

HEADQUARTERS,
DEPARTMENT OF THE ARMY

Field Manual 11-50

COMBAT COMMUNICATIONS WITHIN THE DIVISION (HEAVY AND LIGHT)

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Unless otherwise stated, whenever the masculine gender is used, both men and women are included.

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PREFACE

Purpose and Scope

This publication describes combat signal support in the heavy and light divisions including the air assault and airborne divisions. It is designed for existing communications networks under the Improved Army Tactical Communications System (IATACS). The division communications environment is addressed in FM 24-1, which covers signal support in the AirLand Battle, and FM 24-33, which covers electronic warfare (EW) defense and Threat radio electronic combat. Other manuals that complement this publication are FM 71-1, FM 71-2, FM 71-100, and FM 100-5.

Planning, managing, and employing signal resources in maneuver units, support units, and headquarters are critical combat functions covered in this publication. It applies specific tactical communications to combat operations of the division. The appendices detail the organizations and functions of communications elements, nets, and systems in the division.

This manual addresses the communications spectrum--from the squad on the battlefield to the headquarters of the division controlling the battle. It presents signal support principles and signal unit/element integration.

Stated or implied quantities of available communications equipment in this manual do not reflect actual authorizations. Changing communications support requirements are reflected in authorization documents. Appendix F addresses Mobile Subscriber Equipment (MSE) as it interfaces with non-MSE equipped corps/divisions. Refer to FM 11-30, FM 11-37, and FM 11-38 for MSE doctrine.

User Information

The proponent of this publication is HQ TRADOC. Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, United States Army Signal Center and Fort Gordon, ATTN: ATZH-DTL, Fort Gordon, Georgia 30905-5075. Key comments and recommendations to pages and lines of text to which they apply. If DA Form 2028 is not available, a letter is acceptable. Provide reasons for your comments to ensure complete understanding and proper evaluation.

CHAPTER 1

Division Communications in the AirLand Battle

1-1. General

The ability of Army units to fight in low-, mid-, and high-intensity conflicts with other services and with allies is critical. All elements of combat power must be integrated to win the conflict. An integrated battlefield combines conventional, chemical, nuclear, and directed energy weapons and electronic jamming equipment. The commander must be able to see deep into Threat territory to delay, disrupt, and destroy Threat second echelon forces and create opportunities for decisive maneuver. This deep attack principle is the extended battlefield. Thus, the integrated and extended battlefields are the AirLand Battle concept and subsequently AirLand Battle doctrine.

1-2. AirLand Battle

a. For combat initiative, US forces must have enough command and control to integrate intelligence and to target the Threat with maneuver forces. This requires timely and responsive communications. There is an increased need to link air and land operations elements. The circuits over the division multichannel systems are critical in the AirLand Battle. Continuity of operations is vital. Tactical communicators must consider the total flow of information from source to consumer. This requires close coordination and cooperation between corps and division signal units. All signal personnel must understand the AirLand Battle concept to participate successfully in the AirLand Battle. It calls for aggressive action to maintain communications and to rapidly establish new communications links.

b. Elements of the division can be dispersed over areas extending 90 by 170 kilometers (55 by 105 miles). Figures 1-1 and 1-2 show the typical organization of the heavy and light divisions. Figure 1-3 shows the air assault division; Figure 1-4 shows the airborne division. This dispersion of division units requires a flexible communications system. The division signal battalion meets this requirement.

1-3. The Division's Role

a. Because AirLand Battle demands effective command and control, it requires changes and enhancements in signal doctrine. The communications structure must be area based and for common use (dial-up rather than dedicated or "hotline" circuits between users) to maintain maximum flexibility for operations. This Area Common-User System (ACUS) will have one to three nodes. Users accept more responsibilities to own, operate, and install phones, communications terminals, facsimile devices, or workstations. Record traffic is limited to two entry ports (or gateways to corps) in a division. Within the division, informal record traffic using common-user facsimile is recommended. The role of the user is clarified in FM 24-1.

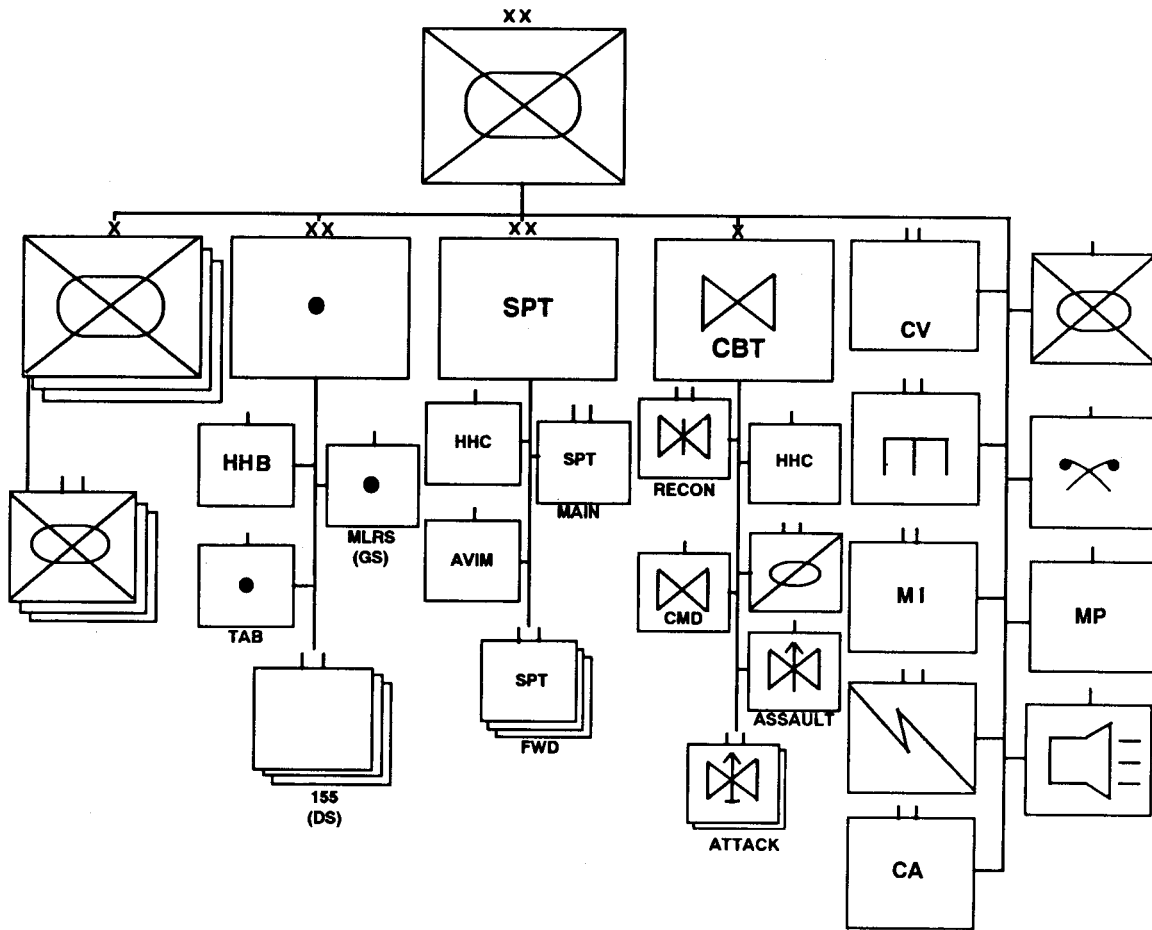


Figure 1-1. Typical organization of the heavy division.

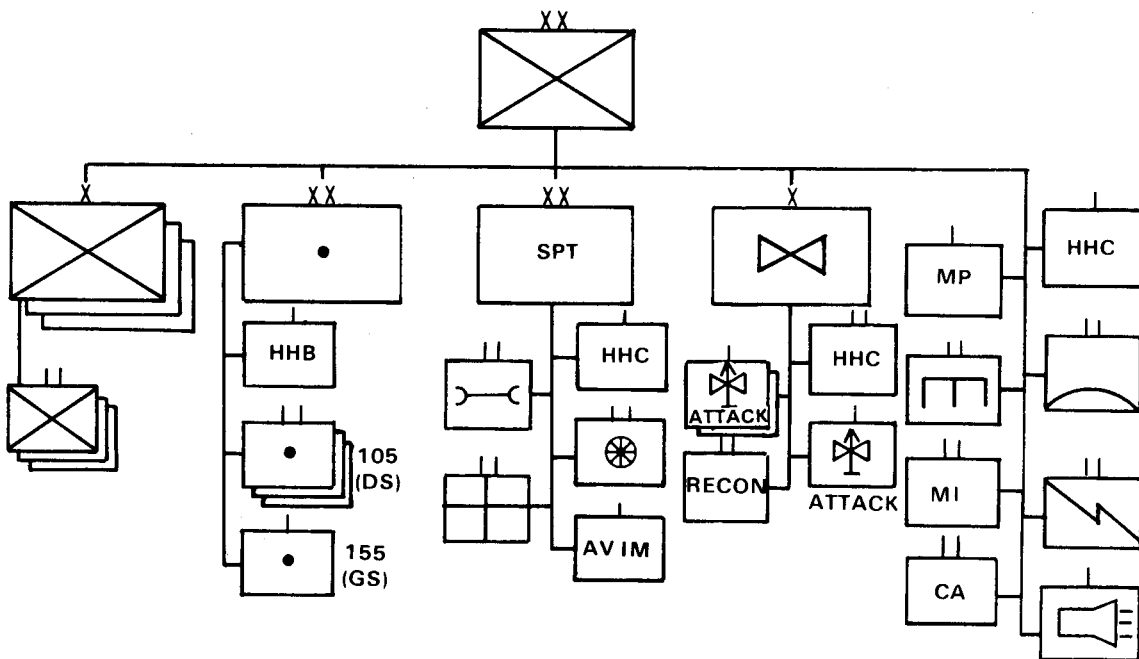


Figure 1-2. Typical organization of the light division.

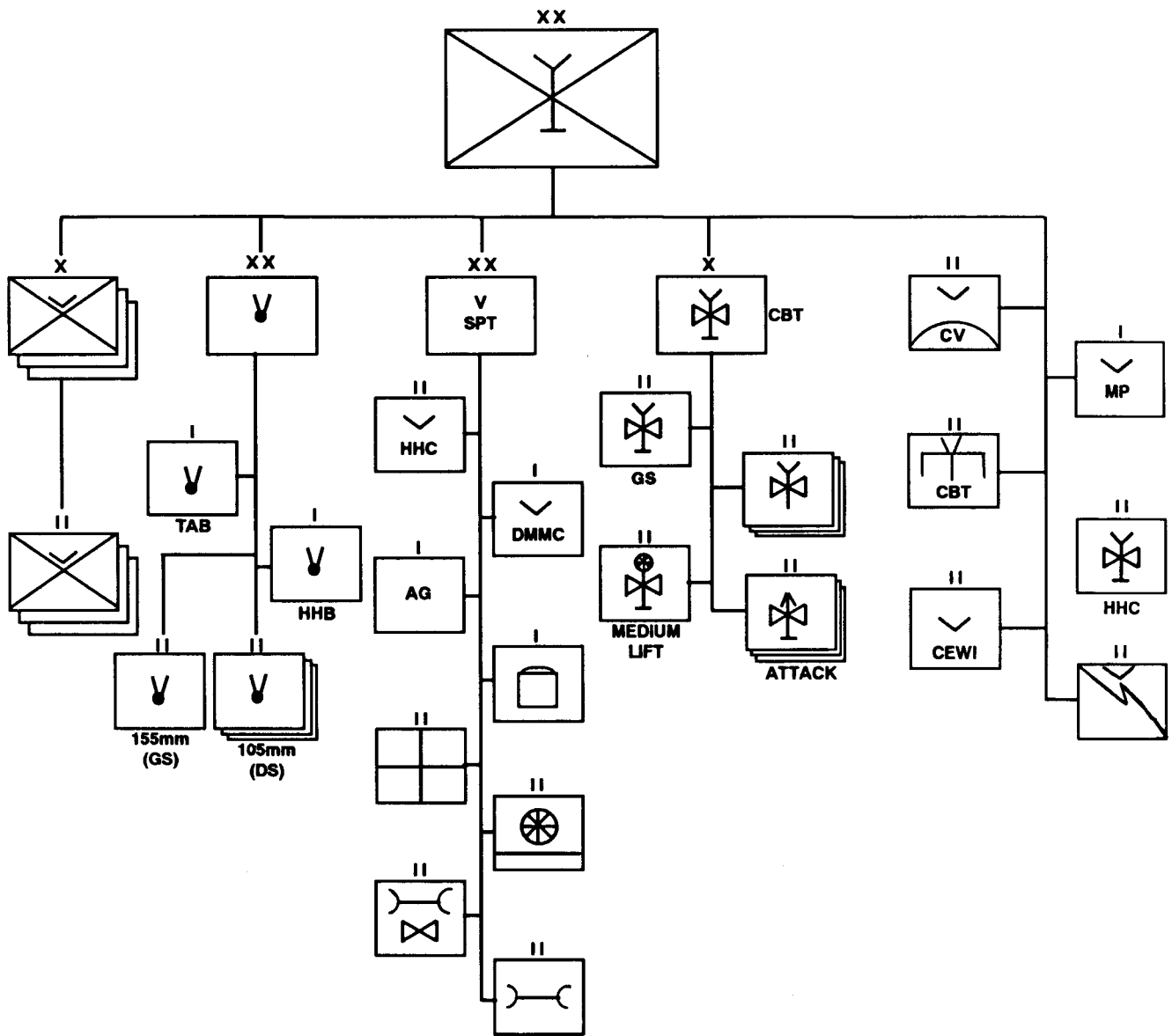


Figure 1-3. Air assault division.

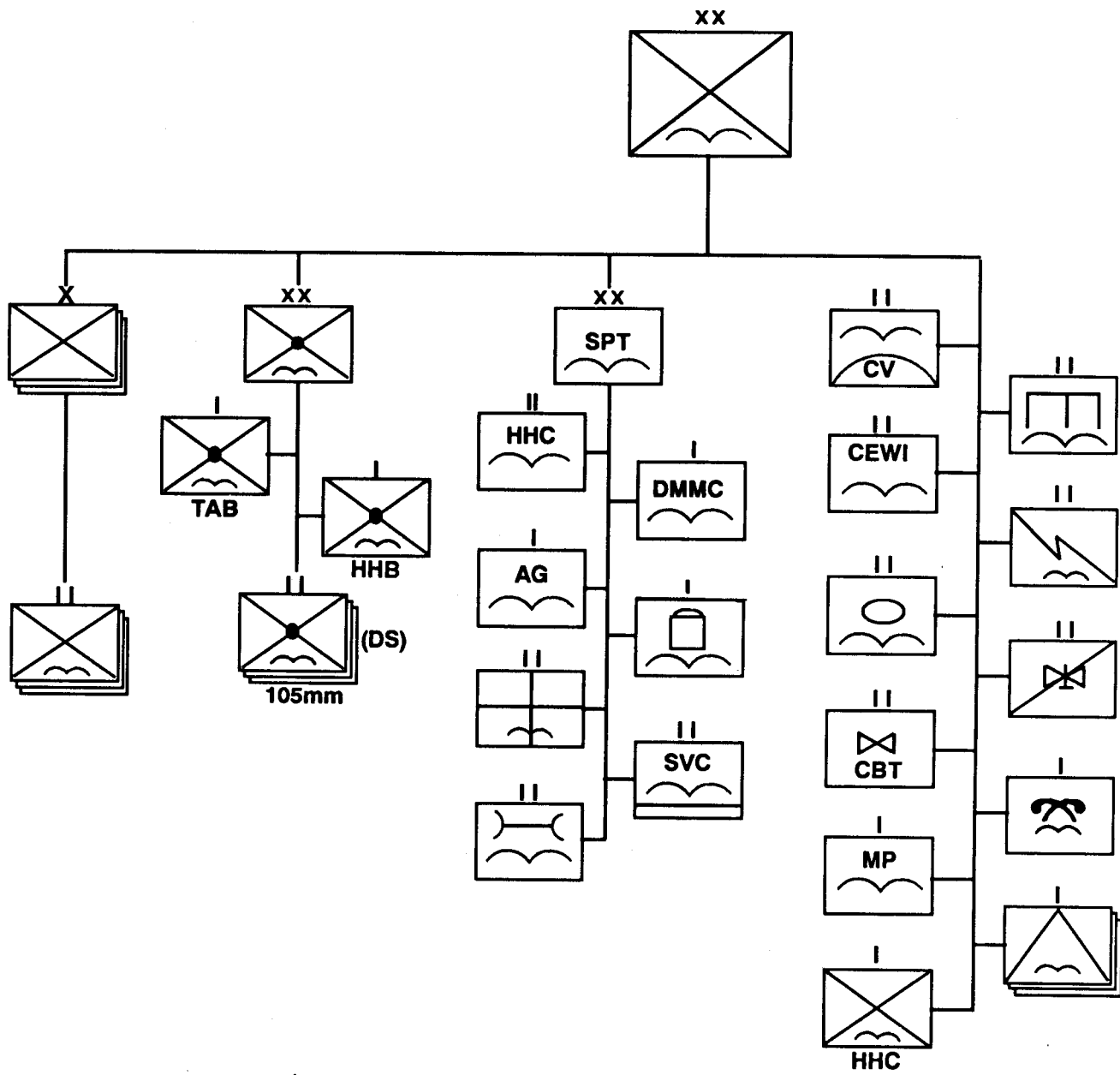


Figure 1-4. Airborne division.

b. The communications network must be flexible and able to support deep, close, and rear operations. At the same time, it must be resilient and mobile to survive on the AirLand Battlefield. Timely relocation of signal nodes and command posts (CPs) ensures survivability. In a dispersed CP, communications assets are distributed to each operational cell. This requires signal soldiers and signal systems to be as dispersed as the units they support.

c. The signal battalion commander and staff must understand the division commander's concept of operation and intent to plan signal support operations.

1-4. Deep, Close, and Rear Operations

a. AirLand Battle consists of deep, close, and rear operations synchronized at all echelons. The deep operation is combat power projected into the Threat rear to delay, destroy, or cause early deployment of the Threat's second echelon's forces. The close operation is the battle fought on the forward line of own troops (FLOT). Rear battle operation is action taken to defeat the Threat deep attack forces and to ensure continuity of our lines. Attacking deep is a decision based on more than fire power and command wisdom. The decision to attack deep or create an operational maneuver is based on intelligence. Beyond the FLOT direct fire ranges, intelligence systems gather information. Strategic and tactical reconnaissance operatives assess Threat intent and capability. Unmanned sensors monitor movements in the Threat area. This information is passed through communications links provided by the user and signal community. Once the input is provided, the commander determines whether a deep maneuver may involve undue risk.

b. While fighting close operations, the division relies heavily on combat net radio (CNR). Multichannel service is provided among the division headquarters, major subordinate commands, separate battalion headquarters, and brigade support areas (BSAs). Thus, communications is provided for the close and rear battles. Host nation enhancement of division communications is encouraged to eliminate unclassified traffic on tactical circuits.

(1) Mobility of a division is restricted on the ground. Close operations or any engagement demands a communications system that provides redundancy in alternate signal paths. An example of this is a simple wiring system. Since World War I, foxhole wire communications have been installed along two paths. They are buried to protect against indirect fire outage.

(2) For security measures, messengers should use different routes to the same CP. Otherwise, the enemy may predict the time and location the messenger uses.

(3) Security of communications assets can be enhanced by--

- Arranging shelters so that signal entry panels face inward, thereby protecting cables from frontal or lengthwise firing.
- Backing vehicles into position to allow for rapid displacement.

- "Sandbagging" generators to muffle their noise.
- Camouflaging.
- Providing good site security.

c. The division rear is vulnerable in either low-, mid-, or high-intensity conflict. Threat operations are continual in the division rear. The spectrum of hostility ranges from planned riots to regular Threat forces. These Threat combinations require special signal support consideration. Rear operations are planned, coordinated, and controlled by the rear command post (Div Rear CP) through the rear operations FM net and by other available rear operations communications systems. Rear operations planners use existing net structure at brigade and below. Rear operations command and control begin on the ground in site defense, in colocated unit control, and in rear base clusters.

1-5. Command and Control Support

a. To successfully execute the AirLand Battle, the command and control system must allow the commander to control and synchronize deep, close, and rear operations. The commander must be able to receive, process, and transmit information in a timely manner and his decisions require rapid distribution. If the commander sees the same battle as his subordinates, he can provide faster and more effective orders and support. The commander cannot be tied to one location if he is to influence these three areas. Superior communications facilitate the commander's mobility.

b. AirLand Battle command and control generates many concerns on information flow--generation, transmission, fusion, resolution, and interoperability. AirLand Battle envisions information as a force multiplier giving the commander an advantage. Corps, division, or task force commanders often look to national resources for intelligence information. They must be able to receive and disseminate this information through a data distribution system. The rapid dissemination of information is a key to success on the battlefield. Many communications systems can pass data. Those used are largely a matter of SOP and criticality.

c. The division must be able to plan and conduct operations with the Navy, the Air Force, and the Marines. Interfacing must be done at the appropriate level and automated when required. Operating in the joint arena is imperative.

d. The Army Tactical Command and Control System (ATCCS), a subset of the Army Command and Control System (ACCS), is the objective command and control architecture. ATCCS includes automated information systems for maneuver control, air defense, fire support, intelligence and electronic warfare (IEW), and combat service support (CSS). All echelons from brigade to corps are linked by data distribution, CNR, and/or area common-user system. The information systems must be integrated vertically within systems and horizontally within echelons for effective command and control.

1-6. Automation Management

a. The division signal office manages the division automation. The trend of automation in the Army is toward decentralization and user-owned and -operated equipment. The decentralization of CSS Standard Army Management Information System (STAMIS), the increase of embedded computers in communications equipment, and the proliferation of Battlefield Automated Systems (BASs) by the five major functional areas of ATCCS impact on the Army's communications networks. Multiple types of BASs will coexist in many CPs. They will have similar requirements for software support and maintenance and they must be integrated with the supporting distribution networks. Automation personnel assigned to the division signal office are responsible for centralized staff level planning and force integration of the division's tactical information management resources. In this capacity, the division signal officer (DSO) will serve as the integrator of the ATCCS within the division.

b. ATCCS is an integrated system of equipment, software, information, and staff. This system allows tactical commanders and staff at each of the five battlefield functional areas to plan and control their operations and to coordinate these with other functional commanders. Therefore, ATCCS consists of the automated command and control systems for the battlefield functional areas and the communications links between and among the control systems.

c. Information management is the policy, process, and procedures used to manage information systems and services. It includes, but is not limited to, resources and activities that create, gather, manipulate, classify, store, display, retrieve, secure, transmit, disseminate, or access elements of information. Elements of information may be visual, aural, or electrical. Information management occurs at strategic, theater/tactical, and sustaining base levels.

(1) Strategic information is required by theater Army, joint or combined commands, defense, and other federal agencies to execute national policies and theater goals.

(2) Theater/tactical information is used in the theater of operations, normally at corps level and below, and is required to conduct maneuver warfare. Tactical information includes unit status, unit employability, fire support capabilities, supply routes, key terrain, avenues of approach, and Threat disposition, capabilities, and intentions. It includes information systems needed to direct, coordinate, and support combat power during peace, transition to war, and conflict. This information is processed from the foxhole to the successive command headquarters of the joint, unified, specified, or combined commands.

(3) Sustaining base information is primarily concerned with base operations and training. Sustaining base information systems function during peace, mobilization, deployment, employment, and sustainment of the fighting force.

d. Personnel responsible for information management coordinate, process, and manage information vertically between the strategic, theater/tactical, and sustaining base; and horizontally and vertically between the five major functional areas. The effectiveness of this force level information exchange network is the key to the Army's success to fight IAW the four basic tenets of AirLand Battle. The tenets are initiative, agility, depth, and synchronization. The AirLand Battle command and control system must facilitate the commander's ability to operate, delegate authority, and exert leadership from any critical point on the battlefield.

e. The Information Mission Area (IMA) has five disciplines: automation, communications, visual information, records management, and printing and publications. As defined below, the five disciplines encompass strategic, theater/tactical, and sustaining base information. The IMA responsibilities of the ADSO address only those aspects of the tactical environment, systems, and services.

(1) Automation is implementing processes or procedures using automated electronic equipment in tactical and nontactical environments. The technologies include, but are not limited to micrographics, word processing, copiers, printing, communications, decision aids, and general-purpose (GP) data processing.

(2) Communications is disseminating information through transmission, emission, or reception of signs, signals, writing, images, sounds or data of any nature using audio, visual, electro-optical, or electromagnetic systems.

(3) Visual information is using sound and visual material or processes to communicate information. Visual information includes, but is not limited to, motion pictures, still and motion photography (combat camera), television, audio, graphic art, and audiovisual libraries.

(4) Records management is managing and maintaining documentation. It includes distribution, use and disposition, storage, declassification, and the implementation of responsibilities under the freedom of information and privacy acts. Media includes correspondence, reports, forms, directives, publications, electronic mail/messages, mail, magnetic tape/disk, and electro-optical storage/retrieval. The Information Services Support Office (ISSO), formerly the ASD, is responsible for the "Battlefield Information Services (BIS)."

(5) Printing and publications is the process for producing documents on media such as micropublishing, plate making, press work, photocomposition, and binding for issue and distribution. For the most part, this is accomplished through Signal Corps channels to the garrison/wartime DOIM.

1-7. Radio Electronic Combat

a. Sound ECCM techniques require a thorough understanding of the threat to the electromagnetic spectrum. Radio electronic combat (REC) is one such threat. REC is the total integration of electronic and physical destruction resources to deny the use of electronic systems. It also protects friendly electronic control systems from disruption by the enemy. The Threat considers

REC integral to all combat actions. Therefore, the Threat has made investments in developing techniques and equipment to deny enemies the effective use of the electromagnetic spectrum for communications.

b. The purpose of REC is to disrupt or destroy command and control systems at the most advantageous time. A goal of REC is to disrupt or destroy at least 60 percent of command, control, intelligence, and weapons system communications: 30 percent by jamming and 30 percent by destructive fires. To accomplish this goal, enemy forces expend considerable effort and resources to gather combat information about their enemies. As locations are determined and units are identified, enemy forces establish priorities as follows:

- To fire suppressive fires.
- To jam communications assets.
- To deceptively enter radio nets.
- To interfere with the normal flow of the enemy's communications.

1-8. Battlefield Spectrum Management

a. Managing the use of the electromagnetic spectrum is crucial in the AirLand Battle. Battlefield spectrum management (BSM) is systematic planning, managing, coordinating, and using tactical electromagnetic spectrum-dependent material in tactical units. Spectrum management or frequency management involves US forces and international governing bodies. Each military branch and the Department of Defense (DOD) maintains its own spectrum management agencies and staff elements. For national as well as international harmony's sake, therefore, it must be clear to all that BSM is critical on the ALB, and is further described below.

b. The US Military Communications-Electronics Board (MCEB) is the primary agency for coordinating military signal matters among DOD components, departments, and agencies. The MCEB provides guidance and direction for preparing and coordinating joint and combined signal directives and agreements. The MCEB allocates spectrum from allotments received from the National Telecommunications and Information Administration (NTIA). The Army member of the MCEB is the Army Spectrum Manager. The Army Spectrum Manager is under the direction of the Director for Information Systems for Command, Control, Communications, and Computers (DISC). The MCEB includes the--

- Joint Staff (JS).
- Defense Communications Agency (DCA).
- National Security Agency (NSA).
- Army.
- Navy.
- Air Force.
- Marines.

c. Unified and specified Commanders in Chief (CINCs) are responsible for US military spectrum use within their commands. The theater commander exercises control over spectrum use through the joint staff. The Director of Communications-Electronics in the theater, called the J6, has primary responsibility for spectrum management. The Allied Communication Publications (ACPs) provide guidance to unified and specified commands for spectrum use.

d. Frequency support for US forces in a foreign host nation is guided by International Telecommunications Union (ITU) regulations. The host nation, also guided by ITU regulations, allocates and controls frequencies.

(1) US forces have no rights to any portion of the frequency spectrum other than those authorized by host nation allotments. Frequency allotments contain authorizations as well as limitations. Misuse of such allotments or use of non-allotted frequencies can cause serious interference to authorized users, danger to life and property, and unnecessary embarrassment to the US government and the respective host nation.

(2) The senior US military signal officer in a foreign country obtains frequency support from the host nation. The host nation usually provides a frequency allotment list. Requests for frequencies are submitted through the appropriate signal channels.

(3) A contingency operation involving US forces in a hostile country is governed by some logical considerations as well as existing international policy.

(a) Existing telecommunications in the invaded country could be useful to our purposes, particularly in the police/peacekeeping phase. We may want to protect certain portions of the already used spectrum for our own eventual use.

(b) International law as governed by the International Telecommunications Union directs the spectrum in use by neighboring and allied nations to be protected during a contingency operation.

1-9. Mission Spectrum Planning Considerations

a. Signal support must exist across the full operational continuum: peacetime competition, conflict, and war. Operations within this continuum, focused on the Threat and constrained to well-defined objectives, can take place in an environment that is--

- Allied to US interests/policy--peacetime competition.
- Hostile and in a state of unsettled control--conflict.
- Totally hostile--limited or general war.

b. Elements of the division may be committed across the entire operational continuum. They must be prepared to cover the entire spectrum from terrorist operations to sustained combat against a modern air defense and armor-heavy foe, with possible chemical and nuclear attacks. Overall mission requirements dictate the combat task force size and the command relationships

with other US and allied commands. These factors influence the information systems tasked to support and sustain operations. As with other elements of the force, information planners must determine the appropriate personnel and equipment for the mission. The stated and implied tasks must be identified and prioritized. Any constraints, such as lift capability or range limitations, must be applied. Risks must be identified and stated clearly to the commander. The commander must know the signal support limitations that may restrict his plans.

(1) In a low-intensity conflict, the Army opposes irregular or unconventional forces, Threat special operations forces, and terrorists. Low-intensity conflict threatens US interests at all times, not just during periods of active hostilities. In the most benign environment no overt hostile opposition is expected, although the continuous threat of terrorist activity must be considered. Hostile intercept and position locating activities are continuously conducted in peacetime by overt and covert means, from ships to embassy listening posts. During contingency operations, jamming and using intercept information for weapons targeting should be expected. Some Third World countries have sophisticated EW that can be used against US forces.

(2) In mid- or high-intensity conflicts, the Army must prepare to fight campaigns of considerable movement across a wider space of air, land, or sea. Hostile opposition is expected after deployment. In the most difficult environment, an opposed deployment is expected, requiring a combat assault to secure entry. Associated with the armed threat is the anticipated EW threat.

c. Depending on the environment and mission, some level of augmentation to the light division signal battalion will be required. Task organization of organic division signal battalion assets may provide communications for independent brigade operations. This negates the need for outside augmentation. Augmentation scenarios are being developed by the Combined Arms Center and will provide guidance for staff planning.

d. Communications planning for each operation should consider the following phases:

- Predeployment.
- Strategic deployment.
- Tactical deployment.
- Tactical employment.
- Sustainment operations.

e. The division or deployed element must be prepared to operate as an independent task force or as a part of a larger deployed force.

(1) Each tactical unit is provided minimal organic communications systems to support internal operations. The division signal battalion provides access to the ACUS by deploying communication terminals at the division main CP, division tactical CP, and division rear CP. It also provides the

communications systems that link the division CP and major subordinate units. The division communications systems are prioritized to link the major tactical headquarters. These systems also provide communications to the brigade and divisional support areas for sustained operations.

(2) When the division is deployed, division signal battalion elements are under the command of the signal battalion commander. They are always under the operational control of the signal battalion systems control (SYSCON). The division signal battalion provides direct support (DS) maintenance for organic communications equipment, cryptographic equipment, plus control and distribution of all communications security (COMSEC) materiel to include two-man materiel, operations codes, and signal operation instructions (SOI). The division support command (DISCOM) maintenance battalion provides DS maintenance for declassified cryptographic equipment.

(3) When elements from the signal battalion are attached to a brigade or battalion task force, they come under the control of the unit signal officer for full integration into the unit's tactical communications system during deployment.

(4) The positioning of the terminals at each major unit headquarters dictates that the signal battalion element maintain close and continual coordination with the supported unit. This ensures that communications operations, technical planning, and execution remain current with tactical operations. It also assists in logistical support, primarily Class I and Class III.

(5) In a task force situation, the ADSO primarily provides general communications planning for the division staff. The ADSO also provides SOI, COMSEC, frequency management, and telephone system planning support for the entire division. While still under the purview of the DSO, automation, visual information, and the BIS play a less critical role. This will not be true for the integration of automation in the very near future.

1-10. Information Requirements

a. Tactical information can be divided into four categories.

(1) Intelligence: Exchange of information on Threat forces, terrain, and weather between levels and elements of command.

(2) Command: Issuance of execution orders or guidance to subordinate commanders.

(3) Control: Exchange of information on subordinate forces between levels and elements of command to provide dynamic command of fires and maneuver forces.

(4) Sustainment: Exchange of logistical information between levels and elements of command.

b. Since communications are usually limited, failure to prioritize information may critically impede the tactical mission. The force commander sets the priority for his command.

1-11. Operations Security

a. All operational communications means, including commercial telephones and radios, should be securable. In particular, the administrative and logistical planning, routinely discussed as unclassified information, should be secured to avoid disclosing sensitive plans. During the planning phase couriers should be used when possible, and selected local telephones should be secured with Parkhill or VINSON (KY-57 used in conjunction with the HYX-57 wire line adapter). This should include the secure telephone unit (STU) II or III when available.

b. Multichannel system radios are secure. Total system security, allowing user-to-user security, is assured only if every wire line and terminal instrument using the multichannel system is physically safeguarded with controlled access. Each commander must ensure the security of his area of responsibility, otherwise the entire system is nonsecure. A nonsecure system, such as a local telephone network or AUTOVON circuit, should not be allowed to interface with the secure system.

c. All CNRs must be secure and associated classified documents (for example, SOI, key lists, hopsets) must be protected against compromise.

1-12. Communications Means

a. Reliable communications is critical; therefore, plans must include multiple communications systems in unit movement plans. Table 1-1 shows communications means and characteristics.

(1) Secure single-channel radio provides the most responsive means of communications on the battlefield. It allows direct voice communications between individuals using highly mobile communications terminals. Each system provides unique characteristics that complement each other by covering the various combinations of range, Threat electronic countermeasures (ECM) vulnerability, and inherent reliability. The types include ultra high frequency/tactical satellite (UHF/TACSAT), very high frequency/frequency modulation (VHF/FM), and high frequency/single side band (HF/SSB). These radios also support data system operations such as the Tactical Fire Direction System (TACFIRE). The radio teletypewriter (RATT) systems support transmission of hard copy messages. Careful use of nonsecured radios minimizes the intelligence value of transmitted information. Commercial radios are especially vulnerable to interception and exploitation. They must be secured if used to support an operation.

(2) Secure multichannel radio provides the high capacity systems required to support the simultaneous use by many users. The multichannel radio systems provide trunks to interconnect the automatic telephone network, allowing the use of direct-dial telephones for voice and facsimile. The multichannel system also supports other special purpose telephone and data terminals. The available systems are restricted to line of sight (LOS) operations with a limited number of relays to overcome terrain obstacles or to extend system range.

(3) Wire lines 5 to 8 kilometers (3 to 5 miles) long are not practical for quick, frequent CP moves. However, local wire networks are needed to support telephones, communications terminals, and facsimiles in local CP areas.

(4) The courier is a reliable means of communications. This is especially true in a high threat EW environment. For messenger service over extended distances or for critical messages, an aircraft may be required. Procedures to request air support are normally SOP. See paragraph 3-3b(1) for further explanation of the messenger service mission in the division.

b. The choice of communications means depends on the availability of systems that interconnect the desired locations, the urgency of the message, and the risk involved by using a particular means. One of the facets of the division is its capability to operate over vast distances and rugged terrain. In many cases, this requires the use of extended range communications. The appropriate systems are single-channel TACSAT terminals, multichannel TACSAT terminals, and HF/SSB radios. These systems are vulnerable to Threat ECM activity. HF/SSB radio also depends on favorable atmospheric propagation conditions and sunspot activity level combined with intensive frequency management techniques. TACSAT systems are currently limited in both terminal and space segment availability.

c. The most commonly used tactical communications system is the VHF/FM radio. While it is constrained by distance, larger units have at least one retransmission system. A strategically located retransmission capability can overcome terrain obstacles and extend the radio net operating range.

Table 1-1. Communications means and characteristics.

SYSTEM	SECURE	ECCM	PLANNING RANGE	MOBILE
UHF TACSAT	YES	NO	16,200 km (10,000 mi)	MANPACK AND VEHICULAR
VHF/FM	YES	YES	30 to 50 km (20 to 30 mi)	MANPACK AND VEHICULAR
HF/SSB/AM	SOME	NO	2,430 km (1,500 mi)	MANPACK AND VEHICULAR
RATT	YES	NO	3,890 km (2,400 mi)	VEHICULAR
MCHAN TACSAT	YES	YES	1,300 km (800 mi)	VEHICULAR
MCHAN LOS	YES	NO	50 km (30 mi)	VEHICULAR
WIRE	SOME	YES	N/A	NO
COURIER	YES	N/A	N/A	AIR OR GROUND

CHAPTER 2

The Division Signal Battalion

2-1. General

A division has only one signal battalion to provide the ACUS for the division. The division commander and staff rely heavily on the division signal battalion communications network. Since sophisticated weapon systems are becoming more dependent on communications means, the integration of these information systems on the battlefield places more responsibility on signal units. Effective signal support is a combat multiplier; it makes possible coordinated engagements against larger Threat forces. Control of the division and success on the battlefield depend heavily on the effectiveness of the signal battalion.

2-2. Mission

The division signal battalion--

- Installs, operates, and maintains the division ACUS.
- Provides the division commander and his staff with signal support (that is, IMA) and staff assistance to plan and control division automation, visual information, and the BIS.
- Provides internal CP communications at all echelons of the division headquarters including the division main command post (Div Main CP), division tactical command post (Div TAC), and division rear CP (Div Rear CP).
- Provides DS COMSEC repair and logistics for the division to include the administration of the division COMSEC material account.

2-3. Design Concept

The division signal battalion installs the division headquarters command and control system. The system is designed based on the following:

- Common-user trunking. This eliminates point-to-point; however, long local circuits on an area signal node switchboard may be used during jumps until local switching is reinstalled at the extension node.
- Automatic or semiautomatic switchboards. This allows the subscriber to dial the number; however, some units will still have manual switchboards that must be considered during planning.
- LOS multichannel systems. These are the standard division signal battalion multichannel terminals.

- Messenger responsibility. There is no messenger service on a division scale and no internal record traffic system. When division messenger service is required, the division signal office is responsible for determining routes and schedules. The division G3 is responsible for tasking division units for vehicles and personnel. To compensate for the lack of a record traffic system, user-owned and -operated terminals are relied on to transfer messages through the ACUS. Subscribers dial the intended recipient and send the message. Key unit personnel with appropriate security clearance who travel between CPs could also carry the bulk traffic (for example, overlays).

- Facsimile and communications terminals available for record traffic service in the division through the secure multichannel network. The common-user dial-and-send capability eliminates brigade and separate battalion communications centers.

- Shared CP wire installation responsibilities. Staff personnel and headquarters soldiers will connect their own phones to the provided distribution box (J-1077).

- Pulse code modulation (PCM) cable installation based on time available, tactical situation, and the commitment of multichannel terminal equipment. The cable installation sections of the signal battalion will provide limited cable installation.

- Contingency and liaison support through RATT terminals. One general-purpose division RATT net can be split into two nets: operations/intelligence (O/I) and administrative/logistics (A/L). This will be phased out when Mobile Subscriber Equipment (MSE) is fielded to each major division/corps.

2-4. Host Nation Communications

Local host nation telephone networks reduce traffic on tactical systems. They also increase the planning and operational ability. These operational advantages outweigh the costs of paying for host nation facilities.

- a. Host nation telephone networks usually connect--
 - Command group to local authorities.
 - Public affairs office to local nationals.
 - Theater logistics centers to corps logistics centers.
 - Transportation, to include rail, water, air, and movement control offices, to local counterparts.
- b. Host nation telephone networks are also used for--
 - Battle planning, integrating, backup, leased circuits.
 - Deployment control.

- Signal battalion use of host nation telecommunications systems.
- Div Rear CP.

c. Using local wire communications reduces the electronic signature. This also reduces traffic on and enhances the division system. Host nation facilities are not the only solution, but an alternate one. Secure modification to host nation circuits provides planning and operational flexibility both tactically and in garrison. The KL-43D off-line encryption device is currently in the Army's inventory and has proven effective in sending classified information over military nonsecure and host nation nonsecure communications lines.

2-5. Corps Signal Interface

The corps signal brigade provides assets to integrate the corps area system with the division by installing a multichannel link between two division area nodes and two corps area signal nodes. These interfaces are now automated because the SB-3614A (product improved) works with the AN/TTC-39A by providing automatic dialing throughout the corps areas.

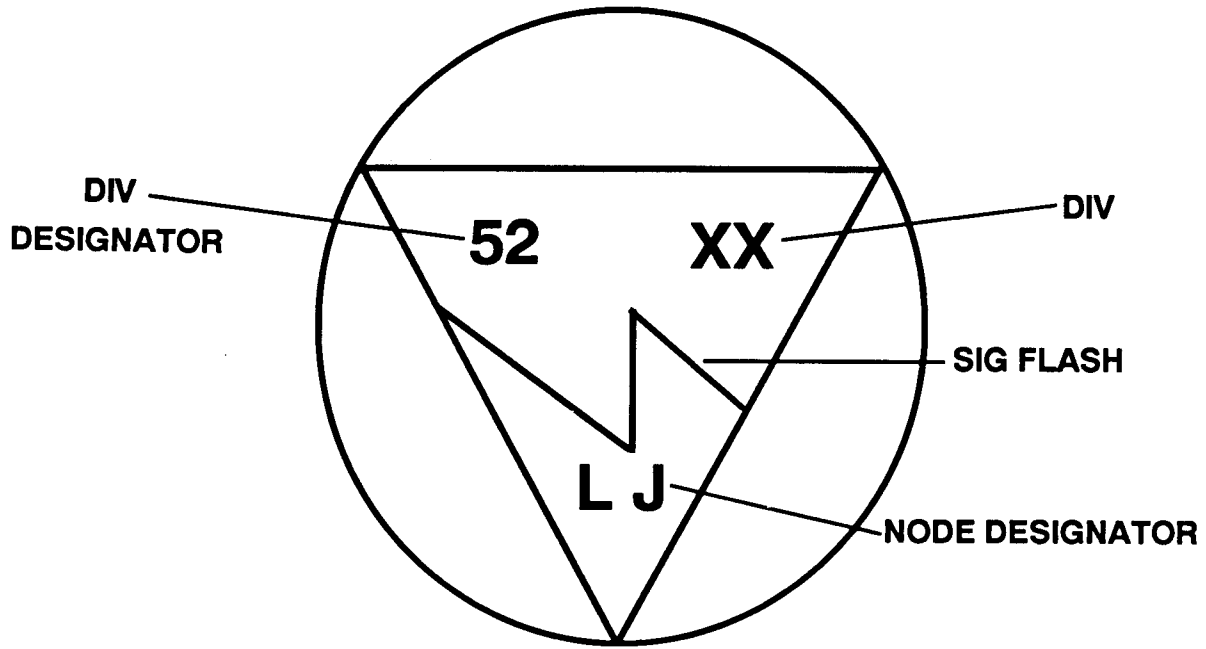
2-6. Net Radio Interface

The division signal battalion establishes net radio interface (NRI) stations at various signal extensions nodes. NRI permits radio calls to be integrated with the ACUS and vice versa. NRI also provides subscribers a means to overcome the distances between units on the battlefield. The coordinating instructions of the division SOI tell how to place NRI calls.

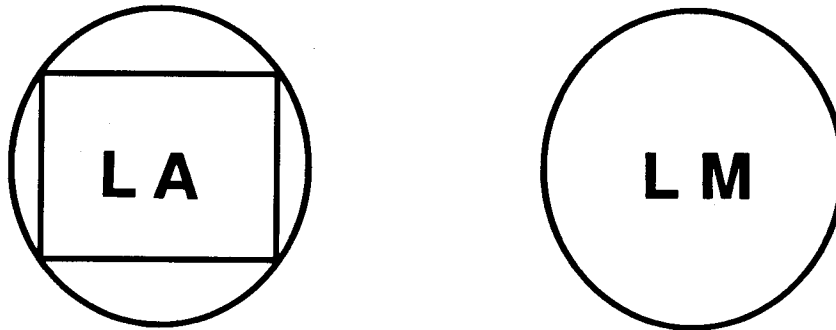
2-7. Signal Node Network

The division signal battalion installs, operates, and maintains the division's multichannel communications network. A signal node is a group of signal facilities at a junction point of a communications system where the flow of communications is managed, controlled, and directed. A signal node may contain switching (automatic, semiautomatic, or manual), a communications nodal control element, relay, and multiplexing equipment for external communications. The multichannel network is built around area signal nodes and extension nodes. Area signal nodes serve a geographic area. Extension nodes are signal assets from the signal battalion that supports unit headquarters or CPs. Teams of signal personnel who control these nodes form a habitual relationship with the users, but receive all technical control from the area signal nodes. The extension nodes interconnect with one or two area signal nodes while all area signal nodes are interconnected. Figure 2-1 shows the nodal symbols.

AREA SIGNAL NODE



EXTENSION NODES



**SWITCHING PROVIDED BY
SIGNAL BATTALION**

ORGANIC SWITCHING

NOTE: In this example, LA is the node designator and the rectangle inside the circle designates switching provided by the battalion.

Figure 2-1. The nodal symbols.

a. The division signal battalion installs, operates, and maintains the division multichannel communications system. The division signal battalion provides multichannel terminals at the following locations:

- The division main command post (Div Main CP).
- The division tactical CP (Div TAC).
- The division rear command post (Div Rear CP).
- Division artillery (DIVARTY).
- Each of the three maneuver brigade headquarters.
- Each of the three brigade support areas (BSAs).
- The air defense artillery (ADA) battalion.
- The military intelligence (MI) battalion.
- The aviation brigade (AB).
- The engineer battalion (only in the heavy division).
- Area signal nodes.
- An adjacent division on the right facing the forward line of troops (FLOT).

Currently, in the division signal battalion, the predominant LOS multichannel equipment is the AN/TRC-145. The AN/TRC-145 processes analog signals and provides secure voice and teletypewriter or facsimile circuits for divisional elements. The AN/TRC-113 multichannel radio repeater provides extended range through relay capability. Multichannel assets allow the signal battalion highly flexible communications on an integrated battlefield with numerous CP displacements. It must be emphasized that the area signal nodes are division signal battalion assets and serve no local CP. The siting and displacement of any area signal node is not constrained and is at the discretion of the signal battalion commander through coordination with the division G3.

b. The area signal node concept gives priority to supporting the AirLand Battlefield. It enhances signal battalion flexibility, increases network efficiency, and provides dual homing of major divisional elements. Dual homing provides reliable connectivity throughout the division even during CP and area node displacement or destruction.

c. The area signal nodes of the heavy division signal battalion terminate the following systems:

(1) Area signal node 1 terminates LOS multichannel systems from each maneuver brigade headquarters, Div TAC, Div Main CP, Div Rear CP, MI battalion, an adjacent division system, and nodes 2 and 3.

(2) Area signal node 2 terminates LOS multichannel systems from each maneuver brigade headquarters, Div TAC, Div Main CP, DIVARTY, engineer battalion, an adjacent division system, and nodes 1 and 3.

(3) Area signal node 3 terminates LOS multichannel systems from each BSA extension node, DISCOM, DIVARTY, ADA battalion, aviation brigade (AB), and nodes 1 and 2. The interconnection of the area nodes increases the alternate routing capability and creates the ACUS.

d. The area signal nodes of the light division and the air assault division signal battalions terminate the following systems:

(1) Area signal node 1 terminates LOS multichannel systems from each BSA extension node, Div TAC, Div Main CP, Div Rear CP, AB, ADA battalion, an adjacent division, and node 2.

(2) Area signal node 2 terminates LOS multichannel systems from each maneuver brigade headquarters, Div TAC, Div Main CP, Div Rear CP, DIVARTY, MI battalion, an adjacent division, and node 1.

e. The airborne division deploys only one area node. Each extension node will establish a multichannel system with that area node. The assault tactical CP initially deploys using CNR as the primary source of communications with other elements of the division.

f. The area signal nodes provide reliable alternate routing, systems control, and continuity during displacements. Using more than one node ensures multichannel continuity between the maneuver brigade headquarters and the tactical CPs during division movement by routing circuits through the other area signal nodes. Division headquarters staff elements collocate needed assets with another extension during the Div Main CP movement. When the Div Main CP completes its move and regains control, the Div TAC and the other area signal nodes alternate movement with no break in communications support. Using more than one node adds to battlefield flexibility, mobility, and survivability of the division communications system.

2-8. System Management

Managing the division communications system involves planning, analyzing requirements, designing and modifying systems, keeping records, and controlling quality. The division signal office, SYSCON, signal site operations, and chain of command perform these tasks.

a. The division signal battalion commander, who is also the division signal officer (DSO), manages the division communications system. The DSO issues guidance and instructions on signal activities and missions. These missions are developed into detailed plans and orders by the division signal office and SYSCON based on the communications priorities determined by the division commander and division G3.

b. The ADSO and staff, in coordination with the battalion S3, perform battlefield analysis and initial tactical planning. The ADSO also coordinates the communications support requirements of all units in the division area and

prepares the signal annex to the division operations order. The ADSO controls the issue of SOL and manages automation. Communications requirements are the basis for the ADSO's directives and orders.

c. The battalion S3 and operations staff function as the SYSCON and as part of the division signal office. They design, modify, and manage the division communications system based on the current situation and/or priorities of communications. The SYSCON functions include designing systems and circuits, engineering, keeping records, reporting, managing frequencies, and supervising. The SYSCON also allocates and controls signal battalion communications resources and monitors the status of systems and circuits.

d. The signal site operations are the implementing arms of the SYSCON; they maintain and control systems and circuits. The signal site operations are subordinate to the division SYSCON. They manage the communications node locally and technically control the circuits and systems that terminate at or pass through the node. Signal site operations personnel monitor, test, report, maintain, patch (route and reroute), and supervise local circuits. Systems management functions are done in the operations facility by the platoon leader and assistants. The technical control functions are done in the patch facility by tactical circuit control personnel. The signal site operations personnel follow standing operating procedures (SOPs) and other directives from the SYSCON.

2-9. Allied Signal Interface

Standardized allied interface requires strict adherence to established procedures. The various national mixtures are endless. The problems in the radio voice spectrum have been solved by frequency alignment and liaison teams.

a. The problems of switching, terminals, and trunking are not so easily solved. STANAG 5040 describes trunking and physical limits of switching. However, the specific system designs are usually left to the mutual agreement of signal officers or unit SOP.

b. The responsibility to terminate communications service to the subscriber goes from higher to lower, left to right, and supporting to supported when equipment is not interoperable. For example, the German AutoKo-Netz system cannot interface with current US division equipment. When the Germans are on the left, they must terminate and extend their system into the nearest area node. This involves a German signal extension in addition to the US Army signal extension.

2-10. Division Signal Officer

a. The division signal officer is responsible to the division commander for the tactical application of the IMA. This is referred to as signal support at the theater/tactical level. Refer to Appendix G for signal support doctrine and the implementation plan. The DSO is a member of the division staff and is commander of the division signal battalion. The DSO's duties involve general and special staffs. He works through the division chief of staff on overall automation and communications issues that affect the command.

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The DSO coordinates all communications and automation with the general staff. The functions of the DSO are advisory, coordination, plans and orders, staff supervision, liaison, and training.

b. The DSO advises the division commander, staff, and all division units on tactical information management. This includes employment of signal troops, availability of communications facilities and their required augmentation, COMSEC, and how location of division CPs affects communications. This information may first pass through the chief of staff or general staff officers according to division SOP.

c. The DSO coordinates with the division staff. The DSO is included in all staff planning to present the communications aspects for tactical operations and automation resources.

(1) The DSO coordinates with the G1 on the following:

- Assignment of signal personnel throughout the division.
- Personnel matters involving strength, replacement, and morale.
- Movement, organization, operation, internal arrangements, and space allocation for the headquarters or CPs.
- Internal operation and other administrative functioning of the headquarters.
- Administrative support requirements of division communications activities.

(2) The DSO coordinates with the G2 on the following:

- COMSEC and counterintelligence in communications.
- Interpretation of Threat signal documents.
- Evaluation of Threat signal equipment.
- Other special signal support for intelligence operations.
- Divisionwide training and knowledge of EW defense procedures.
- Evaluation of meaconing, intrusion, jamming, and interference (MIJI) reports.

(3) The DSO coordinates with the G3 on the following:

- Overall tactical information activities.
- Manipulative communications deception and tactical electronic counter-countermeasures (ECCM).
- Organization and signal equipment of division units.

- Division personnel training in communications activities.
 - Information use in combat operations.
 - Selection of CP locations for the divisional headquarters.
 - Physical security of signal installations.
 - Preparation of signal annexes to the division SOP and division operation plans. This includes paragraph 5 of the division operations order.
 - Preparation of the EW annex to the division operations order. This annex pertains to manipulative communications deception, ECCM, and command, control, and communications countermeasures.
 - Issue and assignment of radio frequencies.
- (4) The DSO coordinates with the G3/G4 to establish priorities for issue of critical signal supplies and equipment.
- (5) The DSO coordinates with the G5 on the following:
- Utilization of local communications facilities.
 - Interpretation of communications aspects of treaties.
 - Military use of local civilian communications facilities, supplies, and equipment.
 - Military support of civilian communications.
- (6) The DSO coordinates with the DISCOM commander on the following:
- Issue of critical signal supplies and equipment.
 - Maintenance of communications and automation equipment.
 - Preparation of the signal portion of the division administrative order.
 - Communications requirements for the Div Rear CP and its subordinate units.
 - Priority of signal support repair.
 - Issue of automation assets to include personnel, based on G3 priorities.
- (7) The DSO coordinates with unit commanders and other DSOs on the following:
- Signal personnel training.

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- COMSEC and ECCM.
- Technical aspects of information equipment and systems.
- Additional information support.
- Signal maintenance or communications maintenance.

d. The battalion commander commands, directs, and supervises the division signal battalion efforts to accomplish the mission. The early phase of every combat operation requires detailed signal planning and coordination. The DSO uses the following written instructions and orders to ensure proper planning, coordination, and supervision in signal matters:

- (1) Signal estimate.
- (2) Signal plans.
- (3) Signal portion, paragraph 4, division operations order.
- (4) Paragraph 5, division operations order.
- (5) Signal annex to division operations order.
- (6) Signal portion of the division administrative order.
- (7) Signal battalion operation order.
- (8) ECCM portion of EW annex to the division operations order.
- (9) SOI.
- (10) SOP.

The first eight must be prepared for particular operations. The SOI and SOP must always be kept current.

e. Normally, the DSO has staff supervision throughout the division of the following:

- Installation and operation of tactical communications and automation facilities.
- Satisfying requirements for visual information, records management, and printing and publications.
- COMSEC regulations, training, accounting, disposition, and control.
- BSM (to include CNR).
- Cryptographic logistics support to all division units.

- Providing circuits for automatic data processing within the division.

- COMSEC maintenance for the division.

f. The DSO conducts liaison with the signal officers of higher headquarters, adjacent headquarters, and MI battalion. The DSO also performs staff and coordinating functions in the division.

(1) The DSO consults the DTOC support element (DTSE) on the following:

- Technical directives.
- SOP and SOI matters.
- Routes of signal communications and locations of signal centers in the communications system.

- Tactical plans for future operations.
- Requirements for signal personnel and equipment.
- Use of local communications facilities.
- Manipulative electronic deception and ECCM.
- BSM (to include CNR).

(2) The DSO consults adjacent headquarters (DTSE unit commanders and signal officers) on the following:

- Signal support for the operation.
- Establishment of lateral communications.
- Tactical plans for impending operations.
- Changes anticipated in current operations.
- BSM (to include CNR).

(3) The DSO consults the MI battalion on the following:

- Manipulative electronic deception.
- ECCM.
- EW plans, operations, and annex.
- COMSEC.
- Frequency utilization.

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- g. The DSO must train the following:
- All assigned signal units of the division.
 - Skill qualification training and testing.
 - Division-level communications training such as division RATT or FM radio training.

2-11. Assistant Division Signal Officer

The ADSO represents the signal battalion commander in most division staff actions. The ADSO and office are a part of the signal battalion, but work on the division staff. Table 3-1 outlines the ADSO section personnel. Appendix A discusses the responsibility of signal personnel in brigade, division artillery, and maneuver battalions. The ADSO--

- Supervises the division signal office.
- Represents the signal battalion commander in division headquarters actions.
- Assists the DSO in planning division information systems operations and signal support for tactical operations.
- Assists in preparing the signal annex of the division operations order and plan.
- Assists in detailed planning for preparation of the signal portion of the division SOP.
- Provides signal assistance to other division headquarters staff elements.
- Assists in planning automated systems and the division telephone directory.
- Controls the allocation of radio frequencies and provides radio (except multichannel) frequency management for the division.
- Controls host nation and allied signal interface.
- Manages/controls actions and responsibilities of the Information Services Support Office (old administrative services branch/division).

2-12. Signal Section Personnel

a. The radio officer has staff supervision over all radio communications established in the division. The radio officer works for the ADSO, but coordinates closely with the signal battalion S3 during preparation of multichannel systems diagrams. However, the radio officer does not

coordinate use of frequencies or allocation of frequencies to multichannel systems. (This is the duty of the S3.) The radio officer provides the S3 with current and future division unit locations and circuit requirements. The S3 prepares the radio relay diagrams. The radio officer--

- Prepares and issues radio net diagrams for the division nets.
 - Maintains a radio frequency utilization register and map to ensure accurate and up-to-date radio frequency assignment for all systems except multichannel.
 - Supports the division tactical CP as the ADSO representative.
 - Prepares items of the division SOI relating to radio matters.
 - Coordinates frequency assignments to aid frequency compatibility within the division and with adjacent divisions.
 - Is responsible for distribution of frequency information associated with the Single-Channel Ground and Airborne Radio System (SINCGARS) and other frequency-hopping equipment.
 - Coordinates with corps for hopsets and transmission security codes.
 - Implements transmission security policy within the division.
- b. The telecommunications technician operates in the division signal office section. This warrant officer--
- Manages all operational COMSEC matters concerning security and development of COMSEC aids, inspections and COMSEC operations, plans, and policies.
 - Develops, changes, and updates the division SOI. The SOI, once developed, is requisitioned through the corps signal office from the National Security Agency.
 - Is responsible for communications and cryptonetting within the division.
 - Is responsible for distribution of transmission security keys (TSKs) associated with SINCGARS and other frequency-hopping equipment.
 - Works with the ADSO or G3 to ensure COMSEC assets meet mission requirements.
 - Implements COMSEC policy within the division.
 - Performs command COMSEC facility inspections.
 - Is responsible for COMSEC investigations and reports.
 - Establishes priorities for issue of COMSEC materiel.

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c. The signal operations chief is the senior NCO in the signal section.
This NCO--

- Supervises the other enlisted members of the section.
- Establishes ADSO field operations.
- Performs administrative functions of the section.
- Assists the DSO and ADSO.
- Operates the signal office in the absence of section officers.

d. The frequency management NCO assists the radio officer in frequency assignment in the division and assists in the maintenance of the radio frequency utilization register and map.

e. The automation officer--

- Serves as the automation staff officer in the division while being assigned to the division signal office.
- Serves as advisor to the division commander and staff on automation policy and technical matters.
- Plans, coordinates, and supervises the development of automation policy and procedures.
- Plans, programs, and budgets for automation resource (people and dollar) requirements.
- Manages automation resources, maintenance programs, and logistics support.
- Performs analysis and makes recommendations pertinent to automated systems life-cycle management processes and force modernization needs.
- Works with the ADSO or G3 to ensure automation assets meet mission requirements.
- Implements automation policies within the division.
- Is responsible for automation inspections and reports.
- Establishes (or coordinates through the G3) priorities for issue of automation materiel.

f. The assistant automation officer manages or supervises a specific automated system or node in a data or communications network within the division. This officer provides detailed technical direction and advice to all echelons on the installation, operation, and maintenance of automated systems, teleprocessing systems, and data communications supporting BAS. The assistant

automation officer applies the automation theory to the design, implementation, and successful interoperation of hardware and software for automated telecommunications and teleprocessing systems.

g. The data processing technician--

- Provides staff oversight of all automatic data processing (ADP) operations in the division.

- Directs and coordinates production activities of the electronic data processing element, to include functional or machine design applications, programming, or operation of ADP equipment.

- Analyzes, plans, and manages the development, testing, evaluation, and modifications of automation.

- Plans and coordinates activities of data processing personnel engaged in programming, wiring, and debugging programs.

- Establishes work standards.

- Supervises coding and machine processing of data and develops training programs.

- Interprets policies, purposes, and goals of ADP activity to subordinates.

- Participates in decisions regarding personnel staffing, allocation of ADP resources, security of automated data systems, and equipment acquisitions.

h. The data processing NCO--

- Provides staff oversight and supervises operation within the division.

- Serves as principal NCO in the data processing section.

- Supervises systems analysis, programming machine operations, security of automated data systems, and related activities.

- Plans, organizes, and conducts technical inspections.

- Prepares reports and recommendations for improved methods and procedures.

- Supervises preparation of studies, reports, and records relating to systems analysis, programming, machine operations, systems security, and other data processing fields.

- Coordinates and integrates operations of electrical input and output equipment with operation of electronic equipment.

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- Prepares operating schedule.
- Controls work flow, assigns projects, establishes priorities, and maintains follow-up.
- Instructs in procedures and in unusual and complex cases.
- Establishes production controls and standards.
- Determines personnel, equipment, and supplies required.
- Provides liaison with activities support or supporting data processing systems activities.
- Prepares instructions and interprets data processing reports and programs.

2-13. Division Signal Office Functions

Conceptually, the division signal office has three functions: planning, operations, and systems integration.

- a. Through planning, the division signal office--
 - Determines the division information systems requirements.
 - Develops and manages information management resource procurement strategies to allocate the division information systems resources.
 - Validates user requirements in direct response to the tactical mission.

Plans all tactical information systems in support of the division command and control systems.

- Integrates automation and signal plans with tactical operations.
- Determines preferential service requirements.
- Prepares the division tactical information management plan.
- Prepares the signal portion of the division SOP.
- Prepares diagrams and map overlays.
- Provides the signal battalion S3 with direction and guidance for establishing the division communications system.
- Prepares the division telephone directory.
- Assists units with Continuity of Operations Plan (COOP).

- Coordinates and controls the allocation of radio frequencies to provide (except multichannel) frequency management for the division.
 - Develops the division information systems contingency plans.
 - Plans and coordinates training requirements and contracts for training, equipment, and materials related to tactical information systems.
 - Develops division level integrated information policies for all tactical information media such as radio, telecommunications, and ADP equipment.
 - Assigns discrete frequencies and ensures adequate spare frequencies are available to support tactical air (TACAIR) and US Air Force support to ground forces.
- b. The operations function includes staff supervision of the division information systems resources. The signal office--
- Provides staff supervision of performance of engineering and control functions for BAS and information system networks.
 - Coordinates with the signal battalion S3 during the preparation of network plans and diagrams.
 - Provides the signal battalion S3 with current unit locations, organizational status, hilltop data, and circuit and data requirements.
 - Coordinates network connectivity.
 - Reviews network layout development.
 - Reviews the availability of automation and communication resources.
 - Establishes signal battalion area responsibilities and adjusts nodal responsibilities.
 - Maintains and provides information systems and communications networks status information, including hardware, software, personnel, and training.
 - Coordinates radio terminal and relay locations.
 - Coordinates and controls host nation and allied information systems interface.
 - Manages all operational COMSEC matters on security, inspections, investigations, operations, plans, and policies.
 - Works with the ADSO and G3 to ensure COMSEC assets meet mission requirements.
 - Develops, updates, and distributes the division SOI.

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- Is responsible for data, voice, and record copy communications and cryptonetting within the division.
 - Assists in preparation of the signal annex of the division operations order.
 - Provides staff supervision of information system training.
 - Manages tactical information systems resource programming and budgeting.
 - Determines information systems security requirements IAW AR 380-380.
 - Coordinates with adjacent, allied, and divisional assets for land management.
- c. The systems integration function is key to effective integration of division information systems resources. In executing this function, the division signal officer--
- Manages force integration of the division information systems resources.
 - Works issues on information systems equipment and personnel requirements analysis due to modification table of organization and equipment (MTOE) changes by higher headquarters initiatives.
 - Works issues on planning and coordination with higher headquarters for information systems upgrade, replacement, elimination, and integration within division units.
 - Plans the integration of the division BAS and other information systems.
 - Acts as the focal point for the control, distribution, and implementation of applications software and incremental change packages for signal automation and Battlefield Automation System (BAS) (not including weapons systems with embedded computers).
 - Provides staff supervision of analysis and programming support and troubleshooting of automated systems.
 - Coordinates with the DISCOM system support section for CSS proponent automated systems and STAMIS and with the appropriate functional area node for programming and analyst expertise and technical supervision for that particular BAS.
 - Provides automatic data processing (ADP) training program supervision and execution.
 - Develops policy and procedure for provision of ADP services.
 - Provides staff assistance in ADP related areas.

- Provides guidance in the design and development of command information systems. While there are no assigned designers/developers for such systems, the requirement may be recognized to do some developing. The DSO provides guidance to his chain of command.
- Monitors unique application program development.
- Ensures unique programs are not developed when existing applications provide for the functional requirements.
- Assists division units in development of unique application programs.
- Provides for continuity of operations planning for automated systems and coordinates execution of continuity of operations planning when required.
- Provides staff supervision for the maintenance of tactical data bases within the division.
- Plans integration of data bases of newly assigned or attached units.
- Provides automated resource security training program.
- Develops and manages division cryptonetting and COMSEC keying material requirements.

2-14. Division COMSEC Operations

The DSO retains responsibility for all COMSEC operations, plans, security, and logistic matters within the division. Two warrant officers serve as the division COMSEC officer and COMSEC custodian. The COMSEC custodian must be a graduate of the standardized COMSEC custodian course.

a. The division communications security technician is the principal advisor to the division commander on all COMSEC matters within the division. He is the controlling authority for all divisional headquarters cryptosystems. He is responsible for implementing COMSEC policy and plans, force modernization actions, integration of COMSEC systems into the division, cryptofacility inspections, crypto-operations, COMSEC training, and cryptosecurity matters. The communications security technician is also the division cryptographic custodian and reports directly to the DSO.

b. The division COMSEC custodian and the alternate custodian are responsible for all COMSEC materiel management, resupply, and maintenance actions for the division. This includes cryptosystem accountability records, reports, equipment readiness, modification work order applications, and any other division COMSEC materiel. All administrative and maintenance personnel needed to maintain and support the division central office of record (DCOR) are under the control of the division COMSEC custodian. The custodian reports directly to the DSO.

c. The division establishes a single COMSEC account. The signal battalion, MI battalion, and other division elements operate as subaccounts, as required. Staff elements are issued COMSEC materiel on hand receipts. The DCOR is formed from within the division signal battalion with staff supervision exercised through the DSO.

(1) The DCOR maintains staff supervision over the division COMSEC assets and reports to the corps central office records (CCOR) office, as required. The DCOR uses the Army COMSEC Commodity, Logistical and Accounting Information Management System (ACCLAIMS) Level IV software through the COMSEC Materiel Control System.

(2) The DCOR receives, stores, processes, distributes, and controls all division COMSEC materiel destined for division subaccount and hand receipt holders. The DCOR is equipped to deploy with all divisional COMSEC materiel required (operational readiness float (ORF), authorized stockage list/prescribed load list (ASL/PLL), contingency/reserve COMSEC materiel, and records).

(3) The DCOR moves to the signal battalion headquarters at the direction of the commander during deployment. From its operations facility, the DCOR performs COMSEC operations, stores bulk division reserves, and distributes COMSEC materiel. The facility also houses the automated COMSEC accounting capability for the division.

(4) The signal battalion COMSEC logistics maintenance facility provides COMSEC repair for classified COMSEC equipment. The appropriate support battalion provides controlled cryptographic item repair. Intermediate DS COMSEC maintenance requirements are coordinated for units within, or passing through, the division area of operations (AO).

(5) The distribution system for COMSEC materiel to the division is the Defense Courier Service during peacetime. Since the Defense Courier Service will not deliver or receive material at division level during deployment (contingency, war), a sealed bulk shipment distribution point is established at the CCOR to support the DCOR'S requirements.

(6) All COMSEC repair personnel are provided exportable COMSEC maintenance cross-training packages to ensure that assigned COMSEC repairers are qualified to repair all divisional COMSEC assets at the DS level.

2-15. Signal Battalion Executive Officer

The executive officer (XO) is principal assistant and advisor to the battalion commander. The XO--

- Serves as battalion second in command.
- Supervises the battalion administrative operations.
- Frees the commander for operational supervision.
- Stays informed on logistical and tactical situations.

- Supervises the battalion staff in execution of responsibilities and ensures element coordination.
- Represents the commander in his absence.
- Reviews staff instructions and SOP for policy conformity.
- Recommends security and defensive measures for installation of the battalion.
- Supervises and plans for battalion movement, including reconnaissance for new locations and alternate areas.
- Plans and directs rear operations and area damage control activities of the battalion.
- Is commander of signal battalion rear area.

2-16. Signal Battalion Command Sergeant Major

The battalion Command Sergeant Major (CSM) is the commander's senior enlisted assistant. The CSM assists the commander in matters involving NCOs and soldiers and often assists the adjutant in administrative matters. The CSM maintains close and continuous contact with the first sergeants and with the division CSM. Working closely with the S3, the CSM, in concert with senior NCOs in the battalion, develops individual soldier's skills and testing programs. As the chief enlisted person in the battalion, the CSM works with the S3 on NCO development and schools.

2-17. Signal Battalion S1

a. The battalion S1 is responsible for administration of the headquarters and for coordinating the administration of signal units organic and attached to the battalion. Responsibilities include--

- Supervising operation of the battalion Personnel and Administration Center (PAC) in the combined battalion administrative and logistics section to include administrative and personnel matters involving transfers, assignments, promotions, demotions, and personnel classifications.
- Processing recommendations for citations, honors, and awards; supervising the leave program; and coordinating with the division unit ministry team for religious support.
- Preparing instructions relating to records and reports.
- Receiving and processing replacements.
- Supervising the arrangement and movement of battalion headquarters.
- Supervising postal services.
- Publishing and distributing administrative orders and directives.

- Ensuring required publications and forms are obtained and distributed.
 - Maintaining the unit journal, policy files, and radiation exposure data.
 - Maintaining unit history.
 - Organizing the partnership program.
- b. Key personnel of the division signal battalion S1 staff are the PAC supervisor and the senior Army career counselor.

(1) The PAC supervisor operates under the supervision of the S1 and functions as the staff personnel advisor, coordinator, and supervisor. The PAC supervisor--

- Assists individuals in handling personal affairs.
- Processes personnel management actions (strength changes, levies, appointments).
- Prepares and maintains suspense cards.
- Initiates actions (efficiency and evaluation records).

(2) The senior Army career counselor works under supervision of the battalion CSM and advises enlisted personnel on career development.

2-18. Signal Battalion S2/S3

a. The battalion S2/S3 has staff responsibility in organization, operations, training, plans, and intelligence and is assisted by the operations and intelligence section. The S2/S3 officer--

- Recommends changes or additions to equipment and personnel in the signal battalion organization.
- Allocates battalion resources for the mission.
- Allots frequencies to multichannel systems within the network.
- Supervises the battalion SYSCON.
- Ensures operational readiness.
- Keeps current on status of critical military occupational specialty (MOS) in the battalion through coordination with the S1.
- Coordinates with the S4 on equipment and supplies.
- Assigns unit missions and employment.

- prepares orders, estimates, diagrams, and SOP.
- Recommends location of CP.
- Prepares and supervises the battalion training program.
- Develops and distributes training aids.
- Develops training facilities.
- Allocates training ammunition in coordination with the S4.
- Conducts battalion field training exercise and CP exercise training.
- Conducts inspections and tests.
- Prepares intelligence SOP, estimates, and reports.
- Disseminates intelligence information to battalion units.
- Obtains and distributes maps.
- Supervises physical security.
- Supervises classified information and security clearance programs.

b. Key personnel of the operations and intelligence section are the two assistant S3s, the operations sergeant, the intelligence sergeant, and the senior chemical staff NCO.

(1) The assistant S3's office is normally in the SYSCON. The assistant S3--

- Assists the battalion S3 in staff supervision and coordination of battalion operational activities.
- Prepares and distributes training charts, reports, circuit and traffic diagrams, line route maps, intelligence data, and other technical operational matters (battalion SOI, SOP, estimates, and operations orders).
- Coordinates battalion activities involving operation, training, and intelligence as directed by the S3.
- Maintains status of battalion communications capabilities.
- Supervises the preparation and implementation of the battalion physical security and COMSEC plans.
- Supervises skill qualification test programs.
- Supervises school programs.

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(2) The operations sergeant--

- Assists the S3 in preparing plans and policies for operational, intelligence, and technical-type training programs and acts as training NCO.
- Assists in establishing and operating the SYSCON.
- Assists in use of SOP, supervision of mission assignments, and the relocation of units.
- Provides technical assistance in planning, engineering, and supervising battalion communications systems.
- Drafts operation order.

(3) The intelligence sergeant--

- Collects data on the weather, the terrain, and the Threat and evaluates their effect on the mission.
- Maintains the security clearance program.
- Determines requirements for and procures maps.
- Assists senior chemical staff NCO in supervising battalion nuclear, biological, chemical (NBC) monitoring and surveying operations.
- Plans, prepares, and assists in supervising intelligence training programs.
- Aids in SYSCON operations.

(4) The senior chemical staff NCO--

- Coordinates with the intelligence sergeant to collect, prepare, and disseminate NBC operations data.
- Performs necessary calculations involving NBC predictions.
- Supervises NBC training within the battalion and prepares portions of estimates, orders, and SOP relating to NBC.
- Monitors and surveys NBC operations.
- Supervises the 54E who supervises the crew operating the headquarters and headquarters company (HHC) power-driven decontaminating equipment.

2-19. Signal Battalion S4

Key logistics personnel are the S4 and the battalion supply sergeant. Key sections are the battalion signal maintenance section and the battalion motor maintenance section.

a. The battalion S4 or logistics officer has staff responsibility for planning, coordinating, and supervising battalion logistical operations and facilities. The S4's major areas of responsibility are the logistics elements of the combined battalion administrative and logistics section, electronic maintenance, and the dining facility. Other responsibilities include--

- Supervision of the logistics and supply section.
- Administration of supply activities.
- Supervision of petroleum, oils, and lubricants (POL) distribution and resupply procedures.
- Staff supervision of unit-level supply activities.
- Preparation of logistical estimates and appropriate portions of SOP, plans, and orders.
- Staff supervision of the battalion electronic maintenance section and maintenance section.
- Supervision of the battalion logistics control point/administrative logistics operations center (BLCP).

b. The battalion supply sergeant works under supervision of the battalion S4 and supervises the supply specialists and clerks. The supply sergeant supervises battalion-level supply and the preparation of requisitions, supply reports, and readiness reports. The supply sergeant inspects company areas for required supplies to support initial war or contingency missions (7 through 10 days).

c. The battalion signal maintenance section provides DS maintenance of organic signal equipment. This includes COMSEC equipment for the entire battalion and organizational maintenance of signal equipment of HHC. This section is supervised by the battalion S4 and the signal systems maintenance technician. Maintenance facilities with storage are provided for the repair authorized in the section. These facilities are at the BLCP. The signal repair technician provides technical guidance on signal maintenance to all supported units and technical expertise in operating the signal maintenance section. Repair persons in the signal maintenance section are under the direct supervision of the NCOIC. The battalion signal maintenance section uses Standard Army Maintenance System (Version I) (SAMS I) to manage the battalion DS maintenance mission.

d. The battalion motor maintenance section has personnel and equipment necessary for staff supervision of maintenance on wheeled vehicles, power generators, air conditioning equipment, and maintenance performed within HHC. The automotive maintenance technician and motor sergeant give battalion-level supervision of maintenance performed at subordinate unit levels. They ensure compliance with battalion wheeled vehicle and power generator maintenance policies and provide technical expertise. This section is under staff supervision of the battalion motor officer and is normally at the BLCP.

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e. The signal battalion logistics and service support are separate demands. The control of circuitry, planning, and system design restricts the ability of the battalion SYSCON to control logistics. The battalion XO and S4 control the logistics from a control point designed to support, service, rearm, recover, and repair. This point is the BLCP.

(1) The organization is near an area signal node. The location allows HHC, the battalion motor officer, the battalion signal maintenance, the wrecker, and the XO to support the signal extension and isolated sites. The logistics demand requires a coordination point closer to the battalion than DISCOM.

(2) Each company establishes a CP operation; however, the dispersion of the battalion requires company commanders to move constantly. An area signal company may have 3 primary sites plus 12 relay and 6 retransmission sites. The forward communications company has 6 primary and 6 additional separate headquarters. The command operations company can have 5 signal locations.

(3) This enormous dispersion demands close analysis of company command locations. The area signal company commander locates at an area signal node opposite that of the SYSCON and moves to other sites as needed. The forward communications company commander's CP locates at a central BSA or area signal node as the situation dictates. The command operations company commander locates as the situation dictates, preferably in the Div Main CP area or in the Div Rear CP. Regardless of the location of company commanders, the BLCP should be the focal point for coordinating logistics.

(4) Class III support for remote signal nodes may require the BLCP to consolidate battalion assets.

2-20. Division Signal Battalion Capabilities and Limitations

a. The division signal battalion can provide--

- Area signal nodes.
- Multichannel LOS communications. This links area signal nodes, Div Main CP, Div TAC, DIVARTY, Div Rear CP, MI battalion, engineer battalion (heavy division only), ADA battalion, AB, three maneuver brigades, three BSAs which include their appropriate forward support battalions (FSBs), adjacent divisions, and corps area systems. This includes multichannel LOS relay capability to terminate NLOS systems and to extend distances.
- Technical control of the entire network from the area signal nodes.
- Automatic telephone and switching facilities for trunk and local telephone subscriber circuits.
- Cable and wire installation teams. These teams install internal cables and local telephone circuits, and extend indigenous communications as determined.

- NRI stations at Div Main CP, Div TAC, Div Rear CP, and three brigade support extensions for FM radio access to the division telephone system.

- Single-channel retransmission stations. These stations provide VHF/FM radio relay capability for division level FM voice nets, as well as, signal battalion command/operations, engineering, and administrative and logistical nets.

- Telecommunications centers for the Div Main CP and Div Rear CP.
- The integration of the BAS (that is, ATCCS)
- RATT terminals for the division GP net.
- DS COMSEC repair and logistics for the division.

b. The battalion depends on division units for the following:

- Personnel and administrative services.
- Finance services.
- Unit level medical support.
- DS motor maintenance.
- Engineer equipment maintenance.
- Public affairs.
- NBC support for total decontamination of personnel and equipment.
- Supplemental transportation.
- Religious support.
- Legal services.
- Supplemental defense of isolated relay or retransmission operating sites.
- Photographic support in coordination with corps signal office.
- Aviation support.
- Messenger service support. (See paragraph 3-3b(l).)
- Printing and publications support (for example, corps and local DOIM).

c. The battalion depends on division aviation assets for continuous support and command and control of dispersed sites. Aircraft can transport maintenance contact teams to replace critical equipment and perform site reconnaissance.

2-21. Nuclear Operations Communications

a. Multiple means of communications, from the president and the secretary of defense to the individual with custody of the nuclear weapons system, are required for positive control of all nuclear weapons.

(1) The positive control system includes two-man access rules that have unique security requirements. Nuclear systems brought into an area must be accompanied by the appropriate control and communications capability.

(2) Continuous communications links must be maintained into the worldwide military command and control system (WWMCCS) through tactical, strategic, or a combination of communications systems.

b. Electronic systems are vulnerable to electromagnetic pulse (EMP). Especially vulnerable are systems that use microelectronics with low operating voltages typical of modern electronics and computers. EMP is a high voltage, extremely short duration burst of energy generated by large (megaton) nuclear bursts. EMP is not normally associated with tactical nuclear weapon yields.

c. The systems should be analyzed for vulnerability. They should be protected from direct exposure. Equipment not in use can be buried or sandbagged (a minimum of 4 meters (13.2 feet)) as an expedient means of shielding against EMP. Plans should provide for rapid repair when nuclear operations are anticipated. Continued operations may require replacing power fuses and any lightning or other high voltage surge protection devices, or the entire set. Built-in hardening of system equipment or shelters must be maintained.

CHAPTER 3

The Heavy Division Signal Battalion

3-1. General

The heavy division signal battalion--

- a. Installs, operates, and maintains a division communications system to support the division's command, control, intelligence, fire control, CS, and CSS functions.
- b. Provides internal CP communications at all echelons of the division headquarters.
- c. Assists the division commander and staff in planning division communications.
- d. Provides direct support COMSEC repair and logistics for the division to include the administration of the division COMSEC materiel account.

3-2. Organization

The battalion is organized in four companies: HHC, command operations company, forward communications company, and area signal company. HHC commands, controls, and provides service support typical of any battalion headquarters. Exceptions exist in medical support and religious support missions. The line companies are organized to perform specific signal node and signal extension missions. Company headquarters are aligned to perform similar missions in all companies. (See Figure 3-1.)

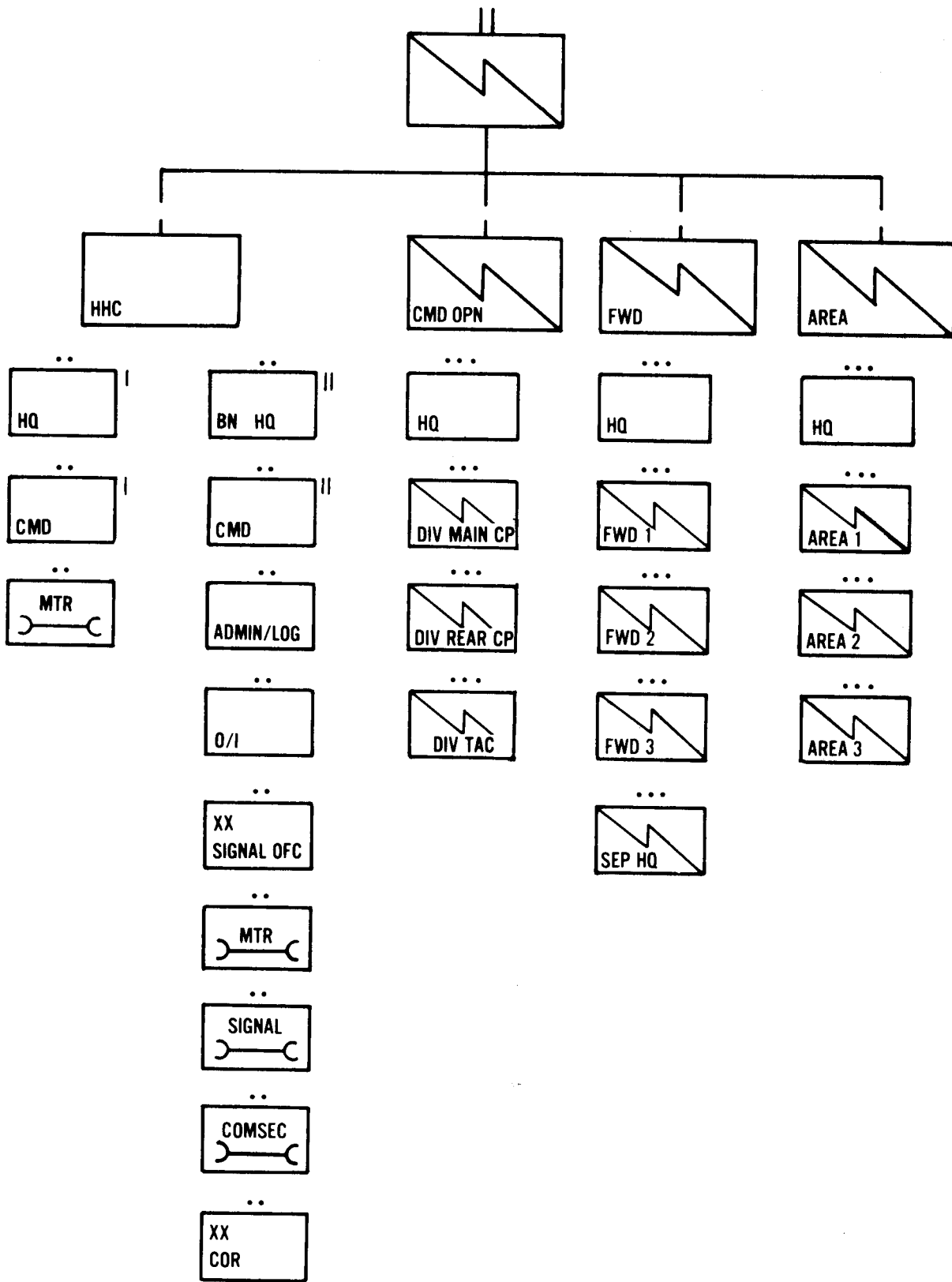


Figure 3-1. The heavy division signal battalion.

a. All company headquarters perform command, control, and logistical coordination. While specific company missions may vary, company headquarters missions are similar. Personnel and equipment are provided for administration, organizational maintenance of organic weapons, generators, air-conditioning equipment, and organizational maintenance of communications equipment and vehicles. The PAC at battalion level provides formal company administration. The HHC provides--

- Command, control, staff planning, and battalion supervision.
- A signal officer, a communications staff, and staff facilities.
- Supply and garrison dining facility administration for the battalion.
- Administrative and logistical support for the battalion. This includes--
 - DS maintenance (DS level) for communications equipment organic to the battalion.
 - Administrative support to assigned or attached units.
 - Organizational maintenance of field radio and teletypewriter equipment organic to the company.
 - DS COMSEC repair and logistics (DS level) for the division.
 - Scheduled maintenance of all wheeled vehicles organic to the company and backup for the wheeled vehicle organizational capability for the line companies assigned to the battalion.

(1) The battalion headquarters includes the battalion commander, the battalion XO, the ADSO, the DAMO, the S2/S3, the S1, the S4, the battalion motor officer, the signal maintenance officer, the COMSEC officer, and the battalion CSM. The headquarters assists the battalion commander in command and staff supervision of signal companies assigned or attached to the battalion.

(2) HHC has six sections as follows:

(a) The division signal office includes the ADSO, the DAMO, the radio officer, the chief signal NCO, the frequency management NCO, enlisted personnel, and other personnel that form the automation office. The signal section prepares paragraph 5 of the division plans and orders and the signal annex of the division plans and orders. This section also prepares the division SOI and the telephone directory. The signal section conducts field operations from a vehicular-mounted communications operations facility and has two vehicular-mounted single-channel FM radios. It is collocated with the Div Main CP. Table 3-1 shows the personnel in a typical division signal office.

Table 3-1. Division signal office.

POSITION	RANK/GRADE
ADSO	MAJ
COMSEC Technician	CW4
Information Management Officer (old DAMO)	CPT
Radio Officer	CPT
Telecommunications Processing Staff Officer (Asst DAMO)	CPT
Telephone and Teletypewriter Officer	LT
Chief Signal NCO	E9
Data Processing NCO (ADP Tech)	E8
Frequency Management NCO	E7
Programmer/Analyst Programmer System Analyst	E7
Communications System Supervisor	E7
Programmer/Analyst Programmer System Analyst	E6
Crypto Material NCO	E6
COMSEC Clerk	E4
Clerk Typist (2 each)	E4
COMSEC Clerk	E3

(b) The battalion operations and intelligence section includes personnel and equipment required to plan, coordinate, and supervise use of battalion operational assets. Key personnel under the battalion S3 include assistant S3 officer, an operations sergeant and assistant, an intelligence sergeant, an NBC NCO, and various clerks. This section forms the systems control (SYSCON). Normally, the section operates from a vehicular-mounted communications operations facility at an area signal node. The battalion NBC NCO operates the NBC center, colocated with the SYSCON, which receives, collates, evaluates, prepares, and distributes NBC reports. Table 3-2 shows the personnel in the operations and intelligence section.

Table 3-2. Operations and intelligence section personnel.

POSITION	RANK/GRADE
Operations Officer	MAJ
Signal Systems Control Officer	CPT
Assistant Signal Systems Control Officer	LT
Operations Sergeant	E8
Radio Systems Operations Supervisor	E7
NBC NCO	E7
Circuit Control NCO	E6
Intelligence Sergeant	E5
Clerk Typist	E4
Combat Signaler	E4

(c) The administrative and logistics section provides personnel and equipment to support the administrative and logistical efforts of the battalion. Administrative personnel include the PAC supervisor, the PSNCO, the legal clerk, PAC clerks/specialists, the clerk typist, and vehicle drivers. The supply personnel include the battalion logistics officer, the supply sergeant, supply specialists, and supply clerks. This section is at the BLCF. The administrative personnel work under staff supervision of the S1. The supply personnel work under the staff supervision of the S4. Table 3-3 shows the personnel in a typical administrative and logistics section.

Table 3-3. Administrative and logistics section personnel.

POSITION	RANK/GRADE
Administration Officer	CPT
Logistics Officer	CPT
Maintenance Operations NCO	E8
Supply NCO	E7
PAC Supervisor	E7
PSNCO	E6
Supply Sergeant	E5
Legal NCO	E5
Personnel Administrative Specialist	E5
Clerk Typist	E4
PAC Clerk	E4
Supply Specialist	E4
Petroleum Light Vehicle Operator (2 each)	E4
PAC Clerk	E3
Supply Specialist	E3
Petroleum Light Vehicle Operator (6 each)	E3

(d) The battalion motor maintenance section operates under the direct supervision of the automotive maintenance technician. The section includes a motor sergeant, mechanics, and a wrecker operator. This section supervises the organizational maintenance of motor vehicles and power generating equipment throughout the battalion and supplements the organizational maintenance capabilities of the companies. When possible, equipment needing repair is brought to the section's maintenance shop; however, maintenance section personnel perform on-site maintenance of vehicle and generator equipment. This section distributes petroleum supplies within the battalion from the BLCF through coordination with the battalion S4. Table 3-4 shows personnel in the motor maintenance section.

Table 3-4. Motor maintenance section.

POSITION	RANK/GRADE
Automotive Maintenance Technician	CW2
Maintenance Sergeant	E7
Senior Mechanic	E6
Recovery Vehicle Operator	E5
Equipment Record/Parts Specialist	E5
Power Generator Equipment Repairer	E5
Light Wheel Vehicle Mechanic (2 each)	E5
Quartermaster and Chemical Equipment Repairman	E4
Light Wheel Vehicle Mechanic (2 each)	E4
Utility Equipment Repairman	E4
Recovery Vehicle Operator	E4
PLL Clerk	E3
Power Generator Equipment Repairer	E3
Light Wheel Vehicle Mechanic (3 each)	E3

(e) The signal maintenance section has personnel and equipment to provide DS level maintenance for mission-essential communications equipment of the battalion. The signal systems maintenance technician (warrant officer) supervises the section and is assisted by the enlisted maintenance supervisor who provides technical assistance for the maintenance activities. The signal maintenance section personnel repair field radio equipment, multichannel communications equipment, manual central office equipment, automatic switchboard, and teletypewriter equipment. They also perform quarterly services on signal equipment. All test, measurement, and diagnostic equipment (TMDE) for the battalion is also handled through this section. This section is at the BLCP. Table 3-5 shows personnel in the signal maintenance section.

Table 3-5. Signal maintenance section.

POSITION	RANK/GRADE
Signal Systems Maintenance Technician	CW2
Signal Maintenance Supervisor	E7
TACSAT/MWAVE Supervisor	E6
Radio Repairer (2 each)	E5
Equipment Record/Parts Specialist	E5
TACSAT/MWAVE Supervisor (2 each)	E5
Telephone Center Office Repairer	E5
Telecommunications Terminal Device Repairer	E5
Radio Repairer (2 each)	E4
TACSAT/MWAVE Repairer (3 each)	E4
Telephone Center Office Repairer	E4
Telecommunications Terminal Device Repairer	E4
Radio Repairer	E3
Equipment Record/Parts Specialist	E3
TACSAT/MWAVE Repairer	E3
Telephone Center Office Repairer (2 each)	E3
Telecommunications Terminal Device Repairer	E3

(f) The COMSEC maintenance section has cryptographic repairers and materiel specialists to provide DS COMSEC logistics, maintenance, and repair for the division. The COMSEC warrant officer supervises COMSEC repair.

b. The command operations company supports the division CP. This company provides communications facilities and services at the Div Main CP, Div Rear CP, and Div TAC.

(1) Communications facilities and services at Div Main CP and Div Rear CP include--

- Multichannel LOS communications terminals.
- A split terminal section to provide split terminal extension support (Div Main CP only).
- Automatic telephone and switching facilities for trunk and local telephone subscriber circuits.
- Cable and wire installation teams to install cable and local telephone circuits.
- NRI facility for single-channel voice radio access to the division telephone system.
- A patch panel section to provide tactical circuit control by use of a patching facility.
- A record traffic receiving and distribution facility to process electrical messages and to deliver high precedence messages.
- Signal site operations.
- RATT for operation in the division GP net. (See Figure 3-2.)

(2) The tactical CP platoon is a composite platoon. It provides multichannel access to the division multichannel systems plus HF RATT, automatic switching, and NRI at the Div TAC. There are two AN/TRC-145s for multichannel systems to two area signal nodes. The use of two AN/TRC-145s allows the tactical CP to jump/displace. This capability is also authorized for the Div Main CP, Div Rear CP, three brigade CPs, and three BSAs. Communications facilities and services at Div TAC are--

- Multichannel LOS communications terminals.
- Automatic switching facilities for trunk and local telephone subscriber circuits.
- Cable and wire installation teams to install internal cable, local telephone circuits, and facsimile.

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- NRI facility for single-channel voice radio access into the division telephone system.
- RATT for operation in the division GP net. (See Figure 3-2.)

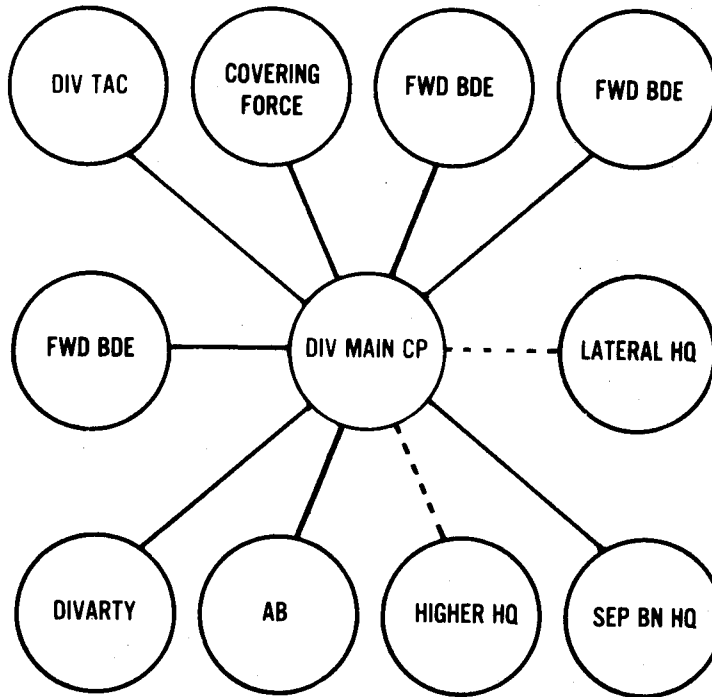


Figure 3-2. Tactical employment single-channel radio HF/SSB TOC net and division GP RATT net for heavy division.

c. The forward communications company supports the maneuver brigades and the five separate headquarters. The five separate headquarters include DIVARTY, AB, ADA battalion, MI battalion, engineer battalion, and a designated headquarters.

(1) Each of the three brigade extension platoons has a platoon headquarters (signal site operations), a telephone and switchboard section, a single-channel radio section, a cable and wire installation section, and a multichannel communications LOS section. A platoon leader, assisted by a platoon sergeant, provides command and control and supervision of operations. The platoon leader spends most of the time at the brigade headquarters but must also travel to the brigade trains area as well as be liaison to the forward support battalion. Each platoon has several functions. The platoons establish and operate an extension node to support a forward support battalion in the BSA. They establish and operate an extension node at the brigade headquarters to connect into division level ACUS. The field trains of the maneuver battalions (when in the BSA) can be connected to an extension by wire.

(2) At the brigade headquarters and the BSA, the forward communications platoon provides--

- Multichannel LOS communications terminals. These terminals terminate the division multichannel systems at each brigade location and provide "jump" capability.
- Automatic telephone and switching facilities for trunk and local telephone subscriber circuits (at the BSA only; the AN/TCC-41(V)2 at the brigade headquarters is provided by the brigade communications platoon).
- Cable and wire installation teams to install cable and local telephone circuits (at the BSA only).
- NRI facility for single-channel voice radio access to the division telephone system (at the BSA only).
- Signal site operations.
- RATT for operation in the division GP net. (See Figure 3-2.)

(3) The separate headquarters platoon provides secure multichannel connectivity into the division network and RATT service for the AB, DIVARTY, ADA battalion, MI battalion, and engineer battalion, and one additional headquarters.

d. The area signal company is the backbone of the division multichannel communications network using three area signal node platoons. Each platoon has a platoon headquarters (signal site operations), cable and wire installation section, two multichannel LOS sections, and a split terminal section. It also has a telephone and switchboard section, and a technical control facility section. The platoon headquarters provides command, control, and coordination

for platoon operations. The platoon leader operates in the battalion engineering net. The area signal company provides--

- Multichannel LOS communication terminals. Each multichannel section terminates systems from within the division, between adjacent division systems, and between corps and division.
- Multichannel LOS communications relays to extend LOS radio systems and to terminate non-LOS systems.
- A split terminal section to provide split terminal extension support. The split terminal section provides one AN/TCC-65 telephone terminal to allow a CP to be offset from the signal antenna field.
- Automatic telephone and switching facilities for trunk and local telephone subscriber circuits.
- Cable and wire installation teams to install cable and local telephone circuits.
- Tactical circuit control by use of a patching facility. The signal site operations section at an area signal node has one AN/TSC-76 communications patching center. The AN/TSC-76 monitors, controls, and provides circuit distribution.
- FM voice radio retransmission facilities.

3-3. Capabilities and Limitations

a. The heavy division signal battalion can provide the following:

(1) Three area signal nodes.

(2) Multichannel LOS communications. This links three area signal nodes, Div Main CP, Div TAC, Div Rear CP, DIVARTY, MI battalion, ADA battalion, AB, three maneuver brigades, three colocated BSAs and FSB, and an adjacent division.

(3) Technical control from the three area signal nodes.

(4) Automatic telephone and switching facilities for trunk and local telephone subscriber circuits.

(5) Cable and wire installation teams. These teams install internal cables and local telephone circuits, and extend indigenous communications as determined.

(6) NRI stations at Div Main CP, Div TAC, Div Rear CP, and three brigade support extensions for FM radio access to the division telephone system.

(7) Single-channel FM retransmission stations. These stations provide radio relay capability for division level FM voice nets and the signal battalion command, engineering, and administrative and logistical nets.

(8) Telecommunications center for the Div Main CP and Div Rear CP.

(9) RATT terminals for the division GP net.

(10) DS COMSEC repair and logistics for the division.

b. The heavy division signal battalion's limitations are described below.

(1) There is no messenger service on a division scale and no internal record traffic system. When a division messenger service is required, the division signal office is responsible for determining routes and schedules. The division G3 is responsible for tasking division units for vehicles and personnel. To compensate for the lack of a record traffic system, user-owned and -operated terminals are relied on to transfer messages through the ACUS. Subscribers dial the intended recipient and send the message. Key unit personnel with appropriate security clearance who travel between CPs could also carry the bulk traffic (for example, overlays).

(2) Space segment is necessary when extended conditions or difficult terrain requires the use of tactical satellite communications (TACSAT) systems. Due to the limited amount of space segment available, this is seen as a limitation.

(3) Threat environments are of particular concern. If the threat borders on high intensity, then augmentation to the division signal battalion is needed. Additional assets and personnel are necessary in countering the REC threat, in extending the system to disperse communications facilities even further, and in supplying relays or retransmission stations beyond organic levels.

(4) Sustainment must be planned for when the signal battalion is employed. The unit maintains signal-unique systems and gets little assistance from higher echelons. It is a very difficult operation when the battalion is greatly dispersed throughout the division area.

(5) There rarely seems to be enough backup of reserve equipment. The employment of less complex doctrinal systems should be considered. This leaves the division signal officer a small base of assets to be used when needed.

3-4. Command and Control

The signal battalion must exercise disciplined control over its units down to multichannel terminals and relays to ensure sound division command and control. The multichannel network in Figure 3-3 shows the doctrinal heavy division connectivity of multichannel extensions into the three area nodes. The multichannel diagram shows one way to use available assets; other configurations may be derived to suit the mission.

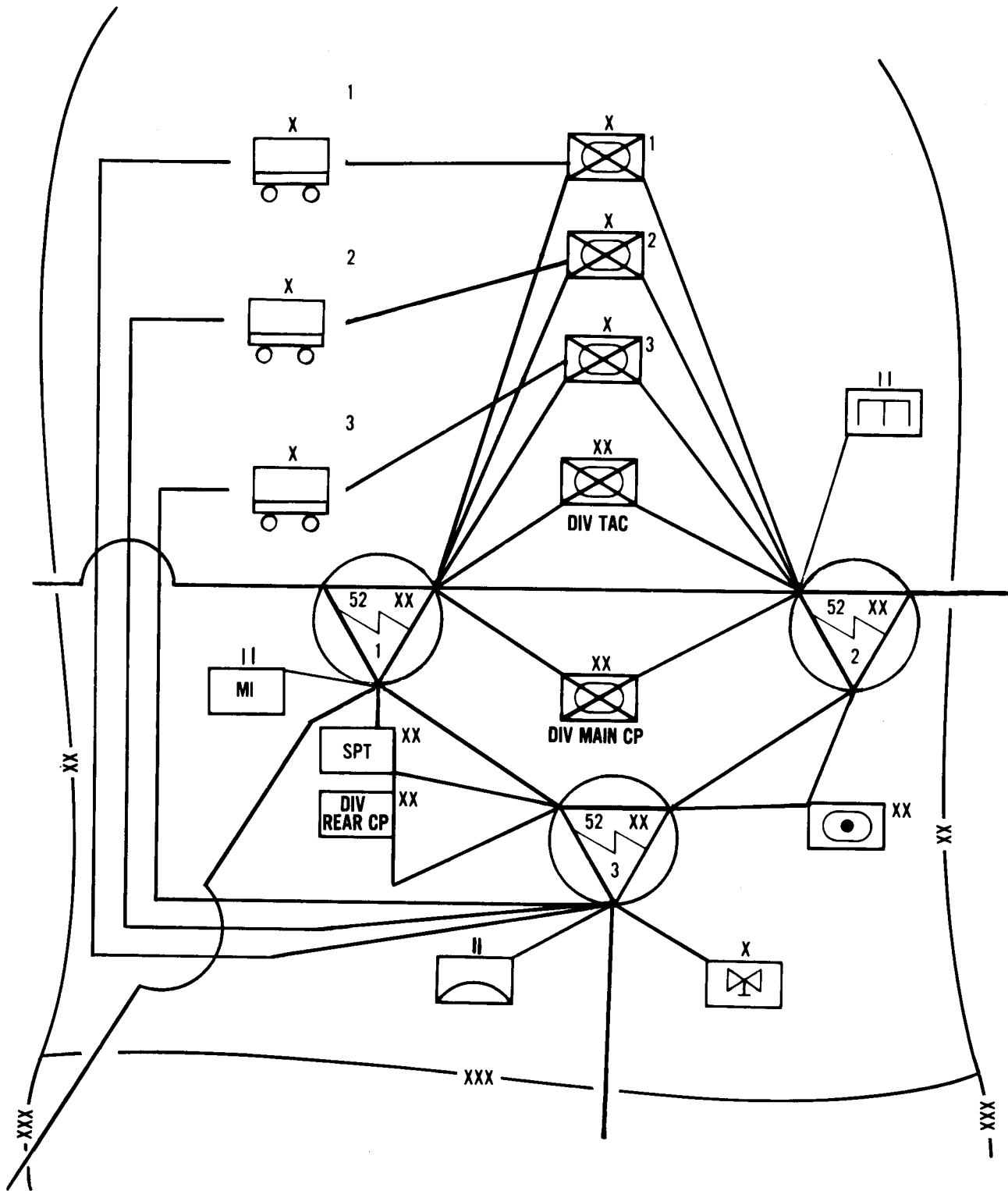


Figure 3-3. Heavy division LOS multichannel terrestrial system.

3-5. Internal Command, Control, and Communications

a. The AirLand Battle concept requires that the command and control system be responsive and flexible. Division command and control has increased through development of the signal battalion communications network. Thus, the signal battalion is required to operate not only as a separate battalion but also as the command and control arm of the division. To manage the signal battalion, an extensive FM net structure is required. The vastness of the division area and the complexity of battalion command and control requirements result in intense single-channel radio communications throughout the signal battalion. This requirement includes FM radios for multichannel relays and terminals. Figures 3-4 through 3-7 show the large number of internal systems installed for battalion command and control.

b. The signal battalion uses SB-22 switchboards to terminate circuits within its own area of operation. SB-22s are at the battalion SYSCON for systems control, signal site operations (area nodes), and the division signal office. The battalion commander and S3 use this switchboard to connect the engineer circuits. A second SB-22 is often used by the SYSCON. This enables the SYSCON to terminate up to twenty-seven 2-wire circuits. (See Figure 3-8.) Figure 3-9 shows the heavy division signal battalion TOC. Another SB-22 is in the BLCP. (See Figure 3-10.) The battalion XO and S4 use it to support the logistical site operations. These SB-22s are components of the operations center, AN/MSC-31A, belonging to each of these staff sections.

c. Signal companies may operate within their own nets during movement, during training, and as the operational mission requires. Nodes, extension platoons, and company CPs enter the appropriate battalion net during full deployment to expedite command and control. Each signal line company has an internal FM net. (See Figures 3-11 through 3-13.)

d. Figure 3-14 shows the doctrinal equipment employment to support a heavy division multichannel system.

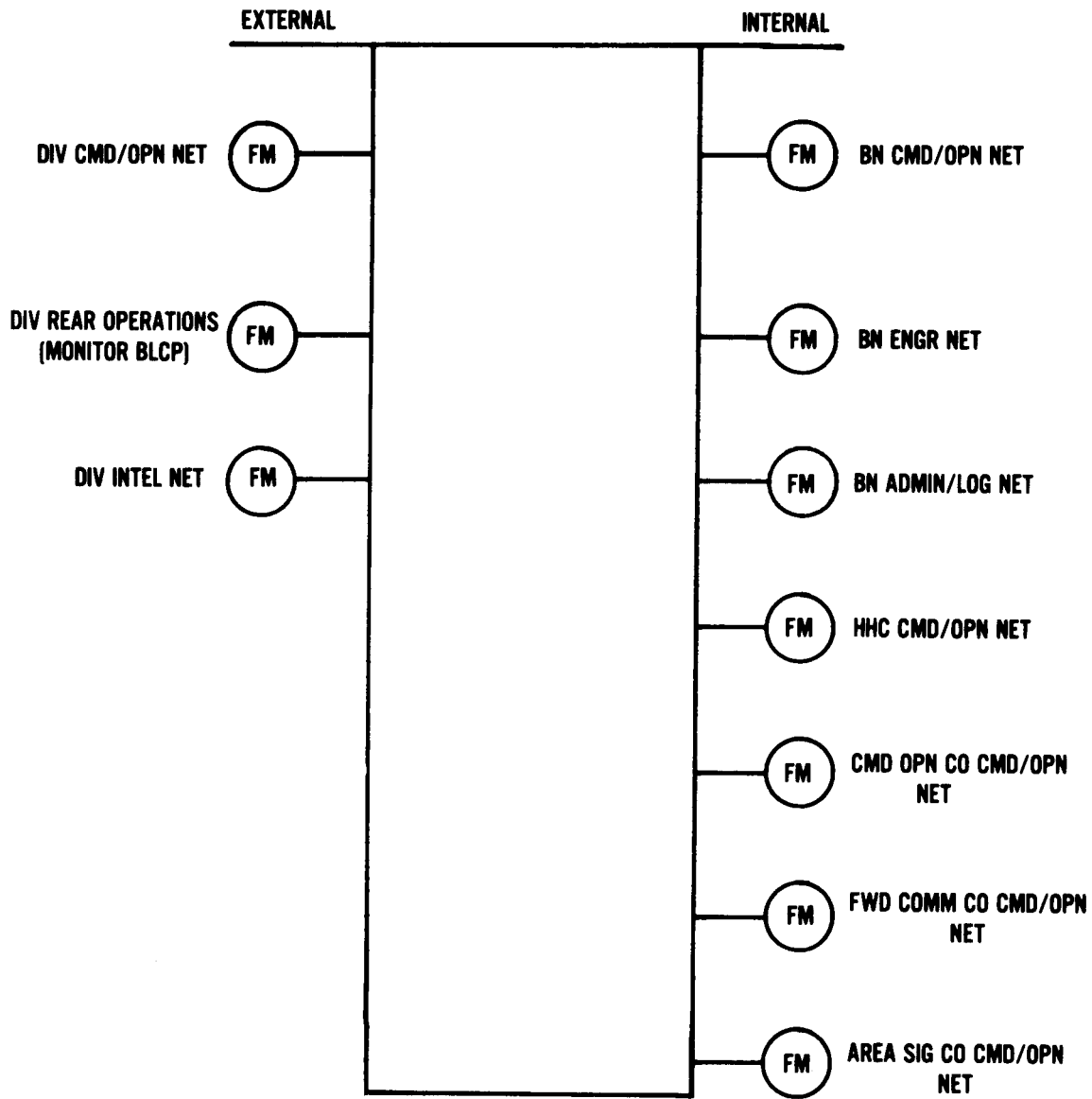


Figure 3-4. Signal battalion radio net structure.

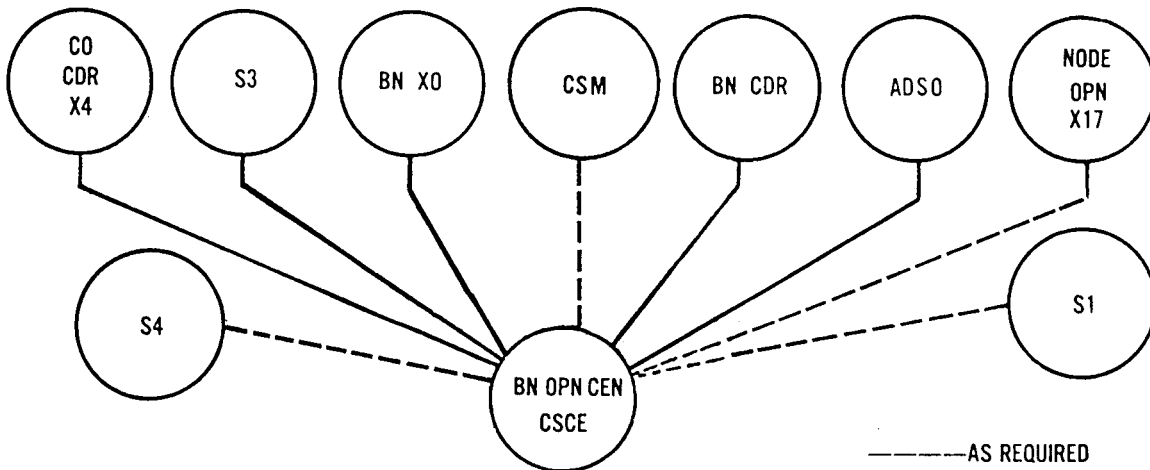


Figure 3-5. Signal battalion command/operations FM net.

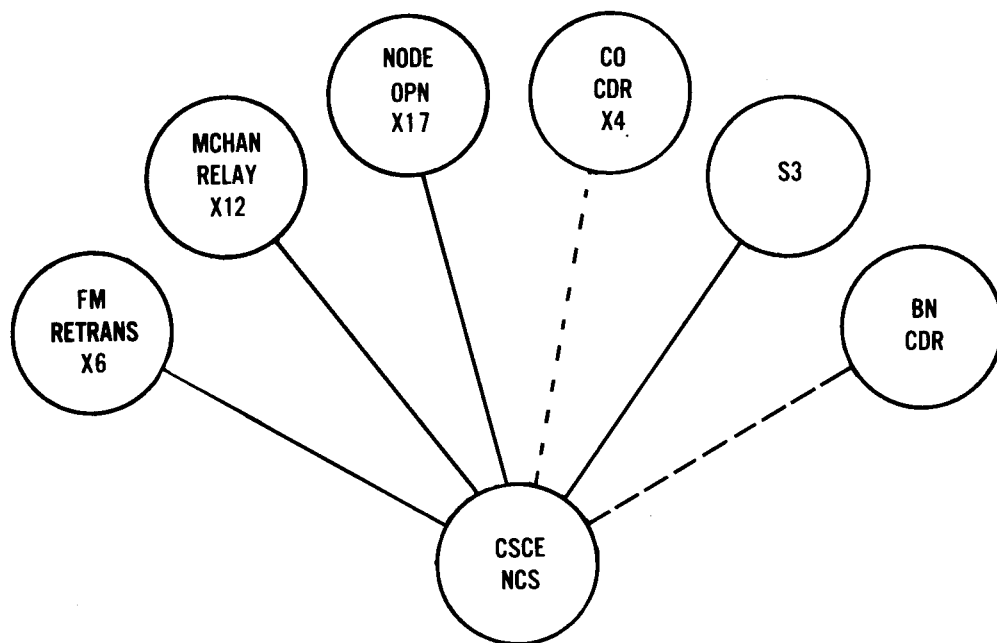


Figure 3-6. Signal battalion engineering net.

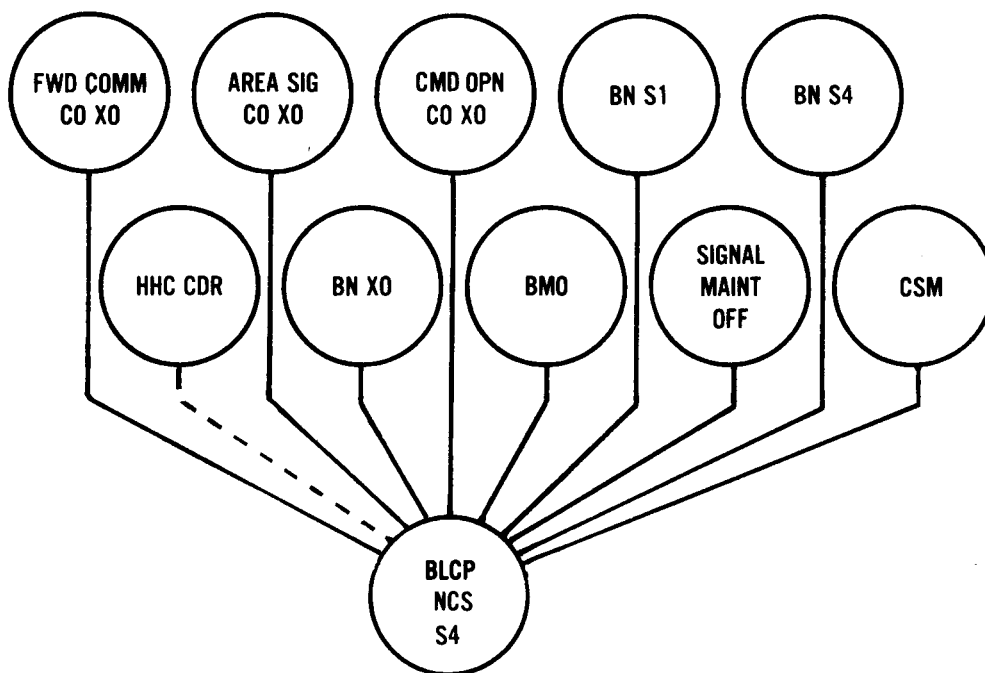


Figure 3-7. Signal battalion administrative and logistical FM net.

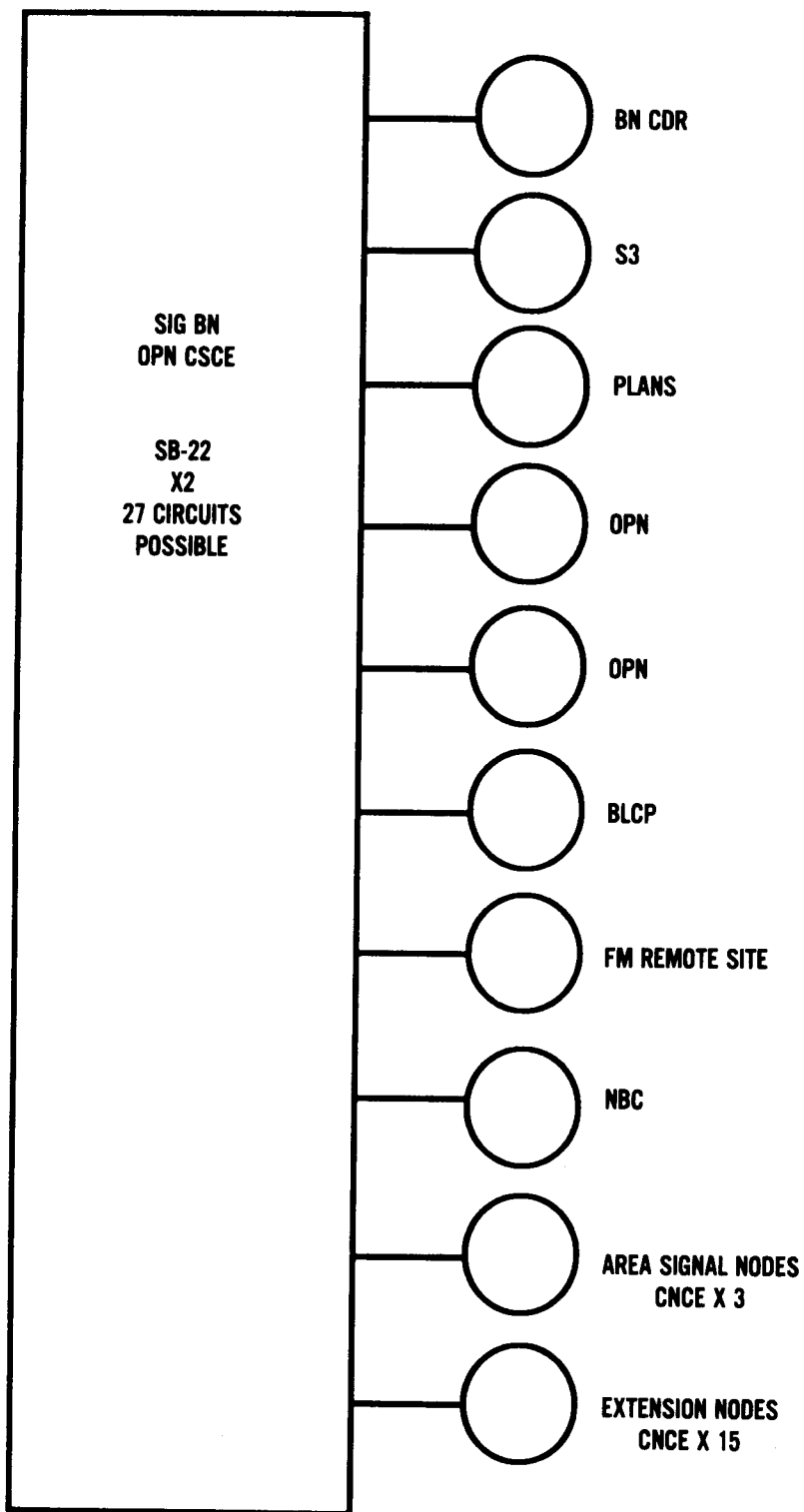


Figure 3-8. Wire diagram for signal battalion operations.

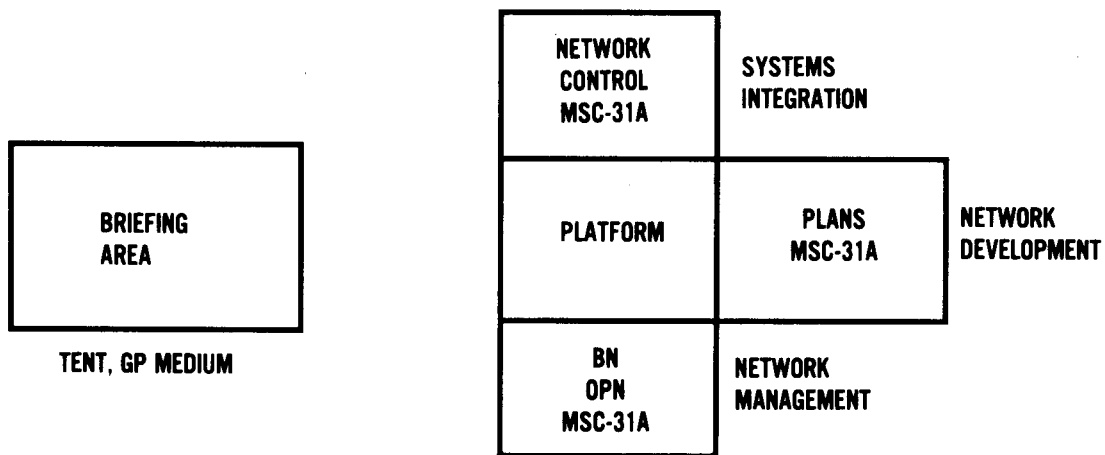


Figure 3-9. Heavy division signal battalion TOC, typical.

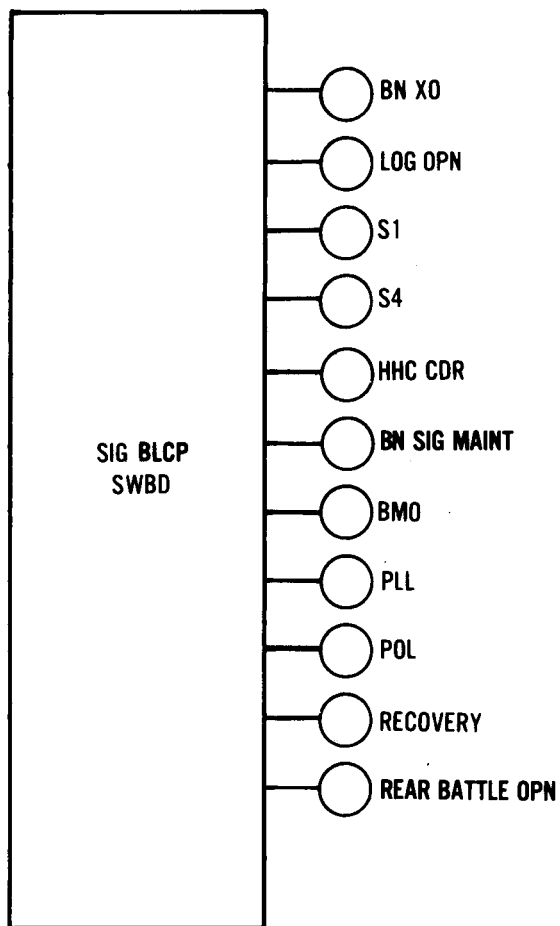


Figure 3-10. Wire diagram for signal BLCP.

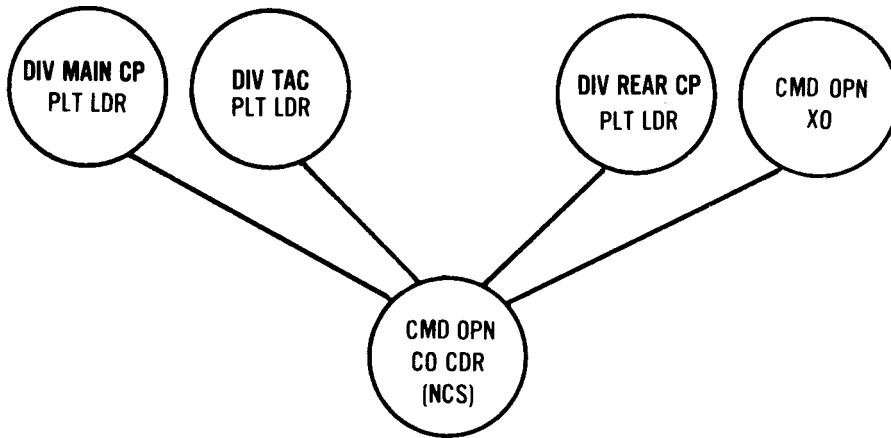


Figure 3-11. Command operations company command/operations FM net.

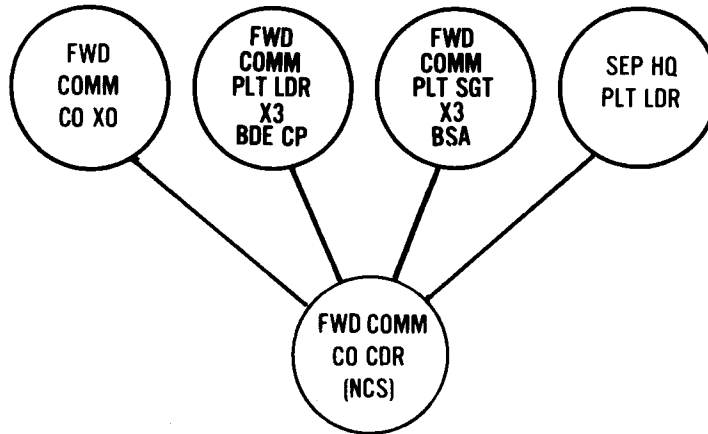


Figure 3-12. Forward communications company command/operations FM net.

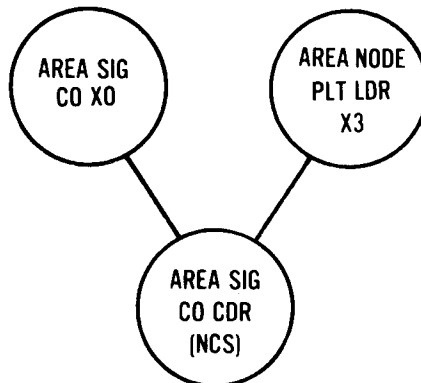


Figure 3-13. Area signal company command/operations FM net.

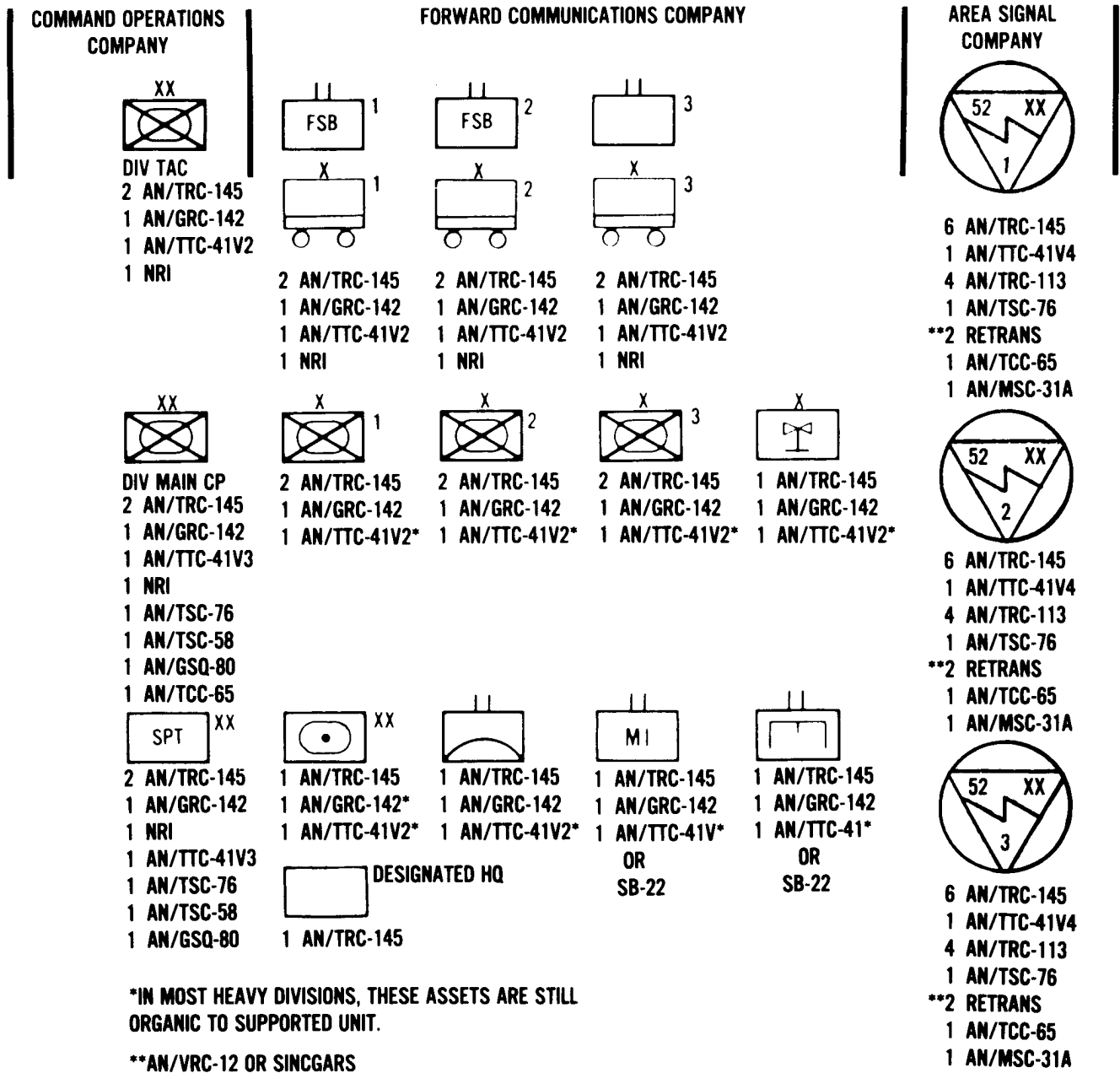


Figure 3-14. Heavy division doctrinal equipment employment.

Chapter 4

The Light Division Signal Battalion

4-1. General

The light division signal battalion has the same mission and functions as the heavy division signal battalion with unique functions.

a. The signal missions are normally executed with outside augmentation. Even in a low- or mid-intensity threat environment, if the division is subordinate to a deployed corps headquarters, the corps signal brigade supplies certain interconnecting systems.

b. The signal battalion is designed to support the division when it is employed over extended distances. It supports the division even when the area of operations is noncontiguous and when terrain or circumstances prohibit normal LOS multichannel usage. In these instances the division multichannel TACSAT system usually satisfies C³ requirements.

c. Only a binodal area network is established (rather than 3 as in the heavy division). It still offers system flexibility, alternate routing, and the security gained by elimination of highly vulnerable communications clusters.

4-2. Organization

The light division signal battalion has four companies. Figure 4-1 shows the structure of this unit by company. They are HHC, command operations extension company, forward command extension company, and the area signal company. Each company has distinct missions and roles that complement each other in support of the division.

a. HHC furnishes the typical mix of command and control assets to operate the battalion. It provides the same functions and has the same mission as the heavy division signal battalion.

b. The command operations extension company is one of the three operational signal companies. It has the personnel and equipment to support CP connectivity for the division headquarters elements. User-owned and -operated terminal equipment connect to these links provided by the signal battalions command operations extension company for both internal and external information transfer.

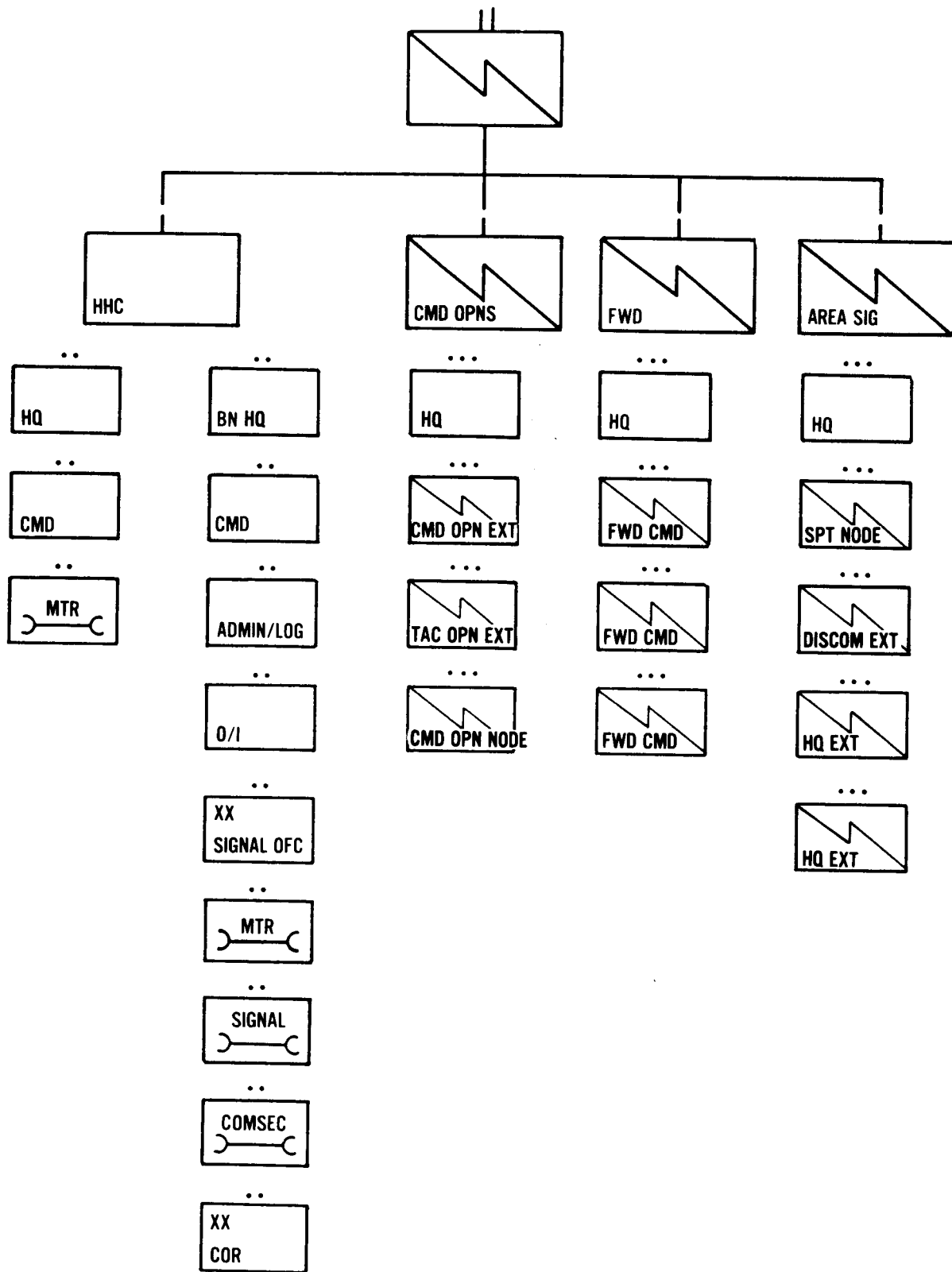


Figure 4-1. The light division signal battalion.

(1) The command operations extension company has a two-fold mission. It provides essential signal facilities for division elements at Div Main CP and Div TAC. It also provides one of the two area nodes for the division ACUS. The capability to distance these headquarters elements from the area nodes and for dual homing them is provided. It can secondarily provide signal node support for units in the vicinity of node one. This extension service could be LOS multichannel or cable if the distances allow. This gives greater access for outlying tactical units to take advantage of the common-user switched network and other nodal facilities.

(2) The company provides the following services:

- Automatic telephone central office and switching facilities for trunk and local telephone circuits.
- Secure multichannel LOS communications terminals for access to the automatic switched network.
- An NRI facility for secure single-channel (FM) radio access into the division automatic switched network.
- Cable installation teams to install internal cables and local telephone circuits. The teams lay cable to tagged junction boxes. Subscribers install local telephone circuits to these boxes. If time permits, cable teams may assist users in this effort.
- Secure single-channel improved high frequency radio (IHFR) RATT terminal at the Div Main CP for entry into the division level net.
- Secure multichannel TACSAT terminals for selected light divisions providing access to the automatic switched network over extended distances.

(3) The company unit level functions involve site defense for node one. In the event sites are collocated with other divisional elements, defense is a mutual responsibility. Limited repair of organic equipment is conducted. Isolated systems, such as the multichannel relays or the FM retransmission sites, pose special logistical and defense concerns to the company.

(4) The company is composed of a company headquarters section, a command operations platoon, a tactical CP extension platoon and the command operations node platoon. The three functional platoons and the elements they support are--

- Command operations extension platoon supports the Div Main CP.
- Tactical CP extension platoon supports the Div TAC.
- Command operations node platoon supports node one.

c. The forward command extension company provides signal support forward of the Div Main CP. It provides the essential signal facilities at the three brigade CPs and the three BSAs.

FM 11-50

(1) The forward command extension company provides the following services:

- Automatic telephone central office and switching facilities for trunk and local telephone circuits.
- Secure multichannel LOS communications terminals for access to the automatic switching network.
- NRI facilities for secure single-channel (FM) radio access into the division automatic switching network.
- Cable installation teams. The teams lay cable to tagged junction boxes. Subscribers install local telephone circuits to these boxes. If time permits, cable teams may assist.
- Secure single-channel (IHFR) RATT terminals for entry into the division RATT net.
- Secure multichannel TACSAT terminals for access into the automatic switched network over extended distances.

(2) The company unit level functions involve site defense coordinated with the supported CPs.

d. The area signal company provides signal facilities at the DISCOM as well as five headquarters support teams for communications at the DIVARTY, AB, ADA battalion, MI battalion, and one additional headquarters, as specified by the command. It also provides the second node for the division ACUS.

(1) The second signal node supports units in the vicinity of this node and allows the necessary connectivity into the division area system. This gives outlying tactical units access to the common-user switched network and other nodal facilities.

(2) The company provides the following services:

- Automatic telephone central office and switching facilities for trunk and local telephone circuits.
- Secure multichannel LOS communications terminals for access to the automatic switched network.
- An NRI facility for secure single-channel (FM) radio access into the division automatic switched network.
- Cable installation teams to install internal cables and local telephone circuits. The teams lay cable to tagged junction boxes. Subscribers install local telephone circuits to these boxes. If time permits, cable teams assist.
- Secure single-channel (IHTR) RATT terminals for entry into the division RATT net.

- Secure multichannel TACSAT terminal for selected light divisions at the DISCOM for access to the automatic switched network over extended distances.

(3) The company unit level functions involve site defense for node two. In the event sites are collocated with other divisional elements, defense is a mutual responsibility. Isolated systems, such as multichannel relays or FM retransmission sites pose special problems. These problems include sustainment of Classes I and III and site defense.

4-3. Capabilities and Limitations

a. The light division signal battalion can provide the following:

(1) Automatic telephone and switching facilities that eliminate the need for point-to-point circuits. This does not prevent the use of long line circuits for temporary or even semipermanent periods.

(2) A binodal area common-user system that affords flexibility, some degree of alternate routing, and the security of eliminating highly vulnerable communications clusters.

(3) An ability to operate the division communications system in difficult terrain that comes from technological advantages (like TACSAT and IHFR) as well as intense training in air mobile operations.

b. The light division signal battalion's limitations are described below.

(1) To meet the size, weight, and volume constraints of a light division, some operational means are sacrificed. Therefore, not all division subordinate headquarters have area linkage as in the heavy divisions.

(2) There is no organic messenger service provided by the signal battalion on a division scale. The following procedures/characteristics overcome this limitation:

- Facsimile is used to transmit message traffic.
- User units are responsible for their own messenger delivery.
- When a division messenger service is required, the division signal office is responsible for determining routes and schedules. The division G3 is responsible for tasking division units for vehicles and personnel.
- User-owned and -operated terminals are relied on to transfer messages through the area common-user switched system. Subscribers dial the intended recipient and send the message without intervention by or assistance of signal personnel.

(3) An available satellite space segment is necessary when extended conditions or difficult terrain requires the use of TACSAT systems. This is a limitation in view of the scarcity of space segment today.

(4) Threat environments are of particular concern. If the threat is great enough, then augmentation to the division signal battalion is needed to counter the REC threat. The system should be dispersed even further. This requires outside augmentation of relays and retransmission stations.

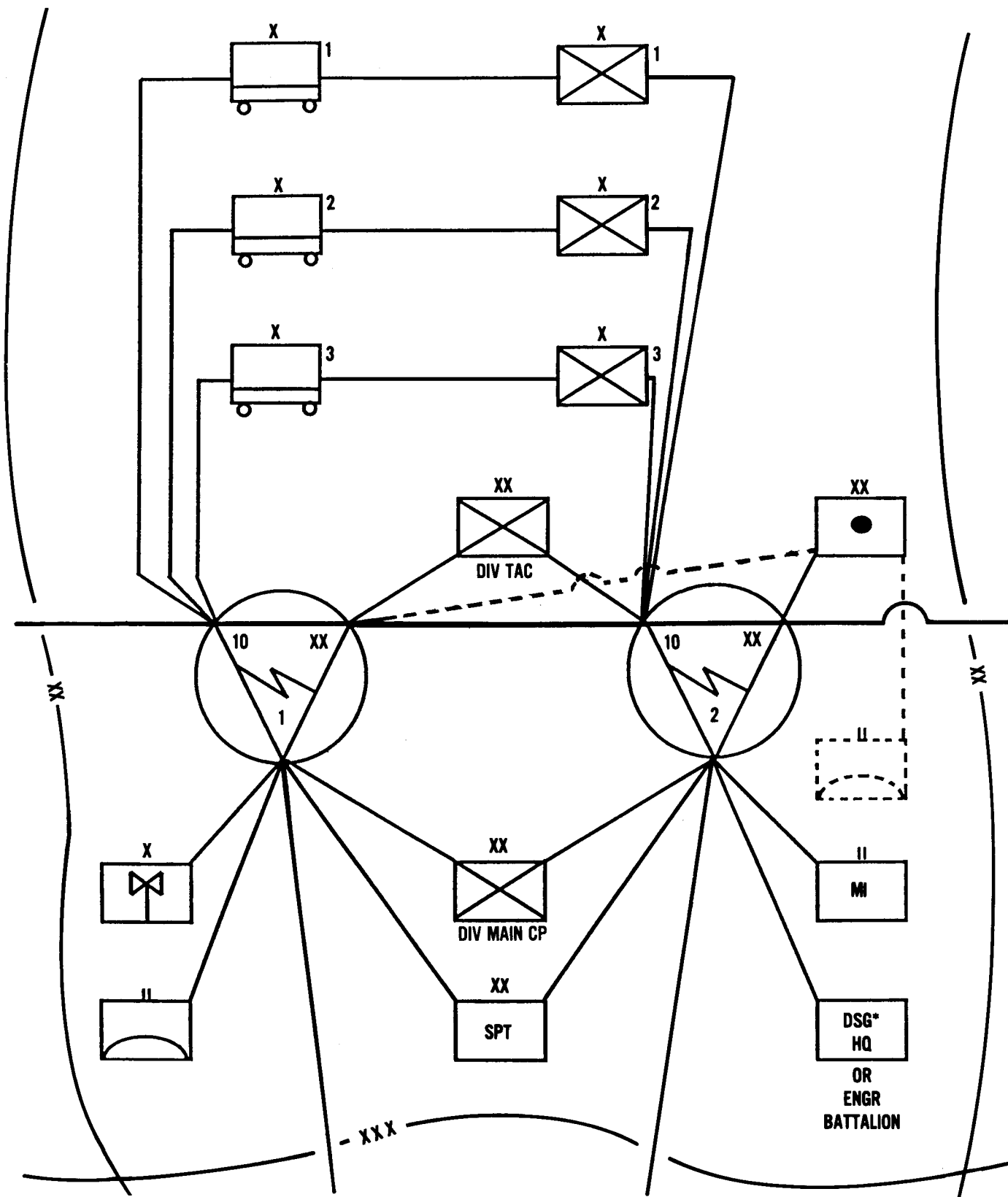
(5) Collocating a major node and one or more division headquarters may be considered in some situations. Of course, the increased physical size and electronic signature make the location more susceptible to detection. Separating headquarters from the nodes is a primary goal. Separation results in immediate physical security and more ease in displacement.

(6) Unit sustainment of highly dispersed signal assets creates a significant challenge. The unit maintains signal-unique systems with little assistance from higher echelons.

(7) There is not as much backup or reserve equipment available. The employment of less complex doctrinal systems should be planned. For instance, employing both stacks of equipment in an AN/TRC-145 multichannel system to terminate two systems allows a spare system in reserve or "jump" status for rapid displacement. This leaves the DSO a small base of assets to be used when needed.

4-4. Command and Control

a. The division signal battalion provides an area network of various communication means that allows the division commander and his subordinates to properly plan and execute the battle. Figure 4-2 shows a typical multichannel system in a light division. It is based on two major signal nodes. Limited alternate routing is provided.



RECOMMENDED

OPTIONAL

*DSG DESIGNATED

Figure 4-2. LID multichannel (LOS) terrestrial system.

b. LOS multichannel is the most common and most frequently used system in the division. It is also used in the heavy division. The basic system consists of terminals at--

- The two area nodes.
- Div Main CP.
- Div Rear CP.
- AB.
- DIVARTY.
- Div TAC.
- ADA battalion headquarters.
- The three BSAs.
- The three brigade headquarters.
- The headquarters designated by the division.

c. The light infantry division (LID) battalion with TACSAT has only 31 LOS multichannel terminals. An LID battalion without TACSAT has 36 LOS multichannel terminals.

d. Fielding of the AN/TSC-85A/93A (TACSAT) to selected light divisions has provided additional C³ links for the brigades. In the LID, TACSAT assets will be used to supplement the existing LOS multichannel systems or to provide global C³ depending on the mission. Selected LID signal battalions are authorized two AN/TSC-85As, one at Div Main CP and one at Div Rear CP; three AN/TSC-93As are authorized for deployment in support of the three maneuver brigades. Figure 4-3 shows a typical TACSAT employment.

e. The commander makes the final determination as to location of TACSAT assets. On a linear battlefield the multichannel system may be augmented by TACSAT. TACSAT can be operated on an interim basis until the LOS system is available. On a nonlinear battlefield the TACSAT network may be the primary communications means between the forward elements of the division and the support bases. However, consideration must be given to the increasing importance of IFR means in light of the ease with which current satellite systems are jammed.

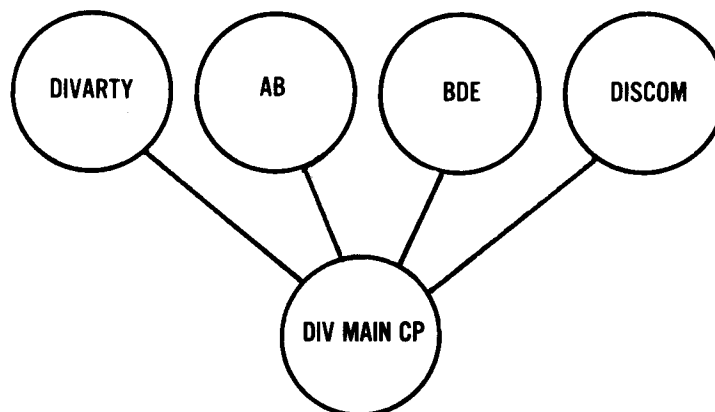


Figure 4-3. Optional TACSAT employment.

4-5. Internal Command, Control, and Communications

a. Command and control elements of the battalion function throughout the division to efficiently control and operate the communications system. Normally, the battalion headquarters section and the SYSCON operate from Node 1. The BLCP, positioned at Node 2, controls the battalion's other major functions.

b. The company headquarters disperses throughout the division area based upon operational requirements. All company level units face the problem of widely separated assets. Commanders are more mobile than stationary. Normally, the various company headquarters and functional sections may establish themselves in the following areas:

- HHC--with Node 2.
- Command communications company--with Node 1.
- Forward command extension company--with selected BSA.
- Area signal company--with Node 2.

- Division signal office--with Div Main CP.
- SYSCON--with Node 1.
- BLCP--with Node 2.
- Signal site operations--with BSAs, Div TAC, Div Main CP, and Div Rear CP.

c. The rapid movement of the LID demands a responsive command and control system. The isolated two- or three-person teams performing relay, retransmission, or terminal functions are common. To assist the various command and control elements, FM CNRs are needed. Figures 4-4 through 4-6 show the nets used for internal operations and for interface with division level staffs. Figure 4-7 shows the doctrinal equipment employment to support a light division multichannel system.

d. The LID concept presents unique challenges to the unit. Subordinate units supporting the division throughout a wide contingency of missions are also uniquely challenged. Another factor to be considered is the active component, reserve component mix, or round out system used for the LID.

(1) The signal battalion must plan, analyze, and manage a signal training program to compensate for this structural fundamental. The round out brigade along with its necessary CS and CSS elements are not as well trained in signal operations as are full-time units. Older equipment and operational differences may affect the interoperability and lower the design efficiency of the division ACUS.

(2) System engineering and employment by division signal office and SYSCON personnel consider the technical differences that may occur. The incompatibility caused by unfamiliarity with reserve component units should be handled by personal liaison and joint training.

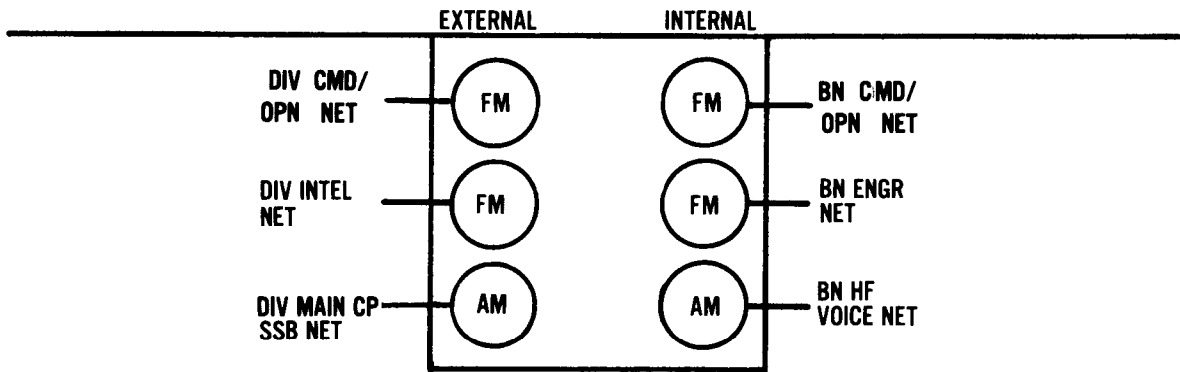


Figure 4-4. External and internal signal battalion nets.

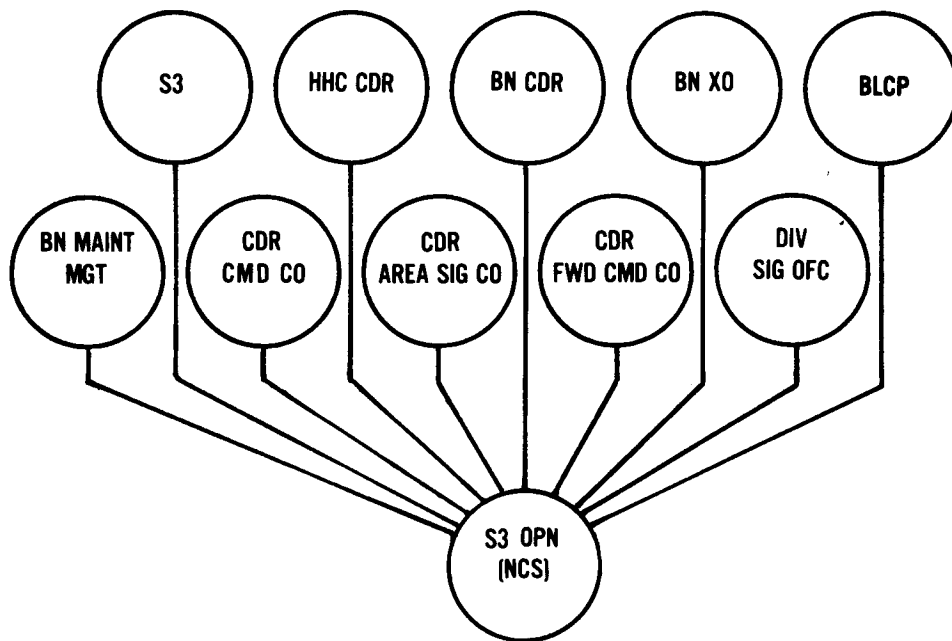


Figure 4-5. LID signal battalion command/operations FM net.

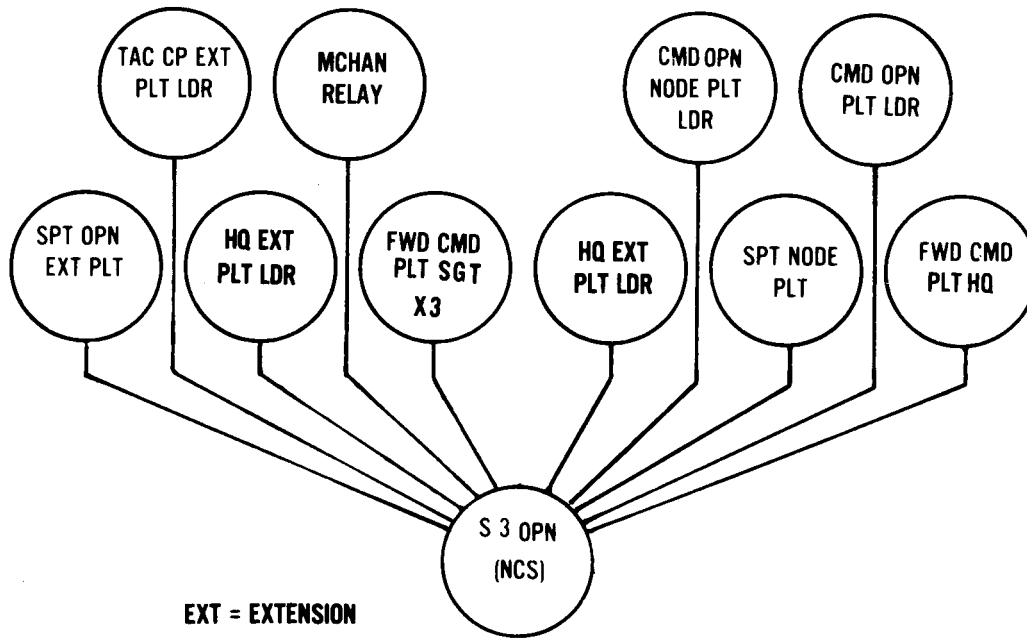


Figure 4-6. LID signal battalion engineer FM net.

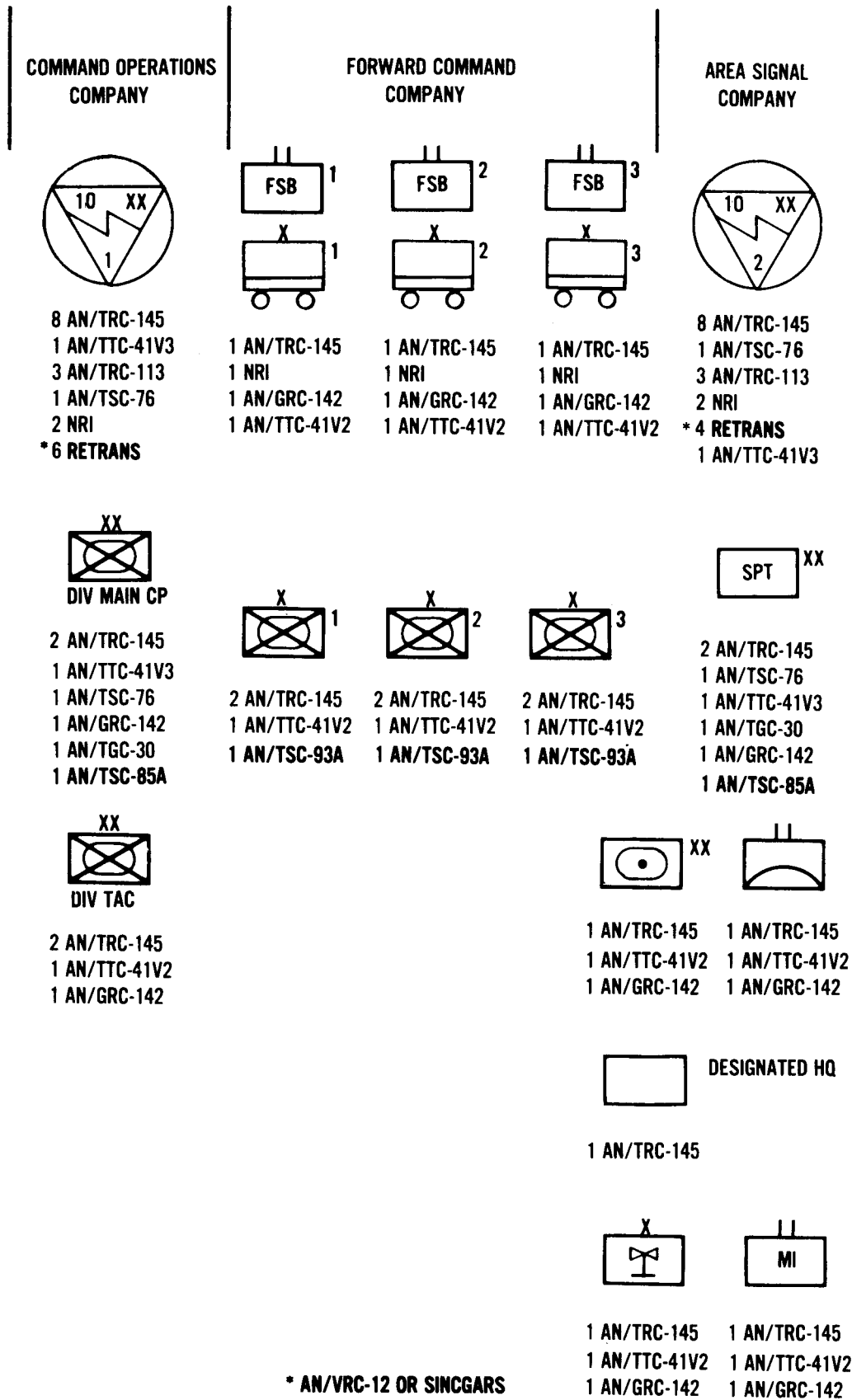


Figure 4-7. LID doctrinal equipment employment.

4-6. Potential Deployment Light/Air Assault/Airborne Division

a. Through the application and analysis of METT-T (mission, enemy, terrain, troops and time available), the light division deployed as part of a corps may be found deficient. Logistically, without additional support, the time on station for a light division is limited. Operationally, extended communications lines require equipment from the corps.

b. Command and control, as part of a corps, requires the corps signal office and light division signal office to jointly plan and accomplish the mission. The corps signal office plans for augmentation of the light division as required. An example of this is record traffic management where the two-position AN/TGC-30 of the LID limits the amount of record traffic flow. The corps signal office may support the light division as part of a corps communications center operation or provide a stand-alone configuration.

4-7. Joint Task Force

a. The joint task force (JTF) is made up of assigned or attached elements of the Army, the Navy or the Marine Corps, and the Air Force, or two or more of these services. The JTF is established by the Secretary of Defense, by the commander of a unified or specified command, or by an existing JTF.

b. A JTF may be composed of all service elements. The communications engineering of successful joint operations requires knowledgeable signal officers to ensure command and control.

c. The light division participates as a member of a JTF. The division signal office is responsible for contingency communications planning. Each service has a signal office.

4-8. Predeployment Communications

a. Just prior to deployment, maximum use of infrastructure communications should be used rather than organic assemblages that may require extensive preparation for transport. At the same time, they must minimize exposure of tactical communications to intercept. It is important at this phase to emphasize the use of either automatic secure voice communications (AUTOSEVOCOM) or locally secured telephones, teletypewriter/data automatic digital network (AUTODIN), and courier systems. These measures protect the security of the planned operation and free tactical communications systems for deployment. Table 4-1 contrasts predeployment missions and possible communications means.

b. TACSAT terminals should not be committed for administrative communications unless they can be quickly and positively recovered and redeployed. These limited assets are critical in the initial deployment and employment phases because of their high mobility and ease of operation in almost any worldwide location.

Table 4-1. Predeployment.

MISSIONS	COMMUNICATIONS MEANS
Control of outload	Secure commercial and TDA radios and telephones, WWMCCS ADP, AUTOSEVOCOM, AUTODIN, courier
Coordination of communications requirements in deployment area	Secure commercial and TDA radios and telephones, WWMCCS ADP, AUTOSEVOCOM, AUTODIN, courier
Coordination of logistics support in deployment area	Secure commercial and TDA radios and telephones, WWMCCS ADP, AUTOSEVOCOM, AUTODIN, courier
Intelligence on deployment routes and deployment area	Secure commercial and TDA radios and telephones, WWMCCS ADP, AUTOSEVOCOM, AUTODIN, courier

c. Plans must be made for external support to provide access into the Defense Communications System (DCS) or the diplomatic telecommunications service (DTS) in the deployment area if elements of the division are deploying as an independent task force. The DTS interfaces with the DCS, allowing the exchange of both secure voice and teletype/data traffic. Also, each embassy or consulate can assist with the local telephone system in the deployment area. Existing tactical communications systems, with the exception of the UHF/TACSAT and IHFR, do not have sufficient range to communicate out of many contingency deployment areas. It is possible to deploy to an area where even the UHF/TACSAT radio cannot communicate directly back to CONUS. In this case, DTS/DCS interface is the only alternative for intertheater communications.

4-9. Strategic Deployment Communications

a. Operations security (OPSEC) is ensured through the use of available communications systems. Each deployed Military Airlift Command Airlift Control Element (MAC ALCE) maintains contact with MAC headquarters in CONUS and with other MAC ALCE teams at intermediate staging bases. (See Figure 4-8.) Table 4-2 contrasts missions and communication means for strategic deployment.

b. Early deployment of a multichannel TACSAT terminal into a secure base area provides both direct command and control communications and a means for the commander to access the DCS secure voice network through a DCS entry station.

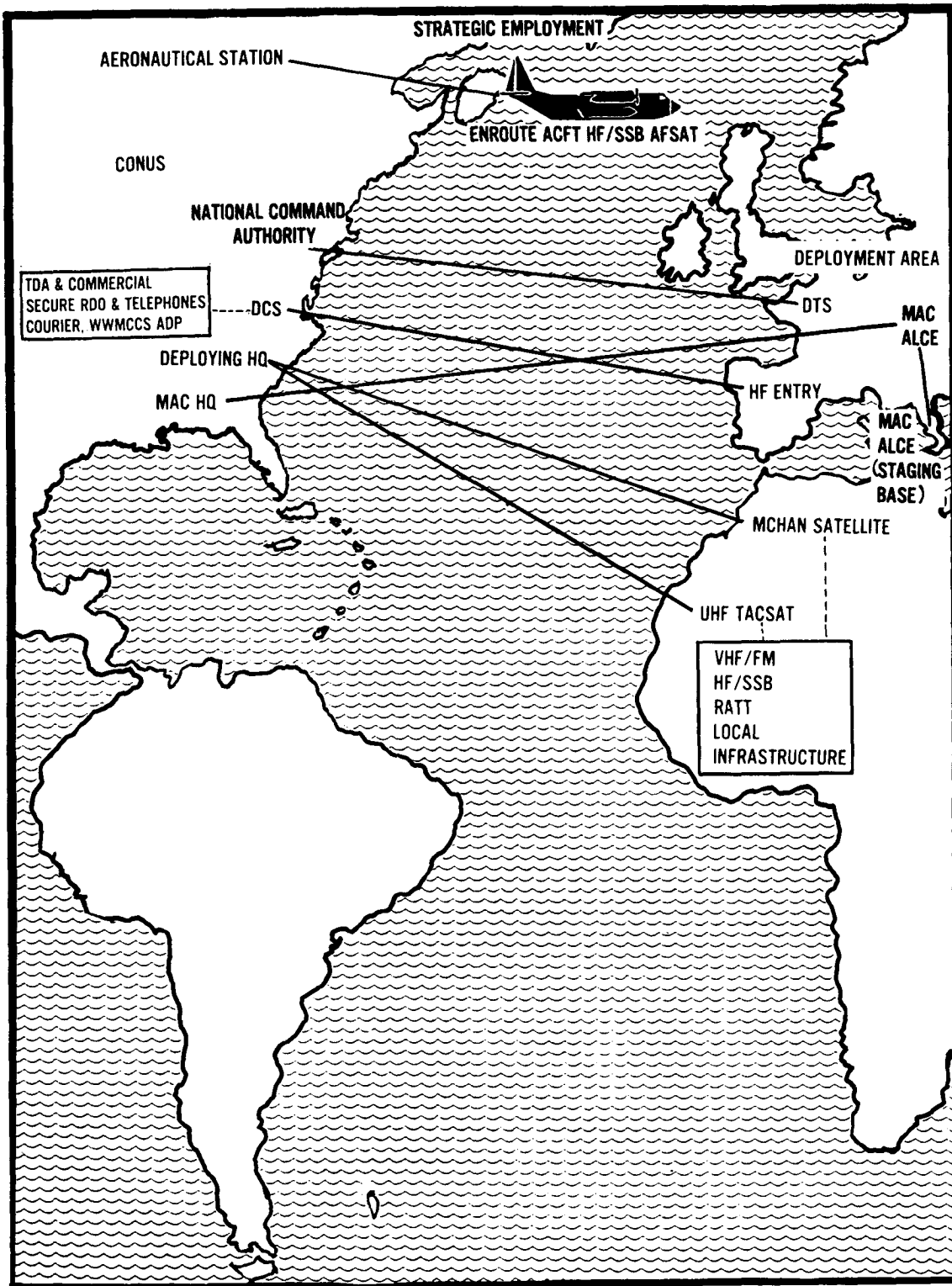


Figure 4-8. Strategic deployment.

Table 4-2. Strategic deployment.

MISSIONS	COMMUNICATIONS MEANS
Enroute control of self-deploying aircraft	Aeronautical stations, HF/SSB
Control of arrival area	UHF/TACSAT
Arrival area local command and control	VHF/FM (SINGARS), HF/SSB (IHFR), RATT EPLRS, local area infrastructure
Coordination of logistics flow and pre-positioning	UHF/TACSAT MCHAN TACSAT, HF DCS entry

c. Deployed units require assistance to access the DCS through either multichannel TACSAT or high power HP DCS entry. DCS access provides AUTOVON, AUTODIN, secure voice, and WWMCCS access. This capability is not organic to the division and must be provided by the supporting command.

d. Planners must identify mission capability packages as mission planning develops. Incremental deployment may be required based on mission requirements and lift constraints. The essential integrity of communications system packages is retained for the mission. For example, the system must include the basic radio, prime mover, generator, fuel, spare parts, and operators. Any sustained operation includes a maintenance package which is usually a combination of replacement components, repair parts, tools, batteries, a maintenance facility, and trained personnel.

4-10. Tactical Deployment

a. During the initial phase of tactical deployment, communications equipment is brought forward to ensure essential command, control, and intelligence communications are immediately available upon arrival.

b. The existing infrastructure should be exploited as much as possible, leaving the tactical communications systems free to deploy forward with the combat forces.

c. If available, the Airborne Battlefield Command and Control Center (ABCCC) provides initial command and control communications to a deployed task force headquarters. These scarce assets are usually used to support joint headquarters deployments.

d. OPSEC is key to survival as relays or isolated signal elements are deployed. When possible, deploying teams should move only during periods of limited visibility. Camouflage systems should be installed to prevent direct or overhead observation. Resupply vehicles and routes should be concealed. Failure to observe OPSEC leaves these small teams vulnerable to hostile action.

4-11. Tactical Employment

a. US forces should continue to use the existing communications infrastructure, including US and host nation assets. (See Table 4-3.)

b. Any task force deployed separately will be supported by available long-range communications systems from the division signal battalion. However, because assets may be committed to a higher priority mission, each brigade and battalion must be prepared to use organic HF radio systems for long-range communications. Figures 4-9 and 4-10 show the battalion task force tactical employment and communications.

(1) A separate battalion task force, deployed as either the initial combat element of a larger force or as a small force tailored for a short duration and limited mission, initially deploys with organic manpack VHF/FM and limited vehicular mounted VHF/FM and HF/SSB radio sets if required and if within the movement constraints. When required by the mission, one or two TACSAT teams from the division signal battalion are attached to the task force.

(2) Wire should be used to interconnect local elements within CP areas; however, long wire lines, meaning a greater distance than can be observed unless secure, should be avoided. Long wire lines can be monitored and long wire installation is extremely time consuming. The lines can be destroyed by vandals, track vehicles, or hostile forces. If wire line is extended outside a secure area, the entire telephone network is unsecure unless secured by existing cryptographic devices.

(3) Deployment of a brigade task force is supported by a division CP to provide additional communications and logistical and personnel support. When appropriate, the division CP controls base area operations. The division CP includes a task force signal officer who provides signal planning and technical support directly or through coordination with a supporting signal element. The division task force signal officer exercises operational control of all deployed signal battalion elements. Figures 4-11 and 4-12 show the brigade task force tactical employment and communications.

Table 4-3. Tactical employment.

MISSIONS	COMMUNICATIONS MEANS
Tactical command and control of combat operations	VHF/FM (SINGARS), HF/SSB (IHFR), UHF/TACSAT
Combat intelligence reports	VHF/FM (SINGARS), HF/SSB, UHF/TACSAT, RATT
Strategic intelligence reports	UHF/TACSAT, MCHAN TACSAT, HF DCS entry, Corps Communications System
Staff coordination and reports	MCHAN telephone and TRCFAX, RATT
Logistical requests	MCHAN telephone and TRCFAX, RATT

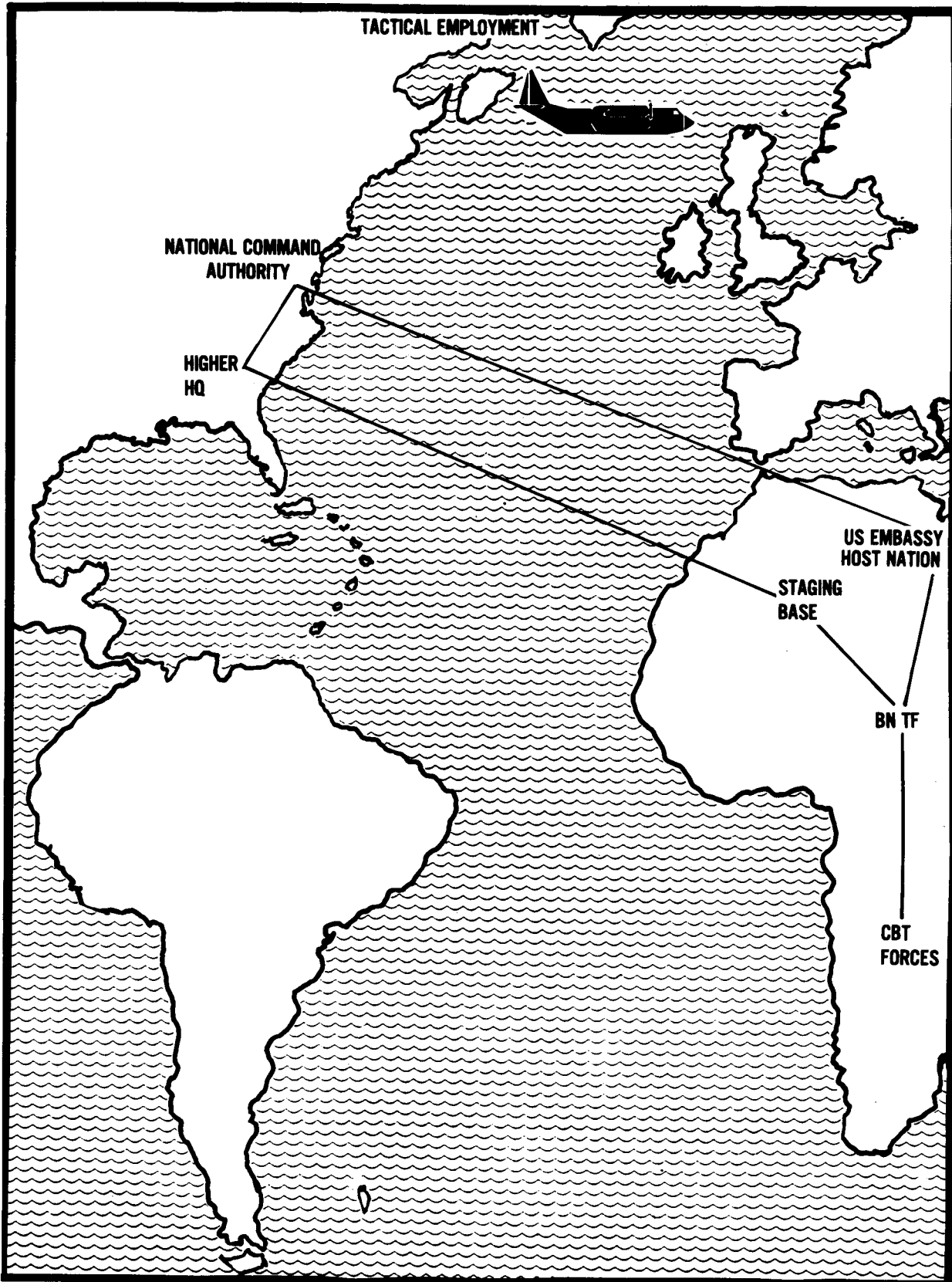


Figure 4-9. Battalion task force tactical employment.

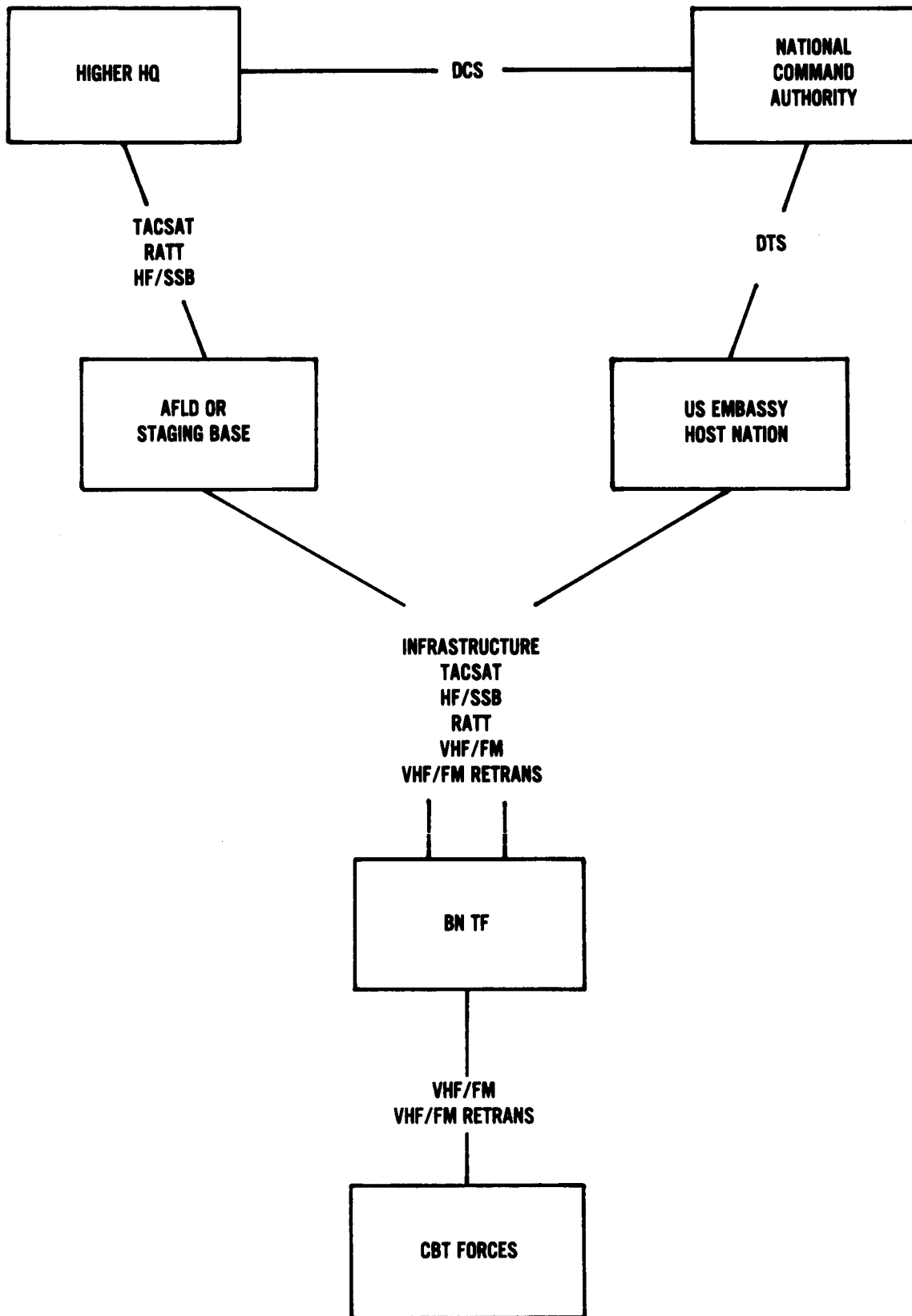


Figure 4-10. Battalion task force communications.

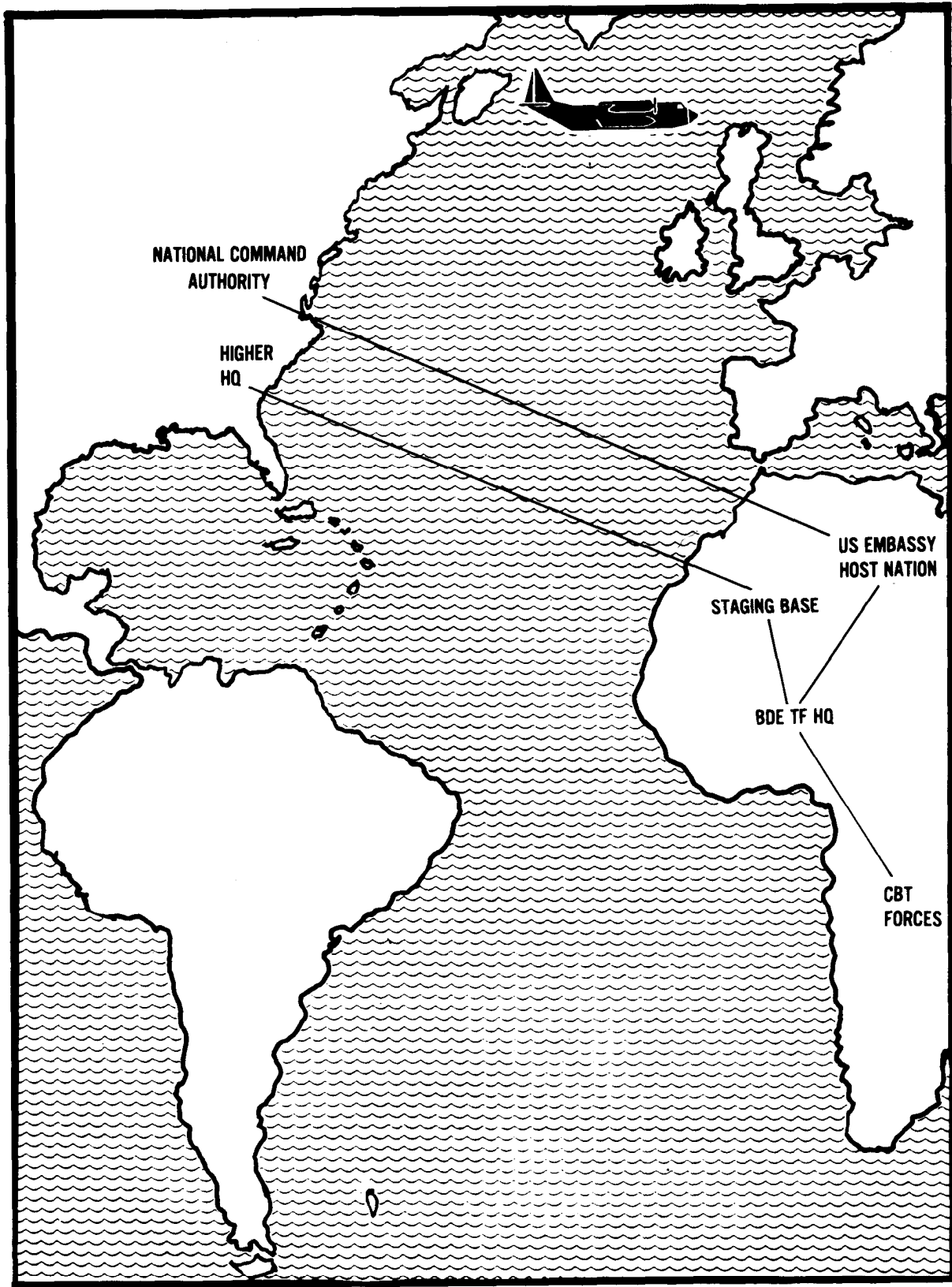


Figure 4-11. Brigade task force tactical employment.

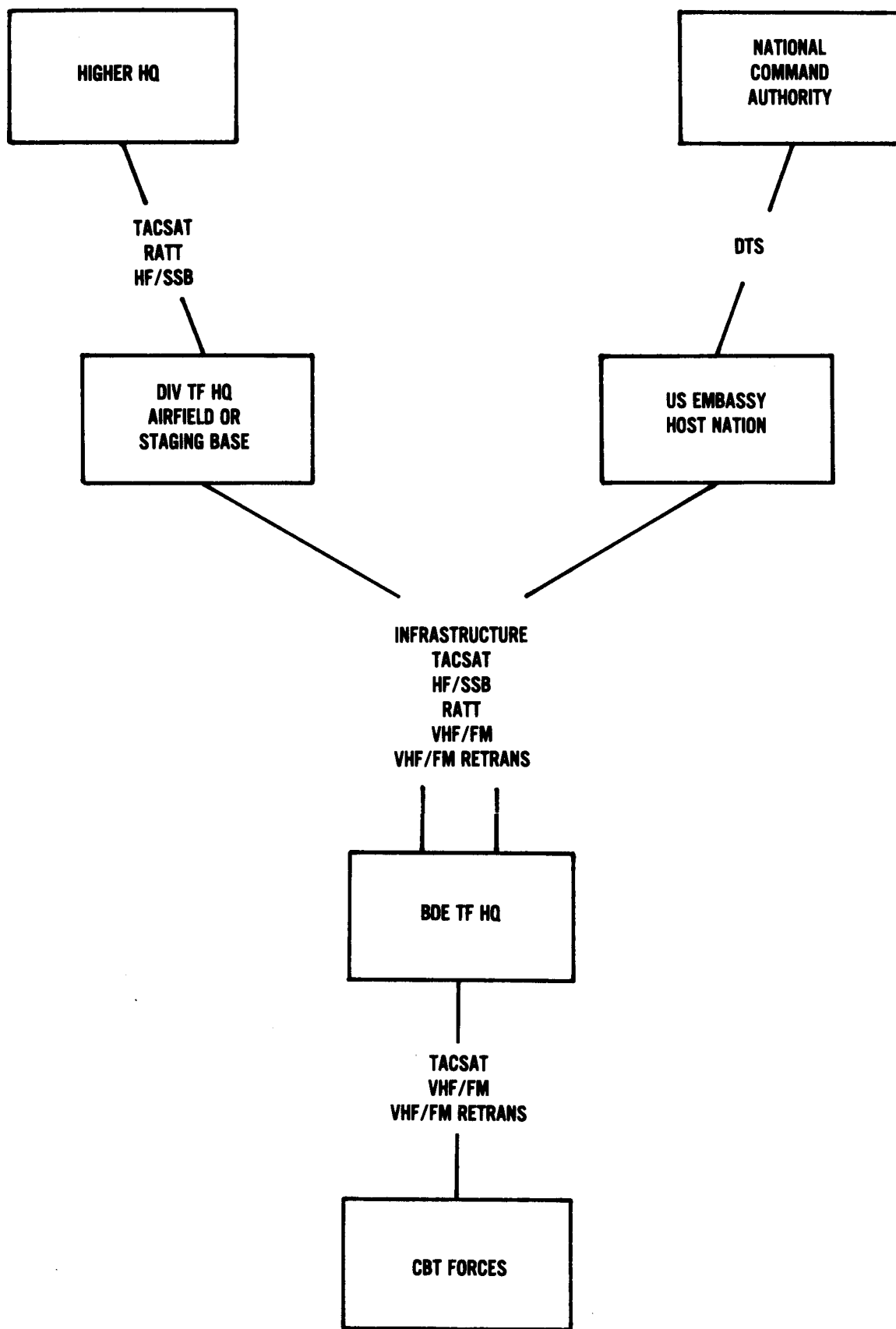


Figure 4-12. Brigade task force communications.

(4) The reliability and security of the VHF/FM system should be used to full advantage, to include range extension using retransmission stations where required. Multichannel systems should not be deployed unless a requirement for sustained operations communications develops or additional divisional units deploy. Couriers selected from within the task force should continue to carry the non-time-sensitive traffic.

(5) Employing VHF/FM retransmission stations requires care in several areas: antenna siting for best coverage, antenna siting to minimize intercept by hostile forces, resupply and recovery, and frequency management. In general, the retransmission should not be placed at the very peak of a crest or ridge. The higher elevation should be used to mask transmissions from the Threat. Even if the signal is not completely attenuated, the mask distorts the location accuracy for direction finders. Planned positioning should allow for ingress and egress of helicopters without exposure over the horizon. When possible, sites should be located where they are not dependent upon helicopters for resupply or extraction. Key terrain for radio relay becomes obvious in the course of a mission. Collocation of relays aids in their resupply and protection. However, collocation can offer the enemy a lucrative target.

(6) HF radio operations are significantly enhanced by an aggressive frequency management program, with frequency changes as required by atmospheric or other interference, supported by use of an atmospheric sounding device such as a chirpsounder. The unit signal officer must take extracts of propagation predictions into the area to manage HF radio frequencies. The task force signal officer must control the frequencies used to prevent mutual interference which can render systems ineffective. The ADSO will have prediction charts and a handheld calculator system for near real-time prediction. A skilled operator, with correct frequencies, can maintain communications in the contingency area. Local forces will rely upon HF for NLOS communications in the area.

(7) Single-channel TACSAT and VHF/FM (Figures 4-13 through 4-15) are used for most critical command, control, and intelligence communications. A Parkhill secured HF/SB tactical operations center (TOC) net and RATT provide NLOS secure communications to all units. HF/SSB is the only NLOS system provided to units below brigade because of the shortage of TACSAT assets.

(8) A typical multichannel grid network system covers a broad frontal area. However, contingency operations may force the division into an elongated posture, with the deployed brigades positioned quite distant from the division support area (DSA). This resulting multichannel system may involve extensive use of relays including some that may need to be airlifted to locations inaccessible by vehicles. The extended communications ranges may result in a system that does not include DSA-BSA systems or lateral systems between adjacent units. Rather than the grid-like system of nodes, they may be in a more linear alignment. Since the VHF/FM retransmission and the multichannel relays generally support the same headquarters, they are often colocated on favorable terrain. This requires both an integrated defense and an intensively managed frequency plan.

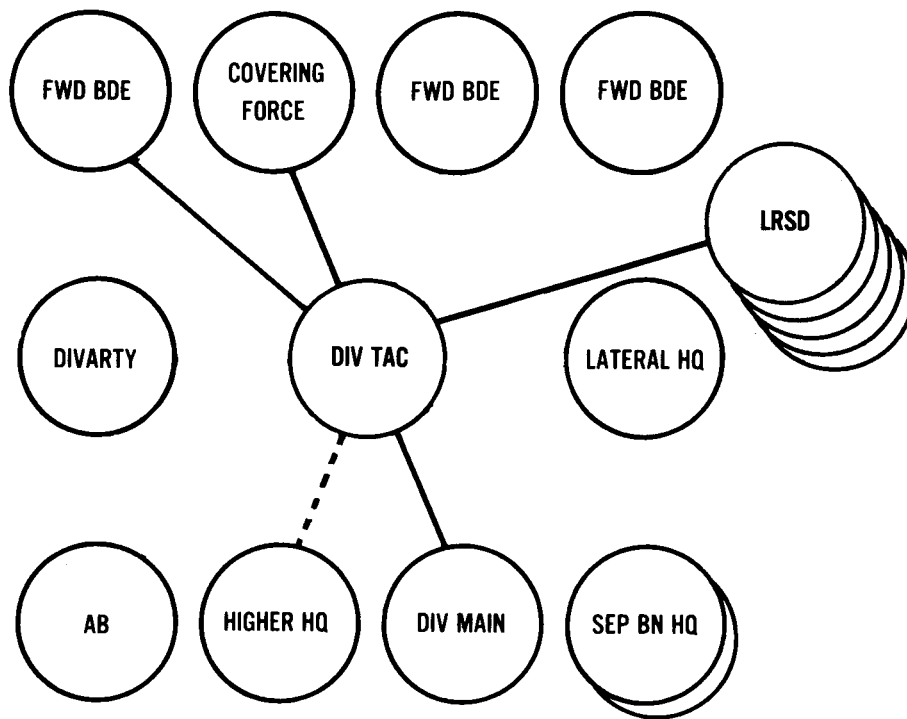
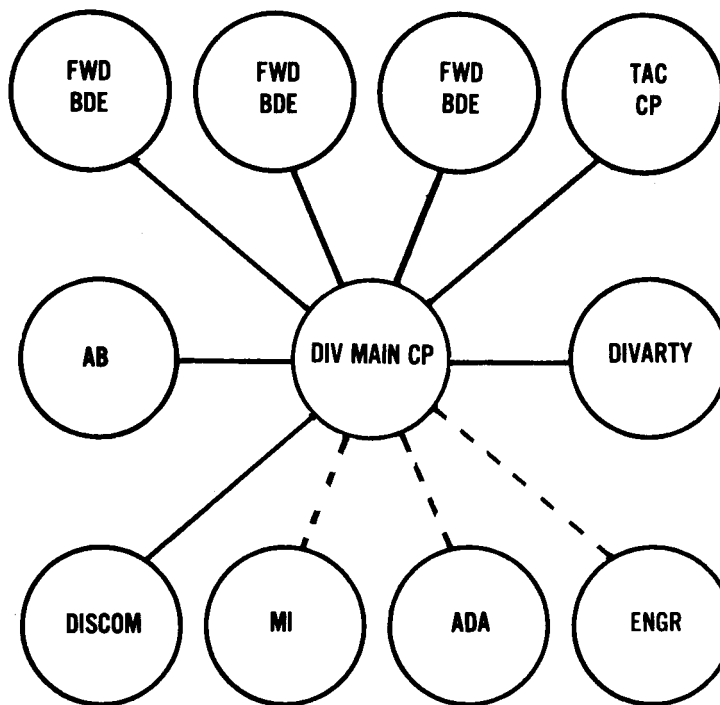


Figure 4-13. Tactical employment single-channel radio UHF/TACSAT.



-----ONLY SUPPORTED IF SERVICE IS NOT DESIRED AT ANOTHER HQ.

Figure 4-14. Tactical employment single-channel radio HF/SSB TOC net and division GP RATT net for light division.

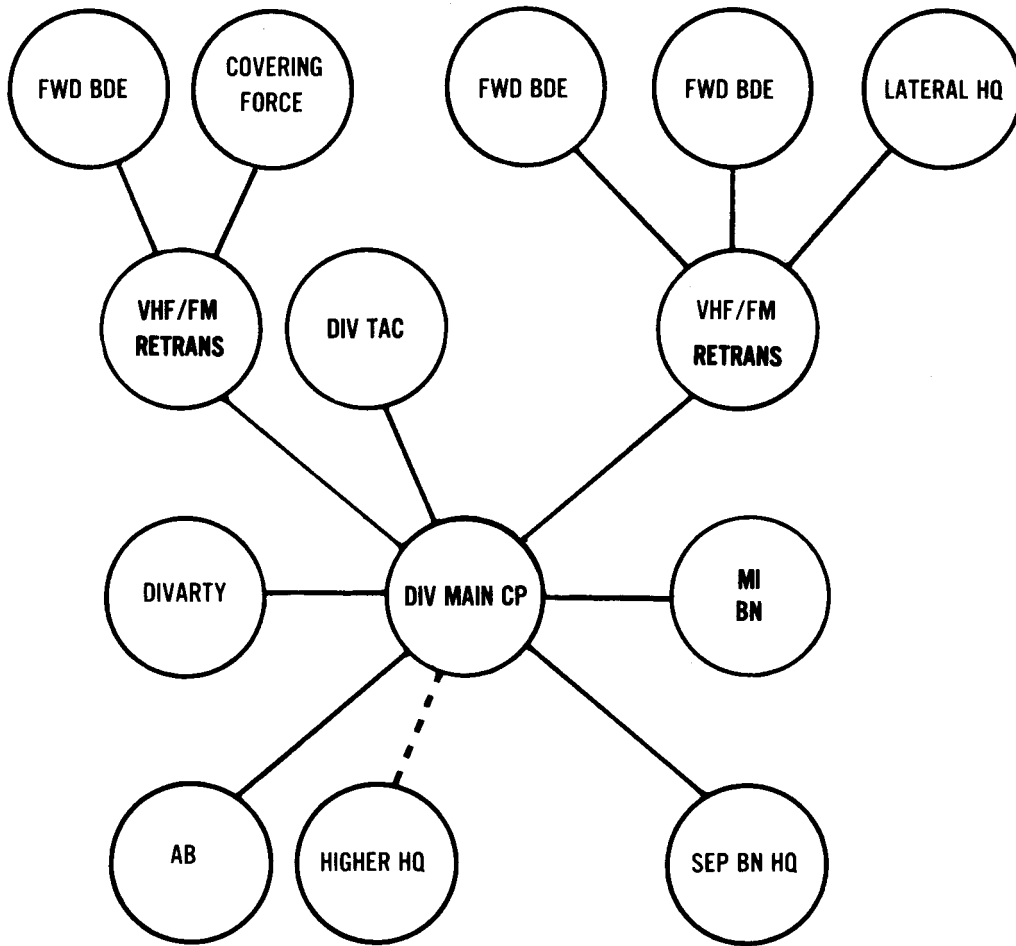


Figure 4-15. Tactical employment division command operations net VHF/FM.

(9) ECCM is critical to successful operations. Users must deny electronic intercept to avoid direct physical attack and jamming. Antenna siting and minimizing radio transmissions are key methods of providing tactical ECCM. Each unit should train extensively in these methods.

(10) Liaison teams must be provided adequate communications back to their parent headquarters when they are dispatched to lateral or other headquarters. In the best cases, the existing telephone and message network will be adequate. However, in most tactical situations, the only communications will probably be through the radio that the liaison team brings from their own unit. The radio must be adequate for the communications ranges, and the team must be provided SOI and COMSEC or operations code materiel before departure.

(11) High capacity data communications may be necessary for corps artillery and air defense units operating in the division area. This may require extension of the division multichannel system to these units. They may be colocated with the division artillery or the division air defense battalion, as appropriate. These measures ensure that the corps TACFIRE network and the joint automated air warning network are made available to the division.

(12) Airspace management communications must be coordinated between the Division Air Management Element (DAME) and any combined or joint air operations in the area. The appropriate interface with air defense and artillery fire control centers must also be coordinated.

4-12. Sustaining Operations Communications

a. Communications and COMSEC DS maintenance facilities must be deployed forward in the division main area to ensure reliable operation of the secure communications systems. Figure 4-16 shows the sustainment communications system.

b. Development of supporting high capacity communications for the logistics base and high capacity systems linking that base and the deployed division is essential.

c. An expanded base communications system, to include the use of local infrastructure on a contract basis, and an expanded DCS access are required to fully support sustaining base operations.

d. The DISCOM or other specified commander is tasked to control rear area security. If required, the logistics nets and communications lines may be used to support limited combat operations. Major operations require augmentation by combat forces to include their communications means and possible augmentation from division or higher headquarters.

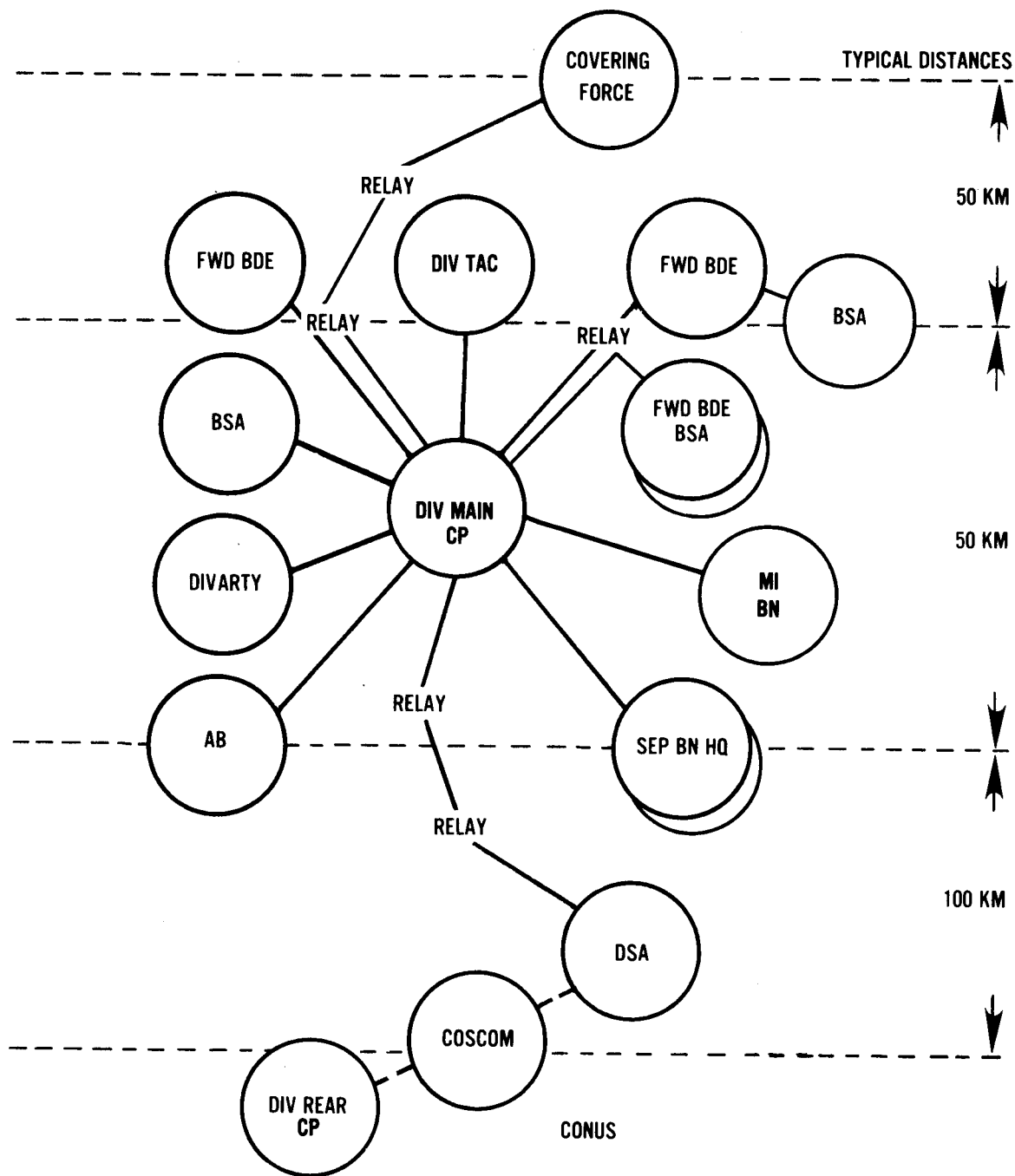


Figure 4-16. Sustainment communications system.

e. The BSA and DSA are normally added into the division multichannel system during the initial deployment of the multichannel system. However, these extensions may be deferred depending on the situation and the ability of the DSA/BSAs to fix their locations relative to the Threat force. In addition to the multichannel system, a separate GP RATT net installed by the signal battalion will provide hard-copy communications traffic between the BSA and the DSA.

CHAPTER 5

The Air Assault Division Signal Battalion

5-1. General

The air assault signal battalion--

- a. Deploys as a light division signal battalion (see Chapter 4).
- b. Installs, operates, and maintains a division communications system to support division level functions including command, control, fire control, intelligence, CSS, and air defense.
- c. Provides internal CP communications at all echelons of the division headquarters.
- d. Provides the division commander and staff with signal staff assistance to plan division signal support (for example, automation and communications). For more information, see Chapters 2 through 4.
- e. Provides direct support COMSEC maintenance and logistics for the division to include the administration of the division COMSEC material account.

5-2. Organization

The air assault division signal battalion has four companies: HHC, a command communications company, a signal support company, and an area signal company.

- a. HHC--
 - Commands and controls the battalion.
 - Provides the division signal staff element.
 - Provides DS COMSEC maintenance and logistics functions for the division.
 - Provides DS electronic maintenance of signal support equipment organic to the battalion.
- b. The command communications company--
 - Provides extension nodes at the Div Main CP and the Div TAC.
 - Provides an area node in support of the division multichannel network.
 - Provides FM retransmission stations in support of the division AO.

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- Provides multichannel relays in support of the division AO.
- Provides command, control, and administration of organic assets.
- c. The signal support company--
 - Provides three extension nodes in the forward division AO to support the three brigade CPs and their support areas.
 - Provides secure RATT stations at the brigade CPs for operation in the division GP RATT net.
 - Provides command, control, and administration of organic assets.
- d. The area signal company--
 - Provides multichannel communications terminals at DIVARTY, aviation group, air defense battalion, MI battalion, and engineer battalion.

Provides secure RATT stations and automatic switchboards at the DIVARTY, aviation group, air defense battalion, MI battalion, and engineer battalion for operation in the division GP RATT net and to tie into the division's switching network.

- Provides the second area node to support the division multichannel network.
- Provides the extension node at the Div Rear CP/division rear element.
- Provides FM retransmission stations in the division AO.
- Provides multichannel relays in the division AO.
- Provides command, control, and administration of organic assets.

Figure 5-1 shows the air assault division multichannel system. Figure 5-2 shows doctrinal equipment employment to support doctrinal divisional multichannel network in the air assault division.

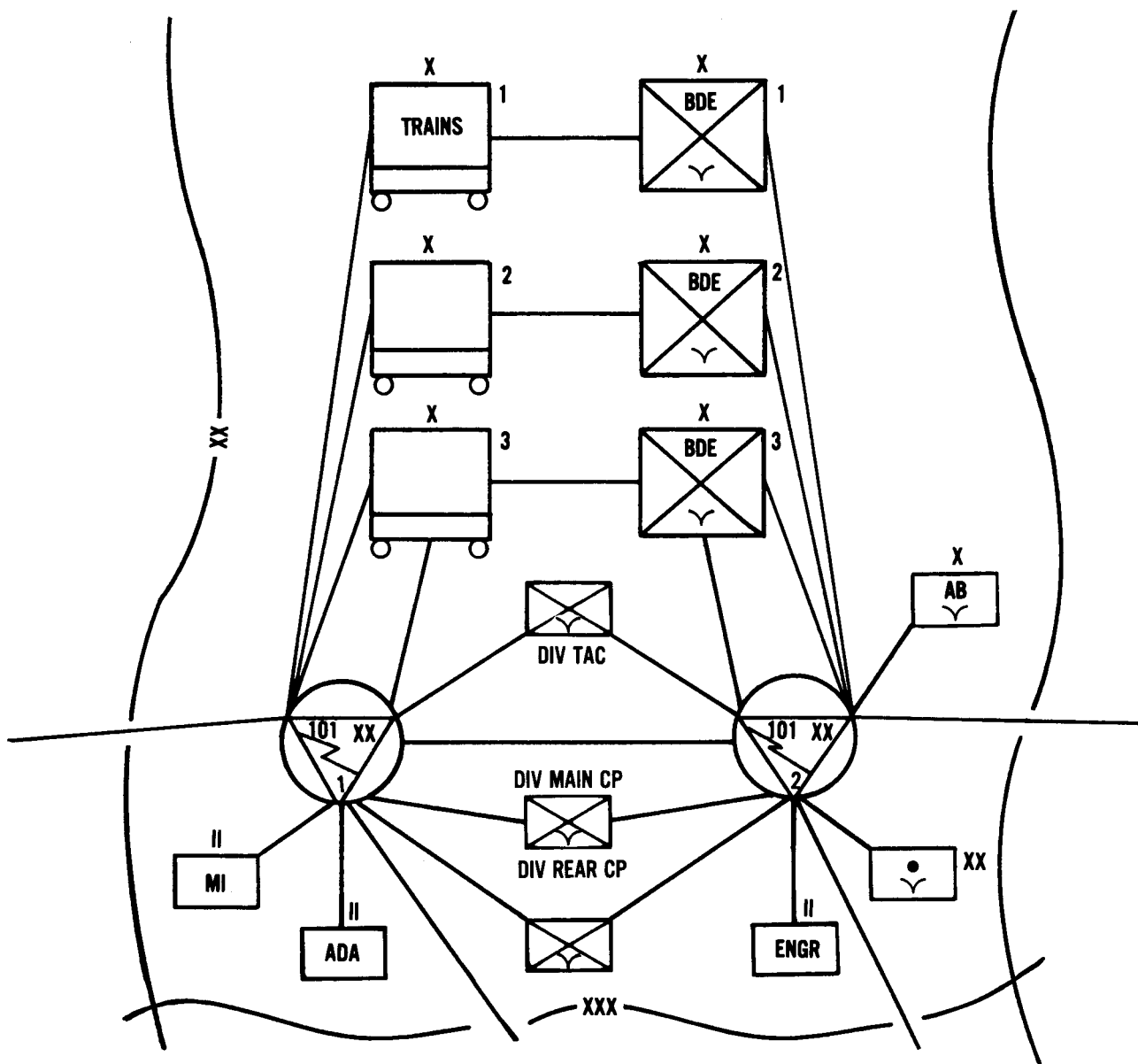


Figure 5-1. Air assault division LOS multichannel terrestrial system.

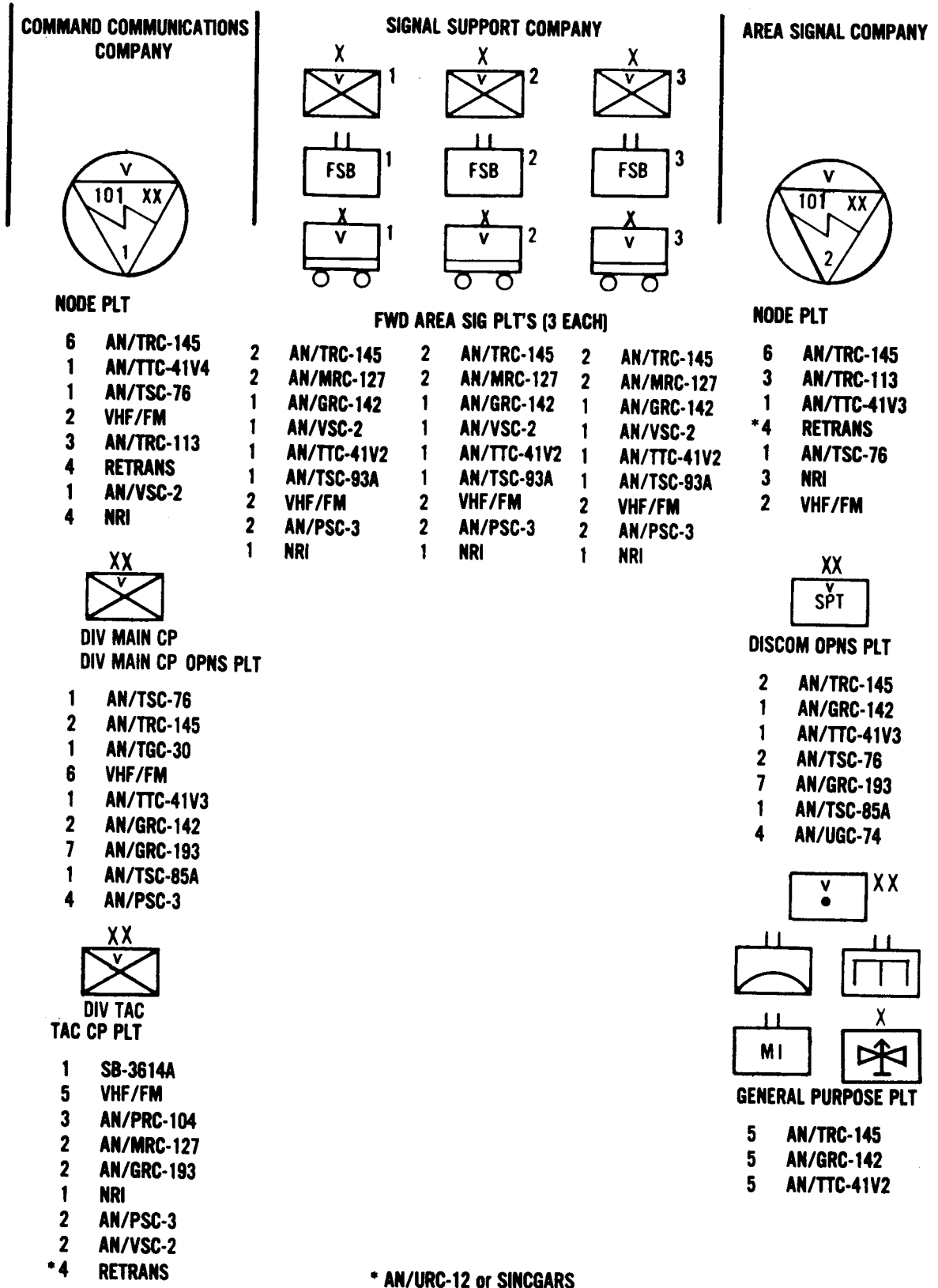


Figure 5-2. Air assault division doctrinal equipment employment.

CHAPTER 6

The Airborne Division Signal Battalion

6-1. General

The airborne division signal battalion--

- a. Deploys as a light division signal battalion (see Chapter 4), However, only one area signal node is employed for multichannel coverage.
- b. Installs, operates, and maintains a division communications system to support division level functions including command, control, intelligence, fire control, CSS, and air defense.
- c. Provides internal CP communications at all echelons of the division headquarters.
- d. Assists the division commander and staff in planning division signal support (for example, automation, communications, and VI). For more information, see Chapters 2 through 4.
- e. Provides DS COMSEC maintenance and logistics for the division to include the administration of the division COMSEC material account.

6-2. Organization

The airborne division signal battalion has three companies: HHC, a command communications company, and a forward communications company.

- a. HHC--
 - Commands and controls the battalion.
 - Provides the division signal staff element.
 - Provides DS COMSEC maintenance and logistics functions for the division.
 - Provides DS electronic maintenance of communications equipment organic to the battalion.
- b. The command communications company--
 - Provides an area node to support the division multichannel network.
 - Provides an extension node at Div Main CP.
 - Provides an extension node at DISCOM.
 - Provides an extension node at Div TAC.

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- Provides single-channel FM voice retransmission stations in the division AO.
- Provides command, control, and administration of organic assets.
- c. The forward communications company--
 - Provides multichannel terminals linking DIVARTY, combat aviation battalion, air defense artillery battalion, MI battalion, engineer battalion, and the armor battalion into the division multichannel communications network.
 - Provides RATT stations for DIVARTY, combat aviation battalion, air defense artillery battalion, MI battalion, engineer battalion, and the armor battalion.
 - Provides multichannel relays in the forward division AO.
 - Provides command, control, and administration of organic assets.

Figure 6-1 shows the airborne division multichannel system. Figure 6-2 shows doctrinal equipment employment to support doctrinal divisional multichannel network in the airborne division.

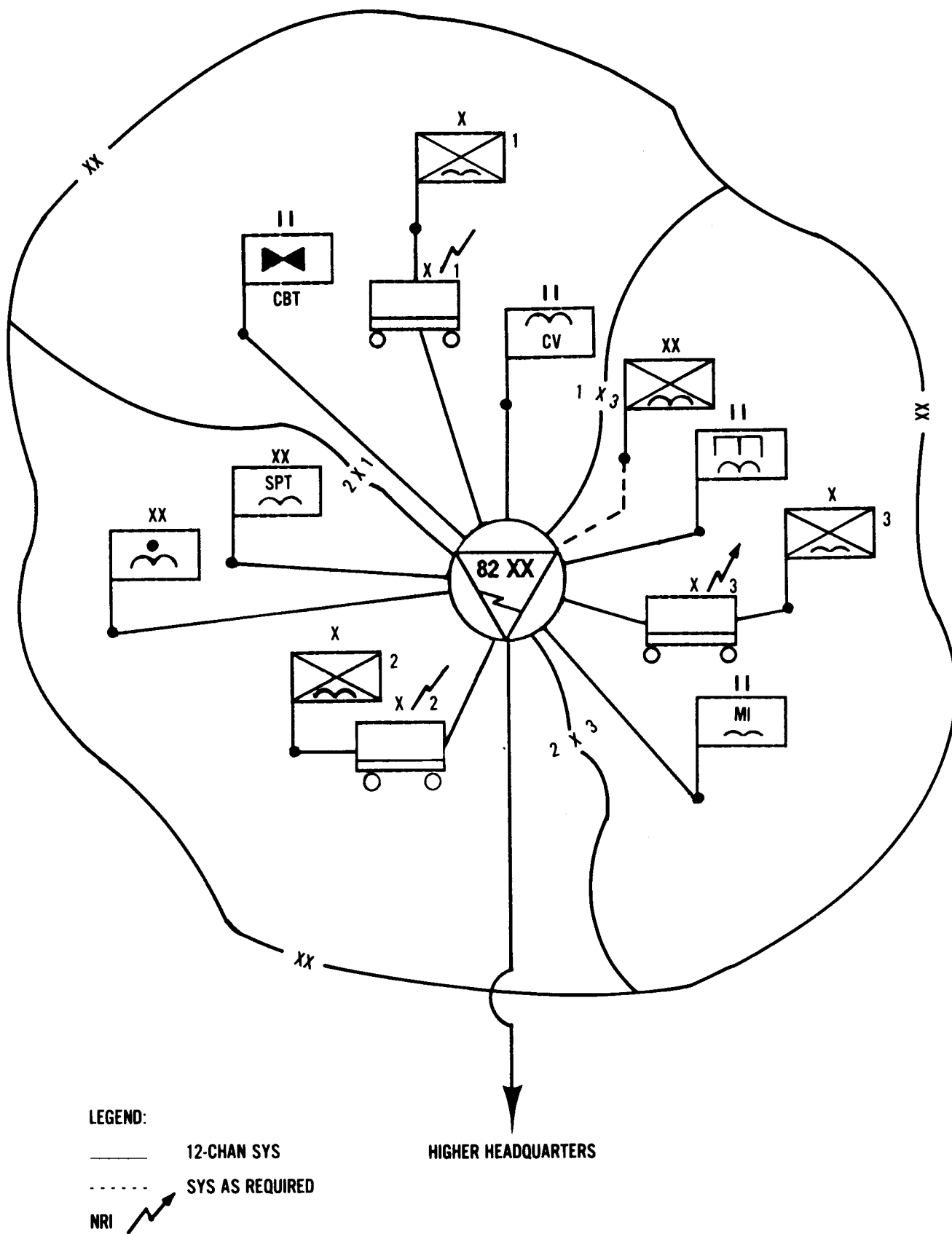
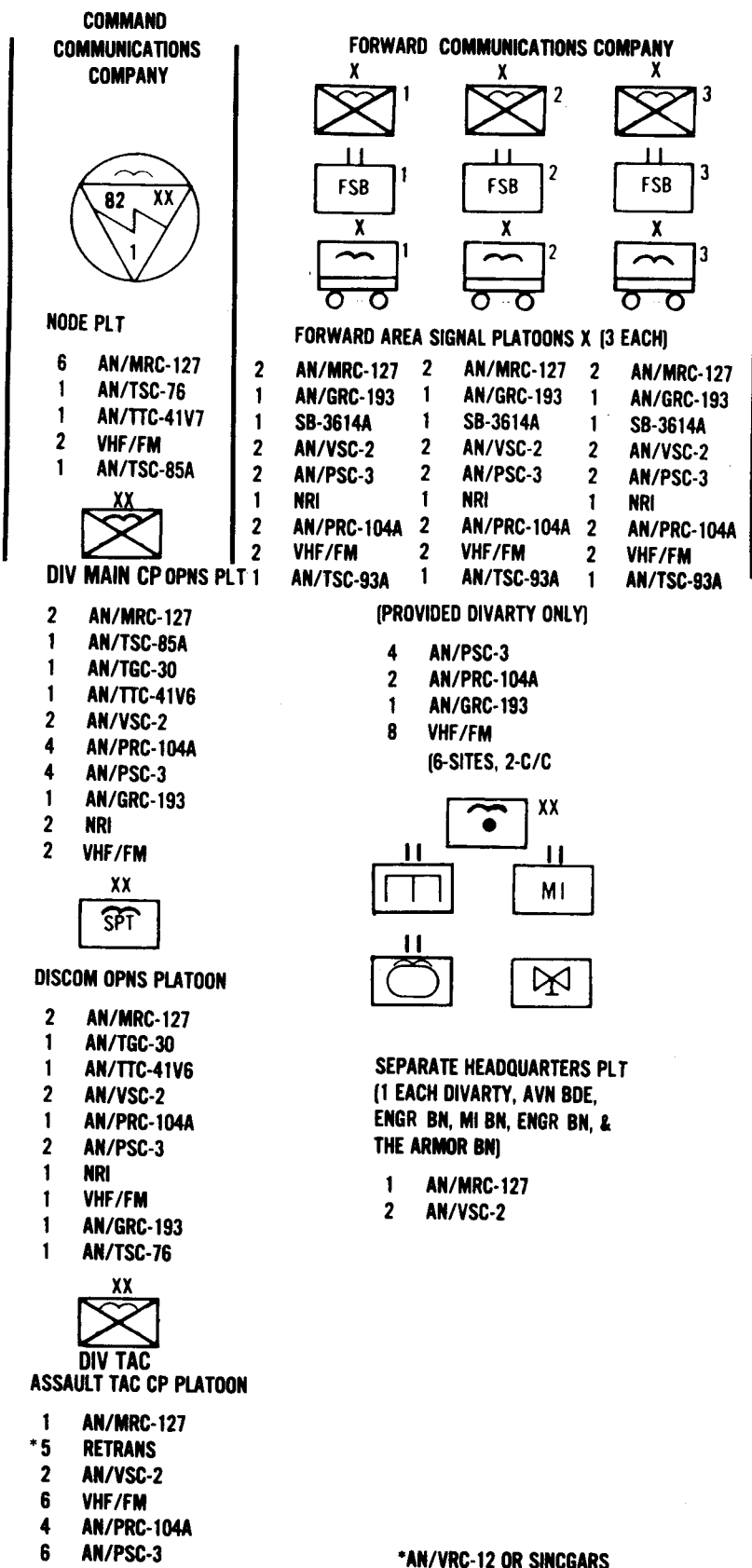


Figure 6-1. Airborne division LOS multichannel terrestrial system.



*AN/VRC-12 OR SINGGARS

Figure 6-2. Airborne division doctrinal equipment employment.

CHAPTER 7

Maneuver Communications

7-1. General

Armored, infantry, and mechanized battalions fight the battle and are the combat edge of the division. Our communications system is based on the needs of these battalions. These units must have simple, mobile, and dependable communications equipment. Communicators and commanders must know the equipment and how to best employ it. They must keep equipment operational during the fast pace of battle. Single-channel radios, field wire, messengers, and visual signals are the basis of the battalion communications system. Combat arms battalions lay wire, provide messengers, and connect telephones for their battalions. The reduction of signal MOS soldiers in combat arms battalions has resulted in the need for signal training of nonsignal MOS soldiers in these units. This chapter covers radio and wire communications on the battlefield. Radio and wire system diagrams in this chapter can be modified to support specific combat operations and unit SOPs. Appendices B through D show radio nets for all levels of command.

7-2. Radio Nets

The basic single-channel radio nets are the command and operations net, the intelligence net, the administrative and logistical net, the fire direction net, the surveillance net, and the rear operations net. Additional nets include the HF voice net and the GP RATT net.

a. The command and operations net passes orders and immediate command and operational information. Commanders use this net for tactical control, combat coordination, and tactical data reporting. The command and operations net is given the highest installation priority.

b. The intelligence net passes intelligence information and spot reports. The intelligence net is the backup for the command and operations net and is given the second highest installation priority.

NOTE: Operations and intelligence nets are often combined at brigade and battalion levels.

c. The administrative and logistical net passes personnel and supply information. This traffic does not have the same immediate tactical importance as the command and operations net and the intelligence net used at brigade and battalion levels.

FM 11-50

d. The fire direction net is the highest priority net in the field artillery firing units. This net is used for exchange of technical and/or firing data.

e. The surveillance net passes reports dealing with Threat movements and massing. The battalion battlefield information control center sets up this net to coordinate and control the ground surveillance radar and unattended ground sensor teams. The information from this net is vital to commanders and is given high priority for activation.

f. The rear battle net passes orders and information to control rear operations. The net control station (NCS) of this net is the Div Rear CP. The rear battle net at division level is a separate net (FM or IHFR). Rear operations at brigade and below merge with other brigade operations and use the brigade command and operations net to process rear operations traffic.

g. The HF voice net is used as a backup to the command and operations FM net and the intelligence net.

h. The GP RATT net passes hard copy radio teletype traffic between headquarters elements. It is not used to send lengthy or time sensitive information due to the slow processing and handling time required to send messages.

7-3. Special Considerations

a. Some US divisions are round out divisions. This means that one of the brigades within that division is comprised of Army Reserve or National Guard units. The problems that arise from such a configuration are significant and must be recognized ahead of time for training and planning purposes. The reserve/guard units usually have older equipment, which is not always compatible with the current Active Army equipment. These equipment differences must be planned for when configuring equipment for deployment. The ADSO must keep this in mind when assigning frequencies.

b. The LID battalions communicate in rough terrain and over great distances. Their units are deployed unconventionally. Communicating in this austere division is a challenge for the Army communicator. It requires careful planning to make maximum use of limited resources.

c. Non-Mobile Subscriber Equipment (MSE) units can interface with MSE units. See Appendix F.

7-4. The Division Headquarters

a. The division commander is responsible for command and control of combat, CS, and CSS units. The commander relies on his staff and subordinate commanders to supervise all division elements. The commander, staff, and subordinate commanders operate from CPs dispersed throughout the division area.

These CPs are the nerve centers of the division. Their functions determine combat effectiveness. Dispersion of the CPs prevents the Threat from destroying the division command structure with a single assault or nuclear attack. The dispersion requirement is satisfied by dividing and structuring the division headquarters into the main CP, tactical CP, and Div Rear CP/DISCOM.

(1) The division main CP is the clearinghouse for information in the division. It is the division's permanent CP. The center of the division main CP is the Div Main CP. The Div Main CP has members of the division's general and special staffs, plus current and future combat operations activities. The Div Main CP assists the division commander by combining the details of combat operations and Threat activities and then processing this data to make command decisions throughout the division. The chief of staff exercises overall direction of the Div Main CP while the division operations officer (G3) has primary staff responsibility for its operation. The division commander rotates between the Div Main CP and Div TAC.

(a) Division operations directed from the main CP are--

- Operations to disrupt and delay follow-on echelon forces.
- Interdiction.
- Divisional fire support.
- EW operations.
- Suppression of Threat air defenses.
- Mobility, countermobility, and survivability, and general engineering operations.
- Psychological operations.

(b) Figure 7-1 illustrates a typical Div Main CP showing the normal locations of standard elements. The division signal officer or the ADSO is at the Div Main CP. Continuous occupation in the G3 operations maintains close contact with the Div Main CP. The ADSO is the battle staff interface for the signal battalion and ensures information and battle situation are evaluated in signal terms and impact.

(2) The division tactical CP is a small, highly mobile package of selected personnel and equipment that provides command, control) and communications well forward. The tactical CP contains division staff elements concerned with current combat operations. It is the location of the assistant division commander (maneuver) (ADC-(M)). The tactical CP's objective is to place the ADC-M in the most effective position to maneuver the brigades and to influence the battle. There is only one actual tactical CP but sufficient communications assemblies are provided to accommodate displacements.

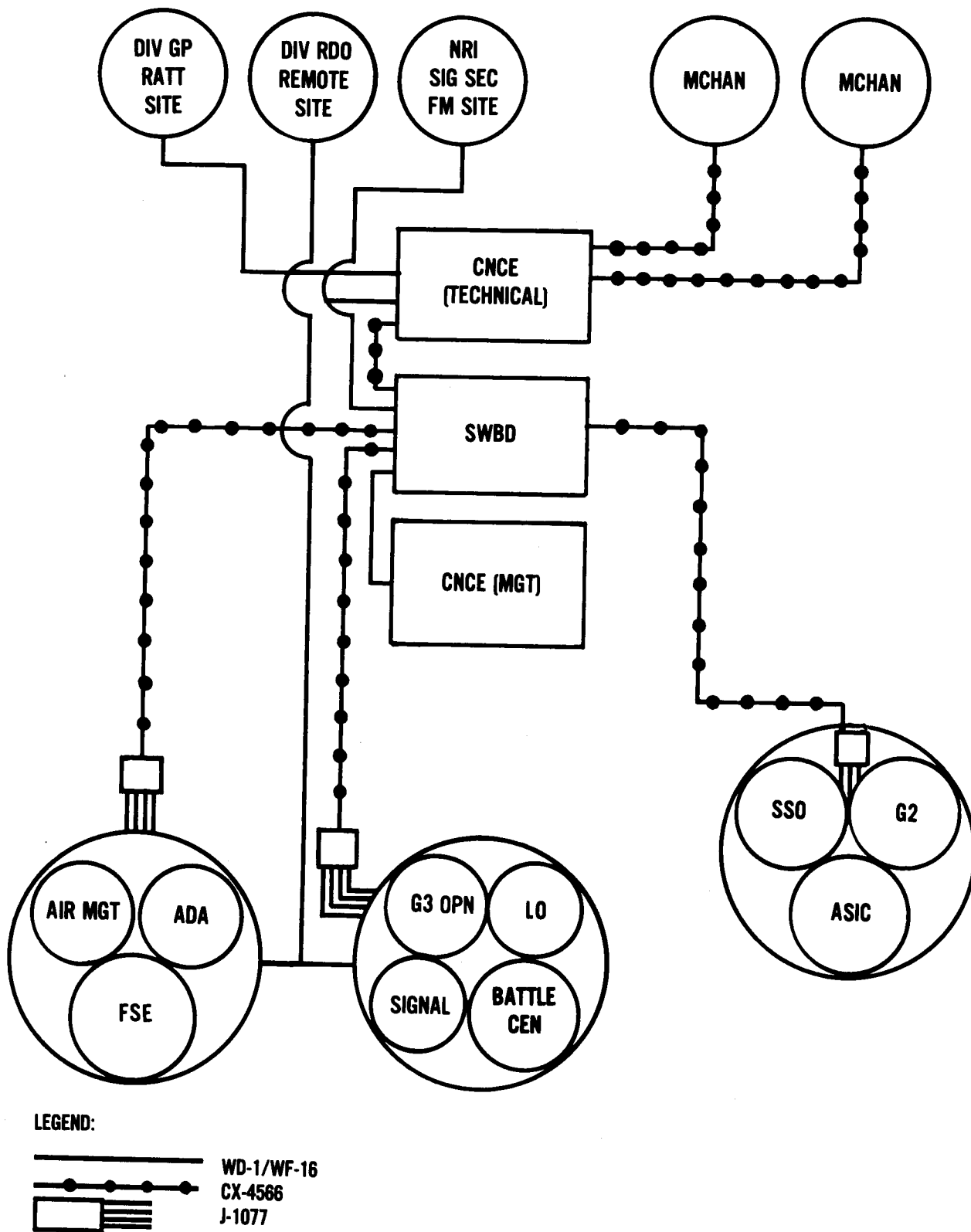


Figure 7-1. The Div Main CP extension internal connection.

(3) The division rear elements are located near the Div Rear CP. Coordination of CSS and rebuilding operations are directed from the rear CP. A rear CP separate from DISCOM may or may not be established. The rear CP may collocate with the Div Rear CP because of limited CNR assets and for access into the division multichannel system. The rear CP force sustainment operations are--

- Administrative and logistics.
- Civil affairs.
- Chaplain activities.
- Inspector general.
- Staff Judge Advocate.
- Division HHC maintenance, mess, and medical operations.

b. Single-channel net radios provide initial command, control, and communications at the division headquarters level and throughout the division. Threat EW capabilities determine our use of single-channel radio. Single-channel radio requires special considerations, especially when operated from static locations such as a CP area. Radio transmission is limited to information of an immediate operational nature. Table 7-1 shows the overall division radio net structure.

7-5. Rear Area Communications

a. Rear area operations are controlled by the Div Rear CP. This organization operates as part of division operations (G3) staff. The assistant division commander (support) (ADC-(S)) controls this organization. When deployed in the field, it is separated from division CP. Its mission function requires the division net structure to include the rear operations net. The size and violence of rear area operations cause increased participation in the net beyond the initial core. Rear area operations demand a separate net that controls and fights the rear area.

b. Four items are unique to the light division and require additional attention.

(1) Command operations are assumed to be in a sensitive compartmented intelligence facility (SCIF) environment; hence, the DTSE and special security office (SSO).

(2) Currently, the TACSATCOM link from the long-range surveillance detachment (LRSD) terminates at the reconnaissance squadron. Since the LRSD is a division asset, the satellite communications link should be received at the G2 where its mission taskings originate.

Table 7-1. Division radio net structure.

NET STATIONS	DIV CMD OPN FM NET	DIV INTEL FM NET	DIV REAR OPN CEN FM NET	DIV HF VOICE	DIV GP RATT NET
DIV CDR	*				
ASST DIV CDR	*				
DIV OPN CELL (G3)	*	*	*	*	*
DIV INTEL CELL (G2)	*	*		*	
OPN FWD (TAC CP)	*			*	
INTEL FWD		*			
DIV SPT CMD	*	*	*	*	*
BDE CP	*	*			
BDE TRAINS	*		*		*
RECON BN	*	*	*	*	*
AB	*	*		**	*
ENGR BN	*	*	*	*	
MI BN		*			*
ADA BN	*	*		*	*
DIVARTY	*	*	*	*	*
MP CO	*		*		
REAR OPN CEN	*		*	*	
SIG BN	*		*		
LN TM LIAISON TEAM	*				
LONG-RANGE RECON UNIT		*			

* INTERNAL
 **HEAVY DIVISION ONLY.

(3) The prisoner of war interrogation (IPW) element may have access to the Div Rear CP RATT to division if the element is colocated with the division trains. Courier communications is reliable and secure, but the timeliness is questionable. The IPW element has limited ability to communicate via FM secure. In most situations, it does not have the range to reach the Div Main CP. The radio link will be to the DISCOM S2. The IPW element needs a dedicated RATT link. Realizing that assets are not available within the MI battalion (6xRATT) or the division signal battalion (10xRATT), this link may be provided by echelons above division (EAD) with the interrogator plug needed for deployment.

(4) The tactical CP normally monitors this net, but it will have occasion to transmit.

7-6. The Maneuver Brigade

a. The brigade is one of the major subordinate commands of the division. When organized for combat, it normally consists of three to four tank or mechanized infantry battalions. When augmented, it can fight independently. The brigade is a potent force of infantry and armor. This force is built up by other fighting and supporting elements such as artillery, air defense, engineers, chemical, US Air Force aircraft, and attack helicopters. The brigade defends against attacking Threat formations and disrupts and destroys combat and support elements deep in the Threat's rear. This fighting force provides the battlefield structure. It is the fighter who digs in, holds the terrain, and denies Threat use or takes the fight to the Threat. The fighter must have versatility to fight on the integrated battlefield in any kind of terrain, weather, or visibility and against any kind of force.

b. The brigade commander is always fully engaged when controlling the battle for the battlefield point of decision. Communications provides command, control, and the intelligence needed to determine the point of decision. Total reliance is never deliberately placed on any single communications means. However, a single-channel radio is the primary communications for command and control in the maneuver brigade. Radio and wire must complement each other for overall maximum reliability, redundancy, and responsiveness.

c. A signal officer is assigned to the brigade staff to advise and assist the commander on all signal matters. The signal officer coordinates and supervises the technical training and employment of all communications personnel attached or organic to the brigade. The signal officer has operational control (OPCON) over the communications section in the brigade HHC. This officer supervises signal activities of the entire brigade.

d. The communications section is a part of each brigade HHC. Each platoon is organized and equipped to install, operate, and maintain the brigade internal communications system. Platoons also extend that system to subordinate battalions and other attached units when appropriate. The communications section operates the brigade organic retransmission station to extend brigade nets. (See Figure 7-2.)

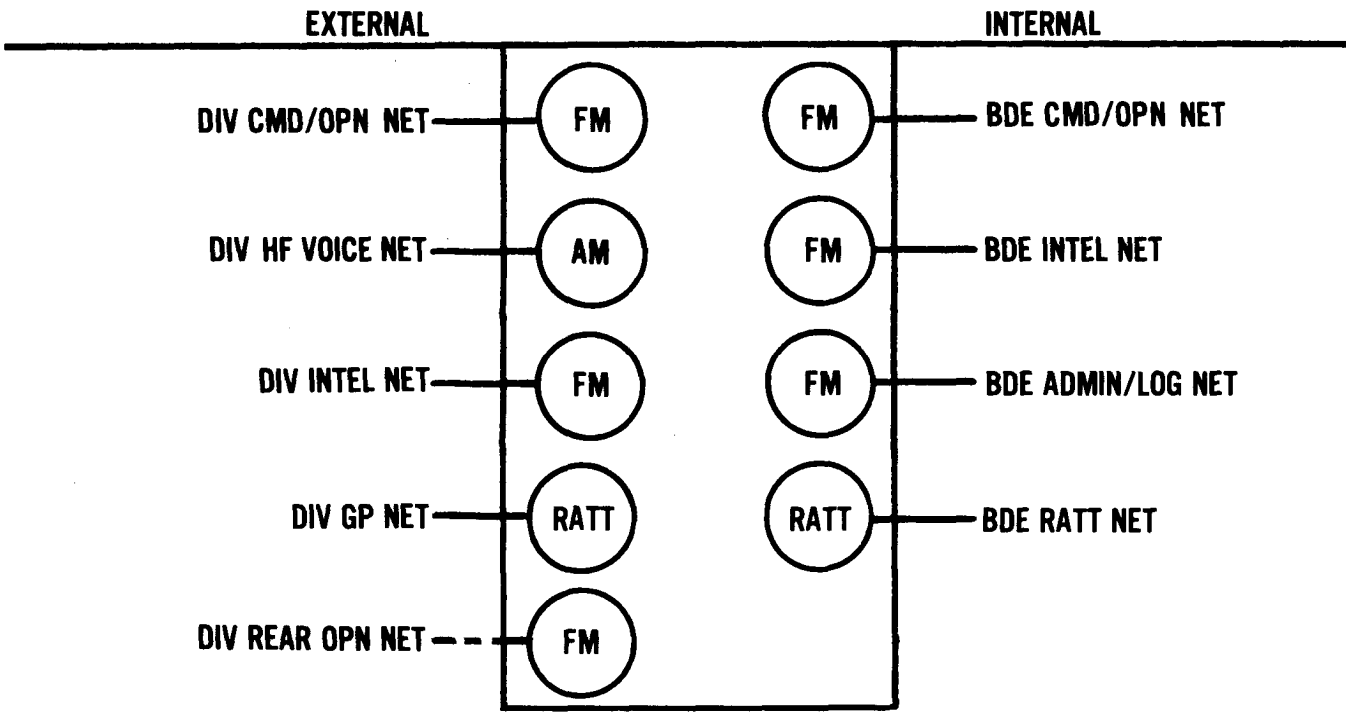


Figure 7-2. Brigade radio net structure.

7-7. Brigade CP Communications

a. The brigade CP requires rapid, continuous, dependable, and flexible communications. Within hours, the brigade CP and forward CP displace to battlefield locations. The brigade uses vehicular-mounted and manpack radios. It establishes a RATT net with subordinate battalions in addition to voice nets. This net facilitates transmission of most hard copy traffic between headquarters. The brigade also operates in external radio nets. Its single-channel voice stations are provided from organic assets. However, the division signal battalion provides RATT stations for external nets.

b. The brigade has no organic means to enter the division multichannel communications system. The forward communications company of the division signal battalion provides multichannel terminal teams to each brigade. The terminal teams establish a site near each brigade headquarters to terminate multichannel systems. Other teams are set up as a part of the extension near the BSA. Figure 7-3 shows a typical wire distribution system for the brigade headquarters.

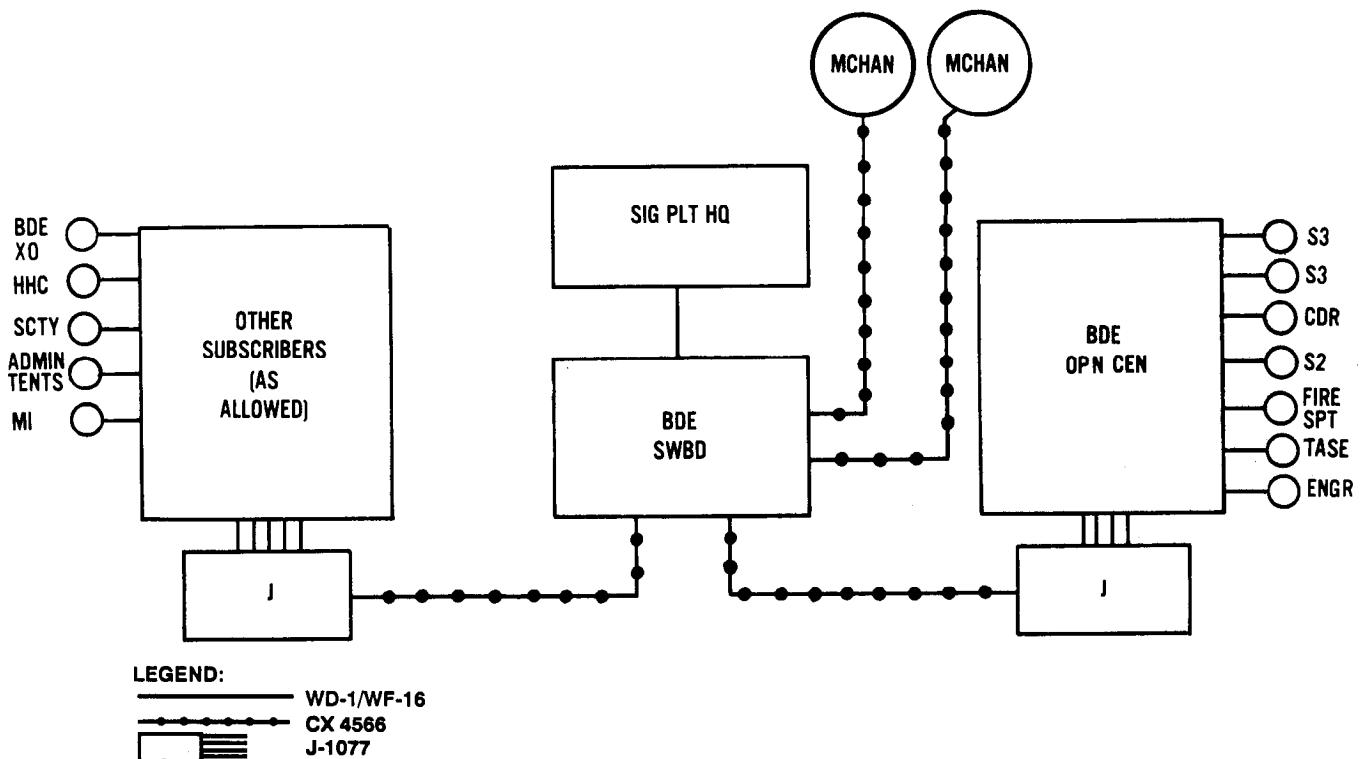


Figure 7-3. Brigade headquarters extension access node wiring configuration.

c. The brigade communications platoon and other brigade personnel install internal CP wire lines. The two lengths of 26-pair cables between the multichannel terminals and the brigade CP switchboard are the responsibility of the division signal battalion. The brigade communications platoon is often needed to help signal battalion personnel install the cable from the

multichannel site. Tailgate circuits may be installed as the first priority link to allow circuits between the brigade and the division to be activated during displacement. This long local circuit (telephone and field wire) is extended from the binding posts of the AN/TRC-145 to the brigade TOC. These circuits are transferred to the local switchboard when cable systems are completed on site or maintained as a back up to the switchboard trunks. Reduction of the single-channel radio signature--the immediate goal--is realized. Installation priorities for other cables and wire lines will vary in brigades. Telephones serving the commander and key staff elements are usually installed first. Field fortifications and wire systems should be expanded and refined continuously.

d. The LID maneuver brigade has a unique method of operating on its intelligence net.

(1) The counterintelligence team may have to enter the brigade intelligence net. This may be necessary for two reasons. First, counterintelligence teams are equipped with AN/PRC-77 radios. When the AN/PRC-77 is used to transmit, the distance between transmitter and receiver is relatively short compared to the AN/VRC-46. When secure equipment is attached to the AN/PRC-77, its transmission power will be even less. Therefore, a counterintelligence team operating in an infantry brigade tactical area of responsibility (TAOR) might not be able to communicate with any element other than the brigade. Second, a counterintelligence team operating in a brigade TAOR may obtain critical/perishable information and must be able to cue the brigade S2 by radio. Indigenous wire systems secured with KL-43 and HYX-57 should be used. In some instances, coordination with allies for loan of their communications is advisable.

(2) In the event of heavy augmentation or an increase in current MI organizations in the LID, interrogation teams may be placed in a DS role to the brigade.

(3) AN/TRQ-30/32 signals intelligence (SIGINT) operators on position may gather highly critical/perishable information. They must be able to immediately cue the concerned brigade S2.

(4) IEW assets may not be placed in a DS role to the brigades because of the MI battalion's austere organization in the LID. However, the brigades still need to know about ongoing IEW operations within their respective TAORs. The technical control and analysis element (TCAE) may develop information of a highly critical/perishable nature. The concerned brigade S2 must be cued immediately.

(5) An IEW support team will be provided to each brigade in the event of an increase in MI assets.

7-8. The Brigade Support Area

a. A collection of support and service elements that make up the BSA is in the rear of the brigade CP. Its composition varies with the tactical situation and with the way the brigade is organized for combat. Figure 7-4 shows a typical wire distribution diagram for brigade support. The BSA includes--

- Field trains of each subordinate combat battalion.
- Elements of the brigade HHC.
- Staff elements not required at the brigade headquarters.
- Elements of the AB supporting the brigade.
- Div Rear CP FSB.
- Service elements of other units supporting or attached to the brigade.
- Military Police (MP) platoon headquarters.

b. An extension node deploys to the BSA for communications support to all area units. Personnel and equipment for the extension node will be provided by a platoon of the forward communications company of the division signal battalion. The platoon provides the following services:

(1) NRI facilities to connect single-channel (FM) radio stations into the division telephone system.

(2) Secure multichannel communications terminals for entry into the division multichannel communications system.

(3) Automated switchboard service to provide switching of local area telephone circuits and trunks to permit all subscribers access into the division telephone network.

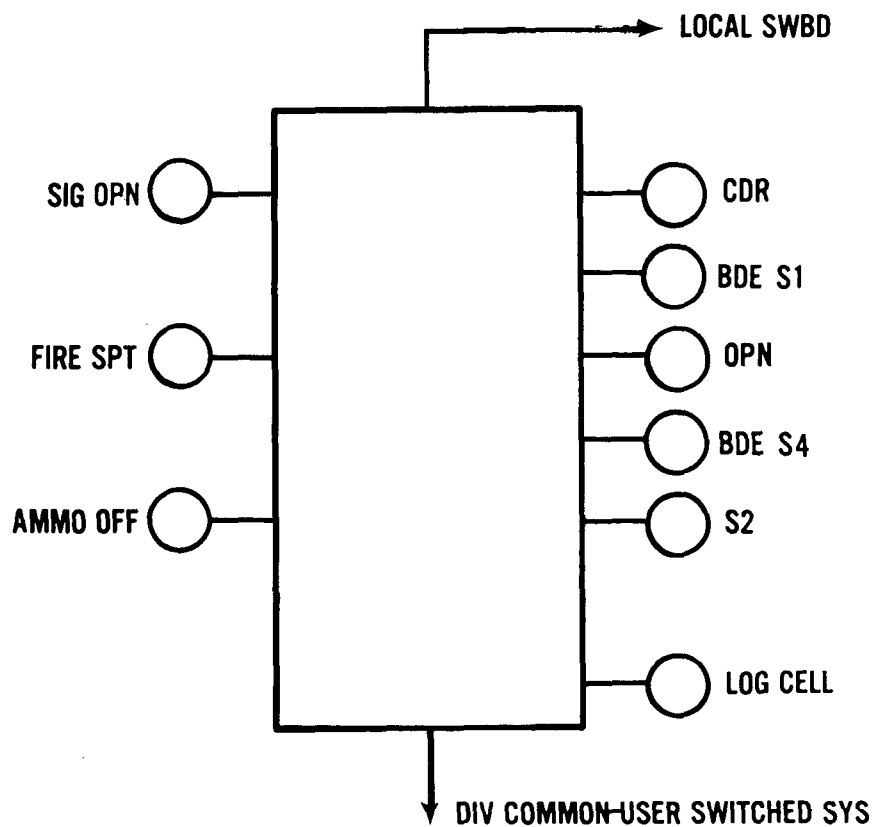


Figure 7-4. Brigade support extension switchboard configuration.

7-9. The Heavy Separate Brigade

The heavy separate brigade gives the theater or corps commander a flexible combat force. The theater or corps commander determines the brigade's direct combat employment. The decision depends on whether the separate brigade is a theater or corps asset. The separate brigade may be engaged in a separate action and may also reinforce another division. The separate brigade TOE must support its unique stand-alone role and must adapt to various missions at different command levels. The key to separate brigade flexibility is communications. A separate brigade's assignment to an unfamiliar headquarters emphasizes the need for clarity in communications responsibility. This clarity ensures command and control. The separate brigade's communications structure is designed to meet command adaptability.

a. The brigade signal office provides communications and COMSEC management. The brigade support battalion supplies COMSEC logistics. Internal brigade headquarters CP communications is installed by the brigade CP support and BSA signal platoons. These platoons have more personnel than the normal maneuver brigade communications platoon because their role is expanded in a separate brigade. The brigade signal platoons provide multichannel communications and other signal platoon services.

b. The brigade signal officer, a master sergeant, and a warrant officer are the cadre of the separate brigade signal office. The separate brigade signal office acts as a division signal office and signal battalion S3 in the

absence of the division level headquarters. The brigade signal officer and the COMSEC warrant officer supervise COMSEC. Their duties include COMSEC software management and two-man account quality control.

c. The separate brigade is treated as a division when it acts as part of corps. The corps signal brigade terminates and extends service to the brigade CP. The separate brigade signal equipment is different and cannot terminate corps signal systems. The separate brigade equipment is used for internal communications and terminates division signal systems. The immobility of the corps signal equipment provides momentum to OPCON separate brigades to division for ease of command and control.

d. The signal platoons terminate the division multichannel system from two out of three area signal nodes when the separate brigade comes under the OPCON of a division. The DSO or staff directs the separate brigade signal platoon. Unless the DSO directs otherwise, the separate brigade signal platoon sets up multichannel communications priorities as follows:

- Terminate division multichannel system at the brigade CP.
- Establish multichannel link from the BSA/brigade support battalion to the brigade CP.
- Provide alternate link from another division signal node to the brigade CP.

7-10. The Maneuver Battalion

a. The strength of the maneuver battalion is firepower. The communications system is used to direct and control firepower. The heavy maneuver battalion has four rifle or armor companies, an HHC with scout platoon, and a battalion mortar platoon. The light infantry battalion has three rifle companies and an HHC with a mortar platoon, anti-armor platoon, and scout platoon. When an engineer platoon is part of the battalion communications net, they are integrated into the battalion net structure. This assures synchronization of the mission.

b. The signal officer is assigned to the battalion staff. This officer maintains operational command and control of the communications platoon in the battalion headquarters company. The signal officer is responsible to the battalion commander for the status of all signal matters within the entire battalion. The signal officer must have a close working relationship with the entire battalion staff, especially the S3. This relationship must include the signal officer at brigade and subordinate signal personnel.

c. The battalion communications section--

(1) Installs, operates, and maintains internal battalion wire and telephone systems connecting the battalion TOC to each company CP. A reduction in strength eliminates this section's ability to install, operate, and maintain the wire system in the battalion.

(2) Installs, operates, and maintains a station in the brigade RATT net.

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(3) Provides unit maintenance of signal equipment for the battalion headquarters and is a consolidation point for all battalion signal equipment evacuated to DS maintenance.

(4) Accounts for, stores as necessary, and distributes SOI materiel within the battalion headquarters and to subordinate units.

(5) Accounts for, stores as necessary, and distributes COMSEC equipment and materiel within the battalion headquarters and subordinate units.

(6) Provides all subordinate units with assistance and training to install, use, and maintain signal equipment.

(7) Provides a retransmission station.

(8) Provides all subordinate units with assistance and training on ECCM.

d. The single-channel radio is used for a mobile battalion. The battalion uses FM radio equipment on all radio nets except the battalion station in the brigade RATT net. (See Figure 7-5.) This station uses an HF radio for teletypewriter transmission or voice.

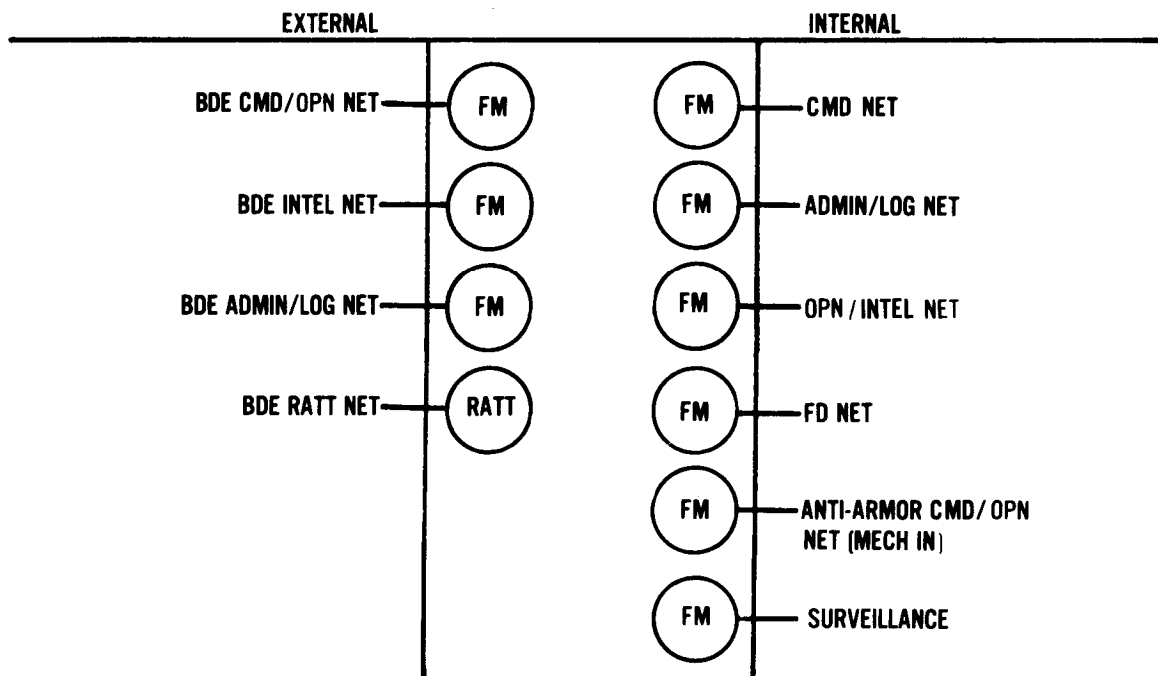


Figure 7-5. Battalion net structure.

e. The battalion uses its radio nets extensively while it is moving. However, field wire lines should become the primary communications when the battalion halts. The battalion wire system may be as big as time and wire assets allow. (See Figure 7-6.) The basic wire system should link the battalion TOC with each company CP. Other wire links are installed as necessary and as time permits. All personnel shown in Figure 7-6 may not be

at the TOC but at the combat or field trains. Units designate where their switchboards are used to support the mission. Extreme care should be used when installing wire lines to protect them from being destroyed by tracked vehicles. The North Atlantic Treaty Organization (NATO) style hooks, such as Haken Spann or instep field hook, should be used for hanging field wire or cable.

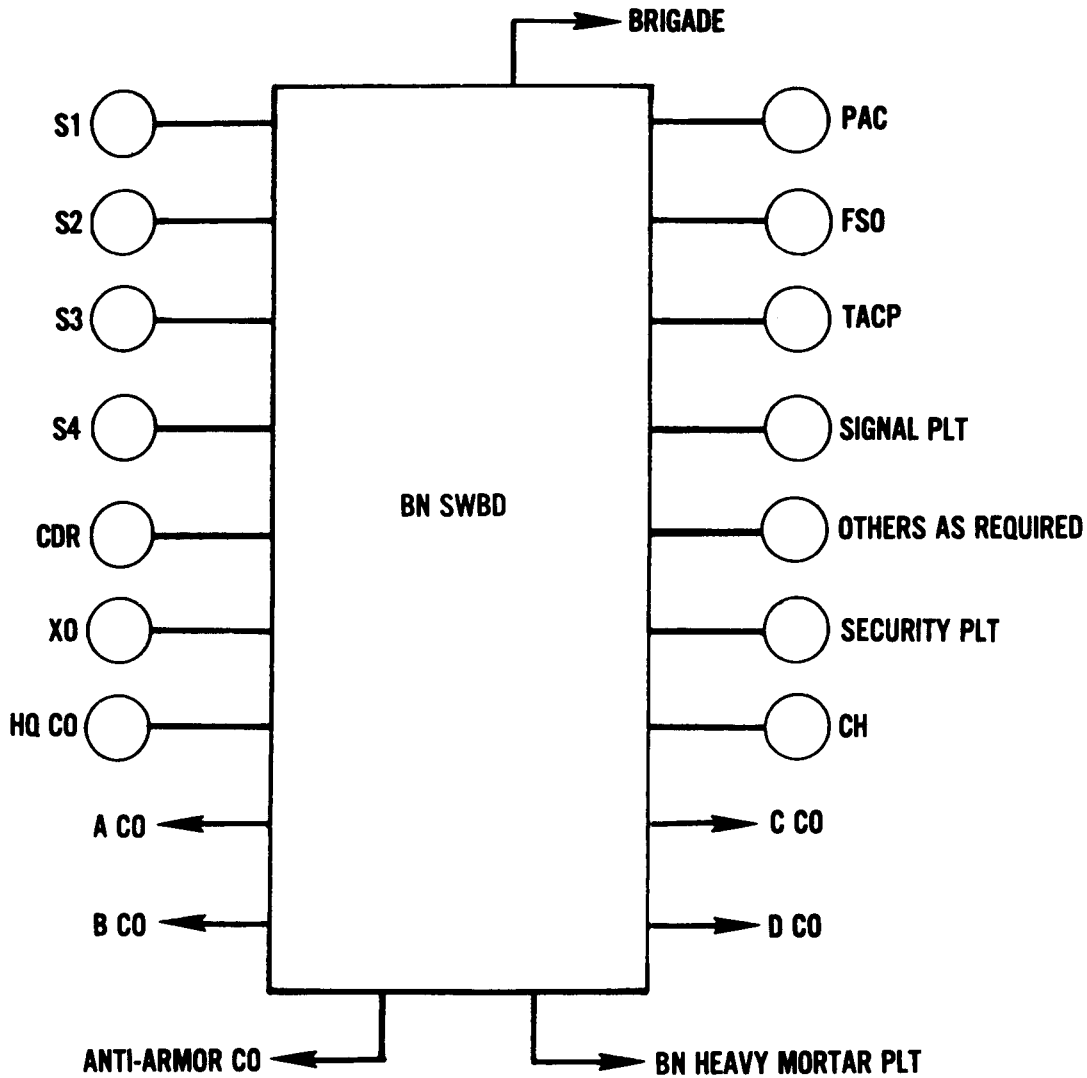


Figure 7-6. Battalion wire system.

7-11. Armored and Infantry Companies

Today's AirLand Battlefield is deadlier than ever. Each company must respond immediately with firepower and must maneuver to defeat the Threat. The commander must have absolute and immediate control over combat power and must depend on communications to win. Visual signals and CNR are the primary communications for these company commanders. (See Figure 7-7.) (In certain situations, wire may be the primary communications.) Armor units place little emphasis on wire communications. In assembly areas and in the defense, a wire system should be installed to eliminate radio traffic on company radio nets. The intensity of jamming expected in direct combat requires alternate signal means to be implemented. Visual signals must be coordinated before engagement.

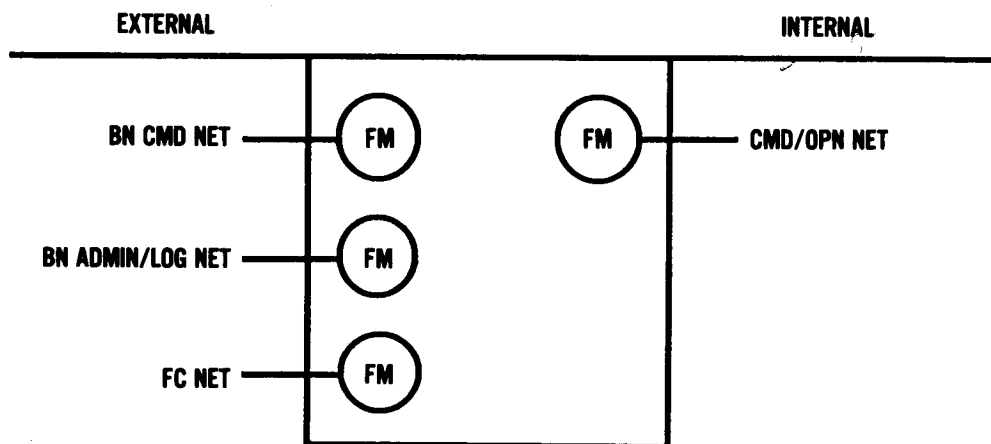


Figure 7-7. Company radio net structure.

- a. The commander primarily commands and controls the unit through the infantry company command and operations net.
- b. The company fire control (FC) net is used for fire support planning between the fire support team (FIST) chief and platoon forward observers (FOs). Observers who are not field artillery (FA) can use this net for requesting supporting fires. Conversion to digital messages for TACFIRE is done at the FIST headquarters. The FC net may be used for employing laser guided munitions such as Hellfire or for emergency control of close air support. The net will also transmit fire commands to the company mortars in the mechanized units if company mortars are assigned.
- c. No artillery platoon FO is in the tank FC net. The tank platoon leader performs the FO function. No company mortars are in the tank company. When armor and infantry organize as a team, FIST is provided through the infantry company.
- d. The external company communications is two single-channel radio nets (battalion command net and administrative and logistical net) or wire lines extended from the battalion switchboard. (See Figures 7-8 and 7-9.)

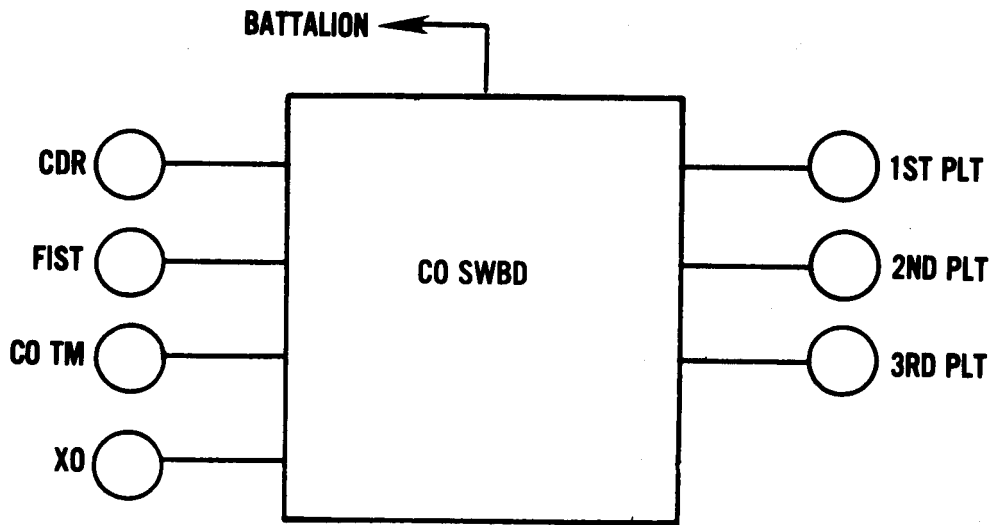


Figure 7-8. Tank company wire system.

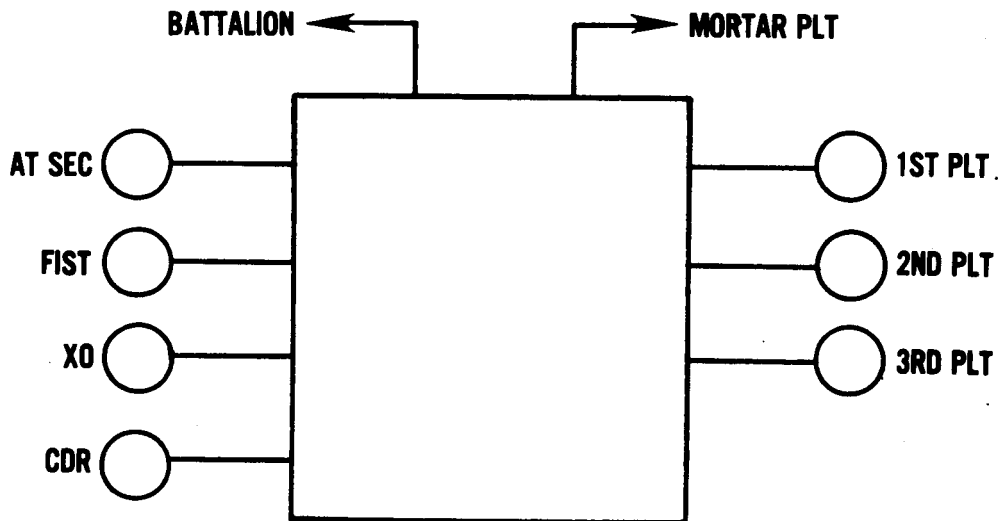


Figure 7-9. Infantry company wire system.

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7-12. Infantry Platoon

The infantry platoon can fight with or without the support of its M-2 fire systems. It operates with tanks as part of the combined arms team. The platoon leader gives orders to the squads and receives commands from the company commander through two single-channel radios mounted in the armored personnel carrier (APC). Wire, audible signaling devices, or arm-and-hand signals are used when radio transmissions are not advisable.

a. The platoon leader communicates with the squads on the platoon FM command and operations net. A single-channel radio on this net is used while moving. While dismounted, the platoon leader can remove this radio from the APC and use it as a backpack. The second radio is used in the company command and operations net.

b. The platoon leader uses a hot loop when radio transmissions are not advisable. Wire communications is an important part of the platoon leader's communications system. The hot loop is a continuous series of wire lines through the platoon switchboard that provides subscribers simultaneous telephone service similar to a party line. The hot loop is used primarily in assembly areas or defensive positions.

7-13. Tank Platoon

The tank platoon can fight a fast, changing battle in various combat situations. The platoon works well with mechanized infantry in a combined arms role. Tanks provide the mobility, armor protection, firepower, shock action, and communications needed to operate as part of the tank and infantry team on today's battlefield.

a. The tank platoon leader gives orders to tank crews and receives commands from the company commander by single-channel radio. Arm-and-hand signals are used when radio transmissions are not advisable. Wire is used in assembly areas or when the tanks are stopped for a considerable time.

b. The platoon leader communicates with tank crews through the tank platoon command and operations net and with the company commander through the company command and operations net. The platoon leader uses arm-and-hand signals when radio transmissions are not advisable.

7-14. Armored and Mechanized Infantry Squads

All mechanized infantry squads and armored tank crews have three basic requirements. They must move, shoot, and communicate on the AirLand Battlefield. If the squad or crew fails in any requirement, defeat is almost assured.

a. In the infantry squad, the squad leader gives orders and communicates with the platoon leader by voice, by arm-and-hand signals, or by other signaling devices. The squad leader also communicates with the platoon leader by single-channel radio or by wire. While mobile, the squad leader uses the radio mounted in either the M-113 APC or the M-2 Bradley and arm-and-hand signals to communicate with the platoon leaders. While dismounted, the squad leader uses a hand-held transceiver or dismounts the vehicle radio and uses it as a backpack. The squad leader uses the backpack radio to communicate with platoon leaders. In an assembly area or during a prolonged halt, the squad leader ties the APC into the platoon wire net (hot loop).

b. In the tank, the tank commander gives orders to the crew through the tank's intercom system. The tank commander communicates with the platoon leader with arm-and-hand signals, single-channel radio, or wire. While moving, the tank commander uses the single-channel radio in the tank to operate in the platoon command and operations net. During radio silence or when radio transmission is not advisable, the tank commander uses arm-and-hand signals to communicate with other tanks.

7-15. The Aviation Brigade

The AB is another major subordinate command of the division. The AB has an HHC, Attack Helicopter Company (ATKHC), AB general support (GS), two Attack Helicopter Battalions (ATKHBs), and the division cavalry squadron. Its mission is to find, fix, and destroy Threat forces by fire and maneuver as an integrated member of the combined arms team. The AB also conducts reconnaissance and airmobile and aerial logistics operations and provides command, control, aerial ECM, and direction finding to the division. It provides FA air observer aviation assets to DIVARTY. The AB gives the division commander a highly mobile, potent force with unity of command for all division aviation assets. The brigade headquarters maneuvers its two ATKHBs and other maneuver forces under its control, and separates the fighters from supporters, providing a lethal addition to the combined arms team.

a. Single-channel radio is the primary communications because of AB's mobility. Other available communications are messenger, wire, sound, and visual. Although each may be used on today's battlefield, they complement radio or provide alternate communications as the tactical situation dictates. Figure 7-10 shows AB internal single-channel radio nets.

b. The HHC contains the command section, the airspace management section, and the Class III/V platoon.

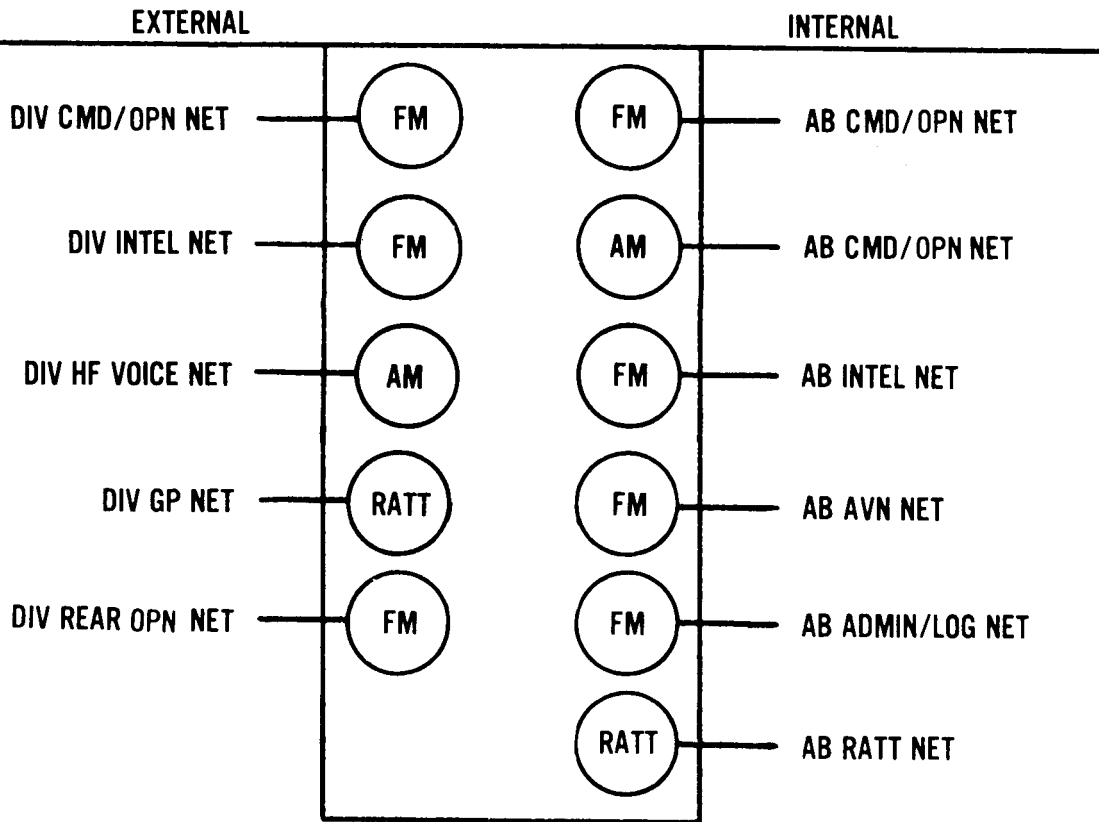


Figure 7-10. AB radio net structure.

c. The brigade signal officer coordinates with the ADSO for multichannel support. The communications platoon installs, operates, and maintains the brigade headquarters communications equipment. (See Figures 7-11 and 7-12.)

d. The multichannel team of the division signal battalion and the communications platoon of the brigade cooperate in the installation of wire circuits. While the brigade communications platoon installs wire lines in the CP, the multichannel terminal team of the signal battalion installs two lengths of 26-pair cable (ground laid) between the terminal and the switchboard. This is done more quickly with a combined effort.

e. The AB wire system is a combination of field wire circuits and those established through the division multichannel system. The AB staff uses these circuits--

- To coordinate activities with higher and lower headquarters.
- To assist the commander in command and control.
- To communicate with brigade subordinate elements and division.
- To distribute plans and orders.

7-16. Attack Helicopter Battalions

The AB's maneuver elements are two ATKHBs and the cavalry squadron. They find, fix, and destroy Threat armored and motorized forces. They serve as an important member of the combined arms team.

a. The ATKHB has a headquarters and service company and three ATKHCs. The headquarters and service company refuels, rearms, and repairs the maneuver elements of the battalion. The ATKHC destroys and disrupts Threat armored forces. The companies are used by the battalion commander for offensive and defensive operations as well as special operations such as rear battle operations and raids.

AB ELM	DIV CMD & OPN (FM)	DIV INTEL (FM)	DIV TOC (AM)	DIV GP RATT (HF-RATT)
CDR	*			
X0	*			
S1				*
S2		*		
S3	*		*	
S4				*
RECON SQDN	*	*	*	
NOTE : RECONNAISSANCE SQUADON ENTERS THESE NETS AS REQUIRED.				

Figure 7-11. AB external radio nets.

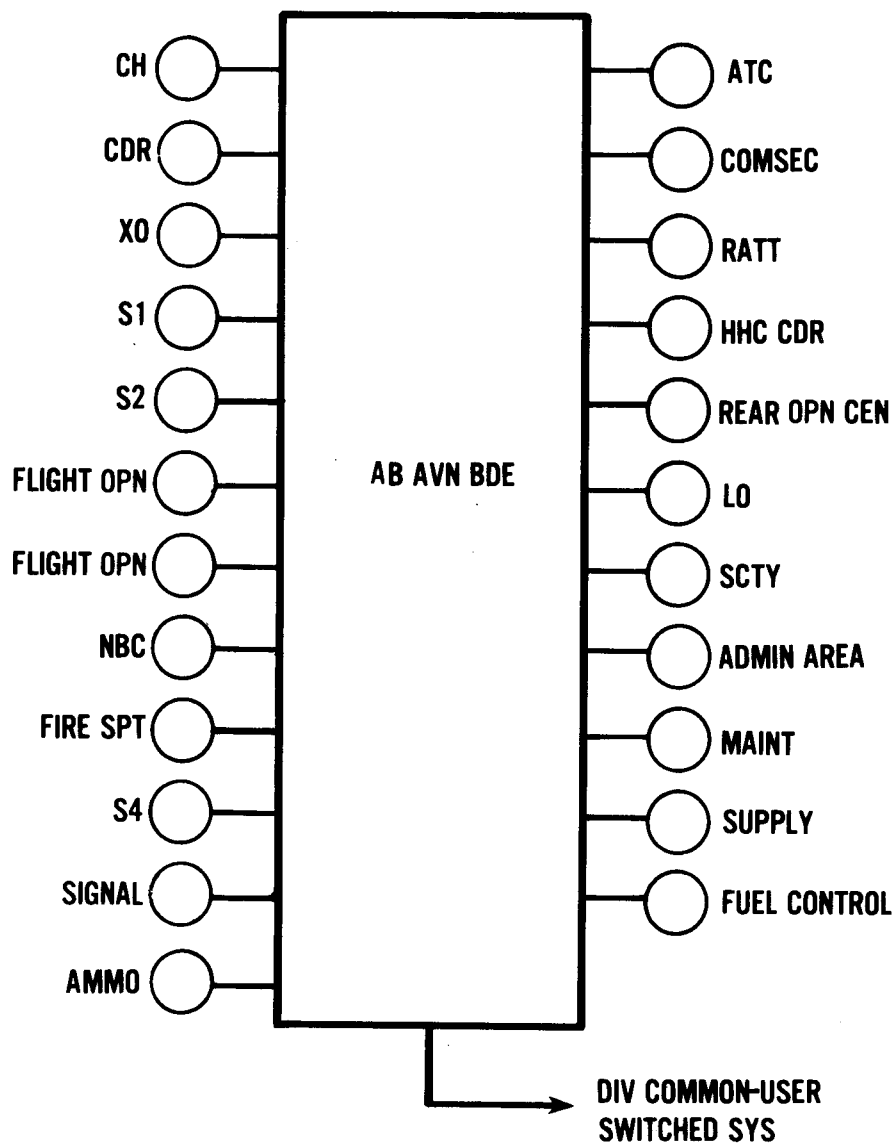


Figure 7-12. AB wire system diagram.

b. The attack helicopter units provide highly maneuverable anti-armor firepower. They are employed when rapid reaction time is critical or when ground forces are restricted by terrain. They perform overwatch operations, attack the flanks and rear of Threat formations, conduct raids in Threat-held territory, and dominate key terrain.

c. The headquarters and service company consists of the command section, flight operations section, service platoon, and supply platoon. The company provides command, control, communications, and CSS for the battalion. The communications and avionics elements of the service platoon provide equipment and personnel to install, operate, and maintain battalion communications equipment.

d. The tactical communications chief supervises the S3 communications element and is responsible for installation, operation, and maintenance of the battalion communications systems.

e. Command and control in the ATKHB uses the following internal radio nets:

- Command VHF-FM net.
- Administrative and logistical VHF-FM net (air/air).
- Air and ground UHF-AM net.

Figure 7-13 shows the ATKHB wire system; Figure 7-14 shows the ATKHB radio net structure.

f. Each ATKHC has its own command net to control scouts and attack helicopters.

7-17. Cavalry Squadron

The mission of the division cavalry squadron is reconnaissance within, to the front, on the flanks, and to the rear of the division area. The importance of reconnaissance reaffirms the need for timely and accurate information. Parts of the cavalry squadron perform surveillance, acquire information, locate Threat units, and aid in the command and control of friendly units. Engineer units may be integrated for some missions.

a. The cavalry squadron includes the headquarters and headquarters troop (HHT), two ground cavalry troops, and two air cavalry troops. The LID has only one ground cavalry troop.

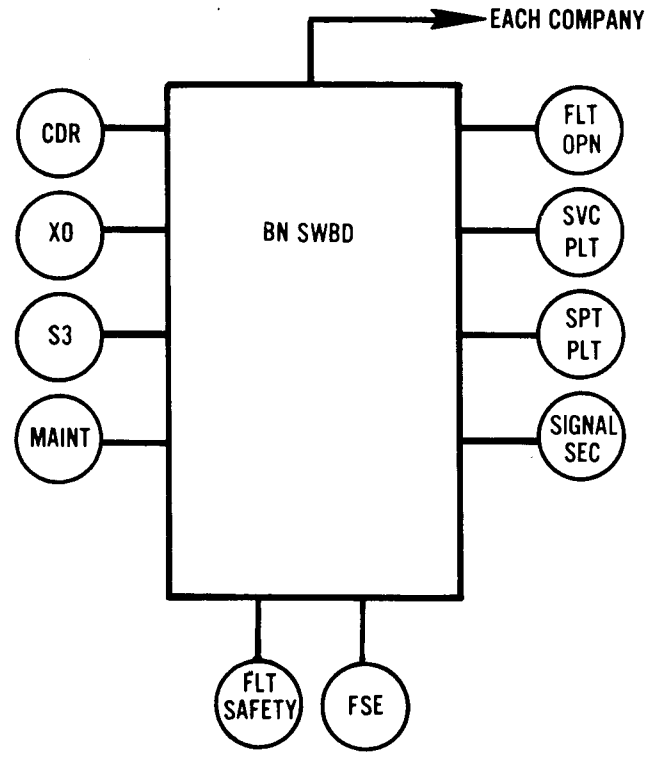


Figure 7-13. ATKHB wire system.

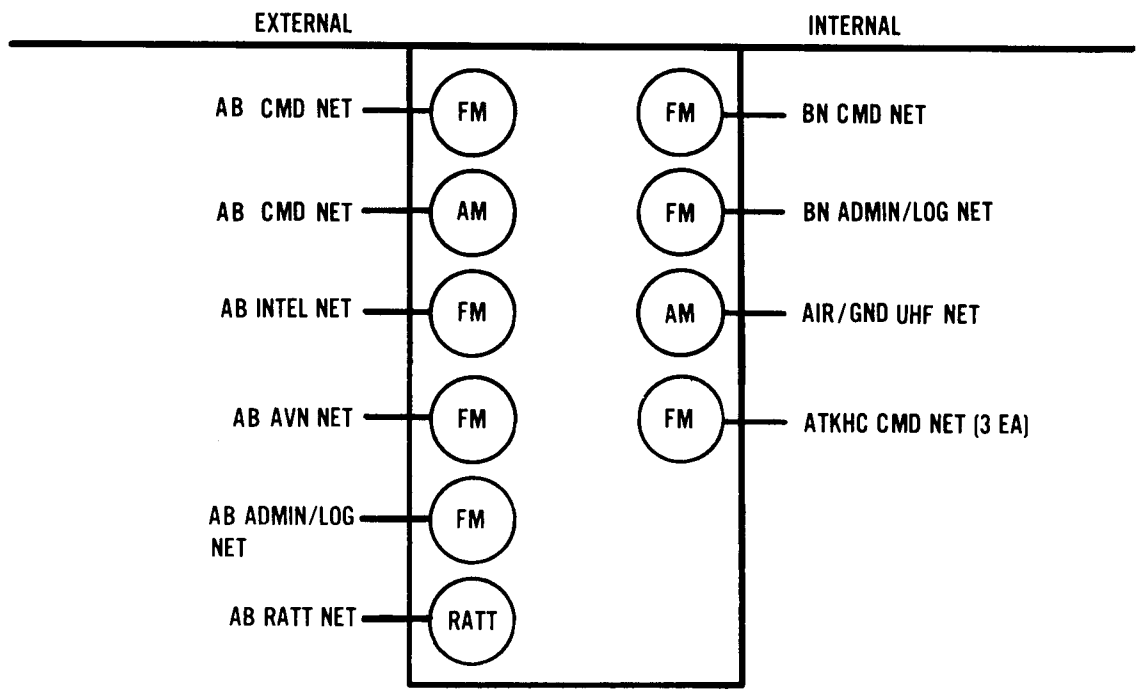


Figure 7-14. ATKHB radio net structure.

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(1) The HHT has--

- A squadron headquarters section.
- S1 and S2 sections.
- S3 and S4 sections.
- A communications platoon.
- A support platoon.
- A medical platoon.
- A maintenance platoon.
- An NBC reconnaissance platoon.
- A sensor platoon.
- An aviation unit maintenance (AVUM) platoon.
- A motorcycle platoon.
- A fire support element.

(2) Each of the two ground cavalry troops has--

- A headquarters section.
- A mortar section.
- Three scout platoons.
- A troop maintenance section.

(3) Each of the two air cavalry troops has--

- A troop headquarters section.
- An aeroscout platoon containing six scout helicopters.
- An attack helicopter platoon containing four attack helicopters.

b. Cavalry squadron missions encompass all parts of the battlefield. The reconnaissance platoon provides cross-country mobility, agility, and speed. It complements the ground and air cavalry troops by conducting reconnaissance where Threat contact is unlikely. The NBC reconnaissance platoon's mission is to minimize the effects of NBC attacks by locating NBC hazards. Units can be warned to avoid contamination if operationally feasible. Either of these platoons may conduct reconnaissance or be attached to ground or air cavalry troops.

c. The NBC reconnaissance platoon normally operates in conjunction with other cavalry ground troops and not as a separate platoon.

d. An engineer unit may be integrated into the cavalry squadron organization to support the mission.

e. Command and control within a cavalry squadron is extensive and critical. The cavalry squadron normally functions under division control but will often operate under brigade control. The communications nets in which the cavalry squadron operates are shown in Figure 7-15.

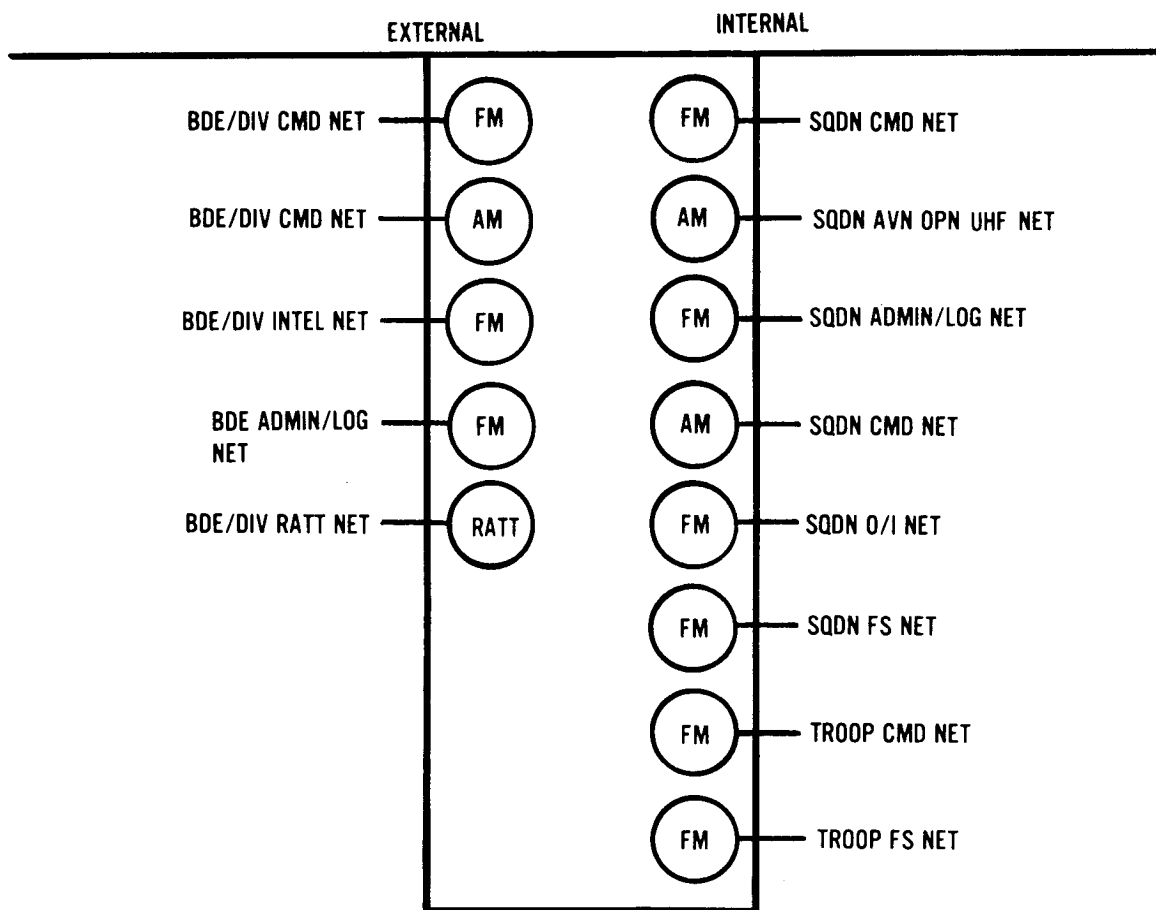


Figure 7-15. Cavalry squadron radio net structure.

f. Internal communications is critical command, control, and coordination of the elements within the squadron.

g. The cavalry squadron relies heavily on single-channel radio to achieve success. The squadron has a signal officer and a communications platoon in the headquarters troop. The signal officer advises the squadron commander on using the communications system. The signal officer is also the communications platoon leader. The platoon installs, operates, and maintains the squadron communications system at the headquarters level. (See Figure 7-16.) The signal officer is assisted by a communications chief.

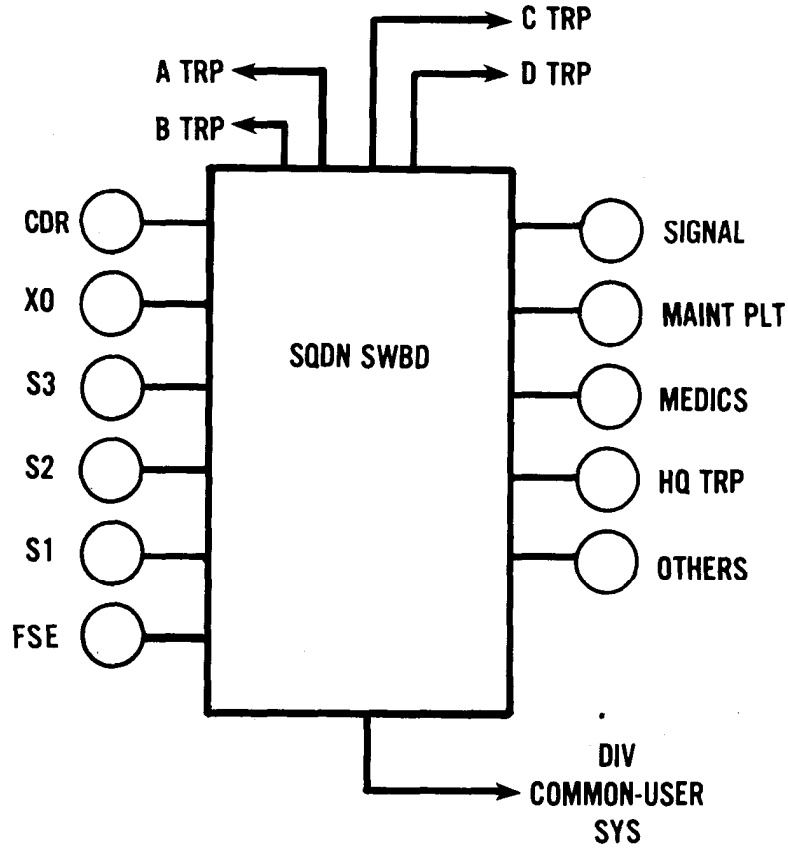


Figure 7-16. Armored cavalry squadron wire system.

7-18. The Combat Support Aviation Battalion and Attack Helicopter Company General Support

The heavy division is supported by combat support aviation battalion (CSAB) and attack helicopter company general support (AHC GS). The AHC GS provides aviation support to DIVARTY, brigade, division headquarters, and limited medical evacuation. CSAB provides the aerial movement of troops, supplies, equipment, and air assault operations. The aircraft maintenance company (AMC) assigned to DISCOM provides aviation intermediate maintenance (AVIM) maintenance for division aircraft.

a. The AHC aircraft operate in the supported unit's nets and are fully equipped for command and control by the division commander and staff, major subordinate commanders, and the FA air observer.

b. One platoon of the air traffic control (ATC) company forward is assigned to support the division. The ATC units are assigned to the AB. The ATC platoons communication requirements are described in detail in FM 1-103.

7-19. The Division Artillery Headquarters

In addition to controlling its organic and attached FA units and conducting fire planning for the division, two essential missions of the DIVARTY are counterfire and interdiction.

a. Counterfire is suppressing, neutralizing, or destroying Threat indirect fire systems capable of firing on friendly forces. Threat systems can be attacked by fire or electronic means. Targets include mortars, cannons, missiles, and rocket systems. The target can be the actual weapon, the command and control elements, the communications, the observers or target acquisition elements, and the support systems. Targets also include air defense systems. Subtasks of counterfire include maneuver, target acquisition, battle control, target processing, target attack, and attack assessment.

b. Interdiction is disrupting, neutralizing, delaying, or destroying Threat forces that are neither in LOS nor capable of direct fire against friendly forces. Interdiction targets include first-echelon units not participating in a direct fire battle and second-echelon regiments. Additional targets include critical CPs, key air defense systems, airfields, nuclear and chemical delivery units, logistic centers, and key avenues of approach. FA scatterable mines can delay, disrupt, or channel follow-on forces. Other subtasks are maneuver, receipt of target information, battle control, target processing, target attack, and attack assessment.

c. The current FA command and control system that meets the challenge of modern combat is the TACFIRE. When used with other FA equipment, TACFIRE provides the maneuver commander with a system that can detect targets, allocate firepower, and provide fire support within seconds. Highly automated equipment can rapidly and accurately determine target data and can transmit that data to the command and control team. TACFIRE provides the means to receive targeting information, allocate firepower, compute ballistic firing data, and send fire orders to FA weapons.

(1) TACFIRE is an electronically integrated command and control information system that also processes fire missions. It is the key to the fire support system. TACFIRE receives, stores, combines, and sorts target reports.

(2) TACFIRE is an information system dependent on its communications links to exchange data to bring accurate and devastating fire on the Threat.

d. Successful counterfire and interdiction missions depend on effective command, control, and communications. Ideally, the DIVARTY has--

- Secure FM radio (voice/data).
- Improved high frequency (IHF) (voice/facsimile).
- Multichannel radio (telephone/facsimile).
- Wire.
- RATT

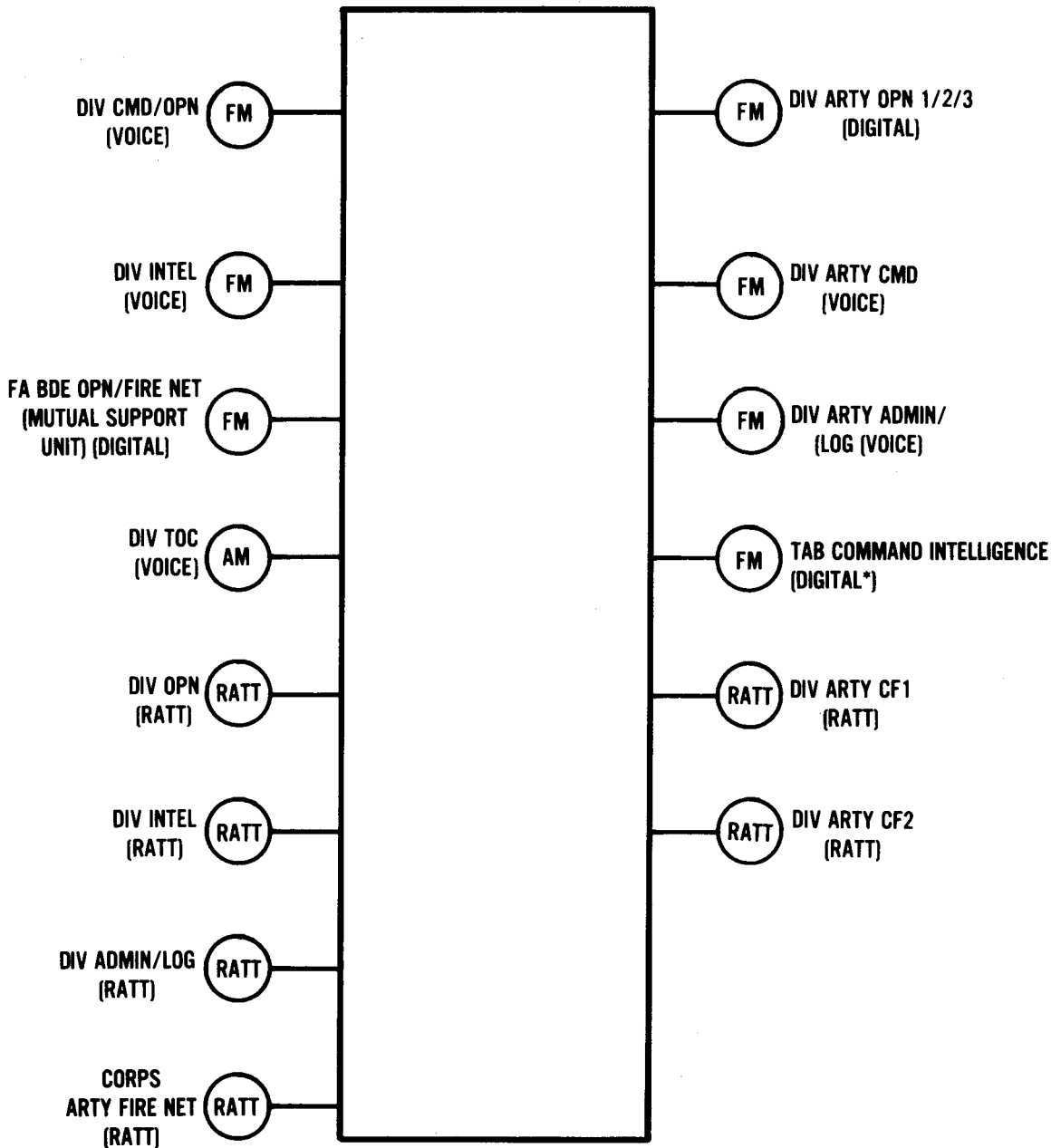
The DIVARTY signal officer matches these communications assets against needs. This officer is involved in everything from selecting CP locations to planning essential communications circuits. The signal officer's plans are carried out by the DIVARTY communications platoon in DIVARTY headquarters and headquarters battery (HHB) and by subordinate unit communications officers and platoons. Specific platoon missions are supervised and controlled by the platoon leader (assistant signal officer) and platoon sergeant or communications chief.

(1) Single-channel radio usually satisfies initial needs for basic communications. The DIVARTY operates in the single-channel nets shown in Figure 7-17. Radio sets must be arranged so that split operations, dispersion of assets, and other ECCM techniques are not hindered while also providing flexibility.

(2) The DIVARTY wire communications system combines wire circuits and multichannel circuits. (See Figure 7-18.) The extent of the system depends upon movement of the DIVARTY headquarters and its subordinate units. Priority circuits are those established for the conduct of fire and for fire support coordination and planning. To set up the required circuits, DIVARTY uses the wire laying assets of the headquarters battery and any attached or reinforcing FA brigades.

(a) Normally, DIVARTY installs lines to all of its subordinate units. To establish circuits to the DS battalions, the wire teams of the DIVARTY communications platoon--

- Lay field wire circuits to the DS battalions.
- Connect the DS battalions through the multichannel system established at each of the supported maneuver brigades.
- Use a combination of both methods.



NOTE: FM radios will be secured with either VINSON or other secure means.

* TAB asset

Figure 7-17. DIVARTY radio net structure in the heavy division.

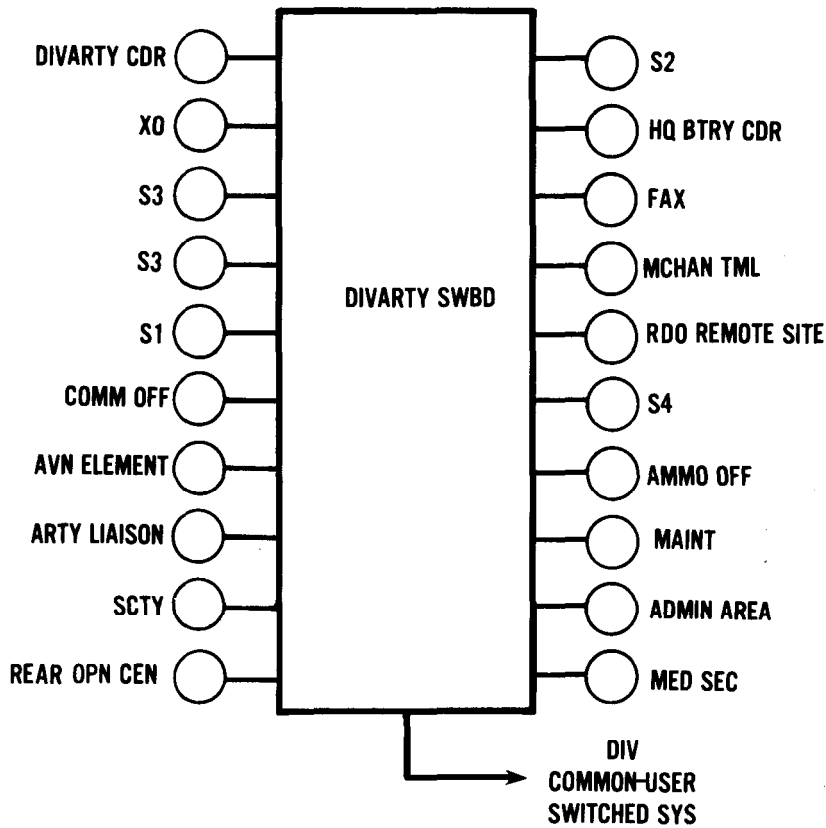


Figure 7-18. DIVARTY switchboard wire diagram.

(b) Installation of a traditional DIVARTY wire system can be affected by the size and conditions of the battlefield. Signal plans must identify circuit priorities for the DIVARTY wire teams--ensuring continuous circuit availability to all subordinate units may be impossible. The division multichannel system can relieve the demand for long distance tactical wire circuit installation. However, detailed coordination between the DIVARTY signal officer and the division signal officer is essential.

(c) DIVARTY uses minimal wire communications in the light division. The rapid movement of artillery batteries, plus their wide dissemination on the battlefield, precludes the use of wire teams. Wire is used for internal wiring at headquarters locations.

(3) The forward communications company of the division signal battalion provides the DIVARTY with one multichannel terminal for access into the division telephone system. Installation of the terminal is the responsibility of the terminal team. This team will install two lengths of 26-pair cable between the terminal and the DIVARTY switchboard. In most cases, however, the DIVARTY communications platoon shares this responsibility. Normally, cable installation has top priority because it links DIVARTY with its subordinate units and fire support element (FSE) throughout the division.

(a) The terminal may locate a long distance away from the DIVARTY headquarters. Field wire or cable ties in circuits installed at the headquarters.

(b) Multichannel systems are ACUS. Additional basic circuits are installed by wire. However, the fire control circuits are sole user installed over the multichannel system and should be backed up with field wire circuits when possible.

e. The GS battery gives range to the DIVARTY's effectiveness in the light division. The battery operates with two battery computer systems (BCSs) so the split-gun configuration can be employed with this eight-gun battery of M-198. (See Figures 7-19 and 7-20.)

7-20. Field Artillery Battalions

The FA can provide continuous fire support for the commander's scheme of maneuver. FA is capable of suppressing direct and indirect fires of the Threat. Effective fire support depends on good communications at every level. The FA commander relies on the communications system to control the elements of the command and to coordinate their fires.

a. Successful communications for TACFIRE is the key to the FA fire and direction system. TACFIRE receives targeting information, allocates firepower, computes ballistic firing data, and sends fire commands to firing units. TACFIRE communicates with standard contemporary radio (FM, IHF), wire, and multichannel communications. The TACFIRE communications control unit (CCU) allows integration of any communications on any net. The CCU allows rapid netting reconfiguration. This provides the FA a rapid, high speed, data communications capability. This unit greatly increases the speed and distances over which messages can be sent.

b. The communications system of the FA battalion must satisfy both internal and external needs. Observers and FIST headquarters must transmit calls for fires and corrections over great distances without delay. The fire support officer (FSO) and fire direction center (FDC) must coordinate the attack on targets and quickly send fire commands to the weapons. External communications provides interface over long distances with higher headquarters, reinforcing units, and other diverse elements.

c. Each armored and mechanized (A/M) infantry DIVARTY has three 155-millimeter self-propelled battalions, one target acquisition battery, one composite 8-inch Multiple Launch Rocket System (MLRS) battalion or one MLRS battery, and one HHB DIVARTY. Each FA battalion has a communications platoon with radio and wire sections, a communications platoon leader (assistant signal officer), and a battalion signal officer in its HHB. The battalion signal officer is a member of the commander's staff. This staff officer advises the commander and staff on ECCM, signal security, COMSEC, signal maintenance, communications training, and site location. The signal officer plans, coordinates, and supervises the installation of the battalion's communications system.

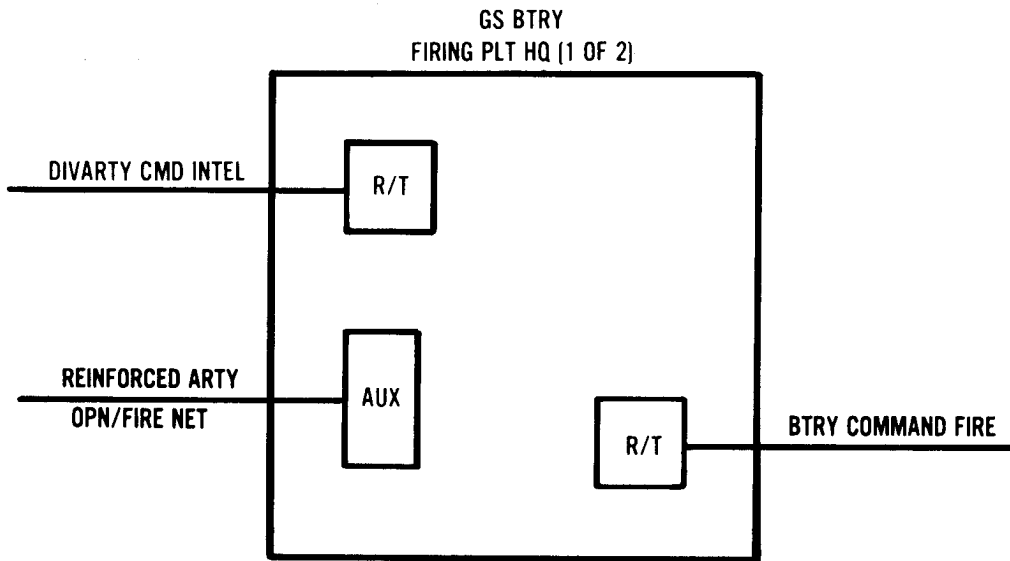


Figure 7-19. DIVARTY GS battery, firing platoon headquarters in the light division.

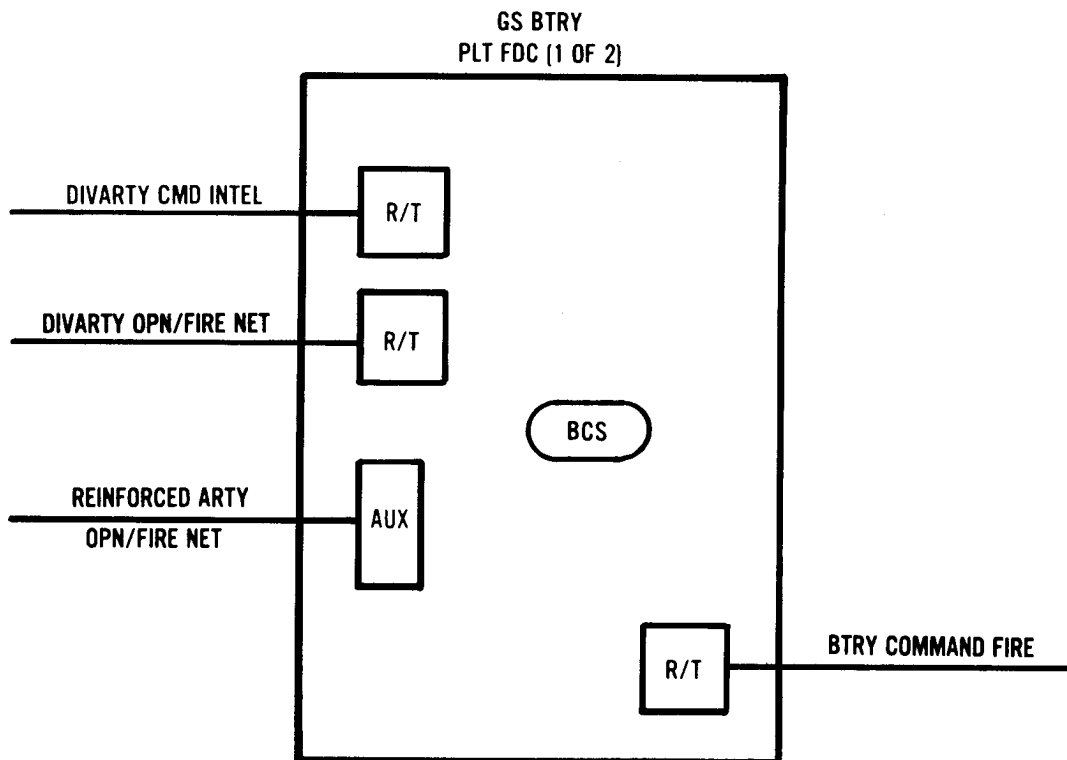


Figure 7-20. DIVARTY GS battery, firing platoon fire direction center (FDC) in the light division.

d. Each light infantry DIVARTY has three 105-millimeter battalions, one 155-millimeter battery, and one HHB DIVERTY. Each battalion has a communications platoon in its HHB, a communications section in each firing battery, and a battalion signal officer. The battalion signal officer advises the commander and staff on ECCM, signal security, communications training, and site location. The battalion signal officer plans, coordinates, and supervises the installation of the battalion's communications system.

e. The communications platoon consists of a communications chief or platoon sergeant, a platoon headquarters, a RATT section, and unit level communications maintainers, operators, and radio mechanics. The platoon installs and maintains the communications for the battalion CP, the battalion trains, and the communications links to supported and subordinate units.

f. The communications systems in the FA battalions have different capabilities and limitations. Radio (FM, IHF), wire, messenger, and visual signal systems should complement each other. Total dependence should not be placed on any one system. Reliability and flexibility of communications are increased by using all systems. The battalion communications system must be secure, easily displaced, and quickly reinstalled.

g. The typical single-channel radio nets in the FA DS battalion and the GS battalion are shown in Figures 7-21 through 7-23.

h. The size of the battalion wire system depends on the time and resources available. Battlefield dynamics often prevent the installation of an entire wire system. The battalion signal officer must prioritize the wire circuits of the battalion. The question is whether the installation of a particular circuit will allow a reduction in radio subscribers. Generally, the wire system duplicates the radio nets of the battalion. The installed wire becomes the primary communications. Wire circuits to subordinate batteries reduce the radio traffic load on the nets. If the battalion is performing a DS mission, circuits to the brigade CP and brigade FSO should be established. CUs have access into the brigade switchboard for communications with battalion FSOs and FIST chiefs and into the division multichannel system. The access provides the FA battalion FDC with a link through the multichannel to the DIVARTY TOC. Four wire teams are assigned to a DS artillery battalion communications platoon. (See Figures 7-24 and 7-25.)

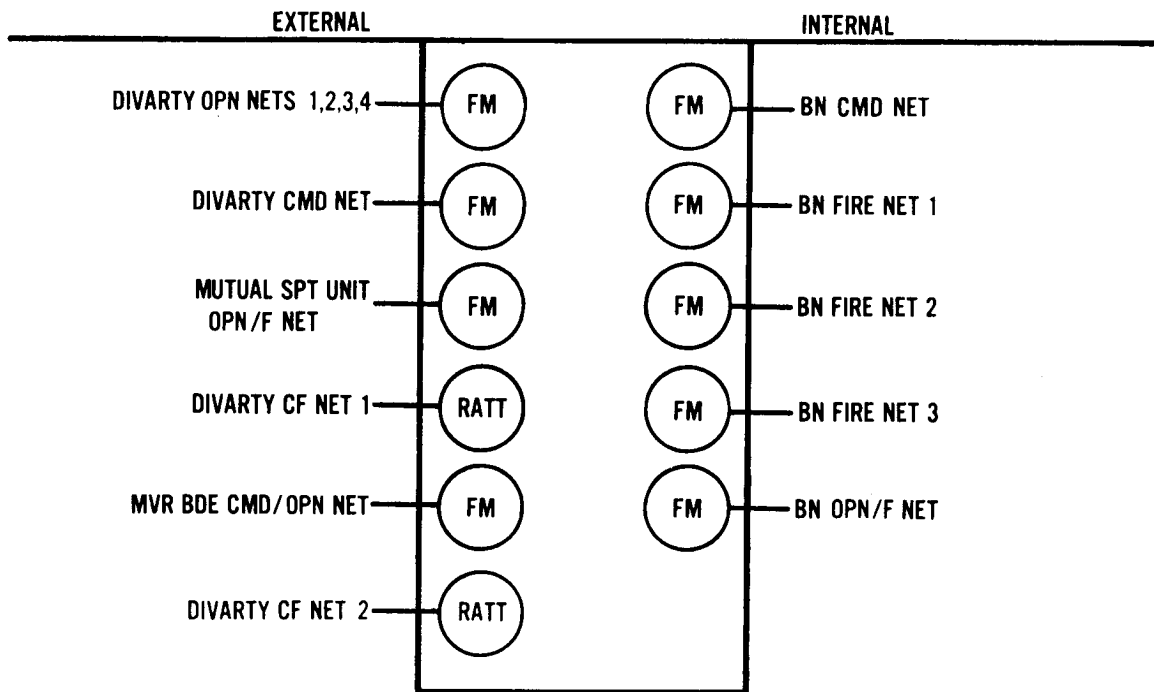


Figure 7-21. FA battalion DS radio net structure.

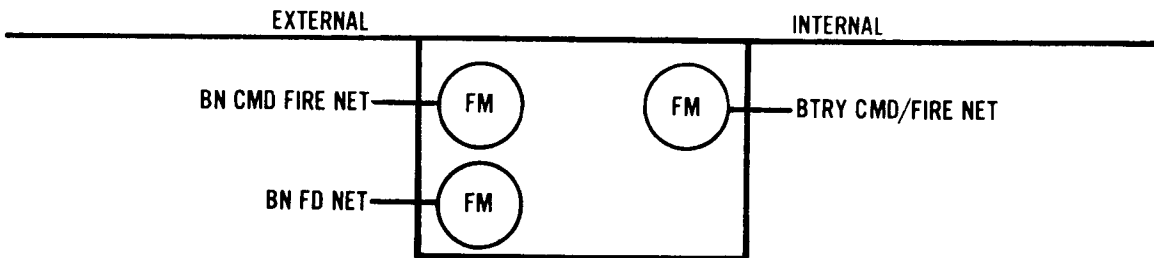


Figure 7-22. Cannon battery radio net structure.

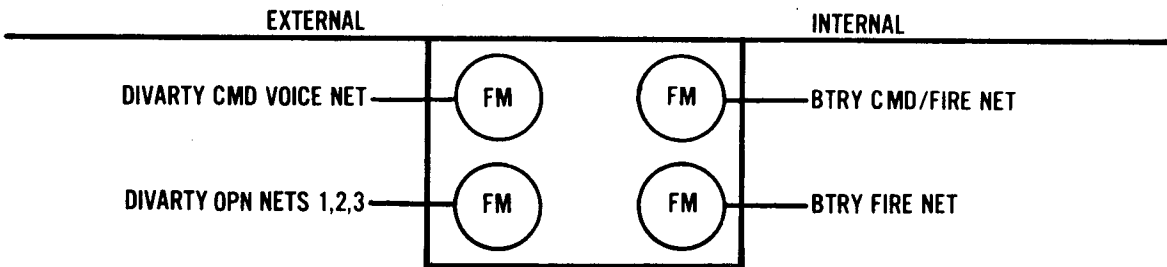


Figure 7-23. MLRS battery radio net structure.

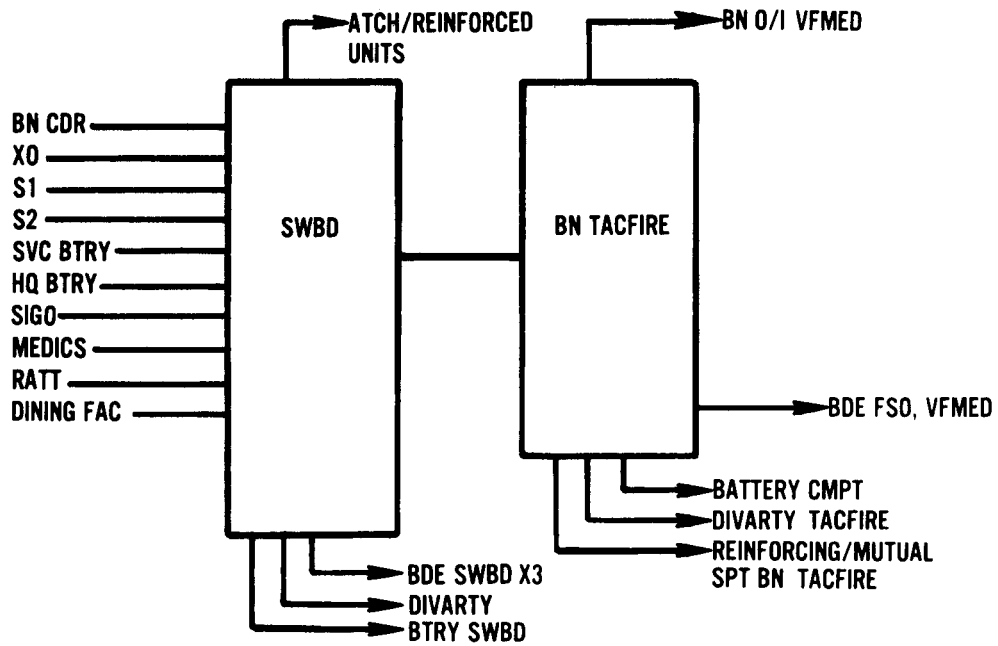


Figure 7-24. DS battalion telephone and circuit distribution diagram.

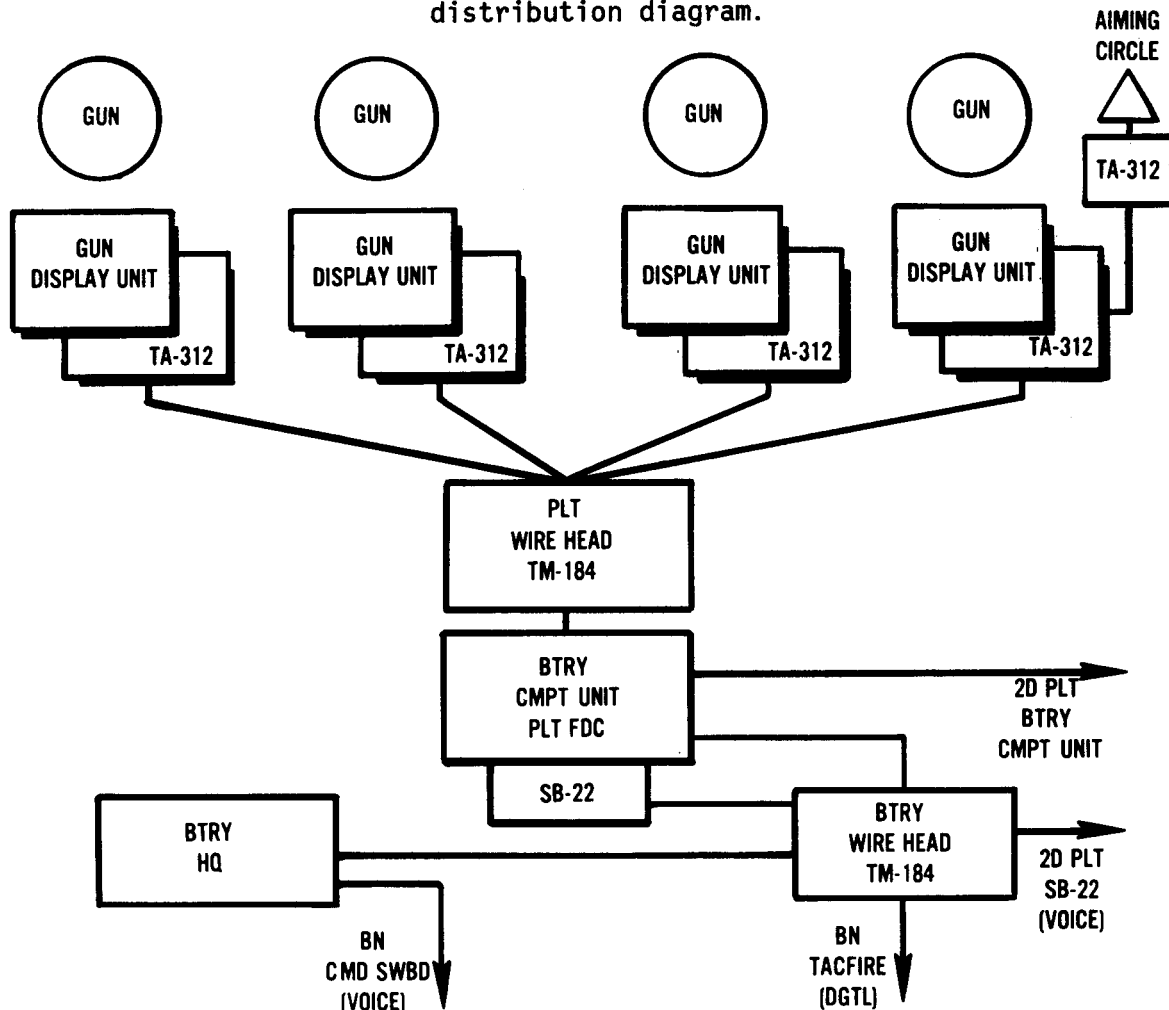


Figure 7-25. Intrabattery wire system.

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(1) Three of the wire teams are responsible for establishing wire communications with the three firing batteries.

(a) First priority is the line from the battalion TACFIRE to each battery computer system. These lines transmit firing data and fire missions.

(b) Second priority is the line from the battery command switchboard to the battalion command switchboard. This is a voice circuit used for command and control as well as administrative and logistical traffic.

(2) The fourth wire team sets up supporting-to-supported unit communications.

(a) First priority is the wire line from the battalion TACFIRE to the brigade FSO's variable format message entry devices (VFMED).

(b) Second priority is a line from the battalion TACFIRE to the multichannel shelter at the brigade headquarters extension or support extension (whichever is closer) to pick up a prerouted digital circuit to the DIVARTY TACFIRE.

(c) Third priority is a voice circuit between the DS battalion switchboard and the brigade or signal extension node switchboard for ACUS access throughout the brigade and division telephone system.

(3) Other lines within the DS battalion CP are installed by the user or subscriber.

7-21. The Division Support Command in the Heavy Division

DISCOM is the major subordinate command that provides CSS to the division.

a. The DISCOM has a headquarters and headquarters company/material management center (HHC/MMC), a main support battalion, three forward support battalions, and an AMC. The DISCOM CP is usually located in the division rear area. The HHC/MMC and the main/support battalion are normally located in the DSA.

b. The DISCOM units in the DSA normally access the area communications system through the signal battalion DISCOM/Div Rear CP node. In some cases, the main support battalion may not be colocated with the DISCOM CP and tie in through various switchboards based on tactical laydown. The AMC ties into the area system based on location, normally the division airfield.

c. The FSBs access the division communications system through signal extensions. These signal extensions are installed and operated by the forward communications company of the division signal battalion.

d. The division command operations company of the division signal battalion provides a signal extension node at the DISCOM CP/Div Rear CP. (See Figure 7-26.)

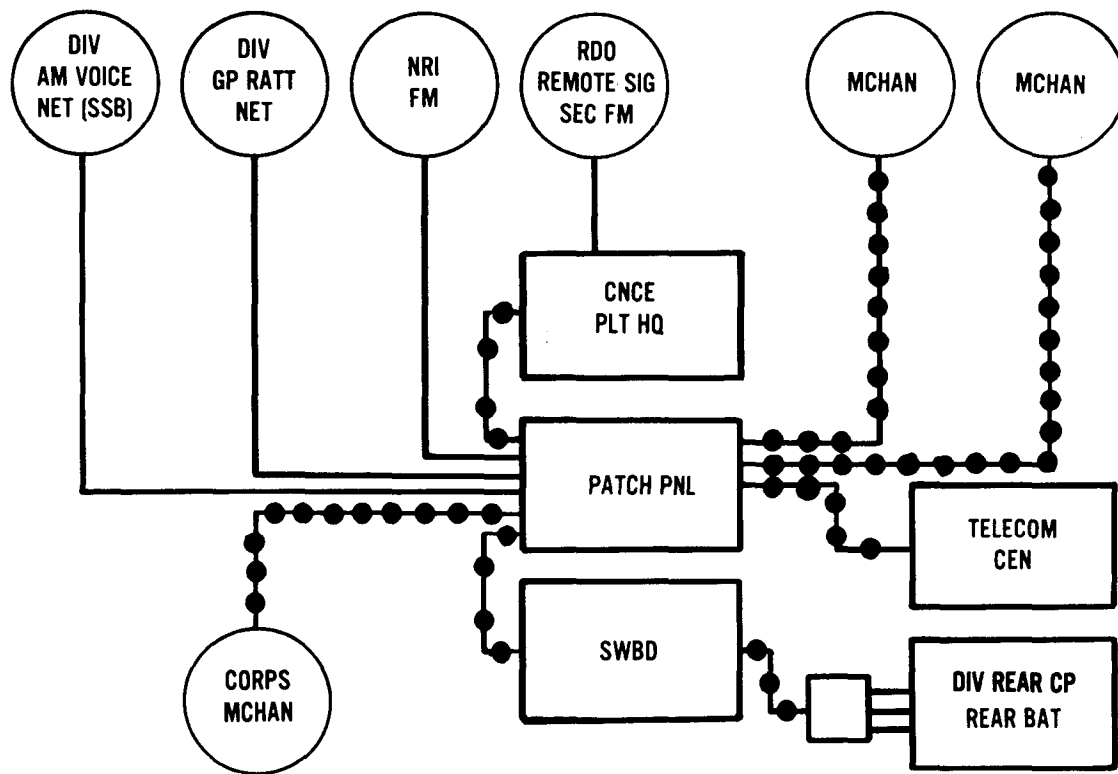


Figure 7-26. DISCOM extension.

e. The division signal battalion provides communications services to the FSB. Other units in this area also receive services from the signal extension node. (See Figure 7-27.) The signal extension at the DISCOM CP provides division-level communications services to DISCOM and to its battalions. However, DISCOM operates an internal communications system partly through its single-channel radio nets for command and control. (See Figure 7-28.)

f. The internal CP wire communications of the division support command is partially installed by a wire team from the signal support operations platoon of the division signal battalion. Much of the installation of wire and phones must be done with organic assets. Elements of DISCOM in the division forward areas are connected by the DISCOM units with cable or wire to the extension. Figures 7-29 through 7-31 depict the wire system for DISCOM, each of its battalions, and the division materiel management center (DMMC).

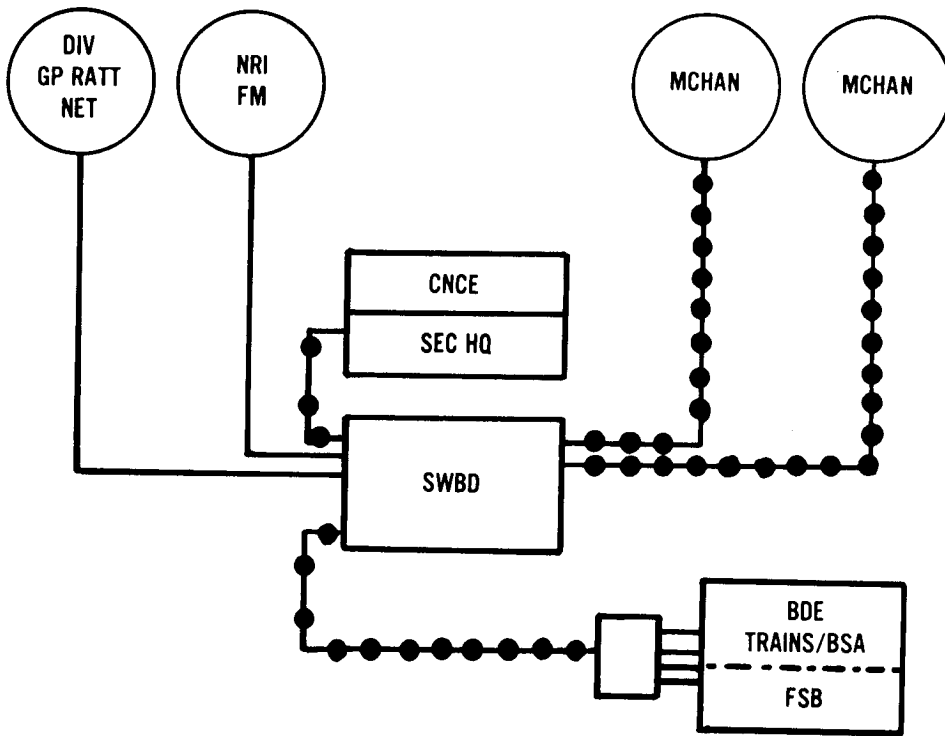


Figure 7-27. Brigade support extension FSB and brigade trains.

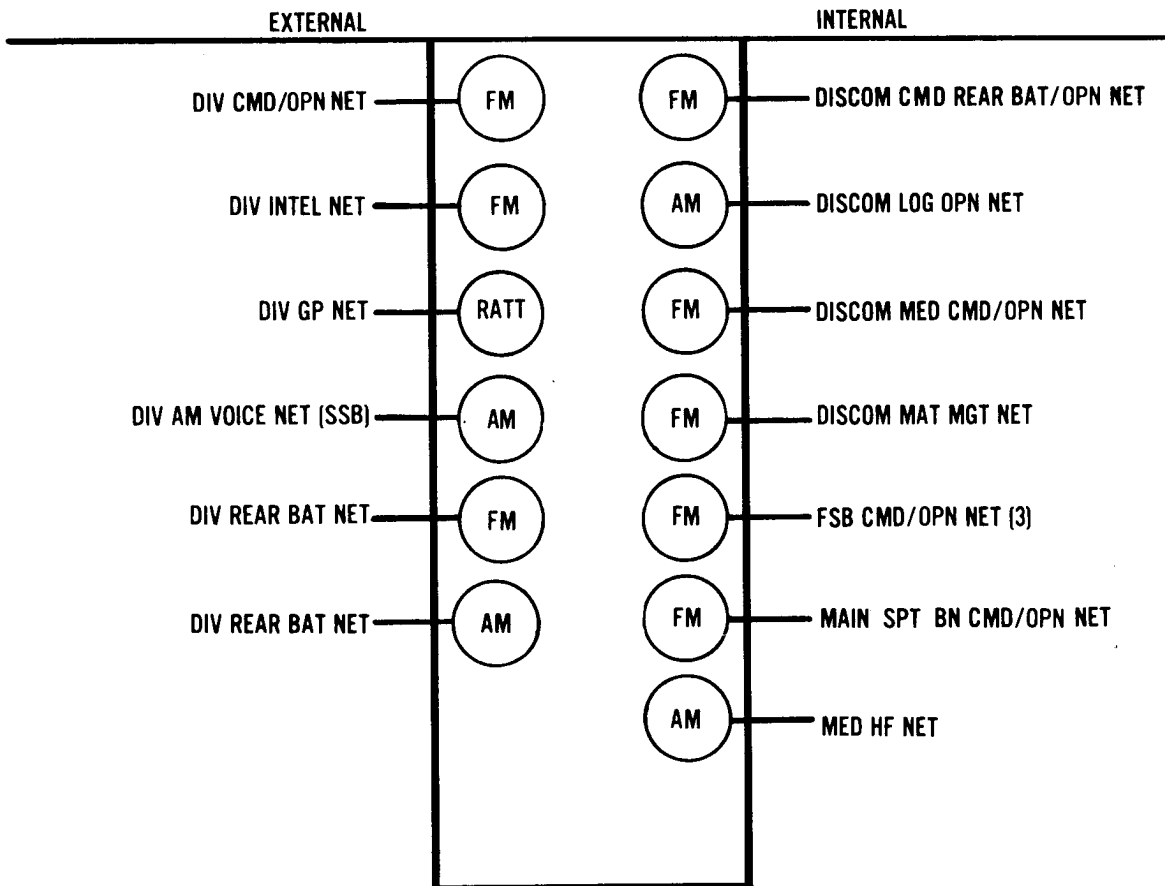


Figure 7-28. DISCOM radio net structure.

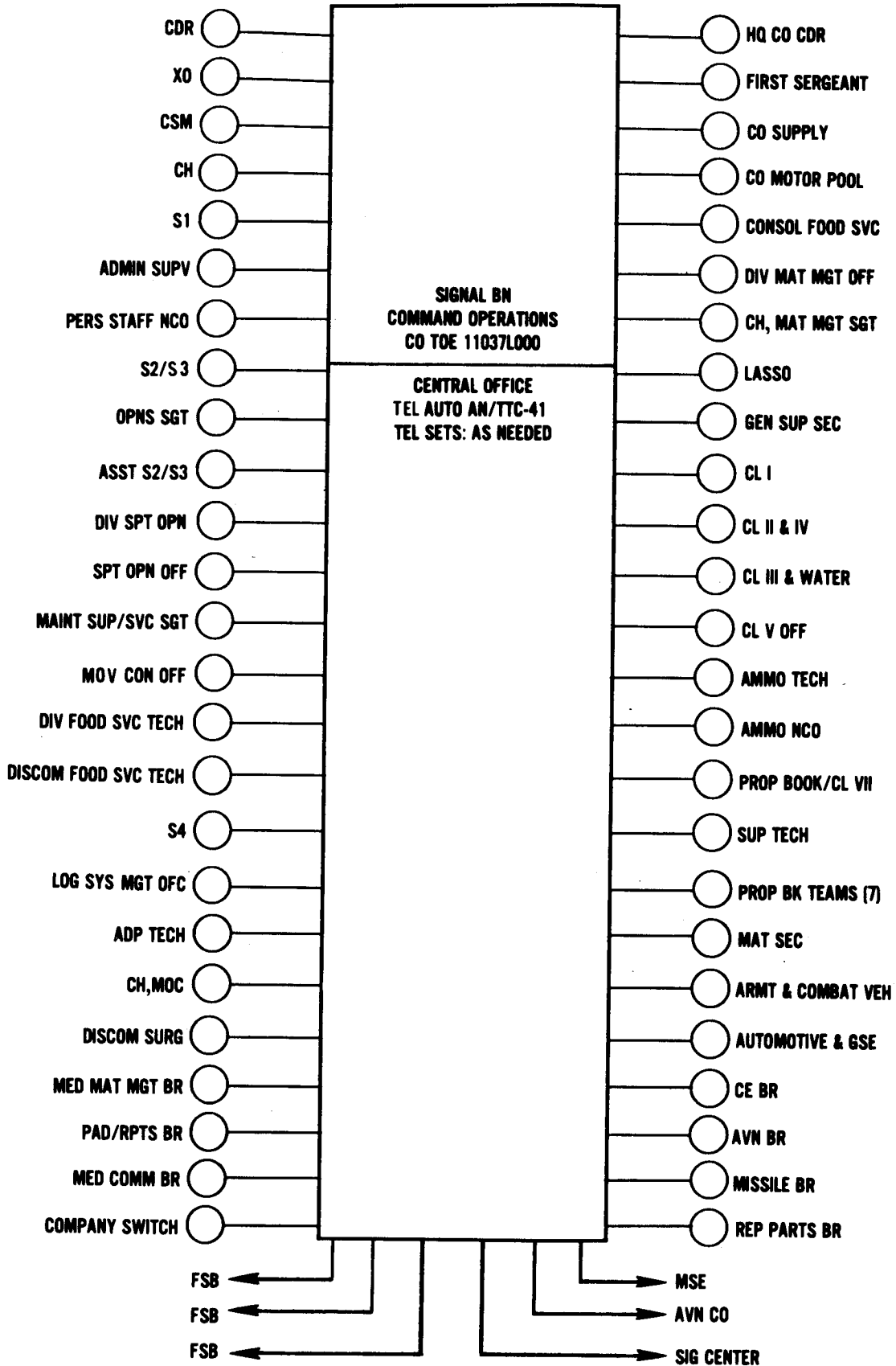


Figure 7-29. DISCOM HHC/MMC wire system.

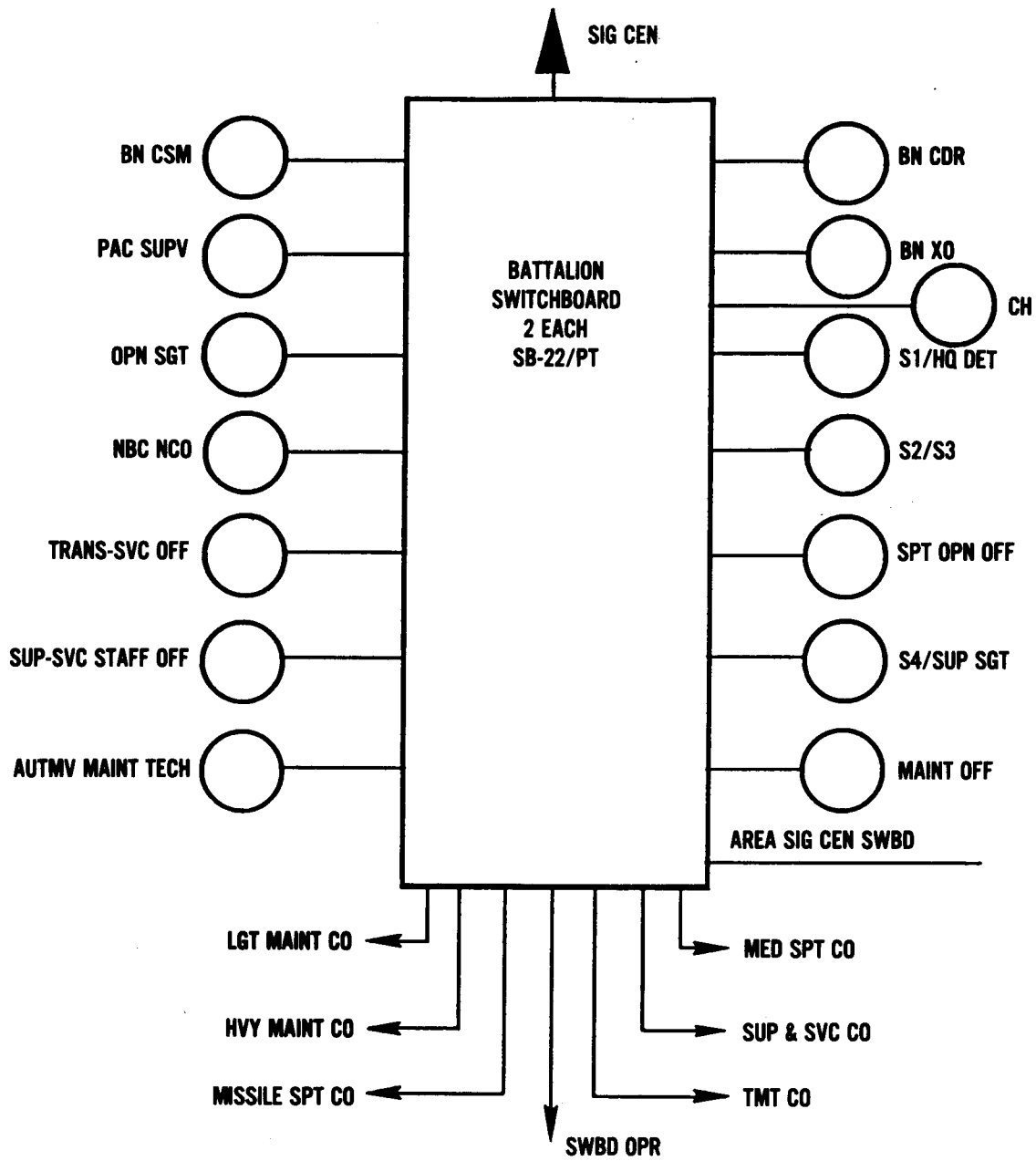


Figure 7-30. Main support battalion wire system.

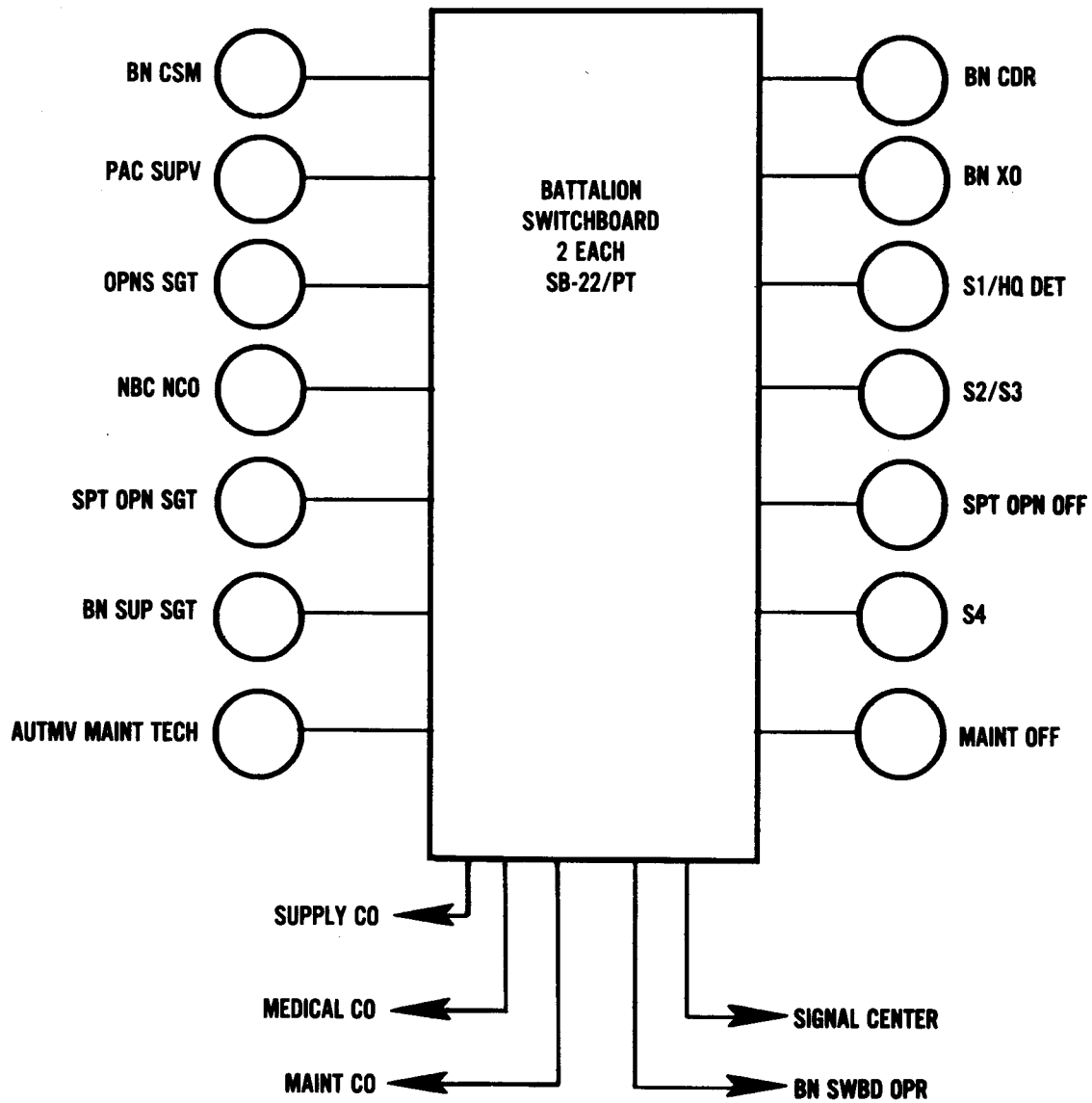


Figure 7-31. FSB wire system.

7-22. The Division Support Command in the Light Division

a. The HHC of the DISCOM is located in the DSA. It commands and controls organic and attached units and provides planning, direction, and supervision of logistics and medical support elements in support of the division. The DMMC is located in the DSA and materiel management net to supervise supply and maintenance operations. The three forward area support coordination officers (FASCOS) are organic to the DISCOM HHC; one operates in each BSA. They coordinate logistics and medical support for units operating in each brigade area. (See Figure 7-32.)

b. The maintenance battalion has a headquarters, a main support company, and three forward support maintenance companies. The headquarters and main support company are located in the DSA. The forward support companies are located in the BSA. The battalion provides DS maintenance management and operations for the division and Class IX support less aviation and medical.

(1) Maintenance support and capabilities depend on consolidated organizational maintenance, with the bulk of the maintenance being consolidated in the DSA. Although the BSA performs minimal DS, there is heavy use of repairable exchange, maintenance exchange item (MEI), and operational readiness float (ORF). Maintenance priorities are to discard, exchange, evacuate, and finally, fix in division.

(2) The communications nets within the maintenance battalion provide command and control for internal operations. (See Figures 7-33 through 7-35.)

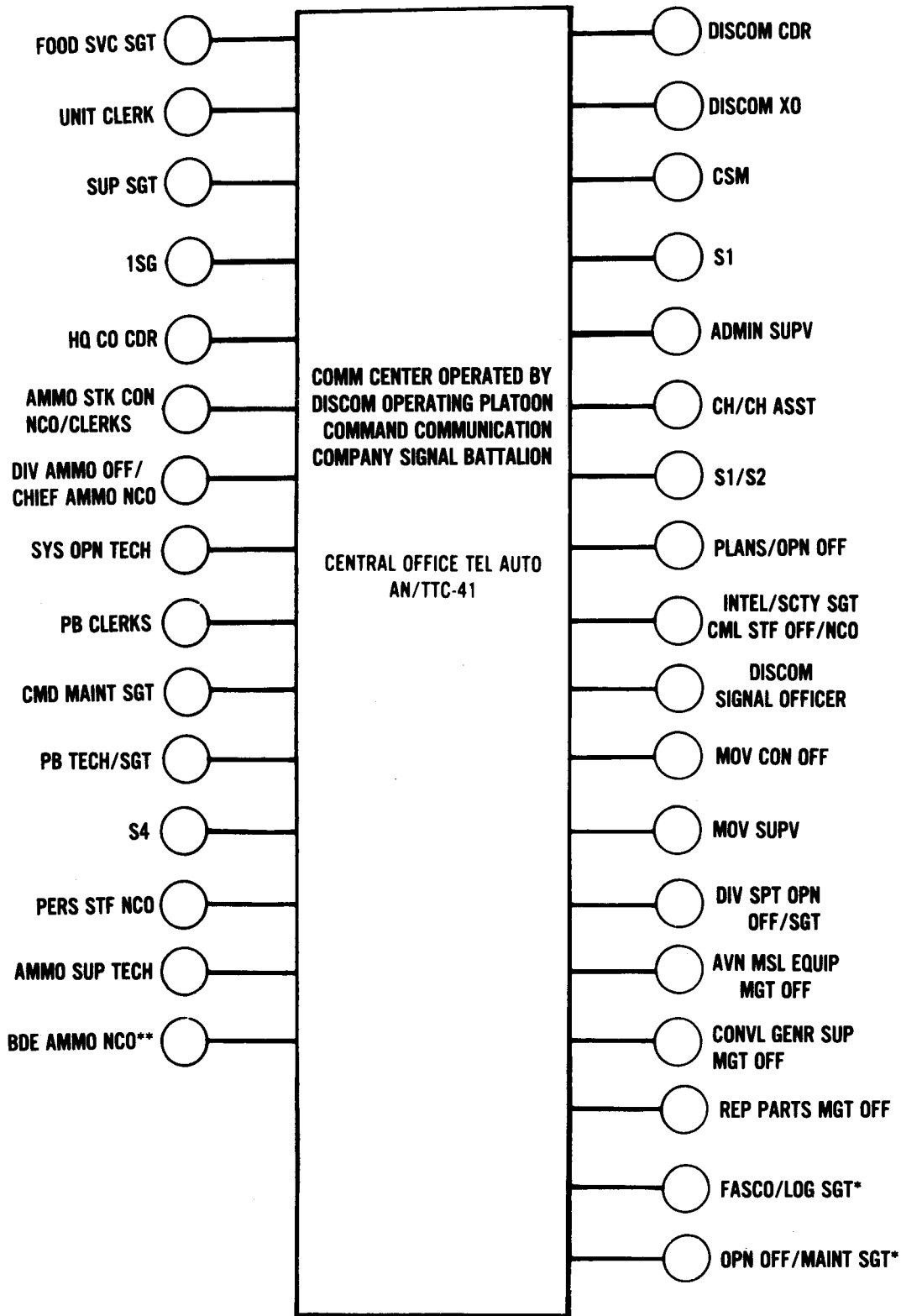
c. The support battalion has a headquarters and headquarters detachment (HHD) and supply company, a transportation motor transport company, and three forward supply companies. The forward supply companies are located in the BSA. The rest of the battalion is located in the DSA. The battalion provides DS supply for Classes I, II, III (packaged and bulk), IV, and VII. It also supplies ground transportation for distribution of supplies and equipment; water supply and distribution; and three ammunition transfer points (ATPs) in the BSA for transloading ammunition from corps transportation vehicles to using unit vehicles. When augmented, the battalion also provides graves registration (GRREG) and clothing exchange and bath (CEB) services.

(1) The support battalion is usually located within the DSA. The support battalion uses the DISCOM communications network set up by the division signal battalion.

(2) The headquarters and supply company provide command and control over the operating and support units assigned or attached to the battalion.

(3) One forward supply company is located in each BSA to conduct DS for Classes I, II, III, IV, and VII supply operations.

(4) The transportation motor transport (TMT) company is usually located close to the support battalion headquarters. The TMT company provides transportation for unit distribution of Classes II, IV, and IX supplies and for troops in support of division operations. The company command/operations net maintains control of truck platoons. (See Figures 7-36 through 7-38.)



*TELEPHONE SETS TIE INTO SWITCHBOARD OF SIG BN FWD COMM CEN OR SUPPORT BN-FWD SUP CO.
**TELEPHONE SET TIES INTO SWITCHBOARD OF SUPPORT BN-FWD SUP CO.

Figure 7-32. Light DISCOM HHC/MMC wire system.

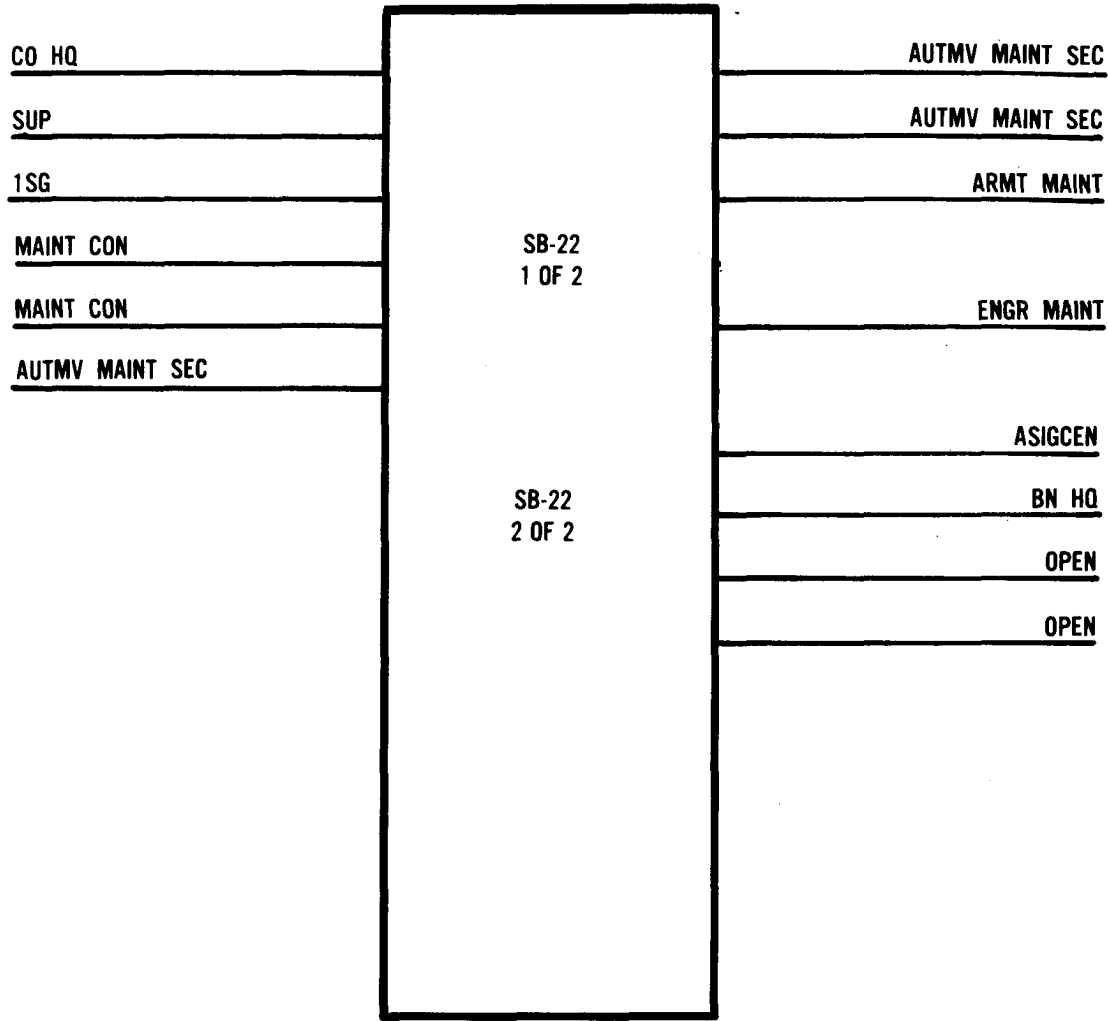


Figure 7-33. Main support company, maintenance battalion wire system.

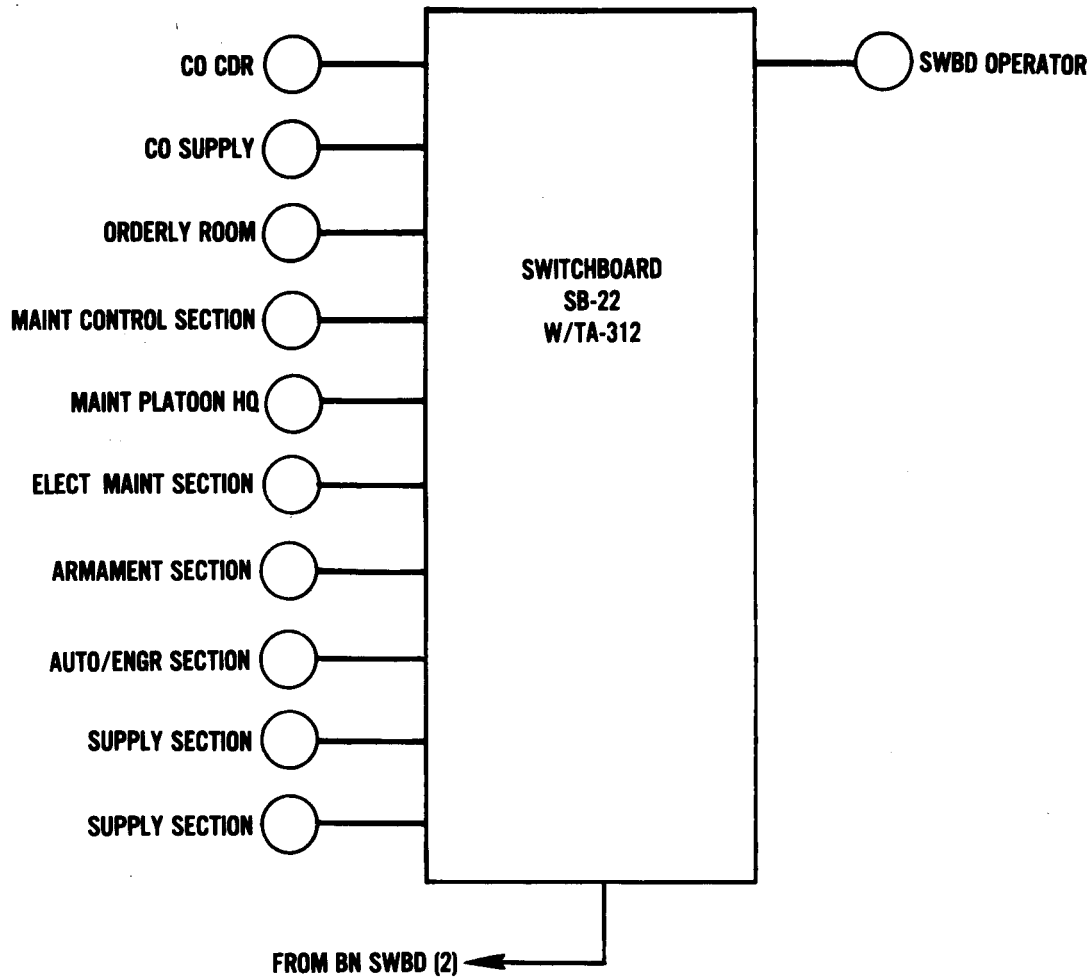


Figure 7-34. Forward support maintenance company maintenance battalion LID.

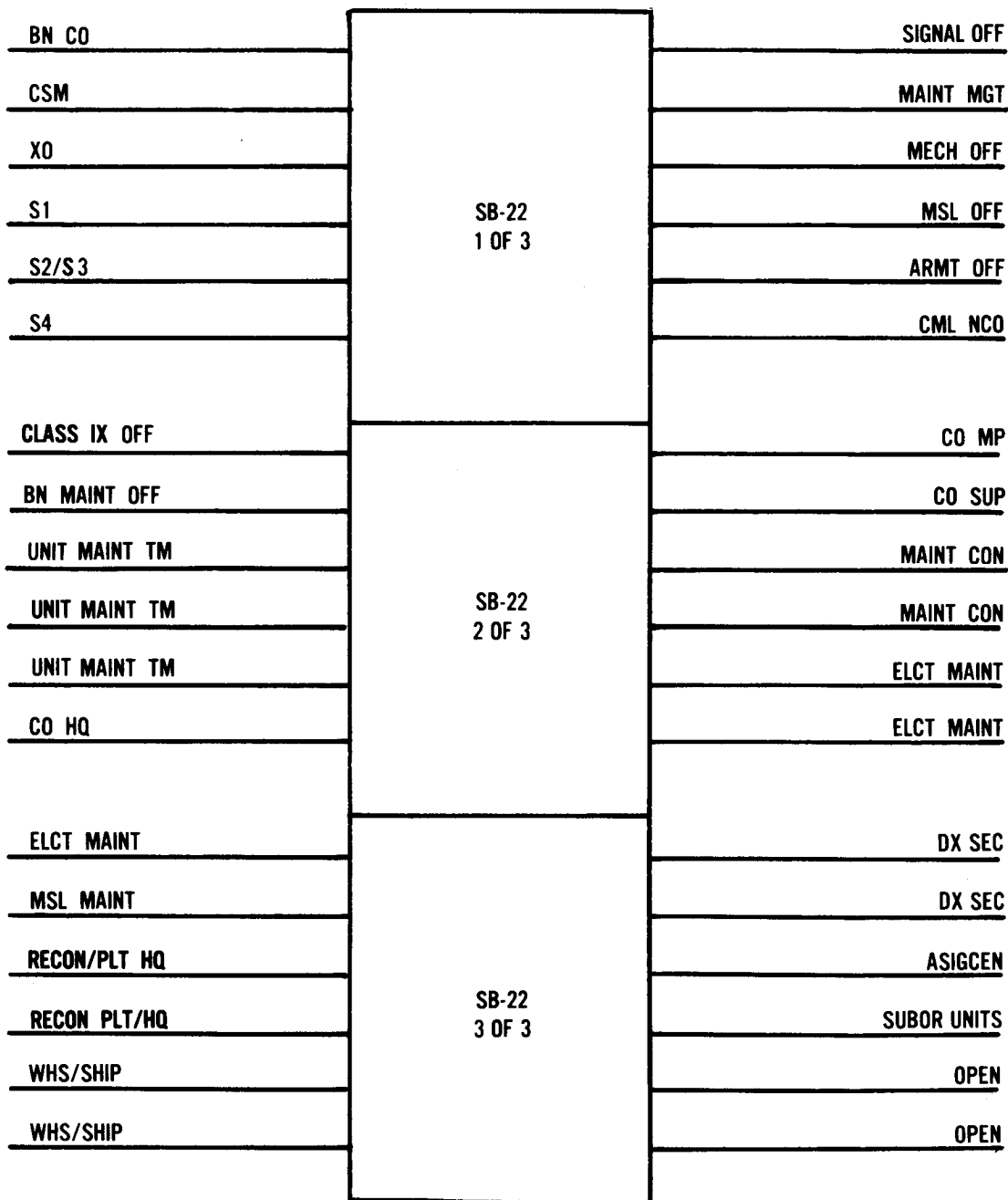


Figure 7-35. Headquarters and light maintenance company wire system, maintenance battalion.

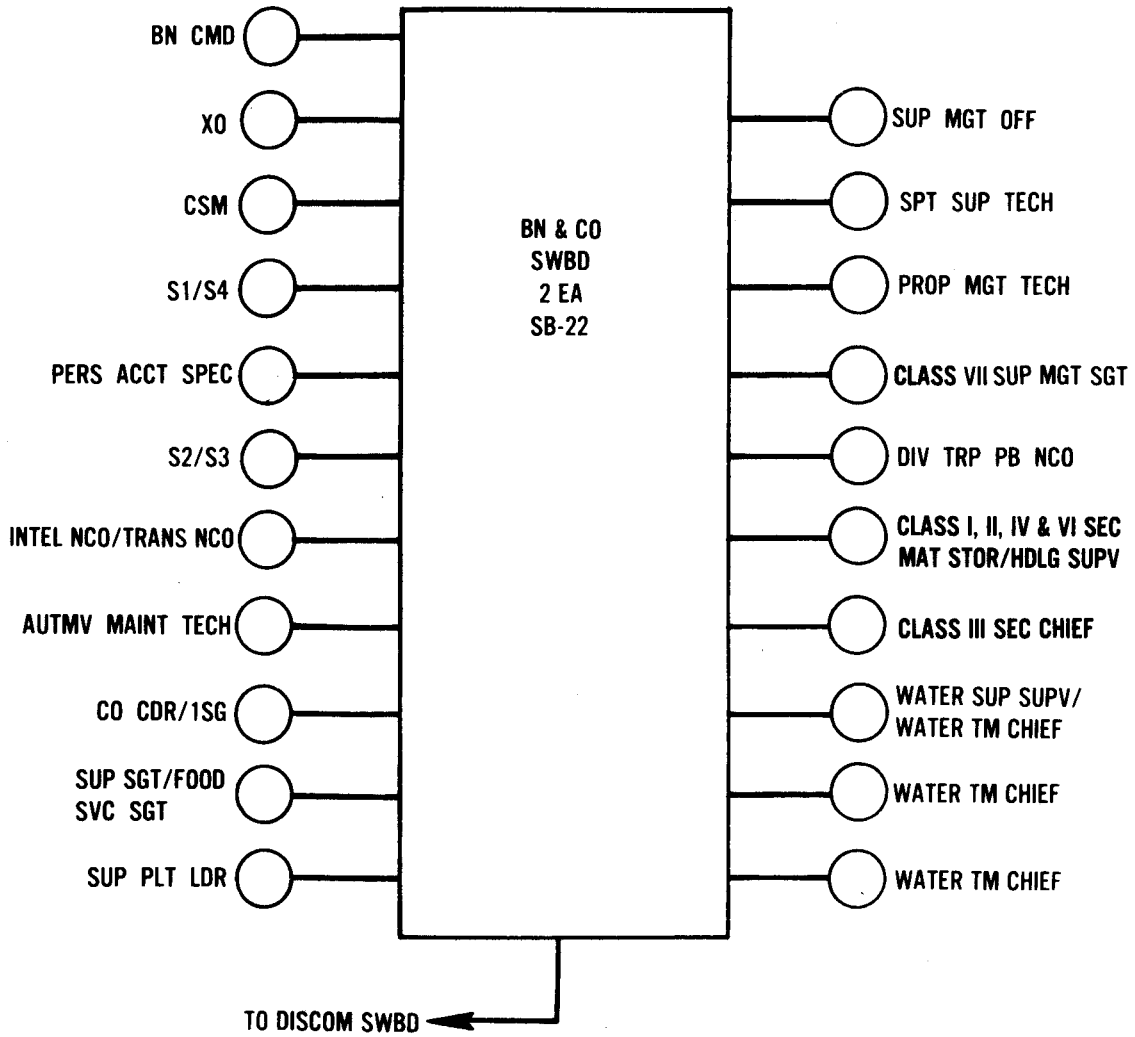


Figure 7-36. HHD wire net diagram, support battalion.

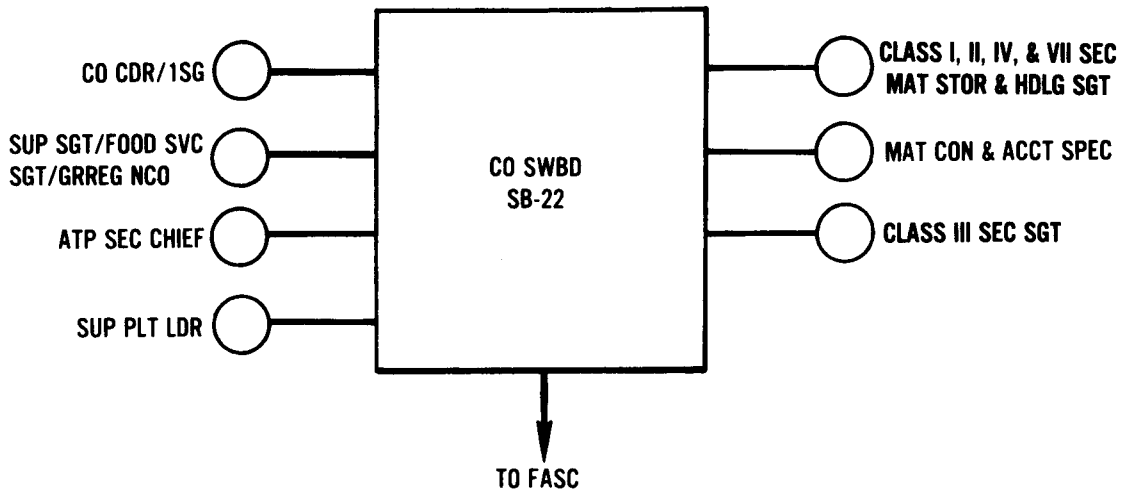


Figure 7-37. Forward supply company wire net diagram, support battalion.

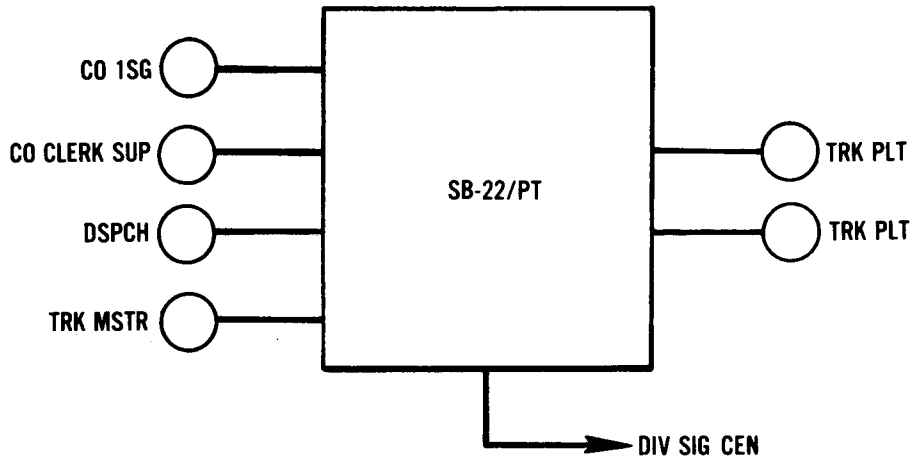


Figure 7-38. TMT company wire net diagram, support battalion.

d. The medical battalion has a headquarters and support company and three forward support medical companies (FSMCs). The headquarters provides divisionwide support for preventive medicine, mental health, optometry, and medical supply (Class VIII) and maintenance management and operations. The medical support companies have identical organizations providing unit and division level health service on an area basis. One company is located with the battalion in the DSA. The three forward support companies are located in the BSA. All companies provide treatment, holding, and evacuation. Aeromedical evacuation is conducted by corps units IAW the division medical battalion. (See Figures 7-39 and 7-40.)

e. The transportation aircraft maintenance company (TAMC) provides aviation intermediate maintenance support and aircraft repair parts supply support. (See Figure 7-41.)

f. The AMC is located in the DSA or near the division airhead or airfield. It provides DS to the division for aircraft, aircraft armaments, avionics, and aircraft peculiar items of grand support equipment.

g. Communications support for the DISCOM and its subordinate units is achieved by several means. It depends on the signal battalion to provide multichannel area system to tie together its divisionwide command, control, and functional requirements for the passage of voice, data, and facsimile traffic. The HHC DISCOM and its battalion provide switchboard operated by the command communications company. Each unit of the DISCOM has an organic wire system for internal communications and ties into this area system depending on the tactical laydown. Those DISCOM elements that operate forward in the brigade area tie into the area system through the FASC extension located in the BSA. Internal DISCOM wire systems are shown in Appendix C. The DISCOM also uses CNR for command, control, and rear operations. The radio nets are shown in Appendix C.

7-23. The Air Defense Artillery Battalion

As the proponent for the air defense battlefield operating system (BOS), ADA has the main responsibility for air defense of friendly forces across the battlefield. ADA translates the responsibility into a four fold mission: Ensure the combined arms team retains freedom of maneuver, protect critical command and control nodes, sustain the battle, and kill the enemy aircraft the first time.

a. Threat air attacks are conducted by fixed-wing and rotary-wing aircraft, cruise missiles, drones, remotely piloted vehicles (RPVs), tactical ballistic and air-to-surface missiles, airborne jammers, and airborne and airmobile assault forces. The attacker selects air routes based on terrain, weather, and allied air defense capabilities. The heavy and light ADA battalion provides short-range air defense (SHORAD) coverage for critical assets in the division. The ADA battalion is organized with an HHB and four firing batteries. The battalion defends division assets in support of the division commander's air defense concept of the operation.

b. The ADA battalion provides the light division the majority of its air defense. The ADA battalion has an HHB and three firing batteries. The reduced size of the ADA battalion is based on the minimal size of any Threat air activity in the initial stages of a low-intensity conflict.

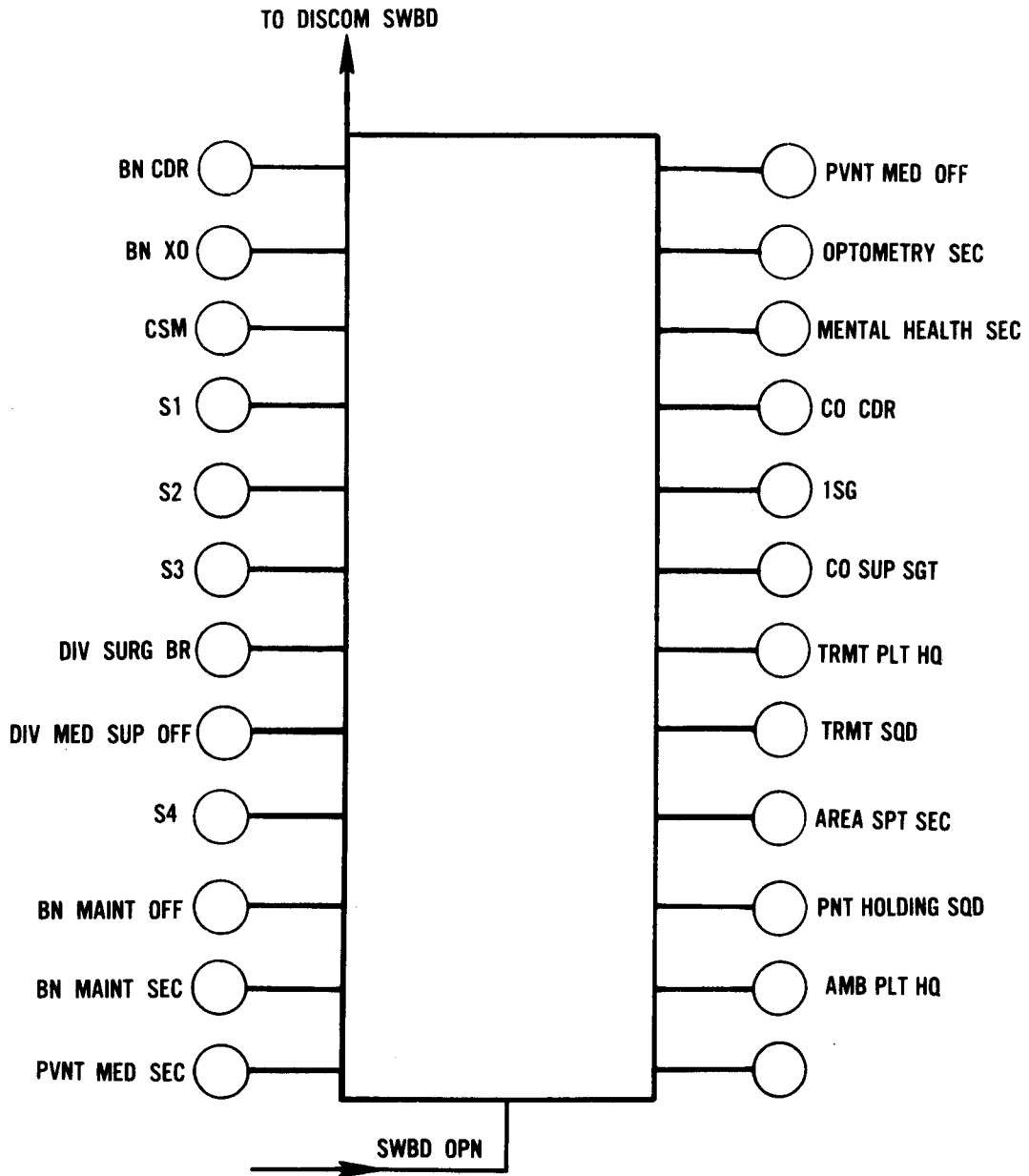


Figure 7-39. Battalion headquarters and support company wire diagram, medical battalion.

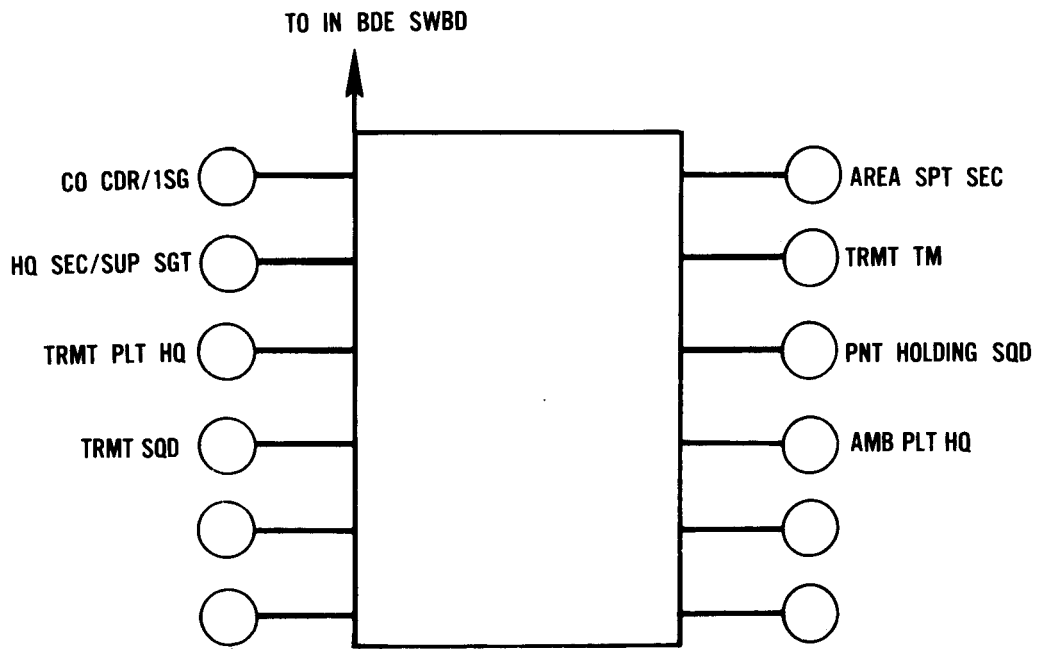


Figure 7-40. FSMC wire diagram, medical battalion.

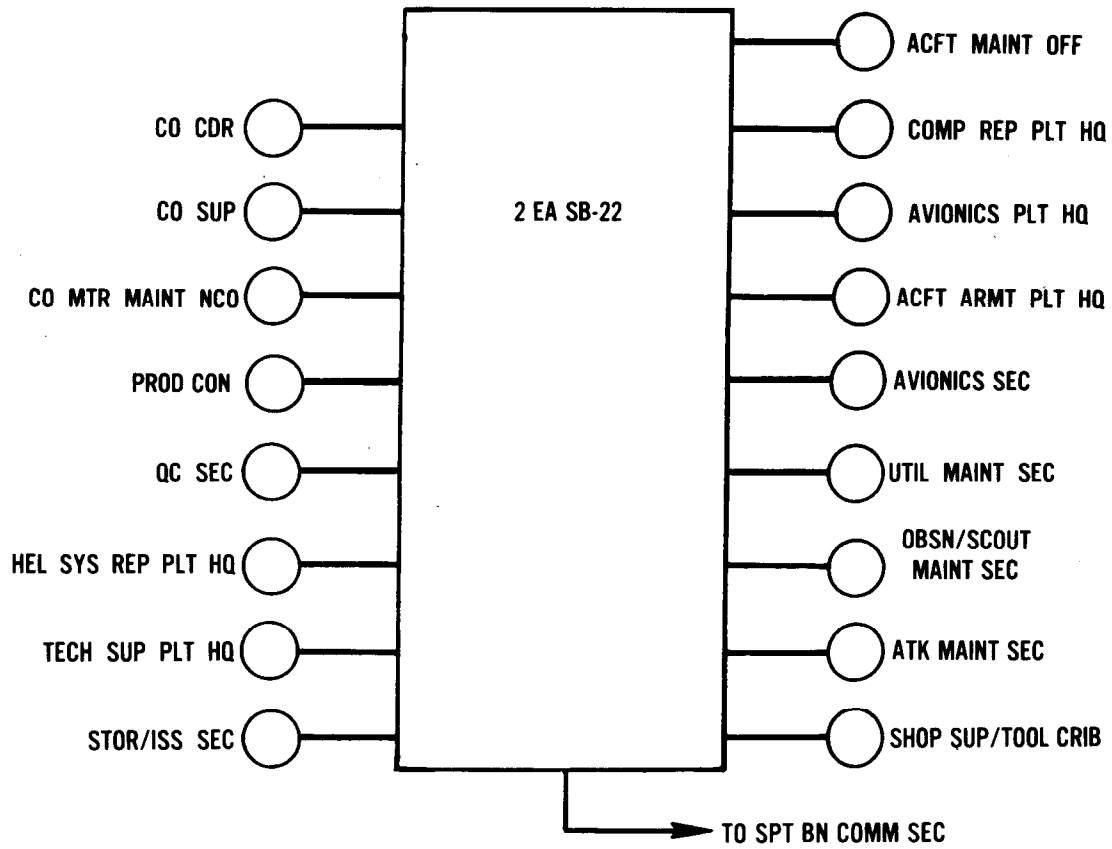


Figure 7-41. TAMC wire net diagram, DISCOM.

c. Command, control, and coordination are essential for successful employment of air defense within the division. The ADA battalion commander must have secure and speedy communications with staff and subordinate commanders. Therefore, the battalion is designed with internal communications that allows the battalion commander to direct operations and provide early warning information. The battalion also operates in external communications nets, which allow the commander and other battalion elements to keep abreast of division operations. The battalion has a retransmission frequency and the communications platoon operates the battalion FM retransmission station. (See Figure 7-42.)

d. The ADA battalion signal officer serves on the battalion staff and directs the headquarters battery communications section. The signal officer plans and supervises the battalion communications system and coordinates integration into the division system. The communications chief assists the signal officer and is the first line supervisor of the communications section.

e. The battalion headquarters battery and each firing battery have a communications section with radio operators and radio mechanics. This section installs, operates, and maintains the battery communications system.

f. Frequent and rapid moves to keep up with the displacements of supported units make single-channel radio essential in the ADA battalion. Firing batteries and their fire units are positioned from the battle's forward edge to the division's rear boundary. Because of the distances involved, field wire lines are not usually installed between the battalion headquarters and its batteries. However, telephone communications are available to the ADA units through supported units.

g. Each ADA firing platoon installs wire circuits to its fire units from the platoon switchboard when possible. (See Figure 7-43.) In turn, the ADA battery installs wire circuits to each platoon from its switchboard. The battery also ties into the switchboard of the supported unit. If an ADA platoon is too far from its battery headquarters for direct wire lines, it ties into the nearest signal extension. In that case, the battery headquarters also ties into the nearest extension or area signal node. The completed system provides each unit, from the firing unit to the ADA battery, access to the division telephone system. It also provides unit-to-unit access.

h. The ADA battalion headquarters has access to the division communications system through a multichannel terminal team provided by the division signal battalion. The terminal team sets up near the ADA battalion CP and installs a multichannel system. This system provides the ADA battalion switchboard access into the division ACUS. (See Figure 7-44.) Cable furnished by the division signal battalion is installed by the terminal team and ADA battalion communications section personnel.

i. The ADA battalion operations section also has ACUS access to the airspace management elements at division main.

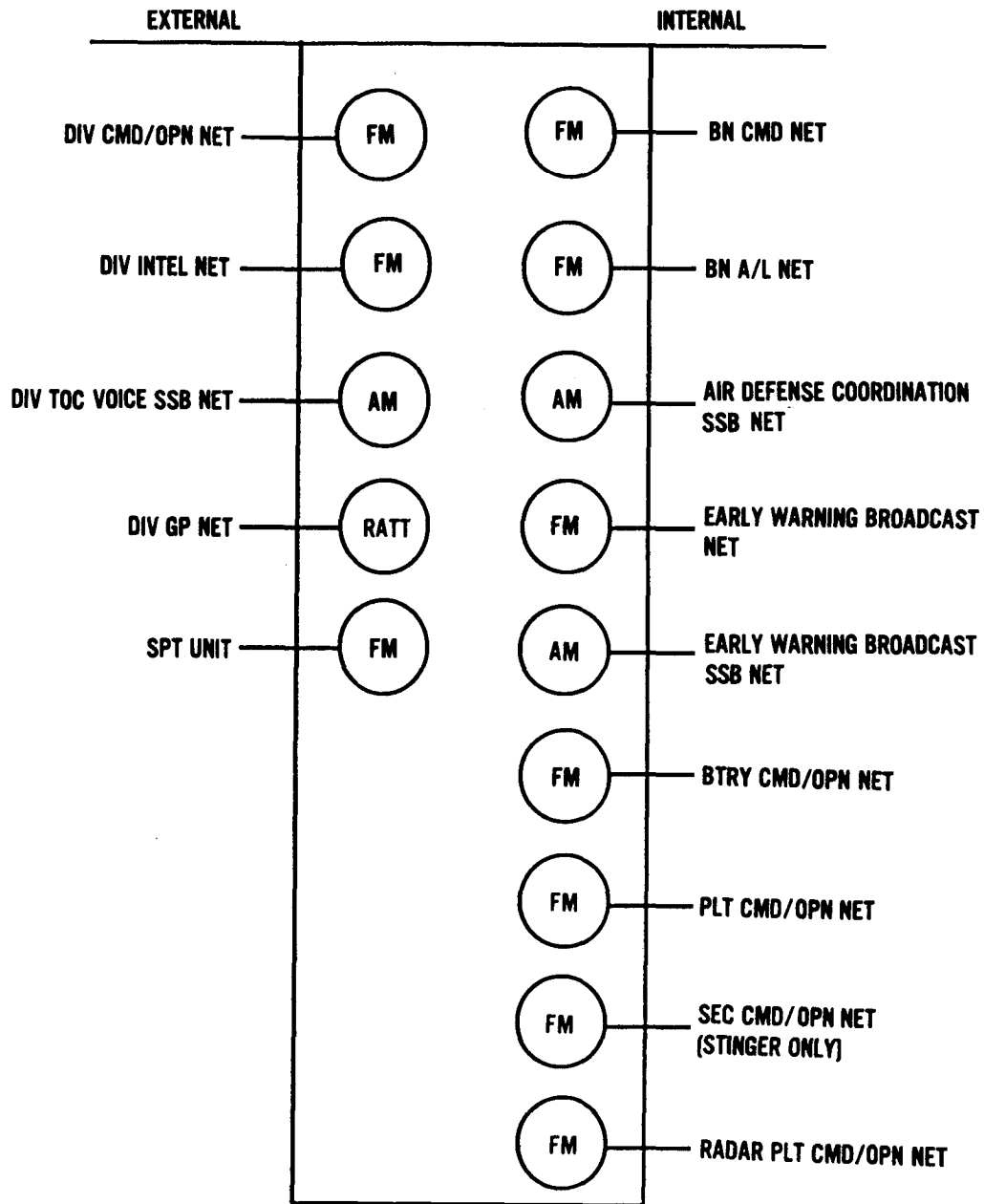


Figure 7-42. ADA battalion radio net structure in the heavy/light division.

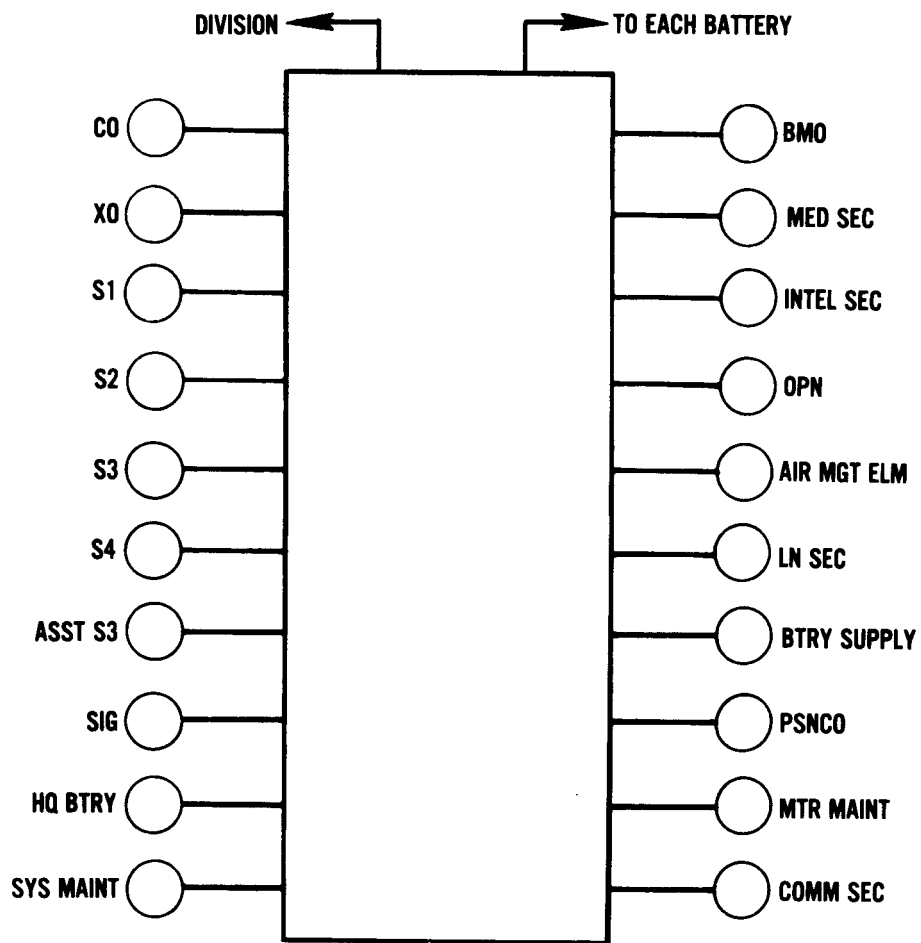


Figure 7-43. Wire system for the heavy division ADA battalion.

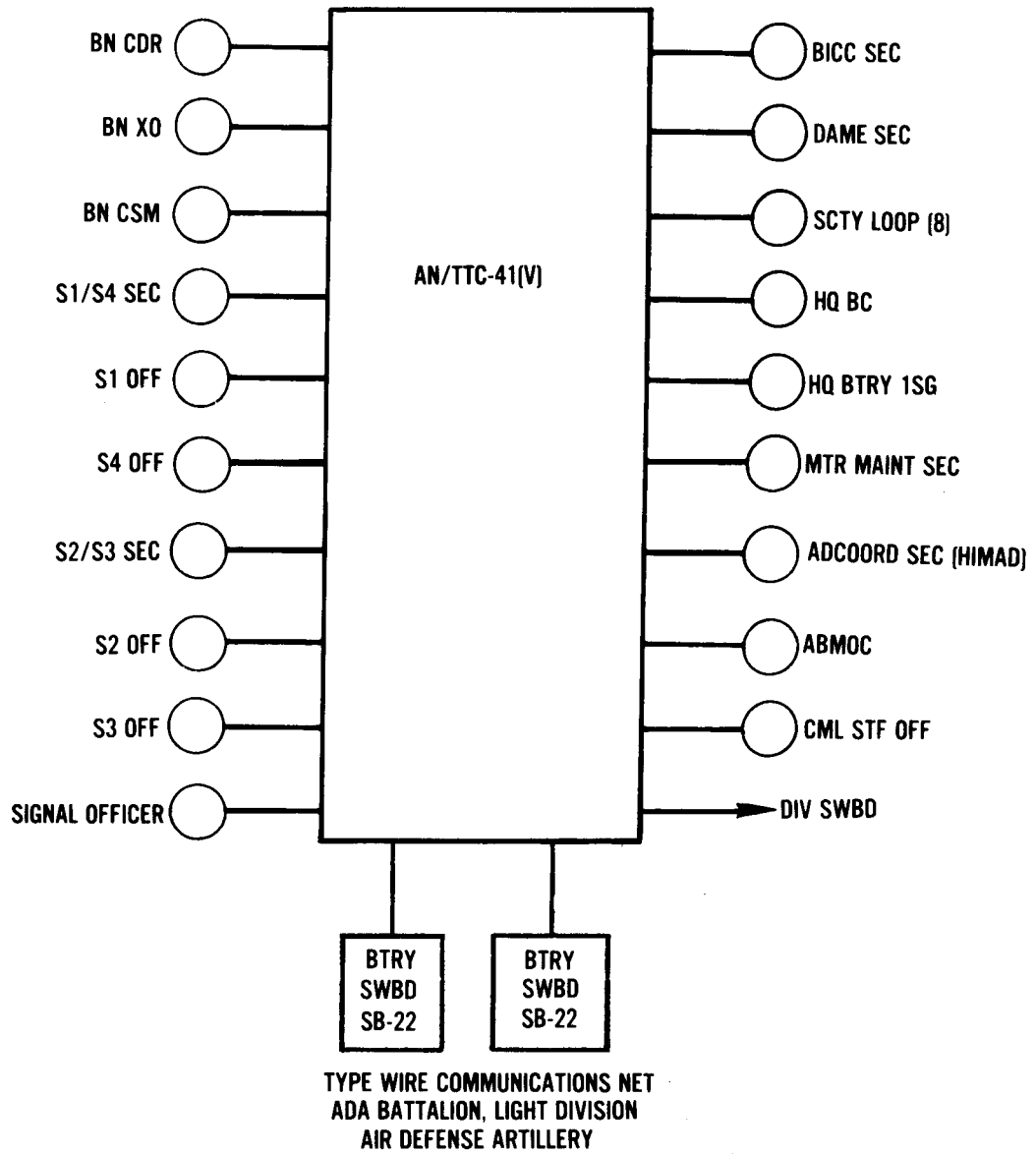


Figure 7-44. Wire diagram for the light division ADA battalion.

j. Logistical operations are coordinated through the ADA administrative and logistical net.

7-24. The Engineer Battalion

The engineer battalion's mission is to provide mobility, countermobility, and survivability on the battlefield. The engineers are needed to defeat the Threat. Additional engineer battalions and engineer companies, from corps and adjacent divisions, can operate in the division area at one time.

a. Mobility aids friendly battlefield movement by reducing or negating the effects of natural or man-made obstacles on units or supply movement. Subtasks of the engineer battalion during mobility operations include--

- Breaching and removing obstacles.
- Supporting deliberate river crossing operations and building assault bridges for short gaps.
- Preparing and maintaining essential combat routes for communications and supply.
- Clearing debris in built-up areas.
- Breaching and clearing mine fields.
- Controlling area damage.

b. Countermobility slows the Threat by disrupting and disorganizing its force and provides time, space, and survivability for maneuver and fire forces. Engineer obstacles reinforce the terrain's natural strength to reduce Threat mobility and make the Threat vulnerable to our direct weapon and observed indirect weapon fires.

c. The engineer battalion aids survivability of friendly forces by providing specialized equipment and materials to prepare primary and secondary battle positions, to dig in key weapon systems, and to assist command, control, and logistics operations.

d. The division engineers allocate units and equipment to forward engineer companies based on the tactical mission. They also allocate support to the maneuver brigades in coordination with the division commander and G3.

e. Command and control within the engineer battalion is done by single-channel radio. However, access into the division communications systems is available through a multichannel terminal provided by the signal battalion at the battalion headquarters. A RATT terminal is also provided by the signal battalion for access into the division level RATT net. An organic SSB voice radio is used to access the division HF voice net.

f. The engineer battalion has a communications section with a tactical communications chief, radio and switchboard operators, and unit level communications maintainers to install, operate, and maintain organic signal and associated equipment. It has retransmission capability. The communications section operates the retransmission station to extend the battalion nets.

g. The battalion signal staff officer has operational control of the battalion headquarters communications section. The signal officer is the staff supervisor over each company communications section and is directly responsible to the battalion commander for all communications.

h. Figures 7-45 and 7-46 show the engineer battalion radio net structure. Figures 7-47 through 7-49 show the wire system for the engineer battalion.

7-25. The Military Intelligence Battalion

The MI battalion provides intelligence, EW, and counterintelligence support to the division. Battalion assets include interrogators, counterintelligence personnel, ground surveillance radars, and EW systems such as TEAMPACK, tactical jamming (TACJAM), and TRAILBLAZER. THE MI battalion detects important Threat nets, intercepts its traffic, and employs direction finding (DF). Locating the Threat and intercepting its messages at critical periods contribute directly to the success of combat operations. The commander receives critical battlefield information and intelligence and directs ECM to hamper Threat communication. The MI battalion has a headquarters and headquarters service (HHS) company, a collection and jamming (C&J) Company, an intelligence and surveillance (I&S) company, and an EW company (heavy division only). The HHS company has a communications platoon with RATT and telecommunications center sections. The platoon installs, operates, and maintains organic systems at the MI battalion TOC. The platoon also has a signal maintenance section to provide unit and intermediate forward maintenance on organic signal equipment. The communications section on the C&J company and the EW company install and maintain RATT systems and radio retransmission at the forward deployed SIGINT/EW platoons.

a. The battalion signal officer supervises communications personnel and manages assets. A communications chief assists the signal officer. The signal officer, as a special staff officer to the battalion commander, advises the commander on all signal matters. This includes--

- Establishing priorities for communications in support of tactical operations.
- Developing signal operations plans.
- Coordinating communications requirements within battalion staff elements.
- Coordinating EW Threat capabilities with the battalion operations section.

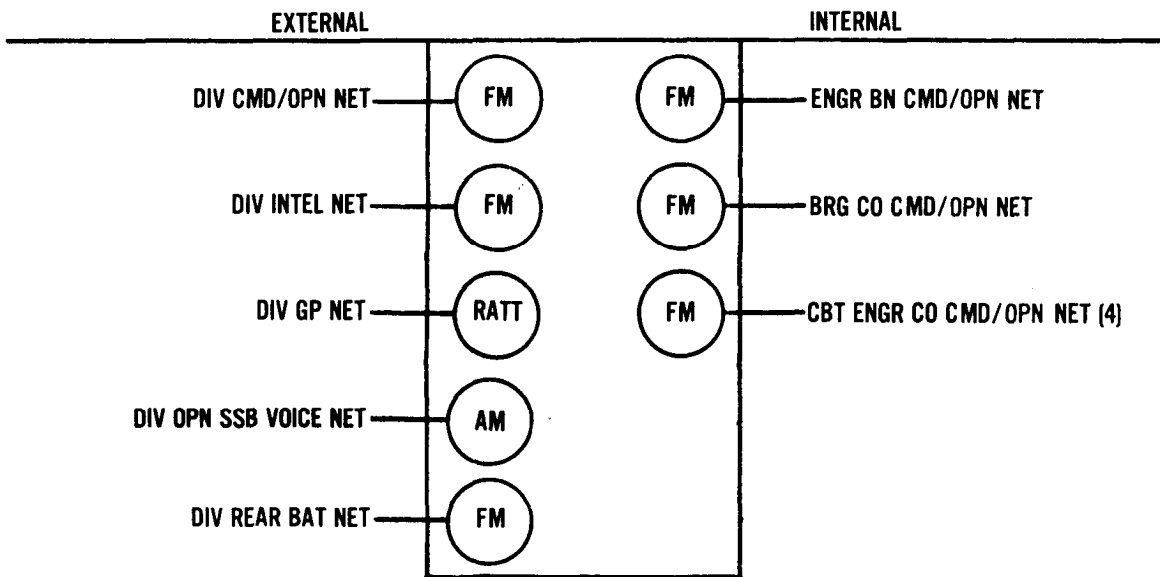


Figure 7-45. Heavy division engineer battalion radio net structure.

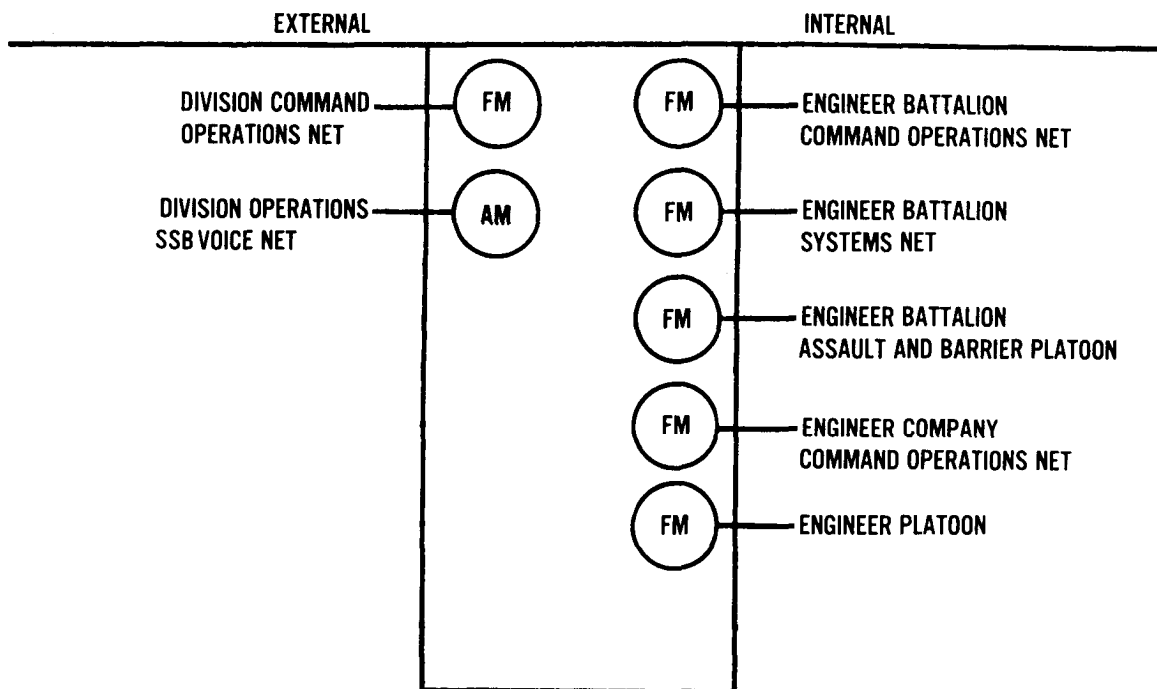


Figure 7-46. Light division engineer battalion radio net structure.

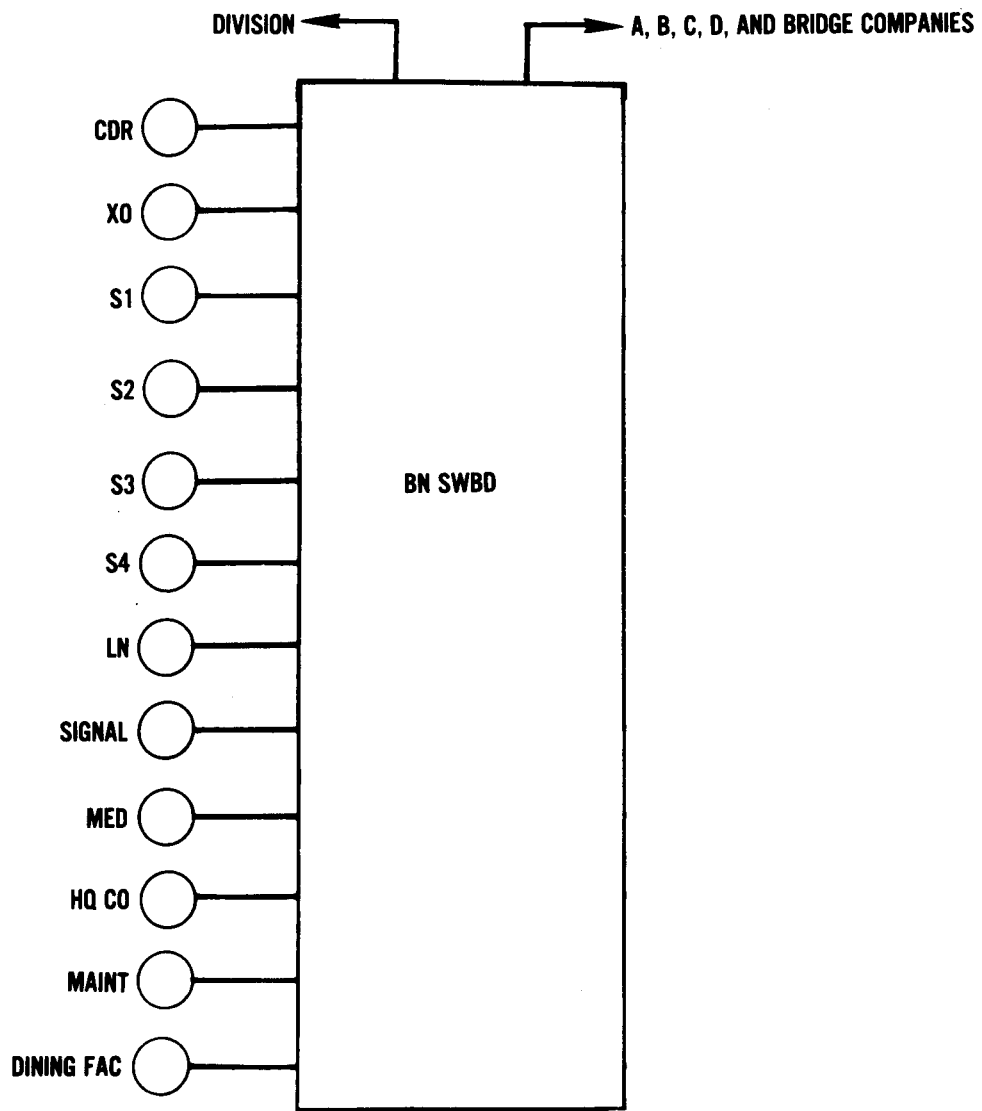


Figure 7-47. Wire system for the heavy division engineer battalion.

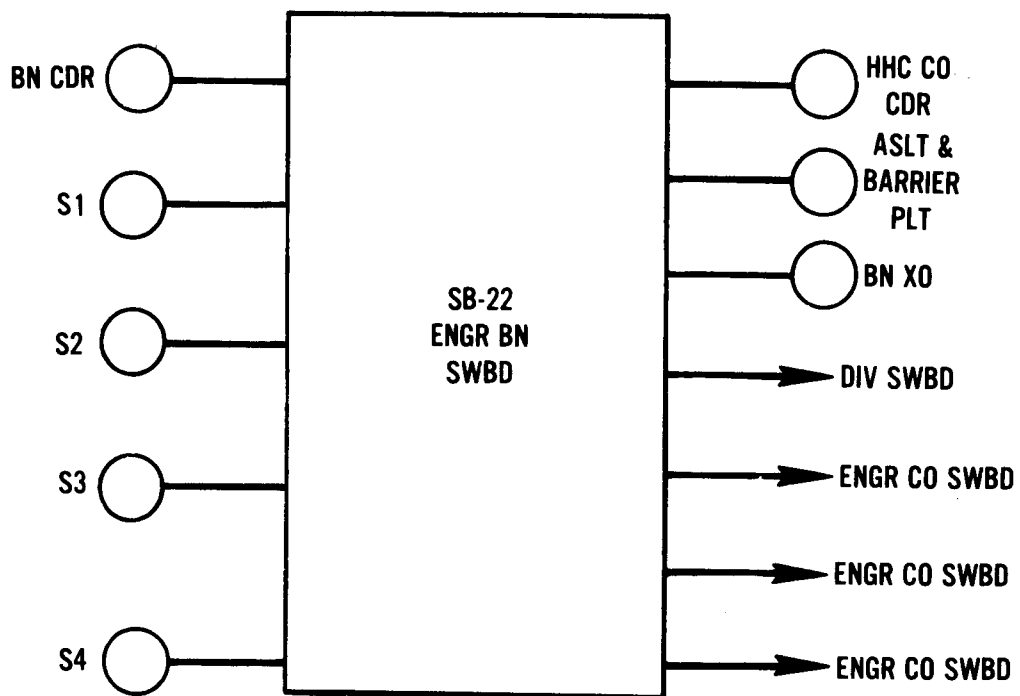


Figure 7-48. Light division engineer battalion wire diagram.

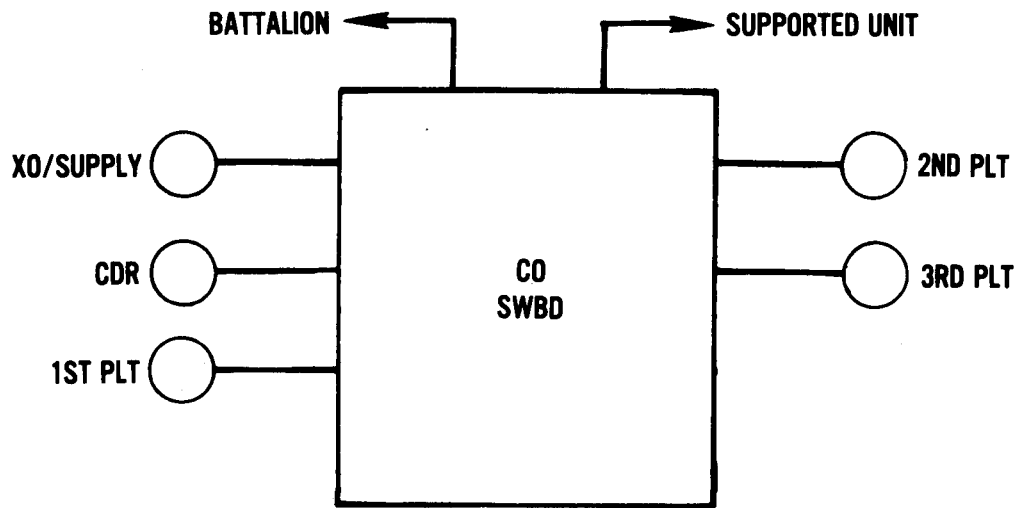


Figure 7-49. Light division engineer company wire diagram.

b. The MI battalion provides internal command and control through single-channel radio communications. The division signal battalion provides additional signal support through the division multichannel system. The forward communications company provides the MI battalion a multichannel terminal to access the division multichannel system and a RATT terminal to access the division GP RATT net.

c. Extensive radio communications within the battalion for command, control, and coordination exist in addition to the external FM/voice/data radio nets entered by the MI battalion. These internal nets must be operated to collect and disseminate intelligence for the division. There may be less capability in divisions other than heavy. (See Figure 7-50.)

(1) The MI battalion command and operations net (FM) is used by the MI battalion commander for command, control, and coordination.

(2) The MI battalion operations net (FM) is the principal operations net in the MI battalion. It is used for the asset tasking, coordinating, and tactically controlling deployed IEW elements. The MI battalion operations net is used for asset tasking of IEW company teams and GS counterintelligence and interrogation teams. Counterintelligence and interrogation teams report to the division tactical operations center support element (DTOCSE) using division ACUS communications (for example, multichannel and GP RATT systems).

(3) The MI battalion administrative and logistics net coordinates CSS requirements internal to the MI battalion. Its primary subscribers are the maintenance teams of the battalion HHS company and service support platoons or elements found in each of the operating companies of the MI battalion. The service support platoons or elements deploy with their parent company headquarters task reorganized as an IEW company team. Colocated with the company team headquarters section, the service support platoon or element provides communications with the MI battalion trains for the company team commander.

(4) The MI battalion C&J tasking and reporting nets (FM) are used for SIGINT and EW tasking and reporting and for passing technical data to the deployed C&J platoons. Due to the distances between stations, a retransmission capability may be required for effective FM communications. The intelligence electronic warfare surveillance element (IEWSE) at the brigade CP monitors the C&J tasking and reporting net for elements in the brigade sector to provide rapid reporting of combat information and intelligence derived from SIGINT to the brigade S2.

(a) In addition, C&J tasking and reporting nets (RATT) connect the TCAE to each C&J platoon for record traffic. Each C&J platoon terminates a TCAE NCS HF RATT net. A separate full duplex net exists for each C&J platoon.

(b) Upon receipt of missions from the TCAE via the FM or RATT tasking and reporting nets, the transcription and analysis (T&A) team will task subordinate teams of the platoon via the C&J platoon's internal tasking and reporting net. Each inner C&J platoon operates such a net.

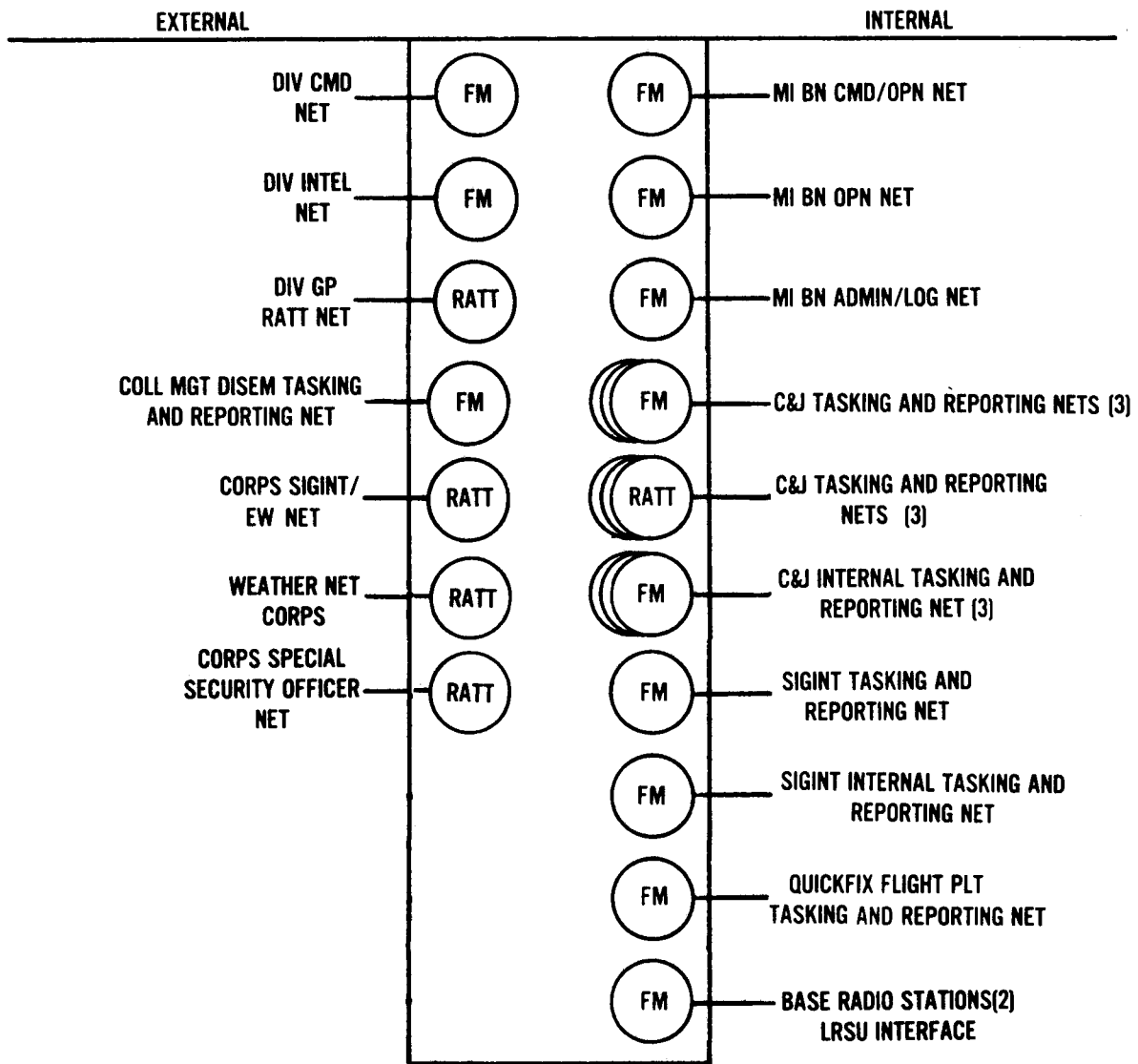
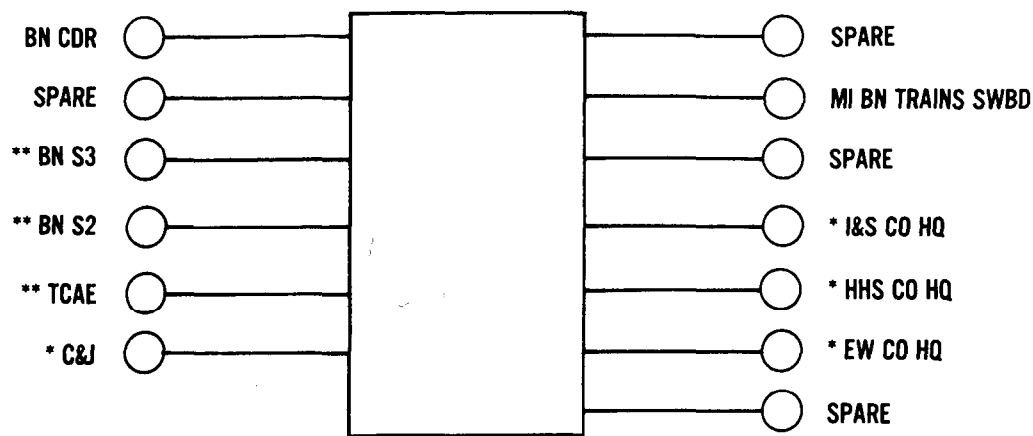


Figure 7-50. MI battalion radio net structure.

(5) SIGINT tasking and reporting nets (RATT and FM) connect the TCAE to the SIGINT processing platoon analysis section for record traffic and operational taskings and reporting. The primary net, RATT, is wired to the primary master control station (MCS) of the TRAILBLAZER system to permit automatic transmission of DF reports from the computer of the primary MCS to the TCAE. The FM net is used only when the HF RATT network is inoperable or when a backlog of operational traffic exists. UHF data links connect the TRAILBLAZER MCS to the outstations. A data link will also connect the noncommunications intercept teams when upgraded equipment is fielded.

(6) The flight platoon operations section is tasked by the TCAE for Quick Fix missions. Mission tasking and technical data to support this tasking is provided to the platoon operations center over the Quick Fix flight platoon tasking and reporting net before to mission execution to allow maximum operational time by SIGINT and EW operations while aloft. SIGINT and EW operators within the Quick Fix aircraft provide immediate tactical reporting to only those priority collection tasks stated in the tasking message using on-board UHF and VHF communications systems netted with the TCAE. For data collected of a general information and intelligence nature, reports are normally provided at the conclusion of the Quick Fix mission to allow maximum time for collection operations. As a general rule, when Quick Fix SIGINT and EW operators are communicating reports while aloft, they must cease collection operations.

(7) The MI battalion uses wire to communicate between elements internal to the TCAE, between elements at the battalion TOC, and between the battalion TOC and trains. The battalion wire system also interfaces with the division multichannel system providing access to other units within the division multichannel system. The MI battalions main switchboard is located at the MI battalion TOC. The AN/MSC-31 communications operations center is positioned and manned by the MI battalion's communications platoon to serve as the battalion's main integrating communications center. It provides access from the internal SB-22 switchboard to the division main switchboard through the division multichannel system by way of its interface with the AN/TRC-145(V) radio terminal. Figure 7-51 depicts the wire lines to and from the battalion's main switchboard, which connects sections and elements of the battalion. The headquarters section of the HHS company provides an SB-22 switchboard for the battalion trains locations. This switchboard is in the trains operations center set up by the S4 and XO. It is connected by wire or cable to the MI battalion main switchboard at the TOC or to the nearest unit switchboard. The SB-22 switchboard provides communications between the battalion trains and other CSS organizations and staff within the division. The TCAE employs an SB-22 switchboard for telephone communications internal to the TCAE.



* UNLESS DEPLOYED

** LOCATED AT THE BATTALION TOC

Figure 7-51. MI battalion wire system diagram.

7-26. Long-Range Surveillance Detachment

The LRSD provides the division commander with human intelligence (HUMINT) about second echelon and follow-on Threat forces in the division's area of interest, about 50 kilometers (31 miles) forward of the FLOT. Mission requirements for the LRSD are determined by the G2 in coordination with the other staff sections; they reflect the division commander's priority intelligence requirements (PIR) and intelligence requirements (IR). LRSD transmits its information back to the LRSD operations center closely located to the Div Main CP where it will be evaluated. LRSD teams use sophisticated communications equipment to transmit their findings to the LRSD operations center. LRSD uses IHFR. Future planning envisions TACSAT communications augmenting and complimenting IHFR. LRSD is organic to the MI battalion at division. Figure 7-52 shows division LRSD IHFR.

7-27. The Military Police Company

The MP company provides essential support to tactical commanders. This support is concentrated on MP combat operations and combat support operations. MPs expedite the forward and lateral movement of combat resources. They evacuate Threat prisoners of war from forward areas. The MPs provide security for the main CP, and they operate IPW collection points. The MPs will often represent the initial response force against the Threat in a command's rear area. Flexible employment of MP units enable them to respond to the constantly changing tactical situation.

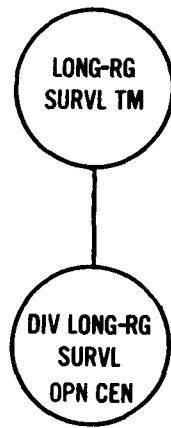


Figure 7-52. Division LRSD IHFR net.

a. The MP company depends on the signal battalion area and extension nodes for the following communications services:

- NRI.
- Telephone.
- Teletypewriter and facsimile.

b. The MP company communications chief aids the commander in planning communications. The communications chief supervises communications in the company. The company has a unit level communications maintainer for organizational maintenance. Figure 7-53 shows the MP company radio net structure.

c. The MP company installs its own limited telephone communications within the CP and has access to the division telephone system through a wire line the MPs install to the nearest signal extension (usually DISCOM). If an MP platoon or squad supports a brigade, it has access to the division telephone system through the switchboard of the supported brigade. The primary linkage is through FM and IHF radios. (See Figure 7-54.)

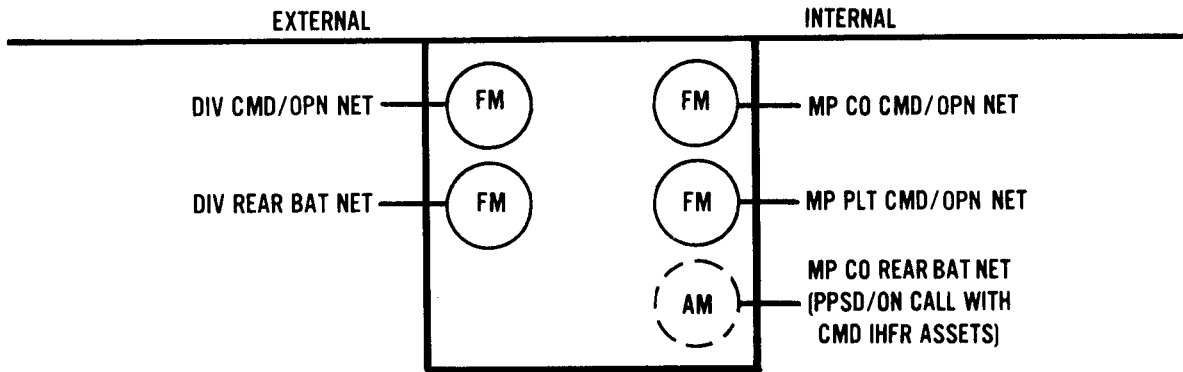


Figure 7-53. MP company radio net structure.

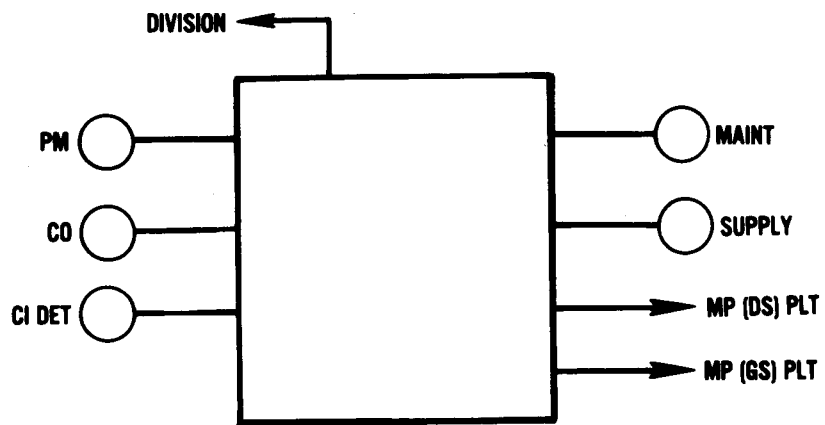


Figure 7-54. MP company wire diagram.

7-28. Chemical Company (Nuclear, Biological, Chemical)

The chemical company provides staff support, equipment decontamination, and smoke in the division AO. The decontamination platoons are attached to or placed in DS of the brigades. More than one platoon may be in support of a brigade, particularly when a brigade conducts the main attack. Platoon-size operations are the preferred methods of employment. When not assigned a smoke mission, the smoke platoon is located with the company headquarters near the division main or the tactical CP. When used, the smoke platoon is attached to or in DS of the supported unit. The chemical company depends on the signal battalion signal centers for NRI and record traffic services. The chemical company relies heavily on FM radios for communication. (See Figure 7-55.) The company is not authorized a communications chief. However, a unit level communications maintainer is authorized for organizational maintenance. The chemical company installs limited telephone communications within its CP area and accesses the division telephone system through the nearest signal center. When a platoon supports a brigade, it has access to the division telephone system through the switchboard of the supported brigade.

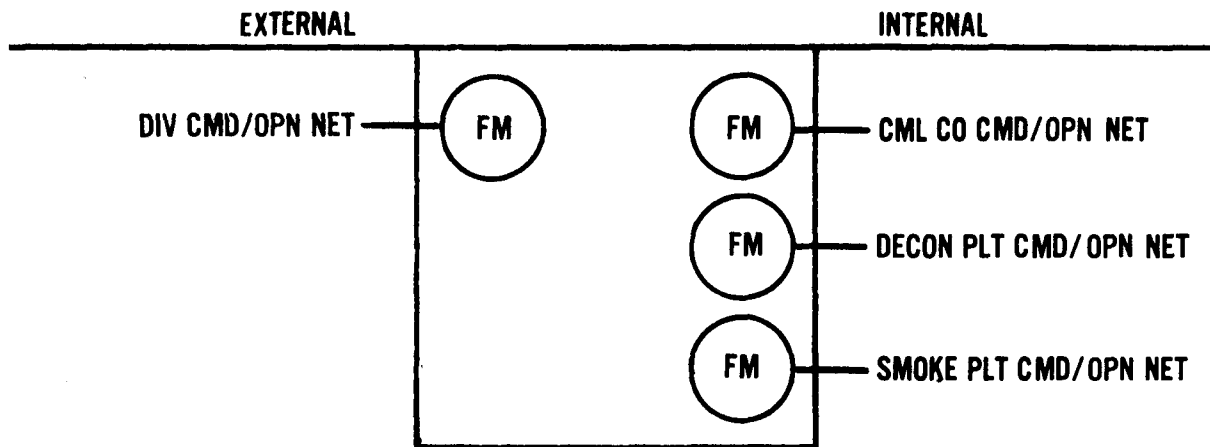


Figure 7-55. Chemical company radio net structure.

APPENDIX A

Signal Personnel in Brigade, Division Artillery, and Maneuver Battalions

A-1. Responsibilities

Signal personnel responsibilities in brigade, division artillery, and maneuver battalions include, but are not limited to--

- a. The signal officers at brigade and battalion--
 - Advise the commander and staff officers on all signal support matters.
 - Plan, manage, and direct all aspects of the unit communications systems.
 - Exercise staff supervision over the communications activities of subordinate and attached units.
 - Plan and supervise the integration of the unit communications and automation systems into the systems of lower, adjacent, and higher headquarters.
 - Supervise the installation and operation of tactical communications and automation facilities.
 - Coordinate requirements for visual information, records management, and printing and publications.
 - Supervise the unit maintenance of unit signal support
 - Monitor the status of unit and subordinate unit signal support equipment in support maintenance.
 - Prepare and write the signal annex of unit operations orders, operations plans, and the command SOP.
 - Serve as the COMSEC officers for the unit COMSEC account.
 - Supervise the unit COMSEC custodian.
 - Serve as the primary Terminal Area Security Officer in the unit.
 - Issue and account for security equipment, key lists, codes, ciphers, and authentication systems IAW current regulations.
 - Maintain, issue, and account for the unit SOI IAW current regulations.

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- Prepare, update, and present unit training programs pertaining to all aspects of communications and automation, including COMSEC, electronic security, technical signal training for all unit personnel, and an extensive cross-training program.
- Ensure signal training is part of all aspects of unit training exercises.
- Determine, with the unit S3 and headquarters company commander, the exact location of the unit CP and support area.
- Ensure that areas selected afford the maximum in communications potential and the minimum in potential Threat interference through EW.
- Exercise complete OPCON of the unit communications platoon and section and command the platoon by TOE or when no assistant staff officer is assigned.
- Plan and supervise communications support for moving the CP, to include an attack CP as required.
 - Assist in preparing EW plans and annexes.
 - Advise the commander and staff on the technical aspects of EW.
 - Monitor communications and automation personnel in the command.
 - Take action when necessary to fill personnel vacancies.
 - Recommend duty assignments for newly assigned communications and automation personnel.
 - Coordinate reassignment of personnel in the command to fill vacancies.
 - Advise the commander and staff on signal support systems and equipment affected by nuclear and chemical weapons and required protective measures.
 - Advise the logistics officer on distribution of signal support equipment and supplies and the allocation of shortage items.
 - Coordinate with the civil affairs officer to use civilian communications and automation facilities or to prevent the facilities from interfering with the military communications system.
 - Advise the civil affairs officer on the rehabilitation and operation of local communications and automation facilities.
 - Advise the civil affairs officer on international communications and automation treaties and agreements on signal and frequency allocation and use.

- Develop plans using, but not dependent upon, host nation capabilities.

- Develop a chain of reporting procedures throughout the unit for relaying MIJI reports.

b. The communications platoon leader (assistant signal officer)--

- Commands the communications platoon.
- Assists the unit signal officer in all signal duties.
- Assumes signal responsibility to the commander in the signal officer's absence.
- Supervises installation, operation, and maintenance of unit communications equipment with the communications chief under the direction of the signal officer.

- Serves as an alternate COMSEC custodian for the unit account with artillery units.

- Plans and conducts training of the communications platoon.

Serves as the headquarters company or battery XO as an additional duty .

c. The communications chief--

- Serves as the communications platoon sergeant.
- Is the principal enlisted assistant to the unit signal officer.
- Supervises, through NCO team chiefs, installation of the unit's communications and day-to-day operation and maintenance of signal equipment.

- Coordinates all communications within the CP.
- Keeps informed on all communications aspects of the tactical operation.

- Assists the unit signal officer in developing and implementing the communications and automation training program and the SOPs.

- Serves as an alternate COMSEC custodian for the unit account.

- Performs other duties as assigned by the unit signal officer.

d. The wire section chief--

- Assists the signal officer and communications chief in planning wire systems.

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- Surveys wire routes.
- Supervises the installation, operation, and maintenance of all wire lines and equipment installed by the wire section.
- Supervises and coordinates unit maintenance of wire equipment in the unit.
- Prepares local telephone traffic diagrams and directories.
- Prepares line route maps.
- Trains wire section personnel and switchboard operators.
- Assists the signal officer in his automation role.
- e. The wire team chief--
 - Acts as section chief when no section chief is assigned.
 - Alters planned wire routes to facilitate installation and reports changes to section chief.
 - Assists in the preparation of line route maps.
 - Installs and maintains wire lines.
 - Trains or assists in training wire section personnel.
- f. The senior switchboard operator--
 - Supervises installation, operation, and maintenance of the unit switchboard.
 - Assists in preparing the local telephone traffic diagrams and directories.
 - Trains switchboard operators.
 - Assists the signal officer in his automation role.
- g. Combat signalers--
 - Install wire lines in IAW directions of senior wiremen.
 - Perform duties as switchboard operator.
 - Perform duties as messenger.
- h. The radio section chief--
 - Recommends location of radio and antenna sites to signal officer.

- Organizes the radio system at the CP.
- Supervises and coordinates organizational maintenance of unit radio equipment.
- Trains members of radio section.
- Supervises training and operations of radio operators assigned to staff sections.
- Assists the signal officer in his automation role.

A-2. Staff Interrelationships

Signal relationships in a headquarters depend on the commander's recognition of communications and the signal officer's strength or weakness as an important part of the commander's staff. The signal officer's technical ability and decisiveness in dealing with other staff officers, particularly the S3 and the HHC commander, determine the ease with which this officer manages the unit's signal assets and implements the battalion signal training program.

a. The S3 officer has staff supervision over communications and automation activities of the unit in combat. However, the signal officer is directly responsible to the commander for these activities. Therefore, the signal officer should work for and be rated by the brigade/battalion executive officer. This responsibility does not necessarily go through the S3, especially at brigade level. The unit commander will dictate this role in words, not by actions. The commander may desire to work strictly with the S3 or may coordinate with and instruct the signal officer directly. If the commander chooses to deal directly with the signal officer, then this officer must keep the S3 informed of the commander's requirements. Communication between the signal officer and the commander can cause problems if the S3 is not informed.

b. The communications platoon is the largest single platoon in the headquarters company. It should not be considered a ready source of manpower to the HHC commander over and above minimum taskings. Technically, the communications platoon, the communications chief, and the communications platoon leader (where assigned) are commanded by the HHC commander. However, these people must be under the signal officer's OPCON. More duties and taskings could interfere with the primary mission of providing signal support. The signal officer must impress the HHC commander with the need to coordinate signal personnel on non-signal missions. However, the signal officer must also recognize the HHC commander's needs to support the headquarters.

c. Signal personnel must cooperate to keep communications and automation working. The brigade signal officer must assist the battalion signal officer. This signal officer must assist the company communications chiefs. The exchange of ideas, techniques, and methods is critical in providing the commander with reliable and responsive systems.

APPENDIX B

Division Level Radio Nets

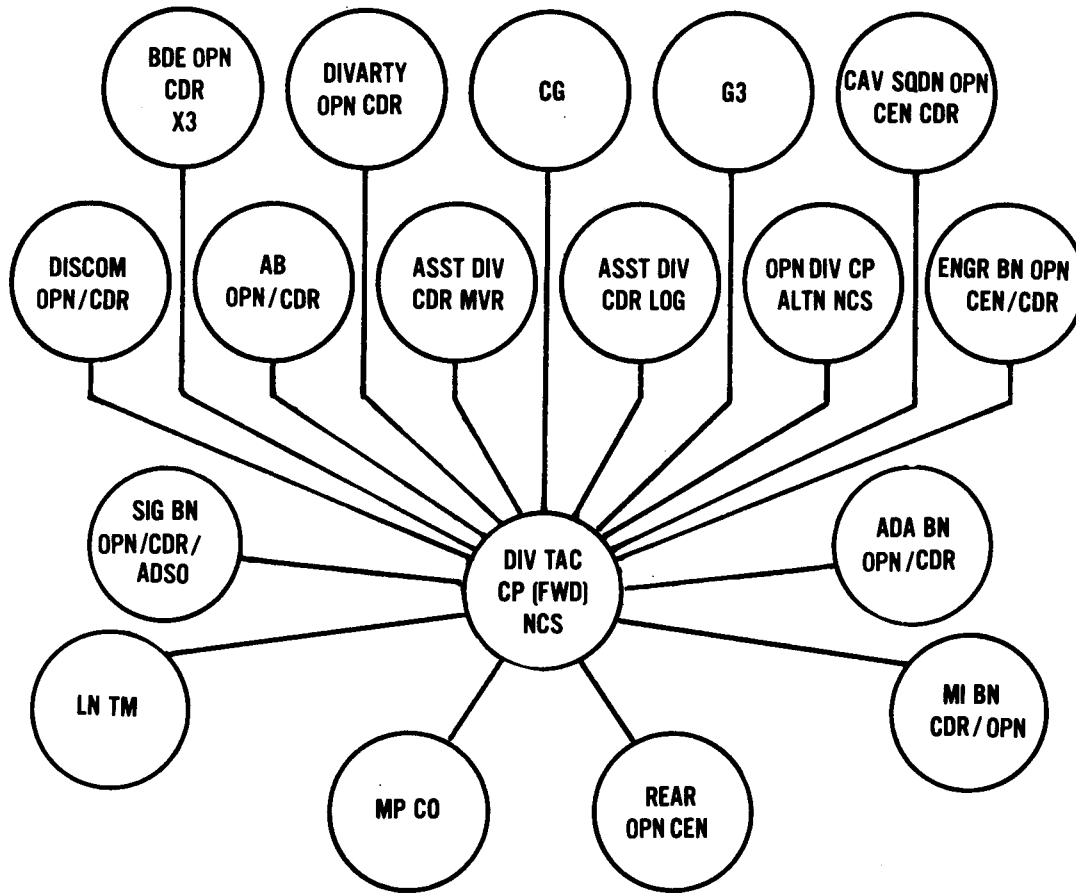


Figure B-1. Division command and operations FM net.

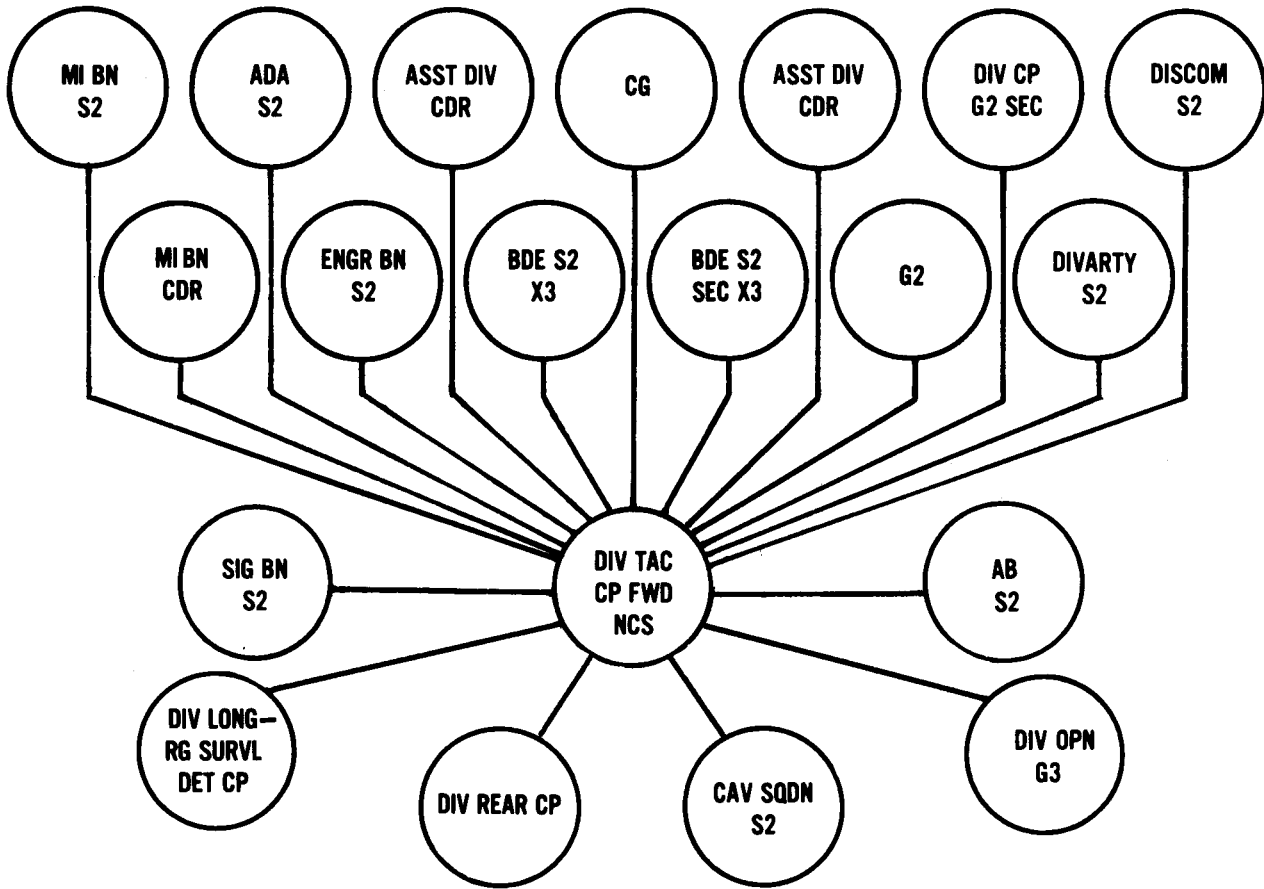


Figure B-2. Heavy division intelligence FM net.

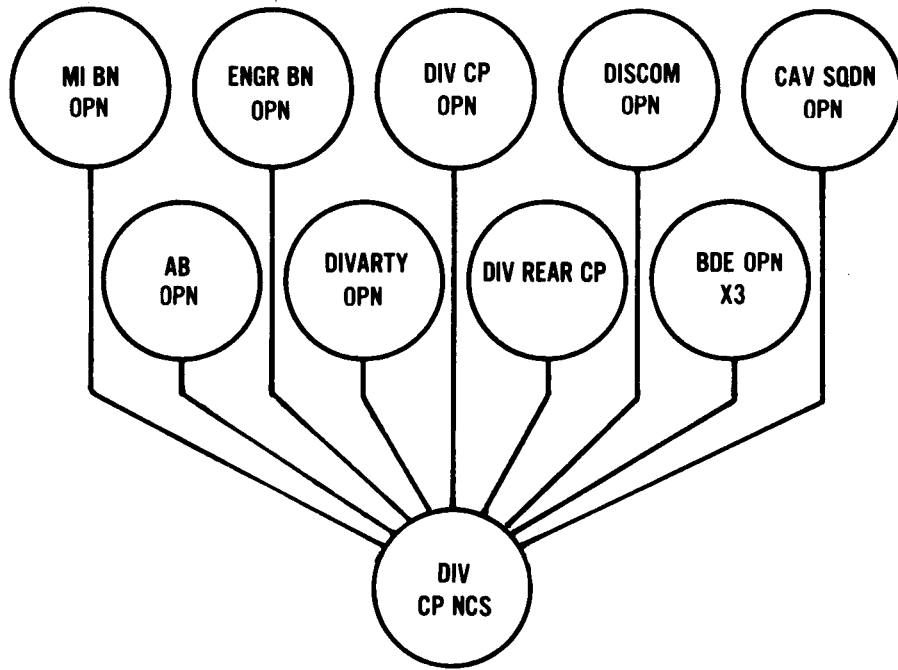


Figure B-3. Division tactical operations HF voice SSB net.

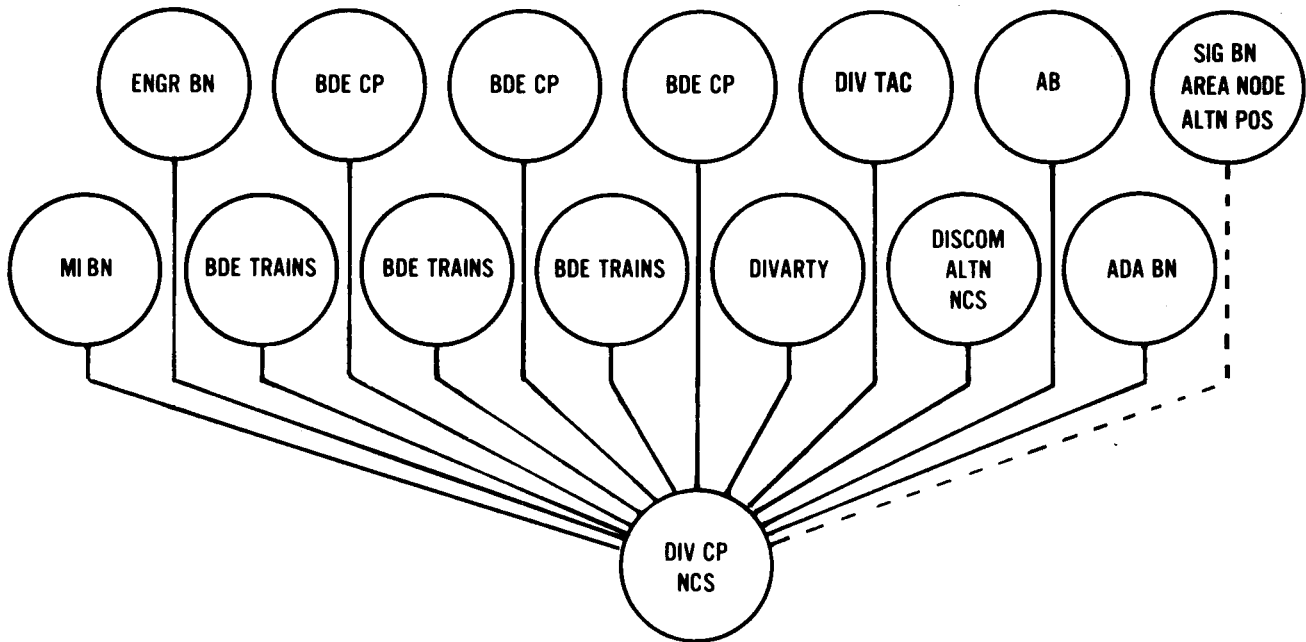


Figure B-4. Division GP RATT net.

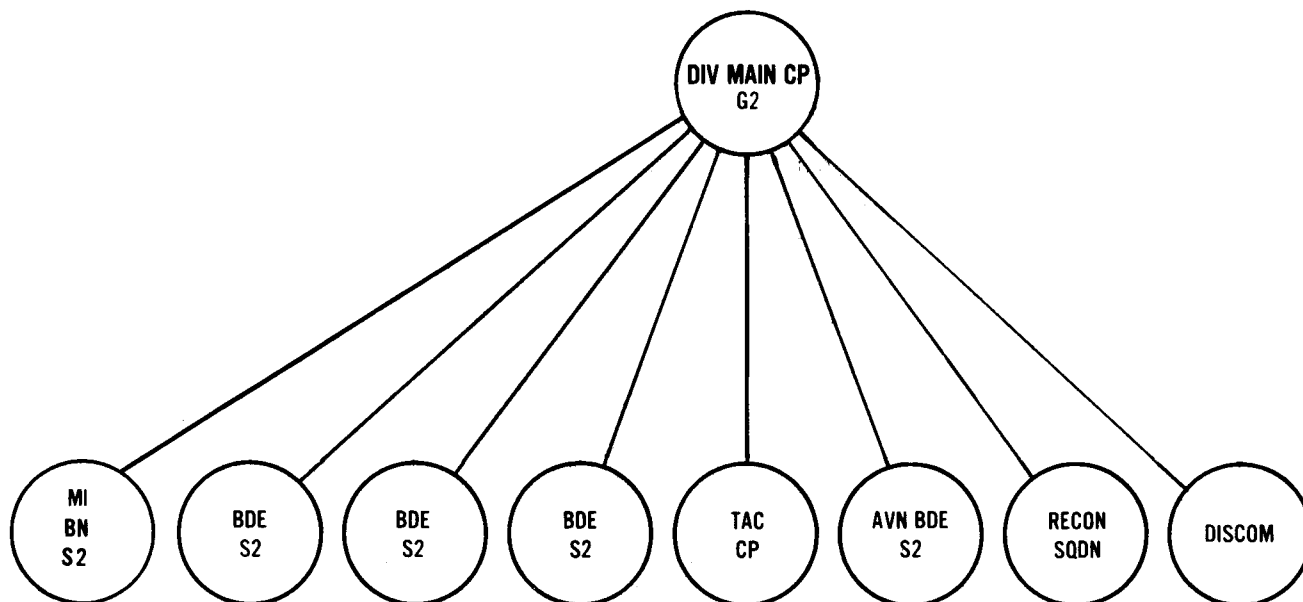
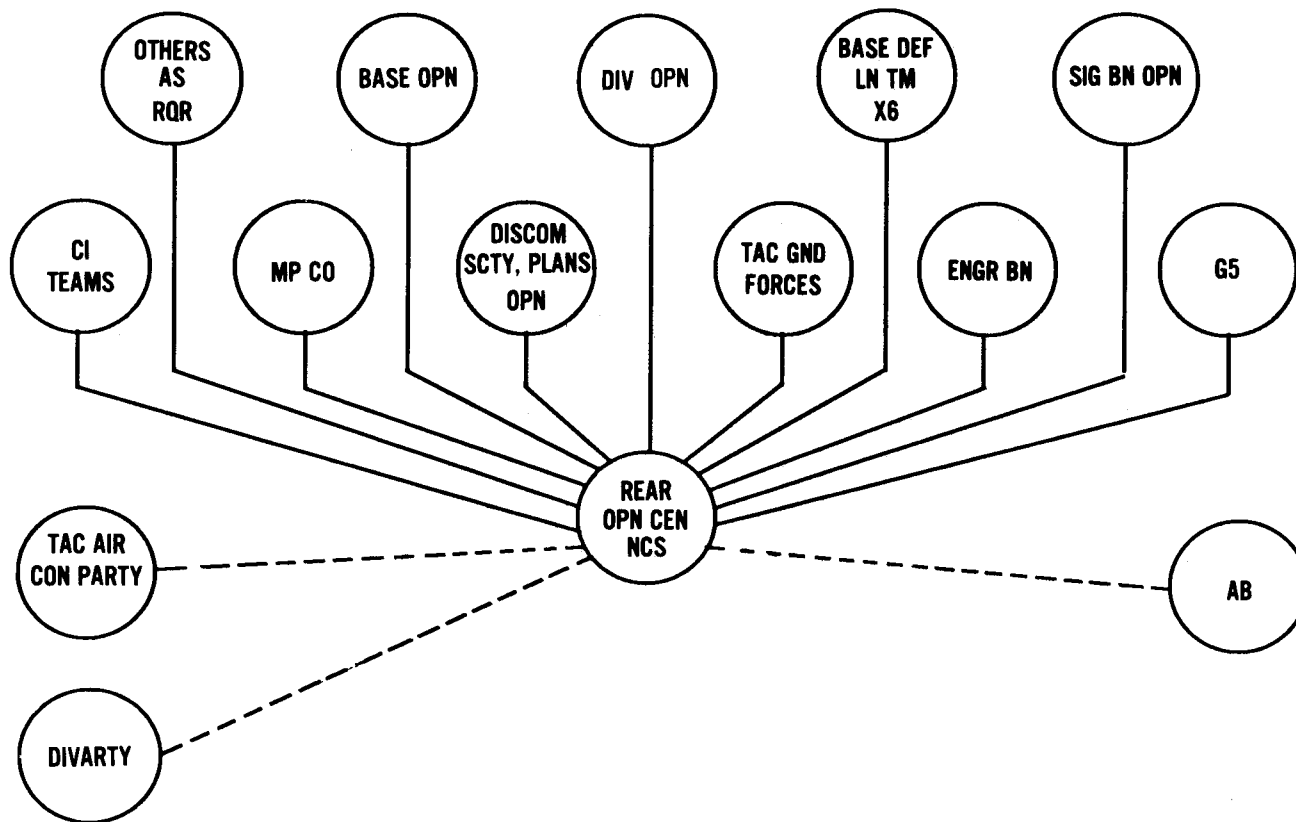
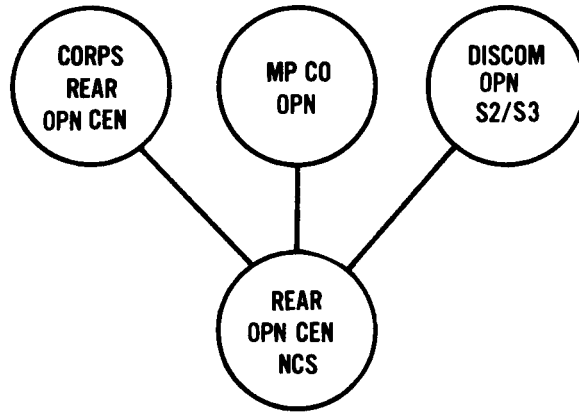


Figure B-5. LID intelligence FM net.



NOTE: RADIOS IN THIS NET HAVE COME UP ON A PREARRANGED FREQUENCY TO FORM THIS NET. THERE ARE NO RECOGNIZED ASSETS FOR THIS NET.

Figure B-6. Rear operations FM net.



NOTE: See notation in Figure B-6.

Figure B-7. Rear operations IHFR net.

APPENDIX C

Brigade Level Radio Nets

C-1. Maneuver Brigade

The internal doctrinal radio nets in a maneuver brigade are the command and operations FM net, administrative and logistical FM net, intelligence net, and the RATT AM net. Figures C-1 through C-4 show the stations normally in each of these nets.

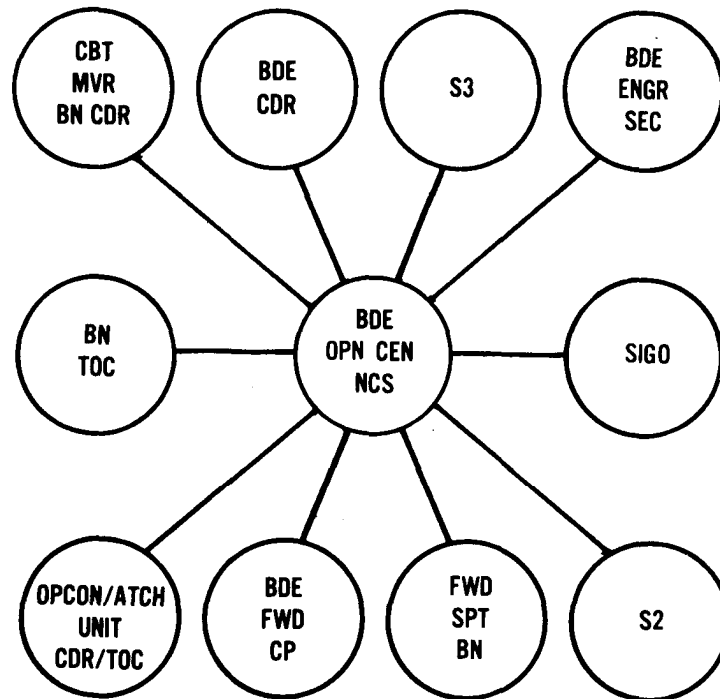


Figure C-1. Brigade command and operations FM net.

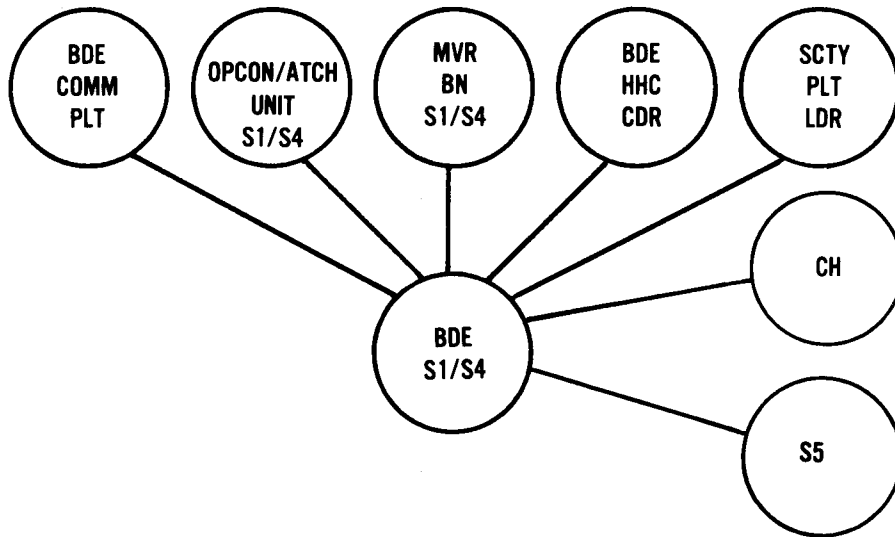


Figure C-2. Brigade administrative and logistical FM net.

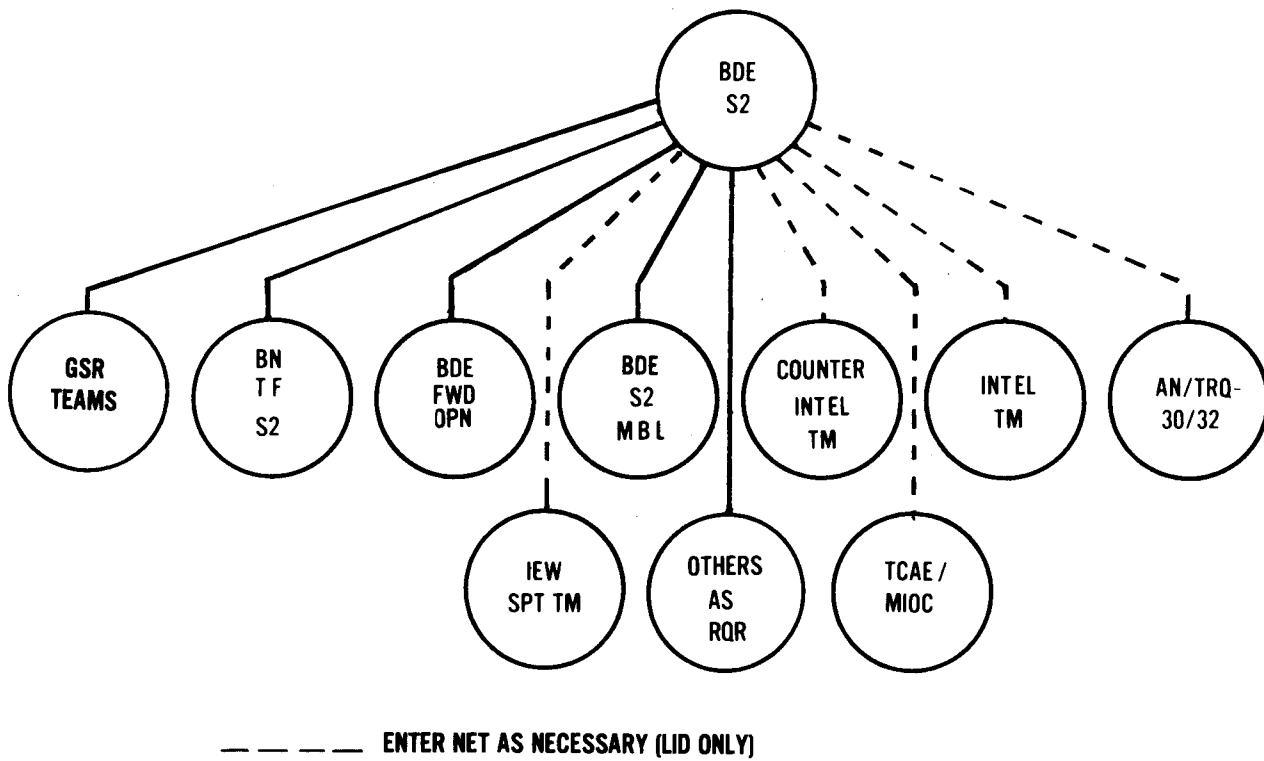


Figure C-3. Brigade intelligence net.

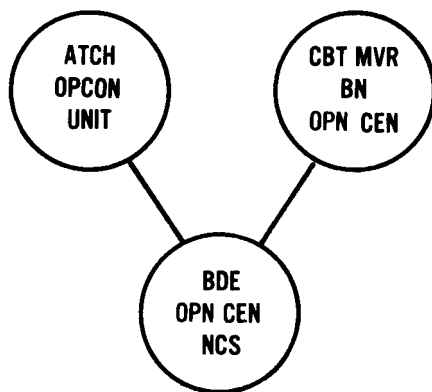


Figure C-4. Brigade RATT AM net.

C-2. Aviation Brigade

The All radio nets are shown in Figures C-5 through C-41. Due to the unique nature of the AB, the radio nets are shown down to company level.

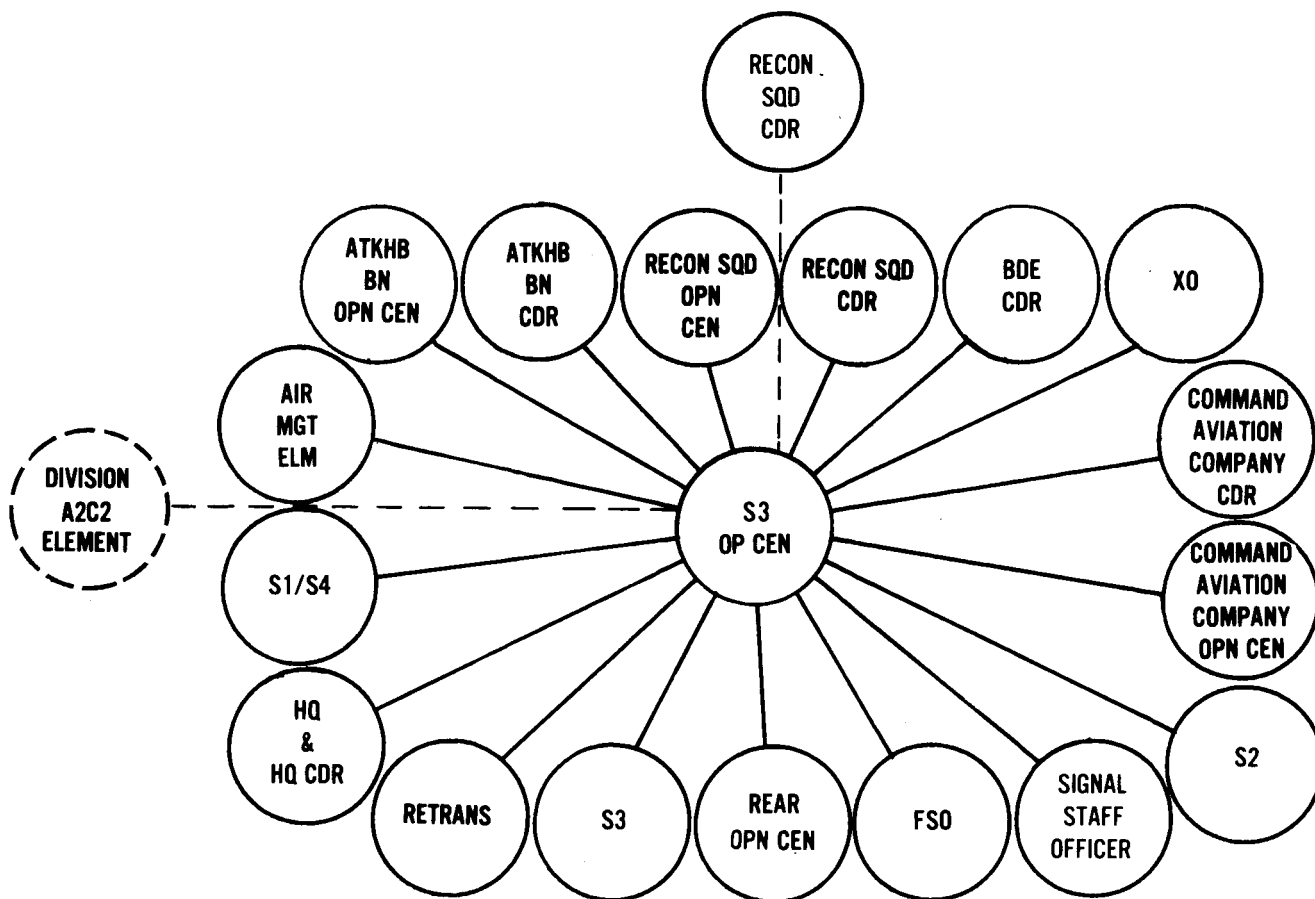


Figure C-5. AB command and operations FM net.

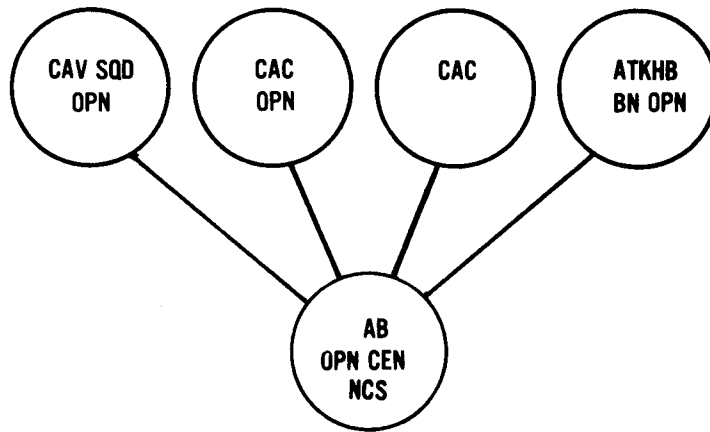


Figure C-6. AB command and operations HF net (heavy division).

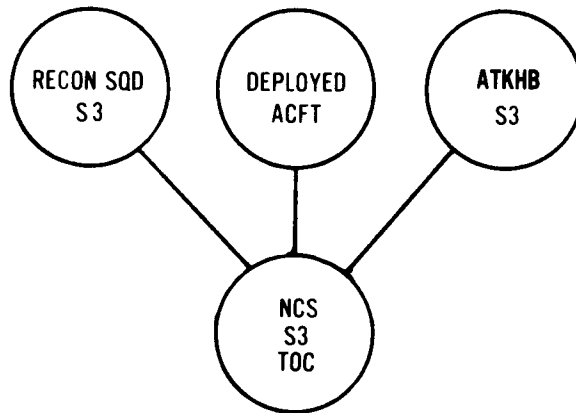


Figure C-7. AB command HF (AM voice) net (light division).

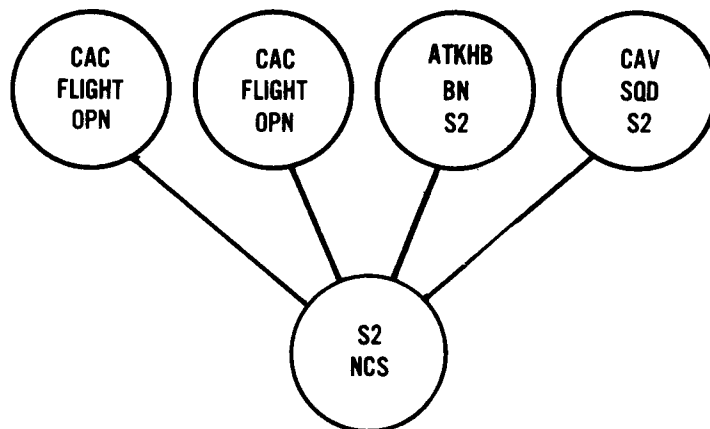


Figure C-8. AB intelligence FM net (heavy division).

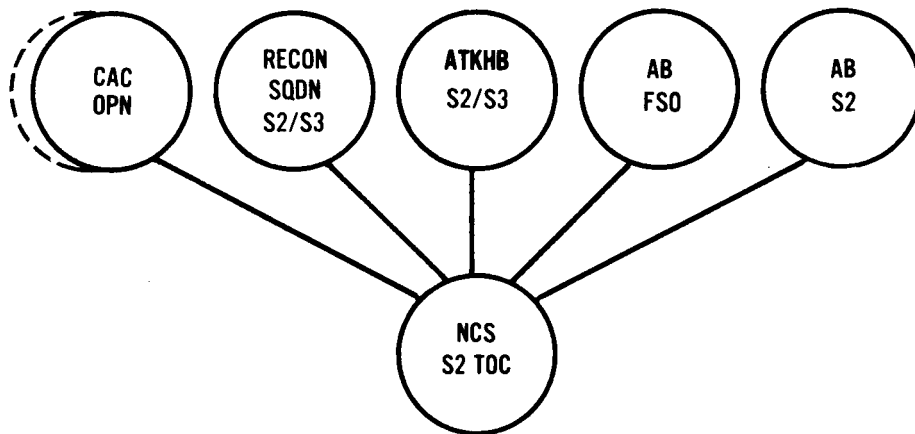
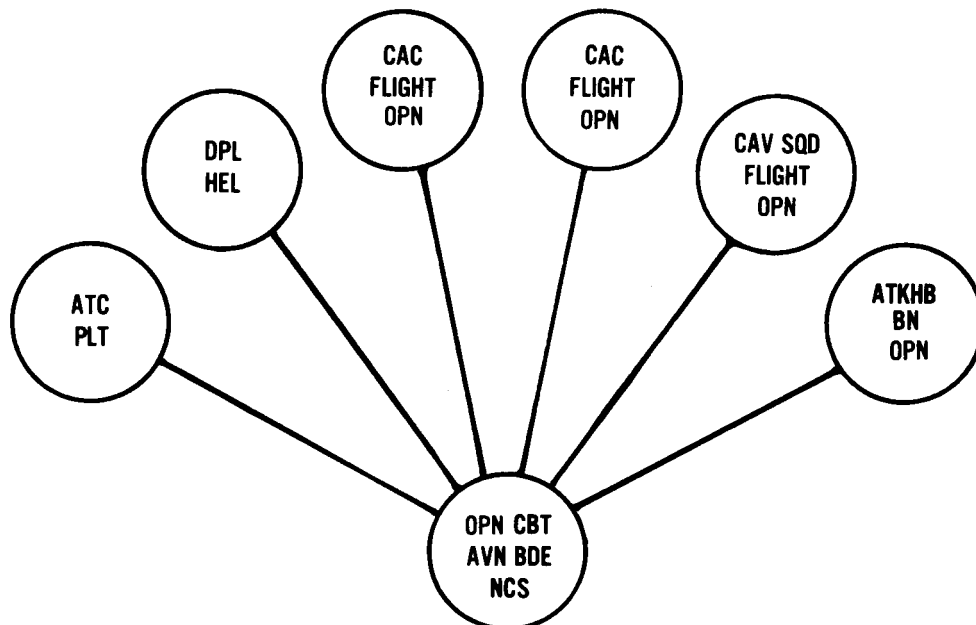


Figure C-9. AB intelligence FM net (light division).



NOTE: In the light division only, the deployed aircraft and the NCS are on the net.

Figure C-10. AB aviation UHF net.

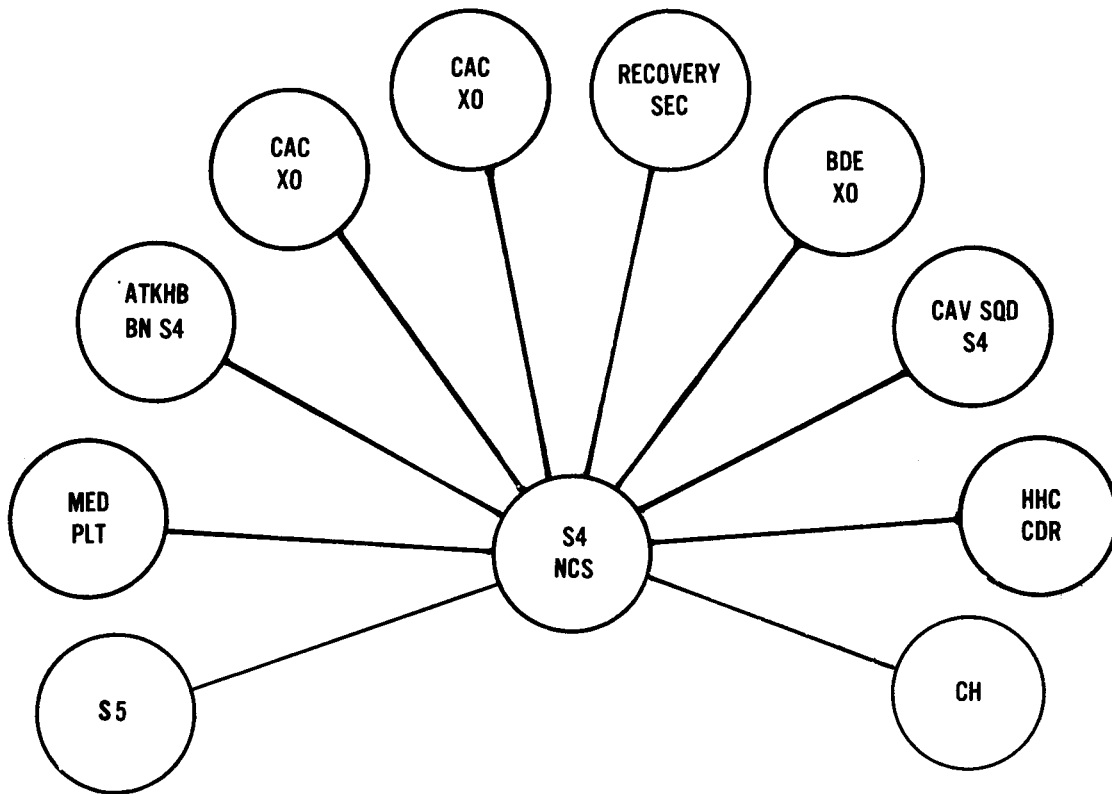


Figure C-11. AB administrative and logistical FM net (heavy division).

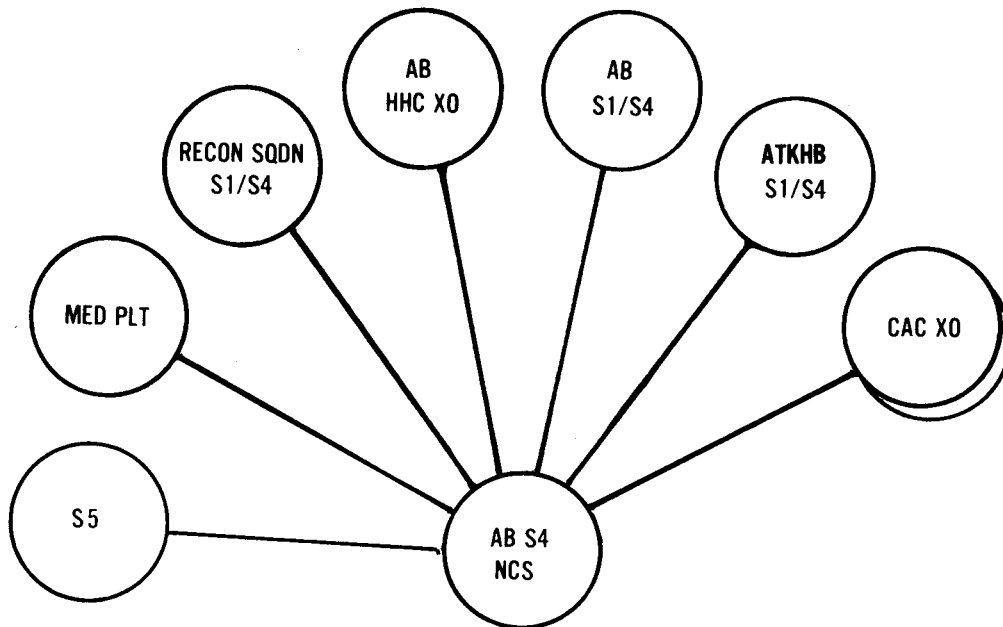
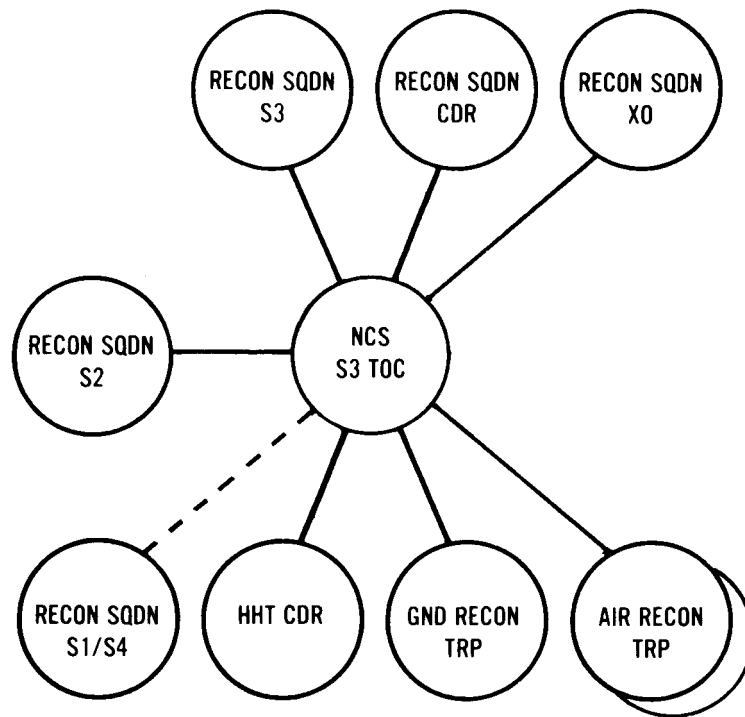


Figure C-12. AB administrative and logistics FM net (light division).



NOTE: ENTER AS REQUIRED.

Figure C-13. Reconnaissance squadron command and operations FM net (light TOC division).

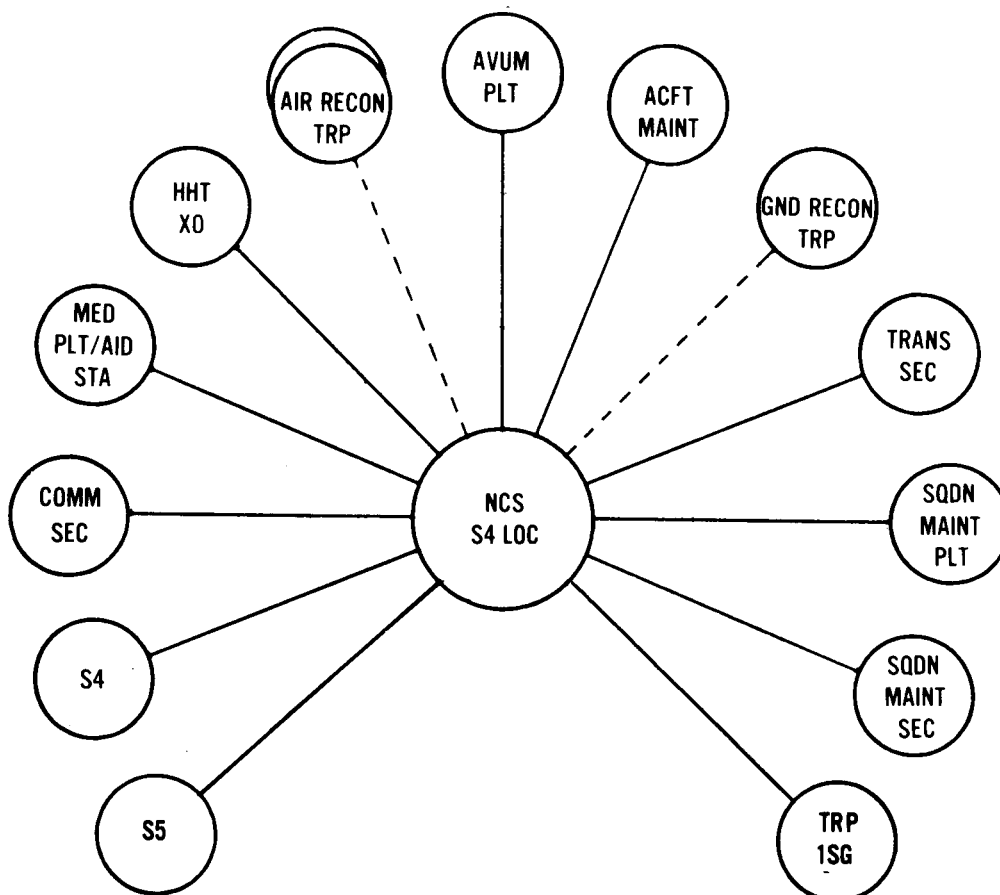


Figure C-14. Reconnaissance squadron administrative and logistics FM net (light division).

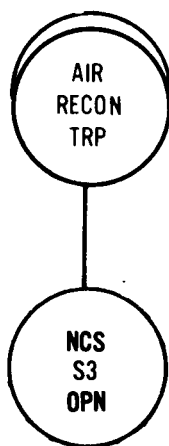


Figure C-15. Reconnaissance squadron aviation UHF net (light division).

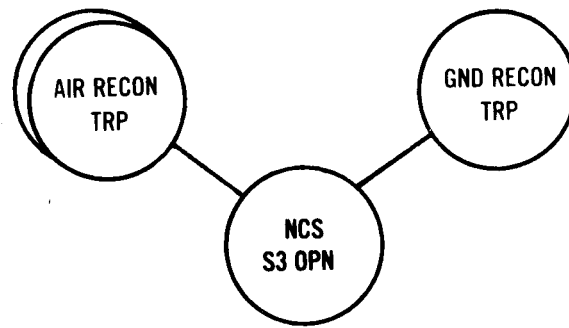
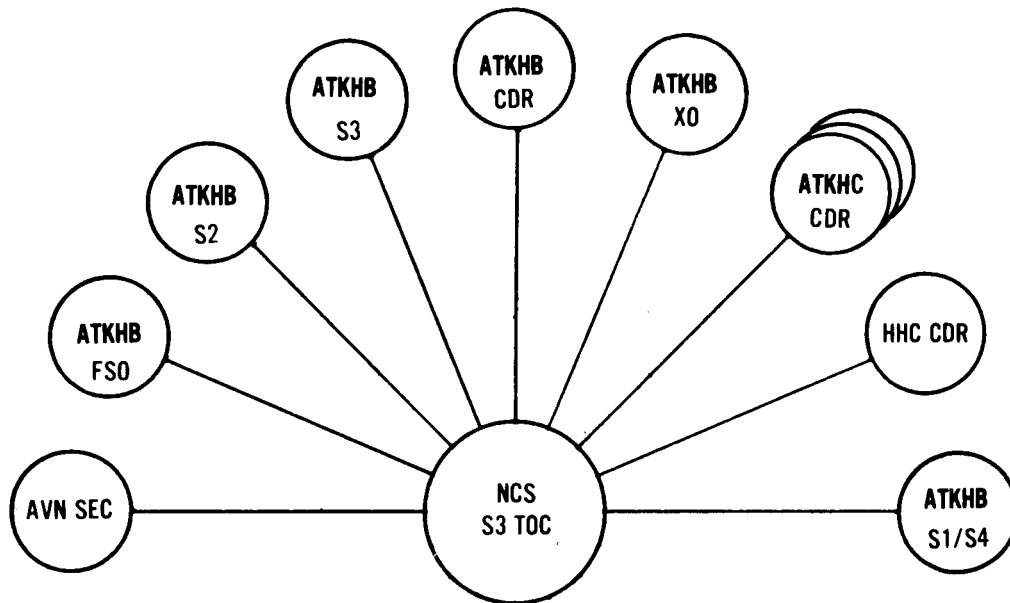


Figure C-16. Reconnaissance squadron HF (voice) net (light division).



NOTE: ENTER AS REQUIRED.

Figure C-17. ATKHB command and operations FM net.

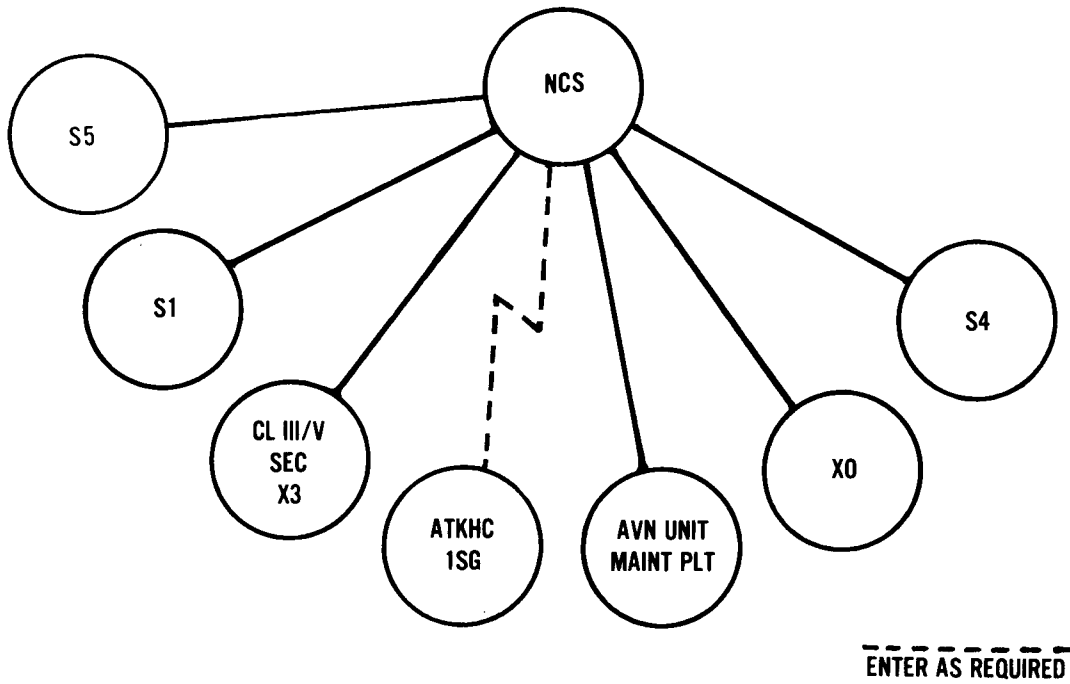
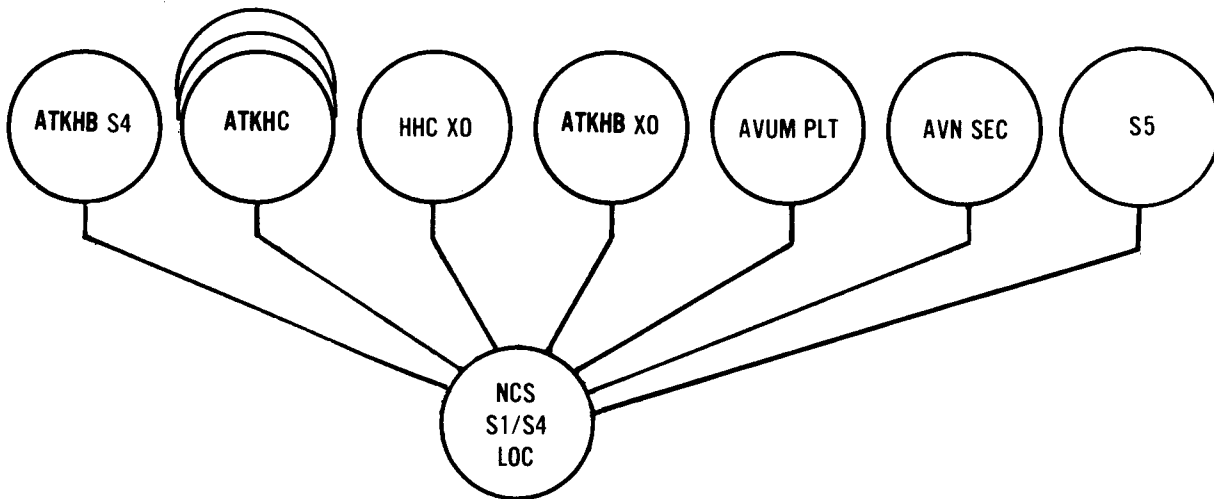


Figure C-18. ATKHB administrative and logistical FM net (heavy division).



NOTE: ENTER AS REQUIRED.

Figure C-19. ATKHB administrative and logistics FM net (light division).

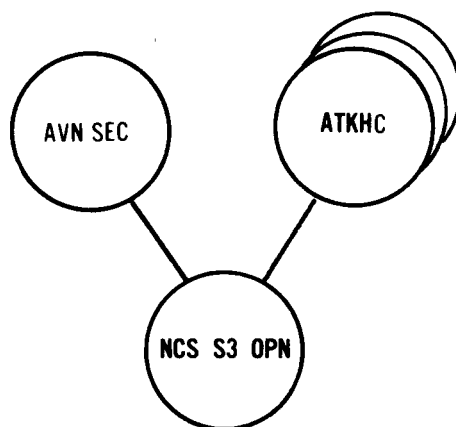


Figure C-20. ATKHB command (AM voice) net (heavy division).

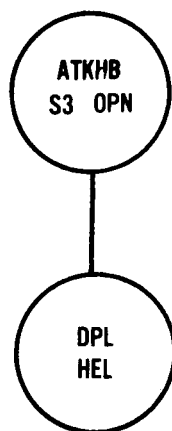


Figure C-21. ATKHB air and ground HF-AM net (light division).

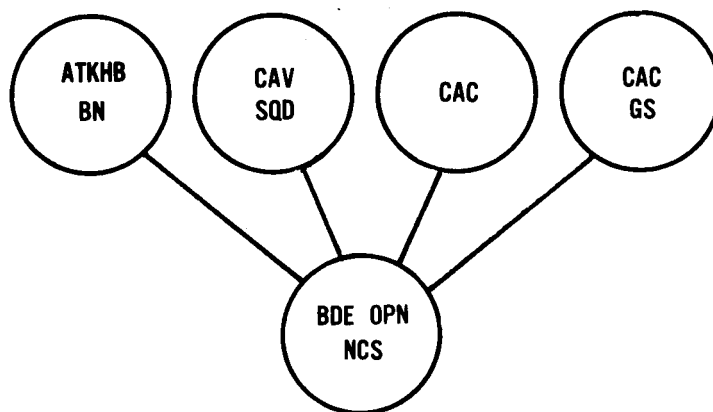
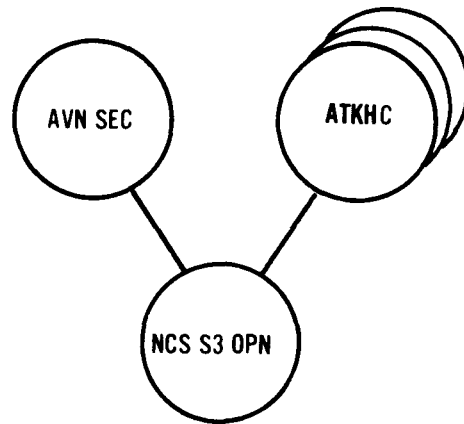


Figure C-22. AB RATT net.



NOTE: ACTIVE WHEN NECESSARY. REQUIRES EXITING BRIGADE HF NET.

Figure C-23. ATKHB aviation UHF net (light division).

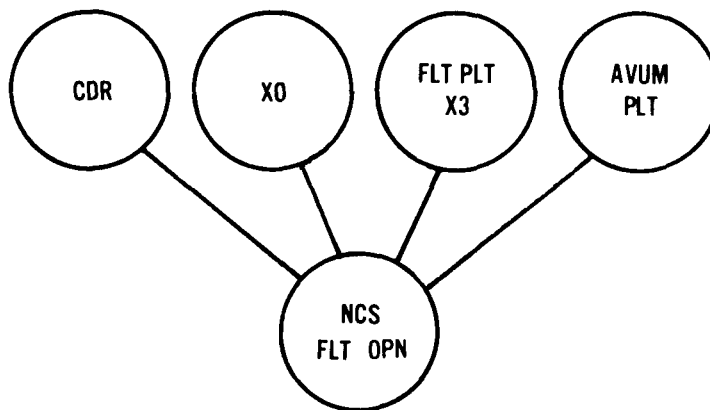


Figure C-24. AHC command FM net.

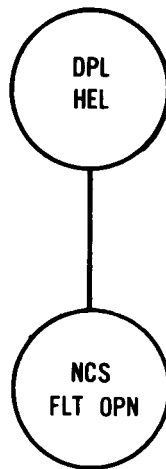


Figure C-25. AHC flight control UHF-AM net.

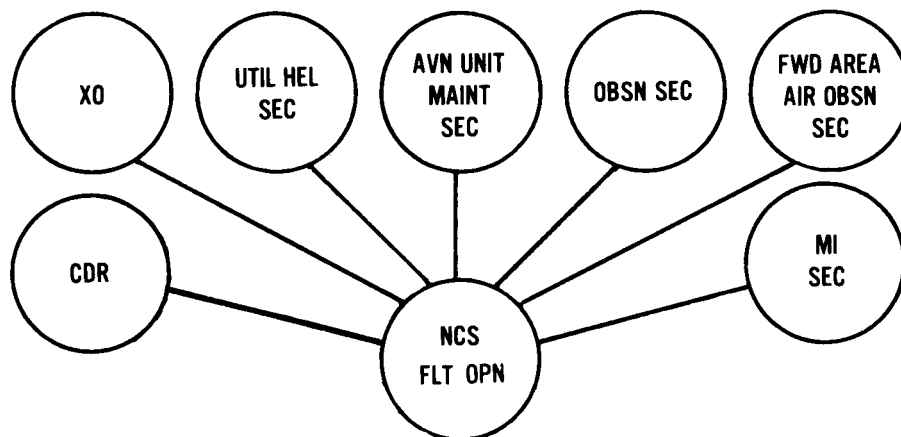


Figure C-26. AHC command FM net.

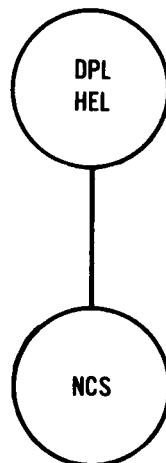


Figure C-27. AHC flight control UHF-AM net.

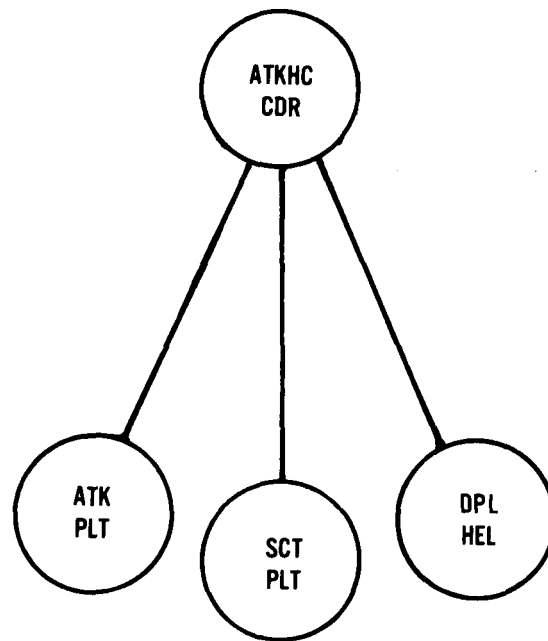


Figure C-28. ATKHC company command FM net.

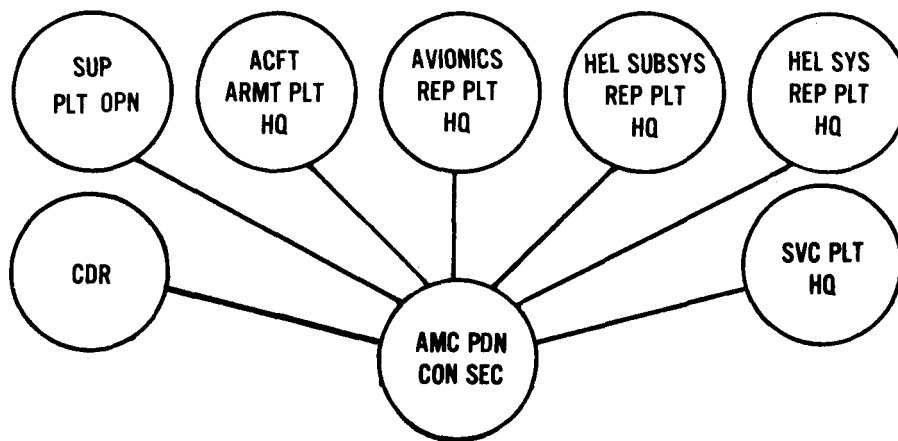


Figure C-29. Aircraft maintenance company command FM net.

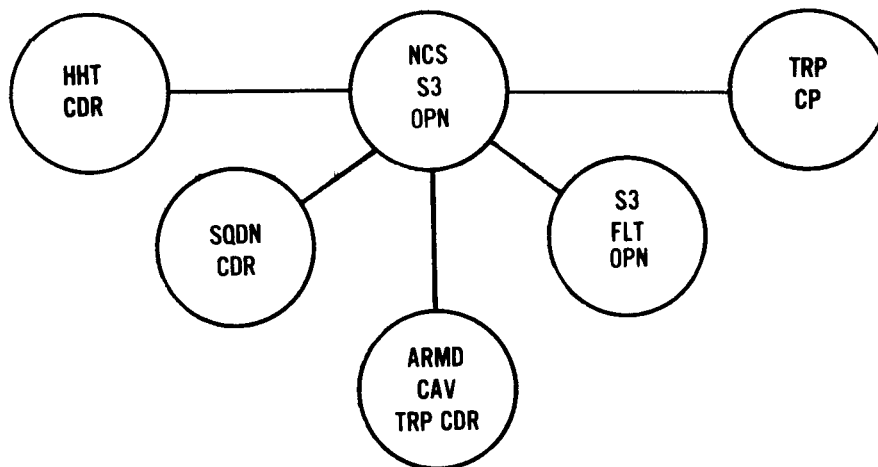


Figure C-30. Cavalry squadron command FM net.

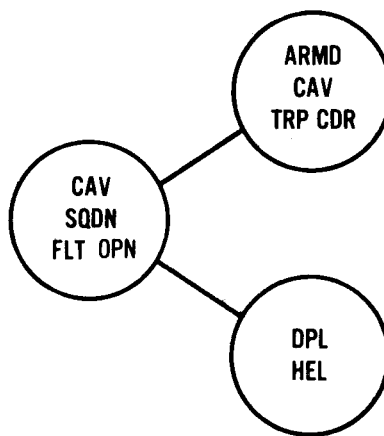


Figure C-31. Cavalry squadron aviation UHF-AM net.

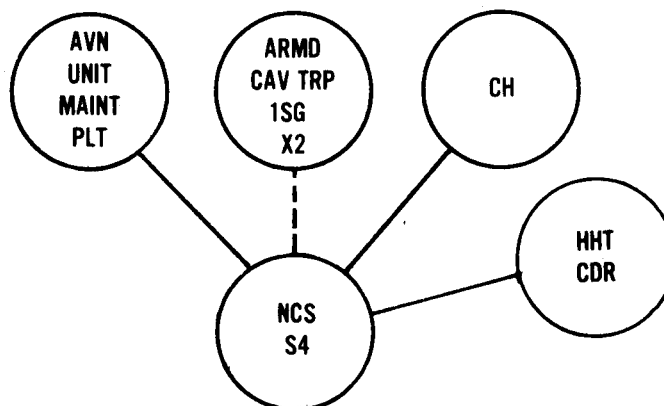


Figure C-32. Cavalry squadron administrative and logistical FM net.

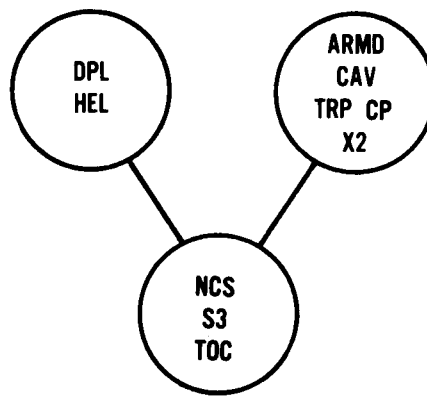


Figure C-33. Cavalry squadron operations and intelligence IHF net.

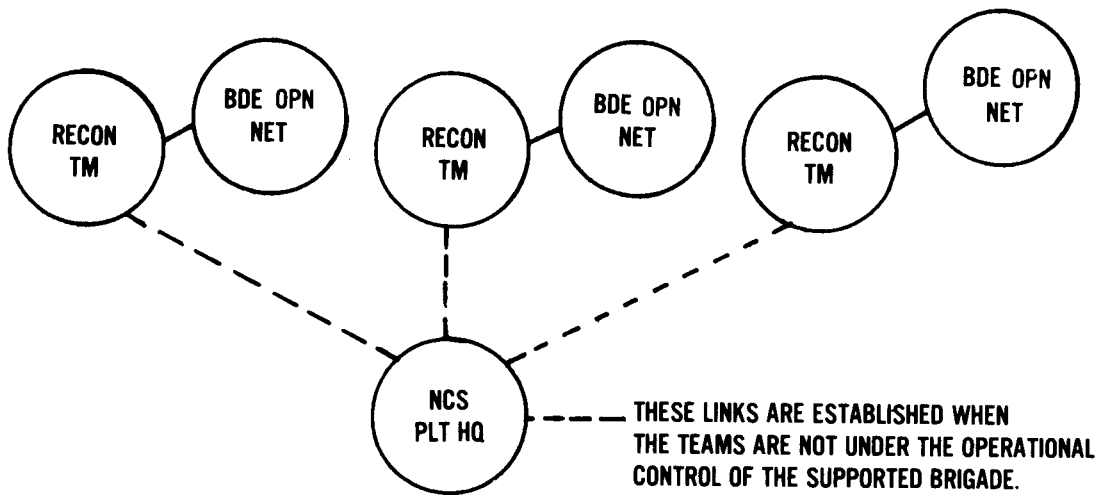


Figure C-34. Reconnaissance platoon NBC control FM net.

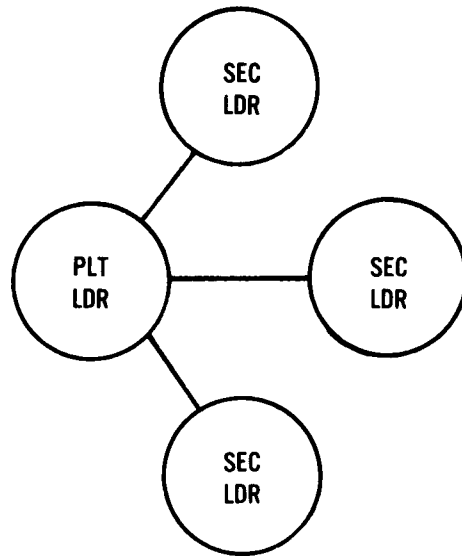


Figure C-35. Motorcycle platoon operations FM net.

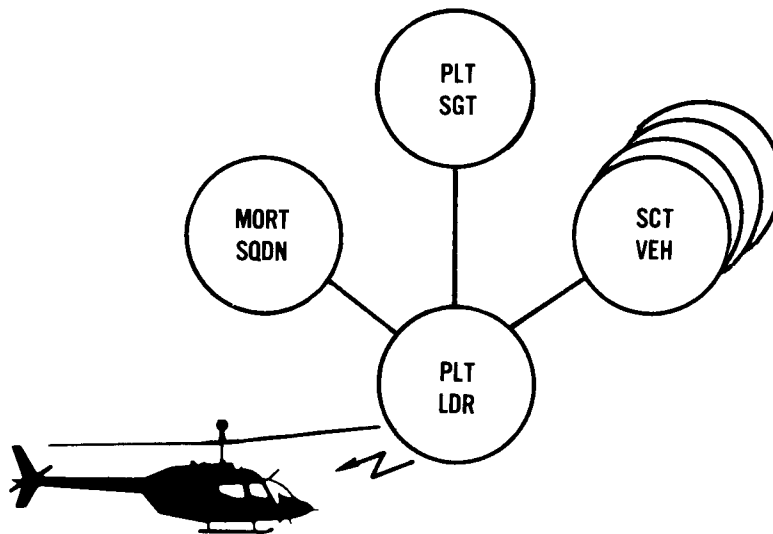


Figure C-36. Scout platoon command and operations FM net.

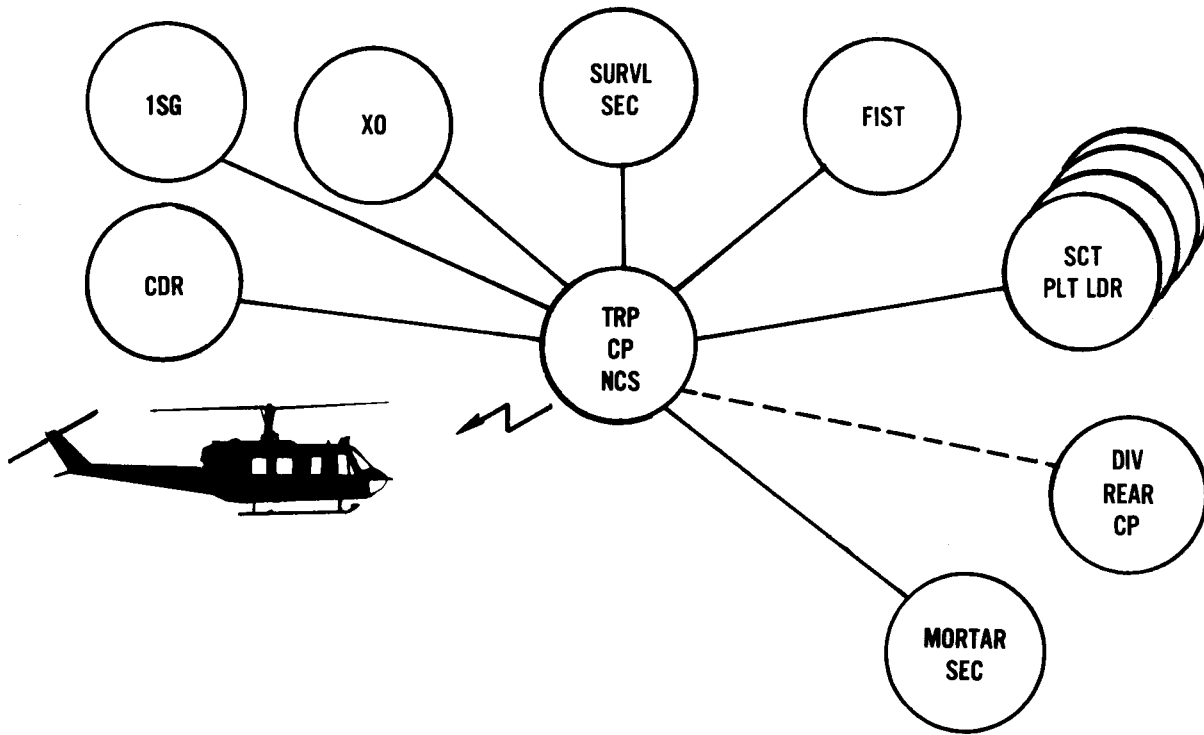


Figure C-37. Ground cavalry troop command FM net.

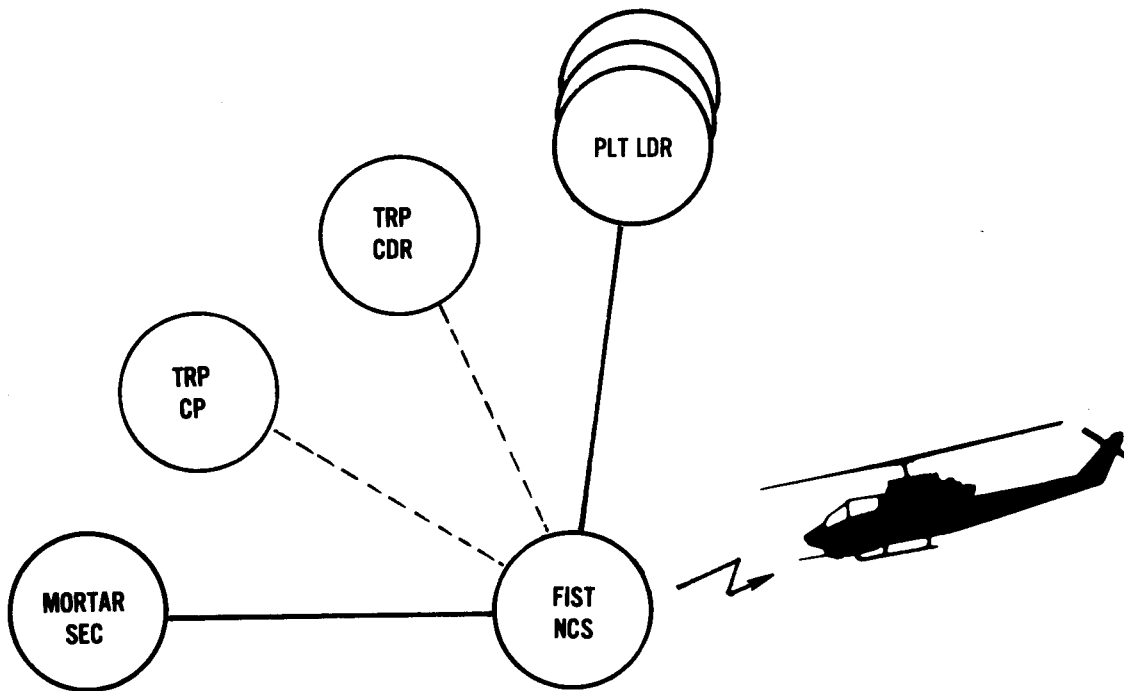


Figure C-38. Ground cavalry troop company fire control FM net.

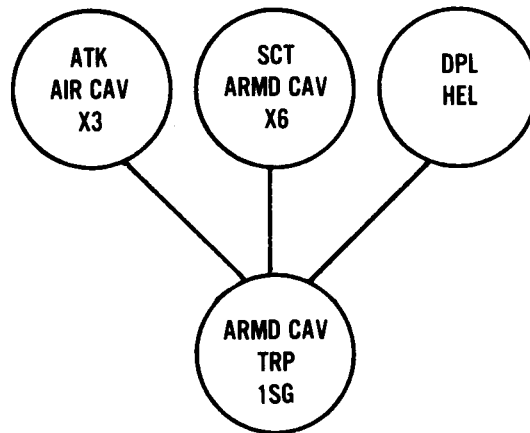


Figure C-39. Air cavalry troop command FM net.

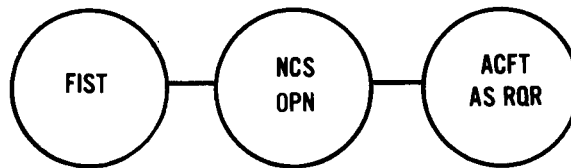
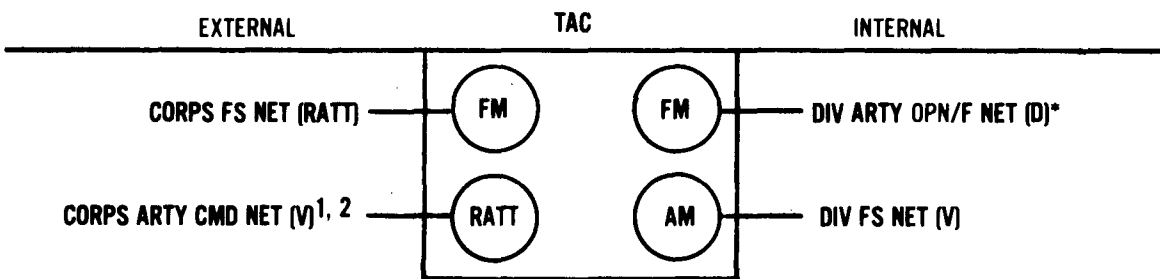
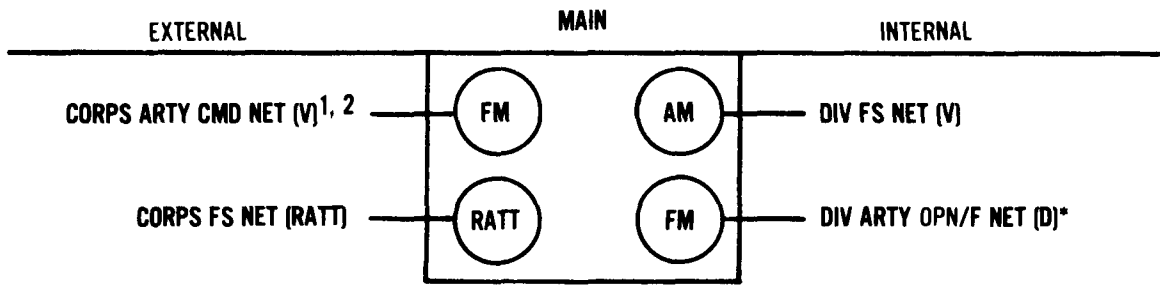


Figure C-40. Air cavalry troop company fire control FM net.



*One of three Nets (Div Arty Opn/F 1, 2, or 3 Nets (D))

NOTE 1: When out of VHF-FM range of Corps Arty, FSS monitors the nearest FA Bde Cmd Net (V) for Corps Arty Input.

Note 2: Monitor Div Cmd/Opn when not co-located with Div Cdr/Dep Cdr as required.

Figure C-41. Division FSS radio net structure.

C-3. Division Artillery

The DIVARTY radio nets and the stations within those nets are shown in Figures C-42 through C-60.

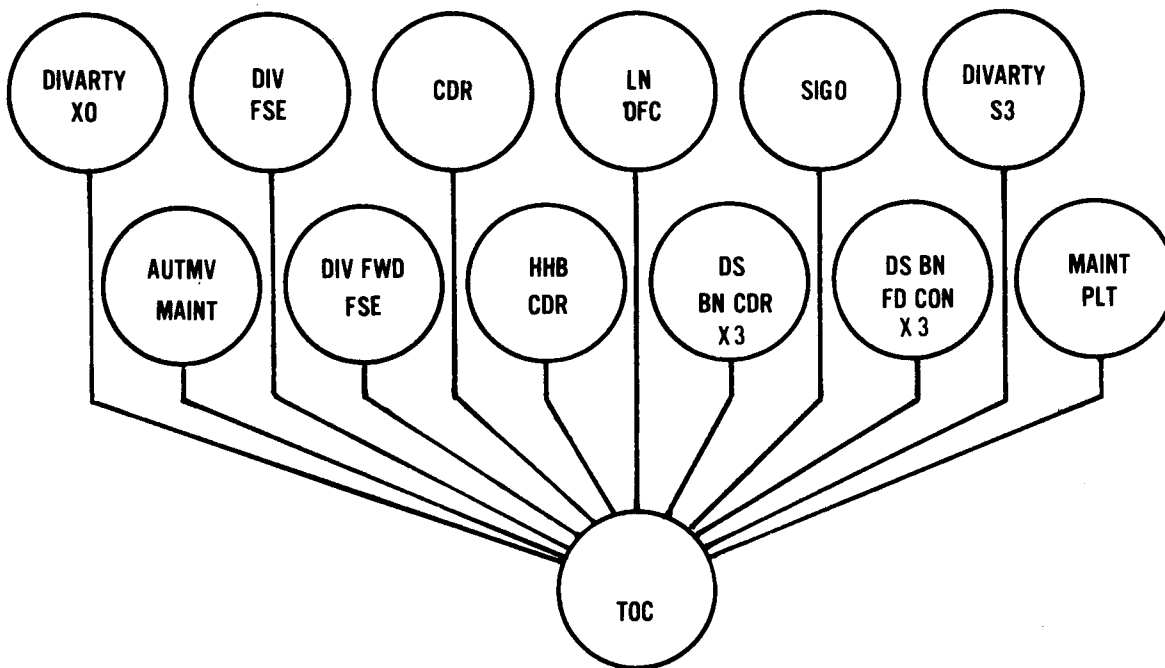


Figure C-42. DIVARTY command FM net.

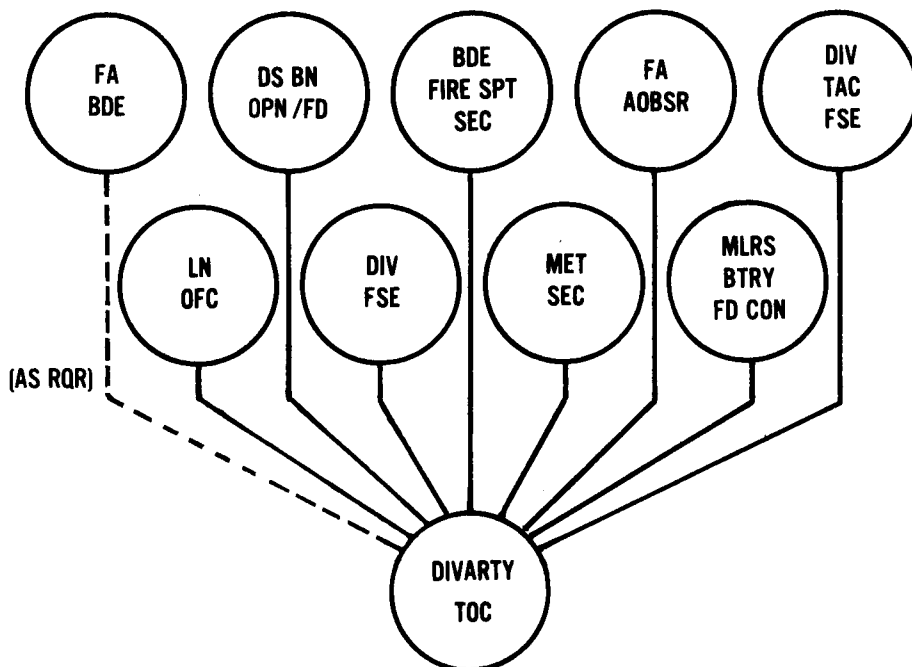


Figure C-43. DIVARTY operations FM digital nets 1, 2, and 3 (heavy division).

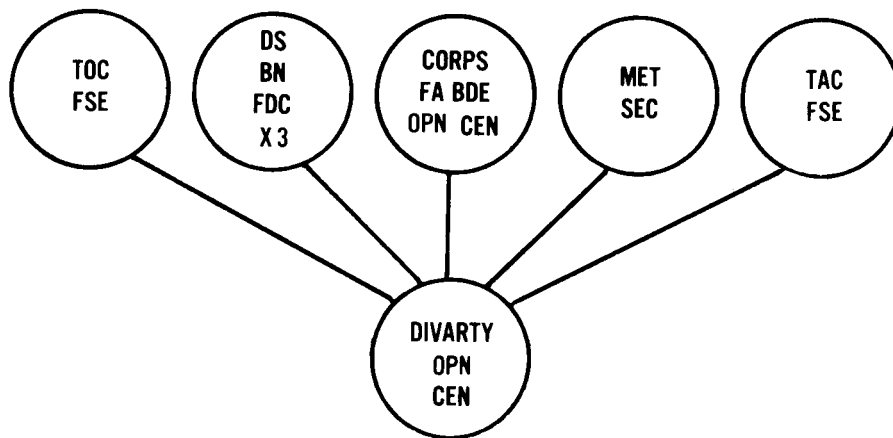


Figure C-44. DIVARTY command and fire direction RATT net 1.

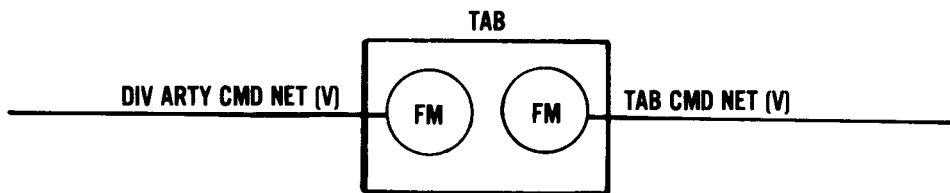


Figure C-45. DIVARTY target acquisition battery radio net structure.

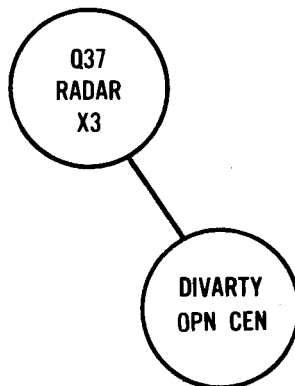
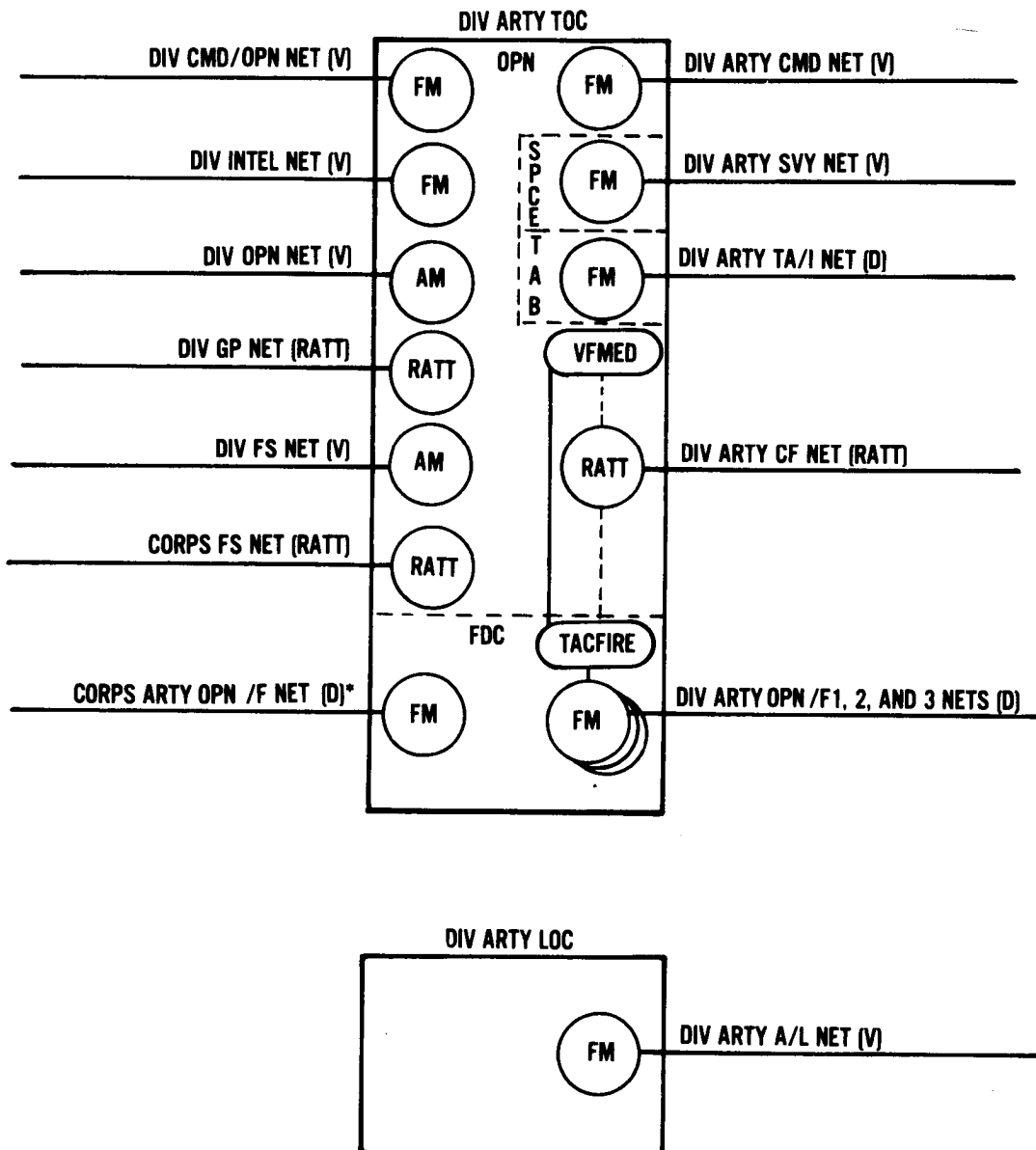
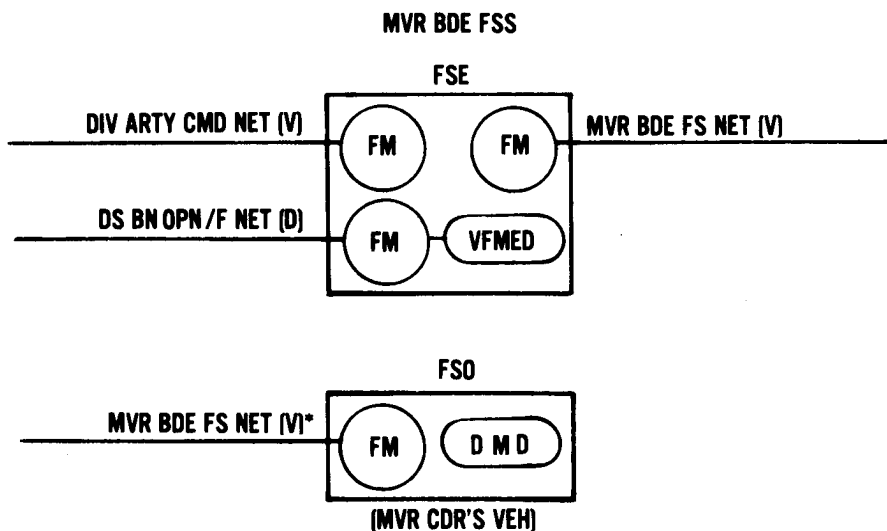


Figure C-46. DIVARTY target acquisition battery command and intelligence FM digital net (heavy division).



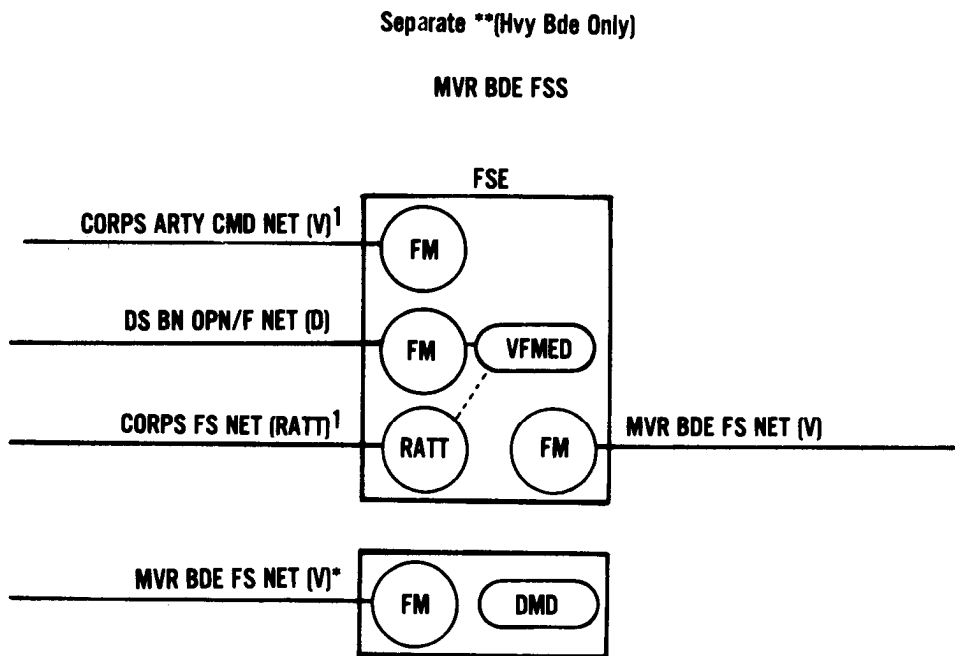
- *One of three Nets (Corps Arty Opn/F 1, 2, or 3 Nets (D))
- (V) = Voice
- (D) = Digital (Note: May be voice on units without digital devices that is, TACFIRE)
- (RATT) = Radio Teletypewriter
- FM = Frequency Modulated Combat Net Radio (CNR)
- SSB = Single Sideband Amplitude Modulated CNR (AM)

Figure C-47. DIVARTY radio net structure (light division).



*When not physically with Mvr Bde Cdr, monitor Mvr Bde Cmd/Opn Net (V).

Figure C-48. The maneuver brigade FSS radio net structure.



*When not physically with Mvr Cdrs, monitor Mvr Bde Cmd/Opn Net.

** Organic field artillery.

NOTE: When OPCON to Div, FSE switches to Div Arty Cmd Net (V) and Div FS Net (V); other nets maybe required depending on tactical organization.

Figure C-49. Separate maneuver brigade FSS radio net structure (heavy brigade only).

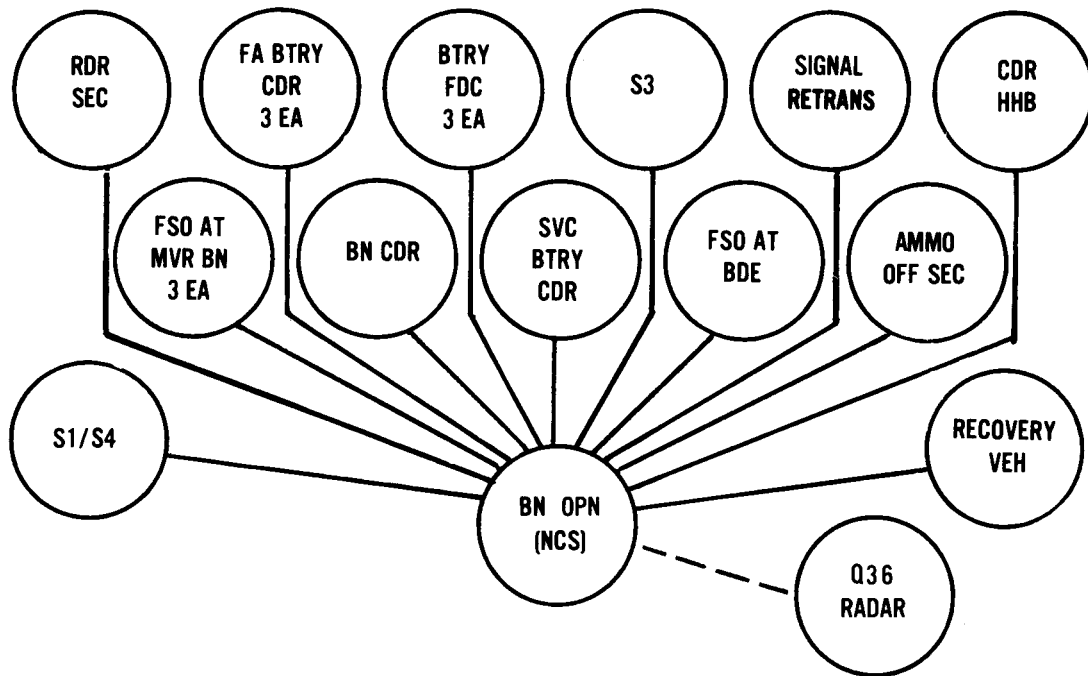
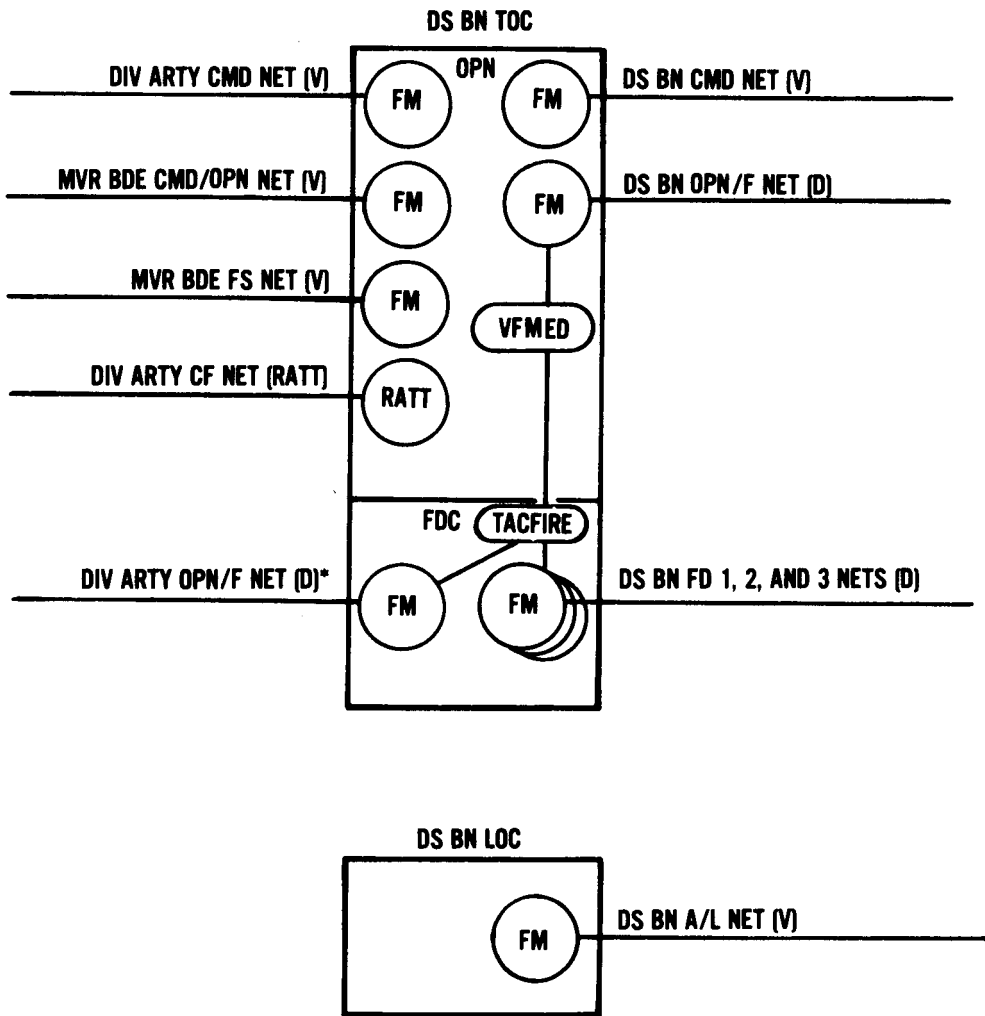


Figure C-50. DS battalion command FM net.



*One of three Nets (Div Arty Opn/F 1, 2, or 3 Nets (D))

Figure C-51. DS battalion operations and fire direction FM digital net.

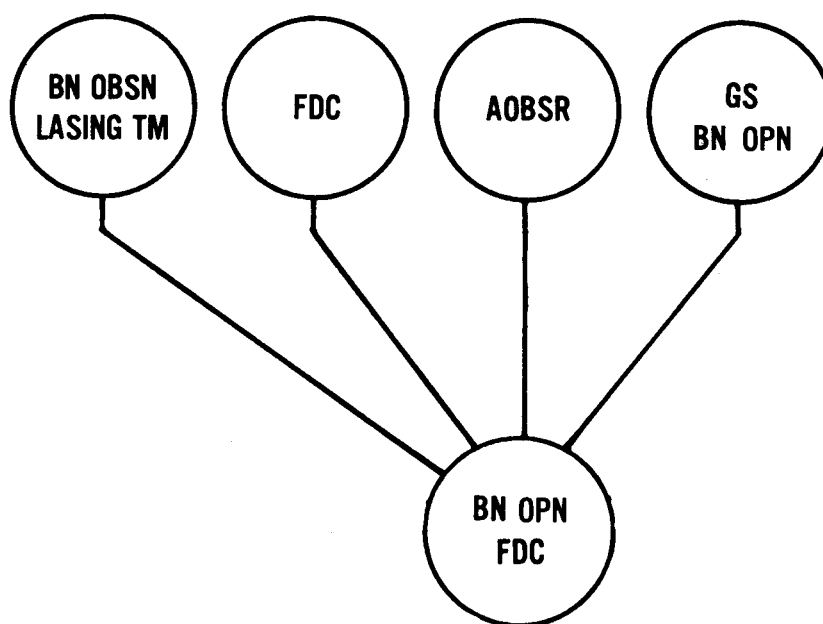
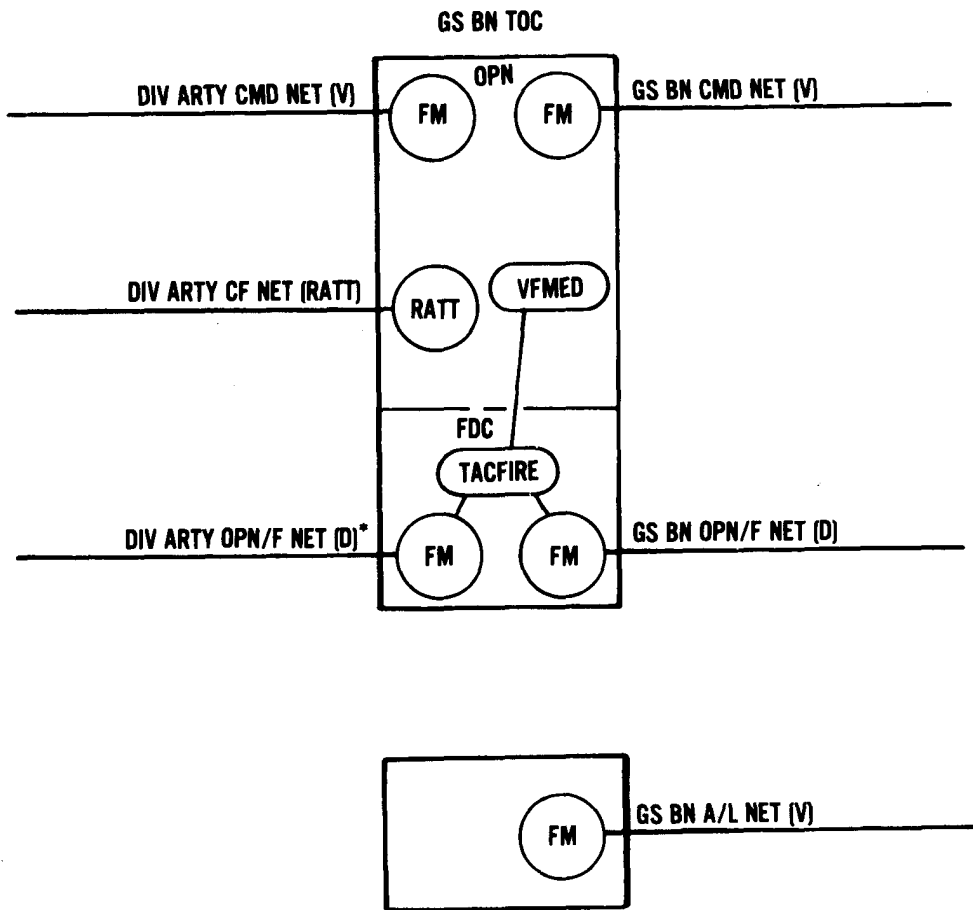


Figure C-52. DS battalion fire direction FM digital nets 1, 2, and 3.



*One of three Nets (Div Arty Opn/F 1, 2, or 3 Nets (D))

NOTE: When assigned mission of Direct Support (DS), the GS battalion must add those nets peculiar to DS:

Mvr Bde Cmd/Opn Net (V)

Mvr Bde FS Net (V)

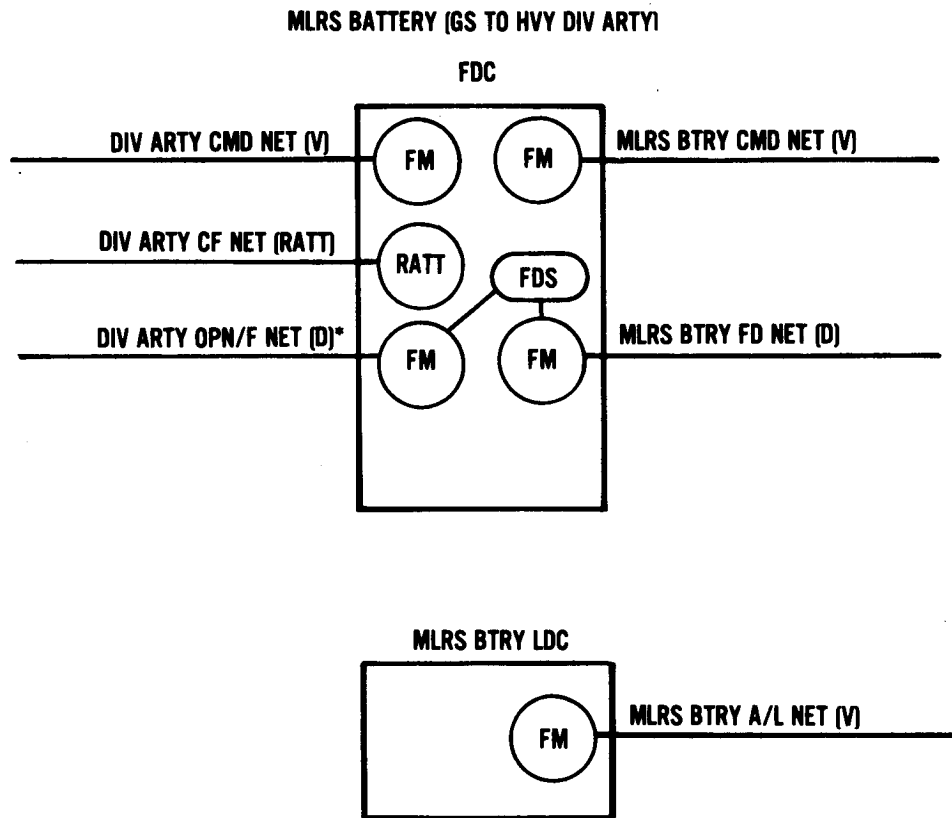
and add the DS designator or assume DS Nets (DS Bn Cmd Net (V)

DS Bn Opn/F Net (D)

DS Bn FD 1, 2, and 3 Nets (D)

DS Bn A/L Net (V)

Figure C-53. GS battalion fire direction FM digital net.



*One of three (Div Arty Opn/F 1, 2, or 3 Nets (D))

Figure C-54. MLRS battery fire direction FM digital net.

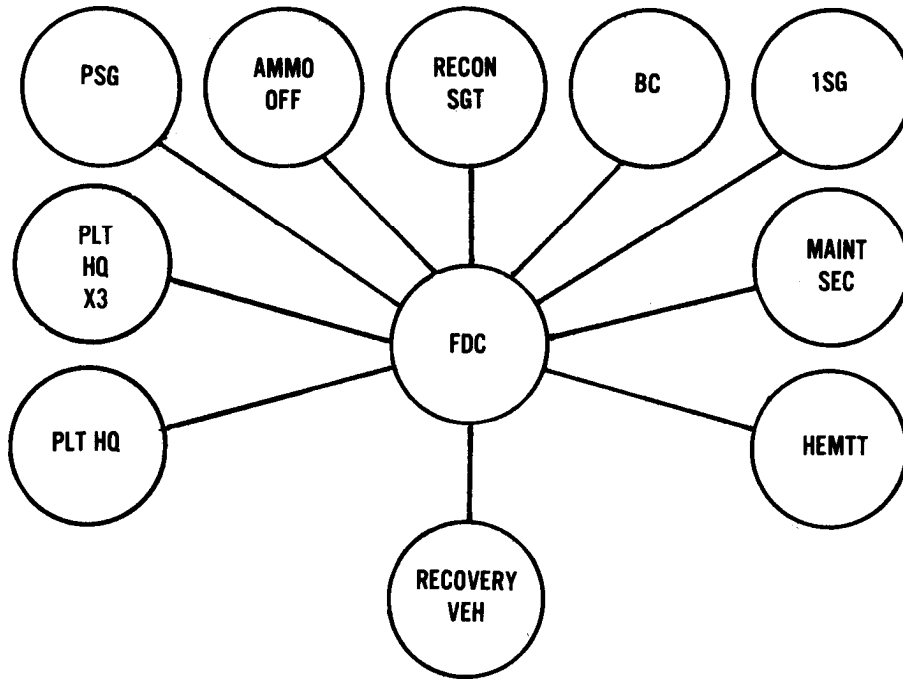


Figure C-55. MLRS battery command FM voice net.

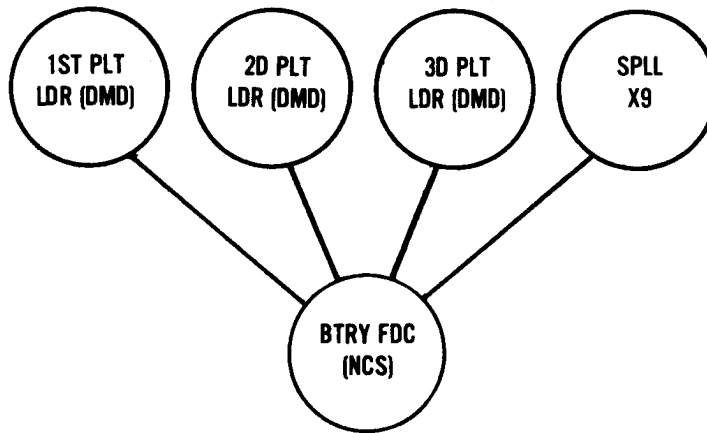
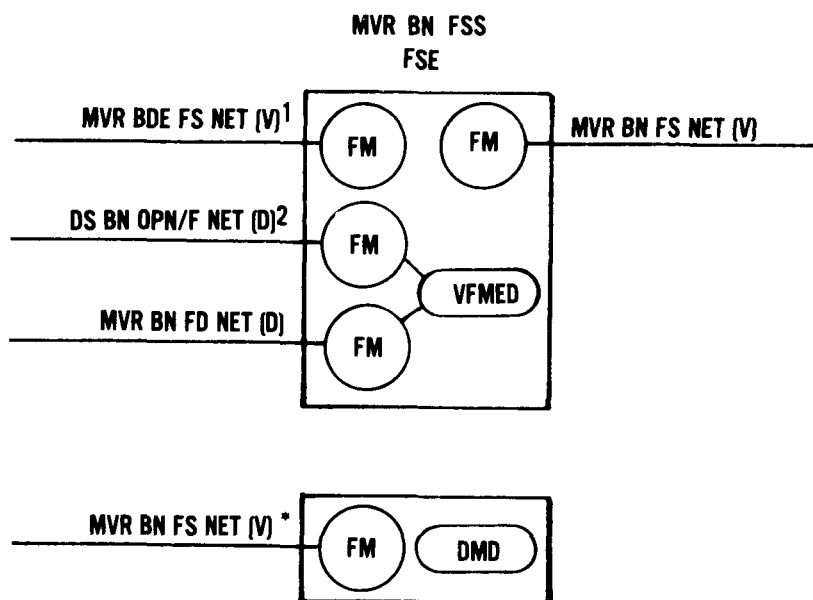


Figure C-56. MLRS battery fire direction FM digital net.

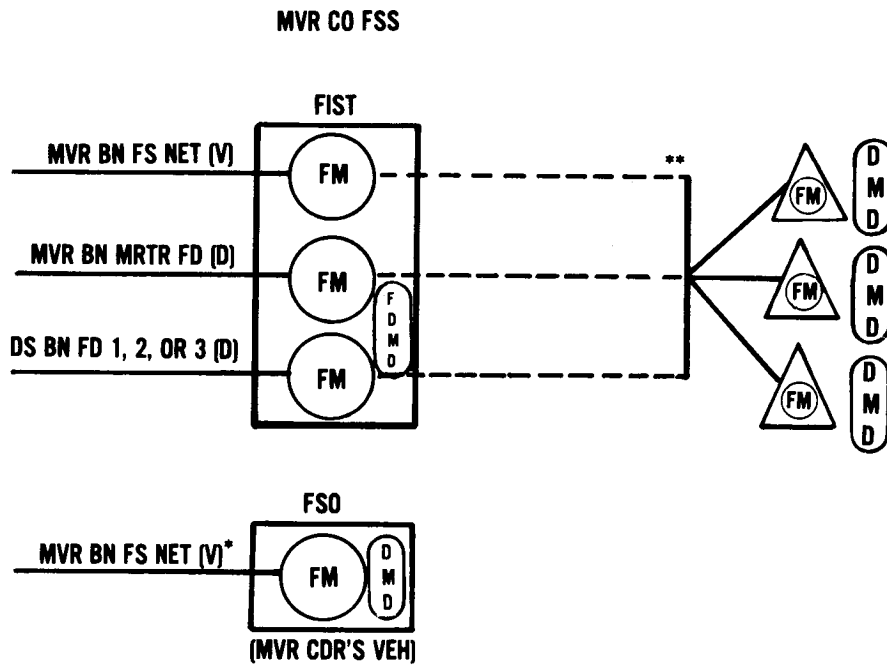


*When not physically with Mvr Cdr, monitor Mvr Bn Cmd/Opn Net (V).

NOTE 1. May be required to monitor DS Bn Cmd Net (V).

NOTE 2. May be required to monitor FA Btry FD Net (D).

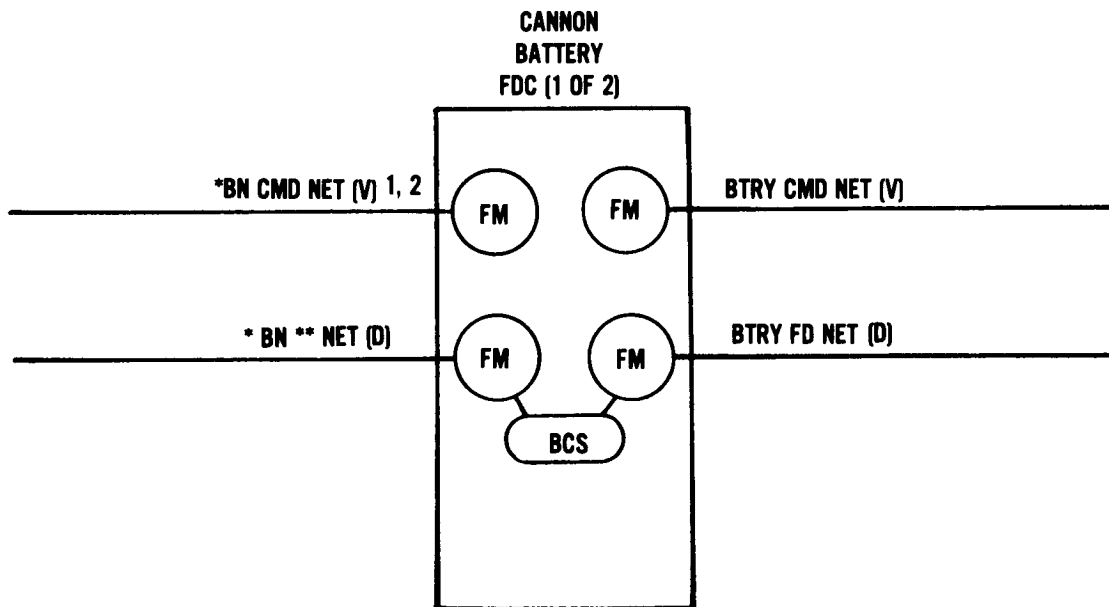
Figure C-57. The maneuver battalion Fire Support System (FSS) radio net structure.



*When not physically with Mvr Bde Cdr, monitor Mvr Bde Cmd/Opn Net (V).

** Forward observers (FOs) may be directed to appropriate net by FIST.

Figure C-58. The maneuver company FIST radio net structure.



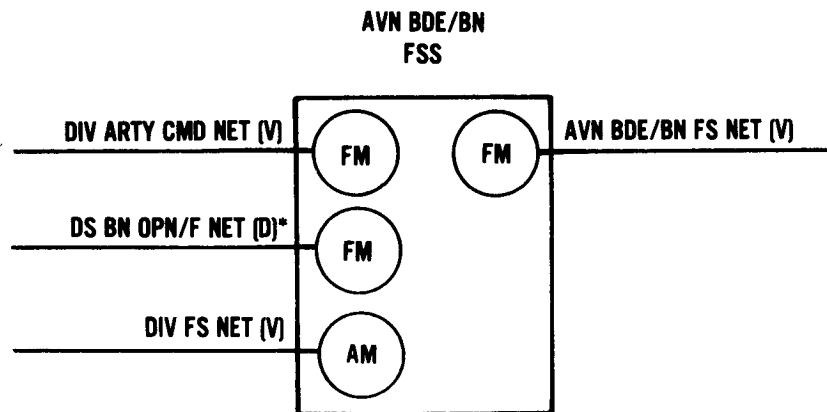
* Either DS or GS

** When DS net title is FD (One of three FD 1, 2, or 3).
When GS net title is Opn/F.

NOTE 1. When in dedicated role Mvr Bn Cmd/Opn Net (V).

NOTE 2. When HIP Howitzer may be Mvr Bn FS Net (V).

Figure C-59. Cannon battery FSS radio net structure.



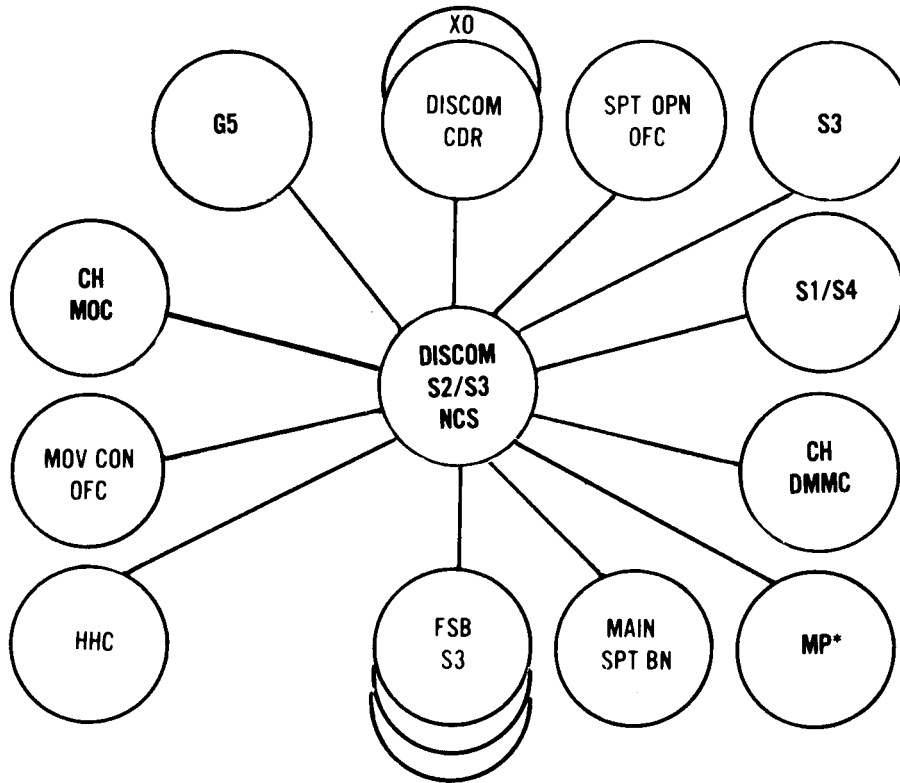
* May be required to monitor Div Arty Opn/F Net (D) (one of three (Div Arty Opn/F 1, 2, or 3 Nets (D))).

Figure C-60. AB battalion FSS net structure.

FM 11-50

C-4. DISCOM

The mission requirement organization of DISCOM in the heavy division is different from that in the light division. Figures C-61 through C-67 show the radio nets in the heavy DISCOM. Figures C-68 through C-89 show the radio nets in the light DISCOM.



*Enter as required.

Figure C-61. DISCOM command and rear battle FM net (heavy division).

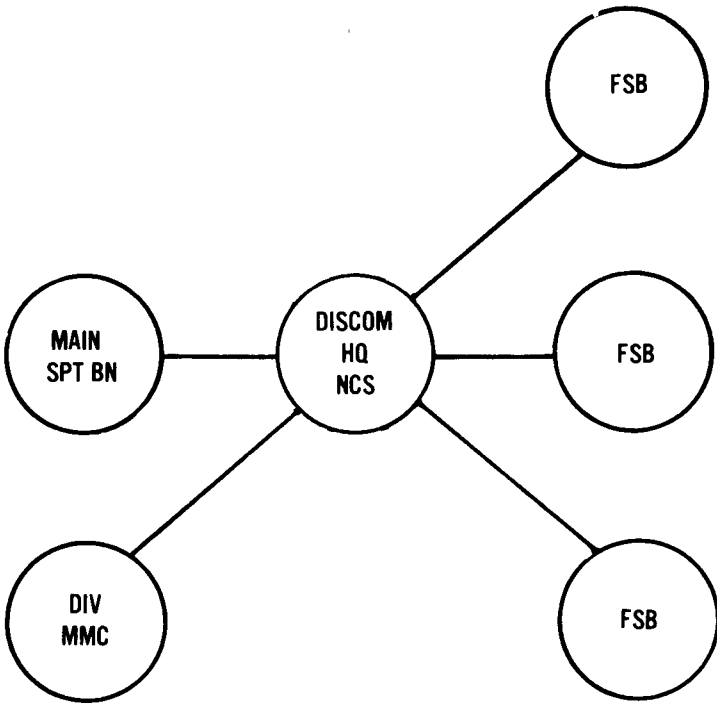


Figure C-62. DISCOM logistics operations SSB net (heavy division).

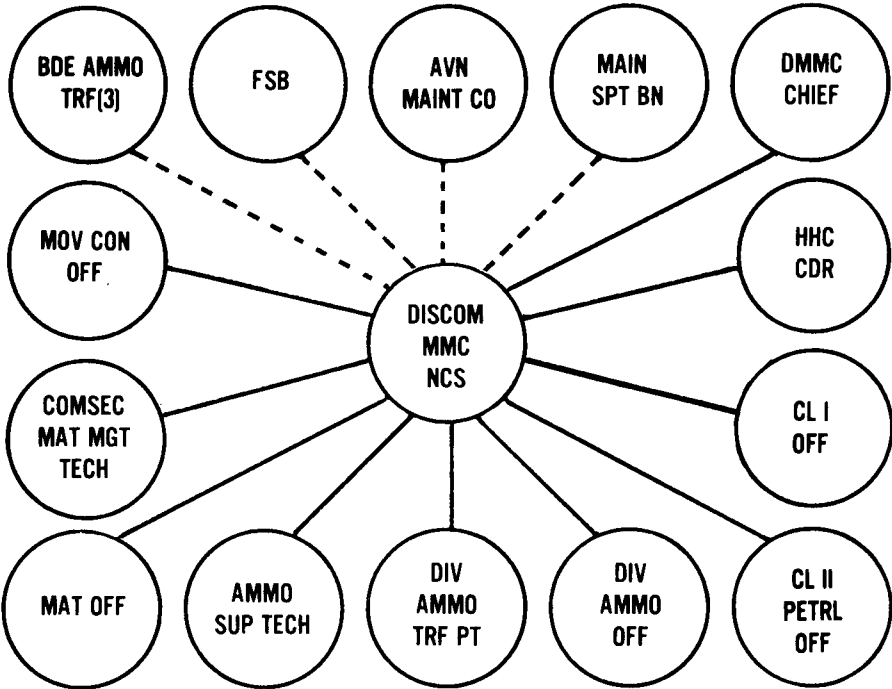


Figure C-63. DISCOM materiel management FM net (heavy division).

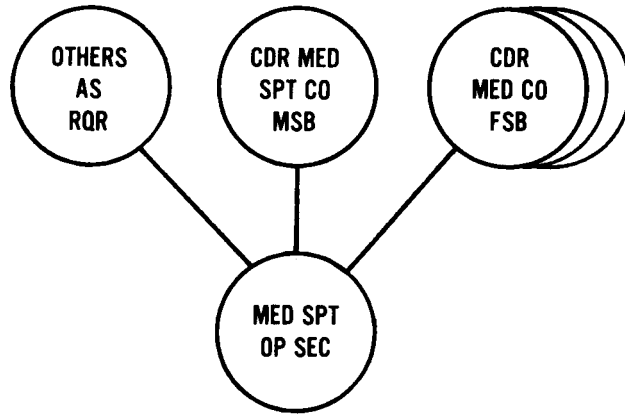


Figure C-64. DISCOM medical command and operations FM net (heavy division).

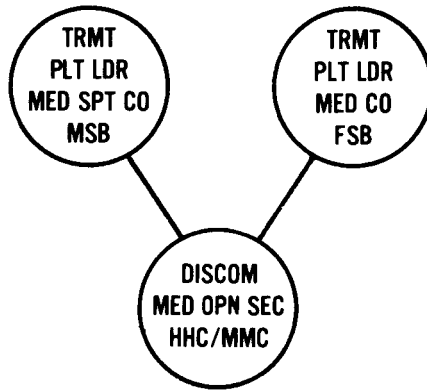


Figure C-65. DISCOM HF voice medical net (heavy division).

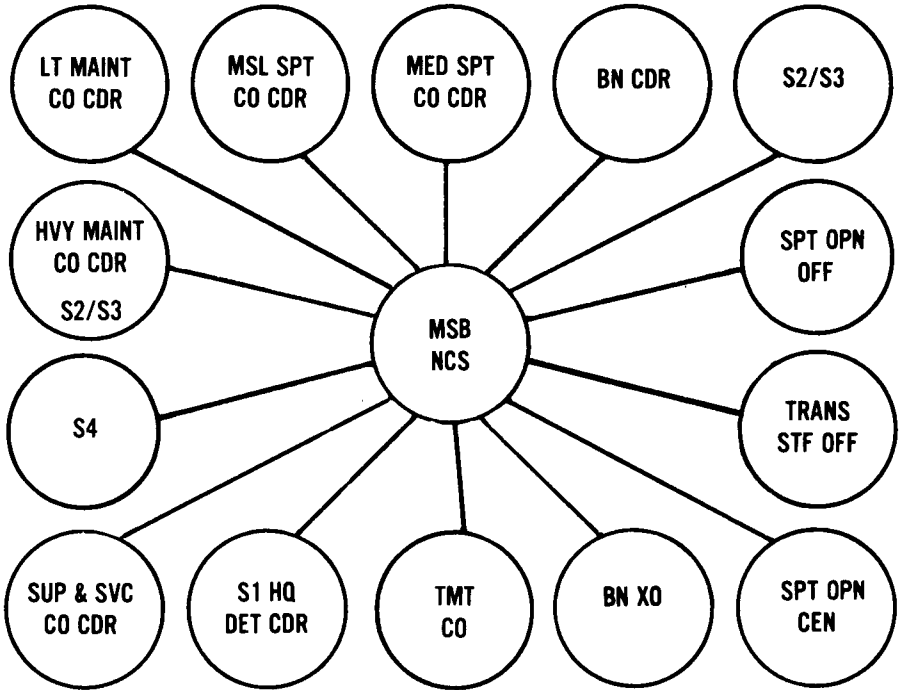


Figure C-66. Main support battalion command and operations FM net (heavy division).

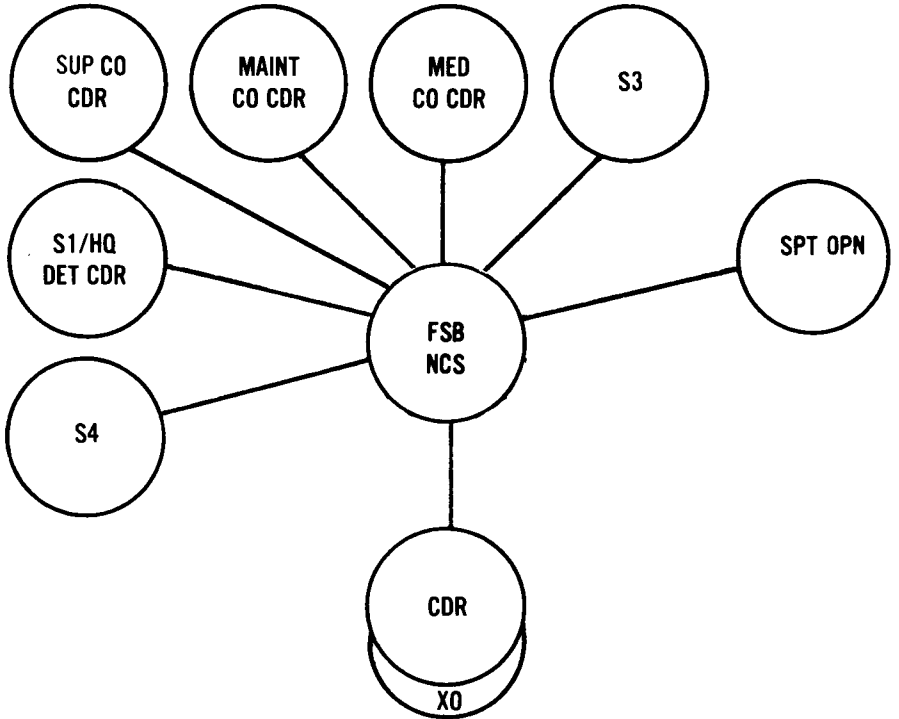


Figure C-67. FSB command and operations FM net (heavy division).

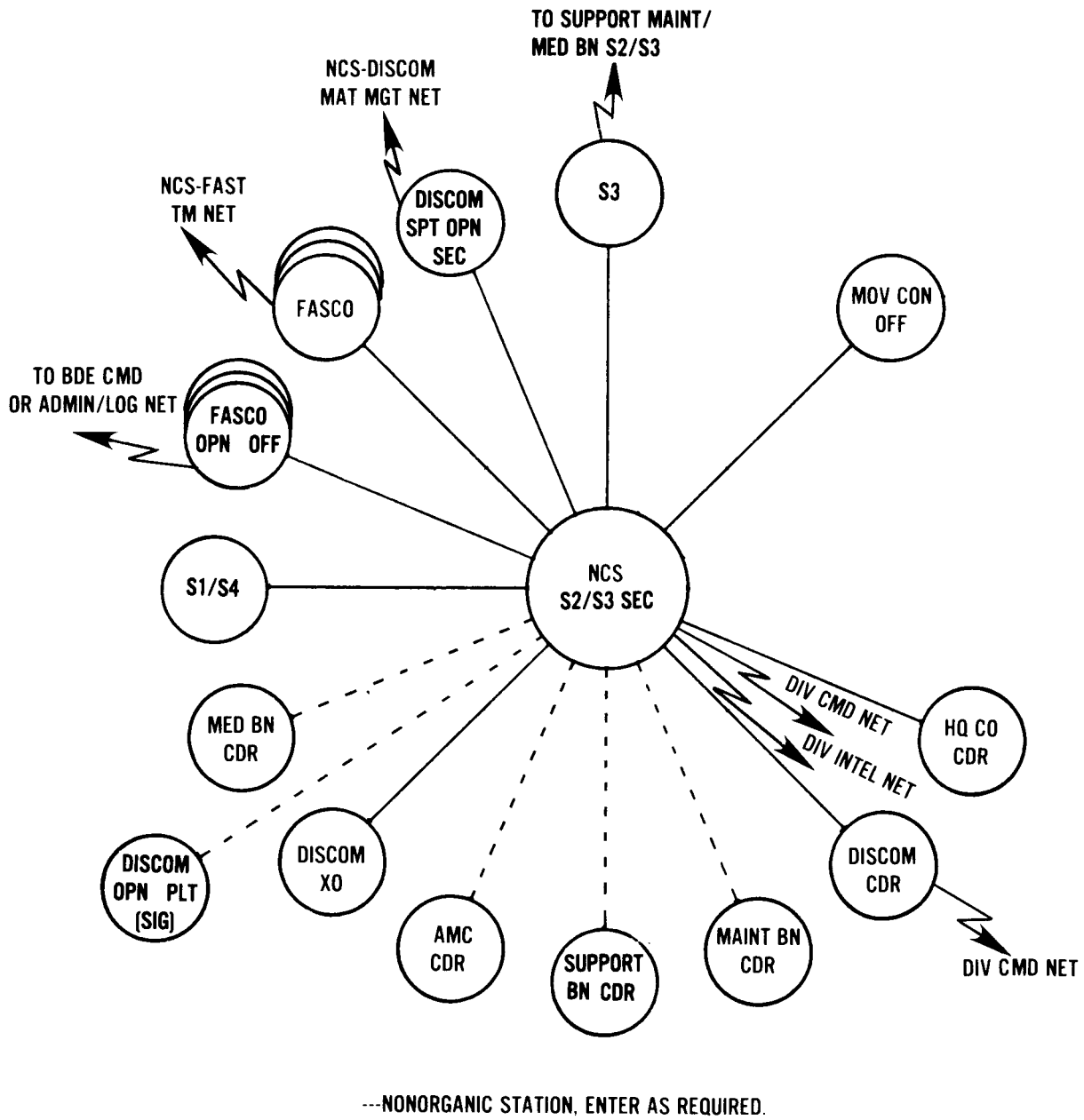
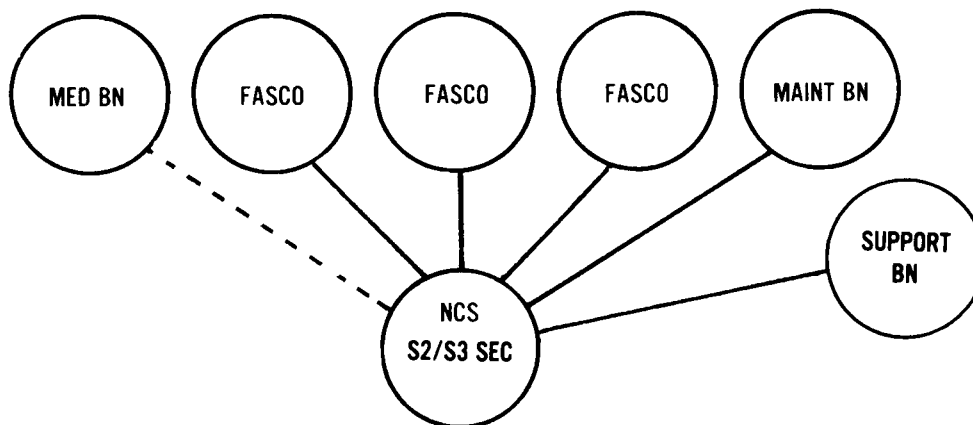
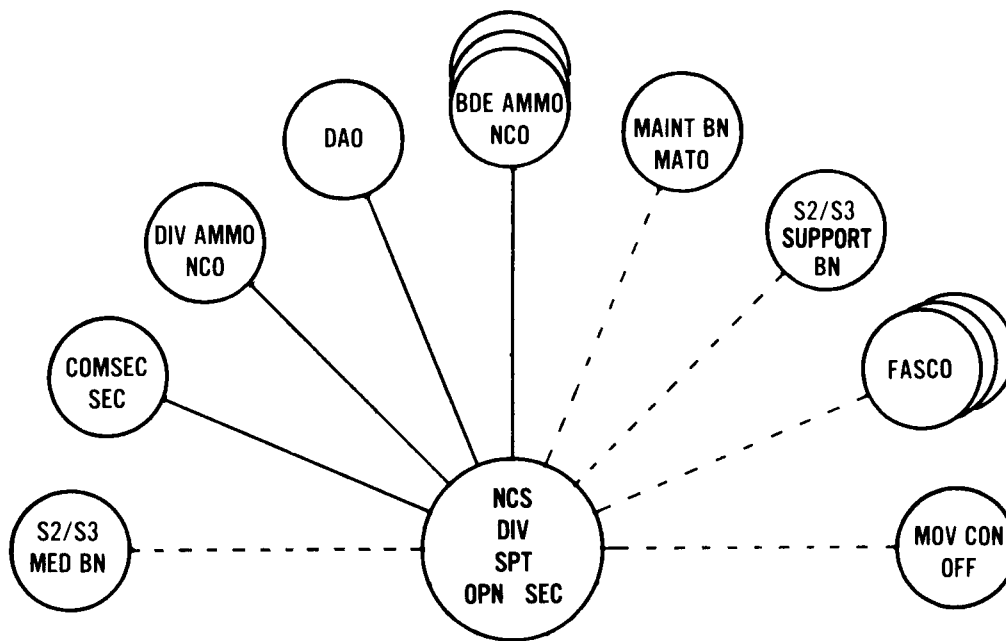


Figure C-68. DISCOM command/operations net (FM) (light division).



--NONORGANIC STATION, ENTER AS REQUIRED.

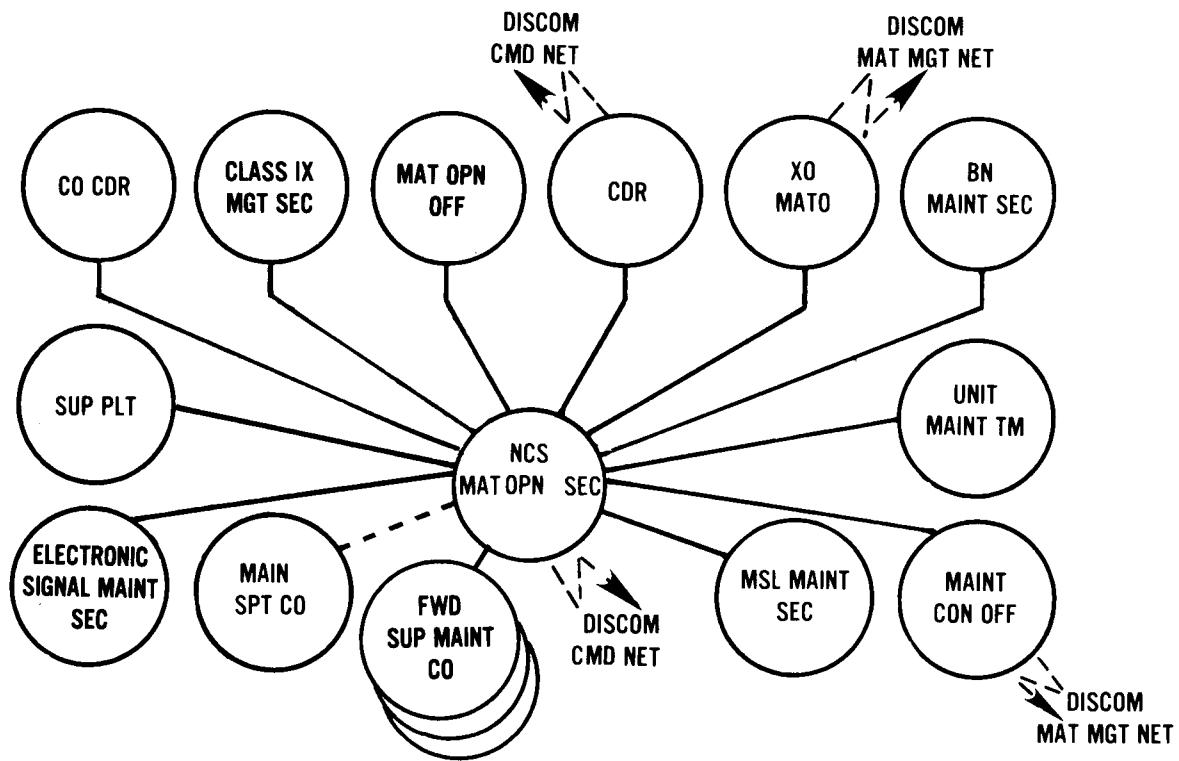
Figure C-69. DISCOM logistics operations net (AM/SSB) (light division).



--NONORGANIC STATION, ENTER AS REQUIRED.

DISCOM, MATERIEL MANAGEMENT NET (FM), LIGHT INFANTRY DIVISION.

Figure C-70. DISCOM materiel management net (FM) (light division).



--NONORGANIC STATION, ENTER AS REQUIRED.

Figure C-71. Command/operations net, headquarters and light maintenance company, maintenance battalion (light division).

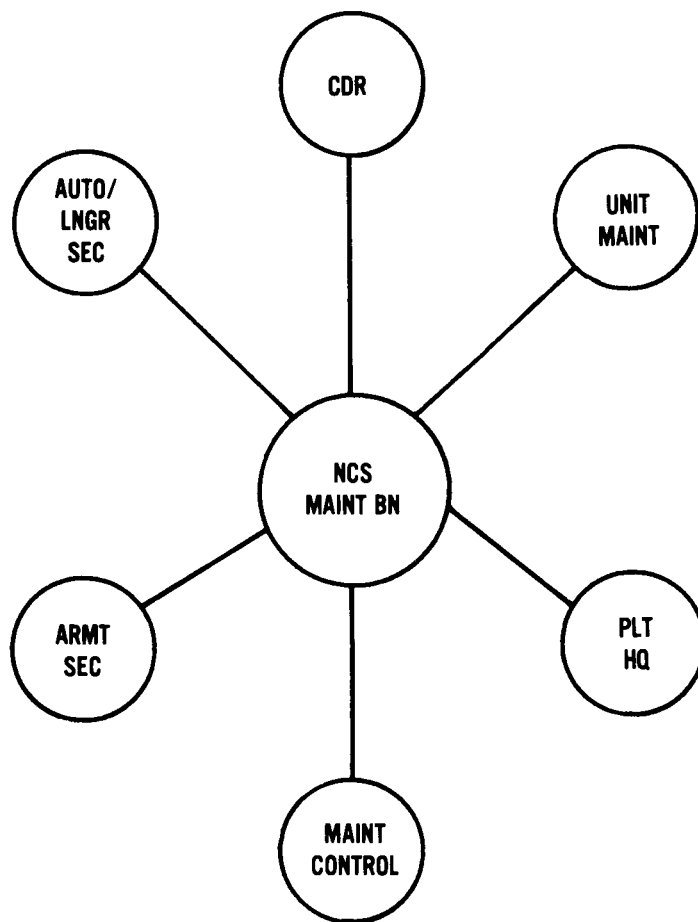
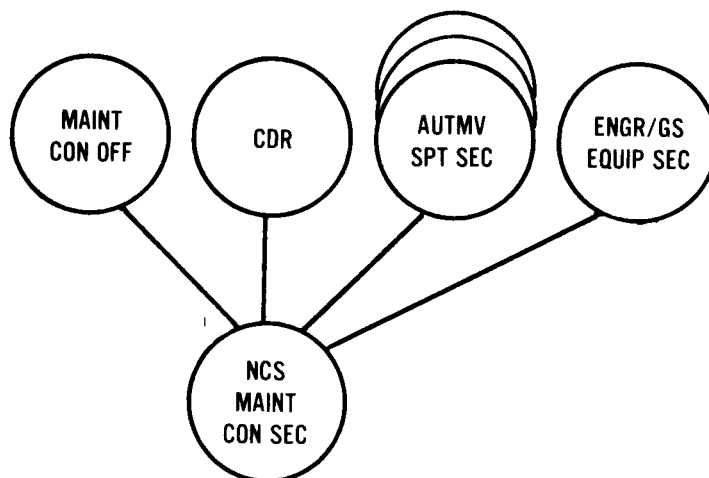


Figure C-72. Forward support maintenance company maintenance battalion LID command FM net.



DISCOM MAT MGT NET & BN CMD NET

Figure C-73. Command net, main support company, maintenance battalion (light division).

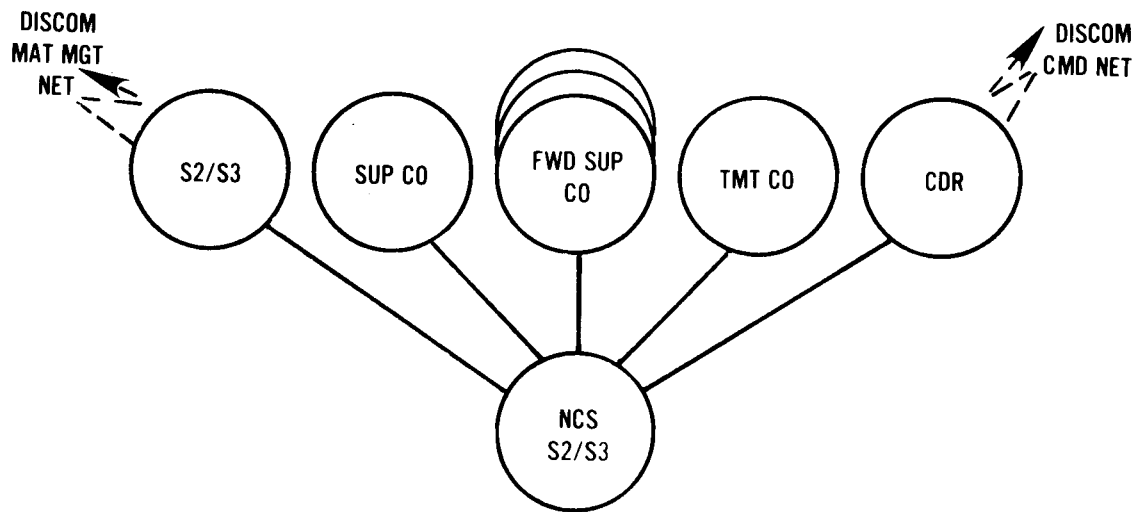


Figure C-74. Support battalion command net (FM) (light division).

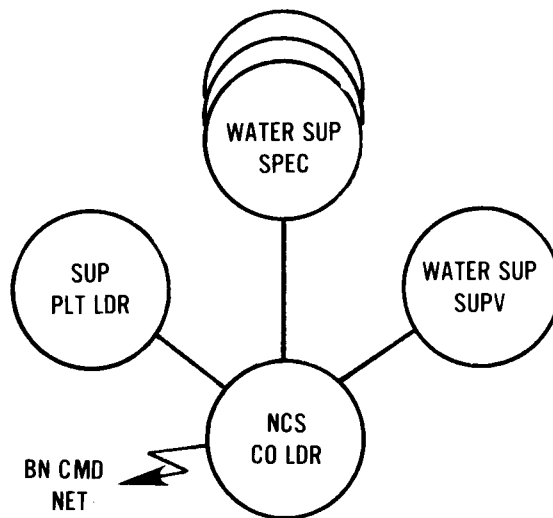


Figure C-75. Supply company net (FM), support battalion (light division).

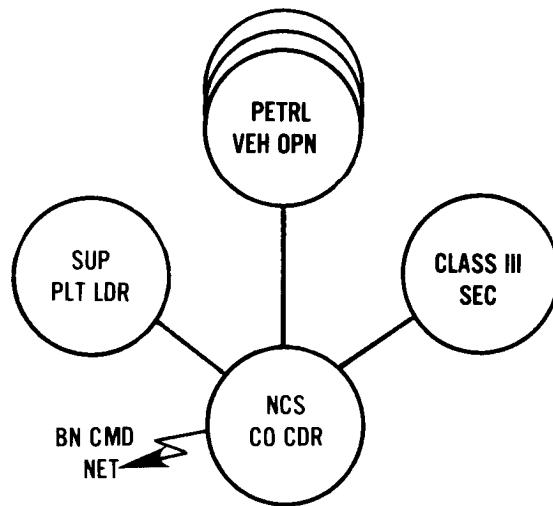


Figure C-76. Forward supply company net (FM), support battalion (light division).

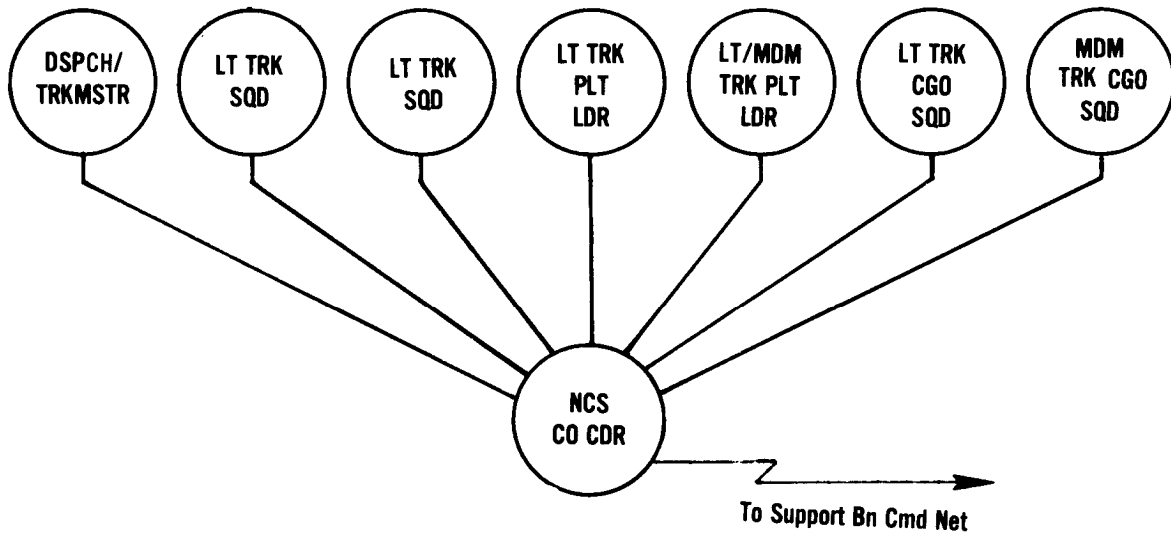
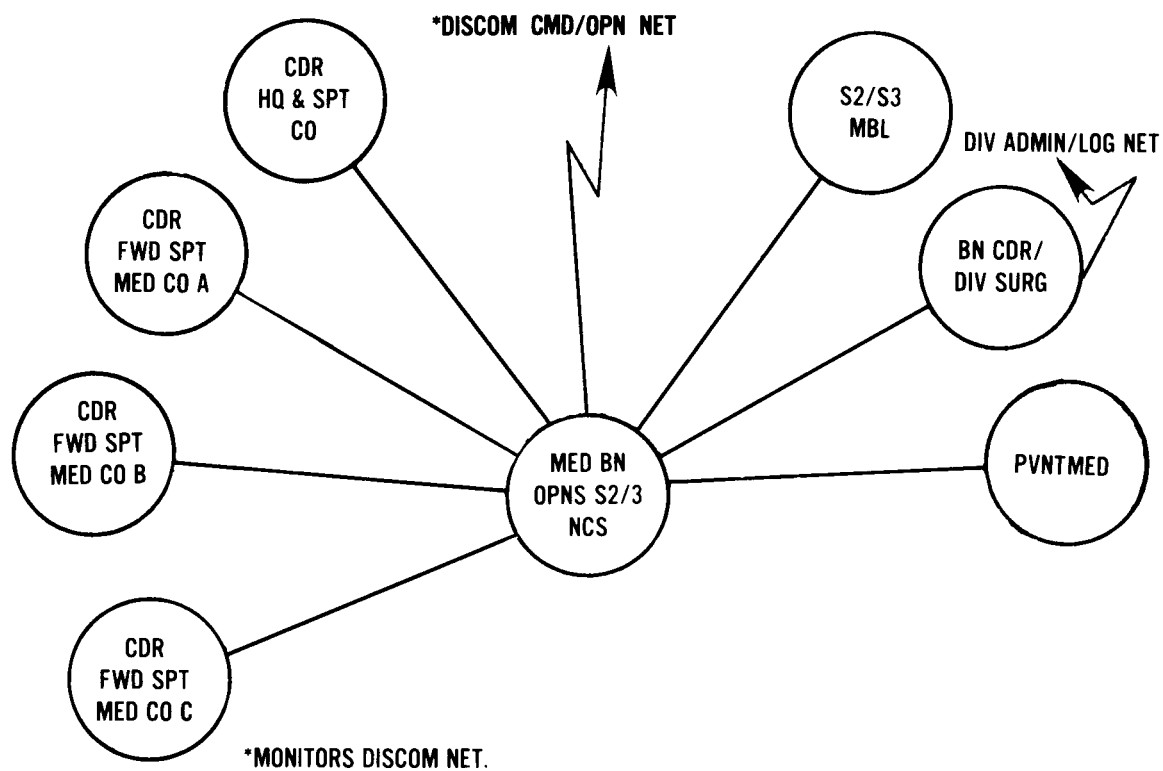
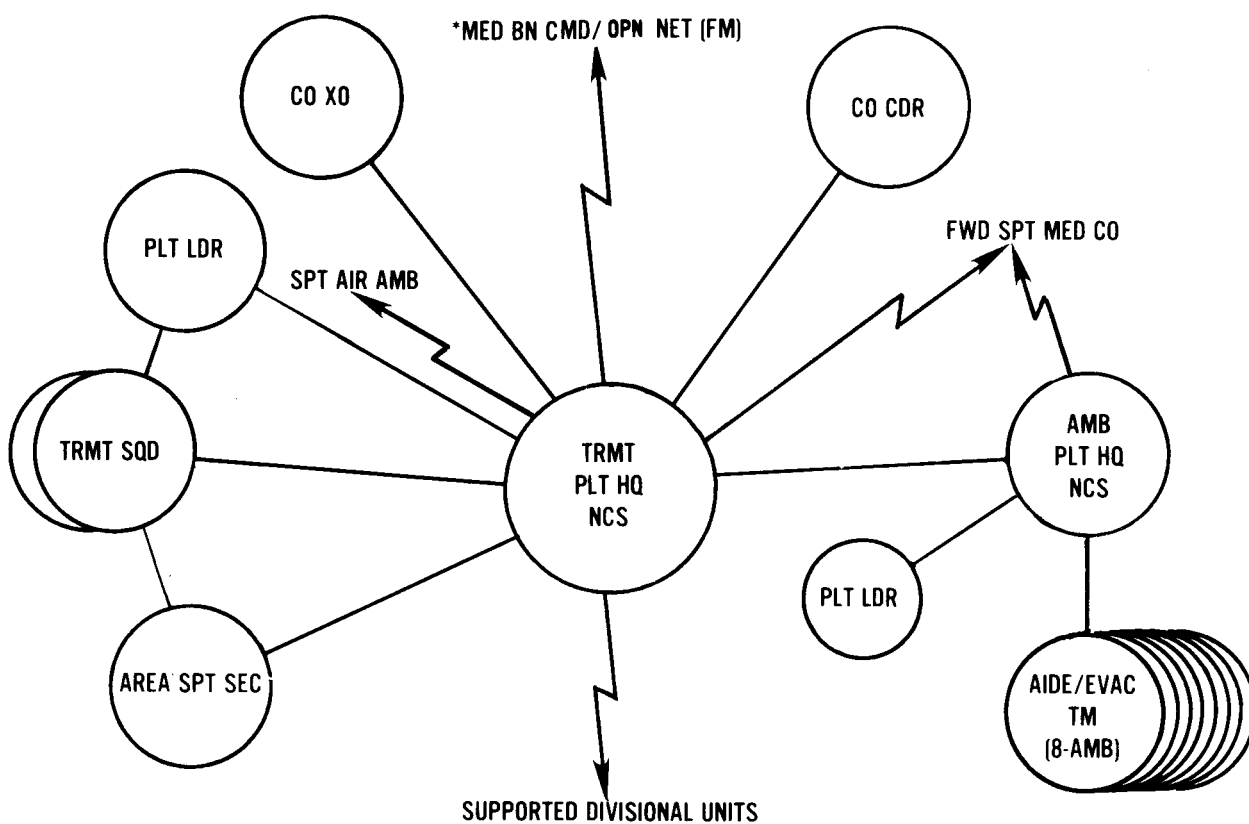


Figure C-77. Command/operations net (FM), TMT company, support battalion (light division).



MEDICAL BATTALION, SUPPORT COMMAND INFANTRY DIVISION (LIGHT)

Figure C-78. Medical battalion command/operations (FM) net (light division).



*MONITORS MED BN NET.

Figure C-79. Medical battalion administrative/logistical (AM) net (light division).

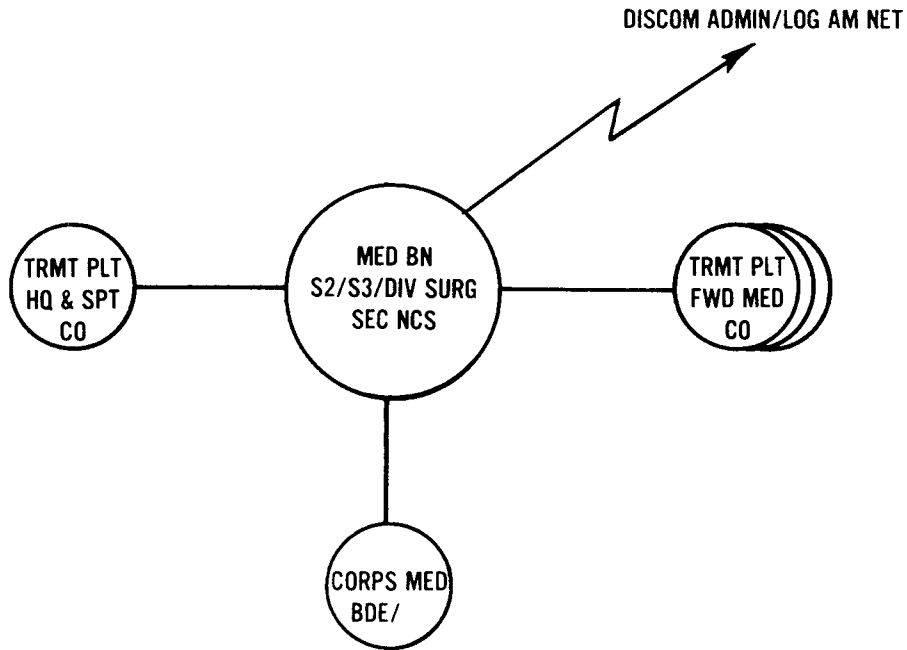


Figure C-80. Command/operations (FM) net, headquarters support company, medical battalion (light division).

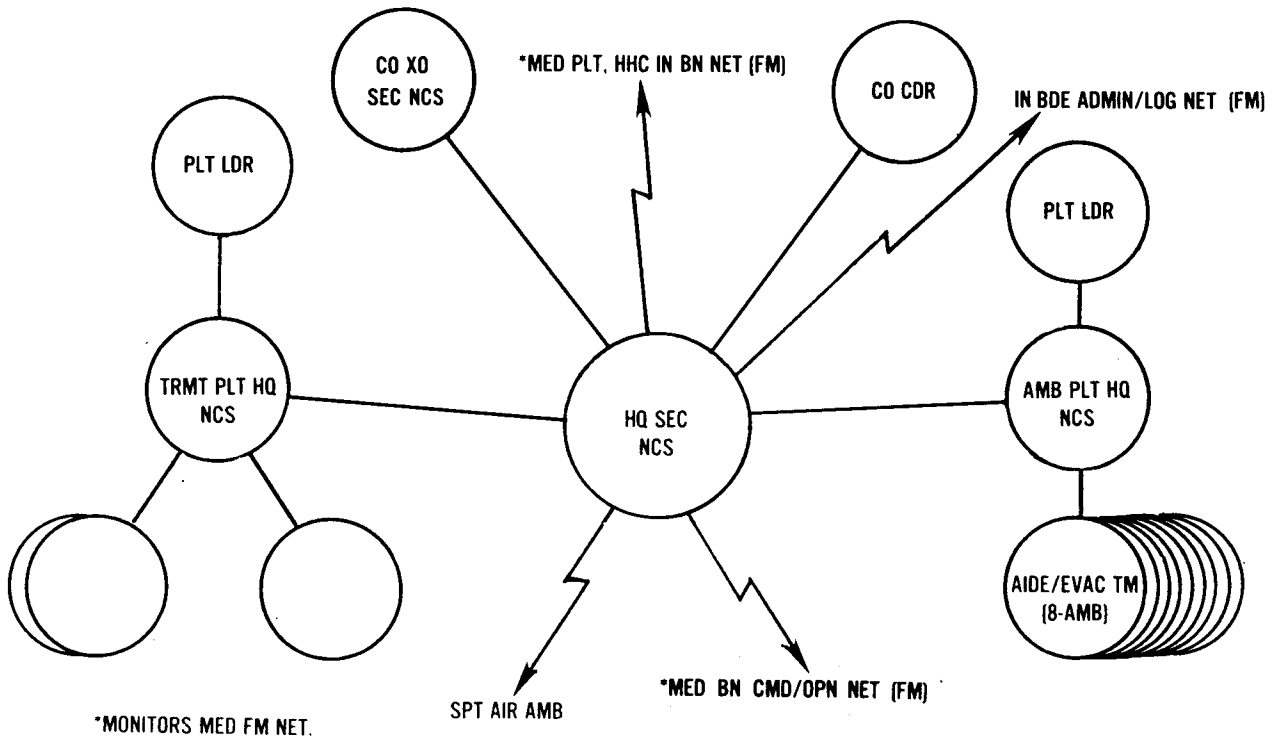


Figure C-81. FSMC command/operations (FM) net, medical battalion (light division).

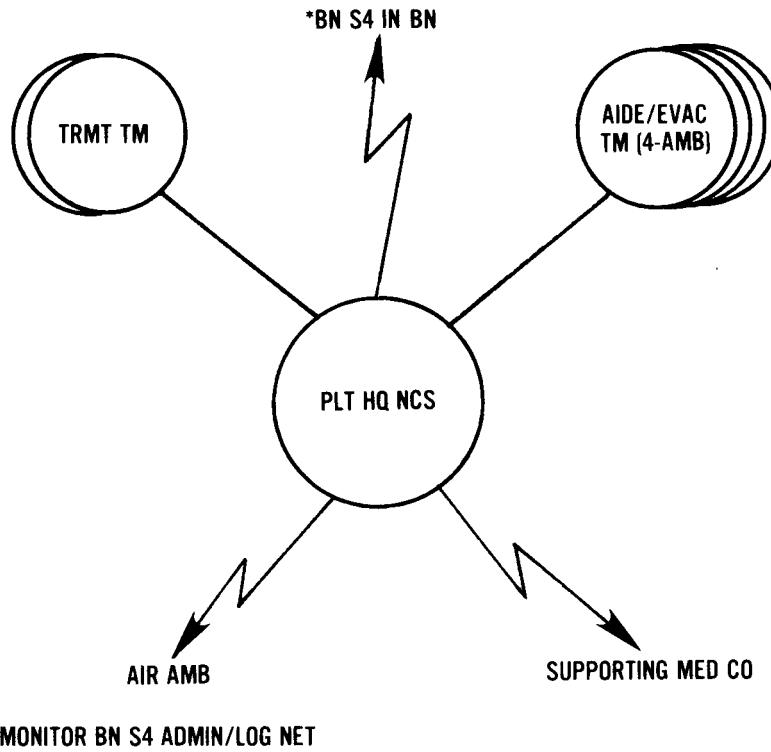


Figure C-82. Medical platoon HHC operation net (FM), infantry battalion (light division).

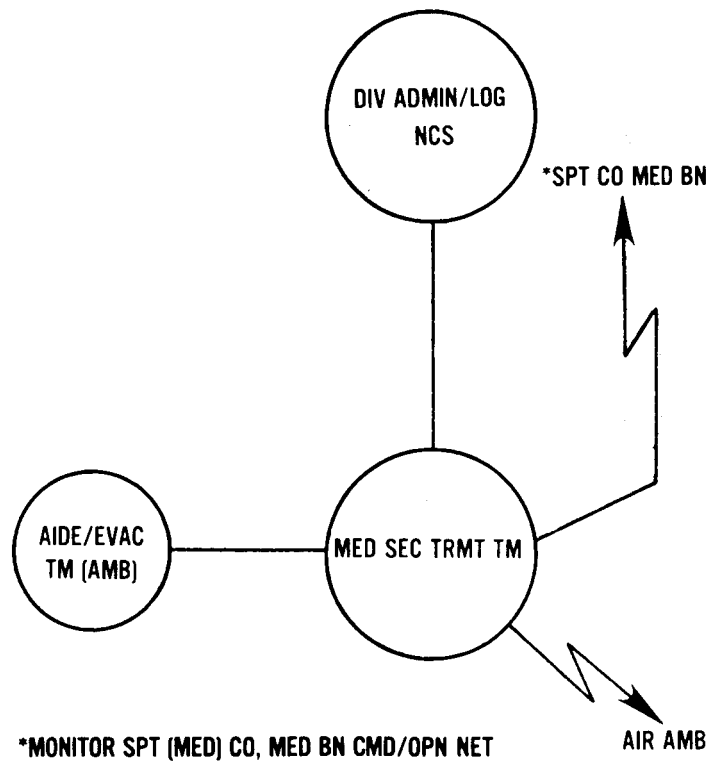


Figure C-83. FM network interface, medical section HHC, infantry (light division).

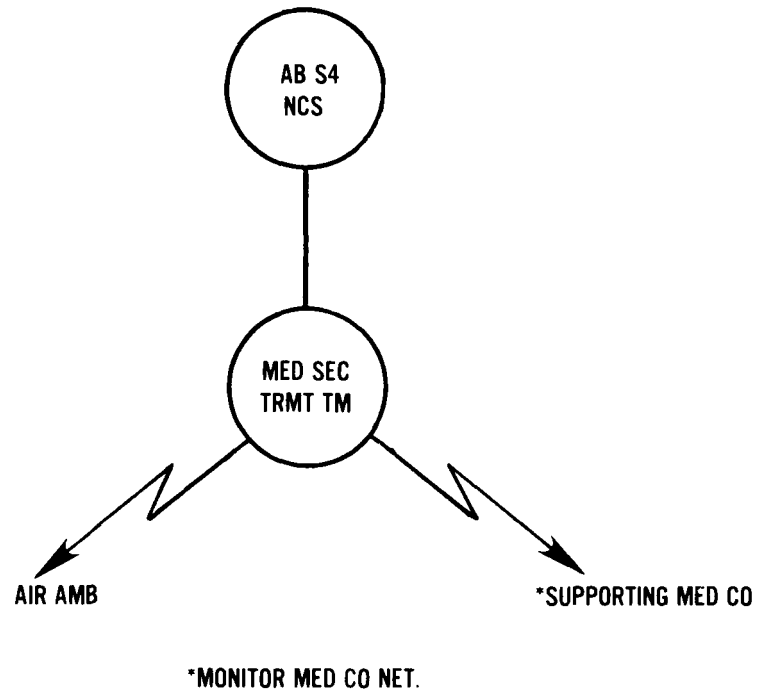


Figure C-84. FM network interface, medical section HHC, AB.

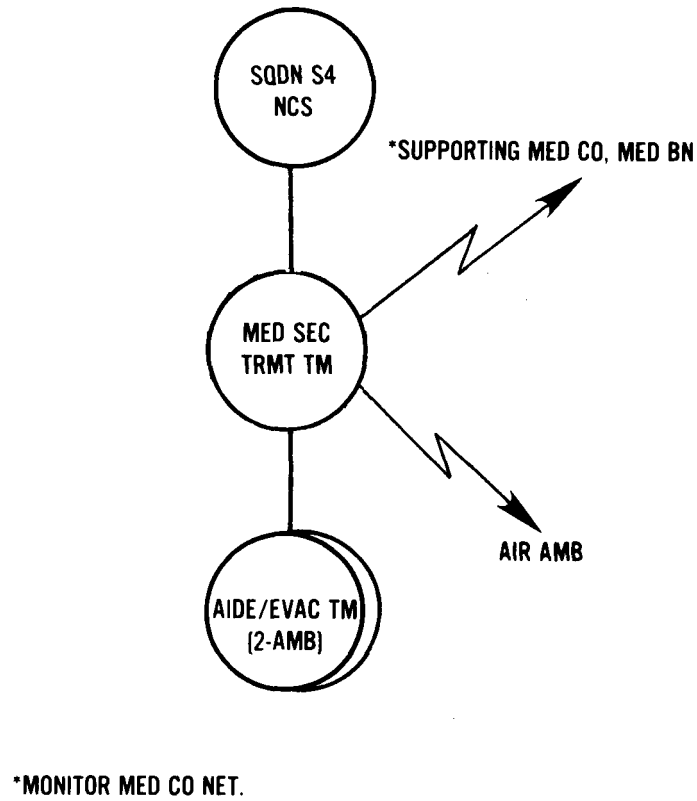
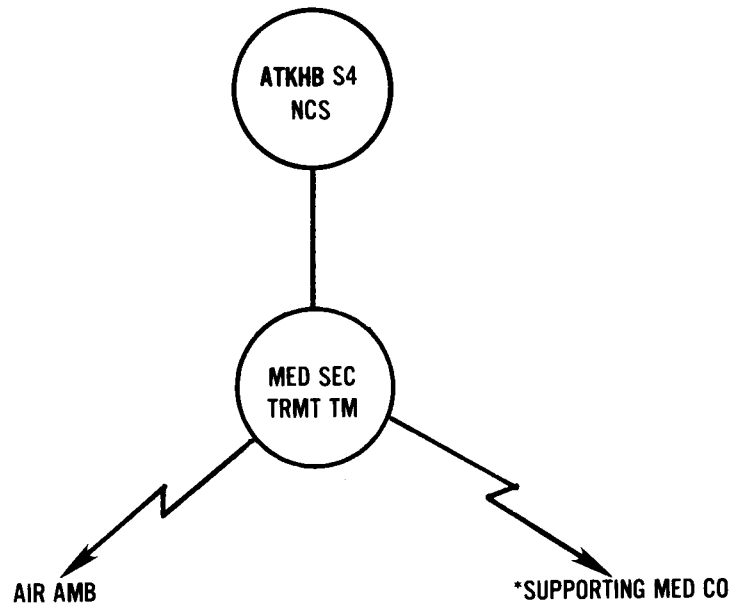
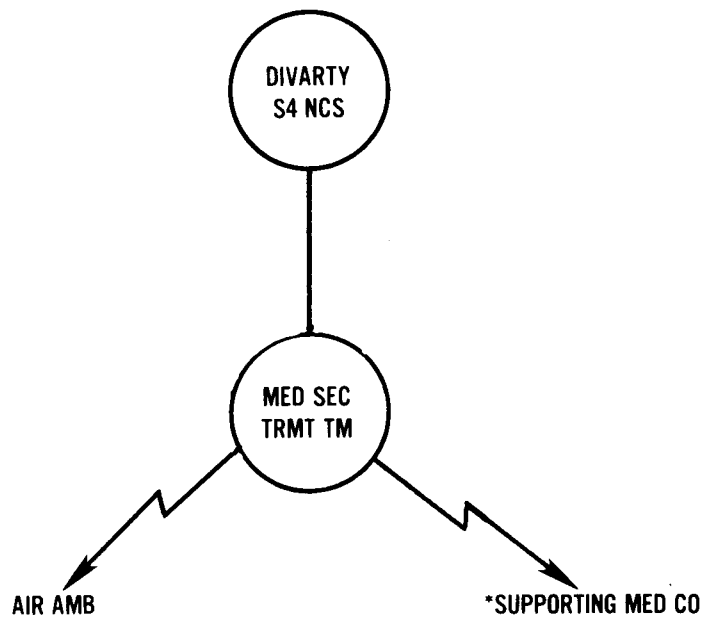


Figure C-85. FM network interface, medical section HHT reconnaissance squadron, AB (light division).



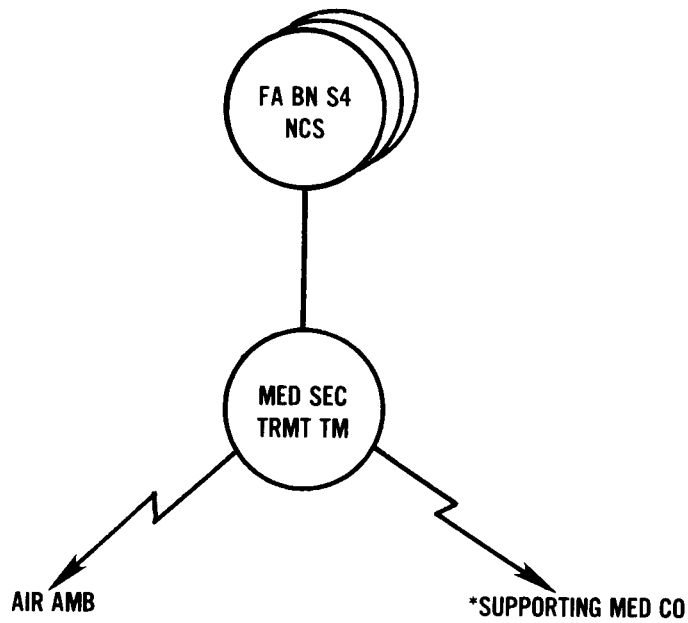
*MONITOR MED CO NET.

Figure C-86. FM network interface, medical section HHB, DIVARTY.



*MONITOR MED CO NET.

Figure C-87. FM network interface, medical section headquarters and support company, ATKHB, AB (light division).



*MONITOR MED CO NET.

Figure C-88. FM network interface, medical section HHB, DS FA battalion, DIVARTY (light division).

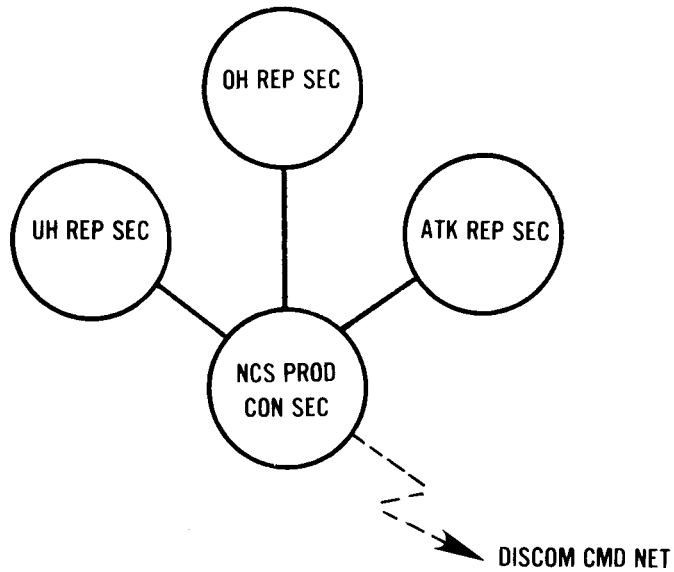


Figure C-89. TAMC command/operation net, DISCOM (light division).

APPENDIX D

Battalion Level Radio Nets

D-1. Maneuver Battalions

Figures D-1 through D-14 show the maneuver battalion down to and including the tank and rifle platoon radio nets.

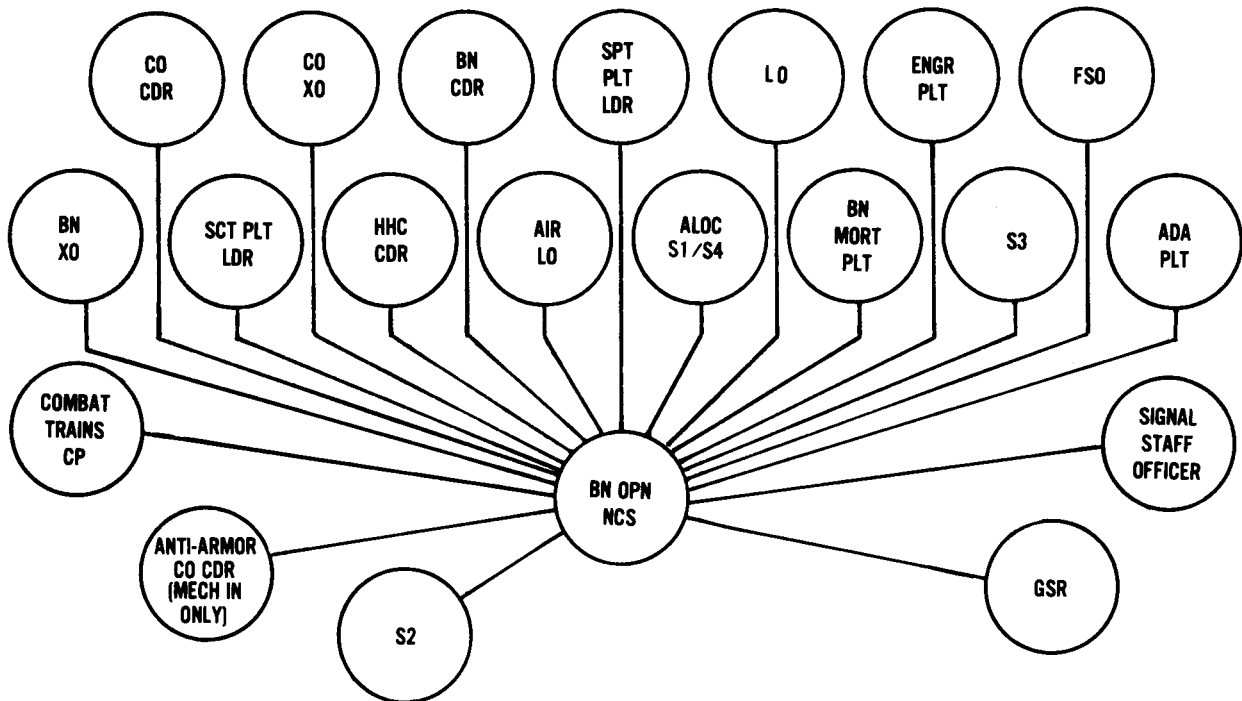


Figure D-1. Task force command or battalion command FM net.

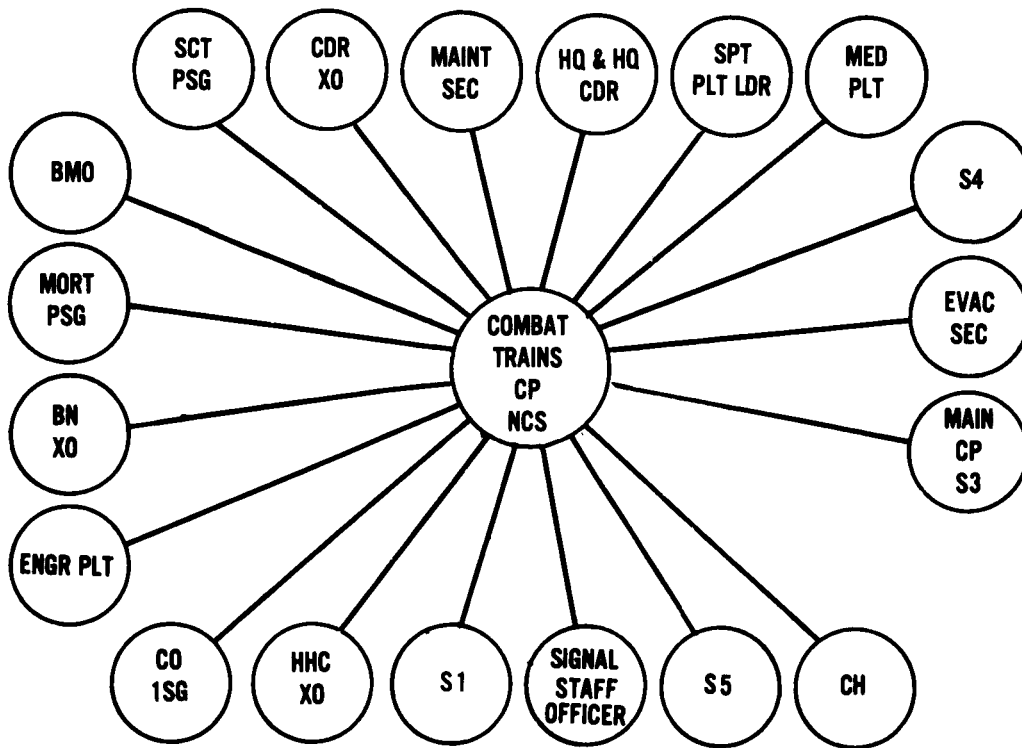


Figure D-2. Battalion administrative and logistical FM net.

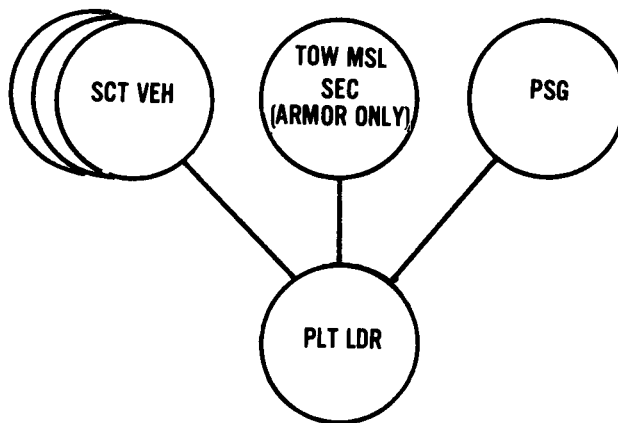


Figure D-3. Battalion scout platoon command and operations FM net.

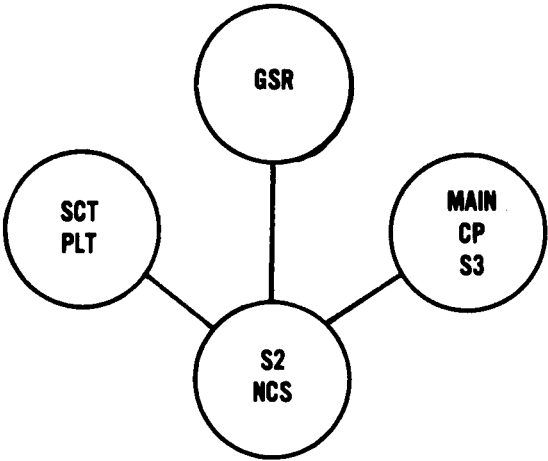


Figure D-4. The battalion/task force operations/intelligence FM net.

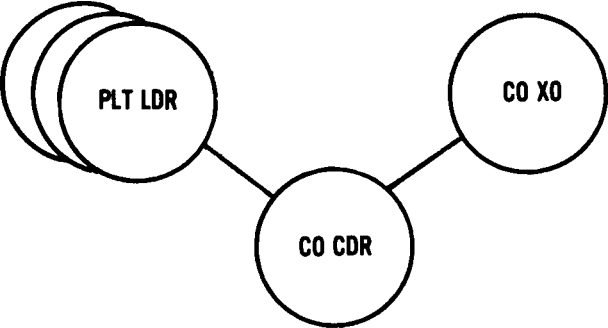


Figure D-5. Heavy anti-armor company command and operations net.

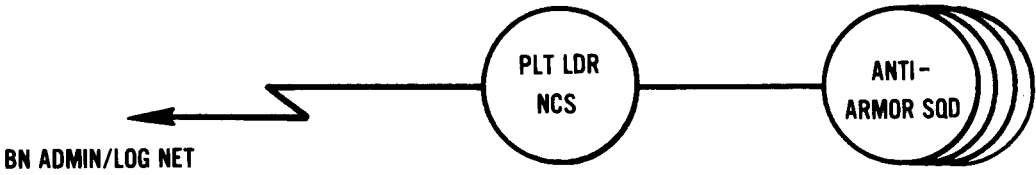


Figure D-6. Light infantry battalion anti-armor platoon (FM) net.

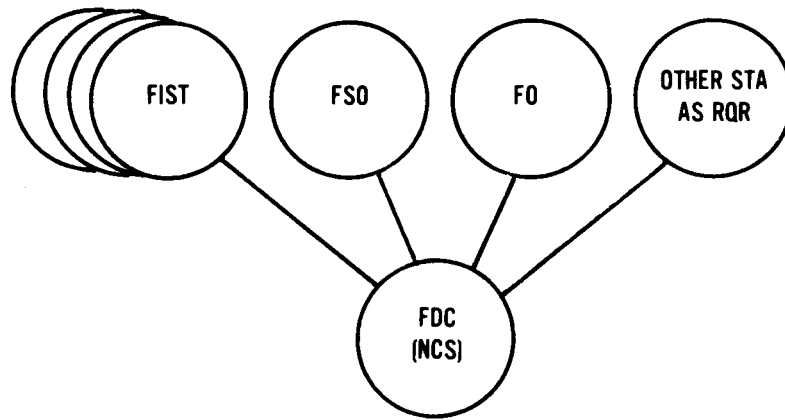


Figure D-7. Heavy battalion mortar fire direction FM net.

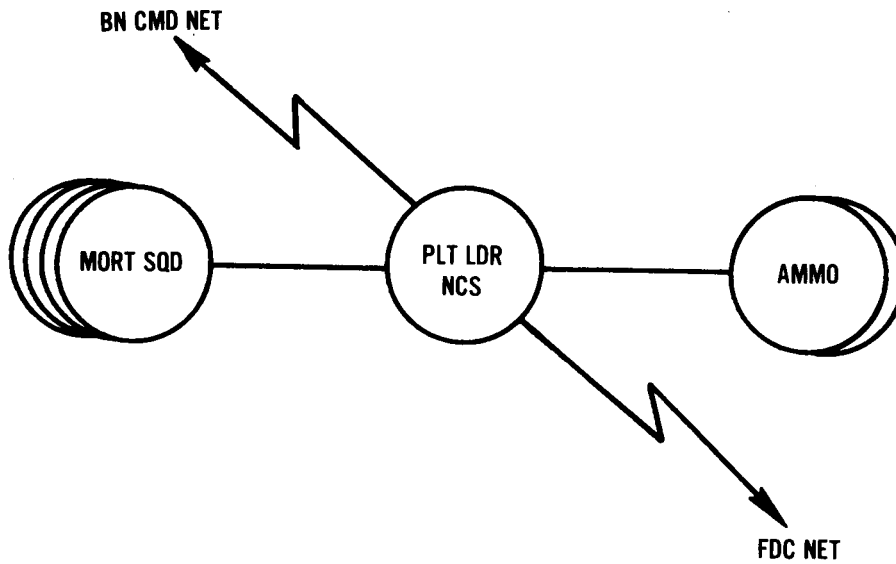


Figure D-8. Light infantry battalion mortar platoon (FM) net.

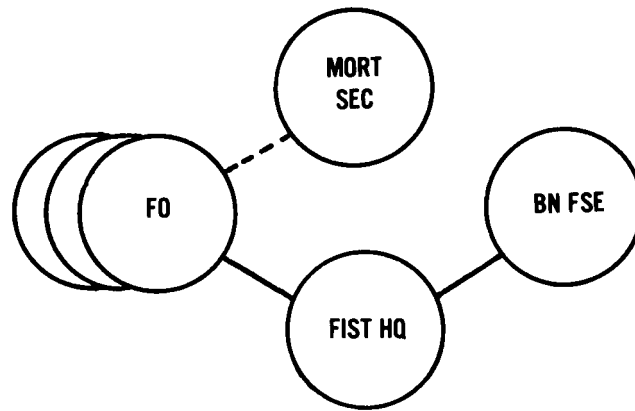


Figure D-9. Infantry CFC FM net.

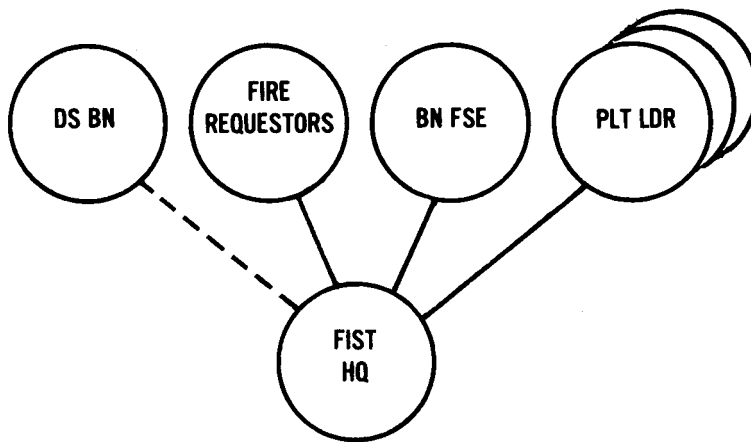


Figure D-10. Tank CFC FM net.

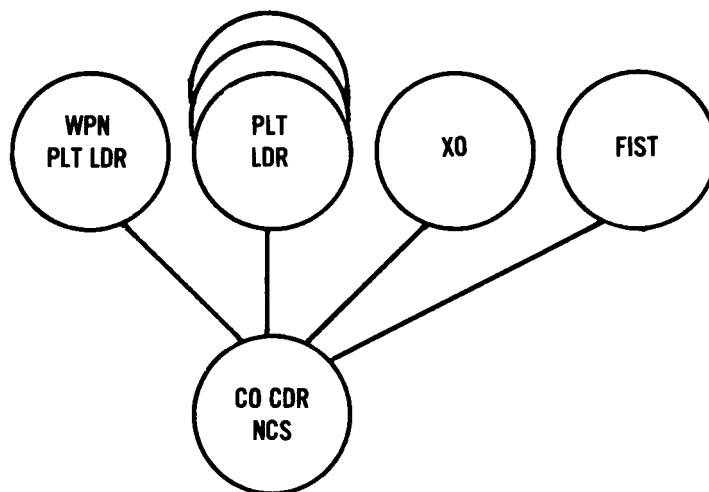


Figure D-11. Infantry company command and operations FM net.

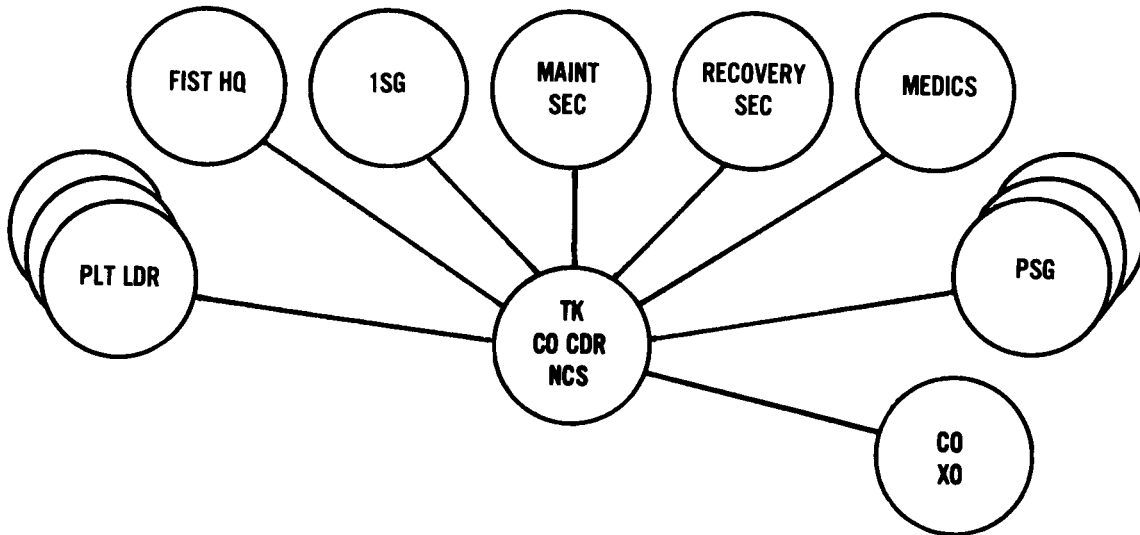


Figure D-12. Tank company command and operations FM net.

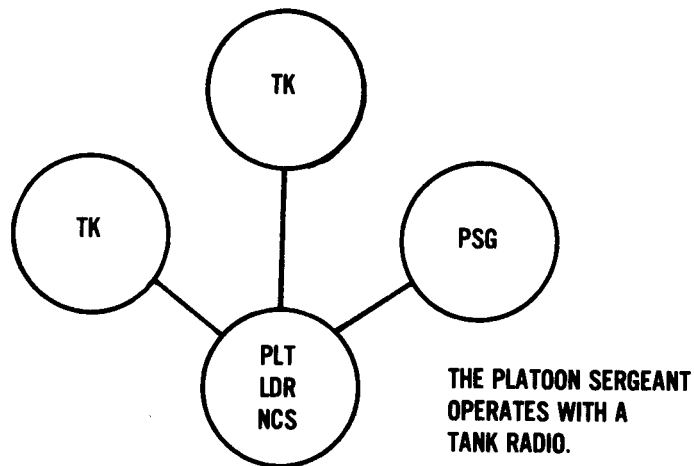


Figure D-13. Tank platoon command and operations FM net.

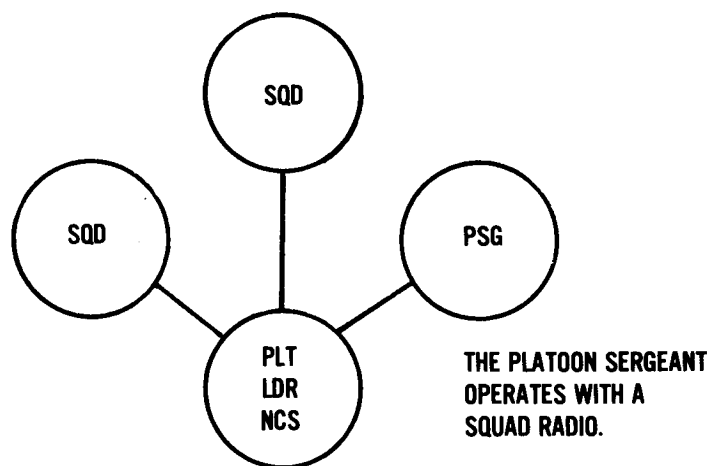


Figure D-14. Rifle platoon command and operations FM net.

D-2. Engineer Battalion

Figures D-15 through D-26 show the engineer battalion down to and including the platoon radio nets.

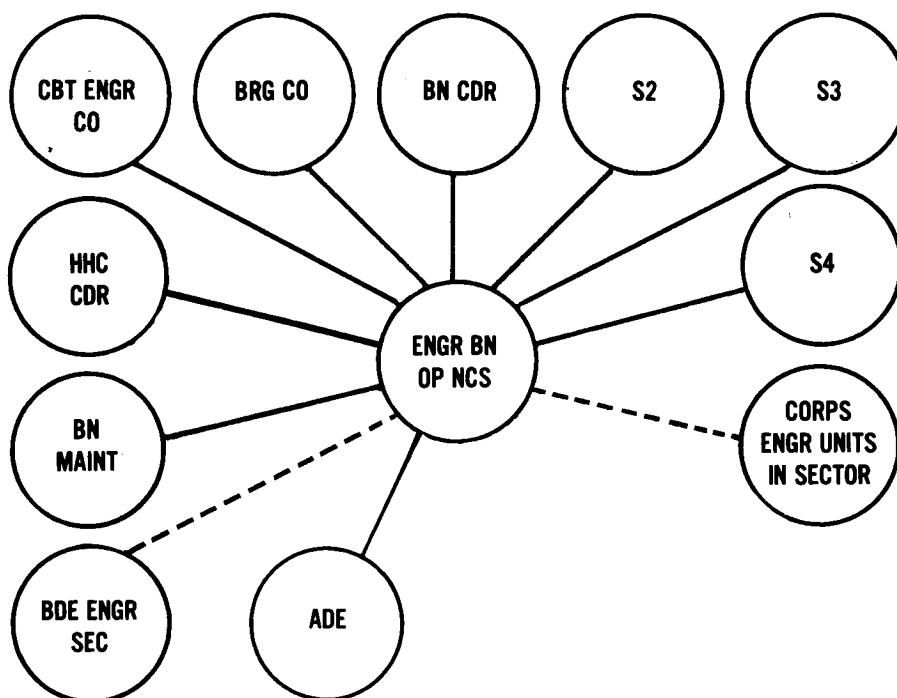


Figure D-15. Heavy division engineer battalion command and operations FM net.

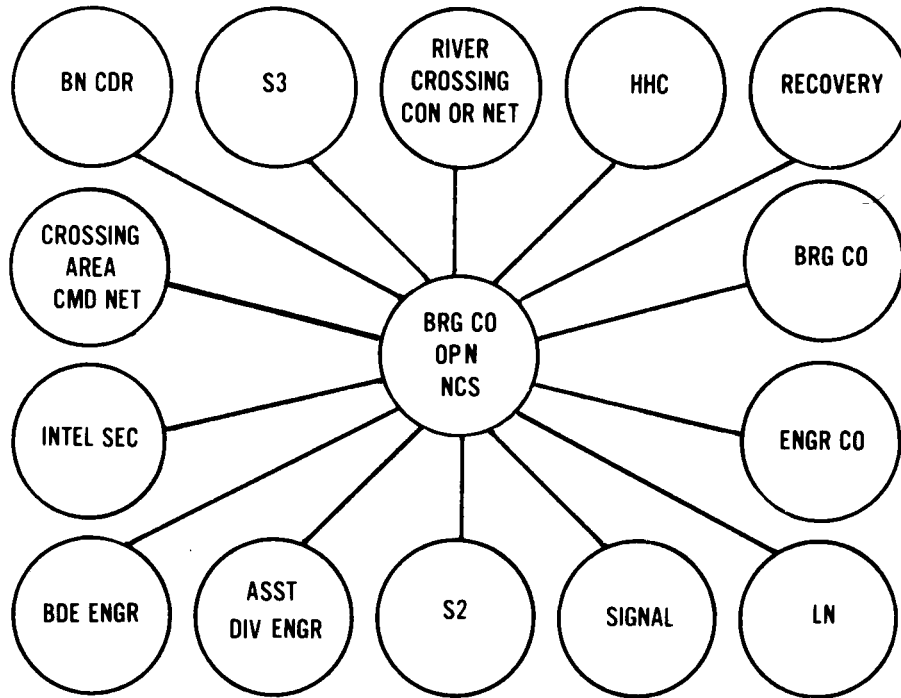


Figure D-16. Bridge company operations FM net (heavy division).

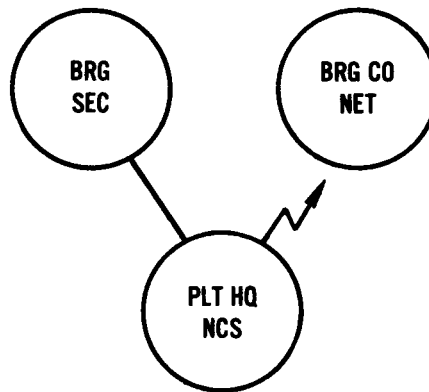


Figure D-17. Bridge platoon command FM net (heavy division).

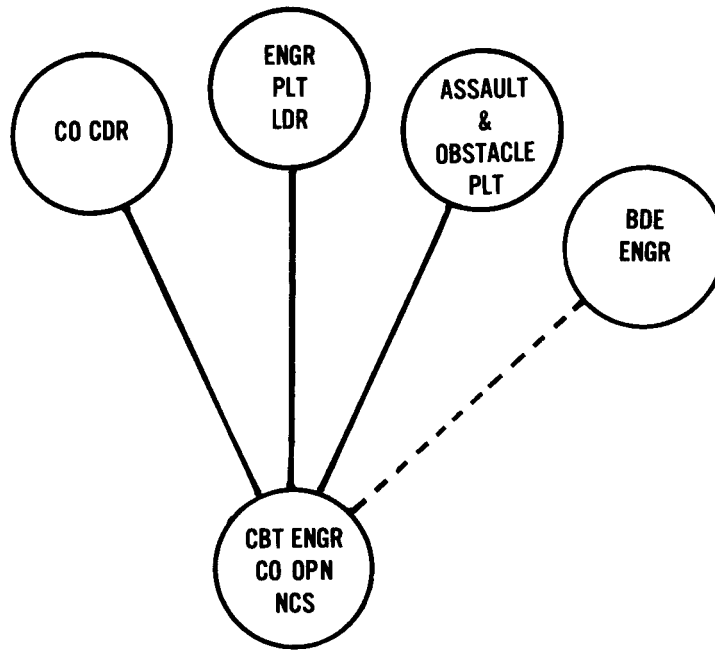


Figure D-18. Combat engineer company command and operations FM net (heavy division).

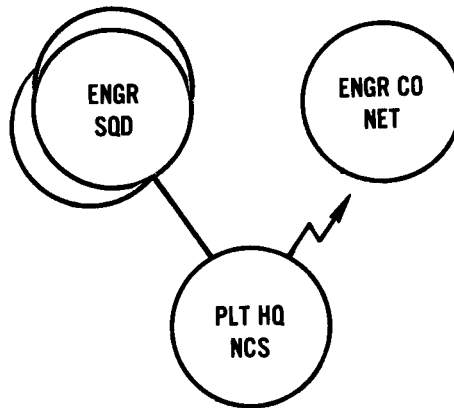


Figure D-19. Engineer platoon command FM net (heavy division).

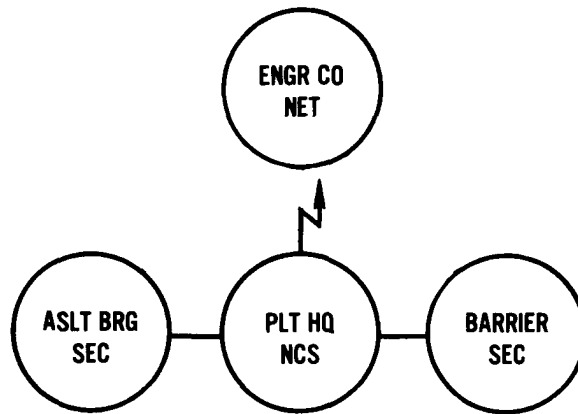


Figure D-20. Assault and obstacle platoon FM net (heavy division).

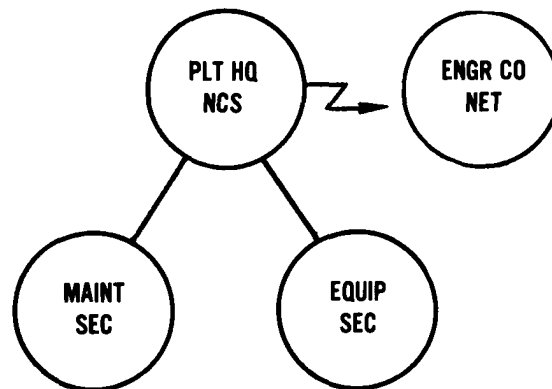


Figure D-21. Support platoon command FM net (heavy division).

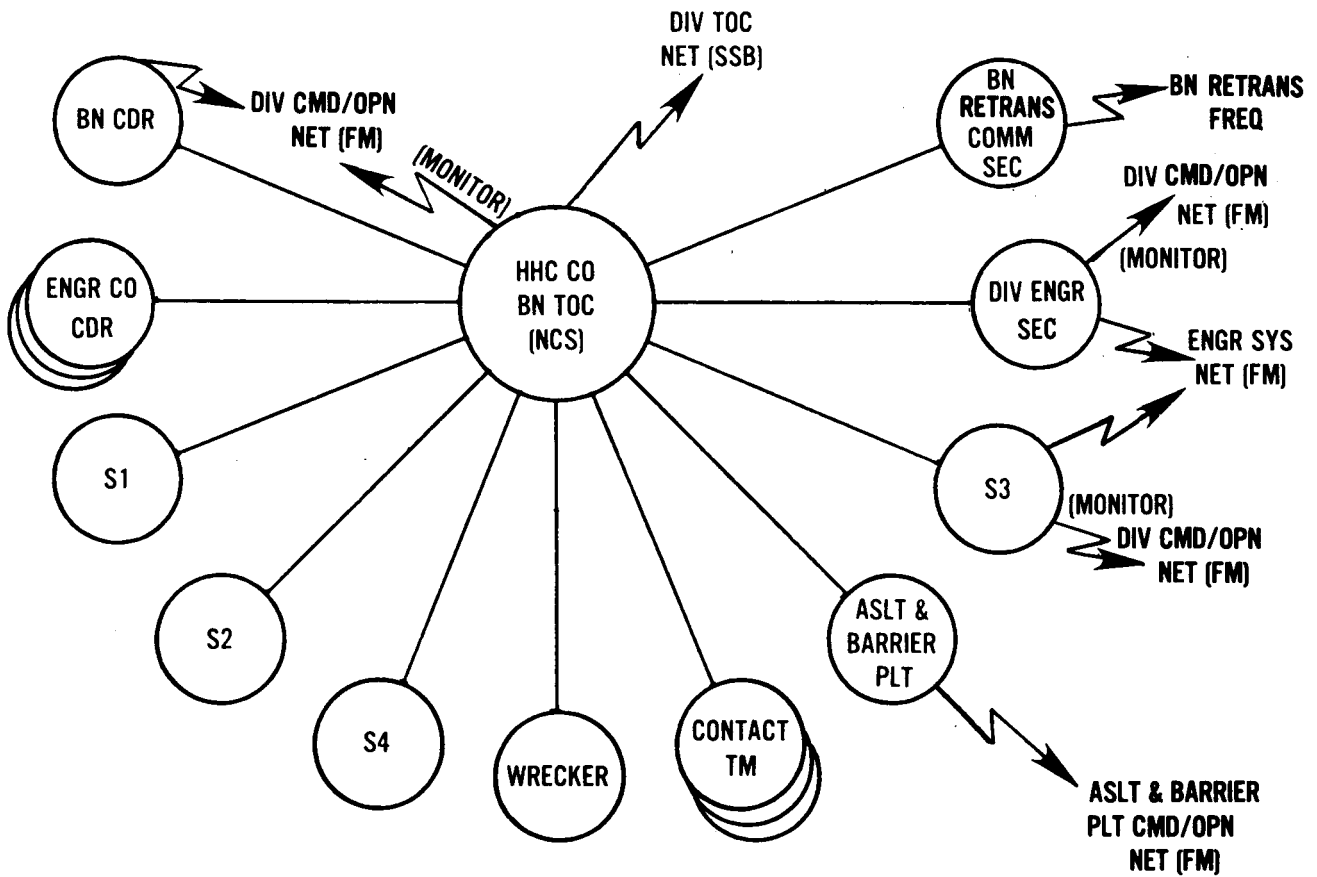
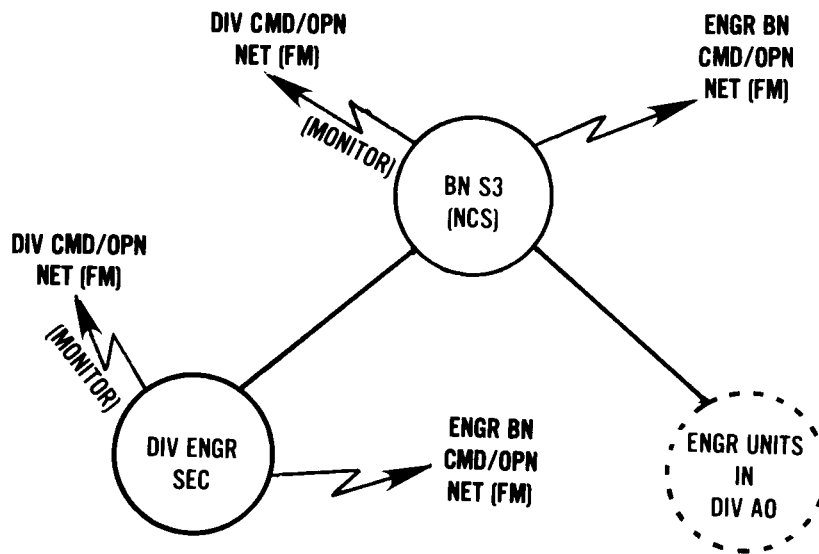


Figure D-22. Light division engineer battalion command/operations (FM) net.



*THIS NET IS FOR THE CONTROL AND COORDINATION OF ENGR ACTIVITY WITHIN THE DIVISION AREA OF OPERATIONS.

Figure D-23. Engineer battalion systems (FM) net.

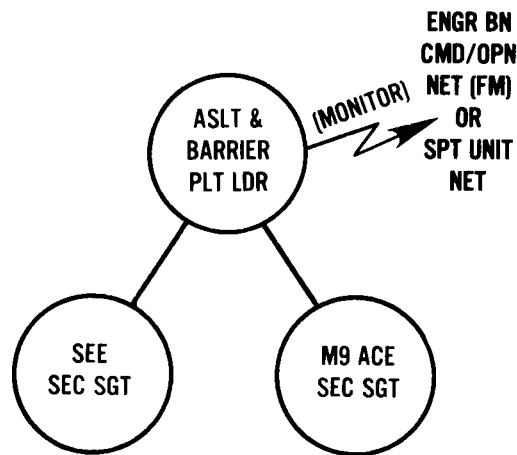


Figure D-24. Assault and barrier platoon (FM) net, engineer battalion (light division).

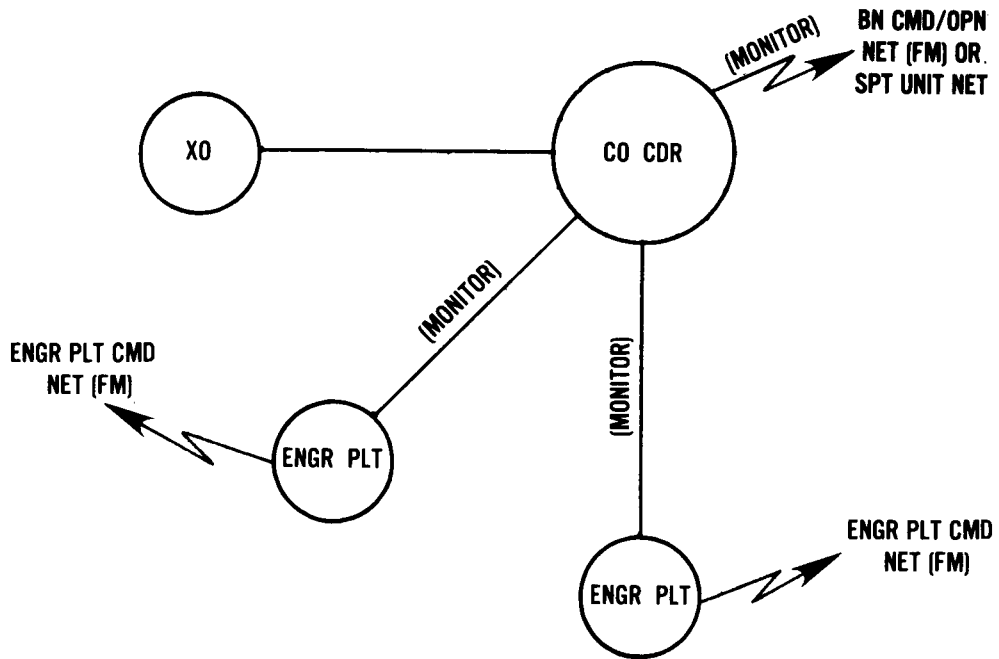


Figure D-25. Engineer company command/operations (FM) net (light division).

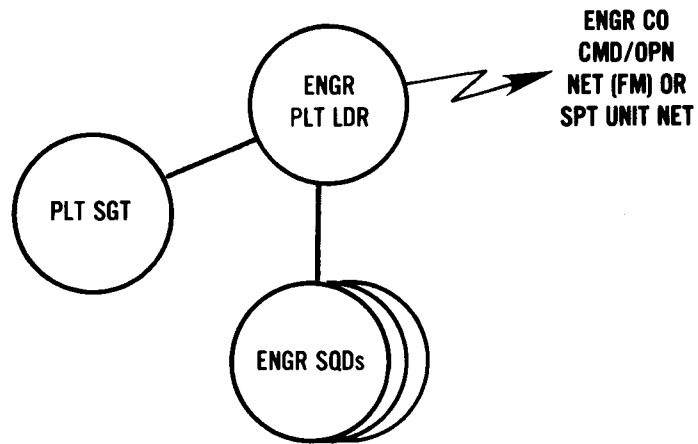


Figure D-26. Engineer platoon command (FM) net (light division).

D-3. ADA Battalion

Figures D-27 through D-39 show the ADA battalion radio nets.

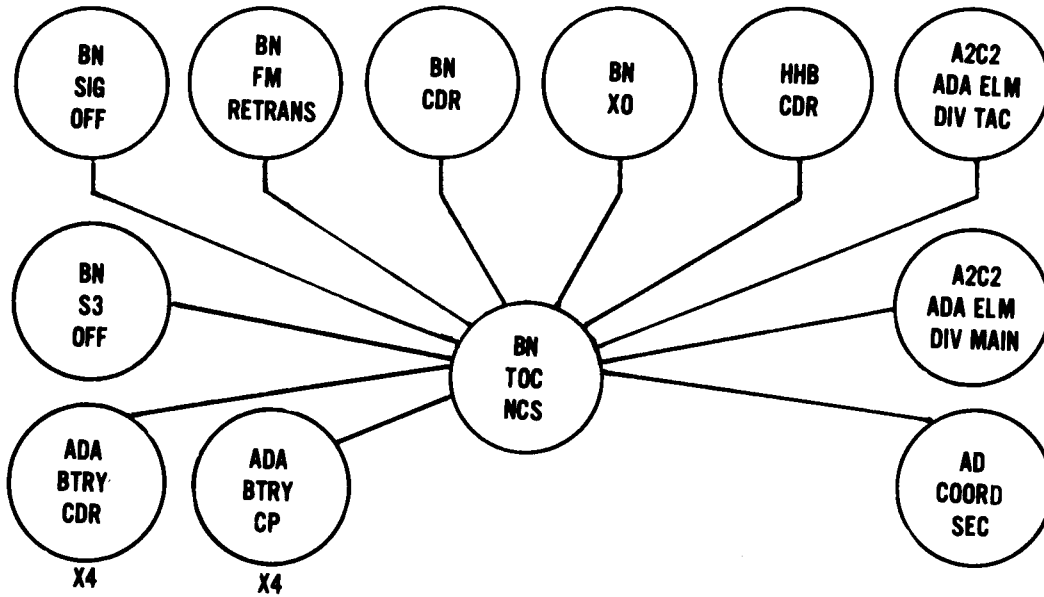


Figure D-27. ADA battalion command FM net (heavy division).

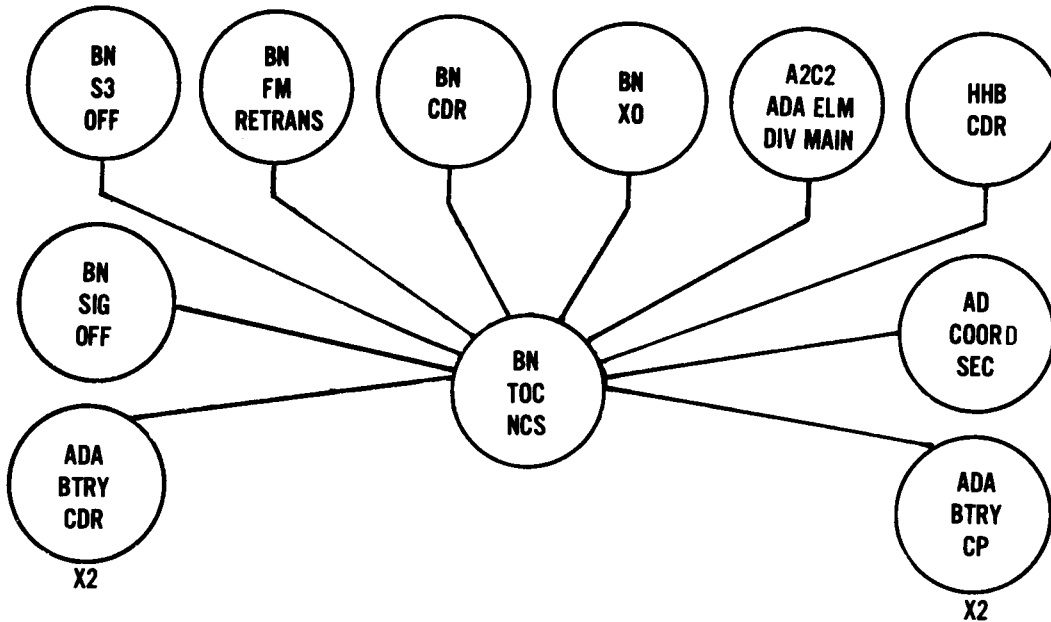


Figure D-28. ADA battalion command (FM) net (light division).

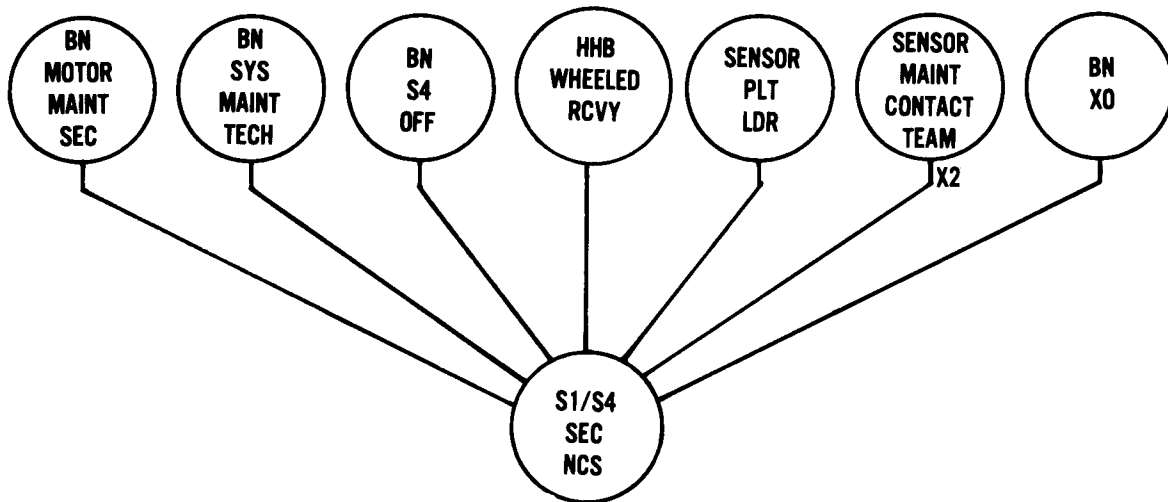


Figure D-29. ADA battalion administrative/logistical FM net (heavy division).

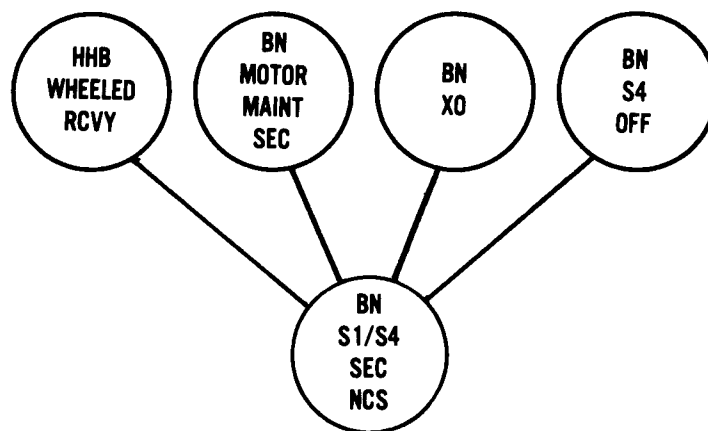


Figure D-30. ADA battalion administrative/logistics (FM) net (light division).

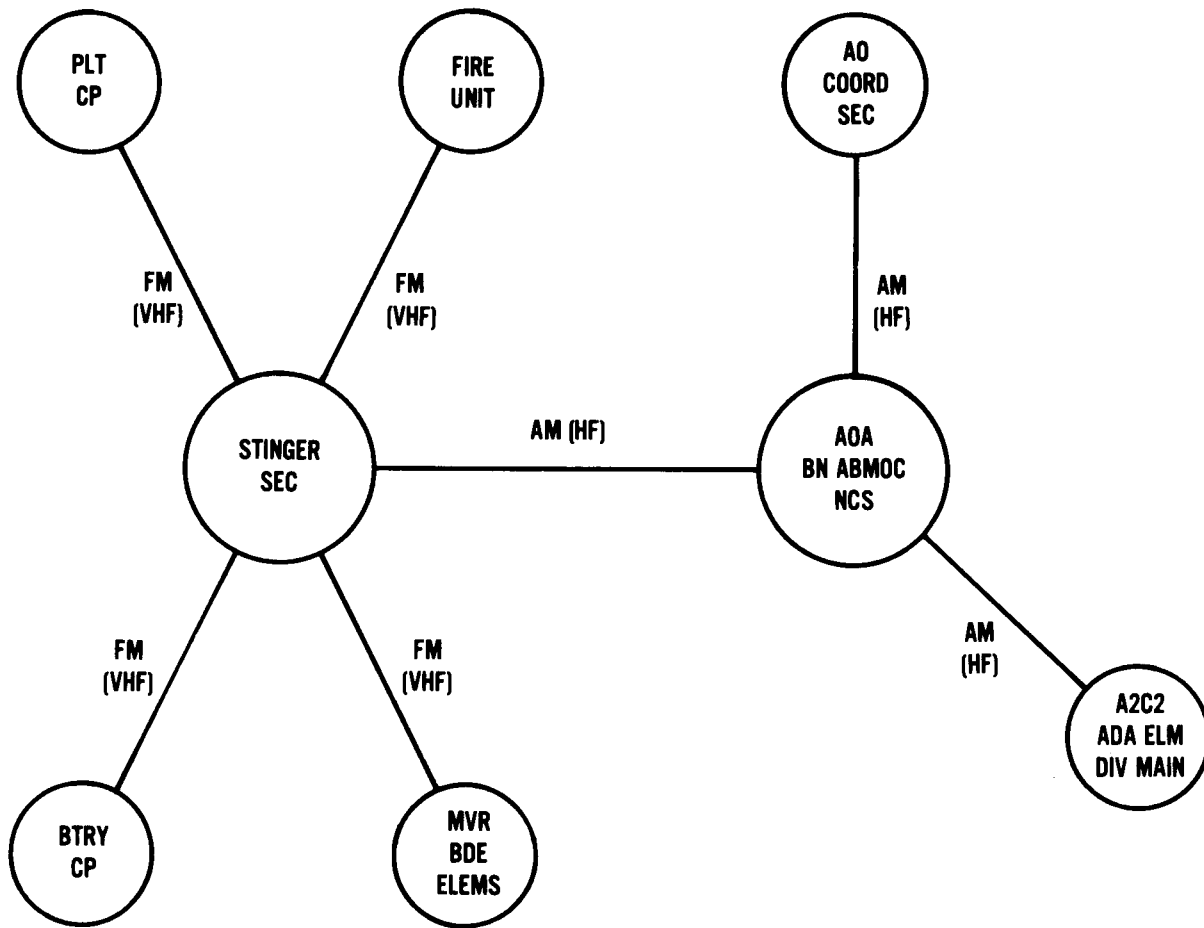


Figure D-31. ADA early warning broadcast (AM/FM) net.

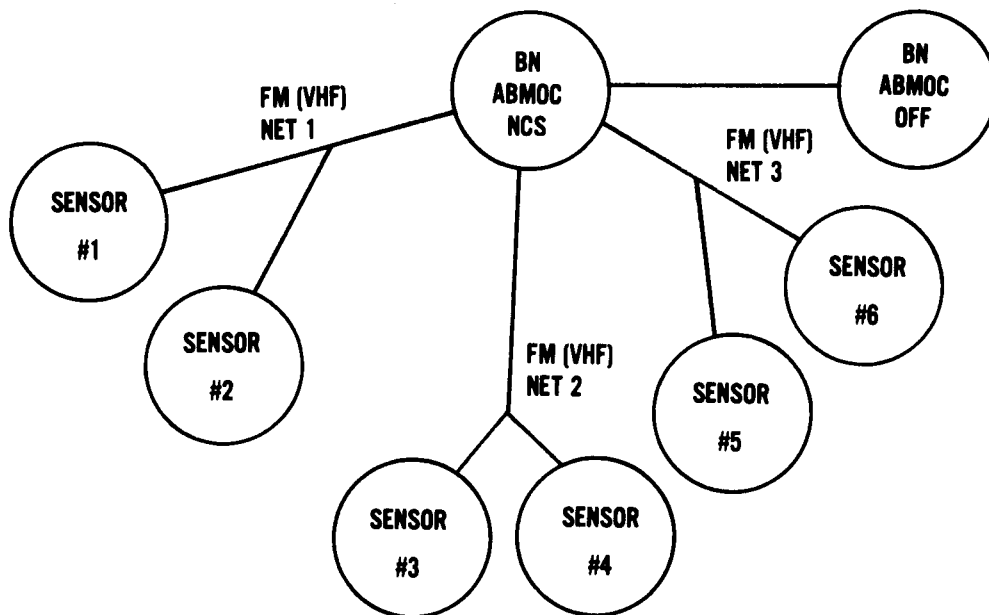


Figure D-32. ADA battalion sensor alert/input (FM) net.

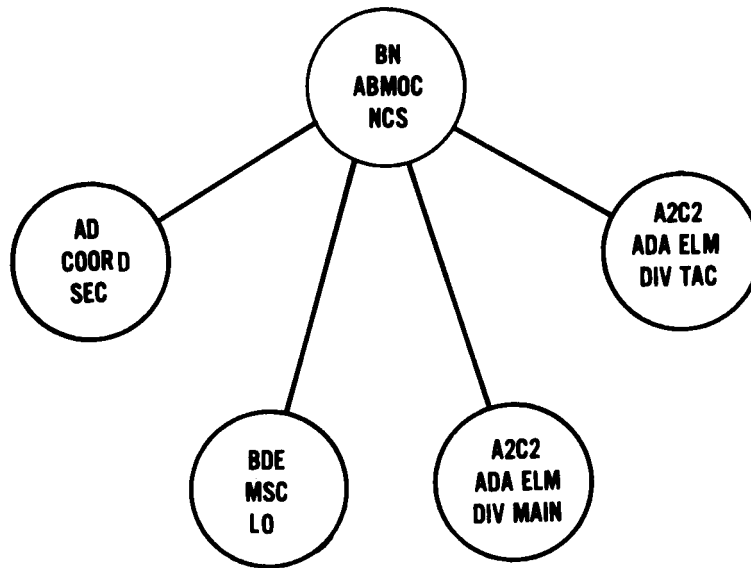


Figure D-33. ADA battalion air defense coordination (AM) net.

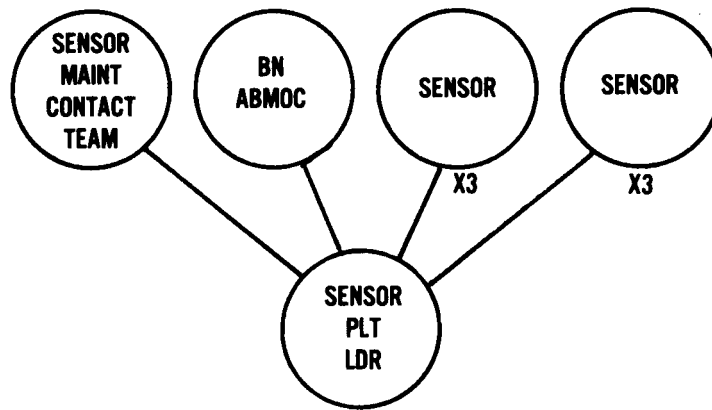


Figure D-34. Sensor platoon command (FM) net (heavy division).

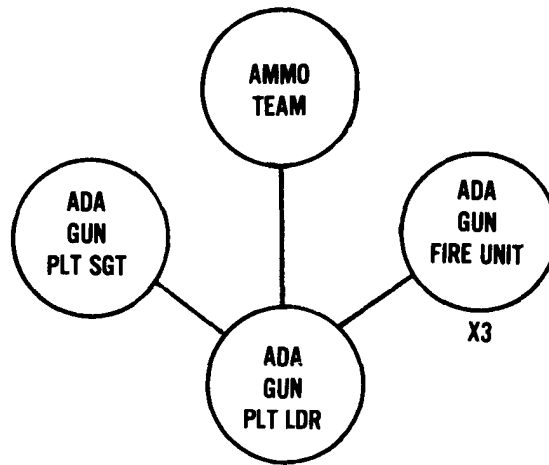


Figure D-35. ADA gun platoon command (FM) net.

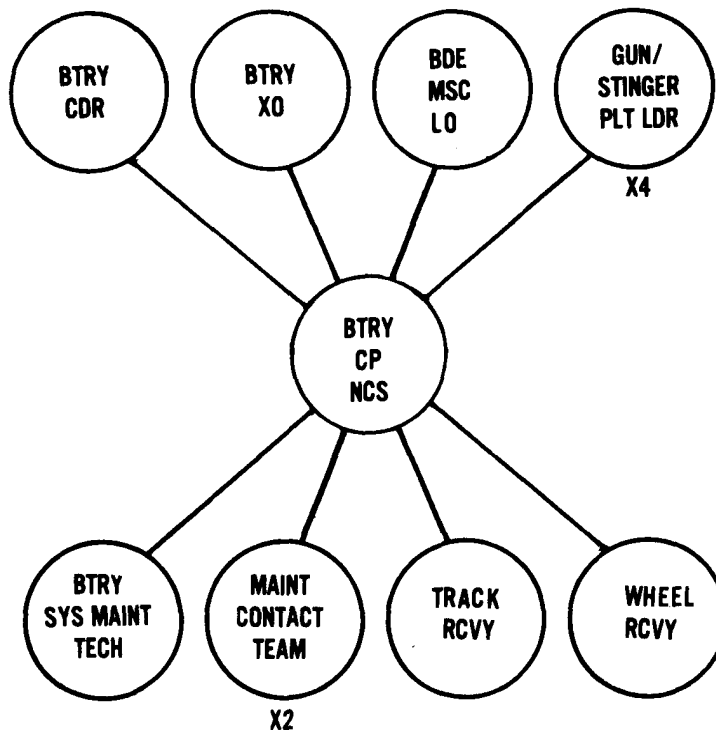


Figure D-36. ADA battery command (FM) net.

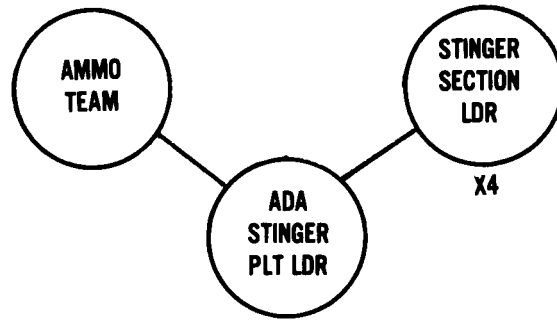


Figure D-37. ADA stinger platoon command (FM) net.

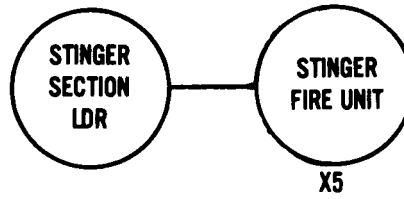


Figure D-38. ADA stinger section command (FM) net.

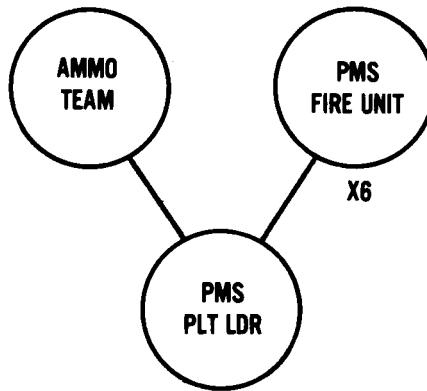
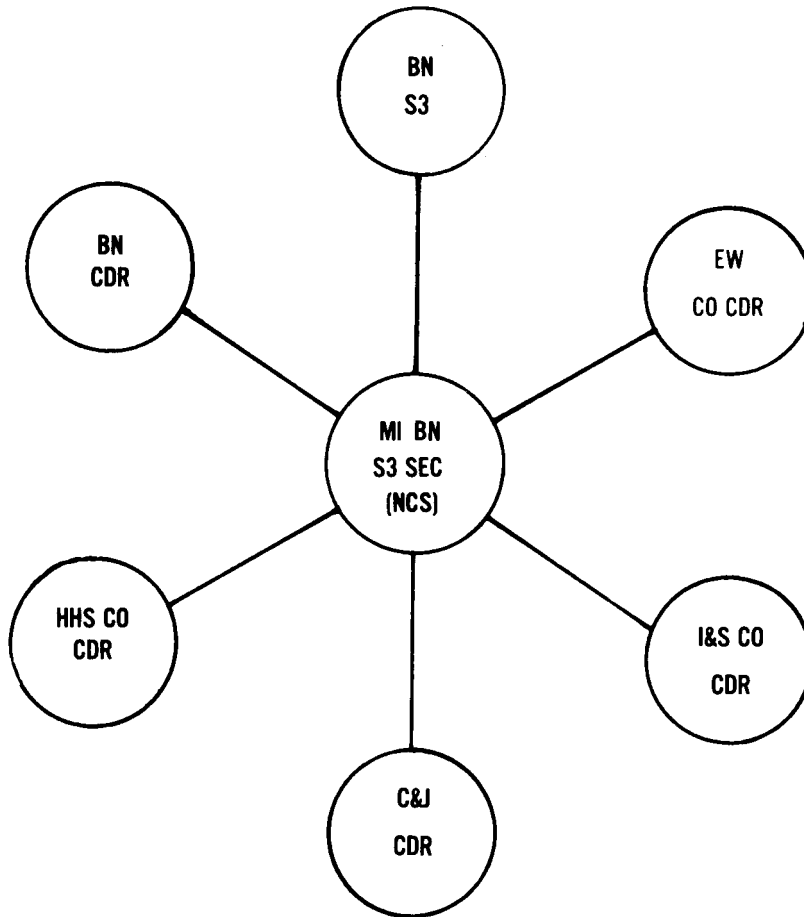


Figure D-39. Pedestal mounted stinger (PMS) platoon command (FM) net.

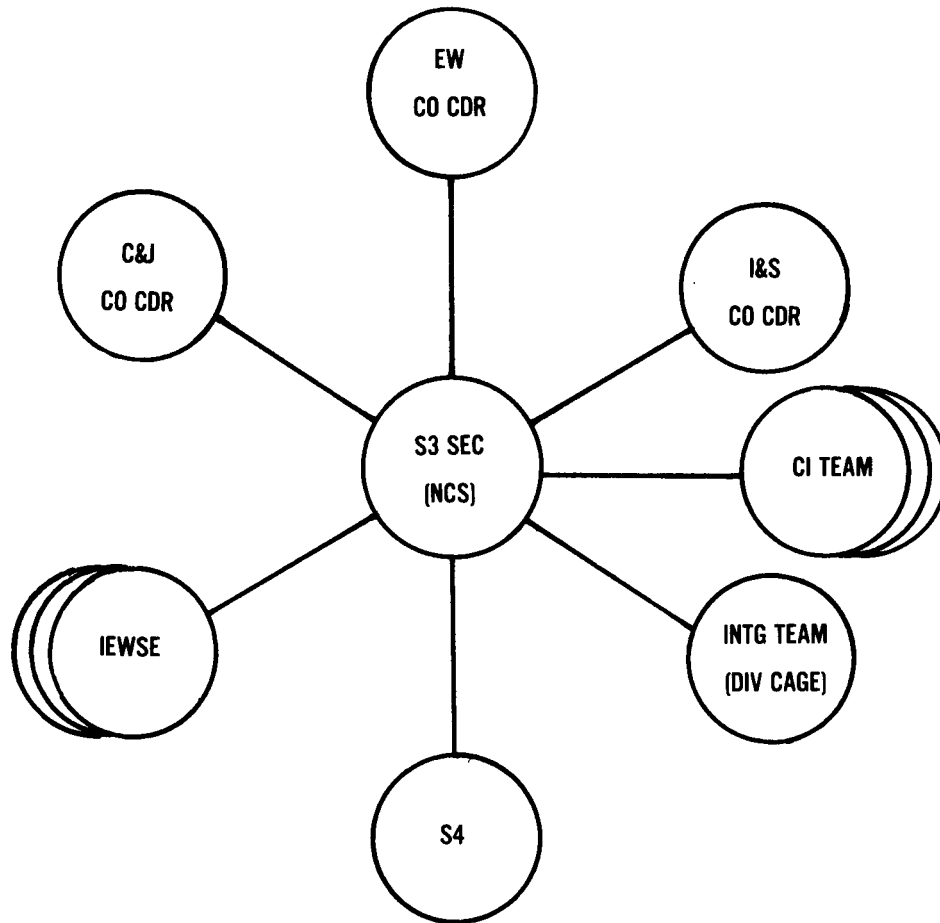
D-4. MI Battalion

The MI battalion radio nets are operated to collect and disseminate intelligence for the division. Figures D-40 through D-46 show the radio nets.



NOTE: This net is used by battalion commanders to C² the MI battalion.

Figure D-40. Command and operations net (FM).



NOTE: This net is used for tactical control of deployed IEW assets.

Figure D-41. MI battalion operations net (FM).

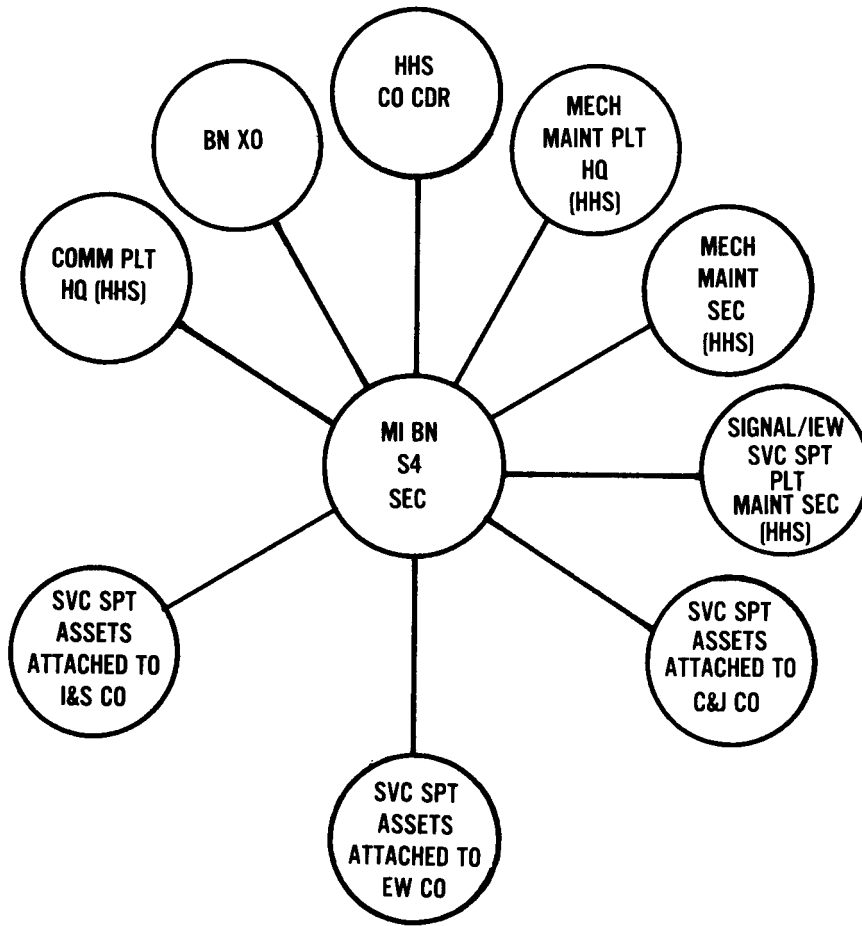


Figure D-42. Administrative/logistical net.

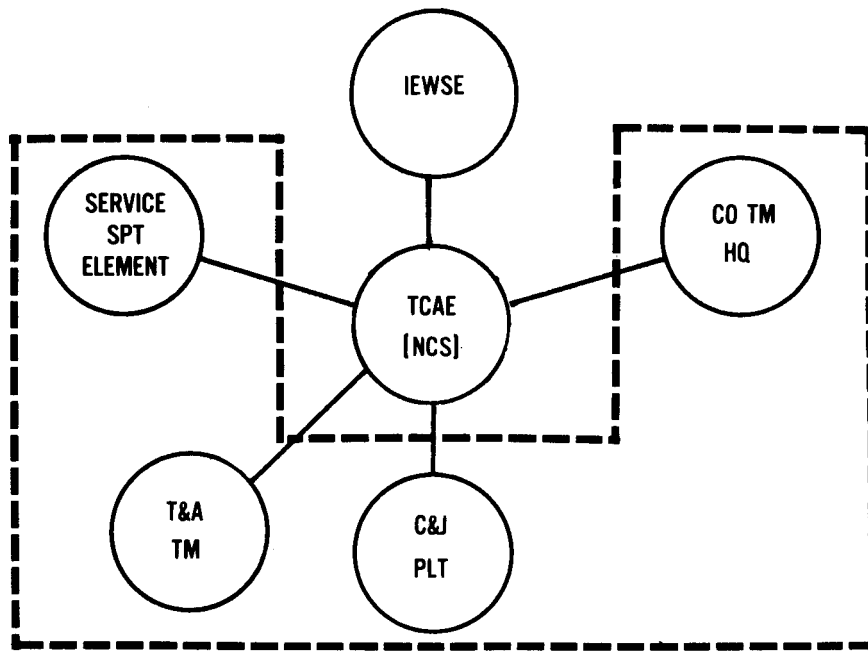


Figure D-43. C&J tasking and reporting net (FM).

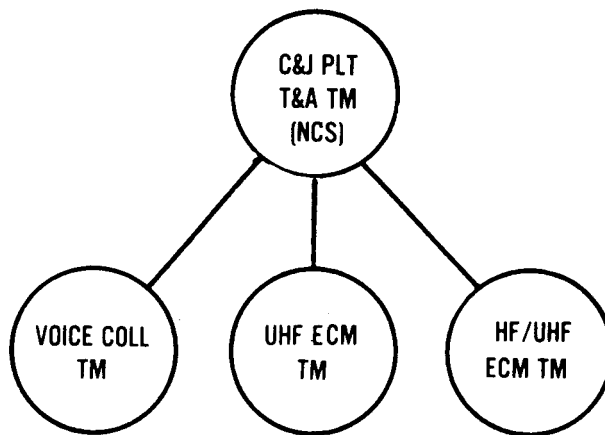
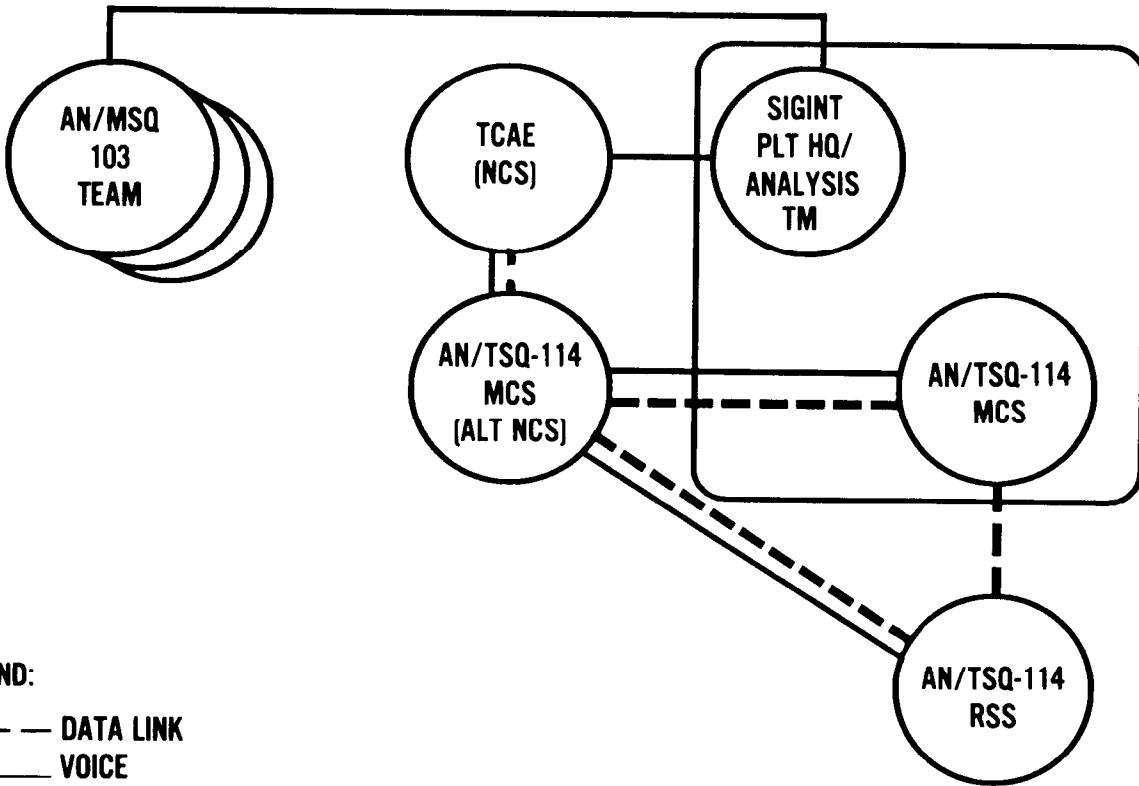


Figure D-44. C&J platoon internal tasking and reporting net.



LEGEND:

- DATA LINK
- VOICE

NOTE: SECONDARY AN/TSQ-114 MCS is collocated with an adjacent C&J platoon HQ/CP for AN/GRC-122 backup RATT communicaitons with the TCAE when mission and terrain requirements permit.

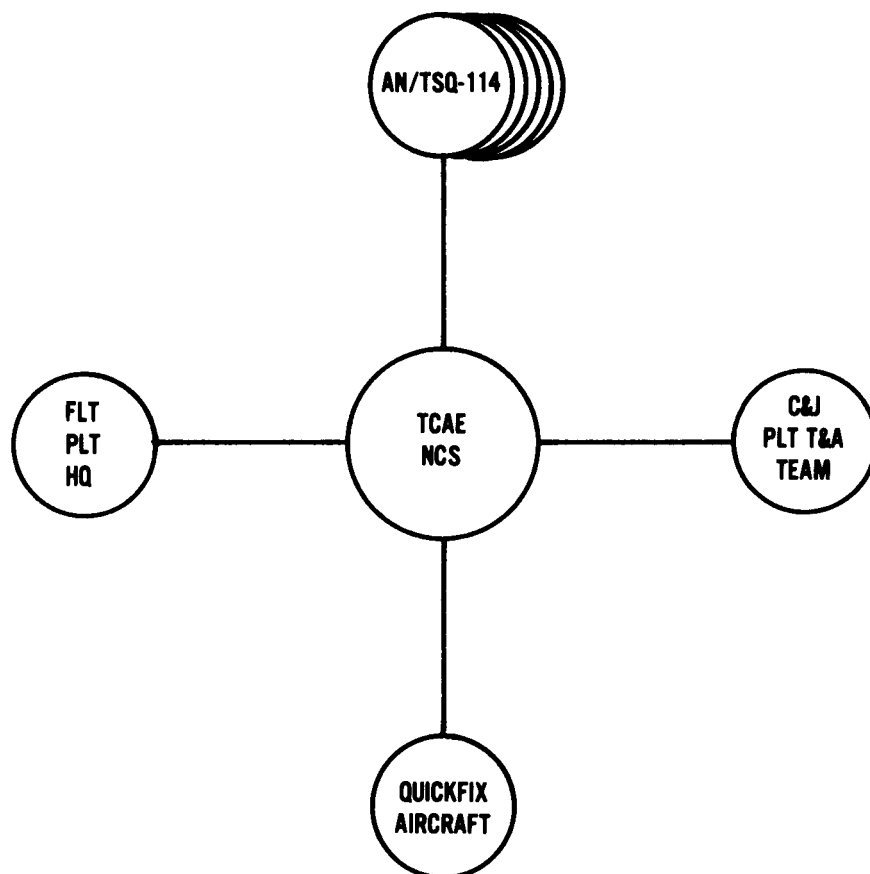


Figure D-46. Quick Fix flight platoon tasking/reporting net.

D-5. MP Company

Figures D-47 through D-50 show the MP company radio nets.

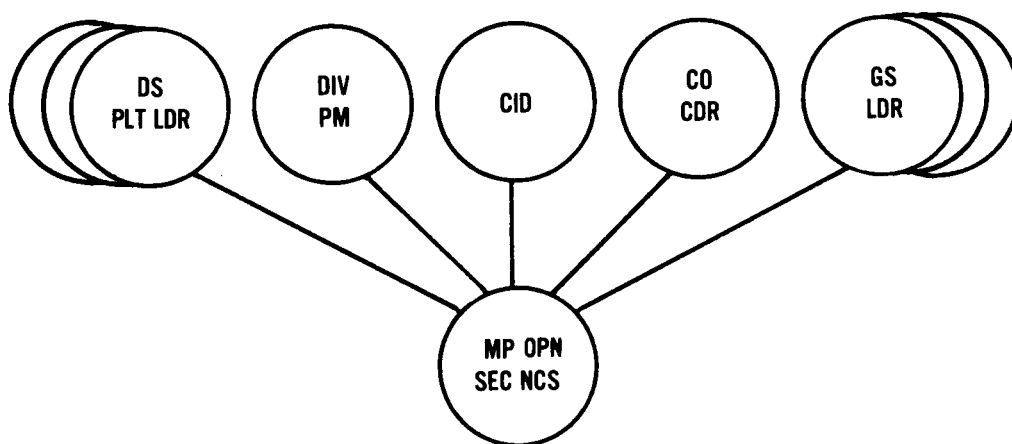


Figure D-47. MP company command and operations FM/IHFR net (heavy division).

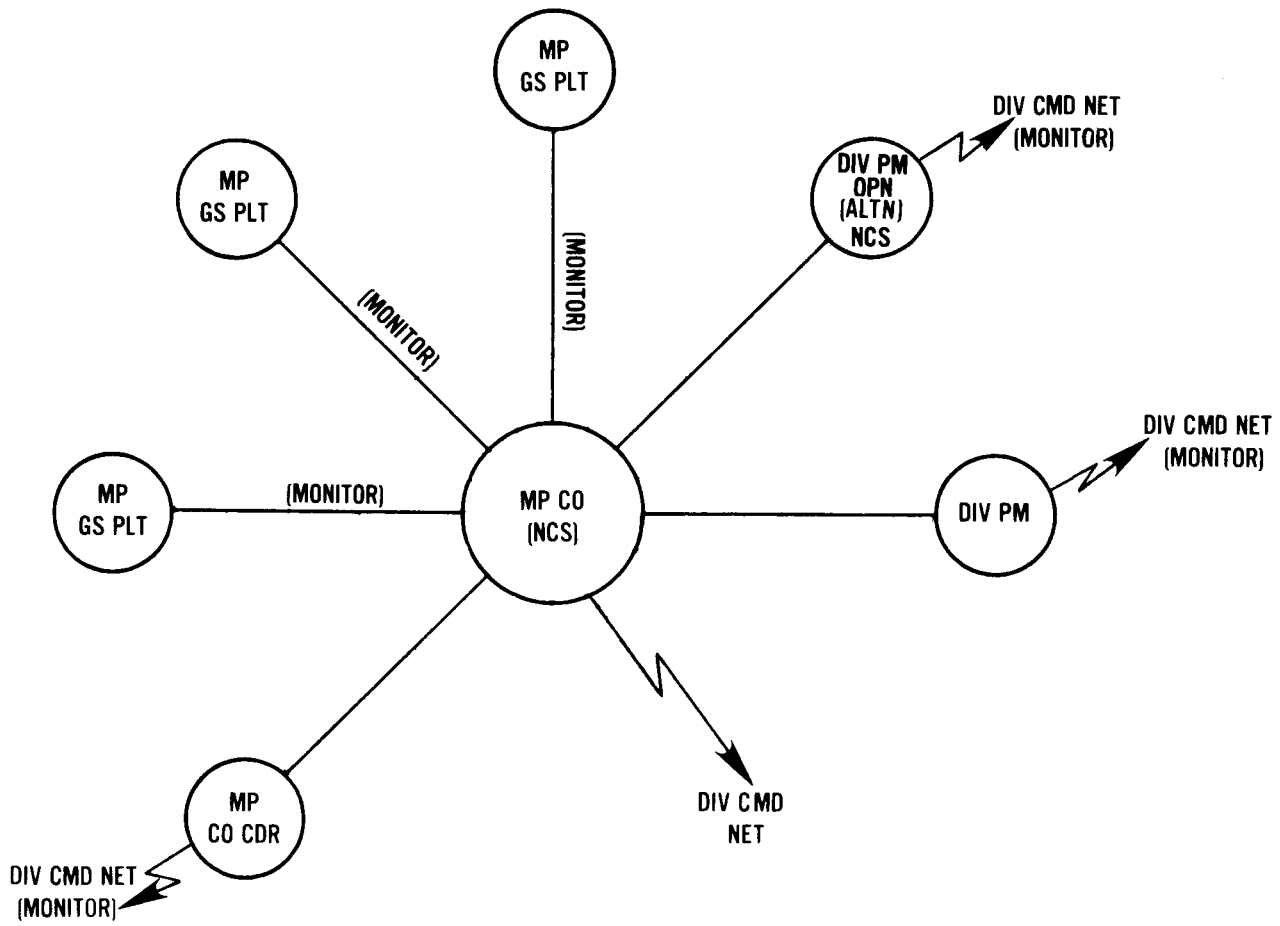


Figure D-48. MP company command/operations net (light division).

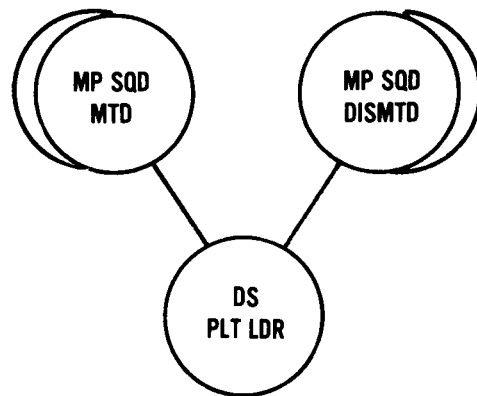


Figure D-49. MP platoon DS FM radio net.

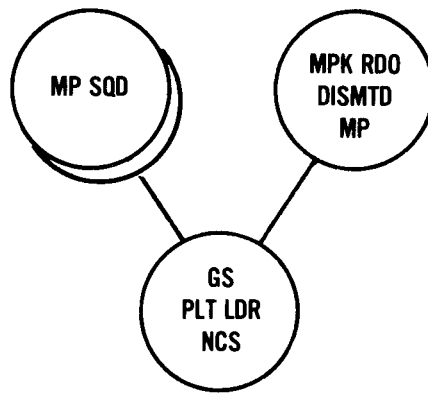


Figure D-50. MP platoon GS FM radio net.

D-6. Chemical Company

Figures D-51 through D-53 show the chemical company radio nets.

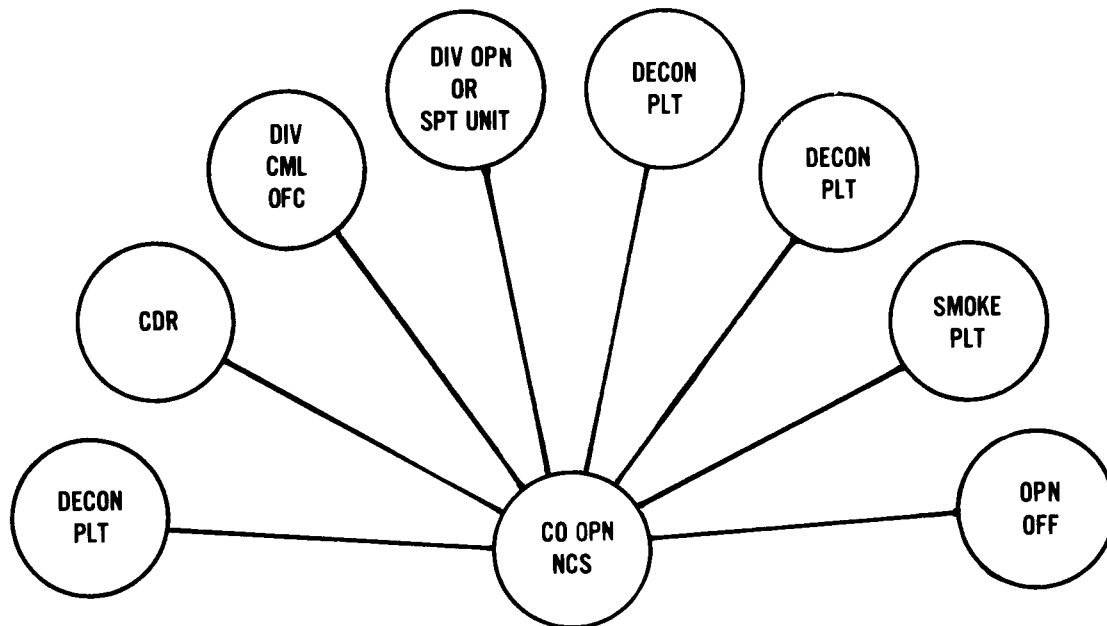


Figure D-51. Chemical company command and operations FM net.

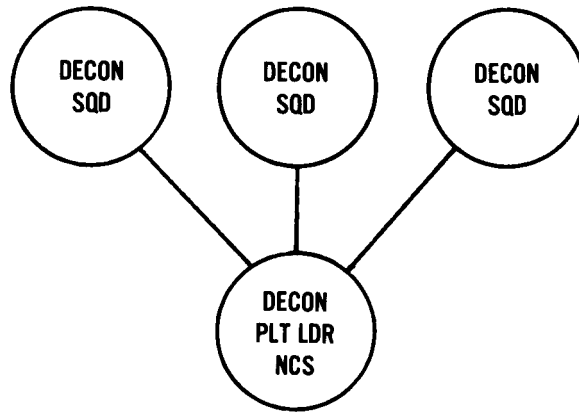


Figure D-52. Decontamination platoon command and operations FM net.

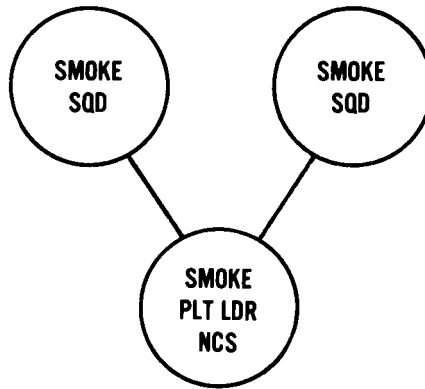


Figure D-53. Smoke platoon command and operations FM net.

APPENDIX E

Signal Site Defense

E-1. Site Defense

Signal site defense ensures the division C² system is not destroyed by a Level I or Level II rear Threat. FM 90-14 clearly identifies the increased role for CS and CSS in rear battle operations. Our fighting forces must be free to engage the Threat or to operationally maneuver IAW AirLand Battle doctrine.

a. Our sites must be able to defend against sabotages, ground forces, and perhaps airborne/air assault forces. We must do the job with little, if any, immediate help. Training and equipment must reflect more concern for the defense.

b. Signal sites are defended according to the site category. The site categories are remote sites, colocated sites, and separate or node sites.

(1) Remote sites are composed of one to four communication teams located on an isolated position. This site provides critical continuity to the communications system. The division commander extends his communications by use of these isolated teams.

(2) Colocated sites are composed of a signal extension node servicing a headquarters colocated with that headquarters unit.

(3) Node sites are composed of a platoon or larger signal unit that does not collocate with a subscribing unit. These nodes are the division signal officer's and are displaced at his discretion to support the division communications network. These are major communications locations and their loss or compromise severely impacts the battle and C².

c. Table E-1 provides a generic allocation for nodes at remote sites and colocated sites (extensions).

Table E-1. Allocation for nodes.

	M-60	M-203	SAW	M-16
Remote Site				
1 vehicle 3-man crew			1	2
Extension				
2 vehicles 6-man crew		2		4
Nodes	4	6	1/3	2/3

d. The sites may acquire heavier weapons and coordinate with other units, through the battalion rear battle operations officer, at the battalion logistics operations point.

Further measures include using claymores, light antitank weapons (LAWs), and patrols.

E-2. Site Defense Planning

a. The types of site you are defending are--

- Remote site (relays retransmission).
- Separate node site.
- Colocated site, an extension site.

b. The remote site defense has the following capabilities:

- It camouflages well.
- It establishes defensive position and rallying points.
- It sets up NBC equipment.
- It does not draw attention to your site.
- It opens fire only if directly threatened.
- It uses night vision devices.

c. Remote sites usually are on high ground and are an advantage in observing terrain. You can--

- Identify Threat equipment.
- Call for fires.
- Expect to be bypassed.

d. During minimum levels of threat to security, requirements are as follows:

- Assign a roving fire/security guard.
- Spot-check the area.
- Inventory sensitive items.

change. Report communications consistently to receive any battle status

E-3. Colocated Site Defense

a. Colocated defense applies to sites colocated with supported units. Units have integrated defense plans. Several sites with colocated responsibilities are as follows:

- Div Main CP.
- Div TAC.
- Div Rear CP.
- Three brigade CPs.
- Three brigade support areas.
- Five separate headquarters.

b. Colocated defense requires clarification and definition of the following points:

- Perimeter, limited production (LP), and observation post responsibilities.

- Additional communications to site commander.
- Ammunition logistics.

c. The following assumptions are made in colocated defense:

- Assigned areas of responsibility have been established.
- The perimeter will hold.

d. Colocated defense usually has the following faults:

- No alternate positions.
- No internal site/roving guards.

E-4. Separate or Node Site Defense

a. First establish security with minimum personnel.

- Use dismount guard with backup positions.
- Use roving fire/security guards.
- Inventory sensitive items.
- Position NBC equipment.
- Establish stand-to procedures.

FM 11-50

- b. Defend your perimeter with the maximum number of personnel available to engage a ground force. Ensure your perimeter prevents grenade penetration of signal vans. Allow enough terrain for alternate positions to be taken.
- c. Emplace your machine gun and M-203s with primary and alternate positions in the plan. Ensure that the M-203s have positioned target/range cards for live space. Since machine guns receive intense return fire, provide riflemen to cover the weapon and halt flanking maneuvers.
- d. Clear the field of fire low to the ground (about 45.7 centimeters (18.28 inches)). This will not draw attention to the site from air reconnaissance.
- e. Establish fields of fire, targets, known ranges, and alternate positions. All are plotted.
- f. Inspect fighting positions for the following:
 - Cover and concealment.
 - Overhead cover and concealment.
 - Range cards.
 - Aiming stakes.
 - The most likely approaches.
- g. Consider how fire discipline depends on communications. You can probably talk to different division's units, but how do you talk from one foxhole to another? How do you open and cease fire? Wire-to-key positions must be laid and an FC point must be established.
- h. Examine your map for the following:
 - Rallying points.
 - Preplanned fire targets.
 - Medical evacuation (MEDEVAC) landing zones.
 - Threat landing zones.
- i. Constantly improve your site. Never let a day pass without improving your defensive posture.
- j. Consider the faults in site defense. Some of the most common faults are--
 - Minimum security is not established.

vehicles. Dismount point is inadequately manned and does not alternate route

- Black-out line is not provided out from the site.
- Perimeter is too close to signal center.
- Coordination is not made.
- Vans are too close for indirect fire.
- No one can call for fire.
- NBC alarms are not emplaced.
- Listening posts are within earshot of generators.
- Observation post cannot see.
- Fields of fire are not staked.
- M-203 is not forked and range cards are not made.
- There is no site C².
- Overhead cover is ignored.
- There is no rallying point.
- A landing zone is not identified.

k. Consider the enumerate phases of site defense determined by the site commander.

(1) In low phase, site security means defensive positions are made and roving guards are out. The dismount guard post is out. A defensive plan is made.

(2) In medium phase, half of the force or security is used. Personnel are briefed and the plan is reviewed. Any last changes are made before engagement.

(3) In high phase, there is minimum C³, if any. Engagement is imminent.

l. Make load inspection.

(1) Ammunition, water, NBC, placement of weapons, special instructions, convoy signs, flags, glow lights, last vehicle largest, and strip maps are checked.

(2) Advance party departs.

(3) Leaders reconnaissance.

- (4) Advance party closes on site.
- (5) Security is established upon arrival at site.
- (6) Leaders sweep the objective.
- (7) The site and paths are established.
- (8) The site is walked.
- (9) Vehicle drives paths.
- (10) Post ground guides for main body are assigned.
- (11) Main body is notified that the site is secured for occupation.
- (12) Main body arrives. Vans and generators are emplaced and communications are established.
- (13) Main body coordinates with adjoining unit.
- (14) The perimeter is defined (beyond hand grenade range of vans if possible). The site officer in charge prepares positions, establishes dismount points, and assigns roving guards/fire guards.
- (15) Key weapons are positioned as follows:
 - M-60 alternate position.
 - M-16 backup.
 - M-249 (squad automatic weapon).
 - M-203 - claymores, LAWS, range cards.
- (16) Fighting positions are inspected. The following is checked:
 - Sector of fire.
 - Overhead cover/concealment.
 - The front.
 - Defense communications.
 - The location of ammunition and food supply points is known to everyone.
 - Obstacle emplacement.

- Alternate positions.
 - Selected and recorded predesignated artillery targets.
 - Emplacement of NBC alarms.
 - Generators. Can you hear them at the listening posts?
 - Observation point. Is it too close to the site? Can personnel see to observe?
 - Field of fire cleared 45.7 centimeters (18.28 inches).
 - Lanes of engagement staked.
 - Final protective fires established.
- (17) Alternate headquarters is established.
- (18) Rallying points and rendezvous points are established.
- (19) Keep improving the following:
- Ground - dimension.
 - Air dimension - camouflage and spread out.
 - NBC dimension.
 - Electronic - low power, low peak.
- (20) Quiz your soldiers.

APPENDIX F

Interoperability with an MSE Corps or Division

F-1. Interoperability and Connectivity

a. Interoperability and connectivity between an MSE equipped corps/division and one that is not equipped with MSE (that is, an Improved Army Tactical Communications System (IATACS) or plain ATACS equipped division) are accomplished in several ways. This appendix focuses on interfacing the ACUS of the MSE and ATACS equipped units in three different ways. Paragraph F-5 describes data communications.

b. The three methods described show how an MSE small extension node switch (SENS) (AN/TTC-48) interfaces with an IATACS switch (AN/TTC-41). Interfacing requires slight modification to existing configurations of the AN/TTC-41 and AN/TTC-48. The three primary methods of making this ACUS interconnection are as follows:

- Method 1, Type V circuit card to Type I circuit card.
- Method 2, Type V circuit card to Type II circuit card.
- Method 3, Type VI circuit card to Type VI circuit card (the preferred method).

Connections and procedures depend on the availability of circuit cards. Close coordination between planners and installers is required.

F-2. Interface Method 1--Type V to Type I

a. Method 1 shown in Figure F-1 interfaces the AN/TTC-41 (SB-3614A) using a Type I card to the AN/TTC-48 (SENS) Type V DCO port. Data base entries required to implement method 1 are very minor, but extensive operator intervention is required.

b. Method 1 achieves reliable voice communications across the MSE/IATACS boundary. The MSE operator must use a TA-312 telephone which is wired in parallel with the SENS DCO terminal to send a 20-Hz ringdown signal to the IATACS operator. Telephone calls cannot be automatically routed across the networks and both operators must intercept and extend calls. Another disadvantage of this approach is the SENS loses its ability to interface with a public switch.

c. Method 1 does not achieve data communications (that is, computer-to-computer) across the MSE/IATACS boundary. Data communications is not achieved because computers (MCS or TACCS) must be configured differently to interface with the ACUS (MSE or IATACS) to which they are connected. With MSE, the computers are configured for digital connection to the DSVT or DNVT. With IATACS the computers are configured for analog modem connection. These configurations are incompatible with each other.

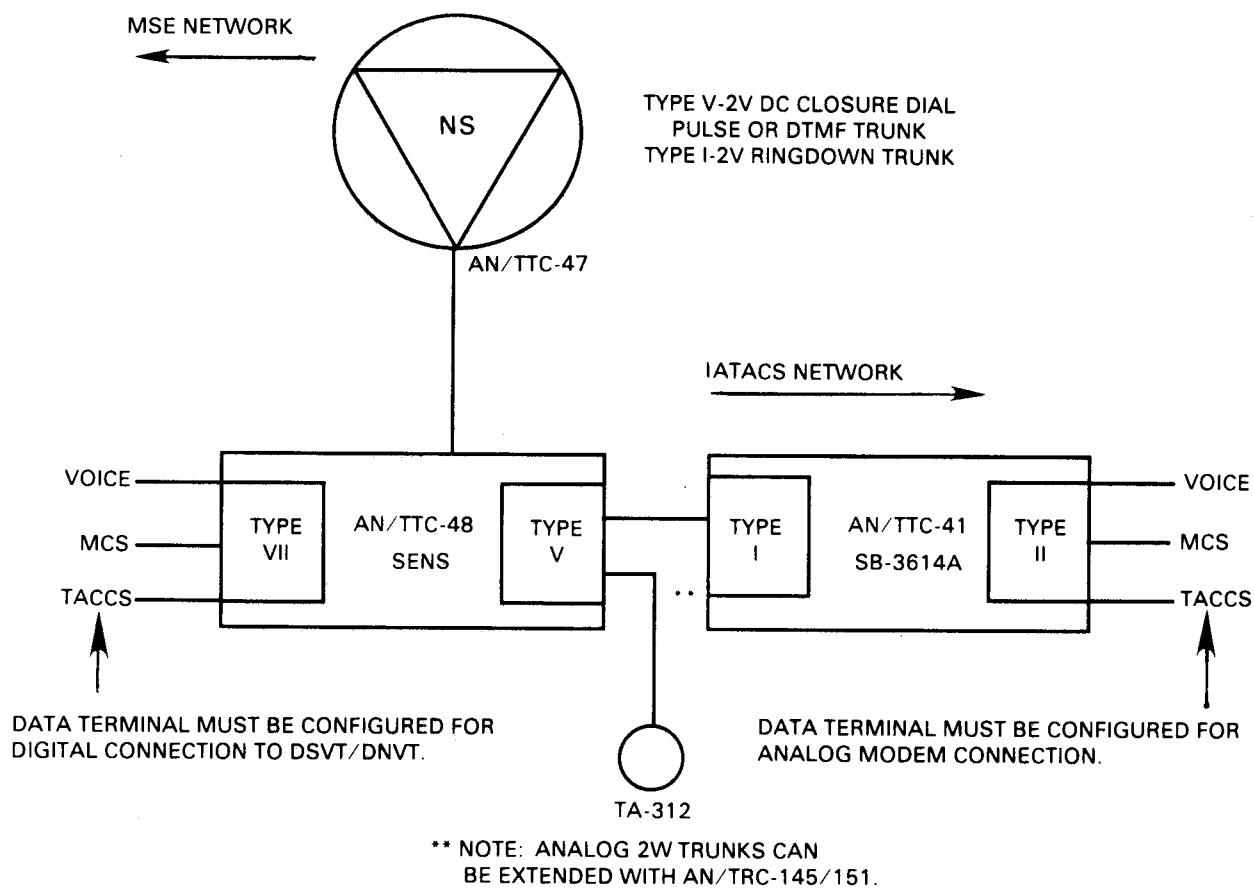


Figure F-1. MSE-IATACS interface method 1--Type V to Type I.

d. The following procedures are required to network IATACS with MSE using interface method 1.

(1) Directly connect the two switchboards (SBs) with field wire using the two DCO access terminals on the SENS (2-wire DC closure, pulse dial) and a Type I card (2-wire line, ringdown) in the SB-3614A. A TA-312 is attached to the same SENS DCO terminals that send a 20-Hz ringdown signal to the SB-3614A. The signal alerts the IATACS operator that a call is coming in from the MSE operator.

(2) This interface does not allow automatic routing between the two networks. Subscribers in the MSE network are given the SENS call service position number (LNXXXXX) and are required to place all calls to the IATACS network through the SENS operator. Subscribers in the IATACS networks are given the MSE network area code (NYX) and the designated MSE interface number assigned to the DCO line. They are required to place all calls to the MSE network through the IATACS operator.

(a) The MSE operator places all calls to the IATACS network by dialing 5C and cranking the TA-312 thus signaling the IATACS operator. The IATACS operator lets the SB ring for 5 seconds and answers the SB. The SENS operator gives the SB-3614A operator the requested IATACS subscriber number and the SB-3614A operator extends the call to the requested IATACS subscriber. When the IATACS subscriber answers the call, the operator tells him to standby for a call and then presses CALL RELEASE.

(b) The MSE operator intercepts all calls from the IATACS network on the DCO lines. The MSE operator knows of an incoming call from the IATACS network when the TA-312 attached to the shared DCO port rings. The SEN operator lets the TA-312 ring twice and then answers the incoming call on the SENS operator's DNVT. The SENS operator extends calls into the MSE network in the normal manner.

(3) This method does not require any additional circuit cards but requires a TA-312 (from the IATACS network) and some data base changes for operation.

e. SENS procedures required for operation are as follows:

(1) Initialize the SB-4303 with the normal procedures ensuring that the Type V termination card is set with switches to the left for pulse dial.

(2) If required, and upon direction of SYSCON, reprogram terminals 29 and 30 to remove the nonsecure warning tone with these procedures. Reprogram as follows:

FO 06 29 34 000 000 000 000 R
FO 06 30 34 000 000 000 000 R

(3) For each additional terminal, the SENS operator will program the following:

FO 06 TT 34 000 000 000 R (TT = terminal number)
FO 08 TT 11 R

(4) Reprogram the switch locator table as follows:

I 02 2 5C R (deletes 5C entry)
FO 02 2 5C 02 11 2 R (adds 5C with new routing)

(5) Connections from the AN/TTC-48 to the AN/TTC-41 will be made with the existing 2-wire interfaces. At the AN/TTC-48, connect to the SEP DCO lines (terminations 29 and 30). At the AN/TTC-41, connect to the two Type I terminals identified by the AN/TTC-41 operator (terminations 11 and 12). These termination numbers at the AN/TTC-41 can be changed to suit the local data base. If additional Type V cards are available at the SENS and Type I cards are available at the SB-3614A, more line interfaces can be added. (One Type V card and one Type I card will provide two additional gateway trunks.) Connecting the additional 2-wire lines to the SENS J-1077 takes place using the receive pair at the J-box.

(6) Once the operator's DNV T is affiliated, dial 5C and crank the TA-312 to access the AN/TTC-41.

NOTE: Ensure the node switch (NS) does not assign commercial access to the SENS trunk group cluster.

f. AN/TTC-41 procedures required for operation are as follows:

(1) Select two Type I terminals and place the mode switch (switches 1 and 3) to the center for RINGDOWN LINE mode and the ON/OFF mode switch (switches 2 and 4) to the right. Assign directory numbers (XXX) to the two Type I terminals with normal procedures. Assign the following to class of service:

FO 06 10 01 000 000 000 R

(2) Assign routing to the MSE network using the local subscriber table with the following:

FO 01 500 10

(3) Connect each of the terminals to the SENS DCO binding posts with WF-16 or WD-1.

(4) The AN/TTC-41 operator calls the SENS operator by dialing the directory number (XXX) assigned to the terminals (Type I card terminations).

g. MSE system planning required for operation is as follows.

NOTE: MSE users could intercept the operator by programming the NS with the 5C (DCO access). However, this is not recommended since a real DCO access or another AN/TTC-48 to AN/TTC-41 network interface could be in operation and the 5C request will not be properly routed.

(1) Publish the SENS call service position DNVT phone number as the operator access the AN/TTC-41 network.

(2) Provide the SENS operator with phone directories for the AN/TTC-41 network and the MSE network since calls from both networks are intercepted at the SENS.

(3) Determine if the adjacent network meets security requirements. Instruct gateway SENS to clear nonsecure warning tone when appropriate.

h. IATACS system planning required for operation is as follows:

(1) Publish the NYX area code of the MSE network plus XXXXXXX (any digit 0 through 9) as the primary access to MSE (SENS operator intercept). The seven X digits can be assigned at random since they are not actually used for routing. Assign digits that are easy to remember.

(2) Publish the directory number of the Type I terminals (PR-SL-XXXX) as another access to the MSE SENS operator. A fixed directory number could be assigned to simplify the dialing instructions for the network.

(3) The AN/TTC-41 operator should provide the SENS operator with directory assistance in the AN/TTC-41 network.

i. MSE subscriber dialing instructions for calling through SENS/AN/TTC-41 gateway are as follows:

(1) Dial the published directory number for operator assisted calls to the AN/TTC-41 network. The number is LNXXXXX (seven-digit SENS operator's DNVT).

(2) Give the SENS operator the desired IATACS directory number and the SENS operator will give the number to the SB-3614A operator for routing.

j. IATACS subscriber dialing instructions for calling through SENS/AN/TTC-41 gateway are as follows:

(1) Dial the published directory number for operator assisted calls to the MSE network.

(2) The SENS operator answers the call and extends the call into the MSE network after the SENS operator is told (or determines) the MSE number to be called. (The seven-digit MSE number is LNXXXXX.)

F-3. Interface Method 2--Type V to Type II

a. Method 2 shown in Figure F-2 is similar to method 1. Method 2 interfaces the AN/TTC-41 (SB-3614A) with the AN/TTC-48 (SENS) Type V DCO port using a Type II card which is a standard available card for the AN/TTC-41. Data base entries required to implement method 2 are very minor.

b. Method 2 also achieves reliable voice communications across the MSE/IATACS boundary, but significant intervention by the SENS operator is required. The TA-312 telephone and AN/TTC-41 operator intervention, as in method 1, are no longer required. Telephone calls cannot be automatically routed across the networks. The SENS operator must extend all calls from or into the IATACS network. Method 2, like method 1, has the disadvantage that the SENS loses its ability to connect to a DCO.

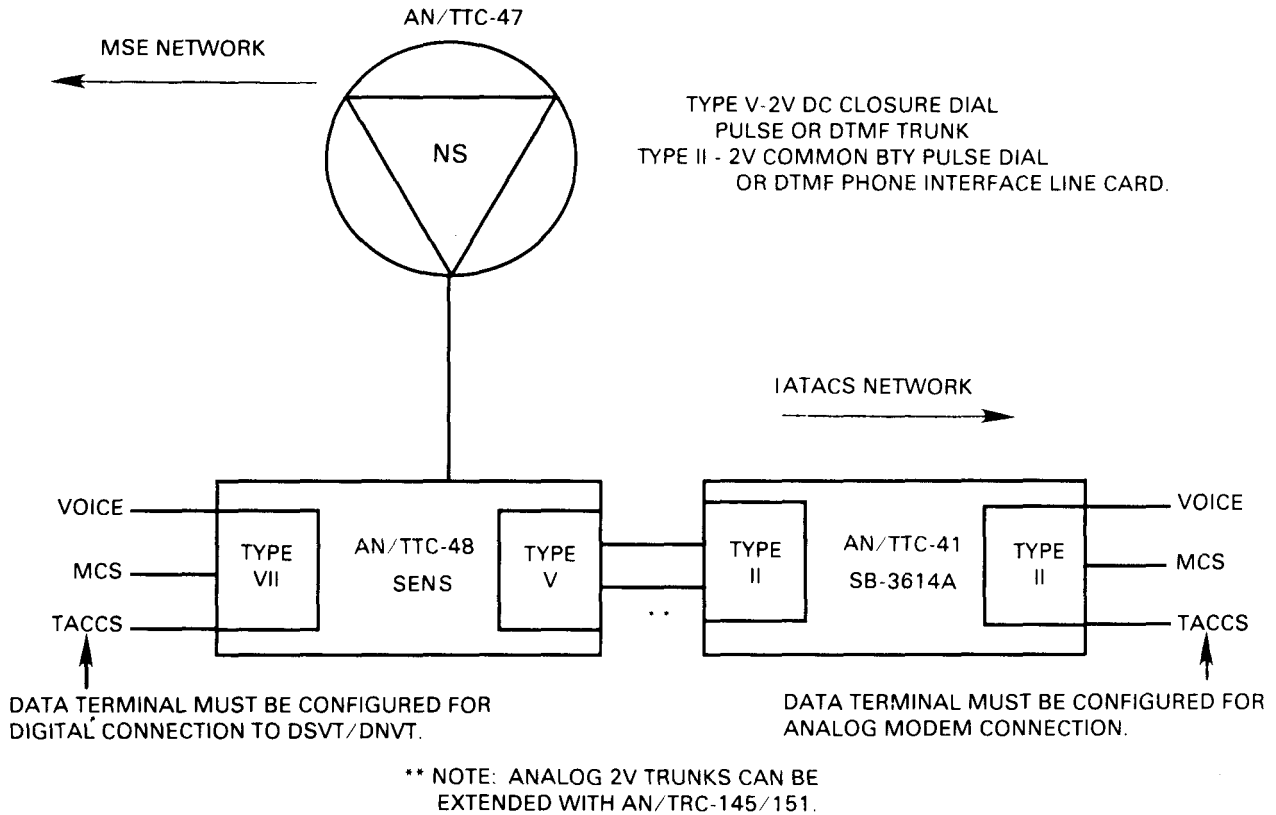


Figure F-2. MSE-IATACS interface method 2--Type V to Type II.

c. Method 2 does not achieve data communications across the MSE/IATACS boundary for the same reasons described for method 1.

d. The following procedures are required to network IATACS switching systems with MSE using the SENS Type V DC closure card as a gateway to the AN/TTC-41 Type II common battery card. (See Figure F-2.)

(1) Collocate an MSE SENS AN/TTC-48 with an IATACS AN/TTC-41 and directly connect the two with field wire using the two DCO access terminals on the SENS (2-wire, DC closure, pulse dial) and any two terminals using a Type II termination card (2-wire, common battery, pulse dial) in the AN/TTC-41. When collocation is not possible, the MSE and AN/TTC-41 can interface with AN/TRC-145/151 or TACSAT multichannel systems.

(2) This interface does not allow automated routing between the two networks and requires operator intercept at the SENS AN/TTC-48. Subscribers in the MSE network are given the SENS call service position number (LNXXXXX) and are required to place all calls to the IATACS network through the SENS operator. Subscribers in the IATACS network are given the MSE network area code (NYX) and the telephone drop number assigned to the Type II terminations in the AN/TTC-41 (XXX). They are required to place all calls to the MSE network through the SENS operator.

(3) The SENS operator places calls to the IATACS network by dialing 5C and after receiving dial tone from the AN/TTC-41, directly dials the seven-digit AN/TTC-41 user's directory number.

(4) The SENS operator intercepts all calls from the IATACS network simply by going off-hook with his DNVT. He extends calls into the MSE network in the normal manner and connects the two parties.

NOTE: When receiving a call from the AN/TTC-41, the SENS operator must not depress the CALL ANS push button. It might cause damage to the Type V card at the SENS.

(5) This method does not require any special equipment or additional circuit cards for either the SENS or the AN/TTC-41 (unless more than two gateway trunks are required) but does require some data base entries for operation which follow.

e. SENS procedures required for operation are as follows:

(1) Initialize the SB-4303 with the normal procedures ensuring that the Type V termination card is set with switches to the left for pulse dial.

(2) If required, and upon direction of SYSCON, reprogram terminals 29 and 30 to remove the nonsecure warning tone using the following:

FO 06 29 34 000 000 000 000 R
FO 06 30 34 000 000 000 000 R

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(3) For each additional terminal, the SENS operator will program the following:

FO 06 TT 34 000 000 000 000 R (TT = terminal number)
FO 08 TT 11 R

(4) Reprogram the switch locator table as follows:

I 02 2 5C R (deletes 5C entry)
FO 02 2 5C 02 11 2 R (adds 5C with new routing)

(5) Connections from the AN/TTC-48 to the AN/TTC-41 will be made with the existing 2-wire interfaces. At the AN/TTC-48, connect to the SEP DCO lines (terminations 29 and 30). At the AN/TTC-41, connect to the two Type II terminals identified by the AN/TTC-41 operator (terminations 11 and 12). These termination numbers at the AN/TTC-41 can be changed to suit the local data base. If additional Type V cards (MSE) and Type II cards (IATACS) are available, more line interfaces can be added. (One Type V card and one Type II card will provide two additional gateway trunks.) Connecting the additional 2-wire lines to the SENS J-1077 takes place using the receive pair at the J-box.

(6) Once the operator's DNVT is affiliated, dial 5C to access the AN/TTC-41. When dial tone is received, dial the AN/TTC-41 telephone (TA-838) to validate the interface.

NOTE: Ensure the NS does not assign commercial access to the SENS trunk group cluster.

f. AN/TTC-41 procedures required for operation are as follows:

(1) Select two Type II terminals and place the card switch positions to the left for pulse dial. Assign directory numbers (XXX) to the two Type II terminals with normal procedures. Assign the following to class of service:

FO 06 TT 11 000 000 000 000 R (TT = terminal number)

(2) Assign the two Type II terminals to a trunk group as follows:

FO 08 TT BB R

Where:

TT = Type II card terminal numbers.

BB = Trunk group number (10 or above).

NOTE: Using a trunk group authorizes an automatic line hunting to access each Type II termination.

(3) Assign routing to the MSE network using the switch locator table with the following:

FO 02 3 NYX 10 BB 0 R

Where:

NYX = MSE network area code.

BB = Trunk group number (10 or above).

(4) Connect each of the terminals to the SENS DCO binding posts with WF-16 or WD-1.

(5) The AN/TTC-41 operator has two options in dialing the SENS operator.

(a) One option is for the AN/TTC-41 operator to dial the directory number (XXX) assigned to the terminals (Type II card terminations).

(b) The second option is to dial 9 NYX XXXXXXXX as a normal subscriber; XXXXXXXX can be any digit, since the routing to MSE will be done using the MSE unit NYX area code. The seven X digits are to fill the dialing memory of the SB-3614 and are not interpreted by either the AN/TTC-41 or the AN/TTC-48. The SENS operator will answer and place a call into the MSE network (parent NS) to verify the interface.

g. MSE system planning required for operation is as follows.

NOTE: MSE users could intercept the operator by programming the NS with 5C (DCO access). However, this is not recommended since a real DCO access or another AN/TTC-48 to AN/TTC-41 network interface could be in operation and the 5C request will not be routed properly.

(1) Publish the SENS call service position DNVN phone number as the operator access the IATACS network.

(2) Provide the SENS operator with phone directories for the IATACS network and the MSE network since calls from both networks are intercepted at the SENS.

(3) Determine if the adjacent network meets security requirements. Instruct gateway SEN to clear nonsecure warning tone when appropriate.

h. IATACS system planning required for operation is as follows:

(1) Publish the NYX area code of the MSE network plus XXXXXXXX (any digit) 0 through 9) as the primary access to MSE (SENS operator intercept). The seven X digits can be assigned at random since they are not actually used for routing. Assign digits that are easy to remember.

(2) Publish the directory number of the Type II terminals (PR-SL-XXXX) as another access to the MSE SENS operator. A fixed directory number could be assigned to simplify the dialing instructions for the network.

(3) The AN/TTC-41 operator should provide the SENS operator with directory assistance in the IATACS network.

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i. MSE subscriber dialing instructions for dialing through the SENS/AN/TTC-41 gateway are as follows:

NYX PR-SL-XXX

Where:

NYX = adjacent corps area code

PR = primary route

SL = switch location

XXXX = local subscriber directory number

(1) Dial the published directory number for operator assisted calls to the IATACS network. The number is LNXXXXX (seven-digit SENS operator's DNVN).

(2) Give the SENS operator the desired IATACS directory number and the SENS operator will dial it for you. The seven-digit IATACS subscriber directory number is PR-SL-XXX.

j. IATACS subscriber dialing instructions for dialing through the SENS/AN/TTC-41 gateway are as follows:

(1) Dial the published directory number for operator assisted calls to the MSE network. The SENS operator will answer the call. The IATACS subscriber has two options.

(a) Option 1 is to dial 9 NYX XXXXXXXX. (NYX is the MSE unit area code and XXXXXXXX is the random access number.)

(b) Option 2 is to dial PR-SL-XXX which is the Type II card.

(2) Give the SENS operator the desired MSE directory number and the SENS operator will dial it for you. The seven-digit MSE subscriber's directory number is LNXXXXX.

F-4. Interface Method 3--Type VI to Type VI

a. Method 3 shown in Figure F-3 interfaces the MSE AN/TTC-48 (SENS) to an IATACS AN/TTC-41 network using Type VI tone burst confirmation trunking cards in both systems (NS MSE version or lower software). Data base entries required to implement method 3 are significant. A special analog data base profile is required in the NS which can not be accomplished by the operator with version OY-3.0 SCOLOP.

b. Method 3 achieves reliable voice communications across the MSE/IATACS boundary and allows calls to route automatically between the networks (no operator intervention required). Implementing this method requires installing additional circuit cards (two Type VIs, one Type II, three analog gates, and one DTMF receiver) into the SENS. These cards must be obtained from the IATACS network (AN/TTC-41). This procedure automatically routes calls across the networks and retains the SENS ability to interface with a public switch. The procedure also extends the distance between the SENS and AN/TTC-41 switches using AN/TRC-145 LOS and/or TACSAT AN/TSC-85/93 multichannel.

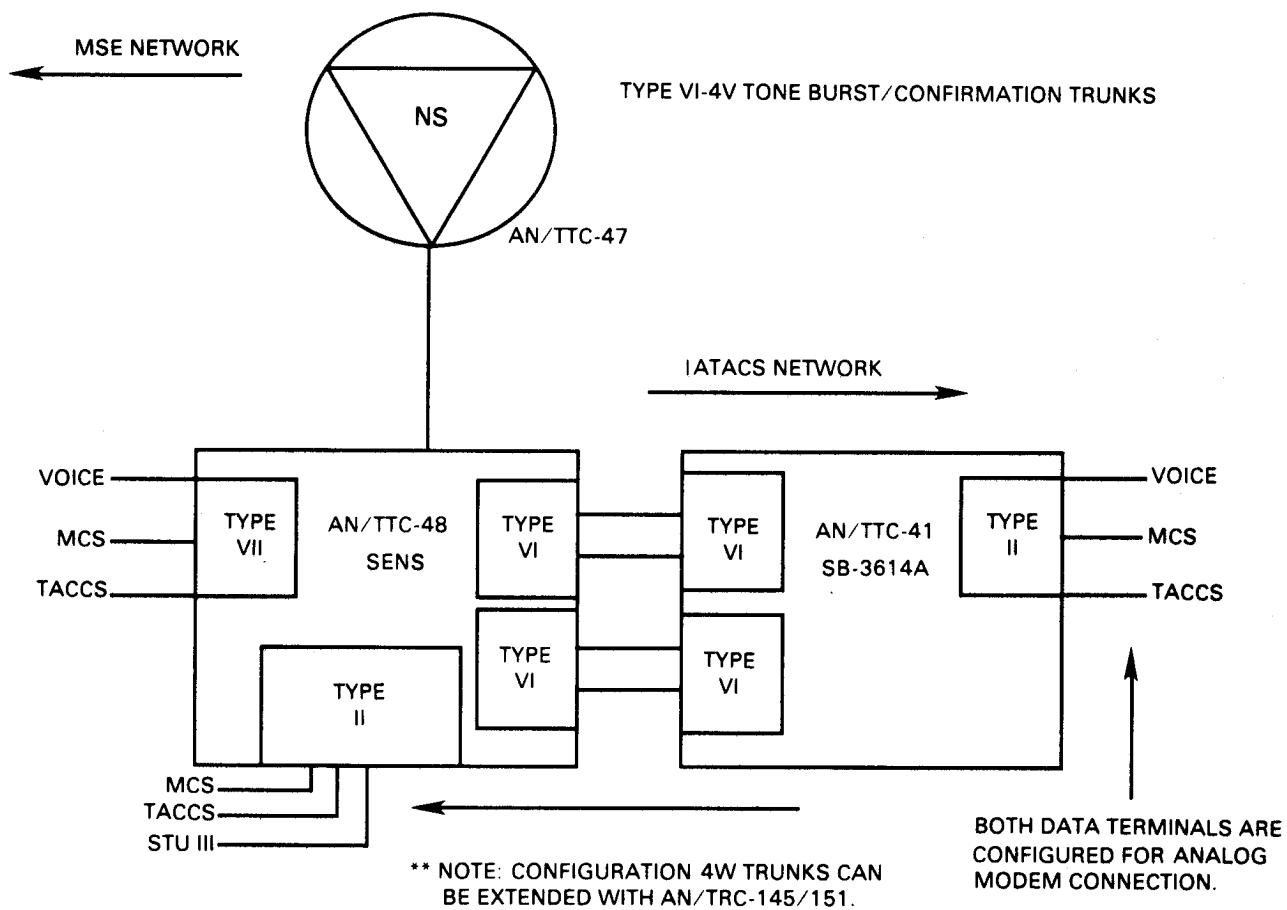


Figure F-3. MSE-IATACS interface method 3--Type II to Type VI.

c. The Method 3 approach provides the SENS with analog subscriber loop ability using a Type II card. This allows computers in both networks to be configured for analog modem connection; therefore, protocols would be compatible. Using this technique, TACCS data communications across the MSE/IATACS boundary is successful but MCS data communications unsuccessful. The MCS software aborts data transmission before the communications systems achieve terminal connection. Software changes are required to prevent the MCS software from aborting prior to connection.

(1) When the MSE system is expanded as shown in Figure F-4 to provide a more realistic tactical network, TACCS data communications across the MSE/IATACS boundary becomes marginal.

(2) Assessment of test results and research indicates that data transmissions using standard analog modem connections over MSE analog subscriber loops will probably be unreliable over extended tactical networks. In a simple network (Figure F-4), an STU-III secure telephone, connected to the MSE analog subscriber loop (Type II card), provides secure communications. Significant performance degradation will occur over a realistic tactical MSE network due to the increase in analog transmission impairments. Figure F-3 also shows a TACCS (with BLAST software) to DDN connectivity through the MSE DCO port. TACCS with BLAST software will access a CTASC-I over extended distances to send and receive DAMMS-R files and free text messages. As the MSE network is expanded (Figure F-4), data communications degrades.

d. The following procedures are required to network IATACS switching systems with MSE using SENS Type VI 4-wire confirmation trunking cards in the SENS and AN/TTC-41 switching systems.

(1) The SENS operator must affiliate an analog phone with the SENS for each terminal that interfaces the AN/TTC-41. This identifies the terminal as a legal subscriber for access into the MSE network. To use this implementation, the SENS needs additional circuit cards as listed in the implementation specifics section.

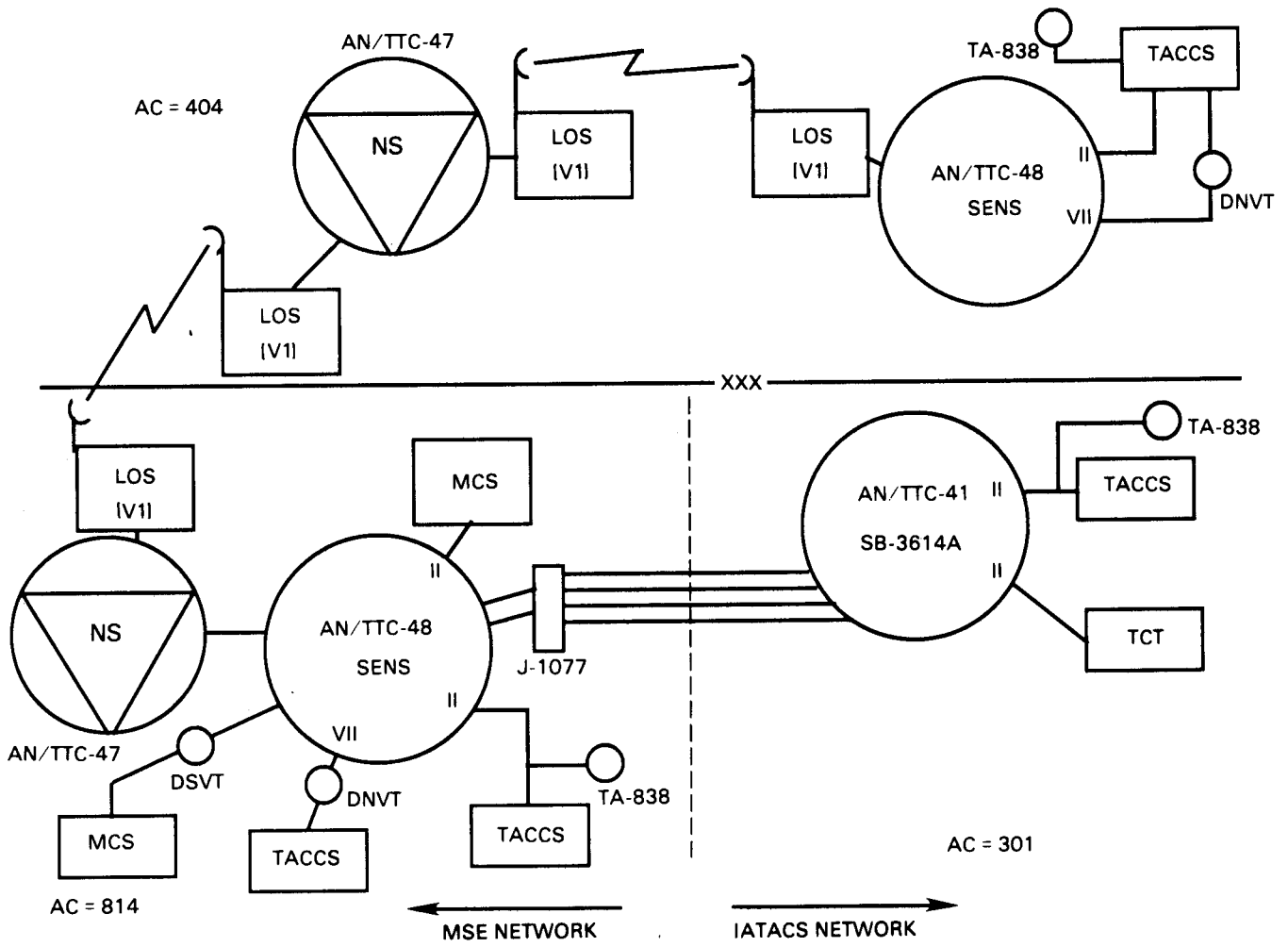


Figure F-4. MSE/IATACS expanded network.

(2) In the MSE network, the NSs and LENSs need to upload deterministic routing entries into the data base under the direction of SYSCON. SYSCON must assign the IATACS network an NYX area code. Each switch then enters, via the ANY MAMA command, the routing for this NYX. Additionally, the SYSCON must select an LN that will not be assigned within MSE. This LN will be set up in the SENS data base for routing over the trunk group to the IATACS network. If the SENS that is used as a gateway does not have local subscribers connected to it, then this LN need not be reserved. The reason for this is that subscribers in both networks use an area code to reach the other network.

e. Connections between the SENS and the AN/TTC-41 are accomplished via 4-wire confirmation trunks. Four confirmation trunks connect these two switches. Figure F-3 shows the appropriate termination numbers and interconnection details.

(1) At the SENS, the following circuit cards shall be added: three analog gates, one DTMF receiver, two Type VI CCA for confirmation trunks, and one Type II CCA to affiliate the confirmation trunks. A TA-838 or equivalent telephone is also required. Install these circuit cards in the following slots:

(a) Analog gates into slots A19, A21, and A23.

(b) DTMF RCVR into slot A22.

(c) Type II CCA to affiliate the termination that will be used to interface the AN/TTC-41.

(d) Type VI CCA into slots A31 and A35.

(2) It is important to follow the affiliation instructions. At the NS that is to be connected to the SENS, a special analog profile will be set up. The following four numbers with this profile will be preaffiliated: 7600111, 7601111, 7602111, and 7603111. The LN here is 76. This LN needs to match the NN of the IATACS network for proper routing.

f. The affiliation process for the TA-838 is shown in Table F-1.

Table F-1. Affiliation process for TA-838.

NOTE: Place the toggle switches located on the Type II CCA to the right most position.

STEP	ACTION
1	Make sure the SB is powered off.
2	Insert the Type II CCA into slot A31.
3	Connect the TA-838 transmitter terminals to the two wires in a separate J-box, pair 2.
4	Cold start the SB.
5	When the SB comes on-line, enter the following (after entering password): FO 06 21 12 000 000 000 000 R.
6	Place the SB back into CALL PROCESS mode.
7	Go off-hook with the TA-838. This will ring the SEN operator. Go off-hook with the operator's DNVT.
8	TA-838 and operator's DNVT will be connected.
9	Place the TA-838 on hold (by depressing the REENTRY push button). Do not go on-hook with the TA-838.
10	Operator now will dial 8R-XXX-7600111.
11	When the operator receives dial tone announcing a successful affiliation, the operator will go on-hook.
12	The operator then goes off-hook (after the DNVT rings) and is reconnected to the TA-838.
13	Go on-hook with the operator and the TA-838.
14	Go off-hook with the TA-838, and the phone will receive dial tone. Go on-hook. If there is no dial tone, repeat steps 7 through 14.
15	Reconnect the TA-838 to pair 4 of the same J-box.
16	Enter the following (after entering password) into the SB: FO 06 22 12 000 000 000 000 R.
17	Place the SB back into CALL PROCESS mode.

Table F-1. Affiliation process for TA-838. (continued)

STEP	ACTION
18	Go off-hook with the TA-838. This will ring the SEN operator. Go off-hook with the operator's DNVT.
19	TA-838 and operator's DNVT will be connected.
20	Place the TA-838 on hold (by depressing the REENTRY push button). Do not go on-hook with the TA-838.
21	Operator now will dial 8R-XXX-7601111.
22	When the operator receives dial tone announcing a successful affiliation, the operator will go on-hook.
23	The operator shall then go off-hook (after the DNVT rings) and will be reconnected to the TA-838.
24	Go on-hook with the operator and the TA-838.
25	Go off-hook with the TA-838 and the phone will receive dial tone. Go on-hook. If there is no dial tone, repeat steps 18 through 25.
26	Power off the SB.
27	Insert the Type II CCA into slot A35.
28	Power on the SB.
29	Reconnect the TA-838 to pair 6 of the same J-box.
30	When the SB comes on-line, enter the following (after entering password): FO 06 23 12 000 000 000 000 R.
31	Place the SB back into CALL PROCESS mode.
32	Go off-hook with the TA-838. This will ring the SEN operator. Go off-hook with the operator's DNVT.
33	TA-838 and operator's DNVT will be connected.
34	Place the TA-838 on hold (by depressing the REENTRY push button). Do not go on-hook with the TA-838.
35	Operator will now dial 8R-XXX-7602111.
36	When the operator receives dial tone announcing a successful affiliation, the operator will go on-hook.

Table F-1. Affiliation process for TA-838. (continued)

STEP	ACTION
37	The operator then goes off-hook (after the DNVT rings) and is reconnected to the TA-838.
38	Go on-hook with the operator and the TA-838.
39	Go off-hook with the TA-838 and the phone will receive dial tone. Go on-hook. If there is no dial tone, repeat steps 32 through 39.
40	Reconnect the TA-838 to pair 8 of the same J-box.
41	Enter the following (after entering password) into the SB: FO 06 24 12 000 000 000 000 R.
42	Place the SB back into CALL PROCESS mode.
43	Go off-hook with the TA-838. This will ring the SEN operator. Go off-hook with the operator's DNVT.
44	TA-838 and operator's DNVT will be connected.
45	Place the TA-838 on hold (by depressing the REENTRY push button). Do not go on-hook with the TA-838.
46	Operator will now dial 8R-XXX-LNXXXXX.
47	When the operator receives dial tone announcing a successful affiliation, the operator will go on-hook.
48	The operator then goes off-hook (after the DNVT rings) and is reconnected to the TA-838.
49	Go on-hook with the operator and the TA-838.
50	Go off-hook with the TA-838 and the phone will receive dial tone. Go on-hook. If there is no dial tone, repeat steps 43 through 50.
51	Power off the SB.
52	Remove the Type II CCA from slot A35.
53	Now install the Type VI CCAs in slots A31 and A35.

Table F-1. Affiliation process for TA-838. (continued)

STEP	ACTION
	NOTE: Steps 54 through 77 provide two analog subscriber loops using a Type II CCA. Steps 54 through 77 are optional and allow using any 2-wire DTMF telephone.
54	Install the Type II CCA in slot A37.
55	Power on the SB.
56	Reconnect the TA-838 to pair 10 of the same J-box.
57	When the SB comes on-line, enter the following (after entering password): F0 06 25 12 000 000 000 000 R.
58	Place the SB back into CALL PROCESS mode.
59	Go off-hook with the TA-838. This will ring the SEN operator. Go off-hook with the operator's DNVT.
60	TA-838 and operator's DNVT will be connected.
61	Place the TA-838 on hold (by depressing the REENTRY push button). Do not go on-hook with the TA-838.
62	Operator will now dial 8R-XXX-LNXXXXX.
63	When the operator receives dial tone announcing a successful affiliation, the operator will go on-hook.
64	The operator then goes off-hook (after the DNVT rings) and is reconnected to the TA-838.
65	Go on-hook with the operator and the TA-838.
66	Go off-hook with the TA-838, and the phone will receive dial tone. Go on-hook. If there is no dial tone, repeat steps 59 through 66.
67	Reconnect the TA-838 to pair 12 of the same J-box.
68	Enter the following (after entering password) into the SB: F0 06 26 12 000 000 000 000 R.
69	Place the SB back into CALL PROCESS mode.
70	Go off-hook with the TA-838. This will ring the SEN operator. Go off-hook with the operator's DNVT.

Table F-1. Affiliation process for TA-838. (continued)

STEP	ACTION
71	TA-838 and operator's DNVT will be connected.
72	Place the TA-838 on-hold (by depressing the reentry push button). Do not go on-hook with the TA-838.
73	Operator will now dial 8R-XXX-LNXXXXX.
74	When the operator receives dial tone announcing a successful affiliation, the operator will go on-hook.
75	The operator then goes off-hook (after the DNVT rings) and is reconnected to the TA-838.
76	Go on-hook with the operator and the TA-838.
77	Go off-hook with the TA-838, and the phone will receive dial tone. Go on-hook. If there is no dial tone, repeat steps 70 through 77.
78	Power off the SB.

(1) Once all cards are in, power on the SB. (Do not cold start.) In program mode, enter the following:

```
FO 07 21 R
FO 07 22 R
FO 07 23 R
FO 07 24 R
FO 06 21 46 004 000 000 000 R
FO 06 22 46 004 000 000 000 R
FO 06 23 46 004 000 000 000 R
FO 06 24 46 004 000 000 000 R
P 07 R
```

(2) The four terminations that now have a phone number associated with them have been purposely assigned the wrong class mark for the type of circuit card installed the (Type VI). The FO 07 command places the terminations out of service to allow the modification of the terminations class of service (the FO 06 command).

g. The special analog profiles for the AN/TTC-48 and AN/TTC-41 are listed below.

(1) AN/TTC-48 data base. (See Table F-2.)

Table F-2. AN/TTC-48.

<u>PROGRAM</u>	<u>EXPLANATION</u>
FO 08 21 13 R FO 08 22 13 R FO 08 23 13 R FO 08 24 13 R	These entries establish a trunk group to route to the AN/TTC-41.
FO 02 2 76 07 13 2 R	This entry establishes the deterministic routing to the AN/TTC-41 over the established trunk group.
FO 02 3 814 10 10 2 R	This entry establishes routing for all incoming calls from the AN/TTC-41. All calls from the 41 route to the parent NS.
FO 08 57 14 R	This establishes a trunk group for incoming calls from the AN/TTC-41 operator.
FO 02 3 815 10 14 2 R	This routes incoming calls from the gateway AN/TTC-41 operator to the SENS operator.

(2) AN/TTC-41 data base. All incoming calls from MSE to the IATACS network depend on SWL table entries that are normally part of the AN/TTC-41 data base. It is important that the NN code of the IATACS network match the LN code that is being used in MSE. (See Table F-3.)

Table F-3. AN/TTC-41.

<u>PROGRAM</u>	<u>EXPLANATION</u>
CHG CLS<cr> 21 46 004 000 000<cr> 22 46 004 000 000<cr> 23 46 004 000 000<cr> 24 46 004 000 000<cr>	Confirmation trunks.
ENT TLG<cr> 21 14<cr> 22 14<cr> 23 14<cr> 24 14<cr>	Establish trunk group to route to SENS.
ENT SWL<cr> 3 814 10 14 1<cr>	This routes all incoming calls from the AN/TTC-41 network to MSE.
ENT SWL<cr> 3 815 10 14 1<cr>	Routes calls to SENS operator.

(3) AN/TTC-47 data base.

(a) At each NS, the operator must enter a route to the 301 (or the assigned NYX) gateway SENS. A special data base must be made also with a modified profile for the analog subscriber numbers to be used for routing from the IATACS network. With NS software version OY-3.0 SCOLOP, this special data base profile cannot be created by the NS operator. Contractor support is required to accomplish the task of creating a special analog data base profile tape; however, this shortcoming will be corrected in the near future.

(b) Subscribers from MSE dial 301 76XXXXX to gain access to the IATACS network. The LN in this application is 76 and can be changed under the direction of SYSCON. This LN has to match the AN/TTC-41 NN for proper automated routing. The XXXXX that is dialed will be the two-digit switch code (XX) and the person's three-digit directory number (XXX). By using this convention, MSE subscribers will connect directly to an IATACS network subscriber without any operator intervention.

(c) Subscribers from the IATACS network who know the MSE subscribers LNXXXXX, dial 9 814 LNXXXXX; otherwise they dial the operator at the gateway AN/TTC-41 for connection to the SENS operator.

F-5. Data Communications

a. MCS data communications does not work across the MSE/IATACS boundary (digital/analog) and TACCS communications were marginal due to frequency repeatability degradation above 2000 Hz. Because of the problems experienced with data communications, alternative solutions to using ACUS switched circuits were investigated. The most logical solution for passing data across the MSE/IATACS boundary is to utilize unused channels of the multichannel system connecting the MSE and IATACS switches. Method 3 provides four common-user analog trunks for MSE/IATACS connectivity which leaves eight unused channels that could be dedicated to MCS or TACCS gateway functions. CNR could also be used as a gateway to bridge the MSE/IATACS boundary.

b. An automated MCS gateway/relay solution using the dedicated channel approach was tested and validated over AN/TRC-145 and TACSAT. If an MCS in the MSE network wanted to send a message to an MCS in the IATACS network, he would send the message to the MSE gateway MCS. The MSE gateway MCS would receive the message on channel 1 and examine the message header and nodal address. If the nodal address is a user in the IATACS network, the MSE gateway MCS will automatically relay or route the message out channel 2, over the dedicated multichannel circuit to the IATACS gateway MCS. The IATACS gateway MCS will examine the message header and nodal address and automatically route the call over channel 1 to the appropriate MCS user in the IATACS network.

c. Figure F-5 shows the setup for single MCS gateways. Table F-4 shows system initialization for a single MCS gateway.

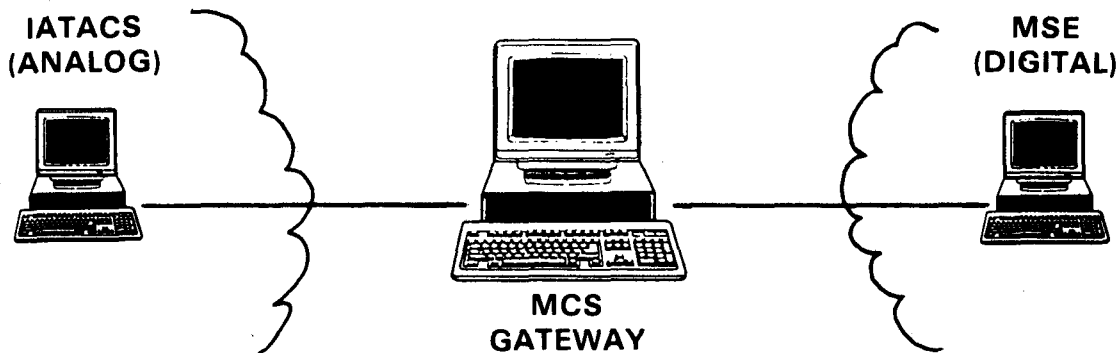


Figure F-5. Single MCS gateway.

Table F-4. System initialization--single MCS gateway.

<p>SYSTEM INITIALIZATION (FIRST TIME SETUP)</p>	<p>Date/time group (set during system bootup) Initialization source (new) Local nodal definition</p> <p>Unit ID (20 Chrs) Use unit name with relay designator; for example, III Corps relay 1.) Nodal address (provided by unit) Message number 000 (or set by unit) Grid location (dependent on location) System classification (set by unit)</p> <p>Local message handling</p> <p>Print when received: NO Print when transmitted: NO Print when deleted: NO Print when aborted: NO If cycle message area is full: NOT ACKNOWLEDGE</p> <p>Relay message handling</p> <p>Print when relayed: NO, unless changed by unit Print when aborted: NO, unless changed by unit</p>
<p>DESTINATION TERMINAL IDENTIFICATION (35 ENTRIES)</p>	<p>Digital to analog: All destination terminals will be for units on the analog net. Analog to digital: All destination terminals will be for units on the digital net. Unit ID: (Set by SOP) (20 Chrs) Nodal address: (Set by SOP) Pri Ch (digital to analog: "Prt Ch" will be the analog channel; analog to digital: "Prt Ch" will be the digital channel.) Alt Ch: Leave blank Permissions ("Rly": All units Y; all other entries blank.) Distribution (leave blank)</p>

Table F-4. System initialization--single MCS gateway. (continued)

<p>DATA/VOICE TELEPHONE DIRECTORY</p>	<p>All primary numbers will be for that unit's MCS. Alternate numbers not used unless unit has a second phone on its MCS.</p>
<p>COMMUNICATIONS CHANNEL CODE DEFINITION</p>	<p>(NO INPUT, NOT USED)</p>
<p>CHANNEL STATUS</p>	<p>Digital ←-----→ analog</p> <p>Configure one channel as #15 KY-68 (DSVT/MSE) NRZ ext Configure other channel as either #09 corps switch 4-wire #10 division switch 2-wire</p> <p>The analog configuration must be set for the type of switch it is connected to.</p>
<p>SAVE INITIALIZATION</p>	<p>Prior to saving, verify the following: All destination terminals Pri Ch: correct All permissions Rly: Y Unit ID and nodal address correct All other entry fields: blank Digital to analog: Analog channel is same as destination terminal Pri Ch Analog to digital: Digital channel is same as destination terminal Pri Ch</p> <p>Save initialization to hard disk.</p>
<p>CONNECT COMMUNICATIONS DEVICES/WIRES TO APPROPRIATE CHANNELS</p>	<p>(NO INPUT, NOT USED)</p>
<p style="text-align: center;">END GATEWAY INITIALIZATION</p>	

d. Figure F-6 shows the setup for dual MCS gateway. Table F-5 shows system initialization for dual MCS gateway.

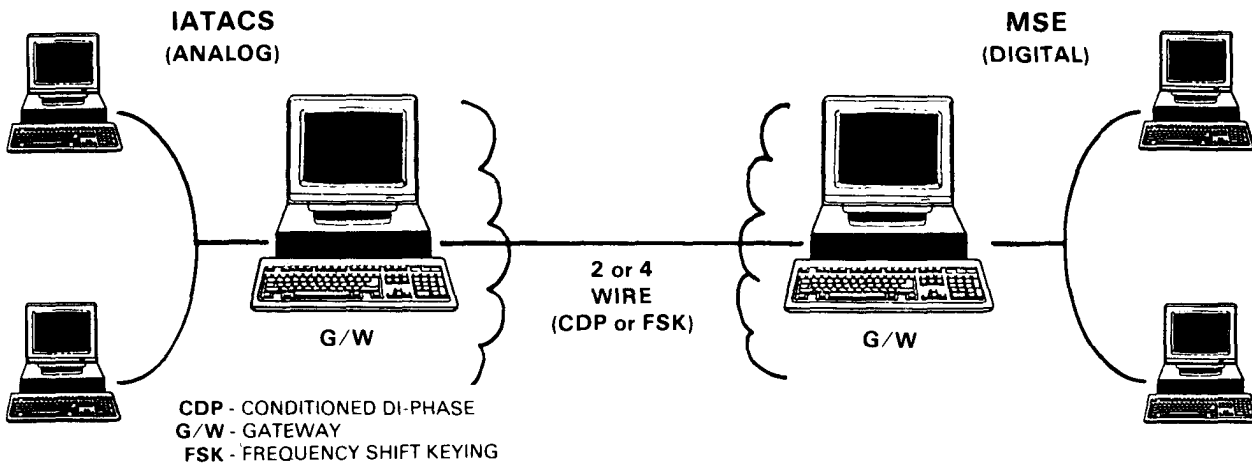


Figure F-6. Dual MCS gateway.

Table F-5. System initialization--dual MCS gateway.

<p>SYSTEM INITIALIZATION (FIRST TIME SETUP)</p>	<p>Date/time group (set during system bootup) Initialization source (new) Local nodal definition</p> <p>Unit ID (20 Chrs) Use unit name with relay designator; for example, III Corps relay 1.) Nodal address (provided by unit) Message number 000 (or set by unit) Grid location (dependent on location) System classification (set by unit)</p> <p>Local message handling</p> <p>Print when received: NO Print when transmitted: NO Print when deleted: NO Print when aborted: NO If cycle message area is full: NOT ACKNOWLEDGE</p> <p>Relay message handling</p> <p>Print when relayed: NO, unless changed by unit Print when aborted: NO, unless changed by unit</p>
<p>DESTINATION TERMINAL IDENTIFICATION (35 ENTRIES)</p>	<p>Digital to analog: All destination terminals will be for units on the analog net. Analog to digital: All destination terminals will be for units on the digital net. Unit ID: (Set by SOP) (20 Chrs) Nodal address: (Set by SOP) Pri Ch (All Pri Chs will be the point-to-point channel.) Alt Ch: Leave blank Permissions ("Rly": All units Y; all other entries blank.) Distribution (leave blank)</p>

Table F-5. System initialization--dual MCS gateway. (continued)

<p>DATA/VOICE TELEPHONE DIRECTORY</p>	<p>All primary numbers will be for that unit's MCS. Alternate numbers not used unless unit has a second phone on its MCS.</p>
<p>COMMUNICATIONS CHANNEL CODE DEFINITION</p>	<p>(NO INPUT, NOT USED)</p>
<p>CHANNEL STATUS</p>	<p>Digital unit gateway</p> <p>Configure one channel as #15 KY-68 (DSVT/MSE) NRZ ext Configure other channel as point-to-point #01 4W FSK-188C 1200 - 6DB #02 4W CDP 16000 - 6DB #03 2W FSK-188C 1200 - 6DB #04 2W CDP 16000 - 6DB</p> <p>Analog unit gateway</p> <p>Configure one channel #09 corps switch 4-wire #10 division switch 2-wire Configure other channel as point-to-point #01 4W FSK-188C 1200 - 6DB #02 4W CDP 16000 - 6DB #03 2W FSK-188C 1200 - 6DB #04 2W CDP 1600 - 6DB</p> <p>Analog and digital gateway point-to-point channel configurations must be identical.</p>
<p>SAVE INITIALIZATION</p>	<p>Prior to saving, verify the following: All destination terminals Pri Ch: correct All permissions Rly: Y Unit ID and nodal address correct All other entry fields: blank Digital or analog unit gateway, point-to-point channel is same as destination identification, "Pri Ch."</p> <p>Save initialization to hard disk.</p>
<p>CONNECT COMMUNICATIONS DEVICES/WIRES TO APPROPRIATE CHANNELS</p>	<p>(NO INPUT, NOT USED)</p>
<p style="text-align: center;">END GATEWAY INITIALIZATION</p>	

e. Table F-6 shows system initialization for the unit MCS.

Table F-6. System initialization--unit MCS.

<p>FOLLOW UNIT MCS SOP</p>	
<p>DESTINATION TERMINAL IDENTIFICATION</p>	<p>Follow unit MCS SOP. Add in unit information for units to contact through gateway.</p>
<p>DATA/VOICE TELEPHONE DIRECTORY</p>	<p>Units not contacted through gateway follow unit MCS SOP. Units contacted through gateway:</p> <p style="padding-left: 40px;">Analog gateway: All primary numbers will be the analog phone number of the MCS gateway. Digital gateway: All primary numbers will be the digital phone number of the MCS gateway.</p> <p>Follow unit MCS SOP for all other system initialization procedures.</p> <p>NOTE: When sending message traffic through a gateway, set the "ETE ACK" option in the message header to Y, otherwise set it to N.</p>

f. Figures F-7 and F-8 show the automatic routing of MCS messages using the relay function.

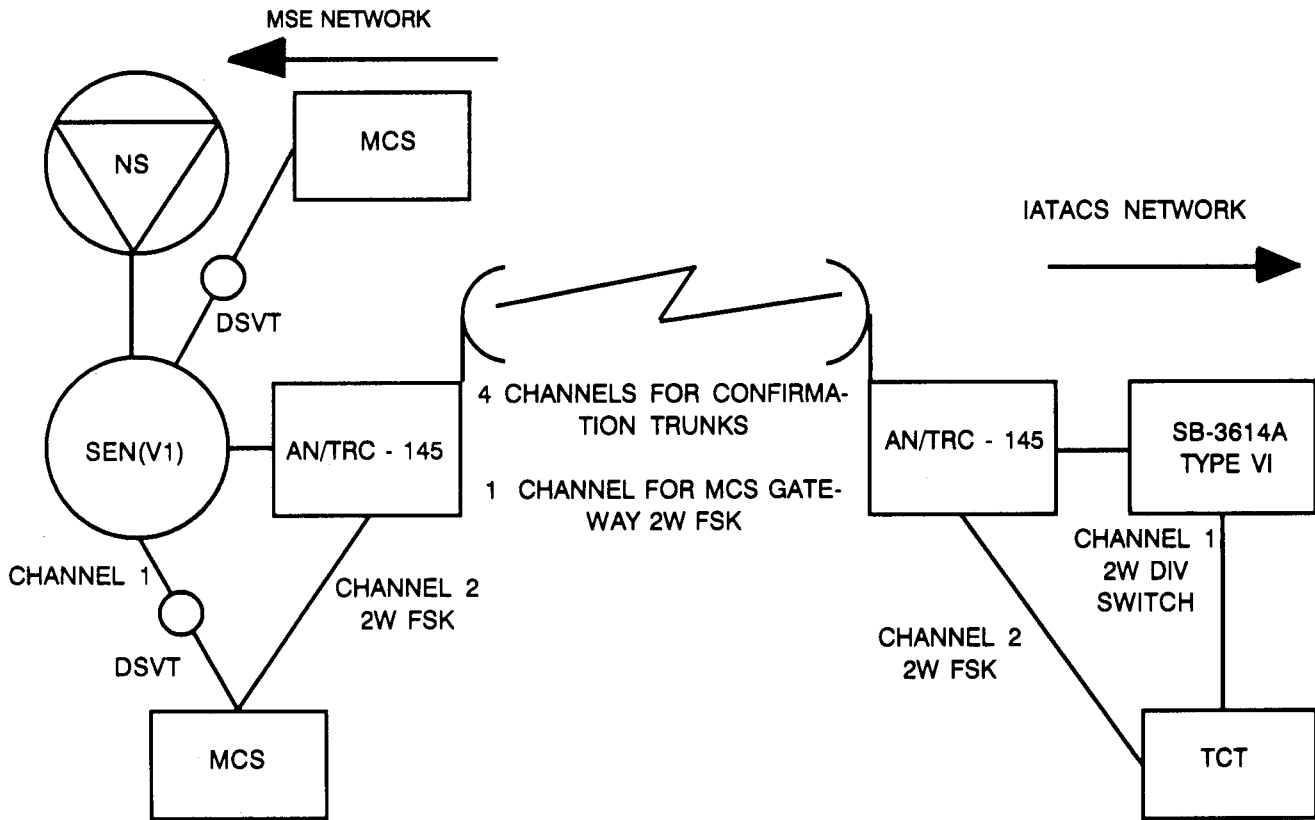
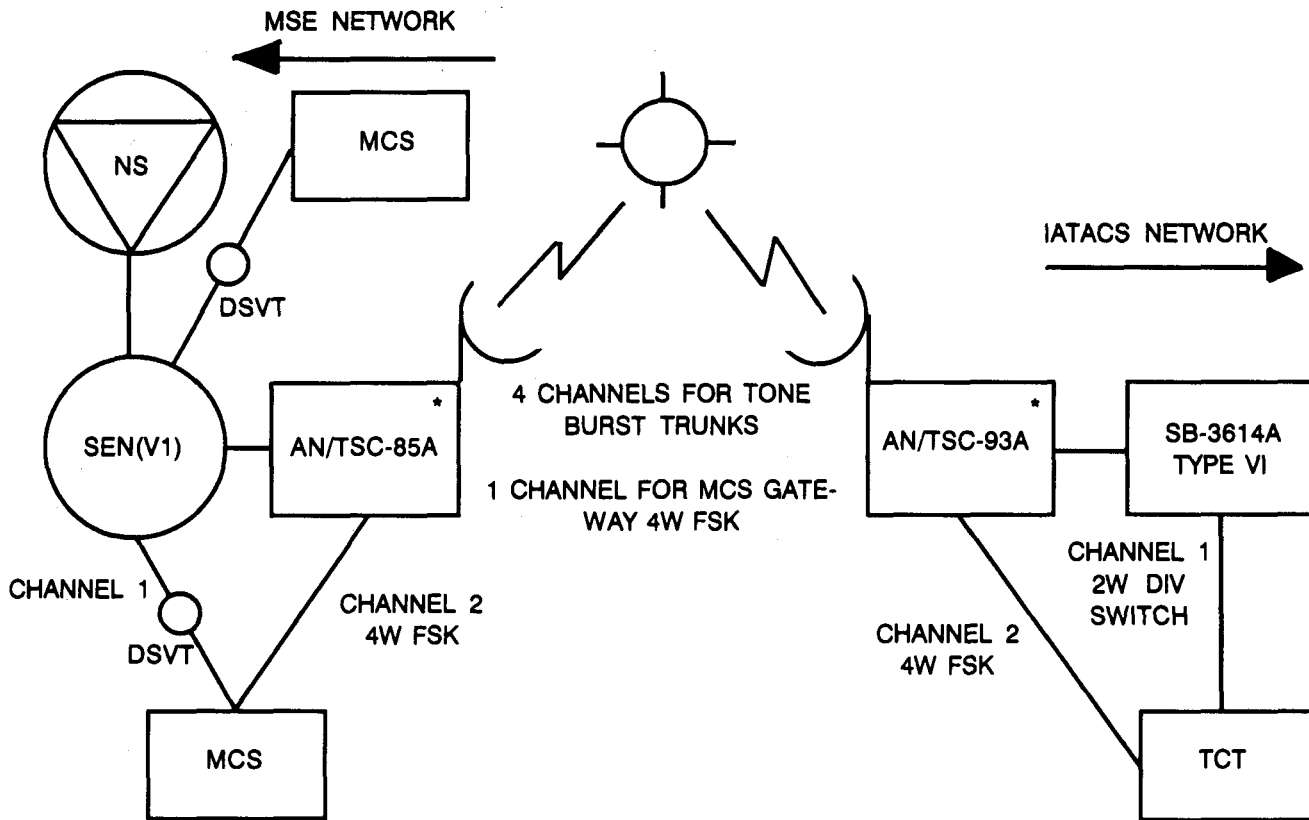


Figure F-7. MCS gateway/relay MSE-AN/TRC-145-IATACS.



* CHANNEL 2 (4W FSK) TERMINATED INTO THE AN/TSC - 85A/93A LRM ON A CVSD CARD PROGRAMMED AT 32KB.

Figure F-8. MCS gateway/relay MSE-TACSAT-IATACS.

F-6. Conclusions and Recommendations

a. Method 1 requires an unacceptable level of operator intervention and is not recommended.

b. Method 2 is recommended if requirements can be satisfied with the SENS operator extending all calls from or into the IATACS network. The SENS loses its ability to connect to a public switch, but no additional circuit cards are required to implement this method.

c. Method 3 is recommended where requirements dictate automated call routing across the networks. The SENS retains its ability to connect to a public switch, but additional circuit cards are required to implement this method. The additional circuit cards are not authorized for MSE units and support from the contractor (GTE) is required to provide the special NS analog profile tape.

d. Data transmission using analog modem signals over tactical MSE networks is unreliable due to frequency repeatability and instability above 2000 Hz. Therefore, it is recommended that gateway solutions using dedicated channels be used to bridge the MSE/IATACS (digital/analog) boundary.

APPENDIX G

IMA Implementation Plan

G-1. Organization

a. This appendix covers--

- Renaming the ASD to the ISSO.
- Transferring the function and resources from the G1/AG to the organic signal unit.

Some TOEs do not specify an organization as an administrative service section (below division level). However, personnel now performing these functions will be identified and transferred with the functions. This appendix also covers in table form all IMA disciplines (for example, signal support).

b. Records management is the essence of information management. It is managing correspondence, reports, forms, directives, publications, official mail (may include electronic mail), and distribution. It includes the maintenance, use, and disposition of recorded information (for example, corporate data bases), classification/declassification of recorded information, and the implementation of responsibilities under the Freedom of Information Act and the Privacy Act. The Army has been using the format, form, terminology dictionaries, literary rules, and disposal instructions for some time. The standards are the same for automatons, communicators, publishers, and printers.

c. Printing and publications is the process of information composition and representation on media. It includes photocomposition and binding for issue and distribution of information products. While the printed word has traditionally been the domain of publishers and printers, automatons and communicators can produce and distribute printed material. In electronic format, users produce publication type documents directly from their decision support systems. Likewise, publishers and printers have routinely used sophisticated automation and communications technologies and audiovisual means to get their printed work out to the user.

d. Technological advances are causing the five disciplines of signal support (automation, communications, visual information, records management, and printing and publications) to converge on a common foundation. Manual methods are now being converted to automated processes. Smaller and more sophisticated devices have led to user-owned and -operated systems. Sophisticated electronic and logic-based technology support the printing and publications areas. Choosing hard copy can streamline information management.

The disciplines are evolving towards one integrated information system capability within the Army.

G-2. Signal Corps Responsibilities

a. Specific signal support responsibilities for Signal Corps units include staff and unit responsibilities. The signal officer is responsible for staff supervision of all information services support functions. The operational signal unit commander is responsible for providing the wide-area networks. Figure G-1 shows signal corps responsibilities.

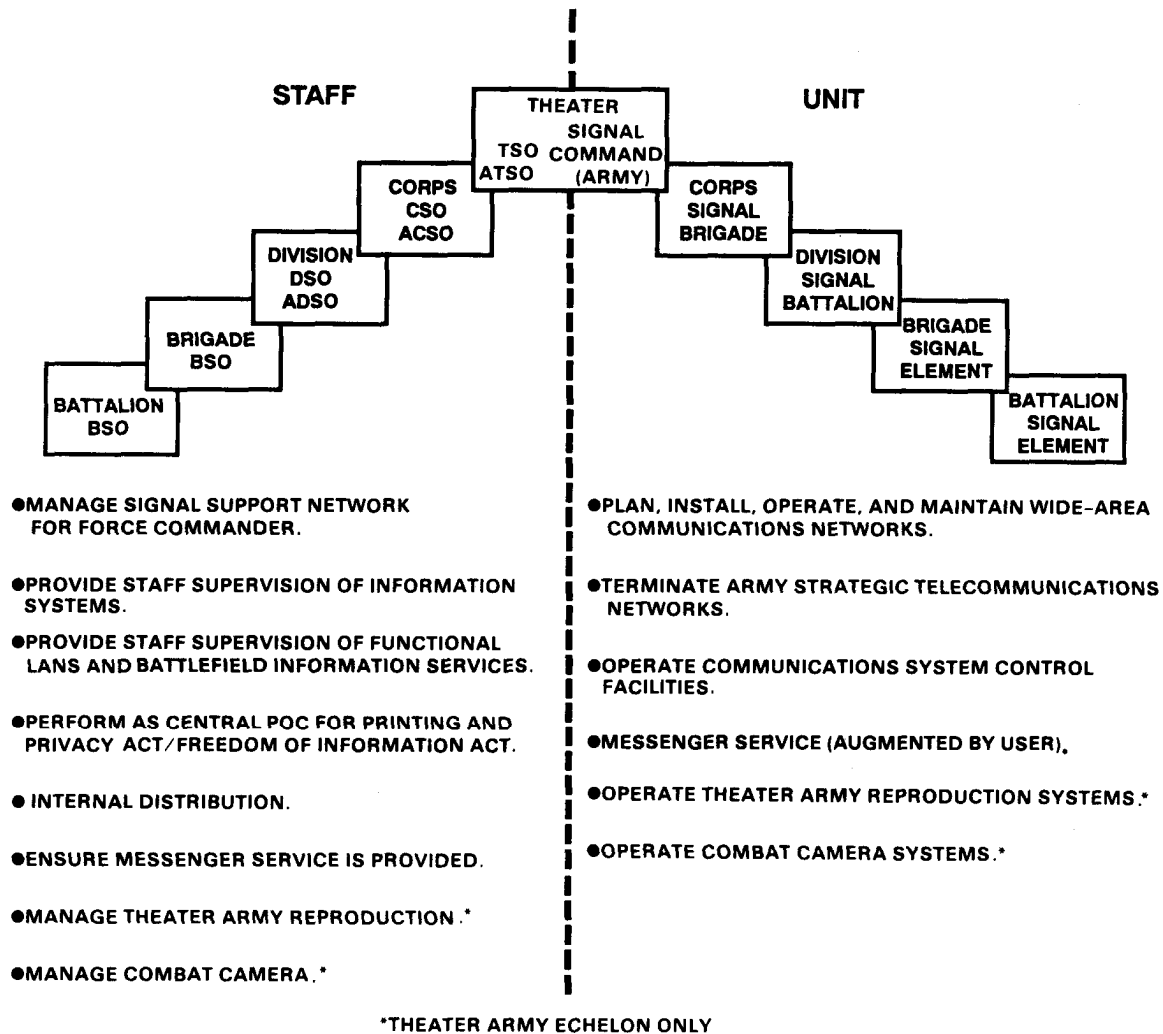


Figure G-1. Signal Corps responsibilities.

b. Many personnel are performing records management functions. Transferring these functions to the Signal Corps support information services requirements. Personnel performing information services will be standard requirement code (SRC) 11, Signal Corps. Management and supervision are under the signal commander (if one is assigned). Force structure realignment accommodates the duties and responsibilities of the ISSO at each level. Force structure realignment of maintenance personnel also accommodates the maintenance requirements for all new signal support equipment. Future and current training will provide officers and NCOs with the needed skills to perform signal support missions on the battlefield. The missions include ISSO duties, automation management, and staff supervision.

c. The signal office is the primary office/staff supporting the commander in his information management responsibilities. The signal office has three primary functions. They are--

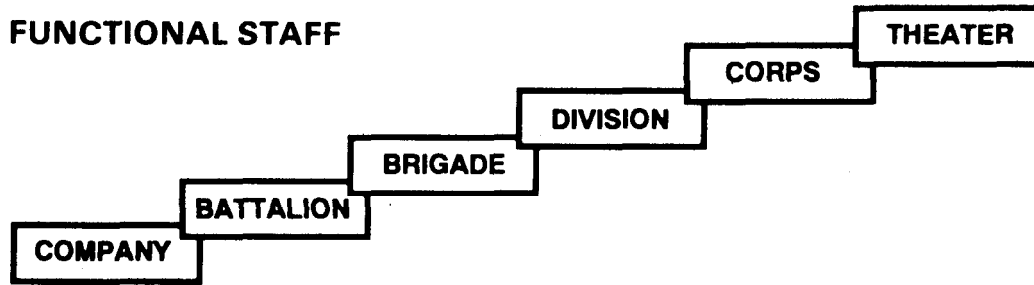
- Advising and assisting the commander in the role as a coordinating staff office.
- Supporting the operational needs of the headquarters by providing signal support to the commander's unit and to tenant units in the area.
- Supporting and managing the informational needs of the headquarters staff.

This last function requires expansion of the traditional role for the Signal Corps. Table G-1 outlines the responsibilities at battalion, brigade, division, and corps among the user, functional manager, and the signal office/staff.

d. The signal officer uses the ISSO to coordinate and to support the signal support functions requiring centralized management internal to the headquarters. An ISSO will be set up at every echelon and be under the signal officer's control. At battalion and brigade, the S1 will accomplish the ISSO function. At support units with no organic supporting signal unit (such as the DISCOM, COSCOM, and TAACOM), the signal officer is the proponent for information services on the staff, but the functional staff officer remains responsible for its execution. The ISSO will provide not only the management functions but will also serve as the central point for those functions that benefit from economies of scale and centralized operations (such as, TOP SECRET repositories for classified document control). Table G-2 outlines the ISSO signal support responsibilities at each echelon. Many functions listed will be supplemented by the DOIM in a garrison environment. The ISSO's structure and functions may vary depending on the requirements and location of the unit with respect to the supporting DOIM. The commander has the authority to adjust ISSO responsibilities.

G-3. Functional Staff Responsibilities

In a tactically deployed headquarters, each functional staff element is responsible for implementing signal support policies, procedures, and standards within his functional area of operations. Each headquarters staff element is responsible for managing BIS which support his function. Figure G-2 shows functional staff responsibilities.



- **IMPLEMENT SIGNAL SUPPORT POLICIES, PROCEDURES, AND STANDARDS IN FUNCTIONAL OPERATIONS.**
- **COORDINATE WIDE-AREA NETWORKS INTERFACE REQUIREMENTS WITH SIGNAL OFFICER.**
- **MANAGE:**
 - **FUNCTIONAL INFORMATION SYSTEMS.**
 - **FUNCTIONAL LOCAL AREA NETWORKS.**
 - **SIGNAL SUPPORT NETWORKS DEDICATED TO SUPPORTING FUNCTIONAL SYSTEMS.**
 - **BATTLEFIELD INFORMATION SERVICES SUPPORTING FUNCTIONAL SYSTEMS.**

Figure G-2. Functional staff responsibilities.

Table G-1. Signal support responsibilities at battalion/brigade/division and corps.

NOTE: Sig refers to Signal Corps responsibilities, user refers to user responsibilities, and staff refers to functional staff responsibilities.

CORRESPONDENCE			
	BN	BDE	DIV/CORPS
Staff supervision of correspondence • recommending local procedures and conventions governing authentication (who, what, when, how)	Sig	Sig	Sig
Preparing correspondence	User	User	User
Establishing distribution schemes	Sig	Sig	Sig
Authenticating correspondence (authentication is defined as approved for release)	User	User	User
Reading file • management • input • recommending local procedures governing reading files	Staff User Sig	Staff User Sig	Staff User Sig

NOTE: Once the correspondence has been authenticated, it becomes "distribution" and then a "file."

CLASSIFIED DOCUMENT CONTROL			
Staff supervision of classified document control • recommending classified document policies, procedures, and inspections (see note)	Sig	Sig	Sig
Classification authority	User	User	User
Classified document distribution	Staff	Staff	Sig
Classified document storage	User	User	User
TOP SECRET repository	Staff	Staff	Sig

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

	BN	BDE	DIV/CORPS
Classified document control <ul style="list-style-type: none"> • as correspondence or file 	User	User	User
Document destruction <ul style="list-style-type: none"> • SECRET • TOP SECRET 	User Staff	User Staff	User Sig

NOTE: Classified document control must apply in phases and areas of the IMA (for example, correspondence, printing/reproduction, distribution/mail, and file management). Because signal is so involved in classified document control and because of this area's criticality, another proponent must set and enforce the standards; the intelligence community.

PRINTING			
There is no printing capability at corps and below. If the need arises, signal forwards the request through signal channels to the appropriate (signal) organization. All signal offices are responsible for verifying correct formatting of materiel and requests. Signal has no involvement in topographic and psychological operations at corps.			
POC for any request to be forwarded	Sig	Sig	Sig
REPRODUCTION			
Staff supervision of reproduction <ul style="list-style-type: none"> • recommending policy, procedures, and conventions 	Sig	Sig	Sig
Copier management <ul style="list-style-type: none"> • determining need for requirement • validating requirement • assisting/advising in satisfying the requirement 	User Staff Staff	User Staff Staff	User Sig Sig
Copier operation and user maintenance	User	User	User

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

PUBLICATIONS			
	BN	BDE	DIV/CORPS
Staff supervision of publications <ul style="list-style-type: none"> • recommending policy, procedures, and conventions 	Sig	Sig	Sig
Publications account management <ul style="list-style-type: none"> • consolidating, ordering, and distributing subordinate unit requests through the pin-point distribution system. This function occurs only at the echelon owning the pin-point account. 	Staff	User*	User*
Identify publications requirement	User	User	User
Publications library <ul style="list-style-type: none"> • not a mandatory requirement • when applicable, geared towards user's function (for example, S2 and maintenance). 	User	User	User
*Separate user pin-point accounts			
FORMS			
Staff supervision of forms management <ul style="list-style-type: none"> • recommending policy, procedures, and conventions • compiling, ordering, and distributing forms. This function occurs only at the elements owning the pin-point account. 	Sig	Sig	Sig
Requests for new forms <ul style="list-style-type: none"> • recommending • approving 	Staff	Staff	Staff
Adhere to forms usage policy <ul style="list-style-type: none"> • includes use management • requesting resupply 	User Staff/ Sig	User Staff/ Sig	User Staff/ Sig
	Staff/ User User	Staff/ User User	Staff/ User User

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

FILES MANAGEMENT			
	BN	BDE	DIV/CORPS
Staff supervision of files management • recommending policy, procedures, and conventions	Sig	Sig	Sig
Files transfer to records holding area	Staff	Staff	Staff
Approval of file listings	Sig	Sig	Sig
Files maintenance	Staff/ User	Staff/ User	Staff/ User
DISTRIBUTION			
Staff supervision of distribution • recommending policy, procedures, and conventions	Sig	Sig	Sig
Internal HQ distribution • distribution center operations • pickup of distribution	Staff User	Staff User	Sig User
External distribution service • recommending policy, procedures, and convention	Sig	Sig	Sig
• providing resources for necessary messenger service. (Maximum use is made of existing delivery systems (for example, Class I and V.)	User	User	User
• coordinating resources for necessary messenger service	Sig	Sig	Sig
Official mail • official mail, internal distribution • censorship	Staff User	Staff User	Sig User

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

NOTE: Mail may be categorized as both official and personal; however, once official mail is reviewed by a unit, it becomes normal distribution. Personal mail remains mail, subject to postal regulation until delivered to the intended recipient. Official mail contains military information. Personal mail contains personal information or subject (sometimes to censorship).

PRIVACY ACT			
	BN	BDE	DIV/CORPS
Staff supervision of Privacy Act • recommending policy, procedures, and convention	Sig	Sig	Sig
POC for Privacy Act	Sig	Sig	Sig
Implementation of Privacy Act	User	User	User
FREEDOM OF INFORMATION ACT (FOIA)			
Staff supervision of FOIA • recommending policy, procedures, and convention	Sig	Sig	Sig
POC for FOIA	Sig	Sig	Sig
Implementation of FOIA	User	User	User
COMMUNICATIONS			
Determine specific communications requirements for joint and combined operations	Sig	Sig	Sig
Determine communications requirements for a heavy/light or light/heavy integrated task force	Sig	Sig	Sig
Analyze/evaluate terrain using a map for signal site selection	Sig	Sig	Sig
Conduct signal site reconnaissance	Sig	Sig	Sig

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

	BN	BDE	DIV/CORPS
Configure a signal node/site	Sig	Sig	Sig
Analyze communications systems and equipment outages	Sig	Sig	Sig
Prepare and update a signal estimate of the situation	Sig	Sig	Sig
Establish signal operating instructions (SOI)	Sig	Sig	Sig
Implement SOI	User	User	User
Install, operate, and maintain combat net radio (CNR) equipment	User	User	User
Identify unit communications requirements	User/ Sig	User/ Sig	User/ Sig
Plan and coordinate communications operations, including preparation of signal plans and orders	Sig	Sig	Sig
Coordinate with appropriate signal elements	User	User	User
Coordinate with appropriate units on signal support matters	Sig	Sig	Sig
Identify communications requirements for an EPLRS/JTIDS network	User/ Sig	User/ Sig	User/ Sig
Install, operate, and maintain EPLRS/JTIDS user-owned and -operated equipment	User	User	User
Plan, design, and layout EPLRS/JTIDS network to include NCS-E/NCS-J (when fielded)	Sig	Sig	Sig
Identify and evaluate electronic counter-countermeasures (ECCM) requirements and plans	Sig	Sig	Sig
Implement ECCM	User/ Sig	User/ Sig	User/ Sig
Execute communications operations	User/ Sig	User/ Sig	User/ Sig

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

	BN	BDE	DIV/CORPS
Manage all frequencies	Sig/ Staff	Sig/ Staff	Sig/ Staff
Manage COMSEC key distribution	User/ Sig	User/ Sig	User/ Sig
Coordinate for signal support not available through organic assets	User/ Sig	User/ Sig	User/ Sig
Plan the use of visual and audible signals	User/ Sig	User/ Sig	User/ Sig
Protect communications equipment from EMP	User/ Sig	User/ Sig	User Sig
Signal and communications securities <ul style="list-style-type: none"> • establish policy and procedures • follow policy and procedures 	Sig User/ Sig	Sig User Sig	Sig User/ Sig
MSE <ul style="list-style-type: none"> • plan, design, install, operate, and maintain an MSE communications network to include supporting transmission systems 	N/A	N/A	Sig
<ul style="list-style-type: none"> • install, operate, and maintain user-owned terminal instruments (for example, telephones and facsimile machines) 	User	User	User
<ul style="list-style-type: none"> • manage and control the MSE network 	N/A	N/A	Sig
<ul style="list-style-type: none"> • maintain/update the MSE system data base 	Sig	Sig	Sig
Improved Army Tactical Command and Control System (IATACCS) <ul style="list-style-type: none"> • plan, design, install, and operate an IATACCS, TRI-TAC based communications network to include supporting transmission systems 	N/A	N/A	Sig
<ul style="list-style-type: none"> • manage/control the IATACCS network 	N/A	N/A	Sig

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

	BN	BDE	DIV/CORPS
<ul style="list-style-type: none"> • prepare and maintain a field operation telephone directory 	Sig	Sig	Sig
<ul style="list-style-type: none"> • install, operate, and maintain terminal instruments not user-owned and -operated 	Sig	Sig	Sig
Calibration program			
<ul style="list-style-type: none"> • manage calibration program • calibrate electronic equipment 	User ORD	User ORD	User ORD
Maintenance			
<ul style="list-style-type: none"> • perform operator PMCS on • communications equipment 	User	User	User
<ul style="list-style-type: none"> • perform organizational maintenance on signal unit communications equipment 	Sig	Sig	Sig
<ul style="list-style-type: none"> • perform organizational maintenance on communications equipment from other than signal units 	ORD	ORD	ORD
<ul style="list-style-type: none"> • evacuate communications equipment to next higher maintenance level 	User/ Sig	User/ Sig	ORD
<ul style="list-style-type: none"> • perform DS and higher maintenance on communications equipment 	ORD	ORD	ORD

NOTE: MSE unique communications equipment is evacuated by ordinance to the nearest regional support center.

<ul style="list-style-type: none"> • maintain repair parts stockage for communications equipment 	User	User/ ORD	ORD
<ul style="list-style-type: none"> • plan, install, and operate all noncommunication electrical systems (for example, lighting, power security, intelligence, and entertainment systems) 	User	User	User
<ul style="list-style-type: none"> • perform organizational maintenance for all noncommunication electrical systems 	Sig	Sig	Sig

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

	BN	BDE	DIV/CORPS
AUTOMATION			
Planning and Advice for Automated Information Systems (AIS)			
<ul style="list-style-type: none"> • establish standards for the design and implementation of locally developed AIS • develop information requirements/needs • establish priorities for information • allocate automation devices • develop continuity of operations plan (COOP) • plan wide-area network • design data base • determine initialization information for devices and data bases • advise user regarding AIS 	<p>Sig</p> <p>Staff/ User</p> <p>Staff/ User</p> <p>Staff</p> <p>Sig</p> <p>Sig</p> <p>Staff/ User</p> <p>User</p> <p>Sig</p>	<p>Sig</p> <p>Staff/ User</p> <p>Staff/ User</p> <p>Staff</p> <p>Sig</p> <p>Sig</p> <p>Staff/ User</p> <p>User</p> <p>Sig</p>	<p>Sig</p> <p>Staff/ User</p> <p>Staff/ User</p> <p>Staff</p> <p>Sig</p> <p>Sig</p> <p>Staff/ User</p> <p>User</p> <p>Sig</p>
Installation of Automated Information Systems			
<ul style="list-style-type: none"> • install equipment for operation • install local area network • coordinate interface requirements with communications network • define standards for interface network • load system and functional software 	<p>User</p> <p>User</p> <p>User</p> <p>Sig</p> <p>User</p>	<p>User</p> <p>User</p> <p>User</p> <p>Sig</p> <p>User</p>	<p>User</p> <p>User</p> <p>User</p> <p>Sig</p> <p>User</p>

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

	BN	BDE	DIV/CORPS
Operation of Automated Information Systems			
• operate functional AIS	User	User	User
• perform basic word processing and spreadsheet functions	User	User	User
• update and manipulate data bases	User	User	User
• backup and restore data bases	Staff/ User	Staff/ User	Staff/ User
• employ automation security procedures	Staff/ User	Staff/ User	Staff/ User
• supervises AIS network operations	Staff/ User	Staff/ User	Staff/ User
• develop and produce unique reports for commander/staff	User	User	User
• control software versions	Sig/ Staff	Sig/ Staff	Sig/ Staff
Maintenance of Automated Information Systems			
• perform operator maintenance	User	User	User
• perform unit level maintenance/evacuate	Sig	Sig	User
• troubleshoot and isolate faults to hardware or software	User	User	User
Automated Information Systems Training			
• conduct operator/crew training	User*	User*	User*
*Signal assists			

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

	BN	BDE	DIV/CORPS
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VISUAL INFORMATION (VI)

NOTE: Functional commanders and users are responsible for integrating VI (enhancements) in their information systems and activities to support their own requirements on the battlefield. Units such as PSYOPS, intelligence, medical and public affairs, own and operate their own equipment and systems to support battlefield operations. Such units may use camera illustrators, computer graphics, graphic printers and plotters, electronic mapping, and other devices and capabilities to support their mission. The sole purpose of VI equipment/system is to perform VI functions, provide services, and/or produce VI products. The application of all VI on the battlefield is governed by VI (IMA) doctrine.

Establish VI policy and procedures	Sig	Sig	Sig
Staff supervision of VI policy and procedures	Sig	Sig	Sig
Develop VI requirements and needs	Staff/ User	Staff/ User	Staff/ User
Allocate VI resources	Staff	Staff	Staff
Integrate VI into OPLANS, battle plans, and SOPs	Sig*	Sig*	Sig*
Determine interface requirements	Sig/ User	Sig/ User	Sig/ User
Perform technical integration of VI into functional communications and information systems	Sig	Sig	Sig
Provide technical advice and assistance for systems integration and standardization of VI into functional information systems	Sig	Sig	Sig

* Mandatory coordination between signal and user organizations

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

	BN	BDE	DIV/CORPS
Install, operate, and perform PMCS on VI equipment/systems designated user-owned and -operated	User	User	User
Effect disposition of record/file VI material	User	User	User
Coordinate VI support not available through organic assets	Sig	Sig	Sig
Perform operator maintenance	User	User	User
Perform unit level maintenance on VI equipment/evacuate	User	User	User
Troubleshoot and isolate faults to hardware or software	User	User	User
COMBAT CAMERA (COMCAM)			

NOTE 1: COMCAM is VI documentation covering air, sea, and ground actions of armed forces in combat and combat support operations, and in related peacetime training activities such as exercises, games, and operations. COMCAM capabilities are external to any specific functional (user-owned and -operated) information system, and are provided by the Theater Signal Command (Army) TSC(A). COMCAM is not meant to replace user-owned and -operated VI systems such as those used specifically for intelligence, medical, prisoner documentation (MP), and PSYOPS. The purpose of COMCAM is to provide combat documentation to support the National Command Authority, the local commanders decision-making process, and to create an operational record of unit activities on the battlefield. COMCAM will augment functional VI systems only when they cannot provide the required support.

Coordinate COMCAM support	Sig	Sig	Sig
Establish COMCAM policy and procedures	TSC(A) only		

Table G-1. Signal support responsibilities at battalion/brigade/division and corps. (continued)

	BN	BDE	DIV/CORPS
Staff supervision of COMCAM policy and procedures	Sig	Sig	Sig
Develop COMCAM requirements and needs	Staff/ User	Staff/ User	Staff/ User
Establish priorities for COMCAM	User	User	User
COMCAM OPCON	Sig	Sig	Sig
Allocate COMCAM resources, plans, and SOP	TSC(A) only		
Determine interface requirements and perform functional and technical integration of COMCAM into communications and information systems	Sig	Sig	Sig
Manage technical standardization of COMCAM (for example, formats and standards)	TSC(A) only		
Install, operate, and maintain COMCAM equipment/systems	TSC(A) only		
Produce and distribute unique COMCAM reports/support products for commander/staff	TSC(A) only		
Determine and effect disposition of record/file COMCAM material	Sig	Sig	Sig
Perform user maintenance on COMCAM equipment	TSC(A) only		
Perform organizational maintenance on COMCAM equipment	TSC(A) only		
Perform DS maintenance on COMCAM equipment on location	TSC(A) only		
Evacuate COMCAM equipment to next higher maintenance level	TSC(A) only		
Maintain repair parts stockage for COMCAM equipment	TSC(A) only		
Maintain direct exchange or backup COMCAM equipment stockage	TSC(A) only		

Table G-2. Signal support/ISSO responsibilities at battalion/brigade/division/corps and theater.

NOTE: Sig refers to ISSO responsibilities assigned to the supporting signal unit, and user refers to an organization or individual.

CORRESPONDENCE			
	DIV	CORPS	THEATER
Staff supervision of correspondence • recommending policies, procedures, and conventions	Sig	Sig	Sig
Preparing correspondence	User	User	User
Establishing distribution schemes	Sig	Sig	Sig
Authenticating correspondence (Authentication is defined as approved for release)	User	User	User
Reading file • management • input	Staff User	Staff User	Staff User
Staff supervision of correspondence • recommending local procedures and conventions governing authentication (who, what, when how)	Sig	Sig	Sig
• recommending local procedures governing reading files	Sig	Sig	Sig

NOTE: Once the correspondence has been authenticated, it becomes "distribution" and then a "file."

CLASSIFIED DOCUMENT CONTROL			
Staff supervision of classified document control • recommending policies, procedures, and convention	Sig	Sig	Sig
Classification authority • recommending classified document control policies, procedures, and inspections (see note)	User Sig	User Sig	User Sig

Table G-2. Signal support/ISSO responsibilities at battalion/brigade/division/corps and theater. (continued)

	DIV	CORPS	THEATER
Classified document distribution	Sig	Sig	Sig
Classified document storage	User	User	User
TOP SECRET repository	Sig	Sig	Sig
Classified document control <ul style="list-style-type: none"> • as correspondence or file 	User	User	User
Document destruction <ul style="list-style-type: none"> • SECRET • TOP SECRET 	User Sig	User Sig	User Sig

NOTE: Classified document control must apply in all phases and areas of the IMA (for example, correspondence, printing/reproduction, distribution/mail, and files management).

PRINTING			
There is no printing capability at corps and below. If needed, signal forwards the request through signal channels to the appropriate (signal) organization. All signal offices are responsible for verifying correct formatting of materiel and requests. Signal has no involvement in topographics and psychological operations at corps.			
Staff supervision of printing <ul style="list-style-type: none"> • recommending policies, procedures, and conventions 	Sig	Sig	Sig
POC for any request to be forwarded	Sig	Sig	Sig
Priority establishment	User	User	User
REPRODUCTION			
Staff supervision of reproduction <ul style="list-style-type: none"> • recommending policies, procedures and conventions 	Sig	Sig	Sig
Copier management <ul style="list-style-type: none"> • determining need for requirement • validating requirement • assisting/advising in satisfying requirement 	User Sig Sig	User Sig Sig	User Sig Sig

Table G-2. Signal support/ISSO responsibilities at battalion/brigade/
division/corps and theater. (continued)

	DIV	CORPS	THEATER
Copier operation and user maintenance	User	User	User
PUBLICATIONS			
Staff supervision of publications <ul style="list-style-type: none"> • recommending policies, procedures, and conventions 	Sig	Sig	Sig
Publications account management <ul style="list-style-type: none"> • consolidating, ordering, and distributing subordinate unit requests through pin-point distribution system. This function occurs only at the echelon owning the pin-point account. 	User*	User*	User*
Identify publications requirement	User	User	User
Publications library <ul style="list-style-type: none"> • not a mandatory requirement • when applicable, geared towards user's function (for example, (S2 and maintenance) 	User	User	User
* Separate user pin-point accounts			
FORMS			
Staff supervision of forms management <ul style="list-style-type: none"> • recommending policies, procedures, and conventions 	Sig	Sig	Sig
<ul style="list-style-type: none"> • compiling, ordering, and distributing forms. This function occurs only at the element owning the pin-point account 	Staff	Staff	Staff
Requests for new forms <ul style="list-style-type: none"> • recommending • approving 	User Staff/ Sig	User Staff/ Sig	User Staff/ Sig
Adhere to forms usage policy <ul style="list-style-type: none"> • includes use management • requesting resupply • resupply stockage 	User User Sig	User User Sig	User User Sig

Table G-2. Signal support/ISSO responsibilities at battalion/brigade/
division/corps and theater. (continued)

FILES MANAGEMENT			
	DIV	CORPS	THEATER
Staff supervision of files management • recommending policies, procedures, and conventions	Sig	Sig	Sig
Files transfer to record holding area	Staff	Staff	Staff
Approval of files listing and electronic conventioning	Sig	Sig	Sig
Files maintenance	Staff/ User	Staff/ User	Staff/ User
DISTRIBUTION			
Staff supervision of distribution • recommending policies, procedures, and conventions	Sig	Sig	Sig
Internal HQ distribution • POC • distribution center operations • pickup of distribution	Sig Sig User	Sig Sig User	Sig Sig User
External distribution service • recommending policies, procedures, and conventions	Sig	Sig	Sig
• provide resources for necessary messenger service. (Maximum use is made of existing delivery systems (for example, Class I and V)	User	User	User
• task resources for necessary messenger service	Sig	Sig	Sig
Official mail • official mail distribution • censorship	Sig User	Sig User	Sig User

Table G-2. Signal support/ISSO responsibilities at battalion/brigade/
division/corps and theater. (continued)

NOTE: Mail may be categorized as both official and personal; however, once official mail is received by a unit, it becomes normal distribution. Personal mail remains mail, subject to postal regulation until delivered to the intended recipient. Official mail contains military information. Personal mail contains personal information, subject (sometimes) to censorship.

PRIVACY ACT AND FREEDOM OF INFORMATION ACT (FOIA)			
	DIV	CORPS	THEATER
Staff supervision of Privacy Act and FOIA • recommending policies, procedures, and conventions	Sig	Sig	Sig
Implementation	User	User	User
POC	Sig	Sig	Sig

GLOSSARY

Acronyms and Abbreviations

A2C2	Army Airspace Command and Control
AB	aviation brigade
ABCCC	Airborne Battlefield Command and Control Center
ABMOC	air battle management operations center
ACCLAIMS	Army COMSEC Commodity, Logistical and Accounting Information Management System
ACCS	Army Command and Control System
ACE	armored construction equipment
ACOMS	Automated Collection Management System
ACUS	Area Common-User System
ADA	air defense artillery
ADCO	Air Defense Communications Office
ADE	Assistant Division Engineer
ADP	automatic data processing
ADPS	Automatic Data Processing System
ADSO	Assistant Division Signal Officer
AG	Adjutant General
AHC	assault helicopter company
ALCE	Airlift Control Element
AM	amplitude modulated
AMC	aircraft maintenance company
ARFCOS	Armed Forces Courier Service
ASIC	all source intelligence center
ASL	authorized stockage list
ASOC	air support operations center
ATCCS	Army Tactical Command and Control System
ATKHB	Attack Helicopter Battalion
ATKHC	Attack Helicopter Company
ATP	ammunition transfer point
AUTODIN	automatic digital network
AUTOSEVOCOM	automatic secure voice communications
AUTOVON	automatic voice network
AVIM	aviation intermediate maintenance
AVUM	aviation unit maintenance
BAS	Battlefield Automated Systems
BCS	Battery Computer System
BICC	battlefield information control center
BIS	battlefield information services
BLCP	battalion logistics control point
BOC	battalion operation center (AD)
BSA	brigade support area
BSM	battlefield spectrum management
CA	Civil Affairs
CCOR	corps central office of records
CCU	communications control unit

FM 11-50

CEB	clothing exchange and bath
CEOI	Communications-Electronics Operation Instructions (See SOI)
CEWI	combat electronic warfare intelligence
CF	command fire
CFC	company fire control
CH	chaplains
CNR	combat net radio
COOP	Continuity of Operations Plan
COR	central office of records
COSCOM	corps support command
CSAB	combat support aviation battalion
CV	chaparral vulcan
DAME	Division Air Management Element
DAMO	division automation management office
DAO	division ammunition officer
DCA	Defense Communications Agency
DCO	Dial Central Office
DCOR	division central office of record
DCS	Defense Communications System
DF	direction finding
DISC ⁴	Director Information Systems for Command, Control, Communications, and Computers
DISCOM	division support command
DLOC	Division Logistical Operations Center
DMD	digital message device
DMMC	division materiel management center
DSA	division support area
DTAC	division tactical command post
DTMF	dual tone multifrequency
DTOC	division tactical operations center
DTOCSE	division tactical operations center support element
DTS	diplomatic telecommunications service
DTSE	DTOC support element
ECCM	electronic counter-countermeasures
ECM	electronic countermeasures
EMP	electromagnetic pulse
EPLRS	Enhanced Position Location Reporting System
FA	field artillery
FAAO	field artillery air observer
FAAR	forward area alerting radar
FASCO	Forward Area Support Coordination Officer
FAST	forward area support team
FC	fire control/field circular when used with a number
FIST	fire support team
FLOT	forward line of troops
FM	frequency modulation
FO	forward observer
FSMC	forward support medical company
FSS	Fire Support System
GP	general purpose
GRREG	graves registration

GRT	ground reconnaissance troop
GSE	ground support equipment
GSR	ground surveillance radar
HEMTT	heavy-expanded mobility tactical truck
HF	high frequency
HIMAD	high-to-medium-altitude air defense
HIP	Howitzer improvement program
HMMWV	high mobility multipurpose wheeled vehicle
HSMC	headquarters and support medical company
HUMINT	human intelligence
IATACS	Improved Army Tactical Communications System
IDS	Infrared Discrimination System
IEW	intelligence and electronic warfare
IEWSE	intelligence and electronic warfare surveillance element
IHFR	improved high frequency radio
IMA	information mission area
IN	infantry
ISB	intermediate/initial staging base
ISSO	Information Services Support Office
JTIDS	Joint Tactical Information Distribution System
LASER	light amplification by stimulated emission of radiation
LASSO	logistics automated system support office
LAW	light antitank weapon
LOS	line of sight
LRSD	long-range surveillance detachment
MANPAD	man-portable air defense
MAST	mobile area support team
MATO	materiel officer
MCEB	Military Communications-Electronics Board
METT-T	mission, enemy, terrain, troops and time available
MIJI	meaconing, intrusion, jamming, and interference
MIOC	military intelligence operations center
MLRS	Multiple Launch Rocket System
MSC	major subordinate command
MSE	Mobile Subscriber Equipment
MSR	major supply route
NLOS	non-line-of-sight
NRI	net radio interface
PIR	priority intelligence requirements
PLRS	Position Location Reporting System
PMS	pedestal mounted stinger
PSNCO	personnel staff noncommissioned officer
PVNTMED	preventive medicine
RAOC	rear area operations center
RATT	radio teletypewriter
REC	radio electronic combat
RPV	remotely piloted vehicles
RSS	remote slave station
SAMS I	Standard Army Maintenance System (Version I)
SATCOM	satellite communication(s)
SAW	squad automatic weapon
SCIF	sensitive compartmented intelligence facility

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SENS	small extension node switch
SHF	super high frequency
SHORAD	short-range air defense
SINCGARS	Single-Channel Ground and Airborne Radio System
SOI	signal operation instructions (formerly CEOI)
SOP	standard operating procedures
SPLL	self-propelled loader launcher
SPO	security, plans, and operations
SSB	single side band
SSO	special security office
STAMMIS	Standard Army Multicommand Management Information System
STU	secure telephone unit
SYSCON	systems control
T&A	transcription and analysis
TAB	target acquisition battery
TACP	tactical air control party
TACSAT	tactical satellite
TAMC	transportation aircraft maintenance company
TAOR	tactical area of responsibility
TASE	Tactical Air Support Element
TCAE	technical control and analysis element
TMT	transportation motor transport
TOW	tube-launched, optically tracked, wire-guided
TRCFAX	terminal radio carrier facsimile
UHF	ultra high frequency
VFMED	variable format message entry devices
VHF	very high frequency
WWMCCS	Worldwide Military Command and Control System

REFERENCES

Required Publications

Required publications are sources that users must read in order to understand or to comply with this publication.

Field Manuals (FM)

25-100	Training the Force
100-5	Operations

Related Publications

Related publications are sources of additional information. They are not required in order to understand this publication.

Allied Communication Publications (ACP)

125 (US Supp-2)(A)	Radiotelephone Procedures for the Conduct of Artillery and Naval Gunfire (US Supplement No. 2)
125(D)	Communications Instructions--Radiotelephone Procedures
126(C)	Communications Instructions --Teletypewriter (Teleprinter) Procedures

Army Regulations (AR)

5-12	Army Management of the Electromagnetic Spectrum
10-53	(C) US Army Intelligence and Security Command (U)
25-1	The Army Information Resources Management Program
25-50	Preparing and Managing Correspondence
25-400-2	The Modern Army Recordkeeping System (MARKS)
66-5	Armed Forces Courier Service
105-31	Record Communications
105-86	Performing Electronic Countermeasures in the United States and Canada
310-25	Dictionary of United States Army Terms
350-1	Army Training
380-5	Department of the Army Information Security Program
380-40	(C) Policy for Safeguarding and Controlling COMSEC Information (U)
380-67	The Department of the Army Personnel Security Program
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381-14	(S) Technical Surveillance Countermeasures (TSCM) (U)
525-22	(S) Electronic Warfare (EW) Policy (U)
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600-83	The New Manning System - Cohort Unit Replacement System
640-15	Criteria for Insuring the Competency of Personnel to Install, Maintain and Repair Communications Security Equipment

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2028	Recommended Changes to Publications and Blank Forms
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25-30	Consolidated Index of Army Publications and Blank Forms
25-35	(C) Index of Communications Security (COMSEC) Publications (U)
738-750	The Army Maintenance Management System (TAMMS)

Field Manuals (FM)

1-103	Airspace Management and Army Air Traffic in a Combat Zone
1-111	Aviation Brigade
3-3	NBC Contamination Avoidance
3-4	NBC Protection
3-5	NBC Decontamination
3-100	NBC Operations
5-100	Engineer Combat Operations
6-20	Fire Support in the AirLand Battle
6-20-1(HTF)	Field Artillery Cannon Battalion
6-20-2(HTF)	Division Artillery, Field Artillery Brigade, and Field Artillery Section (Corps) (How to Fight)
7-7	The Mechanized Infantry Platoon and Squad (APC)
7-10(HTF)	The Infantry Rifle Company (Infantry, Airborne, Air Assault, Ranger)
7-20	The Infantry Battalion (Infantry, Airborne and Air Assault)
7-30	Infantry, Airborne and Air Assault Brigade Operations
8-15	Medical Support in Divisions, Separate Brigades, and the Armored Cavalry Regiment
11-486-6	Telecommunications Engineering: Base Wire Transmission Engineering
17-12-5	Tank Combat Tables M551A1
17-95	Cavalry Operations
19-1	Military Police Support for the AirLand Battle
21-60	Visual Signals
23-30	Grenades and Pyrotechnic Signals
24-2	Radio Frequency Management
24-12	Communications in a "Come-As-You-Are" War
24-17	Tactical Telecommunications Center Operations
24-18	Tactical Single-Channel Radio Communications Techniques

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24-22	Communications-Electronics Management System (CEMS)
24-33	Communications Techniques: Electronic Counter-Countermeasures
24-35	(0) Communications-Electronics Operations Instructions (The CEOI)
25-2	Unit Training Management
34-1	Intelligence and Electronic Warfare Operations
34-10	Division Intelligence and Electronics Warfare Operations
34-40	(S) Electronic Warfare Operations
44-3	Air Defense Artillery Employment: Chaparral/Vulcan/Stinger
44-90	Hawk Battalion Operations
63-1	Combat Service Support Operations, Separate Brigade
63-2	Combat Service Support Operations - Division (How to Support)
71-1	Tank and Mechanized Infantry Company Team
11-2	The Tank and Mechanized Infantry Battalion Task Force
71-3	Armored and Mechanized Infantry Brigade
71-100(HTF)	Armored and Mechanized Division Operations (How to Fight)
71-101(HTF)	Infantry, Airborne, and Air Assault Division Operations
90-2	Battlefield Deception
90-3(HTF)	Desert Operations (How to Fight)
90-4	Air Assault Operators
90-6	Mountain Operations
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90-14	Rear Battle
100-26	The Air-Ground Operations System
100-27	US Army/US Air Force Doctrine for Joint Airborne and Tactical Airlift Operations
101-5	Staff Organization and Operations
101-5-1	Operational Terms and Symbols
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Standardization Agreements (STANAG)

2014	Operation Orders, Warning Orders, and Administrative and Logistic Orders
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2028	System for Field Cable or Field Wire Labelling
2047	Emergency Alarms of Hazards or Attack (NBC and Air Attack Only)
2868	Land Force Tactical Doctrine
4202	Transmission Envelope Characteristics for High Reliability Data Exchange Between Land Tactical Data Processing Equipment Over Single Channel Radio Links
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5040	NATO Automatic and Semi-Automatic Interfaces Between the National Switched Telecommunications Systems of the Combat Zone and Between These Systems and the NATO Integrated Communications System (NICS); Period 1975 to 1990s

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11035L000	Signal Battalion Heavy Division
11036L000	Headquarters and Headquarters Company Signal Battalion
11037L000	Command Operations Company
11038L000	Forward Communications Company
11039L000	Area Signal Company
11045L000	Signal Battalion, Light Infantry Division
11205L000	Signal Battalion, Air Assault Division
11215L000	Signal Battalion, Airborne Division

Technical Manuals (TM)

11-666	Antennas and Radio Propagation
38-750-1	The Army Maintenance Management System (TAMMS) Field Command Procedures

Training Circulars (TC)

6-50	The Field Artillery Cannon Battery
24-20	Tactical Wire and Cable Techniques
24-21	Tactical Multichannel Radio Communications Techniques
24-24	Signal Data References: Communications-Electronics Equipment

Projected Publications

Projected publications are sources of additional information that are scheduled for printing but are not yet available. Upon print, they will be distributed automatically via pinpoint distribution. They may not be obtained from the USA AG Publications Center until indexed in DA Pamphlet 25-30.

Field Manuals (FM)

11-30	MSE Corps/Division Signal Unit Operations
11-32	Combat Net Radio Operations
11-37	MSE Primer for Small-Unit Leaders
11-38	MSE System Management and Control
24-1	Signal Support in the AirLand Battle
24-11	Tactical Satellite Communications
24-35	Signal Operation Instructions: The "SOI"
24-35-1	Signal Supplemental Instructions

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