



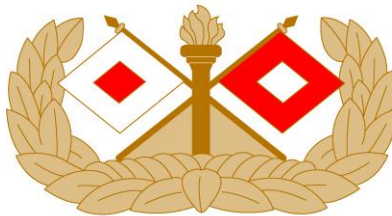
Virginia Defense Force

Basic

Communications Operators Badge

Basic Skills for a Communicator

Training Material



SUBJECT: Basic Knowledge of Communications

PURPOSE:

To provide the fundamental history, the various type communications, and their purpose. In addition, the student will be able to understand and identify the various types of communications and gain the knowledge of the proper technique and format for utilizing communications in both a civilian and military setting.

TIME REQUIREMENTS: 2 HOURS

ACADEMIC.....75 MINUTES
HANDS –ON.....15 MINUTES
TESTING.....30 MINUTES

SCORE REQUIRED FOR PASSING: 70%

MODULES

- 1. History of Communications**
- 2. Types of Communications**
 - a. Visual**
 - b. Spoken**
 - c. Messenger**
 - d. Wire**
 - e. Wire-less**
- 3. Advantages/Disadvantages of Various Types of Communications**
- 4. Radio Spectrum**
- 5. Licensing & Authority**
- 6. Messaging Format**
 - a. Phonetic Alphabet**
 - b. Procedure Words**
 - c. Call signs**

Test (Open Book)

Module 1: – History of Communications

History of Communications Timeline

- 3000 B.C. - The Egyptians created a picture language called hieroglyphics.
- 105 A.D. - Chinese began using paper and ink.
- 450 A.D. - Asia used Block Printing.
- 1539 A.D. - Mexico began using the first printing press in the Western Hemisphere.
- 1639 A.D. - The first press in the American Colonies was established in Cambridge, Mass.
- 1665 A.D. - The "London Gazette" was the first English newspaper.
- 1738 A.D. - The first daily newspaper was the "Pennsylvania Evening Post and Daily Advertiser".
- 1828 A.D. - The first comprehensive dictionary was published by Noah Webster.
- 1844 A.D. - Samuel Morse transmitted the first public telegraph message.
- 1858 A.D. - The first Transatlantic cable was laid.
- 1876 A.D. - Alexander Graham Bell invented the telephone.
- 1878 A.D. - Thomas Edison invents and patents the recording of sound onto cylinders and discs.
- 1906 A.D. - First wireless communication of human speech.
- 1919 A.D. - First broadcast radio station KDKA licensed in Pittsburgh, Pennsylvania.
- 1936 A.D. - First television broadcast made in London, England.
- 1941 A.D. - First commercial television began in the United States.
- 1941 A.D. - Z3 computer developed by German engineer Konrad Zuse.
- 1954 A.D. - Color television broadcast standards are set in the U.S...
- 1957 A.D. - Satellite first sent information back to earth.
- 1959 A.D. - U.S. and Russian rockets sent information back to earth from distances beyond the moon.
- 1962 A.D. - "Telestar I", a satellite, first beamed television programs between the U.S. and Europe.
- 1971 A.D. - Intel 4004 chip developed an integrated microprocessor chip, for the computer, that could be programmed for different needs.
- 1976 A.D. - JVC markets the first VCR with the VHS (instead of Beta) format.
- 1985 A.D. - Television began to be broadcast in Stereo.
- 1994 A.D. - High Definition TV standards agreed on in the U.S..
- 1999 A.D. - Intel introduces the Pentium III processor, taking personal computing to new highs.

Early communications were operated in various expressions to include hieroglyphics, story telling, drums and smoke signals. Cave drawings were murals

that people painted onto the walls of caves and canyons to tell the story of their culture. They would tell stories of battles, hunts and culture. Storytelling was used to tell stories, both fiction and nonfiction, before there were books. It was a way for families and communities to pass on information about their past. Drums were one way to send signals to neighboring tribes and groups. The sound of the drumming patterns would tell them of concerns and events they needed to know. Smoke signals were another way to send messages to people who were not close enough to use words with.

The oldest printed book known is a Chinese religious book, The Diamond Sutra. Other books like this were printed with wood blocks, usually made from Mulberry wood. Johann Gutenberg invented an actual printing press in 1450, it was a screw press that worked very much like a wine press. He discovered how to make a good ink that would print with metal type. Gutenberg was the first to use a press to print the Bible, it is the oldest full length volume printed. From Gutenberg's press in Mainz, Germany, printing spread all over Europe.

Rome developed a printing press in 1465, but, because the rulers of many countries felt that the printed word encouraged people to rebel against their authority, they strictly controlled the amount of material that printers were allowed to produce. Printing did not really grow again until the 18th century. The mechanics of printing changed little between 1450 and the 1800s, when the power press was introduced. By the 1600's the art of printing was used in business. Printed news sheets, called corantos, which were somewhat like newspapers of today.

In 1728 Ben Franklin opened his own printing office in Philadelphia, he had learned about the business of printing while working, since age 12 with his brother James. He was a fully skilled printer by the age of 17. Ben Franklin printed newspaper he called The Pennsylvania Gazette and the Poor Richard's Almanac. He had a lot of new ideas for printing, more books and newspapers, he began printing cartoons and illustrated news stories, which he became famous for. He encouraged communication by introducing letters to the editor, and believed in the power of the press. He used his printing press to bring the news to the people. Today we use modern versions of these printing presses to print books, magazines, and newspapers.

The idea for the electric telegraph was not thought up in a scientific laboratory, but on the deck of a sailing ship called the Scully, in the middle of the Atlantic Ocean. The inventor was Samuel Finley Breese Morse, and in 1832, he

was on of the most famous artists in the United States. Morse and ship passengers were talking about the invention of the electromagnet, which looked like a horseshoe with wire wrapped around it. They talked about how electricity traveled through the wire. Morse thought if electricity would travel a short distance through wire, it could travel long distances through wire also.

Morse's idea was to string a wire between two points, maybe miles apart. A key at one end is pressed and it closes the electrical circuit which sends a pulse of electricity through the wire. When the key is let go very fast, the pulse of electricity sent through the wire is a dot. If the key is held down 3 times longer, the pulse is a dash. Dashes and dots mixed together form different letters of the alphabet and when sent from a person at one end of the wire to another person at the other end of the wire, these dashes and dots would spell out words.

In 1837, he developed his telegraph idea enough to test it. Morse strung seventeen hundred feet of wire around his room at New York University, where he taught. It worked; his signals traveled from one end of the wire to the other.

He showed his invention to members of Congress in the Capital by stringing 10 miles of wire around the room, and it worked. Congress didn't think the telegraph would work for long distances, so Morse put several miles of wire through underground pipes. The insulation around the wire wouldn't let the electricity travel very well, so Morse decided to string the wire from poles instead. These were the first of thousands of poles that would go across the United States.

On May 24, 1844, Morse stretched wires from Washington D.C. to Baltimore, New York and sent the message, "What hath God wrought!" through the telegraph machine. The telegraph was a success. In 1874, engineer and inventor Thomas Edison invented quadruplex telegraphy, where two messages could be sent in each direction at one time. In 1915, the multiplex telegraphy let eight or more messages be sent at one time. Because of this and the invention of the teleprinting machines during the mid-1920s the Morse Code telegraph system wasn't needed anymore.

A telephone is an instrument that sends and receives information, usually by means of electricity. The word telephone comes from Greek words meaning far and sound. The telephone is one of our best ways to communicate. You can make a telephone call almost anywhere in the world. Telephones are even used in cars, planes, ships, and on lots of different mechanical machines. Alexander Graham Bell invented the telephone in Boston in 1876, 120 years later there are over 360

million telephone numbers, and that figure grows each year. Cordless phones do not have wires connected to them, that is why they are called cordless phones, but they still need to have vicinity within the range of a unit that is wired to the telephone system. Cellular phones are true wireless phones.

Radios are used for many purposes. Some examples are communication, radar navigation and television broadcasting. Radios affect everyone's life in many ways. Radios help us get the weather reports. They help NASA speak to astronauts; they even allow us to speak to our friends on the telephone. Radios send information through a process called electromagnetic waves. These waves are measured by a metric measurement called a hertz, one kilohertz is equal to 1,000 hertz and a megahertz is 1,000,000 hertz. The term hertz is named after the early radio pioneer Heinrich Hertz.

Because electromagnetic waves travel in a straight line and earth is round, long distance travel for radio waves are made in the ionosphere, this is known as short wave signals or low frequency. Wave length in short distance communication is called high frequency and does not use the ionosphere to reflect signals. Radios are made up of two main components; a transmitter and a receiver that send signals back and forth.

Television means to see from afar. Seeing far or nearby requires light. Light forms scenes you see on the television screen. But it is not light of the original scene, in television, images and sounds travel electronically, that is, by means of electrical energy. A television camera changes the light that is reflected from a scene into electronic signals. Then a device called a transmitter sends out the signals (along with signals for the accompanying sound, which has been picked up by a microphone). Finally, a television receives the signals and changes them back into sound and picture images. Television signals began with a television camera, the television camera has lenses that concentrate light to form images of objects.

Konrad Zuse is popularly recognized in Germany as the "father of computer" and his ZI, a programmable automation system built between 1936 and 1938, has been called the first computer in the world. Konrad Zuse realized that he could construct a system capable of doing sequences of mathematic operations, like those needed to construct mathematical tables. He had no formal training in electronics and was not familiar basic technological ideas, which allowed him to solve problems he came across, with new, creative and original solutions.

Herman Hollerith was the first American to help in the invention of the computer in 1890. He invented the Tabulating Machine which was used by the U.S. Government. His company was called the Computing-Tabulating-Recording Company. Later the company changed its name to International Business Machines, we know the today as IBM, one of the world's largest computer companies. The ENIAC (the Electronic Numerical Integrator and Computer) was built at the Moore School of Electrical Engineering of the University of Pennsylvania in 1943-1945, and is said to be the first large scale general purpose electronic computer in the world.

In the 1940-1950's one single computer filled an entire room and weighed about 30 tons. In the 50's and 60's the computers were smaller and faster, but still too big and expensive for home use. In the 1970's smaller computers were designed for smaller businesses and the microprocessors were introduced. They were now small enough for use in homes and schools.

MODULE 2: --Types of Communication

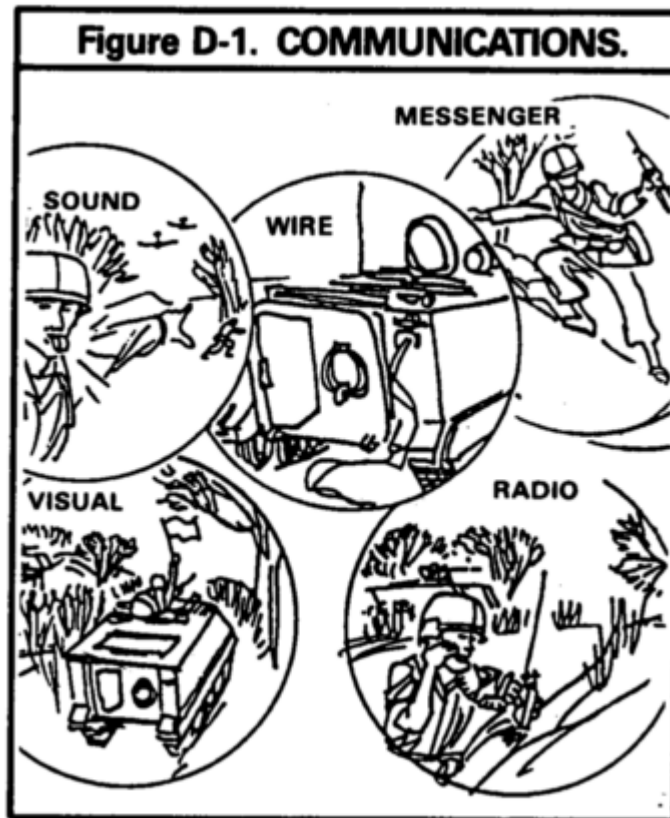
Communication is the process of exchanging information usually via a common system of symbols. "Communication studies" is the academic discipline focused on communication forms, processes and meanings, including speech, interpersonal and organizational communication.

SQUAD/PLATOON TYPES OF COMMUNICATIONS

D-1. GENERAL

Squads and platoons must be able to communicate to control and coordinate movement and fires, send and receive instructions, request logistical or fire support, and gather and distribute information.

There are many ways to communicate. Each has its own capabilities and limitations. The primary types of communications available at platoon level are visual, sound, messenger, wire, and radio. A backup means of communicating should always be planned in case the primary method fails. The means of communication chosen will depend on the situation.



D-2. VISUAL

Visual signals are the most common means of communicating in squads and platoons. Arm-and-hand signals, flags, flashlights, and pyrotechnics can be used to rapidly transmit messages and instructions. A disadvantage is that these signals may be seen by the enemy, but using the terrain properly lessens that chance.

Another danger is that visual signals require visual contact between the sender and the receiver, and the signals may be misunderstood. To overcome this disadvantage, every man must be able to send, receive, and understand messages using visual signals. Squads and platoons must continually practice these signals.

Arm-and-hand signals are the basic way of communicating within squads and platoons when visibility is good. Flag signals are easier to see and understand at greater distances than are arm-and-hand signals. Each APC and each tank has a set of three flags--red, green, and yellow. Flashlight signals are used mainly for communicating during darkness. For identification, each squad or platoon may use a differently colored filter.

Pyrotechnics (SMOKE) can be used as signals at any time. In daylight, and in conditions of limited visibility such as fog, rain, or falling snow, they are less effective. Pyrotechnic signals are usually prescribed in the communications-electronics operating instructions. Squads and platoons are not to improvise and use their own pyrotechnic signals. They may conflict with the SOI and confuse other units. Pyrotechnic messages must be confirmed as soon as possible because the originator cannot be sure that the signal was seen and understood.

CAUTION

PYROTECHNIC SIGNALS (Smoke) are not recognized by Public Safety Agencies for the most part. If used, only use RED.

Mirrors, headlights, and panels are other means of visual communication but are difficult to use on the move. A complete list of each type of visual signal is in FM 21-60.

Figure D-2. VISUAL SIGNALS.



D-3. SOUND

Sound communications include such simple devices as whistles, horns, gongs, and explosives. Sound signals are used mainly to attract attention, transmit prearranged messages, and spread alarms. Sound signals work but only for short distances. Loud noises cut down the range and reliability of sound signals. They are also open to any interception, so their use may be restricted for security. To avoid any

misunderstanding, sound signals must be simple. They are usually prescribed by the unit SOP and the SOI.

D-4. MESSENGER

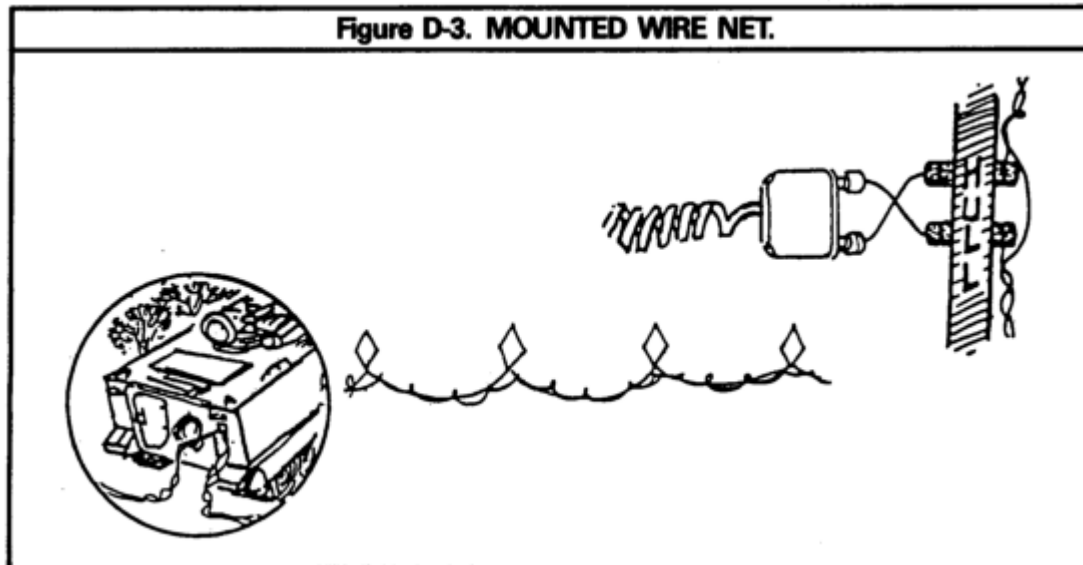
Messengers are fairly secure means of communicating and usually the best way to send long messages that cannot be delivered personally by a commander. Using a messenger, though, is the slowest means of sending information, and it depends on the messenger not being delayed, captured, or killed.

Messages sent by messenger should be clear, concise, and complete. No unnecessary words should be used. If there is a chance the messenger might be captured, the message should be in code using the operational code in the CEOI.

D-5. WIRE

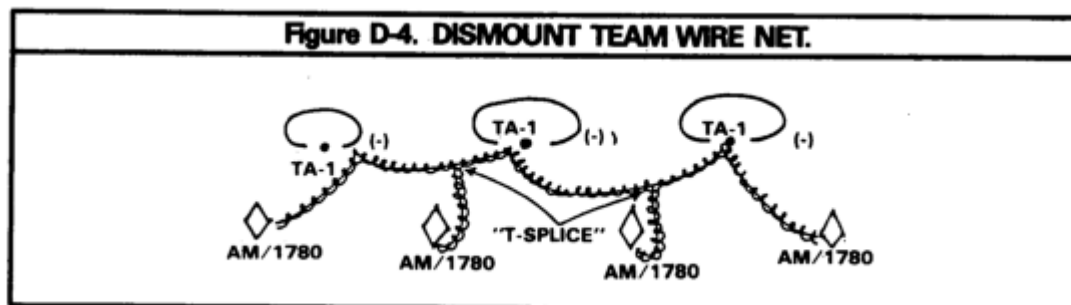
Wire communications should be used whenever tip platoon expects to stay in one place more than an hour. When possible, the whole platoon is tied together through the use of a wire net. The wire net consists of field wire laid among carrier teams and dismount teams. All field communications wire (WD-1 and combat assault) consists of two independently insulated strands twisted together to form one wire. There are several ways the platoon wire net can be set up, depending on whether the platoon is totally mounted or partially dismounted.

In the **mounted mode**, the wire is laid from vehicle to vehicle and connected to the terminals on the right rear of each vehicle. Because TA-1 telephones (which are sound powered) are being used, one strand of the wire must be cut, the insulation stripped away and the wire ends attached to the wire terminal connectors on the right rear of the APC. The TA-1 is connected to the terminals on the inside of the vehicle by using a short length of wire.

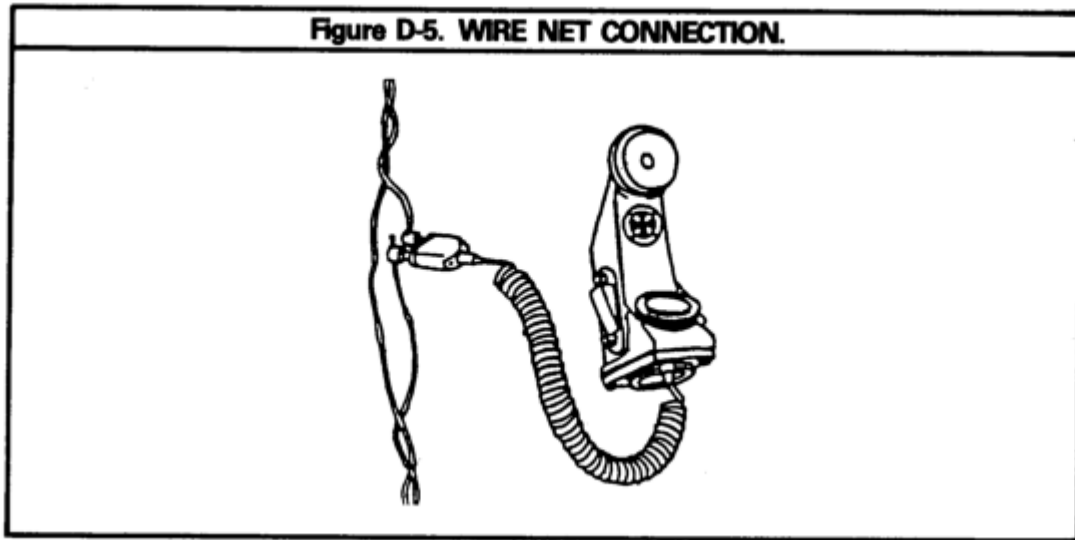


In the **dismounted mode**, situations are of two types.

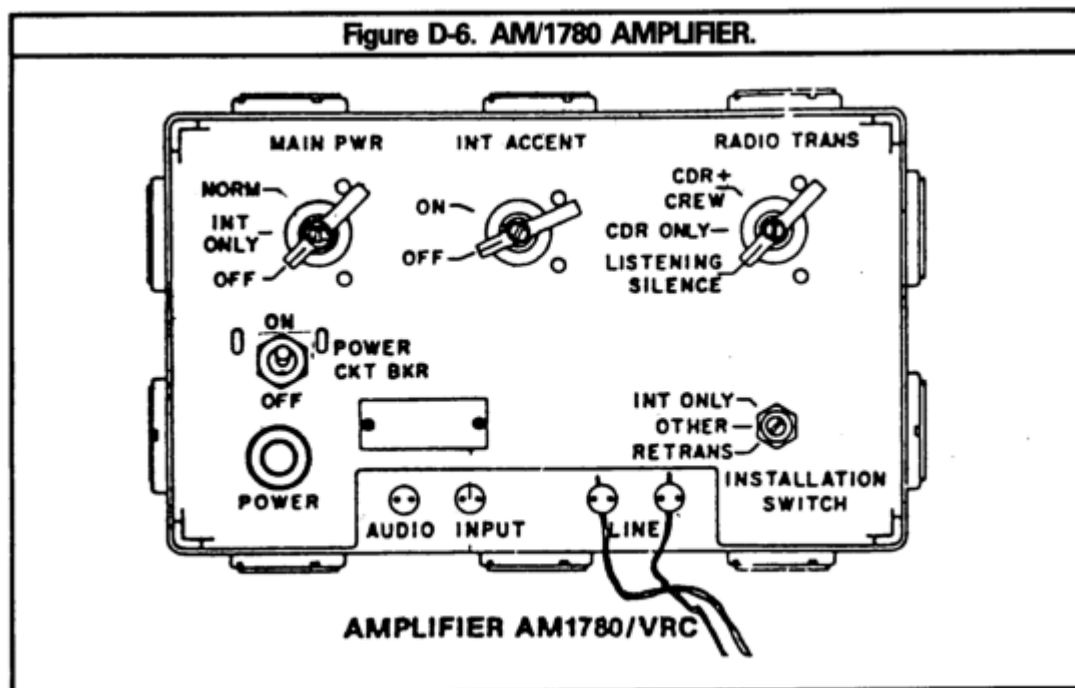
(1) In the first type, the platoon occupies one position with both the carrier element and the dismount element deployed. The wire net would be made by connecting all the platoon carrier teams and dismount teams together by wire.



Because the dismount teams use TA-1's (as in the mounted mode), one strand of the wire must be cut, the insulation stripped back, and the wires attached to the binding posts of the TA-1 to connect the dismount teams to the wire net. Because one strand of wire must be cut, the wire net is in series, which means that if the wire is broken or disconnected the whole wire net will cease to function.

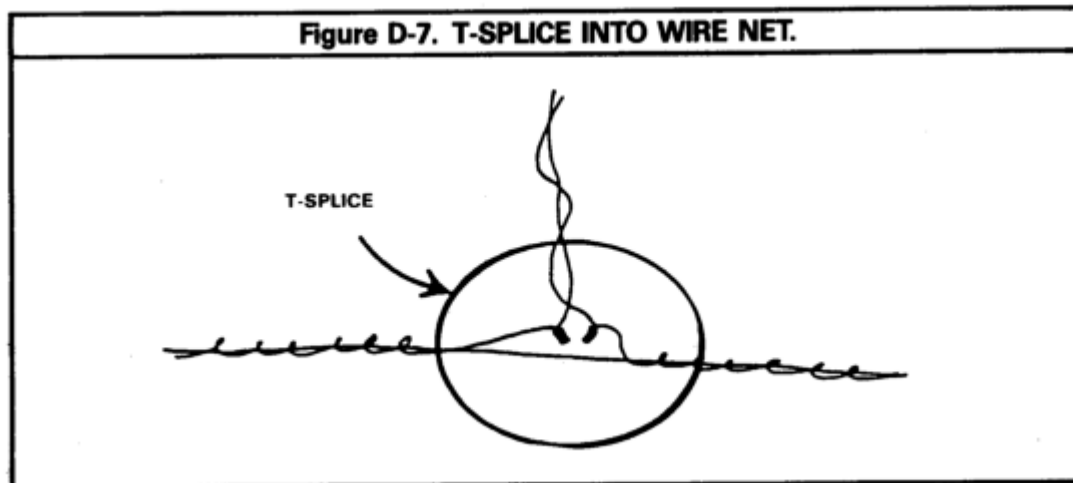


The carrier teams are connected to the wire net by stripping the insulation from the end of the strands of wire and inserting the wire ends into the binding posts of the AM/1780 audio frequency amplifier. The AM/1780 must be turned on while in the wire net. If it is turned off the wire net will not work.



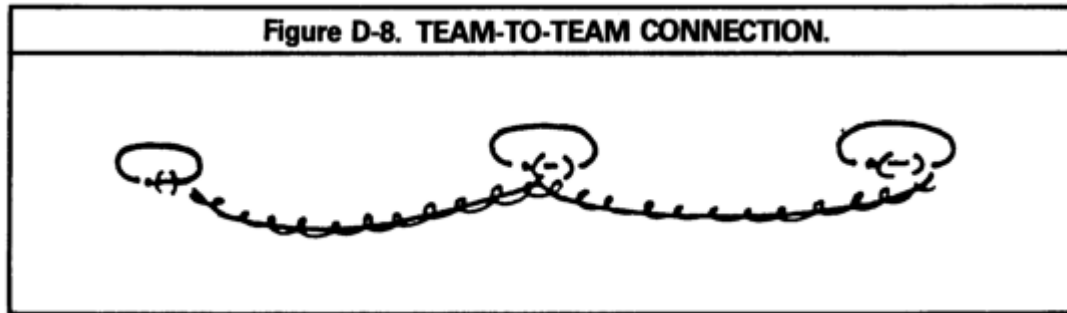
The T-splice method would be used for vehicles that connect to the wire net between the ends of the wire net. If the wire net starts at an APC, the wire would be connected to the binding posts of the

AM/1780. This wire would be T-spliced into the wire net by cutting one strand of the wire, stripping back the insulation from the ends, and splicing the ends to the wire from the AM/1780.



NOTE: A communications check must be made to insure that the wire net works. The C-2298 control box must be set in the ALL position. The AM/1780 is set for normal operations. If a carrier team cannot communicate with the rest of the teams, the strands of wire in the AM/1760 binding posts must be reversed and another check made.

In the second type of dismantled situation, the dismantlement element is in a position different from that of the carrier element. In this placement, the dismantlement teams would use their TA-1 telephones to establish a platoon hot loop among themselves. When using the TA-1, one of the wires must be cut and the insulation stripped back to connect the wire to the telephone binding posts. The telephones do not have to be on the same single wire. Only one wire needs to be cut to connect the telephone. The wire net is laid from team to team until all teams are connected to it.



Wire can also be laid between the carrier team and the dismount team of the same squad. To do this, the telephone must be with the dismount team. If a second telephone is not available, the wires must be connected directly into the APC's AM/1780.

After the wire has been laid to all the carrier teams, it should be either buried several inches deep or strung overhead. This prevents vehicles damaging the wire or soldiers tripping over it. Before a vehicle moves more than a few feet, the track commander should insure that the telephone wire is disconnected.

When a position is vacated, the wire should be recovered.

D-6. RADIO

Because Threat forces have an extensive radio intercept capability, radio is used within the platoon only when messages cannot adequately be sent by other means. If a radio transmission is intercepted, the enemy can usually find out where a unit is and what it is doing.

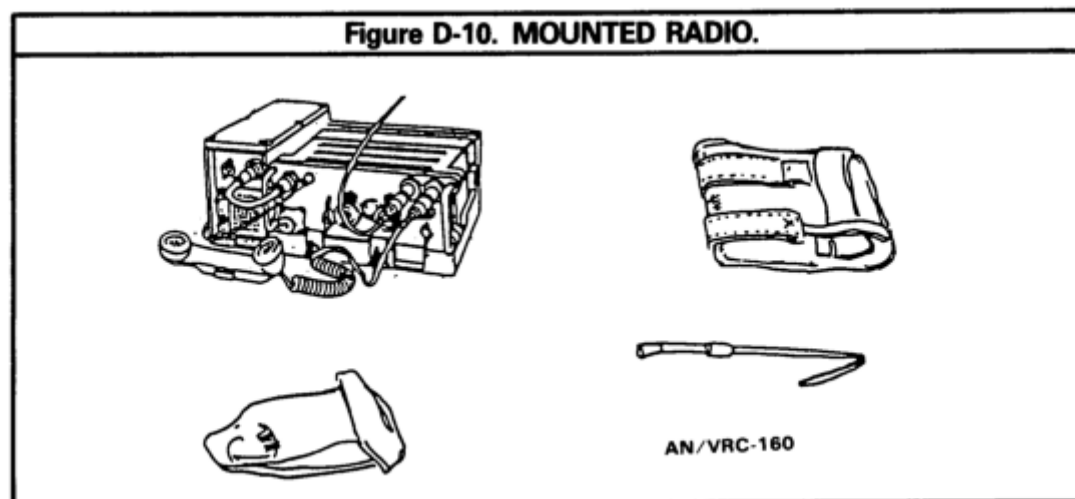
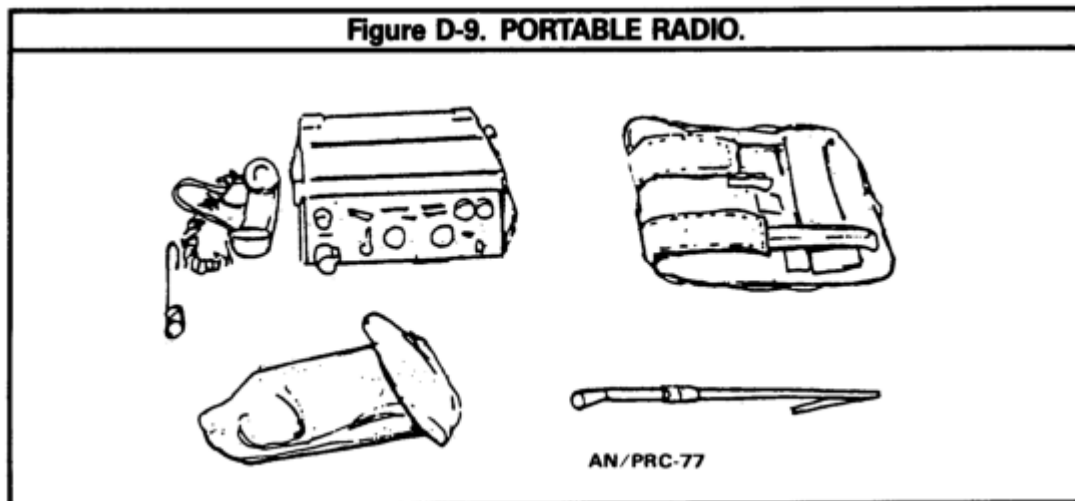
When radios are used, transmissions must be short and to the point. The sender must know what he wants to say before he transmits. This helps to keep messages short and the radio net open for others to use. Also, it reduces vulnerability to enemy intercept.

Each APC has an AN/GRC-160 radio mounted. The AN/GRC-160 can be configured as an AN/PRC-77. Additionally, the platoon leader's vehicle has either another AN/GRC-160 or an AN/VRC-46 mounted, and the platoon sergeant's vehicle may have an AN/VRC-64. Each squad, the platoon leader, and the platoon sergeant has either the squad radio AN/PRC-88 (transmitter AN/PRT-4 and receiver AN/PRR-9) or the small-unit transceiver (SUT) AN/PRC-68 for dismounted operations. There are five SUTs or AN/PRC-88's per platoon.

AN/VRC-46. The AN/VRC-46 radio is powered by the vehicle's electrical system. Its principal advantage is in its 41-kilometer planning range. If it or any other vehicular radio is operated when the vehicle engine is shut off, the driver must take care that the radio does not drain the batteries.

AN/GRC-160. The AN/GRC-160 radio can be mounted in and operated from the vehicle, or it can be dismantled and used as a portable radio (AN/PRC-77). When mounted, it is powered by the vehicle's electrical system. The planning range mounted is 12 kilometers. When it is dismantled, it is called an AN/PRC-77 and can transmit up to 8 kilometers. It is powered by its own battery (BA-4836).

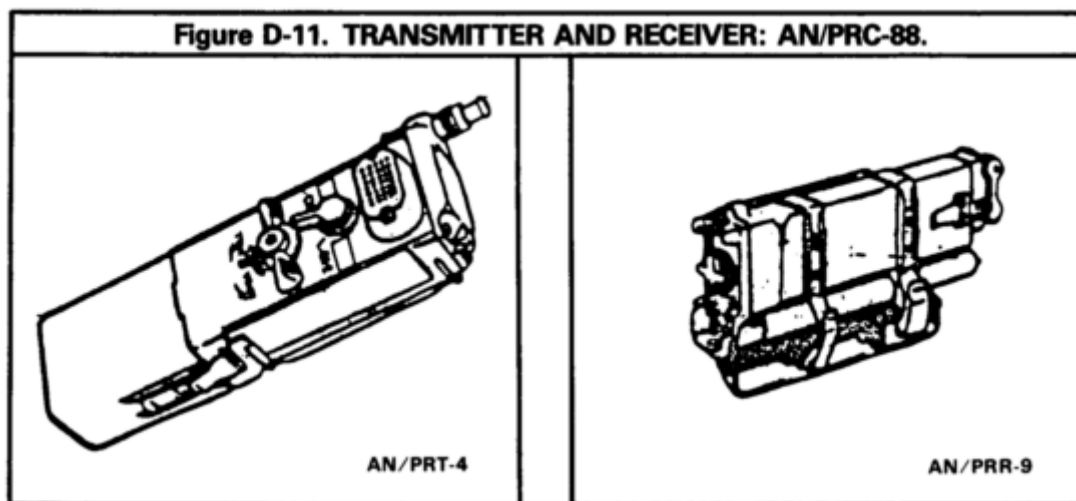
AN/VRC-64. The AN/VRC-64 is similar to the AN/GRC-160 except that it does not come issued with the equipment necessary to make it man-portable.



AN/PRC-88. Some units may be equipped with the AN/PRC-88 squad radio. The squad radio consists of two pieces of equipment, an AN/PRT-4 transmitter and an AN/PRR-9 receiver. Both the transmitter and receiver have preset crystal-controlled frequencies that can be changed as needed by the battalion communications platoon.

AN/PRT-4. The transmitter of the squad radio is battery-powered and has two channels. Channel 1 has a range of 1,600 meters. Channel 2 has a range of 500 meters. The purpose of the two channels is to give the platoon an alternate frequency. In addition to voice, the AN/PRT-4 can transmit a tone. This may be used to send a prearranged signal, such as an alert from an observation post. Battery life is about 35 hours for the BA-399.

AN/PRR-9. The receiver of the squad radio will receive Channel 1 and Channel 2, one at a time. It is battery-powered. Two types of batteries can be used in the receiver. The dry cell battery (BA-505U) has a life of about 14 hours, and the magnesium battery (BA4505U) has a life of about 28 hours.



When the platoon leader is mounted, he communicates with the company commander using a vehicular radio (AN/VRC-46). He uses the second radio (AN/GRC-160) on the platoon frequency to communicate with the carrier teams and the dismount teams.

When the platoon leader is dismounted, he uses the vehicular radio (AN/GRC-160) in the portable (AN/PRC-77) configuration to communicate with the company

commander. He uses the AN/PRC68 or AN/PRC-88 on the platoon frequency to talk with the dismount teams and the carrier teams.

Squad carrier teams use the vehicular radio (AN/GRC-160). The dismount team uses the AN/PRC-68, or the AN/PRC-88. When the platoon leader stays mounted and the platoon sergeant dismounts, the platoon sergeant will use his AN/PRC-68 or AN/PRC-88 to communicate with the dismount teams and the platoon leader. He may dismount the AN/GRC-160 as an AN/PRC-77 to monitor the company command net.

D-7. INTERCOM SYSTEM

The intercom system in each APC consists of three control boxes and three combat vehicle crew (CVC) helmets. The squad leader, TL/gunner, and driver use the CVC microphones and earphones to communicate over the vehicle intercom and radios. The rest of the men in each vehicle monitor the radio loudspeaker to stay abreast of the squad's situation.

The AM/1780 amplifier should be kept in the commander-only (CDR ONLY) mode and the control boxes (other than them) in the intercom-only (INT ONLY) mode. This will prevent unauthorized and accidental radio transmissions. This will also prevent accidental "hot mikes" which jam radio nets.

During mounted movement, the crew wear the CVC helmet in place of the soldier's helmet. Before a crew member dismounts, he hangs his CVC helmet on a hook by his intercom system control box. This is done to prevent soldiers tripping over a CVC cord or headset cord or damaging the equipment.

MODULE 3:--Advantages/Disadvantages of Various Types of Communications

A. Advantages

(1) Wire. More secure than radio, less subject to interference from weather, terrain, and man-made objects.

(2) Radio. Suited for use when on the move or when terrain/water makes wire communications impractical. Increased range.

(3) Messenger. Most secure.

B. Disadvantages -

(1) Wire. Requires more time and manpower to install.

(2) Non-Secure Radio. Lack of security, susceptible to enemy jamming/interception.

(3) Messenger. Time consuming / very slow.

The primary means of communications used on the modern battlefield is wire and radio. Messages that are sent by wire or radio must be clear and brief to ensure proper actions are taken quickly and to reduce the enemy's ability of interference or interception.

Module 4:--Radio Spectrum

The term “radio frequency spectrum” (or simply, “spectrum”) describes a range of frequencies of electromagnetic waves used for communication and other purposes, such as radar. The radio spectrum is a part of everyone's daily lives, whether they think about it or not. It provides a basis for a wide and diverse range of services and industries, including broadcasting, cellular telephones, wireless Internet connections, paging, radar, navigation, air traffic control, microwave services, satellites, and even garage door openers. Spectrum is crucial to the work of police and fire departments, it is essential to air and ground transportation systems, and, as important as any of these, it is used by the military for everything from two-way radios to precision guided weapons to radars.

Spectrum management involves "allocation" and "assignment" of spectrum. An allocation describes use (e.g., broadcasting, fixed, mobile, etc.); allocations are

made internationally and domestically. An assignment authorizes a person to use a discrete radio frequency channel under specified conditions.

Under the Communications Act of 1934, the [Federal Communications Commission \(FCC\)](#) licenses spectrum use within the United States by all parties except *Federal Government agencies*. **NTIA**, through its Office of Spectrum Management, assigns frequencies to Federal Government spectrum users under authority delegated from the President, through the Secretary of Commerce. Federal agencies are represented to NTIA through the Interdepartment Radio Advisory Committee (IRAC), which advises NTIA. In addition, by statute, NTIA acts as the President's principal adviser on telecommunications policies generally, and must develop, in cooperation with the FCC, a long-range plan for management of the spectrum.

The United States Department of Commerce, of which NTIA is a part, has a long history of involvement in radio regulation. Under the Radio Act of 1912, the Department of Commerce issued licenses for commercial radio use. The Radio Act of 1927 established the independent Radio Federal Commission and the basic structure of radio regulation that was carried into the Communications Act of 1934 and the Federal Communications Commission.

MODULE 5:--Licensing & Authority

The Federal Communications Commission (**FCC**) is an independent United States government agency, directly responsible to Congress. The FCC was established by the Communications Act of 1936 and is charged with regulating interstate and international communications by radio, television, wire, satellite and cable. The FCC's jurisdiction covers the 50 states, the District of Columbia, and U.S. possessions.

There are several requirements that must be fulfilled both under the Military and Civilian sectors before obtaining licensure depending on the environment and context in which the communications is being presented.

Local Public Safety agencies such as fire, rescue, and law enforcement require a FCC license. State agencies require FCC licenses also.

Only Federal Government Agencies, military, and Federal Home Land Security Agencies require NTIA approval. National Guard falls under the Department of Defense NETCOM.

All Land Mobile Radio and Tactical communications in the Virginia Defense Force falls under the Virginia Army National Guard/NGB/NETCOM umbrella.

Process of Licensing (Civilian and Military)

1. MILITARY

(NTIA) Radio Regulation and Licensing Department (RRLD)

A. Fixed and Mobile Service Division (FMSD)

Authority to Install and Operate Government Radio Communications

1. Request for Frequencies (VHF/Low, VHF-Hi, UHF)
 - a. Request to Division G-6 Frequencies (14 days prior to use)
 - i. Location of Operation. Address & Latitude and Longitude
 - ii. Purpose
 - iii. Size of Transmitter (Watts)
 - iv. Height of Antenna.
 - v. Duration
 - b. G-6 Runs propagation model.
 - c. Notifies VAARNG- JOC on operational request. Goes to Frequency Manager
 - d. JOC approves
 - e. Requesting Unit operates by military operational guidelines
 - f. Unit report to G-6.
 - g. License terminated.

2. Civilian/Public Safety

B. FCC Licensing Department (Public Safety/Commercial Licensing)

Forms Found on line under www.fcc.gov/ULS

ULS: Universal Licensing Service:

Form FCC: 601

Requirements:

1. Duly accomplished application form for Authority to install and Operate Private Radio Communications Network

A. Administrative Requirements:

a. Justification of Request

For Corporation/Partnership

1. SEC Certificate of Registration/Partnership
2. SEC Articles of Incorporation/Partnership and By-laws

For Sole Proprietorship

1. Certificate of Registration from the Bureau of Domestic Trade

c. Proof of Business Engagement

1. Exporters - Copy of the export documents, certificates of registration from the Board of Investments

2. Contractors - Copies of updated contracts in the proposed locations

Security Agencies - Updated copy of the license to Operate issued by the appropriate authorities and copies of contract from clients

d. Mayor's Permit for each proposed location

e. Audited Financial Statements of Assets and Liabilities

f. Income Tax Return (current)

B. Technical Requirements:

1. Network Diagram showing the exact location of stations (including number of building, street, town, city, province) and shaded topographical map showing area coverage of the network signed and sealed by a registered Electronics Communications Engineer (ECE)
2. Distances between Repeater/Fixed/Land Stations/flow of traffic/proposed
3. Zip Codes for each proposed Repeater/Fixed/Land Locations
4. Service Area and/or Points of Communication
5. Proposed Frequency Band
6. Mode of Operation (simplex/duplex)
7. Bandwidth and Emission
8. Effective Radiated Power
9. Geographical Coordinates for each proposed Repeater/Fixed/Land Stations
10. Antenna Particulars for each proposed Repeater/Fixed/Land

MODULE 6:--Messaging Format (MILITARY)

1-1. INTRODUCTION

Radio is the principal means of communications in most tactical units. It is used for command, fire control, exchange of information, administration and logistics, and liaison between and within units. It provides rapid station-to-station communications in highly mobile situations, and because it is adaptable to rapidly changing situations, it is more likely to be used in the initial stages of combat operations. Because of this, it is essential that all radio operators have a thorough understanding of radiotelephone procedures.

1-2. DEFINITIONS

a. **Radiotelephone Procedures**. Radio-telephone procedures is a uniform system in which everyone uses the same procedures to save time, help eliminate confusion, and provide a degree of security.

b. **Radio Net.** A radio net is a group of radio stations controlled by one station, capable of direct communications with each other using a common frequency.

1-3. OPERATING RULES

a. **Write messages down.** To use circuit time more efficiently, all messages or their substance should be written down prior to transmission. Those messages which must be delivered by the receiving operator, or which are preceded by the proword MESSAGE, shall be written down.

b. **Short transmissions.** Transmissions by radiotelephone shall be as short and concise as practicable, consistent with clarity. The use of standard phraseology (i.e. prowords) enhances brevity.

c. **Natural phrases.** Radiotelephone transmissions should be clear, with natural emphasis on each word (except the prescribed pronunciation of a numeral), and should be spoken in natural phrases, not word by word.

d. **Pause.** If it is technically practicable, the operator shall, during the transmission of a message, pause (release the 'push-to-talk' (PTT) switch) after each natural phrase and interrupt his transmission momentarily to allow another station to break in if necessary.

e. **Listen.** To avoid interfering with other traffic, an operator shall listen to make certain that a circuit (frequency) is clear before making a transmission there.

f. **Test signal.** When it is necessary for a station to initiate test signals, either for the adjustment of a transmitter before making a call or for the adjustment of a receiver, such signals will not continue for more than 10 seconds, and will be composed of spoken numerals (1, 2, 3, etc.) followed by the call sign of the station transmitting the signal. (This usually applies only to AM radios).

1-4. TRANSMISSION SECURITY

a. Radio transmissions are considered secure only when the radio is used with its associated security equipment or authorized operations code. However, even the simple act of keying a transmitter gives the enemy useful information.

b. In the interest of security, transmissions by radiotelephone will be as short and concise as possible, consistent with clarity. Since personnel other than trained operators frequently operate radiotelephone equipment, all personnel must be cautioned that radiotelephone transmissions are subject to enemy interception and, when used without security equipment or operations codes, have no transmission security.

c. Adherence to prescribed procedure is mandatory. Unauthorized departures from or variations in prescribed procedures create confusion, reduce reliability and speed, and tend to nullify security precautions.

d. The following basic rules are essential to transmission security and must be strictly enforced on military radiotelephone nets.

(1) The following practices are **strictly forbidden**:

- (a) Violation of radio silence.
- (b) Unofficial conversation between operators.
- (c) Transmitting on a directed net without permission.
- (d) Excessive tuning and testing.
- (e) Transmitting the operator's personal sign or name.
- (f) Unauthorized use of plain language.
- (g) Use of other than authorized prowords.
- (h) Unauthorized use of plain language in place of applicable prowords.
- (i) Linkage or compromise of classified call signs and address groups by plain language disclosures or association with unclassified call signs.
- (j) Profane, indecent, or obscene language.

(2) The following practices are to be avoided:

- (a) Use of excessive transmitting power.
- (b) Excessive time consumed in tuning, changing frequency, or adjusting equipment.
- (c) Speaking at speed beyond the capabilities of the receiving operators.

1-5 PHONETIC ALPHABET

To avoid confusion and errors during transmissions, special procedures have been developed for pronouncing letters and numerals. The phonetic alphabet must be used to transmit code groups. Individual letters of the alphabet, or to spell difficult and unfamiliar words. The words of the phonetic alphabet, which is a word alphabet and not a code, are pronounced as shown in Figure 1-1.

a. **Numerals** will be transmitted digit by digit except multiples of thousands may be spoken as such. However, there are special cases, such as in anti-air warfare reporting procedures in which normal pronunciation of numerals is prescribed and this rule does not apply. For example, 17 would then be SEVENTEEN.

b. **Artillery Fire** In conduct of artillery fire when calling for fire, the pronunciation of whole hundreds is “HUNDRED” instead of “ONE ZERO, ZERO”, For example, 100 would be spoken as “ONE HUNDRED”.

Phonetic Alphabet

A - ALFA
B - BRAVO
C - CHARLIE
D - DELTA
E - ECHO
F - FOXTROT
G - GOLF
H - HOTEL
I - INDIA
J - JULIET
K - KILO
L - LIMA
M - MIKE
N - NOVEMBER
O - OSCAR
P - PAPA
Q - QUEBEC
R - ROMEO
S - SIERRA
T - TANGO
U - UNIFORM
V - VICTOR
W - WHISKEY
X - XRAY

Phonetic Numerals

1 - WUN
2 - TOO
3 - TREE
4 - FOW-ER
5 - FIFE
6 - SIX
7 - SEV-EN
8 - AIT
9 - NIN-ER
0 - ZERO

Y - YANKEE
Z - ZULU

1-6. PROCEDURE WORDS

Procedure Words (Prowords) are used to aid the radio operator and to keep transmission time to a minimum. They must be committed to memory and used verbatim. A complete understanding of the prowords and their meaning is essential for the expeditious handling of radio traffic. The following is a list of prowords discussed in this reference note; however, a complete list of prowords may be found in Allied communication Publications (ACP) 125 (*).

<u>PROWORD</u>	<u>MEANING</u>
ACKNOWLEDGE	An instruction to the addressees that the message must be acknowledged.
ALL AFTER	The portion of the message to which I have referenced is all which follows_____.
ALL BEFORE have precedes_____ .	The portion of the message to which I referenced is all which
AUTHENTICATE	The station called is to reply to the challenge that follows.
AUTHENTICATION IS	The transmission authentication of this message is _____.
BREAK	I hereby indicate the separation of the text from other portions of the message.

Note: The proword "BREAK" is also used when inserting a 5-7 second break in transmitting for every 15 seconds of transmitting time (see para 1-7d(4)).

CORRECT	You are correct, or what you have transmitted is correct.
CORRECTION	An error has been made in this transmission. Transmission will continue with the
last word (or group or proword) correctly transmitted.	An error has been made in this transmission (or message indicated). The corrected version is
_____.	
DISREGARD THIS TRANSMISSION	This transmission is in error. Disregard it. (This proword will not be used to cancel any message that has been completely transmitted and for which receipt or acknowledgement has been received).
<u>PROWORD</u>	<u>MEANING</u>
DO NOT ANSWER	Stations called are not to answer this call, receipt for this message, or otherwise transmit in connection with this transmission. It will be ended with the proword OUT.
FROM	The originator of this message is indicated by the address designation (call sign) immediately following.
I AUTHENTICATE	The group that follows is the reply to your challenge to authenticate.
I READ BACK	The following is my response to your instructions to read back.
I SAY AGAIN	I am repeating the entire transmission or the portion indicated.
I SPELL	I will spell the next word phonetically.

I VERIFY	That which follows has been verified at your request and it is repeated. (This proword is to be used only as a reply to the proword VERIFY.)
MESSAGE	A message that requires recording is about to follow. (This proword is
transmitted immediately after the call).	
MORE TO FOLLOW	Transmitting station has additional traffic (messages) for the
receiving station.	
NOTHING HEARD	Used when no reply is received from a called station.
OUT	This is the end-of my transmission to you and no answer is required.
OVER	This is the end of my transmission to you
READ BACK	Repeat this entire transmission
back to me exactly as received.	

PROWORD

MEANING

RELAY	Transmit this message to all addresses or to the address designations (call signs) immediately following.
ROGER	I have received your last transmission
satisfactorily.	
SAY AGAIN	Repeat all of your last transmission. When followed by additional

	identification data, it means "Repeat (portion indicated)".
SILENCE	(Repeated three times) Cease transmission on this net Immediately. Silence will be maintained until lifted. (If on a nonsecure net, it <u>must</u> be followed by transmission authentication).
SILENCE LIFTED	Silence is lifted. (If on a nonsecure net, it <u>must</u> be followed by transmission authentication).
SPEAK SLOWER	Your transmission is at too fast a speed. Reduce speed of transmission.
THIS IS	This transmission is from the station whose designation (call sign)
immediately follows.	
THIS IS A DIRECTED NET	From now until further notice this net is
directed.	
THIS IS A FREE NET	From now until further notice this net is
free.	
TIME	That which immediately follows is the time or date time-group of the message.
TO	The addresses whose designations (call signs) immediately follow are to take action on this message.
UNKNOWN STATION	The identity of the station with whom I am attempting to establish
communication is unknown.	
USE ABBREVIATED CALL SIGNS	Call signs are to be abbreviated until further notice.

USE ABBREVIATED
PROCEDURE
further notice.

Conditions are normal. All stations are to
use abbreviated procedure until

PROWORD

MEANING

USE FULL CALL SIGNS
notice.

Call signs are to be sent in full until further

USE FULL PROCEDURES

Conditions are not normal. All stations are
to use full procedure until further notice.

VERIFY

Verify entire message (or portion indicated)
with the originator and send correct version.
(This proword is to be used only at the
discretion of, or by, the addressee to whom
the questioned message was directed).

WAIT

I must pause for a few seconds.

WAIT OUT

I must pause longer than a few seconds.

WILCO

I have received your message, understand it,
and will comply. (This proword
is to be used only by the addressee. Since
the meaning of the proword ROGER is
included in that of WILCO, the two
prowords are never used together).

WORD AFTER
follows.

The word of the message to which I have
referenced is that which

WORD BEFORE
precedes.

The word of the message to which I have
referenced is that which

WORDS TWICE

Communication is difficult. Transmit(ing) each word (or group) twice. (This proword may be used as an order, as a request, or as information).

WRONG

Your last transmission was incorrect. The correct version is _____.

NOTE: The following are not listed as prowords, but are normally referred to as operating words.

AFFIRMATIVE

Yes, or permission is granted.

NEGATIVE

No, or permission is denied.

NOTE: Additional prowords concerning signal strength and readability are found in para 1-14 of this Reference Note.

1-7. NET CONTROL STATION

The net control station (NCS) is the radio station that controls and directs the operation of the net. The station serving the senior commander is normally designated the NCS.

a. **Authority.** The NCS has complete **technical** control over the operation of the radio net, but does **not** have control over local administration of the individual stations in the net. However, within the scope of its authority, its decisions are absolute. Some of the duties and responsibilities of the NCS are as follows:

- (1) Opens and closes the net.
- (2) Admits or releases a station from the net.
- (3) Determines the type of net (free or directed).
- (4) Maintains circuit discipline.
- (5) Supervises the flow of traffic.
- (6) Maintains transmission security.
- (7) Imposes or lifts emergency silence.
- (8) Directs the net to use full or abbreviated calls.

- (9) Directs the net to use full or abbreviated procedure.
- (10) Corrects errors in operating procedures.

b. **Alternate NCS**. The alternate NCS should be appointed prior to any operation. It takes charge of the net whenever the NCS has to leave the net or becomes inoperative. The station serving the next senior commander is normally designated the alternate NCS; however, any station in the net could be designated.

c. **Operation**. A radio net can operate in one of two ways; as a free net or a directed net. In either net, stations must usually request permission from the NCS to enter or leave the net.

(1) **Free Net**. A free net is one where stations may exchange traffic without prior permission from the NCS. Unless otherwise directed by the NCS, radio nets will operate as free nets.

(2) **Directed Net**. When traffic is heavy, or when operators are inexperienced in handling net traffic, the NCS may order a directed net. In this case, no station will call another station without first calling the NCS and requesting permission. A disadvantage of using a directed net is that it increases the volume of traffic; thereby, increasing the chances of the enemy being able to intercept or locate the stations.

d. **Abbreviated Procedure**. Under very good communications conditions, it may be desirable to use abbreviated radiotelephone procedure. By using this type of procedure the transmission time is cut to the absolute minimum; thereby, hindering the enemy from intercepting or direction finding stations in the net. Unless stated in the Unit SOP, the NCS usually declares when abbreviated procedures are used. Abbreviated procedure should not be used unless the operators are well trained in how to use it and no confusion will result. The following are examples of abbreviated procedure:

(1) Eliminate the proword "THIS IS" when giving your own call sign.

(2) Eliminate the proword "OVER" at the end of a transmission. A break in the transmission without the use of the proword "BREAK" indicates an end to a transmission.

(3) When positive communications have been established with the called station, eliminate the use of call signs altogether. This should not be used when three or more stations are communicating with each other as confusion may result.

(4) Use a 5 to 7 seconds break in transmission for each 15 seconds of transmitting time. When using this procedure, the proword "BREAK" (handset is unkeyed) must be used at the end of each intermediate segment, and the proword "OVER" or "OUT" used at the end of the final segment.

1-8. CALL SIGNS

Call signs are used in radiotelephone communications to identify a communications facility, a command, an authority, or a unit

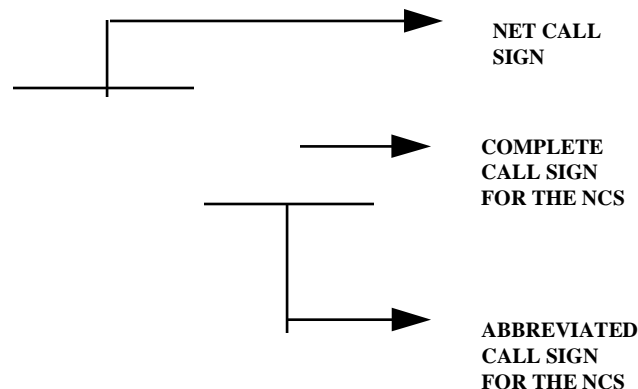
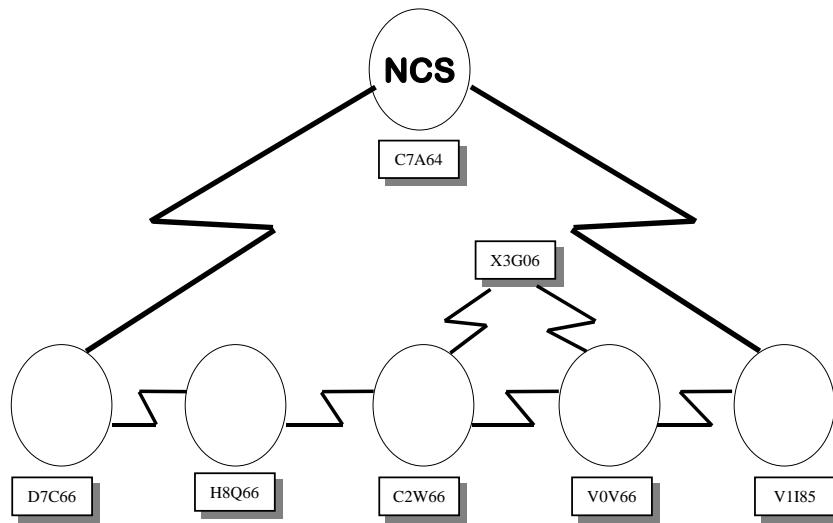


figure 1-8a. Call Sign Structure

a. **Full Call Signs**. Full (complete) call signs consist of a letter-number-letter combination and a suffix. An expander may also be added. Full call signs are used as follows:

- (1) When first establishing (opening) a net.
- (2) When reporting into a previously established net.
- (3) When operating in a net not normally operated in or when relaying a message to another net.
- (4) When directed by the NCS.



b. **Abbreviated Call Signs.** Dropping the first two characters (letter-number) of a full call sign makes an abbreviated call sign.

(a) Corrections.....**CORRECTION – WORD AFTER PLAN - BRAVO**

c. **Types of Call Signs.** There are three types of call signs: individual, collective and net. Refer to Figure 1-8b above.

(1) An individual call sign represents a single station in the net, i.e., D7C66, C2W66, etc.

(2) A collective call sign (X3G06 in figure 3 above) represents a predetermined group of stations within a net. It is used when two or more stations in the net are called more frequently than the other stations. It may also be used when two more stations are operating together, i.e., as part of a “task force”.

(3) A net call sign represents all stations (excluding the NCS) in the net. It is made up of the first three characters (letter-number-letter) of the call sign for the NCS.

(4) Stations respond to collective and net call signs in alphabetical order based on the first letter of their abbreviated call sign.

1-9. RADIO CALLS

The call is that portion of the transmission that identifies the station(s) being called and the station calling by their call signs. The two types of calls are:

a. **Single Call**. A single call is one in which only one call sign precedes the proword THIS IS. A single call may be an individual, a collective, or a net call sign.

b. **Multiple Call**. A multiple call is one in which two or more call signs precede the proword THIS IS. Called stations answer a multiple call in the order called. The calling station will normally place the call signs in alphabetical sequence.

1-10. OPENING A NET

A radiotelephone net is opened at a prearranged time. This time is usually found in the unit SOP or operations order.

a. **Secure Net**. When the NCS is ready to open the net, he will call the net, using the net call sign.

C7A THIS IS C7A64 - OVER

Each station will response to the NCS.

C7A64 THIS IS D7C66 - OVER
C7A64 THIS IS V1I85 - OVER
C7A64 THIS IS H8Q66 - OVER
C7A64 THIS IS VOV66 - OVER
C7A64 THIS IS C2W66 - OVER

The NCS will respond and indicate the type of net.

(1) Free Net.

C7A THIS IS C7A64 - OUT

(2) Directed Net.

C7A THIS IS C7A64 - THIS IS A DIRECTED NET - OUT

1-11. NET CONTROL AND DISCIPLINE

On occasions, the NCS has to take corrective action to maintain circuit discipline, correct errors in operating procedures, and to insure a smooth flow of traffic.

a. **Station Answering Out of Turn.** The NCS has traffic for C2W66 and D7C66. He uses a multiple call to alert them.

Callup: ***C66 W66 THIS IS A64 - PRIORITY - OVER***

Response: ***A64 THIS IS W66 - OVER***
A64 THIS IS C66 - OVER

W66 answered out of turn, something he has done several times recently. The NCS takes corrective action and transmits his message in the same transmission. Since his transmission is somewhat lengthy, he uses the proword "BREAK" (unkeys the handset) to keep the length of his transmission time down.

Message: ***C66 W66 THIS IS A64 - W66 - YOU ARE ANSWERING
OUT OF TURN***

b. **Station Slow in Answering.** On occasions, the NCS may have to discipline a station that has been consistently slow in answering call-ups.

Callup: ***I85 THIS IS A64 - MESSAGE - OVER***

After waiting 15-30 seconds and not receiving a response, the NCS tries again.

Callup: ***I85 THIS IS A64 - MESSAGE - OVER***

Again, there is no response. This time, the NCS sends all words twice during the call-up.

Callup: ***I85 I85 THIS IS A64 A64 - MESSAGE MESSAGE - OVER***

Response: ***A64 THIS IS I85 REPEAT YOUR MESSAGE - OVER***

Although I85 has finally responded to the call-up, he used improper procedure, using the word REPEAT which is not an authorized proword. The NCS takes corrective action and sends his message at the same time.

Message: ***I85 THIS IS 164 - YOU ARE CAUSING DELAY BY YOUR SLOWNESS IN ANSWERING - BREAK***
(pauses 5-7 seconds)
YOU ARE USING IMPROPER PROCEDURE - MESSAGE - TIME 210830Z - BREAK
(pauses 5-7 seconds)
INITIATE PLAN APACHE - OVER

c. **Subordinate Station Leaves the Net.** V0V66 needs to leave the net for a short period of time so that he can service his generators. Before doing so, he request permission from the NCS.

Callup: ***A64 THIS IS V66 - OVER***

Response: ***V66 THIS IS A64 - OVER***

Message: ***A64 THIS IS V66 - REQUEST PERMISSION TO LEAVE THE NET FOR 10 MINUTES - OVER***

Response: ***V66 THIS IS A64 - AFFIRMATIVE - OUT***

d. **Subordinate Station Enters the Net.** To enter the net, a station must also request permission from the NCS.

Callup: ***A64 THIS IS I85 - REQUEST PERMISSION TO ENTER THE NET - OVER***

e. **NCS Leaves the Net.** The NCS must leave the net for an undetermined period of time. Before doing so, he appoints an alternate NCS.

Callup: ***W66 THIS IS A64 - OVER***

Response: **A64 THIS IS W66 - OVER**

Message: **W66 THIS IS A64 - AM LEAVING NET TEMPORARILY -
ASSUME CONTROL - OVER**

1-12. MESSAGE FORMAT

Each message transmitted by radio is divided into three principal parts; the heading, the text, and the ending. Each part may be divided into several elements. Each message contains only those elements essential to the transmission of that particular message.

a. **Heading.** The heading may include any or all of the following elements, which, when included, are transmitted in the order shown. (The separation sign (-) is used in this reference note to facilitate recognition of different elements).

(1) Call**W66
THIS IS A64**

(2) Message
follows.....**MESSAGE**

(3) Transmission
instructions.....**RELAY**

(4)
Precedence.....**PRIORI
TY**

(5) Date-time-
group.....**121430Z**

(6) Address instructions.....**FROM
A64 TO I86**

(7) Separation of text from heading of the
message.....**BREAK**

b. **Text.** The text is the actual message that is to be transmitted.

(1) Text.....**EXECUTE**
PLAN ALFA

(2) Separation of text from ending of the
message.....**BREAK**

c. **Ending.** The ending may contain all or any of the following elements.

(1) Time group (may be used only when there is no date-time
group in the
heading).....**1430Z**

(2) Final instructions.
(b) Additional message follows.....**MORE TO
FOLLOW**

(3) Termination. Every transmission (unless operating with abbreviated
procedure (see para 1-7d) must end with either OVER or OUT. They are never
used together.

(a) Answer
required.....**OVER**

OR

(b) No answer
required.....**OUT**

1-13. OPERATING PROCEDURES

a. **Preliminary Call.** A preliminary call is used when communications are
difficult or when the calling station wants to make sure the called station(s) is (are)
ready to accept traffic.

(1) The simplest use of the preliminary call is calling a single station and
receiving an answer.

Callup: **A64 THIS IS Q66 - OVER**

Answer: **Q66 THIS IS A64 - OVER**

(2) If his traffic is other than routine, the operator may include the precedence of the message in the preliminary call.

Callup: ***A64 THIS IS Q66 - PRIORITY - OVER***

Answer: ***Q66 THIS IS A64 - OVER***

(3) If the calling operator wants to alert the receiving operator that he has a message that requires recording, he does so by using the proword "MESSAGE". If the receiving operator is not ready to record the message at the time he is called and the delay will be only for a few seconds, he uses the proword "WAIT", followed by "OVER".

Callup: ***A64 THIS IS Q66 - MESSAGE - OVER***

Answer: ***Q66 THIS IS A64 - WAIT - (short pause) OVER***

(4) If a delay of longer than a few seconds is anticipated, the receiving operator uses the proword "WAIT" again, but this time follows it with "OUT". When he is ready to record the message, he will call back.

Callup: ***A64 THIS IS Q66 - PRIORITY - OVER***

Answer: ***Q66 THIS IS A64 - WAIT - OUT***

Q66 THIS IS A64 - SEND YOUR MESSAGE - OVER

(5) Word After. V0V66 could have asked for the missing group by using the proword "WORD AFTER".

Request: ***A64 THIS IS V66 - SAY AGAIN WORD AFTER SDD - OVER***

Response: ***V66 THIS IS A64 - I SAY AGAIN - WORD AFTER SDD - XLN OVER***

(6) Heading/Ending. In requesting repetitions of the heading or ending of a message, a repetition may be requested of all that portion of the heading or ending preceding or following a proword, or the portion between any two prowords. The

operator at V1185 missed everything before the time of the message. Using the prowords "SAY AGAIN ALL BEFORE", he transmits-

Request: ***A64 THIS IS I85 - SAY AGAIN ALL BEFORE TIME - OVER***

Response: ***I85 THIS IS A64 - I SAY AGAIN - ALL BEFORE TIME - C71 THIS IS A64 - MESSAGE - PRIORITY - OVER***

b. **Corrections.** When a transmitting operator makes an error, using the proword "CORRECTION" immediately makes a correction.

(1) Text. If the error is made in the text of the message, the last word (or group) that was correctly transmitted follows the proword "CORRECTION".

Message: ***V66 THIS IS A64 - IMMEDIATE - BREAK - MOVE TO POSITION BRAVO - OVER***

(2) Heading/Ending. If the error is in the heading or ending of the message, the proword "CORRECTION" is followed by the last proword that was correctly transmitted.

Message: ***V66 THIS IS A64 - IMMEDIATE - BREAK - MOVE TO POSITION DELTA - OVER***

d. **Cancellations.**

(1) During the transmission of a message and prior to the transmission of the ending proword "OVER" (or "OUT"), the message may be canceled by use of the proword "DISREGARD THIS TRANSMISSION".

Message: ***A64 THIS IS C66 - TIME 171450Z - AM MOVING MY LOCATION TO – (short pause) DISREGARD MY TRANSMISSION - OUT***

(2) A message that has been completely transmitted can only be canceled by another message.

Message: ***A64 THIS IS C66 - CANCEL MY 171450Z - OVER***

e. **Spelling.** Difficult words in the text of plain language messages are spelled out using the proword "I SPELL".

(1) Pronounceable Word. If the word can be pronounced, the operator will do so before and after spelling it.

Message: **A64 THIS IS W66 - CACHE - I SPELL - CHARLIE - ALFA - CHARLIE - HOTEL - ECHO - CACHE - BRIDGE IS DESTROYED OVER**

(2) Unpronounceable Word. If the operator can not pronounce the word, he will imply spell it.

Message: **Q66 THIS IS V66 - ROAD TO - I SPELL - ECHO - INDIA SIERRA - ECHO - EMBER - ALFA - CHARLIE - HOTEL - IS MINED - OVER**

f. **Acknowledgements.** The originator of a message may want an acknowledgement from the addressee that he understands the message and is able to execute the indicated action. Only the addressee can acknowledge the message. Using the proword "ACKNOWLEDGE" in the text of the message normally indicates the request for acknowledgement.

(1) In some cases, the addressee may be operating the radio or is close to it. In these instances, when no delay will result, the addressee will acknowledge the message by using the proword "WILCO".

Message: **Q66 THIS IS A64 - FROM A66 - TO Q46 - MOVE TO ALTERNATE POSITION - ACKNOWLEDGE - TIME1344Z - OVER**

Response: **A64 THIS IS Q46 - WILCO - OUT**

(2) If the address is not available for immediate acknowledgement of the message, the receiving operator will receipt for the message and an acknowledgement will be sent later.

Immediate Response: **A64 THIS IS Q66 - ROGER - OUT**

Later Response: ***A64 THIS IS Q66 - YOUR 1344Z ACKNOWLEDGED - OVER***

g. **Do Not Answer**. When it is imperative for the called station not to answer a transmission (i.e., operating under emergency silence), the proword "DO NOT ANSWER" will be transmitted immediately following the call. the complete transmission will be sent twice, with the full transmission ending with the proword "OUT". A preliminary call is not made.

Message: ***A66 THIS A64 - DO NOT ANSWER - IMMEDIATE - MOVE TO ALTERNATE POSITION - I SAY AGAIN - A66 THIS IS DO NOT ANSWER - IMMEDIATE - BREAK A64 - DO NOT ANSWER - IMMEDIATE - BREAK***
(pause 5-7 seconds)
MOVE TO ALTERNATE POSITION - OUT

h. **Unknown Station**. Sometimes a station receives a call, but is unable to identify the call sign of the calling station because of poor operating conditions. The called station would reply using the proword "UNKNOWN STATION".

Example: ***UNKNOWN STATION THIS IS V66 - SAY AGAIN - OVER***

i. **Verification**. The addressee of a message can, if a message, or part of a message, makes no sense, request that it be verified. Only the originator (usually the writer) of the message can verify it, not the operator who transmitted it. In the following example, H8Q66 sends the following encoded message to the NCS, C7A64.

Message: ***A64 THIS IS Q66 - PRIORITY - BREAK - TAO AMC IAM OPO AMA - BREAK - TIME 1400Z - OVER***

Response: ***Q66 THIS IS A64 - ROGER - OUT***

Later, when decoding the message, the addressee at C7A66 is not certain one group was encoded correctly, and asks the operator to request verification.

Query: ***Q66 THIS IS A64 - VERIFY YOUR 1400Z - WORD AFTER OPO OVER***

Response: **A64 THIS IS Q66 - WAIT - OUT**

If the operator had determined that the group was encoded correctly, he would have verified it as follows:

Verification: **A64 THIS IS Q66 - I VERIFY MY 1400Z - WORD AFTER OPO - AMA - OVER**

The operator at C7A64 notes that the fifth group of the message was read back incorrectly and notifies C2W66 of this, using the proword "WRONG".

Reply: **W66 THIS IS A64 - WRONG - WORD AFTER RAP - RPT - OVER**

C2W66, still under the transmission instruction READ BACK, responds.

Response: **A64 THIS IS W66 - WORD AFTER RAP - RPT - OVER**

C7A64, noting the message has now been read correctly, responds.

Reply: **W66 THIS IS A64 - CORRECT - OUT**

k. **Relay**. C7A64 has a priority message for D7C66, but has been unable to get a response. The operator checks to see if another station in the net has contact with D7C66.

Callup: **V66 THIS IS A64 - OVER**

Response: **A64 THIS IS V66 - OVER**

Request: **V66 THIS IS A64 - DO YOU HAVE CONTACT WITH C66 - OVER**

Response: **A64 THIS IS V66 - AFFIRMATIVE - OVER**

Response: **V66 THIS IS A64 - WAIT - OUT**

C7A64 told V0V66 to wait while he adds the proword RELAY and FROM and TO addressees to the message, then sends it to V0V66 for relay to D7C66.

Message: **V66 THIS IS A64 - RELAY - PRIORITY - FROM A64 - TO C66 BREAK**

(pauses 5-7 seconds)

MOVE TO - GRID ZONE LETTERS INCLUDED - I SET - BREAK

(pauses 5-7 seconds)

MB CG RUEBKF - TIME 1555Z - OVER

The operator at V0V66 receipts for the message. After deleting the transmission instruction RELAY and the TO addressee, he forwards the message to D7C66.

Response: **A64 THIS IS V66 - ROGER - OUT**

Callup: **C66 THIS IS V66 - MESSAGE - OVER**

Response: **V66 THIS IS C66 - OVER**

Message: **C66 THIS IS V66 - PRIORITY - FROM A64 - MOVE TO - GRID ZONE LETTERS INCLUDED - BREAK**

(pauses 5-7 seconds)

I SET - MB CG RUEBKF - TIME 1555Z - OVER

Response: **V66 THIS IS C66 - ROGER - OUT**

1. **Entering Other Nets**. There may be an occasion when a station needs to enter a net that he does not normally operate in. C2W66 has a vital message that must reach his brigade TOC ASAP. For various reasons, he has been unable to raise any of the stations in his battalion net. Using his SOI, he determines the item number identifier for his battalion, the frequency of the command net of the brigade, and the call sign for the brigade TOC. After changing the frequency on his radio, he transmits (using full call signs)-

Callup: **W6T66 THIS IS C2W66 - PRIORITY - OVER**

The operator at the brigade TOC does not recognize the station that wants to transmit a message.

Response: **C2W66 THIS IS W6T66 - IDENTIFY YOUR STATION - OVER**

C2W66 replies with his item number identifier.

Response: **W6T66 THIS IS C2W66 - REFER TO BJ - OVER**

Although C2W66 has identified himself, W6T66 wants to make sure C2W66 is not an enemy station trying to enter the net.

Challenge: **C2W66 THIS IS W6T66 - OVER**

Response: **W6T66 THIS IS C2W66 - OVER**

Since C2W66 authenticated properly, W6T66 tells him to send his message.

Response: **C2W66 THIS IS W6T66 - SEND YOUR MESSAGE - OVER**

Message: **W6T66 THIS IS C2W66 - PRIORITY - HSU UOM YDM
HAN KBE BREAK**
(pauses 5-7 seconds)
LHY FER IBW WWH CPC YQY WHM BFR - BREAK
(pauses 5-7 seconds)
MFM - TIME 1435Z OVER

Response: **C2W66 THIS IS W6T66 - ROGER - OUT**

1-14. RADIO CHECKS

a. **Radio Checks.** Radio checks will not be made unless absolutely necessary. Excessive radio checks are a violation of transmission security.

b. **Signal Strength/Readability.** A station is understood to have good signal strength and readability unless otherwise notified. A station that wishes to inform another station of his signal strength and readability will do so by means of a short and concise report of actual reception such as "Weak, but readable", "Loud, but distorted", "Weak, with interference":, etc. Reports such as "I read you five by", "Loud and clear", "Five by five", etc., will not be used to indicate signal strength and quality of reception.

c. **Prowords.** The prowords listed below are for use when initiating and answering queries concerning signal strength and readability:

(1) General

PROWORD

MEANING

RADIO CHECK
(how do

What is my signal strength and readability
you hear me?)

ROGER
satisfactorily.
additional comments on signal

I have received your last transmission
(The omission of

strength and readability is understood to mean that
reception was loud and clear. If reception is other
than loud and clear, it must be described with the
prowords from subparagraphs (2) and (3) below.

NOTHING HEARD
station

No reply was received from the called
indicated.

(2) Report of Signal Strength.

PROWORD

MEANING

LOUD

Your signal is very strong.

GOOD

Your signal strength is good.

WEAK

Your signal strength is weak.

VERY WEAK
weak

Your signal strength is very

PROWORD

MEANING

FADING
an extent
reception cannot be relied upon.

At times your signal strength fades to such
that continuous

(3) Report of Readability.

PROWORD

MEANING

CLEAR
excellent.

The quality of your transmission is

READABLE
transmission is satisfactory.

The quality of your

UNREADABLE
that I

The quality of your transmission is so bad
cannot understand you.

DISTORTED
you because your
distorted.

I have trouble understanding
signal is

WITH INTERFERENCE

I have trouble understanding you due to
interference.

d. **Example**. The NCS makes a radio check of the entire net.

Callup: ***C7A THIS IS A64 - RADIO CHECK - OVER***

Response: ***A64 THIS IS C66 - ROGER - OVER***
A64 THIS IS I85 - LOUD BUT DISTORTED - OVER
A64 THIS IS Q66 - ROGER - OVER
A64 THIS IS V66 - ROGER - OVER
A64 THIS IS W66 - ROGER - OVER

The NCS now indicates that his reception of each station was loud and clear except for I85 whose transmission, although loud, was distorted.

Reply: ***C7A THIS IS A64 - ROGER - I85 DISTORTED - OUT***

If the NCS had heard all stations loud and clear, he would transmit-

Reply: ***C7A THIS IS A64 - ROGER - OUT***

1-15. ELECTRONIC, RADIO, AND EMERGENCY SILENCE.

a. **Electronic Silence**. Electronic silence is a condition where all equipment emitting electronic signals are totally shut down. This includes radios, radars, facsimiles, etc.

(1) Orders for the imposition of electronic silence will be issued in advance by secure means, and no order in connection with the imposition of electronic silence is to be passed in the clear, or by codeword, over radio.

(2) The orders that impose electronic silence will also detail the circumstances in which, and by whom, it may be lifted or broken as well as the procedure for lifting or breaking. This will normally include the use of codewords or transmission authentication.

b. **Radio Silence**. Radio silence is where all radio transmitters are shut down.

(1) Radio silence is imposed or lifted by the NCS for the net.

(2) Radio silence may be predetermined or may occur in an emergency. When predetermined, instructions for imposing, lifting, or breaking radio silence are to be passed by any secure means available.

(3) Radio silence is to be imposed in accordance with the instructions given. This will normally be by the use of codewords or other predetermined designators. Lifting or breaking radio silence may be achieved in the same way, or by the use of message authentication. An example of imposing radio silence by use of a codeword is as follows:

Callup: ***C7A THIS IS A64 - GRANITE ROCK - OVER***

Response: ***A64 THIS IS C66 - ROGER - OVER***

A64 THIS IS I85 - ROGER - OVER

A64 THIS IS Q66

- ROGER - OVER

A64 THIS IS V66 - ROGER - OVER

A64 THIS IS W66 - ROGER - OVER

Reply: ***C7A THIS IS A64 - GRANITE ROCK NOW - OUT***

NOTE: This procedure is the same as that for changing frequency or closing the net down by using a proword. By keeping the procedure the same, it can confuse the enemy intercept operators as to what is actually happening.

The NCS can lift radio silence with another codeword as follows:

Message: ***C7A THIS IS A64 - PAPER TIGER - TIME 1003Z - OUT***

c. **Emergency Silence**. Emergency silence, imposed under emergency conditions, is similar to radio silence because only the radio transmitters are shut down.

(1) Emergency silence may be imposed or lifted only by competent authority. If the net is nonsecure, transmission authentication must be used when imposing, lifting or breaking emergency silence.

(2) Transmissions imposing emergency silence will be sent twice and ended with the proword OUT. Stations do not answer or receipt such transmissions. To impose emergency silence on a nonsecure net, the NCS transmits-

Message: ***C7A THIS IS A64 - SILENCE SILENCE SILENCE - TIME 0944Z I SAY AGAIN - BREAK***

(pauses 5-7 seconds)

C7A THIS IS A64 - SILENCE SILENCE SILENCE TIME 0944Z - OUT

To lift emergency silence, the NC5 transmits-

Message: ***C7A THIS IS A64 - SILENCE LIFTED - TIME 1000Z - OUT***

1-16. CLOSING A NET

a. **Secure Net**. When the NCS is prepared to close a net, he will call the net and issue closedown instructions.

Callup: ***C7A THIS IS A64 - CLOSE DOWN - OVER***

Each station responds to the NCS indicating they have received his transmission.

Response: *A64 THIS IS C66 - ROGER - OVER*
A64 THIS IS I85 - ROGER - OVER
A64 THIS IS Q66 - ROGER - OVER
A64 THIS IS V66 - ROGER - OVER
A64 THIS IS W66 - ROGER - OVER

The NCS then closes the net.

Message: *C7A THIS IS A64 - CLOSE DOWN NOW - OUT*

Each station will acknowledge his transmission and the NCS will close down the net.

Acknowledge: *A64 THIS IS C66 - ROGER - OVER A64*
THIS IS I85 - ROGER - OVER A64
THIS IS Q66 - ROGER - OVER A64
THIS IS V66 - ROGER - OVER A64
THIS IS W66 - ROGER - OVER C7A
THIS IS A64 - CLOSE DOWN NOW - OUT

The NCS may use a code word or phrase (i.e. BLUE SHIELD) instead of the proword "CLOSE DOWN", there is no need for authentication.

Types of Messages

- 1. Morning Report**
- 2. Strength Report**
- 3. Resurse Report**
- 4. Message Report**

TEST (OPEN BOOK):

- 1) Name the four (4) early methods of communications _____, _____, _____, and _____.
- 2) Morse Code was only made possible by the use of this communications device_____.
- 3) Alexander Graham Bell invented this communication device which is one of the most prominently used communication devices still today. _____
- 4) What are the two main components that radios are made up of? _____ and _____.
- 5) What are the five (5) types of communication? _____, _____, _____, _____, and _____.
- 6) What type of communication would horns, gongs,, whistles, and explosives be?

- 7) What type of communication should be used whenever a platoon expects to stay in one place for more than an hour? _____
- 8) Name the two types of wire communications. _____ and _____.
- 9) Name two (2) advantages of wire communications. _____ and _____.
- 10) What is the most secure method of communications? _____
- 11) Name two disadvantages of radio communications. _____ and _____.
- 12) What is the term that describes a range of frequencies of electromagnetic waves used for communication and other purposes, such as radar? _____
- 13) Spectrum management involves _____ and _____ of spectrum.
- 14) Name two large organizations that deal with regulation, licensing, and authority of Radio Spectrum. _____ and _____.
- 15) _____ is a group of radio stations controlled by one station, capable of direct communications with each other using a common frequency.
- 16) In terms of transmission security name two practices that are strictly forbidden.
_____ and _____.

- 17) Give the proper phonetic alphabet word for each of the following letters:
O _____, L _____, J _____, and Q _____.
- 18) Spell the proper phonetic numeral correctly for the following numbers:
1 _____, 5 _____, 4 _____, and 9 _____.
- 19) _____ are used to aid the radio operator and to keep the transmission time to a minimum.
- 20) The proper proword for this meaning is? "The following is my response to your instructions to read back." _____
- 21) The proper proword for this meaning is? "I have received your last transmission satisfactorily." _____ -
- 22) What are the two words that are not listed as prowords, but are normally referred to as operating words? _____ and _____.
- 23) _____ consists of a letter-number-letter combination and a suffix; an expander may also be added.
- 24) What are the three types of call signs? _____, _____, and _____.
- 25) Name the three principle parts of a Military Message Format. _____, _____, and _____.

