UHF TACSAT /DAMA

MULTI-SERVICE TACTICS, TECHNIQUES, AND PROCEDURES FOR ULTRA HIGH FREQUENCY TACTICAL SATELLITE AND DEMAND ASSIGNED MULTIPLE ACCESS OPERATIONS

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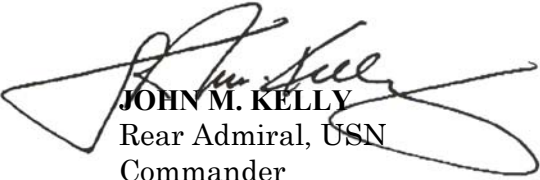
FOREWORD

This publication has been prepared under our direction for use by our respective commands and other commands as appropriate.

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PREFACE

1. Scope

The intent of this publication is to assist planners and users at the joint task force, Service component, and other functional components by providing an improved and unified process for planning, managing, and using ultra high frequency (UHF) tactical satellite (TACSAT) frequencies with special emphasis on maximizing the use of this limited resource.

2. Purpose

Lessons learned and collected by Joint Staff J-6 from numerous joint operations identified significant problems with planning and utilizing the limited number of UHF TACSAT frequencies. Current methods and procedures based on use, geography, channel size, demand access, and time have proved difficult to integrate and require extensive manual tracking and manipulation. These inefficiencies contribute to the shortage of this critical command and control resource. This multi-Service tactics, techniques, and procedures (MTTP) publication consolidates and standardizes Service tactics, techniques, and procedures (TTP) for planning and executing UHF TACSAT frequency management operations. It serves as a planning and execution guide and a framework for coordination and synchronization consistent with current Joint doctrine.

3. Application

a. This publication is applicable to unit level UHF TACSAT planners and users throughout the joint force.

b. The United States (U.S.) Army, Marine Corps, Navy, and Air Force approved this multi-Service publication.

4. Implementation Plan

Participating Service command offices of primary responsibility review this publication, validate the information, and reference and incorporate it into Service manuals, regulations, and curricula as follows:

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5. User Information

a. TRADOC, MCCDC, NWDC, Headquarters Air Force Doctrine Center (AFDC), and the Air Land Sea Application (ALSA) Center developed this publication with the joint participation of the approving Service commands. ALSA reviews and updates this publication as necessary.

b. This publication reflects current joint and Service doctrine, command and control organizations, facilities, personnel, responsibilities, and procedures. Changes in Service protocol, appropriately reflected in joint and Service publications, will be incorporated in revisions to this document.

c. We encourage recommended changes for improving this publication. For each recommendation, include the specific page and paragraph and provide a rationale. Send comments and recommendations directly to—

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(UHF TACSAT/DAMA)
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EXECUTIVE SUMMARY

UHF TACSAT/DAMA

Multi-Service Tactics, Techniques, and Procedures
for UHF TACSAT and DAMA Operations

Chapter I identifies key players in the management of tactical satellite (TACSAT) resources and offers critical guidance for the user to optimize this scarce resource. The usage guidance centers on the need to consider other communications capabilities before requesting access to TACSAT resources. The chapter concludes with sections on TACSAT capabilities, military standards, waveforms, and slave channels. These sections include discussions of narrowband and wideband channels, the utilization of dedicated and demand assigned multiple access (DAMA) services, and descriptions of 5-kHz and 25-kHz waveforms.

Chapter II provides a detailed look at the communications planning cycle of assessing force structure, acquiring resources, managing resources, and issuing resources to users. It discusses DAMA emission control, terminal base address (TBA) management and precedence, common, and private networks, and disadvantaged users.

Chapter III provides techniques and procedures for UHF TACSAT equipment and operations, TBA management, orderwire (OW) key management, and communications security equipment. It also provides samples of 5- and 25-kHz DAMA checklists, accessing dedicated and DAMA channels. The equipment list provides the planner with the capability to assess communications interoperability of various elements in a Joint Task Force (JTF). The point of contact list provides TACSAT users a means of troubleshooting a variety of common problems with UHF TACSAT operations.

The appendices provide samples of checklists, troubleshooting guides, and other planning resources.

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Chapter I
Overview/Terminology

1. Introduction

This multi-Service tactics, techniques, and procedures (MTTP) publication serves as a preparation and execution guide for the communications planner and the terminal operators. It explores solutions to the following problems:

a. Proper preparation and utilization for the limited number of ultra high frequency (UHF) tactical satellite (TACSAT) resources.

b. Greater efficiency in the utilization of this critical command and control resource.

c. Proper consolidation and standardization of Service tactics, techniques, and procedures for planning an execution of UHF TACSAT management.

2. Definition of Key Terms

a. Communications planner. For purposes of this publication, the term "communications planner" refers to individuals responsible for developing UHF satellite communications (SATCOM) requirements in support of the unified combatant commander operations plan (OPLAN), exercise plan (EXPLAN), or emerging operations (EMOP), including unit through component level. Communications planners may be referred to in varying Service elements as frequency managers, signal noncommissioned officer, signal officer, S6, J-6, spectrum manager, communication chief, or other similar term.

b. Terminal operator. For purposes of this publication, the term "terminal operator" refers to any individual who interacts (directly or indirectly) with a UHF TACSAT terminal.

c. Frequency management. The term "frequency management" refers to the process of requesting, issuing, and managing frequency resources in accordance with joint policy, United States (US) and international law, and Service procedures. A SATCOM channel consists of two frequencies managed as individual frequencies.

d. Demand assigned multiple access (DAMA). DAMA is a technique used to increase the number of users a limited "pool" of satellite transponder space can support. The ability to share bandwidth is based on the assumption that not all users require simultaneous access to communication channels. DAMA systems, quickly and transparently, assign communication links or circuits to a network control system based on requests received from user terminals. Once a circuit is not in use, the channels are immediately returned to the central pool for reuse. Using DAMA allows many subscribers to be served using a fraction of the satellite resources required by dedicated, point-to-point signal-channel-carrier networks, thus reducing the costs of satellite networking.

e.   Naval Computer and Telecommunications Area Master Station (NCTAMS)/Satellite Management Center (SMC). The NCTAMS is a station tasked to install, operate, man, and maintain satellite ground stations. The SMC is the DAMA controller office responsible for configuring, monitoring, and troubleshooting DAMA network assignments.

f.   Joint UHF Military Satellite Communications (MILSATCOM) Network Integrated (JMINI) controller. The JMINI is the hardware and software suite used by the NCTAMS-SMC to manage 5-kilohertz (kHz) and 25-kHz DAMA networks. It is a multiplexer controlling the technical configuration of the DAMA satellite channels to provide functionality of the system.

g.   Satellite access request (SAR). The SAR is a formal request, submitted in preformatted message form, to the UCC communications planning office by a using unit through the chain of command. The SAR requests satellite resources to support valid mission requirements.

h.   Satellite access assignment (SAA). The formal SAA assignment message assigning specific resources to a unit for a specific period of time. The SAA is issued by the regional SATCOM support center (RSSC). It is sent to the requesting unit and the NCTAMS for controller configuring and system monitoring .

i.   Net control station (NCS). The NCS is an individual, office, communications control center, or command responsible for facilitating shared access between terminal operators for a particular UHF SATCOM network.

j.   Satellite database (SDB). The SDB is the base document listing validated requirements as a result of UCC mission analysis. The document is reviewed annually to ensure current resource requirements are included.

3. Organizations and Functions

The Joint Chiefs of Staff (JCS), United States Strategic Command (USSTRATCOM), UCC, joint frequency management office (JFMO), global SATCOM support center (GSSC)/RSSC, joint task force (JTF), NCTAMS, combatant commands (COCOM), communications planners, and terminal operators play key roles in planning and managing UHF SATCOM requirements and resources. The responsibilities of each organization are summarized below. The functional relationships between these organizations are depicted in Figure I-1.
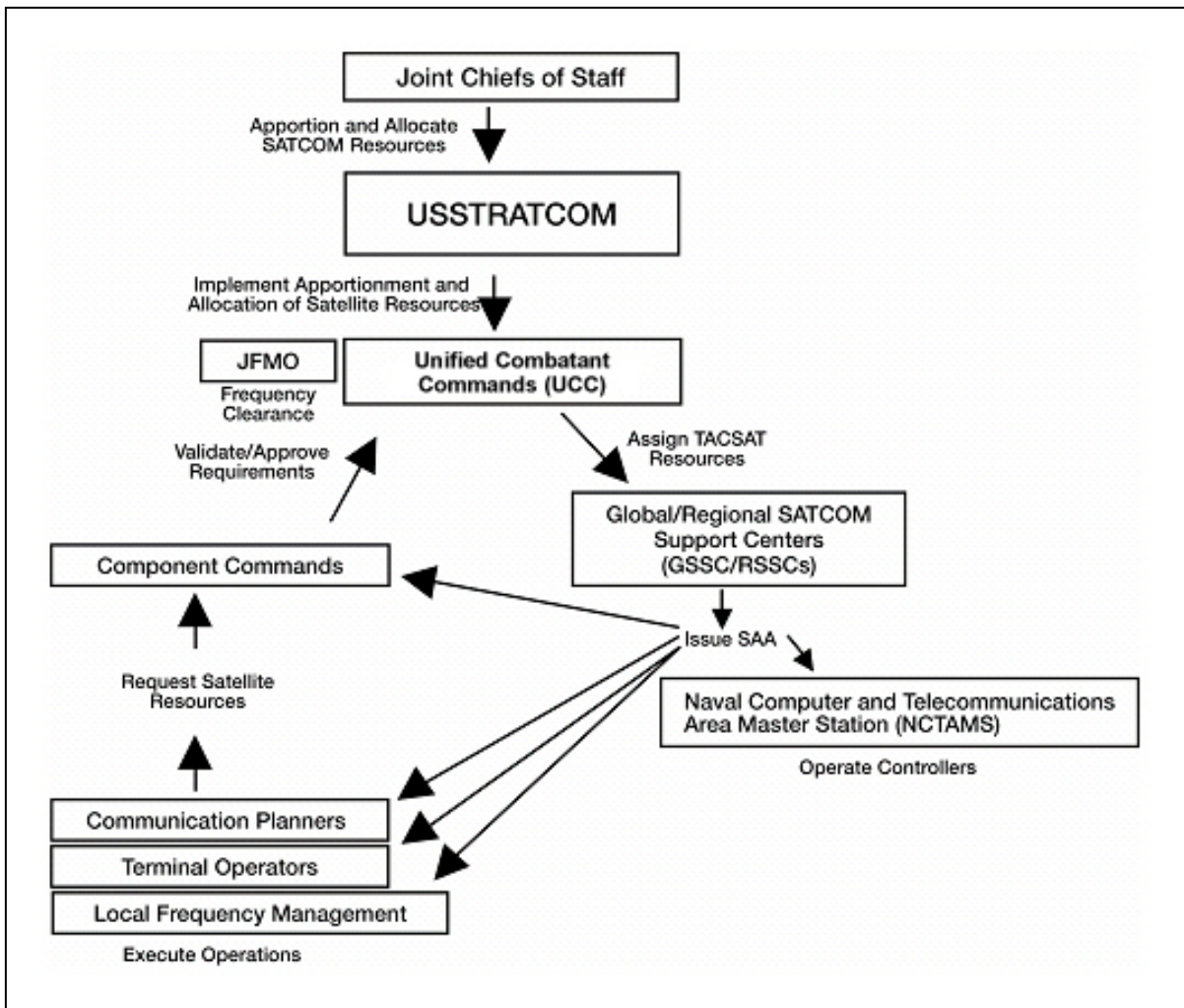
Figure I-1. UHF SATCOM Functional Organization Chart

a. Joint Staff/J-6.

   (1) Provide and maintain a staffing capability to perform the following:

       (a) Monitor, coordinate, and formulate actions – approved by the Chairman of the Joint Chiefs of Staff (CJCS) – for strategic, tactical, and contingency SATCOM operational access.

       (b) Develop a coordinated Joint Staff position on SATCOM issues having operational implications.

       (c) Implement CJCS adjudication directives for SATCOM resources.

       (d) Monitor the health and operational status of SATCOM systems.

   (2) Assist non-Department of Defense (DOD) users in accessing SATCOM capabilities.

   (3) Ensure near-real-time visibility of all SATCOM capabilities and users.

(4) Assist in resolving international SATCOM interference issues that cannot be resolved by COCOM.

(5) Manage the SATCOM requirements process, including the necessary requirements for commercial SATCOM assets for contingency and war situations.

(6) Co-chair the monthly Joint SATCOM panel with USSTRATCOM.

(7) Co-chair the annual joint revalidation and approval for planning purposes of all SATCOM access requirements contained in the SDB with USSTRATCOM.

(8) Review and assess the results of the UCC annual review of SATCOM access requirements. Provide recommendations and corrective actions to the CJCS.

(9) Chair joint working groups addressing SATCOM issues in support of CJCS responsibilities.

(10) Coordinate on USSTRATCOM's recommendations for initial positioning of satellites.

(11) Coordinate the communications message processor (CMP) within the Joint Staff. Oversee the coordination of CMP actions between the Services.

b. USSTRATCOM.

(1) Manage and dynamically assign SATCOM resources commensurate with its role as the single point of contact in military space operational matters.

(2) Monitor resource contention among users and facilitate resolution. Arbitrate conflicts resulting from apportionment decisions, allocation, and spacecraft positioning. Forward unresolved issues to the Joint Staff for adjudication by the CJCS.

(3) Serve as SATCOM operational manager for the day-to-day management of operational SATCOM resources. (See Appendix B for definitions of functions and responsibilities.)

(4) Serve as the advocate for, and develop annual assessment of, SATCOM systems and capability requirements for SATCOM systems supporting operational requirements, as described at Appendix E.

(5) Maintain a direct liaison with the Services, Joint Staff, Defense Information Systems Agency (DISA), Office of the Secretary of Defense, and users of SATCOM systems to identify system provisioning requirements, support DOD SATCOM architecture development, and integrate SATCOM into the Global Information Grid/Defense Information Systems Network.

(6) Coordinate the CMP schedules and issues with the COCOM annually. Prioritize requirements, indicate shortfalls and operational impacts, and provide accurate information to the Services and DISA.

c. Unified Combatant Command (UCC).

(1) Support relationship. Per JP 0-2, "*Unified Action Armed Forces* (UNAFF)," the Secretary of defense establishes support command relationships between combatant commanders for the planning and exeecution of joint operations. Operations Allied Force and Iraqi Freedom highlighted the need to properly manage SATCOM bandwidth, a challenge that may be exacerbated if the supported / supporting

relationship is not clearly defined. With regard to SATCOM support from USSTRATCOM, the UCC typically will be the supported commander and, unless limited by the establishing directive, will "*have the authority to exercise general direction of the supporting effort*." When designated as the supporting commander, Commander USSTRATCOM will determine the "*methods, procedures, and communications to be employed in providing this support*" and "*provide the requested capabilities, as available, to assist the supported commander to accomplish missions requiring additional resources*."

(2) Conduct annual reviews of SATCOM requirements for each validated OPLAN, concept of operation plan, or operational architecture in accordance with the joint strategic capabilities plan and CJCSM 3122.01.

(3) Identify shortfalls from apportioned SATCOM capacity and Joint Strategic Capabilities Plan guidelines. Ensure SATCOM requirements are consistent with current plans and have a validated SDB number.

(4) Consolidate and prioritize all SATCOM requirements needed to execute the referenced plan or mission, including requirements of components and supporting COCOM, Services, Defense agencies, and exercise and training requirements.

(5) Forward a list of prioritized requirements, including requirements that could not be filled using apportioned assets, to USSTRATCOM. Provide an information copy to Joint Staff/J-6 with the annual SDB revalidation. DISA assists by providing a mix of media assessments and modeling support.

(6) Provide operational control of subnetworks for apportioned SATCOM resources including—

(a) Manage apportioned SATCOM capabilities.

(b) Develop allocation plans and allocate apportioned SATCOM assets.

(c) Establish access priorities for subordinate units according to appropriate OPLAN, concept of operation plan, or mission requirements.

(7) Adjudicate SATCOM access conflicts within the respective commands.

(8) Ensure component communications staffs are trained to manage apportioned SATCOM resources.

(9) Prepare an annual report to DISA on commercial SATCOM operational use and associated costs. Provide an information copy to the Joint Staff/J-6 and the Assistant Secretary of Defense (NII). Submit the reports in the first quarter of each fiscal year to DISA. DISA consolidates the reports into one comprehensive report and submits it (annually) to the Joint Staff/J-6 and the Assistant Secretary of Defense.

(10) Ensure proper coordination is routinely employed to obtain, defend, and renew host nation approval for the various SATCOM systems employed by DOD. Determine required coordination based on area of responsibility with the SATCOM operational manager and its SATCOM system experts, the Services, and DISA.

(11) Provide an applicable satellite, terminal, control, and network management segment information for CMP development and updates.

d. GSSC/RSSC.

    (1) Perform 24-hour operations functions.

    (2) Plan and manage communications for the UCC.

    (3) Process SARs and issue SAAs.

    (4) Provide apportionment oversight for the UCCs.

e. JTF.

    (1) Exercise control over joint communications systems and establish and maintain joint circuits, per unified command J-6 guidance.

    (2) Submit frequency requirements to the theater JFMO.

    (3) Validate, consolidate, prioritize, and forward UHF TACSAT requirements to the COCOM for channel allocation.

f. JFMO.

    (1) Provide frequency clearance for apportioned TACSAT channels.

    (2) Assist users in resolving electromagnetic interference (EMI).

g. NCTAMS.

    (1) Configure communications plans for the GSSC/RSSC.

    (2) Execute communications security (COMSEC) rollovers.

    (3) Provide EMI characterization.

    (4) Monitor DAMA control system performance.

    (5) Maintain DAMA control system equipment.

h. Component Command.

    (1) Develop communications plans supporting UCC OPLAN/EXPLAN/EMOP.

    (2) Validate and rank component SARs.

i. Communications Planners.

    (1) Identify resource requirements.

    (2) Submit SARs.

    (3) Perform local frequency deconfliction.

4. UHF TACSAT Usage Guidance

a. UHF TACSAT bandwidth is an extremely scarce resource. Other means of communications are considered prior to requesting a UHF TACSAT resource. UHF TACSAT resources include dedicated channels and DAMA networks. Table I-1 presents criteria communications planners use to determine when a UHF TACSAT resource is necessary. A signals intelligence (SIGINT) risk assessment is performed to determine the system and mode best suited to mitigate the SIGINT risk while accomplishing the mission.

b. Use a logical process for communications planning. The process should include determining the distance and evaluating the terrain between terminating points; the type of information to be moved (voice, data, imagery, video); the systems and modes available to move the information; and the ability of the unit to furnish, install, operate, and maintain the systems and modes. Compare the communications requirements to the systems and modes available to communicate.

c. Do not consider TACSAT as the default solution to any communications requirement. Specific planning considerations drive communications planning and the process of defining the resources required to move information. As the process of system and mode analysis consideration proceeds, eliminate non-TACSAT systems through accurate and defensible mission analysis before determining that TACSAT is required.

d. The planning matrix in Table I-1 represents the logical process used to analyze the systems and modes available to a unit for its communications mission.

Table I-1. Voice/Data Planning Matrix

Distance	Mode	System Example	Remarks
1 to 20 kilometers (km)	LOS (line of sight) FM Secure Voice/Data	VRC-8x/9x MBITR AN/PSC-5/A/C/D AN/PRC-117F LST-5D AN/TRC-176 AN/GRC-206	
	LOS HF Voice/Data	AN/URC-119 PRC-104 AN/GRC-206 Pallet AN/PRC-150	
	Secure Phone/Satellite	STU/STE, Iridium, GSM, INMARSAT	National Security Agency (NSA) Type I Encryption Required
20 to 50 km	LOS HI PWR FM Voice/Data	VRC-8x/9x	Plan 1 watt/km; RETRANS Terrain-Dependent
	LOS HF Voice/Data	AN/URC-119 PRC-104 AN/GRC-206 Pallet AN/PRC-150	
	Secure Phone/Satellite	STU/STE, Iridium, GSM, INMARSAT	NSA Type I Encryption Required
50 to 150 km	LOS HI PWR FM Voice/Data, w/RETRANS	AN/VRC-8x/9x w/RETRANS Site	1 x RETRANS per 40 km; Terrain-Dependent
	EHF (Extremely High Frequency)	AN/PSC-11/SCAMP AN/TSC-154/ SMART-T	
	LOS HF Voice/Data	AN/URC-119 PRC-104 AN/GRC-206 Pallet AN/PRC-150	
	TACSAT	AN/PSC-5/A/C/D AN/PRC-117F LST-5D	
150 to 10,000 km (over-the-horizon)	SIPRNET	SHF	Connected to a Tactical Local Area Network (LAN)
	HF	AN/URC-119 PRC-104 AN/GRC-206 Pallet AN/PRC-150	
	EHF	AN/PSC-11/SCAMP AN/TSC-154/ SMART-T	
	Secure Phone/Satellite	STU/STE, Iridium, GSM, INMARSAT	NSA Type I Encryption Required
	TACSAT	AN/PSC-5/A/C/D AN/PRC-117F LST-5D	

e. Figures I-2, I-3, I-4, and I-5 are decision matrices providing a methodical process for assessing which systems and modes to use for the communications mission. Use this methodical process during all phases of communications planning to ensure the appropriate system and mode are used. Using the following matrices, the

communications planner determines which system and mode meets the requirement. Use the first system and mode identified.

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┌─────────────────────────────────────────────────────────────────────┐
│                                                                     │
│              ┌──────────────────┐                                   │
│              │      TASK:        │                                  │
│              │  Send/Receive     │                                  │
│              │ Secure Voice/Data  │                                 │
│              │    1 - 20 km       │                                 │
│              └──────────────────┘                                   │
│                       │                                             │
│                       ▼                                             │
│                 ╱────────────╲                                      │
│                │   SIGINT     │                                     │
│                │Risk Assessment│                                    │
│                 ╲────────────╱                                      │
│                       │                                             │
│                       ▼                                             │
│            ┌──────────────────┐          ┌──────────────────────┐   │
│            │   Do I have?      │   NO     │ Acquire LOS FM/VHF/UHF │  │
│            │ LOS FM/VHF/UHF    │ ───────▶ │ Acquire LOS HF        │  │
│            │    LOS HF         │          │ Acquire Secure Phone  │  │
│            │  Secure Phone     │          └──────────────────────┘   │
│            └──────────────────┘                                     │
│                   │  YES                                            │
│                   ▼                                                 │
│            ┌──────────────────────┐                                │
│            │ 1. Use LOS FM/VHF/UHF │                                │
│            │ 2. Use LOS HF         │                                │
│            │ 3. Use Secure Phone   │                                │
│            └──────────────────────┘                                │
│                                                                     │
└─────────────────────────────────────────────────────────────────────┘
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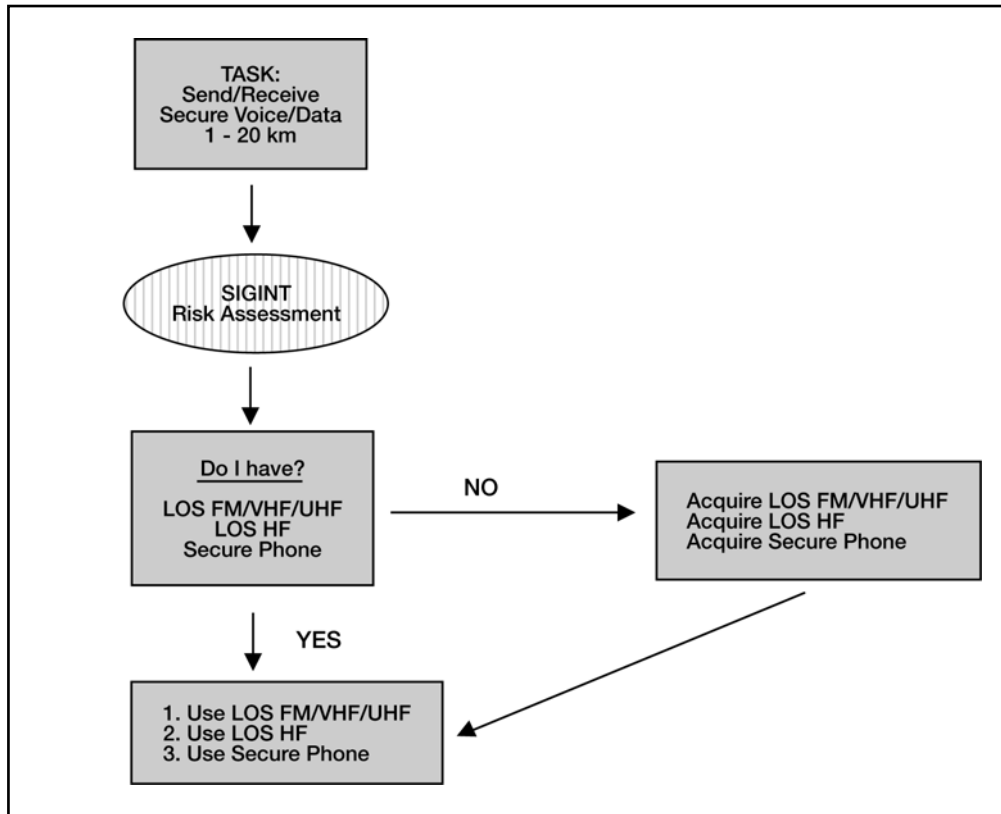
Figure I-2. Short-Range (1 to 20 kilometers) System/Mode Decision Matrix
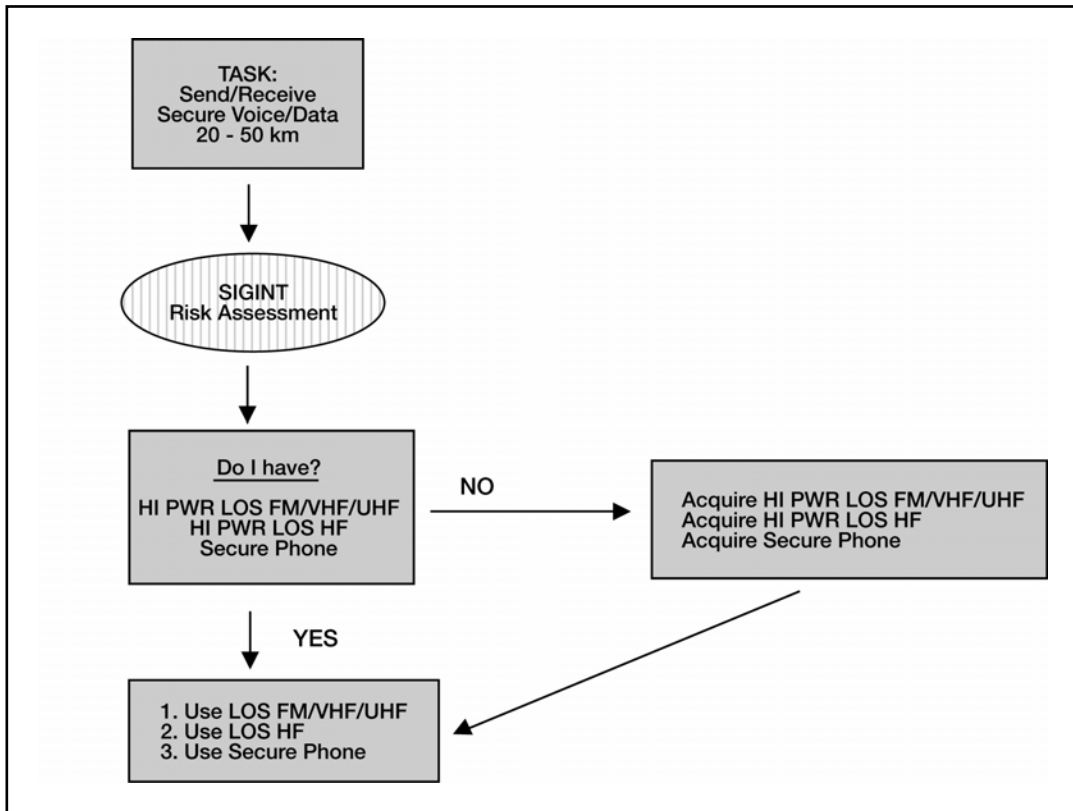
Figure I-3. Medium-Range (20 to 50 kilometers) System/Mode Decision Matrix
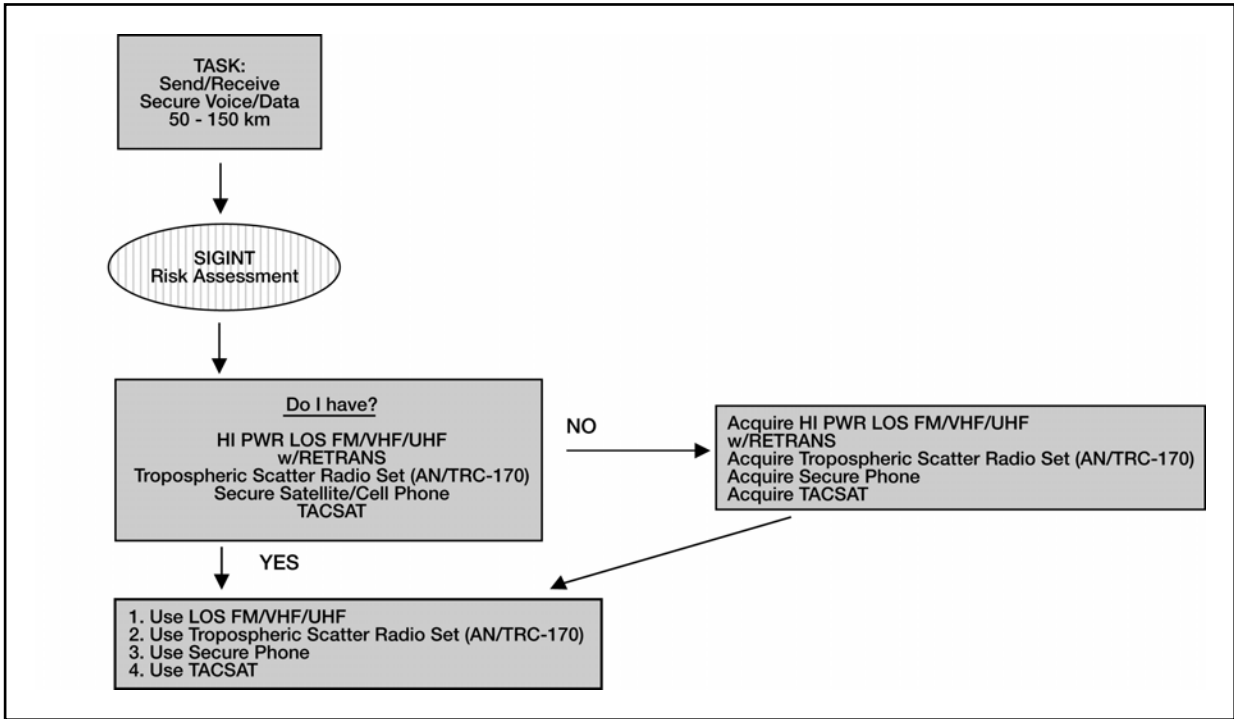
Figure I-4. Long-Range (50 to 150 kilometers) System/Mode Decision Matrix
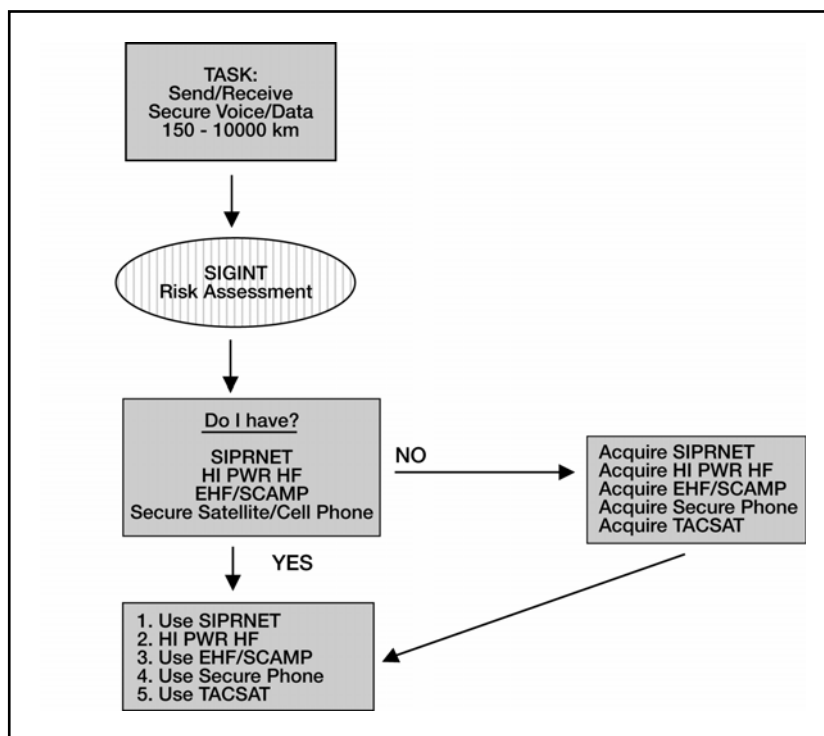
Figure I-5. Over-the-Horizon (150 to 10,000 kilometers) System/Mode Decision Matrix

5. Description of UHF TACSAT Capabilities

The following are commonly used definitions.

a. Bandwidth.

(1) Narrowband. Narrowband describes a low-capacity voicedata communications circuit, path, or channel. This usually implies that the channel is capable of carrying a signal bearing data at a rate of 2.4 kilobits per second (kbps) or less.

(2) Wideband. Wideband describes a medium-capacity voice/data communications circuit, path, or channel. This usually implies that the channel is capable of carrying a signal bearing data at a rate greater than 2.4 kbps and up to 64 kbps.

b. When speaking within the context of communications through 5-kHz and 25-kHz channels of the UHF satellites (per the terminology of MIL-STD 188-181B for single-channel non-DAMA UHF SATCOM), communications up to 9.6-kbps in 5-kHz channels are called narrowband channels; communications up to 64-kbps in 25-kHz channels are called wideband channels.

Military UHF Satellite Constellation and Coverage Areas

Pacific (PAC) F-4 177°W 173°E F-8 172°E

Continental United States (CONUS) F-6 105°W 100°W F-7 100°W

Atlantic (LANT) F-3 15°W 22.5°W F-9 23°E

Indian Ocean (IO) F-5 72.5°E 72°E F-10 29°E F-2

Each Coverage Region has two fully active 'PRIMARY' UFOs and one 'SPARE' FLTSAT or UFO

F-8, F-9, & F-10 carry Global Broadcast Service (GBS) Ka/K-band packages

The UHF Satellites are in geosynchronous orbit approximately 22,300 miles above the equator.

Stars" show equatorial sub-satellite locations of authorized geosynchronous orbital "parking" positions of the primary UHF satellites and the centers of their earth coverage footprints

Footprints Shown are for 18-degrees or Higher Elevation

72°E / 72.5°E   172°E / 177°W   105°W / 100°W   15°W / 22.5°W   72°E / 72.5°E

FLTSAT-4   FLTSAT-7   FLTSAT-8

EAST   WEST   EAST

Satellites

UHF Follow-On (UFO) (Launches began 1992)

Fleet SATCOM (FLTSATCOM) (Launches 1978-1989)

(Note: Satellite locations shown are those known as of Feb. 2004.)

Launch Status

F-11: Launched Dec. 17, 2003

Military UHF* Satellite Capabilities

UFO Satellites

- **Transponders:**
  - All UFO Satellites:
    -- 17 Channels: UHF at 25 kHz BW
    -- 21 Channels: UHF at 5 kHz
    -- 1 Channel: Fleet Broadcast, SHF uplink/UHF downlink, 25 kHz BW*
  - F-4, F-5, & F-6:
    -- 11 Channels: EHF* LDR*
  - F-7, F-8, F-9, F-10, & F-11:
    -- 20 Channels: EHF LDR
  - F-8, F-9, & F-10:
    -- 4 Transponders, 30 GHz uplink/20 GHz downlink, each supporting up to 24 Mbps for Global Broadcast Service

- **Antennas:**
  - UHF: 1 Earth Coverage Transmit & 1 Patch Receive Antenna
  - SHF: 1 Earth Coverage Transmit & 1 Earth Coverage Receive
  - EHF:
    -- 1 Earth Coverage Receive
    -- 1 Earth Coverage Transmit
    -- 1 Five-degree Spot Beam Transmit Antenna
  - GBS:
    -- 1 Fixed Patch Array Receive
    -- 1 Steerable Patch Array Receive
    -- 1 Broad (2000 nmi) Spot Beam Transmit
    -- 1 Spot Beam (500 nmi) Transmit

- **Transmitters:**
  - UHF: 11 Transmit Power Amplifiers
  - SHF: 1 Transmitter
  - EHF: 4 Transmitters at 130 Watts

- **Transponders:**
  - 1 Channel: Fleet Broadcast SHF uplink/UHF downlink at 25 kHz BW*
  - 9 Channels: UHF at 25 kHz BW
  - 12 Channels: UHF at 5 kHz BW
  - 1 Channel: UHF at 500 kHz BW (divided into twenty-one 25-kHz channels allocated to CINCs)

FLTSATCOM Satellites

- **Antennas:**
  - UHF:
    -- 1 Earth Coverage Parabolic
    -- 1 Earth Coverage Helix
  - SHF: 1 Earth Coverage Horn
  - EHF:
    -- 1 Earth Coverage Receive
    -- 1 Earth Coverage Transmit
    -- 1 Five-degree Spot Beam Transmit Antenna

- **Transmitters:**
  - UHF: 12 Power Amplifiers at 25-43 Watts
  - SHF: 1 Transmitter
  - EHF:
    -- 2 Transmitters at 20 Watts

*BW = Bandwidth
*LDR = Low Data Rate (75 bps - 2.4 kbps)
*nmi = Nautical Miles

*UHF = Ultra High Frequency; U.S. Military UHF satellites operate in the Military UHF-Band on 225 - 400 MHz.

*SHF = Super High Frequency; DSCS satellites operate in the SHF X-Band on 7.25 - 8.4 GHz.

*EHF = Extra High Frequency; U.S. Military EHF satellites uplink in the V-Band on 43-45 GHz & downlink in the K-Band on 20.2-21.2 GHz.

Figure I-6. Military UHF Satellite Constellation and Coverage Areas

(1) The UHF follow-on satellite provides twenty-one 5-kHz channels and seventeen 25-kHz channels. In addition to the tactical channels, the Navy uses super high frequency (SHF)-uplink/UHF-downlink broadcast channels to disseminate data to ships. Each footprint has two primary satellites. USSTRATCOM provides a current reference for satellite channel availability at *http://uhfweb2.usspace.spacecom.smil.mil*.

(2) UHF TACSAT channels provide two types of satellite access, dedicated and DAMA. Each type of access can support both voice and data communications.

(3) A combination of fleet satellite communications (FLTSATCOM) and UHF follow-on satellites provides coverage. Each satellite coverage area terminates in at least two adjacent NCTAMS/Naval computing and telecommunications station (NCTS). This redundant coverage ensures global connectivity when using DAMA capabilities.

c. Dedicated TACSAT. All terminals in a net operate on one uplink radio frequency paired with one downlink frequency and assigned exclusively to the net. A net's associated uplink frequency paired with its downlink frequency constitutes a *single* channel dedicated for the net's operational use during an assigned span of hours or days. All stations in the net monitor its channel for calls. Each station has a unique station identifier (or call sign) that is used to identify it to other station operators in the net. Usually, one station in the net is designated as NCS to supervise and authenticate the entry and exit of authorized stations.

d. DAMA. DAMA is a channel access scheme; a TACSAT channel can accommodate multiple concurrent communications. Uuser terminals access is allocated in accordance with demand. DAMA multiplexing channels allow dedicated access to portions of the channel without interference and, through time division multiple access (TDMA), enables more networks to access the channel. TDMA is accomplished when a network controller station transmits control signals that establish precisely recurring intervals of time (frames). A frame is typically one or more seconds in duration. Each frame is subdivided (time-division) into precise time-slots. Certain slots in each frame are reserved for the controller station to receive user station service requests, or to transmit control signals via the satellite. These kinds of signals are called orderwires (OW). Other time-slots are available for user stations to transmit signal bursts to each other via the satellite. User nets are assigned slots within the frames on a given channel. This allows multiple nets to access the same channel simultaneously.

e. Five-kHz DAMA. A 5-kHz DAMA channel supports one 2.4-kbps voice time-slot (with current MIL-STD 188-182 terminals) and provides a dedicated point-to-point (or point-to-network) connection between two outstations.

(1) Point-to-point or point-to-network private circuit is used primarily for data. The time delays in the waveform cause extensive latency for voice and, therefore, limit voice circuits.

(2) The users manually disconnect (teardown) from the time-slot on completion of send/receive to make the time-slot available for other users.

f. Twenty-five-kHz DAMA voice/data. When a dedicated 25-kHz channel is converted to DAMA, it supports up to five 2.4-kbps time-slots that support voice and data communications. A 25-kHz DAMA channel can provide two types of service.

(1) TDMA DAMA (preassigned time-slots).

(a) A shared time-slot dedicated to one network. In this type of service, one set of users with a common or private (guard) network address has exclusive access to this time-slot.

(b) Delay is in proportion to the number of simultaneous users connected to the network address.

(c) A user can be connected, monitoring traffic without interfering with other users, much like a dedicated channel.

(2) Ad hoc DAMA (real DAMA).

(a) Point-to-point/terminal base address (TBA)-to-TBA/TBA-to-common or private (guard) network connection, a private connection between two or more outstations in one time-slot.

(b) No delay or interference due to the point-to-point connection capability.

(c) Users manually disconnect (teardown) from the time-slot on completion of send/receive to make the time-slot available for other users.

g. Five-kHz DAMA multiple-hop (MHOP).

(1) A circuit can be established between two radios that are physically located in two different satellite footprints.

(2) MHOP provides for data transmission over long distances, but has a system delay due to data hopping across multiple satellite footprints that impairs voice communication.

6. Military-Standards (MIL-STD) for DAMA

a. MIL-STD-188-181 (Interoperability Standard for Single Access 5-kHz and 25-kHz UHF Satellite Channels) provides guidance on the use of UHF TACSAT channels in the dedicated mode. Revision B, the most current version, provides the information on home channel numbers and their respective frequencies. It also includes information on higher throughput capabilities for both 5-kHz and 25-kHz DAMA channels.

b. MIL-STD-188-182 (Interoperability Standard for 5-kHz UHF DAMA Terminal Waveform) provides guidance on using 5-kHz DAMA channels. Descriptions of capabilities and OW transmissions are included. Revision A includes a shortened turn-around time for voice communications and allows two simultaneous time-slots for voice communications.

c. MIL-STD-188-183 (Interoperability Standard for 25-kHz UHF DAMA Terminal Waveform) provides guidance on using 25-kHz DAMA channels. Descriptions of capabilities, frame formats, and OW transmissions are included; revision A to this standard allows for both 5-kHz and 25-kHz channels to be utilized as slave channels; other changes included in the document allow the DAMA semi-automatic controller (SAC) to be utilized by terminals conforming to this standard.

7. Waveforms

a. Five-kHz DAMA allows for the multiplexing of widely dispersed terminals over single or multiple non-processed satellite channels. The DAMA waveform is divided

into frames of 8.96 seconds. Each frame is subdivided into 1024 building blocks with a length of 8.75 milliseconds (ms) each. These building blocks are grouped into three segments in each frame, two for OW transmissions and one for communications. The OWs sent from the primary channel controller (PCC) to the terminals are forward orderwires (FOW) and the OWs from the terminal back to the PCC are return orderwires (ROW). The breakout of a frame is depicted in Figure I-7.
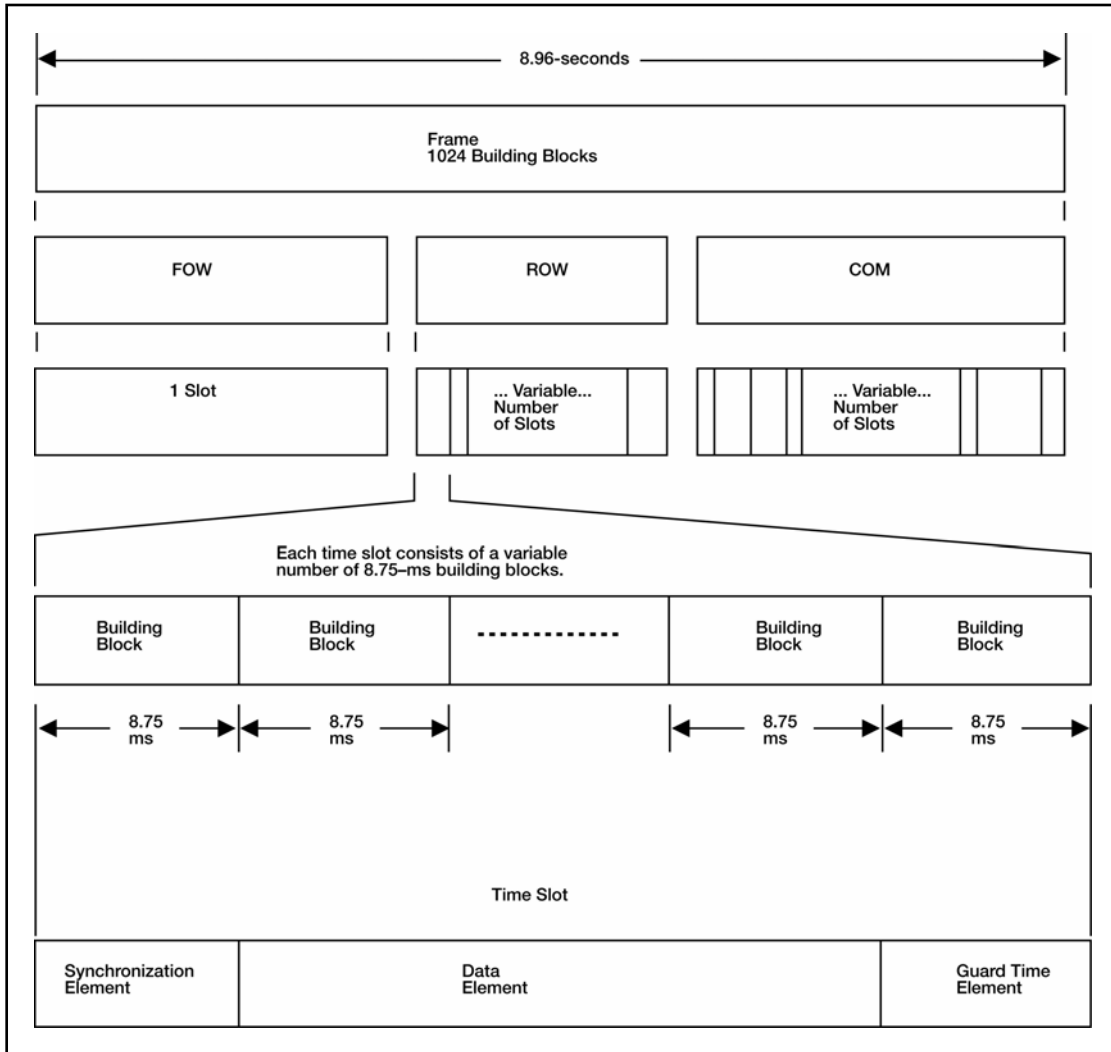
Figure I-7. Waveform Breakout for 5-kHz DAMA

b. In 5-kHz DAMA, the waveform is divided using a *flexible frame format*. In flexible frame format, each frame can be different, based on the missions supported. However, each frame has the same basic set up with the three segments. See Figure I-8.

(1) The FOW is the first segment of all frames. It provides essential control information to all users via one time-slot, which consists of a variable number of building blocks. The number varies in each frame, based on the amount of information

sent at that time and the number of users requiring replies from the PCC. In every frame, the FOW contains information on the next frame.

(2) The ROW is the second segment. It consists of several time-slots, based on the number of users sending information to the PCC. Again, the number of time-slots and number of building blocks changes in each frame based on the number of ROWs sent and how many terminals require ranging in that frame. To ensure there is sufficient room for communications, the ROW slot is limited to a maximum of four user requests in each frame.

(3) The user communications segment is the third segment. It is made up of the remaining building blocks. The building blocks are grouped into time-slots for baseband communications between terminals. The data rate and size of message determine how many building blocks are required in the time-slot for a given transmission. An additional consideration in the length of the time-slot is whether the user has a full-duplex or half-duplex terminal. Based on the continual adjustment of frames, the flexible frame format can technically support an infinite combination of formats. It is also important to note that, with this waveform, the user time-slots are sequential. No other user can begin a transmission until the current user finishes.
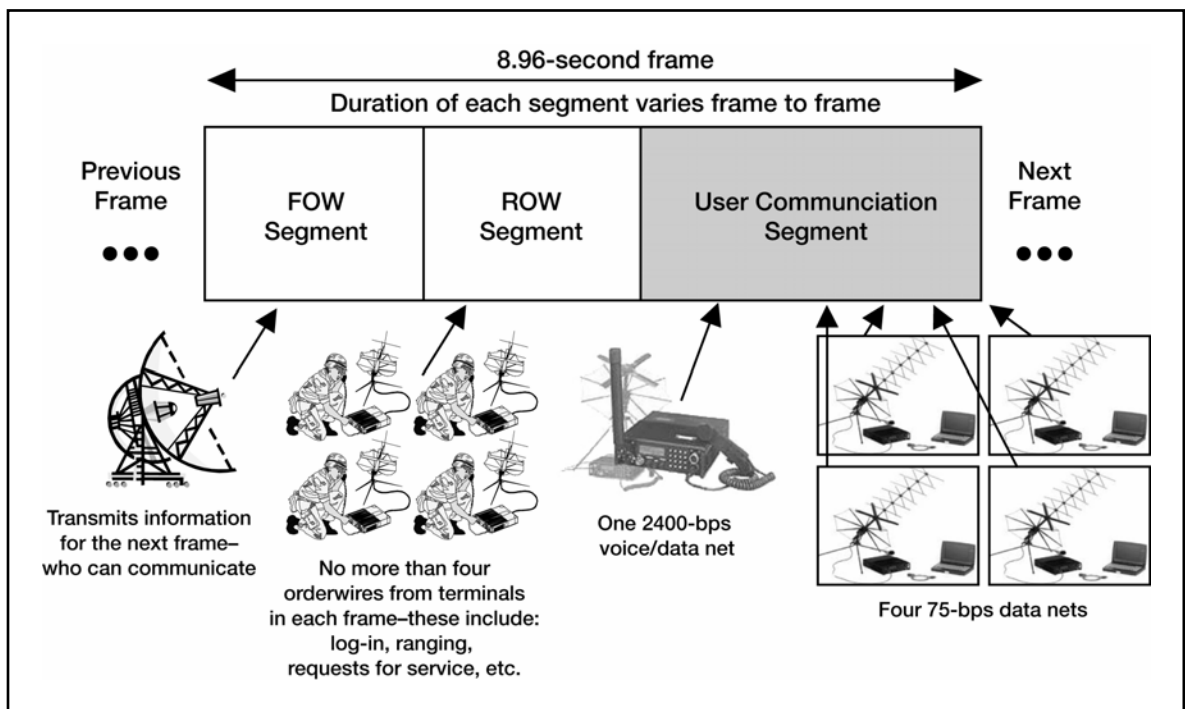
Figure I-8. Waveform Communications for 5-kHz

c. In 25-kHz DAMA, the frames are broken down differently than in 5-kHz DAMA. Each frame has a fixed frame format, predetermined by the controller. The format is based on the number of users supported and the data rates utilized by each one. Unlike 5-kHz DAMA, where each frame is continually adjusted by the changing requests of the users, the frame format normally stays constant on a 25-kHz DAMA channel. The frame is divided into more defined segments, as seen in figure I-9.
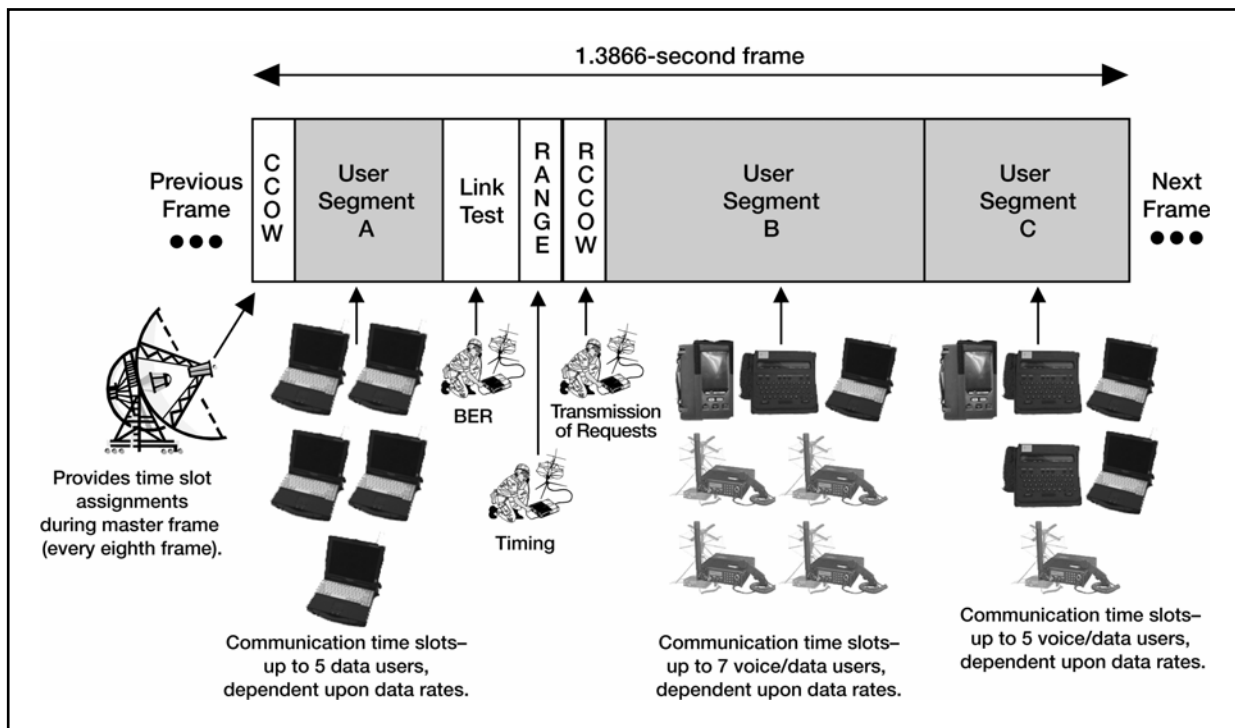
Figure I-9. Waveform Communications for 25-kHz DAMA

d.   The OWs transmitted by the PCC are the channel control orderwire (CCOW) and always start the frame. Every eighth frame is a master frame in which the information on the frame format is provided to the terminals along with COMSEC information. In the 25-kHz DAMA frame, the OWs sent from the terminals return channel control orderwire (RCCOW) are divided into link test, range, and RCCOW slots. The remaining frame is divided into three user segments, as seen in Figures I-10, I-11, and I-12. Each segment—A, B, and C—is divided into time-slots for the users based primarily on the data rate being utilized for communications. The row selected in each user segment provides the controller the information required to select the frame format for the channel, normally stated in three-digit format.

Segment	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5
1	75 - 9.6 - 1/2 10033	75 - 9.6 - 1/2 10034	75 - 9.6 - 1/2 10035		
2	75 - 19.2 - 1/2 10065	75 - 19.2 - 1/2 10066	75 - 19.2 - 1/2 10067	75 - 19.2 - 1/2 10068	75 - 19.2 - 1/2 10069
3	300 - 9.6 - 3/4 10097	75 - 19.2 - 1/2 10098			
4	600 - 19.2 - 1/2 10129	75 - 19.2 - 1/2 10130			
5	1200 - 19.2 - 3/4 101				
6	600 - 32 - 1/2 10193	600 - 32 - 1/2 10194			
7	300 - 32 - 1/2 10225	300 - 32 - 1/2 10226	300 - 32 - 1/2 10227	75 - 32 - 1/2 10228	
8	1200 - 32 - 3/4 10257	75 - 9.6 - 1/2 10258			
9	1200 - 19.2 - 3/4 10289				
A	1200 - 19.2 - 3/4 10321				
B	1200 - 19.2 - 3/4 10353				
C	1200 - 19.2 - 3/4 10385				
D	1200 - 19.2 - 3/4 10417				
E	1200 - 19.2 - 3/4 10449				
F	1200 - 19.2 - 3/4 10481				

KEY TO FIGURE

Number Above Block: AC Slot Number
Top Number Inside Block: Baseband Rate - Burst Rate - Code Rate
Bottom Number Inside Block: DC Circuit Number

EXAMPLE

1
75 - 9.6 - 1/2
10033

Figure I-10. A Segment Slots

B Segment Slots

Row ⊓ — AC slot 5:
- 16 kbps - 32 - 3/4 / 10006

Row 1 — AC slots 6, 23:
- 600 - 19.2 - 1/2 / 10081
- C - SEGMENT
- 75 - 9.6 - 1/2 / 10083

Row 2 — AC slot 6:
- 2400 - 9.6 - 1/2 / 10070

Row 3 — AC slot 6:
- 4800 - 19.2 - 1/2 / 10102

Row 4 — AC slots 6, 7, 8, 9:
- 2400 - 32 -1/2 / 10134
- 300 - 19.2 - 1/2 / 10135
- 2400 - 32 - 1/2 / 10136
- 2400 - 32 - 1/2 / 10137

Row 5 — AC slots 6, 7, 8, 9, 10, 11, 12:
- 2400 - 32 - 3/4 / 10166
- 300 - 32 - 3/4 / 10167
- 2400 - 32 - 3/4 / 10166
- 75 - 9.6 - 1/2 / 10169
- 2400 - 32 - 3/4 / 10170
- 75 - 9.6 - 1/2 / 10171
- 2400 - 32 - 3/4 / 10172

Row 6 — AC slots 6, 7:
- 2400 - 19.2 - 3/4 / 10198
- 4800 - 19.2 - 3/4 / 10199

Row 7 — AC slots 6, 7, 8, 9, 10, 11:
- 2400 - 19.2 - 1/2 / 10230
- 300 - 9.6 - 3/4 / 10231
- 300 - 9.6 - 3/4 / 10232
- 300 - 9.6 - 3/4 / 10233
- 300 - 19.2 - 3/4 / 10234
- 75 - 19.2 - 1/2 / 10235

Row 8 — AC slots 6, 7, 8:
- 2400 - 19.2 - 3/4 / 10262
- 2400 - 19.2 - 3/4 / 10263
- 2400 - 32 - 1/2 / 10264

Row 9 — AC slots 6, 7, 8, 9, 10, 11, 12, 13:
- 2400 - 19.2 - 3/4 / 10294
- 4800 - 32 - 3/4 / 10295
- 2400 - 32 - 3/4 / 10296
- 75 - 19.2 - 1/2 / 10297
- 75 - 19.2 - 1.2 / 10298
- 75 - 19.2- -1/2 / 10299
- 75 - 19.2 - 1/2 / 10300
- 75 - 19.2 - 1/2 / 10301

Row A — AC slots 6, 7, 8, 9, 10, 11, 12, 13, 14:
- 1200 - 32 - 3/4 / 10326
- 1200 - 32 - 3/4 / 10327
- 1200 - 32 - 3/4 / 10328
- 1200 - 32 - 3/4 / 10329
- 1200 - 32 - 3/4 / 10330
- 1200 - 32 - 3/4 / 10331
- 1200 - 32 - 3/4 / 10332
- 1200 - 32 - 3/4 / 10333
- 600 - 32 - 1/2 / 10334

Row B — AC slots 6, 7, 8, 9, 10:
- 1200 - 19.2 - 3/4 / 10358
- 1200 - 19.2 - 3/4 / 10359
- 1200 - 19.2 - 3/4 / 10360
- 1200 - 19.2 - 3/4 / 10361
- 1200 - 19.2 - 3/4 / 10362

Row C — AC slots 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16:
- 300 - 19.2 - 1/2 / 10390
- 300 - 19.2 - 1/2 / 10391
- 300 - 19.2 - 1/2 / 10392
- 300 - 19.2 - 1/2 / 10393
- 300 - 19.2 - 1/2 / 10394
- 300 - 19.2 - 1/2 / 10395
- 300 - 19.2 - 1/2 / 10396
- 300 - 19.2 - 1/2 / 10397
- 300 - 19.2 - 1/2 / 10398
- 300 - 19.2 - 1/2 / 10399
- 300 - 9.6 - 1/2 / 10400

Row D — AC slots 6, 7, 8, 9, 10, 11, 12:
- 300 - 9.6 - 1/2 / 10422
- 300 - 9.6 - 1/2 / 10423
- 300 - 9.6 - 1/2 / 10424
- 300 - 9.6 - 1/2 / 10425
- 300 - 9.6 - 1/2 / 10426
- 300 - 9.6 - 1/2 / 10427
- 75 - 19.2 - 1/2 / 10428

Row E — AC slots 6, 7, 8:
- 2400 - 19.2 - 3/4 / 10454
- 2400 - 19.2 - 3/4 / 10455
- 2400 - 19.2 - 3/4 / 10456

Row F — AC slots 6, 7, 8, 9:
- 2400 - 32 -3/4 / 10486
- 1200 - 19.2 - 1/2 / 10487
- 1200 - 19.2 - 1/2 / 10488
- 1200 - 19.2 - 1/2 / 10489

KEY TO FIGURE

Number Above Block: AC Slot Number
Top Number Inside Block: Baseband Rate - Burst Rate - Code Rate
Bottom Number Inside Block: DC Circuit Number

EXAMPLE

6
2400 - 19.2 - 1/2
10038

Figure I-11. B Segment Slots

I-20
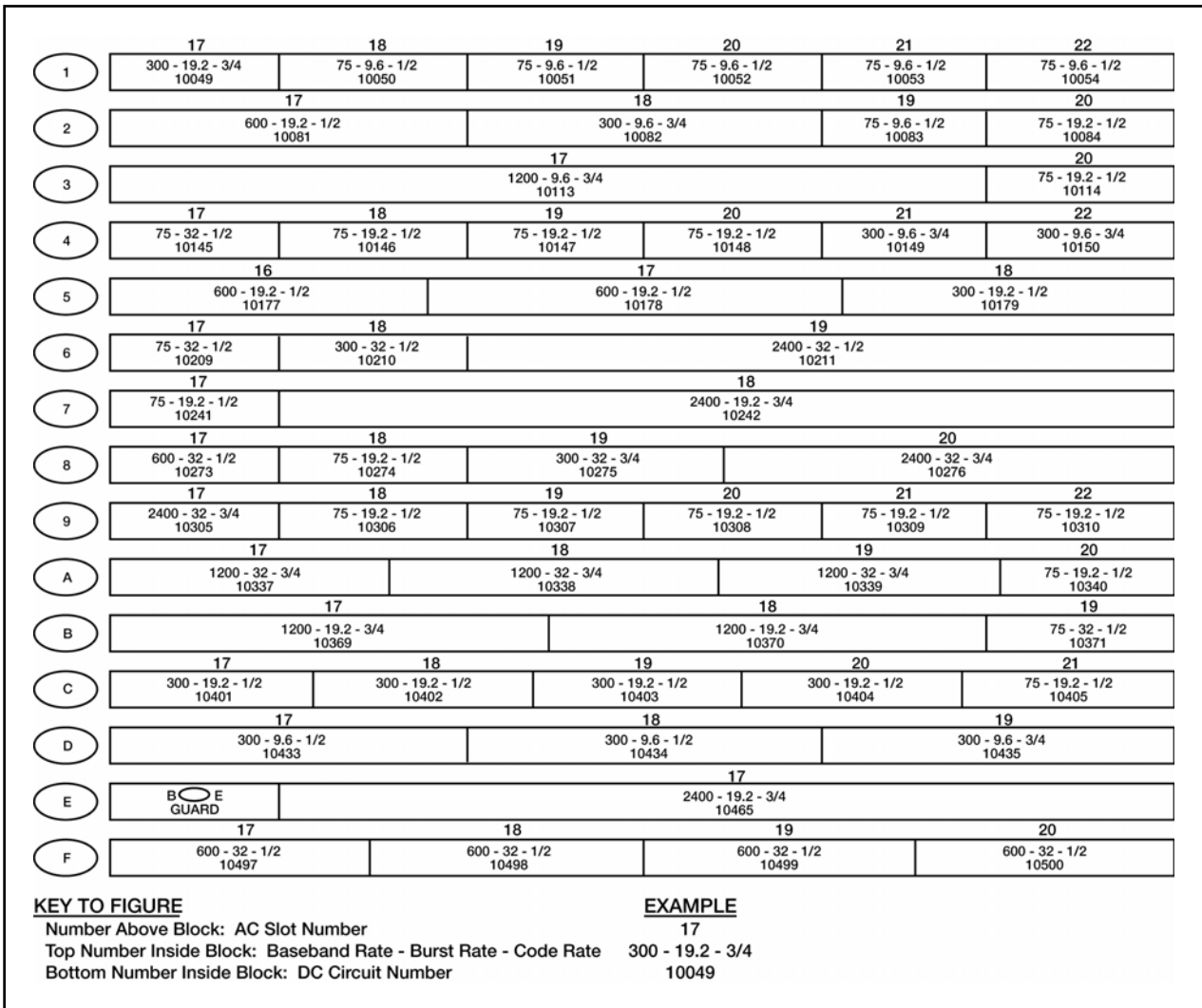
Figure I-12. C Segment Slots

Row						
1	17: 300 - 19.2 - 3/4 / 10049	18: 75 - 9.6 - 1/2 / 10050	19: 75 - 9.6 - 1/2 / 10051	20: 75 - 9.6 - 1/2 / 10052	21: 75 - 9.6 - 1/2 / 10053	22: 75 - 9.6 - 1/2 / 10054
2	17: 600 - 19.2 - 1/2 / 10081	18: 300 - 9.6 - 3/4 / 10082	19: 75 - 9.6 - 1/2 / 10083	20: 75 - 19.2 - 1/2 / 10084		
3	17: 1200 - 9.6 - 3/4 / 10113	20: 75 - 19.2 - 1/2 / 10114				
4	17: 75 - 32 - 1/2 / 10145	18: 75 - 19.2 - 1/2 / 10146	19: 75 - 19.2 - 1/2 / 10147	20: 75 - 19.2 - 1/2 / 10148	21: 300 - 9.6 - 3/4 / 10149	22: 300 - 9.6 - 3/4 / 10150
5	16: 600 - 19.2 - 1/2 / 10177	17: 600 - 19.2 - 1/2 / 10178	18: 300 - 19.2 - 1/2 / 10179			
6	17: 75 - 32 - 1/2 / 10209	18: 300 - 32 - 1/2 / 10210	19: 2400 - 32 - 1/2 / 10211			
7	17: 75 - 19.2 - 1/2 / 10241	18: 2400 - 19.2 - 3/4 / 10242				
8	17: 600 - 32 - 1/2 / 10273	18: 75 - 19.2 - 1/2 / 10274	19: 300 - 32 - 3/4 / 10275	20: 2400 - 32 - 3/4 / 10276		
9	17: 2400 - 32 - 3/4 / 10305	18: 75 - 19.2 - 1/2 / 10306	19: 75 - 19.2 - 1/2 / 10307	20: 75 - 19.2 - 1/2 / 10308	21: 75 - 19.2 - 1/2 / 10309	22: 75 - 19.2 - 1/2 / 10310
A	17: 1200 - 32 - 3/4 / 10337	18: 1200 - 32 - 3/4 / 10338	19: 1200 - 32 - 3/4 / 10339	20: 75 - 19.2 - 1/2 / 10340		
B	17: 1200 - 19.2 - 3/4 / 10369	18: 1200 - 19.2 - 3/4 / 10370	19: 75 - 32 - 1/2 / 10371			
C	17: 300 - 19.2 - 1/2 / 10401	18: 300 - 19.2 - 1/2 / 10402	19: 300 - 19.2 - 1/2 / 10403	20: 300 - 19.2 - 1/2 / 10404	21: 75 - 19.2 - 1/2 / 10405	
D	17: 300 - 9.6 - 1/2 / 10433	18: 300 - 9.6 - 1/2 / 10434	19: 300 - 9.6 - 3/4 / 10435			
E	B-E GUARD	17: 2400 - 19.2 - 3/4 / 10465				
F	17: 600 - 32 - 1/2 / 10497	18: 600 - 32 - 1/2 / 10498	19: 600 - 32 - 1/2 / 10499	20: 600 - 32 - 1/2 / 10500		

KEY TO FIGURE

Number Above Block: AC Slot Number — EXAMPLE: 17

Top Number Inside Block: Baseband Rate - Burst Rate - Code Rate — 300 - 19.2 - 3/4

Bottom Number Inside Block: DC Circuit Number — 10049

e. The segments shown in Figures I-10 through I-14 are complete selections. They facilitate understading how the controller determines the number of users that may simultaneously use a channel without causing interference. The first item considered is the data rate of the baseband device. This is indicated by the first number in each block. The second item considered is the burst rate, which can be one of three selections. On good channels, the burst rate can be as high as 32-kilosymbol(s) per second; on noisier channels (or channels with disadvantaged users), the burst rate is lowered to 19.2- or 9.6-kilosymbol(s) per second to increase the likelihood of successful communication. The encoding rate also plays a major role, especially with the disadvantaged users on the DAMA channels.

f.   While there are selections that can accommodate up to 22 time-slots and selections that can accommodate 16-kbps data/voice users, the most common Navy selections are the 257 and 259 formats (shown in Figure I-13). These formats allow five narrowband voice users at a 2.4-kbps data rate on the channel along with several lower data rate users. The benefit to the user is that five voice nets can be placed on one channel instead of five separate channels. These formats require ideal conditions in which burst rates can be at their highest speed.

g.   Adjustments to the frame format are made for different data rates and different requirements of the users. The UCC, RSSC, or JMINI control station operator always determines the frame format. Users only supply the requests for access to the channels and information (such as data rates, type of communications, length of transmissions, and disadvantaged terminals within the network) supporting the use of the time-slots. This allows the control operators to adjust the channels to support the greatest number of users with the highest quality communications slots available.
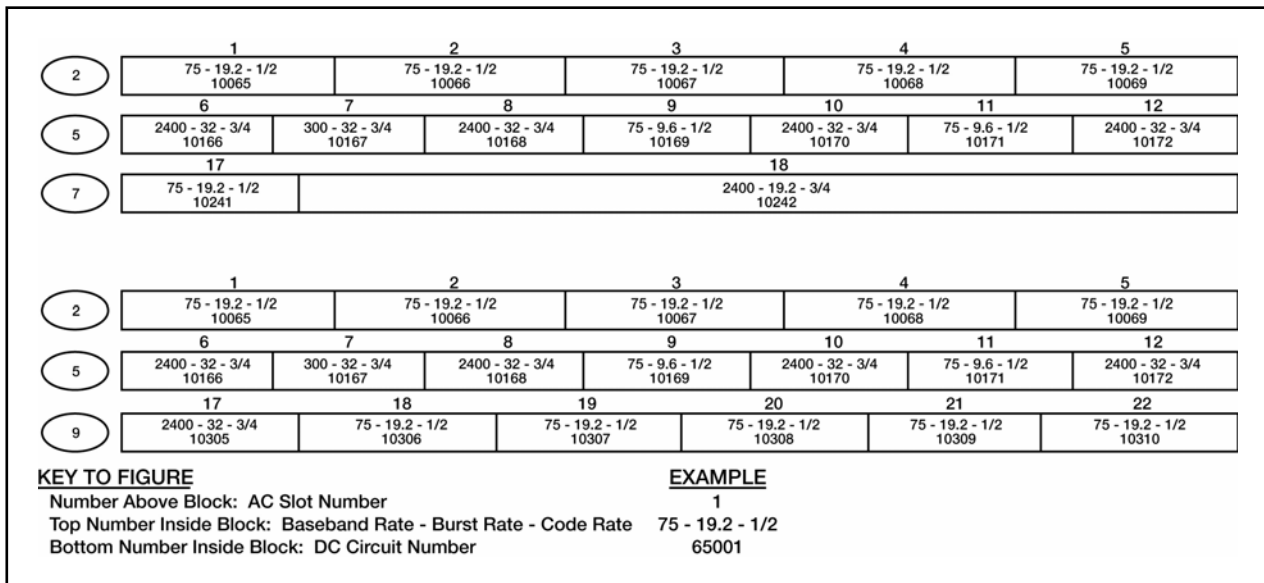
Figure I-13. Typical Navy 25-kHz DAMA Assignments

h.   While these may be the most common frame formats used, they are not the only formats available. Frame formats can, and should, be based on the communications requirements submitted, then updated based on the quality of communications provided. When a unit has disadvantaged users (such as manpack, 20w radio with a low-look angle to the satellite) within the network, the frame format should be adjusted to provide a more robust time-slot. This may include reducing the number of time-slots available to allow for lower burst rates. The lower burst rates (19.2 and 9.6) allow for communications to be established when the burst rate of 32 does not support the majority of users.

i. For TDMA DAMA, the time-slots within the frame format for communications are assigned to a network address. This guarantees assured access to the units. The slot is used only by those terminals contacting the network address. TDMA DAMA does not allow point-to-point or conference calls since all time-slots are dedicated to network addresses as indicated in Figure I-14. In addition, use of TDMA DAMA does not allow changing frame formats based on communications problems. The time-slots are assigned and cannot be changed.
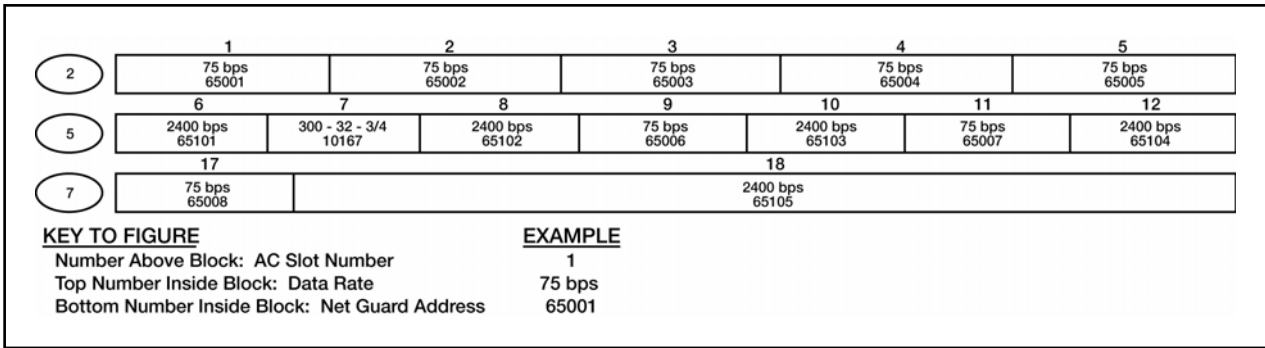
Figure I-14. Example of 25-kHz TDMA DAMA Assignments

8. Slave Channels

a. Slave channels capitalize on a frequency switching concept to assign services on 5-kHz and 25-kHz channels that are time-slaved to a 25-kHz DAMA control channel (Figure I-15).

(1) DAMA control channel used for OW communications, ranging, and link tests.

(2) DAMA slave channels used for baseband communications.

(3) DAMA slave channels do not require channel control modems/radios.
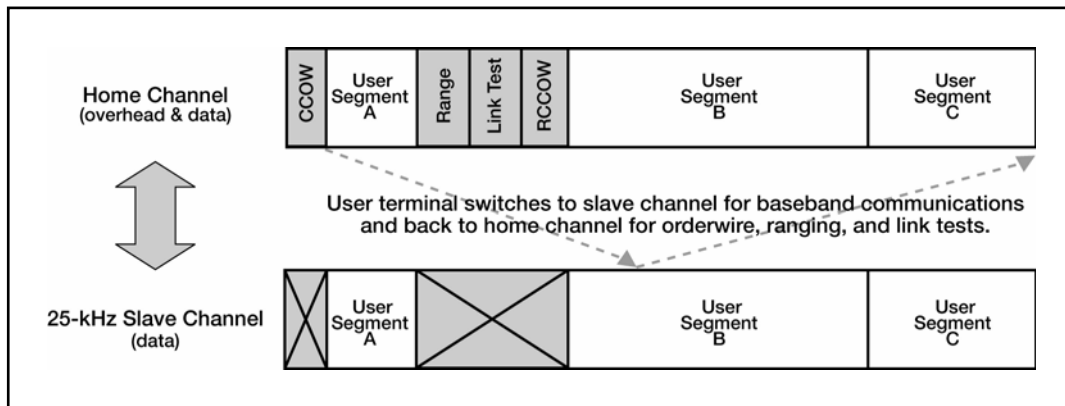
Figure I-15. Slave Channels for 25-kHz DAMA

b. Only DAMA SAC supports slave channels; JMINI at full operational capability supports—

(1) Both -183 (baseline) and -183A terminals can use 25-kHz slave channels.

(2) Only -183A terminals can use 5-kHz slave channels. New burst rates and forward are correction rates.

(3) Set up and push-to-talk delays on 5-kHz slave channels are the same as on any 25-kHz DAMA channel.

c. Consider slave channels a hybrid of DAMA with demand assigned single access (DASA) capability. DASA requires—

(1) User tunes to DAMA home channel, requests timed DASA access.

(2) Radio frequency switches to DASA channel for dedicated channel use.

(3) Radio uses frequency switching technology.

d. In each frame cycle—

(1) Users tune to home channel for overhead.

    (a) CCOW.

    (b) RCCOW.

    (c) Link test.

    (d) Ranging.

    (e) No OW, ranging, or link data on slave channel.

(2) Users frequency switch to slave channel for baseband communications on appropriate data slot(s).
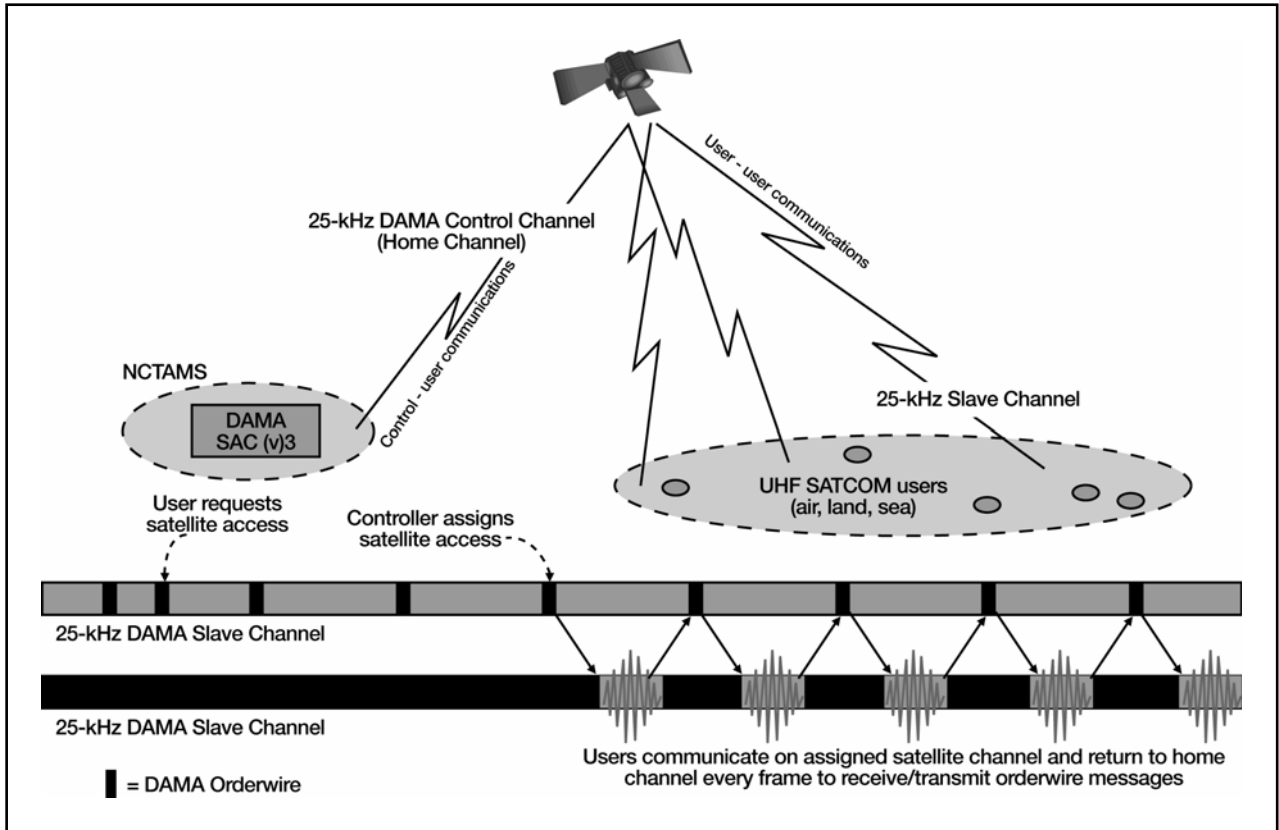
Figure I-16. Communications on 25-kHz DAMA Slave Channels

Text within the figure:

25-kHz DAMA Control Channel
(Home Channel)

User - user communications

Control - user communications

NCTAMS

DAMA
SAC (v)3

User requests
satellite access

Controller assigns
satellite access

25-kHz Slave Channel

UHF SATCOM users
(air, land, sea)

25-kHz DAMA Slave Channel

25-kHz DAMA Slave Channel

▌ = DAMA Orderwire

Users communicate on assigned satellite channel and return to home
channel every frame to receive/transmit orderwire messages

Chapter II
Communications Planning Cycle

1. Assess Force Structure Requirements

a. What is the mission requirement? Who, what, where, when, why (OPLAN/EXPLAN/EMOP)?

b. Validate mission requirements against established SDB (per OPLANS/EXPLANS/EMOP/fragmentary order/Annex-K), and CJCSI 6250.01A priority code.

ASSESS FORCE STRUCTURE
Receive the Mission
Analyze the Force Structure Requirements
Validate against SDB

ISSUE RESOURCES TO USERS
Issue Unit Communication Instructions
Monitor Operations for Emerging Requirements
Respond to Preemptions and/or Recover Resources as Required

COMMUNICATIONS PLANNERS

ACQUIRE RESOURCES
Define unit specific resources
Voice/Data
Duty Cycle
Access Period
Traffic Priority
Mission Rationale
Submit SAR

MANAGE RESOURCES
Monitor Mission Planning Process
Receive Resources (SAA)
Frequency Clearance/Deconfliction
Interference Resolution

Figure II-1. Communications Planning Cycle

2. Acquire Resources

a. Define unit specific resources. TACSAT resources are extremely constrained due to proliferation of TACSAT capable radio systems. Based on system constraints a unit may receive an assignment that provides for lower data rates than originally requested. Communications planners validate all resource requirements based on mission criteria and ensure that realistic resource requests are submitted based on mission analysis.

(1) Do not use TACSAT networks for routine traffic when other systems and modes of communication are available.

(2) Do not request resources at a higher priority than required.

b. Voice.

    (1) Bandwidth (25-kHz or 5-kHz).

    (2) Mode (DAMA or dedicated).

    (3) Data rate (2.4-kbps or 16-kbps).

    (4) Criteria.

        (a) Per the JCS, narrowband voice mandate, compatibility with advanced narrowband digital voice terminal (ANDVT) application 3 using voice digitization at 2.4-kbps is the joint standard for secure voice operations via UHF satellites.

        (b) For a number of high priority networks, the COCOM can designate that a network operate at 16-kbps for technical or voice recognition requirements.

c. Data.

    (1) Bandwidth (25-kHz or 5-kHz).

    (2) Mode (DAMA or dedicated).

    (3) Data Rate (75-bps to 64-kbps).

        (a) The major factors that determine data rate selection are the file size required to be transmitted, the volume of traffic, and tolerance for delay in access to the circuit.

        (b) Larger file sizes require greater throughput speed (for example, a file size of 50-bytes may be transmitted over a 300-baud link, but a 1.2-megabyte file may require a nine.6-kbps link).

d. Duty cycle. (For what percentage of a 24-hour day is access to the circuit required?)

    (1) Low—1 to 2 hours access per 24-hour period.

    (2) Medium—2 to 8 hours access per 24-hour period.

    (3) High—8 hours or more access per 24-hour period.

e. Access period. Coordinated universal time date-time group of start access date and stop access date with specific periods of use per day (for example, 0700Z to 1700z daily). Request 24-hour access if mission analysis identifies the requirement.

f. Traffic priority. CJCSI 6250.01A identifies a prioritization scheme to determine access to both the core warfighting and enterprise-wide SATCOM resource apportionment. See Appendix J for the prioritization scheme used to determine access.

g. Mission rationale (for specific/special resource request).

    (1) Equipment, platforms, or mission capabilities/limitations (such as not capable of operating in all modes or bandwidths).

    (2) Support relationships (special users, coalition users).

    (3) Geographic or physical location (DAMA MHOP), footprint, look angle constraints.

(4) DAMA emission control (EMCON) While using 25-kHz DAMA channels, especially TDMA DAMA, periodic slot connect OWs are transmittable to the terminals. Stating EMCON is required, ensures the DAMA controllers are ready to transmit this OW every 2 to 7 minutes. This "pulls in" any terminal logged into the DAMA channel with the net guard address programmed into the guard list. This eliminates some operator errors in accessing the net guard.

(5) TBA management in TDMA DAMA networks. Access to the 25-kHz DAMA channels is preassigned to the networks. Preassigning the channels removes the capability to make point-to-point or conference calls and prevents preemption of time-slots based on TBA precedence. Usually, the networks are assigned as common networks, eliminating the need to identify which TBAs will participate in the net guard address. Therefore, listing TBAs and requesting precedence for the TBA is not required.

(6) TBA precedence. A unit assigns each TBA a precedence for establishing services/calls via the SAR. For 5-kHz DAMA, the precedences are routine, priority, immediate, flash, and flash override. The precedence determines how fast the terminal accesses the satellite channel. All accesses on 5-kHz DAMA are precedence based. Higher precedence services preempt lower precedence services, even if already established. The precedences for 25-kHz DAMA and 5-kHz DAMA are the same, except emergency action is the highest precedence in 25-kHz DAMA. For ad hoc DAMA channels, TBA precedence works much the same as on 5-kHz DAMA. Precedence is not the only basis for preemption. Ranked networks preempt slots on the channel first, followed by precedence. Preassigned time-slots (TDMA DAMA) cannot be preempted by any precedence.

(7) Common network. A common network is a net guard address without a designated list of access permitted terminals. Any terminal may participate if the net guard address is on the guard list and it uses the configuration code assigned to the address. The size of the network is limited to 512 addresses, because only 512 terminals may use one 25-kHz DAMA channel (ranging limitation). The size on the 5-kHz DAMA channel is limited to 64 terminals, based on the military standard.

(8) Private network. A private network. is a net guard address with a designated access list of terminals. This is the standard network for 5-kHz DAMA. A maximum of 64 TBAs are assigned to the network and designated in the SAR as participants. Any terminal can initiate the network for a call or service and any service is available to the network. A 25-kHz DAMA private network. is also limited to 64 TBAs and they must be stated in the SAR as participants. In addition, designate one terminal as the NCS of the network. This is the only terminal that initiates the network. Usually, these networks are not given preassigned time-slots. A private network on 25-kHz DAMA may request access to a DASA channel while a common network cannot.

(9) Disadvantaged users. Disadvantaged users are terminals with problems accessing the satellite channels. These include, but are not limited to, manpack terminals, aircraft, on-the-move vehicles, and terminals situated in areas with low-look angles to the satellite (especially 20 degrees or less). Five-kHz DAMA has built in capabilities to compensate disadvantaged users. Twenty-five-kHz DAMA must assign frame formats to the channel to compensate these users. The assigned time-slots must have the same data rate but lower burst rates (19.2 or 9.6) to ensure communications.

This reduces the number of time-slots on a channel, but provides better access for the user.

h. Submit SAR. Submit the SAR to higher headquarters (to be published). A common SAR is found at [*Web site to be determined*]. If unavailable, UCC guidance is used.

3. Manage Resources

a. Monitor the mission planning process for changes and submit updates as required.

b. Receive SAA [*Web site to be determined*] (to be published).

(1) Verify that frequencies are correct.

(2) For terminals using channel number, verify that the home channel number is provided (see Appendix A).

c. Provide a copy of the SAA to the frequency management office. Based on theater guidance, the frequency management office—

(1) Verifies that frequencies are clear in the intended area of operation.

(2) Verifies that frequency records (uplink/downlink) are included in the electromagnetic battlespace database (such as Spectrum XXI).

(3) Tags TACSAT frequency assignments for inclusion in the joint restricted frequency lists at the appropriate level.

(4) Assists user with resolving EMI per Chairman Joint Chiefs of Staff Manual (CJCSM) 3320.02.

4. Issue Resources To Users

a. Incorporate appropriate information from the SAA into cut sheets, operations orders, Annex-K, and so forth. Distribute as required. (See Appendix I for samples of cut sheets.)

b. Monitor mission for emerging requirements or changes.

c. Coordinate extensions, preemptions, and terminations of SAAs as they occur.

Chapter III
TACSAT Radio Equipment and Operations

1. Terminal

Table III-1a. Radio Equipment

Radio Item	AN/PSC-5 SPITFIRE	AN/PSC-5C SHADOWFIRE	AN/PSC-5D Multiband Multimission Radio
Frequency Range Megahertz (MHz)	30 to 400	30 to 420	30 to 512
Modes of Operations	LOS, SATCOM, 5-kHz DAMA, 25-kHz DAMA	LOS, SATCOM, 5-kHz DAMA, 25-kHz DAMA	LOS, SATCOM, 5-kHz DAMA, 25-kHz DAMA
DAMA Compliance	MIL-STD 188-181 MIL-STD 188-182 MIL-STD 188-183	MIL-STD 188-181B MIL-STD 188-182A MIL-STD 188-183	MIL-STD 188-181B MIL-STD 188-182A MIL-STD 188-183A
Embedded COMSEC	VINSON ANDVT KG-84A (Modes 3 and 4) FASCINATOR	VINSON MELP ANDVT KG-84A (Modes 1, 2, 3, and 4) FASCINATOR	VINSON ANDVT KG-84A (Modes 1, 2, 3, and 4) FASCINATOR
Platform	Manpack/Vehicular	Manpack/Vehicular	Manpack/Vehicular
Ports	One	One	One
Programming Frequencies	Home Channel Numbers	Home Channel Numbers	Home Channel Numbers

Table III-1b. Radio Equipment

Radio Item	AN/PRC-117F	AN/WSC-3 w/ TD-1271	MD-1324 w/RT-1771 or AN/WSC-3	LST-5D
Frequency Range(MHz)	30 to 512	225 to 400	225 to 400	225 to 400
Modes of Operations	LOS, SATCOM, 5-kHz DAMA, 25-kHz DAMA	SATCOM, 25-kHz DAMA	SATCOM, 5-kHz DAMA, 25-kHz DAMA	LOS, SATCOM, 5-kHz DAMA, 25-kHz DAMA
DAMA Compliance	MIL-STD 188-181B MIL-STD 188-182 MIL-STD 188-183 and A	FSCS for 25-kHz DAMA	MIL-STD 188-181 MIL-STD 188-182 MIL-STD 188-183	MIL-STD 188-181 MIL-STD 188-182 MIL-STD 188-183
Embedded COMSEC	VINSON ANDVT KG-84A (Modes 1, 2, 3, and 4) FASCINATOR	External Crypto	External Crypto	VINSON ANDVT KG-84 External Crypto for Second Port

Table III-1b. Radio Equipment

Radio Item	AN/PRC-117F	AN/WSC-3 w/ TD-1271	MD-1324 w/RT-1771 or AN/ WSC-3	LST-5D
Platform	Manpack/Vehicular	Mounted/Ship	Mounted/Ship	Manpack/Vehicular
Ports	One	Four	Two	Two
Programming Frequencies	Home Channel Numbers	Uplink and Downlink Frequencies and Offsets	Uplink and Downlink Frequencies and Offsets	Uplink and Downlink Frequencies and Offsets

Table III-1c. Radio Equipment

Radio Item	AN/ARC-231 SKYFIRE	DMR	Mini-DAMA AN/USC-42(V)1,2,3
Frequency Range (MHz)	30 to 512	2 to 2000	225 to 400
Modes of Operations	LOS, SATCOM, 5-kHz DAMA, 25-kHz DAMA	LOS, SATCOM, 5-kHz DAMA, 25-kHz DAMA	LOS, SATCOM,
DAMA Compliance	MIL-STD 188-181B MIL-STD 188-182A MIL-STD 188-183A	MIL-STD 188-181B MIL-STD 188-182A MIL-STD 188-183A	MIL-STD 188-181B MIL-STD 188-182 MIL-STD 188-183
Embedded COMSEC	VINSON ANDVT KG-84A (Modes 1, 2, 3, and 4) FASCINATOR	VINSON ANDVT KG-84A	VINSON ANDVT KG-84
Platform	Airborne	Mounted/Ship	Mounted/Ship/Airborne
Ports	One	Four	Eight
Programming Frequencies	Home Channel Numbers	Unknown	Unknown

Note: Information on all DAMA certified equipment is available on the Joint Interoperability Test Command (JITC) Web site: *http://jitc.fhu.disa.mil/reg/uhfdama.htm*.

2. Terminal Set up and Operations

a. AN/PRC-117F. (See Appendix C.)
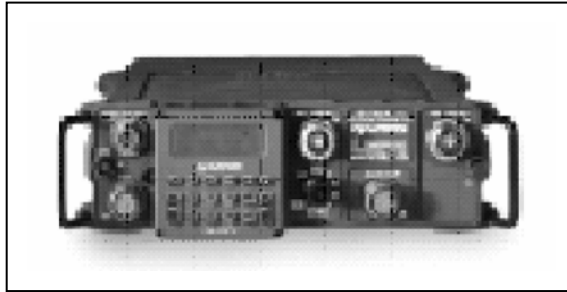
Figure III-1. AN/PRC-117F

b. AN/PSC-5A/C/D. (See Appendix D.)

Figure III-2. AN/PSC-5 Series

c. Lightweight satellite terminal (LST)-5D. (See Appendix E.)

Figure III-3. LST-5

d. AN/ARC-231. (See Appendix F.)

Figure III-4. AN/ARC-231

e. AN/WSC-3. (See Appendix G.)
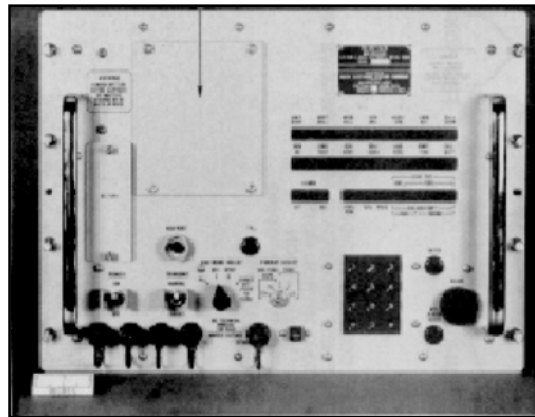
Figure III-5. AN/WSC-3

f. TD-1271B/U. (See Appendix G.)

Figure III-6. TD-1271B/U

g.   MD-1324 W/AN/WSC-3 or RT-1771. (Not available)

Figure III-7. MD-1324

h.   Digital modular radio (DMR) (not available).

Figure III-8. DMR

i. USC-42(V)1, 2, 3 (mini-DAMA) (not available).

Figure III-9. USC-42(V)1, 2, 3

j. AN/ARC-210 (not available).
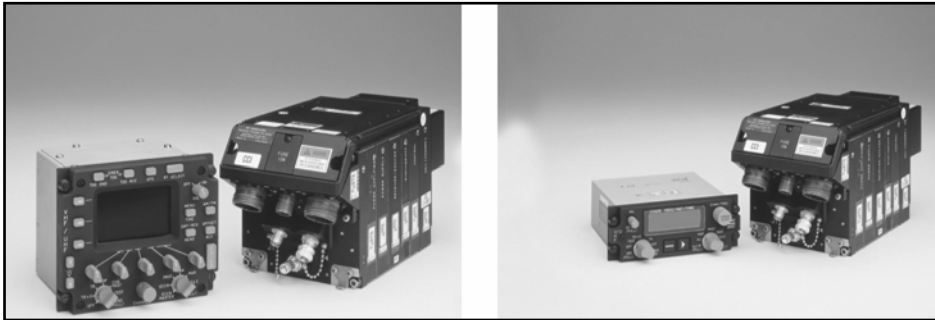
Figure III-10. AN/ARC-210

3. Terminal Base Address (TBA) Management

a. All DAMA capable terminals must have a valid, unique TBA to operate in a DAMA network. A TBA identifies the radio on the DAMA network and in the DAMA controllers at the SMC. TBAs cannot be shared by terminals in a DAMA network. A TBA functions in a DAMA network much like an IP address functions in a computer network. For those radios with more than one port, additional addresses are required and known as port addresses. Space and Naval Warfare Systems Command (SPAWAR) Charleston, South Carolina assigns these port addresses based on the type of terminal for which the unit requests an address. Joint UHF MILSATCOM DAMA maintains a list of all TBAs in the call directory, fleet satellite communications system (FSCS)-211-80-29-2. This directory may be downloaded periodically from SPAWAR's Charleston, South Carolina Web site, *http://sscc.spawar.navy.mil/* or contact SPAWAR's Charleston, South Carolina TBA administrator at commerical phone number (COMM) (843) 218-6620 or defense switched network (DSN) 588-6620.

b. Units request TBA from their higher headquarters to preclude proliferation of unnecessary TBA. The headquarters coordinate with SPAWAR to acquire the required TBAs. This ensures major commands have oversight of the procured TBAs available to their units. Units should not interact with SPAWAR on a regular basis. FSCS-217-98-00-1 provides guidance for requesting. (Point of contact at SPAWAR is COMM (843) 218-6620.) Requests for TBAs should allow a 30 day turn around time for the addresses to ensure the TBA is properly entered in the worldwide JMINI and SAC databases and the TBA is recognized when it logs onto the network to access DAMA network resources. Most units receiving the terminals must submit SARs in a timely manner, therefore address requests should take place 60 to 90 days before receipt of radios.

4. Orderwire (OW) Key Management

a. Unit COMSEC custodians maintain the OW keys used in DAMA. For a unit that does not have keys available, the COMSEC custodian orders the keys from—

(1) Joint Chiefs of Staff ICP Manager, 7115 South Boundary Blvd, MacDill AFB, FL 33608-2461.

(2) COMM (813) 828-2461 or DSN 968-2461.

Note: Only the requesting unit's COMSEC custodian with valid COMSEC account is authorized to order these keys. The DAMA system consists of four satellite coverage areas. Each satellite coverage area has a unique OW key. The requesting activity must specify the satellite coverage area, for example, continental United States (CONUS), Atlantic (LANT), Indian Ocean (IO), or Pacific (PAC) for the OW key requested. The COMSEC custodian receives a message stating which key segment is used for the **WEEKLY** key.

b. The DAMA SAC and JMINI initial operational capability use keys in positions 0 to 7 while, the AN/PSC-5A (Spitfire) uses keys in positions 1 to 8. Careful coordination is performed before executing any DAMA operations. Additionally, the key location must be coordinated in each footprint that operations occur to ensure compatibility with the DAMA controller in all areas of operation. A good technique is placing the same key in the first four fill positions. The other four positions are reserved for future over-the-air rekeying capabilities. The NCTAMS places the keys in the positions indicated in Table III-2. Coordination is required to determine the key position for the current week.

Table III-2. OW Key Positions

DAMA Controller (PCC)	Footprint	NCTAMS Key Position
NCTAMS LANT	CONUS	0 and 1
NCTAMS EURCENT	LANT (MED)	2 and 3
NCTAMS PAC	PAC	2 and 3
NCTAMS Guam	IO	0 and 1

5. Samples of Checklists

a. Sample checklist, 5-kHz DAMA.

Table III-3. Checklist for 5-kHz DAMA

ITEM	OPTIONS					
Modulation	☐ PSK					
Encryption	☐ ANDVT	☐ 3KG-84	☐ 4KG-84	☐ External		
Mode	☐ V		☐ D			
Data Rate	☐ 75	☐ 300	☐ 600	☐ 1200	☐ 2400	☐ 9600
Transmit Power	23 to 43 dBm					
Channel Number	_____ (129 to 191and 194 to 239)					
Configuration Code	_____ (000 to 511 (use 060 for 2400bps))					
Orderwire Encryption	☐ PT		☐ CT			
Operation Mode	☐ Normal	☐ Silent	☐ EMCON			
Ranging	☐ Passive	☐ Active	☐ (Maint)			
Satellite ID	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8					
Satellite Ephemeris	Longitude: ___° (0° to 180°) Ascension Time: ___:__ Zulu Inclination: _____° (0° to 10°)					
Terminal Position	Latitude: N/S _____° (0° to 90°) Longitude: E/W _____° (0° to 180°)					
Terminal Time	__:__ Zulu					
Terminal Address	_____ (00000 to 49999)					
Platform	☐ Stationary	☐ Mobile				
Message Release	☐ Manual	☐ Auto				

b. Sample Checklist, 25-kHz DAMA.

Table III-4. Checklist for 25-kHz DAMA

ITEM	OPTIONS					
Service Type	☐ AC			☐ DC		
Modulation	☐ PSK					
Encryption	☐ ANDVT ☐ 3KG-84 ☐ 4KG-84 ☐ VINSON ☐ External					
Mode	☐ Voice			☐ Data		
Data Rate	☐ 75 ☐ 300 ☐ 600 ☐ 1200 ☐ 2400 ☐ 4800 ☐ 16000 ☐ 32000 ☐ 56000 ☐ 64000					
Transmit Power	23 to 43 dBm					
Channel Number	009 to 128, 192, 193 _____					
Configuration Code	01 to 99 (Use code assigned in SAA)					
Orderwire Encryption	☐ PT			☐ CT		
Operation Mode	☐ Normal			☐ EMCON		
Ranging	☐ Active		☐ Passive		☐ (Maint)	
Satellite ID	1 to 8					
Satellite Ephemeris	Longitude: ___° (0° to 180°) Ascension time: ___:__ Zulu Inclination: _____° (0° to 10°)					
Terminal Position	Latitude: N/S _____° (0° to 90°) Longitude: E/W _____° (0° to 180°)					
Terminal Time	___:__ Zulu					
Terminal Address	_____ (00000 to 65535)					
Guard List	Up to 15 five-digit addresses					
COMSEC Key	1 to 6					
Orderwire Key	1 to 4					
Call Precedence	☐ EA	☐ FO	☐ F	☐ I	☐ P	☐ R
Destination	Five-digit addresses _____ _____ _____ _____ _____					
Circuit Number	000 to 999 (DC mode only)					

6. Accessing a Dedicated Channel

a. A dedicated channel is a 5-kHz or 25-kHz satellite channel (uplink and downlink frequency pair on a transponder) supporting a single communications network for a designated period of time.

b. User requirements—

(1) Azimuth and elevation to satellite.

(2) Home channel/frequency pair/uplink and offset. (See Appendix A to verify home channel number based on frequency pair.)

(3) COMSEC type, mode of operations, and data rate.

7. Accessing a DAMA Channel

a. Description—DAMA (called "demand *assignment* multiple access in the MIL-STDs- is also correct) is a method of automated channel-sharing (multiplexing). User terminals automatically interact with a *control station,* which allocates a portion of a satellite channel for that terminal's communications. Channel allocation is based on current needs and priorities. Any unused DAMA resource is available on a precedence basis and is shared by all users. The ad hoc nature of DAMA limits the waste caused by *long-term* preassigned satellite resources. Channel-sharing is transparent to the TACSAT user. Since there are two types of UHF satellite channels, 5-kHz and 25-kHz, there are two types of DAMA.

b. User requirements—

(1) Azimuth and elevation to satellite.

(2) Home channel/frequency pair/uplink and offset. (See Appendix A to verify home channel number based on frequency pair.)

(3) COMSEC type, mode of operations, and data rate.

(4) OW key and position.

(5) Type of channel—5-kHz or 25-kHz.

(6) Configuration code.

(7) Type of communications—normal, silent, EMCON.

(8) TBAs with assigned maximum precedence and net guard addresses.

(9) Demarcation number for 5-kHz DAMA.

(10) Type of ranging.

(11) Types of services

(a) 5-kHz—message, circuit, or DASA.

(b) 25-kHz—two-party or conference calls.

c. Fundamentals of DAMA operations—

(1) Acquiring the satellite. All terminals must be able to receive and decrypt OWs transmitted by the DAMA controllers. Unless this is accomplished by the individual terminal, access to the satellite channel is not obtained. The OWs include the information required to decrypt messages. Common problems are using the wrong OW key and placing the OW key in the wrong position.

(2) Ranging. For terminals to transmit in the proper time-slot, the radios must have range reaching the satellite. Active ranging may be performed by the terminal. It

automatically determines the range and provides the information required for transmissions. Passive ranging is an option where a terminal computes the range to the satellite based on the terminal position, zulu time (z), and satellite ephemeris data to obtain the information required for transmissions.

(3) Logging in. While terminology is different between the two types of DAMA, each terminal must inform the controller the terminal is accessing the channel.

(a) In 5-kHz DAMA, the radio sends a log in message providing the terminal information to the controller.

(b) In 25-kHz DAMA, the radio sends a status B message providing the terminal information to the controller.

(4) Establishing communications. When the terminal completes the previous steps, it must still request permission to access the channel.

(a) To communicate on 5-kHz DAMA, the type of service or call must be decided before establishing communications with other terminals. The service or call is limited to one address, so either a point-to-point or a net guard call is made. The types of calls are circuit service, DASA service, and message service. Once communication is complete, the call or service is automatically terminated or the operator terminates the call or service manually. This releases the time-slot to be used by other terminals. The system permits the controller to terminate the call or service, in case an operator forgets, so the time-slot is available to other terminals.

(b) To communicate on 25-kHz DAMA, a call or service must be established with the other terminals. The call or service is made to a net guard address, another terminal address, or a conference call (up to six terminal addresses or a mixture of one net guard address and terminal addresses). Once the call or service is established, the individual terminal notifies the operator that communication is possible. In a true DAMA environment, the operators use the time-slot assigned for transmissions and then return the resource by tearing down/completing the call so others may use the time-slot.

(5) Completing communications.

(a) In 5-kHz DAMA, completion of the call or service is based on the type of service established. With a message service, the call or service automatically terminates once the data is sent and received by the terminals. With a DASA service, the operator must request a time limit (5 to 5115 minutes or indefinite, which is 5115 minutes). The call or service automatically terminates when the time expires. For a circuit service, the individual operator terminates the call or service. In addition, the controller monitors the service for communications and if none are detected, the controller terminates the call or service.

(b) In 25-kHz DAMA, completion of the call or service is based on channel set up. The operators may establish the communications with a time limit (01 to 59 seconds, minutes, hours, or days). Once the time limit is reached, the call or service automatically terminates, releasing the time-slot. If a time limit is not set, the operators must initiate the completion of the call or service. If the channel is set up so time-slots are preassigned (also known as TDMA DAMA), the time-slot is not released and completion of the call or service is not performed by the operator.

(6) Logging out.

(a) For 5-kHz DAMA, a log out message must be transmitted to notify the controller the terminal is leaving the channel. Failure to send the log out OW effects terminals when they reaccess the DAMA channels. Terminals on a 5-kHz DAMA channel are monitored continuously and can be logged out by the control station when they do not respond to periodic polling. This time limit is normally set at 30 minutes.

(b) For 25-kHz DAMA, an out of order service OW is transmitted to the controller. This OW notifies the controller to take the terminal off line. The OW requires use of a reason code. To date, 99 is the only code identified. Failure to send the OW does not effect the terminal's ability to reaccess the channel.

d. Common DAMA challenges.

(1) Wrong OW key loaded, OW key loaded in the wrong position or control station has wrong OW key.

(2) Radio programmed improperly.

(3) Radio not programmed or contained incorrect TBA.

(4) Guard list loaded improperly in the radio.

(5) Radio loaded with the wrong home channel number/frequencies.

(6) JMINI or SAC improperly programmed at the NCTAMS.

(7) NCTAMS problems.

e. EMI resolution checklist sample. (See Appendix H.)

f. DAMA operations assistance.

Table III-5. DAMA Points of Contact

NAME	POSITION	AGENCY/POSITION	PHONE
UHF POC	UHF Ops Support Office	ARSTRAT	COMM (719) 554-4151 DSN 692-4151
ICP POC	Orderwire Key Ordering	ICP Manager	(813) 828-2461 DSN 968-2461
SPAWAR	SPAWAR	SPAWAR	SPAWAR
SPAWAR POC	DAMA/JMINI/DAMA SAC	SPAWAR Systems Center Charleston, South Carolina	COMM (843) 218-5698 DSN 588-5698
SPAWAR POC	DAMA/JMINI/DAMA SAC	SPAWAR Systems Center Charleston, South Carolina	COMM (843) 218-4546 DSN 588-4546
SPAWAR POC	DAMA/JMINI/DAMA SAC	SPAWAR Systems Center Charleston, South Carolina	COMM (843) 218-4937 DSN 588-4937
SPAWAR POC (TBAs)	TBAs	SPAWAR Systems Center Charleston, South Carolina	COMM (843) 218-6620 DSN 588-6620

Table III-5. DAMA Points of Contact

SPAWAR Systems Command Consolidated Call Center (Level 1)	ALL DAMA HELP	24 hours, 7 days a week	1-877-4SPAWAR COMM (843) 974-5550 DSN 588-5550
SPAWARSYSCEN Charleston UHF DAMA Help Desk (Level 2)	ALL DAMA HELP	0600-1700 EST Monday through Friday	COMM (843) 974-4546/4939 DSN 588-4546/4939
CONUS	**CONUS**	**CONUS**	**CONUS**
NCTAMS LANT	JMINI		COMM (757) 445-5461/5279 DSN 565-5461/5279
NCTAMS LANT	DAMA SAC	Tech Control/Watch Officer	COMM (757) 445-7111/7112 COMM (757) 445-5625/5626 DSN 565
Global SATCOM Support Center (USSTRATCOM)	SARs; DAMA Assistance; Satellite Issues		COMM (719) 554-4096 DSN 312-692-4096
GSSC		POC 24/7 number	COMM (719) 554-6000 DSN 312-692-6000
RSSC CONUS	SARs; DAMA Assistance; Satellite Issues	UHF CELL	Comm (813) 828-6840 DSN 968-6840
UHF SATCOM Manager	UHF SATCOM Manager	JFCOM	DSN 836-7683
USSOUTHCOM POC	Frequency Manager	USSOUTHCOM	COMM (305) 437-166 DSN 567-1661 Fax 305-437-1951
USAF (CONUS)		JFMO LANT	COMM (757) 836-8006 DSN 836-8006 Fax (757) 836-8022
CONUS	**CONUS**	**CONUS**	**CONUS**
SOCCENT	Spectrum Manager		DSN 968-4079
SOCSOUTH	Spectrum Manager		DSN 865-3970
Frequency Manager	Frequency Manager	JFMO LANT	COMM (757) 836-8014
FORSCOM	**FORSCOM**	**FORSCOM**	**FORSCOM**
FORSCOM POC	FORSCOM Spectrum Mgr	FORSCOM	COMM (404) 464-5572 DSN 367-5572
FORSCOM POC	Frequency Manager	FORSCOM	COMM (404) 464-5807 DSN 367-5807
FORSCOM POC	Frequency Manager	FORSCOM	COMM (404) 464-6016 DSN 367-6016
Additional source of reference.	AN/URC-133 Users Guide	14th WPS/DOSCX Hurlbert Field, FL	DSN 641-8830
USASOC	**USASOC**	**USASOC**	**USASOC**
USASFC G6 Operations/Plans NCO	USASFC G6 Operations/Plans NCO	USASOC	COMM (910) 432-7427 DSN 239-7427
Spectrum Manager	Spectrum Manager	USSOCOM, SOIO-CR	DSN 299-4855
MARINE CORPS	**MARINE CORPS**	**MARINE CORPS**	**MARINE CORPS**

Table III-5. DAMA Points of Contact

Spectrum Manager MARFORLANT; MARFORSOUTH MARFORNORTH		Spectrum Manager Marine Forces Atlantic; Marine Forces South; Marine Corps North	COMM (757) 444-5960 DSN 564-5960 Fax (757) 444- 6136
MARFORRES		MARFORRES	DSN 678-6777
MARFORPAC		MARFORPAC	DSN 315 477-8481
MARFOREUR		MARFOREUR	DSN 314 431-2343
EUROPE	**EUROPE**	**EUROPE**	**EUROPE**
NCTAMS EURCENT	JMINI		DSN 314-626-6140
NCTAMS EURCENT	DAMA SAC	Tech Control/Watch Officer	COMM 011-39081-568-3350 DSN 314-626-3350
RSSC EUR	SARs; DAMA Assist; Satellite Issues		49-711-686-39-5843/5711 DSN 314-434-5843/5711
RSSC EUR		RSSC EUR	Cell (49) 160-969-10238 DSN 314-434-5843/5711
SOCEUR	Spectrum Manager		DSN 314 430-4589
USEUCOM		USEUCOM	49-711-680-8853 DSN 430-8853 Fax 430-5006
MARFOREUR		MARFOREUR	DSN 314 431-2343
PACIFIC	**PACIFIC**	**PACIFIC**	**PACIFIC**
NCTAMS PAC	JMINI		DSN 315-453-0760
NCTAMS PAC	DAMA SAC	Tech Control/Watch Officer	COMM (808) 653-0084/0090 DSN 315-453-0084/0321/0322/5544
NCTS GUAM		TECH CONTROL (DAMA SAC)	COMM 671-355-5104 COMM (671) 355-5326 DSN 315-355COMM
RSSC PAC	SARs; DAMA Assist; Satellite Issues	UHF SATCOM CELL RSSC PAC	COMM (808) 656-0582/4700 DSN 315 456-0582/4700
USARPAC POC	Frequency Manager	USARPAC	COMM (808) 438-8219 DSN (315) 438-8219
SOCPAC	Spectrum Manager		
SOCKOR	Spectrum Manager		
MARFORPAC	Spectrum Manager	MARFORPAC	DSN 477-8481

8. COMSEC Equipment

a. VINSON. VINSON encryption is provided at 16 kbps only for voice and data communications. It is used with 25-kHz channels, either dedicated or DAMA (with a 16 kbps time-slot).

b. ANDVT. ANDVT encryption is provided at 1.2 kbps or 2.4 kbps for voice and data communications. It is used with 5-kHz and 25-kHz channels, either dedicated or DAMA.

c. Mixed excitation linear predicative (MELP) voice encoder. MELP encryption is provided for 2.4 kbps voice only, providing increased voice recognition, reliability, and quality. It is used with 5-kHz and 25-kHz channels, either dedicated or DAMA.

d. KG-84. KG-84 encryption is primarily used for data communications and is used with data rates from 75 bits per second (bps) up to 56 kbps. It is used with 5-kHz and 25-kHz channels, either dedicated or DAMA, depending on the data rate. It is the encryption device used with the MIL-STD 188-181B data rates, providing up to 9.6 kbps on 5-kHz dedicated and DASA channels and up to 56 kbps on 25-kHz dedicated and DASA channels.

e. KGV-11. KGV-11 is used to provide OW encryption/decryption, either embedded or external.

Appendix A
SATELLITE CHANNEL AUTHORIZATION LIST

Table A-1. Satellite Channel (Home Channel) Authorization List

Channel Number	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Channel Bandwidth
1	SHF	250.350	N/A
2	SHF	250.400	N/A
3	SHF	250.450	N/A
4	SHF	250.500	N/A
5	SHF	250.550	N/A
6	SHF	250.600	N/A
7	SHF	250.650	N/A
8	SHF	250.700	N/A
9	292.850	251.850	25-kHz
10	292.950	251.950	25-kHz
11	293.050	252.050	25-kHz
12	293.150	252.150	25-kHz
13	294.550	253.550	25-kHz
14	294.650	253.650	25-kHz
15	294.750	253.750	25-kHz
16	294.850	253.850	25-kHz
17	296.250	255.250	25-kHz
18	296.350	255.350	25-kHz
19	296.450	255.450	25-kHz
20	296.550	255.550	25-kHz
21	297.850	256.850	25-kHz
22	297.950	256.950	25-kHz
23	298.050	257.050	25-kHz
24	298.150	257.150	25-kHz
25	299.350	258.350	25-kHz
26	299.450	258.450	25-kHz
27	299.550	258.550	25-kHz
28	299.650	258.650	25-kHz
29	306.250	265.250	25-kHz
30	306.350	265.350	25-kHz
31	306.450	265.450	25-kHz
32	306.550	265.550	25-kHz
33	307.750	266.750	25-kHz
34	307.850	266.850	25-kHz
35	307.950	266.950	25-kHz
36	308.050	267.050	25-kHz
37	309.150	268.150	25-kHz
38	309.250	268.250	25-kHz
39	309.350	268.350	25-kHz
40	309.450	268.450	25-kHz

Table A-1. Satellite Channel (Home Channel) Authorization List

Channel Number	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Channel Bandwidth
41	310.650	269.650	25-kHz
42	310.750	269.750	25-kHz
43	310.850	269.850	25-kHz
44	310.950	269.950	25-kHz
45	293.950	260.350	25-kHz
46	293.975	260.375	25-kHz
47	294.000	260.400	25-kHz
48	294.025	260.425	25-kHz
49	294.050	260.450	25-kHz
50	294.075	260.475	25-kHz
51	294.100	260.500	25-kHz
52	294.125	260.525	25-kHz
53	294.150	260.550	25-kHz
54	294.175	260.575	25-kHz
55	294.200	260.600	25-kHz
56	294.225	260.625	25-kHz
57	294.250	260.650	25-kHz
58	294.275	260.675	25-kHz
59	294.300	260.700	25-kHz
60	294.325	260.725	25-kHz
61	294.350	260.750	25-kHz
62	294.375	260.775	25-kHz
63	294.400	260.800	25-kHz
64	294.425	260.825	25-kHz
65	294.450	260.850	25-kHz
66	295.050	261.450	25-kHz
67	295.075	261.475	25-kHz
68	295.100	261.500	25-kHz
69	295.125	261.525	25-kHz
70	295.150	261.550	25-kHz
71	295.175	261.575	25-kHz
72	295.200	261.600	25-kHz
73	295.225	261.625	25-kHz
74	295.250	261.650	25-kHz
75	295.275	261.675	25-kHz
76	295.300	261.700	25-kHz
77	295.325	261.725	25-kHz
78	295.350	261.750	25-kHz
79	295.375	261.775	25-kHz
80	295.400	261.800	25-kHz
81	295.425	261.825	25-kHz
82	295.450	261.850	25-kHz
83	295.475	261.875	25-kHz
84	295.500	261.900	25-kHz
85	295.525	261.925	25-kHz

Table A-1. Satellite Channel (Home Channel) Authorization List

Channel Number	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Channel Bandwidth
86	295.550	261.950	25-kHz
87	295.650	262.050	25-kHz
88	295.675	262.075	25-kHz
89	295.700	262.100	25-kHz
90	295.725	262.125	25-kHz
91	295.750	262.150	25-kHz
92	295.775	262.175	25-kHz
93	295.800	262.200	25-kHz
94	295.825	262.225	25-kHz
95	295.850	262.250	25-kHz
96	295.875	262.275	25-kHz
97	295.900	262.300	25-kHz
98	295.925	262.325	25-kHz
99	295.950	262.350	25-kHz
100	295.975	262.375	25-kHz
101	296.000	262.400	25-kHz
102	296.025	262.425	25-kHz
103	296.050	262.450	25-kHz
104	296.075	262.475	25-kHz
105	296.100	262.500	25-kHz
106	296.125	262.525	25-kHz
107	296.150	262.550	25-kHz
108	297.150	263.550	25-kHz
109	297.175	263.575	25-kHz
110	297.200	263.600	25-kHz
111	297.225	263.625	25-kHz
112	297.250	263.650	25-kHz
113	297.275	263.675	25-kHz
114	297.300	263.700	25-kHz
115	297.325	263.725	25-kHz
116	297.350	263.750	25-kHz
117	297.375	263.775	25-kHz
118	297.400	263.800	25-kHz
119	297.425	263.825	25-kHz
120	297.450	263.850	25-kHz
121	297.475	263.875	25-kHz
122	297.500	263.900	25-kHz
123	297.525	263.925	25-kHz
124	297.550	263.950	25-kHz
125	297.575	263.975	25-kHz
126	297.600	264.000	25-kHz
127	297.625	264.025	25-kHz
128	297.650	264.050	25-kHz
129	302.445	248.845	5-kHz
130	302.450	248.850	5-kHz

Table A-1. Satellite Channel (Home Channel) Authorization List

Channel Number	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Channel Bandwidth
131	302.455	248.855	5-kHz
132	302.465	248.865	5-kHz
133	302.475	248.875	5-kHz
134	302.485	248.885	5-kHz
135	302.495	248.895	5-kHz
136	302.500	248.900	5-kHz
137	302.505	248.905	5-kHz
138	302.515	248.915	5-kHz
139	302.525	248.925	5-kHz
140	302.535	248.935	5-kHz
141	302.545	248.945	5-kHz
142	302.550	248.950	5-kHz
143	302.555	248.955	5-kHz
144	302.565	248.965	5-kHz
145	302.575	248.975	5-kHz
146	302.585	248.985	5-kHz
147	302.595	248.995	5-kHz
148	302.600	249.000	5-kHz
149	302.605	249.005	5-kHz
150	302.615	249.015	5-kHz
151	302.625	249.025	5-kHz
152	302.635	249.035	5-kHz
153	302.645	249.045	5-kHz
154	302.650	249.050	5-kHz
155	302.655	249.055	5-kHz
156	302.665	249.065	5-kHz
157	302.675	249.075	5-kHz
158	302.685	249.085	5-kHz
159	302.695	249.095	5-kHz
160	302.700	249.100	5-kHz
161	302.705	249.105	5-kHz
162	302.715	249.115	5-kHz
163	302.725	249.125	5-kHz
164	302.735	249.135	5-kHz
165	302.745	249.145	5-kHz
166	302.750	249.150	5-kHz
167	302.755	249.155	5-kHz
168	302.765	249.165	5-kHz
169	302.775	249.175	5-kHz
170	302.785	249.185	5-kHz
171	302.795	249.195	5-kHz
172	302.800	249.200	5-kHz
173	302.805	249.205	5-kHz
174	302.815	249.215	5-kHz
175	302.825	249.225	5-kHz

Table A-1. Satellite Channel (Home Channel) Authorization List

Channel Number	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Channel Bandwidth
176	302.835	249.235	5-kHz
177	302.845	249.245	5-kHz
178	302.850	249.250	5-kHz
179	302.855	249.255	5-kHz
180	302.865	249.265	5-kHz
181	302.875	249.275	5-kHz
182	302.885	249.285	5-kHz
183	302.895	249.295	5-kHz
184	302.900	249.300	5-kHz
185	302.905	249.305	5-kHz
186	302.915	249.315	5-kHz
187	302.925	249.325	5-kHz
188	302.935	249.335	5-kHz
189	302.945	249.345	5-kHz
190	302.950	249.350	5-kHz
191	302.955	249.355	5-kHz
192	307.750	254.150	25-kHz
193	311.150	257.550	25-kHz
194	316.955	243.855	5-kHz
195	316.960	243.860	5-kHz
196	316.975	243.875	5-kHz
197	317.000	243.900	5-kHz
198	317.010	243.910	5-kHz
199	317.015	243.915	5-kHz
200	317.025	243.925	5-kHz
201	317.035	243.935	5-kHz
202	317.045	243.945	5-kHz
203	317.055	243.955	5-kHz
204	317.065	243.965	5-kHz
205	317.075	243.975	5-kHz
206	317.085	243.985	5-kHz
207	317.090	243.990	5-kHz
208	317.095	243.995	5-kHz
209	317.100	244.000	5-kHz
210	317.105	244.005	5-kHz
211	317.110	244.010	5-kHz
212	317.115	244.015	5-kHz
213	317.125	244.025	5-kHz
214	317.135	244.035	5-kHz
215	317.145	244.045	5-kHz
216	317.155	244.055	5-kHz
217	317.165	244.065	5-kHz
218	317.175	244.075	5-kHz
219	317.185	244.085	5-kHz
220	317.190	244.090	5-kHz

Table A-1. Satellite Channel (Home Channel) Authorization List

Channel Number	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Channel Bandwidth
221	317.195	244.095	5-kHz
222	317.200	244.100	5-kHz
223	317.205	244.105	5-kHz
224	317.210	244.110	5-kHz
225	317.215	244.115	5-kHz
226	317.225	244.125	5-kHz
227	317.235	244.135	5-kHz
228	317.245	244.145	5-kHz
229	317.255	244.155	5-kHz
230	317.265	244.165	5-kHz
231	317.275	244.175	5-kHz
232	317.285	244.185	5-kHz
233	317.290	244.190	5-kHz
234	317.295	244.195	5-kHz
235	317.300	244.200	5-kHz
236	317.305	244.205	5-kHz
237	317.310	244.210	5-kHz
238	317.315	244.215	5-kHz
239	317.325	244.225	5-kHz
240	307.550	253.950	25-kHz (& 25-kHz UK)
241	307.700	254.100	25-kHz
242	311.050	257.450	25-kHz (& 25-kHz UK)
243	311.200	257.600	25-kHz
244	307.750	254.150	25-kHz UK
245	311.250	257.650	25-kHz UK
246	307.650	254.050	25-kHz UK
247	311.150	257.550	25-kHz UK
248	294.800 to 314.800	253.650 to 254.350	25-kHz UK
249	298.300 to 313.300	257.150 to 257.850	25-kHz UK

Appendix B
Information Request Codes

Table B-1. Information Request Codes

Note: If action states contact NCTAMS – the RSSCs may be contacted for assistance.		
Code	*Condition*	*Action*
1 to 3	Not used.	None.
4	Disconnect constant key offender. The controller determined a constant key offender should be disconnected.	Terminal has been transmitting for 17 minutes—waveform does not allow for constant transmission. AN/PSC-5 terminal does not provide a means to bypass this rule, so all transmissions must be less than 17 consecutive minutes.
5 to 65	Not used.	None.
66	Terminal type cannot be connected to the requested guard number. The requested guard number is associated with terminals built to a different version of the MIL-STD. Check the guard number and try connecting again. FSCS or 183A terminal requested to connect to a guard number associated with 183 (baseline) terminals. 183 (baseline) terminal requested to connect to a guard number associated with FSCS and 183A terminals	Information request code 66 is sent when a user requests to join/start a network service using the wrong network address. MIL-STD 188-183(-) uses the odd numbered (primary) address; this is the AN/PSC-5, AN/PRC-117F, and so forth. FSCS and MIL-STD 188-183(A) use the even numbered (alternate = primary + 1); for now this is the TD-1271, since there are not any certified 188-183(A) terminals yet. *Note:* 117F and AN/PSC-5D are pending upgrade to 183B capability.) The new DAMA SAC channel controller software links the even/odd network address pair to maintain interoperability between all terminal types. Example VOICE CMD NET: Primary network address: 56001 for MIL-STD 188-183 (-). Alternate network address: 56002 for TD-1271 and MIL-STD 188-183A terminals. The DAMA SAC links 56001 and 56002 in its software to the same data slot. Use of 56001 is required in the AN/PSC-5. Any TD-1271 and MIL-STD 188-183A terminals would use 56002.

Table B-1. Information Request Codes

Code	Condition	Action
67	Terminal cannot communicate on the assigned channel. The requested service is assigned on a channel a MIL-STD 188-183 (baseline), to which the terminal cannot connect. The channel is identified by an 8-bit channel code and this terminal uses channels identified by a 6-bit channel code. The channel is a 5-kHz slave channel.	AN/PSC-5 terminals receive this code if mistakenly assigned a 5-kHz slave channel. AN/PSC-5 terminals cannot use these channels. Contact NCTAMS.
68	Log out report has been ignored—terminal log out is performed only from port 1. The log out information report was not sent from port 1. Change to port 1 and retry.	Should not receive this code—contact NCTAMS. AN/PSC-5 is a single port terminal and only uses port 1. In addition, start using code 99 when sending the out of service message. This performs log out on the DAMA SAC.
69	Terminal identification (ID) duplicates an existing operational address. The requesting terminal's ID duplicates the address of an operational controller.	Terminal address is the same as a PCC's. Check the terminal address.
70	Requesting party's guard list does not contain guard address. The requesting user's port guard list does not contain the guard address of the guard it is activating.	Enter the correct net guard address in the guard list.
71	Service request access restriction violation. The service requested either has a higher precedence than allowed by the source's terminal access restriction level or it has a lower precedence than the channel access restriction level.	Send a status B message. Lower the precedence and set up the service again.
72	Requesting party already has an outstanding queued request. A user can have only one request in the queue. This user already has a request queued. Therefore, the current request is canceled.	Three things may have occurred— 1. Already sent a service set up to the queue. Only permitted one service on 25-kHz DAMA. The operator must teardown and then set up the new service. 2. The control station believes a service is pending for the terminal. Teardown and retry. If this does not work, teardown, out-of-service, send status B, and set up the service again. 3. Received a busy signal from the distant end—try later or page the terminal.

Note: If action states contact NCTAMS – the RSSCs may be contacted for assistance.

Table B-1. Information Request Codes

Code	Condition	Action
Note: If action states contact NCTAMS – the RSSCs may be contacted for assistance.		
73	Requesting party is not authorized to activate All-Call. The current request is canceled because only the controller operator activates a service to the All-Call address.	This code applies only if the service addressed is—16383 or 65535. Check the service set up and ensure the correct address was entered. If not, resend request with correct address. If still receiving code 73— JMINI identified address incorrectly—contact NCTAMS.
74	Requested terminal is already connected to a DASA service. The requested user is on a terminal connected to a DASA service already; therefore, it is unavailable.	The terminal called is unavailable. Teardown (if required) and try later.
75	Request canceled by user. The source of the service request canceled the request while it was queued and waiting for a resource.	Received if teardown of the service is sent before the service is provided (after requesting a service setup; usually it is queued). No action is required.
76	Queued call canceled; service queue time-out timer expired. The previously queued request from the requesting user has been canceled due to the controller imposed time-out limit on queued service requests.	JMINI canceled service. Set up the service again.
77	Terminal does not exist in the controller database. The controller has no record of the requesting terminal's address being assigned.	Terminal address is missing from the database—check TBA for accuracy. If correct, contact NCTAMS.
78	Currently the request queue is full. The controller has too many requests in the queue and cannot accept more at this time.	Should not receive this code. However, received a busy signal again— try later.
79	Call in the queue canceled; connection is no longer possible. The controller deleted a request from the queue, either at the request of the controller operator or because it was no longer a valid request.	Attempt the service set up again. If the terminal(s) called sent an out of service or radio is the only one active on the network, a different code may be received providing updated information. .
80	Enter a configuration code and retry. The terminal operator has not entered a configuration code into the port originating the request since the terminal was powered up or since an RCCOW, out-of-service message was sent from this port.	Check for a configuration code, ensure it is correct on the current menu, and set up the service again.
81	Required data rate cannot be supported. The data rate required for this connection is not supported by any channels operating on this satellite.	Requested a data rate different from the original SAR submission. The channel cannot support changing to a different data rate. Set up service for original data rate and configuration code (via current mode screen).

Table B-1. Information Request Codes

	Note: If action states contact NCTAMS – the RSSCs may be contacted for assistance.	
Code	*Condition*	*Action*
82	Requested party unknown. Check call directory and retry. The requested user or guard does not exist in the controller database.	Check the terminal or network address in the service setup and retry. If the network address is correct and terminals are active on the network, the controller may not have activated the network address. Contact NCTAMS. (If unable to contact NCTAMS, try making a conference call.)
83	Cannot add users to this guard. The requesting party is connected to a guard and attempted to add user port(s) to the guard connection.	Terminal is not at SVC idle. Teardown and retry the call. (Even if it says SVC idle, try this procedure first.)
84	Cannot add a guard to an existing call. The requesting user is participating in a call and attempting to add a guard.	Terminal is not at SVC idle. Teardown and retry the call. (Even if it says SVC idle, try this procedure first.)
85	Requesting party is not authorized to activate this guard. The requesting user attempted to activate a guard, but this user is not authorized to activate the guard for one of the following reason: • The requesting party attempted to activate a private guard, but is not a net controller for this guard (All). • This is a common guard and common guards cannot be activated by a user (SAC only). • This common or private guard is specified in the communications plan but is not active at this time (SAC only).	The JMINI database marked the net guard address wrong. Contact NCTAMS to correct error. OR The unit requested a private guard and the NCS has not or is not setting up the service to the network first.
86	Requesting party is not a member of this private guard. The requesting user attempted to join a private guard, but the user is not an authorized member of this private guard.	Terminal not listed as part of the private network. OR Called the wrong net guard address (check service set up). Contact NCTAMS.
87	JMINI controller sends this code. Requested user's terminal is unauthorized or zeroized. The user's terminal is marked in the controller database as unauthorized or zeroized.	Ensure terminal called the correct address. If yes, contact NCTAMS about the address to determine why it is marked this way.

Table B-1. Information Request Codes

Code	Condition	Action
Note: If action states contact NCTAMS – the RSSCs may be contacted for assistance.		
87	DAMA SAC sends. Requested service requires a 5-kHz or 25-kHz slave channel, but the required slave channel is not accessible from the requestor's home channel.	Requested a service with a terminal and/or network address assigned to a different home channel. Currently, no capability to assign terminal to either a different home channel or a slave channel associated with a different home channel. If authorized to talk within this network, check current mode screen to ensure it is set up for the correct home channel. If not, send an out of service message, make changes, or select correct preset, reenter the DAMA mode on the correct channel and set up service again.
88	Requesting party's device is incompatible with this guard. The requesting port's baseband device is incompatible with the baseband device specified for this guard.	Configuration code does not match the JMINI database for the net guard address. Check the code. If correct per the SAA, retry. If continued receipt of code—contact NCTAMS.
89	Requested party does not have a compatible baseband device. No port on the requested terminal is configured for a baseband device compatible with the baseband port from originating the request.	Configuration code does not match the JMINI database for the terminal being called. Check the code. If correct, the distant end may have entered the wrong code. First, try again, then need to work with distant end.
90	None of the users requested are available. Not enough requested users are capable and available (for various reasons) to activate the service request.	Set up the service for a later time. If making a conference call, page the other terminals. If making a network call, there may not be any other active users on the network.
91	Connection would cause contention. The requested connection would cause contention with an ongoing communication.	Teardown and out of service then send status B and attempt to set up the service again. If this does not work—contact NCTAMS. Mistakenly, the JMINI has the terminal in service.
92	Not all requested parties could be connected. At least one, but not all, of the requested parties could be connected. (This request is honored, connecting any available parties.)	Set up a conference call but not all participants received the service assigned message. Call all the stations and find out who is not connected. Before making a conference call, page all users to ensure they are available for the call. This ensures the terminal does not receive this message. However, if a message is received, send a status B message. The only way to add a missed terminal into the service is for all to teardown, and then have one terminal set up the service again.
93	Other link test in progress. Only one link test can be conducted on a channel and currently another user terminal is conducting a test.	Wait 2 to 5 minutes then rerun link test. Run it at 32-kbps first.

Table B-1. Information Request Codes

Code	Condition	Action
Note: If action states contact NCTAMS – the RSSCs may be contacted for assistance.		
Code	*Condition*	*Action*
94	Unable to connect parties from different channels (JMINI sends). OR Unable to perform frequency switch required for this connection (DAMA SAC sends). Frequency switching is required to connect the requested service, but frequency switching cannot be accomplished for any of the following reasons: • Terminal or terminals that must switch • Communications and orderwire channels are not on the same satellite. • Required frame segment on the communications and orderwire channels match. • Frame timing for the channels may not be aligned	Requested a service with a terminal and/or network address assigned to a different home channel. Currently, there is no capability to assign the terminal a different home channelIf authorized to talk within this network, check current mode screen to ensure it is set up for the correct home channel. If not, send an out of service, make changes or select correct preset, reenter the DAMA mode on the correct channel and set up service again.
95	JMINI sends. Demand assigned activation disabled for this guard. This network is activated on a preassigned basis only. In order for a user to activate this network, the national military strategy network management system operator must check the "Allow User to Activate" box in the network definition.	The JMINI database marked the net guard address wrong. Contact NCTAMS to correct the error.
95	DAMA SAC sends. DASA requests are reserved for guards only. The requesting user's configuration code indicates a DASA service and the user have requested connection to another user or users. Configuration codes 98 and 99 are reserved for DASA services and only private guards can be assigned to DASA channels.	Should not receive this code—contact NCTAMS.
96	No DASA channel available.	Should not receive this code—contact NCTAMS.

Table B-1. Information Request Codes

Note: If action states contact NCTAMS – the RSSCs may be contacted for assistance.		
Code	*Condition*	*Action*
97	Party is connected to a DAMA time-slot already. Cannot assign a DASA connection if another user port on the requested/requesting user's terminal is participating in a DAMA service of equal or higher precedence. If it has a lower precedence, the user could be preempted out of the DAMA service.	Should not receive this code—contact NCTAMS.
98	Too many guards specified in this request. More than one guard was specified in conference request.	Request can state only one network address. Use terminal addresses for the other four addresses.
99	Reserved for TD-1271 home channel change notification.	Should not receive this code—contact NCTAMS.

Table B-2. Configuration Codes

Configuration Code	Equipment	Data Rate	Protocol	Crypto
0	Reserved	0	N/A	N/A
1	Network (Prearranged)	75	IAW Network/Prearranged	IAW Network/Prearranged
2	Teletype	75	ASCII 8N2	KG-84A/C
3	Computer	75	ASCII 8N2	KG-84A/C
4	PSC-2A	75	PSC-2A	KG-84A/C
5	KL-43C/F	75	ASCII 8N2	KL-43C/F
6-14 Not Used				
15	Network (Prearranged)	300	IAW Network/Prearranged	IAW Network/Prearranged
16	Teletype	300	ASCII 8N2	KG-84A/C
17	Computer	300	ASCII 8N2	KG-84A/C
18	Fax	300	Fax	KG-84A/C
19	Fax	300	Fax	KYV-5, KY-99A/100
20	PSC-2A	300	PSC-2A	KG-84A/C
21	PSC-2A	300	PSC-2A	KYV-5, KY-99A/100
22	KL-43C/F	300	ASCII 8N2	KL-43C/F
23	Computer	300	ASCII 8N2	KYV-5, KY-99A/100

Table B-2. Configuration Codes

Configuration Code	Equipment	Data Rate	Protocol	Crypto
24-29 Not Used				
30	Network (Prearranged)	600	IAW Network/Prearranged	IAW Network/Prearranged
31	Teletype	600	ASCII 8N2	KG-84A/C
32	Teletype	600	ASCII 8N2	KYV-5, KY-99A/100
33	Fax	600	Fax	KG-84A/C
34	PSC-2A	600	PSC-2A	KG-84A/C
35	PSC-2A	600	PSC-2A	KYV-5, KY-99A/100
36	KL-43C/F	600	ASCII 8N2	None
37	Computer	600	ASCII 8N2	KG-84A/C
38	Computer	600	ASCII 8N2	KYV-5, KY-99A/100
39	Fax	600	FAX	KYV-5, KY-99A/100
40-44 Not Used				
45	Network (Prearranged)	1200	IAW Network/Prearranged	IAW Network/Prearranged
46	Computer	1200	ASCII 8N2	KG-84A/C
47	Fax	1200	FAX	KYV-5, KY-99A/100
48	Fax	1200	FAX	KG-84A/C
49	PSC-2A	1200	PSC-2A	KG-84A/C
50	PSC-2A	1200	PSC-2A	KYV-5, KY-99A/100
51	DMDG	1200	DMDG	KG-84A/C
52	DMDG	1200	DMDG	KYV-5, KY-99A/100
53	KL-43C/F	1200	ASCII 8N2	KL-43C/F
54	Computer	1200	ASCII 8N2	KYV-5, KY-99A/100
55-56 Not Used				
57	TEST2	Prearranged	Prearranged	Prearranged
58-59 Not Used				
60	Network (Prearranged)	2400	IAW Network/Prearranged	IAW Network/Prearranged
61	Fax	2400	Fax	KYV-5, KY-99A/100
62	Fax	2400	Fax	KG-84A/C
63	Hand Set/ANDVT	2400	Voice	KYV-5, KY-99A/100
64	Data/ANDVT	2400	Prearranged	Prearranged
65 Not Used				

Table B-2. Configuration Codes

Configuration Code	Equipment	Data Rate	Protocol	Crypto
66	PSC-2A	2400	PSC-2A	KG-84A/C
67	PSC-2A	2400	PSC-2A	KYV-5, KY-99A/100
68	KL-43C/F	2400	ASCII 8N2	KL-43C/F
69	Computer	2400	ASCII 8N2	KG-84A/C
70	Computer	2400	ASCII 8N2	KYV-5, KY-99A/100
71	Tactical Internet	2400	Tactical Internet	KG-84A/C
72	Personal Computer	2400	Prearranged	KG-84A/C
73	TEST1	Prearranged	Prearranged	Prearranged
74 Not Used				
75	Network (Prearranged)	4800	IAW Network/Prearranged	IAW Network/Prearranged
76	Fax	4800	Fax	KYV-5, KY-99A/100
77	Fax	4800	Fax	KG-84A/C
78	KL-43C/F	4800	ASCII 8N2	KL-43C/F
79	Tactical Internet	4800	Tactical Internet	KG-84A/C
80	Computer	4800	ASCII 8N2	KG-84A/C
81	Computer	4800	ASCII 8N2	KYV-5, KY-99A/100
82-88 Not Used				
89	Fax	16000	Fax	KG-84A/C
90	Network (Prearranged)	16000	IAW Network/Prearranged	IAW Network/Prearranged
91	Fax	16000	Fax	KY-57/58
92	Hand Set/ANDVT	16000	Voice	KY-57/58
93	PSC-2A	16000	PSC-2A	KYV-5, KY-99A/100
94	PSC-2A	16000	PSC-2A	KG-84A/C
95	Tactical Internet	16000	Tactical Internet	KG-84A/C
96	Computer	16000	Prearranged	KG-84A/C
97	Computer	16000	ASCII 8N2	KG-84A/C
98	DASA 5-kHz	Prearranged	Prearranged	Prearranged
99	DASA 25-kHz	Prearranged	Prearranged	Prearranged

Appendix C
AN/PRC-117F Radios

1. AN/PRC-117F Dedicated UHF SATCOM Operation

The AN/PRC-117F operates in UHF SATCOM mode using MIL-STD 188-181B modulation and HPW data operation. It supports encrypted voice and data communications in wideband 25-kHz and narrowband 5-kHz channels. The AN/PRC-117F in SATCOM mode is compatible with VINSON KY-57 (wideband 25-kHz), ANDVT KY-99/99A, and KG-84C cryptographic equipment. Refer to tables C-1 through C-3 for capabilities.

Table C-1. Dedicated UHF SATCOM Capabilities

Band of Operation	MOD	COMSEC	DATA VOC	Data Rates SYNC or ASYNC
Dedicated SATCOM 5-kHz Narrowband Channel 20 Watts Max	MS181	PT-None	DATA only	1200, 2400
	MS181	ANDVT	VOICE	2400
	MS181	ANDVT	DATA	300, 600, 1200, 2400
	MS181	KG-84C	DATA only	1200, 2400 using SBPSK
	MS181	KG-84C	DATA only	4800, 6000, 7200, 8000, 9600 using Continuous Phase Modulation (CPM)
	HPW	KG-84C	DATA only	4 to 8.5 kbps – ARQ
Dedicated SATCOM 25-kHz Wideband Channel 20 Watts Max	MS181	PT-None	DATA only	1200, 2400, 9600 2 kbps, 16 kbps
	MS181	VINSON	VOICE	16 kbps
	MS181	VINSON	DATA	16 kbps
	MS181	KG-84C	DATA only	1.2 k, 2.4 k, 9600, 16 k
	MS181	KG-84C	DATA only	19.2, 28.8, 32, 38.4, 48, 56 kbps using CPM
	MS181	ANDVT	DATA	300, 600, 1200, 2400
	MS181	FASC	VOICE	Special RETRANS Systems
	HPW	KG-84C	DATA only	18 to 56 kbps – ARQ

Table C-2. MIL-STD 188-181B Data Rate Options, 5-kHz

Option	I/O Data Rate	Modulation Type	Applicable COMSEC	Voice or Data	Remarks
008	1200	SBPSK	KG-84	DATA	
010	2400	SBPSK	KG-84	DATA	181A
010	2400	SBPSK	ANDVT	D/V	181A NB Voice
A10	1200	SBPSK	ANDVT	DATA	
B10	600	SBPSK	ANDVT	DATA	
C10	300	SBPSK	ANDVT	DATA	
013	4800	CPM	KG-84	DATA	
016	6000	CPM	KG-84	DATA	
018	7200	CPM	KG-84	DATA	
020	8000	CPM	KG-84	DATA	
021	9600	CPM	KG-84	DATA	

Table C-3. MIL-STD 188-181B Data Rate Options, 25-kHz

Option	I/O Data Rate	Modulation Type	Applicable COMSEC	Voice or Data	Remarks
130	9600	SBPSK	KG-84	DATA	
131	9600	CPM	KG-84	DATA	
132	16 k	FSK	VINSON	D/V	181A WB Voice
F12	12 k	FSK	FASCINATOR	VOICE	
137	19.2 k	CPM	KG-84	DATA	
139	28.8 k	CPM	KG-84	DATA	
141	32 k	CPM	KG-84	DATA	
143	38.4 k	CPM	KG-84	DATA	
144	48 k	CPM	KG-84	DATA	
145	56 k	CPM	KG-84	DATA	

2. UHF Dedicated SATCOM Programming Checklist

Table C-4 outlines programming parameters necessary for dedicated UHF SATCOM net presets. See Figures C-1 and C-2 for the sub menu and programming tree.

Table C-4. UHF SATCOM Programming Parameters

Menu Item	Options	Remarks
FREQUENCY		
Frequency Code	Channel Number 001-249, or 999	Refer to Appendix A for list of FREQ codes.
Receive Frequency	999	Use 999 to manually enter non-standard uplink and downlink frequencies.
Transmit Frequency		225.00000 to 511.99999 mHz
Receive Only	NO YES	YES for EMCON, no transmit.
COMSEC		
Crypto Mode	None	Function switch in PT, mode defaults to DATA only.
	VINSON	Not available on NB channels.
	ANDVT	2400 max data rate.
	KG-84	Data only in NB or WB.
	FASCINATOR	Not available on NB channels. Available for SATCOM to LOS BLACK RETRANS.
Encryption Key	TEK 01 to 25	Load TEKs first.
Analog Data	YES NO	External devices with own modem, eliminates crypto resyncs that interfere (KL-43C/F).
KG-84 Synchronization	Redundant Mode 1 Redundant Mode 2	Match mode used in net.
	Non-Redundant Mode 3 Non-Redundant Mode 4	HPW operation requires Mode 1.
HPW Transec Key ID	TSK 01 to 25	TSK loaded in SATELLITE storage position.
Training Frames	6, 9, 12, 15, 30, or 60	Sets length of training frames sequence, 9 is default.
DATA/VOICE		
Data/Voice	DATA	Only option w/KG-84 selected.
	AUTO on ADF Port	With VINSON, select port to receive DATA.
	AUTO on DATA Port	
	DATA or VOICE	With ANDVT COMSEC.
Modulation	MS181	Regular SATCOM
	HPW	Requires using KG-84 encryption in mode 1.
Sync/Async Select	ASYNC	ASYNC requires port programming.

Table C-4. UHF SATCOM Programming Parameters

Menu Item	Options	Remarks
	SYNC	Synchronous data systems
Baud Rate	(HPW) UFO (25-kHz) WB (25-kHz) NB (5-kHz)	Select type of satellite used, NB only on NB channel when using FREQ code 999. Refer to Appendix A
Option	Data Option Codes	Available options dependent on FREQ code and COMSEC previously selected.
SQUELCH		
Digital Squelch	ON OFF	Digital squelch ON prevents PT override.
Digital Squelch	ON OFF	Digital squelch ON prevents PT override.
POWER		
TX Power Level	2 to 20 watts	Steps in one-dBm increments.
NAME		
Change Net Name	NET 00 to 99	12 characters alphanumeric, no spaces.

```
FREQ CODE   COMSEC   DATA/VOC
SQUELCH        POWER      NAME
     USE ← → TO SELECT ITEMS
```

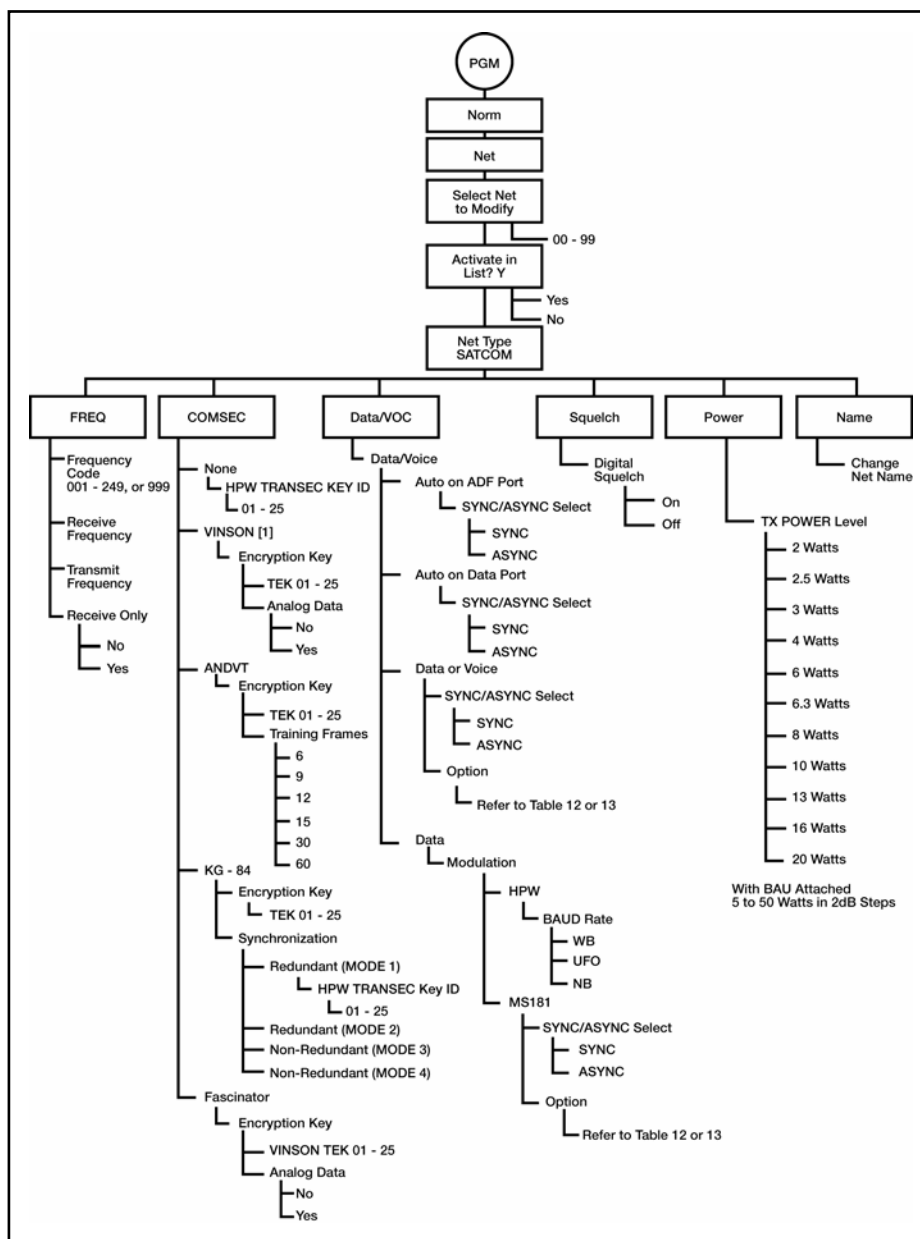**Figure C-1. UHF SATCOM Programming Sub Menu**

Figure C-2. SATCOM Programming Menu

3. Dedicated UHF SATCOM Operational Steps

a. To operate in dedicated UHF SATCOM mode, connect a medium or high gain SATCOM antenna to VHF-HI/UHF J8 antenna connector with a coax cable. Analyze terrain in planned areas of operation for satellite look-angle access. Verify the SATCOM antenna is correctly oriented using a magnetic compass to point the antenna on the proper horizontal azimuth to the satellite. Make an approximate antenna vertical elevation adjustment. Pointing graphs and look-angle calculation software may assist in this task. Azimuths from these graphs are not adjusted for local magnetic declination. Table C-5 contains UHF satellite positions. To check SATCOM antenna

pointing using the SATCOM receive signal strength indicator (RSSI) test, complete the following procedures:

Table C-5. UHF Satellite Positions

Footprint Name	Satellite Position
CONUS	100 and 105 dog W longitude
LANT	15 and 23 dog W longitude
IO	72 and 72. dog E longitude
PAC	172 and 177 dog E longitude

Note: The SATCOM RSSI test can be conducted only by using data operating parameters of 1200 or 2400 bps. Preselect data operation using KG-84 or ANDVT at one of these rates before initiating the test.

(1) After placing the AN/PRC-117F into normal mode dedicated SATCOM operation, press the CALL button on the KDU.

(2) Press ENT to initiate the SATCOM RSSI test.

(3) Watch display for test completion. A relative signal strength score is displayed with a value from 000 to 100. Repeat test and adjust pointing of the SATCOM antenna to obtain a better than 80 score.

(4) Press CLR to exit SATCOM RSSI test.

b.   Perform the following procedure for dedicated UHF SATCOM operation:

(1) Rotate function switch to cipher text (CT) or TD. The AN/PRC-117F does not allow plain text (PT) non-secure voice operation in SATCOM to operate in a non-secure SATCOM mode. The radio defaults to DATA only operation when PT is selected.

(2) After the radio initializes, press MODE.

(3) At the OPERATIONAL MODE prompt, select NORMAL; press ENT.

(4) Select the desired SATCOM net preset by pressing the PRE + or – switch.

(5) Begin radio operation. See Figure C-3 for SATCOM operational displays.

4. SATCOM 181B Data Operation Using KG-84 COMSEC and Continuous Phase Modulation

a.   When using a SATCOM net preset using KG-84 COMSEC and Continuous Phase Modulation (CPM) modulation, the sender transmitting station decides in which CPM data option to conduct the transmission. The receiving end must also use a CPM data code of the same channel type. To change the data option code for the currently selected SATCOM net preset—

(1) Press the circular arrow key to view the data option page of the SATCOM net preset. See Figure C-3 for SATCOM displays.

(2) Use left/right arrow key to scroll over to data option field. With the up/down arrow key, select the required code. Only the data option codes relating to the presently selected COMSEC mode and/or satellite channel type can be selected.

(3) Refer to Table C-6 AN/PRC-117F DAMA SATCOM capabilities. If COMSEC mode needs to be changed to achieve required data option, use the COMSEC menu under OPT key.
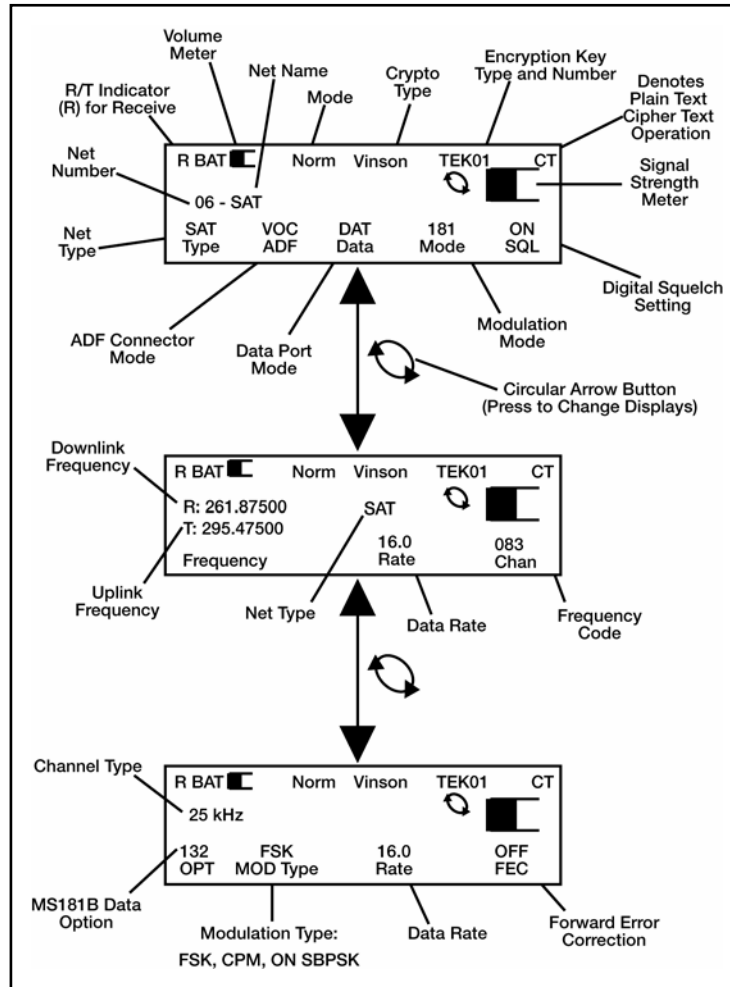
Figure C-3. Dedicated UHF SATCOM Displays

b. To send SATCOM DATA with CPM data option—

(1) Ensure net communications plan is for all outstations to use a CPM data option from Table C-7 for the same channel type (5-kHz or 25-kHz). A synchronous data transmission application is best.

(2) Sending station selects the desired CPM data option with which to transmit the data message. On transmitting the message, the receiving radio automatically matches speed of the sending station.

(3) If transmission is unsuccessful, (the receiving end does not acknowledge good reception), it may be necessary to reduce the CPM data rate and re-attempt the data transmission. If transmissions continue to be unsuccessful, troubleshoot the communications software set up to determine the communications failure.

5. AN/PSC-117F DAMA UHF SATCOM

a.   UHF DAMA SATCOM is a separate mode of operation in the AN/PRC-117F. DAMA operation is available on 5-kHz and 25-kHz UHF SATCOM channels that have been converted to DAMA control. THE 25-kHz DAMA is operated in either automatic control (AC) or distributed control (DC). Refer to Table C-6 AN/PRC-117F DAMA SATCOM for capabilites.

Table C-6. AN/PRC-117F DAMA SATCOM Capabilities

Channel Type	MOD	COMSEC	Data Voice	Data Rates
DAMA UHF SATCOM (AC)	5K CKT	ANDVT	VOICE	2400
	5K CKT	ANDVT	DATA	600, 1200, 2400
	5K CKT	KG-84C	DATA	75, 300, 600, 1200, 2400
	5K MSG	KG-84 C	DATA	75, 300, 600, 1200, 2400
	25K AC	ANDVT	VOICE	2400
	25K AC	ANDVT	DATA	600, 1200, 2400
	25K AC	KG-84 C	DATA	75, 300, 600, 1200, 2400
DAMA UHF SATCOM 25-kHz (DC)	25K DC	ANDVT	VOICE	2400
	25K DC	ANDVT	DATA	600, 1200, 2400
	25K DC	KG-84	DATA	75, 300, 600, 1200, 2400
	25K DC	VINSON	VOICE	16 kbps
	25K DC	VINSON	DATA	16 kbps
DAMA UHF SATCOM Dedicated Calls (DASA)	25-kHz	VINSON	VOICE	16 kbps
	25-kHz	VINSON	DATA	16 kbps
	25-kHz	KG-84C	DATA	75, 300, 600, 1200, 2400, 4800, 16 kbps
	5-kHz	ANDVT	VOICE	2400
	5-kHz	ANDVT	DATA	600, 1200, 2400
	5-kHz	KG-84C	DATA	75, 300, 600, 1200, 2400

b.   Figure C-4 depicts the overall DAMA UHF SATCOM programming menu tree. Entry into DAMA programming takes the radio offline (not communicating).
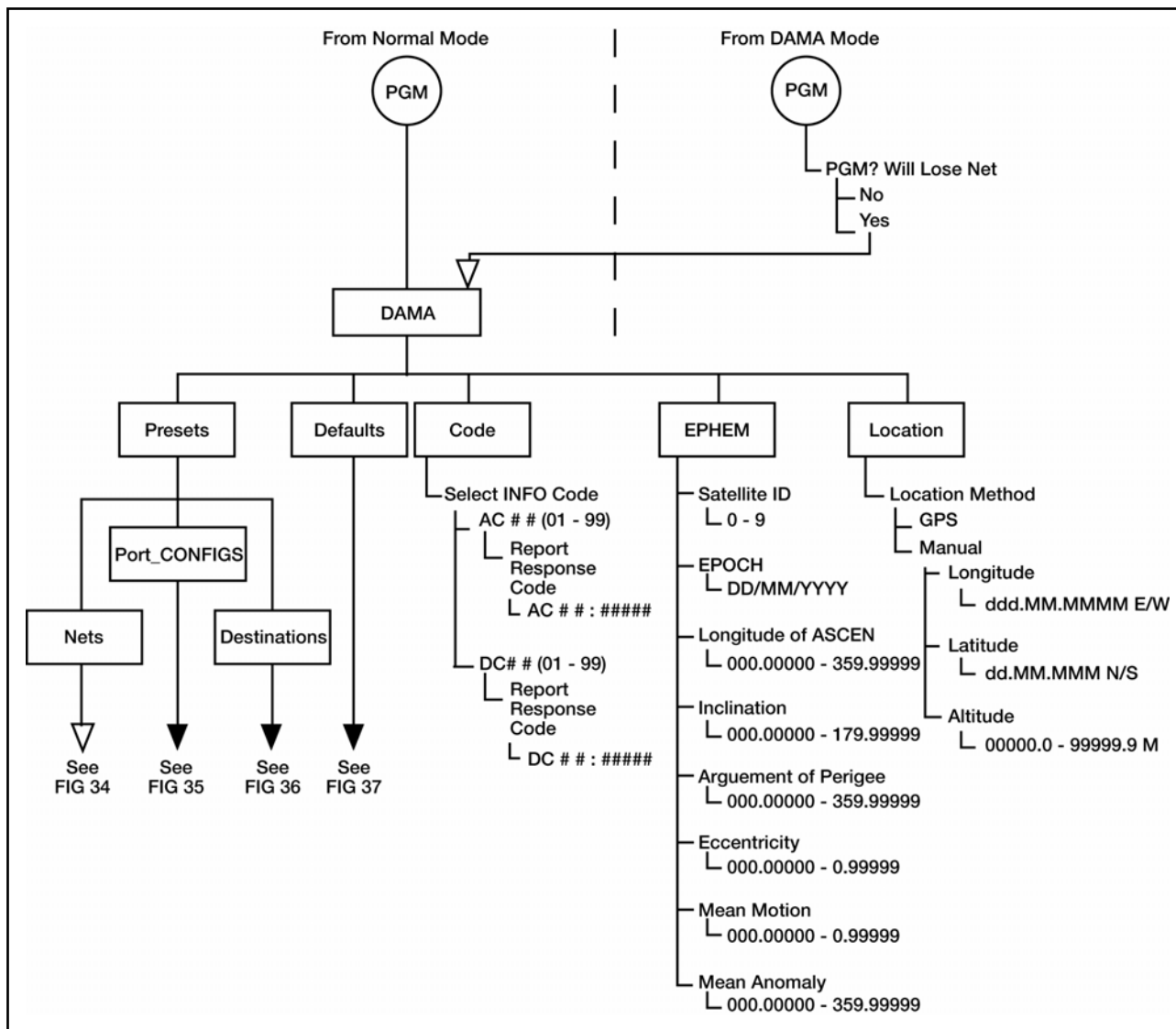
From Normal Mode

PGM

From DAMA Mode

PGM

└ PGM? Will Lose Net
   ├ No
   └ Yes

DAMA

| Presets | Defaults | Code | EPHEM | Location |

Presets
- Port_CONFIGS
  - Nets
  - Destinations

Nets → See FIG 34

Port_CONFIGS → See FIG 35

Destinations → See FIG 36

Defaults → See FIG 37

Code
└ Select INFO Code
  ├ AC # # (01 - 99)
  │ └ Report Response Code
  │   └ AC # # : #####
  └ DC# # (01 - 99)
     └ Report Response Code
        └ DC # # : #####

EPHEM
├ Satellite ID
│ └ 0 - 9
├ EPOCH
│ └ DD/MM/YYYY
├ Longitude of ASCEN
│ └ 000.00000 - 359.99999
├ Inclination
│ └ 000.00000 - 179.99999
├ Arguement of Perigee
│ └ 000.00000 - 359.99999
├ Eccentricity
│ └ 000.00000 - 0.99999
├ Mean Motion
│ └ 000.00000 - 0.99999
└ Mean Anomaly
   └ 000.00000 - 359.99999

Location
└ Location Method
  ├ GPS
  └ Manual
    ├ Longitude
    │ └ ddd.MM.MMMM E/W
    ├ Latitude
    │ └ dd.MM.MMM N/S
    └ Altitude
      └ 00000.0 - 99999.9 M

Figure C-4. Overall DAMA Programming Menu Tree

    c.   Table C-7 is the overall DAMA programming checklist. Figure C-5 is DAMA net preset programming menu tree.

Table C-7. DAMA Programming Checklist

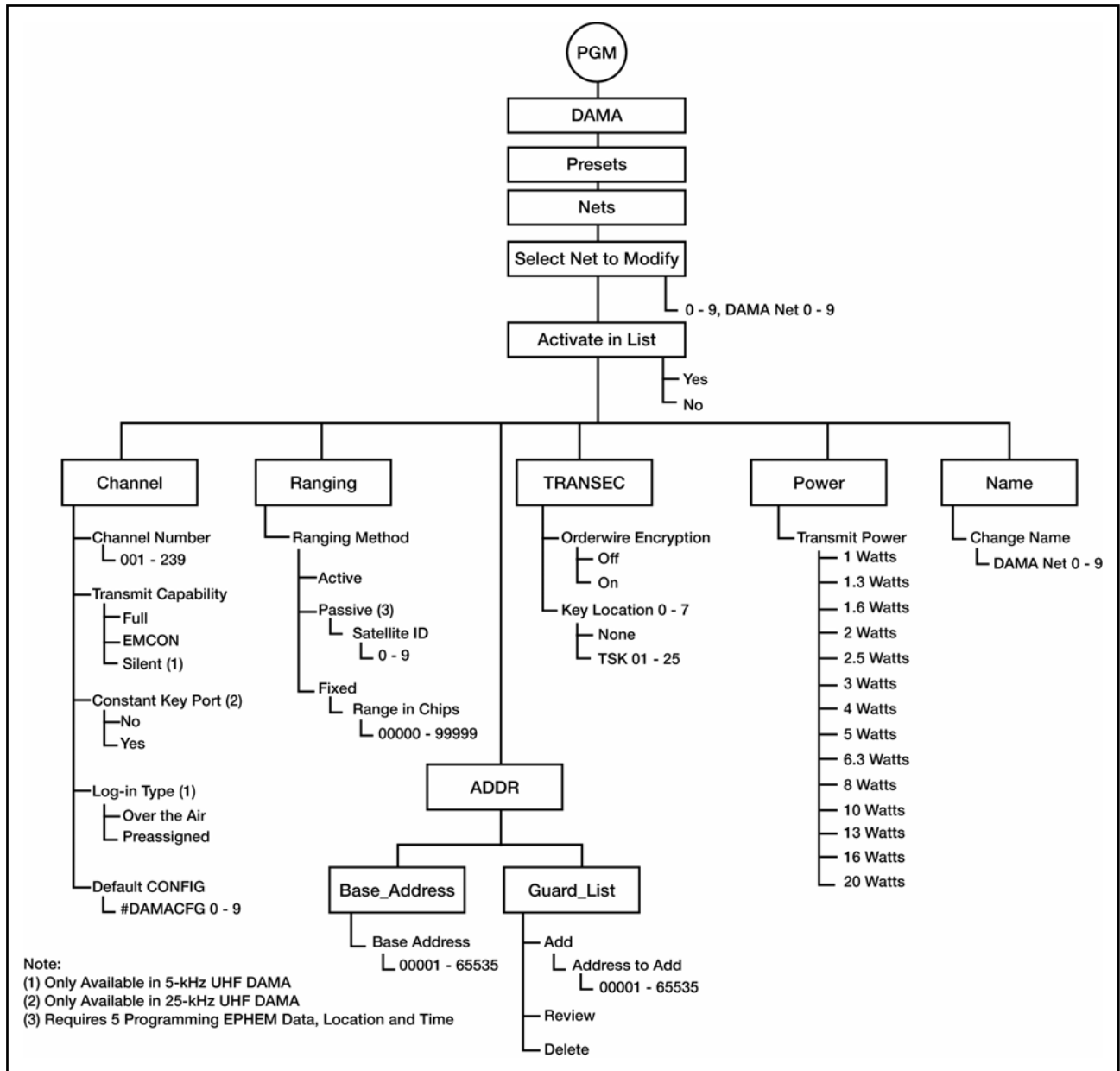| Menu Item	Options	Remarks
PRESETS		
Nets (10) 00 to 09		Sets up the parameters required to access a DAMA channel.
Port_Config (10) 00 to 09		Matches the DAMA channel with the desired COMSEC and mode of operation.
Destinations (50) 00 to 49		Sets all the call parameters to use a TBA on any type of DAMA channel.
DEFAULTS		
Defaults		Sets defaults in CALL operating menu.
CODES		
Select Info Code AC # # (01 to 99)	Report Response Code AC # # # # # #	Allows programming of expected response to report codes.
Select Info Code DC # # (01 to 99)	Report Response Code AC # # # # #	Allows for programming of expected response to report codes.
EPHEM		
Satellite ID	0 to 9	A storage location linking programmed data to the corresponding number in the DAMA net preset, not a UFO number.
EPOCH	DD/MM/YYYY	The data for the TLE data set being used, not the current date unless the same.
Longitude of ASCEN	000.00000 to 359.99999	Calculated from the TLE for the UFO being ranged.
Inclination	000.00000 to 179.00000	
Argument of Perigee	000.00000 to 359.99999	
Eccentricity	0.00000000 to 0.99999999	
Mean Motion	0.00000000 to 0.99999999	
Mean Anomaly	000.00000 to 359.99999	
LOCATION		
Menu Item	Options	Remarks
Location Method	GPS	Requires PLGR to radio interface.
	Manual	
Longitude	DDD MM.MMMM E/W	Decimal minutes format in WGS-84 datum.
Latitude	DD MM.MMM N/S	
Altitude	+/- 00000.0 to 99999.9 meters	

Figure C-5. DAMA Net Preset Programming Menu Tree

d. Table C-8 is the DAMA net preset programming parameters checklist.

Table C-8. DAMA Net Preset Parameters

Menu Item	Options	Remarks
TRANSEC		
Orderwire Encryption	OFF	PT EOW operation.
	ON	ON by present doctrine. Requires TSKs to be assigned to key locations.
Key Location 0	None TSK 01 to 25	DAMA EOW TSKs loaded to SATELLITE storage positions. Assign proper key where channel controller expects to find it. IF not known, assign key to all key locations.
Key Location 1	None TSK 01 to 25	
Key Location 2	None TSK 01 to 25	
Key Location 3	None TSK 01 to 25	
Key Location 4	None TSK 01 to 25	
Key Location 5	None TSK 01 to 25	
Key Location 6	None TSK 01 to 25	
Key Location 7	None TSK 01 to 25	
ADDR		
Base_Address	00001 to 65535	
Guard_List	Address to add: 00001 to 65535	Add up to 15 TBA and/or network addresses.
	Review	View programmed addresses.
	Delete	Removes an address.
POWER		
Transmit Power	1 to 20 watts	Steps in one-dBm increments.
NAME		
Change Net Name	DAMANET 0 to 9	12 characters alphanumeric, no spaces.

e.   Table C-9 is the DAMA port configuration preset parameters. Figure C-6 is the DAMA port configuration preset menu tree.

| Menu Item	Options	Remarks
Table C-9. DAMA Port Configuration Preset Parameters		
Menu Item	*Options*	*Remarks*
COMSEC		
Crypto Mode	None	Function switch in PT.
	VINSON	Not available on NB channels.
	ANDVT	2400 max data rate.
	KG-84	Data only.
Encryption Key	TEK 01 to 25	Load TEKs first. Do not program empty position.
Analog Data	YES NO	External devices with own modem, such as KL-43C/F.
KG-84 SYNC Mode	Redundant Mode 1 Redundant Mode 2 Non-Redundant Mode 3 Non-Redundant Mode 4	Match mode used in net. PSC-5 only compatible with Mode 4.
Training Frames	6, 9, 12, 15, 30, or 60	Sets length of training frames sequence for KY-99 compatibility, 9 is default setting.
DATA/VOICE		
Data/Voice	AUTO ON ADF PORT	With VINSON, select port on which to receive DATA.
	AUTO ON DATA PORT	
	DATA or VOICE	With ANDVT COMSEC.
	DATA	With KG-84 COMSEC.
SYNC/ASYNC Select	ASYNC SYNC	ASYNC requires port programming.
Baud Rate	WB to 75, 300, 600, 1200, 2400, 4800, 16 kbps	COMSEC mode and CHAN type dependent.
	NB to 75, 300, 600, 1200, 2400	
CONFIG_CODE		
25-kHz Port Config Code	01 to 99	Use configuration code that matches COMSEC type, data rate, and data device. Refer to Appendix B, Table B-2.
5-kHz Port Config Code	001 to 511	Add leading zero, same codes as in 25-kHz DAMA. Use configuration code that matches COMSEC type, data rate, and data device. Refer to Appendix B, table B-2.
NAME		
Change Name	DAMACFG 0 to 9	12 characters alphanumeric, no spaces.
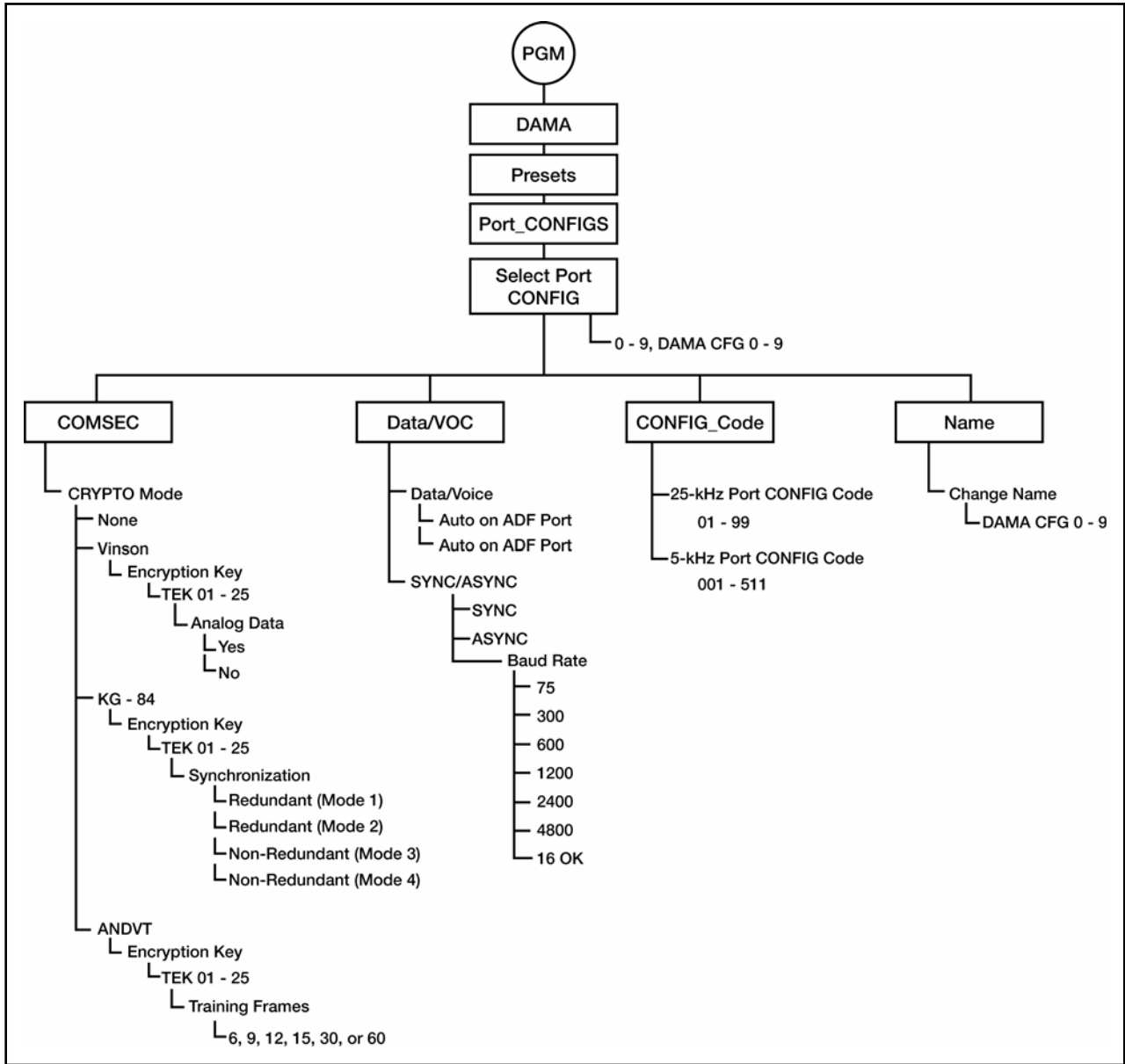
Figure C-6. DAMA Port Configuration Preset Programming Menu Tree

    f.   AN/PRC-117F DAMA destination presets may be used on any type of DAMA channel. All necessary elements for each type of channel are included in the preset. Table C-10 is the preset checklist and Figure C-7 is the preset programming tree.

Table C-10. DAMA Destination Preset Programming Checklist

Menu Item	Options	Remarks
5-kHz		
Destination	TBA 00000 to 65535	5-kHz channels allow calls only to one address.
25-kHz AC		
Add Destination to Add:	1: 00001 to 65535 2: 00001 to 65535 3: 00001 to 65535 4: 00001 to 65535 5: 00001 to 65535	25-kHz AC operation allows up to five addresses to be designated. Conference call capability.
Review	Destination X of X	Allows checking of programmed addresses.
Delete	00000 to 65535	Remove an address.
25-kHz DC		
Circuit Number	10000 to 10999	Enter authorized 25-kHz DC circuit number.
SEARCH		
Search Area (5-kHz Only)	Local	Local footprint only.
	Global	Sets up 5-kHz MHOP operation.
NAME		
Change Name	DAMADEST0 0 to 49	12-digit alphanumeric name.
CLEAR		
Are You Sure?	YES NO	Used to clear all parameters in the preset being programmed.
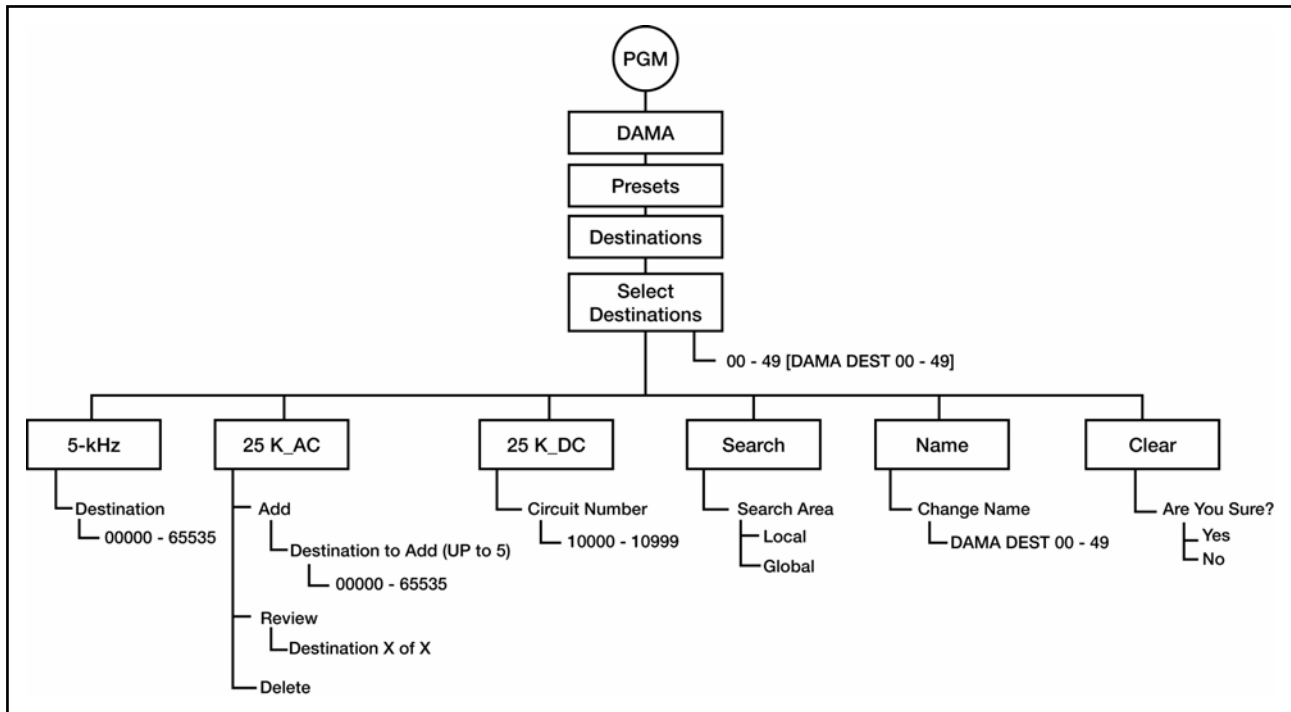
**Figure C-7. DAMA Destination Preset Programming Menu Tree**

g.   DAMA defaults set which items appear as default values throughout the AN/PRC-117F DAMA CALL menus. This speeds up operation by reducing the amount of scrolling needed to reach the proper CALL parameters. All options for making calls are still available in the CALL menus, regardless of DAMA defaults initially programmed. Refer to Table C-11 for the checklist and Figure C-8 for the defaults programming tree.

Table C-11. DAMA Defaults Programming Checklist

Menu Item	Options	Remarks
OUT OF SERVICE		
Precedence	Routine, Priority, Immediate, Flash, Flash Override, Emergency Action	Use only authorized precedence.
Reason Code	00 to 99	User developed codes.
Duration	# # # # - Seconds, Minutes, Hours, Days	Requires setting the amount and the units before pressing ENT. Use 0000 for indefinite.
PAGE		
Addresses to Page	1: # # # # # 2: # # # # # 3: # # # # #	00000 to 65535

Table C-11. DAMA Defaults Programming Checklist

Menu Item	Options	Remarks
LINK _TEST		
Link Test Rate	9.6k 19.2k 32k	Sets default link test data rate when conducting link tests. Refer to Table C-13 for times required to complete link tests.
CALL		
Duration	# # # # - Seconds, Minutes, Hours, Days	Requires setting the amount and the units before pressing ENT. Use 0000 for indefinite.
5-kHz CIRCUIT		
Dedicated	YES NO	Set YES to make call default to dedicated DASA operation.
Duration	# # # # - Seconds, Minutes, Hours, Days	Requires setting the amount and the units before pressing ENT. Use 0000 for indefinite.
Channel Type	25-kHz 5-kHz	Sets the default type of channel requested when making dedicated DASA calls.
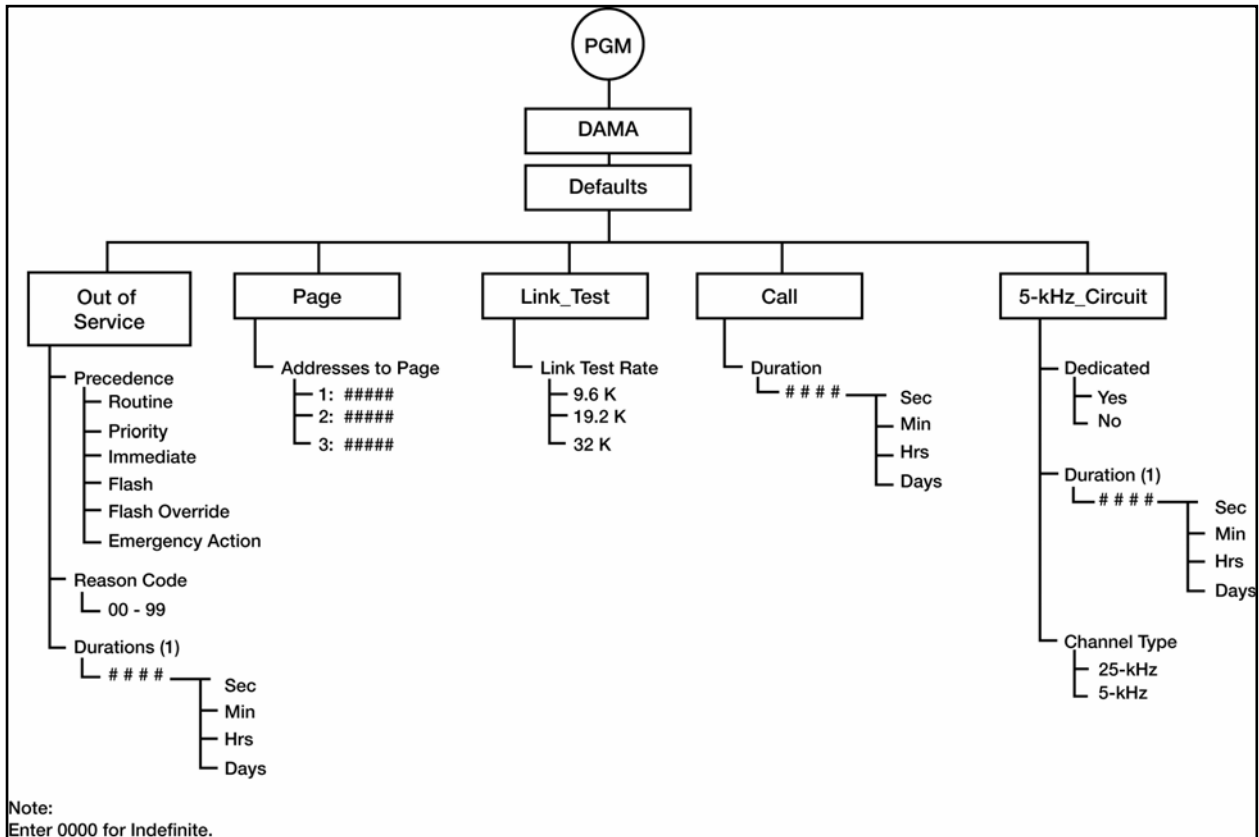
Figure C-8. DAMA Defaults Programming Menu Tree

h. Passive ranging and ephemeris data is used when the tactical situation dictates the need to control emissions from the radio. Refer to Table C-12 to determine the necessary elements required for passive ranging programming and operation.

Table C-12. DAMA Ranging Methods

Ranging Method Used	Transmit Capability	Time (Options)	Location	EPHEM Data	5-kHz Log in
Active	Full Silent	Not Required	Not Required	Not required	Over-the-Air or Preassigned
Passive	Full Silent (5-kHz) Yes	Yes	Yes	Yes	Over-the-Air or Preassigned

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WARNING

Contact with the antenna or exposure directly in front of the antenna during DAMA SATCOM transmissions may cause injury to personnel. In DAMA SATCOM operation, the AN/PRC-117F interacts automatically with the channel controller, transmitting and receiving as needed. This automatic transmission may not be apparent to the operator; therefore, all personnel should avoid contact with the antenna or exposure directly in front of the antenna.

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i. The 25-kHz DAMA UHF SATCOM is operated in either AC or DC. The AN/PRC-117F uses the following types of DAMA presets to manage operating parameters. These presets allow for quick configuration changes to any type of operation.

(1) DAMA net presets, 10 each—0 to 9.

(2) DAMA port configuration presets, 10 each—0 to 9.

(3) DAMA destination presets, 50 each—00 to 49.

j. Verify that the SATCOM antenna is oriented correctly using a magnetic compass to point it on the proper azimuth, as determined from pointing slide rule graphs or software applications. Make an approximate adjustment in the elevation angle as needed. SATCOM RSSI test cannot be used in DAMA operation.

k. Initial operation calls may be either normal DAMA circuit service calls or DASA dedicated calls. See Table C-9. Perform the following procedure for initial operation:

(1) Rotate function switch to CT.

(2) At the OPERATIONAL MODE prompt, select DAMA; press ENT.

(3) Select the desired DAMA net preset by pressing the left/right arrow keys on the KDU to scroll to the NET preset number and use the KDU numeral keys to enter the desired net preset number.

Note: In DAMA mode, the PRE + / – key on the KDU is disabled to prevent inadvertently changing the net preset while in a net connected state.

(4) Press the circular change key to see that the proper DAMA port configuration preset is selected for the intended DAMA service request. If a different DAMA port configuration preset is desired, use the left/right arrow keys on the KDU to scroll to the preset number. Enter the required preset number and press ENT.

(5) Begin radio operation. View main screen for network status changes in the order listed:

(a) ACQUIRING.

(b) RANGING (active ranging method only).

(c) LOGGING IN (5-kHz only).

(d) CONNECTED.

(6) Network status of CONNECTED indicates the terminal is ready to request or receive services in the DAMA network. If terminal does not become connected, check antenna pointing, loading, and programming assignment of the proper EOW TSK and TBA. ERROR network status indicates that no DAMA EOW TSK is loaded.

l.   The 25-kHz DAMA has two modes of operation: AC or DC. The channel controller determines the frame format of the channel and the radio operates accordingly.

m. Calls in 25-kHz AC DAMA may be made from one to five terminal or network addresses. A network address is a predetermined group of terminals operated together as a network. Determine the following before making a call request:

(1) Type of Service. Before placing the call, use the proper DAMA port configuration preset for the service needed from the service state display screen. On changing the port configuration preset with a connected terminal, the radio sends a status report B RCCOW to the channel controller for notification of the new configuration. For DASA dedicated calls in 25-kHz AC DAMA, a port configuration preset with a configuration code to signify DASA must be used. Refer to current configuration codes.

(2) Station(s) to be Called. DAMA destination presets are used in call menus to select station(s) to be called. TBAs associated with this destination preset are shown on the line below the DAMA destination preset name.

(3) Precedence of the Call. Use the proper precedence for the importance of the required service. If a higher precedence than authorized is used, the call is denied. Not all terminals have access to every precedence level. Check with organization DAMA planners and authorization documents. At certain times, the channel controller can place precedence restrictions. The AN/PRC-117F does not allow calls below this precedence during these times.

(4) Duration of the Call. Request enough time to complete the required communications; service is terminated automatically at the end of this time. See Figure C-9. Perform the following procedure to place a call using 25-kHz AC DAMA:

(a) Press CALL key to bring up SELECT REQUEST TYPE.

(b) Select PLACE A CALL and press ENT.

(c) Select the destination to be called. Use the left/right arrow keys to select the DAMA destination preset number field, then enter the preset number needed. As an alternative, select the destination name field or scroll through the DAMA destination presets names with the up/down arrow keys. Press ENT when proper destination preset number or name is in view. The TBAs associated with this destination preset are shown at the bottom of the display.

(d) At the next display screen, choose the precedence of the CALL and press ENT.

Note:	When the channel controller places system restrictions, it sets the minimum precedence required to place a call on the DAMA channel. When this happens, the call precedence not authorized is no longer showm on AN/PRC-117F call menus.

(e) Enter the required call duration in number of seconds, minutes, hours or days (or input 0000 for indefinite). Use the left/right arrow keys to select between either the unit digits field or the units. Press ENT when correct time and units are selected.

(f) The display returns to the main operational display. Service state changes to PENDING. Wait for the radio to send the request to the channel controller.

(g) Observe the following service states:

- PENDING—Radio terminal is negotiating the sending of the call request and action on it from the channel controller. Wait until it becomes active or a system message is received concerning the request.

- ACTIVE—Service request has been granted, the normal indication to commence operation with the requested service.

- QUEUED—Service request is being held and is granted when channel resources are free. Wait until the service is granted or terminate the call and try again later.

- DEDICATED—Indicates that DASA operation has been granted. Operation in DASA is ruled by MIL-STD 188-181A covering 5-kHz and 25-kHz dedicated UHF SATCOM.

- IDLE—The radio is not active or is setting up a service.

n. Terminate a 25-kHz AC DAMA call on completion. The user should terminate the timed or indefinite call so the channel controller can reassign that channel to another terminal user in the network.

o. The 25-kHz DAMA has two modes of operation: AC or DC. The channel controller determines the frame format of the channel and the radio operates accordingly.

p. Calls in 25-kHz AC DAMA can be made from one to five terminal or network addresses. A network address is a predetermined group of terminals operated together as a network. Determine the following before making a call request:

(1) Type of Service. Before placing the call, use the proper DAMA port configuration preset (from the service state display screen) for the service needed. On changing the port configuration preset with a connected terminal, the radio sends a status report B RCCOW to the notify channel controller of the new configuration. For DASA dedicated calls in 25-kHz AC DAMA, use a port configuration preset with a configuration code to signify DASA. Refer to current configuration codes.

(2) Station(s) to be Called. DAMA destination presets are used in call menus to select station(s) to be called. TBAs associated with this destination preset are shown on the line below the DAMA destination preset name.

(3) Precedence of the Call. Use the proper precedence for the importance of the required service. If a higher precedence than authorized is used, the call is denied. Not all terminals have access to every precedence level. Check with organization DAMA planners and authorization documents. At certain times, the channel controller can place precedence restrictions. The AN/PRC-117F does not allow calls below this precedence during restricted times.

(4) Duration of the Call. Request enough time to complete the required communications; service is terminated automatically at the end of this time. See Figure C-9. Perform the following procedure to place a call using 25-kHz AC DAMA:

(a) Press CALL key to bring up SELECT REQUEST TYPE.

(b) Select PLACE A CALL and press ENT.

(c) Select the destination to be called. Use the left/right arrow keys to select the DAMA destination preset number field, then enter the preset number needed. As an alternative, select the destination name field or scroll through the DAMA destination presets names with the up/down arrow keys. Press ENT when proper destination preset number or name is in view. The TBAs associated with this destination preset are shown at the bottom of the display.

(d) At the next display screen, choose the precedence of the call and press ENT.

Note:	When the channel controller places system restrictions, it sets the minimum precedence required to place a call on the DAMA channel. The call precedence not authorized is no longer shown on AN/PRC-117F call menus.

(e) Enter the required call duration in number of seconds, minutes, hours, or days (or input 0000 for indefinite). Use the left/right arrow keys to select either the unit digits field or the units field. Press ENT when correct time and units are selected.

(f) The display returns to the main operational display. Service state changes to PENDING. Wait for the radio to send the request to the channel controller.

(g) Observe the following service states:

• PENDING—Radio terminal is negotiating the sending of the call request and action on it from the channel controller. Wait until it becomes active or a system message is received concerning the request.

- ACTIVE—Service request has been granted, the normal indication to commence operation with the requested service.

- QUEUED—Service request is being held and is granted when channel resources are free. Wait until the service is granted or terminate the call and try again later.

- DEDICATED—Indicates that DASA operation has been granted. Operation in DASA is ruled by MIL-STD 188-181A covering 5-kHz and 25-kHz dedicated UHF SATCOM.
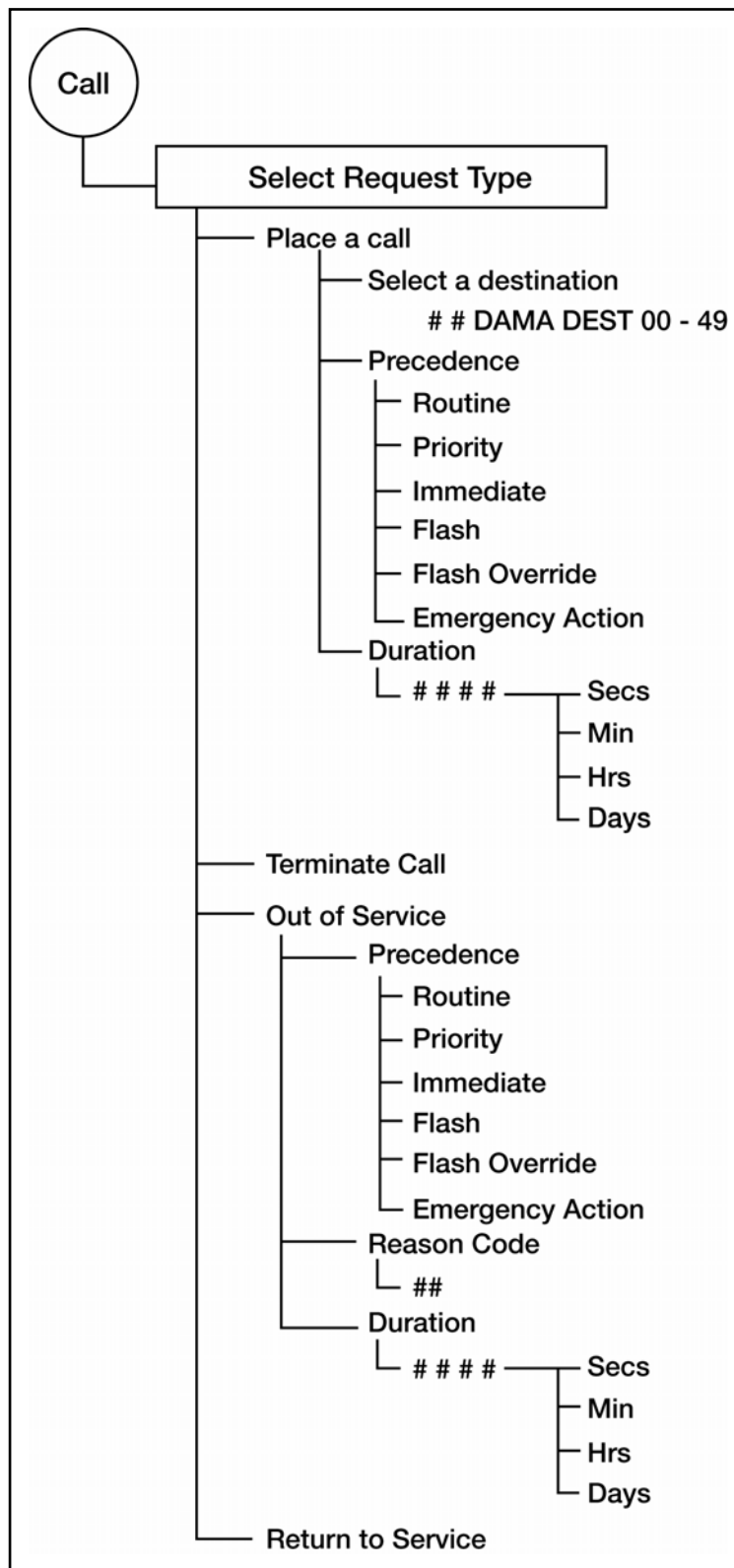
- IDLE—The radio is not active or is setting up a service.

Call

Select Request Type

- Place a call
  - Select a destination
    - # # DAMA DEST 00 - 49
  - Precedence
    - Routine
    - Priority
    - Immediate
    - Flash
    - Flash Override
    - Emergency Action
  - Duration
    - # # # #
      - Secs
      - Min
      - Hrs
      - Days
- Terminate Call
- Out of Service
  - Precedence
    - Routine
    - Priority
    - Immediate
    - Flash
    - Flash Override
    - Emergency Action
  - Reason Code
    - ##
  - Duration
    - # # # #
      - Secs
      - Min
      - Hrs
      - Days
- Return to Service

Figure C-9. DAMA 25-kHz AC Call Menu

q. Terminate 25-kHz AC DAMA calls on completion. The user should terminate a timed or indefinite call so the channel controller can reassign that channel to another terminal in the network. Perform the following procedures to terminate a call:

(1) From a service state display indicating ACTIVE and time remaining, press CALL.

(2) From SELECT REQUEST TYPE display, select TERMINATE CALL with the up/down arrow keys; press ENT.

(3) The TERMINATE CALL request is sent to the channel controller. The channel controller tearsdown the service and the service state of the terminal returns to one of the service states (IDLE, PENDING, or QUEUED), depending on other ongoing requests.

r. Send a 25-kHz AC DAMA out-of-service request to the channel controller instead of logging out as in 5-kHz DAMA. In these requests, the duration for being out of service, precedence, and reason code is transmitted. If another station attempts to call the terminal during the out-of-service period, the channel controller can report the reason code and time to be out of service to that user. Perform the following procedures to send an out-of-service request:

(1) Press CALL key to bring up SELECT REQUEST TYPE display.

(2) Select OUT OF SERVICE and press ENT.

(3) Select precedence for out-of-service request and press ENT.

(4) Enter two-digit numerical out-of-service code.

(5) Enter duration for the out of service period; use 0000 if it is to be indefinite. Press ENT.

(6) The out-of-service request is sent to the channel controller. Watch the display for acknowledgement from the channel controller.

s. To return to service in 25-kHz AC DAMA operation, send a status report B RCCOW (menu item RETURN TO SERVICE) to the channel controller. This informs the channel controller that the operator has returned. When an operational radio is unmanned, it is not necessary to use this menu item when turning on after a power off. The RCCOW sent to the channel controller when connected notifies the channel controller of return to service. Perform the following procedure to return to service:

(1) Press CALL key to bring up SELECT REQUEST TYPE display.

(2) Select RETURN TO SERVICE and press ENT.

(3) A Status report B RCCOW is sent to the channel controller.

t. In 25-kHz UHF AC DAMA, an AN/PRC-117F terminal user can page up to three other terminals. Paging is available only in 25-kHz AC DAMA. Using organization network planners, determine the procedures on responding to pages. See Figure C-10. Perform the following procedure to page:

(1) Press CALL key to bring up service request screen of SELECT REQUEST TYPE.

(2) Select PAGE and press ENT.

(3) Use KDU number keys to type in the first address to page; press ENT to accept number.

(4) Repeat step 3above for the second and third addresses. (If no more addresses need to be paged, type 0000 and press ENT.)

(5) The radio sends the page request to the channel controller. The paged station should respond as unit procedure dictates.
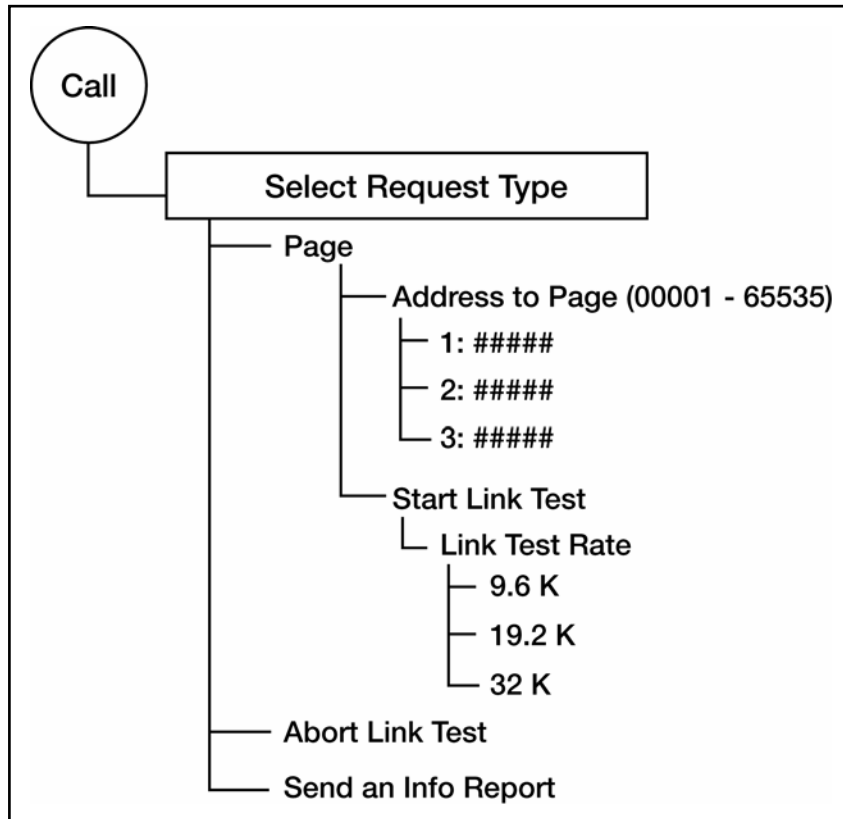
Figure C-10. Twenty-five-kHz AC Paging and Link Test

u. To alleviate problems in 25-kHz AC DAMA operation, the channel controller can send an information request code to request information (INFO Report, see Figure C-10). from the terminal operator. The terminal operator must respond to the request with an information report code to continue operation in DAMA. Perform the following procedure to send an information report code at any other time:

(1) Press CALL to bring up SELECT REQUEST TYPE display.

(2) Select INFO REPORT from menu and press ENT.

(3) Enter the desired information report response code to send to the channel controller and press ENT. The radio sends the code to the channel controller.

v. The 25-kHz DAMA has start-link test built into its frame format. Link testing determines suitability for data operations using more robust frame formats that support higher burst data rates. It does not reduce channel overhead allotted to supporting

communications. Slower data rate link tests require more time to complete. Refer to Table C-13. Perform the following procedure to conduct a link test:

    (1) Press CALL key to bring up SELECT REQUEST TYPE display.

    (2) Select START LINK TEST and press ENT.

Note:	This sends a link test request to the channel controller. When the link test slot becomes available, the channel controller commands the radio to begin the link test. On completion of the link test, the radio displays the results in number of bit errors and missed acquisitions during the test. Results are recorded automatically by the channel controller and used to determine data burst rates. Terminals that show good results in link tests are assigned frame formats supporting more robust burst data rates, thereby increasing overall data throughput.

Table C-13. Link Test Data Rates, 25-kHz DAMA

Link Test Data Rate	Time Required to Complete
9.6-kbps	6 to 7 minutes
19.2-kbps	2 minutes
32-kbps	1 minute

    w. Abort link test (25-kHz AC or DC DAMA) and use the radio for another purpose, perform the following procedure:

    (1) Press the CALL key to bring up the SELECT REQUEST TYPE display.

    (2) Select ABORT LINK TEST and press ENT. The radio aborts the link test process and terminates the link test.

    x. View network status messages (all DAMA modes). The AN/PRC-117F displays operational status messages that pop up on the display and are then placed into a message database while DAMA operation continues. To determine the steps in an operation while using DAMA, refer to the technical manual for a list of the messages and their explanation. There are two methods that may be used to view messages while operating in UHF DAMA SATCOM: message indicator method and options menu method.

    y. Perform the following procedure for the message indicator method:

    (1) Press the left/right keys to scroll over to the envelope icon on the operational display and press ENT.

    (2) Use the up/down arrow keys to scroll through the message database.

    (3) Press CLR to return to operational screens.

Note:	When operations on a current DAMA net terminate, all the DAMA status messages erase. Some pop-up messages require operator intervention to continue.

z. In 5-kHz DAMA, calls can be made to a single terminal address for a point-to-point capability or to a sub-net address giving network capability. The nine-second frame format creates long delays for voice users. The 5-kHz DAMA network operation was designed and, therefore, more suited for DATA operations. DASA dedicated service requests are used to handle service requests greater than the DAMA channel can handle. On entry into DAMA mode using a properly configured DAMA net preset, the AN/PRC-117F automatically acquires, ranges, and logs in with the channel controller. Network status shows CONNECTED, if successful. DASA call requests are placed with precedence of the call and the desired duration. Service request can be granted, placed in queue, or denied. Calls made with a precedence higher than authorized are denied. The 5-kHz DAMA has two basic modes of operation of circuit or message service. The AN/PRC-117F is placed in each mode by changing it on the display. The mode of operation is selected prior to operation in that mode. If a service message is received while in circuit mode, the radio is switched to message mode to download the message.

(1) Circuit service provides half-duplex encrypted voice or data service to a single destination or to a network, or terminals grouped under a sub-network address.

(2) Message service is a specialized data mode that provides packet transmission and reception of data messages up to 14 kilobytes. This requires an external data device to input the message to the AN/PRC-117F.

aa. Place a call (5-kHz circuit service or dedicated call). (See Figure C-11.) Requests for circuit service and dedicated calls are essentially the same. Dedicated service gives a channel unhindered by the delay the long 5-kHz DAMA frame format. Not all users have authorized use of dedicated service. Dedicated service is used to support data rates and message lengths not adequately supported by circuit service. Consider the following items before placing a call:

(1) Type of service. Use the proper DAMA port configuration preset for the service needed. Select this preset from the service state display screen before placing the call.

(2) Station(s) to be called. DAMA destination presets are used in call menus to select station(s) to be called. TBAs associated with this destination preset are displayed on the line below the DAMA destination preset name.

(3) Precedence of the call. Use the proper precedence for the importance of the required service. If a higher precedence than authorized is used, the call is denied. Not all terminals have access to every precedence level. Check with organization DAMA planners and authorization documents.

(4) Duration of the call (DASA only). Request enough time to complete the required communications. Service is terminated automatically at the end of this time. Additionally, when making DASA calls, select either 5-kHz NB or 25-kHz WB channels. Perform the following procedure to place a call using 5-kHz DAMA:

(a) Rotate function switch to CT.

(b) After the radio initializes, press MODE.

(c) At the OPERATIONAL MODE prompt, select DAMA; press ENT.

(d) Select the desired DAMA net by pressing the left/right arrow keys on the KDU to scroll to the NET preset number. Use the KDU number keys to enter the desired net preset number.

(e) Press the circular change key to view that the proper DAMA port configuration preset is selected for the intended DAMA service request. If a different DAMA port configuration preset is desired, use the left/right arrow keys on the KDU to scroll to the preset number. Enter the required preset number and press ENT.

(f) Begin radio operation. View main screen for network status of CONNECTED.

(g) Use the circular arrow key to check service state screen for 5-kHz CKT mode. If in MSG mode, use the left/right arrow keys to scroll to mode and change to CKT mode.

(h) Press CALL key to bring up SELECT REQUEST TYPE.

(i) Select PLACE A CALL and press ENT.

(j) To select the destination to be called, use either—

- The left/right arrow keys to select DAMA destination preset number for numeric entry of the destination

- The up/down arrow keys to select the destination preset name for the desired destination.

Note: The five-digit terminal addresses associated with this destination preset show on the bottom line of the display.

(k) At next display screen, choose the precedence of the **call** and press **ENT**.

(l) At DASA REQUEST? prompt, select YES for dedicated service and NO for regular DAMA circuit service.

(m) Enter the required DASA call duration in numerical units of seconds, minutes, hours, or days (or use 0000 for indefinite). Press ENT when proper time and units are selected. Time is not entered for normal DAMA calls.

(n) For DASA dedicated calls, channel type (5-kHz or 25-kHz) is also requested in the call request. This menu option is not shown when making a normal DAMA circuit service call.

(o) The display returns to the main operational display. Service state changes to PENDING. Wait for the radio to send the request to the channel controller.

(p) Observe the service state display for the following indications:

- PENDING—Radio terminal is negotiating the sending of the call request and action on it from the channel controller. Wait until it becomes active or a system message appears concerning the request.

- ACTIVE—Service request is granted. This is the normal indication to commence operation with the requested service.

- PREEMPTED—An active service is preempted by a higher priority service. Wait for the service to become active again.

- DEDICATED—Indicates that DASA operation is granted. Operation in DASA is ruled by MIL-STD 188-181B covering 5-kHz and 25-kHz dedicated UHF SATCOM. Use the appropriate DAMA port configuration preset needed for the DASA service.

- IDLE—The radio is inactive or setting up a service.
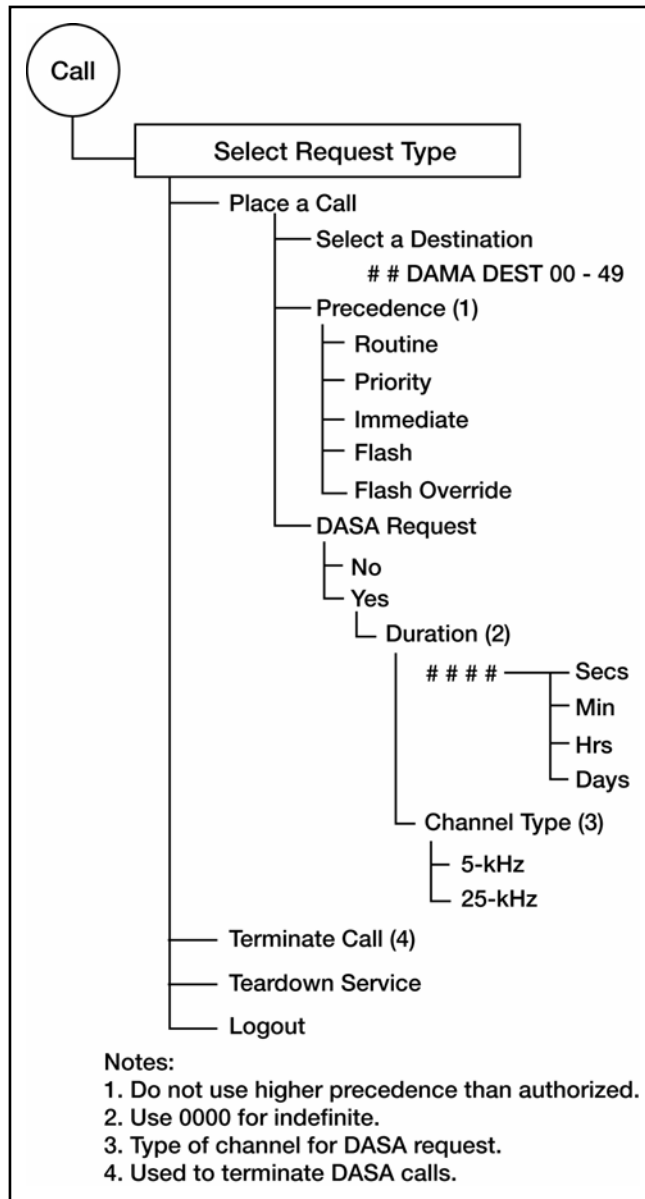
Figure C-11. Call Menu 5-kHz DAMA

bb. Perform teardown service (5-kHz). If time is still remaining or if indefinite time period (0000) is selected, circuit service and dedicated service are torn down on

completion of the communications. Perform the following procedure for service teardown:

        (1) At end of using a DAMA service, press CALL key on KDU.

        (2) Use up/down arrow keys to scroll to TEARDOWN. Press ENT to begin teardown.

        (3) Use the up/down arrow keys to select the desired service to teardown. Press the circular arrow keys to view the second screen of the service state.

        (4) Press ENT to teardown this service.

    cc. Terminate call (5-kHz dedicated call only). If time is remaining, dedicated calls should be terminated. Perform the following procedure to terminate a dedicated call:

        (1) At the end of using DASA dedicated service, press CALL button on KDU.

        (2) Use up/down arrow keys to scroll to TERMINATE CALL.

        (3) Press ENT to terminate call.

        (4) Service state goes to IDLE after reacquiring the network home channel.

    dd. Send a message using 5-kHz DAMA message service. DATA messages of less than 14 kilobytes are uploaded to radio and the packet is sent to the destination address. The terminal prompts a message upload to the radio. Perform the following procedure to send a message:

        (1) Ensure the DATA device is connected to the J1 ADF connector or J3 data connector and is ready for operation with a message to be transmitted.

        (2) Select a DAMA port configuration preset that properly interfaces the data device to the radio using KG-84C encryption.

        (3) Press the circular arrow keys to move display screens to service state screen to place radio in MSG mode. If radio is in CKT mode, use the left/right arrow keys to scroll to MODE and change to MSG mode with the up/down arrow keys, then press ENT.

        (4) Press CALL key to bring up display for SELECT REQUEST TYPE. See Figure C-12.

        (5) Select SEND A MESSAGE and press ENT.

        (6) Select DAMA destination preset to which the message is sent and press ENT. TBAs associated with this preset are shown across the bottom line of the display.

        (7) The next display is SELECT PRECEDENCE. The display shows the precedence last used to call the selected destination. Press ENT to keep that precedence, or scroll and select an alternate message precedence.

        (8) After a brief configuring screen, the terminal prompts the user to ENTER MESSAGE to the radio. Send the message on the data device to upload it into the radio. Press CLR to abort.

        (9) When uploading is complete, the service state indicates IDLE with a message status of one (1) for outgoing. After the message is transmitted, the outgoing message indicator number decreases.

ee. Receive a data message using 5-kHz DAMA message service. Depending on operation of the particular data device, the radio is programmed to either automatically download a received message from the radio buffer to the data device, or manually download a received message after the data device is ready to accept it from the radio. When using manual message release, remember to download messages so additional messages are received without losing important data. When using 5-kHz message service, the AN/PRC-117F is operated with a network state of CONNECTED and a service state of IDLE. When a sender initiates sending a data message to the terminal, the channel controller looks for the presence of the destination terminal and sets up a service between the two terminals. On successful transmission, the AN/PRC-117F indicates (in its message buffer) that it is holding a message for downloading. If the 5-kHz MSG mode is set to AUTO instead of MANUAL, it sends the message immediately to the interfaced output data device. Perform the following procedure to download a message using 5-kHz message service with manual message mode:

(1) Verify there is a buffered message in the radio and the radio is in MSG mode.

(2) Connect the data device to either the J1 ADF connector or J3 data port, as applicable, and ensure it (connector or port) is ready to receive the message.

(3) Press the CALL key and bring up SELECT REQUEST TYPE display.

(4) Select DOWNLOAD MESSAGE and press ENT.

(5) The service state changes to DOWNLOAD and the message is sent to the data device. When complete, the service state changes back to IDLE.

(6) Check the data device for proper reception of the message. The incoming message number is decremented.
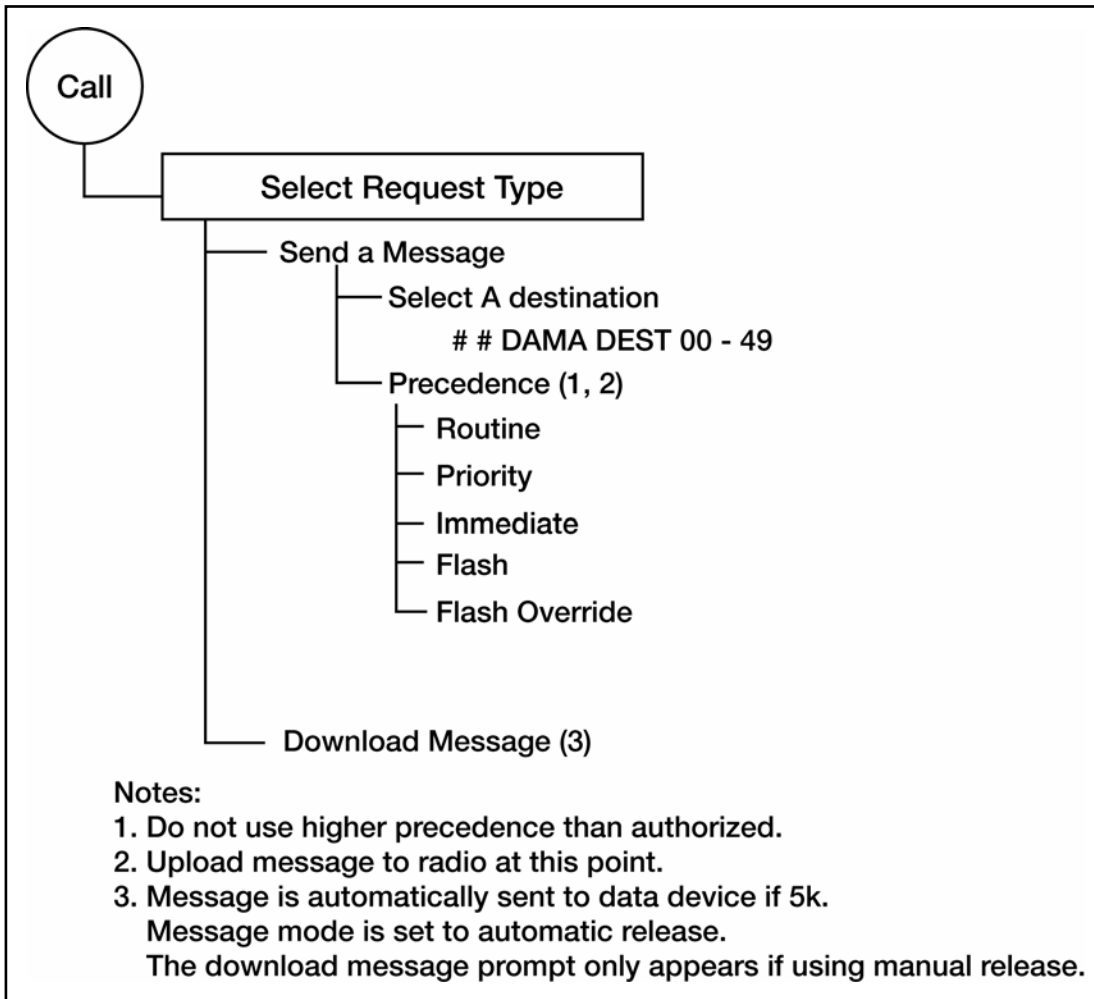
Figure C-12. MSG Service Call Menu, 5-kHz DAMA

ff.   Log out of 5-kHz DAMA. To leave the 5-kHz DAMA channel, the terminal must log out with the channel controller. Also, this is required if shutting the radio off for any reason (such as changing the batteries or adjusting the antenna). Perform the following procedure to log out of a 5-kHz DAMA net:

Note: If the radio goes off the net without logging out, the channel controller automatically logs it out after it missed 200 ROWs (approximately 30 minutes). Until it logs out, the channel controller considers the terminal logged in. If the terminal attempts to log in a second time, the channel controller may reject the second log in attempt. If a log in is rejected, go into net preset programming (Figure C-6) and change log in type to preassigned. The terminal is connected again. Return setting to over-the-air after the net connects again.

(1) Press the CALL key to bring up the SELECT REQUEST TYPE display screen.

(2) Use the up/down arrow keys to select LOG OUT; press ENT to log out.

Note: The service state and network state switch to DISABLED after the channel controller acknowledges the log out request. The radio is switched to another DAMA net preset, or turned off. Figure C-13, Figure C-14, and Figure C-15 provide screen displays and descriptions for the radio.
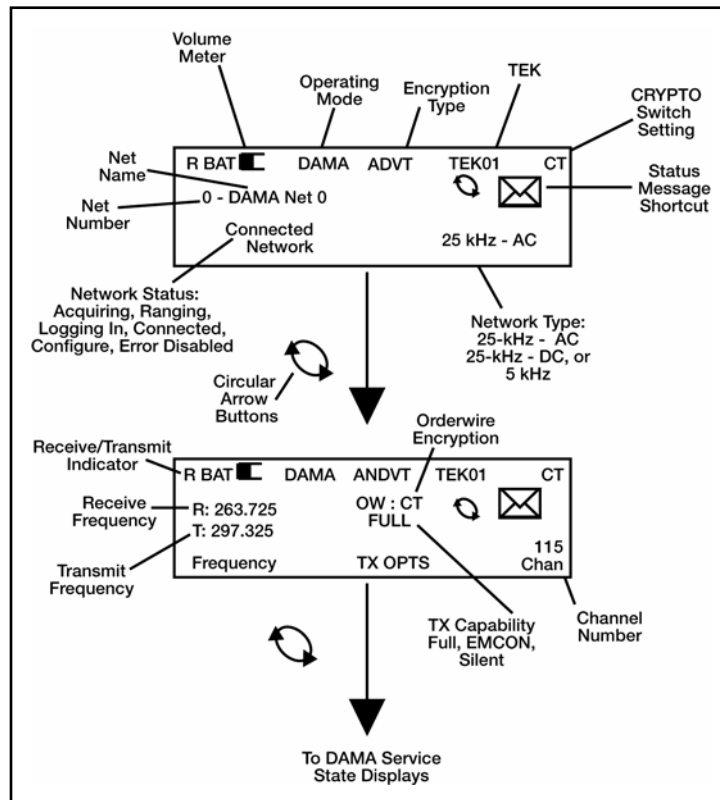

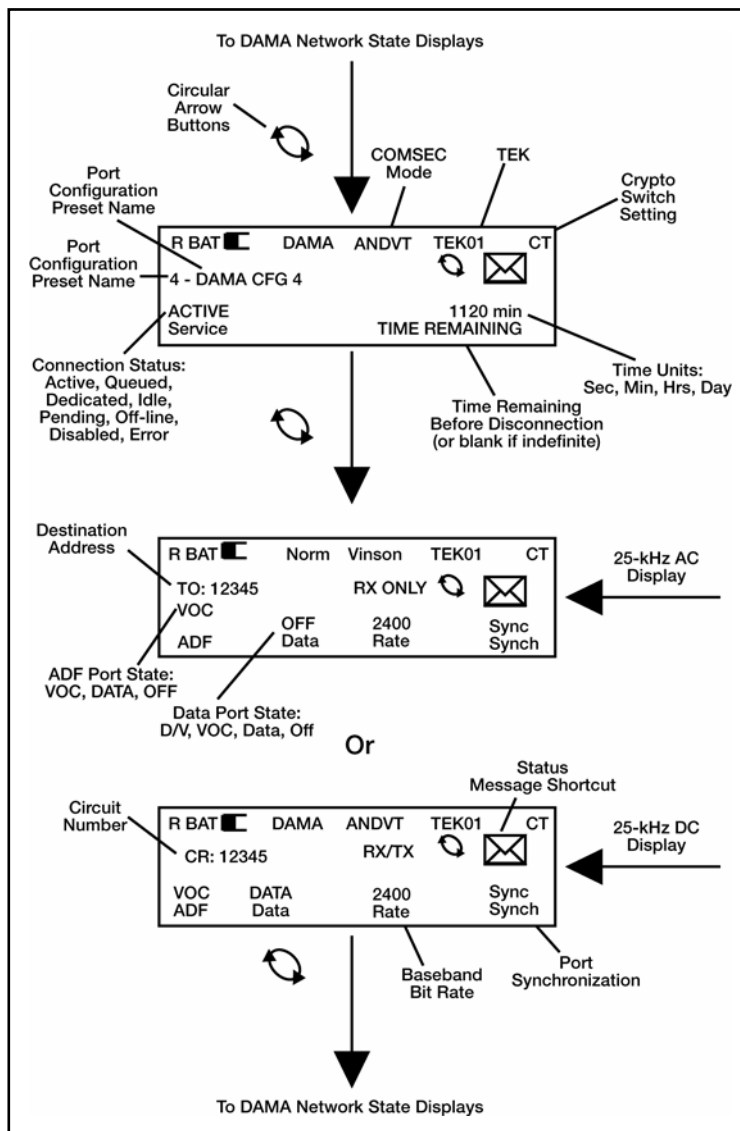**Figure C-13. DAMA Network State Displays, 5-kHz and 25-kHz**

Figure C-14. DAMA Service State Displays, 25-kHz
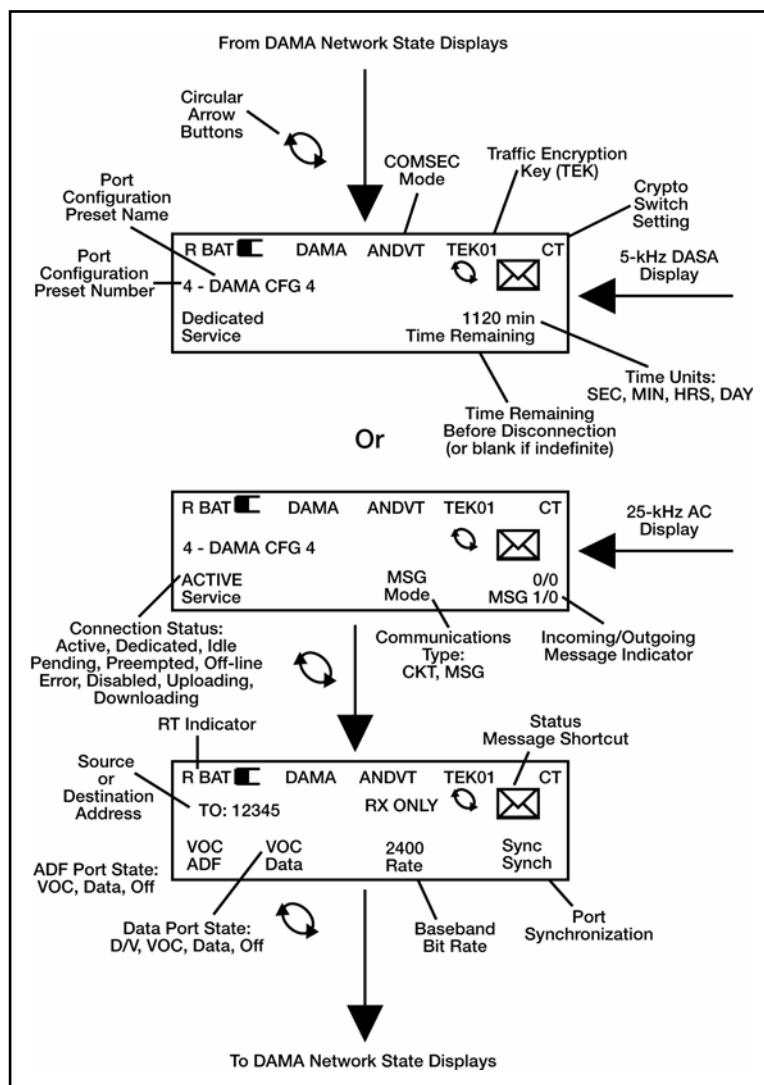
Figure C-15. DAMA Service State Displays, 5-kHz

AN/PSC-5 Series Radios

1. Line of Sight (LOS) Operations

    a. Press ESC until the main menu is displayed.

    b. Press 3 (set presets).

    c. Press 1 (set mode presets).

    d. Select LOS.

    e. Enter the preset number (1 to 6).

```
SET PRESET
LOS   -P#
TEK#
Normal
R###.###
```

    f. Enter the COMSEC key number (1 to 5).

    g. Select modulation (amplitude modulation [AM], frequency modulation [FM] or frequency-shift keying [FSK]).

    h. Select encryption type (VINSN, FASCN, 3KG-84, 4KG-84).

    i. Select mode (V or D).

    j. Select data rate.

    k. In orderwire encryption PT only, select normal.

    l. Select transmit power level (see Table D-1).

    m. Enter receive frequency (030.000 to 399.975).

Table D-1. Lind of Sight (LOS) Operations

FREQs	Modulation	Power
30.000 to 87.975	FM/FSK	23 to 43 dbm
108.000 to 129.975	AM	23 to 38 dbm
130.000 to 148.975	AM/FM/FSK	23 to 38 AM 23 to 39 FM/FSK
156.000 to 173.975 225.000 to 399.975	FM/FSK	23 to 39 dbm

n. If the transmit frequency is the same as the receive frequency, press ENT. Otherwise enter a new transmit frequency.

o. To load additional presets, repeat steps e through n.

p. Perform the following procedure for LOS operation.

    (1) In the current mode screen, select LOS.

    (2) Enter the preset number (1 to 6).

    (3) Check all fields to ensure they are correct.

```
CURRENT MODE
LOS   -P#     Sq- -054
TEK# FM  VINSN  D16K
Normal     Tpwr 37 dbm
```

q. Proceed with communications.

2. SATCOM Operations

a. Press ESC until the main menu is displayed.

b. Enter 3 (set presets).

c. Enter 1 (set mode presets).

d. Select SATCOM.

e. Enter the preset number (1 to 6).

Note: Modulation is not selectable. Satellite loopback is not performed in FSK.

```
          SET PRESET
SATCOM   -P#
TEK#     FSK VINSN V16K
Normal          Tpwr 43 dbm
```

f.   Enter COMSEC key (1 to 5).

g. Select encryption type (ANDVT, VINSN, 3KG-84, 4KG-84).

h. Select mode (V or D).

i. Select data rate (1200, 2400, 9600, 16 kbps).

j. Enter/select power level (23 to 43dbm).

Note: It may be necessary to re-enter the encryption type and data rate after entering the channel number.

k. Enter channel number (009 to 239) or 999 to enter frequency pairs manually. Using the home channel number is recommended. SATCOM loopback cannot be utilized if 999 is the channel number.

```
Channel Number: ###
R###.###              T###.###
DIFF
```

l.   If 999 was entered in previous step, enter the receive and transmit frequencies (225.000 to 399.995).

m. Select encoding type (DIFF or NDIFF). Radios must have the same encoding type to communicate.

n. To load additional presets, repeat steps d through m.

o. Perform the following procedures for SATCOM operation.

(1) In the current mode screen, select SATCOM.

(2) Enter the preset number (1 to 6).

(3) Check all fields to ensure they are correct.

```
          CURRENT MODE
SATCOM  -P#    Sq-__-030
TEK#  FSK   VINSN  V16K
Normal      Tpwr 43 dbm
```

3.   DAMA 5-kHz Operations

a. Perform the following to select 5-kHz input/output (I/O) rates. (See Table D-2 for I/O data rates.)

Table D-2. I/O Data Rates for 5-kHz DAMA

Baud	KG-84 Data	ANDVT Data	ANDVT Voice
75	X	X	
300	X	X	
600	X	X	
1200	X	X	
2400	X	X	X
9600	X		
16 k	X		

(1) Press ESC until the main menu is displayed.

(2) Press 2 (database options).

(3) Press 4 (5-kHz I/O rates).

(4) Use NEXT/PREV to select a field.

(5) Use arrow keys to select (or deselect) each option, then press ENT. If voice is used, 2400 is checked by default.

```
DAMA 5KHz I/O RATES
__75     __300    __600
__1200_☑2400 __9600
__16k
```

(6) Repeat steps 4 and 5, as required.

(7) When completed, press ESC to return to the database menu.

b. To ensure the terminal receives communications from a terminal, place that network address (common guard, private guard, or subnet) in the guard list (do not enter the terminal address). To add to (or change) the guard list, follow the procedure below.

Note: The guard list is a set of addresses for which a terminal receives services. The guard number is the address of a single terminal or network. Terminal addresses from which communications need to be received by a specific terminal are placed in the guard list. When a terminal address is placed in the guard list, the control station logs that address into the network.

The guard list procedure is not recommended for 5-kHz DAMA. If a guard list is used for a 5-kHz terminal, ensure the terminal addresses placed in the guard list are not used by another active terminal.

The demarcation point divides addresses between single terminals and networks. Addresses below the demarcation point (single terminals) should usually be left off the guard list.

(1) Press ESC until the main menu is displayed.

(2) Press 2 (database options).

(3) Press 2 (guard list).

(4) Select desired action (add, delete, modify, or view).

(5) Perform the following, as required:

(a) Add/enter address.

(b) Delete—use NEXT/PREV to move to the desired address; press ENT.

(c) Modify—use NEXT/PREV to move to the desired address; enter the new address.

(d) View—use NEXT/PREV to scroll through the list.

(e) When completed, press ESC to return to the database menu.

GUARD LIST VIEW				Note: 64000 is an example only. Do not enter it as a default setting.
1	64000	------	-----	
4	-----	------	-----	
7	-----	------	-----	
10	-----	------	-----	
13	-----	------	-----	

c. Perform the following procedure to enter a DAMA preset.

(1) Press ESC until the main menu is displayed.

(2) Press 3 (set presets).

(3) Press 1 (set mode presets).

(4) Select DAMA..

(5) Enter preset number (1 to 6).

```
         SET PRESET
DAMA -P#
TEK#  PSK   ANDVT V2400
5 KHz        Tpwr 35 dbm
```

Note: Modulation is not selectable.

---

(6) Enter the COMSEC key number (1 to 5).

(7) Select encryption type (ANDVT, 3KG-84, 4KG-84).

(8) Select mode (V or D).

(9) Select data rate (75 to 2400).

(10) Select DAMA type (5-kHz).

(11) Enter/select power level (23 to 43 dBm).

(12) Enter channel number (129 to 191, 194 to 239). Corresponding frequencies are displayed on the next line.

```
Channel Number: ###
R###.###        T###.###
Code:##          OW:CT
Normal  Range: Active
```

(13) Enter configuration code.

(14) Select orderwire encryption (PT or CT).

(15) Select mode of operation (normal, EMCON, silent).

(16) Select ranging (passive, active, maintenance).

(17) If passive ranging, enter satellite number (1 to 8).

(18) For 5-kHz DAMA, select log in (preassigned, over-the-air).

(19) If preassigned, select precedence (FO, F, I, P, R).

(20) If preassigned, enter demarcation number 49999. If demarcation number is not entered in preset, the radio defaults to 16384.

```
Channel Number: ###
R###.###        T###.###
Code:##          OW:CT
Normal  Range: Passive
Satellite ID: 4
Login: Preassigned
Prec:R     Dmark:49999#
```

d. Perform the following procedure to enter a 5-kHz service preset.

(1) Press ESC until the main menu is displayed.

(2) Press 3 (set presets).

(3) Press 2 (5-kHz service).

(4) Enter preset number (01 to 20).

```
SET PRESET 5K       P01
CIR   EN    SYN  V2400
Prec:R            D:#####
Code:###
```

(5) Select type of service (CIR or DASA).

(6) Select encryption (EN or UN).

(7) Select data communications (SYN or ASYN, see Table D-3). Use synchronous unless sending asynchronous data in PT.

Table D-3. SYN/ASYN Settings

Data Device Type	Mode Switch	Selection
Synchronous	PT or CT	SYN
Asynchronous	PT	ASYN
Asynchronous	CT	SYN

(8) Select mode (V or D).

(9) Select data rate (75 to 16k). Data rate is selected in the 5-kHz I/O rates menu.

(10) Select precedence (FO, F, I, P, R).

(11) Enter destination address.

(12) Enter configuration code.

(13) For DASA only, enter time requested in hours and minutes, or select INDEFINITE. Maximum time is 85 hours 15 minutes, in five-minute increments. Indefinite is 85 hours 15 minutes.

```
SET PRESET 5K P01
DSA   EN    SYN  V2400
Prec: R              D:#####
Code:###
INDEFINITE
```

(14) To load additional presets, repeat steps 4 through 13 above.

e.   Perform the following to enter a 5-kHz message preset.

(1) Press ESC until the main menu is displayed.

(2) Press 3 (set presets).

(3) Press 4 (5-kHz message).

(4) Enter preset number (01 to 20).

```
SET PRESET 5K MESG
XMIT  P01
TEK1   3KG84
PREC: R   EN     D:#####
```

(5) Enter the COMSEC key number (1 to 5).

(6) Select encryption type (3KG-84, 4KG-84, ANDVT).

(7) Select precedence (FO, F, I, P, R).

(8) Select encryption (EN or UN).

(9) Enter destination address.

(10) To load additional presets, repeat steps 4 through 9 above.

f.   To start a 5-kHz DAMA network service quickly, perform the following.

(1) In the current mode screen, select DAMA.

(2) Enter preset (even if displayed already).

(3) Enter the service preset number (01 to 20).

Note: Verify terminal DAMA address is correct before continuing.

(4) Press ENT on start DAMA..

(5) Observe display. See Table D-4 if LOGIN is rejected by controller.

```
            CURRENT MODE
DAMA  -P1           - -060
TEK1  PSK  ANDVT V2400
5KHz          Tpwr 35 dbm
Channel Number: 136
R248.900         T302.500
Code: 060         OW:CT
Normal Range: Active
Login: Over The Air

Service Preset: 01
    Start DAMA for 01000
```

```
 DAMA          SQ - - 045
5K         Acquiring     N
SRV-Idle
1-Service Setup
```

(a) Acquiring—Acquisition in process.

(b) Range—Wait while ranging in process.

(c) Log in—Manual log in required.

(d) Log in-Pnd—Login pending.

(e) Connected—Log in successful.

(6) At SRVC ASGND popup message, enter on ACCEPT. To reject the service, use the arrow keys to select REJECT and press ENT key.

Note: When a warning or error message is displayed, refer to tables D-5 and D-6 for proper corrective action.

```
Srvc Asgnd
CIR  TEK  ANDVT    V2400
Prec:R      EN    D:01000
SYN  S:02000    {ACCEPT}
```

Note: When SRV-RX/TX appears on the display, the terminal is ready for normal communications. See Table D-7 for hot keys to access additional tasks.

Table D-4. Messages, 5-kHz DAMA

Message	*Action*
A	
Acquisition Failed	Terminal is not receiving OW. Check azimuth, power out, and reposition antenna.
C **Circuit**	
Aborted	Check previous status messages. If logged out, log in over-the-air. Other messages include circuit not available (especially DASA) and the reason. Attempt to re-establish or establish a different type of service.
Denied (Reason)	Circuit service request is denied for the stated reason. If condition is correctable, take appropriate action or try again later.
Mismatch Detected	An incoming service is established but a mismatch is detected between the service and the current mode settings. Check setting of PT/CT mode and type of attached data device.
Preempted	The channel controller preempted the circuit. Wait for it to resume before transmitting. Or Contact was temporarily lost with the controller; wait for it to resume.
Receive Buffer Overflow	Check data device for incomplete message or errors in message. If needed, request source to retransmit message.
Set up Queued (Reason)	Service is queued for the reason supplied. Local—terminal called is logged in but time-slot is unavailable. MHOP—terminal called is not logged in with controller. If it is in another footprint, wait. If it is supposed to be in the current footprint, teardown and try again later.
Set up Rejected (Reason)	Service request is denied for the stated reason. Try again later unless one of the following reasons is displayed. Data Rate—Requested a DASA service at higher than 2400 bps—no 25-kHz DASA channel available. Not Assignable—The LQ from terminal or the destination terminal is poor. Check LQ in network state menu. If LQ is low, check antenna or raise power. Prec. Violation—The precedence entered is not allowed. Check network state menu for assigned values. Ensure previous messages do not state logged out. If previous message stated logged out, log in over-the-air and re-attempt service set up at lower precedence. Service Restrict—Request for a 2400 bps circuit denied due to network traffic. Reduce data rate or wait until LIO no longer displayed in network state.
Terminated (Reason)	An existing service is terminated for the stated reason. Try again later.
COMMAND	
Rejected	Check parameters and network; try again.
Rejected Port is busy (Check Current Mode)	Request is rejected because of an existing active service. Ensure terminal is idle before setting up a service.

Table D-4. Messages, 5-kHz DAMA

Message	Action
CTIC	
Alarm Invalid Key	Invalid OW key. Reload OW key in correct position.
Alarm Invalid Time-slot Number	Invalid time-slot number detected. Reload OW key in correct position.
Alarm Unknown Cause	Reload OW key in correct position.
I	
Incoming Message From: xxxxx Aborted	Message from another terminal aborted.
L	
Logged Out (Reason)	The controller logged the terminal off the network for the reason supplied. Correct the error and perform an over-the-air log in. Invalid Address on Guard—Check the addresses in the guard list. Not Authorized—Terminal address is not in the database—contact the controller if correcting it fails. 200 Missing FOWs—Once the terminal accumulates 200 FOWs the terminal automatically logs itself off. Check antenna and radio. To clear count, change current mode to LOS then return to DAMA. Start DAMA and perform a preassigned log in. Invalid Service Request—The terminal is not logged in the network. Log in and resend the service request.
LOG IN	
Command Rejected	More than one log in has been attempted; wait for the controller to respond.
Failed No PCC Response	Try again. If no response, the control station is down. Contact control station.

Rejected, Invalid Log in Address	Terminal address must be in the range of one to the demarcation address (49999). Other possibilities:
	    Log in already accomplished.
	    Logged in on a 25-kHz channel and now attempting to log in on a 5-kHz channel.
	    Another operator has the terminal address in their guard list.
	    Trying to log in over-the-air in silent/EMCON mode.
	To resume, log in preassigned.

Rejected, No Capacity	The current channel has no capacity. Call the controller.
Rejected, Not Authorized	Terminal is not authorized to participate in the network. Call the controller.
LOG OUT	
Command Rejected	Attempted to log out more than once—wait the 18 seconds for response.
Failed No PCC Response	The controller has not responded to the log out request. Shut down the system.
MESSAGE	

Table D-4. Messages, 5-kHz DAMA

Message	Action
Aborted To:xxxx (Reason)	Message is aborted for the stated reason. Try again.
From: xxxx Encrypt Mismatch Detected	Mode switch (PT/CT) setting is different from the transmitting terminal. Contact distant end to correct.
Input Rejected	Transmission rejected. Another operator is transmitting—try again later. Or Radio is in idle—set up a service.
Output Rejected	Transmission rejected. Another operator is transmitting—try again later. Or Radio is in idle—set up a service.
Set up Rejected, (Reason)	Message set up is rejected for the stated reason.
Terminated Frm: xxxx to:yyyy (Reason)	Message is terminated for the stated reason. Try again later.
Mode Command Rejected, Node Address is Zero	Terminal address is entered as zero. This is reserved for the controller. Enter a valid terminal address.
Msg Set up Rejected Precedence Violation	Precedence entered is not allowed. Check network state menu for allowed values and re-enter.
No Resources for Message From: xxxx	Terminal is busy and cannot receive a message from the other terminal.
R **RANGING**	
Failed	Check current mode entries and antenna. Run BIT to verify terminal operation.
Overdue Transmit Inhibited	A successful ranging attempt is not completed as scheduled. Transmission is denied. Check antenna. Transmit a ranging burst using the contention ranging menu.
S **SERVICE SET UP**	
Command Rejected	Verify connected and logged in and try again.
Rejected, Invalid Data Rate	Ensure a valid data rate is selected.
T	
Teardown Command Rejected	The terminal has rejected the teardown request. Verify Idle.
Transmission Rejected Re-Transmit	Transmission rejected. Another operator is transmitting—try again later. Or Radio is in idle—set up a service.
Tx Rejected, Check Mode & Status Msgs Retransmit	Transmission rejected. Another operator is transmitting—try again later. Or Radio is in idle —set up a service.

Table D-5. Service Assigned Errors and Warnings

Message	Action
Verify I/O Device	a. ERROR. Attach asynchronous data device and accept service. b. WARNING. Attach synchronous data device and accept service.
I/O Device Present?	Attach data device and accept service.
Check PT/CT Switch	Set mode switch to other setting (PT or CT) and accept service.
Illegal Mode	Reject service.
Assuming Ext Encrypt	If using external encryption, accept service. Otherwise, reject service.
I/O Rate Invalid	Check for proper rate selection on the 5-K DAMA I/O rates menu.

Table D-6. Message Queue Errors

Message	Action
No Ext Dev?	Attach data device.
Ext Encrypt?	If using external encryption, continue. Otherwise, set mode switch to CT and send encrypted data.
PT/CT?	If message is not encrypted, set mode switch to PT.
Sync Dev?	Attach synchronous device or set mode switch to PT.
Inv I/O Rate?	Check for proper data rate selection on 5-kHz DAMA I/O rates menu.

Table D-7. Hot Keys, 5-kHz DAMA

Key	Function	Screen
1	**Service Set up.** Information on type of service requested so controller can set up communication with another party. Requests time on satellite for communication services (dials the phone).	SERVICE SETUP P## CIR EN SYN V2400 PREC: R D: ##### CODE: ### {SEND}
2	**Teardown.** Ends current service; terminal remains logged in to network (hangs up the phone) (hot key 1 in DASA).	TEARDOWN 1/3 DESTIN ADD 02000 CIR D PT PREC: R LOCAL ACTIVE {SEND}
3	**Service State.** Indicates status of up to three services.	SERVICE STATE 1/3 DESTIN ADD 02000 CIR D PT PREC: R LOCAL ACTIVE
4	**Network State.** Indicates status of current network. LQ should be greater than 36.0.	NETWORK STATE PCC: ##### MHOP LIO FOW MISS ### LQ: ##.#

Table D-7. Hot Keys, 5-kHz DAMA

Key	Function	Screen
		PREC MIN/MAX: R/FO
5	**Status Messages.** Displays last 10 stored messages (hot key 2), when using dedicated service.	MSG ##:##Z 01 of 10 NETWORK ACQUIRED 02
6	**Log out.** Removes terminal from network.	LOGOUT OVER-THE-AIR {SEND}
7	**Contention Ranging.** Ranges satellite when operating in silent mode. Contention ranging should be performed initially, then once every 4.5 hours.	CONTENTION RANGING {SEND}
8	**Message Queue.** Accesses queue to send or receive data messages.	MESSAGE QUEUE XMIT P## 1 IN QUE TEK # ANDVT D2400 Prec: R EN D: ##### {SEND}

    g. Perform the following to set up a 5-kHz DAMA network manually.

       (1) In the current mode screen, select DAMA.

       (2) Enter preset (even if already displayed).

```
        CURRENT MODE
DAMA  -P1      Sq-   -045
TEK1  PSK   ANDVT V2400
5KHz            Tpwr 35 dbm
```

Note: For manual service set up, ensure service preset is set to 00.

       (3) Press ENT on start DAMA.

```
Channel Number: 136
R248.900          T302.500
Code: 060         OW:CT
Normal Range: Active
Login: Over The Air
Service Preset: 00
Start DAMA for 01000
```

       (4) Observe display.

```
 DAMA            Sq-   -045
5K        Acquiring       N
SRV-Idle
1–Service Setup
```

         (a) Acquiring—Acquisition in process.

         (b) Range—Wait while ranging in process.

```
 DAMA          Sq-  -045
5K         LOGIN
SRV-Idle
LOGIN
```

(5) Select log in type (over-the-air or preassigned).

```
         LOGIN
Over The Air
                  {SEND}
```

(6) For preassigned, select maximum assigned precedence (FO, F, I, P, R) and enter demarcation address (49999).

(7) Press ENT on send.

```
         LOGIN
Preassigned
Prec: R    Dmark:#####

                  {SEND}
```

Note: "Connected" appears on display and the terminal is ready for service set up. To set up a service, proceed to manual service set up by pressing Hot Key #1. See Table D-7 for hot keys to access additional tasks.

```
 DAMA          Sq-   -045
5K       Connected   N
SRV-Idle
1-Service Setup
```

Note: Ensure current service state is idle (SRV-IDLE).

h. Circuit/DASA service set up (hot key #1).

(1) Enter on preset number 00 for manual service set up, or enter the service preset number and proceed to step k.

(2) Select type of service CIR or DSA.

```
   SERVICE SETUP   P##
DSA    EN   SYN   V2400
Prec: R  ANDVT  D: #####
Code:###       ##hr ##min

                  {SEND}
```

(3) Select encryption (EN or UN).

(4) If using data service, select data type (SYN or ASYN).

(5) Select mode (V or D).

(6) Select data rate, if applicable.

(7) Select precedence (FO, F, I, P, R).

(8) Enter destination address.

(9) Enter configuration code, if required.

(10) If using DASA, specify length of service.

(11) For indefinite, press ENT on indefinite, then press ENT on send (indefinite for DASA is 85 hours 15 minutes).

(12) For timed service, with indefinite highlighted, press right or left arrow key. With hour highlighted press ENT. Move cursor to ## field and input number of hours, if applicable, and press ENT. Move cursor to ## field and input number of minutes and press ENT.

(13) Press ENT on send.

(14) At SRVC ASGND popup message, enter on ACCEPT. To reject the service, use the arrow keys to select REJECT and press ENT key.

```
Srvc Asgnd
DSA  TEK1  KG-84 D2400
Prec: R    UN        D: 01320
SYN   S:02000       {ACCEPT}
```

Note: When a warning or error message is displayed, refer to Table D-5 for proper corrective action.
"SRV-Rx/Tx" appears on display, when terminal is ready for communications.

i.   Send a message (hot key #8).

(1) Ensure service is idle; select XMIT. The display indicates how many messages are in the queue.

```
          MESSAGE QUEUE
XMIT        P##     0 IN QUE
TEK 1      4KG-84     D2400
Prec: R     EN      D:#####
                    {SEND}
```

(2) Enter 00 if not using a service preset, or enter the preset number and proceed to step 8.

(3) Enter the COMSEC key (1 to 5).

(4) Select encryption type (4KG-84, 3KG-84, VINSN, ANDVT) same as current mode.

(5) Select precedence (FO, F, I, P, R).

(6) Select encryption (EN or UN).

(7) Enter address of the message recipient.

(8) Press ENT on SEND and observe display. See Table C-6 if an error message is displayed.

(9) After "Enter Message Now" is displayed, key data device. (Message input from the data device is confirmed by the message prompt "Msg Input Done" briefly displayed on line 5 of the Msg Queue Display.)

Note: When sending a message to a terminal address with manual or automatic release selected and the receiving operator downloads the message to their data device within 60 seconds, two popup acknowledgement messages are displayed. No acknowledgement is displayed if the message is sent to a network address or if the message was not downloaded to the data device within 60 seconds. If using AUTO message release, messages are automatically sent to the data device and the following procedure is not applicable.

j. Receive a message (hot key #8).

(1) Ensure service is idle; select RCV. The display indicates how many messages are in the queue.

(2) Enter the COMSEC key number (1 to 5).

```
          MESSAGE QUEUE
RCV                    1 IN QUE
TEK 1        4KG-84      D2400
Prec: R          EN    D:####
                    {RELEASE}
```

(3) Select encryption type (3KG-84, 4KG-84, ANDVT) same as current mode. See Table D-5 if an error message is displayed.

(4) Select RELEASE to send the message to the data device, or DELETE to erase the current message.

k. Teardown (hot key #2, hot key #1 for DASA).

(1) Select service (# / #) to teardown.

(2) View DESTIN or SOURCE address, and enter.

(3) Press ENT on SEND.

```
TEARDOWN                  1/1
DESTIN   ADD   02000   CIR
D    PT       PREC:R
LOCAL    ACTIVE
                    {SEND}
```

(4) Press ENT to verify teardown. The display changes to the network menu. A status message confirms the result of the teardown.

```
          TEARDOWN
        Verify Teardown

                    {SEND}
```

l. Log out (hot key #6).

Note: When logging out then back in, use the following as a rule of thumb: Log out over-the-air—log back in over-the-air. Log out forced locally—log back in preassigned.

(1) Select over-the-air, if the terminal is off for 30 minutes or longer. Select force locally, if less than 30 minutes.

```
┌─────────────────────────────┐
│          LOGOUT             │
│ Over The Air                │
│                             │
│                             │
│                    {SEND}   │
└─────────────────────────────┘
```

(2) Press ENT on SEND.

Note: A status message confirms the result of the log out. If no log out was sent, or if the terminal was off for more than 30 minutes after a force locally log out, the JMINI logs the terminal out of the network.

	MESSAGE	
	Input Rejected	Transmission rejected. Another operator is transmitting - try again later. Or, radio is in idle – set up a service.
	Output Rejected	Transmission rejected. Another operator is transmitting - try again later. Or, radio is in idle – set up a service.
	Setup Rejected, (Reason)	Message setup is rejected for the stated reason.
	Terminated Frm:xxxx to:yyyy (Reason)	Message is terminated for the stated reason. Try again later.
	Mode Command Rejected, Node Address is Zero	Terminal address is entered as zero. This is reserved for the controller. Enter a valid terminal address.
	Msg Setup Rejected Precedence Violation	Precedence entered is not allowed. Check network state menu for allowed values and re-enter.
	No Resources for Message From:xxxx	Terminal is busy and cannot receive a message from the other terminal.
R	**RANGING**	
	Failed	Check current mode entries and antenna. Run BIT to verify terminal operation.
	Overdue Transmit Inhibited	A successful ranging attempt has not been completed as scheduled. Transmission is denied. Check antenna. Transmit a ranging burst using the contention ranging menu.
S	**SERVICE SETUP**	
	Command Rejected	Verify connected and logged in and try again.
	Rejected, Invalid Data Rate	Ensure a valid data rate is selected.
T		
	Teardown Command Rejected	The terminal has rejected the teardown request. Verify Idle.
	Transmission Rejected Re-Transmit	Transmission rejected. Another operator is transmitting - try again later. Or, radio is in idle – set up a service.
	Tx Rejected, Check Mode & Status Msgs Retransmit	Transmission rejected. Another operator is transmitting - try again later. Or, radio is in idle – set up a service.

AN/PSC-5 25-kHz AD HOC DAMA SETUP GUIDE

1. The following are required before setup:
   a. AN/PSC-5
   b. Satellite Antenna
   c. Proper Crypto (ANDVT)
   d. Proper Orderwire set
   e. Good batteries
2. Turn radio on to PT, **Let the BIT finish**, then ESC.
3. Go to Set Presets (**3**), **enter.**
4. Choose Set Mode Presets (1).
5. > to **DAMA**; hit **enter**.
6. Choose Preset number **1**; hit **enter**.
7. Choose COMSEC fill slot—
   - Use **TEK1** as the default fill slot for ANDVT.
8. Choose type of Crypto: **ANDVT**; hit **enter**.
9. Choose Data transfer rate—
   - 2400; hit enter.
10. Choose **25-kHz, enter**.
11. TPWR select **43** dbm; **enter**.
12. Channel number; **enter**.
13. Code **60**; **enter**.
14. OW: **CT**; **enter**.
15. **Normal**; **enter**.
16. Range: **Active**, **enter**.
17. Send Status B, **YES.**
18. Hit **ESC.**
19. Select **Current Mode**; **enter**.
20. Change mode to **LOS**; **enter**.
21. Hit **ESC**.
22. Go to Database Options (**2**), **enter.**
23. Go to Guard List (**2**), **enter.**
24. **> ADD, enter** ##### (the Guard list/NETWORK ID number from the SOI/SAA), **enter**. (**DO NOT PUT THE TBA HERE!**)
25. Hit **ESC** once.
26. Go to **Terminal Data** (**3**), **enter.**
27. Enter **ADDRESS** ##### (the TBA, from the SOI) hit **enter. (DO NOT PUT THE NETWORK ADDRESS HERE!)**
28. Backlight Timer, (user pref), **enter.**
29. Msg Release: **Manual. Enter.**
30. **ENTER** N
              E
              TIME = ZULU TIME (not required)
31. Platform: **Stationary**, hit **enter**.
32. Press **ESC twice**.
33. Change radio on/off switch to **F1**.
34. Input **ANDVT** in fill slot 1.
35. Follow the on screen instructions for filling the key. Watch for the Key Filled message on the screen. Be patient.
36. Change radio on/off switch to **F2**.

37. C5594 (positions 3-4), IO = C5596 (positions 1-2) (Must input the same key set in positions). Do not connect the cable until the ANCD says "connect to radio". Cycle the radio to CT and return to F2 if it continually fails to load. Be patient.
38. Go to Current Mode (**1**) and hit **enter**.
39. Change mode back to **DAMA**; hit **enter**.
40. Press Preset **#1,** hit the 1 key on the keypad; hit **enter**.
41. Enter correct **TEK#**; hit **enter**.
42. Hit enter to confirm the remainder of the settings until **SEND STATUS B YES/NO**.
43. Verify connection to an antenna at this time, with antenna on azimuth to satellite.
44. At **SEND STATUS B,** select **YES**, hit **enter**.
45. Select the desired service preset (P01, P02, etc), **hit enter twice.**
46. Radio screen will blink, an arrow in the right side of the screen will go up and then down once or twice, then see **acquiring,** then **range,** then **25kHz AC connected-SRV-idle.**
47. **NOTE: AD HOC DAMA ALLOWS TBA-TO-TBA, TBA-TO-NETWORK, OR TBA TO MULTIPLE TBA CONNECTIONS.**
48. Hit next to **Service Setup (1)**, select **R** (Routine), then enter the **TBA or NETWORK ADDRESS, then** enter **desired connection time,** hit **enter** and then **Send, enter**.
49. Radio screen will show arrows on the right going up and down and then the screen will display **25-kHz AC SRV-RX/TX** (the station called will change at the same time).
50. Ready to talk as normal (be patient).
51. To terminate setup, select Teardown (**2**) THE CONNECTION MUST BE TORN DOWN AFTER COMPLETING TRAFFIC **TO AVOID LOCKING UP THE OTHER STATION AND BLOCKING OTHER TRAFFIC TO THAT STATION.** Terminal will be in **25-kHz AC Connected SVC-idle** mode.

NOTE: To send data: (for example, KL-43 or V-Mail) change the V2400 to D2400.

NOTE: If the radio is not working properly cycle the radio off/on, then filter tune the radio and run a second BIT.

ERROR CODE = DO THIS
Load Orderwire Keys, LANT = **(PREVENTIVE MEASURE)**

77 = Talk to net NCS. NCS needs to check with the SMC/NCTAMS to ensure the network is on line.

82 = Check the TBA entered into the radio to ensure it is correct. (PMCS).

90 = This is a busy signal. Call back later.

92 = Indicates a conference call was made or more than one terminal was called. At least one terminal is not on the air but others are.

Troubleshooting DAMA problems—

Problem: Fail to get past 25-kHz – Acquiring – Idle when attempting first connection after initial setup. No up and down arrows displayed on the right side of the screen.

Solution: Ensure the current Orderwire key segment is loaded in fill slots 1 – 4 in F2. Lack of the current orderwire COMSEC loaded and/or not in 1 – 4 will cause a connection stop at the 25-kHz AC – Acquiring – Idle window during initial connection.

Problem: Cannot get the Orderwire COMSEC to load.

Solution: Do not connect the ANCD cable to the radio until the ANCD displays *Connect ANCD to Radio*. Press the down arrow after connecting the cable, follow on screen instructions.

Problem: COMSEC Alarm continues to popup.

Solution: Refill ANDVT key in F1.

Problem: CTIC alarm.

Solution: Refill the orderwire key in the correct positions.

Problem: Data communications not getting through but voice communications are.

Solution: Run Link Test. It is item 7 in DAMA menu, needs to be run at 32 kbps, and the Symbol Errors need to be less than 100 when transmitting data. Takes about a minute to run and lets the operator know a better signal is needed. Info Code 93 appears, send back information report and wait since someone else is running the test.

25-kHz AD HOC DAMA SETUP GUIDE – AN/PSC-5C/D RADIOS

1. The following are required before setup:
   a. AN/PSC-5C/D
   b. Satellite Antenna
   c. Proper Crypto (ANDVT)
   d. Proper Orderwire set
   e. Good batteries
2. Turn radio on to **PT**, **let the BIT finish,** then ESC.
3. Go to Set Presets (**3**), **enter.**
4. Choose Set Mode Presets (1).
5. > to **DAMA**; hit **enter**.
6. Choose Preset number **1**; hit **enter**.
   - Choose COMSEC fill slot: Use TEK 01 as the default fill slot for ANDVT.
7. Choose type of Crypto: **ANDVT**; **enter**.
8. Choose Data transfer rate—
   - 2400; enter.
9. Choose **25-kHz, enter**.
10. Channel number; **enter**.
11. **> Normal**; **enter**
12. TPWR select **43**dbm; **enter**.
13. Code **60**; **enter**.
14. OW: **CT**; **enter**.
15. Range: **Active**, **enter**.
16. Send Status B, **YES**
17. Hit **ESC X 2.**
18. Select **Current Mode**; **enter**.
19. Change mode to **LOS**; **enter**.
20. Hit **ESC**.
21. Go to Database Options (**2**), **enter.**
22. Go to Guard List (**2**), **enter.**
23. **> ADD, enter ##### (the network ID number from the SOI) enter**. (**DO NOT PUT THE TBA HERE!**)
24. Hit **ESC** twice.
25. Go to **Configuration (4), enter.**
26. Go to **Terminal Data (1), enter.**
27. Enter **ADDRESS #####** (the TBA, from the SOI) hit **enter. (DO NOT PUT A NETWORK ADDRESS HERE!)**
28. **DS-101 ADD, ignore.**
29. Backlight Timer, (user pref), **enter.**
30. Msg Release: **Manual. Enter.**
31. **ENTER** LAT N
   LON E
   TIME = ZULU TIME
   (not required)
32. Platform: **Stationary**, hit **enter**.
33. **Freq Bands: Unlimited.**
34. **Ext PA Opt: Normal.**
35. **Remote Opt: PRCD.**
36. Press **ESC twice**.
37. Change radio on/off switch to **F1.**
38. Input **ANDVT** in fill slot 1.
39. Follow the on screen instructions for filling the key. Watch for the Key Filled message on the screen. Be patient.

25-kHz TDMA DAMA

40. Change radio on/off switch to **F2**.
41. Load Orderwire Keys, LANT = C5594 (positions 3-4), IO = C5596 (positions 1-2) (Input the same key set in positions). Do not connect the cable until the ANCD says "connect to radio". Cycle the radio to CT and return to F2 if it continually fails to load. Be patient.
42. Return on/off switch back to **CT**.
43. Go to Current Mode (**1**) and hit **enter**.
44. Change mode back to **DAMA**; hit **enter**.
45. Press Preset **#1,** hit the 1 key on the keypad; hit **enter**.
46. Enter correct **TK##**; hit **enter**.
47. Hit enter to confirm the remainder of the settings until **SEND STATUS B YES/NO** appears.
48. Ensure antenna is connected at this time, with antenna on azimuth to satellite
49. At **SEND STATUS B,** select **YES**, hit **enter**.
50. Select the service preset desired (P01, P02, etc), **hit enter twice.**
51. Radio screen will blink, an arrow in the right side of the screen will go up and then down once or twice, then see **acquiring,** then **range,** then **25-kHz AC connected-SRV-idle**
52. **NOTE: AD HOC DAMA WILL ALLOW TBA-TO-TBA, TBA TO MULTIPLE TBA, AND TBA TO NETWORK CONNECTIONS.**
53. Hit next to **Service Setup (1)**, select **R** (Routine), then enter the **TBA, MULTIPLE TBA'S, OR TO A NETWORK ADDRESS** enter **time required,** hit **enter** and then **Send, enter**.
54. Radio screen will show arrows on the right going up and down and then the screen will display **25-kHz AC SRV-RX/TX** (the station or network called will change at the same time).
55. Ready to talk as normal (be patient).
56. To terminate setup, select Teardown (**2**) THE CONNECTION MUST BE TORN DOWN AFTER COMPLETING TRAFFIC **TO AVOID INTERFERING WITH OTHER STATIONS' TRAFFIC.**
57. Terminal will be in **idle** mode.

NOTE: To send data: (for example, KL-43 or V-Mail) change the V2400 to D2400.

NOTE: If the radio is not working properly cycle the radio off/on several times. Filter Tune does not correct all as it did with older versions of radios!

38. Do not connect the cable until the ANCD says "connect to radio".

ERROR CODES = DO THIS

(PREVENTIVE MEASURE)

77 = Talk to net NCS. NCS needs to check with Naples to insure the TBA is on line.

82 = Check the TBA entered into the radio to ensure it is correct. (pmcs)

90 = This is a busy signal. Call back later.

92 = Indicates conference call to more than one terminal was made. At least one terminal is not on the air but others are.

Troubleshooting DAMA problems

Problem: Fail to get past 25-kHz AC – Acquiring M – Idle when attempting first connection after initial setup. No up and down arrows displayed on the right side of the screen.

Solution: Ensure the current Orderwire key segment is loaded in fill slots 1–4 in F2. Lack of the current orderwire COMSEC loaded and/or not in 1 – 4 will cause a connection stop at the 25-kHz AC – Acquiring – Idle window during initial connection.

Problem: Cannot get the Orderwire COMSEC to load.

Solution: Do not connect the ANCD cable to the radio until the ANCD displays *Connect ANCD to Radio*. Press the down arrow after connecting the cable, follow on screen instructions.

Problem: COMSEC Alarm continues to popup.

Solution: Refill keys in F1.

Problem: CTIC alarm.

Solution: Refill the orderwire key in the correct positions – F2.

Problem: Data communications not getting through but voice communications are.

Solution: Run Link Test. It is item 7 in DAMA menu, needs to be run at 32 kbps, and the Symbol Errors need to be less than 100 when transmitting data. Takes about a minute to run and lets the operator know a better signal is needed. Info Code 93 appears, send back information report and wait since someone else is running the test.

ERROR CODES = DO THIS

SETUP GUIDE AN/PSC-5

1. The following are required before set...
   a. AN/PSC-5
   b. Satellite Antenna
   c. Proper Crypto (ANDVT)
   d. Proper Orderwire set
   e. Good batteries
2. Turn radio on to PT; **let the BIT finish**, then ESC.
3. Go to Set Presets (**3**), **enter.**
4. Choose Set Mode Presets (1).
5. > to **DAMA**; hit **enter**.
6. Choose Preset number **1**; hit **enter**.
7. Choose COMSEC fill slot: Use **TEK 01** as the default fill slot for ANDVT.
8. Choose type of Crypto: **ANDVT**; hit **enter**.
9. Choose Data transfer rate—
   • 2400; hit enter.
10. Choose **25-kHz, enter**.
11. TPWR select **43**dbm; **enter**.
12. Channel number; **enter**.
13. Code **60**; **enter**.
14. OW: **CT**; **enter**.
15. **Normal**; **enter**.
16. Range: **Active**, **enter**.
17. Send Status B, **YES**.
18. Hit **ESC.**
19. Select **Current Mode**; **enter**.
20. Change mode to **LOS**; **enter**.
21. Hit **ESC**.
22. Go to Database Options (**2**), **enter.**
23. Go to Guard List (**2**), **enter.**
24. **> ADD, enter #####** (the Guard list/NETWORK ID number from the SOI) **enter**. (**DO NOT PUT THE TBA HERE!**)
25. Hit **ESC** once.
26. Go to **Terminal Data** (**3**), **enter**
27. Enter **ADDRESS #####** (TBA, from the SOI) hit **enter. (DO NOT PUT THE NETWORK ADDRESS HERE!**)
28. Backlight Timer, (user pref), **enter.**
29. Msg Release: **Manual. Enter.**
30. **ENTER**   LAT N
             LON E
             TIME = ZULU TIME
             (not required)
31. Platform: **Stationary**, hit **enter**.
32. Press **ESC twice**.
33. Change radio on/off switch to **F1**.
34. Input **ANDVT** in fill slot 1.
35. Follow the on screen instructions for filling the key. Watch for the Key Filled message on the screen. Be patient.
36. Change radio on/off switch to **F2**.
37. Load Orderwire Keys, LANT = C5594 (positions 3-4), IO = C5596 (positions 1-2) (Input the same key set in positions).

25-kHz TDMA DAMA SETUP GUIDE - AN/PSC-

Cycle the radio to CT and return to F2 if it continually fails to load. Be patient. Return on/off switch back to **CT**.

39. Go to Current Mode (**1**) and hit **enter**.
40. Change mode back to **DAMA**; hit **enter**.
41. Press Preset **#1**, hit the 1 key on the keypad; hit **enter**.
42. Enter correct **TEK#** for the mode (V or D); hit **enter**.
43. Hit enter to confirm the remainder of the settings until **SEND STATUS B YES/NO** appears.
44. Verify connection to an antenna at this time, with antenna on azimuth to satellite
45. When **SEND STATUS B** appears, select **YES**, hit **enter**.
46. Select the desired service preset (P01, P02, etc), **hit enter twice.**
47. Radio screen will blink, an arrow in the right side of the screen will go up and then down once or twice, then see **acquiring,** then **range,** then **25-kHz AC connected-SRV-idle.**
48. **NOTE: TDMA DAMA WILL NOT ALLOW TBA-TO-TBA CONNECTIONS. SERVICE MUST BE SET UP SERVICE TO THE NETWORK ADDRESS. MULTIPLE STATIONS CAN BE CONNECTED AT ONE TIME BUT THEY SHARE THE "CHANNEL".**
49. Hit next to **Service Setup (1)**, select **R** (Routine), then enter the **NETWORK ADDRESS (6???? Or 5????)** enter **00 ind (required for TDMA)** hit **enter** and then **Send, enter**. **DO NOT SET UP A SERVICE TO A TBA! THIS WILL LOCK UP THE NETWORK.**
50. Radio screen will show arrows on the right going up and down and then the screen will display **25-kHz AC SRV-RX/TX** (the called station will change at the same time).
51. Ready to talk as normal (be patient).
52. To terminate setup, select Teardown (**2**) Terminal will be in **idle** mode.
53. **TEARDOWN IS NOT REQUIRED IN TDMA. Terminal can remain connected and monitor traffic without interfering with other stations if desired.**
  NOTE: To send data: (for example, KL-43 or V-Mail) change the V2400 to D2400. If the radio is not working properly cycle the radio off/on, then filter tune the radio and run a second BIT.

39. Input **ANDVT** in fill slot 1.
40. Follow the on screen instructions for filling the key. Watch for the Key Filled message on the screen. Be

(PREVENTIVE MEASURE)

77 = Talk to the NCS. NCS needs to check with Naples to ensure the network is on line.

82 = Check the TBA entered into the radio to ensure it is correct. (PMCS)

90 = This is a busy signal. should not be seen with TDMA.

92 = Indicates more than one party was called. At least one party is not on the air but others are.

Troubleshooting DAMA problems

Problem: Fail to get past 25-kHz AC – Acquiring – SVC - Idle when attempting first connection after initial setup. No up and down arrows displayed on the right side of the screen.

Solution: Ensure the current Orderwire key segment are loaded in fill slots 1 – 4 in F2. Lack of the current orderwire COMSEC loaded and/or not in 1 – 4 will cause a connection stop at the 25-kHz AC – Acquiring –SVC - Idle window during initial connection.

Problem: COMSEC Alarm continues to popup.

Solution: Refill ANDVT key in F1.

Problem: CTIC alarm.

Solution: Refill the orderwire key in the correct positions (F2).

Problem: Data communications not getting through but voice communications are.

Solution: Run Link Test. It is item 7 in DAMA menu, needs to be run at 32 kbps, and the Symbol Errors need to be less than 100 when transmitting data. Takes about a minute to run and lets operator know a better signal is needed. Info Code 93 appears, send back information report and wait since someone else is running the test.

NOTE 1: To send data: (for example, KL-43 or V-Mail) change the V2400 to D2400.

5C/D RADIOS

1. The following are required before starting setup:
   a. AN/PSC-5C/D
   b. Satellite Antenna
   c. Proper Crypto (ANDVT)
   d. Proper Orderwire set
   e. Good batteries
2. Turn radio on to **PT**, **let the BIT finish,** then ESC.
3. Go to Set Presets (**3**), **enter.**
4. Choose Set Mode Presets (1).
5. > to **DAMA**; hit **enter.**
6. Choose Preset number **1**; hit **enter**.
7. Choose COMSEC fill slot—
   • Use TEK 01 as the default fill slot for ANDVT.
8. Choose type of Crypto: **ANDVT**; hit **enter.**
9. Choose Data transfer rate—
   • 2400; hit enter.
10. **2400 for voice**; hit enter. Choose **25-kHz, enter**.
11. Channel number; **enter**.
12. **> Normal**; **enter.**
13. TPWR select **43** dbm; **enter**.
14. Code **60**; **enter**.
15. OW: **CT**; **enter**.
16. Range: **Active**, **enter**.
17. Send Status B, **YES.**
18. Hit **ESC X 2.**
19. Select **Current Mode**; **enter**.
20. Change mode to **LOS**; **enter**.
21. Hit **ESC**.
22. Go to Database Options (**2**), **enter.**
23. Go to Guard List (**2**), **enter.**
24. **> ADD, enter** ##### (the network ID number from the SOI) **enter. (DO NOT PUT THE TBA HERE!)**
25. Hit **ESC** twice.
26. Go to **Configuration (4), enter.**
27. Go to **Terminal Data (1), enter.**
28. Enter **ADDRESS #####** (the TBA, from the SOI) hit **enter. (DO NOT PUT A NETWORK ADDRESS HERE!)**
29. **DS-101 ADD, ignore.**
30. Backlight Timer, (user pref), **enter.**
31. Msg Release: **Manual. Enter.**
32. **ENTER**   LAT N
             LON E
             TIME = ZULU TIME
             (not required)
33. Platform: **Stationary**, hit **enter**.
34. **Freq Bands: Unlimited.**
35. **Ext PA Opt: Normal.**
36. **Remote Opt: PRCD.**
37. Press **ESC twice**.
38. Change radio on/off switch to **F1.**

41. Change radio on/off switch to **F2**.
42. Load **Orderwire Keys,** LANT = C5594 (positions 3-4), IO = C5596 (positions 1-2) (Input the same key set in positions). Do not connect the cable until the ANCD says "connect to radio". Cycle the radio to CT and return to F2 if it continually fails to load. Be patient.
43. Return on/off switch back to **CT**.
44. Go to Current Mode (**1**) and hit **enter**.
45. Change mode back to **DAMA**; hit **enter**.
46. Press Preset **#1,** hit the 1 key on the keypad; hit **enter**.
47. Enter correct **TK##**; hit **enter**.
48. Hit enter to confirm the remainder of the settings until **SEND STATUS B YES/NO** appears.
49. Verify connection to an antenna at this time, with antenna on azimuth to satellite.
50. When **SEND STATUS B** appears**,** select **YES**, hit **enter**.
51. Select the service desired preset (P01, P02, etc), **hit enter twice.**
52. Radio screen will blink, an arrow in the right side of the screen will go up and then down once or twice, then see **acquiring,** then **range,** then **25-kHz AC connected-SRV-idle**
53. NOTE: **TDMA DAMA WILL NOT ALLOW TBA-TO-TBA CONNECTIONS. SET UP SERVICE TO THE NETWORK ADDRESS. MULTIPLE STATIONS CAN BE CONNECTED AT ONE TIME BUT THEY SHARE THE "CHANNEL".**
54. Hit next to **Service Setup (1)**, select **R** (Routine), then enter the **NETWORK ADDRESS (6???? Or 5????)** enter **00 ind (required for TDMA)** hit **enter** and then **Send, enter**. **DO NOT SET UP SERVICE TO A TBA, IT WILL LOCK UP THE NETWORK.**
55. Radio screen will show arrows on the right going up and down and then the screen will display **25-kHz AC SRV-RX/TX** (the station or network called will change at the same time).
56. Ready to talk as normal (be patient).
57. To terminate setup, select Teardown (**2**) Terminal will be in **idle** mode.
58. **TEARDOWN IS NOT REQUIRED IN TDMA. It is possible to remain connected and monitor traffic without interfering with other stations if desired.**

NOTE: If the radio is not working properly cycle the radio off/on several times. Filter Tune does not correct all as it did with older versions of radios!

ERROR CODES = DO THIS (PREVENTIVE MEASURE)

77 = Talk to the NCS. NCS needs to check with NAPLES to ensure the TBA is on line.

82 = Check the TBA entered into the radio to ensure it is correct. (PMCS)

90 = This is a busy signal -- should not be seen with TDMA.

92 = Indicates more than one party was called. At least one party is not on the air but others are. Check service state (3) for who is connected.

Troubleshooting DAMA problems

Problem: Fail to get past 25-kHz AC – Acquiring M – Idle when attempting first connection after initial setup. No up and down arrows displayed on the right side of the screen.
Solution: Ensure the current Orderwire key segment is loaded in fill slots 1–4 in F2. Lack of the current orderwire COMSEC loaded and/or not in 1 – 4 will cause a connection stop at the 25-kHz AC – Acquiring – Idle window during initial connection.

Problem: Cannot get the Orderwire COMSEC to load.

Solution: Do not connect the ANCD cable to the radio until the ANCD displays *Connect ANCD to Radio*. Press the down arrow after connecting the cable, follow on screen instructions.

Problem: COMSEC Alarm continues to popup.
Solution: Refill ANDVT key in F1.

Problem: CTIC alarm
Solution: Refill the orderwire key in the correct positions (F2).

Problem: Data communications not getting through but voice communications are.

Solution: Run Link Test. It is item 7 in DAMA menu, needs to be run at 32 kbps, and the Symbol Errors need to be less than 100 when transmitting data. Takes about a minute to run and lets them know they need a better signal. Info Code 93 appears, send back information report and wait since someone else is running the test.

Table D-8. 5-kHz DAMA Operations (Same Footprint/MHOP) Guide

Procedure	Steps/Notes
Load presets for 5-kHz DAMA	1. Turn on the radio; go to PT. 2. Escape to main menu. 3. Scroll to set presets; press enter or 3. 4. Select mode DAMA (press ⇒ to get to DAMA).
Enter 5-kHz DAMA channel	1. Enter preset number 2. 2. Enter encryption device: ANDVT. 3. Enter D. 4. Enter data rate 2400. 5. Enter 5-kHz (for type of DAMA). 6. Enter channel number. 7. Enter configuration code N/A. 8. Enter OW: CT. 9. Enter mode of operations: normal. 10. Enter range: active
Load database	From current menu, scroll to database options and enter (or press 2).
Enter guard list addresses	1. From database menu, press enter (or 1). 2. Use arrow keys to scroll through options—VIEW, ADD, DELETE, MODIFY. 3. Enter on ADD. 4. Enter guard list addresses Notes. Guard list includes addresses for which operator wishes to receive services; it does not impact who is called. Each address must be 5 digits long. Up to 15 different addresses may be entered. Always enter network address in the guard list. Terminal addresses may be entered if the operator wishes to listen to calls made to that address. In 5-kHz DAMA, if a terminal address is entered in the guard list, the controller also logs in that TBA. When the terminal attempts to log in, it is denied. Be careful.
Enter terminal data LAT, LON, TIME	1. Enter LAT—N or S and four-digit number N. 2. Enter LON—E or W and four-digit number E. 3. Enter time—Must be Zulu time (if no time was entered, the time reflected is how long the terminal is turned on). Note. This needs to be entered only if terminal is set up for silent, passive mode in 5-kHz DAMA. This is NOT the preferred method.
Enter terminal address	TBA from the SOI. *Note:* Every terminal must have its own terminal address; no two terminals can come up on a DAMA channel with the same address.
Enter platform	Enter stationary.
Enter type of MSG release 5-kHz message queue only.	Enter MANUAL if the radio is to hold the message, AUTO if the message is to go straight into the data device (rule of thumb, KL-43, DMDG, PSC-2A, use MANUAL; VDC-400/computer, use AUTO). *Note:* If voice is used, this field always reverts to manual.
Enter 5-KHZ I/O data rates 5-kHz DAMA only	Check only the ones used. If voice is used, 2400 bps must be checked.

Table D-8. 5-kHz DAMA Operations (Same Footprint/MHOP) Guide

Procedure	Steps/Notes
Enter satellite ephemeris data	Not required **Note:** This information is obtained from the unit frequency manager (who gets it from the SMC). It is required only if terminal is set up for silent, passive mode. There are eight positions to input satellite ephemeris data. This information changes. Information used for one exercise may differ for the next exercise.
Check COMSEC keys	1. Change mode selector switch to CT. 2. Scroll to database options and enter (press 2). 3. Scroll to COMSEC key states and enter (press 7). 4. Scroll through key positions to ensure key was filled. Update column should state 0, unless some of the keys were updated.
Load orderwire keys	1. Change mode selector switch to F2 position. Before loading orderwire keys, it is best to have the COMSEC keys already loaded. Key positions 1 through 8 are available. Orderwire keys need to be put in positions 1 to 4 only. 2. Positions 5 to 8 are reserved for over-the-air rekeying in the future.
Check orderwire keys	The only way to check to see if keys were loaded is to go to F2 and see if the numbers are on the line.

Change to DAMA preset and enter DAMA network	1. Go to current mode screen.
	2. Change mode to DAMA.
	3. Press preset number for channel and enter (press 2).
	4. Ensure all information is correct from preset by pressing enter through all fields. (The TEK is not part of the presets so special attention should be given to this field to ensure it is correct.)
	5. Press enter on start DAMA (radio does not change to DAMA mode until enter on network is done).
	Notes Watch screen for 5-kHz ACQUIRING; 5-kHz RANGE; 5-kHz LOGIN PND. If the radio does not go to 5-kHz LOGIN PND or an M is on the net acquiring line, check the following:
	    Adjust antenna.
	    Adjust output power.
	    Refill keys.
	    Ensure the proper key is loaded and in correct position.
	Radio automatically log in—check for status messages.
	Respond and view as necessary to all status messages received.

Table D-8. 5-kHz DAMA Operations (Same Footprint/MHOP) Guide

Procedure	Steps/Notes

Log in manual—over-the-air	1. Ensure the radio is at the 5-kHz —LOG IN screen.
	2. Press enter.
	3. Screen states LOGIN; Over-the-air; SEND—press enter to send.
	Notes: Do not perform this step until the first line states 5-kHz —LOGIN and last line states LOGIN.
	    When accepted by the controller, screen changes to 5-kHz —CONNECTED.
	    Many other OWs may be sent and received by the terminal; one to especially watch for is the guard list being changed.
	    Only one over-the-air log in is transmitted without sending an over-the-air log out. If more than one is attempted, the terminal receives an error message from the controller.
	      Log in rejected.
	      Not authorized.
	      Log in rejected, invalid log in address.
	    These messages let the operator know that log in was attempted too many times.
	    It is also possible to receive the above messages because the controller did not activate the terminal address in the database. In this case, the unit frequency manager intervenes.
	    Now, the terminal is ready to communicate with other radios. The terminal is able to respond to service requests from other radios or send service requests to other radios.

Log in, manual, preassigned	1. Ensure the radio is at 5-kHz LOGIN.
	2. Press enter.
	3. Screen states LOGIN; over-the-air—change to preassigned
	4. New screen appears; ensure the maximum precedence is correct and the demarcation point (DMARK) is at 49999 (unless told otherwise by the frequency manager).
	5. Press enter on send.
	Notes: OWs are not received from the controller; this is only a means for telling the terminal that it needs to be logged in.
	    If the terminal was not previously logged in (except when a SILENT terminal), an attempt to set up a service is denied and the reason given is the terminal is not logged in. In this case, send the over-the-air log in.
	    This is used when an over-the-air log in was already sent and the terminal needs to come back up in the DAMA network—OR—when a service connection has been torn down and re-access is required but the terminal has not logged off the net.
	    The controller has the maximum precedence already stored in its database. If that precedence is exceeded when attempting to set up a service, the controller may log the terminal out of the system. The operator needs to go back and send an over-the-air log in.

Set up circuit service—data/terminal for MHOP	1. Ensure current mode screen reflects D. 2. Ensure screen states 5-kHz CONNECTED—SVC IDLE. 3. Scroll to service set up and enter (or press) 1. 4. Information displayed is the same information as in current mode (what was put in the preset). Change anything that does not reflect data, 2400 bps, ANDVT. 5. In Destination, enter TBA (NOT network address) that is in the other footprint. Enter on Send
Communicate	When SRVCASGND message is received, press enter to ACCEPT. Pass traffic

Table D-8. 5-kHz DAMA Operations (Same Footprint/MHOP) Guide

Procedure	Steps/Notes
	with VDC-400 CARD. Traffic takes longer over multiple footprints in the MHOP service.

Check service state	1. Check to ensure 5-kHz connected; may check service state whether in a service, pending a service, or preempted from a service (also when idle).
	 2. Scroll to check service state and enter (or press 3).
	 Note: Information only screen displays how many services there are (up to 3)— change the first number by pressing 2/3 to see other services and their status.
	     Who set up the service/who was the destination address.
	     CIR or MSG service.
	     V or D; PT/CT; and precedence sent.
	     LOCAL (in the same footprint) or MHOP.
	     ACTIVE, PENDING, or QUEUED.

Check network state	1. Ensure 5-kHz connected.
	 2. Scroll to check network state and enter (or press 4).
	 3. Displays information about the DAMA network:
	     PCC address—address assigned to the DAMA control station (not to be confused with 00000).
	 4. MHOP indicates the controller is capable of sending messages across footprints.
	 Note: LIO (limited input/output)—if displayed, controller does not accept services of 2400 bps or higher. If using data, use a lower data rate if possible when setting up a service. If using voice (which is highly discouraged on 5-kHz DAMA), terminal is denied if a service set up is sent for voice communications.
	     FOW Miss—number of OWs missed from the controller. This is a running total (which means misses could be intermittent). However, if the terminal misses 200 consecutive OWs, the terminal is supposed to be logged out of the network by the controller and goes to acquiring on its own.
	     Link Quality—values are from 26.0 to 57.5. The terminal requires a minimum of 36 to access DAMA communications, 45 or better for data communications.
	     Precedence/Precedence—indicates minimum precedence for network access (if the net is a routine net and this displays priority, the entire network is unable to gain access to the DAMA channel). Second precedence indicates the maximum precedence for the terminal; the frequency manager should provide this information. This is a way to check what is in the controller's database.

Log out	1. Ensure the terminal is at 5-kHz CONNECTED and SVC IDLE; if there are any services active, teardown. 2. Scroll to log out and enter (or press 6). 3. Select over-the-air log out and send. 4. Radio is now ready to be shut down. Terminal should receive a log out acknowledgement message. 5. Turn off the radio or go to another preset channel for other modes of operation.

Appendix E
LST-5D Radios

1. LST-5D LOS Procedures (Updated: 02 APR 98)

a. Reminder.

(1) HD SET—Use a 6-pin audio connector plain text handset connector only.

(2) LOS—Refers to line of sight. The radio is configured in the AM mode. This may be used for ground-to-air and air-to-ground communications. If FM is required in a LOS environment, the radio is configured in the SATCOM mode.

(3) Audio/Data/Fill Connector—Connects to handset in secure voice modes, data devices in secure data modes, or fill devices in fill modes.

b. Prior to COLD START, press 0 and right arrow together. Then turn on the radio. This will MASTER CLEAR all settings and crypto in the radio, if needed.

c. Cold start initialization.

Note: The down arrow button works as the "enter" button.

(1) When unit is powered up in an un-initialized state, the unit performs system tests and then displays a blinking ALARM message. (If the alarm blinks without going to self-test, press ESC twice and then self-test begins.) The speaker shaped icon in the lower left corner of the display is an ALARM annunciator. As long as the internal COMSEC KG is not initialized, the radio set remains in the ALARM condition and displays the ALARM message.

(2) Rotate the key management (KGMT)switch to the LD KG position, then depress and release the ESC on the front panel keypad twice. The SELF TESTING message is displayed after the internal COMSEC KG successfully performs its power up tests.

(3) Once the radio completes and passes all power up tests (approximately 60 to 70 seconds) the radio displays a prompt to connect a fill device.

(4) The radio is not used in a secure mode, move the KGMT switch to operate (OP) position.

(5) The three-digit alarm code in the lower right corner of the display should read 050.

(6) The three digit error code 255 is a catchall error code. Reinitiate the radio.

d. Programming operating modes.

<hr>

Note: The left and right arrow buttons move to the menu option needed.

<hr>

(1) Turn the mode select to OP position.

(2) At the function screen, usethe right arrow button to select PROG and then depress the down arrow button.

(3) The program menu displays MODES and FREQS.

(4) Select FREQS depress the right arrow button followed by the down arrow button to enter.

(5) The Program Freqs Menu displays CH1 with the RX—TX (DOWNLINK/UPLINK) UHF frequencies. Insert the appropriate frequencies in the channels (there are nine channels to use).

(6) Depress the up arrow until STORE FREQ menu is displayed. Select YES and depress the down arrow button to enter and save.

(7) At the program screen, select MODES using the left arrow button followed by the down arrow button to enter.

(8) Select the preset to store the configuration into (enter a number) and depress the down arrow button.

(9) Scroll through the terminal selections and select LOS, depress the down arrow button.

(10) Display/SOURCE KG, select PT, depress the down arrow button.

(11) Display/RADIO SCAN, select OFF, depress the down arrow button.

(12) Display/CHANNEL SELECT, select the preset channel, depress the down arrow button.

(13) Display/POWER ADJ, select LOW or HIGH, depress the down arrow button.

(14) Select SAVE, depress the down arrow button to store.

(15) Display/STORE INTO PRESET (what ever the circuit preset is 1 to 6)

(16) Press ESC until the OP screen is displayed and select OP.

(17) Recall the PRESET.

(18) After recalling the preset, the display shows a monetary alarm condition.
Radio initializes for a minute or so. Then the radio automatically accesses the
frequencies and the display reads as—

```
PRESET # 1
LOS     PLAIN TEXT
I I I I I I I I I I (power bars)
  SIG
CH#1   FREQ              RX
```

e. Upon completion of the circuit, depress the ESC button or the up arrow button to
the FUNCTION menu.

f. Remember, communications are only as good as antennas.

2. LST-5D SATCOM Procedures

a. SATCOM. SATCOM refers to satellite communications. When using plain text
voice communication, this is FM modulation. Using secure communication is frequency-
shift keying (FSK) or phase-shift keying (PSK) depending on the data rate.

b. Cold start initialization.

(1) When unit is powered up in an un-initialized state, the unit performs system
tests and then displays a blinking ALARM message. (If the alarm blinks without going
to self test, press ESC twice and then self test begins.) The speaker shaped icon in the
lower left corner of the display is an ALARM annunciator. As long as the internal
COMSEC KG is not initialized, the radio set remains in the ALARM condition and
displays the ALARM message.

(2) Rotate the key management (KGMT) switch to the LD KG position, then
depress and release the ESC on the front panel keypad twice. The SELF TESTING
message is displayed after the internal COMSEC KG successfully performs its power up
tests.

(3) Once the radio completes and passes all the power up tests (approximately 60
to 70 seconds) the radio displays a prompt to connect a fill device.

(4) If the radio is not used in a secure mode, move the KGMT switch to OP.

(5) If the radio is used in a secure mode, the internal COMSEC KG is initialized
and the KGMT switch is placed in the LD KG position.

(6) The three-digit alarm code in the lower right corner of the display should
read "050".

(7) The three digit error code 255 is a catchall error code. Reinitiate the radio.

(8) The COMSEC KG within the radio has six key variable storage locations.
Locations 1 to 4 are user selectable traffic variable locations, 5 and 6 are used for Saville
advanced remote keying (SARK).

(9) Switch the KGMT to LD KG.

(10)   CONNECT FILL DEVIC" blinks, connect KYK-13 to the ADF connector.

(11) Turn on KYK-13 and screen displays KG VARIABLE FILL (put fill in any of
the variable, KG1 to KG4) depress the down arrow button.

(12) After pushing the variable position to fill location, depress the STO/RCL button.

(13) The fill device light flashes. Display reads KG FILL IN PROGRESS.

(14) Turn off KYK-13 and disconnect, the display reads KG FILL SUCCESSFUL. (This verifies the correct transfer of the variable).

  c. Programming operating modes.

Note: The left and right arrow buttons move to the menu option needed.

(1) Turn the mode select to OP position.

(2) At the function screen, select PROG use the right arrow button then depress the down arrow button.

(3) The program menu displays MODES and FREQS.

(4) Select FREQS use the right arrow button followed by the down arrow button to enter.

(5) The Program Freqs Menu displays CH1 with the RX - TX (DOWNLINK/UPLINK) satellite frequencies. Insert the appropriate frequencies in the channels (there are nine channels to use).

(6) Depress the up arrow button until STORE FREQ menu is displayed. Select YES and depress the down arrow button to enter to save.

(7) At the program screen select MODES use the left arrow button, then the down arrow button to enter.

(8) Select a preset channel to store the configuration (a number must be entered) and depress the down arrow button.

(9) Scroll through the terminal selections and select SATCOM, depress the down arrow button.

(10) Display/SOURCE KG, select INT KG, depress the down arrow button.

(11) Display/CRYPTO MODE, select ANDVT, depress the down arrow button.

(12) Display/ KG VARIABLE, select VARIABLE POSITION THAT IS LOADED (1 to 6), depress the down arrow button.

(13) Display/PHASING, select NORMAL, depress the down arrow button.

(14) Display/TX MODE, select NORMAL, depress the down arrow button.

(15) Display/DATA INVERT, select DISABLE, (for SATCOM), depress the down arrow button.

(16) Display/RADIO SCAN, select OFF, depress the down arrow button.

(17) Display/CHANNEL SELECT, select the channel previously entered, depress the down arrow button.

(18) Display/POWER ADJ, select desired level (for example, 12) up to 18, depress the down arrow button.

E-4

(19) Select SAVE, the down arrow button to store in desired preset (a number must be entered).

(20) Press ESC until the OP screen is displayed and select OP.

(21) Recall the PRESET.

(22) After recalling the preset, the display shows a monetary alarm condition. Radio initializes for a minute or so. Then the radio automatically accesses the satellite and the display reads as—

```
PRESET # 1
SATCOM ANDVT V2.4V1
I I I I I I I I  (power bars)
   SIG
CH#1   FREQ              RX
```

d. Upon completion of the circuit, depress the ESC of the up arrow button to the FUNCTION menu.

3. Key Variable Zeroization

a. The radio has six fill positions. To zeroize all six key variables, pull and rotate the KMGT switch to the extreme counter clockwise position. This is labeled ZALL. If the radio set is in a mode that has the COMSEC hardware turned on, the display immediately shows the ALARM message signifying a successful ZEROIZATION. The preset operating modes are not affected by ZEROIZATION. If the radio is in a mode with COMSEC hardware off, the display may not immediately display the ALARM message after a ZALL. However, if a mode is entered that causes the COMSEC hardware to turn on, the ALARM message l appears and a KG initialization is required.

b. The radio can be zeroized by two other means. Removing the standby battery when the radio set is turned off zeroizes all key variables. Also, unauthorized attempts to access the COMSEC compartment zeroizes the key variables.

c. To zeroize a specific key variable location, rotate the KMGT switch to the ZSEL. Select (use the left or right arrow keys on the keypad) the key variable storage location number (KG1 –to KG6) desired to zeroize.

d. Once the proper location for the key variable is entered and verified on the display, press and release the STO/RCL button on the keypad. If a KG variable is selected, the message ZSEL IN PROGRESS is displayed briefly. The message ZSEL SUCCESSFUL is displayed when the operation is completed successfully. The ZSEL IN PROGRESS display should be brief and may not be identifiable.

4. LST-5D DAMA 25-kHz AC Procedures (For MOD-3 and Below)

a. Under AC, 25-kHZ AC is 25-kHz DAMA. This terminal is used for satellite communication in either voice or data mode. The channel width is 25-kHz.

b. DAMA is a channel access scheme in which access of a channel from geographically distributed communications terminals is allocated based on demand.

c. AC is an operating mode that allows communications slots within the waveform to be dynamically assigned to terminals requiring access to the slots.

d. Prior to COLD START, press 0 and right arrow together and then turn on the radio.

e. This will MASTER CLEAR all settings and crypto in the radio, if needed.

5. Cold Start Initialization

a. When unit is powered up in an un-initialized state, the unit performs system tests and then displays a blinking ALARM message. (If the alarm blinks without going to self-test, press ESC twice and then self-test begins.) The speaker shaped icon in the lower left corner of the display is an ALARM annunciator. As long as the internal COMSEC KG is not initialized, the radio set remains in the ALARM condition and displays the ALARM message. Do not power up the unit in the OP position and then toggle the KGMT switch to the LDOW position.

b. The three-digit alarm code in the lower right corner of the display should read 050.

c. The three digit error code 255 is a catchall error code. Reinitiate the radio.

6. Loading LST-5D for DAMA Use

a. To initiate the internal fill, the KMGT switch must be placed in the LDOW position for the internal modem to initialize. The fill device cannot be connected before the internal modem initializes. During the initialization process, the message LOAD CTIC ORDERWIRE INITIALIZING is displayed. If the initialization is longer than 5 minutes, toggle the switch to OP and then back to LDOW. The menu should change within a few minutes. If the fill device connects before the modem completes initializing, the message LOAD CTIC ORDERWIRE DISCNCT FILL DEVICE is displayed and the fill device must be disconnected. After the modem completes initialization, the message CONNECT FILL DEVICE blinks until a device is connected and/or turned on or the KMGT switch is moved to another position.

b. After the fill device is connected, the message LOAD CTIC ORDERWIRE KEY 1 is displayed. Load the appropriate keymat in all variable positions by pressing and releasing the STO/RCL button. Do this for all variables. The lamp on the KYK-13 flashes when the button is pressed and the message OW FILL IN PROGRESS is displayed. If the fill is completed successfully , the message OW FILL SUCCESSFUL is displayed. In addition, when the KYK-13 is turned off, the CONNECT FILL DEVICE message is displayed. Toggle the KGMT switch to the LDKG position and load the ANDVT) keymat in load variable 1 of the LST-5D by pressing and releasing the STO/RCL button. When the KGMT switch is toggled to the LDKG and the ALARM 255 flashes in the lower right corner, press the ESC button. The radio goes into an ALARM 050 and then to self-testing. Wait for the CONNECT FILL DEVICE to flash and then load the ANDVT keymat.

7. Programming Operating Modes

a. Turn the mode select to the OP position.

b. At the function screen, use the right arrow button to select PROG and then depress the down arrow button.

c. The program menu displays MODES and FREQS.

d. Select FREQS using the right arrow button followed by the down arrow button to enter.

e. The Program Freqs Menu displays CH1 with the RX - TX (Downlink/Uplink) satellite frequencies. Insert the appropriate frequencies in the channels (there are nine channels to use).

f. To save the frequencies depress the up arrow button until STORE FREQ menu displays. Select YES and depress the down arrow to enter.

g. At the program screen, select MODES using the left arrow button and then the down arrow button to enter.

h. Select a preset channel in which to store the configuration (a number must be entered) and depress the down arrow button.

i. Scroll thru the terminal selections and select 25-kHz AC and depress the down arrow button to enter.

j. Select the frequency channel the satellite frequencies are stored in and then depress the down arrow button to enter.

k. Adjust the power up to 18 watts. Depress the down arrow button.

l. Select ranging NORMAL. Depress the down arrow button.

m. TX INHIBIT: select NO. Depress the down arrow button.

n. XMODE ADDR: insert the TBA for that radio. The communication plan should have this information.

o. INTKG ADDR: automatically changes to the next higher number. Depress the down arrow button.

p. INTKG is displayed with 25-kHZ AC.

q. ORDERWIRE: select ENABLE. Depress the down arrow button.

r. CRYPTO MODE: select ANDVT. Depress the down arrow button.

s. KG VARIABLE: insert 1. ANDVT keymat should have been inserted in variable 1. Depress the down arrow button.

t. DATA INVERT: can select DISABLE or ENABLE. (Does not matter with voice). Depress the down arrow button.

u. DEST ADDR: insert the NET # from the COMM STATUS REPORT. Depress the down arrow button.

v. CONFIG CODE: insert the number from the COMM STATUS REPORT. Depress the down arrow button.

w. ALLOW CONSTANT KEY: select NO. Depress the down arrow button.

x. XMODE now displayed with 25-kHZ AC.

y. Throughout XMODE menus, depress the down arrow button. Do not change any of the menus. Used only with external crypto.

z. GUARD ADDR 01: insert the NET #. Depress the down arrow button.

aa. INTKG should flash. Leave as is. Depress the down arrow button.

bb. GUARD ADDR 02: Leave as is. (all XMODE menus are leave as is). Depress the down arrow button.

cc. Arrow over to SAVE. Depress the down arrow button.

dd. STORE INTO PRESET: insert desired preset which is to be stored. (Enter number).

ee. Hit ESC or UP ARROW until the FUNCTION MENU is displayed.   Arrow over to OP and depress the down arrow button.

ff. RECALL PRESET: enter the number where the preset is stored.The display shows a monetary alarm condition. The menu reads as—

```
PRESET 1  SU
25KAC  ANDVT  V2.41
INITIALIZING
```

gg. Once the radio completes initializing, source dual port reads as—

```
DAMA DL/IL OK
SOURCE: DUAL PORT
```

hh. The menu reads as—

```
STAT REPROT B (either) NACKED or
ACKED
*DOWN ARROW TO NEXT
```

ii. Depress the down arrow button. The menu reads as—

```
XMODE NOT CONNECTED
INTKG NOT CONNECTED
```

jj. Depress the down arrow button. The menu reads as—

```
REQUEST CALL
TERMINATE CALL
SEND STAT REPORT B
*RESERVED
```

kk. Depress the down arrow button. The menu reads as—

```
INHIBIT TX
PAGE USER(S)
SEND INFO REPORT
```

ll. Depress the down arrow button. The menu reads as—

```
OUT OF SERVICE
PERFORM LINK TEST
*RESERVED*
EXIT PRESET
```

mm.   Depress the down arrow button, returns to DAMA DL/UL OK menu.

nn. To make calls on air.

(1) Go to the REQUEST CALL menu

(2) Press number 1.

(3) DAMA CALL REQUEST

(4) CH PREC = ROUTINE

(5) PORT INTKG OR XMODE appears

(6) Use INTKG, press the down arrow button

(7) CALL PREC: ROUTINE appears (This is the call precedence. Press the down arrow button.)

(8) CONFERENCE CALL? Yes or No

(9) USER 1

(10) Enter the NET number. Press the down arrow button.

(11) Radio emits RCCOW and displays if it is or is not connected.

(12) If the menu states the RCCOW NACKED, go back to the REQUEST CALL menu and reinitiate.

(13) After completing the use of the circuit, press the ESC or the up arrow button and scroll until the EXIT PRESET is displayed and press number 4.

8. Fill Procedures Using A KYX-15

a. On the KYX-15, select the desired key to be loaded (1 to 16), then set the switch to the LD position. On the radio, enter and verify on the display the proper storage location for the variable. Press and release the STO/RCL button on the radio set's keypad and the lamp on the KYX-15 flashes when the button is pressed. The message KG FILL IN PROGRESS is displayed. To verify correct transfer of the variable, disconnect the KYX-15. If the fill completed successfully, the message KG FILL SUCCESSFUL is displayed.

b. Continue with the operating procedures.

9. Key Variable Zeroization

See section 3 above.

Appendix F
AN/ARC-231/SKYFIRE

1. Skyfire Operator Training

a. Obtain basic operational knowledge of the AN/ARC-231(V3).

b. Radio (Skyfire) system characteristics and capabilities.

c. Understand basic operations of the Skyfire radio.

d. Load COMSEC variables.

e. Load presets manually and through software/PCMCIA.

f. Place Skyfire radio into various modes of operation, to include plain and Cipher text modes.

g. Change from preset to manual operations and back to preset.

2. Skyfire Characteristics and Capabilities

Multi-band receiver/transmitter that provide the following modes of communication:

a. LOS 30- to 400-MHz.

b. Maritime voice communications 156- to 162.025-MHz.

c. HAVE QUICK (HQ) voice communications 225- to 400-MHz.

d. Single channel ground and airborne radio system voice and data 30- to 87.975-MHz.

e. SATCOM DAMA 5-kHz and 25-kHz channel spacing voice and data 225- to 400-MHz.

f. Non-DAMA SATCOM voice and data 225- to 400-MHz.

g. ADF 30- to 400-MHz.

h. Beacon transmission 30 to 400 MHz.

i. Scan mode up to ten preset frequencies and transmit on one stored frequency,

3. Capabilities and Features

a. Menu driven operations displayed on a 5 line by 20 character control interface

b. Internal diagnostics that continuously run built in test routines.

c. Embedded COMSEC functions provide VINSON, ANDVT), KG-84 modes 1 to 4, and FASCINATOR.

d. Preset mode allows storage of 20 sets of parameters for the following modes: LOS, Maritime, HQ, single channel ground and airborne radio system, and non-DAMA SATCOM.

e. DAMA SATCOM mode allows storage of 30 presets.

f. The radio stores the last operating mode and all presets in non-volatile memory. In addition, COMSEC keys are retained up to 20 minutes when internal battery is fully charged, or indefinitely using an external hold up power source.

4. Control/Fill Panel

a. Data display 5 line 20 characters.

b. Preset card slot

c. Selector control

d. Enter encryption key switch

e. Fill connector

f. Mode select switch

g. Toggle switches
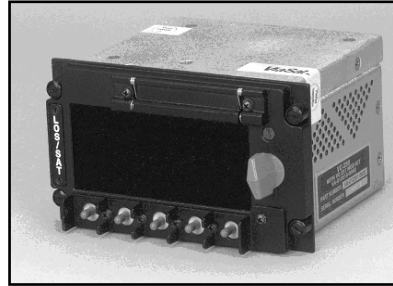
Figure F-1. Control/Fill Panel

5. Loading COMSEC

Note: Unless stated otherwise, all switches and controls called out in this procedure are on the control indicator (CI).
Until directed, do not connect fill device.
Always load key position number 1 first, for proper key recall.

STEP 1. Set mode switch on fill panel from PT to CT position.

The following message appears–

```
COMSEC RANDOMIZE
PROCEED TO F1 AND
PRESS ENT TWICE
 (0)
S/G  M/Z  D/D  P/N  X/E
```

The following message appears–

```
INITIALIZING
TERMINAL FOR
KEY FILL
S/G  M/Z  D/D  P/N  X/E
```

STEP 2. Press the X/E ↓Control Enter switch down, the (0) field changes to (1).

STEP 3. Press the X/E ↓ Control Enter switch down again, the (1) field changes to (2).

STEP 4. Press the ENTER switch twice on the fill panel to ensure COMSEC is randomized

The following message appears–

```
F1:  COMSEC
CONNECT DEVICE
S/G  M/Z  D/D  P/N  X/E
```

STEP 5. Connect desired fill device such as, KYK-13, KYX-15, or CYZ-10 (configured for DS-102) to the fill panel connector; the display shows the COMSEC fill menu when the fill device is turned on.

```
F1: COMSEC
DS-102
COMSEC Key: _ _
KEY TYPE:  VINSN
S/G  M/Z  D/D  P/N  X/E
```

STEP 6. Rotate the selector control knob clockwise, as required, to select COMSEC key storage position (01 to 19). Next press ENTER (X/E) ↓

STEP 7. Rotate selector control knob to select desired key type (ANDVT, FASCN, VINSN, or #KG84, where #=1, 2, 3, or 4).   (Field defaults to over-the-air rekeying if position 20 was selected.)

```
F1: COMSEC
DS-102
COMSEC Key: 01
KEY TYPE:  VINSN
S/G  M/Z  D/D  P/N  X/E
```

STEP 8. Set address select (fill) switch on KYK-13 to the desired position.

STEP 9. Press (X/E) ↓ Enter switch on the control indicator and observe that LED on KYK-13 flashes.

STEP 10. The CI display shows the message Key Filled or Key Fill Failure.

```
F1: COMSEC
KEY FILLED
COMSEC Key: _ _
KEY TYPE:  VINSN
S/G  M/Z  D/D  P/N  X/E
```

STEP 11. If key fill failed message appears, repeat steps 6 through 9 and try to fill radio again.

STEP 12. If additional keys need to be filled, select desired key on fill device (if applicable) and repeat steps 6 through 9. If key fill operation is complete, turn off and disconnect COMSEC fill device from fill panel. Rotate mode select from F1 to CT or PT position.

Note: If at any time, the radio displays an alarm condition; follow the instruction given by the radio to clear the alarm properly.

If an alarm condition does not clear using the instructions given, press the ↑ X/E switch to escape the menu and reset the radio.

If an alarm condition persists, turn off radio for 15 to 30 seconds and then turn the radio on in PT mode. Allow the radio to go through BIT to ensure fault is not a system failure. Once BIT is complete and the radio goes into the current operations mode, continue previous operation.

6. Download Presets

Note: Unless stated otherwise, all switches and controls called out in this procedure are on the control indicator (CI).

STEP 1. Set mode switch on fill panel to PT. After BIT is complete, the display shows the last active operational CURRENT MODE.

```
LOS-P01  Rx-PT-120
AM  V16K
R378.050  T378.050
GUARD: OFF
S/G  M/Z  D/D  P/N  X/E
```

STEP 2. Press MODE (M/Z)↑. The display shows the CI mode menu.

STEP 3. Insert the pre-loaded PCMCIA card into PCMCIA port on the CI.

STEP 4. Rotate selector control knob to select LOAD PRESETS and press ENTER (ENT) ↓.

```
CI MENU
CMD: SAVE PRESETS
ENT
```

STEP 5. The display shows the LOAD PRESETS submenu. Notice toggle switches on CI change function and are re-identified.

STEP 6. Press LOAD switch up or down to activate loading process.

```
CI MENU
LOAD PRESETS
LOADING PRESETS
LOAD  EXIT
```

STEP 7. When message PRESET LOAD COMPLETE is displayed, the PCMCIA card may be removed from PCMCIA port on the CI.

```
CI MENU
LOAD PRESETS
PRESET LOAD COMPLETE
LOAD            EXIT
```

STEP 8. Press EXIT switch up or down to deactivate LOAD PRESET function.

STEP 9. The display returns to the main CI mode menu.

```
CI MENU
CMD: SAVE PRESETS
ENT
```

STEP 10. To return to radio operating menus, rotate selector control knob to select CONTROL RT and press ENTER (ENT).↓

```
CI MENU
CMD:  CONTROL RT
ENT
```

STEP 11. The radio returns to the main menu with cursor flashing over number 1. Press the ENTER (X/E)↓ switch to return to the current operating mode.

```
MAIN MENU
1 - CURRENT MO
2 - DATABASE OPTIONS
3 - SET PRESETS
S/G  M/Z  D/D  P/N  X/E
```

7. Save Presets Manually

STEP 1. From the current operating mode, press the ESCAPE/ENTER ↑(X/E) switch to proceed to the main menu.

```
MAIN MENU
1 - CURRENT MODE
2 - DATABASE OPTIONS
3 - SET PRESETS
S/G  M/Z  D/D  P/N  X/E
```

STEP 2. Press the (P/N) ↓ switch until cursor is flashing over number 3, then press the ENTER (X/E)↓ switch to activate the preset submenu. With cursor flashing over the number 1, press the ENTER (X/E)↓ switch to activate the preset submenu.

```
MAIN MENU
1 - CURRENT MODE
2 - DATABASE OPTIONS
3 -SET PRESETS
S/G  M/Z  D/D  P/N  X/E
```

```
SET PRESETS
1 – SET MODE PRESETS
2 – 5-K SERVICE
3 – 25K SERVICE
S/G  M/Z  D/D  P/N  X/E
```

STEP 3. Rotate the selector control knob to move through available selections, or select numeric value using the (D/D) ↑ number switch to change the numeric value and the (X/E) ↓ to accept the number. Press the ENTER (X/E)↓ switch to save choice in the non-volatile memory.

```
SET MODE PRESET
LOS-P01  Sq- -39
TK 01   AM   VINSN   V16K
R378.050  T378.050
GUARD: OFF
NORMAL  Tpwr  43 dbm
```

STEP 4. After setting all desired presets; press the ESCAPE/ENTER ↑(X/E) switch twice to proceed to the main menu.

```
MAIN MENU
1 - CURRENT MODE
2 - DATABASE OPTIONS
3 - SET PRESETS
S/G  M/Z  D/D  P/N  X/E
```

STEP 5. Press the ENTER (X/E)↓ switch to return to the current operating mode.

8. Brightness Adjustment

STEP 1. Press MODE (M/G)↑. The display shows the CI mode menu.

STEP 2. Rotate selector control knob to select BRIGHTNESS and press ENTER (ENT) ↓

```
CI MENU
CMD: BRIGHTNESS
ENT
```

STEP 3. Rotate the selector knob to brighten or dim the display. Press the EXIT switch up or down to save the brightness setting and return to the CI mode menu. Press the NVG or NORM switch up or down to apply or remove the NVG brightness delta respectively.

```
CI MENU
BRIGHTNESS
NVG      NORM      EXIT
```

STEP 4. Press the EXIT switch up or down to deactivate brightness menu.

STEP 5. The display returns to the main CI mode menu.

```
CI MENU
CMD:  SAVE PRESETS
ENT
```

STEP 6. To return to radio operating menu, rotate selector control knob to select CONTROL RT and press ENTER. (ENT) ↓.

```
CI MENU
CMD:  CONTROL RT
ENT
```

STEP 7. The radio returns to the main menu with cursor flashing over number 1. Press the ENTER (X/E)↓ switch to return to the current operating mode.

```
MAIN MENU
1 - CURRENT MODE
2 - DATABASE OPTIONS
3 - SET PRESETS
S/G  M/Z  D/D  P/N  X/E
```

9. LOS Operations

a. Preset operation.

> Note: Unless, stated otherwise, all switches and controls called out in this
> procedure are on the Control Indicator (CI). Do not proceed to CT
> operations until radio initialized in PT.

STEP 1. Set mode switch on fill panel to PT. Initialization BIT runs for approximately 30 seconds when PT is selected.

STEP 2. With cursor flashing in the display mode field, rotate selector control knob left or right until LOS appears then press ENTER (X/E) ↓. The cursor moves to preset the field.

STEP 3. Rotate selector control knob for desired preset (01 to 20) and press ENTER (X/E) ↓.

```
LOS-P01  Sq- -030
AM  V16K
R378.050  T378.050
GUARD:  OFF/ NONE
S/G  M/Z  D/D  P/N  X/E
```

STEP 4. For CT operations change mode switch to CT, ensure prior to LOS operations, proper key is loaded according to COMSEC loading procedures.   If required, rotate selector control knob to select desired key (01 to 19) then press (X/E) ↓. to configure radio.

```
LOS-P01  Tx-CT-38 TK 01
AM   VINSN  V16K
R378.050  T378.050
GUARD:  OFF
S/G  M/Z  D/D  P/N  X/E
```

STEP 5. Begin communications.

b.   Manual LOS operation

For manual operation, make desired changes to CURRENT MODE menu (for example, transmit power, operating frequency, and so forth). After making changes, the "—P" field changes to "—M" to indicate manual operation.

```
LOS-M01  Sq- -30
```

STEP 1. Press PREVIOUS/NEXT (P/N) ↓↑ to move to desired field(s) for changes.

STEP 2. Rotate selector control knob to move through available selections, or select numeric value using the (D/D) ↑ switch to change the numeric value

STEP 3. Press ENTER (X/E) ↓. Switch to accept change and configure radio.

STEP 4. Begin communications

10. LOS Guard Operations

a.   Perform the following steps to control guard operation:

(1) On = Activates guard receiver.

(2) Off = Deactivates guard receiver.

(3) Emergency = Disables guard receiver and tunes main receiver to guard channel.

STEP 1. Press NEXT (P/N) ↓ to scroll down menu to guard field.

STEP 2. Rotate selector control knob to select On, Off, or Emergency.

```
LOS-P01  Sq- -30
TK 01   AM   VINSN   V16K
R378.050  T378.050
GUARD:  ON
S/G  M/Z  D/D  P/N  X/E
```

STEP 3. Press ENTER (X/E) ↓.

STEP 4. Begin communications.

11. SATCOM Operations

a. Preset operation.

Note: Unless stated otherwise, all switches and controls called out in this procedure are on the control indicator (CI). It is assumed proper COMSEC key material is loaded and system is initialized in PT mode.

STEP 1. Set mode switch on fill panel to CT.

STEP 2. With cursor in the display mode field, rotate selector control knob to SATCOM and press ENTER (X/E) ↓.

STEP 3. Rotate selector control knob for desired preset (01 to 20) and press ENTER (X/E) ↓. Radio reconfigures.

```
SATCOM-P01    Rx-CT-120
TK 01   FSK   VINSN   V16K
CHANNEL NUMBER: 100
R295.975  T262.375
S/G  M/Z  D/D  P/N  X/E
```

STEP 4. Begin communications.

b. Manual operation.

Note: For manual operation, simply make desired changes to CURRENT MODE menu (for example, transmit power, channel number, and so forth.). After making changes, the preset "—P" field changes to "—M" to indicate manual operation.

STEP 1. Press PREVIOUS/NEXT (P/N) ↓↑ to move to desired field(s) for changes.

STEP 2. Rotate selector control knob to move through available selections, or select numeric value using the (D/D) ↑ number switch to change the numeric value.

STEP 3. Press ENTER (X/E) ↓ press the Enter switch to configure to radio.

```
SATCOM-M01   Rx-CT-120
TK 01   FSK  VINSN   V16K
CHANNEL NUMBER:  100
R295.975 T262.375
S/G  M/Z  D/D  P/N  X/E
```

STEP 4. Begin communications.

Appendix G
AN/WSC-3

1. Setting Up for DAMA

At antenna controller, dial in the elevation and azimuth of satellite (such as, UHF follow-on 6) that the assigned channel is located. This setting depends on a ship's location and it changes as the ship travels the ocean. There is an azimuth/elevation computation aid used to determine these values; each ship has one or more.

a. Verify all power to the SA-2000 is on and all switches are turned on.

b. On WSC-3 turn on or set as follows:

(1) Turn power on.

(2) Place standby/operate switch to operate.

(3) Place control switch to local.

(4) Place SATCOM/LOS switch to SATCOM.

(5) Place modulation switch to EXT Modem.

(6) For frequency select switches, dial the uplink frequency from Daily Comm Status message for the operational channel (for example, CONUS DAMA 1).

(7) Completely turn power control knob clockwise, then turn back approximately one-quarter turn.

(8) Partially extend radio from chassis.

(a) Set SATCOM offset switch to offset 4. (This is the normal setting if the difference between uplink and downlink frequency is 41-MHz. Sometimes offset 3 is used if the difference is 33.6-MHz.)

(b) This switch sets the downlink frequency in the radio.

(c) Set TDMA/non-TDMA switch to TDMA position.

(d) Return radio into chassis.

c. At SB-4125 or SB-4126 IF patch panel, patch the TD-1271 Xmt to the transmitting radio. Patch the TD-1271 Rcv to the receiving radio. (Usually it is the same radio.)

d. On the SB-4124 PATCH panel on the OK-454 or OK-455 equipment rack, ensure the TD-1271 XMT position is either normal thru'd or patched to the radio used to transmit. This TD-1271 XMT position is the top left position on the panel (A1J1).

e. At the TD-1271.

(1) Turn on the TD-1271.

(2) Ensure the transmit inhibit switch is off.

(3) Load proper current keymat variable into the KGV-11 memory position called for in the Daily Comm Status message for the operational channel and according to the ship's CMS procedures.

(4) Normally, loading is performed with a KYK-13 or KOI-18.

(5) Set KGV mode switch to Fill.

(6) Attach fill device to front of KGV-11, set the KYK-13 to the proper position in which the key variable is located and turned on.

(7) Depress bite alarm reset pushbutton. Any bite alarm should clear.

(8) Use the numeric keypad to depress the memory position number specified in the Daily Comm Status message (for example, 0 or 1 CONUS, 2 or 3 LANT). Then press Fill pushbutton. The KG alarm light should go out.

(9) If using a KOI-18 pull tape through tape reader. KG alarm light should go out.

(10) Shut off and remove fill device

(11) Set KGV mode switch to operate.

(12) If everything above is lined up and loaded correctly, the TD-1271 acquires and logs on the channel within approximately 5 to 10 seconds. An indication this happened is a 6 (randomly a D) displayed in the front window of the multiplexer. If a B displayed, check the crypto load for currency or proper memory location. If a C displayed, check the IF patching on the SB-4125/4126, TD-1271 XMT control patching on the SB-4124 patch panel, and satellite antenna azimuth/elevation alignment.

(13) If the 6 (randomly a D) display is observed, the terminal is operating in DAMA.

(14) Press number 1 followed by the ENTER key to transmit the status report. Acceptance and completion of this is observed by the ACCPT, XMT, and ACK lamps on the front panel of the TD-1271. Upon receipt of the status report, the channel controller automatically issues a channel change command, the TD-1271 alarms, automatically enter port 1 and display an information code of AAA99. Enter number 600000 and depress the ENTER key to clear the alarm. (This clear sequence has to be repeated in the other ports as they were entered.)

(15) Use the command *6 to exit port1. (The ENTER key is not required.)

(16) Connect to the proper circuit(s). From the Daily Comm Status message for the operational channel, record the guard number and configuration code of the circuit where communications are established. For example—

CIRCUIT	GUARD	CC
SATHICOM	15014	60

f.   On the SB-4124 patch panel, find the baseband device (such as, ANDVT) and either normal-through or patch the device to one of the four TD-1271 I/O ports. Assuming port 2.

g.   On the TD-1271, use the following keystroke to enter port 2:

(1) Enter *92 then depress the Enter key. (Port 1 is *91, port 3 is *93, and port 4 is *94.)

(2) Enter number 600000 then depress the Enter key to clear any AAA99 IR codes.

(3) Enter the configuration code *5 60 then depress the Enter key. The TD-1271 transmits the configuration of the port to the channel controller. This is observed by the ACCPT, XMT, and ACK lamps on the front panel of the TD-1271.

(4) Enter the guard number into the port—*1 15014—then depress the Enter key. A momentary 01 is displayed if that is the only guard in the multiplexer port. If more than one guard is in the port a 02 or higher number is displayed. The preference is to have only one guard in each port and that the same guard number is not put into any other port. To read what guards are entered in the port, depress number 2 and watch the display. A number is displayed for two seconds, which is the TBA of the port (for example, 02157). Each guard number in the port is displayed for two seconds. To remove unwanted guard numbers use the command number 4 followed by the guard number then depress the Enter key (for example, number 4 15008 ENTER).

(5) Use the keystrokes—#76 15014 ENTER—to request a connection to the appropriate guard. The ACCPT, XMT, and ACK lamps on the front panel of the TD-1271 cycle. If the guard number is a valid guard for the channel, the proper configuration code was entered, and the terminal is an authorized user on the channel. The channel controller responds with a guard connect command. (If one of the previous actions is not valid, an information code is returned.) There is a laminated sheet with the codes and their meanings). If everything is correct, the port connects to the correct time-slot (guard) and beeps five times to indicate a connection. The CALL CONN lamp should illuminate.

(6) Enter *7 to display the guard number the terminal connected to.

(7) Enter *6 to exit the port.

(8) Repeat above steps for other circuits/baseband equipment configurations.

h. When a connection is no longer required or desired—

(1) Enter the appropriate port with a *91, *92, *93, or *94 command.

(2) Enter—*4 ##### Enter–to remove the guard number (for example, *4 15014 ENTER).

(3) Enter number 4 to disconnect from the circuit.

(4) Enter *6 to exit the port.

Notes: Be observant of KGV-11 keymat rollover dates and memory locations. They are listed in the Daily Comm Status messages. If mux front panel PREC display goes to a B, it is an indication of improper key or memory location.
Do not put the same guard number in two or more ports.
If the TD-1271 beeps entering a guard connect request (for example, number 76 #####) and refuses to take the guard, it indicates the port is keyed already. The source of the key must be removed before the TD-

1271 accepts entry of the guard connect request.
Call COMM (843) 218-4937/4939 or DSN 588-4937/4939, SPAWAR
Charleston if problems are experienced.

Appendix H
EMI CHARACTERIZATION CHECKLIST

Extract from CJCSM 3320.02, Joint Spectrum Interference Resolution (JSIR) Procedures.

Table H-1. EMI Characterization Checklist

STEP	ACTION	COMPLETE Y/N
001	Start a log and collect as much information as possible.	
002	Record what interference sounds like. If appropriate measurement equipment is available, an attempt should be made to quantify the characteristics of the interference signal. These characteristics include the interfering source's center frequency, bandwidth, relative amplitude, modulation, direction of interference, time of occurrence, and any other characteristics that can be obtained.	
003	Geographical Information.	
003-01	Check with other units in the geographical area to determine the area affected.	
003-02	Verify exact location of receiver using global positioning system, if available.	
004	Determine interference start and stop times.	
005	Ensure affected system is operating correctly.	
005-01	Ensure all connectors are tight.	
005-02	Ensure antenna cables are in good condition.	
005-03	Have maintenance personnel ensure equipment is operating IAW technical manual specifications and frequency assignment parameters.	
006	Verify antenna is on the correct azimuth and elevation.	
007	Environment Information	
007-01	Contact all nearby units to determine if they have recently installed any new equipment.	
007-02	Check with equipment maintenance personnel to determine if the interference is the result of maintenance actions or an equipment malfunction. This should include non-RF equipment that can cause spark-type interference used to support the operation of RF equipment (e.g., thermostat-controlled devices, electric motors, welders, etc.)	
007-03	Check to see if construction is being conducted in the immediate area.	
007-04	Determine whether the natural environment is the cause of the problem; see Enclosure F.	
008	Frequency Assignment Information	
008-01	Verify through service Component or JTF spectrum manager that a valid frequency assignment and/or satellite authorization exists.	
008-02	If no assignment exists, cease transmission and request new frequency.	
008-03	If valid assignment exists, change to alternate frequency and determine if interference is present. If interference is to a satellite communications system, skip to step 9.	
008-04	If a valid assignment exists and the interference goes away after changing to an	

STEP	ACTION	COMPLETE Y/N
	alternate frequency, submit an interference report through next higher headquarters and info JSC.	
008-05	Where co-channel or adjacent channel interference is suspected (i.e., the interfering signal overlaps the operating bandwidth of the victim receiver), check with local and area frequency management personnel to determine if other locally operated equipment has been recently assigned a co-channel or adjacent channel frequency.	
009	Satellite Communications Interference for MILSATCOM	
009-01	Net Control Station should contact the supporting SSC and determine if they can identify interference on the satellite. A determination shall be made at this time as to whether the interference is on the uplink or downlink of the satellite channel. If two or more users separated by 300 miles are observing the same interference, the interference is likely on the uplink.	
009-02	If no interference is present on the satellite uplink frequency, request to be switched to an alternate channel in a different part of the frequency band.	
009-03	If SSC reports a steady receive key (SRK) on the channel, have all users vacate the net.	
009-04	Once all users are off the net, contact SSC and ask if the SRK is present.	
009-05	If SRK is gone, have users re-access the net one at a time while SSC monitors; once the user that was causing the interference moves back onto the net the SRK will re-appear.	
009-06	If SRK is present, request another channel for testing. Have users move to the new channel, one at a time, while monitoring the channel.	
009-07	Once all users have moved to new channel, determine if SRK is present on the original channel.	
009-08	If SRK is present on original channel, initiate a harmful interference report.	
010	Combatant command or JTF will request JSC support to help resolve interference to terrestrial systems.	
011	Combatant command or JTF will request resources to support interference resolution to space systems.	
012	Provide feedback through the chain of command to the affected unit of actions taken and the resolution.	

CUT SHEETS

The following figures are examples of cut sheets. Each unit may have developed cut sheets specific to their unit or mission.

LOS Cut Sheet			Presets					
Mode	*Parameter*	*Value*	*1*	*2*	*3*	*4*	*5*	*6*
LOS	Modulation	AM						
		FM						
		FSK						
	Encryption	VINSON						
		FASCINATOR						
		4-KG84						
		3-KG84						
		ANDVT						
		KYV5						
	Communications	VOICE						
		DATA						
	Data Rate	12k						
		16k						
		32k						
		56k						
		64k						
	Scan Mode	NORMAL						
		SCAN						
	TX Power (dBm)							
	RX Frequency							
	TX Frequency							
	Mode Switch	PT or CT						

Figure J-1. Sample of LOS Cut Sheet

SATCOM Cut Sheet			Presets					
Mode	Parameter	Value	1	2	3	4	5	6
SATCOM	Encryption	ANDVT/MELP						
		VINSON						
		4-KG84						
		3-KG84						
	Communications	VOICE						
		DATA						
	Data Rate	1200						
		2400						
		9600						
		16k						
		19.2k						
		28.8k						
		32k						
		38.4k						
		48k						
		56k						
	TX Power (dBm)							
	Home Channel Number (no SATCOM loopback if 999)	9 to 239 or 999						
	RX Frequency	required if 999						
	TX Frequency	required if 999						
	Encoding	DIFF						
		Non-DIFF						
	Mode Switch	PT or CT						

Figure J-2. Sample of SATCOM Cut Sheet

DAMA Database Set up			Presets					
Mode	**Parameter**	*Values*	*1*	*2*	*3*	*4*	*5*	*6*
	Backlight Timer	2 to 60 seconds						
	Guard List		1	2	3	4	5	6
			7	8	9	10	11	12
			13	14	15			
DAMA Database	Terminal Data		LAT	LON	Zulu	Address	Platform	Msg. Rel.
							Stationary	Manual
	5-kHz I/O Data Rate		2400					
	Satellite Ephemeris		ID #	LON	Ascen.	Inc.		
	Information Codes (25-kHz Only)		AC/DC	Request	Meaning			Response
			AC	70	Network address not in guard list			N/A
			AC	71	Violated Maximum Precedence			N/A
			AC	72	Already have a pending service			N/A
			AC	75	Requester sent teardown message			N/A
			AC	77	Terminal address not in database			N/A
			AC	81	Data rate incorrect - check configuration code			N/A
			AC	82	Address called incorrect			N/A
			AC	88	Configuration code incorrect for network			N/A
			AC	89	Configuration code does not match distant end			N/A
			AC	90	All addresses called are not available			N/A
			AC	92	Some addresses called are not available			N/A
			AC	93	Someone else is running link test			N/A
			AC	98	Two or more addresses are network addresses			N/A

Figure J-3. Sample of DAMA Cut Sheet page 1

DAMA Cut Sheet			Presets					
Mode	Parameter	Value	1	2	3	4	5	6
DAMA	Encryption	ANDVT						
		VINSON						
		KG-84						
	Communications	VOICE						
		DATA						
	Data Rate	75						
		300						
		600						
		1200						
		2400						
		4800						
		9600						
		16k						
	Channel Variant	5-kHz						
		25-kHz						
	TX Power (dbm)	23 to 43						
	Channel Number	9 to 239						
	RX Frequency	For Reference Only						
	TX Frequency	For Reference Only						
	Configuration Code	5-kHz						
		25-kHz						
	OW Encryption	PT or CT						
	Mode of Operation	Normal						
		EMCON						
		Silent						
	Ranging	Active						
		Passive						
	Satellite ID Number	Passive Ranging Only (1 to 8)						

Figure J-4. Sample of DAMA Cut Sheet page 2

Appendix K
Prioritization Scheme

Table K-1. SATCOM Priority Table

SATCOM PRIORITY TABLE	
Note: **CINCs and other users rank order within a category when multiple accesses are assigned the same priority**	
Priority User	*Category*
Priority 1	**Strategic Order (Essential to National Survival)**
1A	System Control/Orderwire
1B	National Command Authorities
1B1	Presidential Support
1B2	Secretary of Defense Support
1B3	Envoy and Emissary Support
1C	Strategic and Threat Warning/Intelligence
1D	SIOP/Force Direction Requirements
Priority 2	**Warfighting Requirements**
2A	Department of State Diplomatic Negotiations
2B	CJCS Support
2C	COCOM Operations
2D	JTF or CTF Operations
2E	Component Operations (Theater Forces)
2F	Tactical Warning and Intelligence
2G	CJCS-Sponsored Select Exercises
2H	Counternarcotics Operations
Priority 3	**Essential Nonwarfighting Operational Support**
3A	Humanitarian Support
3B	Intelligence and Weather
3C	Logistics
3D	Radio Frequency Interference Resolution
3E	Diplomatic Post Support
3F	Space Vehicle Support
3G	Other Service Support

Table K-1. SATCOM Priority Table

SATCOM PRIORITY TABLE	
Note: **CINCs and other users rank order within a category when multiple accesses are assigned the same priority**	
Priority User	*Category*
Priority 4	**Training**
4A	CJCS Sponsored
4B	COCOM Sponsored
4C	MAJCOM, major command, Echelon 2 Sponsored
4D	Unit Sponsored
Priority 5	**VIP Support**
5A	Service Secretaries
5B	Service Chiefs
5C	COCOM Travel
5D	Other Travel
Priority 6	**RDT&E and General**
6A	DOD-Sponsored Testing
6B	DOD-Sponsored Demonstrations
6C	DOD Administrative Support
6D	DOD Quality of Life Initiatives
Priority 7	**Miscellaneous**
7A	DOD Support to Law Enforcement
7B	Other Non-DOD Support
7C	Non-U.S. Support as approved by the authorized organization
7D	Other

References

Joint

CJCSM 3122.01, *Joint Operating Planning and Execution System (JOPES) Volume I (Planning Policies and Procedures)* 14 July 2000

CJCSM 3320.02, *Joint Spectrum Interference Resolution Procedures (JSIR)* 8 November 2002

CJCSI 6250.01A, *Satellite Communications* 10 December 2001

Military Standards

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Glossary

PART 1 -- ACRONYMS AND ABBREVIATIONS

µs	microsecond
A	
A	signal amplitude
AC	automatic control
ADF	audio/data/fill connector for the LST-5D
AFDC	Air Force Doctrine Center
AFI	Air Force instruction
AFTTP(I)	Air Force technical training publication (inter-Service)
ALSA	Air Land Sea Application
AM	amplitude modulation
ANDVT	advanced narrowband digital voice terminal
ARSPACE	Army Space Command
ASCEN	ascension
ASYNC	asynchronous
ATM	asynchronous transfer mode
ATTN	attention
B	
bps	bits per second
BPSK	binary phase-shift keying
C	
C	total received carrier power
CC	channel controller
CCOW	channel control orderwire
CHAN	channel
CHLS	channels
CI	control indicator
CINC	commander-in-chief
CJCS	Chairman of the Joint Chiefs of Staff
CJCSI	Chairman of the Joint Chiefs of Staff instruction
CJCSM	Chairman of the Joint Chiefs of Staff manual
C/kT	carrier-to-noise power density
CLR	clear
CMP	communications message processor
C/N	carrier to noise ration

COCOM	combatant command
COMM	commercial
COMSEC	communications security
CONPLAN	concept plan
CONUS	continental United States
CPM	continuous phase modulation
CRC	cyclic redundancy check
CT	cipher text
CTF	combined task force
CTIC	communications security/transmission security integrated circuit
D	
DAMA	demand assigned multiple access
DAMACFG	demand assigned multiple access configuration
DAMANET	demand assigned multiple access network
DAMA SAC	demand assigned multiple access semi-automatic controller
DASA	demand assigned single access
dB	decibel
dBm	decibel (referenced to milliwatts)
DC	distributed control
deg	degree
DEQPSK	differentially encoded quadrature phase-shift keying
DISA	Defense Information Systems Agency
DMR	digital modular radio
DOD	Department of Defense
DSCS	Defense Satellite Communications System
DSN	defense switched network
D/V	data/voice
E	
E	east
Eb	energy per bit
EHF	extremely high frequency
eirp	effective isotropic radiated power
EMCON	emission control
EMI	electromagnetic interference
EMOP	emerging operations
EN	encrypted
ENT	enter
EOW	engineering orderwire

EPHEM	ephemeris
ESC	escape
EST	Eastern
EURCENT	Europe Central
EXPLAN	exercise plan
F	
FASC	fascinator
FAX	facsimile
FIG	figure
FLTSAT	fleet satellite communications
FM	field manual, frequency modulation
FORSCOM	Forces Command
FOW	forward orderwire
FREQ	frequency
FSCS	Fleet Satellite Communications System
FSK	frequency-shift keying
G	
GBS	global broadcast service
GHz	gigahertz
GPS	global positioning
GSM	global system for mobile communications
GSSC	Global SATCOM Support Center
H	
HD SET	handset
HF	high frequency
HI	high
HPW	high performance waveform
HQ	HAVE QUICK, headquarters
HR	hour
Hz	hertz
I	
I	in phase
IAW	in accordance with
ICP	inter-theater COMSEC package
ID	identification
IDN	initial distribution number
ind	indefinite
INMARSAT	international maritime satellite
I/O	input/output

IO	Indian Ocean
IP	internet protocol
J	
J-6	command, control, communications, and computer systems directorate of a joint staff
JCS	Joint Chiefs of Staff
JFCOM	Joint Forces Command
JFMO	Joint Frequency Management Office
JITC	Joint Interoperability Test Command
JMINI	Joint UHF Military Satellite Communications Network Integrated
JSC	Joint Spectrum Center
JSIR	joint spectrum interference resolution
JTF	joint task force
K	
kbps	kilobits per second
KDU	keyboard display unit
KG	key generator
KGMT	key management
kHz	kilohertz
km	kilometer
L	
LAN	local area network
LANT	Atlantic
LAT	latitude
LDR	low data rate
LIO	limited input/output
LON	longitude
LOS	line of sight
LQ	link quality
LST	lightweight satellite terminal
M	
MAJCOM	major command
MARFOREUR	United States Marine Corps Forces, Europe
MARFORLANT	United States Marine Corps Forces, Atlantic
MARFORNORTH	United States Marine Corps Forces, North
MARFORPAC	United States Marine Corps Forces, Pacific
MARFORRES	Marine Forces Reserve
MARFORSOUTH	United States Marine Corps Forces, South

MB	megabyte
Mbps	megabytes per second
MCCDC	United States Marine Corps Combat Development Command
MCRP	Marine Corps reference publication
MELP	mixed excitation linear prediction
MHOP	multiple-hop
MHz	megahertz
MILSATCOM	military satellite communications
MIL-STD	military standard
MILSTRIP	military standard requisition and procedure
MIN	minute
ms	milliseconds
MSG	message
MTTP	multi-Service tactics, techniques, and procedures
N	
N	integer number; north
N/A	not applicable
NAVSUP P	Navy supplement publication
NB	narrowband
NCO	noncommissioned officer
NCS	network control station
NCTAMS	Naval Computer and Telecommunications Area Master Station
NCTAMS EURCENT	Naval Computer and Telecommunications Area Master Station Europe Central
NCTAMS PAC	Naval Computer and Telecommunications Area Master Station Pacific
NCTAMS SMC	Naval Computer and Telecommunications Area Master Station Satellite Management Center
NCTS	Naval Computing and Telecommunications Station
NCTS GUAM	Naval Computing and Telecommunications Station, Guam
NII	national information infrastructure
nmi	nautical miles
No=kT	noise power spectral density
NSA	National Security Agency
NTTP	Navy tactics, techniques, and procedures
NWDC	Navy Warfare Development Command
O	
OP	operate
OPLAN	operations plan
OW	orderwire

P

PAC	Pacific
PCC	primary channel controller
PGM	program
PLGR	precise lightweight global positioning receiver
PMCS	preventive maintenance checks and services
POC	point of contact
PSK	phase-shift keying
PT	plain text
PWR	power

Q

QPSK	quadrature phase shift keying

R

RCCOW	return channel control orderwire
RDT&E	research, development, test and evaluation
rf	radio frequency
ROW	return orderwire
RSSC	Regional SATCOM Support Center
RSSC EUR	Regional Space Support Center Europe
RSSC PAC	Regional Space Support Center Pacific
RSSI	receive signal strength indicator
RX	receiver

S

S	south
SAA	satellite access assignment
SAC	semi-automatic controller
SAR	satellite access request
SARK	Saville advanced remote keying
SATCOM	satellite communications
SBPSK	shaped binary phase-shift keying
SCAMP	single channel anti-jam man portable terminal
SCCF	spectrum management
SDB	satellite database
SEC	second
SHF	super high frequency
SIGINT	signal intelligence
SIOP	single integrated operational plan
SIPRNET	secret internet protocol router network

SMC	Satellite Management Center
S/N	signal to noise
SOCCENT	Special Operations Command, Central
SOCEUR	Special Operations Command, Europe
SOCKOR	Special Operations Command, Korea
SOCPAC	Special Operations Command, Pacific
SOCSOUTH	Special Operations Command, South
SPAWAR	Space and Naval Warfare
SPAWARSYSCEN	Space and Naval Warfare Systems Center
SPOC	space command operations center
SRK	steady receive key
SSC	space support center
STE	secure telephone equipment
STU	secure telephone unit
SVC	service
SYNC	synchronous
T	
TACSAT	tactical satellite
TBA	terminal base address
TD	
TDMA	time division multiple access
TEK	traffic encryption key
TLE	telemetry
TRADOC	Training and Doctrine Command
TRANSEC	transmission security
TSK	task
TTP	tactics, techniques, and procedures
TX	transmitter
U	
UCC	unified combatant command
UFO	ultra high frequency follow-on
UHF	ultra high frequency
UHF SATCOM CELL RSSC PAC	ultra high frequency satellite communications cell Regional Space Support Center Pacific
UK	United Kingdom
UN	unencrypted
USA	United States of America
USAF	United States Air Force

USARPAC	United States Army, Pacific
USASFC	United States Army Special Forces Command
USASOC	United States Army Special Operations Command
USEUCOM	United States European Command
USMC	United States Marine Corps
USN	United States Navy
USSOCOM	United States Special Operations Command
USSOUTHCOM	United States Southern Command
USSTRATCOM	United States Strategic Command
V	
VHF	very high frequency
VINSON	encrypted ultrahigh frequency communications system
VIP	very important person
W	
W	watts; west; with
WAN	wide area network
WB	wideband
Z	
Z	Zulu

PART II -- TERMS AND DEFINITIONS

access	The ability, permission, or liberty to communicate with, or make use of, any system resource.
acknowledgment	A message from the addressee indicating that information has been received without error.
acquisition	A necessary preliminary condition of a receiver, by which frequency and phase ambiguities of an incoming radio frequency (rf) carrier are sufficiently resolved to allow information modulated onto the carrier to be properly demodulated.
acquisition back-off number	A number used by the terminal in the algorithm to reduce the possibility of conflicting transmissions during the initial ranging of terminals.
active ranging	The transmission and subsequent reception of a burst signal used for estimating the range to a satellite.
active service	A service that has been assigned communications resources and has not been torn down. Active services are either assigned or preempted.
address	A 16- or 14-bit code that uniquely identifies a terminal I/O port or network.

algorithm	A procedure or formula for solving a mathematical problem. Extremely complex algorithms or sets of algorithms are used to simplify, modify or predict data in the digital manipulation of information. Often, algorithms developed for digital applications are proprietary and are an important aspect of defining significant differences among the various digital compression and codec (coding/decoding) standards.
allocation	TDMA frame time apportioned by the PCC for a particular function.
alternate channel controller	The control station function that monitors the channel and can assume control, either manually by operator action or automatically when it detects that the PCC has failed.
angle of inclination	The angle at which a satellite's orbit is tilted in relation to the Earth's equator. A 90-degree angle of inclination is a polar orbit. A zero degree angle of inclination is an equatorial orbit.
antenna	A device for transmitting and receiving radio waves. Depending on their use and operating frequency, antennas can take the form of a single piece of wire, a dipole, a grid such as a yagi array, a horn, a helix, a sophisticated parabolic-shaped dish, or a phased array of active electronic elements of virtually any flat or convoluted surface.
apogee	The point in orbit where an object, such as a satellite, is farthest from Earth.
assigned service	A service being assigned communications resources.
assigned-return orderwire time-slot	A ROW segment time-slot that a PCC assigns to a specific terminal for the terminal's sole use. The assignment is made by the PCC when the terminal is required to respond to a FOW, such as when the PCC transmits a FOW requesting a network status message be transmitted by the terminal.
asymmetric warfare	Unanticipated or non-traditional approaches to circumvent or undermine an adversary's strengths while exploiting his vulnerabilities through unexpected technologies or innovative means. Simply put, dirty fighting that gives the weak the best chance to defeat the strong.
asynchronous transfer node	A switching architecture that uses cell relay technology to carry vast quantities of data at extremely high speeds.
atmosphere	The layer of gas surrounding the earth or other planets. The upper atmosphere is the region of Earth's atmosphere above the troposphere (which extends to about 20-km). Regions of the upper atmosphere are the stratosphere, mesosphere and thermosphere.
attenuation	The loss of power of electromagnetic signals between the transmission and reception point. It can be caused by distance or weather.
attitude	The position in space of a spacecraft or aircraft. A satellite's

attitude can be measured by the angle the satellite makes with the object it is orbiting, usually the Earth. Attitude determines the direction a satellite's instruments face. The attitude of a satellite must be constantly maintained; this is known as attitude control.

aurora
Light radiated by ions and atoms in the Earth's upper atmosphere, mostly in polar regions.

automatic control
An operating mode that allows communications slots within the waveform to be dynamically assigned to terminals requiring access to the slots.

automatic frequency change
A terminal capability to automatically switch to and operate on another 5- or 25-kHz DASA or DAMA channel upon receipt of a FOW directing such a change. This capability requires the change to be accomplished within 8.96...seconds for switching to a DASA channel, 90 seconds for switching to another DAMA channel (5- or 25-kHz), and 90 seconds for switching from a DASA channel to a DAMA channel. The 90-second switching time from a DASA to a DAMA channel applies when assigned time on DASA channel expires.

bandwidth
A measure of spectrum (frequency) use or capacity. For instance, a voice transmission by telephone requires a bandwidth of about 3000 cycles per second (3-kHz). A TV channel occupies a bandwidth of 6 million cycles per second (6-MHz) in terrestrial systems. In satellite-based systems, a larger bandwidth of 17.5- to 72-MHz is used to spread or "dither" the television signal in order to prevent interference.

baseband
The original band of frequencies produced by a signal-initiating device such as a microphone or data key prior to the initial modulation of the carrier.

binary phase-shift keying
A form of PSK in which the instantaneous phase of the carrier can be either unchanged or shifted 180 degrees. The information content of an uncoded BPSK signal is 1 binary digit (bit) per symbol; therefore, the symbol rate and the information rate are identical.

bit
A single digital unit of information The smallest increment of digital information. Often referred to as a 1 or 0 in the binary system. Also referred to as an 'on' or 'off' when referring to the mechanical operation of bits in the computer.

bit error rate
The fraction of a sequence of message bits that are in error. A bit error rate of 10Î6 means that there is an average of one error per million bits.

bit rate
The amount of data being transported, measured relative to quantity over time in bps; the speed of a digital transmission, measured in bps.

bit synchronization (clock lock)	The condition achieved when significant transitions of the recovered data rate clock are phase-stable to within 25 percent of the bit period.
blocked service	A queued service held from scheduling, awaiting (1) the availability of participating terminals busy with other services, or (2) the completion of setting up the path for a multiple-hop service.
building block	A fundamental unit of channel time used in determining time within a frame. Used in the assignment of channel resources.
burst	A time-limited transmission composed of a synchronization preamble and a finite-length data stream that are formatted into interleaver block pairs.
burst code	A combination of modulation rate, coding rate, and (for message services) maximum burst size.
burst rate	The over-the-air transmission rate (modulation rate) in symbols per second.
bus	The body of a satellite. The bus holds all of the scientific equipment and other necessary components of the satellite. The bus of a satellite is made of a variety of materials that are selected to protect the satellite from things like collisions, a build-up of electric charge, extreme temperatures, and radiation.
carrier	The basic radio, television, or telephony center of frequency transmit signal. The carrier in an analog signal is modulated by manipulating its amplitude (making it louder or softer) or its frequency (shifting it up or down) in relation to the incoming signal. Satellite carriers operating in the analog mode are usually frequency modulated.
carrier acquisition	The condition achieved when a receiver carrier reference is coherent in frequency and phase with the receive signal.
carrier frequency	The main frequency on which a voice, data, or video signal is sent. Microwave and SATCOM transmitters operate in the band from 1- to 14-gigahertz (GHz) (a GHz is one billion cycles per second).
carrier to noise ratio	The ratio of the received carrier power and the noise power in a given bandwidth, expressed in dB. This figure is directly related to G/T (antenna gain-to-noise temperature in dB/K) and signal/noise (S/N); and in a video signal the higher the C/N, the better the received picture.
cassegrain	The antenna principle that utilizes a sub-reflector at the focal point that reflects energy to or from a feed located at the apex of the main reflector.
channel	A frequency band in which a specific broadcast signal is transmitted. The Federal Communications Commission specifies channel frequencies in the United States.

channel control orderwire	The transmissions from a controller that control the waveform and its usage, such as frame number, encryption synchronization counts, user time-slot assignments, and frame format in current use.
channel control orderwire acquisition	The terminal's status when it has successfully achieved error free reception of a CCOW: Master Frame (checked by CRC).
channel control orderwire time-slot	The time-slot through which a terminal receives CCOW transmissions.
channel controller	A generic term that relates to either a primary or alternate controller.
channel resources	The available time, bandwidth, and power of a channel.
circuit burst kind	A field that identifies the type of burst being transmitted during a circuit service.
circuit number	A 5-digit decimal number that identifies a time-slot when operating in the DC mode.
circuit service	Channel resource assignments in each frame that are dedicated for use by participating members for duration of the assignment.
C/kT	The ratio of the rf carrier power (C) relative to noise power density. Carrier power is measured into the receiving system. k = Boltzman's constant and T = the effective noise temperature at the terminal antenna in kelvins.
coherent demodulation	A demodulation process characterized by a synchronized, phase-matched condition between a receiver's reference and the received signal.
connected	The configuration of a channel controller in which connectivity to adjacent satellite footprints by relay is available.
connectivity	The physical infrastructure required to allow access and exchange of electronic information.
contention-return orderwire time-slot	A ROW segment time-slot available for use by any terminal that has achieved downlink acquisition. The possibility exists that transmissions from multiple terminals occurs in the same time-slot.
continuous phase modulation	A phase-only modulation technique in which the signal phase changes are continuous. Phase changes for each symbol are odd integer multiples of the modulation indices hi. For multi-h CPM, the indices cyclically change from symbol to symbol in order to provide coding gain to the waveform.
control channel	A 25-kHz DAMA channel on which a channel controller (CC) transmits CCOW messages and the frame is segmented for terminals to transmit RCCOW, link test, ranging, and user communications signals.

control station	The equipment and software that performs resource management, channel control, and external interface functions in two adjacent satellite coverage areas.
controller	An entity that establishes frame format and system timing. In the AC mode a controller also assigns waveform access to users.
coronal mass ejection	A vast region of hot, dense, and high speed solar wind propagating away from the Sun.
cyclic redundancy check	A type of error detection scheme that uses parity bits generated by polynomial encoding and decoding algorithms to detect transit-generated errors.
data block	A quantity of user data (224 bits) used in integer multiples within message-service packets.
delay	The time it takes for a signal to go from the sending station through the satellite to the receiving station. This transmission delay for a single hop satellite connection is very close to one-quarter of a second.
Demand assigned multiple access	A highly efficient means of instantaneously assigning a channel in a transponder according to immediate traffic demands.
demand assigned single access	An access scheme in which a SATCOM channel is assigned for single access through the DAMA control system in accordance with demand.
destination terminal	The terminal addressee of a communication.
differential encoding	A process by which baseband digital data before modulation is used to resolve the phase ambiguity of digital data recovered from demodulation. It is not used for error detection or correction. A process such that if the prior code bit and the message bit are the same, the encoder output is zero. If they are different, the encoder output is a one.
differentially encoded quadrature phase-shift keying	Quadrature phase-shift keying (QPSK) that has been differentially encoded. DEQPSK is used to resolve the phase ambiguity of digital data recovered from demodulation. It is not used for error detection or correction.
digital	Conversion of information into bits of data for transmission through wire, fiber optic cable, satellite, or over the-air techniques. Method allows simultaneous transmission of voice, data or video.
digitization	Digitization comprises the nuts and bolts solution for synchronizing the vast amount of communications and sensor equipment on the battlefield. Digitization allows a plane to talk to a ship to talk to a soldier, etc.
distance learning	Using video technology to allow students in one location to

	participate in a class broadcast from another location.
distributed control	An operating mode in which a terminal's access to a communications slot is preassigned (both time-slot and frame format).
Doppler shift	An apparent shift in the frequency of a wave. For example, when someone is listening to the sound of an ambulance siren, and that person is staying still but the ambulance is driving by, the person hears a change in pitch of the ambulance siren. That change in pitch is caused by the "Doppler effect". The frequency of a sound wave determines the pitch, so the distance of the source of the sound from the observer of that sound determines the amount that the frequency seems to have shifted, known as the Doppler shift.
downlink	The satellite-to-earth half of a 2-way telecommunications satellite link. Often used to describe the receive dish end of the link.
downlink acquisition	Condition during initial acquisition of the waveform, when the terminal or a non-controlling CC receives a correct FOW burst.
dual spin	Spacecraft design whereby the main body of the satellite is spun to provide altitude stabilization, and the antenna assembly is despun by means of a motor and bearing system in order to continually direct the antenna earthward. This dual-spin configuration thus serves to create a spin-stabilized satellite.
eccentricity	The measure of how circular a satellite's orbit is. For a perfectly circular orbit the eccentricity is zero; elliptical orbits have eccentricities between zero and one. The higher the eccentricity, the more "squashed" the orbit is.
effective isotropic radiated power	This term describes the strength of the signal leaving the satellite antenna or the transmitting earth station antenna, and is used in determining the carrier/noise (C/N) and signal/noise (S/N). The transmit power value in units of decibels relative to 1 watt is expressed by the product of the transponder output power and the gain of the satellite transmit antenna.
encryption	To encode data so as to render a document unreadable by all except those who are authorized to have access to it. Encryption is accomplished by scrambling the bits, characters, words, or phrases in the original message.
energy per bit	The average signal energy contained in a binary digit.
even link test time-slot	A link test time-slot used to perform dedicated ranging measurements when the receive frame count is even.
field	A specific portion of a burst or message.
fill bits	Fill bits are used to complete the last interleaver block and must be zero.

flush bits	All-zero bits added to a data field prior to encoding to provide proper convolutional encoder operation.
footprint	The area with which a satellite in geostationary orbit can communicate. A footprint can be as large as an entire country; for example, many Canadian satellites have footprints almost the entire size of Canada, from coast to coast.
format	The structuring of a frame into time-slots for the transmission and reception of CCOW, RCCOW, ranging, link test, and user communications bursts.
format number 1	The frame structure in effect when subformat B-1 is selected. Used to reduce contention for half-duplex terminals [at radio frequency (rf)] that require communications on two 2400-bps circuits.
format number 2	The frame structure in effect when subformats B-00 or B-2 through B-F are selected.
forward error correction	Adds unique codes to the digital signal at the source so errors can be detected and corrected at the receiver.
forward orderwire	The OW used for transmitting control and status information from a PCC to terminals or alternate channel controller.
frame	A unit of time on the channel. (5-kHz DAMA) A frame is 8.96 seconds long and consists of 1024 building blocks, which are grouped into segments for waveform overhead and user-to-user communications. (25-kHz DAMA). A unit of time on a channel. A frame is 1.3866 seconds long and is subdivided into waveform overhead slots and user time segments.
frame count	The sequence in which a particular frame occurs. The frame count is defined by a 21-bit field transmitted by the controller in each master frame.
frame format	The frame time-slot configuration defined by the combination of frame subformats in use for user segments A, B, and C. Also refers to the 3-digit hexadecimal code used to specify this configuration.
frame lock	The status a terminal achieves when it has received and detected the precise location of two consecutive CCOWs. A terminal that achieves this status is considered to have properly established receive frame timing.
frame lock loss	The condition of a terminal that has not decoded any CCOW for 5 minutes for DC mode and 2 minutes for AC mode.
frame subformat	The time-slot configuration of user communications segments A, B, or C. Also refers to the 1-digit hexadecimal code used to specify this configuration.
frame time delay	Time delays introduced due to conversion of a continuous

	data stream into burst-formatted data blocks.
frequency code	An 8-bit code that defines the uplink and downlink frequency pair of a satellite transponder.
frequency-shift keying	A form of frequency modulation. In FSK modulation, the frequency of the carrier is discretely controlled by the transmitted information bits. In binary FSK, the instantaneous frequency of a signal is shifted between two discrete values called the mark and space frequencies.
frequency switched connection	A time-slot connection on a channel other than the one where the terminal receives CCOW.
frequency switching	The ability of a terminal to transmit and receive in multiple channels within the same frame.
frequency uncertainty	The difference between a received signal's expected frequency and its actual frequency. Frequency uncertainty results when (1) a difference in frequency between reference oscillators exists, (2) Doppler effects cause frequency shifts, or (3) frequency-setting inaccuracies occur.
full-duplex	(1) Communications that occur in both directions (transmit and receive) within one frame. (2) A terminal characteristic that signifies the capability to simultaneously receive and transmit rf signals.
gain	A measure of amplification. It is the ratio of output, current, voltage or power to input current, voltage or power, respectively. Gain is usually expressed in decibels. If the ratio is less than unity, the gain expressed in dB, is negative, in which case there is a loss between input and output.
geosynchronous	Refers to an orbit with a period equal to one day. A satellite in geosynchronous orbit above Earth's equator stays over the same point on Earth at all times. Communications satellites are often put in geosynchronous orbits so that satellite dishes on earth can remain pointed at the same point in the sky at all times.
global	A network configuration in which relays are present and data may be routed to a network on another satellite channel.
ground segment	A term that describes that portion of the total communications satellite system that is situated on the Earth such as the transmitting and receiving antennas, signal generating facilities, repeaters, RF receivers and digital encoding equipment and decoders.
guard group	A group of terminals that have a common guard address.
guard list	A set of addresses for which a terminal receives services.
guard time	Unused time interval within a frame that prevents overlap of transmissions that could occur due to timing differences

	between transmitting terminals.
half-duplex	A terminal characteristic that allows receipt and transmission of signals, but not both at the same time.
high power satellite	A satellite with greater than 100 watts of transponder radio frequency transmitting power.
home channel	The control channel that a terminal uses to receive its CCOW messages and transmit its RCCOW and other system support messages.
hyperspectral	An instrument capability using many very narrow spectral frequency bands (300 or more), enabling a satellite-based passive sensor to discriminate specific features or phenomena on the body being observed (e.g., Earth).
inclination angle	The angle between a satellite's orbital plane and the earth's equatorial plane.
indicator	A symbol, flag, or signal that serves to identify a specific state or item.
input/output data rate	The rate, in units of bps, at which bits are sent to or received from an I/O device.
Internet	Interconnection of thousands of networks linked by a common set of technical protocols which make it possible for users to communicate and use services.
interoperability	The ability to have applications and computers from different vendors work together on a network.
key generator identification number	A unique 16-bit ID number associated with the OW encryption/decryption device. The KG ID number is the same as the terminal base address.
key generator memory	A 3-bit code that defines one of eight memory locations in which the KG keys used for OW encryption and decryption are stored.
key generator net number	A 5-bit code used to prepare the KG, which encrypts the CCOW and RCCOW.
local area network	A group of computers and related equipment connected locally, usually within a single building, by a communications channel capable of sharing information among several users.
link test time-slot	A shared time-slot used by a terminal to evaluate its link conditions or measure two-way range to the satellite. A link test is performed only in odd-numbered frames; range measurements are performed only in even-numbered frames.
local	(1) Operations within a channel or group of channels in a single footprint controlled by one PCC. (2) Initiations by an equipment operator.
local footprint	The satellite coverage area of a PCC and the terminals operating under its control.

low power satellite	A satellite with less than 30 watts of transponder radio frequency transmitting power.
master frame	A frame occurring once in every eight frames that identifies the current waveform format and other configuration parameters.
master frame epoch	A set of eight contiguous frames, beginning with a master frame.
medium power satellite	A satellite with greater than 30 watts but less than 100 watts of transponder radio frequency transmitting power.
message service	A service that provides resources for transmitting messages, using a packet-oriented protocol.
modem	A telecommunications device that converts between analog and digital signals, allowing communication over voice circuits.
modernization	The replacement of equipment, weapons systems, and facilities in order to maintain or improve combat capability, upgrade facilities, or reduce operating costs.
modulation rate	The rate at which information is transferred across a satellite channel, in units of symbols per second.
modulo	A mathematical function that yields the remainder of a division.
multicast	Multicast is a subset of broadcast that extends the broadcast concept of one to many by allowing "the sending of one transmission to many users in a defined group, but not necessarily to all users in that group."
multi-h	A scheme that employs multiple modulation indices, or h values, that are cyclically changed for successive symbol intervals.
multiple-channel	The network capability of automatically switching from channel to channel within a single satellite footprint for transmit and receive services when commanded by the PCC.
multiple-hop	Operations that relay information between two or more satellite channels.
multiplexing	Techniques that allow a number of simultaneous transmissions over a single circuit.
narrowband operation	A communications mode whose essential spectral content is limited to a channel of nominal 5-kHz bandwidth.
net guard address	Address above the demarcation number that allows multiple terminals to communicate. Also called network address, guard address, subnet address, or guard list address.
node	A terminal or channel controller in a network.
noise power spectral density	The noise power per hertz (Hz) of bandwidth ($No = kT$)
noncoherent	A demodulation process in which there is no synchronized

demodulation	phase-matched condition between a receiver's reference and the desired signal.
nonprocessed channel	A channel capable only of receiving, amplifying, filtering, limiting, frequency translating, and retransmitting a received signal. (There is no signal processing.)
nonregenerative transponder	A transponder (e.g., a satellite repeater) in which digital signals are not reconstituted.
Northern Lights	A name for the aurora occurring over the North Pole.
offset quadrature phase-shift keying	A form of offset quadrature phase-shift keying in which the in-phase (I) and quadrature bit streams are offset in time by one-half a symbol period, equal to the reciprocal of the data rate.
operator	The person who controls and operates a communications terminal or controller.
orbit	The path of an object that is moving around a second object or point.
orderwire	The portion of the DAMA (or TDMA) frame used for transmission of management, control, and status information among the channel controllers and terminal users.
originator	A person or terminal that initiates a communication.
packet	For message service, the information transmitted in one burst.
pad bits	Pad bits are used both before and following user data when insufficient user data is present to fill the data portion of a burst.
passive ranging	A process by which a terminal determines signal propagation time to a satellite by means other than transmitting a ranging signal.
pending service	A queued service that is not blocked but is awaiting availability of communications resources on the channel.
perigee	Low point of an orbit.
polarization	The property that describes the orientation of an electromagnetic wave.
polar orbit	A satellite orbit passing over both poles of the Earth. During a 12-hour day, a satellite in such an orbit can observe all points on Earth.

preamble	Consists of a carrier segment modulated by a predetermined signal used for acquisition. The preamble may also include an unmodulated segment, immediately preceding the modulated carrier segment, which is used by the receiver during carrier acquisition. The carrier segment modulated by a predetermined bit pattern is used by the demodulator for bit synchronization. The preamble bit pattern immediately precedes, and is phase-locked to, transmitted baseband data
preassigned service	A type of service whose channel or time-slot allocation is scheduled and set up well in advance of being used.
preempted service	A service that has been interrupted to allow for higher-precedence network activities.
primary channel controller	The control station function that actively controls the DAMA channel.
quadrature phase-shift keying	A form of PSK in which the instantaneous phase of the carrier can be either unchanged, shifted ±90 degrees, or shifted 180 degrees. QPSK may be represented as two independent binary bit streams modulated onto the in phase (I) and quadrature phase components of the carrier. The information content of a QPSK signal is 2 binary digits (bits) per symbol; therefore, the symbol rate is one-half the information rate.
queued service	A service in the request queue at the PCC waiting to be assigned communications resources. Queued services are either blocked or pending.
range	The round-trip distance between a satellite and a terminal within the satellite footprint. (Because signal propagation velocity is constant, terminals measure range in units of time.)
range lock	The status a terminal achieves when it has determined its range time delay with an uncertainty of less than or equal to 875-microseconds (Fs). [Terminal transmissions are inhibited (except for active ranging transmissions) until the terminal achieves this status.]
range time-slot	A shared slot used to measure two-way range to the satellite.
ranging	A process by which a terminal determines signal propagation time to a satellite to establish uplink timing.
ranging epoch interval	The interval between scheduled dedicated ranging attempts by a terminal.
relay	A method of communications in which data is passed from one DAMA channel to another to achieve greater connectivity than that which is provided by the one channel.
requested party	The address to which a call is placed.

requesting party	The address of the I/O port initiating a call.
return channel control orderwire	A TDMA slot used by the terminals to (1) request, from the channel controller, access to the waveform; (2) respond to channel controller requests with information such as status and configuration; and (3) transfer computer data to other terminals.
return orderwire	The OW used to transmit control and status information from network terminals to the channel controller and perform system support functions, including ranging.
satellite	A body that revolves around a larger body.
satellite footprint	The area of the earth's surface from which terminals are able to access a particular satellite.
segment	A portion of a frame allocated to users for communicating. The segment is further divided into time periods called time-slots.
service	A specified set of information-transfer capabilities provided to a group of users by the DAMA system.
shaped binary phase-shift keying	A form of BPSK modified to produce the phase-shift over a period of time. For example, in 50 percent shaped binary phase-shift keying, the phase-shift occurs over a period of time equal to one-half a bit period.
shaped offset quadrature phase-shift keying	A form of offset quadrature phase-shift keying modified to produce phase-shift over a period of time. For example, in 50-percent shaped offset quadrature phase-shift keying, the phase-shift occurs over a period of time equal to one-half a bit period.
slant range	The one-way distance between a satellite and a terminal within the satellite's footprint. (Because signal propagation velocity is constant, terminals measure range in units of time.)
slave channel	A DAMA channel (5- or 25-kHz) used only for user communications and not for reception or transmission of OW or system support messages. Channel timing is derived from synchronization with the CCOW on the control channel.
slot connect	A connection between a terminal's I/O port(s) and a communications slot in a TDMA frame.
slot number	A 5-bit code that identifies a time-slot when operating in the AC mode.
solar flare	An explosive release, marked by a sudden brightening near a sunspot or prominence, of electromagnetic radiation and huge quantities of charged particles from a small area of the solar surface.
solar wind	A stream of particles accelerated by the heat of the solar corona (outer region of the sun) to velocities great enough to

permit them to escape from the Sun's gravitational field.

source terminal The terminal from which information is considered to originate.

space weather The conditions and processes occurring in space that have the potential to affect the near Earth environment. Space Weather processes can include changes in the interplanetary magnetic field, coronal mass ejections from the sun, and disturbances in the Earth's magnetic field. The effects can range from damage to satellites to disruption of power grids on Earth.

special frame format A frame format in which one or more of a terminal's subformats may differ from the frame format indicated in the master frame.

spectrum The range of electromagnetic radio frequencies used in transmission of voice, data and television.

spot beam A focused antenna pattern sent to a limited geographical area. Spot beams are used by domestic satellites to deliver certain transponder signals to geographically well-defined areas such as Hawaii, Alaska, and Puerto Rico.

spread spectrum The transmission of a signal using a much wider bandwidth and power than would normally be required. Spread spectrum also involves the use of narrower signals that are frequency-hopped through various parts of the transponder. Both techniques produce low levels of interference between the users. They also provide security in that the signals appear as though they were random noise to unauthorized earth stations.

subformat See frame subformat.

subnet A group of terminals with a need for common communications that share a common address.

symbols per second The unit of measure of the modulation rate. The modulation rate in symbols per second is calculated by dividing the bit rate, after forward error correction, by the number of bits per symbol.

synchronization A deliberate attempt to determine what aspects of unit processes are hindering the flow of information and order; figuring out the bottlenecks and then coming up with better ways.

system support slots Those portions of a control channel allocated for terminals to perform link test and ranging operations.

teardown Termination of an established communication.

telemetry Radio signals from a spacecraft used to encode and transmit data to a ground station.

telemetry, tracking, and Telemetry, Tracking, and Control refers to the brain of a satellite and its operating system. Telemetry, Tracking, and

control	Control is the satellite's method for storing and analyzing the data it collects, and controlling its various systems. It also logs every activity of the satellite, receives information from the ground station, and takes care of any general upkeep, or "housekeeping", the satellite needs to do.
terminal	Equipment designed to receive and transmit voice or data information using the frequencies, modulations, data rates, access protocols, eirp, and sensitivity needed to establish and sustain voice or data communications over a satellite channel. A terminal may include internal or external voice or data encryption devices, or both.
terminal base address	The address of the lowest numbered I/O port attached to a terminal.
time chip	One cycle of a 19,200-Hz oscillator (approximately 52-microseconds).
time-slot	A fraction of a TDMA frame allocated for a specific control function (FOW and ROW) (CCOW, RCCOW, Range, and Link Test) or user communications.
transformation	(Regarding Army future change) The evolution and deployment of combat capabilities that provide revolutionary or asymmetric advantages to our forces.
transmission mode	A terminal configuration (such as modulation rate or I/O rate) specified by the channel controller for a specific transmission.
transmitter turn-on time	The time interval between baseband equipment key down and the time at which the transmitter has stabilized to within 90 percent of steady-state transmit power and 20-Hz of the steady-state transmit center frequency
transponder	An instrument used on communications satellites that receives a signal from a station on Earth at one frequency, amplifies it, and shifts it to a new frequency.
uplink	The earth station used to transmit signals to a satellite
uplink acquisition	The status attained by a terminal or an alternate channel control (1) after downlink acquisition is successful, and (2) upon correct reception of a ranging burst or determination of round-trip propagation time to the satellite by some other means. Uplink acquisition is lost if round-trip propagation time to the satellite is not known to within 12.604-millisecond.
user time-slot	A fraction of the waveform frame that carries user-to-user communications (such as encryption preambles, independent network protocols, and encrypted data).
Van Allen radiation belts	Bands of radiation trapped in Earth's magnetic field. These bands absorb ambient deep-space radiation and provide protection for Earth's surface. They are hazardous for satellites and humans operating within them.

waveform   The combination of baseband signal structure, rf signal structure, and communications protocols that provides a framework within which coordinated communications can be effected.

wide area network   A long distance computer network that enables users to share information across large geographical distances; a WAN may connect a number of LANs at different sites.

wideband operation   A communications mode whose essential spectral content is limited to a nominal 25-kHz channel bandwidth.

x-band   A portion of the RF spectrum located between 7.25-GHz and 8.4-GHz that is dedicated to the United States Military for SATCOM.

zulu   Time zone indicator for Universal Time.

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