DEPARTMENT OF THE AIR FORCE
Headquarters US Air Force
Washington DC 20330-5000

Air Force Job Qualification
Standard 492X1-212F
22 JULY 1992

AFSATCOM CGT OPERATIONS
(Communications Systems Radio Operator/Supervisor)

SECTION A: GENERAL

1. This Air Force Job Qualification Standard (AFJQS) and attached Qualification Training Package (QTP) standardize on-the-job training (OJT) tasks and constitute an approved training program for performing AFSATCOM Consolidated Ground Terminal (CGT) Operations. The AFJQS and QTP are used by unit training managers, supervisors, trainers, trainees, and other training functions to plan, conduct, and document OJT on this function.

2. Maintain the AFJQS IAW AFR 50-23 and AFR 50-65. Routine changes will be accomplished via page changes and urgent changes will be disseminated via message. Enter additional local tasks in the blank areas on the AFJQS or add forms. Develop Task Training Guides for added tasks; they should be consistent in content and format with those in the QTP. Submit recommended AFJQS/QTP improvements/corrections to the 81 TRSS/TSQS, 601 D Street, Keesler AFB, MS 39534-2229.

3. Review Air Force publishing bulletins and AFR 0-8 to identify available training materials. Use this AFJQS in conjunction with other applicable JQSs or the Specialty Training Standard (STS) and locally-assigned tasks to identify work center duty positions. Also, use this AFJQS along with other applicable JQSs and the STS to evaluate newly assigned personnel and identify individual training requirements.

4. Tasks listed on the AFJQS have been selected IAW the Instructional System Development (ISD) process and are the minimum, mandatory AF training requirements for this function. An asterisk (*) preceding a task statement indicates it may not be common to all equipment functions and training may be deferred if not applicable. Rationale for this deferment should be documented in the work center training plan.

5. Trainees must accurately perform each assigned task unassisted IAW Technical References (TRs) prior to being certified. To qualify for skill-level upgrade, trainees must be certified on assigned tasks, satisfactorily complete career knowledge training, and meet mandatory specialty qualifications IAW AFRs 35-1 and 39-1. After upgrade, assign individuals to other work center duty positions and continue qualification training.

_____
Supersedes QTP 492X1-212F, dated 18 Dec 89
OPR: HQ USAF/SCXB
OCR: 81 TRSS/TSQO
DISTRIBUTION: F

SECTION B: DOCUMENTATION

1. AFJQS/STS tasks will be compiled in an automated training management system, such as the Core Automated Maintenance System (CAMS), if available. The system must contain each AFJQS/STS title line with appropriate AFJQS/STS numbers, titles, and dates. AFJQS/STS and automated documentation requirements are listed below.

a. Load applicable tasks in the automated training system or identify training requirements by circling the task numbers on each individual's AFJQS/STS.

b. If task statements contain more than one noun or action verb which precludes certification on the entire task, load/circle the noun or verb to indicate the individual is being trained only on that portion of the task.

c. When training is started on a task, enter the start date in the appropriate place. When training is complete, the supervisor and trainee accomplish certification by changing the automated code or by initialing the appropriate blocks and entering the date completed.

2. The identification blocks listed below are to be used when the trainer is other than the trainee's immediate supervisor.

TRAINEE'S NAME	INITIALS	SSN
TRAINER'S NAME, INITIALS, DATE:		
TRAINER'S NAME, INITIALS, DATE:		
TRAINER'S NAME, INITIALS, DATE:		
TRAINER'S NAME, INITIALS, DATE:		

BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL
USAF

MERRILL A. McPEAK, General,

Chief of Staff

EDWARD A. PARDINI, Colonel, USAF
Director of Information Management

5 Atch
1. AFJQS
2. Trainer's Guide
3. Skill Training Material
4. Knowledge Evaluation Pamphlet
5. Diagrams Book

JOB QUALIFICATION STANDARD CONTINUATION/COMMAND JQS

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	CERTIFICATION							
	CORE TASK	START DATE	CERTIFYING OFFICIAL'S INITIALS	TRAINEE'S INITIALS	MAJCOM DIRECTED USE ONLY	AETC		COMPLETION
1. Load Message Storage Area TR: 31R5-2GSC-111-2, para 5-160 thru 5-162; CCSOM 171-4, para 3.5.1; and local procedures								
2. Transmit Messages TR: 31R5-2GSC-111-2, para 5-159 thru 5-162; CCSOM 171-4, para 2.5, 2.6, and 3.5.2; and local procedures								
3. Receive Messages TR: Local procedures								
4. Configure CGT for NB/OW Operations TR: Local procedures								
5. Configure CGT for WB Operations TR: Local procedures								
6. Load Key Generator TR: KAO-137E/TSEC								
7. Load CGT Software TR: 31R5-2GSC-111-1, Table 4-50; CCSOM 171-4, para 2.4 and 3.3; and local procedures								
8. Power Down Equipment TR: 31R5-2GSC-111-1, Table 3-6; and local procedures								
9. Power Up Equipment TR: 31R5-2GSC-111-1, Table 3-2; And local procedures								
10. SYNCHRONIZED OPERATIONS								

Trainee's Name

JQS NUMBER 492x1-212F

AF Form 797, MAY 87 PREVIOUS EDITION IS OBSOLETE. EXCEPTION APPROVED BY: SAFAA/DPS, 30 OCT 87

JOB QUALIFICATION STANDARD CONTINUATION/COMMAND JQS

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	CERTIFICATION							
	CORE TASK	START DATE	CERTIFYING OFFICIAL'S INITIALS	TRAINEE'S INITIALS	MAJCOM DIRECTED USE ONLY	AETC		COMPLETION
a. Prepare System for Random Mode TR: 31R5-2GSC-111-1, Table 4-64; and local procedures								
b. Prepare System for TDM 1 Mode TR: 31R5-2GSC-111-1, Table 4-65; and local procedures								
c. Prepare System for TDM 2 Mode TR: 31R5-2GSC-111-1, Table 4-66; MITRE, Chap 5.15; and local procedures								
d. Transfer Control of TDM Net TR: 31R5-2GSC-111-1, Tables 4-68 thru 4-71; OPS Plan; and local procedures								
11. Dump Memory TR: CCSOM 171-4, para 3.8; and local procedures								
12. Configure Remote Subsystem TR: Local procedures								

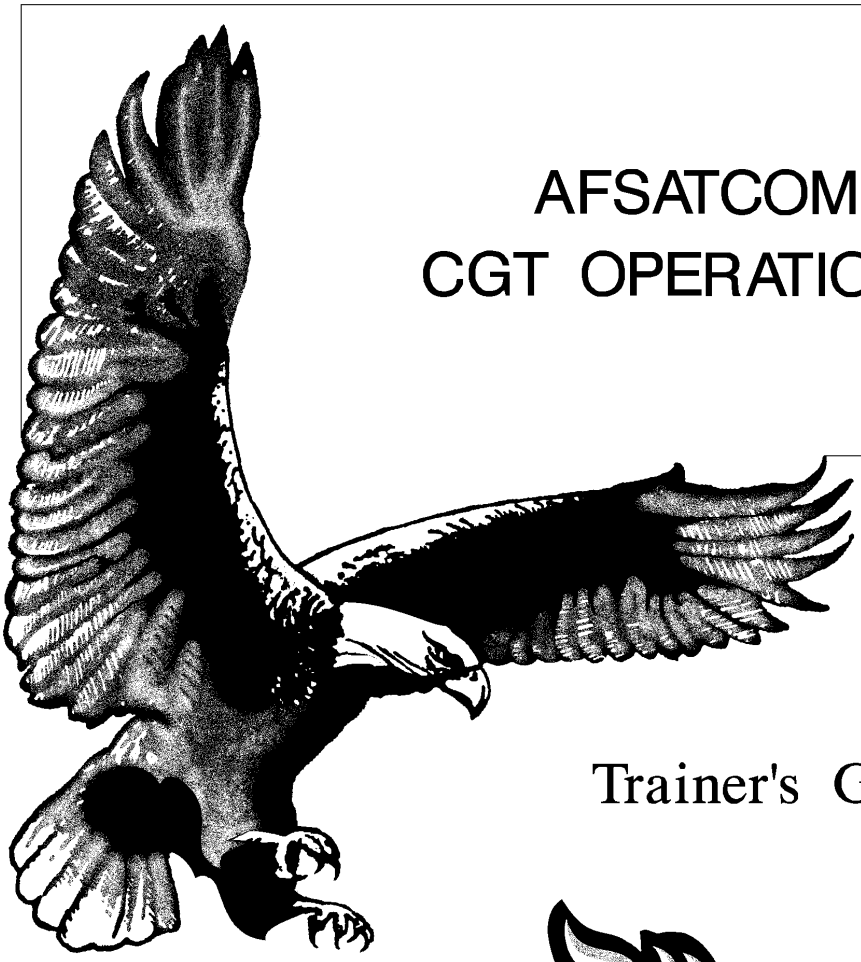
Trainee's Name

JQS NUMBER 492X1-212F

PAGE NO 2

QUALIFICATION TRAINING PACKAGE

QTP 492X1-212F



AFSATCOM
CGT OPERATIONS

Trainer's Guide

SUPERSEDES QTP 492X1-212F,
DATED 18 DECEMBER 1989

FOR OFFICIAL USE ONLY

TABLE OF CONTENTS

LIST OF ATTACHMENTS

INTRODUCTION

This qualification training package (QTP) was developed to enhance on-the-job training for the personnel performing AFSATCOM CGT Operations. It provides you, the trainer, the tools you need to rapidly train your people to a high degree of proficiency. It can also aid evaluators in performing well-rounded personnel evaluations. You'll find this QTP is a valuable tool that gives you and the people you train long-term dividends.

The goal of the 81st Training Support Squadron is to publish accurate training material beneficial to trainers and trainees. The value of your expertise in meeting this goal cannot be overstated. We ask you to assist us in meeting this goal. If you find discrepancies in this QTP or have suggestions for its improvement, we want to know about them. Use the Trainer Survey located at the back of this Trainer's Guide. Don't be shy in presenting your suggestions or telling us we made an error. In return, we pledge to provide you an answer and to devote our resources to providing you the best possible training material.

QUALIFICATION TRAINING FLIGHT
81st TRAINING SUPPORT SQUADRON
601 D STREET
KEESLER AIR FORCE BASE, MS 39534-2229

ABOUT THIS QTP

This QTP was developed using Instructional System Development (ISD) concepts by SSgt Stephen J. Pederson. Mr. George McGrevey was the Training and Education Specialist. This QTP was field tested and validated by the 33 CG, March AFB, CA; 1962 CG, Kadena AB, Japan; 390 COSQ, Offutt AFB, NE; and HQ SCD, Offutt AFB, NE.

OBJECTIVES. This QTP was developed with four objectives in mind.

1. To standardize on-the-job training.

2. To reduce training time while maintaining proficiency standards.

3. To provide trainers and trainees with a logically organized training plan which yields immediate and measurable feedback.

4. To provide a standard to measure task knowledge and performance during personnel evaluations.

APPLICATION. This QTP provides the trainee logical, step-by-step modules (lessons) covering task knowledge and the practical application of AFSATCOM CGT Operations procedures. It permits the trainee to gain the required knowledge prior to demonstrating task proficiency. It also provides you a standardized training plan and a Knowledge Evaluation Pamphlet (KEP) for measuring the trainee's progress. Since the KEP provides excellent criteria for measuring task knowledge, it can also be used by task evaluators during personnel evaluations. This training material applies to personnel in upgrade and/or qualification training.

QTP CONTENTS

This QTP consists of an Air Force Job Qualification Standard, Trainer's Guide, a Skill Training Material Volume, a Diagrams book, and Knowledge Evaluation Pamphlet. Carefully inventory the QTP to ensure all parts have been received. Please advise us immediately if portions of the QTP are missing. The purpose and content of the QTP documents are explained below.

CAUTION

This package is NOT intended to replace the applicable technical references. It is to be used in conjunction with these for training purposes only.

AIR FORCE JOB QUALIFICATION STANDARD (AFJQS). The AFJQS is a listing of all tasks performed on the AFSATCOM CGT that require structured training and certification. Use and maintain the AFJQS IAW applicable Air Force directives.

TRAINER'S GUIDE (TG). The TG provides you, the trainer, the tools and information you need to effectively conduct on-the-job training using this QTP.

Task Training Guides (TTG). Attachment 2 contains a series of TTGs. Every task identified on the AFJQS is covered on a TTG. TTGs provide you a detailed sequence of actions which must be followed to conduct effective on-the-job training and meet minimum requirements for task certification. TTGs identify all the material required to train the task and any prerequisite training required before task training can begin. Each TTG also contains a Task Evaluation Checklist. These checklists aid you in measuring the trainee's ability to successfully perform the task. Task

Evaluation Checklists reflect the major areas of a task which must be performed satisfactorily before certification.

SKILL TRAINING MATERIAL (STM) VOLUME. The STM contains instructions on what the trainee is responsible for during the course of completing this QTP. The STM also contains training modules, review questions, a review question confirmation key, and performance procedures.

QTP Module. Each QTP module provides information and guidance to the trainee concerning the task being trained. The module may present the required information or it may make specific reading assignments to the trainee. Each module contains review questions the trainee must answer.

Review Questions. Review questions measure the trainee's attainment of the knowledge associated with the training objective(s). Review questions are open-book.

Review Question Confirmation Key. A review question confirmation key is in the back of the STM. It is used by the trainee to verify the review question answers are correct. It provides immediate feedback to the trainee to reinforce learning.

Performance Procedures. Modules which contain criterion-based training objectives also include performance procedures the trainee must complete. These procedures specify, to the trainee, the conditions under which the task is performed, requirements of the procedure(s), and the standard of performance which must be met. They are performed in conjunction with the Task Evaluation Checklist.

DIAGRAMS BOOK (DB). The Diagrams book contains schematic drawings, forms, flowcharts, illustrations, and other training aids the trainee may need during completion of this QTP.

KNOWLEDGE EVALUATION PAMPHLET (KEP). The KEP contains a test for each module. KEP questions are administered and checked by a trainer. Separate the KEP from the rest of the QTP and detach the KEP Key and Answer Sheet(s). Store the KEP and KEP Key in a secure place. Failure to do so compromises the KEP. The results of the KEP tests provide you immediate feedback as to how well the trainee understands the information.

DEVELOPING INDIVIDUAL TRAINING PLANS

For training to be effective, carefully plan what you want the trainee to do. Use the following steps to plan training.

1. Determine your work center's needs to assure 100% task coverage. Develop a work center Master Task List (MTL) IAW applicable directives. QTP 750X0-30A (new CAMS number 750X0-215G), ISD for OJT, provides you detailed guidance on MTL and work center training program development.

2. Review the trainee's training record and determine the trainee's previous training and certification. AF Form 623, On-the-Job Training Record, provides this information for each military member. You must question or evaluate the trainee to determine current proficiency levels.

3. Assign the trainee to a duty position. The duty position is a series of work center tasks the trainee is responsible to perform after training is completed. When making this assignment, you must first consider the work center's needs and then the needs of the trainee. After the trainee completes the training requirements of the initial duty position, assign additional duty positions and conduct the necessary training for each. Keep in mind that the

objective of training is to produce a 100% qualified technician.

4. Develop the trainee's training plan outlining which tasks are to be trained and when the training takes place. You can use a General Purpose form (such as the AF Form 3126) or create a computer generated Individual Training Plan for this purpose. (See Attachment A1-1.)

5. Interview the trainee. Discuss with the trainee the initial duty or expanded duty position and training program.

6. Should circumstances dictate a change in duty position, or in training schedule, discuss this with the trainee and annotate the trainee's training record, AF Form 623a. On the Individual Training Plan, annotate the remarks area.

CONDUCTING OJT USING THIS QTP

1. Explain the QTP to the trainee and how it is used to conduct training. If the trainee is enrolled in upgrade training (UGT), explain any CDC requirements which may apply and the trainee's UGT responsibilities.

NOTE

Trainees in UGT must use this QTP to satisfy the performance criteria for each task selected for training.

2. Using the trainee's Individual Training Plan, select the first task for training and review the applicable TTG. Ensure all training material and references are available. Assure that the trainee is qualified on all prerequisites for this task.

3. Discuss with the trainee the task objective(s) and training steps listed on the appropriate TTG. Assign the corresponding STM module for the trainee to complete.

4. Verify the trainee completed the review questions. Answer any questions the trainee may have. The trainee may use the QTP modules and technical references (TRs) to answer the review questions.

5. When you and the trainee are satisfied with the trainee's knowledge of the material, administer the module KEP Questions. The trainee may NOT refer to the QTP modules when answering the KEP questions. Normally, the trainee is not permitted to use TRs when taking a KEP test. If use of TRs is permitted, it will be stated in the STM and at the beginning of each KEP test. If TR use is permitted (open-book test), a score of 100% is required. If the use of TRs is not permitted, the trainee must score a minimum of 70% on the KEP tests. Check the trainee's KEP answers against the KEP Confirmation Key. Review missed KEP questions with the trainee to ensure understanding of the material. If the score is less than what is required, have the trainee restudy the module and retake the KEP.

6. Using the technical reference(s) and Task Evaluation Checklist as guidance, explain the task performance procedures to the trainee.

7. Demonstrate the task procedures to the trainee. Answer any questions the trainee has.

8. Have the trainee practice and explain the task procedures to you. Correct any errors the trainee may make.

9. Have the trainee perform the task procedures unassisted. Using the Task Evaluation Checklist, evaluate

the trainee's performance. Should the trainee fail the evaluation, determine the cause of unsatisfactory performance. If the cause is a lack of knowledge, the trainee may have to retake the module. If the cause is a lack of trainee's skill, demonstrate the task again. Have the trainee practice the task under your supervision. When you and the trainee are satisfied that the task can be performed unassisted, reevaluate the trainee.

10. When the trainee performs the task at the desired level of proficiency without assistance, document training and task certification as outlined in the AFJQS cover letter.

11. Using the Individual Training Plan, assign additional tasks until the trainee completes the requirements for the duty position.

12. Expand the trainee's duty position, if possible, by adding more tasks to the Individual Training Plan. Training continues until the trainee is 100% work center task qualified or is reassigned.

NOTE

Should the trainee not complete the QTP before being reassigned to another location which has this equipment, we recommend you retrieve the training material from the trainee and forward it to the gaining work center.

13. Schedule periodic evaluations after the trainee is task certified. We recommend you use the performance procedures and Task Evaluation Checklists to conduct these evaluations. The KEP developed for this QTP may also be used to measure the trainee's knowledge of the tasks.

14. When you are satisfied that the trainee has completed all of the requirements for this QTP, remove Attachment A4-1, Training Certification document, from the back of this TG and process it as follows:

a. Have the work center supervisor or designated person certify QTP completion on the document.

b. Attach the Trainee and Trainer Surveys and KEP answer sheets to the document.

c. Forward the document to the commander or designated representative for concurrence/nonconcurrence.

d. Mail the completed document to the address specified.

e. Upon receipt of a properly completed certification document, the 81 TRSS/TSQS will forward a Certificate of Training through channels to the trainee.

STORING MESSAGES
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 1

2. ESTIMATED TASK TRAINING TIME:_____

3. TRAINING REFERENCES:

   a. CCSOM 171-4

   b. TO 31R5-2GSC-111-1

   c. TO 31R5-2GSC-111-2

   d. TO 31R2-4-481-1

   e. QTP Modules 1 and 2

4. REQUIREMENTS:

   Tell trainee which ASR will be used for the test.

5. TRAINING OBJECTIVES:

   a. Given an AN/UGC-120B (ASR) in receive mode; a test message; TO 31R5-2GSC-111-2, para 5-160 thru 5-162; CCSOM 171-4, para 3.5.1; and local procedures, load a message into a buffer IAW prescribed procedures.

   b. Given an AN/UGC-120B (ASR) in receive mode; a test message; TO 31R5-2GSC-111-2, para 5-160 thru 5-162; and local procedures, load a message into a bin IAW prescribed procedures.

   c. Given an AN/UGC-120B (ASR) in receive mode; a test message; TO 31R5-2GSC-111-2, para 5-160 thru 5-162; and local procedures, load a message into working memory IAW prescribed procedures.

   d. Given an ASR in receive mode, a test message in a bin, and local procedures, transfer a message from a bin to a buffer IAW prescribed procedures.

   e. Given an ASR in receive mode, local procedures, and an incorrect message in working memory, correct the message.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Assign QTP Module 1.

___ b. Discuss the review questions and answers with the trainee.

___ c. Administer the KEP.

___ d. Check the KEP answers and review missed questions.

___ e. Discuss the objectives for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed.

___ f. Assign QTP Module 2.

___ g. Discuss the review questions and answers with the trainee.

___ h. Administer the KEP.

___ i. Check the KEP answers and review missed questions.

7. OBJECTIVE 5a TRAINING STEPS:

___ a. Using the technical references and checklist in para 12a, steps (1) thru (4), as guidance, discuss the task steps for achieving objective 5a with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives. Tell the trainee which ASR will be used for message composition.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

8. OBJECTIVE 5b TRAINING STEPS:

___ a. Using the technical references and checklist in para 12a, steps (5) thru (8), as guidance, discuss the task steps for achieving objective 5b with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives. Tell the trainee which ASR will be used for message composition.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

9. OBJECTIVE 5c TRAINING STEPS:

___ a. Using the technical references and checklist in para 12a, steps (9) thru (12), as guidance, discuss the task steps for achieving objective 5c with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives. Tell the trainee which ASR will be used for message composition.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

10. OBJECTIVE 5d TRAINING STEPS:

___ a. Using local procedures and checklist in para 12a, steps (13) thru (15), as guidance, discuss the task steps for achieving objective 5d with trainee.

___ (1) Tell the trainee which ASR will be used for transferring the message.

___ (2) Tell the trainee which bin the message is located in.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

11. OBJECTIVE 5e TRAINING STEPS:

___ a. Using local procedures and checklist in para 12a, steps (16) thru (19), as guidance, discuss the task steps for achieving objective 5e with trainee.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

12. TASK EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return

to step 7a, 8a, 9a, 10a, or 11a, as applicable, if evaluation is unsatisfactory.)

___ (1) Routed ASR to buffer.

___ (2) Entered COMP/EDIT.

___ (3) Composed message.

___ (4) Transmitted message to buffer.

___ (5) Placed ASR in expanded memory.

___ (6) Selected bin.

___ (7) Entered COMP/EDIT.

___ (8) Composed message.

___ (9) Selected adequate memory amount.

___ (10) Cleared memory.

___ (11) Entered COMP/EDIT.

___ (12) Composed message.

___ (13) Routed ASR to buffer.

___ (14) Depressed AUTO/XMIT key.

___ (15) Selectedbin message was located in.

___ (16) Depressed VERIFY key when message wasincorrect.

___ (17) Edited message.

___ (18) Depressed VERIFY key.

___ (19) Found all errors in message.

___ b. Certify the trainee on JQS task 1 and assign the next task.

SENDING MESSAGES
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 2

2. ESTIMATED TASK TRAINING TIME:_____

3. TRAINING REFERENCES:

a. CCSOM 171-4

b. TO 31R2-4-481-1

c. TO 31R5-2GSC-111-2

d. QTP Module 3

4. REQUIREMENTS:

a. Tell trainee which storage spaces contain the messages to be transmited, which KG to use, and which radio modem will be used.

b. Ensure trainee has completed QTP Modules 1 and 2.

5. TRAINING OBJECTIVES:

a. Given a configured CGT; a loaded KG; a classified message in a bin; TO 31R5-2GSC-111-2, para 5-159 thru 5-162; CCSOM 171-4, para 2.5 and 2.6; and local procedures, transmit a classified message IAW prescribed procedures.

b. Given a configured CGT; a message in working memory; TO 31R5-2GSC-111-2, para 5-159 thru 5-162; CCSOM 171-4, para 2.5 and 2.6; andlocal procedures, transmit a message IAW prescribed procedures.

c. Given a configured CGT; a message in a buffer; TO 31R5-2GSC-111-2, para 5-159 thru 5-162; CCSOM 171-4, para 2.5, 2.6, and 3.5.2; and local procedures, transmit a message IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objectives for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed.

___ b. Assign QTP Module 3.

___ c. Discuss the review questions and answers with the trainee.

___ d. Administer the KEP.

___ e. Check the KEP answers and review missed questions.

7. OBJECTIVE 5a TRAINING STEPS:

___ a. Using the technical references and checklist in para 10a, steps (1) thru (4), as guidance, discuss the task steps for achieving objective 5a with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives. Tell the trainee which bin the message is in, which ASR to use, and which radio will be used for message transmission.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

8. OBJECTIVE 5b TRAINING STEPS:

___ a. Using the technical references and checklist in para 10a, steps (5) thru (7), as guidance, discuss the task steps for achieving objective 5b with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives. Tell the trainee which ASR to use and which radio will be used for message transmission.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

9. OBJECTIVE 5c TRAINING STEPS:

___ a. Using the technical references and checklist in para 10a, step (8), as guidance, discuss the task steps for achieving objective 5c with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives. Tell the trainee which buffer the message is in, which ASR to use, and which radio will be used for message transmission.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

10. TASK EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to step 7a, 8a, or 9a, as applicable, if evaluation is unsatisfactory.)

___ (1) Routed ASR through KG to radio modem.

___ (2) Placed ASR in expanded memory.

___ (3) Pressed AUTO/TX key.

___ (4) Selected bin message is located in.

___ (5) Routed ASR to radio modem.

___ (6) Placed ASR in working memory.

___ (7) Pressed AUTO/TX key.

___ (8) Routed buffer to radio modem.

___ b. Certify the trainee on JQS task 2 and assign the next task.

RECEIVING MESSAGES
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 3

2. ESTIMATED TASK TRAINING TIME:_____

3. TRAINING REFERENCES:

a. SAC OPORD 5-FY

b. AFCC/SACR 700-20, Vol 1

c. TO 31R5-2GSC-111-2

d. Local OIs

e. QTP Module 4

4. REQUIREMENTS:

Ensure trainee has completed QTP Modules 1 thru 3.

5. TRAINING OBJECTIVE:

Given a CGT configured for normal operations and local OIs, receive messages IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objective for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed.

___ b. Assign QTP Module 4.

___ c. Discuss the review questions and answers with the trainee.

___ d. Administer the KEP.

___ e. Check the KEP answers and review missed questions.

7. OBJECTIVE TRAINING STEPS:

a. Using local OIs and checklist in para 8a as guidance, discuss the task steps for achieving the objective with trainee.

___ (1) Tell trainee which message will be received.

___ (2) Teach trainee local procedures for receiving messages.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

8. TASK EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to step 7a if evaluation is unsatisfactory.)

___ (1) Recognized when a message is being received.

___ (2) Turned off EAM alarm, if required.

___ (3) Performed local procedures for received message.

___ b. Certify the trainee on JQS task 3 and assign the next task.

NARROWBAND(NB)/ORDERWIRE(OW) CONFIGURATION
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 4

2. ESTIMATED TASK TRAINING TIME:_____

3. TRAINING REFERENCES:

a. TO 31R5-2GSC-111-2

b. QTP Module 5

4. REQUIREMENTS:

Ensure trainee has completed QTP Modules 1 thru 4.

5. TRAINING OBJECTIVE:

Given a CGT, frequencies to be used, local procedures,and satellite positioning information, configure system for NB/OW operations IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objective for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed.

___ b. Assign QTP Module 5.

___ c. Discuss the review questions and answers with the trainee.

___ d. Administer the KEP.

___ e. Check the KEP answers and review missed questions.

7. OBJECTIVE TRAINING STEPS:

a. Using local procedures and the checklist in para 8a as guidance, discuss the task steps for achieving the objective with trainee.

___ (1) Tell trainee which channels and satellite plans will be used.

___ (2) Tell trainee where to position the antenna.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

8. TASK EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to step 7a if evaluation is unsatisfactory.)

___ (1) Selected the correct satellite plan.

___ (2) Correctly inputted the alternate frequency, if utilized, and placed the selector switch on the satellite RT control in the correct position.

___ (3) Dialed in the correct receive and transmit channels to be used on the modem control.

___ (4) Placed the Mode switch in the correct radio position for the radio being tested.

___ (5) Placed modem being tested in an RF loop.

___ (6) Pushed in required loop test button(s).

___ (7) Entered the proper channel to be utilized for the test.

___ (8) Ensured the receive and transmit channels were the same.

___ (9) Placed the Level Select switch between 156 and 162.

___ (10) Placed the Sync Rcvr switch to the KEY position.

___ (11) Adjusted the RF to the correct level.

___ (12) Reset the system back to its original position.
___ (13) Adjusted antenna azimuth.

___ (14) Adjusted antenna elevation.

___ b. Certify the trainee on JQS task 4 and assign the next task.

WIDEBAND (WB) CONFIGURATION
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 5

2. ESTIMATED TASK TRAINING TIME:_____

3. TRAINING REFERENCES:

   a. AFCC/SACR 700-20, Vol 1

   b. TO 31R2-4-481-1

   c. TO 31R5-2GSC-111-2

   d. QTP Module 6

4. REQUIREMENTS:

   Ensure trainee has completed QTP Modules 1 thru 5.

5. TRAINING OBJECTIVE:

   Given a CGT, transmit and receive addresses to be used, local procedures, and antenna positioning information, configure system for WB operations IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objective for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed.

___ b. Assign QTP Module 6.

___ c. Discuss the review questions and answers with the trainee.

___ d. Administer the KEP.

___ e. Check the KEP answers and review missed questions.

7. OBJECTIVE TRAINING STEPS:

___ a. Using local procedures and the checklist in para 8a as guidance, discuss the task steps for achieving the objective with trainee.

___ (1) Tell trainee which transmit and receive addresses to use.

___ (2) Tell trainee where to position the antenna.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

8. TASK EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to step 7a if evaluation is unsatisfactory.)

___ (1) Selected the correct satellite plan.

___ (2) Dialed in the correct receive and transmit addresses to be used on the Modem control.

___ (3) Placed the Mode switch in the correct radio position for the radio being tested.

___ (4) Placed modem being tested in an RF loop.

___ (5) Pushed in required loop test button(s).

___ (6) Entered the proper address to be utilized for the test.

___ (7) Ensured the receive and transmit addresses were the same.

___ (8) Placed the Level Select switch between 156 and 162.

___ (9) Placed the Sync Rcvr switch to the KEY position.

___ (10) Adjusted the RF to the correct level.

___ (11) Reset the system back to its original position.

___ (12) Adjusted antenna azimuth.

___ (13) Adjusted antenna elevation.

___ b. Certify the trainee on JQS task 5 and assign the next task.

LOADING KEY GENERATOR (KG)
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 6

2. ESTIMATED TASK TRAINING TIME:_____

3. TRAINING REFERENCES:

a. KAO-137E/TSEC

b. Current USKAK

4. REQUIREMENTS:

Ensure trainee has completed QTP Modules 1 thru 6.

5. TRAINING OBJECTIVE:

Given KOK trays, the current USKAK, and KAO-137E/TSEC, load the Key Generators IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objective for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed. Advise the trainee that the two-man concept is used while keying and loading this KG equipment.

___ b. Assign KAO-137E/TSEC and USKAK.

___ c. Review the reading assignment with the trainee and ask questions to ensure understanding.

7. OBJECTIVE TRAINING STEPS:

___ a. Using KAO-137E/TSEC, the current USKAK, and checklist in para 8a as guidance, discuss the task steps for achieving the objective with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objective.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

8. TASK EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to steps 7a if evaluation is unsatisfactory.)

___ (1) Keyed KOK trays.

___ (2) Loaded KOK trays into KG.

___ b. Certify the trainee on JQS task 6 and assign the next task.

IPL PROCEDURES
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 7

2. ESTIMATED TASK TRAINING TIME:_____

3. TRAINING REFERENCES:

a. TO 31R5-2GSC-111-1, Table 4-50

b. TO 31R5-2GSC-111-2

c. TO 31R2-4-481-1

d. CCSOM 171-4

e. QTP Modules 7 and 8

4. REQUIREMENTS:

Ensure trainee has completed QTP Modules 1 thru 6.

5. TRAINING OBJECTIVE:

Given a CGT with Tape Transport Unit installed; TO 31R5-2GSC-111-1, Table 4-50; CCSOM 171-4, para 2.4 and 3.3; and local procedures, perform an initial program load IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objective for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed.

___ b. Assign QTP Module 7.

___ c. Discuss the review questions and answers with the trainee.

___ d. Administer the KEP.

___ e. Check the KEP answers and review missed questions.

___ f. Assign QTP Module 8.

___ g. Discuss the review questions and answers with the trainee.

___ h. Administer the KEP.

___ i. Check the KEP answers and review missed questions.

7. OBJECTIVE TRAINING STEPS:

___ a. Using the technical references and checklist in para 8a as guidance, discuss the task steps for achieving the objective with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

8. TASK EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to step 7a if evaluation is unsatisfactory.)

___ (1) Reset the SDU and activated the IPL switch.

___ (2) Responded to the IPL inquiry.

___ (3) Updated the real-time clock correctly.

___ (4) RespondedtoanIPLabort.

___ b. Certify the trainee on JQS task 7 and assign the next task.

POWERING DOWN CGT
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 8

2. ESTIMATED TASK TRAINING TIME:_____

3. TRAINING REFERENCES:

a. TO 31R5-2GSC-111-1, Table 3-6

b. Local OIs

4. REQUIREMENTS:

Ensure trainee has completed QTP Modules 1 thru 8.

5. TRAINING OBJECTIVE:

Given a CGT, TO 31R5-2GSC-111-1, Table 3-6, and local OIs, power down the CGT IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objective for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed. Advise the trainee that this task will only be simulated.

___ b. Assign TO 31R5-2GSC-111-1, Table 3-6, and local OIs.

___ c. Review the reading assignment with the trainee and ask questions to ensure understanding.

7. OBJECTIVE TRAINING STEPS:

___ a. Using TO 31R5-2GSC-111-1, Table 3-6, local OIs, and the checklist in para 8a as guidance, discuss the task steps for achieving the objective with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objective.

___ b. Simulate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have the trainee practice simulating task steps and assist as necessary.

8. TASK EVALUATION:

a. Have the trainee simulate task steps unassisted and evaluate performance IAW the following checklist. (Return to steps 7a if evaluation is unsatisfactory.)

___ (1) Turned off all Satellite RT controls.

___ (2) Turned off all Comsec controls.

___ (3) Turned off all RF controls.

___ (4) Turned off all ASRs.

___ (5) Turned off all takeup reels.

___ (6) Turned off circuit breakers on all Power controls.

___ (7) Turned off all CP synchronizers.

___ (8) Turned off Processor control.

___ (9) Turned off Status Display Unit.

___ (10) Turned off High-speed printer.

___ (11) Turned off all circuit breakers on the RSS rack.

___ (12) Turned off all circuit breakers on the KG rack.

___ (13) Turned off all circuit breakers on the NB racks.

___ (14) Turned off all circuit breakers on the WB racks.

___ (15) Turned off all circuit breakers on the MPU rack.

___ (16) Shut down AAMS station if required.

___ (17) Informed Remote sites to turn off all their equipment.

___ (18) Turned off all circuit breakers at main circuit breaker box.

___ b. Certify the trainee on JQS task 8 and assign the next task.

POWERING UP CGT
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 9

2. ESTIMATED TASK TRAINING TIME:_____

3. TRAINING REFERENCES:

a. TO 31R5-2GSC-111-1, Table 3-2

b. Local OIs

4. REQUIREMENTS:

Ensure trainee has completed QTP Modules 1 thru 8.

5. TRAINING OBJECTIVE:

Given a CGT, TO 31R5-2GSC-111-1, Table 3-2, and local OIs, power up the CGT IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objective for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed. Advise the trainee that this task will only be simulated.

___ b. Assign TO 31R5-2GSC-111-1, Table 3-2, and local OIs.

___ c. Review the assignment covered with the trainee and ask questions to ensure understanding.

7. OBJECTIVE TRAINING STEPS:

___ a. Using TO 31R5-2GSC-111-1, Table 3-2, local OIs, and the checklist in para 8a as guidance, discuss the task steps for achieving the objective with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objective.

___ b. Simulate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have the trainee practice simulating task steps and assist as necessary.

8. TASK EVALUATION:

a. Have the trainee simulate task steps unassisted and evaluate performance IAW the following checklist. (Return to steps 7a if evaluation is unsatisfactory.)

___ (1) Verified all circuit breakers and switches were turned off.

___ (2) Turned on all circuit breakers at main circuit breaker box.

___ (3) Turned on all circuit breakers on the RSS rack.

___ (4) Turned on all switches on the RSS rack.

___ (5) Turned on the KG Power switches located in each RSS rack.

___ (6) Pressed PREP buttons.

___ (7) Placed RIU Mode switch to OPERATE, if required.

___ (8) Turned on the Power switch for each RIU located in the RSS rack.

___ (9) Informed Remote site(s) to turn on all their RSS racks.

___ (10) Turned on all circuit breakers on the KG rack.

___ (11) Turned on all switches on the KG rack.

___ (12) Turned on all circuit breakers on the NB racks.

___ (13) Turned on all switches on the NB racks.

___ (14) Set Modem switches to 1 X 3, if required.

___ (15) Set STD SELECT switch to INT, if required.

___ (16) Turned on all circuit breakers on the WB racks.

___ (17) Turned on all switches on the WB racks.

___ (18) Set STD SELECT switch to INT, if required.

___ (19) Turned on all circuit breakers on the MPU rack.

___ (20) Turned on MTM Power switch located in the MPU rack.

___ (21) Turned on circuit breakers for all Power controls located in each operator console.

___ (22) Turned on MAIN INPUT, 400Hz, and 28V/PS circuit breakers on the Power control located in each operator console.

___ (23) Turned on power supply circuit breakers on each power supply located in each operator console.

___ (24) Turned on remaining circuit breakers on the power control, located in each operator console.

___ (25) Turned on all Satellite RT controls located in each operator console.

___ (26) Turned on all ASRs.

___ (27) Turned on all takeup reels.

___ (28) Turned on all COMSEC controls.

___ (29) Turned on all circuit breakers for all Power controls located at each MPU console.

___ (30) Turned on all Satellite RT controls located in each MPU console.

___ (31) Turned on all CP synchronizers.

___ (32) Turned on Status Display Unit(s).

___ (33) Turned on High-speed printer(s).

___ (34) Informed Remote site(s) to turn on their ASR.

___ (35) Informed Remote site(s) to turn on their High-speed printer.

___ (36) Informed Remote site(s) to turn on their SMR, if required.

___ (37) Turned on Processor control.

___ (38) Performed an IPL.

___ (39) Turned on AAMS station, if required.

___ b. Certify the trainee on JQS task 9 and assign the next task.

SYNCHRONIZED OPERATIONS
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBERS: 10a, 10b, 10c, and 10d

2. ESTIMATED TASK TRAINING TIMES:_____

3. TRAINING REFERENCES:

a. TO 31R5-2GSC-111-1

b. TO 31R5-2GSC-111-2

c. TO 31R2-4-481-1

d. CCSOM 171-4

e. AFCC/SACR 700-20, Vol 1

f. MITRE book

g. Current OPS Plan

h. QTP Module 9

4. REQUIREMENTS:

Ensure trainee has completed QTP Modules 1 thru 8.

5. TRAINING OBJECTIVES:

a. Given a configured CGT; TO 31R5-2GSC-111-1, Table 4-64; and local procedures, configure the Command Post (CP) Synchronizer for Random operations IAW prescribed procedures.

b. Given a configured CGT; channels to use; TO 31R5-2GSC-111-1, Table 4-65; and local procedures, configure the CP Synchronizer for Time-Division Multiplex (TDM) 1 operations IAW prescribed procedures.

c. Given a configured CGT; channels and codeword to use; satellite telemetry; TO 31R5-2GSC-111-1, Table 4-66; MITRE, Chap 5.15; and local procedures, configure the CP Synchronizer for TDM 2 operations IAW prescribed procedures. d. Given a configured CGT; TO 31R5-2GSC-111-1, Tables 4-68 thru 4-71, current OPS Plan; and local procedures, transfer Net Control IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objectives for the tasks, including the workcenter speed and accuracy standards for performing the

tasks. Also discuss the conditions under which they are normally performed.

___ b. Assign QTP Module 9.

___ c. Discuss the review questions and answers with the trainee.

___ d. Administer the KEP.

___ e. Check the KEP answers and review missed questions.

7. OBJECTIVE 5a TRAINING STEPS:

___ a. Using the technical references and checklist in para 8 as guidance, discuss the task steps for achieving objective 5a with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

8. TASK 10a EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to step 7a if evaluation is unsatisfactory.)

___ (1) Placed Command Selector switch to RNDM.

___ (2) Pressed the load button.

___ b. Certify the trainee on JQS task10a.

9. OBJECTIVE 5b TRAINING STEPS:

___ a. Using the technical references and checklist in para 10 as guidance, discuss the task steps for achieving objective 5b with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives.

___ (1) Tell the trainee which channels to use.

___ (2) Tell the trainee which NB to use.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

10. TASK 10b EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to step 9a, if evaluation is unsatisfactory.)

___ (1) Dialed in TX channel on the CP Synchronizer.

___ (2) Dialed in RX channel on the 1 X 3 Modem control.

___ (3) Placed Command Selector switch to TDM1.

___ (4) Placed Sync Subnet control in PRIME position.

___ (5) Pressed the load button.

___ b. Certify the trainee on JQS task10b.

11. OBJECTIVE 5c TRAINING STEPS:

___ a. Using the technical references and checklist in para 12, discuss the task steps for achieving objective 5c with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives.

___ (1) Tell the trainee which channel to use.

___ (2) Tell the trainee which NB to use.

___ (3) Show the trainee where to obtain the codes and explain how to use the code book.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

12. TASK 10c EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to step 11a if evaluation is unsatisfactory.)

___ (1) Dialed in TX channels on the CP Synchronizer.

___ (2) Dialed in RX channels on the 1 X 3 Modem control.

___ (3) Loaded code into the CP Synchronizer.

___ (4) Transmitted TDM2 satellite command.

___ (5) Placed Command Selector switch to TDM2.

___ (6) Placed Sync Subnet control in PRIME position.

___ (7) Pressed the load button.

___ b. Certify the trainee on JQS task10c.

13. OBJECTIVE 5d TRAINING STEPS:

___ a. Using the technical references and checklist in para 14 as guidance, discuss the task steps for achieving objective 5d with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objectives.

___ (1) Tell the trainee which station will assume Net Control.

___ (2) Show the trainee where to obtain time slot information from the OPS Plan.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

14. TASK 10d EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to step 13a if evaluation is unsatisfactory.)

___ (1) Coordinated Net Control changeover.

___ (2) Entered time slot on the CP Synchronizer.

___ (3) Placed the Sync Subnet in the SUBNET position.

___ b. Certify the trainee on JQS task 10d and assign the next task.

MEMORY DUMPS
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 11

2. ESTIMATED TASK TRAINING TIME:_____

3. TRAINING REFERENCES:

a. TO 31R5-2GSC-111-2

b. CCSOM 171-4

c. QTP Module 10

4. REQUIREMENTS:

Ensure trainee has completed QTP Modules 1 thru 9.

5. TRAINING OBJECTIVES:

a. Given a CGT; CCSOM 171-4, para 3.8; and local procedures, perform a CPU1 Operations Program dump IAW prescribed procedures.

b. Given a CGT; CCSOM 171-4, para 3.8; and local procedures, perform a CPU2 Buffer dump IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objectives for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed. Advise the trainee why this task will only be simulated.

___ b. Assign QTP Module 10.

___ c. Discuss the review questions and answers with the trainee.

___ d. Administer the KEP.

___ e. Check the KEP answers and review missed questions.

7. OBJECTIVE 5a TRAINING STEPS:

___ a. Using the technical references and checklist in para 9a, steps (1) thru (6), as guidance, discuss the task steps for achieving objective 5a with trainee. Ensure the trainee observes all applicable supplements, local directives, and

MAJCOM directives amended to the references listed in the objective.

___ b. Simulate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice simulating task steps and assist as necessary.

8. OBJECTIVE 5b TRAINING STEPS:

___ a. Using the technical references and checklist in para 9a, steps (7) thru (12), as guidance, discuss the task steps for achieving objective 5b with trainee. Ensure the trainee observes all applicable supplements, local directives, and MAJCOM directives amended to the references listed in the objective.

___ b. Simulate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice simulating task steps and assist as necessary.

9. TASK EVALUATION:

a. Have the trainee simulate task steps unassisted and evaluate performance IAW the following checklist. (Return to step 7a or 8a as applicable, if evaluation is unsatisfactory.)

___ (1) Entered dump command on keyboard 1.

___ (2) Selected CPU1 Memory dump.

___ (3) Selected CPU1 Operations Program dump.

___ (4) Returned to Main menu after printout.

___ (5) Initialized the CGT.

___ (6) Updated the real-time clock.

___ (7) Entered dump command on keyboard 1.

___ (8) SelectedCPU2 Memory dump.

___ (9) Selected CPU2 Buffer dump.

___ (10) Returned to Main menu after printout.

___ (11) Initialized the CGT.

___ (12) Updated the real-time clock.

___ b. Certify the trainee on JQS task 11 and assign the next task.

REMOTE SUBSYSTEMS
TASK TRAINING GUIDE

TRAINEE'S NAME:_____

1. JQS TASK NUMBER: 12

2. ESTIMATED TASK TRAINING TIMES:_____

3. TRAINING REFERENCES:

a. TO 31R5-2GSC-111-1

b. TO 31R5-2GSC-111-2

c. QTP Module 11

4. REQUIREMENTS:

Ensure trainee has completed QTP Modules 1 thru 10.

5. TRAINING OBJECTIVE:

Given a CGT and local procedures, configure a subuser for remote operations IAW prescribed procedures.

6. INITIAL TRAINING STEPS: (Check when Completed)

___ a. Discuss the objective for the task, including the workcenter speed and accuracy standards for performing the task. Also discuss the conditions under which it is normally performed.

___ b. Assign QTP Module 11.

___ c. Discuss the review questions and answers with the trainee.

___ d. Administer the KEP.

___ e. Check the KEP answers and review missed questions.

7. OBJECTIVE TRAINING STEPS:

___ a. Using local operating instructions and the checklist in para 8a as guidance, discuss the task steps for achieving the objective with trainee.

___ (1) Tell the trainee who your Remote subusers are and their mission.

___ (2) Tell the trainee what the equipment routing requirements are for your station's subusers.

___ b. Demonstrate correct task performance.

___ c. Review task steps with trainee and answer any questions.

___ d. Have trainee practice task steps and assist as necessary.

8. TASK EVALUATION:

a. Have trainee perform task steps unassisted and evaluate performance IAW the following checklist. (Return to step 7a if evaluation is unsatisfactory.)

___ (1) Changed KOK-1 cards.

___ (2) Prepped each KG.

___ (3) Reset each KG.

___ (4) Placed Mode toggle switch to TEST position, if RIU did not synchronize.

___ (5) Turned Display Select switch to the 6 o'clock position.

___ (6) Pushed the start button simultaneously with subuser(s).

___ (7) Checked KG cards, if RIU did not sync and fault code "7" or "FF" appeared.

___ (8) Pushed in AUD BUS button on LMU.

___ (9) Sent test message to subuser.

___ (10) Placed Mode toggle switch back to OPERATE, if RIU synchronized.

___ (11) Placed Display Select switch to 9 o'clock position, if RIU synchronized.

___ (12) Contacted maintenance, if required.

___ (13) Routed equipment as required.

___ b. Certify the trainee on JQS task 12.

TRAINER SURVEY

NAME_____ **RANK**_____ **DSN**_____

UNIT ADDRESS_____**DATE**_____

1. How long have you been a trainer on this equipment/ system/function?

    a. Less than 1 year
    b. 1 to 2 years
    c. 3 to 6 years
    d. 7 to 10 years
    e. 11 years or more

2. Which statement best describes the experience level of most technicians arriving at your duty location?

    a. No experience
    b. Limited experience (technical school or previous training)
    c. Experienced on related equipment/function
    d. Experienced on this equipment/function

3. What is the average training time required to fully qualify a trainee on this equipment/function?

    a. 30 days
    b. 60 days
    c. 90 days
    d. 120 days
    e. Other_____

4. The purpose of QTPs is to provide standardized training programs on specific equipment or functions. How well do you feel this QTP accomplished its purpose?

    a. Outstanding
    b. Excellent
    c. Satisfactory
    d. Marginal (Please explain; use extra paper if necessary)
    e. Unsatisfactory (Please explain)

5. Have you completed this QTP?

    a. Yes
    b. No (Please explain)

6. Were the technical references listed on the AFJQS correct?

    a. Yes
    b. No (Please explain)

7. The Trainer's Guide helped me to conduct an effective training program while using this QTP.

a. Yes
b. No (Please explain)

8. Was the information presented in the Skill Training Material (STM) technically correct?

a. Yes
b. No (Please explain)

9. Did the module arrangement follow a logical training sequence (easy to difficult, simple to complex)?

a. Yes
b. No (Please explain)

10. Would additional figures, illustrations, or examples help the trainee understand the material presented in the QTP?

a. Yes (Please explain)
b. No

11. Does the AFJQS contain all required tasks?

a. Yes
b. No (List tasks)

12. Do the review and KEP questions measure the knowledge required by the trainee to perform the task(s)?

a. Yes
b. No (Please explain)

13. While completing this package, the trainee

a. had no major or unusual difficulties.
b. had some minor problems.
c. often required my assistance.
d. could not have completed this QTP without assistance from an experienced trainer.

14. Approximately how many people have you trained using this QTP?_____

15. What improvements would you make to this QTP to help meet your training needs?

QUALIFICATION TRAINING PACKAGE, 492X1-212F
AFSATCOM CGT OPERATIONS

I certify that the individual listed below has completed all of the requirements for the above QTP. Date completed _____.

_____
(Please Print) TRAINEE'S RANK, FIRST, MI, LAST NAME SSAN

_____
(Please Print) UNIT MAILING ADDRESS, INCLUDING ZIP CODE

_____
SUPERVISOR'S RANK/NAME

_____
DUTY TITLE DSN

CONCUR/NONCONCUR

_____
Commander or Designated Representative

Please attach the completed and graded KEP answer sheet(s) and Trainer/Trainee Surveys. A certificate of training will be issued upon receipt of these documents.

NOTE

Do NOT submit trainees for training certificates more than once per QTP. Some QTPs are used for recurring training, but only ONE certificate will be issued for a trainee per QTP.

PERSONAL DATA
PRIVACY ACT OF 1974
(5 U.S.C. 552a)

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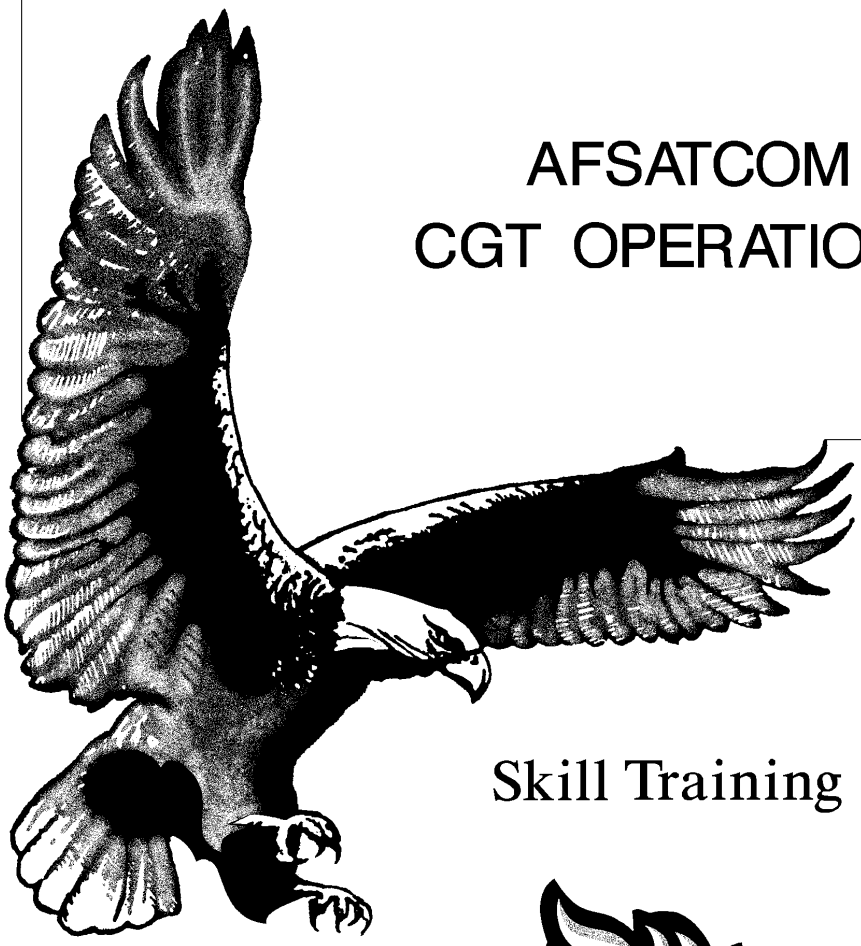
QUALIFICATION TRAINING PACKAGE

QTP 492X1-212F
VOLUME I



AFSATCOM
CGT OPERATIONS

Skill Training Material

SUPERSEDES QTP 492X1-212F,
DATED 18 DECEMBER 1989

FOR OFFICIAL USE ONLY

TABLE OF CONTENTS

PREFACE

Qualification Training Package (QTP) 492X1-212F was developed to standardize the OJT program for AFSATCOM CGT Operations personnel. It explains the functional operation of the equipment and some system operations.

Put this package to use. We hope you'll find it to be a valuable tool which aids you in becoming a competent 492X1 AFSATCOM CGT Operator in the shortest possible time.

This QTP was developed by SSgt Stephen J. Pederson, 81st Training Support Squadron, Keesler AFB, MS. The Training and Education Specialist was Mr. George McGrevey. The QTP was validated by the 33 CG, March AFB, CA; 1962 CG, Kadena AB Japan; 390 COSQ, Offutt AFB, NE; and HQ SCD, Offutt AFB, NE.

CAUTION

This package is NOT intended to replace the applicable technical references. It is to be used for training purposes only.

INSTRUCTIONS TO THE TRAINEE

1. Be sure your trainer explains the qualification training process (task assignment, proficiency attainment, task certification), your responsibilities, and how to use this QTP.

2. Review the Air Force Job Qualification Standard (AFJQS) and this volume to get an idea of their content.

3. Your trainer uses the AFJQS to assign your initial tasks and the corresponding Volume I modules. You and your trainer jointly plan your anticipated progress.

4. Make sure you understand the prerequisites before attempting each module (ask your trainer). If you are not familiar with the prerequisites, training is necessary.

5. Within normal workload constraints, set aside sufficient time to work on the package. Studies into effective training programs indicate that the best trainees reserve the same time each day to complete their study. Pace yourself; establish a schedule and stick to it. Give yourself top priority in becoming qualified.

6. After you read the information in the module, answer the review questions and immediately check your responses. You may use the QTP modules and technical references to answer the questions. Ask your trainer to explain the questions you don't understand or answer incorrectly. Refer to applicable technical references for more detailed information.

7. After you answer the review questions, your trainer will administer the Knowledge Evaluation Pamphlet (KEP). Answer all KEP questions and give the answer sheet to your trainer for grading. Your trainer will discuss any incorrect answers with you. You are normally NOT allowed to use the QTP modules to

answer the KEP questions. If you are not permitted to use technical references, you must score 70% or more on each test. In some cases, technical references may be used to answer the KEP questions. This is identified at the beginning of the particular module test. If you are permitted to use the references (open-book test), you must score 100%.

8. You are required to demonstrate your task proficiency by completing the performance procedures identified at the end of each module. When both you and your trainer are satisfied that you have attained the required proficiency level, you will be certified on the AFJQS. If you are not completely satisfied that you have obtained the required proficiency level, further study and practice are needed before you initial the AFJQS.

CAUTION

You are not to perform on the equipment without your trainer being present.

9. Your trainer assigns additional tasks (modules) until you have completed the entire package and have become position qualified.

10. We need your help in revising this QTP and in developing future QTPs. Make note of any problem areas you find as you encounter them. If you have recommendations, suggestions, corrections, or comments, please jot them down on the Trainee Survey located at the end of this volume. When you complete the QTP, give the survey to your trainer to attach to the Training Certification document located at the back of the Trainer's Guide. When we receive the Training Certification document and all attachments, we will forward your Certificate of Training. We pledge to devote all our resources to providing you with the best possible training materials.

MODULE 1
INTRODUCTION TO AFSATCOM

OBJECTIVES

1. Explain the system description of the AFSATCOM network.

2. Explain the principles of a satellite.

3. Explain the purpose of the AFSATCOM network.

4. Explain the capabilities of the AFSATCOM system.

5. Explain the basic functions and responsibilities of the various system control elements.

INFORMATION

Twenty years ago, few people in the Air Force had heard of satellite communications. Today, the Consolidated Ground Terminal (CGT) represents the culmination of the last twenty years. It is one of the most sophisticated satellite communications systems in the inventory. Before we get into actual CGT operations, you need to understand some basics about its operations. These basics include how satellites work, communication capabilities, and the responsibilities of agencies with which you'll work.

DESCRIPTION. The Air Force Satellite Communications (AFSATCOM) System consists of transponders onboard Fleet Satellite Communications (FLTSATCOM) and Satellite Data System (SDS) satellites. These transponders provide uplink and downlink channel communications via ultra-high frequencies (UHF). Operators use a 75 bit per second (bps), 100 words per minute

(wpm) teletypewriter using binary frequency shift keying (FSK) modulation for communications. These satellites are in either geosynchronous or nonsynchronous orbits. The orbits are at 100 and 23 degrees West and 72 and 172 degrees East. Figure 1-1 shows the overlap coverage area provided by the FLTSATCOM satellites.

Figure 1-1. FLTSATCOM Overlap Coverage

The AFSATCOM system is in two segments: space and terminal. TO 31R2-4-481-1 and AFCC/SACR 700-20, Vol I, describes these two segments.

STOP

Read TO 31R2-4-481-1, para 1-4 thru 1-9, and AFCC/SACR 700-20, Vol I, Chap 2, para 2-2 and 2-3, and then return to this module.

As stated before, a satellite can have two orbits, synchronous and nonsynchronous. These are further broken down into a circular equatorial orbit, which is geosynchronous; and

elliptical polar or elliptical inclined orbit, which is nonsynchronous.

Synchronous orbit satellites are in an orbit that is equal in speed to the earth's rotation. If you look at these types of satellites in the horizon, they appear stationary or fixed. A satellite launched into a circular orbit over the equator is an example of a synchronous orbit satellite called geosynchronous. They normally orbit approximately 22,582 statute miles above the equator. Also, they take almost 24 hours to complete one revolution--the same as earth. Figure 1-2 illustrates a circular equatorial orbit.

Figure 1-2. Circular Equatorial Orbit

Nonsynchronous orbit satellites are in an elliptical orbit. To maintain this orbit, the satellite must obtain a velocity that will balance the attraction created by the earth's gravitational pull. As the satellite approaches the earth, it increases in speed so it can reach breakaway velocity. The point at which the satellite breaks away from the gravitational pull is its perigee. The perigee is often around a hundred or so miles from the earth. As the satellite shoots out into space, it decreases in velocity. This continues until it reaches a point at which the earth's gravitational pull starts drawing the satellite inward. This point--its apogee--may be several thousand miles from the earth. Figure 1-3 illustrates the principles of an elliptical polar orbit and an elliptical inclined orbit.

Figure 1-3. Elliptical Polar Orbit and Elliptical Inclined Orbit

SATELLITE SYSTEMS. Once a satellite is launched into orbit, the next thing to do is establish a communication link. However; to do this, requires tracking the satellite which carries a small communications transponder. This transponder has a small transmitter attached to its outer skin. This transmitter radiates a signal allowing ground stations to track the satellite throughout its orbit. Once the ground terminals determine the satellite's position, they direct their signals toward the satellite. Any error in aiming ground antennas may cause a complete communication breakdown. There are two systems available when establishing satellite links--passive and active repeater.

The passive satellite system is comprised of a reflective surface for reflecting ground terminal signals. Both the transmitting and receiving stations aim their antennas at the satellite to intercept signals. The bounced receive signals are much weaker than the original transmit signal. This limits passive satellites to the horizon angles of transmission and

reception. As the satellite disappears over the horizon, communications is cut off. Communications stop until that satellite appears over the opposite horizon, or another satellite is available.

Unlike the passive system, the active-repeater system regenerates transmit signals. These transmit signals are rebroadcasted to the receiving station. Onboard equipment can receive, store, amplify, and retransmit messages. This is extremely useful during poor propagation periods because the regenerated signal loses little signal quality. This provides the most reliable worldwide communications available. Figure 1-4 is an example of an active-repeater satellite communications system.

Figure 1-4. Active-repeater Satellite Communications System

Now that we have covered satellite principles, let's discuss the purpose for the AFSATCOM network.

STOP

Read TO 31R2-4-481-1, para 1-2, and then return to this module.

SYSTEM CHANNELS. There are three types of channels available on the AFSATCOM system. They are the Narrowband, Orderwire, and Wideband channels. Each of these channels is for a unique communications requirement.

STOP

Read TO 31R2-4-481-1, para 3-8 thru 3-19, and then return to this module.

SYSTEM HIERARCHY. You will deal with various organizations during your daily operations. We will now see what these organizations are and their responsibilities.

STOP

Read TO 31R2-4-481-1, para 1-11 thru 1-13, 2-3 thru 2-8, and 3-4 thru 3-6; and AFCC/SACR 700-20, Vol I, Chap 2, para 2-4, and then return to this module.

SUMMARY

AFSATCOM is a sophisticated communications system utilizing FLTSATCOM and SDS satellites. These satellites maintain either a Synchronous or Nonsynchronous orbit. Onboard transponders provide up-link and down-link UHF capabilities for AFSATCOM ground terminals. Three types of channels; narrowband, wideband, and orderwire, are used to satisfy each unique communications requirement.

REVIEW QUESTIONS

Answer the review questions and check your responses with the Review Question Confirmation key in the back of this volume. Review and correct any responses which were incorrect. Your responses do not have to match those in the confirmation key word-for-word; however, your responses must convey the same general information as those in the key.

1. What's the difference between a passive and an active-repeater satellite?

2. Who has overall responsibility for the AFSATCOM system?

3. How many narrowband channels does an AFSATCOM satellite have?

4. Which kind of satellite is Wideband operations limited to?

5. Which channel does the PCC use to coordinate with users?

6. Which portion of the frequency spectrum does the AFSATCOM system use?

7. What is the satellite's perigee?

8. What is the bandwidth of the wideband channel?

9. Which kind of orbits can a satellite maintain?

10. What is the lowest level of control in the AFSATCOM system?

11. What is the satellite's apogee?

12. How are ground stations able to track satellites?

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed-book test. Your trainer will check your answers and discuss any you missed. You are required to score 80% or more, or you must repeat the module. When you and your trainer are satisfied that you know the material, go on to the next module.

MODULE 2
STORING MESSAGES

OBJECTIVES

1. Given an AN/UGC-120B (ASR) in receive mode; a test message; TO 31R5-2GSC-111-2, para 5-160 thru 5-162; CCSOM 171-4, para 3.5.1; and local procedures, load a message into a buffer IAW prescribed procedures.

    a. Explain the capabilities of the AN/UGC-120B.

    b. Explain how to compose messages.

    c. Explain basic message formats.

    d. Explain how to load a message into a buffer.

    e. Explain a buffer's memory capability.

2. Given an AN/UGC-120B (ASR) in receive mode; a test message; TO 31R5-2GSC-111-2, para 5-160 thru 5-162; and local procedures, load a message into a bin IAW prescribed procedures.

    a. Explain how to erase storage area memory.

    b. Explain how to load a message into a bin.

    c. Explain a bin's memory capability.

3. Given an AN/UGC-120B (ASR) in receive mode; a test message; TO 31R5-2GSC-111-2, para 5-160 thru 5-162; and local procedures, load a message into working memory IAW prescribed procedures.

a. Explain how to load a message into working memory.

b. Explain working memory's storage capabilities.

4. Given an ASR in receive mode, a test message ina bin, and local procedures, transfer a message from a bin to a buffer IAW prescribed procedures.

Explain message transfer procedures.

5. Given an ASR in receive mode, local procedures, and an incorrect message in working memory, correct the message.

Explain how to verify and edit messages.

PREREQUISITE

Must have completed QTP Module 1.

INFORMATION

In the previous module, we discussed the AFSATCOM system. Now, let's look at how we prepare message traffic for transmission. We will cover the various storage areas, basic message formats, and the AN/UGC-120B (ASR) teletypewriter.

The ASR is the main tool for commanding the CGT terminal. Satellite commands and communication supervisory (COMSUP) commands are the only types of commands the ASR is capable of doing. COMSUP commands make the software changes necessary to perform various CGT functions. Whether satellite or CGT, you initiate all commands on the ASR. Figures D2-1 thru D2-5 illustrate the ASR, its keyboard, and its controls and

indicators. Refer to these figures in the Diagrams book while doing this module.

STOP

Read TO 31R2-4-481-1, para 3-26 and 3-27; and TO 31R5-2GSC-111-2, para 5-74 thru 5-77, and then return to this module.

ASR MODES.

RECEIVE PRINT. As stated in the TOs, the ASR has six modes of operation it can perform. The first of these modes--receive--disables printing functions for messages being monitored during transmit activity. You activate this mode by depressing the RECEIVE PRINT button on the keyboard. It only allows the printing of received messages or messages being verified during composition.

COMPOSE/EDIT. You must first hit the COMPOSE/EDIT button to compose messages not intended for immediate transmission. This compose indicator illuminates when you are in this mode. The following keys are used during editing functions.

1. CLR MEM. Use this button in conjunction with the control (CTL) key to clear the memory. The CLEAR lamp illuminates once the storage area is empty.

NOTE

The CTL key must precede any yellow key or upper-case control function.

2. BACK SPACE. Use this key during editing to move the storage pointer backwards through the memory. The ASR prints a diamond symbol for each backward movement. This diamond symbol is not part of the text; it is only a way to indicate a backspace.

3. FWD SPACE. This button is the opposite of the back space button. The ASR prints each character or space for every space moved forward. This allows you to monitor the pointer location.

4. CHAR INSTR. Use the CHARACTER INSERT key to insert a space in memory at the pointer's location. This moves all text right one space for every space inserted. This is useful in adding text in the middle of a previously composed message. There is no special key set up for character deletion. You overprint a letter or depress CTL X to eliminate an unwanted character position.

5. VRFY. Use the VERIFY key to begin a message printout for verification of a message. To edit, press the VERIFY key a second time. This stops the printing so you can begin editing. Once you have finished editing, press the VERIFY key again to restart printing. Once the message end-of-text (ETX) is printed, the ASR will return to the previous operation mode.

NOTE

You can not edit messages located in buffers. If an error is found there, you must erase the buffer and retype the message.

MANUAL TRANSMIT. Messages composed in manual transmit are transmitted character-by-character. Manually transmitting messages is not recommended. You can not correct errors or detect them until it's too late. There is a time-out feature in this mode. The ASR transmits an ETX if the operator fails to depress a character during any five-second time span. If needed, you can bypass this feature. Press CTL W twice to disable this feature. The disable function will only last until the ASR receives an ETX.

AUTOMATIC TRANSMIT. Use this key to transmit messages already in storage. This is the normal operating mode in AFSATCOM. The ASR switches back to receive mode after the message transmission is complete. You will learn more on this subject in Module 3.

POLL TRANSMIT. This mode is similar to AUTO XMIT; however, this task is no longer performed.

ADDRESS RECOGNITION. Every ASR has a station code. This allows you to address a message to a particular station. Once transmitted, all stations receive the message security header. Only the addressed station receives the rest of the text. This type of message requires the Terminal Recognition Address Code (TRAC) message format. CCSOM 171-4 has further details.

STOP

Read CCSOM 171-4, para 2.8, and then return to this module.

ASR MEMORY

The ASR has two kinds of memory--working and expanded. When composing messages, you must select one of these two memories with the MEM SELECT switch. Memory selection is determined by the storage area and message size.

WORKING MEMORY. Working memory consists of a 20-, 40-, or 160-character storage space. You use this memory to compose messages intended for immediate transmission. The working memory is volatile. When ASR power is shut off, all text is erased. Only one message is stored in this area at any given time. Transferring messages from working memory to expanded memory is not possible.

Before composing messages, you must determine their length. When a message fills the memory, the FULL lamp illuminates. If the message length is more than memory capability, the OVERFLOW lamp will illuminate. You must erase the message and choose a larger storage space to accommodate the message. Depressing the CLR MEM key will erase the text in memory. When the memory is clear, the CLEAR light comes on.

EXPANDED MEMORY. Expanded memory is often called the 4K memory. This memory consists of eight bins, each containing a 512-character storage space. Unlike working memory, expanded memory is linkable. If a message is longer than 512-characters, it overflows to the next available bin. This gives you a total of 4096 characters--4K. Each bin is separate which means only one message can be stored in each bin. Bins are also considered volatile.

NOTE

Bins and working memory are the only places classified messages can be stored.

Before composing messages in a bin, you must first place the MEM SELECT switch in the EXP MEM position. To select a bin, depress the COMP/EDIT key and choose a bin. If a message already exists in that bin, you type over the old message. If you need the old message, perform a bin status check to find an empty bin.

The bin status check is a way to obtain the status of all bins. Check this by pressing COMP/EDIT followed by any character other than one through eight. The ASR will print which bins contain messages and which are empty. This allows you to select an empty bin for message composition.

BUFFERS

There is one last storage space available for messages--buffers. Unlike bins and working memory, buffer memory space is in the Message Processing Unit (MPU). There are 10 buffers in MPU1 with a maximum space of 536 characters per buffer. A buffer is not linkable; therefore, it rejects any message exceeding its capacity. A MESSAGE OVERFLOW message will print on the ASR when this happens. CCSOM 171-4 and TO 31R5-2GSC-111-2 provide details on creating buffer-stored messages.

STOP

Read CCSOM 171-4, para 3.5.1 and 3.5.3; and TO 31R5-2GSC-111-2, para 5-196 and 5-197, and then return to this module.

Editing functions are different with a buffer. Messages are transmitted to a buffer; therefore, you must edit the message before the transfer. To verify a message already in a buffer, you must transmit the data back to the ASR. Do this by routing the buffer to the ASR. Editing is accomplished from the ASR.

Buffer-stored messages are nonvolatile. When you shut off the ASR, your message still exists because it resides in the MPU. This prevents messages from becoming accidentally erased because of someone shutting off the ASR. If you have a message in a bin, you can transmit that message to a buffer. However, keep memory capability in mind when transferring messages. You can not transfer messages linked in two different bins to a buffer. Except for power outages, restarts, and IPLs, buffer-stored messages are safe from loss.

MESSAGE FORMATS

Due to the variety of missions AFSATCOM supports, we can't cover every possible message format. The following reading assignment, however, will help explain the basic requirements detailing message formats.

STOP

Read TO 31R5-2GSC-111-1, Table 4-43, and then return to this module.

It will take time and practice to learn all the required formats. Table 4-43 and your trainer are your best sources of information for specific station requirements.

SUMMARY

The ASR is your primary tool in commanding the CGT. It provides you memory storage for composing and storing messages. Messages can be stored in working memory, bins, or buffers. Buffers provide you with a nonvolatile storage capability which prevents message loss when the ASR is turned off. Bins are used for longer messages because they are linkable. Eight bins

provide you with 4K of storage space. Remember, however, bins and working memory are volatile.

REVIEW QUESTIONS

Answer the following questions and check your answers with the confirmation key at the back of this book. Then, review the areas you missed.

1. How do you exit the bin mode when you have finished with the message?

2. How do you know when you're in the COMP/EDIT mode?

3. How do you verify (edit) a message that is in a bin?

4. What must you do if a message in a buffer overflows?

5. How do you verify if a message was saved correctly to a buffer?

6. How much memory space is available in the working memory?

7. Which memory area is authorized for classified memory storage?

8. What happens when a message is too long to fit in a specified bin?

9. What's erased when the ASR is turned off?

10. How do you check the status of bins?

11. How much memory is available in expanded memory?

12. Where is buffer memory located?

13. How many bins are available for access?

14. What is the highest priority message in the AFSATCOM system?

15. How many special messages are there?

16. What's the difference between an EAM broadcast satellite command and an EAM bypass satellite command?

17. List the six different kinds of security headers used in AFSATCOM messages.

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed-book test. Your trainer will check your answers and discuss any missed questions. You are required to score 80% or more, or you must repeat the module.

When you and your trainer are satisfied that you know the material, go on to the performance procedures.

PERFORMANCE PROCEDURES

Your trainer will review with you the procedures for loading messages in each storage area. The procedures must be followed exactly. All training references will be available for you to use as a guide. If you are not sure of the items in the procedures or any of the steps, now is the time to ask questions. Your trainer will demonstrate the steps necessary to perform this task. You will then practice loading messages in each storage area. When you are confident with your performance, your trainer will evaluate you on this task. Your trainer will provide you test messages and advise which ASR to use. Upon successful completion of the task, your trainer will certify you on the JQS.

MODULE 3
SENDING MESSAGES

OBJECTIVES

1. Given a configured CGT; a loaded KG; a classified message in a bin; TO 31R5-2GSC-111-2, para 5-159 thru 5-162; CCSOM 171-4, para 2.5 and 2.6; and local procedures, transmit a classified message IAW prescribed procedures.

    a. Explain the characteristics of the MPU.

    b. Explain what device mnemonics are.

    c. Explain COMSUP Command usage.

    d. Explain how to route a bin to destination devices.

    e. Explain the characteristics of a Key Generator (KG).

    f. Explain how a transmitted message flows through the CGT.

2. Given a configured CGT; a message in working memory; TO 31R5-2GSC-111-2, para 5-159 thru 5-162; CCSOM 171-4, para 2.5 and 2.6; and local procedures, transmit a message IAW prescribed procedures.

    Explain how to route working memory to destination devices.

3. Given a configured CGT; a message in a buffer; TO 31R5-2GSC-111-2, para 5-159 thru 5-162; CCSOM 171-4, para 2.5, 2.6, and 3.5.2; and local procedures, transmit a message IAW prescribed procedures.

Explain how to route a buffer to destination devices.

PREREQUISITES

Must have completed Modules 1 and 2.

INFORMATION

You have learned how to load messages into storage areas. Now, we will cover how to transmit these messages from each storage area. After finishing this module, you should know what COMSUP commands and device mnemonics are, and how messages are handled.

Transmitting messages from storage areas has certain information which is common to each. We will first discuss this information before covering information unique to each storage space. Before discussing mnemonics and COMSUP commands, you need to understand how the message processor unit (MPU) operates.

MPU. The MPU is the brain for the CGT terminal. This unit processes all inputs to the CGT as specified by its computer program. All routing instructions are stored in the MPU so the CGT can perform the daily mission. Without the MPU, the CGT would be extremely limited in what it could perform. TOs 31R2-4-481-1 and 31R5-2GSC-111-2 will discuss this in detail.

STOP

Read TO 31R2-4-481-1, para 3-32; CCSOM 171-4, para 2.1 and 2.2; and TO 31R5-2GSC-111-2, para 5-65 thru 5-68, and then return to this module.

MNEMONICS. The MPU contains the system program which controls all computer functions on the CGT. To operate this system, however, requires a computer language--mnemonics. For dealing with various system functions, mnemonics provide the MPU with instructions it can understand.

STOP

Read TO 31R5-2GSC-111-2, para 5-161; and CCSOM 171-4, para 2.6, and then return to this module.

COMSUP COMMANDS. Communications Supervisory (COMSUP) Commands are messages used to control message movement. These messages range from changing the CGT setup to actual message transmission. TO 31R5-2GSC-111-2 and CCSOM 171-4 explain what these commands are and their usage.

STOP

Read TO 31R5-2GSC-111-2, para 5-159, 5-160, and 5-162; and CCSOM 171-4, para 2.5, and then return to this module.

You have now learned what mnemonics and COMSUP commands are. Now, let's go into actual message transmission. We will cover message transmission from all storage areas, and how classified messages are transmitted.

MESSAGE TRANSMISSION

UNCLASSIFIED MESSAGES. The first area we will discuss is how to transmit buffer stored messages. You learned earlier that mnemonics are used to route source devices to destination devices. Performing these routings is the bulk of transmitting messages. CCSOM 171-4 explains routing buffers to destination devices.

STOP

Read CCSOM 171-4, para 3.5.2, and then return to this module.

In the last module, you learned how to transfer a message from a bin to a buffer. Transmitting messages from bins is similar. The only difference is, instead of routing the bin to a buffer, you route it to a modem. Once you select the bin number, the message is automatically transmitted.

Transmitting messages in working memory requires you to route the ASR to a modem. Once this is done, press the Auto Transmit button. This transmits the message to its designated destination.

NOTE

The ASR will automatically go back to receive mode once message transmission is complete.

CLASSIFIED MESSAGES. Classified messages are transmitted the same as unclassified messages, except they must be routed through a KG. The KG is treated as an intermediate device. Remember, classified messages are only stored in bins and working memory. TOs 31R2-4-481-1 and 31R5-2GSC-111-2 explain what a KG is.

NOTE

Read TO 31R2-4-481-1, para 3-62; and TO 31R5-2GSC-111-2, para 5-69 and 5-70, and then return to this module.

MESSAGE FLOW. Messages are transmitted into the MPU for subsequent broadcast. These messages are stored in the MPU and transferred to the modem on a first-in-first-out basis. Messages are handled by precedence. However, certain messages have barge-in status. Barge-in type messages include EAMs, Telemetry messages, and satellite commands. These messages always go out above any other messages no matter what classification the other messages may have. Figure 3-1 illustrates how a message flows from the ASR to a modem.

Figure 3-1. Message Flow Diagram SUMMARY

Transmitting messages is a fairly easy process. COMSUP Commands are used to route source devices to destination devices. If a message is classified, a KG must be used as an intermediate device to process that message. This is done by adding a preamble so the receiving CGT recognizes it as a classified

message. Once a message is transmitted, it is sent to the MPU for subsequent broadcast.

REVIEW QUESTIONS

Answer the following questions and check your answers with the confirmation key at the back of this book. Then, review the areas you missed.

1. What does the term mnemonics mean?

2. What is a source device?

3. What is an intermediate device?

4. What is a destination device?

5. What limitations exist for COMSUP Command usage?

6. Which command is used to transmit a classified message from a bin to Narrowband side A?

7. What happens when you try to route an unclassified message through the KG?

8. How does the CGT recognize a message that needs to go through the KG?

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed-book test. Your trainer will check your answers and discuss any missed questions. You are required to score 80% or more, or you must repeat the module. When you and your trainer are satisfied that you know the material, go on to the performance procedures.

PERFORMANCE PROCEDURES

Your trainer will review with you the procedures for transmitting messages from each storage area. The procedures must be followed exactly. All training references will be available for you to use as a guide. If you are not sure of the items in the procedures or any steps, now is the time to ask questions. Your trainer will demonstrate the steps necessary to perform this task. You will then practice transmitting messages from each storage area. When you are confident with your performance, your trainer will evaluate you on this task. Your trainer will tell you where each message is located and which radio and ASR to use. Upon successful completion of the task, your trainer will certify you on the JQS.

MODULE 4
RECEIVING MESSAGES

OBJECTIVES

Given a CGT configured for normal operations and local OIs, receive messages IAW prescribed procedures.

a. Determine when incoming messages are being received.

b. Explain how to handle subuser messages.

c. Explain how to handle station messages.

d. Explain the characteristics of the high-speed and low-speed printer.

e. Explain the message flow of a received message.

PREREQUISITES

Must have completed QTP Modules 1 thru 3.

INFORMATION

Now that you know how to transmit messages, let's discuss the procedures for receiving them. Even though every station provides different mission support, the basic procedures for receiving messages are the same. We will discuss both incoming satellite messages and messages being relayed through your station from a subuser.

AFSATCOM differs from other radio facilities at which you may be stationed. Normally you communicate via voice transmissions; however, at a CGT this is not the case. You conduct all transmissions via teletype; therefore, determining when you have an incoming message is different.

Besides messages being printed, there are three ways to determine when you have an incoming message. For EAMs there is an EAM alarm to alert you. For normal traffic on Narrowband or Orderwire, there is a receive busy light on the 1 X 3 Modem control. For traffic on Wideband, you get a signal acquired light on the Wideband Modem control. Modules 5 and 6 will explain in detail the Wideband, Narrowband, and Orderwire systems. Only concern yourself with the following indicators for now.

EAM ALARM. Go to the Diagrams book and look at Figure D4-1. This alarm sounds when you receive EAM messages on your terminal. To turn it off, you push the Reset/Test toggle switch up. Since every CGT is different, you need to ask your trainer where this alarm is located.

RECEIVE BUSY LIGHT. The 1 X 3 Modem control has three receive busy lights above the channel select window. These lights alert you when you are receiving an incoming message. There is no audio alarm, so you don't have to worry about resetting anything. The 1 X 3 Modem control is illustrated in the next module.

SIGNAL ACQ LIGHT. The signal acquired light is on the upper right-hand portion of the Wideband Modem control. Refer to Figure D6-1 for an illustration. This indicator will light when the modem receives an incoming signal. This modem also has no alarm; therefore, no reset is necessary.

We have covered how to recognize when a message is being received. Now, let's cover how an incoming message flows through your CGT. We will include receiving messages from a subuser for subsequent broadcast and incoming messages from the satellite.

SUBUSER MESSAGES

Every CGT has equipment at different locations that are routed into your terminal. They have an ASR for message transmission and reception. For routing purposes, their keyboards are K3 through K6, or L3 through L6 for low-speed printers. Your mission support will determine who has which keyboard and low-speed printer.

STOP

Have your trainer explain who is routed to your terminal, where they are located, and which keyboard and printer number is associated with these locations. Return to this module when finished.

When a message is for a subuser, it will automatically pass through your CGT. You don't have to do anything, except for EAMs. Before, we stated that the EAM alarm will go off when you receive an EAM message. This will also happen if it's for a subuser. Just turn off the EAM alarm and verify the proper subscribers received the message. Your trainer will explain any additional handling procedures.

When a subuser wants to transmit a message, it will pass through your terminal for transmission. Your only requirement is to route their equipment to your terminal. Do this as if you were transmitting a message but use their source device instead of yours.

STATION MESSAGES

Received messages vary from station-to-station. Your local mission will dictate what kind of messages you handle. You may only handle EAM messages, or you could support reconnaissance missions. The following types of messages are a few examples of what you might deal with.

EMERGENCY ACTION MESSAGES. EAMs are received over Channels 1 and 3 on the Narrowband radio. Once received, they are printed on the high-speed printer. If the high-speed is unavailable, they are routed to the low-speed printer automatically. You must verify incoming EAMs to determine if they are new and call the local command center to verify EAM status. Then, you follow local procedures for newly injected messages.

REPORT BACK MESSAGES. Normally, these messages only need to be acknowledged; however, sometimes the message requires some action. In this case, if action is required, the message content determines what to do. Aircrews normally send these messages to give operation normal reports.

TELEMETRY MESSAGES. You receive telemetry messages on channel four of the satellite you are working with. They have barge-in status, meaning they interrupt current traffic being printed. After the telemetry message is printed, other traffic resumes printing. Telemetry messages provide information for formatting satellite commands. The USKAL operating instructions provide further information about telemetries.

AFCC/SACR 700-20, Vol 1, helps explain some of the various missions. Your trainer will also brief you on local mission support. This will give you a better understanding of what type of traffic you might handle.

STOP

Read AFCC/SACR 700-20, Vol 1, para 2-7 and 2-8, and then return to this module.

PRINTERS

There are two kinds of printers used in an AFSATCOM station for printing received messages. These are the high-speed and low-speed printers. Let's cover the low-speed printer first.

LOW SPEED. The low-speed printer is the printing portion of the ASR and prints at 100 words per minute. It has a paper take-up reel to accumulate all printed traffic. Two modes are available, automatic and manual, to roll the paper on the reel. You need to keep this traffic for later analysis by the NCOIC.

HIGH SPEED. Data readouts from MPU1 are printed on the high-speed printer. This printer operates at 3000 words per minute and only prints upper-case characters. Figures D4-2 and D4-3 illustrate the high-speed printer and its controls. The high-speed printer is divided into five sections. TO 31R5-2GSC-111-2 explains what each of these sections perform along with other technical information.

STOP

Read TO 31R5-2GSC-111-2, para 5-78 and 5-79, and then return to this module.

MESSAGE FLOW

Messages are received in the reverse order of transmission. Messages flow from the receive modem, through the MPU, and then to the designated printer. Classified messages pass through the KG between MPU2 and MPU1. Figure 4-1 illustrates this flow.

Figure 4-1. Message Flow Diagram

The MPU adds a date time group (DTG) to received messages. This DTG represents the time the message was input to the MPU. You use DTGs for reference purposes in determining the time you receive messages.

SUMMARY

Receiving messages is a major part of CGT operations. Messages will either pass through your terminal to or from a subuser, or be received by you. Three indicators alert you to an incoming message. These are the EAM alarm, the signal acquired light on the Wideband Modem control, and the receive busy light on the 1 X 3 Modem control. Incoming messages have a DTG added to them in the MPU. This helps the operator determine which message was received first. Messages are sent to either the low-speed or high-speed printer, station configuration determines which.

REVIEW QUESTIONS

Answer the following questions and check your answers with the confirmation key at the back of this book. Then, review the areas you missed.

1. What are the first indications that you are receiving a message?

2. What causes the EAM alarm to go off on your CGT?

3. Which radio receives EAMs?

4. Which rate of speed is available for printing purposes on the CGT?

5. What is the high-speed printer used for?

6. Why does the CGT place a DTG on each message and when is it added to a message?

7. Which printer is normally used for printing EAMs?

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed-book test. Your trainer will check your answers and discuss any missed questions. You are required to score 80% or more, or you must repeat the module.

When you and your trainer are satisfied that you know the material, go on to the performance procedures.

PERFORMANCE PROCEDURES

Your trainer will review with you the procedures for receiving messages as discussed in this module. The procedures must be followed exactly. All training references will be available for you to use as a guide. If you are not sure of the items in the procedures or any of the steps, now is the time to ask questions. Your trainer will demonstrate the steps necessary to perform this task. You will then practice how to receive messages on both the low-speed and high-speed printer. When you are confident with your performance, your trainer will evaluate you on this task. You will be informed on what kind of messages you will receive. Upon successful completion of the task, your trainer will certify you on the JQS.

MODULE 5
NARROWBAND(NB)/ORDERWIRE(OW) CONFIGURATION

OBJECTIVES

Given a CGT, frequencies to be used, local procedures, and satellite positioning information, configure system for NB/OW operations IAW prescribed procedures.

a. Explain the characteristics of a 1 X 3 Modem control.

b. Explain the characteristics of the Satellite RT control.

c. Explain the characteristics of the Test Translator control.

d. Explain the characteristics of the RF control unit.

e. Explain how to calibrate signal levels.

f. Explain the types of antennas used with a CGT terminal.

g. Explain the characteristics of the Antenna Positioner control.

h. Explain the procedures for configuring NB/OW radios.

i. Explain what the NB/OW channels are used for.

PREREQUISITES

Must have completed QTP Modules 1 thru 4.

INFORMATION

So far, we have covered storing, transmitting, and receiving messages. Now, we will cover some of the radio equipment which allows you to transmit and receive these messages. This will include selecting satellite channels and plans, calibrating modems, and changing satellite positions. With this, you should better understand the total process involved in processing messages.

Configuring the CGT is a rather simple process. You will work with the RF and Antenna Equipment Group. Also, you will use modems rather than the actual transmitter and receiver to control your frequency. These modems are connected to the radio equipment for transmissions.

1 X 3 MODEM CONTROL

You will use the 1 X 3 Modem control to select satellite channels. This modem operates in full duplex with any narrowband radio. You can transmit on one channel and receive on three channels. TO 31R5-2GSC-111-2 details this modem.

STOP

Read TO 31R5-2GSC-111-2, para 5-45 thru 5-50, and then return to this module.

You select channels by turning the control dials on the 1 X 3 Modem control. You can select any one of twelve channels. Channel selection is used with satellite plans chosen on the Satellite RT control. Figures D5-1 thru D5-3 in Diagram book illustrate sample satellite plans. Notice that up link frequencies are different from down link frequencies. This allows for full-duplex operations. The MPU stores received messages when more than one channel is receiving at a time.

You can perform self-testing on the 1 X 3 Modem control to detect problems with the equipment. Figure 5-1 illustrates the 1 X 3 Modem control.

Figure 5-1. 1 X 3 Multi FSK Modem Control Unit

LAMP TEST. Placing the switch in the LAMP position allows testing of all control lamps on the 1 X 3 Modem control and the Satellite RT control. If necessary, have maintenance replace any bad bulbs.

CONTROL TEST. The control test provides the status of the 1 X 3 Modem control and the Satellite RT control. Place the switch in the control position to run a test. If it detects an error, line problems exist between the 1 X 3 Modem control and the RT control. The fault light will light on the 1 X 3 Modem control for modem errors. Fault lights illuminate on both the 1 X 3 Modem control and the Satellite RT control for RT control errors.

RT TEST. The Receive-Transmitter (RT) test detects faults in the RT control/monitor module.

MODEM TEST. This test checks the modem fault status line and the three receivers. During this test, the three receivers are tuned to the modem's transmit frequency. The 1 X 3 modem control conducts a loop test by transmitting the normal preamble. If no fault is detected, the receive busy lamps light.

KEY TEST. The key test monitors the power output of the Satellite RT control. A fault in the RT power supply will light the fault lamp on the 1 X 3 Modem control.

NOTE

Satellite plan A, B, or C must be selected on the Satellite RT Control. Plans D and E will give inaccurate readings during testing.

OPERATE TEST. You can place the 1 X 3 Modem control in any one of three Sync RCVR positions. This allows continuous monitoring of the 1 X 3 Modem control power supply. Fault status lines on the RT control and the 1 X 3 Modem control are also monitored. One of these positions is selected to provide information for TDM operations. You will learn more about this in Module 10.

The modem generates two unique preambles when transmitting messages. These preambles consist of 4, eight-bit synchronous ASCII characters. The first preamble (W, U, SYN, SYN) is used to place the receiving 1 X 3 Modem in receive mode. The modem also generates the ETX suffix which tells the receive modem that the message transmission is complete. The second preamble (W, U, SYN, E) is similar to the first preamble except it also sets off the EAM alarm. This preamble is part of the EAM message.

SATELLITE RT CONTROL

The Satellite RT control is used to select satellite frequency plans. Refer to Figure D5-4 as we discuss this control. You can choose preselected plans or dial in an alternate transmit frequency. The receive frequency is not affected when using an alternate transmit frequency. Select one of the frequency plans for your desired receive frequency. TO 31R5-2GSC-111-2 provides further details on using the Satellite RT control.

STOP

Read TO 31R5-2GSC-111-2, para 5-33, and then return to this module.

Use the satellite selector switch to select satellite plans. Placing the switch to any of the five letters, selects that particular plan. To select an alternate frequency, turn the control dials to the desired frequency. This is used during satellite commanding and EAM broadcasting. Place the OFF/SATL/ALTN XMT FREQ selector switch in one of these two modes (WB or NB) during NB/OW operations. The Satellite RT control has two indicators: power and fault. The power light indicates the satellite selector is on, and the fault light alerts you to faulty equipment.

TEST TRANSLATOR CONTROL

The Test Translator control tests all radio communication channels. This control mixes an internally generated RF signal to the up link signal. This mixture creates a down link frequency to test all radios in a full RF loop. Figure 5-3 illustrates the Test Translator control.

Figure 5-3. Test Translator Control

The following controls and indicators are used to operate the Test Translator control.

SIGNAL CALIBRATE METER. Used to indicate RF output signal levels. A set level point is located midscale for calibrating signal levels.

LEVEL ADJUST. Used for adjusting RF gain on the Test Translator control. Rotate clockwise to increase RF gain and counterclockwise to decrease RF gain.

MODE SELECT. Used to select wideband or narrowband mode of operations.

LOOP TEST. Three pushbuttons are available to select which antenna to use for a loop test.

LVL SELECT (DBW). This is used to adjust the RF output on the Test Translator control.

You can use the Test Translator control to detect bad equipment by placing the modem control in the KEY test position. If no signal is acquired on the Test Translator control, you have a bad modem control. You can also compare acquired signals between modems to detect deteriorating equipment. These comparisons must be made between comparable units, such as WB to WB or NB to NB.

RF CONTROL UNIT

The RF Control unit controls the RF configuration of radio channels. There are seven key switches used to place modems one through seven in an RF loop. Station configuration determines which switch controls each modem. There are also seven indicator lights used to show which modems are keyed. Figures D5-5 and D5-6 illustrate the RF control and its controls and indicators. Along with other RF equipment, the RF control has a fault light for detecting equipment faults.

SIGNAL CALIBRATION

You may need to use the Test Translator control to calibrate signal levels. This calibrates the modem to the current frequency in use and provides a better transmit signal. Use the following steps to assist you in calibrating your equipment.

1. Ensure your receive channel is the same as your transmit channel.

2. Place the modem being calibrated in a loop on the RF Control unit.

3. Place the LVL Select (DBW) switch between 156 and 165.

4. Depress the required loop test pushbutton(s) on the Test Translator control.

5. Adjust the RF gain on the Test Translator control using the signal calibrate window as a guide. Center the meter in the calibration window to midscale for a good calibration.

NOTE

Both narrowband and wideband modems can be calibrated using this control. Place the Mode Select switch to the appropriate modem being calibrated.

Once you have finished calibrating the equipment, you are ready to process traffic. You may, however, need to change your antenna position.

ANTENNAS

CGTs consist of at least three satellite antennas which are hardwired to predetermined radio devices. Two kinds of antennas exist: 6-dB and 14-dB. As stated earlier, these antennas can be disconnected for loop tests. Each station differs so ask your trainer which antenna is connected to which device.

6-dB ANTENNAS. The 6-dB antenna is a single-element device. This antenna can operate between 225 and 400MHz without tuning or adjustments. Refer to Figure D5-7 for an example of a 6-dB antenna.

14-dB ANTENNAS. The 14 dB antenna is a 5-element array of crossed-dipoles. Like the 6-dB antenna, this antenna can

also operate between 225 and 400MHz without tuning or adjusting. Figure D5-8 illustrates the 14-dB antenna.

Both of these antennas have tracking capabilities. This requires either a manual positioner or an electrical motor driven assembly. Maintenance personnel normally position the antenna manually. Due to this, we will cover only the electrical drive assembly.

ANTENNA POSITIONER CONTROL

The Antenna Positioner control supplies the electrical drive assembly with signals to position the antenna. The control displays elevation and azimuth information necessary to change antenna direction. Refer to Figure D5-9 for an illustration of the Antenna Positioner control. You will notice there are two toggle switches next to each scale. Use the switches to adjust antenna positions. Push the Elevation switch up to increase elevation and down to decrease it. Push the Azimuth switch left to move the azimuth counterclockwise and right to move it clockwise. Tracking antennas have an elevation range of 0 to 95 degrees and an azimuth range of 0 to 359 degrees. Both of these ranges are in 1-degree increments.

CONFIGURING SYSTEM

The NB and OW use the same RF equipment group. The difference in these systems is the type of traffic handled. Most station configurations are already set up IAW current operation plans. You may need to make further changes, however, to meet changing mission requirements. The following steps will assist you in changing your current system configuration. AFCC/SACR 700-20, Vol 1, provides you with which satellite plans are authorized for your station.

1. Select which frequency, alternate or preselected, you will use.

2. Select the desired satellite plan.

3. Select the desired transmit channel on the modem control.

4. Select the desired receive channels on the modem control.

5. Select the desired operating receive channel using the SYNC RCVR selector switch.

NOTE

The selected channel on the RCVR switch indicates which channel window was selected. This does not select the numbers inside the window.

NB/OW USAGE

You will use the Narrowband channels for the bulk of your communications traffic. This includes EAM processing and subscriber requirements. The typical CGT has four 1 X 3 modems dedicated for Narrowband operations. In addition, there are two 1 X 3 modems dedicated for Orderwire operations. Narrowband channel 12 is provided for OW operations. You will use the OW to coordinate matters within a network and satellite commands. Both NB and OW traffic may be secured by using the Key Generator (KG). For specific station operations, ask your trainer.

SUMMARY

You will use the RF and Antenna Equipment group to make configuration changes to your CGT. The 1 X 3 Modem control handles channel selection. The Satellite RT control handles satellite plan selection. There are five satellite plans and 12 channels to choose from. AFCC/SACR 700-20, Vol 1, informs you which is authorized. You can calibrate the modem with the Test Translator control. Use the RF Control unit to place the modem in a loop for testing. Antennas are hardwired to predetermined devices. Your station will have a 6-dB or 14-dB antenna or a combination of both. The Antenna Positioner control changes antenna elevation and azimuth.

REVIEW QUESTIONS

Answer the following questions and check your answers with the confirmation key at the back of this book. Then, review the areas you missed.

1. What must you do if you don't want to use the transmit frequency on a satellite plan but must still use that particular receive frequency?

2. How do you set your Satellite RT control to transmit on an alternate frequency?

3. What is the difference between a satellite plan and a channel?

4. If your receive channels were set for channel 7 in window 1, channel 4 in window 2, and channel 1 in window 3, in which position would the Sync Rcvr switch be placed to receive on channel 1?

5. Which position must the Lvl Select switch be in while adjusting the signal calibration?

6. Where do you position the signal calibration needle while calibrating the signal?

7. Which channel is set on the receive channel if your transmit channel is set to 4 when doing a loop test?

8. What's the purpose for signal calibration?

9. Where do you find the satellite plans authorized for your station?

10. What range do you have in adjusting the antenna's elevation?

11. What range do you have in adjusting the antenna's azimuth?

12. What's the difference between a 6-dB antenna and a 14-dB antenna?

13. When the Elevation switch is pushed in the down position, which direction will the antenna move?

14. When the Azimuth switch is pushed right which direction will the antenna move?

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed book test. Your trainer will check your answers and discuss any missed questions. You are required to score 80% or more, or you must repeat the module. When you and your trainer are satisfied that you know the material, go on to the performance procedures.

PERFORMANCE PROCEDURES

Your trainer will review with you the procedures for configuring the NB/OW as discussed in this module. The procedures must be followed exactly. All training references will be available for you to use as a guide. If you are not sure of the items in the procedures or any of the steps, now is the time to ask questions. Your trainer will demonstrate the steps necessary to perform this task. You will then practice how to configure the NB/OW. When you are confident with your performance, your trainer will evaluate you on this task. Your trainer will inform you which satellite channels and plans to use. Also, you will be informed where to position the satellite antenna. Upon successful completion of the task, your trainer will certify you on the JQS.

MODULE 6
WIDEBAND (WB) CONFIGURATION

OBJECTIVES

Given a CGT, transmit and receive addresses to be used, local procedures, and antenna positioning information, configure system for WB operations IAW prescribed procedures.

a. Explain the characteristics of a Wideband Modem control.

b. Explain how to calibrate signal levels.

c. Explain the procedures for configuring WB radios.

d. Explain what the WB channel is used for.

PREREQUISITES

Must have completed QTP Modules 1 thru 5.

INFORMATION

In this module, we will cover how to configure the CGT for Wideband operations. Most of the setup operations are the same as Narrowband. The big difference is you will configure a Wideband Modem control instead of the Narrowband Modem control. We will also discuss some of the operations conducted over the Wideband channels.

Wideband operations differ greatly from Narrowband operations. With Wideband operations, you have only one channel available for each satellite plan. This channel, however, has a 500kHz bandwidth. This bandwidth permits several people to access the wideband channel at the same time. You use the Wideband Modem to gain this access. TO 31R2-2GSC-111-2 provides details about the Wideband Modem.

STOP

Read TO 31R5-2GSC-111-2, para 5-51 thru 5-55, and then return to this module.

WIDEBAND MODEM CONTROL

Figure D6-1 in the Diagrams book illustrates the Wideband Modem control. Figure D6-2 explains the controls and indicators. Refer to these figures as we discuss the Wideband Modem control.

The Wideband Modem control has four thumbwheels to select transmit and receive addresses. Each thumbwheel is numbered from 0 to 7; often called Base 8. You will use these to select your frequency-hopping codes. These codes range from 00 through 77 (Base 8) which equates to a maximum of 64 possible addresses. AFCC/SACR 700-20, Vol 1, provides you with which addresses to use.

Like the 1 X 3 Modem control, you can perform self-testing on the Wideband Modem control. These testing features are similar to the 1 X 3 Modem control. The various test capabilities are listed next.

LAMP TEST. Place the switch in the LAMP position. This test identifies defective lamps. If all lamps remain unlit, there may be a problem with the power supply.

CONTROL TEST. The control test provides a self-test of the Wideband Modem control and the Satellite RT control. Place the switch in the CONTROL position to run a test. The SIG ACQ and IDLE lamps will illuminate for a successful test on the Wideband Modem. You should also receive a signal quality display of 55. The Satellite RT control fault lamp illuminates if a fault is detected.

RT TEST. The Receive-Transmitter (RT) test detects faults in the RT control/monitor module. The fault lamp lights within one second if a fault is detected.

MODEM TEST. This test checks the Wideband Modem. If it detects no errors, the SIG ACQ light illuminates within 6 seconds. The fault light illuminates for errors. You can also test the Wideband Modem loop if the SIG ACQ lamp is illuminated. You must initiate a test message from the ASR to detect errors.

KEY TEST. The key test monitors the power output of the Satellite RT control. This test is the same as the one on the 1 X 3 Modem control.

NORM. The test switch must be in the NORM position for all active operations. This sets the Wideband Modem control to the normal wideband channel.

SPL. Do not place the Wideband Modem control in the SPL position. The Navy uses this position for setting up an alternate wideband channel.

The Wideband Modem control has a Doppler switch to control the Doppler range of the modem's receiver. Two positions, NORM and EXTD, allow you to adjust this range. When placed in the NORM position, you have a range of plus or minus 400Hz. When placed in the EXTD position, you have a range of plus or minus 800Hz. This range compensates for variations in the modem's nominal operating frequency due to satellite and airborne terminal movement. You will usually operate in the NORM position. Aircraft normally use the EXTD position to compensate for aircraft movement.

Like the 1 X 3 Modem, the Wideband Modem transmits information to the receiving modem. This information includes receive timing and frequency offset information. To establish initial communications, you must send a long preamble (532 chips/5.32 seconds) for the first message. This provides the receiving modem with all the required information to establish a link. This long preamble is sent before all messages when you operate in the SYNC NORMAL position. You can shorten the preamble, however, by operating in the Sync Hold mode.

In the Sync Hold mode, you still have to send a long preamble on the initial message. After establishing a link, both stations must put the SYNC switch in the HOLD position. This allows the receiving modem to retain the last transmit information for subsequent use. Once in sync hold, all following messages are transmitted with a short preamble (35 chips/.35 seconds). The short preamble allows you to increase broadcast speed. This is because the receive modem only looks for a start-of-message signal since it retains all other information.

NOTE

The Modem control has a flashing indicator lamp used to indicate you are in the Sync Hold mode.

The modem may start to lose sync while in the HOLD position during extended use. If this happens, push the Preamble button on the Modem control before you transmit your next message. This will rebroadcast a long preamble, allowing the receive modem to re-sync.

The Wideband Modem control has a Query pushbutton used to indicate wideband activity. You can determine if your transmit address is currently in use by pushing this button. When pushed, the receive address will temporarily retune to the transmit address. This allows the modem to determine if the channel is currently busy. This process helps keep you from broadcasting over someone else's traffic. If an address is busy, the BUSY lamp will come on within five seconds. If an address isn't busy, the IDLE lamp will come on within five seconds.

NOTE

The Query button disables your receive capabilities and causes you to lose any possible incoming traffic. Do not press this button while currently receiving traffic.

We stated earlier in Module 4 the SIG ACQ lamp alerts you to incoming messages. The Wideband Modem control also has a signal quality (SIG QUAL) indicator. This indicator gives a visual indication of the quality for incoming signals. Incoming signals must have a minimum signal

quality of 30. The maximum possible signal quality for incoming signals is 64. Normally, most traffic falls between 50 and 55. If signal quality starts to decrease, resend a long preamble. If there is no improvement, your Wideband Modem may be going bad. Have maintenance check your equipment.

SIGNAL CALIBRATION

You calibrate the Wideband Modem in much the same manner as for the Narrowband Modem. The only difference is you match addresses rather than channels. Other steps to calibrate the modem remain the same.

CONFIGURING SYSTEM

Most stations have preset Wideband configurations. These are set up IAW current OPS PLANs. Since there is only one frequency per satellite plan, most major changes occur with required addresses. If the satellite plan needs changing, you make this change on the RT control. The procedures for an address change were previously discussed.

NOTE

Alternate transmit frequencies are not used for Wideband operations.

WB USAGE

The Wideband channel is primarily used for CINC internetting. PCC and NCE terminals are the only WB net members with two Wideband Modems dedicated for this purpose. AFCC/SACR 700-20, Vol 1, provides you with further details on Wideband operations. TO 31R2-4-481-1 illustrates how to establish a Wideband net.

STOP

Read AFCC/SACR 700-20, Vol 1, Chap 6 and Chap 2, para 2-8; and TO 31R2-4-481-1, para 2-15, and then return to this module.

SUMMARY

Wideband configuration is performed in much the same manner as for Narrowband. You select addresses on the Wideband Modem control and choose a satellite plan on the RT control. After calibrating the modem, you are ready to process traffic. Two kinds of preambles are used for transmissions: short and long. The long preamble provides the receiving modem with receive timing and frequency offset. After the modem has this information, both stations can go to SYNC HOLD. This allows for quicker broadcasts since the receive modem has already stored the receive information. You can check Wideband activity with the QUERY button. Remember, this temporarily disconnects receive capabilities. AFCC/SACR 700-20, Vol 1, provides detailed information concerning Wideband operations.

REVIEW QUESTIONS

Answer the following questions and check your answers with the confirmation key at the back of this book. Then, review the areas you missed.

1. While performing a loop test, what is the receive address if your transmit address is 28?

2. What is the purpose of the Sync Hold switch?

3. What happens when you press the Preamble button?

4. How would you determine if a particular transmit address is busy?

5. What is the normal signal quality range on the Wideband Modem control?

6. What are transmit and receive addresses on the Wideband Modem control?

7. What is the Doppler switch used for?

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed-book test. Your trainer will check your answers and discuss any missed questions. You are required to score 80% or more, or you must repeat the module. When you and your trainer are satisfied that you know the material, go on to the performance procedures.

PERFORMANCE PROCEDURES

Your trainer will review with you the procedures for configuring the WB as discussed in this module. The procedures must be followed exactly. All training references will be available for you to use as a guide. If you are not sure of the items in the procedures or any of

the steps, now is the time to ask questions. Your trainer will demonstrate the steps necessary to perform this task. You will then practice how to configure the WB. When you are confident with your performance, your trainer will evaluate you on this task. Your trainer will inform you which satellite channels and plans to use. Also, you will be informed where to position the satellite antenna. Upon successful completion of the task, your trainer will certify you on the JQS.

MODULE 7
STATUS DISPLAY UNIT INDICATIONS

OBJECTIVES

1. Explain the characteristics of the Status Display Unit (SDU).

2. Explain the screen information displayed on the SDU.

3. Explain how to remove program alarms.

4. Explain how to reload the SDU information if the display information is lost.

PREREQUISITES

Must have completed QTP Modules 1 thru 6.

INFORMATION

Throughout the previous modules you have learned how to change and configure the CGT. We will now cover how to monitor these changes and determine the CGT's current conditions. You will learn what the SDU's purpose is, how to interpret screen information, and how to reload display information.

STATUS DISPLAY UNIT

The SDU provides CGT operators with a visual display of current CGT conditions and configuration. Three screens are available to provide you with various information. TO

31R5-2GSC-111-2 and CCSOM 171-4 provide details about SDU characteristics.

STOP

> Read TO 31R5-2GSC-111-2, para 5-72 and 5-73, and CCSOM 171-4, para 3.2 and 3.2.1, and then return to this module.

CONTROLS AND INDICATORS. The SDU has several controls and indicators at the top to control picture quality and power. Refer to Figures D7-1 and D7-2 in the Diagrams book for an explanation of each, and then return here.

DISPLAY INFORMATION

You can choose between three different displays to obtain information on CGT conditions. Refer to Figures D7-3 and D7-4 as we cover these items. These will assist you in learning which screen provides the information you need. Also, CCSOM 171-4, Atch 2, illustrates what information is displayed on Screen 1 of your SDU.

KEYED XMTRS. Screens 1 thru 3 provide you with the status of keyed transmitters. Transmitter indicators illuminate when the transmitter is currently keyed.

RCVD ROUTING. Screen 1 displays how you configured your CGT for receiving traffic. This includes which modem you routed to which printer and if you used a KG as an intermediate device. This column also displays your satellite configuration.

MESSAGE BUFFERS. Screens 1 thru 3 display which buffers contain traffic. The buffer indicator illuminates when

that particular buffer has traffic loaded. In addition to buffer status, these screens display two other program alert indicators. Alert 1 illuminates when you are in message suppression. CCSOM 171-4 explains message suppression.

STOP

Read CCSOM 171-4, para 3.7.2, and then return to this module.

Alert 2 illuminates when your station is in EAM assembly mode. Both alert indicators automatically turn off when you leave that particular operation.

POLL GROUPS. Screen 3 displays poll groups established. Since polling is no longer conducted, don't concern yourself with this column.

PROGRAM ALARM MESSAGES. Screen 3 displays all current program alarm messages. CCSOM 171-4 illustrates some program alarms Screen 3 may display.

STOP

Read CCSOM 171-4, Atch 1, and then return to this module.

MISCELLANEOUS INFO. Screen 3 has a MISC section to provide information not covered in other columns, e.g., kinds of message suppression. Your trainer can explain other possible entries in this column.

KEYBOARD ROUTING. Screen 3 has a keyboard routing column which is used to display current keyboard routing status. Remember, this is the actual keyboard, not the

printer or entire ASR. You can use this column to keep track of where you routed your subusers' keyboards.

REMOVING PROGRAM ALARMS

Program alarms are only short term conditions. When the condition no longer exists, you must erase the message from the SDU. The SDU will not automatically update this information when the condition ends. CCSOM 171-4 discusses the procedures to use in removing these alarm messages.

STOP

Read CCSOM 171-4, para 3.2.3, and then return to this module.

RELOADING SDU

Sometimes it is necessary to reload current information in the SDU. This can happen when you have a temporary SDU display loss. CCSOM 171-4 discusses reloading the SDU.

STOP

Read CCSOM 171-4, para 3.2.2, and then return to this module.

SUMMARY

The SDU provides you with three screens indicating current CGT conditions and configuration. Screens 1 and 2 are similar except Screen 2 does not show receive routing. Screen 3 shows program alarms, miscellaneous information, and keyboard routing. You must remove program alarms after the condition ends. The SDU updates all other conditions

automatically. You can reload SDU information if you lose the SDU display. You must use the reload COMSUP command to do this.

REVIEW QUESTIONS

Answer the following questions and check your answers with the confirmation key at the back of this book. Then, review the areas you missed.

1. Which screen shows keyboard routing?

2. What is the difference between Screens 1 and 2?

3. Which screen must you display to obtain program alarm status?

4. How do you go from one screen to another on the SDU?

5. How do you reload the SDU display?

6. What is message suppression?

7. What does the Alert 2 indicator indicate when illuminated?

8. What must you do first before reloading SDU software?

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed-book test. Your trainer will check your answers and discuss any missed questions. You are required to score 80% or more, or you must repeat the module. When you and your trainer are satisfied that you know the material, go on to the next module.

MODULE 8
IPL PROCEDURES

OBJECTIVES

Given a CGT with Tape Transport Unit installed; TO 31R5-2GSC-111-1, Table 4-50; CCSOM 171-4, para 2.4 and 3.3; and local procedures, perform an initial program load IAW prescribed procedures.

a. Explain the purpose of an initial program load (IPL).

b. Explain how to perform an IPL.

c. Explain the difference between a brief and a full diagnostic test.

d. Explain how to update the internal clock.

e. Explain the purpose for Bin regulation.

PREREQUISITES

Must have completed QTP Modules 1 thru 7.

INFORMATION

We will now discuss procedures for preparing the CGT for operation. This includes IPL procedures, the purpose of an IPL, how it's performed, and how to update the internal clock.

IPL PURPOSE

The CGT operates much like a computer only on a larger scale. Everything you do, whether you're configuring radio modems or typing messages, involves a computer program. This program is contained on a Tape Transport Unit (TTU) which is inserted into a magnetic tape memory (MTM) unit. Figure D8-1 in the Diagrams book illustrates the MTM.

To prepare the CGT for operations, you must perform an IPL. This loads the CGT software from the TTU into the Central Processor Unit. Once loaded, the program information allows you to perform your daily functions.

You may need to load the system software for various reasons, such as power flux and outages, MPU message overloads, buffer overloads, and a system lock-up. Also, you often use IPLs to clear system faults. This allows you to clear a system fault without calling in maintenance personnel. Remember, the AFSATCOM mission is critical, and you can't afford downtime. However, if you can't clear a system fault, contact maintenance.

IPL PROCEDURES

Now that you know some reasons for performing an IPL, let's discuss how to perform one. CCSOM 171-4 and TO 31R5-2GSC-111-2 provide instructions for this process. You will also find step-by-step procedures outlined in TO 31R5-2GSC-111-1.

STOP

Read CCSOM 171-4, para 2.4, TO 31R5-2GSC-111-2, para 5-211 and 5-212, and TO 31R5-2GSC-111-1, Table

4-50, and then return to this module.

You begin an IPL by resetting the SDU and pressing the IPL toggle switch on the Processor control. Refer to Figure D8-2 for an illustration of the Processor control. If the CPU detects an error, it will stop the loading process and print an error message on Low-speed printer 1. If this occurs, restart the IPL to see if the error will clear by itself. If an error reoccurs, contact maintenance to correct the problem.

IPLs take six to twelve minutes to complete when conducting a full diagnostic test. This time varies from terminal to terminal so ask your trainer for your terminal's time. You can reduce loading time by conducting a brief IPL. This only takes three to five minutes and only checks volatile memory. A full diagnostic test checks both volatile and nonvolatile memories. This is the reason for the time difference.

CLOCK UPDATES

Once the CPU completes the program load, it prompts you to update the system clock. This is required for all IPLs, but you can also change the date again later. CCSOM 171-4 outlines how to perform this procedure.

STOP

Read CCSOM 171-4, para 3.3, and then return to this module.

BIN REGULATION

We stated you must perform IPLs because of system lock-ups. Lock-ups can usually be avoided, however, with

Bin Regulation. Bin Regulation is a system function used to help prevent overloads and lock-ups, therefore, eliminating the need for an IPL. TO 31R2-4-481-1 and CCSOM 171-4 explain how Bin Regulation works and some of its limitations.

STOP

Read TO 31R2-4-481-1, para 3-34, and CCSOM 171-4, para 3.10, and then return to this module.

SUMMARY

An IPL provides the CGT with its operating program. After initiated, the CPU will ask you which diagnostic test you desire. If you do not respond within 30 seconds, a full test is automatically performed. A full IPL takes six to twelve minutes and checks both volatile and nonvolatile memories. Brief IPLs check only volatile memory and take three to five minutes to complete. You can sometimes use IPLs to clear system faults preventing the need to call maintenance. After the CPU is finished loading, you must update the system clock.

REVIEW QUESTIONS

Answer the following questions and check your answers with the confirmation key at the back of this book. Then, review the areas you missed.

1. What are the steps involved in performing an IPL?

2. What is indicated if the CPU run light goes off during an IPL?

3. What do you do if you receive an error message and the IPL sequence is aborted?

4. What's the difference between a brief IPL and a full IPL?

5. How much time do you have to respond to the diagnostic inquiry before a full IPL is implemented?

6. What are the commands for a brief and a full IPL?

7. How do you know when the diagnostics process is complete?

8. How long does it take to perform a brief and a full diagnostic test?

9. How do you update the real-time clock on the CGT?

10. When is an IPL performed?

11. What is a magnetic tape memory unit?

12. Why do you reset the SDU for an IPL?

13. What is the purpose of Bin Regulation?

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed-book test. Your trainer will check your answers and discuss any missed questions. You are required to score 80% or more, or you must repeat the module. When you and your trainer are satisfied that you know the material, go on to the performance procedures.

PERFORMANCE PROCEDURES

Your trainer will review with you the procedures for performing an IPL as discussed in this module. The procedures must be followed exactly. All training references will be available for you to use as a guide. If you are not sure of the items in the procedures or any of the steps, now is the time to ask questions. Your trainer will demonstrate the steps necessary to perform this task. You will then practice how to perform an IPL. When you are confident with your performance, your trainer will evaluate you on this task. Upon successful completion of the task, your trainer will certify you on the JQS.

MODULE 9
SYNCHRONIZED OPERATIONS

OBJECTIVES

1. Given a configured CGT; TO 31R5-2GSC-111-1, Table 4-64; and local procedures, configure the Command Post (CP) Synchronizer for Random operations IAW prescribed procedures.

a. Explain the characteristics of the CP Synchronizer.

b. Explain the characteristics of Random operations.

c. Explain how to configure the CP Synchronizer for Random operations.

2. Given a configured CGT; channels to use; TO 31R5-2GSC-111-1, Table 4-65; and local procedures, configure the CP Synchronizer for Time-Division Multiplex (TDM) 1 operations IAW prescribed procedures.

a. Explain the characteristics of TDM 1 operations.

b. Explain how to configure the CP Synchronizer for TDM 1 operations.

3. Given a configured CGT; channels and codeword to use; satellite telemetry; TO 31R5-2GSC-111-1, Table 4-66; MITRE, Chap 5.15; and local procedures, configure the CP Synchronizer for TDM 2 operations IAW prescribed procedures.

a. Explain the characteristics of TDM 2 operations.

b. Explain how to configure the CP Synchronizer for TDM 2 operations.

c. Explain how to place the satellite in TDM 2 mode.

4. Given a configured CGT; TO 31R5-2GSC-111-1, Tables 4-68 thru 4-71; current OPS Plan; and local procedures, transfer Net Control IAW prescribed procedures.

a. Explain the characteristics of the Sync Subnet Control.

b. Explain the procedures for transferring Net Control.

PREREQUISITES

Must have completed QTP Modules 1 thru 8.

INFORMATION

We will discuss how to configure the CP Synchronizer for synchronized operational requirements. You will learn how to load codes and time slots and the characteristics of each of these modes. In addition, we will cover the procedures for transferring Net Control during TDM operations.

CP SYNCHRONIZER

You will use the CP Synchronizer to control the flow of Narrowband traffic for a designated net. You can operate in three different modes: Random, TDM 1, and TDM 2. This gives you some control over when a terminal can transmit a message and on what frequency. Which mode you operate in determines the amount of control you have. Figures D9-1 and

D9-2 in the Diagram book illustrate the CP Synchronizer and its controls and indicators. Refer to these illustrations as we cover each mode of operation.

RANDOM MODE

Stations operating in Random mode can transmit any time the NB channel is inactive. However, Random mode limits stations to a message length of 4,096 characters. They are, however, free to transmit a message of any classification. Synchronization is not provided during this mode.

To establish a net in Random mode, you place the CP Synchronizer Command Selector switch in the RNDM position. Following this, press the load button. The CP Synchronizer transmits the sync message UUU DC4 DC4 RANDOM ETX when you press the load button. This message alerts all users' Force Synchronizers that you are now in Random mode. Users can determine the operational mode by looking at their frame counter. A blank frame counter indicates Random mode. TO 31R5-2GSC-111-1 provides step-by-step procedures for setting up and operating in Synchronizer Random mode.

STOP

Read TO 31R5-2GSC-111-1, Table 4-64,
and then return to this module.

TDM 1 MODE

You will operate in TDM 1 mode when transmissions need to be limited or controlled. In this mode, you become the Master Synchronizer for the entire net. Force terminals are assigned a time slot which limits their transmission time to that period. The Net Control terminal, however, can transmit any time. Each time slot is 5.4 seconds long.

Sixty time slots define a frame which totals 5.4 minutes. This allows the transmission of 60 messages for each frame. The CP Synchronizer automatically transmits a sync message during each frame. This keeps all other synchronizers in sync with your CP Synchronizer. This leaves 59 remaining time slots for Force terminal usage. TOs 31R5-2GSC-111-2 and 31R2-4-481-1 provide further details on TDM operations.

STOP

Read TO 31R5-2GSC-111-2, para 5-58 thru 5-62, and TO 31R2-4-481-1, para 3-52 thru 3-55, and then return to this module.

Establishing a TDM 1 net is similar to a Random net. First, however, you must determine which NB radio to use. The CP Synchronizer has two XMIT windows, one for NB 1 and one for NB 2. This permits you to establish two different synchronized nets. Once you select the radio, you must select the channel you will operate on. Dial the selected channel in the appropriate NB window. When a net is not being conducted, select 0 for that NB radio. This keeps the synchronizer from controlling it.

NOTE

The transmit channel selected on the CP Synchronizer should match the transmit channel on the 1 X 3 Modem control. The only exception is if you select 0 on the CP Synchronizer.

After choosing the NB radio and channel, select the desired receive channel on your 1 X 3 Modem control. The receive channel selected provides information to the

synchronizer for TDM operations. Once you complete all these actions, you are ready to place the net in TDM 1.

You will initiate TDM 1 by placing the CP Synchronizer Command switch in TDM 1. Press the load button to transmit the sync message UUU DC1 DC1 FRAME ETX. This alerts all users you initiated TDM 1 by displaying three zeros in their frame window. This message presets an internal counter on users' synchronizers. This makes their time slot counter match your internal time slot counter. Once these counters match, all terminals are synchronized so slot 1 begins at the same time. TO 31R5-2GSC-111-1 provides you with step-by-step procedures in establishing a TDM 1 net.

STOP

Read TO 31R5-2GSC-111-1, Table 4-65, and then return to this module.

TDM 2 MODE

Operating a net in TDM 2 provides further control of net operations. You not only have control of when users transmit, but also what frequency they will operate on. AFCC/SACR 700-20, Vol 1, explains when you operate in this mode.

STOP

Read AFCC/SACR 700-20, Vol 1, para 4-10, and then return to this module.

In addition to time slot and frame synchronization, you need to establish transmit frequency synchronization. This synchronization ensures that the net's frequencies are

"hopped" in unison. This process is performed in conjunction with the internal timer. Every time a time slot changes, the transmit frequency also changes. A keyword loaded on the CP Synchronizer and the transmit channel dictate which frequency is selected. TO 31R2-4-481-1 provides further details on TDM 2.

STOP

Read TO 31R2-4-481-1, para 3-56 thru 3-60 and 3-76 thru 3-79, and then return to this module.

To initiate TDM 2, you perform all the same functions in setting up TDM 1. Once you finish that, you must load the keyword digits on the CP Synchronizer. You will use the Digit and Code dials to load these keyword digits. You can obtain the code to use from a code book. Have your trainer show you which book to use and how it's used. To load the code, place the Digit dial to position 1. Place the Code dial to the appropriate number obtained from the code book. This number can range from 0 to 7. After setting both dials, press the load button. This loads the code number in window 1. Repeat this procedure until you have loaded all 11 windows with the code number. While operating the CP Synchronizer, the code is not displayed. You can press the display button to illuminate the code if necessary.

The next step is to compose a TDM 2 satellite command. You can only use NB1 and OW radios to transmit this message. CCSOM 171-4 illustrates how to compose this message. Your trainer will also assist you with the message content.

NOTE

Read CCSOM 171-4, Atch 3, para 3, and then return to this module.

Following the satellite command, place the CP Synchronizer Command switch in TDM 2 and depress the load button. This transmits the sync message UUU DC2 DC2 FRAME 001 ETX, advising the users you have entered TDM 2.

The MITRE book and TO 31R5-2GSC-111-1 further explain the procedures in establishing TDM 2. These references provide all the required information in setting up and operating in this mode.

STOP

Read TO 31R5-2GSC-111-1, Table 4-66, and MITRE, Chap 5.15, and then return to this module.

NET CONTROL TRANSFER

So far, we have discussed the procedures in establishing a TDM net while performing as Net Control. We will now cover how to transfer the net to another CP terminal and assume command of a TDM net.

Changing Net Control is performed using the Sync Subnet control. Figures D9-3 and D9-4 illustrate the control and its indicators. The Sync Subnet control has a toggle switch with a SUBNET and PRIME position. While performing as Net Control, the toggle switch must be in the PRIME position. This allows your CP Synchronizer to act as the Master Controller. While acting as a slave unit, place the toggle switch in the SUBNET position. In addition, you must

place the CP Synchronizer Command switch in the SLAVE position. Your synchronizer will then act like a Force Synchronizer and receive signals from the Net Control.

Since you're operating as a slave, you will need to load your designated time slot on the CP Synchronizer. You can obtain this number from your current OPS Plan. Have your trainer show you where the OPS Plan is and how to locate time slot information.

You can transfer Net Control any time or in any mode. First, coordinate the change with the other terminal. At a predetermined time, the station taking over control will dial in their required transmit channel. They will place their Sync Subnet control in PRIME position. Then, you will enter your time slot, change your transmit channel, if required, and place the Sync Subnet control in the SUBNET position.

The station assuming a TDM net must always take control before you relinquish the net. If you relinquish Net Control before they assume it, synchronization may be lost. If this happens, the assuming station must reinitiate the net. During this time, net operations will be interrupted. TO 31R5-2GSC-111-1 provides step-by-step procedures in transferring Net Control in each mode.

STOP

Read TO 31R5-2GSC-111-1, Tables 4-68 thru 4-71, and then return to this module.

SUMMARY

Synchronized operations provide you with the means of controlling transmit time and frequency. Three modes, Random, TDM 1, and TDM 2, provide you with this control. In Random mode, stations can transmit any time a channel is inactive. TDM 1 mode limits a force terminal's transmit time to a station's time slot. Both transmit time and frequency are controlled in TDM 2 mode. Net Control, however, can transmit anytime. Stations can determine which mode they're operating in by checking their frame counter. For Random mode, the frame counter is blank. Three zeros indicates TDM 1 mode and 001 thru 999 indicate TDM 2 mode.

You may need to transfer Net Control at various times. This is performed using the Sync Subnet control. Once you coordinate the change, enter your designated time slot. You then change your channels, if required, and select SUBNET or PRIME on the Sync Subnet control. You can transfer Net Control in any Synchronized mode.

REVIEW QUESTIONS

Answer the following questions and check your answers with the confirmation key at the back of this book. Then, review the areas you missed.

1. What is the Sync Subnet control used for?

2. How long is a time slot in synchronized operations?

3. How many time slots define a frame?

4. What is the difference between TDM1, TDM2, and Random mode of operations?

5. What are mode of operation characters and sync characters in a transmitted sync message?

6. How many times is a random sync message transmitted?

7. How many characters can a message have in TDM2 mode?

8. If you attempted a mode change but nothing happened, what is the first thing you should check?

9. Which position will the Sync Subnet Control switch be in if you are controlling a TDM2 net?

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed-book test. Your trainer will check your answers and discuss any missed questions. You are required to score 80% or more, or you must repeat the module. When you and your trainer are satisfied that you know the material, go on to the performance procedures.

PERFORMANCE PROCEDURES

Your trainer will review with you the procedures for configuring the CP Synchronizer for Random, TDM 1, and TDM 2, and Net transfer as discussed in this module. The procedures must be followed exactly. All training references will be available for you to use as a guide. If you are not sure of the items in the procedures or any of the steps, now is the time to ask questions. Your trainer will demonstrate the steps necessary to perform each task. You will then practice performing each task. When you are confident with your performance, your trainer will evaluate you on these tasks. Upon successful completion of each task, your trainer will certify you on the JQS.

MODULE 10
MEMORY DUMPS

OBJECTIVES

1. Given a CGT; CCSOM 171-4, para 3.8; and local procedures, perform a CPU1 Operations Program dump IAW prescribed procedures.

a. Explain the purpose of a memory dump.

b. Explain what to do with memory dumps.

c. Explain the types of memory dumps available.

d. Explain the procedures for performing a CPU 1 Operations Program dump.

2. Given a CGT; CCSOM 171-4, para 3.8; and local procedures, perform a CPU2 Buffer dump IAW prescribed procedures.

a. Explain the procedures for performing a CPU2 Buffer dump.

b. Explain when System Recovery procedures are used.

PREREQUISITES

Must have completed QTP Modules 1 thru 9.

INFORMATION

From time-to-time, you may need to perform a memory dump. We will discuss the procedures for performing these dumps and why they are performed. We will also cover System Recovery procedures and when you use them.

PURPOSE

Like all equipment, the CGT malfunctions occasionally. The Command and Control Systems Center (CCSC), at Tinker AFB, is in charge of System software. The CCSC uses various memory dumps in isolating software and possibly hardware deficiencies. Should you need to perform a memory dump, the CCSC informs you which dump to perform. You perform these dumps and mail them to Tinker along with a Software Deficiency Report. CCSOM 171-4 explains what information you must provide for these reports.

STOP

Read CCSOM 171-4, para 3.8, and Atch 5 thru 8, and then return to this module.

TYPES OF DUMPS

There are three kinds of memory dumps you perform: Partial, Operations Program, and Message Buffer. Each dump provides different information in troubleshooting system faults. Partial and Operations Program dumps are in machine language, while Message Buffer dumps are in ASCII characters. Do not confuse Buffer dumps with message buffers. Remember, traffic is held in que and transmitted by precedence. The buffer, for buffer dumps, refers to the area of memory used to store messages in que. CCSOM 171-4

and TO 31R5-2GSC-111-2 further explain the characteristics of each dump.

BOLD

Read CCSOM 171-4, para 3.8.1 thru 3.8.3, and TO 31R5-2GSC-111-2, para 5-223 thru 5-226, and then return to this module.

INITIATING MEMORY DUMPS

There are several ways to initiate a memory dump. The type of dump you perform dictates which method to use. CCSOM 171-4 provides detailed instructions to perform each kind of memory dump.

NOTE

Read CCSOM 171-4, para 3.8.4 thru 3.8.8, and then return to this module.

SYSTEM RECOVERY

You can use several methods to recover from a system fault without performing an IPL. Since an IPL takes so long, this is helpful in reducing downtime. CCSOM 171-4 covers various system recovery methods along with when they are performed.

NOTE

Read CCSOM 171-4, para 3.9, and Atch 4, and then return to this module.

SUMMARY

The Command and Control Systems Center uses memory dumps to analyze system faults. You only perform memory dumps and mail Software Deficiency Reports when directed by CCSC. You perform memory dumps by following a simple menu system. This allows you to perform Partial, Operations Program, and Buffer dumps. A Buffer dump refers to the memory in the CPU used to store qued messages. Several system recovery commands are available to eliminate the need for an IPL. CCSOM 171-4, Atch 4, illustrates how and when to perform these.

REVIEW QUESTIONS

Answer the following questions and check your answers with the confirmation key at the back of this book. Then, review the areas you missed.

1. What must you do when the CGT performs an automatic memory dump?

2. What must you do for a CGT lockup?

3. Which keyboard will you use to perform a memory dump?

4. Which printer(s) will print memory dump menus?

5. When are memory dumps normally performed?

6. Why must you update the real-time clock after a memory dump?

7. What is the security classification for a CPU1 memory dump?

8. Why are memory dumps performed?

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed-book test. Your trainer will check your answers and discuss any missed questions. You are required to score 80% or more, or you must repeat the module. When you and your trainer are satisfied that you know the material, go on to the performance procedures.

PERFORMANCE PROCEDURES

Your trainer will review with you the procedures for performing memory dumps as discussed in this module. The procedures must be followed exactly. All training references will be available for you to use as a guide. If you are not sure of the items in the procedures or any of the steps, now is the time to ask questions. Your trainer will simulate the steps necessary to perform this task. You will then practice simulating how to perform memory dumps. Simulation is required to prevent mission downtime. When you are confident with your performance, your trainer will evaluate you on this task. Upon successful completion of the task, your trainer will certify you on the JQS.

MODULE 11
REMOTE SUBSYSTEMS

OBJECTIVES

Given a CGT and local procedures, configure a subuser for remote operations IAW prescribed procedures.

a. Explain the characteristics of the Remote Interface Unit (RIU).

b. Explain the characteristics of the Line Modem Unit (LMU).

c. Explain how to synchronize Remote Subsystems (RSS).

PREREQUISITES

Must have completed QTP Modules 1 thru 10.

INFORMATION

The Remote Subsystem allows you to connect subusers to your CGT. This provides subusers both transmit and receive capabilities while remaining transparent to the CGT. We will discuss the procedures for setting up a remote subuser for CGT access. You will learn the characteristics of the LMU and RIU, and how these units interface during message transmissions. Also, we will cover procedures for synchronizing two Remote Subsystems.

REMOTE INTERFACE UNIT

The RIU is the major component in the Remote Subsystem. This unit is a microprocessor used to transfer signals over ordinary telephone lines. The remote RIU can be a maximum distance of 2000 miles away without signal conditioning. Figures D11-1 and D11-2 in the Diagrams book illustrate the RIU and its controls. The RIU has two interface units for EAM inputs. Terminal modems provide these inputs upon detecting an EAM preamble. This provides EAM alerting to subusers receiving EAM messages. The RIU performs both self-testing and performance monitoring and displays the results on a four-digit display. TOs 31R5-2GSC-111-1 and 31R5-2GSC-111-2 provide further details about the RIU.

STOP

Read TO 31R5-2GSC-111-1, para 1-23 thru 1-26, and TO 31R5-2GSC-111-2, para 5-88, and then return to this module.

LINE MODEM UNIT

The LMU is a receiver-transmitter modem used to interface crypto units with telephone lines. All communication traffic, whether classified or not, is routed through the KG. This gives subusers secure transmission capabilities. Two LMUs are mounted per rack and connect to each RIU. This provides remoting capability for two subusers per rack. TO 31R5-2GSC-111-2 provides further details about the LMU's capabilities.

STOP

Read TO 31R5-2GSC-111-2, para 5-89 and 5-90, and then return to this module.

RSS SYNCHRONIZATION

You must first synchronize your RSS with your subuser(s) before remote communications can begin. This is done by changing K0K-1 cards, prepping each KG, and then resetting each KG. If the RSS doesn't synchronize, you must perform a test. First place the Mode toggle switch in the TEST position. Next turn the Display Selector switch to the 6 o'clock position. Both you and your subuser(s) must do this. After you complete this, all parties must push the start button at the same time. This procedure begins an internal test, and then synchronizes all Remote Subsystems. The test light illuminates during the test phase followed by the sync light, if synchronization was acquired. Once the RIUs synchronize, you place the Mode switch to OPERATE. You then place the Display Selector switch to the 9 o'clock position.

If synchronization was not acquired, the RIU fault light illuminates. Also, you get various readings in the ARQ window. The reading registered depends upon the fault detected. As we stated earlier, the RIU has a four-digit display; the left two indicate problems at your location, while the right two indicate a fault at the remote site.

You will only concern yourself with two kinds of fault readings: number "7" and "FF". A number "7" reading indicates you have a bad KG or bad KG cards. An "FF" reading also indicates a bad KG or KG cards. This reading is not always accurate, however, and can indicate problems

besides bad KG or KG cards. If you should receive either of these readings, rekey the KG cards. You must then reinitialize a test as described above.

If the RIUs still don't synchronize, you can perform a test message to verify the keycards are good. To do this, push in the AUD BUS button located on the LMU. Figure D11-3 illustrates the LMU panel. Route your keyboard to a subuser's printer and transmit a test message. Figure 11-1 illustrates message flow for traffic going through the Remote Subsystem. As your test message flows through the RSS, it often clears the problem. The sync light illuminates if the fault clears. If you still do not obtain a sync light, you must call maintenance for assistance.

Figure 11-1. RSS Message Flow

SUMMARY

The RSS consists of two RIUs, two LMUs, two KGs, and a rack system. This system provides subusers with remote communication capabilities. All RSS traffic is routed through a KG. This provides subusers with secure

transmission capabilities. Before remote communications can begin, you must synchronize all RIUs. You may encounter various fault codes which cause the RIU not to synchronize. Only concern yourself with "7" and "FF" fault codes. Any other codes require you to contact maintenance. You can possibly clear "7" and "FF" fault codes. Check your keycards to make sure you keyed them properly. If that does not work, send a test message to your subuser. If the fault still does not clear, contact maintenance for help.

REVIEW QUESTIONS

Answer the following questions and check your answers with the confirmation key at the back of this book. Then, review the areas you missed.

1. How many subusers can be routed to your CGT with one RSS rack?

2. What does fault code "7" indicate?

3. What is the procedure for starting an internal test on the RIU?

4. Which position should the Display Select switch be in for normal operation?

5. What is the maximum distance allowed between Remote Subsystems?

6. What does a Remote Subsystem consist of?

7. What does an "FF" fault code in the right two ARQ displays indicate?

ADDITIONAL INSTRUCTIONS

When you are ready, your trainer will administer the KEP test for this module. This is a closed-book test. Your trainer will check your answers and discuss any missed questions. You are required to score 80% or more, or you must repeat the module. When you and your trainer are satisfied that you know the material, go on to the performance procedures.

PERFORMANCE PROCEDURES

Your trainer will review with you the procedures for configuring the Remote Subsystem as discussed in this module. The procedures must be followed exactly. All training references will be available for you to use as a guide. If you are not sure of the items in the procedures or any of the steps, now is the time to ask questions. Your trainer will demonstrate the steps necessary to perform this task. You will then practice how to configure the Remote Subsystem. When you are confident with your performance, your trainer will evaluate you on this task. Upon successful completion of the task, your trainer will certify you on the JQS.

REVIEW QUESTIONS CONFIRMATION KEY

MODULE 1

1. A passive satellite reflects the ground terminal's signal; an active-repeater satellite receives the signal and retransmits it
2. The Joint Chiefs of Staff
3. Twelve
4. An Equatorial satellite
5. Channel 12, which is utilized for the system Orderwire
6. The UHF portion of the frequency spectrum
7. This is the point in a satellite's orbit at which a satellite breaks away from earth's gravitational pull
8. 500kHz
9. Synchronous and Nonsynchronous orbits
10. The Net Control Element
11. This is the point in a satellite's orbit at which the earth's gravitation pull starts drawing the satellite back towards earth
12. A satellite carries a small communications transponder.This transponder has a small transmitter attached to its outer skin which provides a signal for tracking purposes

MODULE 2

1. Hit the reset
2. The COMP/EDIT light is on
3. Enter COMP/EDIT, pick the bin the message to be verified is in, hit vrfy, and hit vrfy again to stop the printing. Edit the message and hit vrfy again to continue printing. Repeat this process until the message is correct
4. Start again from scratch and shorten the message or enter another storage area
5. Route the buffer to the printer and print a copy of the message
6. 20 characters, 40 characters, or 160 characters
7. Bin and working memory storage areas
8. The message will automatically overflow into the next available bin
9. All messages in either bins or working memory
10. Bin status can be printed out on the printer
11. 512 characters for each bin
12. MPU1
13. 8
14. Satellite commands
15. 4
16. EAM broadcast satellite commands transmit EAMs to the satellite for a continuous 5 minute broadcast. EAM bypass satellite commands store the EAM in the CGT processor for a continuous 5 minute broadcast

17. UUU for unclassified, AAA for special category, CCC for confidential, EEE for encrypted for transmission only, SSS for secret, and TTT for top secret

MODULE 3

1. This is the computer language used in AFSATCOM to assist the memory in routing equipment
2. This is the device which sends data to the MPU
3. This is the device used to encrypt messages in AFSATCOM. The KG is the only acceptable intermediate device used
4. This is the device that receives data from the MPU
5. When structuring a COMSUP Command, the maximum number of mnemonics permitted in one command, not including an intermediate device, is nine. These nine mnemonics may consist of a maximum of eight sources with one destination, or seven sources with two destinations
6. <DLE> K1KG1N11B <ETX>
7. You get an unclassified message input error
8. There is a three-character KG preamble added to messages transmitted through the KG

MODULE 4

1. The receive busy light will be lit on the 1 X 3 modem control, the signal acquired light will be lit on the wideband modem control, or the EAM alarm goes off
2. The alarm goes off when an EAM passes through your terminal. It does not matter whether the message is for your station or is just passing through your terminal onto a subuser
3. The Narrowband on Channels 1 and 3
4. The low-speed printer is rated at 100 words per minute, and the high-speed printer is rated at 3000 words per minute
5. For printing out data from MPU1
6. So you can reference when you received a message. It's added to the message when it passes through the MPU
7. The high-speed printer; but if unavailable, it will automatically be routed to the low-speed printer

MODULE 5

1. You dial in an authorized alternate transmit frequency on the satellite RT control
2. Place the Altn Freq/Satl/Off switch to the ALTN XMIT FREQ position
3. Satellite plans are a group of uplink/downlink frequencies consisting of channels. Channels are the specific up link/down link frequencies within a satellite plan. There is one up link and one down link frequency per channel
4. Place the Sync Rcvr switch to position 3
5. Place the Level Select switch between 156 and 162
6. Center the needle midway in the window

7. Channel 4. Your receive channel must be the same as the transmit channel
8. This tunes the modem to the radio frequency allowing for a better transmit signal
9. Satellite plans can be found in AFCC/SACR 700-20, Vol 1
10. The antenna can be adjusted between 0 and 95 degrees in 1-degree increments
11. The antenna can be adjusted between 0 and 359 degrees in 1-degree increments
12. A 6-dB antenna has only a single element device; the 14-dB antenna has a 5-element array of crossed-dipoles
13. Towards 0 degree
14. Clockwise

MODULE 6

1. The receive address would be 28
2. When the Sync Hold mode is engaged, the modem transmits a long preamble on the first message. All messages after that have a short preamble
3. A long preamble is sent instead of the normal short preamble when Sync Hold is in use
4. You would press the Query button to determine if a transmit address is busy. The amber light for query busy would illuminate if the address is busy. The amber light for idle busy will illuminate if the address isn't busy5. The normal range is between 50 and 55
6. These are the codes used by the system for frequency-hopping
7. The Doppler switch is used to extend the bandwidth on the modem's receiver. When the Doppler switch is in the NORM position, the range is plus or minus 400Hz. When the Doppler switch is in the EXTENDED RANGE, the range is plus or minus 800Hz

MODULE 7

1. Screen 3
2. Screen 1 shows both transmit and receive routing; whereas, screen 2 only shows transmit routing. All other indicators are the same
3. Screen 3
4. By using the COMSUP command <DLE>SDU d<EXT>. The letter d represents which screen to display
5. By using the COMSUP command <DLE>SDU R<ETX>
6. A mode of operation in which received messages of a predefined format are discarded
7. Your station is in EAM assembly mode
8. Reset the SDU

MODULE 8

1. Reset the SDU and activate the IPL switch, respond to the diagnostic inquiry, and update the clock
2. The IPL sequence has been terminated due to an error

3. Reinitiate an IPL. If the fault doesn't clear on the second IPL, contact maintenance
4. A full IPL will check both volatile and nonvolatile memories for errors. A brief IPL will check only volatile memory
5. 30 seconds
6. Type <DLE>Y<ETX> for a full IPL and type <DLE>N<ETX> for a brief IPL
7. The message SYSTEM ONLINE/PO RCU will be printed on the High-speed printer, and the IPL lamp will turn off
8. A brief IPL will take from three to five minutes to complete, and a full IPL will take from six to twelve minutes to complete
9. Enter <DLE>RCU(space)day(2 char)(space)time(4 char)(space)month (3 char)(space)year(2 char)(space)<ETX>
10. When there is a power flux, a power outage, or a system overload
11. This is a cassette cartridge that contains the CGT system program
12. This clears the current screen information loaded in the SDU so the new information can be loaded
13. This is a system function used to limit incoming messages during core saturation. This prevents the need for performing an IPL due to system overload

MODULE 9

1. This allows the NCE to command TDM2
2. 5.4 seconds
3. 60 slots define a frame. 59 slots are for slave terminals, and 1 time slot is for new sync messages
4. Random mode allows for transmitting at any time on any channel. TDM1 mode only allows transmittal of messages in your time slot. TDM2 controls your transmit time and conducts frequency "hopping"
5. The mode character defines the current mode of operation, and the sync character defines time slot synchronization
6. Once
7. No more than 40 characters
8. Verify the load button was pushed after mode change. Many errors occur in mode changes due to this reason
9. In the PRIME position

MODULE 10

1. Power-up the CGT using option 4 from the main memory dump menu
2. Turn off all the Satellite RT controls, initialize the CGT, turn the Satellite RT controls back on, and update the real-time clock
3. The ASR on side "A"
4. Low-speed printer side "A"
5. When directed to do so by the Command and Control Systems Center at Tinker AFB

6. The real-time clock stops when a memory dump is initiated. If the clock is not updated once memory dumps are complete, the clock will not be accurate
7. Top Secret until it can be determine otherwise
8. To get a printout of memory locations in the CPU in the event of a system fault or abnormal operation. This is then sent to Tinker AFB for analysis

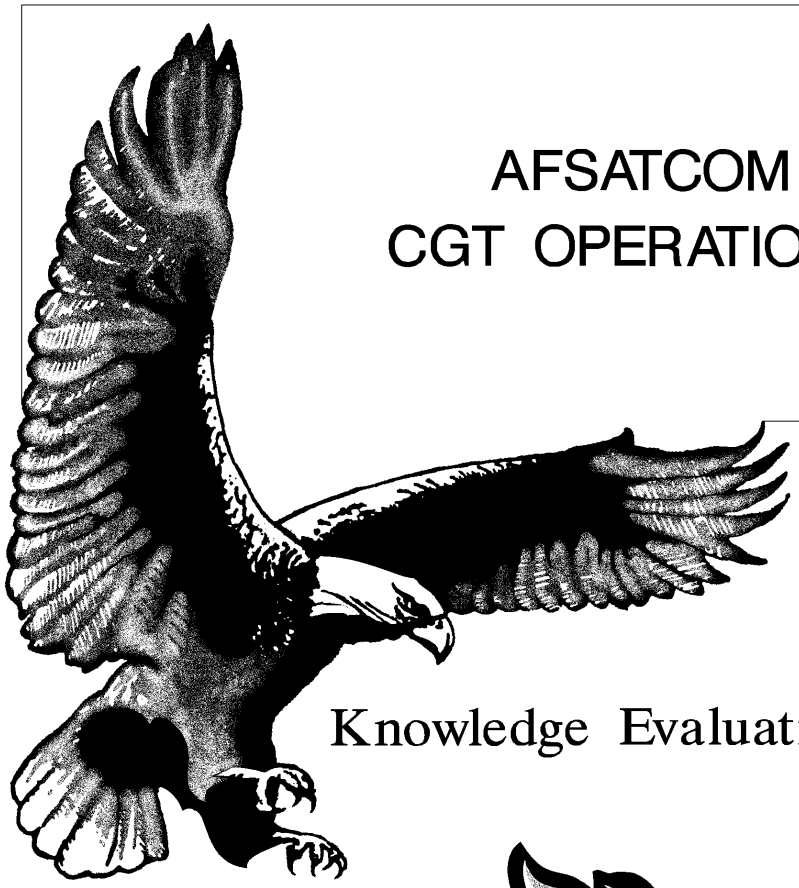
MODULE 11

1. Two
2. You have a bad set of keycards
3. Both you and your subuser(s) must place the Mode toggle switch in the TEST position and turn the Display Selector switch to the 6 o'clock position. All parties must then push the start button at the same time
4. 9 o'clock position
5. 2000 miles
6. Two RIUs, two LMUs, two KGs, and a rack assembly
7. Your remote subuser may have bad KG cards or a bad KG

QUALIFICATION TRAINING PACKAGE

QTP 492X1-212F
VOLUME II

AFSATCOM
CGT OPERATIONS



Knowledge Evaluation Pamphlet

SUPERSEDES QTP 492X1-212F,
DATED 18 DECEMBER 1989

FOR OFFICIAL USE ONLY

KNOWLEDGE EVALUATION PAMPHLET

This volume should be separated from the package immediately and stored to prevent compromise of the questions. The KEP confirmation key located at the back of this volume should be detached and stored.

After the trainee completes each module, the supervisor/trainer administers the corresponding KEP test. Using the KEP confirmation key, the supervisor/trainer checks the trainee's answers and reviews the incorrect responses. If the trainee does not achieve the minimum required score on each module test, he/she must reaccomplish the entire module. After all tests are completed, the supervisor/trainer destroys the KEP tests.

The answer sheet for the KEP is located at the back of this volume. This answer sheet may be detached to make it easier to enter the answers.

The trainee's responses to the KEP questions will aid us in evaluating the effectiveness of this training package. After the questions have been answered for all the module tests, please attach the completed and graded answer sheets and trainee/trainer surveys to the Training Certification document located in the back of the Trainer's Guide and send the package to us at this address:

81 TRSS/TSQS
601 D Street
Keesler AFB, MS 39534-2229

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KEP QUESTIONS - MODULE 1

1. Which satellite can be used for Wideband operations?

a. Nonsynchronous
b. Geosynchronous
c. Elliptical
d. Polar

2. Which narrowband channel is used for Orderwire operations?

a. One
b. Five
c. Seven
d. Twelve

3. Who coordinates narrowband channel requirements for network subscriber terminals?

a. Net Control Element
b. Master Control Center
c. Primary Control Center
d. Network subscriber terminal's Command Post

4. Which satellites use a small transmitter to allow ground stations to monitor their locations?

a. Passive and active repeater
b. Passive and inactive repeater
c. Inactive passive and active repeater
d. Inactive passive and inactive repeater

5. The AFSATCOM Network operates on which frequency range?

a. EHF
b. SHF
c. UHF
d. VHF

6. Which satellite appears stationary in the sky?

a. Polar orbit
b. Nonsynchronous
c. Elliptical orbit
d. Equatorial orbit

7. Whose responsibility is it to develop operational procedures for the AFSATCOM system?

a. Net Control Element
b. Master Control Center
c. Primary Control Center
d. Chief of Staff of the Air Force

KEP QUESTIONS - MODULE 2

1. How many buffers are available for message storage?

    a. 6
    b. 8
    c. 10
    d. 12

2. Which storage space(s) can be used to store classified messages?

    a. Buffers and Working memory
    b. Bins and Working memory
    c. Working memory
    d. Bins

3. Routing buffers to ASRs will cause buffer memory to be automatically erased so new text may be entered.

    a. True
    b. False

4. Which memory storage space is linkable?

    a. All message storage areas
    b. Working memory
    c. Buffer
    d. Bin

Questions 5 thru 9 are matching type. Match each statement in column B with the term it is associated with in column A. Each statement may be used once, more than once, or not at all. Column A terms may have more than one answer.

Column A	Column B
5. CTL C	a. Used by the CGT to distinguish
6. CTL PCOMSUP	b. Used to restart a message during editing.
7. Bins	c. Used to transmit an end-of-text.
8. Buffers	d. Memory containing 4096 characters.
9. Working memory	e. Memory containing 536 characters.
	f. Memory containing 160 characters.
	g. Linkable memory space.
	h. Volatile memory space.

10. Which memory storage space is located in MPU2?

a. Working memory
b. Buffers
c. Bins
d. None of the above

11. How many kinds of security codes are there for AFSATCOM transmitted messages?

a. 3
b. 5
c. 6
d. 9

KEP QUESTIONS - MODULE 3

Questions 1 thru 9 are matching type. Match each statement in column B with the term it is associated with in column A. Each answer may be used once, more than once, or not at all. Column A terms may have more than one answer.

Column A	Column B
1. L1	a. Routing used to transmit a message from a buffer to the Narrowband modem.
2. <DLE>B1 N11A<ETX>	
3. <DLE>A1 N21B<ETX>	b. Routing used to route a message from a bin to the Narrow b and modem.
4. Buffer	
5. K1	c. Used to interface all control and monitor input/output devices.
6. MPU2	
7. ASR	d. Intermediate device.
8. MPU1	e. Used to interface all modems.
9. KG4	f. Destination device.
	g. Source device.

10. Mnemonics are divided into how many categories?

    a. 2
    b. 3
    c. 4
    d. 5

11. Buffers are routed through the KG when transmitting classified messages.

    a. True
    b. False

12. Which keyboards may be used to enter COMSUP Commands?

    a. 3
    b. 1 and 2
    c. 1, 2, and 4
    d. Both a and b

KEP QUESTIONS - MODULE 4

1. Which message is output to a printer first?

    a. Report Back
    b. Top Secret
    c. Telemetry
    d. Special

2. How many words per minute can the high-speed printer print?

    a. 2000
    b. 2500
    c. 3000
    d. 3500

3. The signal acquired light alerts you to an incoming message on the 1 X 3 Modem control.

    a. True
    b. False

4. How many characters per line can the high-speed printer print?

    a. 1207
    b. 80
    c. 63
    d. 40

5. What does a classified message flow through first after being received by the Receive Modem?

a. KG
b. MPU1
c. MPU2
d. None of the above

6. Which of the following indicators is lit when the high-speed printer is ready to accept input signals?

a. ILLUM
b. Power
c. On-Line
d. Low paper

7. You must alert subusers to incoming EAM messages.

a. True
b. False

8. EAM messages always print on the high-speed printer.

a. True
b. False

KEP QUESTIONS - MODULE 5

Questions 1 thru 6 are matching type. Match each statement in column B with the term it is associated with in column A. Each statement may be used once, more than once, or not at all.

Column A	Column B
1. Key Test	a. Used to select satellite plans
2. Control Test	b. Used to select satellite channels
3. Operate Test	c. Used to calibrate the modem control
4. RF Control unit	d. Monitors the power supply on the 1X3 Modem
5. Satellite RT control	e. Used to place system in a loop for testing purposes
6. Test Translator control	f. Monitors the power output on the satellite RT control
	g. Detects line problems between the 1 X 3 Modem and the Satellite RT control

7. Which frequency range is available when selecting an alternate transmit frequency?

a. 100,000 to 600,000MHz
b. 125.000 to 499.995MHz
c. 225.000 to 399.995MHz
d. 275.000 to 499.995MHz

8. The Antenna Position control is only used with FIXED Antennas.

a. True
b. False

9. Which preamble will cause the EAM alarm to go off?

a. U W SYN E
b. W U SYN E
c. U W SYN SYN
d. W U SYN SYN

10. How many channels are available for Narrowband operations?

a. 5
b. 7
c. 12
d. 14

KEP QUESTIONS - MODULE 6

1. How many WB addresses are there?

    a. 7
    b. 8
    c. 64
    d. 77

2. What is the highest possible SIG QUAL display?

    a. 50
    b. 55
    c. 64
    d. 77

3. When operating in the Sync Hold mode, all messages are sent with a short preamble.

    a. True
    b. False

4. How many frequencies are selectable for a Wideband operation?

    a. 3
    b. 4
    c. 5
    d. 6

5. What is the normal SIG QUAL range during Wideband operations?

a. 50 to 55
b. 50 to 64
c. 55 to 64
d. 55 to 77

6. What is the bandwidth for a Wideband channel?

a. 800kHz
b. 500kHz
c. 500Hz
d. 400Hz

7. Incoming messages are ignored when querying a channel.

a. True
b. False

8. What kind of traffic would you handle on Wideband operations?

a. Transmitting traffic from one commander to another
b. Coordinating the set up of a Wideband net
c. Transmitting EAMs
d. All of the above

KEP QUESTIONS - MODULE 7

Questions 1 thru 7 are matching type. Match each statement in Column B with its associated item in Column A. Each statement may be used once, more than once, or not at all. Column A items may have more than one answer.

Column A	Column B
1. Alert 1	a. Displays KG routing
2. Alert 2	b. Reloads SDU software
3. Screen 1	c. Displays program alarms
4. Screen 2	d. Displays status of bins
5. Screen 3	e. Displays printer routing
6. <DLE>SDU R<ETX>	f. Indicates EAM assembly mode
7. <DLE>SDU RPA<ETX>	g. Displays status of buffers
	h. Indicates Message Suppression
	i. Clears program alarms from the screen
	j. Shows routing of subusers' keyboards

8. All condition changes are automatically updated on the SDU.

a. True
b. False

9. Program Alerts are erased when you erase Program Alarm messages.

a. True
b. False

KEP QUESTIONS - MODULE 8

1. What happens if you don't respond to a diagnostic inquiry within 30 seconds?

    a. The IPL will be aborted
    b. A full diagnostic test will automatically be performed
    c. A brief diagnostic test will automatically be performed
    d. The system program will be loaded with no test being performed

2. What happens if you don't reset the SDU before activating the IPL switch on the processor control unit?

    a. The IPL will be aborted
    b. An IPL will be performed, but the the SDU will be inoperative
    c. An IPL will be performed without providing current routing information to the SDU
    d. Nothing

3. What is checked during a brief IPL?

    a. Volatile memory
    b. No memory is checked
    c. Nonvolatile memory
    d. Volatile and Nonvolatile memory

4. How often, in seconds, is the system clock updated in MPU1?

a. 3
b. 5
c. 30
d. 60

5. An IPL will automatically configure your station routing setup.

a. True
b. False

6. What happens to traffic when MPU2 is in Bin Regulation?

a. Messages being received by MPU2 modems at the time Bin Regulation is initiated are printed. Any message received thereafter is ignored
b. The modem receivers are ignored except for any priority messages and the Orderwire
c. All traffic from MPU2 to MPU1 is inhibited except satellite commands
d. Bin Regulation does not affect MPU2

7. Which printer receives IPL abort messages?

a. L1
b. L2
c. High-speed printer
d. IPL abort messages are not sent to printers, they are sent to the SDU

8. How do you know when a successful IPL was accomplished?

   a. The CPU run light goes out
   b. An alarm message, ONLINE-DO RCU, is printed on the Low-speed printer
   c. An alarm message, ONLINE-DO RCU, is printed on the High-speed printer
   d. All of the above

KEP QUESTIONS - MODULE 9

1. How many synchronized nets can be established on a CGT with two operator consoles?

a. 1
b. 2
c. 3
d. 4

2. What does 555 displayed in the CP Synchronizer's frame window indicate?

a. TDM1
b. TDM2
c. Random
d. None of the above

3. Which synchronized mode limits message length to 4,096 characters?

a. TDM1
b. TDM2
c. Random
d. All of the above

4. When may a CP Synchronizer acting as Net Control transmit traffic?

a. In time slot 60
b. In any time slot it chooses
c. In its designated time slot
d. Whenever a user is not using its time slot

5. A Frame is 5.4 seconds long.

a. True
b. False

6. When must you manually initiate synchronization recovery while operating as a slave terminal?

a. When you enter a TDM net that already exists
b. When the frame number in the sync message is correct and your internal frame number is incorrect
c. When the frame number in the sync message is incorrect and your internal frame number is correct
d. None of the above

7. Which radio is used to transmit a TDM 2 satellite command?

a. NB1 and OW
b. NB2 and OW
c. NB1 and WB
d. NB1 and NB2

8. The transmit channel on the 1 X 3 Modem control must always match the channel selected on the CP Synchronizer.

a. True
b. False

KEP QUESTIONS - MODULE 10

1. Which memory dump is considered to be classified until determined otherwise?

    a. Partial
    b. CPU1 Buffer
    c. CPU2 Buffer
    d. CPU2 Operations

2. For which of the following would you not use initialization to recover from a system fault?

    a. CPU1 Fault
    b. Modem Lockup
    c. Terminal Lockup
    d. Power Interruption

3. What would you select to get a Partial memory dump?

    a. CPU1 Memory dump
    b. CPU2 Memory dump
    c. Both a and b
    d. None of the above

4. Which memory dump limitations exist when the High-speed printer is inoperative?

a. Only brief dumps can be performed
b. None, memory dumps will print on the Low-speed printer
c. Memory dumps can not be performed and the CGT will reinitialize
d. Memory dumps can not be performed and the CGT will power up again

5. All memory buffers are deleted when you power up the CGT after a system fault.

a. True
b. False

6. How many methods are used to initiate a memory dump?

a. 2
b. 3
c. 4
d. 5

7. If the DIN command was not previously entered, you can not use the CPU power switch to initiate a memory dump.

a. True
b. False

8. How many seconds does it take to complete a CPU1 Operation Program dump?

a. 3
b. 15
c. 75
d. 240

KEP QUESTIONS - MODULE 11

1. What is the maximum distance, in miles, allowed between a subuser and your station?

a. 500
b. 1000
c. 1500
d. 2000

2. Which part of the RSS is used to interface the KG with telephone lines?

a. Interface Monitor Unit
b. Remote Interface Unit
c. Line Modem Unit
d. All of the above

3. What's the first thing you should do when you get a "6" reading on the RIU?

a. Check the KG
b. Check the KG cards
c. Contact maintenance
d. Have your subusers check their equipment

4. Which baud rate does the LMU normally operate at?

a. 1200
b. 1600
c. 2400
d. 4800

5. Three KGs are used for each RSS rack.

a. True
b. False

6. Which part of the RSS is used to route traffic to destination devices?

a. KG
b. LMU
c. RIU
d. None of the above

7. Which type of traffic passes through a KG when routed to a subuser?

a. Classified
b. Unclassified
c. Both Classified and Unclassified
d. None of the above

8. The LMU is immune to bandwidth limitations and distortion.

a. True
b. False

KEP CONFIRMATION KEY

MODULE 1

1. b
2. d
3. a
4. a
5. c
6. d
7. b

MODULE 2

1. c
2. b
3. b
4. d
5. c
6. a
7. d,g,h
8. e
9. f,h
10. d
11. c

MODULE 3

1. f
2. b, h
3. h
4. g
5. g
6. e
7. g
8. c
9. d
10. b
11. b
12. b

MODULE 4

1. c
2. c
3. b
4. b
5. c
6. c
7. b
8. b

MODULE 5

1. f
2. g
3. d
4. e
5. a
6. c
7. c
8. b
9. b
10. c

MODULE 6

1. c
2. c
3. b
4. a
5. a
6. b
7. a
8. a

MODULE 7

1. h
2. f
3. a,e,g
4. g
5. c,g,j
6. b
7. i
8. b
9. b

MODULE 8

1. b
2. c
3. a
4. a
5. b
6. b
7. a
8. c

MODULE 9

1. d
2. b
3. c
4. b
5. b
6. b
7. a
8. b

MODULE 10

1. b
2. d
3. c
4. c
5. b
6. b
7. a
8. c

MODULE 11

1. d
2. c
3. c
4. b
5. b
6. c
7. c
8. a

KEP QUESTIONS ANSWER SHEET

NAME _____ RANK_____ DAFSC_____ DSN_____

ORGANIZATION _____DATE COMPLETED_____

MODULE 1	MODULE 2	MODULE 3	MODULE 4
1. _____	1. _____	1. _____	1. _____
2. _____	2. _____	2. _____, _____	2. _____
3. _____	3. _____	3. _____	3. _____
4. _____	4. _____	4. _____	4. _____
5. _____	5. _____	5. _____	5. _____
6. _____	6. _____	6. _____	6. _____
7. _____	7. _____,_____,_____	7. _____	7. _____
	8. _____	8. _____	8. _____
	9. _____,_____	9. _____	
	10. _____	10. _____	
	11. _____	11. _____	
		12. _____	

MODULE 5	MODULE 6	MODULE 7	MODULE 8
1. _____	1. _____	1. _____	1. _____
2. _____	2. _____	2. _____	2. _____
3. _____	3. _____	3. _____, _____, _____	3. _____
4. _____	4. _____	4. _____	4. _____
5. _____	5. _____	5. _____, _____, _____	5. _____
6. _____	6. _____	6. _____	6. _____
7. _____	7. _____	7. _____	7. _____
8. _____	8. _____	8. _____	8. _____
9. _____		9. _____	
10. _____			

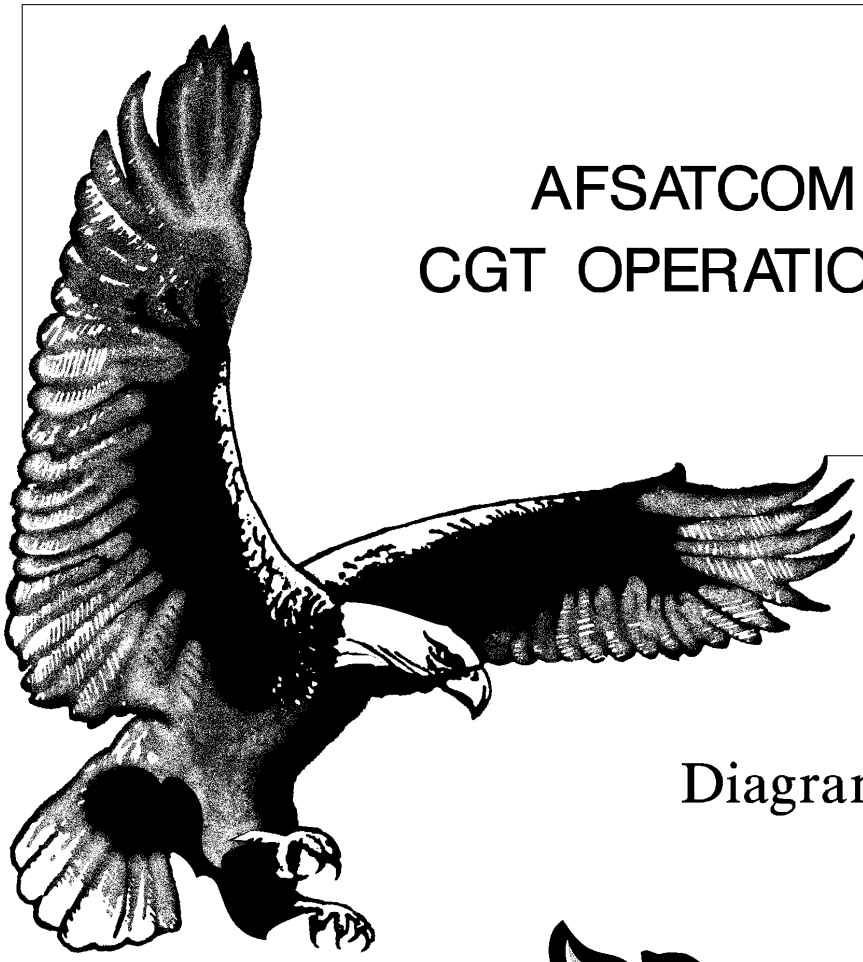
MODULE 9	MODULE 10	MODULE 11
1. _____	1. _____	1. _____
2. _____	2. _____	2. _____
3. _____	3. _____	3. _____
4. _____	4. _____	4. _____
5. _____	5. _____	5. _____
6. _____	6. _____	6. _____
7. _____	7. _____	7. _____
8. _____	8. _____	8. _____

NOTE: After completing and grading all tests, attach this answer sheet, along with the Trainee and Trainer Surveys, to the Training Certification document located in the back of the Trainer's Guide. Send the package to the following address:

81 TRSS/TSQS
601 D Street
Keesler AFB, MS 39534-2229

QUALIFICATION TRAINING PACKAGE

QTP 492X1-212F
VOLUME III



AFSATCOM
CGT OPERATIONS

Diagrams

SUPERSEDES QTP 492X1-212F,
DATED 18 DECEMBER 1989

FOR OJT USE ONLY

TABLE OF CONTENTS

Figure D2-1. AN/UGC-120B, AFSATCOM Ground ASR

Figure D2-2. AN/UGC-120B, Page Printer Assembly

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
1	CRG RETURN	This switch allows the operator to return the hammer to the left marginal position.
2	PRINT READY	Indicates that the printer is ready for operation. This is also a push-to-test switch for checking I27 the lamp.
3	POWER	Indicates when 10 VDC power is applied to the printer circuits.
4	ON/OFF	Controls input power to the unit.
5	MODE SELECT	Selects the following operating modes:
	AFSAT 75	--8 level, 8 units/character synchronous 94 words per minute; used in AFSATCOM.
	ASCII75	--8 level, 10 units/character asynchronous 75 words per minute.
	ASCII150	--8 level, 10 units/character asynchronous 150 words per minute.
	BAUDOT 75	--5 level, 7 units/character asynchronous 107 words per minute.

Figure D2-3. Teleprinter Controls and Indicators

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
6	ILLIUM CONTROL	Rheostat for controlling intensity of lamp on printhead which illuminates printed line.
7	LTR/FIG	This switch allows the operator to locally reverse the sensing of the input data in the Baudot mode from letters to figures and figures to letters
8	LINE FEED	This switch advances the paper.
9	Circuit Breaker	Provides overload protection to the 400-Hz power input circuit.
10	Circuit Breaker	Provides overload protection to the 400-Hz power input circuit.
11	ADDRESS	Pushbutton rotary hexadecimal-to-BCD switches. Permits setting in an address code for the one specific printer. Also permits easy changing of address.
12	TDS-NORM	Provides the selection of time delay or normal operation. Leave in NORM for AFSATCOM.

Figure D2-3. Teleprinter Controls and Indicators (Cont)

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
13	ENBL-DSBL	Local switch for enabling or disabling address switches. When disabled, locks out address code and printer prints all messages on input lines.

Figure D2-3. Teleprinter Controls and Indicators (Cont)

Figure D2-4. AN/UGC-120B, Keyboard Assembly

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
1	CLR MEM	Part of edit function-to erase message stored in memory.
2	CHAR INSRT	Part of edit function-used to insert a character into a message in memory.
3	BACK SPACE	Part of edit function-used to forward space one character at a time.
4	FWD SPACE	Part of edit function-causes memory contents to ETX to be printed on the page printer.
5	VRFY	Part of edit function-causes memory contents, to ETX, to be printed on the page printer.
6	COMPOSE	Indicates that the teletypewriter is in the compose and edit mode.
7	COMP EDIT	Causes the teletypewriter to go into the compose and edit mode.
8	MANUAL	Indicates that the teletypewriter is transmitting data in the manual mode.
9	MNL XMIT	This key allows direct on-line message transmission at the manual typing rate.

Figure D2-5. Keyboard Controls and Indicators

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
10	AUTO	Indicates that the teletypewriter is in the automatic transmit mode.
11	AUTO XMIT	This key enables a message for subsequent transmission as commanded.
12	POLL XMIT	This key enables automatic transmit in response to a polling inquiry.
13	POLL	Indicates that the teletypewriter is in the poll transmit mode.
14	RCV PRINT	When this key is operated, the printer prints only received messages or messages from memory for verification during compose and edit.
15	RECEIVE	Indicates that the teletypewriter is in the receive print mode.
16	RESET	This key halts any operation of the I/O device, removing the transmit enable signal, preamble disable, and causes the teletypewriter to be placed in the receive mode. When depressed, this key initiates a lamp test of all indicators on the keyboard control unit.

Figure D2-5. Keyboard Controls and Indicators (Cont)

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
17	CLEAR	Indicates that the memory is clear.
18	RCVR BUSY	Indicates the presence of incoming messages.
19	FULL	Indicates the memory has received the number of characters selected by message length switch.
20	SECURE	Indicates receipt of a secure signal from external system. (Routed through a KG device)
21	OVERFLOW	Indicates the number of input characters has exceeded the selected message format.
22	MSG SENT	Indicates the conclusion of automatic transmit.

Figure D2-5. Keyboard Controls and Indicators (Cont)

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
23	MEM SELECT	Switch selects storage, permits storage and transmitting of stored messages. 20, 40, and 160 positions permit selection of memory length in which a message can be stored. EXP MEM position permits transmission of messages from the 4K memory in the AUTO XMIT mode. Messages can be selected for transmission from one of eight, 512 character storage bins on command. One or more storage bins may be linked together. RCV MEM position permits printout of contents of a selected storage bin of the 4K memory. One or more storage bins may be linked together. RCV STORE position permits storage of a message in a selected storage segment of the 4K memory. Storage segments are automatically linked together and depend upon the message length.
24	ALPHA	Place all alphabetic characters in upper case while leaving nonalphabetic keys in the nonshift position.
25	POWER	Indicates power is applied to the keyboard. (Power control is located on the printer assembly.)

Figure D2-5. Keyboard Controls and Indicators (Cont)

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
26	SPACE BAR	Performs forward spacing between characters.
27	Keyboard Keys	Provides keys which enable Switches the operator to initiate the following 80 control functions, characters, symbols, or special commands. The available keys are: the alphabet, digits 0 thru 9; symbols consisting of standard punctuation marks, including parentheses; mathematical
27	Keyboard Keys	symbols consisting of =, +, & Switches #, $, %, -, <, >, braces, and brackets; control keys, CR (carriage return), LF (line feed), BS (backspace), 2 shift keys, and 1 lock key, and 2 CTL (control) keys and the following special command keys: ESC (Escape) GS (Grouped Separator) RPT (Repeat) DC1 (Device Control 1) ETB (End of Transmission Block) ENQ (Enquiry) DC2 (Device Control 2) DC4 (Device Control 4) EM (End of Medium)

Figure D2-5. Keyboard Controls and Indicators (Cont)

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
27	Keyboard Keys & Switches	NAK (Negative Acknowledge) HT (Horizontal Tabulation) SI (Shift In) DLE (Data Link Escape) NUL (Null) FS (File Separator) US (Unit Separator) SOH (Start of Heading) DC3 (Device Control 3) EOT (End of Transmission) ACK (Acknowledge) BEL (Bell) VT (Vertical Tabulation) FF (Form Feed) RS (Record Separator) TLD (Tilde) MARK (Special Transmit Mode) SUB (Substitute) CAN (Cancel) ETX (End of Text) SYN (Synchronous Idle) STX (Start of Text) SO (Shift Out)

Figure D2-5. Keyboard Controls and Indicators (Cont)

Figure D4-1. EAM Alarm Unit

Figure D4-2. Datametrix High-Speed Printer

Figure D4-3. High-Speed Printer Controls and Indicators

Figure D5-1. AFSATCOM Channel Frequencies, Plan A

Figure D5-2. AFSATCOM Channel Frequencies, Plan B

Figure D5-3. AFSATCOM Channel Frequencies, Plan C

Figure D5-4. Satellite RT Control

Figure D5-5. RF Control Unit

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
1	XMTR KEY ON Modems 1 thru 7 Indicators	DS1 through DS7. Steady light indicates modems 1 thru 7 transmitters are keyed and routed to their respective antenna. Flashing light indicates modems 1 thru 7 transmitters are keyed and routed to their respective 50-ohm load for RF loop test.
2	XMTR RF LOOP TEST Modems 1 thru 7 switches	S1 through S7. In ON (Up) position, selects modems 1 thru 7 for RF loop test.
3	POWER ON/RESET-OFF Circuit breaker	CB1. Connects 28-VDC power to RF control in ON/RESET position. Interrupts DC power in OFF position. Also provides power input protection.
4	POWER ON/PUSH LAMP TEST Pushbutton Indicator/Switch	SW8. Indicates 28 VDC supplied to RF control from power source; causes RF control to execute lamp self-test routine when pressed momentarily.
5	FAULT indicator	DS8. Indicates RF control fault.

Figure D5-6. RFControl Unit Controls and Indicators

Figure D5-7. 6-dB Ground Antenna

Figure D5-8. 14-dB Ground Antenna

Figure D5-9. Antenna Positioner Control

Figure D6-1. Wideband Modem Control

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
1	RCV ADDRESS switches	Two thumbwheel switches for selectionofthe receive frequency-hopping code;the range is 00 to77
2	SIG ACQ	One greenlight toindicate themodemhas successfully acquiredasignal
3	SIG QUALITY	Two seven-segment incandescent filament displays; these displays indicate the quality of a received signal
4	FAULT	One red light to indicate a fault during operate or self-test modes
5	Mode Select switch	Rotaryswitch withpositions for for selecting operating modes SPLand NORM,and test modes LAMP, CONT, RT, MODEM, and KEY
6	QUERY IDLE	One greenlight to indicate the modem transmit channel was idle when queried
7	QUERY BUSY	Oneamber light to indicate the modem transmit channel was busy when queried

Figure D6-2. WB Modem ControlIndicatorsand Controls

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
8	QUERY pushbutton	A pushbutton switch that allows the operator to determine whether the transmit address is busy
9	PREAMBLE switch	A pushbuttonswitch that causes the next preamble transmitted to be of full length
10	Hold/Normal	Toggle switch for selecting sync hold mode for both receive and transmit functions of the modem
11	SYNC HOLD	One amber blinking light to indicate the modem is in sync hold mode
12	XMIT ADDRESS switches	Two thumbwheel switches for selection of the transmitter frequency-hopping code; the range is 00 to 77
13	DOPPLER switch	Atoggle switch that is used for selecting sync hold mode for both receive and transmit functions of the modem

Figure D6-2. WB Modem Control Indicators and Controls (Cont)

Figure D7-1. Status Display Unit

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
1	POWER ON-OFF	Applies primary power and provides overload protection to display chassis.
2	POWER ON-OFF	Indicates (green light) that primary power is applied to the display chassis.
3	OVER TEMP	Red light indicates loss of cooling airflow or circuit malfunction.
4	FOCUS	Adjust display CRT focus.
5	INTENSITY VECTOR	Adjust brightness of the displayed vectors.
6	INTENSITY SYMBOL	Adjust brightness of the displayed alphanumeric characters and symbols.
7	RESET	Initializes the internal self test and resets the display to the initial conditions.
8	ELAPSED TIME METER (*)	Displays elapsed operating time up to 9,999 hours (can't be reset).

(*) Installed internally on chassis assembly

Figure D7-2. SDU Controls and Indicators

Figure D7-3. SDU Display 1 (Example)

Figure D7-4. SDU Display 3 (Example)

Figure D8-1. Magnetic Tape Memory Unit

Figure D8-2. Processor Control Unit

Figure D9-1. Command Post Synchronizer

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
1	DISPLAY	When pressed, causes the 11 digits of the key word to be displayed.
2	DIGIT	In CLEAR position, clears all key word digits to zero; positions 1 thru 11 select the location of the key word digit to be entered (used in conjunction with Load switch). In OPR position, key word digits can't be altered. The key word digits are displayed in all positions except the OPR position.
3	Key Word Number	Displays the key word digits as they are loaded, when DSPL switch is pressed, and when key word has been disturbed.
4	CODE	Selects the code for each key word digit to be entered.
5	LOAD	When pressed, loads selected code into the selected digit location of the key word.

Figure D9-2. CP Synchronizer Controls and Indicators

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
6	LAMP TEST	When pressed, lights all indicator lamps and displays an 8 in each digit of the key word and frame number indicators.
7	FAULT	The FAULT lamp (red) lights as the result of an incorrect self-test or a fault in the remote power supply.
8	ALM	The ALM lamp (amber) lights when two consecutive synchronization messages are not received.
9	Mode	Selects modes of synchronizer operation. In OFF position, turns synchronizer off. In TEST position, initiates self-test of synchronizer. In SLAVE position, automatically operates in mode determined from sync message received from a CP Synchronizer. On CP Synchronizer only, RNDM (random), TDM1, and TDM2 modes for the AFSATCOM network can be manually selected.

Figure D9-2. CP Synchronizer Controls and Indicators (Cont)

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
10	WRN	The synchronization WRN lamp (amber) lights when one synchronization message is not received, or it flashes when the internal frame number does not agree with the frame number received in the synchronization message. When momentarily pressed, it initiates the synchronization recover mode.
11	XMT CHAN	Selects a narrowband modem transmit channel from 1 to 7. On CP Synchronizer only, NB1 and NB2 positions permit synchronization of two separate AFSATCOM networks simultaneously. Selecting channel 0 removes all synchronization control from the terminal.
12	TIME SLOT	Select a transmit time slot in slave operation only.

Figure D9-2. CP Synchronizer Controls and Indicators (Cont)

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
13	FRAME	Presents the active internal frame number in the TDM2 mode, three zeros in the TDM1 mode, and blanked in the Random mode. In TEST mode, indicator increments from 1 at 5.4-second intervals. During synchronization recovery mode, indicator increments at 492-millisecond intervals.
14	EAM	The EAM receive lamp (blue) lights when the EAM alarm input signal goes active. When pressed, resets the EAM alarm circuits.

Figure D9-2. CP Synchronizer Controls and Indicators (Cont)

Figure D9-3. Sync Subnet Control

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
1	TIME SLOT	DS1 (Tens)/DS2 (Units). Two digit, seven-segment readout for displaying the CP sync current time slot.
2	SUBNET/PRIME	S1. Toggle switch that switches the CP sync into the PRIME or SUBNET modes. Allows operator to assume or relinquish control of the net.
3	PWR ON-PUSH LAMP TEST	S2. Allows operator to activate lamp test and gives indication of power ON or OFF.

Figure D9-4. Sync Subnet Control Controls and Indicators

Figure D11-1. Remote Interface Unit

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
1	MODE HSP-HSD	S5. Selects connection either to High-speed printer or to High-speed data device.
2	MODE OPERATE-TEST	S4. Selects either operate mode of operation or test mode of operation for RIU.
3	SYNC	DS4. Indicates when frame synchronization is achieved.
4	FAULT	DS3. Indicates: 1. Internal voltage fault. 2. Frequency standard fault. 3. Internal clock fault. 4. Self-test fault.
5	TEST	DS2. Indicates self-test is in progress.
6	DISPLAY SELECT	S3. Selects one of three modes of data for display.
	ARQ CONTROL	1. Position ARQ CONTROL displays running average NAK count (NAK/MIN).

Figure D11-2. RIU Controls and Indicators

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
	I/O MONITOR	2. Position I/O MONITOR displays data and clock activity for I/O port selected by I/O monitor switch.
	TEST	3. Position TEST displays results of self-test.
7	ARQ CONTROL FTM	DS1.Indicates forced transmission mode.
8	ARQ CONTROL	S2. Selects non-acquisition count or forced transmission mode override.
9	ARQ CONTROL XMIT/RCV	S1. Selects either transmit or receive ACK/NAK count to be displayed.
10	TEST LAMP	S7. Lights all indicators for lamp test purposes when pressed momentarily.

Figure D11-2. RIU Controls and Indicators (Cont)

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
11	TEST RIU FAULT RCL	S8. Sequences test results of self-test routine when pressed momentarily.
12	TEST START	S9. Initiates self-test(BITE) when pressed momentarily when the Mode Select switch is in the TEST position.
13	I/O MONITOR	S6. Selects one of six ports for monitoring of data and clock status. A22. Selectively displays the following functions: 1. ARQ-NAK/MIN 2. I/O monitoring of transmit and receive data and clock on selected I/O port. 3. Test status (local and system) or status of each step of internal test sequence.

Figure D11-2. RIU Controls and Indicators (Cont)

INDEX NO.	CONTROL/INDICATOR	DESCRIPTION
13	I/O MONITOR	CB1. Connects 115V 60Hz power to circuits of RIU; protects circuits of RIU. DS5. Indicates when operating voltage to RIU is applied.
14	HEXADECIMAL	A22. Selectivity displays the following functions: 1. ARQ-NAK/MIN 2. I/O monitoring of transmit and receive data and clock on selected I/O port. 3. Test status (local and system), or status of each step of internal test sequence.
15	POWER	(B1. Connect 115V 60Hz power ON/RESET AND to circuits of RIU; protects OFF circuits of RIU.
16	POWER	DS5. Indicates when operating voltage to RIU is applied.

Figure D11-2. RIU Controls and Indicators (Cont)

Figure D11-3. Codex Modem (LMU) Control Panel