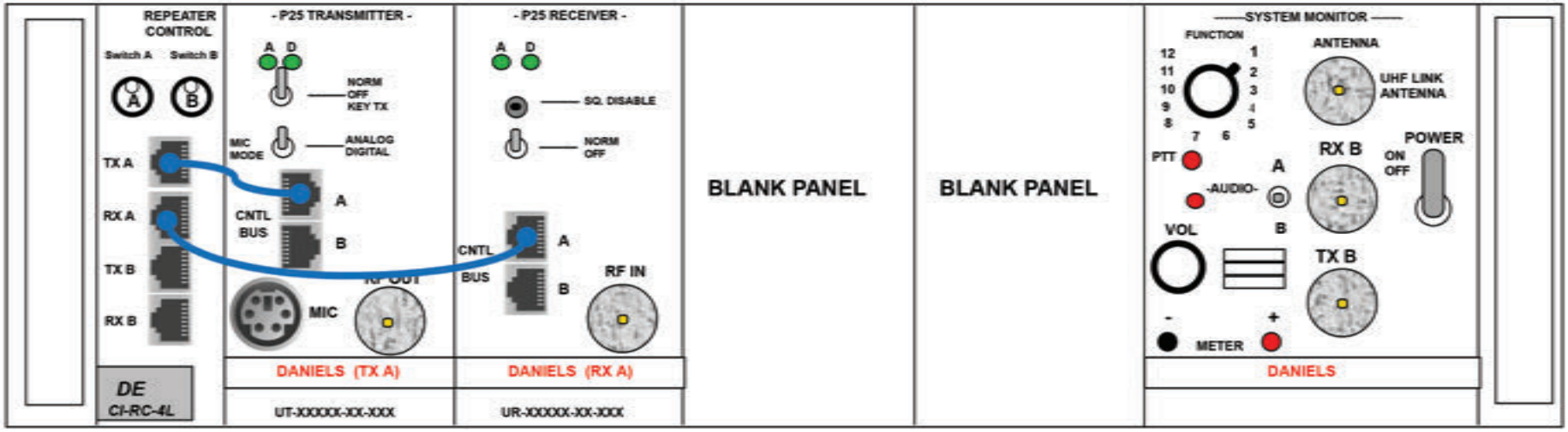
To Enable Audio to Internal Speaker for Troubleshooting:

1. Enable the speaker by switching the Speaker switch located on the System Regulator Module, to the **"ON"** position.
2. Select the **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	RX A Audio
4-12	NIIRSC Technician Testing
Revised 2024	

4248 - UHF REPEATER SWITCH SETTINGS



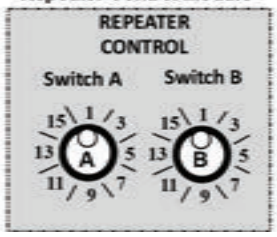
4248 - UHF REPEATER CONFIGURATION:

- 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 subrack power cable to the SLA batteries using the provided **POLARIZED** fused cable. ***(SLA Battery-4150 Kit or Solar Panel-4080 Kit is required to power up NIICD equipment.)***
- 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. ***(NIICD recommends testing with the field Units or ICP if possible before leaving the site.)***

Equipment Note:

- *NIICD has implemented a RX/TX Fixed Tone of **110.9** on all UHF Frequencies to help minimize possible interference on UHF signals.*
- *The Function Switches on the System Monitor Module are only for shop testing and used in conjunction with the meter leads.*
- ***Switch A** and **Switch B** on the **Repeater Control Module** have no effect on the operation of the UHF Stand Alone Repeater.*

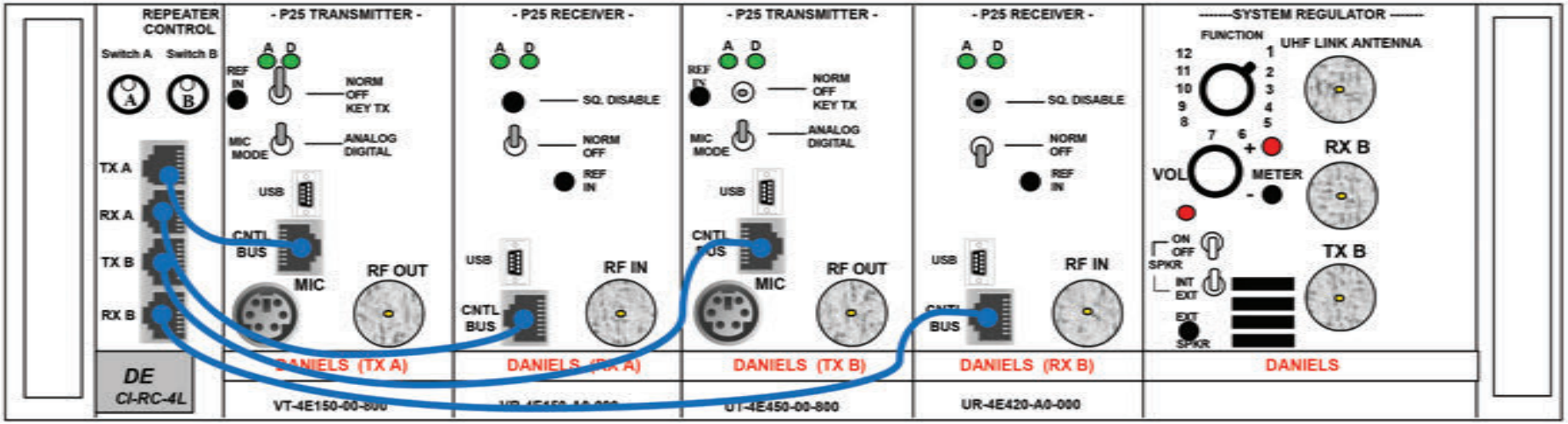
Close-Up View
Switch A, Switch B
Repeater Control Module



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.

System Monitor Switch Functions (4248 - UHF Repeater Configuration)	
2	+13.8 V (Supply Voltage
3	+9.5 V Regulated
4	RX A Audio
1, 4-12	NIRSC Technician Testing
Revised 2024	

4312 - VHF REPEATER SWITCH SETTINGS (E MODELS ONLY)



4312 - VHF REPEATER CONFIGURATION: (E-MODELS ONLY)

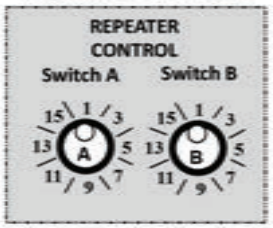
- Set up the VHF **Directional antenna** and attach the coaxial cable to the appropriate VHF Base antenna mount. *(See Antenna Instructions in the User's Guide for detailed setup information)*
- Attach the other end of the **VHF coaxial** cable to the appropriate connector on the bulkhead mount located on the back of the fiberglass box.
- Connect the subrack power cable to the SLA batteries using the provided **POLARIZED** fused cable. Once power cable is connected, all modules are active. *(No master power switch)*
  (SLA Battery-4150 Kit or Solar Panel-4080 Kit is required to power up NIICD equipment.)
- 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, turn OFF UHF RX and TX Modules)*
- 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. *(NIICD recommends testing with the field units or ICP if possible before leaving the site)*

Equipment 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.*

Close Up View
Switch A, Switch B
Repeater Control Module



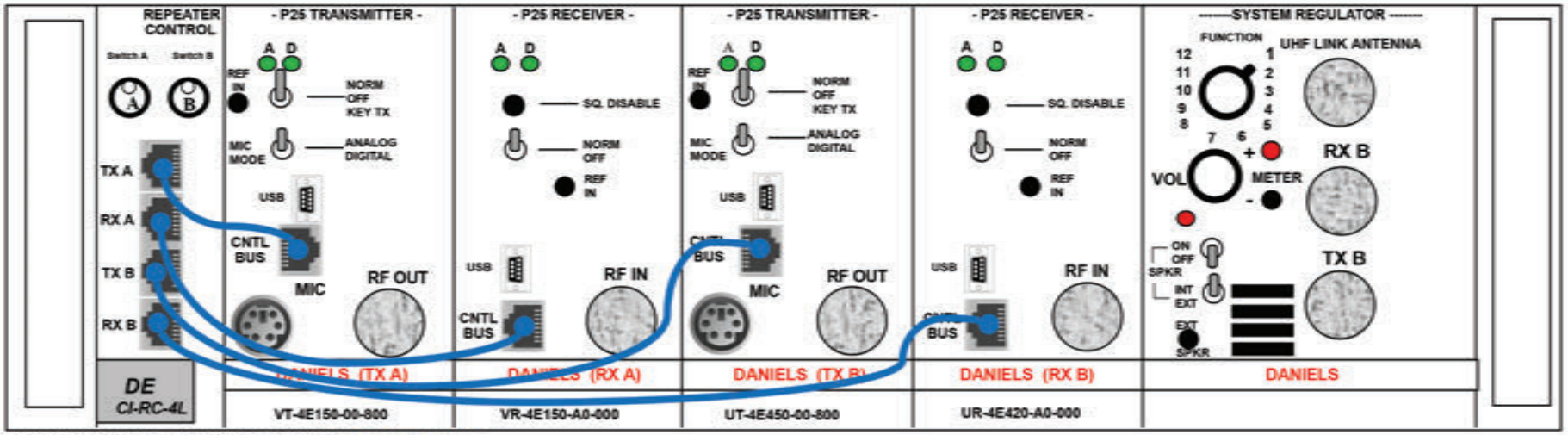
Switch A - VHF Tone Table	
Position A1	Tone 1: 110.9
Position A2	Tone 2: 123.0
Position A3	Tone 3: 131.8
Position A4	Tone 4: 136.5
Position A5	Tone 5: 146.2
Position A6	Tone 6: 156.7
Position A7	Tone 7: 167.9
Position A8	Tone 8: 103.5
Position A9	Tone 9: 100.0
Position A10	Tone 10: 107.2
Position A11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

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	RX A Audio
5	RX B Audio
4, 6-12	NIIRSC Technician Testing
Revised 2024	

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



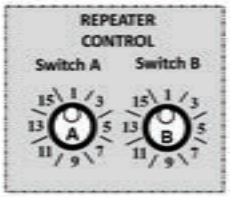
4312 - VHF REPEATER/LINK CONFIGURATION *(E-MODELS ONLY)*

- 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 subrack power cable to the SLA batteries using provided **POLARIZED** fused cable. Once the power cable is connected, all modules are active. *(No master power switch)*
  (SLA Battery-4150 Kit or Solar Panel-4080 Kit is required to power up NIICD equipment.)
- 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. *(See 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. *(See Switch B - UHF Link Frequency/Tone Table)*
  Note:NIICD 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. *(NIICD recommends testing with the field units or ICP if possible before leaving the site)*
- Before leaving the site, NIICD recommends turning the INT/EXT Speaker **OFF** on the **System Regulator Module**.

Equipment 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 dedicated 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.*

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



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 16: 162.2
Position A16	No Tone

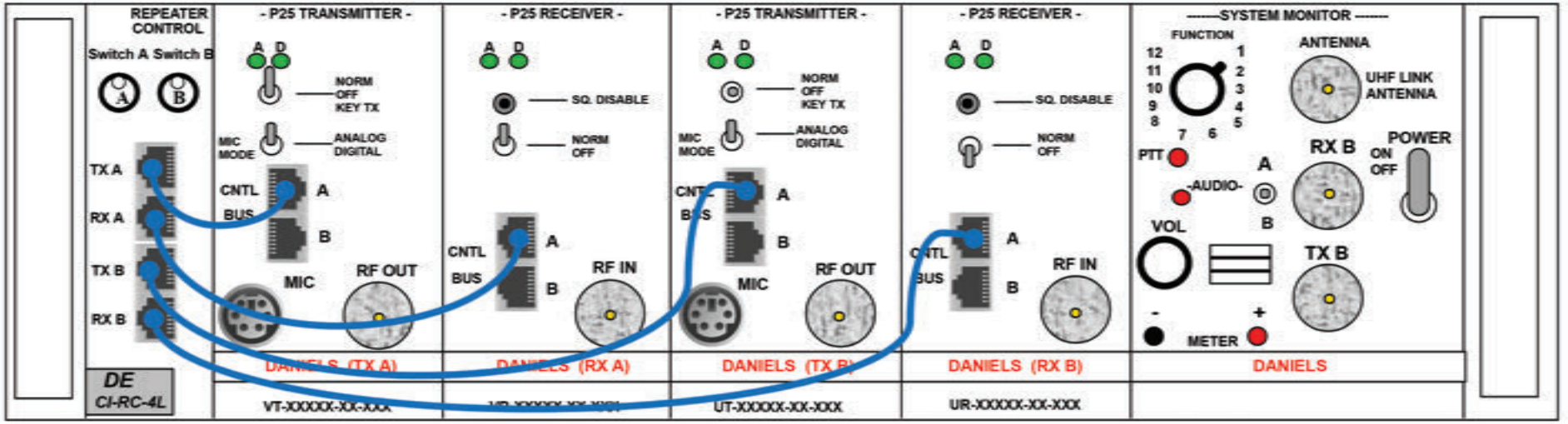
Switch B - UHF Link Frequency/Tone Table		
Position B1	L1 RPTR Access	Tone: 110.9
Position B2	L2 RPTR Access	Tone: 110.9
Position B3	L3 RPTR Access	Tone: 110.9
Position B4	L4 RPTR Access	Tone: 110.9
Position B5	L5 RPTR Access	Tone: 110.9
Position B6	L6 RPTR Access	Tone: 110.9
Position B7	L7 RPTR Access	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:

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 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	RX A Audio
5	RX B Audio
4, 6-12	NIICD Testing
Revised 2024	

4312 - VHF REPEATER SWITCH SETTINGS



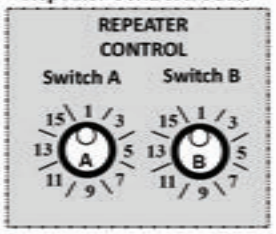
4312 - VHF REPEATER CONFIGURATION:

- 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 subrack power cable to the SLA batteries using the provided **POLARIZED** fused cable. *(SLA Battery-4150 Kit or Solar Panel-4080 Kit is required to power up NIICD equipment.)*
- 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 power switches on both the **TX B** and **RX B** in the **"OFF"** position. *(Stand-alone Repeater Configuration- No Linking, turn OFF UHF RX and TX Modules)*
- Keep the **MIC MODE** switch on both **TX A** and **TX B** in the **"ANALOG"** position.
- Keep the **A/B Audio Select** Switch on the **System Monitor Module** at the center (**OFF**) 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. *(NIICD recommends testing with the field units or ICP if possible before leaving the site)*

Equipment 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.*

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



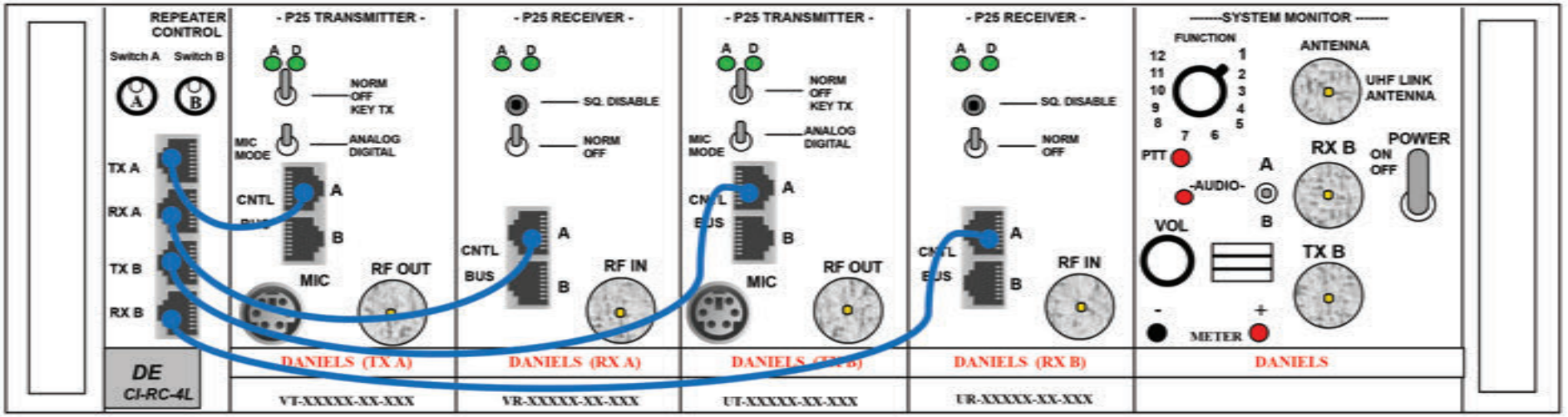
Switch A - VHF Tone Table	
Position A1	Tone 1: 110.9
Position A2	Tone 2: 123.0
Position A3	Tone 3: 131.8
Position A4	Tone 4: 136.5
Position A5	Tone 5: 146.2
Position A6	Tone 6: 156.7
Position A7	Tone 7: 167.9
Position A8	Tone 8: 103.5
Position A9	Tone 9: 100.0
Position A10	Tone 10: 107.2
Position A11	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

Enabling Internal Speaker for Troubleshooting

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

System Monitor Switch Functions (4312-VHF Repeater Configuration)	
2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
8	RX A/B Audio
1, 4-7, 9-12	NIIRSC Technician Testing
Revised 2024	

4312 - VHF REPEATER/LINK SWITCH SETTINGS



4312 - VHF REPEATER/LINK CONFIGURATION:

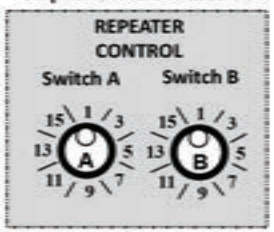
- Set up the VHF **Omni-Directional** antenna and attach the coaxial cable to the appropriate antenna base and bulkhead connector located on the back of the fiberglass box.
- Set up the UHF **antenna** and attach the coaxial cable to the appropriate antenna base and bulkhead connector located on the back of the fiberglass box. *(See Antenna Instructions in the User's Guide for more info)*
- Connect the subrack power cable to the SLA batteries using the provided fused **POLARIZED** cable. *(SLA Battery-4150 Kit or Solar Panel-4080 Kit is required to power up NIICD equipment.)*
- Turn the **Power** Switch to the **"ON"** position on the **System Monitor Module**.
- Keep the power switches on the **TX A, RX A, TX B, and RX B** in the **"NORM"** position.
- Keep the **A/B Audio Select** Switch on the **System Monitor Module** at the center (**OFF**) position.
- Keep the **MIC MODE** switch on both the **TX A** and **TX B** in the **ANALOG** 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. *(See 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. *(See Switch B - UHF Link Frequency/Tone Table)*
- Test with two VHF and one UHF handheld to verify the repeater and link are operating correctly. *(NIICD recommends testing with the field units or ICP if possible before leaving the site)*

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

Equipment 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.*

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



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

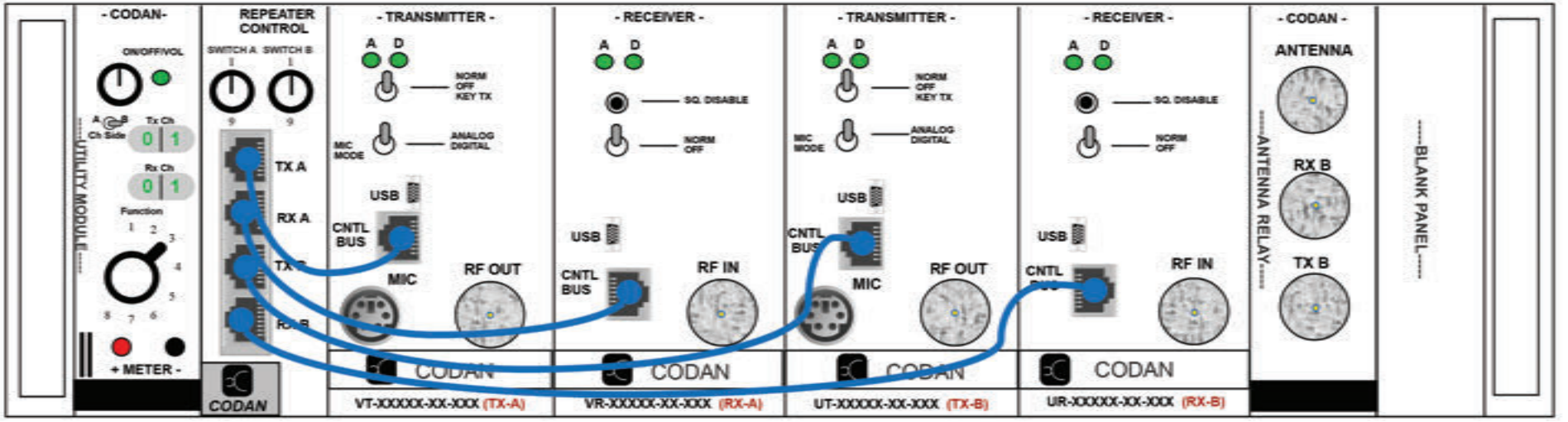
Switch B - UHF Link Frequency/Tone Table		
Position B1	L1 RPTR Access	Tone: 110.9
Position B2	L2 RPTR Access	Tone: 110.9
Position B3	L3 RPTR Access	Tone: 110.9
Position B4	L4 RPTR Access	Tone: 110.9
Position B5	L5 RPTR Access	Tone: 110.9
Position B6	L6 RPTR Access	Tone: 110.9
Position B7	L7 RPTR Access	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

Enabling Internal Speaker for Troubleshooting

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

System Monitor Switch Functions (4312 - VHF Repeater/Link Configuration)	
2	+13.8 V (Supply Voltage)
3	+9.5 V Regulated
8	RX A/B Audio
1, 4-7, 9-12	NIRSC Technician Testing
Revised 2024	

4312 - VHF REPEATER/LINK SWITCH SETTINGS *(MT-5 VERSION)*



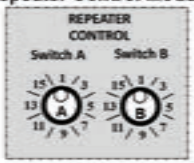
4312 - VHF REPEATER/LINK CONFIGURATION *(MT-5 Version)*

- 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 **Link 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 subrack power cable to the SLA batteries using provided **POLARIZED** fused cable. Once the power cable is connected, all modules are active. *(No master power switch)*
  (SLA Battery-4150 kit or Solar Panel-4080 kit is required to power up NIICD equipment)
- Turn each module **"ON"** by keeping the switches on the **TX A, RX A, TXB, and RXB** in the **"NORM"** position.
- Keep the **MIC MODE** switch on both the **TX A** and **TX B** in the **ANALOG** position.
- Turn **"ON"** the **Utility Module** by turning the **ON/OFF/VOL** switch clockwise past the detent.
  (Note: The Utility Module does not have to be powered ON to switch VHF Repeater tones or UHF Channels on the Repeater Control Module)
- Select the **assigned VHF Repeater RX/TX Tone** by turning the **Switch A** knob, located on the top portion of the **Repeater Control Module**, to associated assigned position. *(See Switch A - VHF Tone Table)*
- Toggle the **A/B Ch Side** switch to the **A** position for a visual indicator of the **VHF Repeater tone** selected. *(Note: Selecting a tone will enable the tone on both TX A and RX A modules.)*
- Select the **assigned** UHF **frequency** by turning the **Switch B** knob, located on the top portion of the **Repeater Control Module,** to associated assigned position. *(See Switch B - UHF Link Frequency/Tone Table)*
- Toggle the **A/B Ch Side** switch to the **B** position for a visual indicator of the UHF **Channel** selected.
  Note: NIICD 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. *(NIICD recommends testing with the field units or ICP if possible before leaving the site)*
- Before leaving the site, NIICD recommends turning **OFF** the **Utility Module** by turning the **ON/OFF/VOL** switch counterclockwise past the detent.

Equipment Notes:

- *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.*
- *Contact the CDO for a tone and UHF frequency assignment @ 208-387-5644.*
- *The Utility Module does not have to be powered **ON** to switch tones or channels on the Repeater Control Module.*
- *The Function Switches on the Utility Module are only for shop testing and used in conjunction with meter leads.*

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

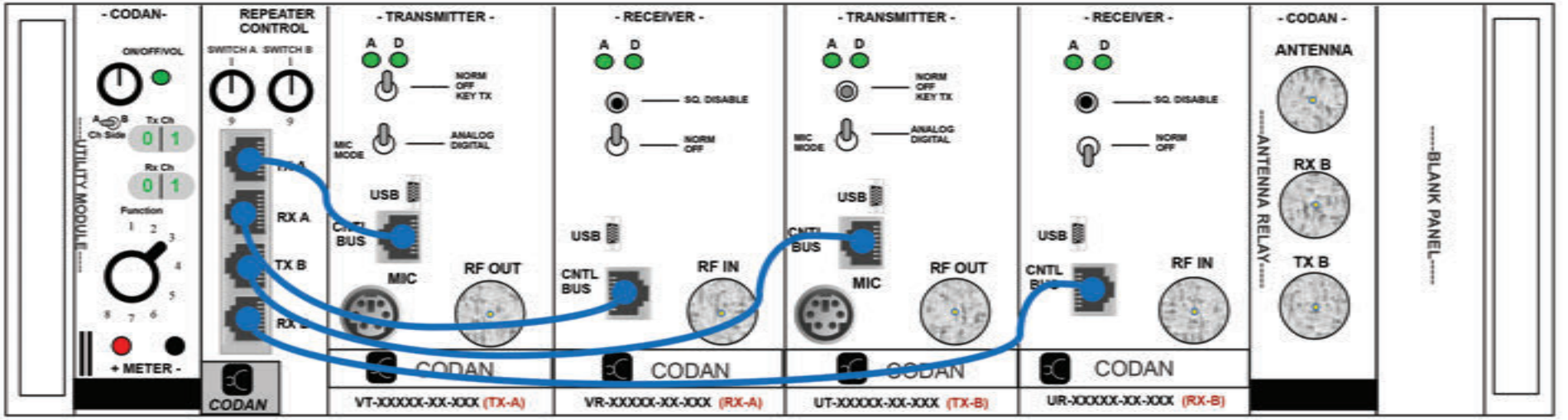


Switch A - VHF Tone Table	
Position A1	Tone 1: 110.9
Position A2	Tone 2: 123.0
Position A3	Tone 3: 131.8
Position A4	Tone 4: 136.5
Position A5	Tone 5: 146.2
Position A6	Tone 6: 156.7
Position A7	Tone 7: 167.9
Position A8	Tone 8: 103.5
Position A9	Tone 9: 100.0
Position A10	Tone 10: 107.2
Position A11	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 16: 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

Codan Utility Module Functions (4312-VHF Repeater/Link Configuration) *MT-5 Version Only*	
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3	RX A Audio
6	RX B Audio
4,5,7-12	NIICD Testing
Revised 2024	

4312 - VHF REPEATER SWITCH SETTINGS *(MT-5 VERSION)*



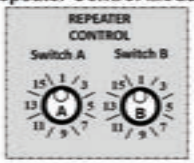
4312 - VHF REPEATER CONFIGURATION *(MT-5 Version)*

- 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)*
- Connect the subrack power cable to the SLA batteries using provided **POLARIZED** fused cable. Once the power cable is connected, all modules are active. *(No master power switch)*
  (SLA Battery-4150 kit or Solar Panel-4080 kit is required to power up NIICD equipment)
- Turn each VHF module **"ON"** by keeping the switches on the **TX A** and **RX A** in the **"NORM"** position.
- Keep the UHF modules **"OFF"** by keeping the switches on the **TX B** and **TX B** in the **"OFF"** position. *(Stand-alone Repeater Configuration - No Linking, turn OFF UHF RX and TX Modules)*
- Keep the **MIC MODE** switch on the **TX A** in the **ANALOG** position.
- Turn **"ON"** the **Utility Module** by turning the **ON/OFF/VOL** switch clockwise past the detent.
  (Note: The Utility Module does not have to be powered ON to switch VHF Repeater tones on the Repeater Control Module)
- Select the **assigned VHF Repeater RX/TX Tone** by turning the **Switch A** knob, located on the top portion of the **Repeater Control Module**, to associated assigned position. *(See Switch A - VHF Tone Table)*
- Toggle the **A/B Ch Side** switch to the **A** position to for a visual indicator of the **tone** selected. *(Note: Selecting a tone will enable the tone on both TX A and RX A modules.)*
- Test with **two VHF** radios to verify the repeater is operating correctly. *(NIICD recommends testing with the field units or ICP if possible before leaving the site)*
- Before leaving the site, NIICD recommends turning **OFF** the **Utility Module** by turning the **ON/OFF/VOL** switch counterclockwise past the detent.

Equipment Notes:

- *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.*
- *Contact the CDO for a tone assignment @ 208-387-5644.*
- *The Utility Module does not have to be powered **ON** to switch the VHF Repeater tones.*
- *The Function Switches on the Utility Module are only shop testing in conjunction with the meter leads.*

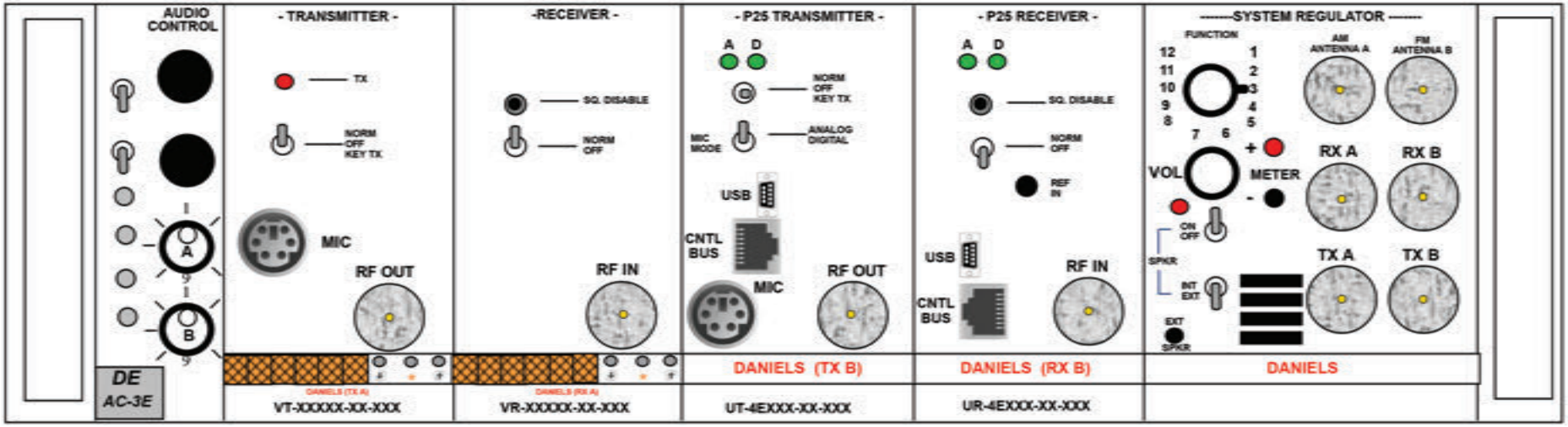
Close-Up View
Switch A, Switch B
Repeater Control Module



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

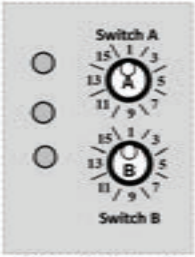
Codan Utility Module Functions (4312-VHF Repeater Configuration) *MT-5 Version Only*	
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3	RX A Audio
6	RX B Audio
4,5,7-12	NIICD Testing
Revised 2024	

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



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

- 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 sub rack power cable to the SLA batteries using the provided **POLARIZED** fused cable. Once power is connected, all modules are active. *(No Master Power Switch)*
  (SLA Battery-4150 kit or Solar Panel-4080 kit is required to power up NIICD equipment)
- Keep both **CTCSS** toggle 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 Speaker Switch on the **System Regulator Module** in the **"ON"** position to enable the speaker.
- Place the function rotary switch on the **System Regulator Module** to **Position # 3** to activate the **RX A Audio.**
- Keep the Speaker Switch on the **System Regulator Module** in the **"EXT"** position to enable the **RA A Audio** to the **External Speaker**.
- Connect the provided **speaker** to the **"EXT SPRK"** jack on the **System Regulator Module**, and adjust the Volume to the desired level.
- Select the **assigned AM** frequency for the **AM TX A** and **AM RX A** using the 16-position rotary **Switch A** on the **Audio Control Module**. *(See 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)
- 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.
  (NIICD 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

Equipment Notes:

- *The CDO or COMC will assign the appropriate **AM** frequency issued directly from the FAA.*
- *Contact the CDO for an assigned AM frequency at 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 Regulator Module are only for shop testing and used in conjunction with the meter leads.*

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.

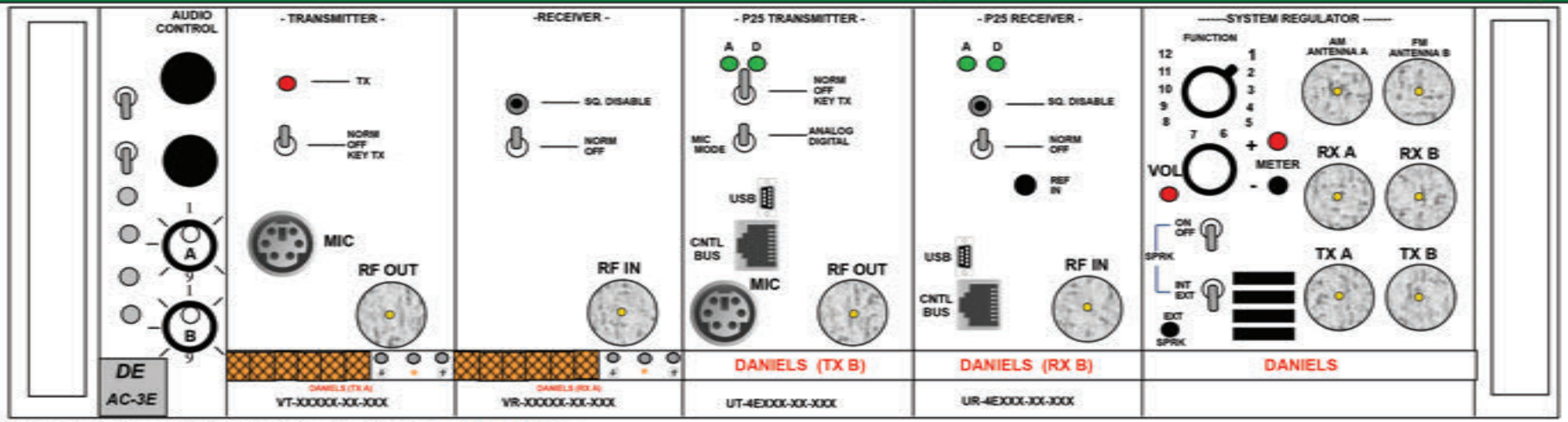
- Turn the rotary **Switch A** on the **Audio Control Module** to **Channel 16**.
- Unlock each unit by momentarily pressing the **" * "** button and, before the **"Locked"** display goes blank, press the **"down "** button.
- The display should now show **"Unlocked"**.
- Wait for the display to blank, 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**.

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 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.

System Regulator Switch Functions (4370 - Aircraft Radio Base Configuration)	
1	+13.8 V (Supply Voltage)
2	+9.5 V Regulated
3	RX A Audio
4-12	NIIRSC Technician Testing
Revised 2024	

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 subrack power cable to the SLA batteries using the provided **POLARIZED** fused cable. Once power is connected, all modules are active. *(No Master Power Switch)*
  (SLA Battery-4150 kit or Solar Panel-4080 kit is required to power up NIICD equipment)
- Keep both **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 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)
- 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)*
  (NIICD has implemented a fixed RX/TX tone of 110.9 on all UHF frequencies to help minimize interference on incoming UHF signals.)
- *Test with **one AM** and **one UHF radio** to verify link is operating correctly.*
  (NIICD 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

Equipment Note:

- The CDO or COMC will assign the appropriate **AM** frequency issued directly from the FAA.
- The CDO or COMC will assign the appropriate **FM UHF Link** Frequency
- Contact the CDO for an assigned **AM** and **UHF** frequency at 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 Regulator Module are only for shop testing and used in conjunction with the meter leads.

Manual AM Frequency Programming: (Channel 16 ONLY)

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

- Turn the rotary **Switch A** (**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/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 RPTR)	Tone 1: 110.9
Position B11	A/C 11 (L9 Simp)	Tone 1: 110.9
Position B12	A/C 12 (L9 RPTR)	Tone 1: 110.9
Position B13	A/C 13 (L10 Simp)	Tone 1: 110.9
Position B14	A/C 14 (L10 RPTR)	Tone 1: 110.9
Position B15	A/C 15 (L11 Simp)	Tone 1: 110.9
Position B16	A/C 16 (L11 RPTR)	Tone 1: 110.9

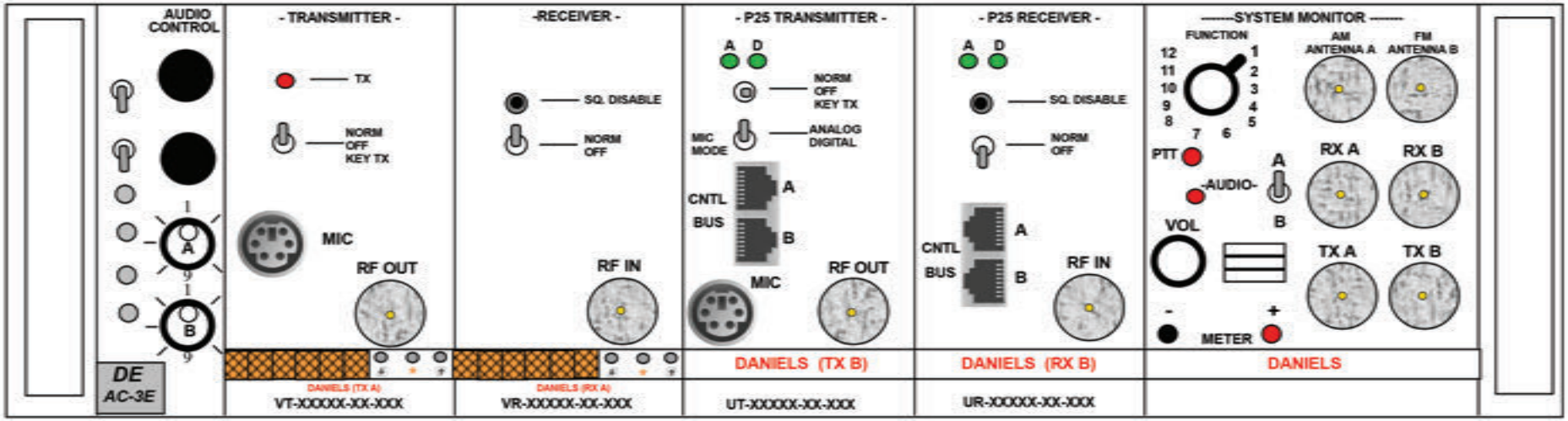
Enabling Internal Speaker for Troubleshooting

- **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

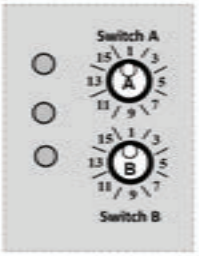
Revised 2024

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 sub rack power cable to the SLA batteries using the provided **POLARIZED** fused cable. One power is connected, all modules are active. *(No Master Power Switch)*
  (SLA Battery-4150 kit or Solar Panel-4080 kit is required to power up NIICD equipment)
- 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)
- 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. *(NIICD 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

Equipment Notes:

- *The CDO or COMC will assign the appropriate **AM** frequency issued directly from the FAA.*
- *Contact the CDO for an assigned AM frequency at 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 using in conjunction with the meter leads.*

Manual AM Frequency Programming: (Channel 16 ONLY)

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

- Turn the rotary **Switch A** on the **Audio Control Module** to **Channel 16**.
- Unlock each unit by momentarily pressing the **" * "** button 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**.

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

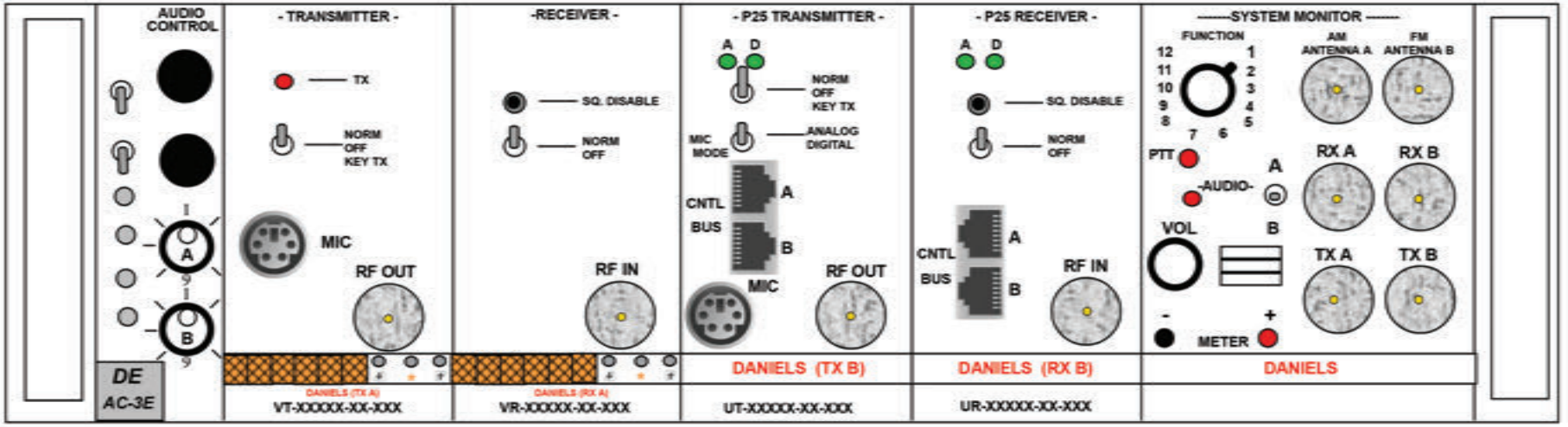
Enabling Internal Speaker for Troubleshooting

- **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 Base Configuration)	
1	External Speaker
2	+13.8 V Regulated
3	+9.5 V Regulated
8	RX A Audio
4-7, 9-12	NIRSC Technician Testing

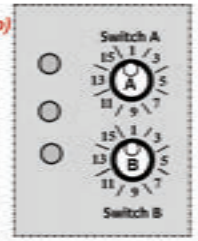
Revised 2024

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 sub rack power cable to the SLA batteries using the provided **POLARIZED** fused cable. Once power is connected, all modules are active. *(No Master Power Switch)*
  (SLA Battery-4150 kit or Solar Panel-4080 kit is required to power up NIICD equipment)
- Keep both **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 for **"OFF"**
- 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)
- 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/Tone Table)*
  Note: The NIICD has implemented a fixed RX/TX tone of 110.9 on all UHF frequencies to help minimize interference on incoming UHF signals.
- *Test with **one AM** and **one UHF radio** to verify link is operating correctly.* *(NIICD 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

Equipment Notes:

- *The CDO or COMC will assign the appropriate **AM** frequency issued directly from the FAA.*
- *Contact the CDO for an assigned AM and UHF link frequency at 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.*

Manual AM Frequency Programming: (Channel 16 ONLY)

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

- Turn the rotary **Switch A** (**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

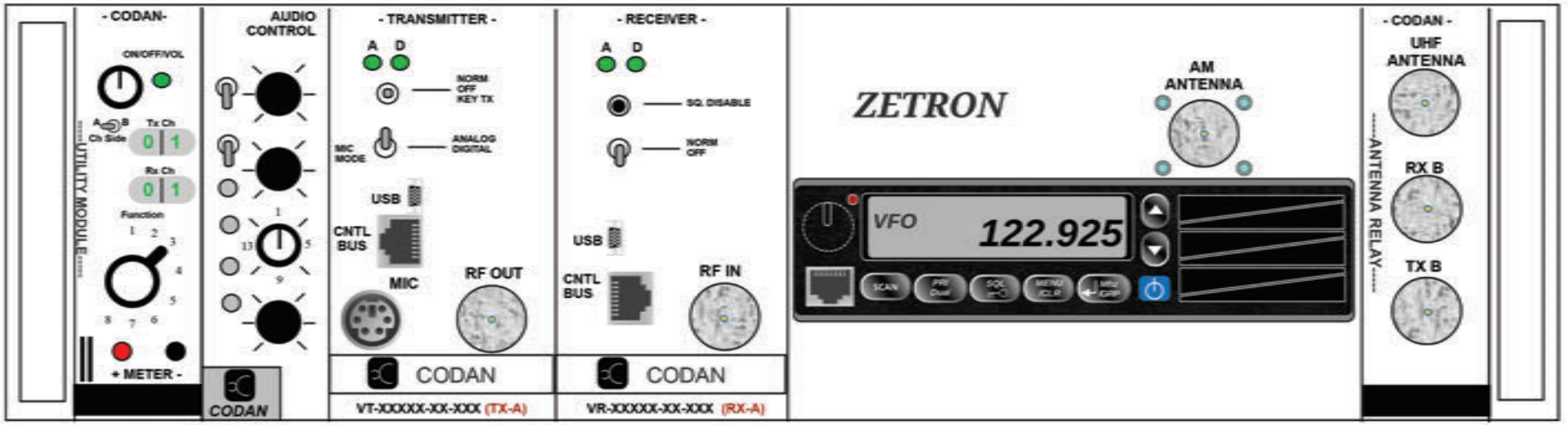
Switch B - UHF Frequency/Tone Table		
Position B1	A/C 1 Simplex	Tone 1: 110.9
Position B2	A/C 2 Simplex	Tone 1: 110.9
Position B3	A/C 3 Simplex	Tone 1: 110.9
Position B4	A/C 4 Simplex	Tone 1: 110.9
Position B5	A/C 5 Simplex	Tone 1: 110.9
Position B6	A/C 6 Simplex	Tone 1: 110.9
Position B7	A/C 7 Simplex	Tone 1: 110.9
Position B8	A/C 8 Simplex	Tone 1: 110.9
Position B9	A/C 9 (L8 Simp)	Tone 1: 110.9
Position B10	A/C 10 (L8 RPTR)	Tone 1: 110.9
Position B11	A/C 11 (L9 Simp)	Tone 1: 110.9
Position B12	A/C 12 (L9 RPTR)	Tone 1: 110.9
Position B13	A/C 13 (L10 Simp)	Tone 1: 110.9
Position B14	A/C 14 (L10 RPTR)	Tone 1: 110.9
Position B15	A/C 15 (L11 Simp)	Tone 1: 110.9
Position B16	A/C 16 (L11 RPTR)	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 Base Configuration)	
1	External Speaker
2	+13.8 V Regulated
3	+9.5 V Regulated
8	RX A Audio
4-7, 9-12	NIRSC Technician Testing
Revised 2024	

4370 - AIRCRAFT RADIO/LINK SWITCH SETTINGS (BASE CONFIGURATION - MT5)



4370 - AIRCRAFT RADIO/LINK: (BASE CONFIGURATION - MT5 VERSION)

- 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)*
- Connect the sub rack power cable to the SLA batteries using the provided **POLARIZED** fused cable. Once power is connected, all modules are active. *(No Master Power Switch)*
  (SLA Battery-4150 kit or Solar Panel-4080 kit is required to power up NIICD equipment)
- Keep both **CTCSS** switches, located on the **Audio Control Module** in the **"OFF"** (down) position.
- Keep the power switches on the **TX A** and **RX A in the "OFF"** position.
- Turn **"ON"** the **Utility Module** by turning the **ON/OFF/VOL** switch clockwise past the detent.
  Note: The Utility Module does not have to be powered ON.
- Turn **"ON"** the **ICOM-A120** radio by pressing and holding the **Blue Power** softkey until the radio turns on.
- Select the **assigned AM RX and TX frequency** by scrolling up or down using the Up/Down softkeys on the ICOM Mobile radio.
  Note: If VFO is not selected on the ICOM-A120 radio, See ICOM-A120 VFO Manual AM Frequency Programming)
- *Test with **one AM radio** to verify base radio is operating correctly.* ***(NIICD recommends testing with the field units before leaving the site)***
- Before leaving the site, NIICD recommends turning **"OFF"** the **Utility Module** by turning the **ON/OFF/VOL** switch counterclockwise past the detent.

Equipment Notes:

- *The CDO or COMC will assign the appropriate **AM** frequency issued directly from the FAA.*
- *Contact the CDO for an assigned **AM** frequency at 208-387-5644.*
- *The **Function Switches** on the **Utility Module** are only for shop testing and used in conjunction with the meter leads.*

ICOM-A120 VFO Manual AM Frequency Programming:

NIICD default of the ICOM-A120 Radio is set to VFO (Variable Frequency). The LCD will indicate "VFO" on the screen.

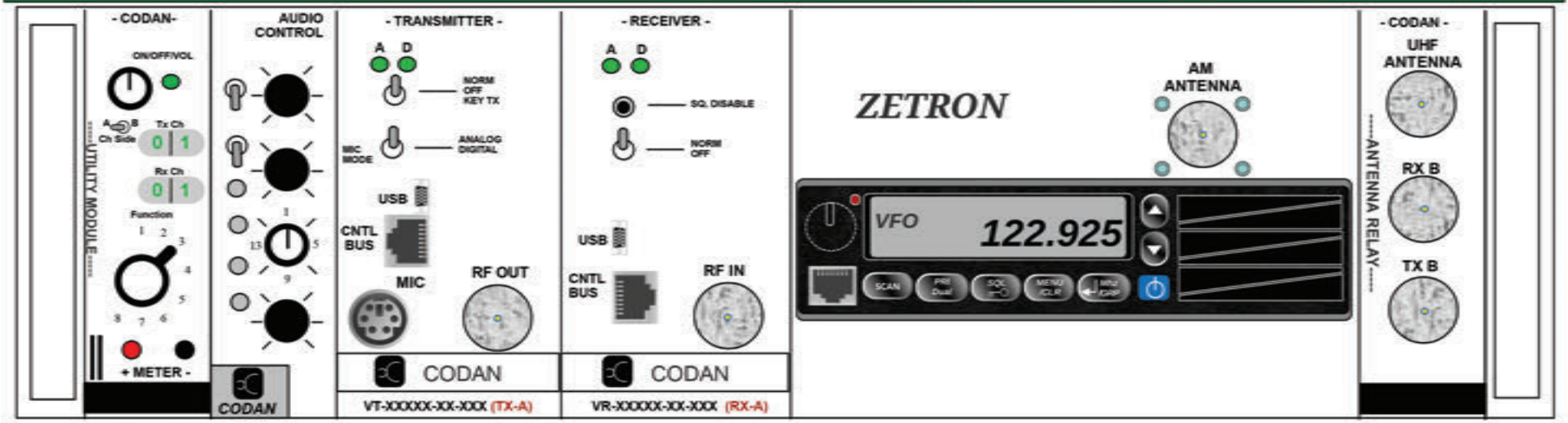
If the radio is not set to VFO, follow the following procedure:

- *Press the **"Menu/CLR"** soft key*
- *Highlight **"VFO Mode"** using the **Up/Down** softkeys.*
- *Press the **"Mhz/GRP"** softkey.*
- *The radio will default back to the **VFO Mode** and ready for direct entry of AM frequencies using the **Up/Down** softkeys.*
- *Once the assigned frequency is set, press and hold the **"SQL"** key to lock the frequency. LCD will briefly indicate **"Lock On"***

For detailed information on programming the ICOM-A120 Radio, see the NIICD User's Guide.

System Monitor Switch Functions (4370 - Aircraft Radio Base Configuration) MT-5 Version Only	
1	+13.8 V Regulated
2	9.5 V Regulated
3	RX A Audio
6	RX B Audio
4-5, 7-12	NIIRSC Technician Testing
Revised 2024	

4370 - AIRCRAFT RADIO/LINK SWITCH SETTINGS (LINK CONFIGURATION - MT5)



4370 - AIRCRAFT RADIO/LINK: (LINK CONFIGURATION - MT5 VERSION)

- 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 sub rack power cable to the SLA batteries using the provided **POLARIZED** fused cable. Once power is connected, all modules are active. *(No Master Power Switch)*
  (SLA Battery-4150 kit or Solar Panel-4080 kit is required to power up NIICD equipment)
- Keep both **CTCSS** switches, located on the **Audio Control Module** in the **"OFF"** (down) position.
- Keep the power switches on the **TX A** and **RX A in the "NORM"** position.
- Keep the **MIC MODE** on the **TX A** in the **ANALOG** position.
- Turn **"ON"** the **Utility Module** by turning the **ON/OFF/VOL** switch clockwise past the detent.
- Toggle the **A/B CH Side** to the **A** position for a visual indicator of the **UHF Link Channel** selected.
  Note: The Utility Module does not have to powered ON to switch the UHF Link Channels on the Audio Control Module.
- Select the **assigned FM UHF link frequency** for both the **TX A** and **RX A** using the 16-position rotary knob on the **Audio Control Module**. *(Audio Control Switch - UHF Link Frequency/Tone Table)*
  Note: The NIICD has implemented a fixed RX/TX tone of 110.9 on all UHF frequencies to help minimize interference on incoming UHF signals.
- Turn **"ON"** the **ICOM-A120** radio by pressing and holding the **Blue Power** softkey until the radio turns on.
- Select the **assigned AM RX and TX frequency** by scrolling up or down using the Up/Down softkeys on the ICOM Mobile radio.
  Note: If VFO is not selected on the ICOM-A120 radio See ICOM-A120 VFO Manual AM Frequency Programming)
- *Test with **one AM** and **one UHF radio** to verify link is operating correctly. (NIICD recommends testing with the field units or Heli-Base is possible before leaving the site)*
- Before leaving the site, NIICD recommends turning **"OFF"** the **Utility Module** by turning the **ON/OFF/VOL** switch counterclockwise past the detent.

Equipment Notes:

- *The CDO or COMC will assign the appropriate **AM** frequency issued directly from the FAA.*
- *Contact the CDO for an assigned **AM** and **UHF** link frequency at 208-387-5644.*
- *The Audio Control Switch is a **16 position rotary** switch with position 1 being straight up.*
- *The **Function Switches** on the **Utility Module** are only for shop testing and used in conjunction with the meter leads.*

ICOM-A120 VFO Manual AM Frequency Programming:

NIICD default of the ICOM-A120 Radio is set to VFO (Variable Frequency). The LCD will indicate "VFO" on the screen.

If the radio is not set to VFO, follow the following procedure:

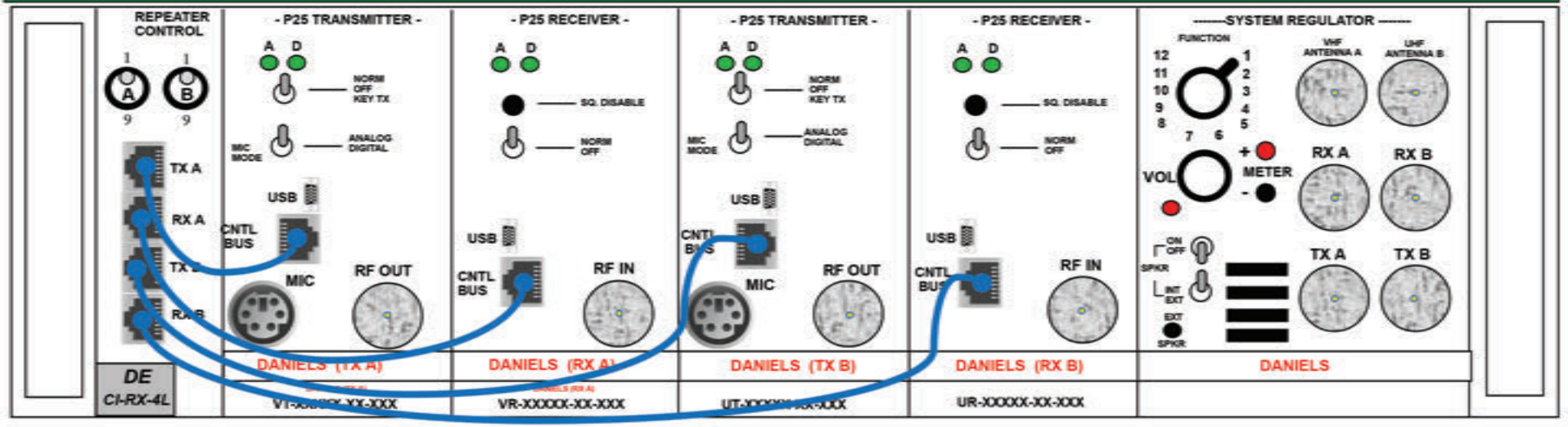
- *Press the **"Menu/CLR"** soft key*
- *Highlight **"VFO Mode"** using the **Up/Down** softkeys.*
- *Press the **"Mhz/GRP"** softkey.*
- *The radio will default back to the **VFO Mode** and ready for direct entry of AM frequencies using the **Up/Down** softkeys.*
- *Once the assigned frequency is set, press and hold the **"SQL"** key to lock the frequency. LCD will briefly indicate **"Lock On"***

For detailed information on programming the ICOM-A120 Radio, see the NIICD User's Guide.

Audio Control Switch - UHF Frequency/Tone Table		
Position A1	A/C 1 Simplex	Tone 1: 110.9
Position A2	A/C 2 Simplex	Tone 1: 110.9
Position A3	A/C 3 Simplex	Tone 1: 110.9
Position A4	A/C 4 Simplex	Tone 1: 110.9
Position A5	A/C 5 Simplex	Tone 1: 110.9
Position A6	A/C 6 Simplex	Tone 1: 110.9
Position A7	A/C 7 Simplex	Tone 1: 110.9
Position A8	A/C 8 Simplex	Tone 1: 110.9
Position A9	A/C 9 (L8 Simp)	Tone 1: 110.9
Position A10	A/C 10 (L8 RPTR)	Tone 1: 110.9
Position A11	A/C 11 (L9 Simp)	Tone 1: 110.9
Position A12	A/C 12 (L9 RPTR)	Tone 1: 110.9
Position A13	A/C 13 (L10 Simp)	Tone 1: 110.9
Position A14	A/C 14 (L10 RPTR)	Tone 1: 110.9
Position A15	A/C 15 (L11 Simp)	Tone 1: 110.9
Position A16	A/C 16 (L11 RPTR)	Tone 1: 110.9

System Monitor Switch Functions (4370 - Aircraft Radio Link Configuration) MT-5 Version Only	
1	+13.8 V Regulated
2	9.5 V Regulated
3	RX A Audio
6	RX B Audio
4-5, 7-12	NIRSC Technician Testing
Revised 2024	

4281 - CROSSBAND LINK SWITCH SETTINGS



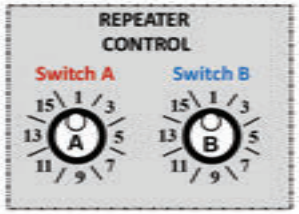
4281 Crossband Link: *(Link Configuration)*

- 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 subrack power cable to the SLA batteries using the provided **POLARIZED** fused cable. Once the power cable is connected, all modules are active. *(No master power switch)*
  (SLA Battery-4150 kit or Solar Panel-4080 kit is required to power up NIICD equipment)
- 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: NIICD 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. *(NIICD recommends testing with the field units or ICP if possible before leaving the site)*

Equipment 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 dedicated 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 Regulator Module are only for a shop testing and used in conjunction with the meter leads.*

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:

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*

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 2024	

NIICD 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 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.

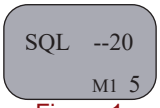


Figure 1

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)

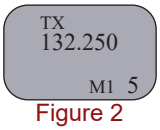


Figure 2

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)

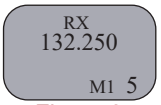


Figure 3

ICOM A-6 Front View

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.

Figure 1

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**"soft key, 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)***

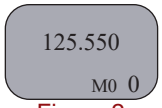


Figure 2

Figure 3

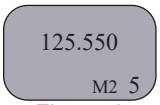


Figure 4

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 memory 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.*

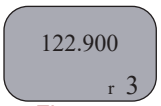


Figure 5

KEYPAD LOCK FUNCTION

To Enable Key Lock, press the "**F**" key, then press the "**7**" key (Key Lock) to turn **"ON"** the function. ***(See Figure 6)***

- Display indicates that the key Lock functions is enabled by displaying the "⊓—0" icon in the upper part of the LCD.

To Disable Key Lock, repeat the process.

Note: The lock function prevents accidental frequency changes & accidental function activation.

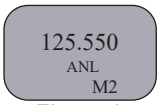


Figure 6

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.

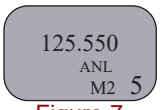


Figure 7

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)*

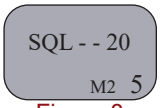


Figure 8

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.

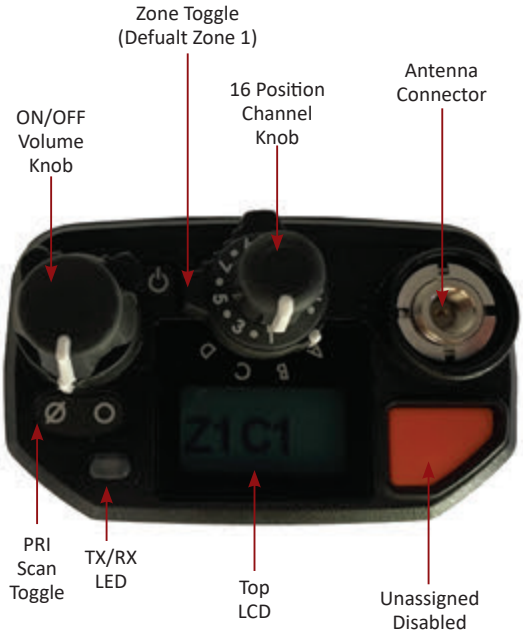
The radio is now ready to operate on the current group and channel.

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 Front View



BKR 5000 Top View

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 " CZ " 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.

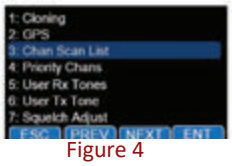


Figure 4

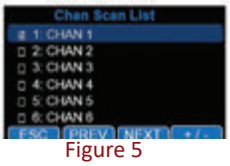


Figure 5

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.

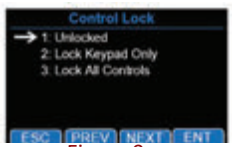


Figure 9

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.

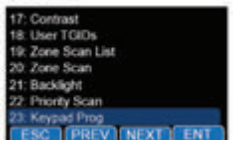


Figure 1

Figure 2

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**".

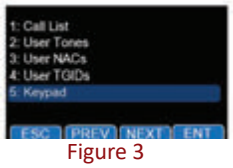


Figure 3

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

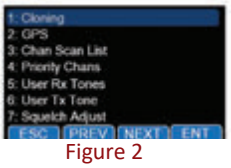


Figure 2

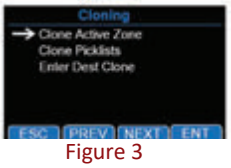


Figure 3

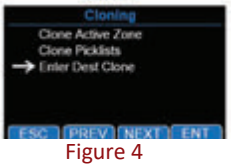


Figure 4

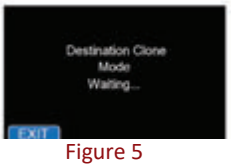


Figure 5

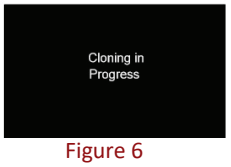


Figure 6

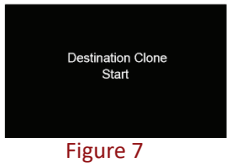


Figure 7

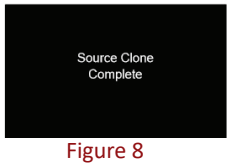


Figure 8

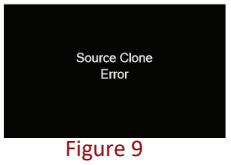


Figure 9

Figure 10

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 the 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

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)*

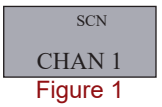


Figure 1

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.

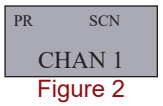


Figure 2

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 in 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.

Figure 3

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.

Figure 4

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.

Figure 5

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.

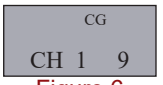


Figure 6

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 7

Figure 8

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 te "**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 Labe**l, 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.

Figure 1

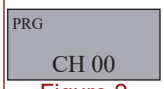


Figure 2

Figure 3

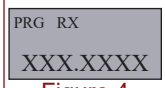


Figure 4

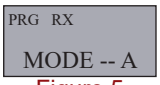


Figure 5

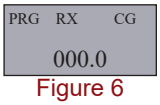


Figure 6

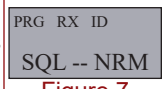


Figure 7

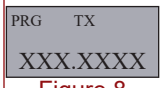


Figure 8

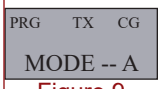


Figure 9

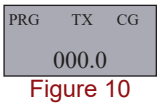


Figure 10

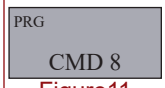


Figure11

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.*

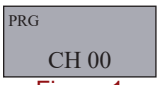


Figure 1

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"***

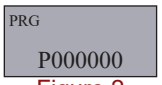


Figure 2

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)

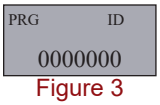


Figure 3

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)

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)

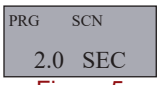


Figure 5

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.

Figure 6

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.

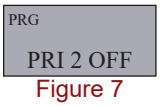


Figure 7

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.)

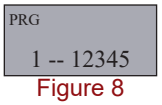


Figure 8

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.)

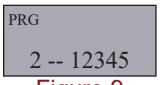


Figure 9

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.)

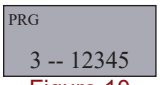


Figure 10

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)

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.

Figure 12

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)***

   *Note: To stop "**FAIL**" mode, press the "**CLR**" key, turn off the radios, and start the cloning process again.*

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.

Figure 1

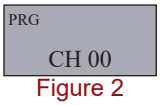


Figure 2

Figure 3

Figure 4

DPHx Cloning Connections

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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

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)***

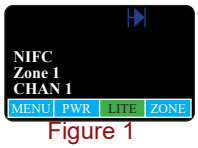

Figure 1

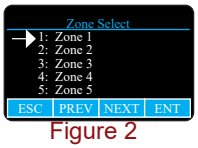

Figure 2

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.

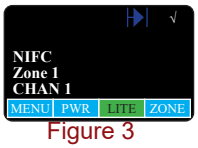

Figure 3

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 "**-**".

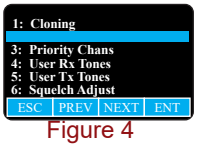

Figure 4

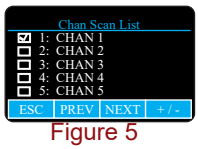

Figure 5

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.

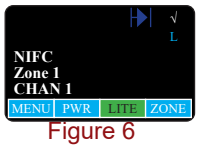

Figure 6

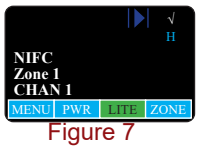

Figure 7

LOCKING KEYPAD

- **To Lock Keypad** - Turn the top bezel button located on the top of the radio to the " ∅ " 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.

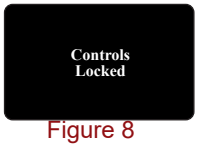

Figure 8

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 "**CRL**" 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.

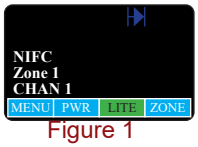

Figure 1

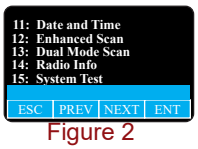

Figure 2

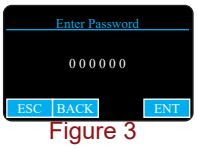

Figure 3

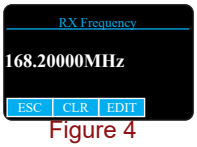

Figure 4

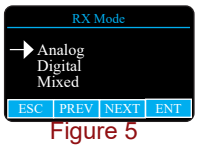

Figure 5

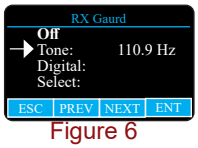

Figure 6

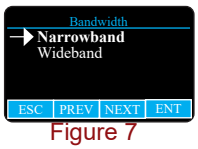

Figure 7

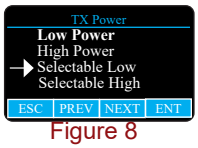

Figure 8

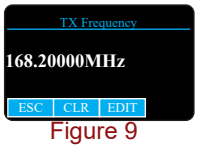

Figure 9

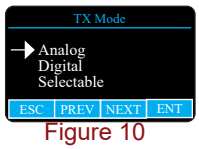

Figure 10

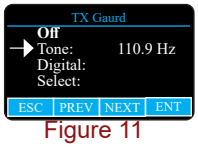

Figure 11

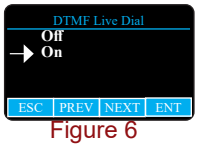

Figure 6

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**" momenterly 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.

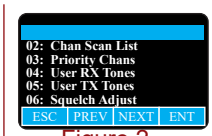

Figure 2

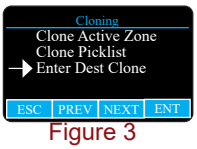

Figure 3

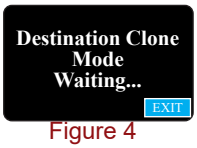

Figure 4

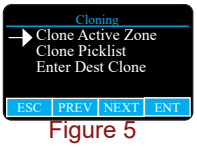

Figure 5

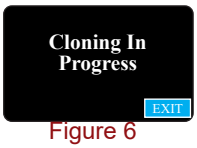

Figure 6

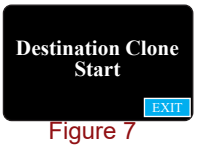

Figure 7

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 preformed 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*

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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

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

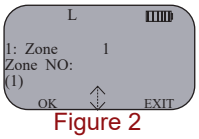

Figure 2

ENABLING/DISABLING SCAN

To Enable Scan - press the " " 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 " " 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.

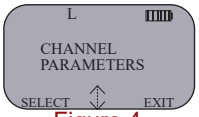

Figure 4

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.*

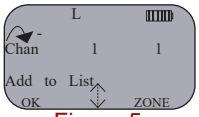

Figure 5

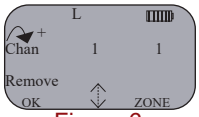

Figure 6

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 " " softkey once to lock the key pad.

- LCD momentarily displays "**Key Lock Active**"

To Unlock the Keypad - press the " " 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).

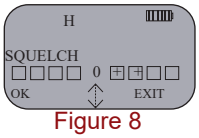

Figure 8

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 " C " 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 " C " 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 " C " 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)***
    - T**o 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.

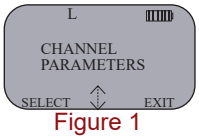

Figure 1

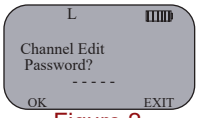

Figure 2

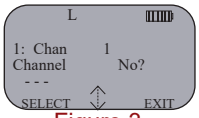

Figure 3

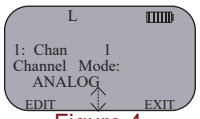

Figure 4

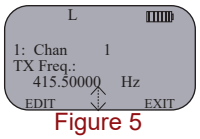

Figure 5

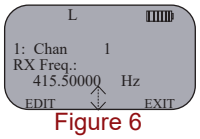

Figure 6

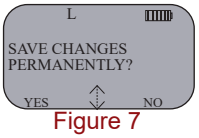

Figure 7

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)***

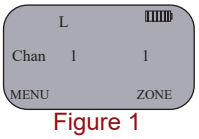

Figure 1

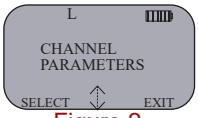

Figure 2

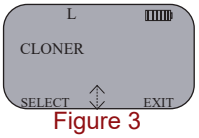

Figure 3

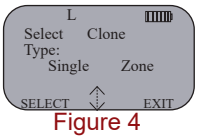

Figure 4

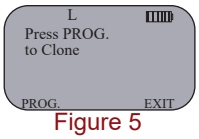

Figure 5

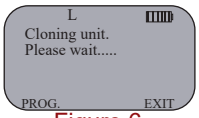

Figure 6

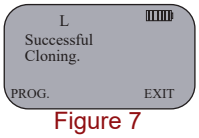

Figure 7

Midland Cloning Connections

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.

XTS 5000 Front View

XTS 5000 Top View

XTS 5000 Side View

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.

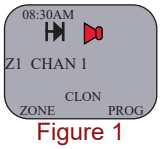

Figure 1

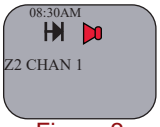

Figure 2

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 (⇄) 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 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 (⇄) 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 (⇄ .) 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 (⇄ .) 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

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.

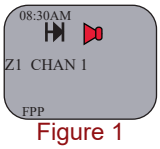

Figure 1

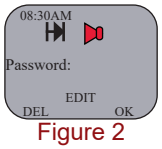

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

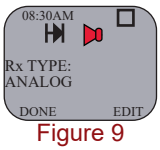

Figure 9

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

Figure 1

Note: *Once the Clamshell cover is removed, batteries can be easily replaced without removing the Clamshell Magazine*

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

NIICD RADIO SYSTEM DIAGRAMS

These diagrams are also available for download online at:

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

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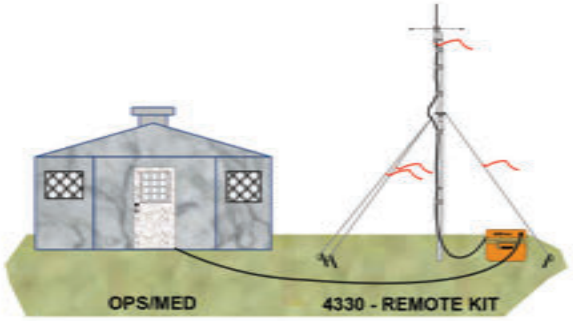
DRAWING 1 - ONE VHF COMMAND REPEATER STAND-ALONE WITH REMOTE

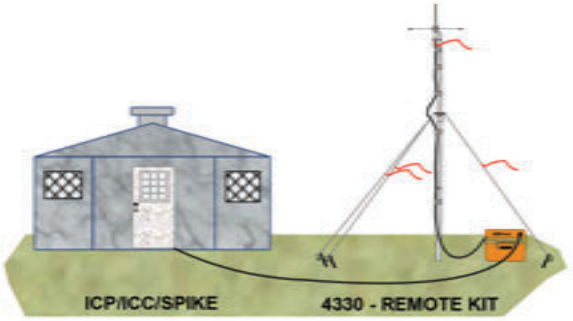
RX RPTR FREQ: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX TONE/NAC: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

VHF

VHF



RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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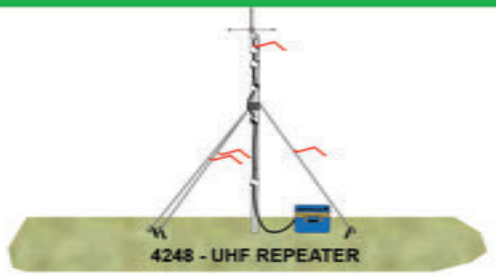
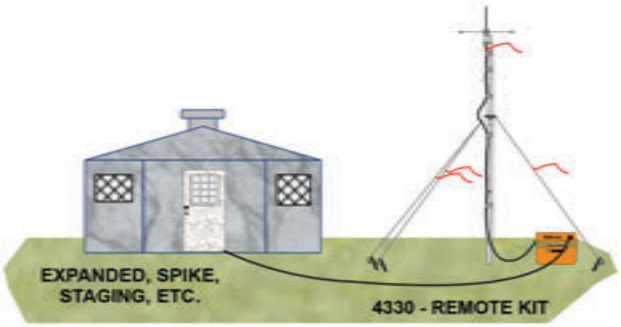
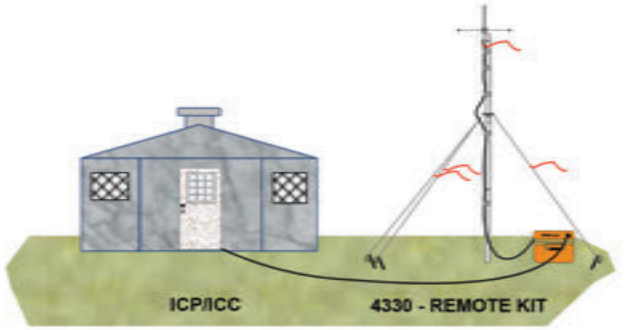
DRAWING 2 - ONE UHF REPEATER WITH TWO REMOTE KITS



RX RPTR FREQ: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX TONE/NAC: _____
4248-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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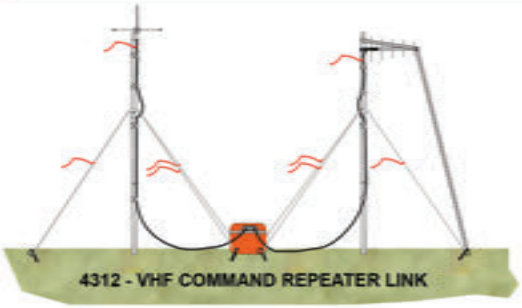
DRAWING 3 - ONE VHF COMMAND REPEATER LINKED THROUGH UHF REPEATER HUB



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: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

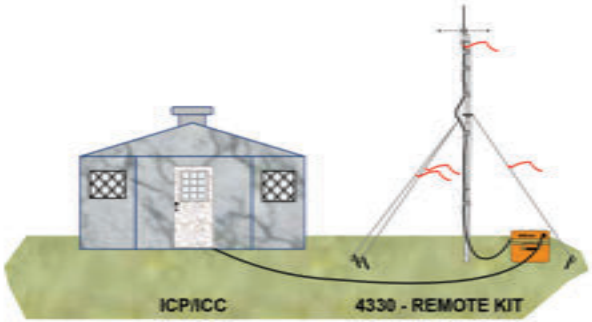
UHF

4248 - UHF REPEATER

RX RPTR FREQ: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX TONE/NAC: _____
4248-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

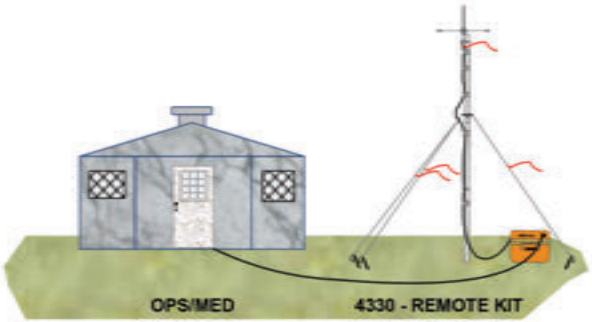
UHF

UHF



ICP/ICC 4330 - REMOTE KIT

RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



OPS/MED 4330 - REMOTE KIT

RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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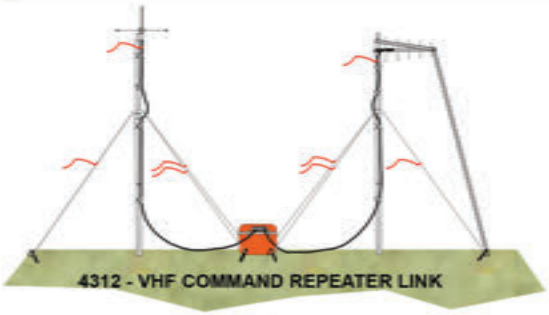
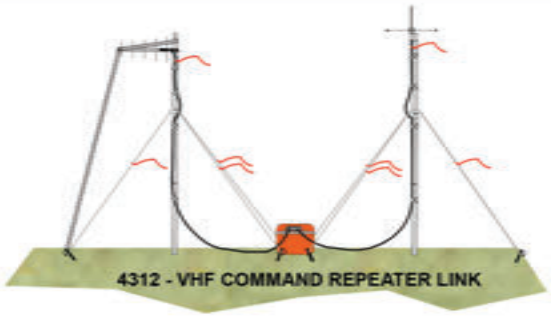
DRAWING 4 - TWO (2) VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX



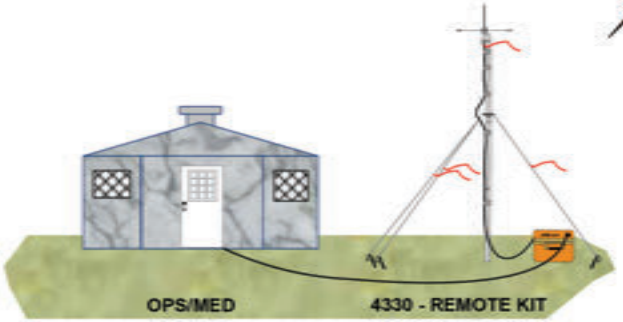
RX RPTR FREQ: _____ RX LINK FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX LINK FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH A: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



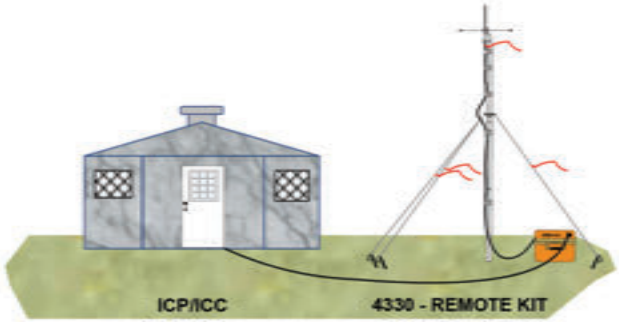
RX LINK FREQ: _____ RX RPTR FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX LINK FREQ: _____ TX RPTR FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH B: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

VHF



RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

VHF



RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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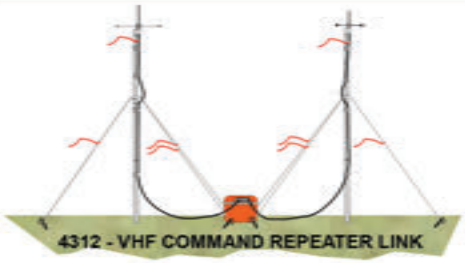
DRAWING 5 - THREE (3) VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX

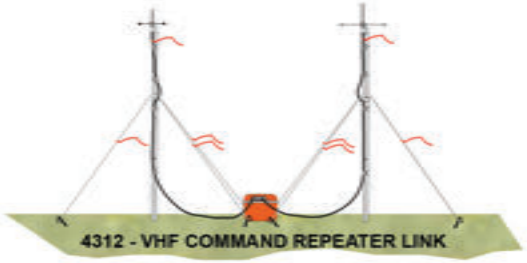


RX RPTR FREQ: _____ RX LINK FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX LINK FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH A: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

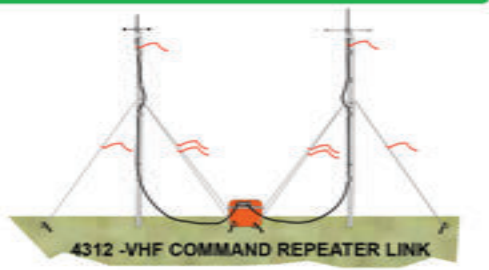
UHF

UHF

UHF

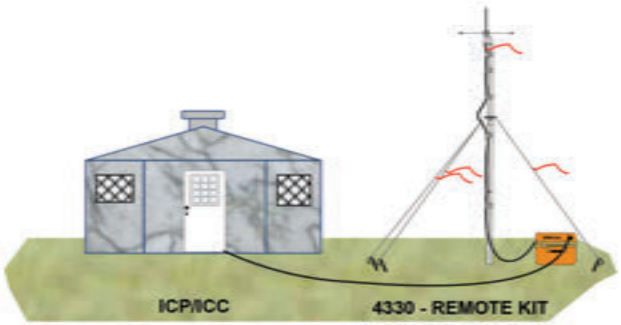


RX RPTR FREQ: _____ RX LINK FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX LINK FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH A: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
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: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

VHF



RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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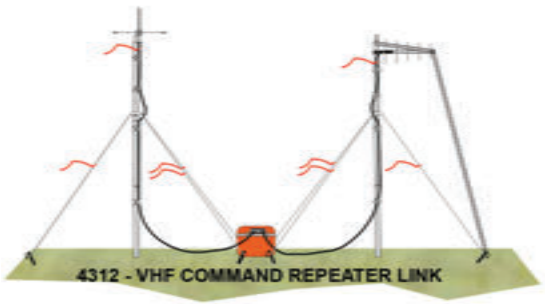
DRAWING 6 - TWO (2) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB

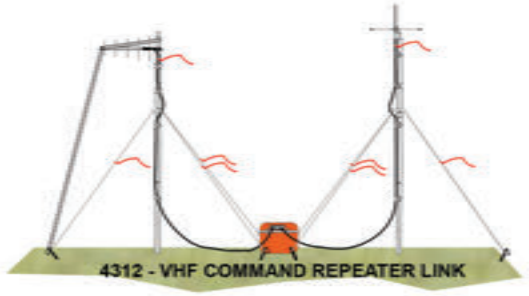


RX RPTR FREQ: _____ RX LINK FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX LINK FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH A: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF

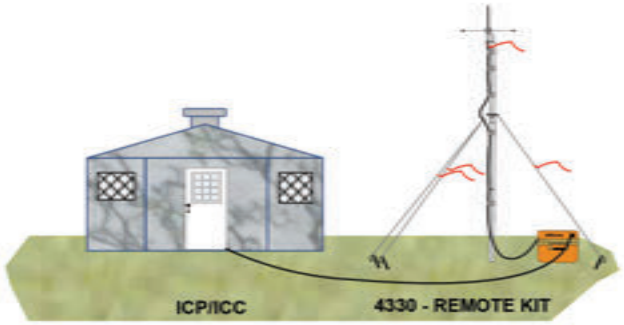
RX RPTR FREQ: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX TONE/NAC: _____
4284-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



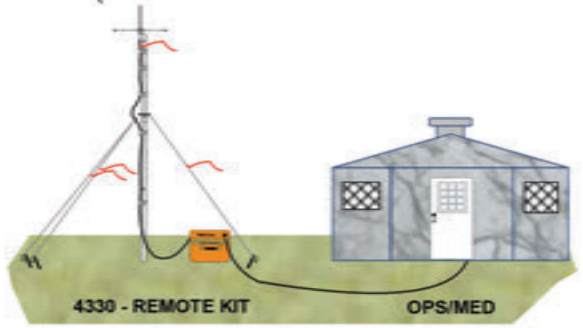
RX LINK FREQ: _____ RX RPTR FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX LINK FREQ: _____ TX RPTR FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH B: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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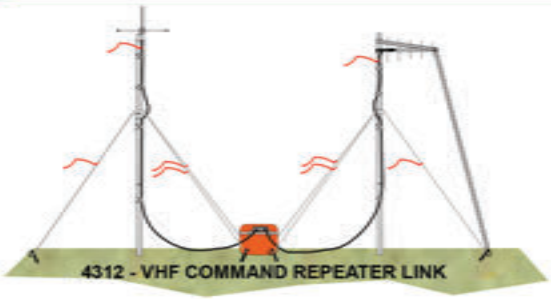
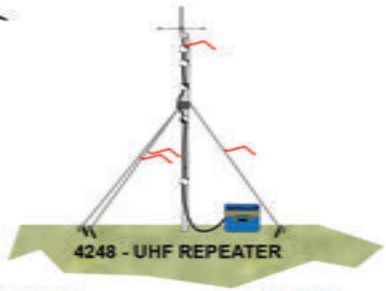
DRAWING 7 - THREE (3) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



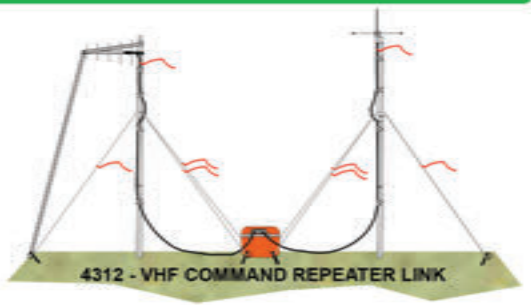
RX RPTR FREQ: _____ RX LINK FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX LINK FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH A: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



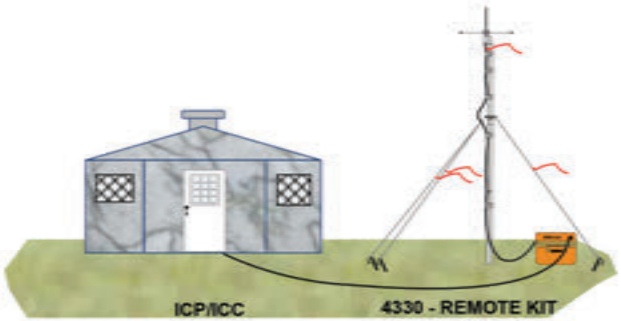
RX RPTR FREQ: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX TONE/NAC: _____
4248-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



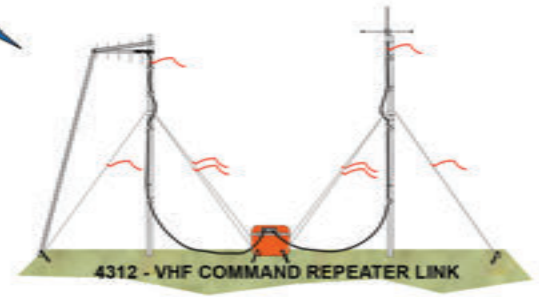
RX LINK FREQ: _____ RX RPTR FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX LINK FREQ: _____ TX RPTR FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH B: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



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: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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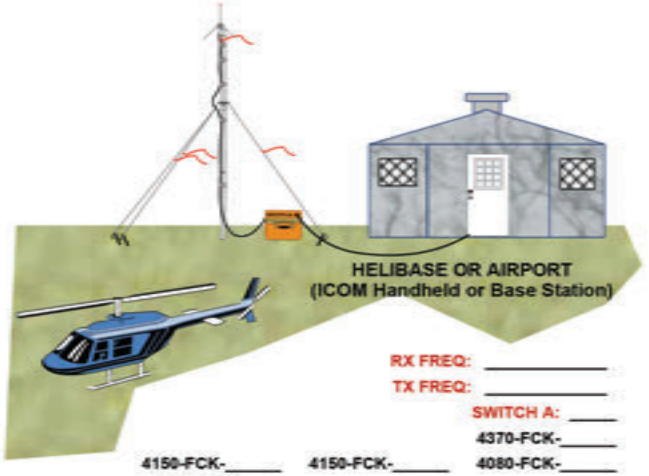
DRAWING 8 - AIRCRAFT LINK SYSTEM (BASE CONFIGURATION) GROUND TO AIRCRAFT COMMUNICATIONS

RX AM FREQ: _____
TX AM FREQ: _____

VHF- AM
(SIMPLEX)



RX FREQ: _____
TX FREQ: _____
SWITCH A: ____
4370-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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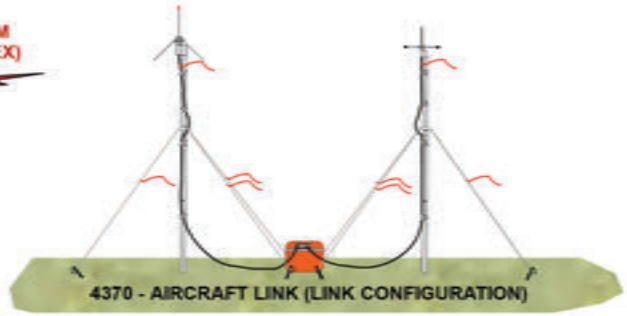
DRAWING 9 - AIRCRAFT LINK SYSTEM (LINK CONFIGURATION) WITH REMOTE AT HELIBASE

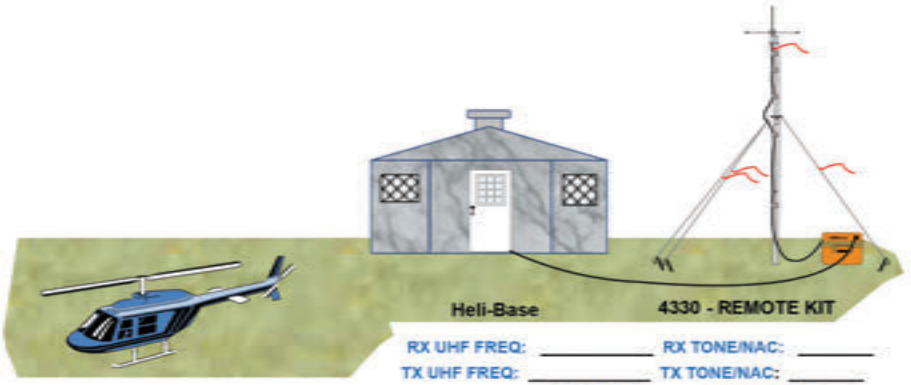
RX AM FREQ: _____
TX AM FREQ: _____

VHF- AM
(SIMPLEX)



RX AM FREQ: _____ RX UHF FREQ: _____
TX AM FREQ: _____ RX TONE/NAC: _____
SWITCH A: _____ TX UHF FREQ: _____
TX TONE/NAC: _____
4370-FCK-_____ SWITCH B: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF
(SIMPLEX)



RX UHF FREQ: _____ RX TONE/NAC: _____
TX UHF FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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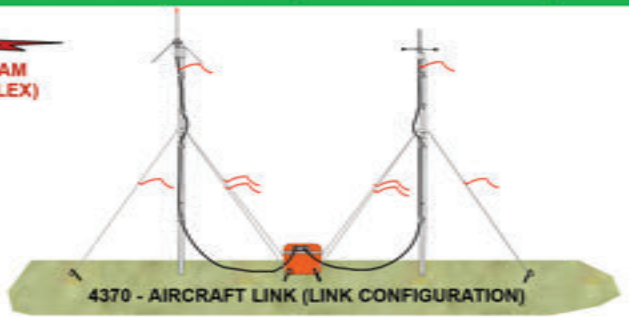
DRAWING 10 - MULTIPLE AIRCRAFT LINK SYSTEM (LINK CONFIGURATION) LINKED THROUGH UHF REPEATER HUB

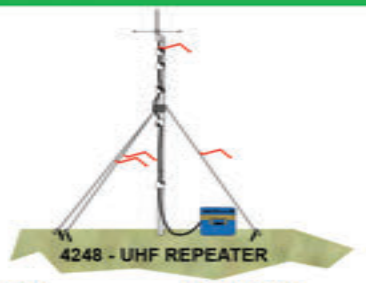
RX AM FREQ: _____
TX AM FREQ: _____

VHF- AM
(SIMPLEX)



RX AM FREQ: _____ RX UHF FREQ: _____
TX AM FREQ: _____ RX TONE/NAC: _____
SWITCH A: _____ TX UHF FREQ: _____
TX TONE/NAC: _____
4370-FCK-_____ SWITCH B: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



RX RPTR FREQ: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX TONE/NAC: _____
4248-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

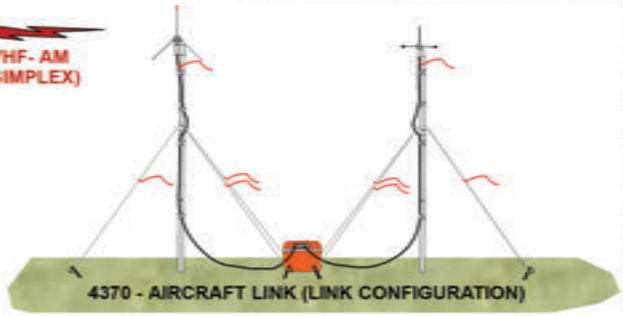
UHF

UHF

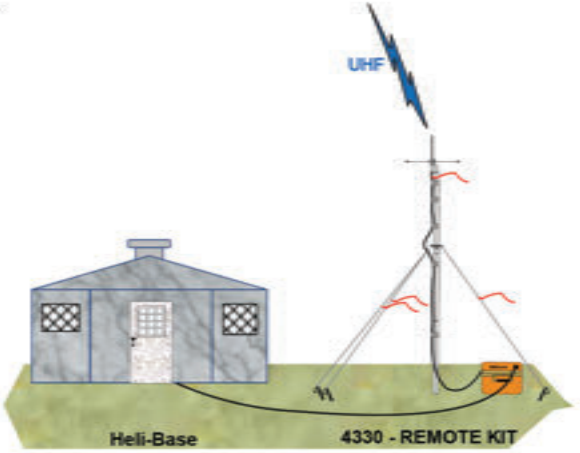
SECONDARY EXPANDED A/C LINK SYSTEM

RX AM FREQ: _____
TX AM FREQ: _____

VHF- AM
(SIMPLEX)



RX AM FREQ: _____ RX UHF FREQ: _____
TX AM FREQ: _____ RX TONE/NAC: _____
SWITCH A: _____ TX UHF FREQ: _____
TX TONE/NAC: _____
4370-FCK-_____ SWITCH B: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



RX UHF FREQ: _____ RX TONE/NAC: _____
TX UHF FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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DRAWING 11 - MAFFS ACTIVATION OR TEMPORARY TANKER BASE OPERATIONS

RX AM VICTOR FREQ:_____ RX VHF NFF FREQ:_____
TX AM VICTOR FREQ:_____ RX TONE/NAC:_____
TX VHF NFF FREQ:_____
TX TONE/NAC:_____

VHF-AM VICTOR
(SIMPLEX)

RX AM VICTOR FREQ:_____ RX VHF NFF FREQ:_____
TX AM VICTOR FREQ:_____ RX TONE/NAC:_____
TX VHF NFF FREQ:_____
TX TONE/NAC:_____

VHF-FM
NATIONAL FLIGHT FOLLOWING
(SIMPLEX)

VHF-AM VICTOR
(SIMPLEX)

RX AM VICTOR FREQ: _____ RX VHF NFF FREQ: _____
TX AM VICTOR FREQ: _____ RX TONE/NAC: _____
TX VHF NFF FREQ: _____
TX TONE/NAC: _____
4660-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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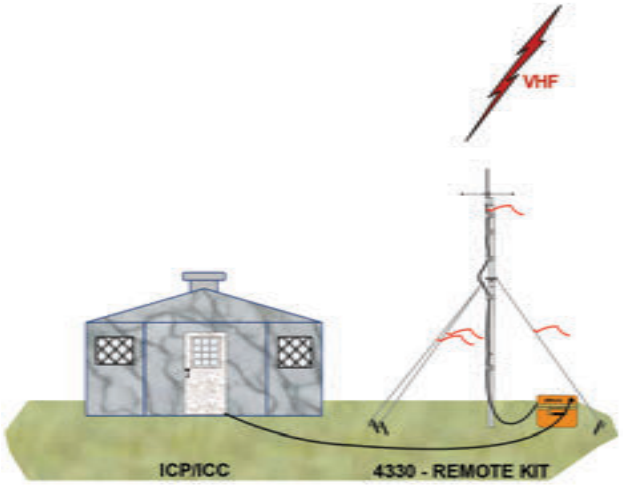
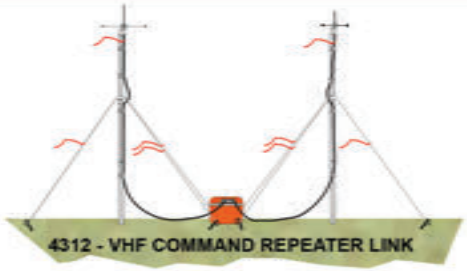
DRAWING 12 - FOUR (4) VHF COMMAND REPEATERS LINKED VIA UHF SIMPLEX

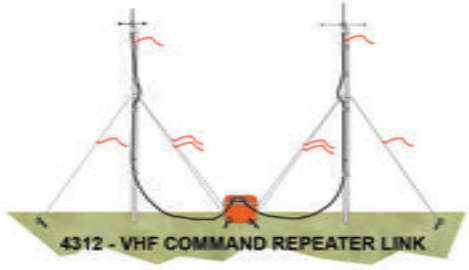


RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



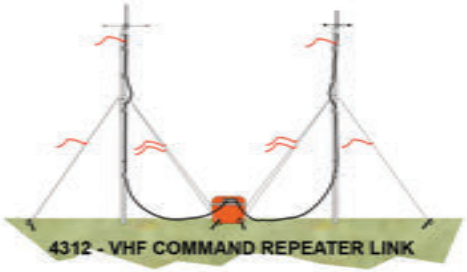
RX RPTR FREQ: _____ RX LINK FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX LINK FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH A: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



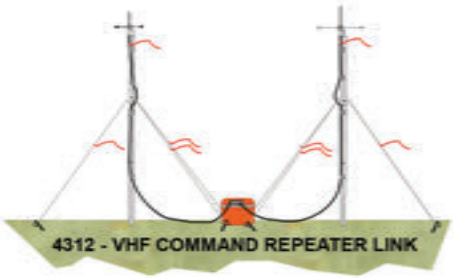
RX LINK FREQ: _____ RX RPTR FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX LINK FREQ: _____ TX RPTR FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH B: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF UHF UHF UHF



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: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



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: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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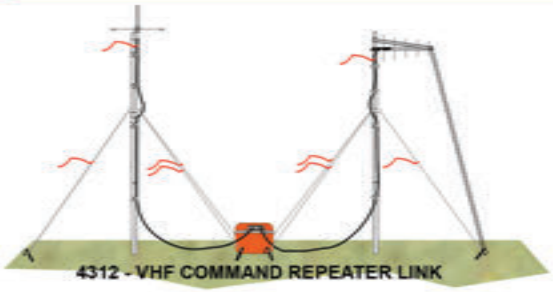
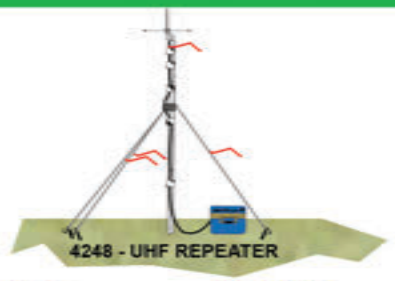
DRAWING 13 - FOUR (4) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



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: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

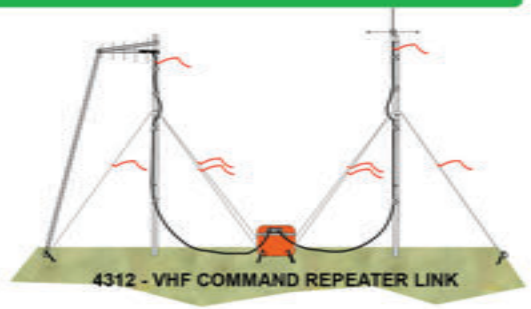
UHF



4248 - UHF REPEATER

RX RPTR FREQ: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX TONE/NAC: _____
4248-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF



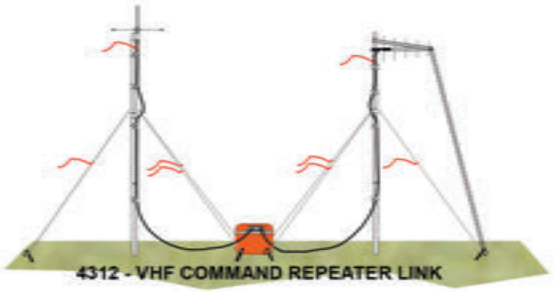
4312 - VHF COMMAND REPEATER LINK

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: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF

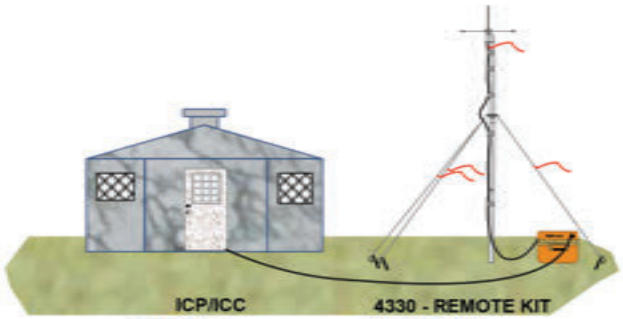
UHF

UHF



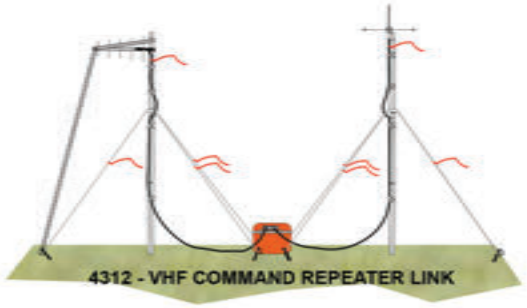
4312 - VHF COMMAND REPEATER LINK

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: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



ICP/ICC 4330 - REMOTE KIT

RX FREQ: _____ RX TONE/NAC: _____
TX FREQ: _____ TX TONE/NAC: _____
GROUP #: _____ CHANNEL #: _____
4330-FCK-_____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
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: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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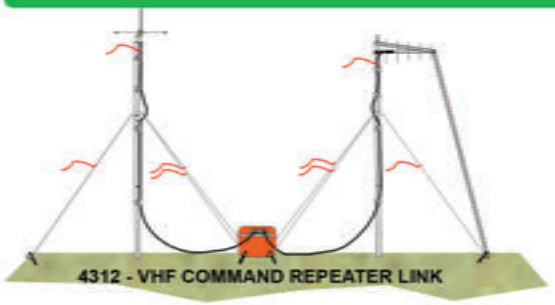
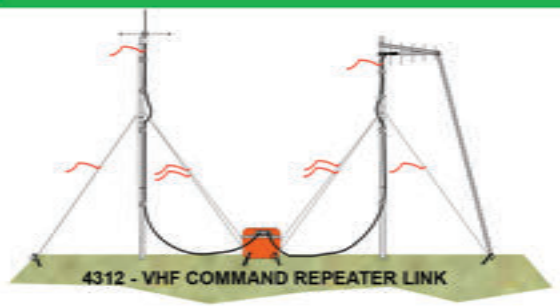
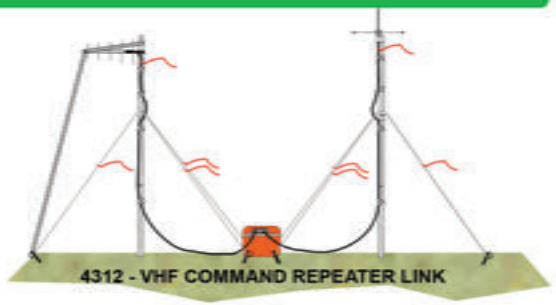
DRAWING 14 - FIVE (5) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



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: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
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: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
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: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

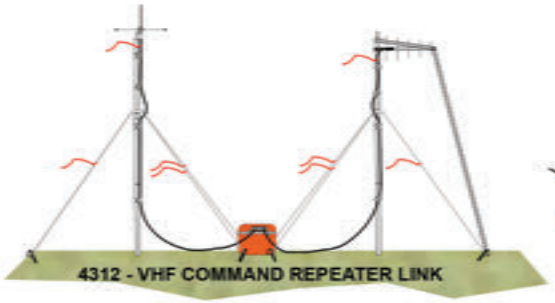
UHF

UHF

UHF

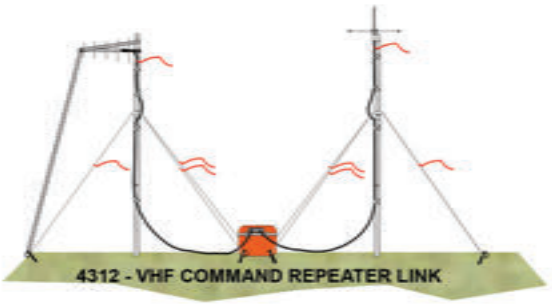
UHF

UHF



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: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

RX RPTR FREQ: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX TONE/NAC: _____
4248-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
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: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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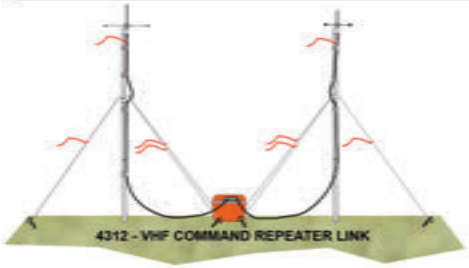
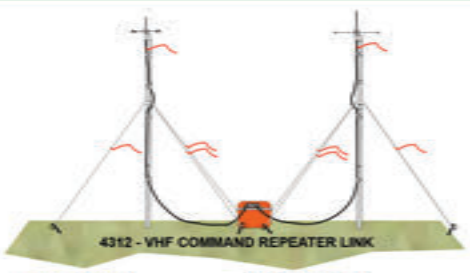
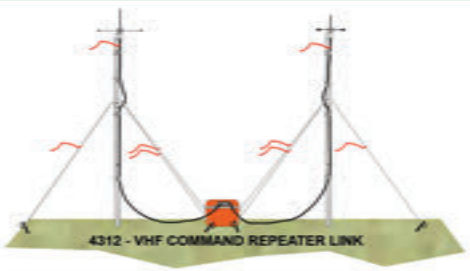
DRAWING 15 - SIX (6) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



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: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
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: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



RX RPTR FREQ: _____ RX LINK FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX LINK FREQ: _____
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LOCATION: _____
LAT.: _____ LONG.: _____
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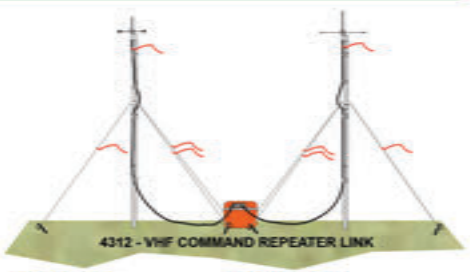
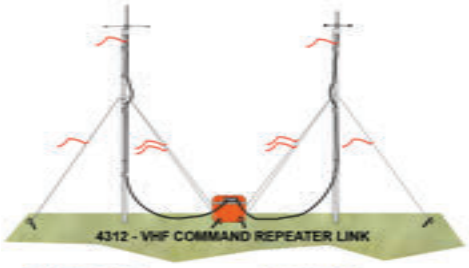


RX LINK FREQ: _____ RX RPTR FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
TX LINK FREQ: _____ TX RPTR FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH B: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF UHF UHF UHF



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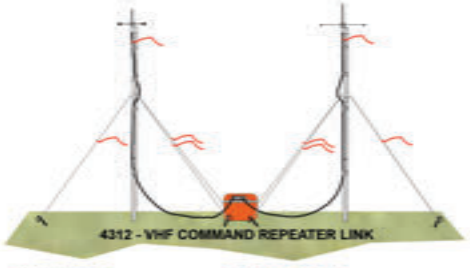
RX TONE/NAC: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX LINK FREQ: _____
TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH A: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

RX RPTR FREQ: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX TONE/NAC: _____
4248-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
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: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

Incident: _____ *Date:* _____

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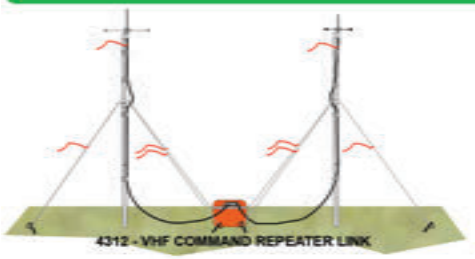
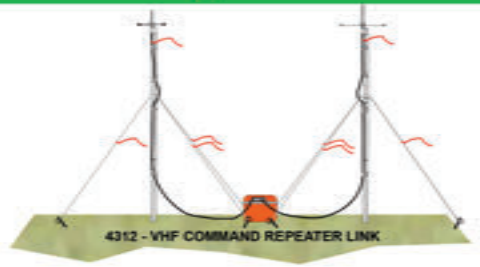
DRAWING 16 - SEVEN (7) VHF COMMAND REPEATERS LINKED THROUGH UHF REPEATER HUB



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: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
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: _____
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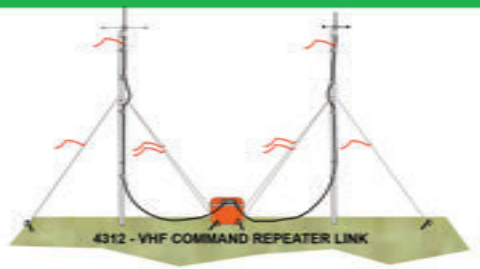
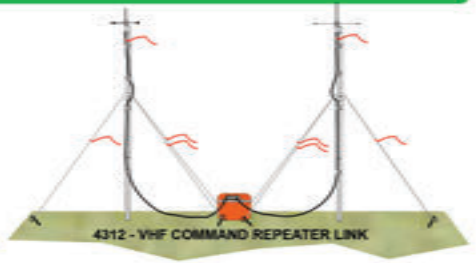
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



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: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



RX LINK FREQ: _____ RX RPTR FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
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TX TONE/NAC: _____ TX TONE/NAC: _____
SWITCH B: _____ SWITCH A: _____
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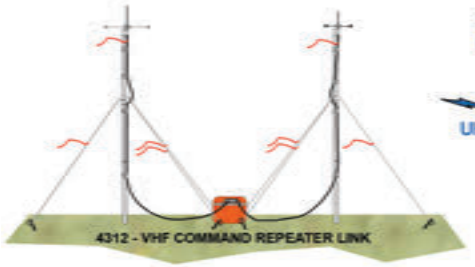
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____



RX RPTR FREQ: _____ RX LINK FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
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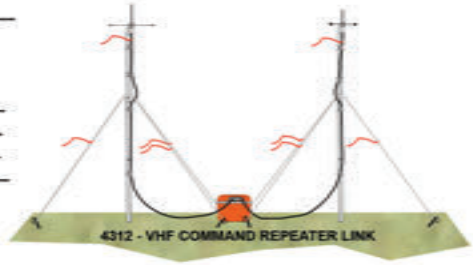

RX RPTR FREQ: _____ RX LINK FREQ: _____
RX TONE/NAC: _____ RX TONE/NAC: _____
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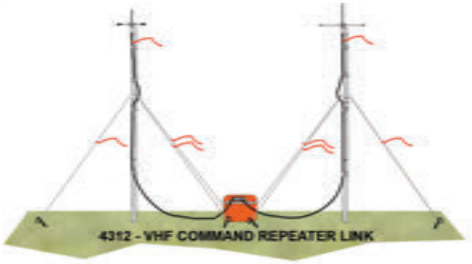
SWITCH A: _____ SWITCH B: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

RX RPTR FREQ: _____ RX TONE/NAC: _____
TX RPTR FREQ: _____ TX TONE/NAC: _____
4248-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
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: _____ SWITCH A: _____
4312-FCK-_____ RPTR ID: _____
4150-FCK-_____ 4150-FCK-_____ 4080-FCK-_____
LOCATION: _____
LAT.: _____ LONG.: _____
REMARKS: _____

UHF

UHF

UHF

UHF

UHF

UHF

Incident: _____ *Date:* _____

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NIICD 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 NIICD 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?

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

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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:						
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9		RX:						
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10		RX:						
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11		RX:						
		TX:						
12		RX:						
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13		RX:						
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14		RX:						
		TX:						
15		RX:						
		TX:						
16		RX:						
		TX:						
17		RX:						
		TX:						
18		RX:						
		TX:						
19		RX:						
		TX:						
20		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

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

Note: This is not a standard NWCG ICS205 Form

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National Interagency Incident Communications Division
3833 S. Development Ave.
Boise, ID 83705

CDO Phone: (208) 387-5644
Toll Free: (877) 775-3451

E-mail: niicd@firenet.gov
Web: www.nifc.gov/resources/NIICD

NFES# 000968