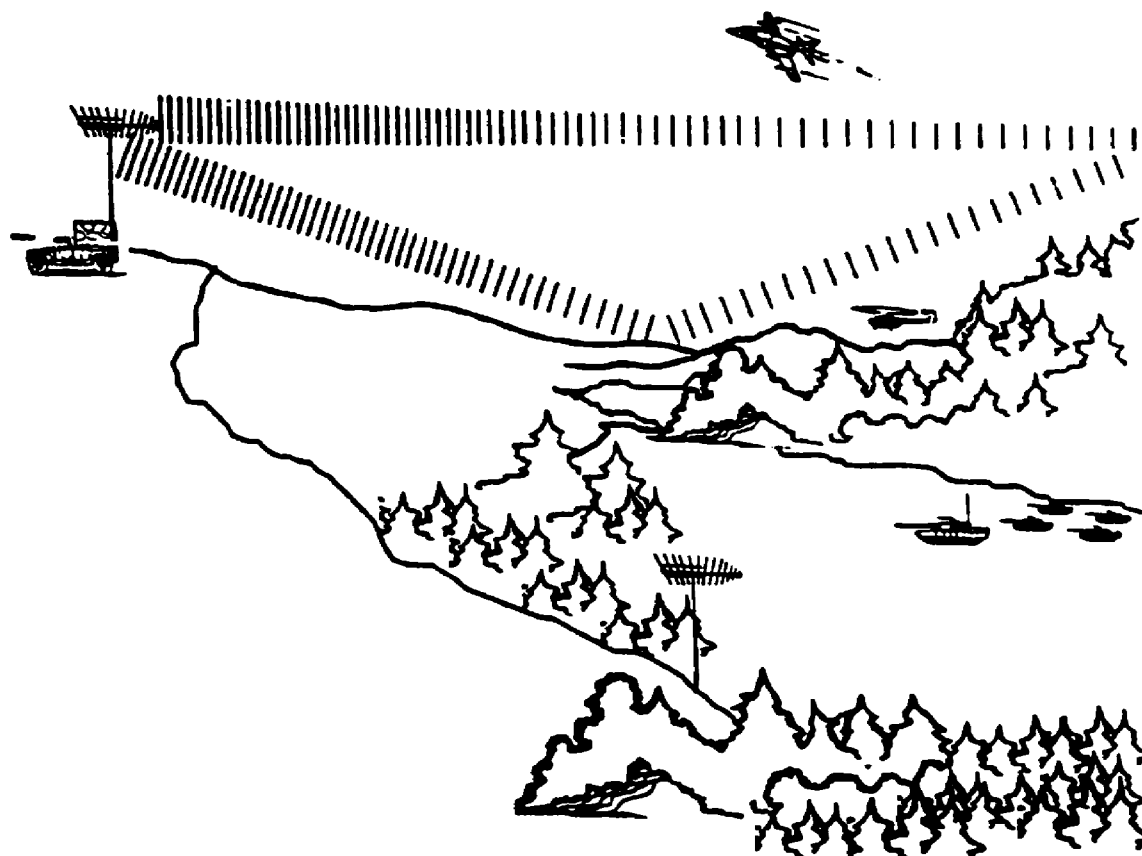


SUBCOURSE
IT0301

EDITION
C

US ARMY INTELLIGENCE CENTER

BASIC COMMUNICATIONS INFORMATION



THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT
ARMY CORRESPONDENCE COURSE PROGRAM

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READINESS,
PROFESSIONALISM



THRU
GROWTH

BASIC COMMUNICATIONS INFORMATION

Subcourse Number IT0301

Edition C

**US ARMY INTELLIGENCE CENTER
FORT HUACHUCA, AZ 85613-6000**

4 CREDIT HOURS

EDITION DATE: June 1999

SUBCOURSE OVERVIEW

This subcourse is designed to teach you certain basic facts about military radio communications, as well as radio operations in general. You will learn to identify the various types of radio net structures and operations. You will also be introduced to the basic operating data which enables efficient radio communications to take place. In addition, the principles for diagramming radio communication structures will also be presented. This will establish the foundation to performing net reconstruction.

There are no prerequisites for this subcourse.

Unless otherwise stated, the masculine gender of singular pronouns is used to refer to both men and women.

TERMINAL LEARNING OBJECTIVE

- | | |
|-------------------|--|
| ACTION: | You will identify various types of radio communication structures/operations and how they are graphically represented. |
| CONDITION: | You will use the information provided in this subcourse. |
| STANDARD: | To demonstrate competency of this task, you must achieve a minimum of 70 percent on the subcourse examination. |

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LESSON 1

NET STRUCTURE

Critical Task: 301-794-1309

OVERVIEW

LESSON DESCRIPTION:

Upon completion of this lesson you will be able to:

1. When provided with a diagram of a communication system, identify each of the types of radio communication structures, and the types of radio net operations.
2. Determine the common operating control of a group, net or network.

TERMINAL LEARNING OBJECTIVE:

TASKS: Identify each type of radio communication structures and radio net operations.

CONDITION: Given the information provided in this subcourse.

STANDARD: To demonstrate competency of this task, you must achieve a minimum of 70 percent on the subcourse examination.

REFERENCES: The material contained in this lesson was derived from the following publications:

NSA Subcourse TA 103(u)
FM 34-88(u)

INTRODUCTION

1. An important phase of traffic analysis is network reconstruction. To reconstruct the communication network of an opposing military force through the study of intercepted radio traffic, the analyst must have a thorough understanding of the elements of net concept.
2. A radio network is made up of radio stations for the purpose of intercommunication. In the military, communication parallels organization. A targets communication procedures will reflect the voice of its command.
3. In military organizations particularly, orders are originated by commanders and passed along to subordinates. In many cases, these orders must pass through intermediate commanders. Additionally, subordinates who receive orders must know from where the order originate, how they are to be answered, and to whom they are applicable, as well as how to direct any inquiries in order to get special instructions. The echelons of command established through the study of

the enemy's communications reflect the target's "chain of command". These commands are targets for traffic analysis.

PART A: BASIC COMMUNICATION STRUCTURES

1. A radio terminal consists of a paired transmitter and receiver. Two or more terminals located together is referred to as a radio station. The path of communication between two or more radio stations is called a radio circuit. In traffic analysis, specific terms have been adopted to describe the various types of circuits according to the manner in which the radio stations communicate (Star, Star with lateral, and Free Operation). Communication systems are limited to certain basic structures which aid in their exploitation. Each component part of this structure has a specific term or definition. The terms used are "Link", "Group", "Net" and "Network". When graphically depicting these terms, a circle, square, or rectangle is used to represent a radio station with a straight line drawn between stations indicating communication between the two stations.
2. The basic unit in a communication system is a "LINK". A link exists where there are two radio stations with direct communication between each other and is graphically represented in Figure 1-1.

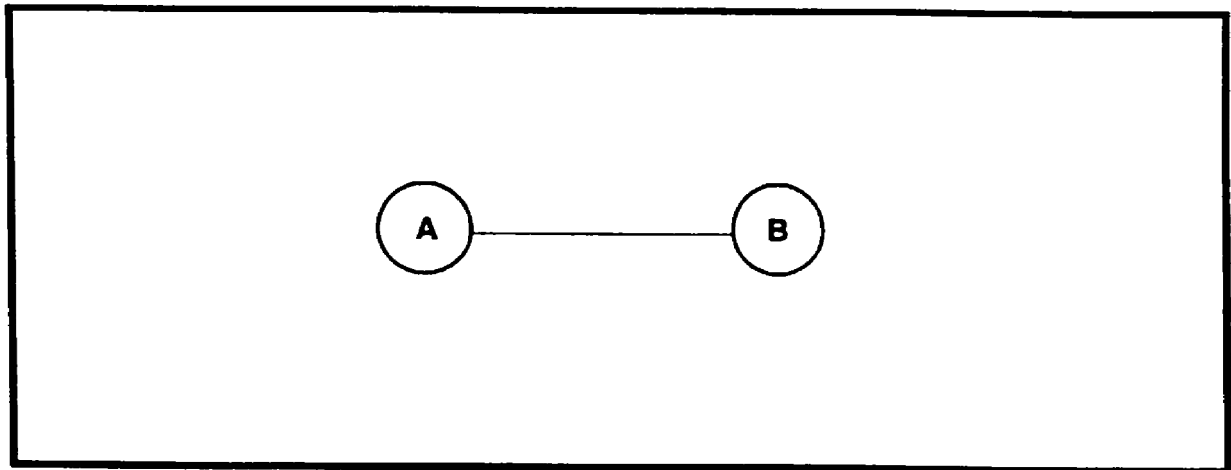


Figure 1-1. A communication "LINK".

3. The link is the simplest of communication structures and represents the foundation for other structures. Building on this foundation we have what is known as a radio "GROUP". A radio group is composed of a number of links with one station serving as the common operating control. Figure 1-2 is a graphic representation of a "group".

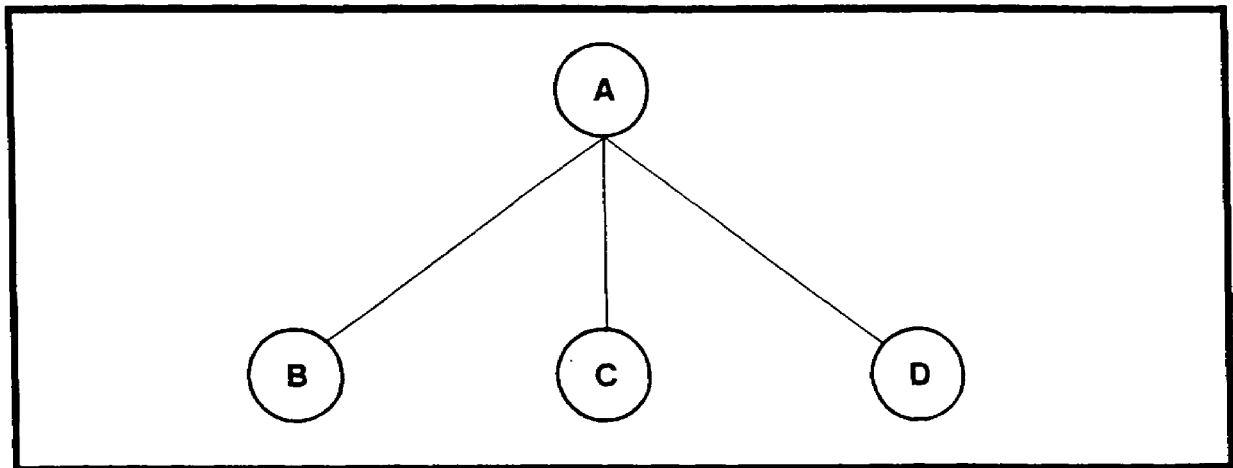


Figure 1-2. A radio "GROUP."

4. A radio Net is a number of associated groups or links assembled on the basis of common operating characteristics under or serving the same common superior headquarters. Figure 1-3 is a graphic representation of a radio "net."

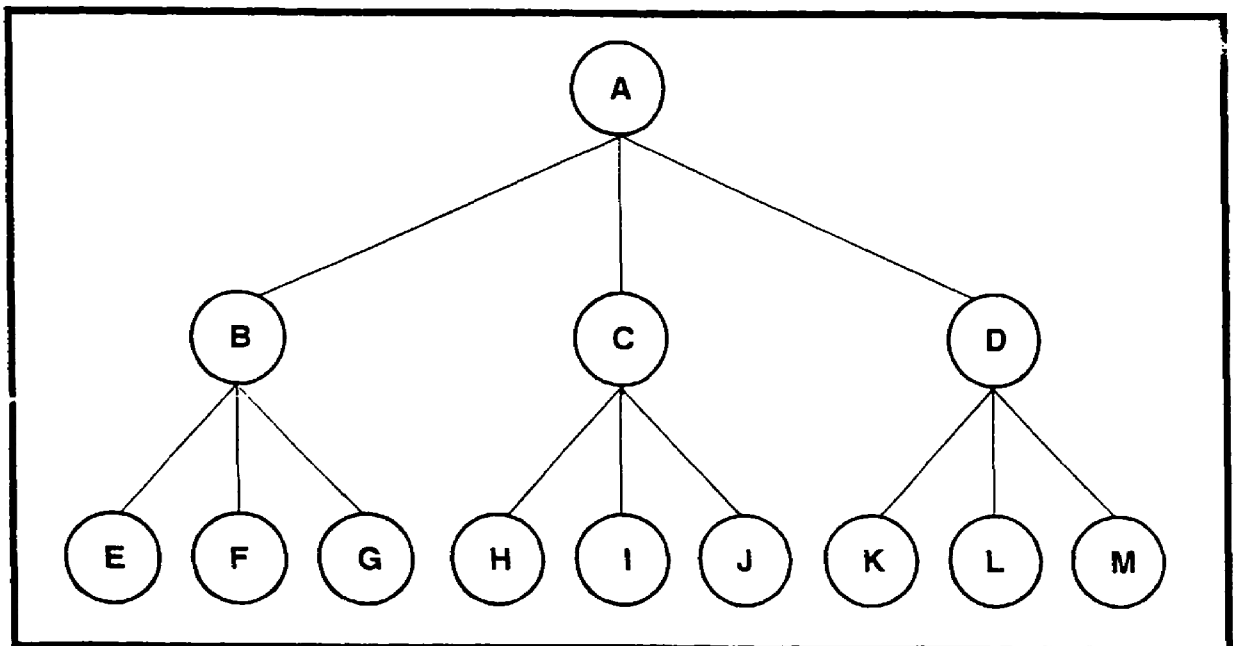


Figure 1-3. A radio "NET".

5. When the entire communications structure of a military unit, military service of a nationality, or other organization including all subordinates or related nets is recovered, the resulting structure is called a "NETWORK". Each radio net or network may be graphically represented in a different way depending on the specific number of links and groups associated to the same or common headquarters (See Figure 1-4).

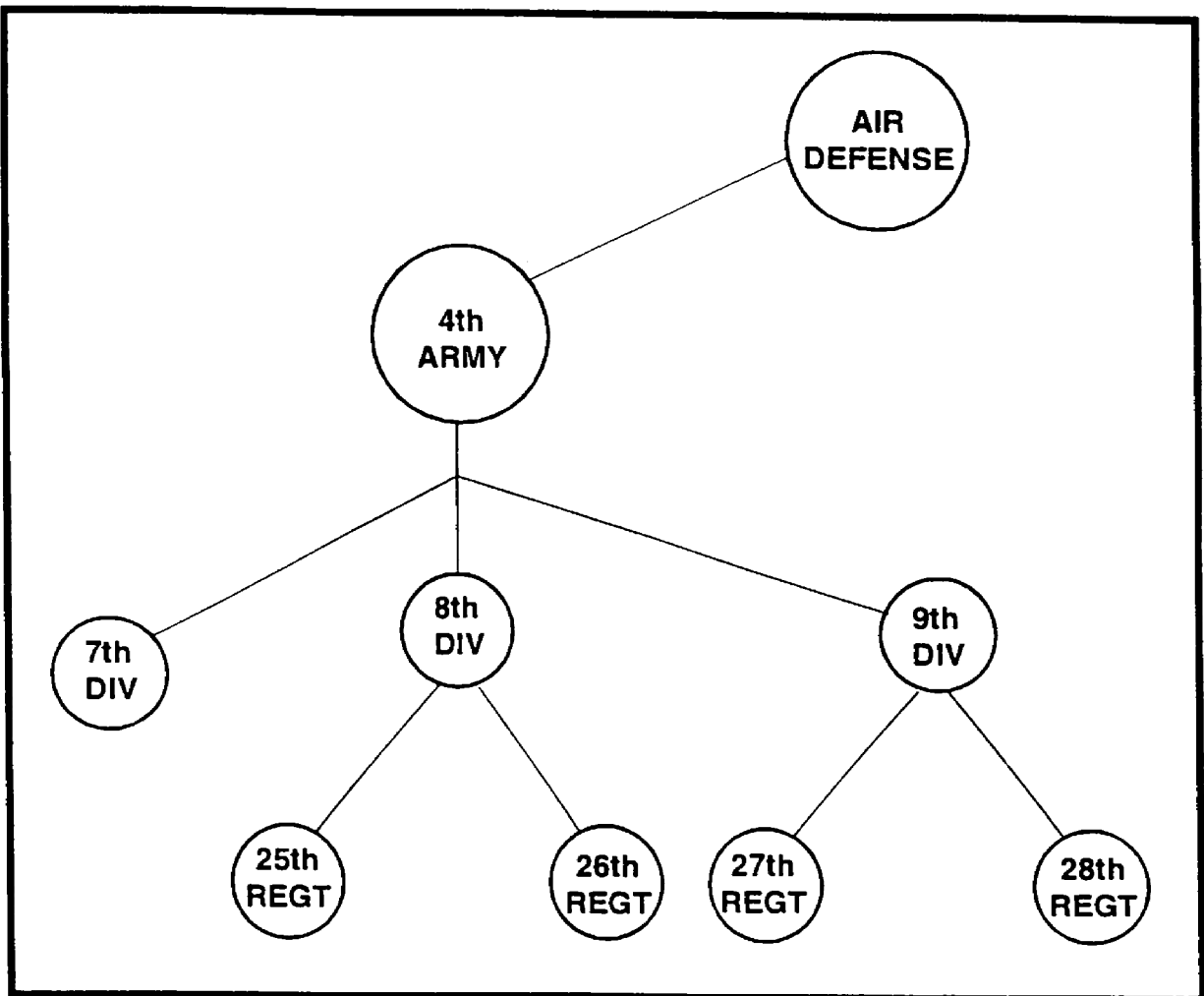


Figure 1-4. 4th Army Network.

6. The previously mentioned definitions may be obscure for they appear to overlap. But it should be kept in mind that they are formulated from the intelligence point of view, that is, from the outside looking in. The following figure and explanation will help clarify these terms and show how communication structures in some entities can be properly referred by more than one term.

7. Figure 1-4 illustrates the general organization of a military network, proceeding from army through division to regiment. Each line represents a radio link within the terms of the definition given; one path of radio communication between two stations. Remember that only two stations are involved in a link, never any more, even though a particular station may appear in two or more links.

8. The 8th Division, for example, may be involved in three different links. Communication between the 8th Division and the 25th Regiment constitutes one link, between the 8th Division and the 26th Regiment constitutes a second link, and between the 8th Division and 4th Army constitutes a third link. In each case, there exists ONE PATH OF RADIO COMMUNICATION BETWEEN TWO STATIONS.

9. The links which form the triangle between the 8th Division, 25th Regiment, and the 26th Regiment constitutes a group; those forming the triangle between the 9th Division, 27th Regiment, and 28th Regiment constitute another group. These links are placed in groups because they work together as a communication entity under a common operating control, the group control being the highest headquarters within the group.

10. A net is made up of the two groups together along with the 7th Division, and is called the 4th Army NET since each division is subordinate to the 4th Army. When considering the entire structure, with all support units (AIR DEFENSE), the communication structure may be termed the Fourth Army Network.

11. The net, group, and the link are merely units of organization in communications language, just as armies, divisions, and regiments are units of organization in the military.

12. In a typical military organization, communications usually pass between successive echelons of subordinate headquarters. That is, if a division headquarters wants to pass a radio message to one of its subordinate battalions, it would normally be routed through that particular battalion's regimental headquarters. In some cases, however, the division headquarters may communicate directly with the battalion. This direct communication, skipping the intermediate echelon is called **SKIP ECHELON** and is shown in Figure 1-5.

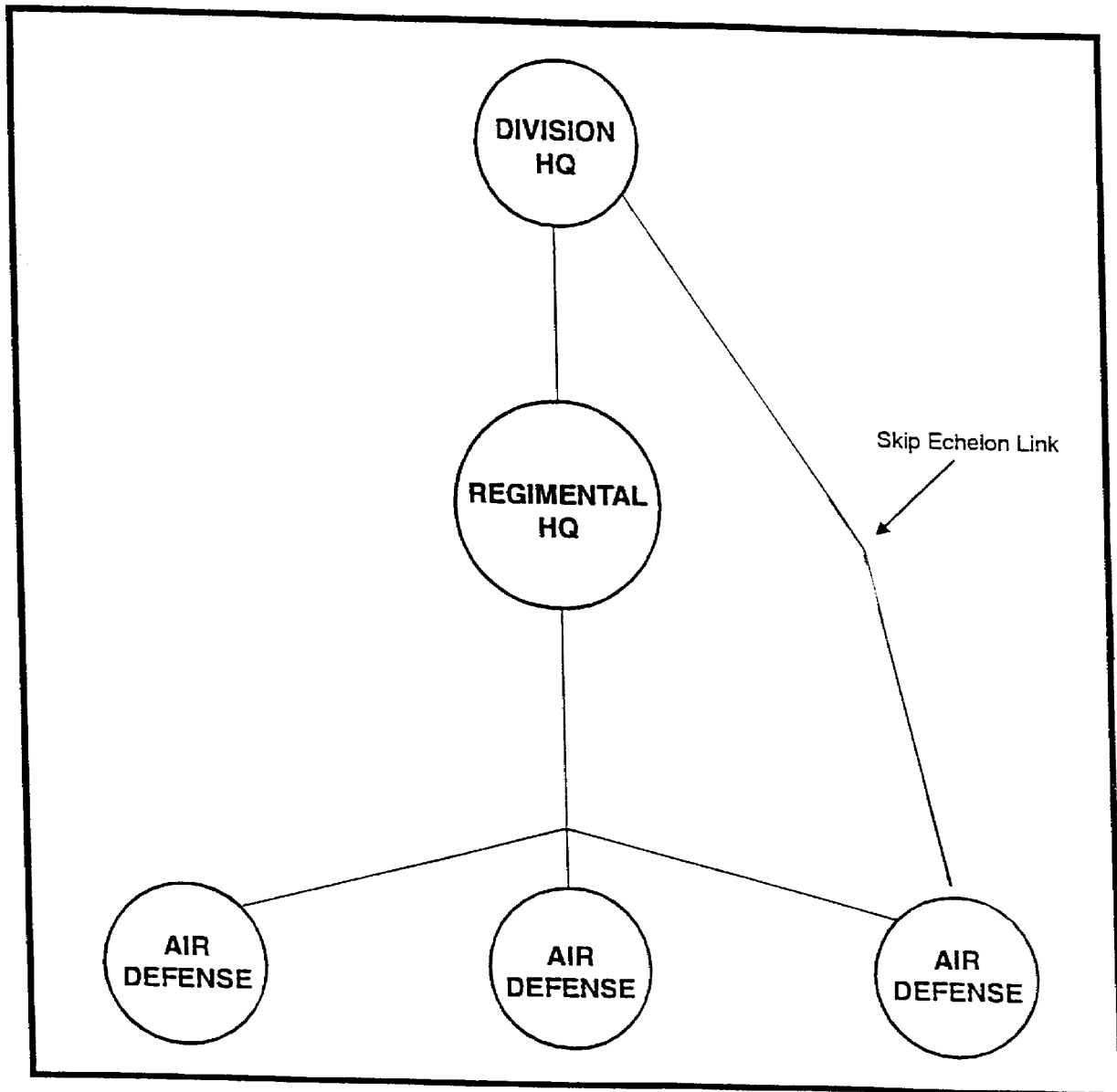


Figure 1-5. "Skip Echelon".

13. In some cases when diagramming a group, net, or network, the analyst may come across a signal facility used by two or more units (i.e. an air unit, missile units, and a headquarters element). When this occurs and it is noted that several units are using the same signal facility it is called **COLLOCATION** and may be represented as depicted in Figure 1-6.

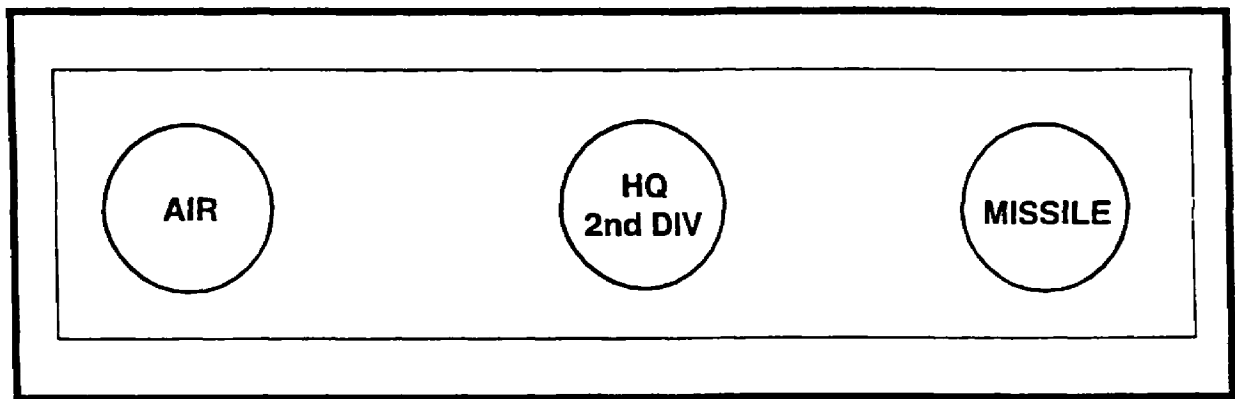


Figure 1-6. "Collocation".

PART B: NET OPERATIONS

1. In addition to net structure, another aspect of radio nets which is of concern in traffic analysis is the degree of control exercised over the net's operation. In military communication structures, just as in any military organization, there are seniors and subordinates. In communications the senior station is called the Net Control Station (NCS), or the Control Station (CT) and the subordinates are called outstations (O/S).
2. The Net Control Station is normally located close to and provides communications for the headquarters of the senior military unit. The authority of the NCS is absolute within the scope of technical control. It opens and closes the net, controls transmissions and clears traffic within the net, corrects errors in operating procedures, gives or denies permission for a station to enter or leave the net, and maintains net discipline. The extent of control exercised by the NCS varies according to operational conditions. In a net where experienced operators are pacing traffic smoothly, little formal control is required. When the volume of traffic is great and operators are less experienced, the NCS may be required to exercise firm control to keep the net organized and traffic flowing in an orderly manner.
3. The outstations normally are the radio stations of the units subordinate to the headquarters served by the NCS.
4. In constructing a net diagram, both the CT and the O/S are represented by circles, squares, or rectangles, with the CT being placed above the O/S. The paths of intercommunication between the stations are represented by connecting lines regardless of the direction of the communication.
5. In any given case, the method of operation used by a communication system is normally determined by the size, mission, and type of unit being served. Basically, there are two types of net operations. The presence of a controlling authority that directs the communications activity or a radio net is called **directed operation**. In radio nets where a controlling authority is absent, the operation is referred to as **free operation**.
6. DIRECTED OPERATION can be further broken down into two basic types. The first type is called a "star." A star is a group of stations under a common control station (CT) wherein all outstations (O/S) transmit only to that control. The O/S do not contact each other, and all messages from one O/S to another are routed through the CT. Figure 1-7 represents a **"STAR."**

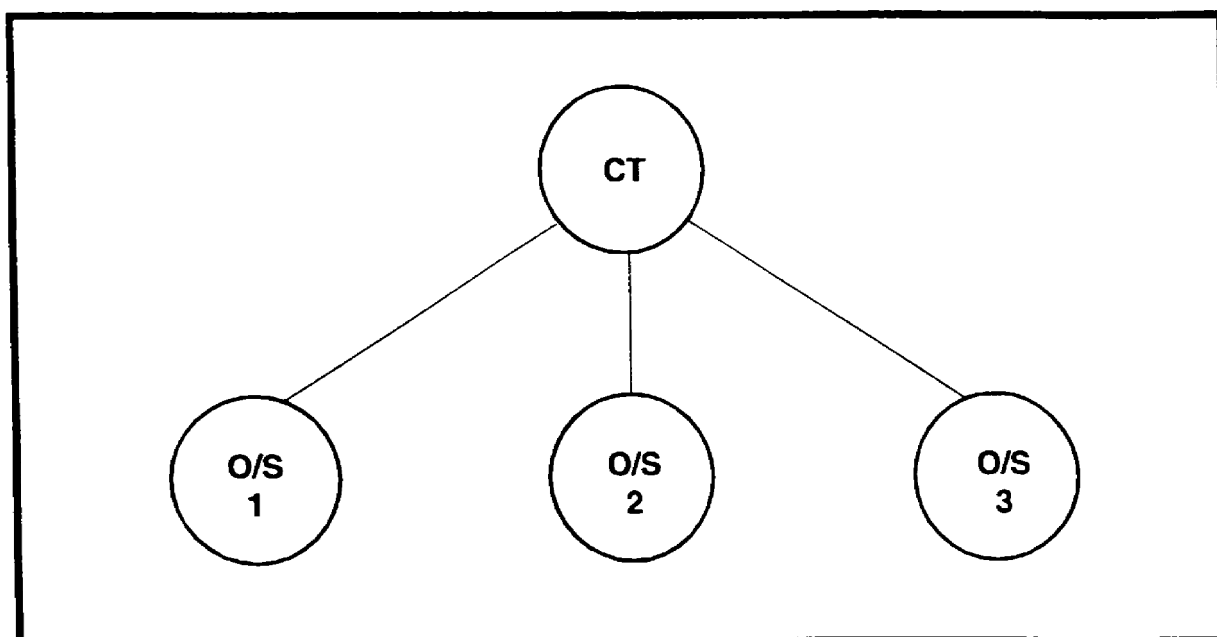


Figure 1-7. A "Star".

7. The second type of directed operation is called a "**STAR-LATERAL**". A star-lateral is a group of stations under a common control station where in the outstations direct their traffic to or through the control station with some regular operation between the outstations. Figure 1-8 represents a "star-lateral."

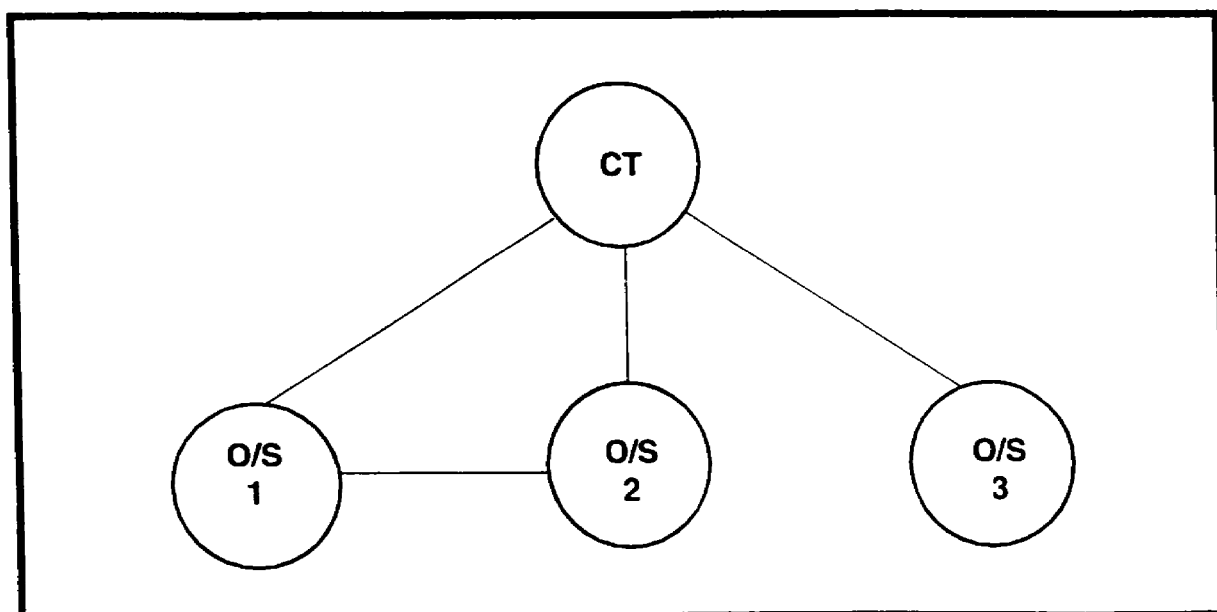


Figure 1-8. A "Star-lateral".

8. The second type of radio net operation is called **Free Operation**. Free operation is the method of radio net operation in which a number of stations are permitted to contact any other station within the net. In free operation there is no formal control station, however, there may be a "senior station" which can exercise control over the net if needed. Figure 1-9 is an illustration of free operation.

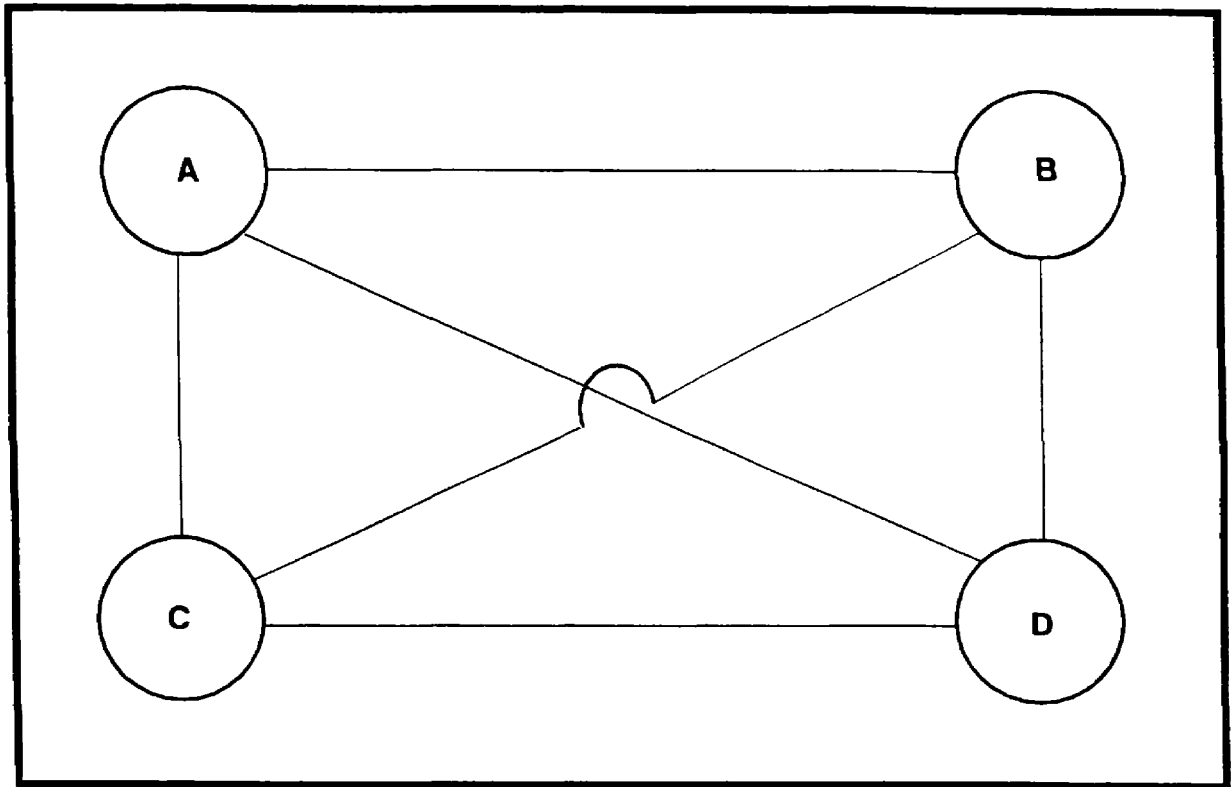


Figure 1-9. "Free Operation".

Notice the "hump" in the link between stations C and B. This hump is used to distinguish the difference between link BC and link AD.

LESSON 1

PRACTICE EXERCISE

This practical exercise is designed to check your comprehension of the material presented on basic communications structure and net concept. There is only one correct answer for each item. When you complete the exercise, check your answer with the answer key that follows. If you answer any item incorrectly, study again that part of the lesson which contains the portion involved.

QUESTIONS 1 through 9 REFER to Figure 1-10:

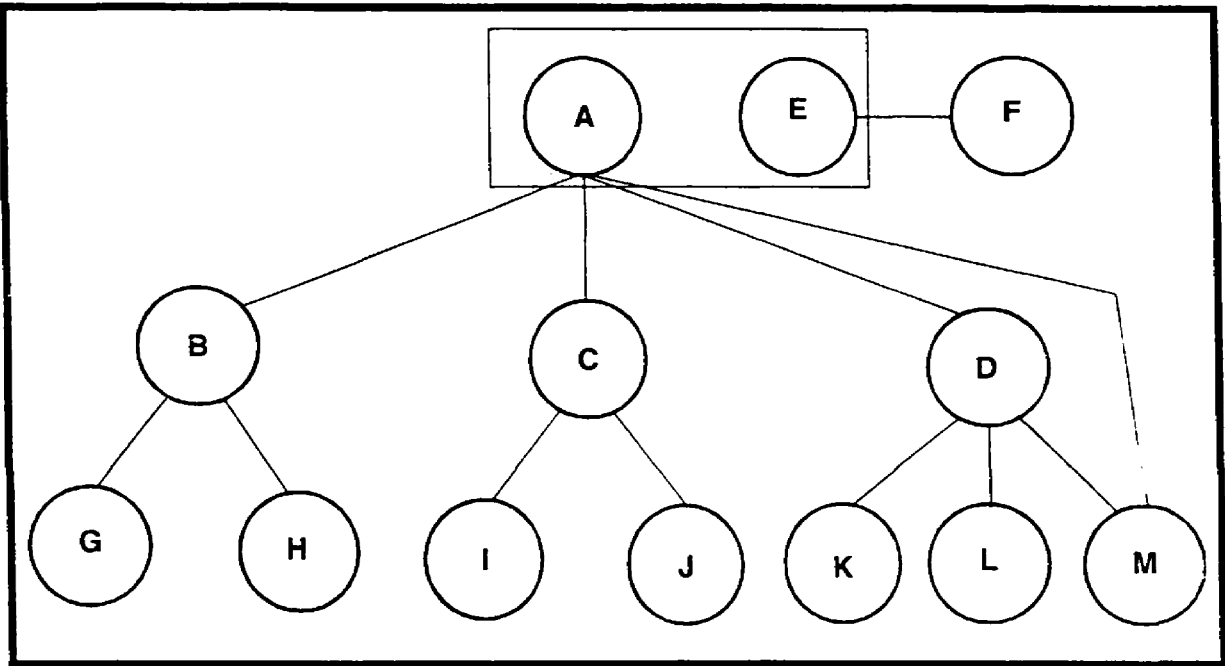


Figure 1-10. PE1 Network.

1. What is the direct radio communication between terminals E and F called?
 - A. net
 - B. link
 - C. group
 - D. network

2. What is it called when stations A and E both use the same communication facility?
 - A. collocation
 - B. skip echelon
 - C. common control
 - D. operating control

3. What is the communication entity that is constructed from stations A, B, C, and D?
 - A. radio net
 - B. radio line
 - C. radio group
 - D. radio network

4. What stations operated under the same control of station B?
 - A. H and I
 - B. I and J
 - C. G and H
 - D. M and K

5. The line that connects radio station A with radio station M is called a what?
 - A. net
 - B. group
 - C. collocation
 - D. skip echelon

6. What station is most likely to be the same operating control of stations K, L, and M?
- A. C
 - B. D
 - C. J
 - D. K
7. Stations A, B, C, D, G, H, I, J, K, L, and M would best be described as a radio what?
- A. net
 - B. link
 - C. group
 - D. network
8. The entire communications system depicted in Figure 1-10 would best be described as a radio what?
- A. net
 - B. link
 - C. group
 - D. network
9. What single station is probably the major headquarters serving the communication system depicted in Figure 1-10?
- A. station A
 - B. station C
 - C. station E
 - D. station F

Question 10 refers to Figure 1-11:

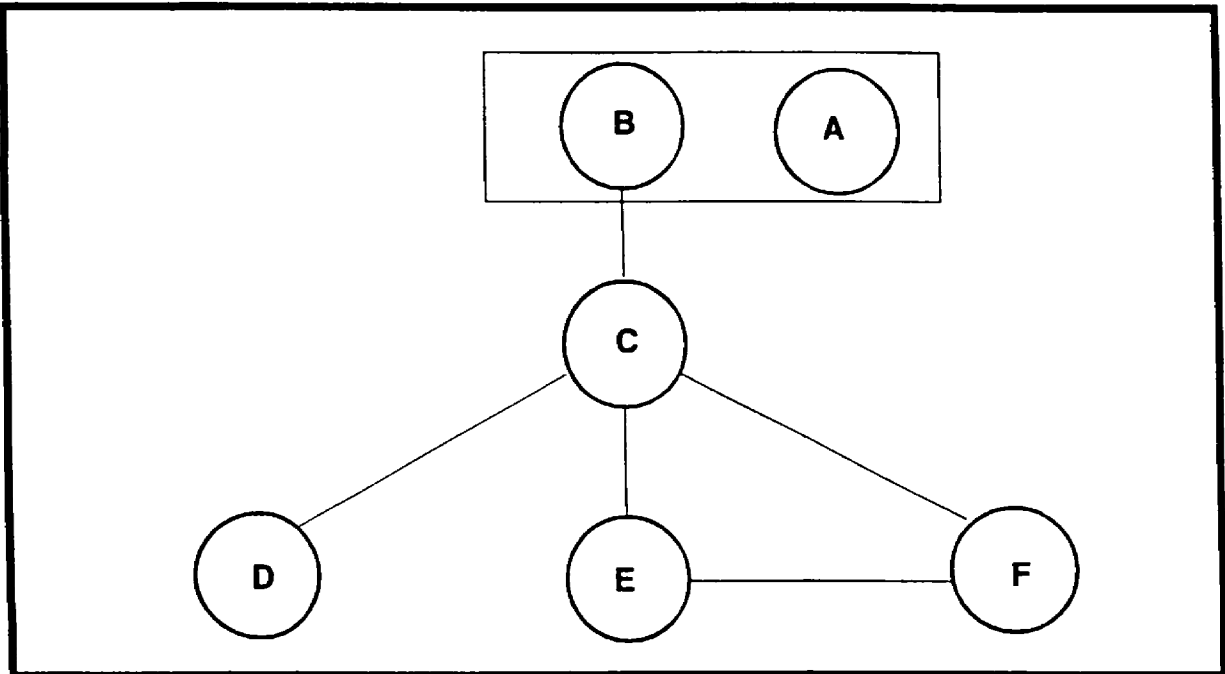


Figure 1-11. P32 NET.

10. In the above figure, station C, D, E, and F represent what?

- A. a net
- B. a link
- C. collocation
- D. a star-lateral

LESSON 1

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

<u>Item</u>	<u>Correct Answer And Feedback</u>
1.	B. A link (page 1-2)
2.	A. Collocation (page 1-7)
3.	C. A radio group (page 1-3)
4.	C. G and H (page 1-5 (fig 1-4))
5.	D. A skip echelon (page 1-6 (fig 1-5))
6.	B. "D" (page 1-8)
7.	A. Net (page 1-3)
8.	D. Network (page 1-4)
9.	A. "A" (page 1-6)
10.	D. A Star-Lateral (page 1-9)

LESSON 2

FREQUENCY USAGE

Critical Task: None

OVERVIEW

LESSON DESCRIPTION:

In this lesson you will learn to identify the types of frequency usage employed by a target communications net.

TERMINAL LEARNING OBJECTIVE:

- TASK:** Identify the types of frequency usage employed by a link, group or net.
- CONDITION:** You will use the information provided in this subcourse.
- STANDARD:** To demonstrate competency of this task, you must achieve a minimum of 70 percent on the subcourse examination.
- REFERENCES:** The material contained in this lesson was derived from the following publications:
- NSA Subcourse TA 103 (U)
FM 34-88 (U)

INTRODUCTION

The basic communication structures discussed in lesson 1 may be modified in appearance by the method of use of operating data. The operating data of a radio net consists of basic items, such as frequencies, call signs, and schedules. This operating data enables the network to function in an efficient and orderly manner and eliminates interference which would be present if there were none. Of all the operating data, frequency usage is the element which modifies the net structure to the greatest degree. Call signs and schedules do not modify the net as much as frequency usage. You should remember that operating data does not change the basic net structure, it only modifies the net structure to the greatest degree. Call signs and schedules do not modify the net as much as frequency usage. You should remember that operating data does not change the basic net structure, it only modified it.

The basis of radio communication is the transmission of radio frequency energy into space after it has been generated in a transmitter, and the reception of that energy by a receiver at a distant point. Because radio stations are paired transmitters and receivers, the method of frequency usage that radio stations use becomes important for reliable and efficient communication. The manner in which frequencies are used on a net is also of great value in traffic analysis to gain a complete understanding of the communication system being studied.

PART A: SIMPLEX WORKING

1. There are two types of radio frequency usage. The terms used to describe frequency usage are **simplex working** and **complex working**.
2. Simplex working is the term used to describe the method of frequency usage in which two or more stations communicate on the same frequency, that is, they use the same frequency to transmit and to receive. This means that on any given radio communication structure, a link, group, or net, only one frequency is used for communications between the stations involved.

When a link, group, or net uses simplex working, we combine the term "simplex" with the specific communication structure, for example, a simplex link or simplex group. Figure 2-1 is a communications diagram of a link using simplex working.

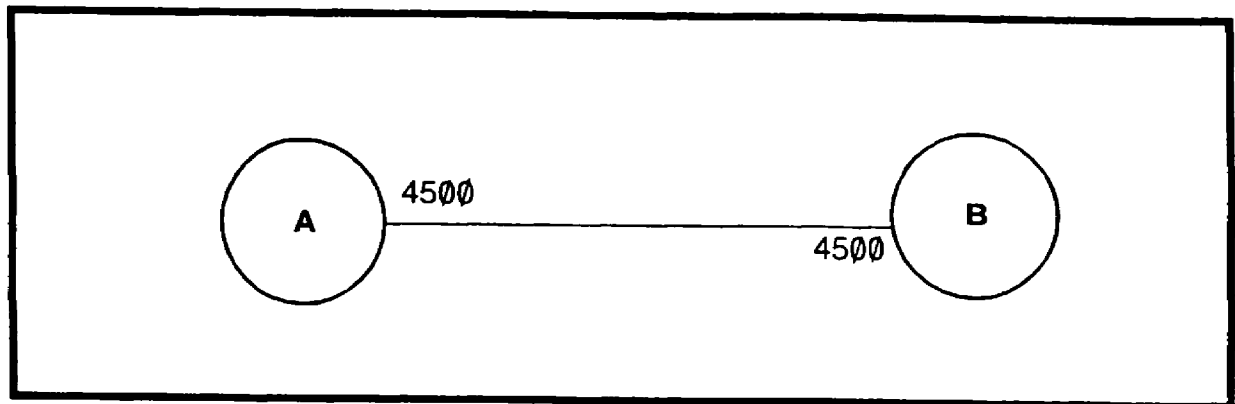


Figure 2-1. Simplex Link.

3. The above link is called a **Simplex link**. The use of this term even without the figure, tells you that only two stations are involved and they both use the same frequency to communicate.
4. We can also combine the term "simplex" with the type of directed operation. For example, if it has been determined that a group is a "star" or a "star-lateral," the resulting combination of terms would be a **simplex star** or a **simplex star lateral**.
5. There is an inherent limitation in simplex working, for only one station in the net can pass traffic at any given time. If two or more stations try to pass traffic, they succeed only in blocking one another out. For this reason, this type of frequency usage is normally used only on low echelon nets.

PART B: COMPLEX WORKING

1. The second method of **employing frequencies is more** complicated and is known as **complex working**. Complex working is the system of frequency usage wherein the stations of a net, group, or link, communicate with each other on different frequencies. Figure 2-2 is an example of how this type of working would look like working.

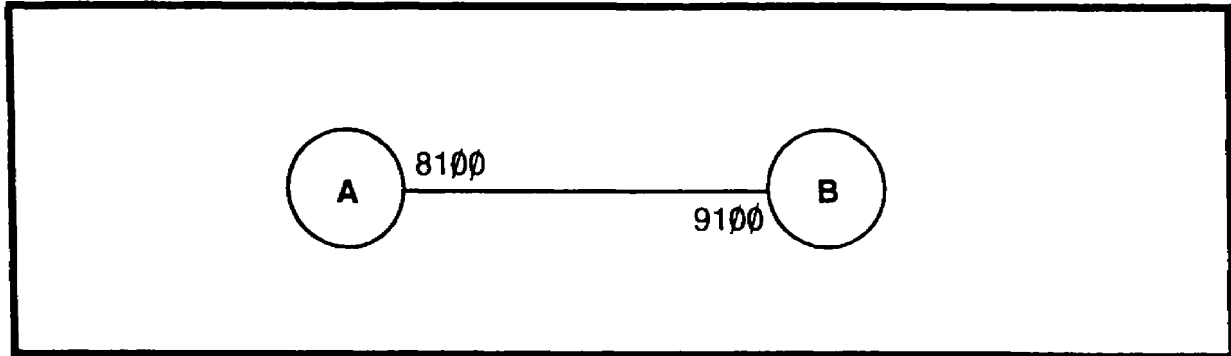


Figure 2-2. Complex Link.

2. We know that the preceding figure illustrates a link. Since the frequency usage is complex, we call it a "complex link."

If we know that Figure 2-3 represents a star-lateral, what combination of terms would be used to describe it?

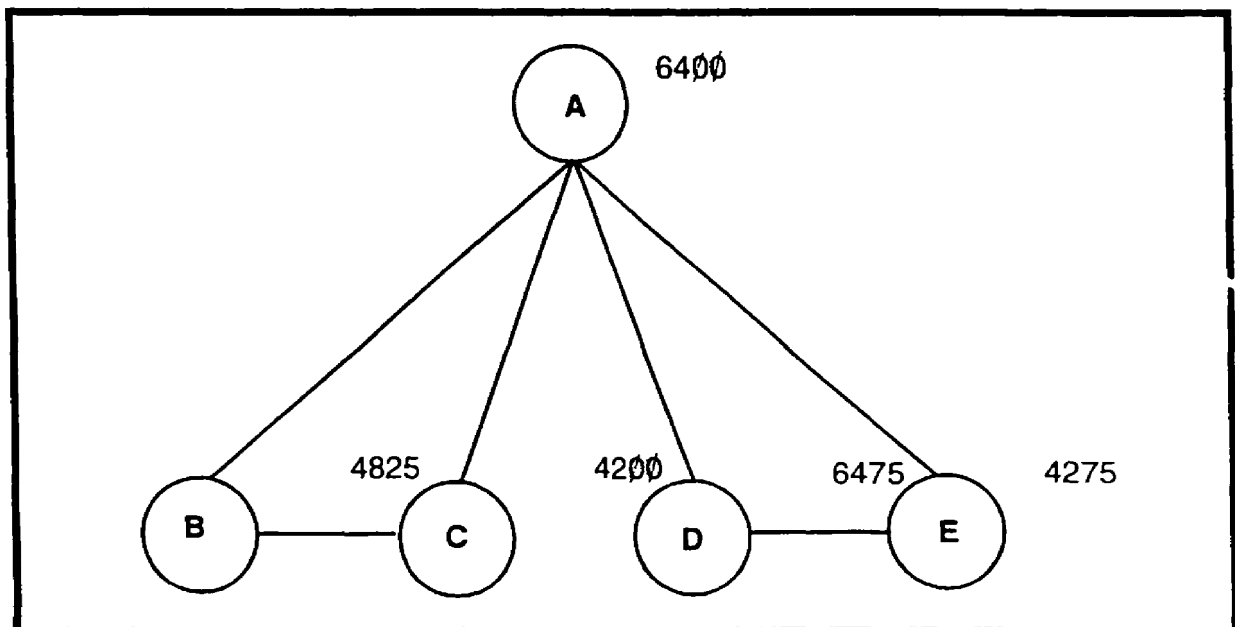


Figure 2-3. Star-Lateral.

Your answer: COMPLEX STAR-LATERAL

You are correct.

3. By using a combination of terms, one describing the communication structure or the degree of control exercised, and the other describing the method of frequency usage, most radio communication systems can be adequately described in a few words.

Study chart 1:

CHART 1 - FREQUENCY USAGE

	SIMPLEX WORKING	COMPLEX WORKING
NET STRUCTURE	SIMPLEX LINK SIMPLEX GROUP SIMPLEX NET	COMPLEX LINK COMPLEX GROUP COMPLEX NET
NET OPERATION	SIMPLEX STAR SIMPLEX STAR-LAT	COMPLEX STAR COMPLEX STAR-LAT

4. By applying the method of frequency usage to either net structure or net operation, terminology is derived to describe each type of communication entity. If this is unclear, review the material covered thus far. Be sure you understand this material before continuing with the instruction.

5. There are two ways that complex frequencies may be used. See Figure 2-4. If each station of a net has its own transmitting frequency, it is called complex sending. The figure 2-4 is an example of complex sending frequency usage.

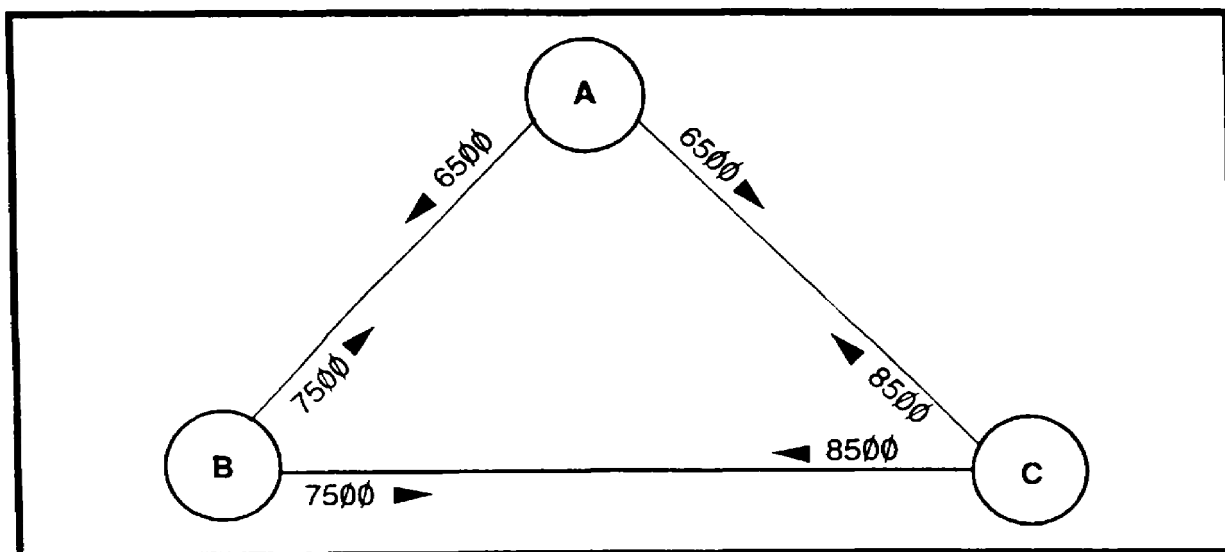


Figure 2-4. Complex Sending.

6. Each station transmits on a different frequency. Station A always transmits on 6500 kHz, station B on 7500, and station C on 8500.
7. The following figure 2-5 uses complex sending. Fill in the appropriate box with the missing frequency. See Figure 2-5.

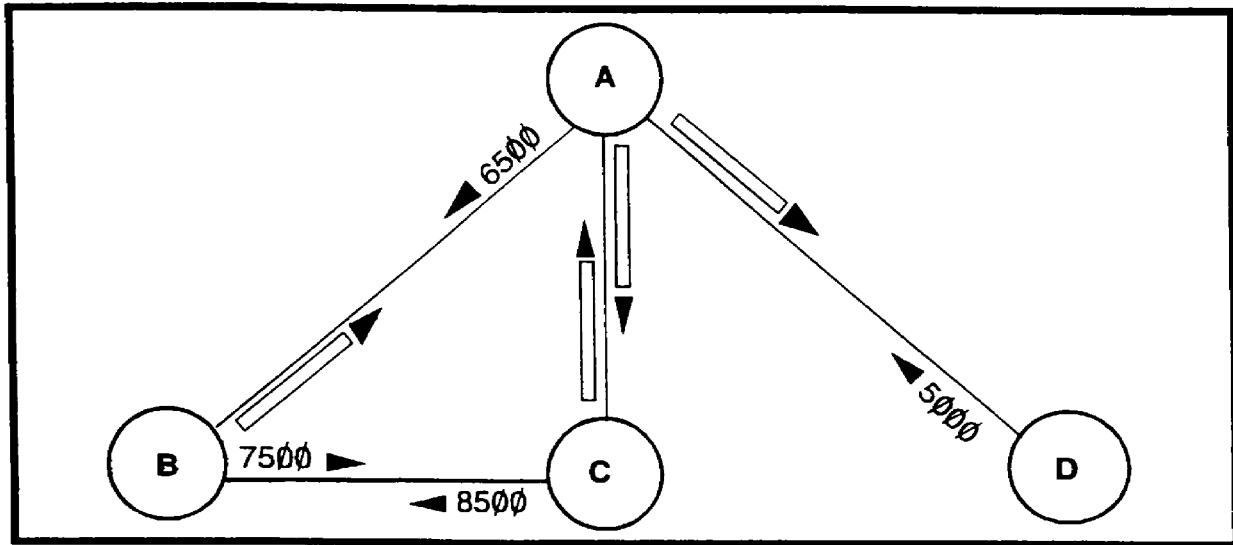


Figure 2-5. PE3 complex Sending.

(MAKE YOUR RESPONSE **BEFORE** CONTINUING)

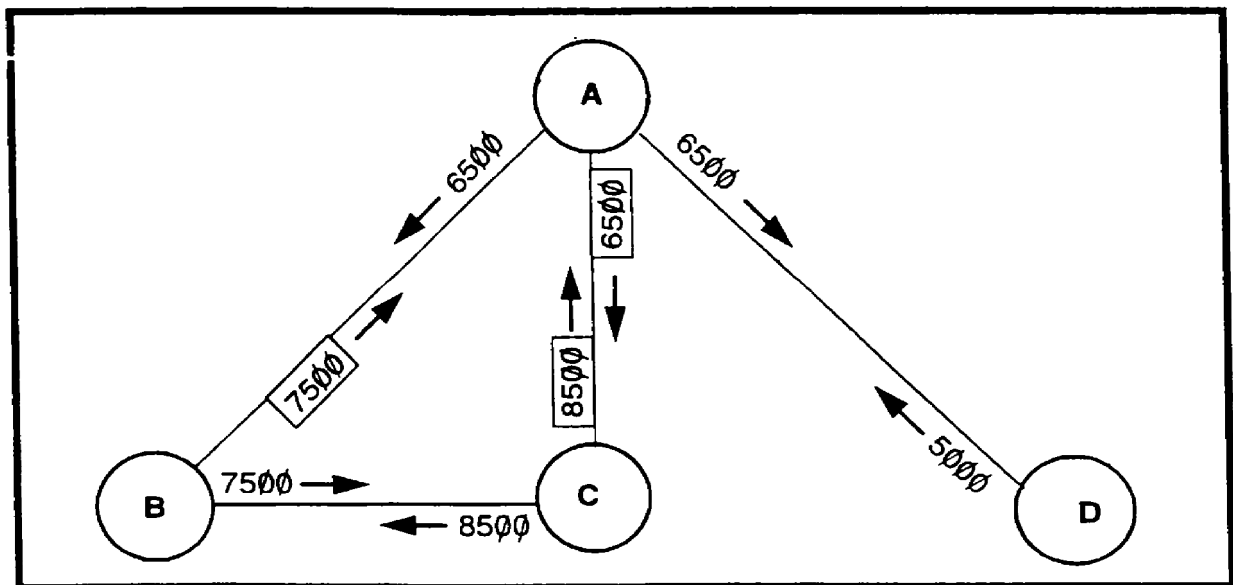


Figure 2-6. PE3 Complex Sending.

If each station of a net has its own transmitting frequency it is called complex sending.

What do you think we call the complex frequency usage when each station of a net has its own receiving frequency?

Your answer: COMPLEX RECEIVING

You are correct:

If each station of a net has its own receiving frequency, it is called **complex receiving**.

The following figure 2-7 uses complex receiving frequencies. Fill the missing frequency in the appropriate box.

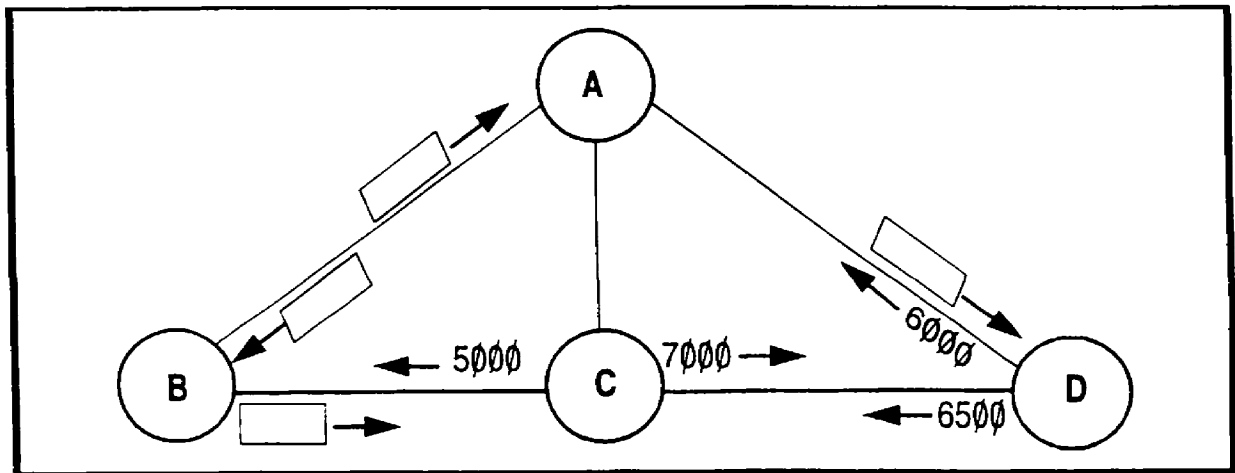


Figure 2-7. PE4 Complex Receiving.

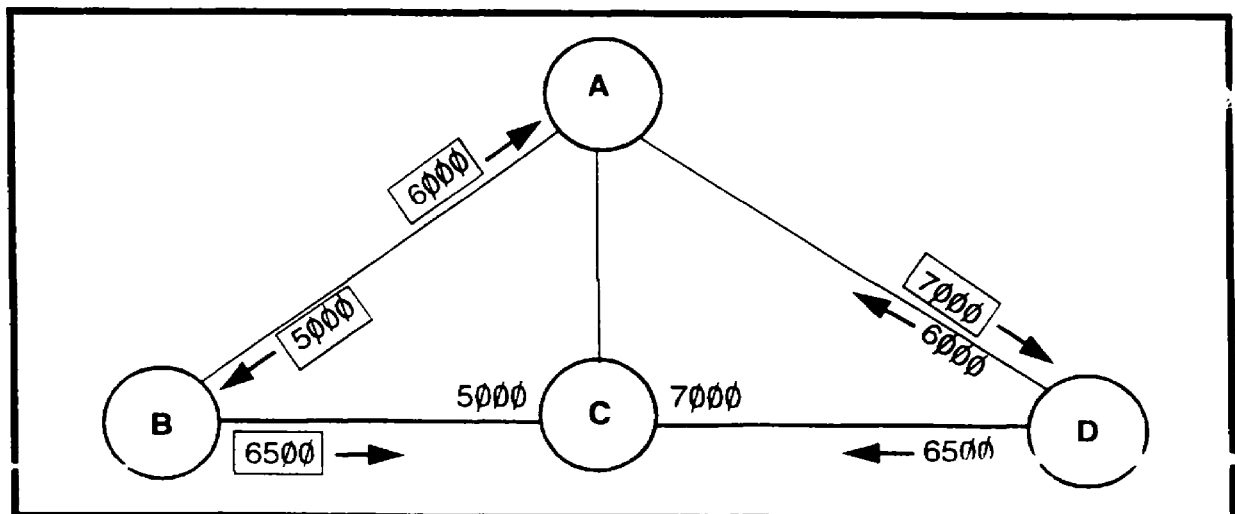


Figure 2-8. PE4 Complex Receiving.

Correct:

R E M E M B E R:

COMPLEX SENDING - Each station in a net has its own sending frequency.

COMPLEX RECEIVING - Each station in a net has its own receiving frequency.

If you had any difficulty understanding complex sending and complex receiving frequencies, review the material presented on pages 2-7 through 2-12.

On a separate sheet of paper, diagram the following:

Control	CT sends to A on 3250
	CT sends to B on 2700
	CT sends to C on 5355
	A sends to CT on 2525
	A sends to B on 3550
	B sends to CT on 6310
	B sends to A on 5175
	B sends to C on 2880
	C sends to CT on 3000
	C sends to B on 2760

The frequency usage of the preceding entity is

Answer (check one.)

complex sending
complex receiving
complex working

Your answer: complex working.

Correct.

The group is illustrated as follows:

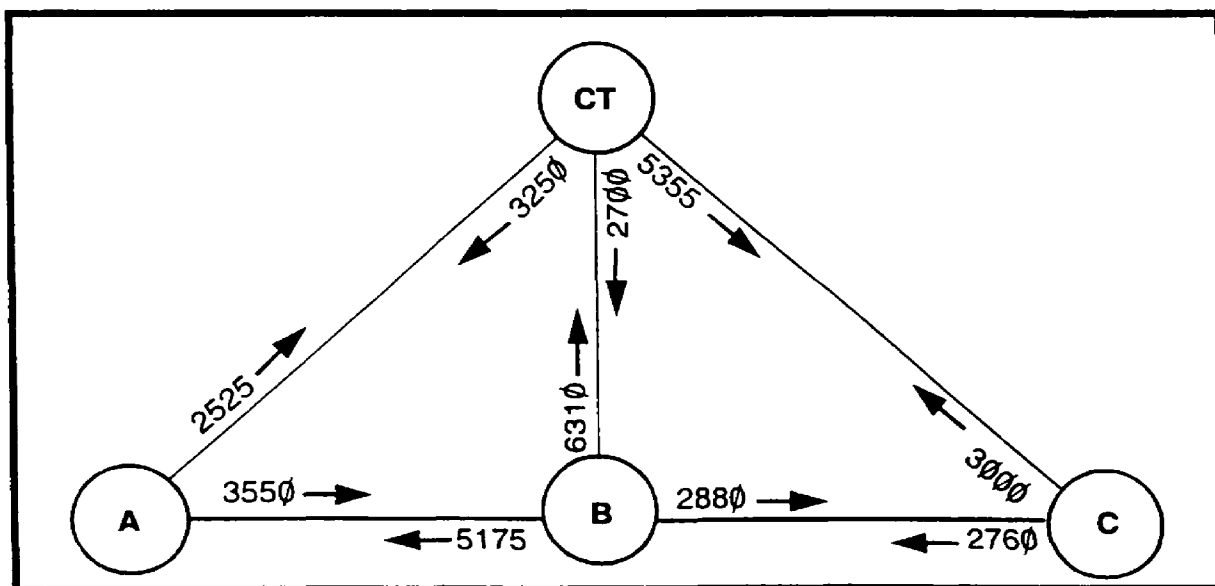


Figure 2-9. PE5 Complex Working.

8. This is neither complex sending nor complex receiving. With so many different frequencies used in no apparent system, it must be termed "complex working." If this is not clear, please return to page 2-4 and review. If you understand the difference between complex working and complex sending or complex receiving, continue with the instruction.

9. Although two stations on a link employing complex working would normally work in alteration, one active at a time, it is sometimes the practice when a large volume of traffic is to be passed to use DUPLEX OPERATION. In duplex operation, communication is carried on simultaneously in both directions (on two frequencies) with both sending and receiving operator at each station.

The figure 2-10 illustrates a link using duplex operation.

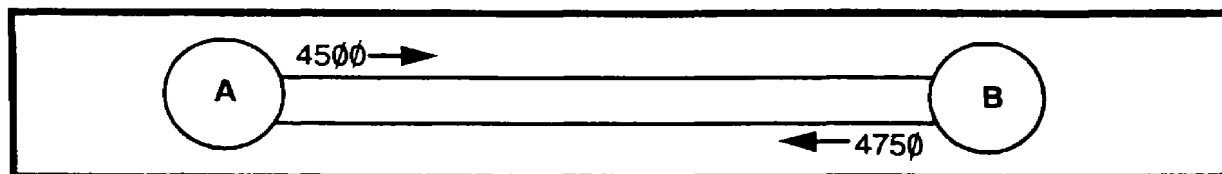


Figure 2-10. Duplex Operation.

Would you say that complex working is a requisite to duplex operation?

Answer (Check one.)

Yes

No

Your answer. YES.

You are correct.

10. **Complex working** is a **requisite** to duplex operation. If both operators send on the same frequency at the same time, they will interfere with each other.

11. When transmission and reception between two stations is simultaneous, complex frequencies are a must. This allows for a different frequency for each terminal to transmit on. We stress this important fact - transmission and reception must be **simultaneous** for the operation to be known as duplex. If it is **not** simultaneous, it is net duplex operation.

LESSON 2

PRACTICE EXERCISE

There is only one correct answer for each item. When you complete the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, study again that part of the lesson which contains the portion involved.

1. Duplex operation requires the use of what?
 - A. simplex frequencies.
 - B. complex working.
 - C. complex sending frequencies.
 - D. complex receiving frequencies.
2. What usage is probably employed if each station receives on one frequency and transmits (sends) on a number of different frequencies?
 - A. duplex.
 - B. complex sending.
 - C. complex working.
 - D. complex receiving.
3. Which terms below describes simultaneous transmitting and receiving between two stations?
 - A. simplex working.
 - B. duplex working.
 - C. complex working.
 - D. complex receiving.

4. If each station sends in one frequency and receives on a number of frequencies, the usage is probably what?
- A. duplex.
 - B. complex sending.
 - C. complex working.
 - D. complex receiving.
5. When each station in a group has its own individual receiving frequency, the usage is known as what?
- A. duplex.
 - B. complex sending.
 - C. complex working.
 - D. complex receiving.
6. What usage is employed if each station in a group has its own individual sending frequency?
- A. duplex.
 - B. complex working.
 - C. complex sending.
 - D. complex receiving.

QUESTIONS 7 through 10 REFER TO THE FOLLOWING FIGURE ON THE NEXT PAGE. MATCH THE ENTITY INDICATED IN COLUMN A WITH THE DESCRIPTION STATED IN COLUMN B.

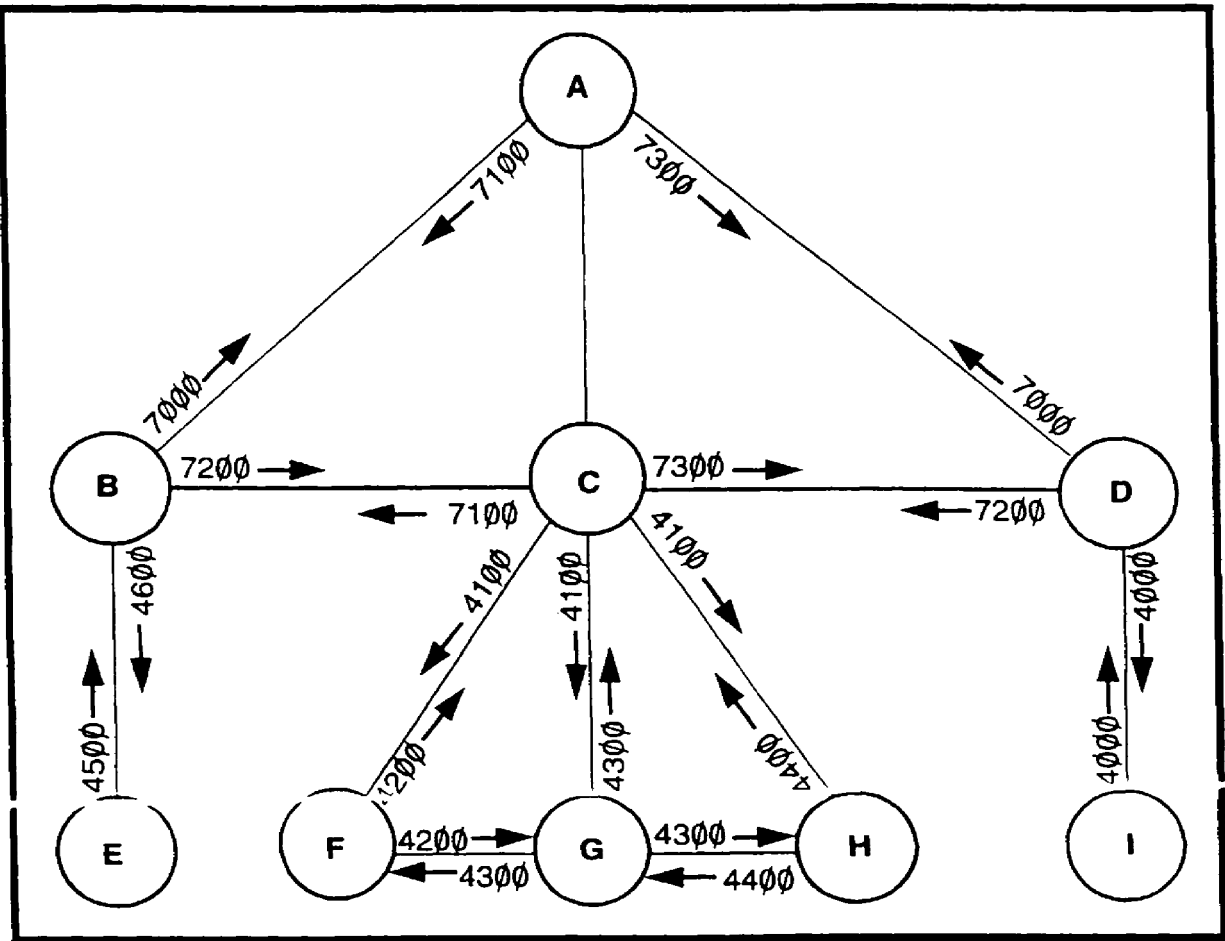


Figure 2-11. PE8 Network.

COLUMN A

- 7. BE
- 8. CFGH
- 9. DI
- 10. ABCD

COLUMN B

- A. Complex link
- B. Directed operation
- C. Complex group
- D. Complex sending group
- E. Simplex link
- F. Simplex group
- G. Complex receiving group
- H. Free operation

LESSON 2

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

<u>Item</u>	<u>Correct Answer and Feedback</u>
1.	B. Complex working (page 2-8)
2.	D. Complex receiving (page 2-8)
3.	B. Duplex working (page 2-10)
4.	B. Complex sending (page 2-6)
5.	D. Complex receiving (pages 2-5/2-6)
6.	C. Complex sending (pages 2-5/2-6)
7.	A. Complex link (page 2-3)
8.	D. Complex sending group (pages 2-5/2-6)
9.	E. Simplex link (page 2-2)
10.	G. Complex receiving group (page 2-8)

LESSON 3

CALL SIGNS AND CALL-UPS

Critical Task: None

OVERVIEW

LESSON DESCRIPTION:

In this lesson you will learn about call signs and how they are used to establish communications (call-ups).

TERMINAL LEARNING OBJECTIVE:

- TASKS:
1. Identify the two categories of call signs.
 2. Identify specific and general call-ups.
- CONDITION: You will use the information provided in this subcourse.
- STANDARD: To demonstrate competency in this task, you must achieve a minimum of 70 percent on the subcourse examination.
- REFERENCES: The material contained in this lesson was derived from the following publications:
- NSA Subcourse TA 103(U)
FM 34-88(U)
INTRODUCTION

Radio stations must have some means of identifying each other regardless of the net structure, operation, or type of frequency usage employed in the communication system. For this reason, call signs are used in the same manner that you would use your name in a telephone conversation. For example:

PARTY #1: Hello, is **John** there? This is Steve.

PARTY #2: Yes, **Steve**, this is **John**. What do you want?

Call signs are actually communications names for radio stations in a link, group, or net. Just as you identify yourself in a telephone conversation, radio stations identify themselves when conducting intercommunication. This is especially important in the analysis of radio communication, because it provides a basis for conducting studies on the routing of messages, and in the reconstructing of the radio network.

PART A. STRUCTURE AND PURPOSE OF CALL SIGNS

1. Call signs are used primarily for establishing and maintaining communications. They consist of any combination of characters or pronounceable words that identify a communication facility, a command, an authority, or a unit. Periodic changing of call signs provide communication security for a brief period, depending on the amount of use and the quality of traffic analysis. Call signs that consist of three-to-six characters, such as 6B69 or DN8Z, are used for radiotelegraph (9CW) and manual teletypewriter (including radio teletypewriter), and are used for voice operation on AM equipment. To avoid confusing call signs with certain procedural codes used by telegraph and teletype operators, three character call signs normally do not begin with the letters Q or Z. Voice call signs that consist of pronounceable words, such as BUTTER DIESEL, or ACHING BUNKER, are used for radiotelephone operation. Sometimes voice call signs are referred to as call words.
2. Call signs may consist of any combination of characters or pronounceable word, and **identify a communication facility**, a command, an authority, or a unit. Call signs are referred to as **OPEN** when their identity is a matter of public knowledge, and **SECRET** when their identity is withheld for reasons of security.
3. International call signs listed in the Beme Books are an example of open call signs. Call signs of this type are allocated to the using stations by the communication authority of a country in accordance with the policies established by the International Telecommunications Union (ITU).
4. SECRET call signs are used by military, paramilitary forces, and other organizations which have a reason for concealing their identity. Traffic analyst are primarily concerned with these call signs.

PART B: THE CALL-UP AND ABBREVIATED CALL

1. To let the receiving radio station know that a transmitting station is trying to contact it, and to ensure that the receiving operator is ready to receive a message, a call-up is made. This call-up serves to alert the receiving stations of a forthcoming message, and to identify the station sending the message. The following examples depict the call-up.

EXAMPLE #1: **ACDJ** DE **CEHN**

EXAMPLE #2: **YELLOWBIRD** THIS IS **GREENAPPLE**

Example #1 shows a call-up using telegraph or teletype callsigns. Note the separator "**DE**" between the call signs. This separator is a procedure signal which means "**FROM**" or "**THIS IS**." The call sign to the right of the procedure signal is always the transmitting call sign.

Example #2 shows a call-up using radiotelephone call signs or call words. The separator in this case is called a procedure word, and is written just as it is heard over a voice net. Again, the call word to the right of the separator is always the transmitting call word.

2. After communications have been established between two stations, an abbreviated call may be used to reduce transmission time. In an abbreviated call, the transmitting operator drops the

call sign of the station being called and begins the transmission with the procedure signal or procedure word meaning THIS IS, followed by the call sign of the transmitting station. The following are examples of the abbreviated call.

EXAMPLE #1: DE CEHN

EXAMPLE #2: THIS IS GREENAPPLE

Example #1 clearly shows that the receiving call sign has been dropped. The abbreviated call begins merely with the procedure signal, and the only call sign heard is that of the transmitting station.

Example #2 reveals the same procedure, but as it is observed on a voice net. The only difference is the use of the procedure word instead of the procedure signal.

(RESOLVE THE FOLLOWING SITUATIONS.)

1. Your call sign is REDFOX and you want to call GREYDOG on a voice net.

Write the call-up that you would use.

2. GREYDOG has replied to your call-up and communication has been established.

- a. Write the abbreviated call that you would use.

- b. Write the abbreviated all that GREYDOG would use.

- a. _____

- b. _____

3. Given the call-up "DTC De TYO," write the abbreviated call used if station DTC is the transmitting station.

(MAKE YOUR RESPONSE **BEFORE** TURNING THE PAGE.)

- Your answer
1. GREYDOG THIS IS REDFOX
 2. a. THIS IS REDFOX
b. THIS IS GREYDOG
 3. DE DTC

You are correct. If you answered incorrectly, or if you had difficulty resolving the above situations, you should review the material about call-ups and abbreviated calls on pages 3-2 and 3-4.

PART C: TYPES OF CALL-UPS

1. Security usually dictates the assignment of call signs, their number and type, whereas the need for operational efficiency determines the manner of their use in communicating. Some of the more complex types of using call signs provide a degree of security in themselves, but may tend to decrease the operational efficiency of the net. There are two types of call-ups: **specific** and **general**. A specific call-up is one in which each call sign identifies a particular station. A general call-up is one wherein one call sign identified to or more stations collectively.

Examine the call-ups presented in this lesson thus far. Would you say that they are examples of the specific call-up or the general call-up?

Answer (Check one)

specific

general

Your answer: SPECIFIC

You are correct. All of the call-ups presented in this lesson thus far are specific call-ups. REDFOX, GREYDOG, and DTC, TYO each identify one, and only one, particular radio station.

2. **Specific call-ups** can be further broken down into three types of calls. The first and most commonly observed method is the **DOUBLE STATION CALL**. In a double station call, the transmitting station uses both its own call sign and the call sign of the station it is calling. Figure 3-1 is an example of a double station call.

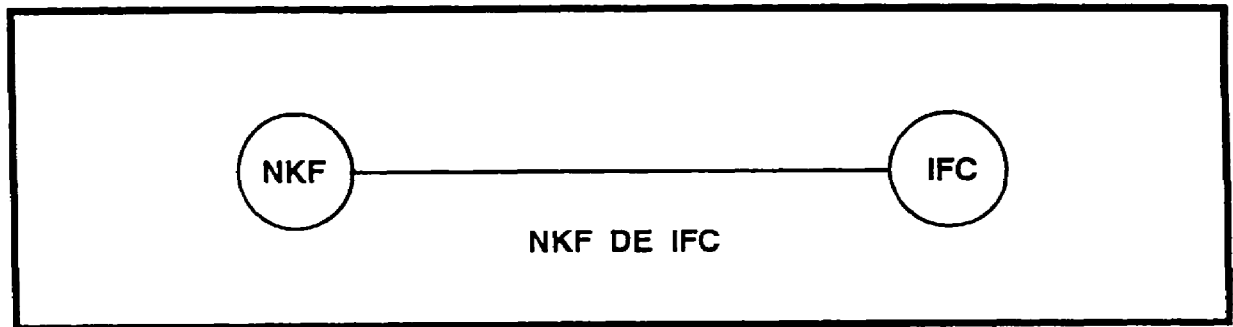


Figure 3-1. "Double Station Call".

1. Which station is transmitting the above call-up?

2. What double call would be the reply?

Your answers: 1. IFC
2. IFC DE NKF

You are correct. Station IFC calls station NKF. The procedure signal (prosign) "DE" means FROM or THIS IS, and is used by the transmitting station to separate the two call signs. When station NKF replies, he becomes the transmitting station, therefore, he replies IFC DE NKF.

Be sure you understand the DOUBLE STATION call before continuing with the instruction.

3. The second type of specific call-up is called the **SINGLE STATION CALL**. In a single station call, the transmitting station uses only one call sign. It may be the call sign of either the transmitting or the receiving station. Figure 3-2 is an example of a single station call.

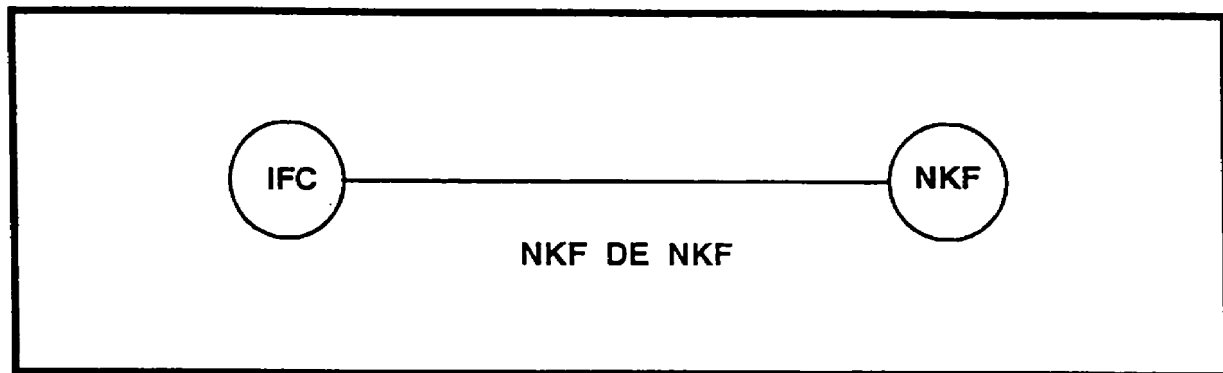


Figure 3-2. "Single Station Call".

What station in the above example is the calling station?

Answer (Check one.)

IFC
NKF
Can't tell

Your answer: CAN'T TELL

Either station could be calling, depending upon which station's call sign has been agreed upon for use. You can see that this type of call-up is inherently secure, for it is difficult for the analyst to determine which station is calling. However, its use is limited due to the confusion which results when inexperienced operators are in charge of net operation.

4. The third type of specific call-up is called the **MULTIPLE CALL**. A multiple call occurs when one station, usually the Net Control Station, calls all or some of the outstations in the net using the call signs of each station concerned. Figure 3-3 is an example of the multiple call-up.

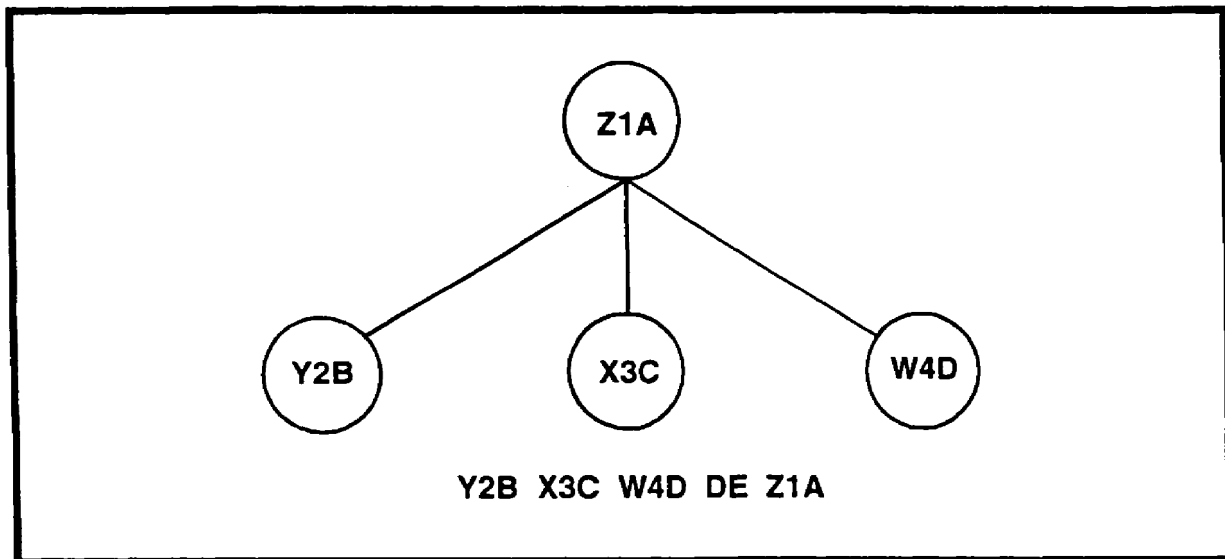


Figure 3-3. "Multiple Call".

5. Normally, when the outstations return the call, they will answer in the same order that they were called in the call-up.

Following normal sequence, which station would call Z1A from the above example after X3C?

Answer (Check one.)

Y2B

W4D

Your answer: W4D

You are correct. After the multiple call, Y2B X3C W4D DE Z1A, each station would normally answer in the order called. Therefore, W4D would answer after X3C.

The double station call, single station call, and the multiple call are all examples of a call-up type wherein the call signs identify one and only one particular station. These three types of calls can be grouped together under a broader type of call-up known as a

Your answer: SPECIFIC CALL-UP

You are correct.

If you had any difficulty understanding the three types of specific call-ups presented thus far, you should review the material of this lesson before continuing with the instruction. **THIS IS A GOOD POINT TO REVIEW. BE SURE THAT YOU UNDERSTAND THE SPECIFIC CALL-UP!**

6. The second type of call-up is referred to as the **GENERAL CALL**. A general call-up occurs when one call sign serves to alert more than one station for the transmission of traffic. A general call-up may be used to identify the stations during the transmission, or it may serve only as an alert signal prior to the transmission of traffic to the stations. In the latter case, the station revert to the use of their normal call signs during the transmission of traffic.

Examine the following call-ups. Would you say that they are examples of general call-ups?

J2K N4P A5T DE 13Y

13Y DE J2K

13Y DE N4P

13Y DE A5T

Answer (Check one.)

Yes

No

Your answer: NO

You are correct. If you answered "yes," you must have missed something. Call signs J2K, N4P, A5T, and 13Y all identify one particular station. Therefore, a specific call-up is being employed, and not a general call-up. As a matter of fact, closer observation shows that a multiple call-up was used and the outstations returned the call in the same order of the initial call-up. The outstations each used a double station call which is also a type of specific call-up.

REMEMBER: A general call-up is the use of one call sign which identifies two or more stations collectively.

7. One type of the general call-up is referred to as the **COLLECTIVE CALL**. A collective call is used when the NCS wishes to alert two or more, and in some cases all the outstations in the net. The collective call will also identify an aggregate of stations. Figure 3-4 is an example of a collective call.

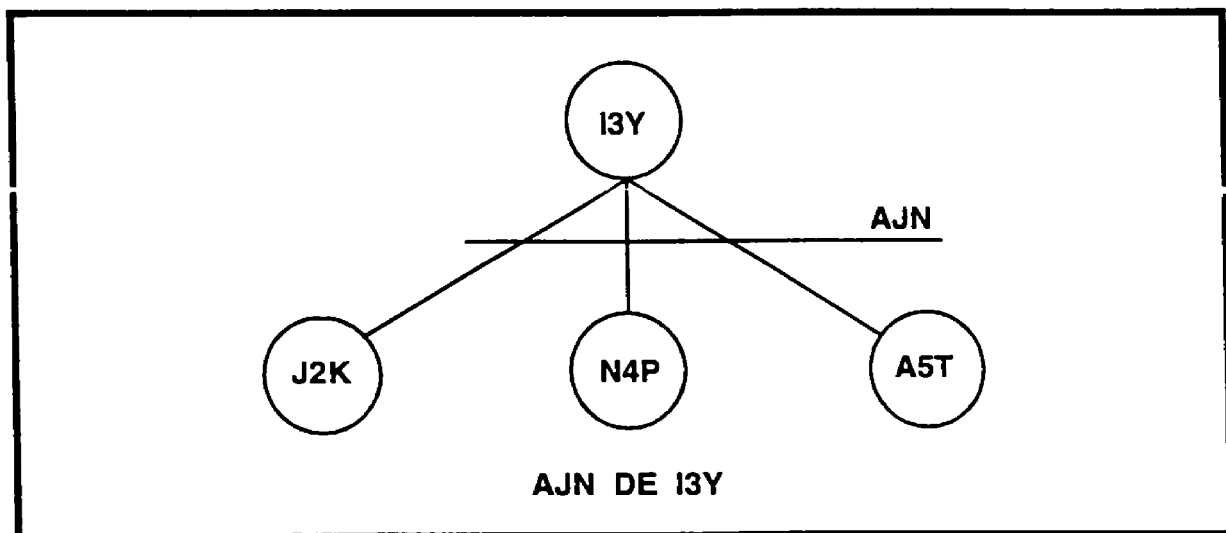


Figure 3-4. "Collective Call".

When the control station in the above example desires to call or pass traffic to its outstations, it would call: AJN DE 13Y. The call sign AJN alerts and identifies J2K, N4P, and A5T collectively. The **abbreviation for a collective call is "C/C."**

Study the following call-ups. Then in figure 3-5 write the call sign in the circle for each station that the call sign identifies, and label the collective call sign on the figure.

Y9BR DE ZOAT

ZOAT DE Y9BR

U5FC DE ZOAT

ZOAT DE X8CA

ZOAT DE W7DF

ZOAT DE V6EI

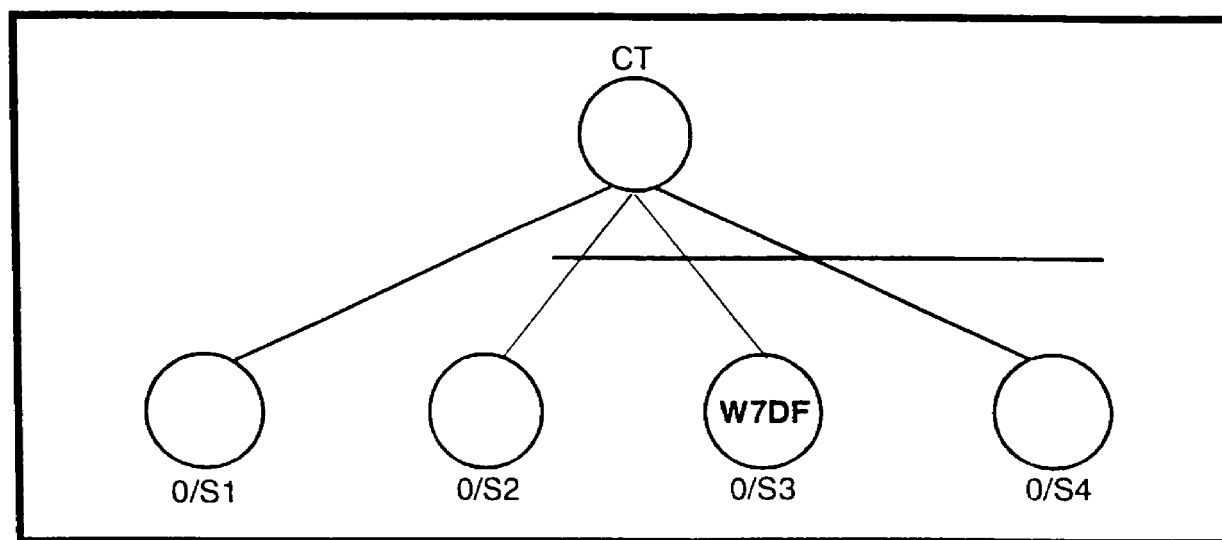


Figure 3-5. PE9 Net.

Compare your solution with Figure 3-6.

They should be identical.

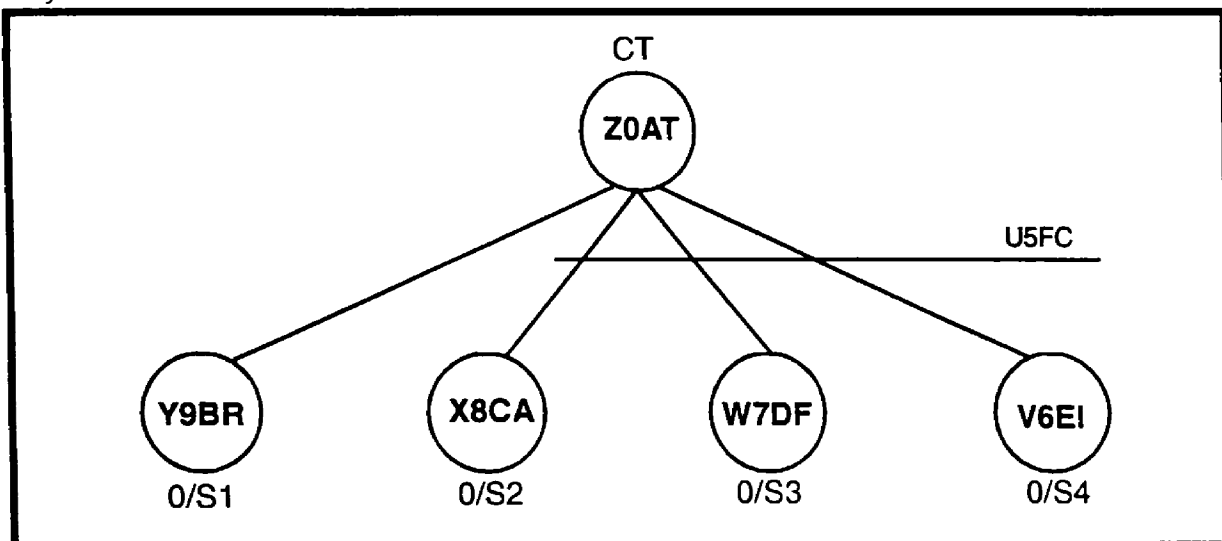


Figure 3-6. PE10 Net.

Station ZOAT appears to be calling two other stations, Y9BR and U5FC. Station Y9BR answers station ZOAT establishing a link, but the call sign U5FC never appears as a transmitting call sign. Instead, three other call signs contact station ZOAT. Since four different call signs are observed calling only one call sign (ZOAT), it may be assumed that station ZOAT is CT of the net, and that call sign U5FC identifies X8CA, W7DF, and V6EI collectively. The order of the return call-ups appear in response to the collective call indicates that X8CA is O/S2 and that V6EI is O/S4.

8. Another type of general call-up is referred to as the **LINK CALL**. A link call is a type of call-up in which a common call sign is used for intercommunication between two stations. Figure 3-7 is an example of a link call.

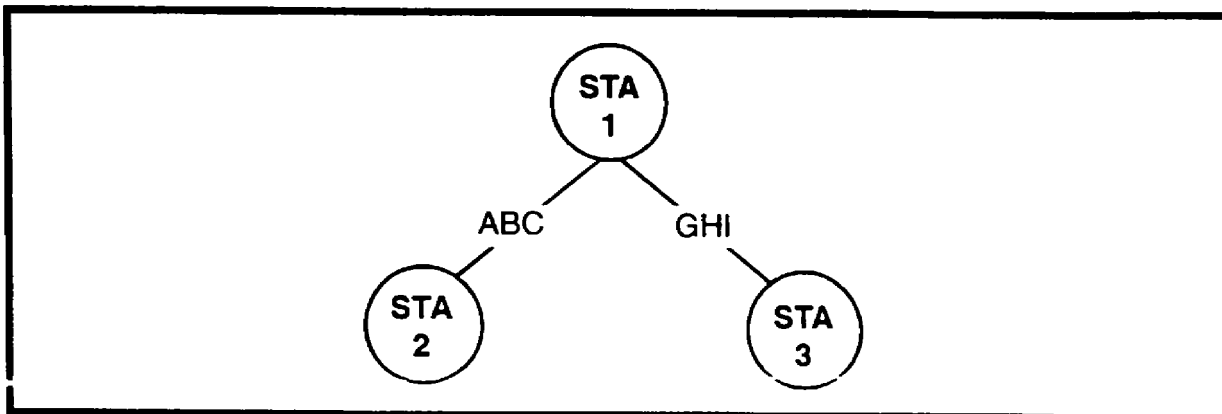


Figure 3-7. PE11 Net.

The call-ups would appear as follows:

STA 1 to STA 2: ABC ABC ABC
STA 2 to STA 1: ABC ABC ABC
STA 1 to STA 3: GHI GHI GHI
STA 3 to STA 1: GHI GHI GHI

The separator DE may appear with this type of call-up, but its use is not necessary since the same call sign would appear on both sides of the separator.

LESSON 3

PRACTICE EXERCISE

The following items will test your grasp of the material contained in this lesson. There is only one correct answer for each item. When you complete this exercise, check your answers with the answer key that follows. If you answer any item incorrectly, study again that part of the lesson which contains the portion involved.

1. What are call signs used to identify?
 - A. unit
 - B. command
 - C. communication facility
 - D. all the above

2. When information about the identify of call signs is a matter of public knowledge, they are called what?
 - A. open
 - B. SECRET
 - C. specific
 - D. general

3. What does a specific call identify?
 - A. open
 - B. SECRET
 - C. specific
 - D. general

4. What is the most common type of call-up?
- A. abbreviated call
 - B. collective call
 - C. double station call
 - D. single station call
5. What type of call is the multiple call?
- A. link
 - B. general
 - C. specific
 - D. collective

QUESTIONS 6 REFERS TOC Figure 3-8.

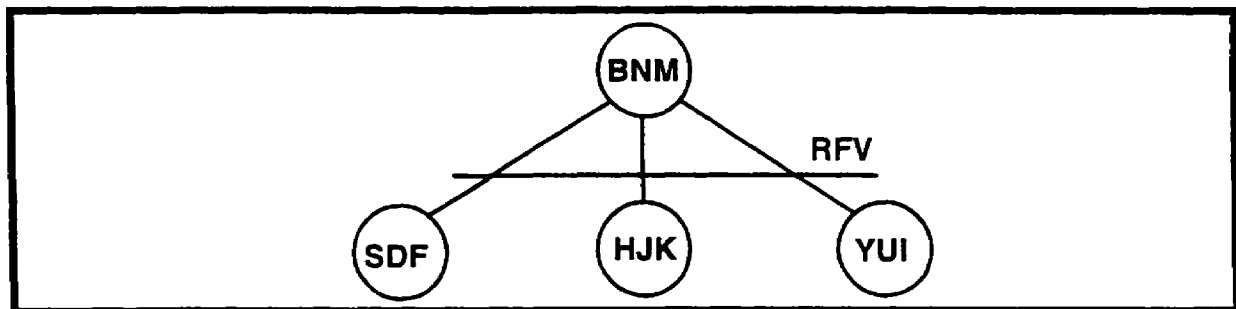


Figure 3-8. PE12 Net.

6. What type of call sign is RFV?
- A. link
 - B. double
 - C. multiple
 - D. collective

7. What type of call is the link?
- A. double
 - B. general
 - C. multiple
 - D. specific
8. What type of call sign is of interest in traffic analysis?
- A. open
 - B. closed
 - C. secret
 - D. commercial
9. When the NCS wishes to alert two or more stations, and in some cases, all the outstations, what type of call would he use?
- A. an alert call
 - B. a general call
 - C. a specific call
 - D. a collective call
10. How many call signs would be seen in traffic between two stations when a link call is used?
- A. 1
 - B. 2
 - C. 3
 - D. 4

LESSON 3

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

<u>Item</u>	<u>Correct Answer and Feedback</u>
1.	D. All the above (page 3-2)
2.	A. Open (page 3-2)
3.	C. One and only one particular station (page 3-5)
4.	C. Double station call (page 3-6)
5.	C. Specific (page 3-8)
6.	D. Collective (page 3-11)
7.	B. General (page 3-13)
8.	C. Secret (page 3-2)
9.	D. Collective call (page 3-11)
10.	A. One (page 3-13)