LEVEL II

Research Memorandum 76-11

AD A076813

PLANIT SUPPORT PROGRAMS--
OPERATOR/USER MANUAL

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Litton Systems Incorporated

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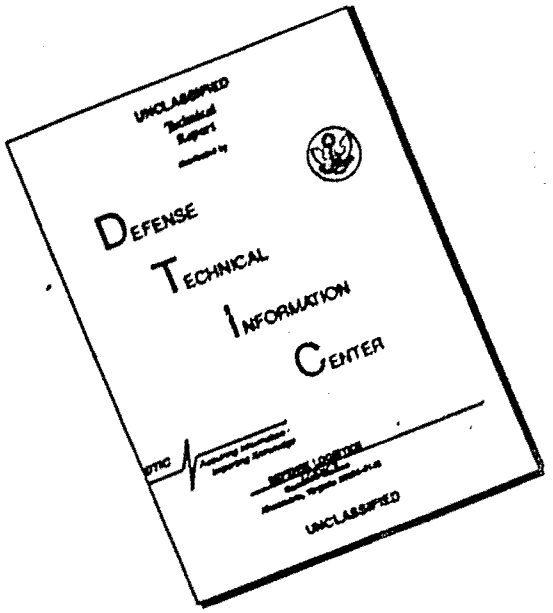
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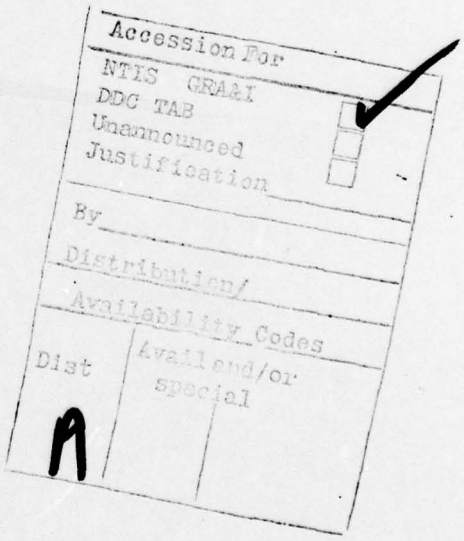
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(14) ARI-RM-76-11

Educational Technology and
Training Simulation
Contract Number DAHC 19-74-C-0064

(9) Research Memorandum 76-11

(6) PLANIT SUPPORT PROGRAMS--
OPERATOR/USER MANUAL

Version 2.0/2.1

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Submitted by:
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EDUCATIONAL TECHNOLOGY AND TRAINING SIMULATION TECHNICAL AREA

(11) May 1976

(12) 121

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ABSTRACT

This document presents the general operational information and specific procedural data for the operation and use of the PLANIT Support Programs. These programs were developed as a part of the system installation of PLANIT (Programming Language for Interactive Teaching) on the AN/GYK-12 (TACFIRE) computer.

Additional information on the operation and use of the AN/GYK-12 PLANIT installation is presented in the following documents:

PLANIT Utility Program Operator/User Manual
(Litton Document No. 125201-900)
PLANIT Support and Utility Programs Flow Charts
(Litton Document No. 125202-950)
PLANIT Author's Guide [SDC Document No. TM-(L)-4422/001/01]
PLANIT Language Reference Manual [SDC Document No. TM-(L)-4422/002/01]
Document Update Information for PLANIT, Version 2.0
(Northwest Regional Educational Laboratory document)

The PLANIT Support Programs were developed as a part of a Litton Systems, Inc., Data Systems Division (DSD), contract with the U. S. Army Research Institute for the Behavioral and Social Sciences (ARI). This contract (# DAHC19-74-C-0064) was awarded on 11 June 1974 as a part of an overall ARI research project which addresses the application of tactical computers to training. This contract specifically addressed the installation of the PLANIT author/student language on the U. S. Army Artillery Tactical Fire Direction System (TACFIRE) general purpose computer. This computer (AN/GYK-12) is also used in several other Army tactical computer systems.

The successful completion of this contract included the delivery and demonstration of a fully operational PLANIT system on the AN/GYK-12 computer. This project included the development of a translator and translation of PLANIT (version 2.6) from FORTRAN to TACPOL (AN/GYK-12 computer programming language). This task was accomplished under a separate ARI contract to the Northwest Regional Educational Laboratory. The Litton contract included the development of the operating system, machine input/output programs, system start and termination routines, utility support programs, and system integration and support to the installation of PLANIT on the AN/GYK-12 system.

BACKGROUND OF THE PLANIT USER TRAINING SYSTEM

Several explicit user requirements converged to generate the research which resulted in the documents contained in this set of reports. The need for some type of user training subsystem in support of tactical automatic data processing (ADP) system developments was clearly established during the evolutionary phase of the Army Tactical Operations System (TOS) development in Europe.[1] In 1974, after a decade of involvement in the development of tactical ADP systems, the Army Computer Systems Command summarized this experience into six "Lessons Learned."[2] One of these lessons was: A dedicated and trained user is required if tactical ADPS is to succeed.

One approach toward meeting this requirement is to apply techniques derived from modern educational technology and the computer sciences by embedding training subsystem packages within the operating system and then using the system itself to teach the user how to use the system. The approach was delineated in a concept paper,[3] which was subsequently submitted, evaluated and found by key Army Personnel to have merit. As a consequence, a requirement was placed on the Army's Behavior and Systems Research Laboratory (BESRL--the predecessor of what is now the Army Research Institute) by what was then the Assistant Chief of Staff for Force Development (ACSFOR) and the Director of Army Research, Office of the Chief of Research and Development (OCRD),[4,5] to effectuate the research necessary to test the concept.

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[1]Baker, J. D. "Human Factors Experimentation Within a Tactical Operations System (TOS) Environment." Proceedings: Office of Naval Research Sponsored Tri-Service Coordination Meeting, London, England, 20-21 February 1968.

[2]Memorandum from Headquarters, U.S. Army Computer Systems Command to Assistant Deputy Commander, CACDA, Ft. Leavenworth, KA; Deputy Commander, MASSTER, Fort Hood, TX; Project Manager, Army Tactical Data Systems, Fort Monmouth, NJ, dtd 30 January 1974, Subject: TSDG Lessons Learned.

[3]Memorandum from U.S. Army Behavior and Systems Research Laboratory to Assistant Chief of Staff for Force Development, dated 28 September 1971, Subject: Proficiency Maintenance Using Computer-Assisted Instruction in an Operational Setting.

[4]Memorandum from Assistant Chief of Staff for Force Development to Chief of Research and Development, dated 10 November 1971; with 18 November 1971 indorsement to Behavior and Systems Research Laboratory, Subject: Request for Research in Application of Tactical Data Systems for Training.

[5]Memorandum from Chief of Research and Development to Assistant Chief of Staff for Force Development, dated 29 Nov 1971, Subject: Request for Research in Application of Tactical Data Systems for Training.

The terms of the requirement actually levied, however, went well beyond the scope of the original concept and called for a simultaneous attack on all facets of the problem associated with testing the feasibility of the approach. In terms of broadened scope, the primary role of these systems is in support of tactical operations. Our original concept paper suggested a potential, select secondary role for these computerized tactical data systems, viz., that of directly supporting the system user by using the system itself, in a stand-alone mode, to teach the user how to use the system. The agencies structuring the research requirements saw a possible tertiary role for these systems. About the time they were structuring their requirements, the Army's Dynamic Training Board identified the maintenance of proficiency of Military Occupation Specialty (MOS) 11B40, the light weapons infantryman, as a glaring unit training problem and suggested that Computer-Assisted Instruction (CAI) as one technique for alleviating the situation.[6] In addition, a subsequent Continental Army Command (CONARC) Task Group report on CAI identified the 11B40 MOS as a top contender for attention in the "non-technical" skills area.[7] Consequently, the scope of the effort was expanded to encompass an examination of a tertiary role, i.e., in support of the system's parent unit by using these computers to meet individual and unit training requirements such as those associated with the 11B40 MOS. Additionally, in response to concern that the implementation of the Modern Volunteer Army concept might produce a need for general education development (GED) upgrading it was determined that an examination should be made of the feasibility of employing extant CAI GED on tactical computers in an operational setting. The assumption was made that accomplishment of these latter requirements would be tantamount to proving the feasibility of the secondary role concept as well. The test, therefore, would be a cost-effective undertaking since it would provide data directed toward answering a number of diverse questions concerned with a common training delivery system, viz., tactical computers.

Irrespective of whether it was the secondary or tertiary role concept being assessed, four major components were required: a test in a credible operational environment; appropriate hardware; functioning software and representative people-ware. The vehicle for this overall assessment was MASSTER[8] Test FM 122, "IBCS: Automated Instruction." The hardware was a "given" viz., the Developmental Tactical Operations

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[6]Report of the Board for Dynamic Training, Volume II. 17 December 1971, page 116.

[7]Headquarters, United States Continental Army Command Task Group Report and Computer Assisted Instruction. April 1972.

[8]MASSTER - Modern Army Selected Systems Test, Evaluation, and Review--is the Army's test bed for assessing equipment, concepts and doctrine. This activity is located at Fort Hood, Texas.

System (DEVTOS) which was then located at Fort Hood, Texas (Hoyt, et al[9] provide a description of the hardware). Likewise, the people were a "given"--our student population would be MOS 11B40 personnel drawn from the 2nd Armored Division and 1st Cavalry Division located at Fort Hood. The question of what "software" approach to take (specifically, whether to use an existing student/author language) was key to the success or failure of Test 122. Clearly, the decision made at this juncture would determine whether we would hit the assigned "test window" in time to conduct the test. As a related issue, courseware development would largely depend upon the structure of the student/author language selected, so courseware development could not commence until this decision was made. The decision itself had to be correct and timely--and whatever decision was made would undoubtedly be risky.

To add to the difficulty in reaching a decision, it must be realized that it could not be made unilaterally. Conduct of a test of the complexity of MASSTER Test FM 122 required support from and coordination between a number of different agencies--key among them being mutual cooperation of the organization which had DEVTOS responsibility, the U.S. Army Computer Systems Command (USACSC), and the Army Research Institute (ARI). A Memorandum of Understanding[10] was drawn up between these two organizations and, as the first USACSC task in this joint undertaking, a MASSTER Test 122 CAI Concept Paper[11] was to provide alternative concepts for implementing automated instruction materials on the DEVTOS in support of MASSTER Test 122. Concurrent with this effort, a contract was let by ARI with the System Development Corporation (SDC) to develop the courseware (i.e., the instructional materials which would be presented through CAI). The first task SDC had to accomplish was to provide alternative student/author language alternatives for generating the courseware and to determine which alternative provided the best likelihood of success under the test conditions and time constraints imposed. In essence, the combined results of these analytic studies were expressed as follows: "At this stage, many alternative design concepts can be formulated. However, due to time constraints on the implementation of any concept, the only alternative concept considered feasible...is the use of PLANIT."[12]

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[9]Hoyt, W. G., Butler, A. K. and Bennik, F. D. "Application of Tactical Data Systems for Training: DEVTOS Feasibility Determination and Selection of an Instructional Operating System." ARI Technical Paper 267, October 1975.

[10]Memorandum of Understanding Between Commander, U.S. Army Research Institute and Commander, U.S. Army Computer Systems Command, Dated 5 June 1973.

[11]Bunker-Ramo Technical Note "MASSTER Test 122--Computer Assisted Instruction (CAI) Concept Paper," February 1973, prepared for the U.S. Army Computer Systems Command.

[12]Ibid. 11, page 18.

PLANIT (Programming Language for Interactive Teaching) is an instructional system consisting of an author language and supporting computer programs for preparing, editing and presenting any subject matter suitable for individualized CAI presentation to students, as well as recording all relevant response data for immediate utilization and subsequent analyses. PLANIT was developed over an eleven year period under the aegis of the National Science Foundation (NSF) at a total investment cost of approximately $740,000. The main goal of this NSF project was to produce a student/author language which would be fully transportable and guaranteed compatible with a large and diversified class of machines.[13] We at ARI take professional pride in the fact that it was our early and subsequent work with PLANIT which validated this visionary transportability notion of NSF.[14] We also take "economic" pride in the fact that we capitalized upon an already "hefty" U.S. Government investment to solve a problem, rather than slipping into the classic mold of "reinventing the wheel" by starting from scratch and building a separate student/author language tailored to the hardware/software system constraints.

To lower the curtain on MASSTER Test FM 122, the test was successfully conducted and demonstrated that it was feasible to use tactical computers in a stand-alone training mode to satisfy individual and unit training requirements. It was found that automated instruction in a field setting was enthusiastically accepted by the non-commissioned officers (NCO's) examined and. as a training medium, it proved to be more effective than the traditional study-method of training.[15,16,17,18,19]

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[13]Frye, C. H. "A Report on PLANIT: One Stage of Completion," Final Report for the National Science Foundation Grant No. EPP73-07319 A04, August 1975.

[14]For a complete account of the experiences of ARI in installing, using and evaluating PLANIT in an Army setting, including all the "warts and blemishes" uncovered during this endeavor, see: Johnson, C. "Implementation of PLANIT at the U.S. Army Research Institute for the Behavioral and Social Sciences," PLANIT Newsletter, July 1975.

[15]Hoyt, W. G. and Baker, J. D. The use of tactical computers to provide weapons and tactics training to combat NCO's: Results of a field test. Proceedings: Sixteenth Annual Conference of the Military Testing Association MTA, U.S. Coast Guard Institute, Oklahoma City, OK. 21-25 October 1974.

[16]Hoyt, W. G., Butler, A. K. and Bennik, F. D. Application of tactical data systems for training: Volume II - CAI/DEVTOS automation studies. ARI Technical Paper 267, October 1975.

[17]Hoyt, W. G., Butler, A. K. and Bennik, F. D. Application of tactical data systems for training: Volume I - Executive Summary. ARI Technical Paper ___, in preparation.

But the results of this test proved more than the preceding. They also indicated that the obvious Army needs mentioned at the outset of this preface, could be met by applying this technology to a real and present problem. It also went beyond the exploratory stage and satisfied a specific Army requirement. The U.S. Army Combat Developments Command (CDC)/Systems Analysis Group (now the U.S. Army Training and Doctrine Command/Combined Arms Combat Developments Activity, or TRADOC/CACDA) had levied the following requirement[20] on ARI:

> The Proposed Material Need for the Tactical Operations System - TOS (Unclassified title, portions of contents classified CONFIDENTIAL) states: "During system non-tactical employment the equipment shall have the capability to permit the training of user personnel without affecting the mission ready capability of the system." While the need exists, no specific data are extant which can be brought to bear on this problem. The requested research will provide data which could impact on all TOS users and result in considerable savings in training costs related to the user's need to maintain proficiency in the use of these systems.

The 122 Test data satisfied the CDC requirement. The Proposed Material Need (MN) for TOS was found to be a viable concept and that MN remains to this day as a bonafide component of the TOS program.

As previously discussed, the results from MASSTER Test FM 122 demonstrated the viability of the embedded training subsystem concept in general and that tactical data systems could be used in a tertiary role, i.e., specifically, that these systems could be used in a stand-alone mode in support of individual and unit softskills training requirements. But conceptually our main goal had always been to embed system specific training packages within the operating system itself and then to use the system to teach the user how to use the system--the earlier noted secondary role for these systems.

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[18]Hoyt, W. G., Butler, A. K. and Bennik, F. D. Application of tactical data systems for training: Volume III - Development of courseware and analysis of results for MOS 11B40. ARI Technical Paper ___, in preparation.

[19]Hoyt, E. G., Butler, A. K. and Bennik, F. D. Application of tactical data systems for training: Volume IV - Development of courseware and analysis of results for GED math. ARI Technical Paper ___, in preparation.

[20]Letter, DARB-ARB 19 July 1972, Subject: New Research Requirements for the Human Resources Research and Development Program (RCS CSCRD 70 CRI); letter response from CDCSAG-AG1, same subject as above, dated 1 September 1972.

As a follow-on to Test 122, research was initiated under the aegis of the Product Manager, Computer Training Systems (PM CTS) through HRN 75-158 (and, subsequently, HRN 76-195) which tasked ARI to address the problem of reducing the novice user's difficulties by making tactical data systems (e.g., TOS[2], TACFIRE, TSQ-73, etc.) more "approachable" through applications of the embedded training concept.[21]

Because of its stage of development, the fact that its basic central processing unit would serve as the core for other Army Tactical Data Systems (ARTADS) to follow, and the fact that its operator training problems appeared to be amenable to reduction through the application of automated instructional technology, TACFIRE (the Army's field artillery tactical fire control system) was chosen by the PM CTS as the test vehicle for assessing the embedded training subsystems concept. The initial and specific requirements for the TACFIRE research were delineated in HRN 76-193, "Development and Evaluation of PLANIT Based Computer Embedded Training Packages for TACFIRE" which was prepared by personnel of the U.S. Army Field Artillery School, Fort Sill, OK.

Once again we were faced with the dilemma as to whether the best decision would be to develop a tailor-made student/author language smoothly fitted to the hardware/software constraints of the TACFIRE system, or to build upon our already successfully operating PLANIT system and attempt to install it on TACFIRE. The latter approach had many merits, among them: (1) it was an author language system with which we were familiar, while a customized system would be untested, costly and would require an extensive checkout; (2) a customized authoring system would be limited to a given TACFIRE configuration, whereas PLANIT would be transportable to the family of ARTADS systems, and (3) because of PLANIT's machine independent characteristics, courseware could be prepared on commercial computers and, after content checkout, easily installed on the tactical system, whereas a customized approach would tie-up the actual tactical system during courseware preparation.

The effort to install PLANIT on the AN/GYK-12 computer, the results of which are contained in this set of reports, was independently undertaken as Technology Based - Exploratory Development research and not as Advanced Development activity (i.e., it was not done in direct response to an explicit, stated user need). It serves as a classic example of what Dr. Malcolm R. Currie, Director of Defense Research and Engineering (DDR&E) was describing in the following statement to the Second Session of the 94th Congress: "The objective of the Technology Base is the advancement of technology applicable to future systems and subsystem

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[21] Human Resource Need (HRN) 75-158, title: "User Training and Proficiency Maintenance in a Tactical Data Systems Environment," submitted as a research requirement for inclusion in the ARI FY 75 Advanced Development Work Program by the Product Manager, Computerized Training System, Fort Monmouth, NJ. HRN 76-195 was a revalidation of the requirements delineated in 75-158 for inclusion in the FY 76 Work Program.

options. These options (or new ideas) usually involve enhanced military capability, reduced cost, increased performance, better reliability and maintainability, more efficient use of resources or some combination of these attributes." Success in this effort would produce a broadly applicable, cost-effective vehicle for employing embedded training subsystem packages in a variety of military system settings.

It merits comment, however, that while this work was a Technology Based-Exploratory Effort, it had the potential for feeding into the Advanced Development program efforts associated with the user tasks presented in HRN 75-158, "User Training and Proficiency Maintenance in a Tactical Data Systems Environment," if the outcome were successful. Consequently, the PM-CTS was appraised of this effort at the outset and he, in turn, coordinated it with the Program Manager, Army Tactical Data Systems (PM ARTADS). During this coordination some valid points of criticism were raised[22] concerning the PLANIT approach. The PM ARTADS recommended that ARI meet with system developers, users and training agencies as soon as sufficient data were available to determine whether, or not, PLANIT would operate on TACFIRE. At that time a determination would be made concerning implementation implications and to assess if, indeed, this were the most effective approach to take, given the potential for impact on TACFIRE system development efforts. In keeping with this recommendation, a Workshop was convened at ARI in Arlington, VA on 1 October 1974 and these items were covered in detail with personnel from all of the suggested groups in attendance. The interaction was found to be most beneficial to all concerned and the concensus of the group was to install the system described in this set of reports on the TACFIRE system at Fort Sill, OK, and to use it as the test vehicle for assessing the embedded training concept on that ARTADS system.

This historic overview of the events leading up to the production of the set of quite specialized reports may seem untoward in view of the projected, limited set of users of these documents. It is, however, a quite meaningful forum for discussing these events. Too frequently the question is raised as to how did a particular research product originate and was it utilized. The intent here is to show that the warp and woof of concepts and coordination, requirements and research are so intertwined that a simple one-to-one relationship (one response, one use) does not tell the story--only a view of the whole cloth will put it into proper perspective. Additionally, it exemplifies a point made in the previously cited presentation by the Director of Defense Research and Engineering to the 94th Congress when he said: "To deploy systems DOD must not only pursue advanced technology but must endure the long years of research required to bring an idea through growth problems to a finished, proven and useful end product."

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[22] Memorandum from Product Manager, Computer Training Systems (PM-CTS) to Program Manager, Army Tactical Data Systems (PM-ARTADS) 28 Jan 74, Subject: HRN 75-158 and 1st indorsement from PM-ARTADS to PM-CTS, same subject as above dated 7 February 74.

This set of reports provides detailed instructions for implementation and operation of PLANIT and auxiliary programs on the AN/GYK-12 computer. The set consists of a report on:

- o TRANSL - The PLANIT Translator Program: Installation and Application
- o PLANIT Support Programs - Operator/user manual
- o PLANIT Utility Program - Operator/user manual
- o PLANIT Support and Utility Programs - Test Procedure
- o PLANIT Support and Utility Programs - Flow Charts.

The first report contains the information for installing and operating a program which is designed to translate the FORTRAN from the PLANIT system of programs into the TACPOL language for compilation on the AN/GYK-12 computer. The second covers the general and specific aspects of leading and operating PLANIT on the AN/GYK-12 computer. The third document covers the general and specific aspects of operating the PLANIT utility programs which are a specialized group of routines developed to accomplish various tasks in support of the AN/GYK-12 computer installation of PLANIT. The fourth report covers the procedures used to verify that PLANIT Support and Utility Programs are functioning as per specifications. The fifth document provides the detailed flow charts of the computer logic of the PLANIT Support and Utility Programs.

The effort detailed in the first report (i.e., TRANSL) was accomplished under ARI Contract DAHC19-74-C-0038 by the Northwest Regional Educational Laboratory, Portland, Oregon. The other four reports in the series were prepared by the Data Systems Division, Litton Systems Inc., Van Nuys, CA under ARI Contract No. DAHC19-74-C-0064.

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SECTION 1

INTRODUCTION

1.1 Scope

This manual covers the general and specific aspects of using and operating the PLANIT Support Programs. These programs are a part of the overall AN/GYK-12 computer PLANIT installation and provide the required equipment and operator interface routines to interface PLANIT with the AN/GYK-12 computer and related peripheral devices and user terminals.

1.2 Manual Organization

This manual has been organized in procedural/sequence of operations scenario format as an aid to understanding the use and operation of the PLANIT Support Programs. The sections of the manual have been ordered in the same sequence that a user would normally encounter the individual program modules, procedures and operational sequences. The information covered in each section is briefly summarized below:

a. Section 1: This section provides general and background information related to the overall AN/GYK-12 PLANIT system installation.

b. Section 2: POS/RAMCHECK program modules procedures and operational sequences encountered during PLANIT system initialization. This section specifically identifies the messages, error indicators and procedures to be utilized during system initialization.

c. Section 3: START program module procedures and operational sequences encountered during PLANIT system initialization. This section specifically identifies the messages, error indications and procedures to be utilized during system initialization after the POS/RAMCHECK initialization sequences have been completed.

d. Section 4: MIOP/TMIOP program modules procedural and operational sequences encountered during PLANIT system initialization and PLANIT operation. This section specifically identifies the messages, error indications and procedures to be utilized during system initialization and system operations involving MIOP and TMIOP.

e. Section 5: FINAL program module procedures and operational sequences encountered during PLANIT system termination operations. This section specifically identifies the messages, error indications and procedures to be utilized during PLANIT system termination.

f. Appendix A: Diagnose Status Codes summary. This section lists in numerical order and describes the meaning of Diagnose Status Codes (DIG Codes) output to the CPU DIG lights by the PLANIT Support Programs.

g. Appendix B: ACC/OCC operating procedures. This section identifies the specific operator/author/student operating procedures associated with the ACC and OCC terminals.

h. Appendix C: MIOD operating procedures. This section identifies the specific operator/author/student operating procedures associated with the MIOD terminal.

i. Appendix D: VFMED operating procedures. This section identifies the specific operator/author/student operating procedures associated with the VFMED terminal.

j. Appnedix E: PLANIT character sets. This section summarizes the character differences between: 1.) the TACFIRE (and TOS^2) ASCII and EBCDIC character sets, 2.) the ARI CDC 3300 character set, and 3.) the ARI Univac 1108 character set.

k. Appendix F: PLANIT cards file. This section provides a listing of the cards file for the version 2.6 PLANIT system used in the AN/GYK-12 PLANIT installation.

l. Appendix G: PLANIT map. This section provides a listing of the PLANIT map for the version 2.6 PLANIT system used in the AN/GYK-12 PLANIT installation.

m. Appendix H: TACFIRE/TOS^2 equipment pictures. This section provides a set of pictures of the TACFIRE and TOS^2 equipment items most frequently used during operation of the AN/GYK-12 PLANIT system.

n. Appendix I: Glossary of terms. This section provides a glossary of terms and mnemonics used throughout the PLANIT support and utility programs manuals and related documentation.

1.3 General Information

The AN GYK-12 PLANIT system installation utilizes the basic PLANIT version 2.6 generated with the AN/GYK-12 computer and system parameters and then translated from FORTRAN to TACPOL. The resulting nine program modules (PLANIT MAIN and PLAN1 through PLAN8 overlays) are compiled along with the PLANIT Support Programs (described in this manual) and integrated into the object and load tapes using the PLANIT Utility Program (PUP). All compilations were performed using the TACFIRE PSSB Compiler (version 3.4). In addition to this manual and the individual program listings, detailed information on the operation and use of the AN/GYK-12 PLANIT System can be found in the following documents:

PLANIT Utility Program Operator/User Manual
(Litton Document No. 125201-900)
PLANIT Support and Utility Programs Flow Charts
(Litton Document No. 125202-950)
PLANIT Author's Guide [SDC Document No. TM-(L)-4422/001/01]
PLANIT Language Reference Manual [SDC Document No. TM-(L)-4422/002/01]
Document Update Information for PLANIT,Version 2.0
(Northwest Regional Educational Laboratory document)

The PLANIT Utility Program (PUP) Operator/User Manual provides a detailed description of the procedures and operational sequences for use of the PUP routines for such support tasks as preparation of PLANIT load tapes or cartridges, field history/lesson tapes and cartridges, object library updates, and processing of PLANIT translation tapes.

The PLANIT Support and Utility Programs Flow Charts document provides an overview of the AN GYK-12 PLANIT System functional interfaces and the detailed flow charts of the support programs and utility routines.

The PLANIT Author's Guide, Language Reference Manual and Document Update Information provide the information required for the application and use of PLANIT itself. In addition, supplementary information on the AN/GYK-12 PLANIT is provided in Appendix F (character set), Appendix G (PLANIT cards file), and Appendix H (PLANIT map) of this manual.

1.4 Special Considerations

The basic (commercial computer) PLANIT system is written in a meta FORTRAN and uses the floating point, trig functions and other special features of the FORTRAN language. The AN/GYK-12 computer and its TACPOL language uses fixed point arithmetic and display buffers of 520 terminal output characters. The translation of PLANIT from FORTRAN to TACPOL results in certain special considerations in the operation and use of the AN/GYK-12 PLANIT system. These special considerations are described below:

a. The display format is 72 characters per line (plus carriage return/line feed) by 7 lines. The top line is used for special MIOP messages or is blank for entering answers. Thus a single PLANIT display output segment is 6 lines (up to 72 characters per line). This is a fixed (non-scrolling) display output, i. e., a frame of 21 output lines of data in PLANIT will result in 3 display outputs of 6 lines followed by a display output of 3 lines (plus a top blank line for response if applicable).

b. The PLANIT/MIOP display buffer is 520 terminal output characters in the current immplementation. For display outputs of greater than 520 terminal output characters (such as printing a large segment of a lesson to the display). The output will result in a splitting of a line (partial line printed followed by rest of line printed on next line of the display) after each 520 terminal output character increment. This does not affect the output to other peripheral devices such as the card reader or punch, printer, tape units, etc.

c. 62,15 [DCL X (62,15)] notation was used in the majority of the cases of conversion from the FORTRAN floating point arithmetic to the TACPOL fixed point arithmetic (scientific notation was used in some instances). The selection of 62,15 results in up to four (4) decimal place numbers.

d. The 62,15 notation and the single word precision used in the TACPOL library functions (such as SQRT, LOG, LN, etc.) results in a limitation to a maximum value of 2^{15} for input to these functions.

e. Since TACPOL does not include fractional exponentation, only integer powers may be used. The base number may be fractional (e. g., $(3.1416)^5$].

f. The limitation of 4 place (decimal) numbers, e. g., XX.XXXX, in the current implementation restricts the use and decimal accuracy of CALC statements and answers. Certain combinations of math statements may result in a degree of error in the decimal portion of the resulting answer. For example, XX.XXX times YY.YY implies five place accuracy in the calculation and will result in a degree of error in the resulting decimal portion of the answer. On the other hand XX.XXX times YY.Y implies four place accuracy and will yield a correct answer. Similarly certain functions such as SQRT (square root) may yield a degree of error in the decimal portion of the answer. Integer arithmetic is not affected by this limitation.

This does imply the need to use the WITHIN expression for answer matching within lessons in cases where the decimal portion of the answer may be affected by this limitation in the current implementation.

SECTION 2

POS/RAMCHECK PROCEDURES/SEQUENCE OF OPERATIONS

This section describes the procedures, sequence of operations, messages and error indications during loading of the POS and RAMCHECK modules and the POS initialization process. The description and procedures are repeated for each of the current AN/GYK-12 system configurations as follows:

Subsection 2.1 - TACFIRE Field Configurations (Division or Battalion)

Subsection 2.2 - TOS^2 Field Configurations (Division or Brigade)

Subsection 2.3 - TACFIRE PSSB Configurations (Division or Battalion)

Subsection 2.4 - TOS^2 SSS Configurations (Division or Brigade)

Descriptions and operator actions are included for the DIAGNOSE STATUS (DIG) Codes which may occur during each procedure/sequence of operations. A summary of all DIG Codes and their meaning is included in Appendix A.

Subsection 2.5 describes the meanings of the TEST SWITCH settings during system loading so that a user can determine the TEST SWITCH setting to be used if loading on other than the standard configuration TACFIRE or TOS^2 system.

Subsection 2.6 describes the meanings of the TEST SWITCH settings after system loading which in conjunction with the COMPUTER RESTART pushbutton allow the TAPE, CARD and PRINTER devices to be changed from the field devices to the PSS/SSS devices and vica versa. This allows a PSS/SSS center to more easily prepare tapes for field use.

2.1 PLANIT SYSTEM SET-UP AND LOADING PROCEDURE FOR TACFIRE FIELD CONFIGURATION

A. Set ACC ADDRESS Switches on the IOU to the ACC switch assembly device address (25).

B. Set the DATA EXCHANGE CHANNEL SELECT switches (IOU Maintenance and Status Panel) A, B and C = 1, 2 and 3 respectively.

C* Insure a minimum of two drums on-line (one drum can be used with load/history tape with a modified " cards file" file allocation).

D. Set all 8K Memory Banks to off-line.

E. Set MCMU BANK ADDRESS switches = 00 (if more than one; 00, 01, 02, etc.)

F. Mount PLANIT LOAD MLU on ARMM1.

G. Set TEST Switches on IOU Maintenance and Status Panel = 00, 20 if 192 track drums. See 2.5 for non-standard configuration.

H. Depress CHANNEL 11 Program Load Switch on the IOU Maintenance and System Panel. This action will bootstrap load the PLANIT Operating System. If the loading operation is successful, the DIAGNOSE STATUS Lights will display 777201 and System Initialization will begin.

I. During the execution of the System Initialization Phase, certain errors may occur which will display any of the following DIAGNOSE STATUS Codes. The appropriate operator action for each code is indicated.

DIAGNOSE CODE	OPERATOR ACTION
776300	Rewind system tape and return to step H.
776301	Rewind system tape and return to step H.
776302	Rewind system tape and return to step H.
776303	Check setting of ACC Switches (step A), rewind system tape and return to step H.
776304	Check setting of TEST switches (step G), rewind system tape and return to step H.
776310	Check ACC Switch setting (step A), rewind system tape and return to step H.

* This step is omitted if the system's Memory Configuration consists of three or more MCMUs.

DIAGNOSE CODE	OPERATOR ACTION
771700	Rewind system tape and return to step A.

J. The PRIORITY MESSAGE Light on the ACC Switch Assembly should be illuminated within 5 seconds following step I. If it is not, depress the LAMP TEST Switch on the Switch Assembly. If the light is inoperative, replace and continue with step K. If the lamp is operating, check the DIAGNOSE STATUS Display for one of the codes listed in step I.

K. Depress the ACC PRIORITY MESSAGE Switch.

L. The light associated with the PRIORITY MESSAGE Switch is extenguished and a listing of all peripheral devices and their device addresses will be displayed on the Compose/Edit Display as follows:

```
CTUO/ARMM1:1/1; CTU1/ARMM2:3/6; CTU2:0/0; CTU3:0/0; RAM:1/0;
DDTAI:2/0; DDTAO:2/1; DDTEI:3/0; DDTBO:3/1; DDTCI:1/2; DDTCO:1/3;
DDTDI:2/2; DDTDO:2/3; DDTEI:1/4; DDTEO:1/5; DDTFI:1/6; DDTFO:1/7;
DDTGI:3/4; DDTGO:3/5; DDTHI:0/0; DDTHO:0/0;
ACCRD:2/6; ACCSA:2/5; ACCCED:2/4;
ELP1:3/3; ELP2:2/7; CARD READER:0/0; CARD PUNCH:0/0; H-S PRINTER:0/0;
```

In the absence of a display, the following DIAGNOSE STATUS Code will appear:

DIAGNOSE CODE	OPERATOR ACTION
771200	Check for "POWER ON" on Compose/Edit Display Module, rewind system tape and return to step H.

M. If no device address changes are desired, go to step O.

N. Device address changes are effected as follows:

Each device address is displayed in the form of two octal digits separated by a slash (/). Activation of the tab key will position the cursor to the first digit of each address in turn. Thus positioned, either or both digits may be altered by entering the desired octal digit from the keyboard. The two digits represent the primary and secondary IOU channels assigned/cabled to the device. 0/0 designates the device is off-line or not used.

O. After entering changes (if any), depress the CURSOR RESET Key, then depress the XMIT Key to store the device addresses displayed and to print a hard copy of the Device Address Assignments (if ELP 1 is on-line). System malfunction at this time will result in the display of one of the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
771201	Rewind system tape and return to step H. Do not enter device address whose octal value is less than 6 or greater than 77.
771202	No operator action required.
771701	Rewind system tape and return to step H.

P.* The second program on the system tape (RAMCHECK) will be loaded next and executed. Possible errors associated with this or subsequent program loads will result in the display of the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
774000	Recheck step B and G. Rewind system tape and return to step H.
774005	Rewind system tape and return to step H.
776305	Recheck step G. Rewind system tape and return to step F.
776306	Rewind system tape and return to step C.

Q.* Execution of RAMCHECK will terminate with the display of one of the following DIAGNOSE STATUS Codes:

0540XX (XX= # Drums on-line) - Drums are operational and program has advanced to step R.

056001-056020 Non-recoverable error. Rewind system tape and return to step H.

R. The remaining programs on the system tape are now being loaded. Errors which may occur during loading and subsequent storage will be displayed as the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
774001	Rewind system tape and return to step H.
774002	Rewind system tape and return to step H.

* This step is omitted if the system's Memory Configuration consists of three or more MCMUs.

DIAGNOSE CODE	OPERATOR ACTION
774003	Rewind system tape and return to step H.
774004	Rewind system tape and return to step H.
774005	Rewind system tape and return to step H.
774006	Rewind system tape and return to step H.

S. Successful conclusion of step R results in the execution of the "START" program which requires prompted inputs from the ACC Terminal Keyboard. System initialization and loading has been completed.

ADDITIONAL DIAGNOSE STATUS CODES WHICH MAY APPEAR DURING PLANIT EXECUTION ARE AS FOLLOWS:

DIAGNOSE CODE	MEANING	OPERATOR ACTION
770000	A NON-IMPLEMENTED PROGRAM LEVEL HAS BEEN REQUESTED.	DEPRESS MASTER RESET SWITCH.
7713XX	XMIT CHANNEL (LEVEL 13) ERROR ON DDT XX (XX = 0-7 FOR DDT A-H).	NONE.
7715XX	RECEIVE CHANNEL (LEVEL 15) ERROR ON DDT XX (XX = 0-7 FOR DDT A-H).	NONE
772000	RAM READ ERROR DURING OVERLAY CALL.	DEPRESS MASTER RESET SWITCH.
770100	UNABLE TO RESTART CLOCKS DURING HOT START.	RETURN TO STEP H
770200	DEVICE TIMEOUT OR PARITY ERROR DURING ITR TO MONITOR REGISTER.	DEPRESS MASTER RESET SWITCH.
77XX17	A TRAP CONDITION OCCURRED IN LEVEL XX (CAUSED BY NON-IMPLEMENTED INSTRUCTION OR ARITHMETIC OVERFLOW).	DEPRESS MASTER RESET SWITCH
776307	ALL PROGRAM LEVELS EXCEPT LEVEL 63 ARE INACTIVE OR A PERIPHERAL DEVICE WAS EXERCISED WITHOUT PROPER PREPARATION OF KEY AND TERM WORDS.	DEPRESS MASTER RESET SWITCH

2.2 PLANIT SYSTEM SET-UP AND LOADING PROCEDURE FOR TOS^2 FIELD CONFIGURATION

A. Set ACC ADDRESS Switches on the IOU to the OCC switch assembly device address (35).

B. Set the DATA EXCHANGE CHANNEL SELECT switches (IOU Maintenance and Status Panel) A, B and C = 1, 2 and 3 respectively.

C. Insure a minimum of two drums on-line.

D. Mount PLANIT LOAD Tape on Potter Drive #1 (800 BPI tape).

E. Set TEST Switches on IOU Maintenance and Status Panel = 11. *See 2.5 for non-standard configuration.*

F. Depress CHANNEL 11 Program Load Switch on the IOU Maintenance and Status Panel. This action will bootstrap load the PLANIT Operating System. If the loading operation is successful, the DIAGNOSE STATUS Lights will display 777201 and System Initialization will begin.

G. During the execution of the System Initialization Phase, certain errors may occur which will display any of the following DIAGNOSE STATUS Codes. The appropriate operator action for each code is indicated.

DIAGNOSE CODE	OPERATOR ACTION
776300	Rewind system tape and return to step F.
776301	Rewind system tape and return to step F.
776302	Rewind system tape and return to step F.
776303	Check setting of ACC Switches (step A), rewind system tape and return to step F.
776304	Check setting of TEST switches (step E), rewind system tape and return to step F.
776310	Check ACC Switch setting (step A), rewind system tape and return to step F.
771700	Rewind system tape and return to step A.

H. The PRIORITY MESSAGE Light on the OCC Switch Assembly should be illuminated within 5 seconds following step G. If it is not, depress the LAMP TEST Switch on the Switch Assembly. If the light is inoperative, replace and continue with step I. If the lamp is operating, check the DIAGNOSE STATUS Display for one of the codes listed in step G.

I. Depress the OCC PRIORITY MESSAGE Switch.

J. The light associated with the PRIORITY MESSAGE Switch is extenguished and a listing of all peripheral devices and their device addresses will be displayed on the Compose/Edit Display as follows:

CTU0/ARMM1:1/1; CTU1/ARMM2:1/1; CTU2:1/1; CTU3:1/1; RAM:1/0;
DDTAI:2/0; DDTAO:2/1; DDTBI:2/2; DDTBO:2/3; DDTCI:2/4; DDTCO:2/5;
DDTDI:2/6; DDTDO:2/7; DDTEI:1/4; DDTEO:1/5; DDTFI:1/6; DDTFO:1/7;
DDTGI:1/2; DDTGO:1/3; DDTHI:3/0; DDTHO:3/1;
ACCRD:3/6; ACCSA:3/5; ACCCED:3/4;
ELP1:3/3; ELP2:0/0; CARD READER:0/0; CARD PUNCH:0/0; H-S PRINTER:0/0;

In the absence of a display, the following DIAGNOSE STATUS Code will appear:

DIAGNOSE CODE	OPERATOR ACTION
771200	Check for "POWER ON" on Compose/Edit Display Module, rewind system tape and return to step F.

K. If no device address changes are desired, go to step M.

L. Device address changes are effected as follows:
Each device address is displayed in the form of two octal digits separated by a slash (/). Activation of the tab key will position the cursor to the first digit of each address in turn. Thus positioned, either or both digits may be altered by entering the desired octal digit from the keyboard.

M. After entering changes (if any), depress the CURSOR RESET Key, then depress the XMIT Key to store the device addresses displayed and to print a hard copy of the Device Address Assignments (if ELP 1

is on-line). System malfunction at this time will result in the display of one of the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
771201	Rewind system tape and return to step F. Do not enter device address whose octal value is less than 6 or greater than 77.
771202	No operator action required.
771701	Rewind system tape and return to step F.

N. The second program on the system tape (RAMCHECK) will be loaded next and executed. Possible errors associated with this or subsequent program loads will result in the display of the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
774000	Recheck steps B and E. Rewind system tape and return to step F.
774005	Rewind system tape and return to step F.
776305	Recheck step E. Rewind system tape and return to step F.
776306	Rewind system tape and return to step C.

O. Execution of RAMCHECK will terminate with the display of one of the following DIAGNOSE STATUS Codes:

0540XX (XX= # Drums on-line) - Drums are operational and program has advanced to step P.

056001-056020 Non-recoverable error. Rewind system tape and return to step F.

P. The remaining programs on the system tape are now being loaded. Errors which may occur during loading and subsequent storage will be displayed as the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
774001	Rewind system tape and return to step F.
774002	Rewind system tape and return to step F.
774003	Rewind system tape and return to step F.

DIAGNOSE CODE	OPERATOR ACTION
774004	Rewind system tape and return to step F.
774005	Rewind system tape and return to step F.
774006	Rewind system tape and return to step F.

Q. Successful conclusion of step P results in the execution of the "START" program which requires prompted inputs from the OCC Terminal Keyboard. System initialization and loading has been completed.

ADDITIONAL DIAGNOSE STATUS CODES WHICH MAY APPEAR DURING PLANIT EXECUTION ARE AS FOLLOWS:

DIAGNOSE CODE	MEANING	OPERATOR ACTION
770000	A NON-IMPLEMENTED PROGRAM LEVEL HAS BEEN REQUESTED.	DEPRESS MASTER RESET SWITCH.
7713XX	XMIT CHANNEL (LEVEL 13) ERROR ON DDT XX (XX = 0-7 for DDT A-H).	NONE.
7715XX	RECEIVE CHANNEL (LEVEL 15) ERROR ON DDT XX (XX = 0-7 for DDT A-H).	NONE
772000	RAM READ ERROR DURING OVERLAY CALL.	DEPRESS MASTER RESET SWITCH.
770100	UNABLE TO RESTART CLOCKS DURING HOT START.	RETURN TO STEP F.
770200	DEVICE TIMEOUT OR PARITY ERROR DURING ITR TO MONITOR REGISTER.	DEPRESS MASTER RESET SWITCH.
77XX17	A TRAP CONDITION OCCURRED IN LEVEL XX (CAUSED BY NON-IMPLEMENTED INSTRUCTION OR ARITHMETIC OVERFLOW).	DEPRESS MASTER RESET SWITCH
776307	ALL PROGRAM LEVELS EXCEPT LEVEL 63 ARE INACTIVE OR A PERIPHERAL DEVICE WAS EXERCISED WITHOUT PROPER PREPARATION OF KEY AND TERM WORDS.	DEPRESS MASTER RESET SWITCH

2.3 PLANIT SYSTEM SET-UP AND LOADING PROCEDURE FOR TACFIRE PSSB CONFIGURATION

A. Set ACC ADDRESS Switches on the IOU to the ACC switch assembly device address (25).

B. Set the DATA EXCHANGE CHANNEL SELECT switches (IOU Maintenance and Status Panel) B and C = 1, 2 and 3 respectively.

C.* Insure a minimum of two drums on-line.

D. Set all 8K Memory Banks to off-line.

E. Set MCMU BANK ADDRESS switches = 00 (if more than one; 00, 01, 02, etc.)

F. Mount PLANIT LOAD Tape on IBM Tape Drive 0, 1, 2 or 3.

G. Set TEST switches on IOU Maintenance Panel to one of the following values:

02 if tape is mounted on Unit 0, 22 if 192 track drums.

03 if tape is mounted on Unit 1, 23 if 192 track drums.

04 if tape is mounted on Unit 2, 24 if 192 track drums.

05 if tape is mounted on Unit 3, 25 if 192 track drums.

See 2.5 for non-standard configuration.

H. If the cards file is to be entered via the Card Reader, place cards in input hopper and start Card Reader.

I. Set INSTRUCTION STOP and press MASTER CLEAR on Computer Test Set.

J. Set PEBU CHANNEL SELECT switch to 1 and BSL SELECT switch to the TU0-TU3 setting which corresponds to the tape drive selected for system load.

K. Depress the PEBU Load switch to Bootstrap Load the PLANIT Operating System from the System Tape. If the load is successful, the computer will halt and the DIAGNOSE STATUS Lights will display 777201. If the load is unsuccessful, rewind the System Tape and return to step I.

---

* This step is omitted if the system's Memory Configuration consists of three or more MCMUs.

L. Set the PEBU CHANNEL SELECT switch to 7.

M. Release the INSTRUCTION STOP Switch and press the COMPUTER START Switch. This action will start system initialization.

N. During the execution of the System Initialization Phase, certain errors may occur which will display any of the following DIAGNOSE STATUS Codes. The appropriate operator action for each code is indicated.

DIAGNOSE CODE	OPERATOR ACTION
776300	Rewind system tape and return to step I.
776301	Rewind system tape and return to step I.
776302	Rewind system tape and return to step I.
776303	Check setting of ACC Switches (step A), rewind system tape and return to step I.
776304	Check setting of TEST switches (step G), rewind system tape and return to step I.
776310	Check ACC Switch setting (step A), rewind system tape and return to step I.
771700	Rewind system tape and return to step A.

O. The PRIORITY MESSAGE Light on the ACC Switch Assembly should be illuminated within 5 seconds following step N. If it is not, depress the LAMP TEST Switch on the Switch Assembly. If the light is inoperative, replace and continue with step P. If the lamp is operating, check the DIAGNOSE STATUS Display for one of the codes listed in step N.

P. Depress the ACC PRIORITY MESSAGE Switch.

Q. The light associated with the PRIORITY MESSAGE Switch is extenguished and a listing of all peripheral devices and their device addresses will be displayed on the Compose/Edit Display as follows:

```
CTU0/ARMM1:7/0; CTU1/ARMM2:7/1; CTU2:7/2; CTU3:7/3; RAM:1/0;
DDTAI:2/0; DDTAO:2/1; DDTBI:3/0; DDTBO:3/1; DDTCI:1/2; DDTCO:1/3;
DDTDI:2/2; DDTDO:2/3; DDTEI:1/4; DDTEO:1/5; DDTFI:1/6; DDTFO:1/7;
DDTGI:3/4; DDTGO:3/5; DDTHI:3/6; DDTHO:3/7;
ACCRD:2/6; ACCSA:2/5; ACCCED:2/4;
ELP1:3/3; ELP2:2/7; CARD READER:7/4; CARD PUNCH:7/5; H-S PRINTER:7/6;
```

In the absence of a display, the following DIAGNOSE STATUS Code will appear:

DIAGNOSE CODE	OPERATOR ACTION
771200	Check for "POWER ON" on Compose/Edit Display Module, rewind system tape and return to step I.

R. If no device address changes are desired, go to step T.

S. Device address changes are effected as follows:

Each device address is displayed in the form of two octal digits separated by a slash (/). Activation of the tab key will position the cursor to the first digit of each address in turn. Thus positioned, either or both digits may be altered by entering the desired octal digit from the keyboard.

T. After entering changes (if any), depress the CURSOR RESET Key, then depress the XMIT Key to store the device addresses displayed and to print a hard copy of the Device Address Assignments (if ELP 1 is on-line). System malfunction at this time will result in the display of one of the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
771201	Rewind system tape and return to step I. Do not enter device address whose octal value is less than 6 or greater than 77.
771202	No operator action required.
771701	Rewind system tape and return to step I.

U.* The second program on the system tape (RAMCHECK) will be loaded next and executed. Possible errors associated with this or subsequent program loads will result in the display of the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
774000	Recheck step B and G. Rewind system tape and return to step I.
774005	Rewind system tape and return to step I.

DIAGNOSE CODE	OPERATOR ACTION
776305	Recheck step G. Rewind system tape and return to step I.
776306	Rewind system tape and return to step C.

V.* Execution of RAMCHECK will terminate with the display of one of the following DIAGNOSE STATUS Codes:

0540XX (XX= # Drums on-line) - Drums are operational and program has advanced to step W.

056001-056020 Non-recoverable error. Rewind system tape and return to step I.

W. The remaining programs on the system tape are now being loaded. Errors which may occur during loading and subsequent storage will be displayed as the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
774001	Rewind system tape and return to step I.
774002	Rewind system tape and return to step I.
774003	Rewind system tape and return to step I.
774004	Rewind system tape and return to step I.
774005	Rewind system tape and return to step I.
774006	Rewind system tape and return to step I.

X. Successful conclusion of step W results in the execution of the "START" program which requires prompted inputs from the ACC Terminal Keyboard. System initialization and loading has been completed.

---

* This step is omitted if the system's Memory Configuration consists of three or more MCMUs.

ADDITIONAL DIAGNOSE STATUS CODES WHICH MAY APPEAR DURING PLANIT EXECUTION ARE AS FOLLOWS:

DIAGNOSE CODE	MEANING	OPERATOR ACTION
770000	A NON-IMPLEMENTED PROGRAM LEVEL HAS BEEN REQUESTED.	DEPRESS MASTER RESET SWITCH.
7713XX	XMIT CHANNEL (LEVEL 13) ERROR ON DDT XX (XX = 0-7 for DDT A-H).	NONE.
7715XX	RECEIVE CHANNEL (LEVEL 15) ERROR ON DDT XX (XX = 0-7 for DDT A-H).	NONE
772000	RAM READ ERROR DURING OVERLAY CALL.	DEPRESS MASTER RESET SWITCH.
770100	UNABLE TO RESTART CLOCKS DURING HOT START.	RETURN TO STEP H
770200	DEVICE TIMEOUT OR PARITY ERROR DURING ITR TO MONITOR REGISTER.	DEPRESS MASTER RESET SWITCH.
77XX17	A TRAP CONDITION OCCURRED IN LEVEL XX (CAUSED BY NON-IMPLEMENTED INSTRUCTION OR ARITHMETIC OVERFLOW).	DEPRESS MASTER RESET SWITCH
776307	ALL PROGRAM LEVELS EXCEPT LEVEL 63 ARE INACTIVE OR A PERIPHERAL DEVICE WAS EXERCISED WITHOUT PROPER PREPARATION OF KEY AND TERM WORDS.	DEPRESS MASTER RESET SWITCH

2.4 PLANIT SYSTEM SET-UP AND LOADING PROCEDURE FOR TOS^2 SSS CONFIGURATION

A. Set ACC ADDRESS Switches on the IOU to the OCC switch assembly device address (35).

B. Set the DATA EXCHANGE CHANNEL SELECT switches (IOU Maintenance and Status Panel) A, B and C = 1, 2 and 3 respectively.

C. Insure a minimum of two drums on-line.

D. Mount PLANIT LOAD Tape on IBM Tape Drive 0, 1, 2 or 3.

E. Set TEST switches on IOU Maintenance Panel to one of the following values:

12 if tape is mounted on Unit 0.

13 if tape is mounted on Unit 1.

14 if tape is mounted on Unit 2.

15 if tape is mounted on Unit 3.

See 2.5 for non-standard configuration.

F. If the cards file is to be entered via the Card Reader, place cards in input hopper and start Card Reader.

G. Set INSTRUCTION STOP and press MASTER CLEAR on Computer Test Set.

H. Set PEBU CHANNEL SELECT switch to 1 and BSL SELECT switch to the TUO-TU3 setting which corresponds to the tape drive selected for system load.

I. Depress the PEBU Load switch to Bootstrap Load the PLANIT Operating System from the System Tape. If the load is successful, the computer will halt and the DIAGNOSE STATUS Lights will display 777201. If the load is unsuccessful, rewind the System Tape and return to step G.

J. Set the PEBU CHANNEL SELECT switch to 7.

K. Release the INSTRUCTION STOP Switch and press the COMPUTER START Switch. This action will start system initialization.

L. During the execution of the System Initialization Phase, certain errors may occur which will display any of the following DIAGNOSE STATUS Codes. The appropriate operator action for each code is indicated.

DIAGNOSE CODE	OPERATOR ACTION
776300	Rewind system tape and return to step G.
776301	Rewind system tape and return to step G.
776302	Rewind system tape and return to step G.
776303	Check setting of ACC Switches (step A), rewind system tape and return to step G.
776304	Check setting of TEST switches (step E), rewind system tape and return to step G.
776310	Check ACC Switch setting (step A), rewind system tape and return to step G.
771700	Rewind system tape and return to step A.

M. The PRIORITY MESSAGE Light on the OCC Switch Assembly should be illuminated within 5 seconds following step L. If it is not, depress the LAMP TEST Switch on the Switch Assembly. If the light is inoperative, replace and continue with step N. If the lamp is operating, check the DIAGNOSE STATUS Display for one of the codes listed in step L.

N. Depress the OCC PRIORITY MESSAGE Switch

O. The light associated with the PRIORITY MESSAGE Switch is extenguished and a listing of all peripheral devices and their device addresses will be displayed on the Compose/Edit Display as follows:

```
CTUO/ARMM1:7/0; CTU1/ARMM2:7/1; CTU2:7/2; CTU3:7/3; RAM 1/0;
DDTAI:2/0; DDTAO:2/1; DDTEI:2/2; DDTBO:2/3; DDTCI:2/4; DDTCO:2/5;
DDTDI:2/6; DDTDO:2/7; DDTEI:1/4; DDTEO:1/5; DDTFI:1/6; DDTFO:1/7;
DDTGI:1/2; DDTGO:1/3; DDTHI:3/0; DDTHO:3/1;
ACCRD:3/6; ACCSA:3/5; ACCCED:3/4;
ELP1:3/3; ELP2:0/0; CARD READER:7/4; CARD PUNCH:7/5; H-S PRINTER:7/6;
```

In the absence of a display, the following DIAGNOSE STATUS Code will appear:

DIAGNOSE CODE	OPERATOR ACTION
771200	Check for "POWER ON" on Compose/Edit Display Module, rewind system tape and return to step G.

P. If no device address changes are desired, go to step R.

Q. Device address changes are effected as follows:

Each device address is displayed in the form of two octal digits separated by a slash (/). Activation of the tab key will position the cursor to the first digit of each address in turn. Thus positioned, either or both digits may be altered by entering the desired octal digit from the keyboard.

R. After entering changes (if any), depress the CURSOR RESET Key, then depress the XMIT Key to store the device addresses displayed and to print a hard copy of the Device Address Assignments (if ELP1 is on-line). System malfunction at this time will result in the display of one of the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
771201	Rewind system tape and return to step G. Do not enter device address whose octal value is less than 6 or greater than 77.
771202	No operator action required.
771701	Rewind system tape and return to step G.

S. The second program on the system tape (RAMCHECK) will be loaded next and executed. Possible errors associated with this or subsequent program loads will result in the display of the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
774000	Recheck steps B and E. Rewind system tape and return to step G.
774005	Rewind system tape and return to step G.

DIAGNOSE CODE	OPERATOR ACTION
776305	Recheck step E. Rewind system tape and return to step G.
776306	Rewind system tape and return to step C.

T. Execution of RAMCHECK will terminate with the display of one of the following DIAGNOSE STATUS Codes:

0540XX (XX= # Drums on-line) - Drums are operational and program has advanced to step U.

056001-056020 Non-recoverable error. Rewind system tape and return to step G.

U. The remaining programs on the system tape are now being loaded. Errors which may occur during loading and subsequent storage will be displayed as the following DIAGNOSE STATUS Codes:

DIAGNOSE CODE	OPERATOR ACTION
774001	Rewind system tape and return to step G.
774002	Rewind system tape and return to step G.
774003	Rewind system tape and return to step G.
774004	Rewind system tape and return to step G.
774005	Rewind system tape and return to step G.
774006	Rewind system tape and return to step G.

V. Successful conclusion of step U results in the execution of the "START" program which requires prompted inputs from the OCC Terminal Keyboard. System initialization and loading has been completed.

ADDITIONAL DIAGNOSE STATUS CODES WHICH MAY APPEAR DURING PLANIT EXECUTION ARE AS FOLLOWS:

DIAGNOSE CODE	MEANING	OPERATOR ACTION
770000	A NON-IMPLEMENTED PROGRAM LEVEL HAS BEEN REQUESTED.	DEPRESS MASTER RESET SWITCH.
7713XX	XMIT CHANNEL (LEVEL 13) ERROR ON DDT XX (XX = 0-7 for DDT A-H).	NONE.
7715XX	RECEIVE CHANNEL (LEVEL 15) ERROR ON DDT XX (XX = 0-7 for DDT A-H).	NONE
772000	RAM READ ERROR DURING OVERLAY CALL.	DEPRESS MASTER RESET SWITCH.
770100	UNABLE TO RESTART CLOCKS DURING HOT START.	RETURN TO STEP F
770200	DEVICE TIMEOUT OR PARITY ERROR DURING ITR TO MONITOR REGISTER.	DEPRESS MASTER RESET SWITCH.
77XX17	A TRAP CONDITION OCCURRED IN LEVEL XX (CAUSED BY NON-IMPLEMENTED INSTRUCTION OR ARITHMETIC OVERFLOW).	DEPRESS MASTER RESET SWITCH
776307	ALL PROGRAM LEVELS EXCEPT LEVEL 63 ARE INACTIVE OR A PERIPHERAL DEVICE WAS EXERCISED WITHOUT PROPER PREPARATION OF KEY AND TERM WORDS.	DEPRESS MASTER RESET SWITCH

2.5 Test Switch Settings During System Load

During system loading, the TEST SWITCH settings shown in Figure 2-1 will have the following effects:

a. The loading device will be based on the right digit of the TEST SWITCH setting.

b. The Peripheral Device Skeleton (PDS) displayed will be based on the loading device first and secondly on the "system" TEST SWITCH settings as follows:

X0	TACFIRE field PDS (loading from ARMM-1)
X1	TOS^2 field PDS (loading from POTTER, drive 1)
mn	TACFIRE PSS PDS (loading from IBM unit (m = 0, 2, 4 or 6) TACFIRE system) (n = 2, 3, 4 or 5)
pq	TOS^2 PSS PDS (loading from IBM unit (p = 1, 3, 5 or 7) TOS^2 system) (q = 2, 3, 4 or 5)

c. The selection of MIOD vs VFMED terminal type is based on the left digit of the TEST SWITCH setting; VFMED if 0, 2, 4 or 6; MIOD if 1, 3, 5 or 7.

d. Operation with short (192-track) vs long (256-track) drums will be based on the left digit of the TEST SWITCH setting. Short drums if 2, 3, 6 or 7; long drums if 0, 1, 4 or 5. TEST SWITCH setting has no effect for 3 or 4 bank MCMU system.

LEFT DIGIT TEST SWITCH VALUE MEANINGS:

VALUE	SYSTEM	DRUM TRACKS
0Y	TACFIRE	256
1Y	TOS^2	256
2Y	TACFIRE	192
3Y	TOS^2	192
4Y	TACFIRE	256
5Y	TOS^2	256
6Y	TACFIRE	192
7Y	TOS^2	192

RIGHT DIGIT TEST SWITCH VALUE MEANINGS:

VALUE	LOAD DEVICE
X0	LOAD FROM ARMM-1
X1	LOAD FROM POTTER, DRIVE 1
X2	LOAD FROM IBM DRIVE 0
X3	LOAD FROM IBM DRIVE 1
X4	LOAD FROM IBM DRIVE 2
X5	LOAD FROM IBM DRIVE 3
X6	Undefined
X7	Undefined

FIGURE 2-1. TEST SWITCH Settings

Example:

To load on a TACFIRE field system with 192 track drums and a mixture of VFMED and MIOD terminals use the TEST SWITCH value of 30 during system load.

2.6 Test Switch Settings During Hot Start

Anytime after the system has been loaded and PLANIT requests "PLEASE LOG IN" the TEST SWITCH setting used in conjunction with the COMPUTER RESTART pushbutton may be used to change the TAPE, CARD and PRINTER devices from the field device assignments to the PSS/SSS device assignments or vica versa. Activating the COMPUTER RESTART will in addition cause a PLANIT HOT START and resumption of PLANIT with the "PLEASE LOG IN" message.

The right digit of the TEST SWITCH setting will have the following affect on system operation only if it has been changed since system loading:

X0	Clears indications of CARD READER, CARD PUNCH and H-S PRINTER. Replaces four possible tape unit assignments with ARMM assignments 1/1 and 3/6.
X1	Clears indications of CARD READER, CARD PUNCH and H-S PRINTER. Replaces four possible tape unit assignments with POTTER assignments (all 1/1).
X2 thru X7	Enters assignments for CARD READER (7/4), CARD PUNCH (7/5) and H-S PRINTER (7/6). Replaces four possible tape unit assignments with IBM Commercial assignments (7/0 thru 7/3).

SECTION 3

START MODULE PROCEDURES/SEQUENCE OF OPERATIONS

This section describes the procedures, sequence of operations, messages and error indications during the START initialization process.

After POS intiialization (and RAMCHECK if applicable) the next module to be executed is the START Module. START inputs date, time and number of terminals and initializes PLANIT files on a HISTORY start.

3.1 Running Message

The first message from START will appear only on the RD screen of the ACC (OCC) and reads as follows:

```
+START MODULE IS RUNNING
```

The message is informational and requires no action.

Except as indicated, all messages will only appear on the CE screen of the ACC(OCC).

3.2 Date and Time Message

The second message from the START module requests the date and time and will appear as follows:

```
+
+START MODULE, ENTER DATE AND TIME
+FORMAT MODDYY,HHMM
+
```

Enter the date and time in the format indicated.
For example, January 12, 1975 at 6:30 P.M. would be entered as:

```
011275,1830
```

If an error is made, the following message is displayed:

```
+DIDNT UNDERSTAND
+START MODULE, ENTER DATE AND TIME
+FORMAT MODDYY,HHMM
+
```

Reenter the date and time.

3.3 Type of Start Message

The third message from START requests the type of start and will appear as follows:

```
+
+ENTER TYPE OF START
+COLD START FROM TAPE (TAPE)
+COLD START FROM CARD READER (CARD)
+HISTORY START (HISTORY)
+
```

Enter the type of start as a single word TAPE, CARD or HISTORY. The operator actions and results of the various start types are described below:

a. TAPE. This start type requires no specific operator action. When PLANIT starts execution it will read the CARDS FILE located at the end of the program load tape. Since this will be a PLANIT COLD START the PLANIT FILES will be empty - i.e., no lesson material and no student records.

b. CARD. This reply will cause the system load tape to be rewound and the following message to be displayed:

```
+YOU MAY REMOVE TAPE FROM ARMM UNIT 0
```

This start type requires that a CARDS FILE deck be loaded into the card reader and that the card reader be made ready before continuing. When PLANIT starts execution, it will read the CARDS FILE in the card reader. This is also a PLANIT cold start and the PLANIT files will be empty.

c. HISTORY. This reply will cause the system load tape to be rewound and the following message to be displayed:

+YOU MAY REMOVE TAPE FROM ARMM UNIT 0

This type of start will require that a HISTORY tape be mounted and made ready on any unit. Prior to PLANIT's execution, START will read the HISTORY tape and load the PLANIT FILES with the same data that existed at the time of the HISTORY DUMP. When PLANIT starts execution it will be given a simulated HOT START.

If an error is made the following message is displayed:

```
+DIDNT UNDERSTAND
+ENTER TYPE OF START
+COLD START FROM TAPE (TAPE)
+COLD START FROM CARD READER (CARD)
+HISTORY START (HISTORY)
+
```

Reenter the type of start.

3.4 Active Terminal Message

The next message from START requests the number of terminals to be made available to PLANIT. The first terminal is always the ACC (OCC), additional terminals are remote terminals connected to DDT A through DDT H. The message appears as follows:

```
+
+ENTER NUMBER OF ACTIVE TERMINALS
+(ONE DIGIT, 1 THRU 9)
+
```

If an error is made the following message is displayed:

```
+DIDNT UNDERSTAND
+ENTER NUMBER OF ACTIVE TERMINALS
+(ONE DIGIT, 1 THRU 9)
+
```

Reenter the number of terminals.

3.5 RAM Message

The next message from START will be output only if the system configuration includes RAMs. The message prints the number of online drums found and the number of bad tracks (in octal). The message is informational and requires no operator action. The message appears as follows:

```
+
+2 DRUMS ON LINE
+01 BADTRACKS (OCTAL)
```

If there were bad tracks, an informational report will be displayed which appears as follows:

```
+BADTRACK ALTERNATE (DRUM TRACK IN OCTAL)
+1 216     0 003
+1 220     0 004
```

The above report indicates that tracks 216 and 220 (octal) of drum 1 were bad and that tracks 3 and 4 of drum 0 were assigned as alternates.

3.6 History Tape Mount Message

A tape mount request will be displayed if the HISTORY start was selected. The message will suggest a tape unit on which to mount the HISTORY tape (IBM UNIT 0, POTTER UNIT 1 or ARMM UNIT 1) depending on the system configuration. The message appears as follows:

```
+
+PLANIT SUSPENDED, MOUNT INPUT TAPE
+ON IBM UNIT 0
+REEL IDENTITY IS HISTORY
+REPLY CANCEL OR UNIT WHEN COMPLETED (C,0,1,2,3)
+
```

The operator should verify that the tape is mounted and ready on some unit and then reply with the correct digit (0 thru 3 for IBM units, 1 thru 4 for POTTER units, 1 or 2 for ARMM units).

The next message is the header data from the HISTORY tape showing when the HISTORY tape was created; it appears as follows:

```
HISTORY TAPE DATE 122174 TIME 0420
```

The HISTORY tape will be loading after this message is displayed.

3.7 START Initialization Complete Message

The last message from START, appears on both the RD screen and on the CE screen and is as follows:

```
+
+START INITIALIZATION COMPLETE
```

No operator action is required.

If the HISTORY or TAPE mode was selected the following message will be displayed:

```
+YOU MAY REMOVE TAPE FROM IBM UNIT 0
```

The operator may remove the tape at this time.

3.8 PLANIT Log In Message

The next message to appear will be the PLANIT log in message which is as follows:

```
PLEASE LOG IN***
```

3.9 START Error Messages

Error messages from START are shown in Table 3-I. A typical error message is shown below:

```
+HISTORY LOAD PROBLEM
+HISTORY TAPE HEADER RECORD INVALID
+DO YOU WISH TO RETRY HISTORY LOAD (Y,N)
+
```

Enter a Y for yes or an N for no.

The Y response will rewind the tape and cause the following message:

```
+YOU MAY REMOVE TAPE FROM IBM UNIT 0
```

It is not necessary to remove the tape and the next message will be the tape mount message as described in 3.6.

If the N response is given the following message will be displayed:

```
+LOAD NEXT SYSTEM ON COMPUTER
```

No further operation is possible until the next system is booted into the computer.

TABLE 3-I. ERROR MESSAGES FROM START (Sheet 1 of 3)

MESSAGE	POSSIBLE CAUSE	RECOMMENDED ACTION
+START FAILURE, CANT OPEN TERMINAL (Note: Appears on RD screen only)	ACC turned off or failing. ACC incorrectly cabled or IOX switches incorrect.	Turn on ACC (if off) verify configuration of system. If recovery is effected, date and time will be asked for, however error message will remain on RD screen.
+SYSTEM LOAD ABORTED - NO RECOVERY +MORE THAN 64 BAD TRACKS, PLANIT CANNOT RUN +TRY RELOADING SYSTEM	Badtracks on drum(s) exceed 64	Try reloading system. Replace drum or turn off failing drum. PLANIT requires one or two drums depending on PLANIT file allocation
+SYSTEM LOAD ABORTED - NO RECOVERY +FILE DID NOT OPEN +TRY RELOADING SYSTEM	Not enough RAMs or MCMUs on line and HISTORY tape from larger system.	Verify number of on-line RAMs or MCMUs and origin of history tape. Try reloading system.

TABLE 3-I. ERROR MESSAGES FROM START (Sheet 2 of 3)

MESSAGE	POSSIBLE CAUSE	RECOMMENDED ACTION
+HISTORY LOAD PROBLEM +MOUNT OR HISTORY TAPE NOT ACCOMPLISHED +DO YOU WISH TO RETRY HISTORY LOAD? (Y,N) +	Incorrect or no response to tape mount message.	Enter Y (yes) and respond correctly to tape mount message
+HISTORY LOAD PROBLEM +MOUNT OF HISTORY TAPE NOT APPROVED +DO YOU WISH TO RETRY HISTORY LOAD? (Y,N) +	Incorrect response to tape mount message.	Enter Y (yes) and respond correctly to tape mount message.
+HISTORY LOAD PROBLEM +HISTORY TAPE DID NOT OPEN +DO YOU WISH TO RETRY HISTORY LOAD? (Y,N) +	No tape was mounted or tape was not mounted on correct unit.	Enter Y (yes) and respond correctly to tape mount message. Verify location of HISTORY tape.
+HISTORY LOAD PROBLEM +HISTORY TAPE HEADER RECORD INVALID +DO YOU WISH TO RETRY HISTORY LOAD? (Y,N) +	Incorrect tape was mounted or incorrect response given to tape mount message.	Enter Y (yes) and verify tape to be read in is HISTORY tape.

TABLE 3-I. ERROR MESSAGES FROM START (Sheet 3 of 3)

MESSAGE	POSSIBLE CAUSE	RECOMMENDED ACTION
+HISTORY LOAD PROBLEM +HISTORY TAPE UNRECOVERABLE ERROR +DO YOU WISH TO RETRY HISTORY LOAD? (Y,N) +	Tape error	Enter Y (yes) and try again. If still no good, use older history tape.
+HISTORY LOAD PROBLEM +UNRECOVERABLE FILE WRITE ERROR +DO YOU WISH TO RETRY HISTORY LOAD? (Y,N)	RAM controller error	Enter Y (yes) and try again. If still no good use RAMFI program to verify RAM status.

MIOP/TMIOP PROCEDURES/SEQUENCE OF OPERATIONS

This section describes the procedures, sequence of operations, messages, and error indications during MIOP/TMIOP operations.

MIOP/TMIOP messages consist of tape mount messages. PLANIT termination messages and error messages. Tape mount messages are utilized by both the START and FINAL modules as well as PLANIT.

4.1 Mount Input Tape Message. PLANIT operation is suspended when a tape mount request is made. A typical request will appear as follows:

```
+
+PLANIT SUSPENDED, MOUNT INPUT TAPE
+ON IBM UNIT 0
+REEL IDENTITY IS TEST 001
+REPLY CANCEL OR UNIT WHEN COMPLETED (C,0,1,2,3)
+
```

The message "MOUNT INPUT TAPE" indicates that the tape will be read only. It is suggested that the write ring be removed before mounting. The message also suggests a unit on which to mount the tape, that unit or any free unit may be used. The next line gives the reel identity, in this case "TEST 001."

The operator should either cancel the request or mount the tape and reply with the proper digit (0 thru 3 for IBM units, 1 or 2 for ARMM units, 1 thru 4 for POTTER units).

If an error is made, one of the following will replace the top line of the mount message:

a) +INVALID REPLY, TRY AGAIN

A reply other than C or a legal digit (0 thru 3 for IBM units; 1 thru 4 for POTTER units; 1 or 2 for ARMM units) was given. Reenter reply.

b) +REPLY UNIT IS BUSY, TRY A DIFFERENT UNIT

The unit selected by the operator was not released by PLANIT. Reply with an unused unit.

4.1.1 Multi-Lesson Input Tape Message. The next message is used to determine if the tape is a multi-lesson tape or not. The message appears as follows:

```
+
+PLANIT SUSPENDED, A TAPE READ REQUEST HAS BEEN MADE FOR
+REEL nnnnnnnn LESSON pppppppp.
+
+IS THE NAMED LESSON PART OF A MULTI-LESSON REEL?
+REPLY YES, NO OR CANCEL. (Y,N,C)
```

The message indicates the reel and lesson name requested for the read request. The message gives the operator the opportunity to verify the lesson name and reel against various tape inventories.

The operator should either cancel the request or reply Y or N as appropriate.

If an operator error is made the top line of the message will be replaced by the following:

```
+INVALID REPLY, TRY AGAIN.

A reply other than Y, N or C was given.
Re-enter reply.
```

If the reply is N, the tape is rewound and PLANIT will read the tape.

If the reply is Y, the tape will be automatically positioned by MIOP before PLANIT will read the tape.

4.2 Mount Card Input Tape Message. PLANIT operation is suspended when this tape mount request is made. A typical request will appear as follows:

```
+
+PLANIT SUSPENDED, MOUNT CARD INPUT TAPE
+ON ARMM UNIT 1
+IDENTITY IS CARD INPUT TAPE
+REPLY CANCEL OR UNIT WHEN COMPLETED (C,1,2)
+
```

This message is a special case of the mount input tape message. The tape mounted must be in a special format created by the stand alone PLANIT Utility Program (PUP) or a card output tape created by this system (see 4.4).

The operator should either cancel the request or mount the requested tape on an available unit. The operator should then reply with the proper digit (0 thru 3 for IBM units, 1 thru 4 for POTTER units, 1 or 2 for ARMM units).

If an error is made one of the following will replace the top line of the mount message:

a) +INVALID REPLY, TRY AGAIN

b) +REPLY UNIT BUSY, TRY A DIFFERENT UNIT

See 4.1 a) and b) for a description of the errors.

4.3 Mount Write Enabled Scratch Tape Message. PLANIT operation is suspended when a tape mount request is made. A typical request will appear as follows:

```
+
+PLANIT SUSPENDED, MOUNT WRITE ENABLED SCRATCH TAPE
+ON IBM UNIT 0
+REEL IDENTITY IS TEST 002
+REPLY CANCEL OR UNIT WHEN COMPLETED (C,0,1,2,3)
+
```

The message "MOUNT WRITE ENABLED SCRATCH TAPE" indicates that the tape will be written on. The message also suggests a unit on which

to mount the tape, that unit or any free unit may be used. The next line gives the reel identify, in this case "TEST 002."

The operator should either cancel the request or mount the tape and reply with the proper digit (0 thru 3 for IBM units, 1 thru 4 for POTTER units, 1 or 2 for ARMM units).

If an error is made one of the following will replace the top line of the mount message:

a) +INVALID REPLY, TRY AGAIN

b) +REPLY UNIT BUSY, TRY A DIFFERENT UNIT

See 4.1 a) and b) for a description of the errors.

4.3.1 Multi-Lesson Output Tape Message. The next message is used to determine if the tape is to be a multi-lesson tape or not. The message appears as follows:

```
+
+PLANIT SUSPENDED, A TAPE WRITE REQUEST HAS BEEN MADE FOR
+REEL nnnnnnnn LESSON pppppppp.
+
+IS THE NAMED LESSON PART OF A MULTI-LESSON REEL?
+REPLY YES, NO OR CANCEL. (Y,N,C)
```

The message indicates the reel and lesson name which will be written on the tape. The message gives the operator the opportunity to verify the lesson name and reel before continuing.

The operator should either cancel the request or reply Y or N as appropriate.

If an operator error is made the top line of the message will be replaced by the following:

```
+INVALID REPLY, TRY AGAIN
```

A reply other than Y, N or C was given.
Re-enter reply.

If the reply is N, the tape is rewound and PLANIT will write the lesson on the tape.

If the reply is Y, the next message will be displayed.

4.3.2 First Record Output Tape Message. The third message is used to determine if the lesson is to be written as the first file on the tape. The message appears as follows:

```
+
+PLANIT SUSPENDED, A TAPE WRITE REQUEST HAS BEEN MADE FOR
+REEL nnnnnnnn LESSON pppppppp.
+IS THE NAMED LESSON TO BE WRITTEN
+AS THE FIRST RECORD ON THE REEL?
+REPLY YES, NO OR CANCEL. (Y,N,C)
```

This message gives the opportunity to add a new lesson to an existing tape (N response) or start a new tape (Y response).

The operator should either cancel the request or reply Y or N as appropriate.

If an operator error is made the top line of the display will be replaced by the following:

```
+INVALID REPLY, TRY AGAIN
```

A reply other than Y, N or C was given.
Re-enter reply.

If the reply is N, the tape is rewound and PLANIT will write the lesson on the tape.

If the reply is Y, the tape will be automatically positioned by MIOP before PLANIT writes the lesson on tape.

4.4 Mount Card Output Tape Message. PLANIT operation is suspended when this tape mount request is made. A typical request will appear as follows:

```
+
+PLANIT SUSPENDED, MOUNT WRITE ENABLED SCRATCH TAPE
+ON IBM UNIT 2
+MARK IDENTITY AS CARD OUTPUT TAPE
+REPLY CANCEL OR UNIT WHEN COMPLETED (C,0,1,2,3)
+
```

This message is a special case of the mount output tape message. The card output tape will be written in a special packed format which can only be read by the stand alone PLANIT Utility Program (PUP) or as a card input tape in this system. (see 4.2).

The operator should either cancel the request or mount a scratch tape on an available unit. The operator should then reply with the proper digit (0 thru 3 for IBM units, 1 thru 4 for POTTER units, 1 or 2 for ARMM units).

If an error is made, one of the following will replace the top line of the mount message:

a) +*INVALID REPLY, TRY AGAIN*

b) +REPLY UNIT BUSY, TRY A DIFFERENT UNIT

See 4.1 a) and b) for a description of the errors.

4.5 Remove Tape Message. When PLANIT is finished with a tape it will cause the following typical message to be displayed:

```
+YOU MAY REMOVE TAPE FROM IBM UNIT 0
```

The unit is now free for use and the reel or MLU may be removed and labeled as required.

4.6 PLANIT Termination Messages. When PLANIT terminates it will produce one of the following messages:

```
+PLANIT NORMAL END                (In response to PLANIT
+DUMP HISTORY TAPE? (Y,N)          QUIT ALL Command.)
```

or:

```
+PLANIT FATAL ERROR 000.          (In response to PLANIT
+DUMP HISTORY TAPE? (Y,N)          FATAL ERROR indication.)
```

In the case of a "FATAL ERROR" the number given is a PLANIT error number and is described in the PLANIT manual.

At this point the operator must determine whether a HISTORY TAPE should be made. As a general rule, a HISTORY TAPE should be made for the PLANIT NORMAL END condition and none should be made for the PLANIT FATAL ERROR condition.

A HISTORY TAPE preserves lesson and student record files so that system operation can be resumed with no loss of data.

The N (no) response to the "DUMP HISTORY TAPE" question will produce the following message:

```
+PRESS MASTER RESET TO HOT START PLANIT IF DESIRED
+OTHERWISE MOUNT NEXT SYSTEM
+FINI
```

As indicated the computer can be MASTER RESET which will restart PLANIT or the next system can be loaded.

The Y(yes) response to the "DUMP HISTORY TAPE" question will cause the FINAL module to be executed (see Section 5).

4.7 RD Screen Error Messages . Table 4-I shows the error messages which may appear on the RD screen of the ACC(OCC). The most recent error will be at the bottom of the screen and errors will move from the bottom to the top of the screen as more errors occur. The error messages appearing on the RD screen require no action and PLANIT, START on FINAL will put out specific messages requesting action should any be required.

Table 4-I. RD Screen Error Messages

ERROR ON POTTER UNIT X
ERROR ON IBM UNIT X
ERROR ON ARMM UNIT X
ERROR ON CARD READER
ERROR ON CARD PUNCH
ERROR ON SYSTEM LINE PRINTER
ERROR ON ELP1
ERROR ON TERMINAL X
ERROR ON DRUM
PAPER LOW ELP1
PAPER LOW ELP2

4.8 MIOP Error Messages and Error Correction. Table 4-II shows the error messages which may occur during MIOP tape positioning of multi-lesson tape reels. Most of the errors will cause an automatic cancellation of the request and return to PLANIT for further activity.

4.8.1 Multi-Lesson Tape Inventory. To inventory a tape, use the PLANIT request "GET TAPEINV nnnn". MIOP will detect the lesson name "TAPEINV", rewind the tape and display headers, six at a time, until a double EOF is detected. A cancel will be returned to PLANIT at the completion of the task and the tape will be rewound. Reel and lesson name checking is bypassed and no multi-lesson questions are asked.

4.8.2 Multi-Lesson Tape Error Correction. Tape correction is provided in the write mode by responding to error messages. The tape correction is limited to ending the tape or rewriting over the invalid lesson and rewriting all following lessons. Either of the following messages will be displayed when an error situation is encountered:

Message A.

```
+
+WRITE REQUEST FOR EEEL nnnnnnnn LESSON pppppppp
+REEL DOES NOT MATCH TAPE HEADER WHICH IS:
0999     FM1      ZFM1     GERMAS
+REPLY OK TO WRITE NEW LESSON, END TO END TAPE OR
+CANCEL. (OK,END,C)
```

Message B.

```
+
+WRITE REQUEST FOR REEL nnnnnnnn LESSON pppppppp
+LESSON MATCHES EXISTING TAPE HEADER WHICH IS:
09999    FM1      ZFM1     GERMAS
+REPLY OK TO WRITE NEW LESSON, END TO END TAPE OR
+CANCEL. (OK,END,C)
```

The END response to message A or B will cause two End of File (EOF) marks to be written over the header record, ending the tape.

The OK response to message A or B will allow PLANIT to write the desired lesson over the header record.

The following examples illustrate correction of typical problems:

Example 1

To correct a reel number error where the TAPEINV display is as follows:

```
212      MATH1      ZMATH1      DOE
212      MATH2      ZMATH2      DOE
222      MATH3      ZMATH3      DOE
212      MATH4      ZMATH4      DOE
END OF TAPE
```

a. Position the tape manually at BOT.

b. SAVE the correct lesson and Reel, i.e., "SAVE MATH3 212".

c. Message A will be displayed, Reply "OK".

d. When completed SAVE the next lesson on tape, i.e., "SAVE MATH4 212".

Example 2

To correct a lesson name error where the TAPEINV display is as follows:

```
100      TANKS1      ZTANKS1      DOE
100      RIVER       ZRIVER       JOE
100      TANKS3      ZTANKS3      DOE
END OF TAPE
```

a. Position the tape manually at BOT.

b. SAVE the incorrect lesson and reel, i.e., "SAVE RIVER 100".

c. Message B will be displayed, Reply "END". Tape will be ended and rewound.

d. SAVE the correct lessons and reel, i.e., SAVE TANKS2 100" and "SAVE TANKS3 100".

Example 3

To correct a tape on which the last lesson is not complete (end of tape encountered), and where the last part of the TAPEINV display is as follows:

```
...
900       MATH50       ZMATH50       DOE
900       MATH51       ZMATH51       DOE
TAPE ERROR
```

NOTE: The "TAPE ERROR" entry indicates the lesson preceeding (MATH51) was bad.

a. Position the tape manually at BOT.

b. SAVE the last lesson and reel, i.e., "SAVE MATH51 900".

c. Message B will be displayed, Reply "END".

TABLE 4-II. ERROR MESSAGES FROM MIOP (Sheet 1 of 2)

Message	Cause	Recommended Action
+ +READ REQUEST FOR REEL nnnnnnnn LESSON pppppppp +CAN NOT BE PROCESSED AT THIS TIME. +WAIT FOR COMPLETION OF PRESTORE OR PUNCH JOB(S) +AND TRY AGAIN. +REQUEST AUTOMATICALLY CANCELLED.	The Buffer used for tape positioning is allocated to a Prestore or Punch job.	Cancel or wait for completion of Prestore or punch job and try again.
+ +WRITE REQUEST FOR REEL nnnnnnnn LESSON pppppppp +CAN NOT BE PROCESSED AT THIS TIME. +WAIT FOR COMPLETION OF PRESTORE OR PUNCH JOB(S) +AND TRY AGAIN. +REQUEST AUTOMATICALLY CANCELLED.	The Buffer used for tape positioning is allocated to a Prestore or Punch job.	Cancel or wait for completion of Prestore or punch job and try again.
+ +READ REQUEST FOR REEL nnnnnnnn LESSON pppppppp +COULD NOT BE LOCATED. END OF TAPE + +REQUEST AUTOMATICALLY CANCELLED.	The lesson tape was searched from beginning to end and the lesson name could not be located.	Verify spelling of lesson name compared to inventory of lesson tape.

TABLE 4-II. ERROR MESSAGES FROM MIOP (Sheet 2 of 2)

Message	Cause	Recommended Action
+ +READ REQUEST FOR REEL nnnnnnnn LESSON pppppppp +REEL DOES NOT MATCH TAPE HEADER WHICH IS: 0999 FM1 AFM1 GERMAS + +REQUEST AUTOMATICALLY CANCELLED.	Incorrect reel was mounted or incorrect unit reply given for tape mount.	Verify lesson name and reel compared to inventory of lesson tape.
+ +WRITE REQUEST FOR REEL nnnnnnnn LESSON pppppppp +REEL DOES NOT MATCH TAPE HEADER WHICH IS: 0999 FM1 ZFM1 GERMAS +REPLY OK TO WRITE NEW LESSON, END TO END TAPE OR +CANCEL. (OK,END,C)	Reel number in tape header does not match write request.	See Section 4.8 Tape Error Correction.
+ +WRITE REQUEST FOR REEL nnnnnnnn LESSON pppppppp +LESSON MATCHES EXISTING TAPE HEADER WHICH IS: 09999 FM1 ZFM1 GERMAS +REPLY OK TO WRITE NEW LESSON, END TO END TAPE OR +CANCEL. (OK,END,C)	Lesson name in tape header matches write request.	See Section 4.8 Tape Error Correction.

SECTION 5

FINAL MODULE PROCEDURES/SEQUENCE OF OPERATIONS

This section describes the procedures, sequence of operations, messages and error indications during execution of the FINAL module for PLANIT system termination operations.

The FINAL module is activated by replying Y (yes) to the MIOP message "DUMP HISTORY TAPE?". The FINAL module will make a HISTORY tape by copying the contents of all PLANIT files.

5.1 Tape Mount Message

The first message to be displayed is the tape mount message. The message will suggest a tape unit on which to mount a write enabled scratch tape which will become the HISTORY tape. The unit suggested depends on the system configuration (IBM UNIT 0, POTTER UNIT 1 or ARMM UNIT 1). A typical message appears as follows:

```
+
+PLANIT SUSPENDED, MOUNT WRITE ENABLED SCRATCH TAPE
+ON IBM UNIT 0
+REEL IDENTITY IS HISTORY
+REPLY CANCEL OR UNIT WHEN COMPLETED (C,0,1,2,3)
+
```

The operator should mount a write enabled scratch on any available unit, double checking that the tape is at load point (beginning of tape) and write enabled. The operator then responds with the correct digit (0 thru 3 for IBM units, 1 thru 4 for POTTER units, 1 or 2 for ARMM units).

5.2 History Header Record Message

The next message is the HISTORY tape header record. It includes the current date and time and appears as follows:

```
+HISTORY TAPE DATE 012975 TIME 2356
```

Although the message is informational, it is suggested that the data be copied onto a stick-on-label to be affixed to the physical tape or MLU.

5.3 File Allocation Message

The next two messages are an informational table on the PLANIT files and appear as follows for a RAM system:

FILE	R SIZE	COUNT	DRUM	TRACK	SECTOR
01	000640	000005	0	001	000
02	000640	000010	0	003	004
03	000384	000010	0	009	012
04	000320	000400	0	013	004
05	001824	000050	0	138	004

FILE	R SIZE	COUNT	DRUM	TRACK	SECTOR
06	004160	000009	0	227	006
08	000064	000001	1	007	024
09	004160	000002	1	007	026
10	000160	000100	1	015	030
11	000160	000025	1	031	018

For an all MCMU system the report will appear as follows:

FILE	R SIZE	COUNT	ADDRESS
01	000640	000005	022000
02	000640	000010	0237FE
03	000384	000010	0258A0
04	000320	000400	02F990
05	001824	000050	03D000

FILE	R SIZE	COUNT	ADDRESS
06	004160	000009	06E3F0
08	000064	000001	0A33FC
09	004160	000002	0A34CC
10	000160	000100	100300
11	000160	000035	12AF30

The tables are intrepreted in the following manner:

a) FILE. PLANIT file number 1 thru 11 except 7 which is non-existent.

b) ADDRESS. For the all MCMU system this is the core address (in hex) of the beginning of the file.

c) DRUM, TRACK, SECTOR. For the RAM system this is the address in decimal of the beginning of the file.

d) R SIZE. This is the size of each record in the file in 32 bit words.

e) COUNT. This is the number of records in the file.

The Report is informational and no operator action is required.

5.4 Remove Tape Message

When the HISTORY tape is complete the tape will rewind and the following typical message will be output:

```
+YOU MAY REMOVE TAPE FROM IBM UNIT 1
```

The tape should be removed, labeled and the write ring removed (if not an MLU).

5.5 History Tape Complete Message

The last message from FINAL is as follows:

```
+HISTORY TAPE COMPLETE WITH NO ERRORS
+TRACKS USED 000305 OR MCMU WORDS 312320
+REMOVE HISTORY TAPE
+PRESS MASTER RESET TO HOTSTART PLANIT IF DESIRED
+OTHERWISE MOUNT NEXT SYSTEM
+FINI
```

The first variable is the number of tracks used for a TACFIRE or TOS^2 drum system plus the number of bad tracks. The MCMU words value for a drum system is the additional core required to replace the drums and does not include resident core storage.

The MCMU words value for an MCMU system (no drums) is the total core used for resident programs and PLANIT FILES. The tracks value is the track equivalent of the MCMU words and is not directly relateable to a drum system.

As indicated the computer can be MASTER RESET which will restart PLANIT or the next system can be loaded.

5.6 FINAL Error Messages

Error messages from FINAL are shown in Table 5-I.

TABLE 5-I. FINAL ERROR MESSAGES (Sheet 1 of 2)

MESSAGE	POSSIBLE CAUSE	RECOMMENDED ACTION
+CANNOT REOPEN ACC TERMINAL FOR MESSAGES (Note: Appears on RD screen only)	ACC turned off or failing. ACC incorrecIty cabled or IOU switches incorrect.	Turn on ACC (if off) verify configuration of system. If recovery is effected, the error message will remain but normal operation will be possible.
+HISTORY DUMP PROBLEM +MOUNT OF HISTORY TAPE NOT ACCOMPLISHED +DO YOU WISH TO RETRY HISTORY DUMP? (Y,N) +	Incorrect or no response to tape mount message.	Enter Y (yes) and respond correctly to tape mount message.
+HISTORY DUMP PROBLEM +MOUNT OF HISTORY TAPE NOT APPROVED +DO YOU WISH TO RETRY HISTORY DUMP? (Y,N) +	Incorrect response to tape mount message	Enter Y (yes) and respond correctly to tape mount message.
+HISTORY DUMP PROBLEM +HISTORY TAPE DID NOT OPEN +DO YOU WISH TO RETRY HISTORY DUMP? (Y,N) +	No tape was mounted or tape was not mounted on correct unit.	Enter Y (yes) and respond correctly to tape mount message. Verify location of scratch tape.

TABLE 5-I. FINAL ERROR MESSAGES (Sheet 2 of 2)

MESSAGE	POSSIBLE CAUSE	RECOMMENDED ACTION
+HISTORY DUMP PROBLEM +HISTORY TAPE UNRECOVERABLE ERROR +DO YOU WISH TO RETRY HISTORY DUMP? (Y,N) +	Tape error	Enter Y (yes) and try again. If still no good, use a different scratch tape.
+HISTORY DUMP PROBLEM +UNRECOVERABLE DRUM READ ERROR +DO YOU WISH TO RETRY HISTORY DUMP? (Y,N) +	RAM controller error	Enter Y (yes) and try again. If still no good use RAMFI program to verify RAM status.

APPENDIX A

DIAGNOSTIC STATUS (DIG) CODES

CODE	MEANING
0540XX	RAM IS FUNCTIONAL. THERE ARE XX DRUMS ON-LINE.
056001	DEVICE TIMEOUT ON ITR FROM DRUM DURING RAMCHECK EXECUTION.
056002	INPUT PARITY ERROR ON ITR FROM DRUM DURING RAMCHECK EXECUTION.
056003	DEVICE TIMEOUT ON OFR TO DRUM DURING RAMCHECK EXECUTION.
056004	DEVICE TIMEOUT ON DEV TO DRUM DURING RAMCHECK EXECUTION.
056005	BUSY FAULT BIT SET IN ITR WORD FROM DRUM DURING RAMCHECK EXECUTION.
056006	ERROR BIT SET IN ITR WORD FROM DRUM DURING RAMCHECK EXECUTION.
056007	F&I BITS IN DRUM TERMWORD NOT SET AT CONCLUSION OF DRUM OPERATION DURING RAMCHECK EXECUTION.
056010	TRANSMISSION OR OPERATIONAL ERROR BIT SET IN DRUM TERMWORD DURING RAMCHECK EXECUTION.
056011	COMPUTER ERROR OR DRUM WRITE PARITY ERROR DURING RAMCHECK EXECUTION.
056012	DRUM READ PARITY ERROR DURING RAMCHECK EXECUTION.
056013	EOB COUNT IN TERMWORD NOT ZERO AT CONCLUSION OF DRUM OPERATION DURING RAMCHECK EXECUTION.
056014	STATUS ERROR ON ITR FROM DRUM DURING RAMCHECK EXECUTION.
056015	DRUM 0 NOT ON LINE.
056016*	DRUM WRITE DATA ERROR.
056017*	DRUM READ DATA ERROR.
056020	DRUMS NOT ASSIGNED CONSECUTIVELY.
770000	ACTIVATION OF A NON-IMPLEMENTED LEVEL HAS BEEN REQUESTED.
770100	DEVICE TIMEOUT OCCURRED WHILE ATTEMPTING TO RESTART REAL TIME CLOCKS 1 AND 2 DURING A HOT START.
770200	DEVICE TIMEOUT OR A PARITY ERROR ON ITR FROM MONITOR REGISTER DURING LEVEL 2 I/O ERROR INTERRUPT PROCESSING.
771200	ERROR OCCURRED DURING ATTEMPT TO DISPLAY I/O DEVICE ADDRESSES ON COMPOSE/EDIT SCREEN. ERROR CAUSED BY ONE OF THE FOLLOWING: 1. DEVICE TIMEOUT ON DEVICE COMMAND. 2. TRANSMISSION ERROR. 3. OPERATIONAL ERROR. 4. STATUS ERROR.
771201	AN ILLEGAL I/O DEVICE ADDRESS WAS ENTERED VIA KEYBOARD.

* RAM CONTROLLER FAILURE. READS ARE PERFORMED WITH THE IGNORE DATA INABLE BIT SET. WRITE ERRORS SHOULD NOT BE DETECTABLE.

CODE	MEANING
771202	A BUFFER OSCILLATOR MALFUNCTION OR A PARITY ERROR OCCURRED DURING THE OUTPUT OF THE DEVICE ADDRESS TABLE TO THE ELP.
7713XX	TRANSMIT CHANNEL ERROR ON DDT XX (0-7 for DDT A-H).
7715XX	RECEIVE CHANNEL ERROR ON DDT XX (0-7 for DDT A-H).
771700	DEVICE TIMEOUT OR PARITY ERROR ON ITR FROM LOCAL TERMINAL (ACC/OCC).
771701	ERROR OCCURRED DURING ATTEMPT TO READ C/E DISPLAY: 1. DEVICE TIMEOUT ON DEVICE COMMAND. 2. TRANSMISSION ERROR. 3. OPERATIONAL ERROR. 4. STATUS ERROR.
772000	ERROR WHILE LOADING OVERLAY FROM DRUM TO CORE. 1. DEVICE TIMEOUT ON ITR, OFR, OR DEVICE COMMAND TO DRUM. 2. STATUS ERROR. 3. OVERLAY LOAD NOT COMPLETED WITHIN 250 MILLISECONDS.
774000	DEVICE TIMEOUT ON OFR TO SET EOB COUNTER FOR IBM TAPE READ.
774001	PROGRAM MODULE LOADED FROM SYSTEM TAPE HAS ILLEGAL I.D. OR IS OUT OF SEQUENCE.
774002	DEVICE TIMEOUT ON DEVICE COMMAND TO WRITE OVERLAY ON DRUM.
774003	ERROR DURING ATTEMPT TO WRITE OVERLAY ON DRUM. 1. F&I BITS NOT SET. 2. EOB COUNT NOT ZERO.
774004	STATUS ERROR DURING ATTEMPT TO WRITE OVERLAY ON DRUM.
774005	ERROR READING PROGRAM MODULE FROM SYSTEM TAPES: 1. DEVICE TIMEOUT ON READ COMMAND. 2. MODULE NOT READ WITHIN 5 SECONDS. 3. END OF TAPE (ARMM OR POTTER). 4. STATUS ERROR. 5. DEVICE AND CHANNEL END BITS NOT SET WITHIN 5 SECONDS OF READ COMMAND (IBM).
774006	DEVICE TIMEOUT ON OFR OR ITR TO DRUM DURING OVERLAY STORAGE ON DRUM.
776300	DEVICE TIMEOUT ON OFR TO SET MONITOR REGISTER DURING SYSTEM INITIALIZATION.
776301	DEVICE TIMEOUT OR PARITY ERROR ON ITR TO READ ACC ADDRESS AND TEST SWITCHES DURING SYSTEM INITIALIZATION.

CODE	MEANING
776302	DEVICE TIMEOUT ON COMMAND TO START REAL TIME CLOCKS 1 AND 2.
776303	LOCAL TERMINAL (ACC/OCC) ADDRESS ENTERED VIA ACC ADDRESS SWITCHES LESS THAN OCTAL "13."
776304	TEST SWITCH SETTING FOR SELECTION OF SYSTEM TAPE DRIVE IS NOT AN ACCEPTABLE VALUE.
776305	DEVICE ADDRESS FOR SELECTED SYSTEM TAPE DRIVE = 0.
776306	DEVICE TIMEOUT ON ITR FROM DRUM DURING SYSTEM INITIALIZATION.
776307	SYSTEM INITIALIZATION (LEVEL 63) HAS BEEN ILLEGALLY ACTIVATED.
776310	DEVICE TIMEOUT ON OFR TO ILLUMINATE THE MESSAGE WAITING SWITCH (PRIORITY MESSAGE) ON THE LOCAL TERMINAL (ACC/OCC).
77XX17	OVERFLOW TRAP (ARITHMETIC OVERFLOW OR NON-IMPLEMENTED INSTRUCTION) OCCURRED IN LEVEL XX.

APPENDIX B

LOCAL TERMINAL (ACC/OCC) OPERATING PROCEDURES

1. The following sequence of steps is designed to assist the student/operator in preparing the ACC/OCC as the PLANIT Local Terminal.

   A. MANDATORY REQUIREMENTS:

      1. ACC/OCC POWER Switch ON.
      2. Keyboard POWER Switch ON.
      3. COMPOSE MODE Switch ON.
      4. AUX I/O Switch OFF.

   B. OPTIONAL REQUIREMENTS:

      1. RD POWER Switch ON.
         The RD Screen is used by PLANIT to display information which is useful but not necessary for successful terminal operation.
      2. ELP1 POWER Switch ON.
         All information displayed on the Compose/Edit Display will be printed via ELP1 except if ELP1 is the only printer available and is being used as a system printer for a PLANIT specified function. The unavailability of an ELP prevents execution of PLANIT listing functions and hard copies of C/E displays during execution of PLANIT system printer functions.

2. Terminal Operating Procedures.

   A. TERMINAL INPUT:

      Messages generated by PLANIT to be displayed on the C/E screen are transmitted to the terminal only when requested by the student/operator.

      Whenever a PLANIT message is ready for transmission to the terminal, the PRIORITY MESSAGE Switch on the Switch/Assembly is illuminated to alert the student/operator. The student/operator will receive the message on the C/E Display when

he depresses the PRIORITY MESSAGE Switch. If the entire message can be displayed on one screen, the light associated with the PRIORITY MESSAGE Switch is extinguished. If the message length exceeds the display screen size the PRIORITY MESSAGE Switch light will remain lighted. Subsequent depression(s) of the PRIORITY MESSAGE Switch will display the remaining portion(s) of the message.

B. TERMINAL OUTPUT

If a message received from PLANIT requires a response from the student/operator, the top line of the C/E display will be blank to accommodate this student/operator response which is entered as follows:

1. Reset the cursor.
2. Enter the response via the keyboard (72 characters max.).
3. (Optional) Enter EOT (⊣) character.
4. Reset the cursor.
5. Depress the XMIT Switch.

Failure of the terminal to transmit is indicated by the illumination of the XMTG light and by the failure of the cursor to re-position itself beyond the end of the message. Remedial action consists of turning the COMPOSE MODE Switch OFF, then ON, then repeating steps 4 and 5 above. Repeated failures may necessitate a hot start.

C. MESSAGE REPEAT:

If the student/operator requires a re-display of the last message received depression of the CYCLE MESSAGES Switch on the Switch Assembly will initiate a retransmission of the last message display segment.

D. SUMMARY:

Excepting the keyboard entry keys, only three ACC/OCC switches are normally utilized during PLANIT Terminal Operations:

1. PRIORITY MESSAGE - press when lighted to receive PLANIT message.
2. CYCLE MESSAGES - press when repeat of last PLANIT message is desired.

3. XMIT - press when response to PLANIT message has been entered into top line of C/E display. Message length may be up to 72 characters ; messages should be (optional on ACC/OCC) followed by an EOT (↵) character.

APPENDIX C

REMOTE TERMINAL (MIOD) OPERATING PROCEDURES

1. The following sequence of steps is designed to assist the student/operator in preparing the MIOD as a PLANIT remote terminal.

   A. **OPERATIONAL REQUIREMENTS:**

      1. DDT associated with MIOD properly set up [max of one MIOD per computer DDT (A-H) channel].
      2. DDT POWER Switch ON.
      3. Keyboard POWER Switch ON.
      4. COMPOSE MODE Switch ON.
      5. AUX I/O Switch OFF.
      6. ELP POWER Switch ON.
      7. ELP CHANNEL SELECT Switch set to "0".

2. Terminal Operating Procedures.

   A. **TERMINAL INPUT:**

   Messages generated by PLANIT to be displayed on the C/E screen are transmitted to the terminal only when requested by the student/operator. Whenever a PLANIT message is ready for transmission to the terminal, the MESSAGE READY Switch is illuminated to alert the student/operator. The student/operator should reset the cursor and will receive the message on the C/E display when he depresses the MESSAGE READY Switch. If the message length exceeds the display screen size, the first line of the display screen will advise "PRESS ACK FOR REST OF MESSAGE". Resetting the cursor and depression of the ACK Switch will display the next portion of the message.

   B. **TERMINAL OUTPUT:**

   If a message received from PLANIT requires a response from the student/operator, the top line of the C/E display will be blank (except for 0000FJ) to accommodate the student/operator response which is entered as follows:

      1. Reset the cursor.
      2. Enter the communications address preamble J0000 (numeric zeros) via the keyboard.

3. Enter the response via the keyboard (67 characters max., one line of display only).
4. Enter the EOT (⏏) character.
5. Reset the cursor.
6. Depress the XMIT Switch.

Failure of the terminal to transmit is indicated by the failure of the cursor to reposition itself just beyond the EOT marker. Remedial action consists of turning the COMPOSE MODE Switch OFF, then ON, then repeating steps 5 and 6 above.

C. MESSAGE REPEAT:

If the student/operator requires a re-display of the last message received, the student/operator resets the cursor and depresses the RE-XMIT Switch which will initiate a retransmission of the last message display segment.

D. SUMMARY:

Excepting the keyboard entry keys, only four MIOD Switches are normally utilized during PLANIT terminal operations:

1. MESSAGE READY - press when lighted to receive PLANIT message.
2. RE-XMIT - press when repeat of last PLANIT message is desired.
3. ACK - press when directed to do so on C/E display.
4. XMIT - press when response to PLANIT message has been entered into top line of C/E display. Message must start with the communications address preamble (J0000 letter J, numeric zeros) followed by a message of no more than 67 characters (one line of display) followed by an EOT (⏏) character.

APPENDIX D

REMOTE TERMINAL (VFMED) OPERATING PROCEDURES

1. The following sequence of steps is designed to assist the student/operator in preparing the VFMED as a PLANIT remote terminal.

   A. OPERATIONAL REQUIREMENTS:

      1. DDT associated with VFMED properly set up [max of one VFMED per computer DDT (A-H) channel].
      2. DDT POWER Switch ON.
      3. Keyboard POWER Switch ON.
      4. COMPOSE MODE Switch OFF. (after Cursor Reset to top of display).
      5. AUX I/O Switch OFF.
      6. ELP POWER Switch ON.
      7. ELP CHANNEL SELECT Switch set to "0".

2. Terminal Operating Procedures.

   A. TERMINAL INPUT:

   Messages generated by PLANIT to be displayed on the C/E screen are transmitted to the terminal only when requested by the student/operator. Whenever a PLANIT message is ready for transmission to the terminal, the message "0000TJ MESSAGE WAITING, PRESS ACK SWITCH" is printed and the MESSAGE Light is illuminated to alert the student/operator. The student/operator will receive the message on the C/E display when he resets the cursor* and depresses the ACK Switch. If the message length exceeds the display screen size, the first line of the display screen will advise, "PRESS ACK FOR REST OF MESSAGE". Resetting the cursor* and depression of the ACK Switch will display the next portion of the message.

   B. TERMINAL OUTPUT:

   If a message received from PLANIT requires a response from the student/operator, the top line of the C/E display will be blank (except for 00003J) to accommodate the student/operator response which is entered as follows:

---

* To reset the cursor, turn COMPOSE MODE Switch on, depress CURSOR RESET, then turn COMPOSE MODE Switch off.

1. Switch COMPOSE MODE Switch to ON.
2. Reset the cursor.
3. Enter the communications address preamble J0000 (numeric zeros) via the keyboard.
4. Enter the response via the keyboard (67 characters max., one line of display only).
5. Enter the EOT (⏎) character.
6. Reset the cursor.
7. Depress the XMIT Switch.
8. Reset the cursor.
9. Switch COMPOSE MODE Switch to OFF.

Failure of the terminal to transmit is indicated by the failure of the cursor to reposition itself just beyond the EOT marker after XMIT (step 7 above). Remedial action consists of turning the COMPOSE MODE Switch OFF, then ON, then repeating steps 6-9 above.

C. MESSAGE REPEAT:

If the student/operator requires a re-display of the last message received the student/operator resets the cursor* and depresses the RE-XMIT Switch which will initiate a retransmission of the last message display segment.

D. SUMMARY:

Excepting the keyboard entry keys, only three VFMED Switches are normally utilized during PLANIT terminal operation:

1. RE-XMIT - press when repeat of last PLANIT message is desired.
2. ACK - press when directed to do so on C/E display.
3. XMIT - press when response to PLANIT message has been entered into top line of C/E display. Message must start with the communications address preamble (J0000; letter J, numeric zeros) followed by a message of no more than 67 characters (one line of display) followed by an EOT (⏎) character.

---

* To reset the cursor, turn COMPOSE MODE Switch on, depress CURSOR RESET, then turn COMPOSE MODE Switch off.

APPENDIX E

AN/GYK-12 PLANIT SYSTEM CHARACTER SETS

Table E-I summarizes the character differences between: 1) the TACFIRE (and TOS^2) AN/GYK-12 PLANIT system ASCII and EBCDIC character sets, 2) the ARI CDC 3300 character set, and 3) the ARI Univac 1108 character set.

The AN/GYK-12 PLANIT character set includes the letters A through Z zero (0) through 9 and the special characters shown in Table E-I. The AN/GYK-12 PLANIT system operates internally with the ASCII Character Set and code converts to from the EBCDIC Character Set for output to or input from the commercial card punch, card reader and the high speed printer.

In addition to the special characters shown in Table E-I, the system includes the following ASCII/EBCDIC characters:

Quote (") - EBCDIC punch 7, 8
At (@) - EBCDIC punch 4, 8
Greater than (>) - EBCDIC punch 0, 6, 8
Underscore (__)- EBCDIC punch 0, 5, 8

Unrecognized EBCDIC input characters (including ¢, see below) are code converted in the AN/GYK-12 planit system to the ASCII ACK character (⋈). Unrecognized ASCII output characters including the ASCII ACK (⋈), NAK (⊗), EOT (⊣), left bracket ([) and right bracket (]) are code converted to the EBCDIC cents character (¢); EBCDIC punch 12, 2, 8.

Table B-1

PLANIT Character Set Differences - AN/GYK-12 and ARI Commercial Systems

TACFIRE PLANIT (ASCII) CHARACTER	IBM (EBCDIC) PUNCH	029 KEY PUNCH CHARACTER	CDC PUNCH	029 KEY PUNCH CHARACTER	UNIVAC PUNCH	029 KEY PUNCH CHARACTER
Plus +	12,6,8	+	12	¿	12	¿
Minus -	11	-	11	-	11	-
Asterisk *	11,4.8	*	11,4,8	*	11,4,8	*
Slash /	0,1	/	0,1	/	0,1	/
Open Paren (	12,5,8	(	0,4,8	%	0,4,8	%
Close Paren)	11,5,8	)	12,4.8	<	12,4,8	<
Period .	12,3,8	.	12,3,8	.	12,3,8	.
Percent %	0,4,8	%	12,6,8	+	0,5,8	—
Equals =	6,8	=	3,8	#	3,8	#
Comma ,	0,3,8	,	0,3,8	,	0,3,8	,
Colon :	2,8	:	2,8	:	5,8	´
Semi-colon ;	11,6,8	;	5,8	´	11,6,8	;
Prime	5,8	'	4,8	@	4,8	@
Backslash \	11,7,8	¬	11,2,8	!	0,6,8	>
Blank		(Blank)		(Blank)		(Blank)
Pound Sign #	3,8	#	12,5,8	(	2,8 (1)	:
Ver Arrow ^	12,7,8	|	11,5,8	)	11,7,8	¬
Hor Arrow <	12,4,8	<	12,2,8	¢	11,6,8	;
Question Mk ?	0,7,8	?	11,7,8	¬	12,0 (multi-punch)	12 0
Dollar Sign $	11,3,8	$	11,3,8	$	11,3,8	S
Exclamation !	11,2,8	!	None	(Blank)	11,0 (multi-punch)	11 0
Ampersand &	12	&	None	(Blank)	2,8	:

(1) An ampersand is used for the Pound Sign in this system.

(2) Letters A-Z and numbers 0-9 are same in all three code sets.

APPENDIX F

PLANIT CARDS FILE

```
C-0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ+-*/().=,:'~ #|<?$                04000200
      ABCDEBCHAJCLMNABCRCDARWCAC                                        04000250
1,$ '                                                                   04000300
2,$ "                                                                   04000400
C:THE TWO CARDS ABOVE PERMIT THE ADDING OF NEW CHARACTERS               04000500
C:THAT MAY BE FOUND ON THE TERMINAL AND EQUATING THE NEW ONE            04000600
C:(2ND CARD) WITH THE OLD ONE (1ST CARD) DIRECTLY ABOVE IT.  THE        04000700
C:OLD CHARACTER MUST BE FROM THE LIST ON THE FIRST CARD.  THUS           04000800
C:THE " IS EQUATED TO THE ' AND LOWER CASE LETTERS MAY BE ADDED          04000900
C:ON THE 2ND CARD IN A SIMILAR MANNER, EQUATING THEM WITH UPPER          04001000
C:CASE WHICH WOULD BE ADDED TO THE 1ST CARD.  IF ADDITIONAL SPACE        04001100
C:IS NEEDED, REPEAT THE PAIR OF CARDS IMMEDIATELY BELOW.                 04001200
C:                                                                      04001300
C:-NOTE- THE BACKSLASH CHARACTER IN THE FIRST CARD HAS BEEN              04001400
C:CHANGED TO A @ TO FACILITATE TRANSPORT.  IT SHOULD BE CHANGED          04001500
C:BACK AGAIN IF THAT CHARACTER IS DESIRED.                               04001600
C:                                                                      04001700
IRECRD IFBTN NAMES NSRCH KEEP LINKS NOCMBN PRIME PI OPERATOR ISYS        04001800
 NEGPOS NUMCH MDEF ADDLOG TQUANT NOTUSED IFIRST IDCHR PRICES             04001900
C:                                                                      04002000
C:THE FOLLOWING (IFBTN) CARD CONTAINS THE TOTAL COUNTS                   04002100
C:OF THE NUMBER OF DISK RECORDS WHICH HAVE BEEN ALLOCATED                04002200
C:TO EACH OF THE 11 DISK FILES.  PLANIT WILL USE ANY OF                  04002300
C:THESE BUT NO MORE.  DO A COLD START AFTER ANY CHANGE.                  04002400
IFBTN  5  15  15  400  50  9  0  1  2  100  25                          04002500
C:                                                                      04002600
C:THE CARDS BELOW MUST LIST EACH PLANIT PROCEDURE NUMBER AFTER           04002700
C:THE OVERLAY PARTITION NUMBER ON WHICH IT RESIDES.  NUMBER ZERO         04002800
C:IS THE MAIN PROGRAM.  UNASSIGNED PROCEDURE NUMBERS ARE IGNORED         04002900
C:EVEN THOUGH THEY HAPPEN TO BE IN THE LIST BELOW.                       04003000
1# 26,27,28,29,30,31,32,33,34,35,36,37                                  04003100
2# 39,40,41,42,43,44,45,46,47,48,49                                     04003200
3# 50,51,52,53,54,55,56,57,58                                           04003300
4# 60,61,62,63,64,65,66,67                                              04003400
5# 69,70,71,72,73,74,75,76                                              04003500
6# 78,79,80,81                                                          04003600
7# 83,84,85,86,87,88,89                                                 04003700
8# 91,92,93,94,95,96,97,98                                              04003800
C:                                                                      04003900
C:THE ORDER OF THE FIRST FOUR CARDS MUST NOT BE CHANGED.  THE            04004000
C:NEXT CARDS TO HERE HAVE SOME ORDER RELATIONSHIPS WITH THOSE            04004100
C:THAT FOLLOW AND SHOULD COME EARLY IN THE DECK.  THE ORDER              04004200
C:OF THE REMAINING CARDS UP TO THE ADDLOG CARDS ARE OPTIONAL             04004300
C:(THE ADDLOG CARDS MUST IMMEDIATELY PRECEDE THE FINAL $$$$ CARD).       04004400
C:                                                                      04004500
OPERATOR = 1                                                            04004600
C:A SECOND NUMBER MAY APPEAR AFTER THE OPERATOR'S NUMBER                 04004700
C:WHICH WILL INITIALIZE AN IAUX TERMINAL IF SO DESIRED.                  04004800
NUMCH=9                                                                 04004900
C:THE ABOVE 'NUMCH' MAY BE LESS THAN THE GENERATED 'NUMCH'               04005000
C:IF DESIRED.                                                           04005100
C:                                                                      04005200
TQUANT=10                                                               04005300
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C:IQUANT (QUANTUM) UNITS ARE CONSISTENT WITH THE <SECDIV>                    04005400
C:PARMETER (NUMBER OF UNITS PER SECOND).                                     04005500
IDCHK(1) ST)                                                                 04005600
C:THE NAME IN IDCHK(1) WILL DESIGNATE THE PREFIX OF STUDENT LOGINS.          04005700
PRICES  1.0   .033   .055   .009                                             04005800
C:PRICES ARE IN PENNIES FOR CPU/SEC. CONNECT SECONDS. UNIT                   04005900
C:RECORD UNITS. AND DISK SPACE PER <RECSZE> WORDS PER DAY.                   04006000
C:                                                                           04006100
C:THE ISYS. NAMES AND NEGPOS ARRAYS CONTAIN ALL THE PRIMITIVE                04006200
C:NAMES OF PLANIT.  THESE MAY BE CHANGED IF DESIRED SO LONG AS               04006300
C:THEY REMAIN DISTINCT (WITHIN EACH ARRAY).                                  04006400
C:                                                                           04006500
ISYS A F I J DATE ENTRY VALUE LOOK PRESTORE PUNCH ADDLOG DELLOG OK           04006600
ISYS(14) CANCEL QUIT AUX SAVE UCT TOC DEBUG DELETE BUILD LIST                04006700
ISYS(24) SRM UNLOAD ADD EXCEPT ALL EDTEXT ACCOUNT JOBS                       04006800
NEGPOS(1) PJSNEG                                                             04006900
PRIME 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71                  04007000
  73 79 83 89 91 97                                                          04007100
PI=3.1416                                                                    04007200
NOCMAN 68 69 78 87 84 89 90 91 92 93 72 99 105 106 110                       04007300
  129 71 76 111 125 95 96                                                    04007400
C:                                                                           04007500
C:THE FOLLOWING MDEF ENTRIES ARE SET TO (-1) TO DESIGNATE                    04007600
C:THAT THE CORRESPONDING CALL AUTHOR NAMES ARE TO BE                         04007700
C:INITIALIZED IN THE ALLOWED STATUS.  ANY AUTHOR ENTRY BEYOND                04007800
C:THE 87TH ONE MAY BE THUS INITIALIZED.                                      04007900
MDEF(103) -1                                                                 04008000
MDEF(109) -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1                          04008100
MDEF(125) -1                                                                 04008200
MDEF(127) -1                                                                 04008300
KEEP 1 64 59 53 30 37 46 27 157 107 112 160                                  04008400
LINKS 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 109                04008500
LINKS(27) 28 29 0 31 32 33 34 35 36 104                                      04008600
LINKS(37) 38 39 40 41 42 43 44 45 0                                          04008700
LINKS(46) 47 48 49 50 51 52 0                                                04008800
LINKS(53) 54 55 56 57 58 0                                                   04008900
LINKS(59) 60 61 62 63 0                                                      04009000
LINKS(64) 65 66 67 0                                                         04009100
LINKS(68) 0 70 73 76 69 84 80 81 82                                          04009200
LINKS(77) 123 120 74 87 83 75 77 74                                          04009300
LINKS(85) 78 79 86                                                           04009400
LINKS(88) 89 90 91 92 93 94 95 96 98 0 127 100 101 102 105 110
LINKS(104) 109 106 108 88 104 0                                              04009600
LINKS(110) 0 129 117 114 103 116 125 118 119 120 121 122                     04009700
LINKS(122) 115 124 85 111 86 128 99 113                                      04009800
LINKS(156) 0 156 159 71                                                      04009900
LINKS(160) 0                                                                 04010000
NAMES S P O I E N A COPY EX BREAK GET SAVE OUT RESTART                       04010100
NAMES(15) UNLOCK LOCK CLEAR ATTACH DISPLAY SYSTEM DIAL                       04010200
NAMES(27) T NOT CANNOT                                                       04010300
NAMES(30) FROM ALL NONE RIGHT WRONG SEEN USED                                04010400
NAMES(37) YES CORRECT TRUE RIGHT OK POSITIVE PLUS ACCURATE SO                04010500
NAMES(46) NO WRONG FALSE INCORRECT NEGATIVE MINUS INACCURATE                 04010600
```

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NAMES(53) LS LQ EQ GQ GR NQ                                                    04010700
NAMES(59) IF AND OR ELSE END                                                   04010800
NAMES(64) F R C B                                                              04010900
NAMES(68) CHANGE SET TO PRINT DROP ROUND TEMP FINISHED ALIGN                   04011000
NAMES(77) FOR MATRIX NORMAL ARRAY READY RETURN SUM PROD                        04011100
NAMES(85) FUNCTION RANDOM ASSIGN                                               04011200
NAMES(88) KEYWORD PHONETIC FORMULAS EQUATE TRACE                               04011300
NAMES(93) RELATED WAIT RECYCLE TEXT                                            04011400
NAMES(98) WITHIN STATUS TIME FRAME RESPONSE REVIEW MINUTES ALLOW               04011500
NAMES(106) PROHIBIT GOTO REEL CALC                                             04011600
NAMES(110) HELP RANK SORT COMB FACT LOG LN SIN COS TAN                         04011700
NAMES(120) COT SEC CSC ABSOLUTE TRUNCATE INVERT                                04011800
NAMES(126) PI USE REPLY SORT                                                   04011900
NAMES(157) ON OFF ALL LINK                                                     04012000
NSRCH 13 45 51 52 53 55 56 59 65 66 67 70                                      04012100
NSRCH(1s) 0.0 0 0 0 10 9 12 11 13 14 15 22 23 25 16 17 18 19 20 0 0            04012200
NSRCH(35) 0 9 17 16 19 22 23 -11 20 25 -10 -12 -13 -14 -15 16                  04012300
NSRCH(51) 0                                                                    04012400
NSRCH(52) 24                                                                   04012500
NSRCH(53) 24 25                                                                04012600
NSRCH(55) 1 16 25                                                              04012700
NSRCH(58) 25                                                                   04012800
NSRCH(59) 24 2 3 4 5 25                                                        04012900
NSRCH(65) 2                                                                    04013000
NSRCH(66) 8                                                                    04013100
NSRCH(67) 6 7 8                                                                04013200
1.1 ENTER CALC LINE.                                                           04013300
2.2 (P)(0)(4)(3)(P.)(D.)(M.)(Q.)                                               04013400
3.3 NO DISK. BACKGROUND HALTED.                                                04013500
120.269 = ?                                                                    04013600
149.147 (*.*                                                                   04013700
10.1 DONE                                                                      04013800
11.1 GONE                                                                      04013900
12.1 IN                                                                        04014000
13.1 WILL DO                                                                   04014100
60.274 ENTER COMMAND                                                           04014200
67.244 3/4/3/P                                                                 04014300
68.68(10) DONE                                                                 04014400
69.69 FRAME
70.262  LABEL=*                                                               04014600
75.245 G2. STATEMENTS                                                          04014700
78.246 G2. CRITERIA                                                            04014800
81.249 G2. TEXT                                                                04014900
82.250 G3. ANSWERS                                                             04015000
83.252 G4. ACTIONS                                                             04015100
84.249(81)                                                                     04015200
85.250(82)                                                                     04015300
86.252(83)                                                                     04015400
101.259 /MATCH/                                                                04015500
102.260 OK? (Y/N)                                                              04015600
103.261 /PRINT/Y/                                                              04015700
104.104  AT FRAME                                                              04015800
105.105 . GROUP                                                                04015900
```


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106.106 . LINE                                                    04016000
112.112 READY.                                                    04016100
120.267 ENTER SYSTEM COMMAND.                                     04016200
122.122   TO: $                                                   04016300
125.$ *10**                                                       04016400
128.128 DEBUG MODE.                                               04016500
132.132 BREAK AT                                                  04016600
135.135 **STUDENT**                                               04016700
136.136 FUNCTIONS**                                               04016800
137.137 MATRICES**                                                04016900
138.138 ITEMS**                                                   04017000
139.139 **LESSON**                                                04017100
150.150 ENTER YOUR ANSWER                                         04017200
152.152 CORRECT                                                   04017300
153.153 FINE                                                      04017400
154.154 GOOD                                                      04017500
155.155 OK                                                        04017600
156.156 RIGHT                                                     04017700
157.157 TRUE                                                      04017800
158.158 VERY GOOD                                                 04017900
159.159 YES                                                       04018000
162.162 FALSE                                                     04018100
163.163 INCORRECT                                                 04018200
164.164 NO                                                        04018300
165.165 NOT SO                                                    04018400
166.166 NOT TRUE                                                  04018500
167.167 WRONG                                                     04018600
169.169 WRONG.TRY AGAIN                                           04018700
170.170 NUMERIC ANSWER PLEASE                                     04018800
206                                                               04018900
14.228 SYNONYMS HAVE BEEN DROPPED                                 04019000
15.229 CAN'T USE THIS NAME WITH ALLOW OR PROHIBIT                 04019100
16.230 UNRECOGNIZED                                               04019200
17.231 NAME IS AUTHOR PROTECTED                                   04019300
18.233 ILLEGAL PARENTHESIS                                        04019400
19.232 LINE CONTINUATION NOT PERMITTED
20.233 ILLEGAL DIVISION BY ZERO                                   04019600
21.233 ILLEGAL COMBINATORIAL                                      04019700
22.233 ILLEGAL USE OF LOGS                                        04019800
23.233 ILLEGAL NEGATIVE SQUARE ROOT                               04019900
24.233 ILLEGAL USE OF TRIG FUNCTION                               04020000
25.233 FACTORIAL LIMITS EXCEEDED                                  04020100
26.233 ILLEGAL CHARACTER ON LINE                                  04020200
27.233 ILLEGAL DECIMAL POINT IN NUMBER                            04020300
28.233 COMMA MISUSED                                              04020400
29.233   MISUSED                                                  04020500
30.233 NUMBER OR SYMBOL MISPLACED                                 04020600
31.233 LEFT PARENTHESIS MISSING                                   04020700
32.233 RIGHT PARENTHESIS MISSING                                  04020800
33.233 '=' MISUSED                                                04020900
34.233 NAME MISSUSED                                              04021000
35.233 NAME NOT FOUND                                             04021100
36.233 NAME ALREADY IN USE                                        04021200
```

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37.233 ILLEGAL--NOT A MATRIX                                          04021300
38.233 BUILT-IN NAME CAN'T BE REDEFINED                               04021400
39.234 VARIABLE HAS NOT PREVIOUSLY BEEN DEFINED                       04021500
40.235 ILLEGAL FORMAT.  ONLY TYPE THE COMMAND NAME AND DESIRED        04021600
   ENTRY LABEL (OR JUST THE COMMAND NAME ALONE).                      04021700
41.233 FUNCTION CAN'T CALL ON ITSELF                                  04021800
42.233 ILLEGAL USE OF 'FORT'                                          04021900
43.233 ILLEGAL SUBSCRIPTING                                           04022000
44.233 SUBSCRIPTING EXCEEDS DEFINED RANGE                             04022100
45.233 WRONG NUMBER OF ARGUMENTS OR SUBSCRIPTS                        04022200
46.233 MATRICES ARE NOT CONFORMABLE                                   04022300
47.233 MATRIX MUST BE N BY N TO INVERT                                04022400
48.233 A SINGULAR MATRIX CAN'T BE INVERTED                            04022500
49.236 HANGING EXPRESSION                                             04022600
50.237 MATRIX SPACE IS FULL                                           04022700
51.237 ITEM SPACE IS FULL                                             04022800
52.237 FUNCTION SPACE IS FULL                                         04022900
53.233 JORK SPACE EXCEEDED                                            04023000
54.233 'FOR' VARIABLE NOT CLOSING IN ON TERMINAL VALUE                04023100
55.233 ALIGN STATEMENT MUST SPECIFY A COLUMN                          04023200
56.233 LABEL NAME NOT VALID.  TYPE JUST THE COMMAND NAME TO SEE       04023300
   THE FULL LIST.                                                     04023400
57.233 PAIRED PRIME MISSING                                           04023500
58.1 ENTER LABEL                                                      04023600
59.1 EXIT TO                                                          04023700
61.61 PLEASE LOG IN***$                                               04023800
114.60 UNNAMED LESSON RESTORED.                                       04023900
312.312 PLANIT TERMINAL NO.                                           04024000
62.241 ILLEGAL USE OF SLASH                                           04024100
63.63 ENTER NEXT LINE OF LESSON                                       04024200
64.60 NAME OR FORMAT ERROR.                                           04024300
65.60 NO SUCH FRAME/LABEL                                             04024400
66.60 FRAME TABLE FULL.  DELETE BEFORE ADDING
71.71 SAVE LESSON? (Y/N)                                              04024600
72.242 FRAME DIRECTORY FULL.                                          04024700
73.243 ILLEGAL GROUP                                                  04024800
74.70 ILLEGAL LABEL/FRAME.  ENTER COMMAND                             04024900
76.76 RECORDS FOR                                                     04025000
77.77 NEW LESSON? (Y/N)                                               04025100
79.60 READ-ONLY.  CANNOT ALTER LESSON.                                04025200
80.248 ILLEGAL FRAME TYPE CHANGE                                      04025300
87.87 INVALID                                                         04025400
88.253 ILLEGAL ANSWER FORMAT                                          04025500
89.254 ILLEGAL MIX OF ANSWER TYPES                                    04025600
90.255 DELIMITERS NOT PROPERLY PAIRED.                                04025700
91.60 FRAME DOESN'T EXIST                                             04025800
92.60 GROUP DOESN'T EXIST                                             04025900
93.60 LINE DOESN'T EXIST                                              04026000
94.60 FRAME LENGTH EXCEEDED                                           04026100
95.95 ELSE/END MUST FOLLOW IF                                         04026200
96.96 ILLEGAL CONNECTIVE...AND/OR MUST FOLLOW IF                      04026300
97.97 RECORD TABLE FULL AND NO MORE WILL BE KEPT.  LESSON             04026400
   WILL CONTINUE BUT YOU SHOULD PROBABLY SIGN OFF AND GET HELP.       04026500
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98,257 FRAME LABEL EXISTS.  LABEL=$                                          04026600
99,258 FRAME EXISTS                                                          04026700
100,259 GROUP EXISTS                                                         04026800
107,60 LINE EXCEEDED                                                         04026900
108,108 IDENTIFY YOURSELF***$                                                04027000
109,316 NOT ON DISK.                                                         04027100
110,60 WRONG REEL NO.                                                        04027200
111,60 AUTHORING COMMANDS RESTRICTED. GET YOUR LESSON.                       04027300
113,60 RESTART OR SAVE LESSON FIRST.                                         04027400
115,60 NO DISK SPACE ON                                                      04027500
116,60 NO G3. ANSWERS. ERROR                                                 04027600
117,60 DECISION STATEMENT MUST START WITH A CONNECTIVE OR F,C,B,R.           04027700
118,260 DUPLICATE LESSON NAME                                                04027800
119,1 ILLEGAL USE OF READY                                                   04027900
121,120 SAVE LESSON ONTO TAPE FIRST.                                         04028000
123,120 UNLOAD AND SAVE LESSON ONTO TAPE FIRST.                              04028100
124,60 INTEGERS ONLY FOR GROUPS/LINES/COLUMNS                                04028200
127,127 LESSON REEL                                                          04028300
129,129 CHOOSE ONE:                                                          04028400
130,60(109) NOT ON DISK.                                                     04028500
131,60 LESSON END                                                            04028600
133,269 IMPROPER KEYWORD SPECIFICATION                                       04028700
134,60  TO NONEXISTENT FRAME/LABEL                                           04028800
140,140  NONE-DEFINED                                                        04028900
141,270 IMPROPER FROM SPECIFICATION                                          04029000
142,270 ERROR IN DECISION STATEMENT                                          04029100
143,270 TAGS MISSING IN DECISION STATEMENT                                   04029200
144,144 NUMBER OF FRAMES LEFT                                                04029300
145,145 YOU'VE BEEN LOGGED OFF DUE TO A BAD LESSON.                          04029400
146,120(64)
147,120(90)                                                                  04029600
148,120 DEVICE IS BUSY.  TRY LATER.                                          04029700
151,151 CAN'T USE CALC JUST NOW.                                             04029800
160,160(152) THIS ENTRY IS RESERVED FOR NEW FEEDBACK MSGS.                   04029900
161,161(152) THIS ENTRY IS RESERVED FOR NEW FEEDBACK MSGS.                   04030000
168,168 THE ANSWER IS:                                                       04030100
171,171 CHOOSE ONE OF THE ABOVE LETTERS.                                     04030200
172,172 ANSWER EITHER YES OR NO.                                             04030300
173,173 ILLEGAL USE OF F: NO CORRECT ANSWER SPECIFIED                        04030400
174,174 ILLEGAL USE OF R:                                                    04030500
175,60 ILLEGAL C:  NO CORRECT ANSWER SPECIFIED.                              04030600
176,176 ILLEGAL BRANCH                                                       04030700
177,177 DATE                                                                 04030800
178,178 STUDENT HISTORY                                                      04030900
179,179 STUDENT SUMMARY                                                      04031000
180,180 LESSON NAME                                                          04031100
181,181 .  STUDENT NAME                                                      04031200
182,182   FRAME   TYPE   TIME    NEUTRAL   ANSWER   LABEL                    04031300
183,183                  MIN/    RIGHT+      TAG                            04031400
184,184                  SEC     WRONG-                                     04031500
185,185 NUMBER RIGHT                                                         04031600
186,186 NUMBER WRONG                                                         04031700
187,187 NUMBER ENTRIES                                                       04031800
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188,188 NUMBER TIME-OUTS                                                    04031900
189,189 TOTAL TIME                                                          04032000
190,233 FOR MUST BE COMBINED WITH SUM OR PROD                               04032100
191,60 DISK I/O ERROR. GET HELP. IF NOT AVAL, TYPE OUT TO LOGOUT.           04032200
192,192 END                                                                 04032300
193,193 START                                                               04032400
194,194 LESSON NOT ON REEL SPECIFIED.                                       04032500
195,195 ENTER RECORD NAMES. FOLLOW ALL BUT LAST NAME BY A COMMA.            04032600
196,196 NEW TAPE? (Y/N)                                                     04032700
197,197 NO ENTRY LABELS ARE AVAILABLE AT THIS TIME.                         04032800
198,198 SUMMARY ONLY? (Y/N)                                                 04032900
199,199 TO THE TERMINAL? (Y/N)                                              04033000
200,200 CARD READER ERROR                                                   04033100
201,60 TAPE REQUEST CANCELLED.                                              04033200
202,202 BILLING PERIOD:                                                     04033300
203,120 DEVICE OUT OF SERVICE.                                              04033400
204,204 IDENTITY     CPU        UNIT-REC  CONNECT   MEM                     04033500
 DRY     CURR-MEM  TOTAL                                                   04033600
205,205 ILLEGAL GROUP NUMBER.                                               04033700
206,206 DUPLICATE FRAME NUMBER--INCREMENTED BY 0.01.                        04033800
207,207 CONTINUATION CARD DOES NOT FOLLOW A PROPER LINE.                    04033900
208,208 LABEL TABLE FULL.                                                   04034000
209,209 DUPLICATE LABEL.                                                    04034100
210,1 ENTER HELP(ANY BUILT-IN OR USER DEFINED NAME)                         04034200
211,1 RANK(MATRIXNAME)--RANKS THE VALUES OF THE MATRIX.                     04034300
212,1 SQRT(EXPRESSION)--POSITIVE SQUARE ROOT FUNCTION.                      04034400
213,1 COMB(M,N)--COMBINATION OF M THINGS TAKEN N AT A TIME.
214,1 FACT(EXPRESSION)--FACTORIAL FUNCTION.                                 04034600
215,1 LOG(NUMBER,BASE)--LOG TO ANY BASE.                                    04034700
216,1 LN(NUMBER)--LOG TO THE BASE E.                                        04034800
217,1 SIN(EXPRESSION)--SINE FUNCTION.                                       04034900
218,1 COS(EXPRESSION)--COSINE FUNCTION.                                     04035000
219,1 TAN(EXPRESSION)--TANGENT FUNCTION.                                    04035100
220,1 COT(EXPRESSION)--COTANGENT FUNCTION.                                  04035200
221,1 SEC(EXPRESSION)--SECANT FUNCTION.                                     04035300
222,1 CSC(EXPRESSION)--COSECANT FUNCTION.                                   04035400
223,1 ABSOLUTE(EXPRESSION)--ABSOLUTE VALUE FUNCTION.                        04035500
224,1 TRUNCATE(EXPRESSION)--ROUNDS TO AN INTEGER.                           04035600
225,1 INVERT(MATRIXNAME)--PERFORMS A MATRIX INVERSE OPERATION.              04035700
226,1 A BUILT-IN 1 X 10 MATRIX. CONSULT TM-4422/002 PART V FOR ITS USE.     04035800
227,1 BUILT-IN NAME. CONSULT TM-4422/002 PART V FOR ITS USE.                04035900
228,1 BUILT-IN NAMES CAN'T BE DROPPED.                                      04036000
229,1 NAME ENTERED CAN'T BE DENIED USING THE COMMAND--PROHIBIT(NAME).       04036100
230,1 NAME ENTERED CAN'T BE FOUND.                                          04036200
231,1 CAN'T ALTER AN AUTHOR DEFINED NAME.                                   04036300
232,1 A CALC STATEMENT CAN'T EXCEED A SINGLE LINE IN A LESSON.              04036400
233,1 CONSULT TM-4422/002 APPENDIX C FOR REPRESENTATIVE ERROR SITUATIONS    04036500
234,1 SORRY, BUT YOU LOST FRAME NO.                                         04036600
235,40 A COMMA OR TOO MANY LABELS HAVE BEEN ENTERED.                        04036700
236,1 STATEMENT IS AMBIGUOUS AND CAN'T BE EVALUATED.                        04036800
237,1 DELETE AN ITEM, FUNCTION, OR MATRIX AND TRY AGAIN.                    04036900
238,238 BACKGROUND OPERATIONAL LEVEL                                        04037000
239,239 GROUP 1 CARD FORMAT ERROR.                                          04037100
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240.120 NOT FOUND.                                                    04037200
241.60 A NUMBER MUST FOLLOW THE + OR -.                               04037300
242.60 DELETE ONE OR MORE FRAMES TO CONTINUE.                         04037400
243.60 GROUP NUMBER ENTERED IS NOT LEGAL FOR THE TYPE OF FRAME.       04037500
244.251 (Q)UESTION/(M)ULTIPLE CHOICE/(D)ECISION/(P)ROGRAMMING         04037600
245.75 G2.  ENTER PROGRAMMING STATEMENTS                              04037700
246.78 G2.  ENTER DECISION STATEMENTS                                 04037800
247.1 'REPLY' MUST FOLLOW 'SET' OR 'USE.'                             04037900
248.60 CAN'T MAKE A Q OR M FRAME INTO A D OR P FRAME OR VICE VERSA.   04038000
249.81 G2.  SPECIFY QUESTION.                                         04038100
250.82 G3.  SPECIFY ANSWERS.                                          04038200
251.67 ENTER FRAME TYPE.                                              04038300
252.83 G4.  SPECIFY ACTIONS.                                          04038400
253.60 ANSWER TAG FORMAT IS ILLEGAL, E.G., .A OR +.A                  04038500
254.60 NUMBER AND LETTER ANSWER TAGS CAN'T BE MIXED WITH DELIMITERS.  04038600
255.60  ANSWER IN A CONDITIONAL Q FRAME MUST BE ENCLOSED BY DELIMITERS 04038700
256.256 BACKGROUND HALTED.                                            04038800
257.96 A LESSON CAN'T CONTAIN A DUPLICATE FRAME LABEL. ENTER ANOTHER.  04038900
258.60 CAN'T INSERT OVER AN EXISTING FRAME OR GROUP.                   04039000
259.101 SPECIFY CHARACTERS TO BE USED IN SEARCH.                       04039100
260.102 REQUEST CONFIRMATION THAT RANGE OF FRAMES IS TO BE DELETED.    04039200
261.103 SPECIFY CHARACTERS FOR MODIFICATION.                           04039300
262.263 LABEL FRAME IF DESIRED.                                       04039400
263.70 A LABEL MUST START WITH A LETTER.
264.264 PRESS RETURN TO TRY AGAIN OR TYPE #RESTART TO ESCAPE.         04039600
265.265 BACKGROUND JOBS MUST FINISH FIRST.                            04039700
266.66 REPEAT THE COMMAND WITH A DIFFERENT NAME.                      04039800
267.120 THE SYSTEM COMMANDS FOR AN AUTHOR: ACCOUNT, BUILD,            04039900
  DELETE, EDTEXT, LIST, UNLOAD.                                       04040000
268.1 ENTER A VALUE FOR THE INDICATED NAME.                           04040100
269.60 KEYWORD WAS NOT FOLLOWED BY ALL, OFF, ON, OR A NUMBER.         04040200
270.270(283) CONSULT TM-4422/002 APPENDIX C. FOR ERROR SITUATIONS.    04040300
271.271 JOB AT TOP OF QUEUE IS                                        04040400
272.266 ENTER Y TO UNLOAD OR N TO ADD MORE NAMES.                     04040500
273.66 LESSON ACCESS DENIED BY AUTHOR.                                04040600
274.60 PLATO COMMANDS ARE: A (APPEND), ATTACH, BREAK, CALC,           04040700
  CLEAR, COPY, D (DELETE), DIAL, DISPLAY, E (EDIT), EX (EXECUTE),     04040800
  GET, I (INSERT), LOCK, M (MODIFY), OUT, P (PRINT), RESTART,         04040900
  SAVE, S (SEARCH), SYSTEM, UNLOCK.  SEE TM-4422/002 FOR DETAILS.     04041000
275.195 REPEAT WITH FEWER NAMES.                                      04041100
276.310 ENTER A NAME THAT CAN LATER BE USED WITH THE BUILD COMMAND.   04041200
277.277 ENTRY    ON DISK? TAPE ASSIGNMENT                             04041300
278.278 STUDENT RECORD IS BEING USED.                                 04041400
279.120 THIS TAPE ALREADY CONTAINS UNLOADED RECORDS.                  04041500
280.120 ILLEGAL AUDLOG/DELLOG FORMAT.                                 04041600
281.120 ABOVE LOGIN(S) NOT FOUND.                                     04041700
282.282 TAPE I/O ERROR.                                               04041800
283.60 BUSY.  ENTER COMMAND.                                          04041900
284.284 TOO MANY CHARACTERS ON INPUT LINE                             04042000
285.285 ITEM                                                          04042100
286.272(102) OK? (Y/N)                                                04042200
287.287 R/O                                                           04042300
288.288 R/W                                                           04042400
```

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289,289 LOCKED                                                          04042500
290,290 STUDENT                                                         04042600
291,291 UNLOCKED                                                        04042700
292,304 NOT FOUND/NOT ACTIVE                                            04042800
293,293 NUMBER OF JOBS ENQUEUED:                                        04042900
294,120 NOT READY YET.                                                  04043000
295,295 DUPLICATE USE OF RECORD IN:                                     04043100
296,296 CHAINED RECORD ERROR IN:                                        04043200
297,297 DELETE ALL RECORDS, YOU? (Y/N)                                  04043300
298,60 UNEXPECTED END OF TAPE.                                          04043400
299,120 SOME RECORDS WERE ALREADY UNLOADED ON ANOTHER TAPE.             04043500
300,120 REQUEST ABANDONED.                                              04043600
301,301 END OF REQUESTED SEQUENCE.                                      04043700
302,60 INCORRECT LESSON NAME GIVEN.                                     04043800
303,233 NAME ASSIGNMENT COULD NOT BE MADE                               04043900
304,304 AUTHOR HAS LOCKED THE LESSON. YOU WILL BE LOGGED OUT            04044000
305,305 LESSON OR SKM IN USE. CANNOT DELETE OR UNLOAD.                  04044100
306,305 SAME IDENTITY ALREADY BEING USED FOR THIS LESSON.               04044200
307,307 UNAUTHORIZED.                                                   04044300
308,60(148) BUSY                                                        04044400
309,1 COMPUTED GO TO OUT OF RANGE
310,276 ENTER FILE NAME.                                                04044600
311,311 ENTER REEL NO.                                                  04044700
313,313 NOT LOGGED IN.                                                  04044800
314,314 PLANIT ERROR                                                    04044900
315,315 SYSTEM SHUTDOWN? (Y/N)                                          04045000
316,139 TO GET FROM TAPE, TYPE 'GET LESSONNAME 1234'                    04045100
  (FILL IN YOUR OWN LESSONNAME AND REEL NUMBER).                        04045200
317,60 EMPTY LESSON DELETED.  ENTER COMMAND.                            04045300
318,1 REVIEW(ANYLABEL) -- TYPE 'REVIEW' TO GET THE LIST.                04045400
319,1 SORT(MATRIXNAME) -- SORTS VALUES IN MATRIX.                       04045500
320,320 DEVICE STATUS:                                                  04045600
ADDLOG /FRYE/CHE/CHUCK/BAKER/LARSON/GERMAS/BERG/CLEVE/ROBE/BLETCH/     04045700
ADDLOG /STU01/STU02/STU03/STU04/STU05/STU06/STU07/STU08/STU09/         04045800
C:USE AS MANY ADDLOG CARDS AS NECESSARY AND AS MANY NAMES ON EACH       04045900
C:CARD AS DESIRED.  ONLY THE $$$$ CARD MAY FOLLOW ADDLOG CARDS.         04046000
$$$$$$$$                                                                04046100
401  CARDS.
```

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APPENDIX G

PLANIT MAP

```
++WRITE  PRINT,PLANIO
     1   IFIRST(1)                                                00001
     2   MSGTBL(125)                                              00002
   127   KARDUM                                                   00003
   128   KARSET(57)                                               00004
   185   MAPDUM                                                   00005
   186   MAP(255)                                                 00006
   441   PRIME(25)                                                00007
   491   PRICES(4)                                                00008
   499   MSGOPR(20)                                               00009
   519   MSGOPN                                                   00010
   520   MCHPHN(26)                                               00011
   546   INNPRT                                                   00012
   547   IPART(100)                                               00013
   647   IDISK(50)                                                00014
   697   LUGNR(9)                                                 00015
   706   ICWH                                                     00016
   707   IETIME                                                   00017
   708   JOUTBF(1170)                                             00018
  1878   JCNT                                                     00019
  1879   JDIAL(23)                                                00020
  1902   ISPOOL(10)                                               00021
  1912   JSPOOL(10)                                               00022
  1922   LPAR                                                     00023
  1923   ILIST                                                    00024
  1924   IPUNCH                                                   00025
  1925   IRDR                                                     00026
  1926   ISYS(62)                                                 00027
  1988   NEGPOS(2)                                                00028
  1990   IDCHK(2)                                                 00029
  1992   MSGDR1(330)                                              00030
  2322   MSGDR2(330)                                              00031
  2652   IBLANK                                                   00032
  2653   MAGTBL(10)                                               00033
  2663   NOCMBN(25)                                               00034
  2688   IASMD(3)                                                 00035
  2691   IDSMA(3)                                                 00036
  2694   IDVCE(9)                                                 00037
  2703   IRSTAT(9)                                                00038
  2712   IWSTAT(9)                                                00039
  2721   IDIAL(9)                                                 00040
  2730   IEPTR(9)                                                 00041
  2739   ISTAT(9)                                                 00042
  2748   IDASR1(9)                                                00043
  2757   IDALOG                                                   00044
  2758   IFBTK(11)                                                00045
  2769   IFBTM(11)                                                00046
  2780   IFBTN(11)                                                00047
  2791   IDATE                                                    00048
  2792   IOPRTR                                                   00049
  2793   IOPER                                                    00050
  2794   IAUX                                                     00051
  2795   PI                                                       00052
  2797   IRAND                                                    00053
```

2798	ISTART	00054
2799	NCHBEG	00055
2800	NUMCH	00056
2801	KYPBRK	00057
2802	ICHNUM	00058
2803	ICHNO	00059
2804	MBKGND	00060
2805	NBKGND	00061
2806	ISTOP1	00062
2807	ISTOP2	00063
2808	JOB	00064
2809	IQUANT	00065
2810	ISWAP	00066
2811	IMASK	00067
2812	NAMES(480)	00068
3292	NAMESX(180)	00069
3472	NBRNAM(2)	00070
3474	LOCTAG	00071
3475	LSTNAM(2)	00072
3477	MDEF(133)	00073
3610	KFEP(34)	00074
3644	LEP(14)	00075
3658	NREC1	00076
3659	NREC2	00077
3660	NREC3	00078
3661	NOTFUL	00079
3662	MQUIT	00080
3663	MKNT1	00081
3664	MKNT2	00082
3665	INREVW	00083
3666	MFUNSV(50)	00084
3716	LPTATX	00085
3717	LPTMFU	00086
3718	WITHIN	00087
3720	IROUND	00088
3721	LSTRYL	00089
3722	NBRRYL	00090
3723	KEEPID(2)	00091
3725	LNCORR(2)	00092
3727	LHSCOM	00093
3728	MDE	00094
3729	LFND	00095
3730	LNBR	00096
3731	LFREXD	00097
3732	LSTPTR(6)	00098
3738	LSDFT(2)	00099
3740	LREPLY(2)	00100
3742	NREPLY(40)	00101
3782	RSPNSE	00102
3784	ARG(61)	00103
3906	ATXVAL(400)	00104
4706	IONOFF(10)	00105
4716	IRECRD(528)	00106
5244	LSNENT	00107

```
5245  LANENT                    00108
5246  LESSON(2)                 00109
5248  KURRYL                    00110
5249  NEWORD                    00111
5250  LSDR1(118)                00112
5368  LSDR2(118)                00113
5486  LAB1(94)                  00114
5580  LAB2(48)                  00115
5628  MSVMSG(6)                 00116
5634  KPTR(8)                   00117
5642  LIBS(10)                  00118
5652  ICYCLE                    00119
5653  IPRCLE(20)                00120
5673  MSGBUF(160)               00121
5833  LESLIN(80)                00122
5913  MBUMSG                    00123
5914  IDLFLG                    00124
5915  IDASR                     00125
5916  LTOC                      00126
5917  ICHCLN                    00127
5918  LPSW                      00128
5919  KNEG                      00129
5920  NPNT1                     00130
5921  NPNT2                     00131
5922  IDAFD                     00132
5923  IDASRM                    00133
5924  NDEX(5)                   00134
5929  NPTR                      00135
5930  IBLFLG                    00136
5931  ICHAR                     00137
5932  ICMPRE                    00138
5933  ICNDWN                    00139
5934  ICR                       00140
5935  IFMT                      00141
5936  IFRSWD                    00142
5937  IFTFLG                    00143
5938  MODFLG                    00144
5939  IMAG1                     00145
5940  IMAG2                     00146
5941  IMOVER                    00147
5942  INDFLG                    00148
5943  INFORM                    00149
5944  INWDNR                    00150
5945  IRDWRT                    00151
5946  NMRPLY                    00152
5947  IBTPTR                    00153
5948  ITPCNT                    00154
5949  NEXT                      00155
5950  ISRBYT(10)                00156
5960  INDBYT(10)                00157
5970  ITOBYT(10)                00158
5980  ISVDEC                    00159
5981  ISCFLG                    00160
5982  IEXP                      00161
```

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 5983  ISVBYT                                                  00162
 5984  ISVDWN                                                  00163
 5985  ITRFLG                                                  00164
 5986  IWKPTR                                                  00165
 5987  JWKPTR                                                  00166
 5988  KWKPTR                                                  00167
 5989  LWKPTR                                                  00168
 5990  LFMT                                                    00169
 5991  LMARG                                                   00170
 5992  IRMARG                                                  00171
 5993  LSBLNK                                                  00172
 5994  LSBLWD                                                  00173
 5995  ILNPR                                                   00174
 5996  JLNPR                                                   00175
 5997  KLNPR                                                   00176
 5998  MLNPR                                                   00177
 5999  NLNPR                                                   00178
 6000  INTR                                                    00179
 6001  MINT                                                    00180
 6002  NINT                                                    00181
 6003  MOVER                                                   00182
 6004  MVEND                                                   00183
 6005  INT                                                     00184
 6006  ISKIP                                                   00185
 6007  LINEUP                                                  00186
 6008  IDEC                                                    00187
 6009  INTPTR                                                  00188
 6010  INDVCE                                                  00189
 6011  INTTBL(12)                                              00190
 6023  MINFLG                                                  00191
 6024  MCUE                                                    00192
 6025  NWRD1                                                   00193
 6026  NWRD2                                                   00194
 6027  NPACK                                                   00195
 6028  NFUNL                                                   00196
 6029  MCUESV                                                  00197
 6030  LSTCHR                                                  00198
 6031  NWRK                                                    00199
 6032  NPCNT                                                   00200
 6033  NAMBEG                                                  00201
 6034  NPREV                                                   00202
 6035  NUMFLG                                                  00203
 6036  NUMPRS                                                  00204
 6037  NDCHAR                                                  00205
 6038  MFOR                                                    00206
 6039  NDKTR                                                   00207
 6040  NSRCH(75)                                               00208
 6115  NCPU                                                    00209
 6116  NUNITR                                                  00210
 6117  NCONN                                                   00211
 6118  MEMORY                                                  00212
 6119  LIBSV                                                   00213
 6120  LIBUSE                                                  00214
 6121  ITMNME(2)                                               00215
```

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6123  NPRSV                                                    00216
6124  LBYTE(80)                                                00217
6204  X(1)                                                     00218
6206  IWORK(164)                                               00219
6370  NOP1(60)                                                 00220
6430  NOP2(60)                                                 00221
6490  EXP1(60)                                                 00222
6610  EXP2(60)                                                 00223
6730  MFRAME(320)                                              00224
7050  NFRAME(320)                                              00225
7370  MNSTAT(2)                                                00226
7372  MNNENT(2)                                                00227
7374  NTRYF                                                    00228
7375  NTRYG                                                    00229
7376  NTRYL                                                    00230
7377  MNFSW                                                    00231
7378  NFULL                                                    00232
7379  NLINE                                                    00233
7380  JDLFLG                                                   00234
7381  LHSEQ                                                    00235
7382  NFNLSV                                                   00236
7383  ISTFLG                                                   00237
7384  ITIME                                                    00238
7385  ITYM                                                     00239
7386  IFRFLG                                                   00240
7387  NRMFLG                                                   00241
7388  IARPTR                                                   00242
7389  IPRPTR                                                   00243
7390  ICOMMA                                                   00244
7391  IPAREN                                                   00245
7392  IFRLUP                                                   00246
7393  IPMPTR                                                   00247
7394  LOK                                                      00248
7395  NSVPRS                                                   00249
7396  IVLEND                                                   00250
7397  VALUE                                                    00251
7399  IASCNT                                                   00252
7400  LESNAM                                                   00253
7401  LRET                                                     00254
7402  KFNBRX                                                   00255
7403  LPTR                                                     00256
7404  LCNT                                                     00257
7405  LDIR1                                                    00258
7406  LDIR2                                                    00259
7407  KBLNO1                                                   00260
7408  KBLNO2                                                   00261
7409  KENTRY                                                   00262
7410  NCODE                                                    00263
7411  KFNBR                                                    00264
7412  KGNBR                                                    00265
7413  KLNBR                                                    00266
7414  KOMNR                                                    00267
7415  IFCOND                                                   00268
7416  MKIND                                                    00269
```

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7417  IHOLD(9)                                                    00270
7426  JHOLD(9)                                                    00271
7435  XHOLD                                                       00272
7437  YHOLD                                                       00273
7439  LTAG                                                        00274
7440  LPLUS                                                       00275
7441  LANS1                                                       00276
7442  LANS2                                                       00277
7443  LANS3                                                       00278
7444  KDKTR                                                       00279
7445  NCONJ                                                       00280
7446  LDEC                                                        00281
7447  LSW                                                         00282
7448  NMAP                                                        00283
7449  LOOP                                                        00284
7450  NPASS                                                       00285
7451  IXFER                                                       00286
7452  KFONLY                                                      00287
7453  KGONLY                                                      00288
7454  KLONLY                                                      00289
7455  JFTYPE                                                      00290
7456  KFTYPE                                                      00291
7457  KOPY                                                        00292
7458  KHR                                                         00293
7459  KTYPE                                                       00294
7460  KRWS                                                        00295
7461  IDA                                                         00296
7462  KCORE                                                       00297
7463  KWRDS                                                       00298
7464  IDERR                                                       00299
7465  KFLG                                                        00300
7466  KLNBR1                                                      00301
7467  LBRK1                                                       00302
7468  LBRK2                                                       00303
7469  NCALC                                                       00304
7470  KUSER                                                       00305
7471  IOUSER(2)                                                   00306
7473  ILOG(2)                                                     00307
7475  ISTUD(2)                                                    00308
7477  IREEL                                                       00309
7478  JPEFL                                                       00310
7479  IDTAPE                                                      00311
7480  IFTAPE                                                      00312
7481  INUSE                                                       00313
7482  NMREEL                                                      00314
7483  JSYS(2)                                                     00315
7485  ISTOP(20)                                                   00316
7505  ISYS1                                                       00317
7506  ISYS2                                                       00318
7507  ISYS3                                                       00319
7508  ISYS4                                                       00320
7509  ISYS5                                                       00321
7510  ISYS6                                                       00322
7511  ISYS7                                                       00323
```

7512	ISYS8	00324
7513	ISYS9	00325
7514	ISYS10	00326
7515	ISYS11	00327
7516	ISYS12	00328
7517	ISYS13	00329
7518	ISYS14	00330
7519	ISYS15	00331
7520	ESYS1	00332
7522	ESYS2	00333
7524	ESYS3	00334
7526	NTMP1	00335
7527	NTMP2	00336
7528	NTMP3	00337
7529	NTMP4	00338
7530	NTMP5	00339
7531	NTMP6	00340
7532	NTMP7	00341
7533	NTMP8	00342
7534	NTMP9	00343
7535	NTMP10	00344
7536	NTMP11	00345
7537	NTMP12	00346
7538	NTMP13	00347
7539	NTMP14	00348
7540	NTMP15	00349
7541	NTMP16	00350
7542	NTMP17	00351
7543	NTMP18	00352
7544	NTMP19	00353
7545	NTMP20	00354
7546	NTMP21	00355
7547	NTMP22	00356
7548	NTMP23	00357
7549	NTMP24	00358
7550	I	00359
7551	J	00360
7552	K	00361
7553	L	00362
7554	M	00363
7555	N	00364
7556	N1	00365
7557	N2	00366
7558	X1	00367
7560	X2	00368
7562	Y1	00369
7564	TEMP1	00370
7566	TEMP2	00371
7568	TEMP3	00372
7570	TEMP4	00373
7572	FLOAT	00374
7574	IERROR	00375
7575	NXTPRT	00376
7576	IGOTO	00377

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7577  IRTRN                                                    00378
7578  IDEPTH                                                   00379
7579  ICALLS(1)                                                00380
7580  IPUSH(9)                                                 00381
7589  MODES                                                    00382
7590  MSGNO                                                    00383
7591  NREAD                                                    00384
7592  IBYT1                                                    00385
7593  IBYT2                                                    00386
7594  INDEX                                                    00387
7595  IORST(15)                                                00388
7610  IFILL(2)                                                 00389
3784  ARG(61)                                                  00390
3906  ATXVAL(400)                                              00391
7520  ESYS1                                                    00392
7522  ESYS2                                                    00393
7524  ESYS3                                                    00394
6490  EXP1(60)                                                 00395
6610  EXP2(60)                                                 00396
7572  FLOAT                                                    00397
7550  I                                                        00398
7388  IARPTR                                                   00399
7399  IASCNT                                                   00400
2688  IASMO(3)                                                 00401
2794  IAUX                                                     00402
2652  IBLANK                                                   00403
5930  IBLFLG                                                   00404
5947  IBTPTR                                                   00405
7592  IBYT1                                                    00406
7593  IBYT2                                                    00407
7579  ICALLS(1)                                                00408
5931  ICHAR                                                    00409
5917  ICHCLN                                                   00410
2803  ICHNO                                                    00411
2802  ICHNUM                                                   00412
5932  ICMPRE                                                   00413
5933  ICNDWN                                                   00414
7390  ICOMMA                                                   00415
5934  ICR                                                      00416
 706  ICWH                                                     00417
5652  ICYCLE                                                   00418
7461  IDA                                                      00419
5922  IDAFD                                                    00420
2757  IDALOG                                                   00421
5915  IDASR                                                    00422
5923  IDASRM                                                   00423
2748  IDASR1(9)                                                00424
2791  IDATE                                                    00425
1990  IDCHK(2)                                                 00426
6008  IDEC                                                     00427
7578  IDEPTH                                                   00428
7464  IDERR                                                    00429
2721  IDIAL(9)                                                 00430
 647  IDISK(50)                                                00431
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5914  IDLFLG                                                    00432
2691  IDSMA(3)                                                  00433
7479  IDTAPE                                                    00434
7471  IDUSER(2)                                                 00435
2694  IDVCE(9)                                                  00436
2730  IEPTR(9)                                                  00437
7574  IERROR                                                    00438
 707  IETIME                                                    00439
5982  IEXP                                                      00440
2758  IFBTK(11)                                                 00441
2769  IFBTM(11)                                                 00442
2780  IFBTN(11)                                                 00443
7415  IFCOND                                                    00444
7610  IFILL(2)                                                  00445
   1  IFIRST(1)                                                 00446
5935  IFMT                                                      00447
7386  IFRFLG                                                    00448
7392  IFRLUP                                                    00449
5936  IFRSWD                                                    00450
7480  IFTAPE                                                    00451
5937  IFTFLG                                                    00452
7576  IGOTO                                                     00453
7417  IHOLD(9)                                                  00454
1923  ILIST                                                     00455
5995  ILNPR                                                     00456
7473  ILOG(2)                                                   00457
5939  IMAG1                                                     00458
5940  IMAG2                                                     00459
2811  IMASK                                                     00460
5941  IMOVER                                                    00461
5960  INDBYT(10)                                                00462
7594  INDEX                                                     00463
5942  INDFLG                                                    00464
6010  INDVCE                                                    00465
5943  INFORM                                                    00466
 546  INNPRT                                                    00467
3665  INREVW                                                    00468
6005  INT                                                       00469
6009  INTPTR                                                    00470
6000  INTR                                                      00471
6011  INTTBL(12)                                                00472
7481  INUSE                                                     00473
5944  INWONR                                                    00474
4706  IONOFF(10)                                                00475
2793  IOPER                                                     00476
2792  IOPRTR                                                    00477
7595  IORST(15)                                                 00478
7391  IPAREN                                                    00479
 547  IPART(10)                                                 00480
7393  IPMPTR                                                    00481
5653  IPRCLE(20)                                                00482
7389  IPRPTR                                                    00483
1924  IPUNCH                                                    00484
7580  IPUSH(9)                                                  00485
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2809  IQUANT                                                    00486
2797  IRAND                                                     00487
1925  IROR                                                      00488
5945  IRDWRT                                                    00489
4716  IRECRD(528)                                               00490
7477  IREEL                                                     00491
5992  IRMARG                                                    00492
3720  IROUND                                                    00493
2703  IRSTAT(9)                                                 00494
7577  IRTRN                                                     00495
5981  ISCFLG                                                    00496
6006  ISKIP                                                     00497
1902  ISPOOL(10)                                                00498
5950  ISRBYT(10)                                                00499
2798  ISTART                                                    00500
2739  ISTAT(9)                                                  00501
7383  ISTFLG                                                    00502
7485  ISTOP(20)                                                 00503
2806  ISTOP1                                                    00504
2807  ISTOP2                                                    00505
7475  ISTUD(2)                                                  00506
5983  ISVBYT                                                    00507
5980  ISVDEC                                                    00508
5984  ISVDWN                                                    00509
2810  ISWAP                                                     00510
7505  ISYS1                                                     00511
7514  ISYS10                                                    00512
7515  ISYS11                                                    00513
7516  ISYS12                                                    00514
7517  ISYS13                                                    00515
7518  ISYS14                                                    00516
7519  ISYS15                                                    00517
7506  ISYS2                                                     00518
7507  ISYS3                                                     00519
7508  ISYS4                                                     00520
7509  ISYS5                                                     00521
7510  ISYS6                                                     00522
7511  ISYS7                                                     00523
7512  ISYS8                                                     00524
7513  ISYS9                                                     00525
1926  ISYS(62)                                                  00526
7384  ITIME                                                     00527
6121  ITMNME(2)                                                 00528
5970  ITOBYT(10)                                                00529
5948  ITPCNT                                                    00530
5985  ITRFLG                                                    00531
7385  ITYM                                                      00532
7396  IVLEND                                                    00533
5986  IWKPTR                                                    00534
6206  IWORK(164)                                                00535
2712  IWSTAT(9)                                                 00536
7451  IXFER                                                     00537
7551  J                                                         00538
1878  JCNT                                                      00539
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 1879  JDIAL(23)                                                00540
 7380  JDLFLG                                                   00541
 7455  JFTYPE                                                   00542
 7426  JHOLD(9)                                                 00543
 5996  JLNPR                                                    00544
 2808  JOB                                                      00545
  708  JOUTBF(1170)                                             00546
 7478  JREEL                                                    00547
 1912  JSPOOL(10)                                               00548
 7483  JSYS(2)                                                  00549
 5987  JWKPTR                                                   00550
 7552  K                                                        00551
  127  KARDUM                                                   00552
  128  KARSET(57)                                               00553
 7407  KBLNO1                                                   00554
 7408  KBLNO2                                                   00555
 7458  KBR                                                      00556
 7462  KCORE                                                    00557
 7444  KDKTR                                                    00558
 3723  KEEPID(2)                                                00559
 7409  KENTRY                                                   00560
 3610  KFEP(34)                                                 00561
 7465  KFLG                                                     00562
 7411  KFNBR                                                    00563
 7402  KFNBRX                                                   00564
 7452  KFONLY                                                   00565
 7456  KFTYPE                                                   00566
 7412  KGNBR                                                    00567
 7453  KGONLY                                                   00568
 7413  KLNBR                                                    00569
 7466  KLNBR1                                                   00570
 5997  KLNPR                                                    00571
 7454  KLONLY                                                   00572
 5919  KNEG                                                     00573
 7414  KOMNR                                                    00574
 7457  KOPY                                                     00575
 5634  KPTR(8)                                                  00576
 7460  KRWS                                                     00577
 7459  KTYPE                                                    00578
 5248  KURRYL                                                   00579
 7470  KUSER                                                    00580
 5989  KWKPTR                                                   00581
 7463  KWRDS                                                    00582
 2801  KYPBRK                                                   00583
 7553  L                                                        00584
 5486  LAB1(94)                                                 00585
 5580  LAB2(48)                                                 00586
 7441  LANS1                                                    00587
 7442  LANS2                                                    00588
 7443  LANS3                                                    00589
 5245  LBNENT                                                   00590
 7467  LBRK1                                                    00591
 7468  LBRK2                                                    00592
 6124  LBYTE(80)                                                00593
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 7404  LCNT                                                    00594
 7446  LDEC                                                    00595
 7405  LDIR1                                                   00596
 7406  LDIR2                                                   00597
 3644  LEP(14)                                                 00598
 5833  LESLIN(80)                                              00599
 7400  LESNAM                                                  00600
 5246  LESSON(2)                                               00601
 5990  LFMT                                                    00602
 3729  LFND                                                    00603
 3731  LFREXD                                                  00604
 3727  LHSCOM                                                  00605
 7381  LHSEQ                                                   00606
 6119  LIBSV                                                   00607
 5642  LIBS(10)                                                00608
 6120  LIBUSE                                                  00609
 6007  LINEUP                                                  00610
 5991  LMARG                                                   00611
 3730  LNBR                                                    00612
 3725  LNCORR(2)                                               00613
 3474  LOCTAG                                                  00614
  697  LOGNR(9)                                                00615
 7394  LOK                                                     00616
 7449  LOOP                                                    00617
 1922  LPAR                                                    00618
 7440  LPLUS                                                   00619
 5918  LPSW                                                    00620
 3716  LPTAPX                                                  00621
 3717  LPTMFU                                                  00622
 7403  LPTR                                                    00623
 3740  LREPLY(2)                                               00624
 7401  LRET                                                    00625
 5993  LSBLNK                                                  00626
 5994  LSBLWD                                                  00627
 3738  LSDFT(2)                                                00628
 5250  LSDR1(118)                                              00629
 5368  LSDR2(118)                                              00630
 5244  LSNENT                                                  00631
 6030  LSTCHR                                                  00632
 3475  LSTNAM(2)                                               00633
 3732  LSTPTR(6)                                               00634
 3721  LSTRYL                                                  00635
 7447  LSW                                                     00636
 7439  LTAG                                                    00637
 5916  LTOC                                                    00638
 5989  LWKPTR                                                  00639
 7554  M                                                       00640
 2653  MAGTBL(10)                                              00641
  186  MAP(255)                                                00642
  185  MAPDUM                                                  00643
 2804  MBKGND                                                  00644
 5913  MBUMSG                                                  00645
  520  MCHPHN(26)                                              00646
 6029  MCUESV                                                  00647
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 6024  MCUE                                    00648
 3728  MDE                                     00649
 3477  MDEF(133)                               00650
 6118  MEMORY                                  00651
 6038  MFOR                                    00652
 6730  MFRAME(320)                             00653
 3666  MFUNSV(50)                              00654
 6023  MINFLG                                  00655
 6001  MINT                                    00656
 7416  MKIND                                   00657
 3663  MKNT1                                   00658
 3664  MKNT2                                   00659
 5998  MLNPR                                   00660
 7377  MNFSW                                   00661
 7372  MNNENT(2)                               00662
 7370  MNSTAT(2)                               00663
 7589  MODES                                   00664
 5938  MODFLG                                  00665
 6003  MOVER                                   00666
 3662  MQUIT                                   00667
 5673  MSGBUF(160)                             00668
 1992  MSGDR1(330)                             00669
 2322  MSGDR2(330)                             00670
 7590  MSGNO                                   00671
  519  MSGOPN                                  00672
  499  MSGOPR(20)                              00673
    2  MSGTBL(125)                             00674
 5628  MSVMSG(6)                               00675
 6004  MVEND                                   00676
 7555  N                                       00677
 6033  NAMBEG                                  00678
 2812  NAMES(480)                              00679
 3292  NAMESX(180)                             00680
 2805  NBKGND                                  00681
 3472  NBRNAM(2)                               00682
 3722  NBRRYL                                  00683
 7469  NCALC                                   00684
 2799  NCHBEG                                  00685
 7410  NCODE                                   00686
 7445  NCONJ                                   00687
 6117  NCONN                                   00688
 6115  NCPU                                    00689
 6037  NDCHAR                                  00690
 5924  NDEX(5)                                 00691
 6039  NDKTR                                   00692
 1988  NEGPOS(2)                               00693
 5249  NEWORD                                  00694
 5949  NEXT                                    00695
 7382  NFNLSV                                  00696
 7050  NFRAME(320)                             00697
 7378  NFULL                                   00698
 6028  NFUNL                                   00699
 6002  NINT                                    00700
 7379  NLINE                                   00701
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5999  NLNPR                                                    00702
7448  NMAP                                                     00703
7482  NMREEL                                                   00704
5946  NMRPLY                                                   00705
2663  NOCMBN(25)                                               00706
6370  NOP1(60)                                                 00707
6430  NOP2(60)                                                 00708
3661  NOTFUL                                                   00709
6027  NPACK                                                    00710
7450  NPASS                                                    00711
6032  NPCNT                                                    00712
5920  NPNT1                                                    00713
5921  NPNT2                                                    00714
6034  NPREV                                                    00715
6123  NPRSV                                                    00716
5929  NPTR                                                     00717
7591  NREAD                                                    00718
3658  NREC1                                                    00719
3659  NREC2                                                    00720
3660  NREC3                                                    00721
3742  NREPLY(40)                                               00722
7387  NRMFLG                                                   00723
6040  NSRCH(75)                                                00724
7395  NSVPRS                                                   00725
7526  NTMP1                                                    00726
7535  NTMP10                                                   00727
7536  NTMP11                                                   00728
7537  NTMP12                                                   00729
7538  NTMP13                                                   00730
7539  NTMP14                                                   00731
7540  NTMP15                                                   00732
7541  NTMP16                                                   00733
7542  NTMP17                                                   00734
7543  NTMP18                                                   00735
7544  NTMP19                                                   00736
7527  NTMP2                                                    00737
7545  NTMP20                                                   00738
7546  NTMP21                                                   00739
7547  NTMP22                                                   00740
7548  NTMP23                                                   00741
7549  NTMP24                                                   00742
7528  NTMP3                                                    00743
7529  NTMP4                                                    00744
7530  NTMP5                                                    00745
7531  NTMP6                                                    00746
7532  NTMP7                                                    00747
7533  NTMP8                                                    00748
7534  NTMP9                                                    00749
7374  NTRYF                                                    00750
7375  NTRYG                                                    00751
7376  NTRYL                                                    00752
2800  NUMCH                                                    00753
6035  NUMFLG                                                   00754
6036  NUMPRS                                                   00755
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 6116  NUNITR                                                    00756
 6025  NWRD1                                                     00757
 6026  NWRD2                                                     00758
 6031  NWRK                                                      00759
 7575  NXTPRT                                                    00760
 7556  N1                                                        00761
 7557  N2                                                        00762
 2795  PI                                                        00763
  491  PRICES(4)                                                 00764
  441  PRIME(25)                                                 00765
 3782  RSPNSE                                                    00766
 7564  TEMP1                                                     00767
 7566  TEMP2                                                     00768
 7568  TEMP3                                                     00769
 7570  TEMP4                                                     00770
 7397  VALUE                                                     00771
 3718  WITHIN                                                    00772
 6204  X(1)                                                      00773
 7435  XHOLD                                                     00774
 7558  X1                                                        00775
 7560  X2                                                        00776
 7437  YHOLD                                                     00777
 7562  Y1                                                        00778
&ENDPROG                                                        00779
```

APPENDIX H

TACFIRE/TOS^2 EQUIPMENT PICTURES

This appendix includes a set of pictures of the TACFIRE and TOS^2 equipment items most frequently used during operation of the AN/GYK-12 PLANIT system. The equipment items shown are those which include significant PLANIT operator/author/student interface. The figures are as follows:

Figure H-1. Artillery Control Console (ACC)/ Operator Control Console (OCC)

Figure H-2. Variable Format Message Entry Device (VFMED)

Figure H-3. Message Input/Output Device (MIOD)

Figure H-4. Electronic Line Printer (ELP)

Figure H-5. AN/GYK-12 Computer [CPU, IOU, (2) 8K Memories, MCMU]

Figure H-6. Auxiliary Removable Media Memory (ARMM) and Random Access Memory (RAM)

Figure H-7. (TOS^2) Potter Tape Unit

Figure H-8. Digital Data Terminal (DDT)

Figure H-9. Computer Test Set (CTS)

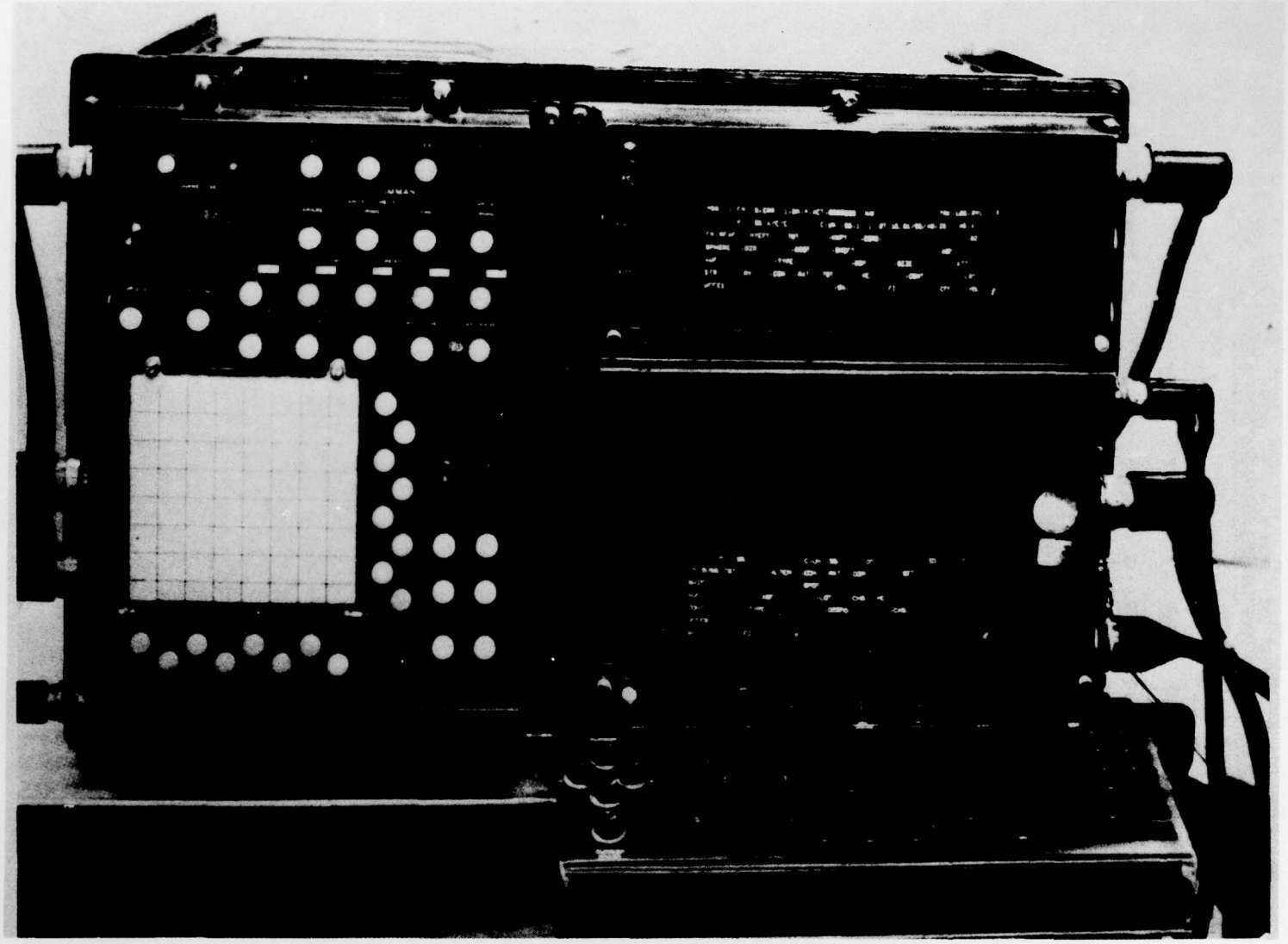


Figure H-1. Artillery Control Console (ACC)/
Operator Control Console (OCC)

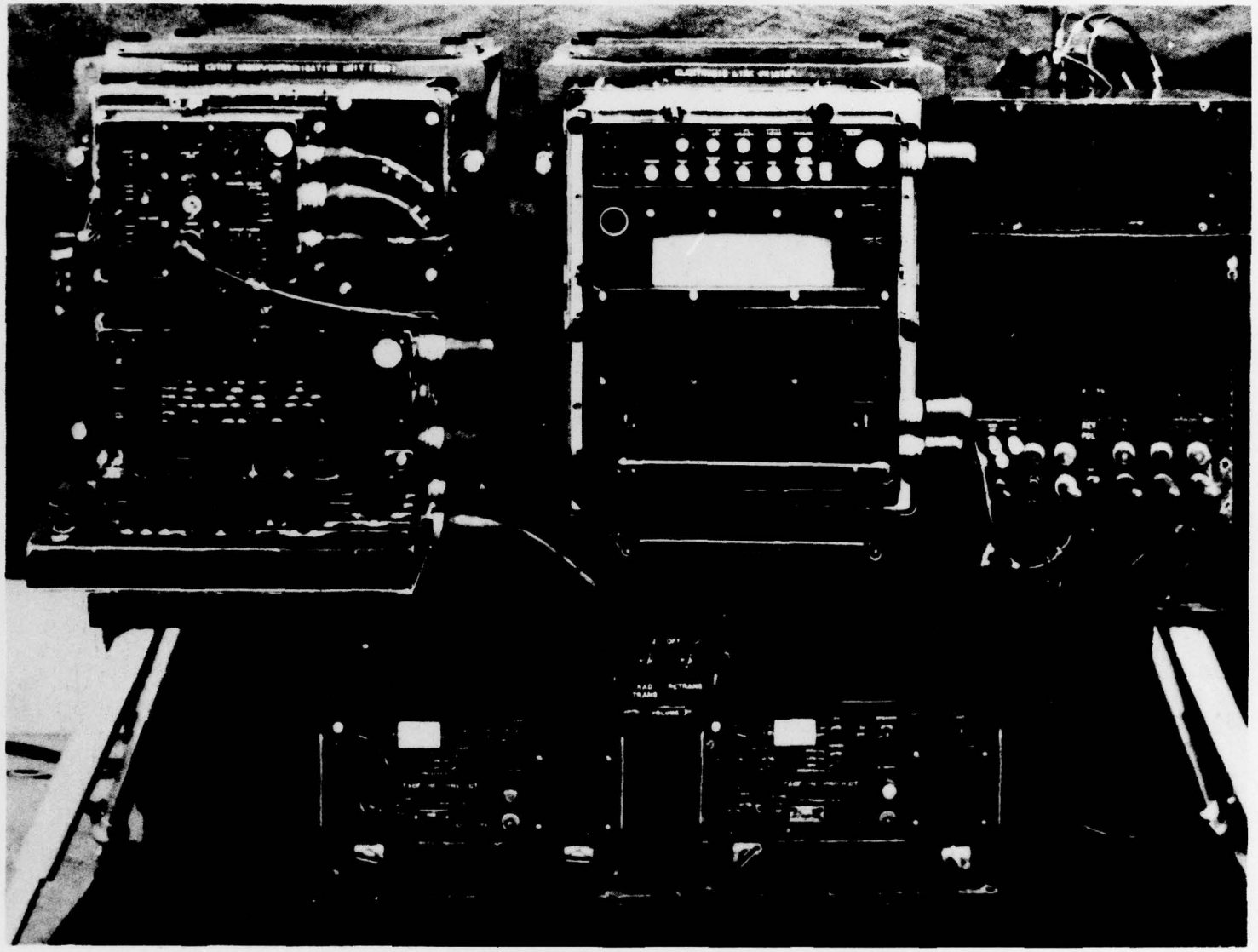


Figure H-2. Variable Format Message Entry Device (VFMED)

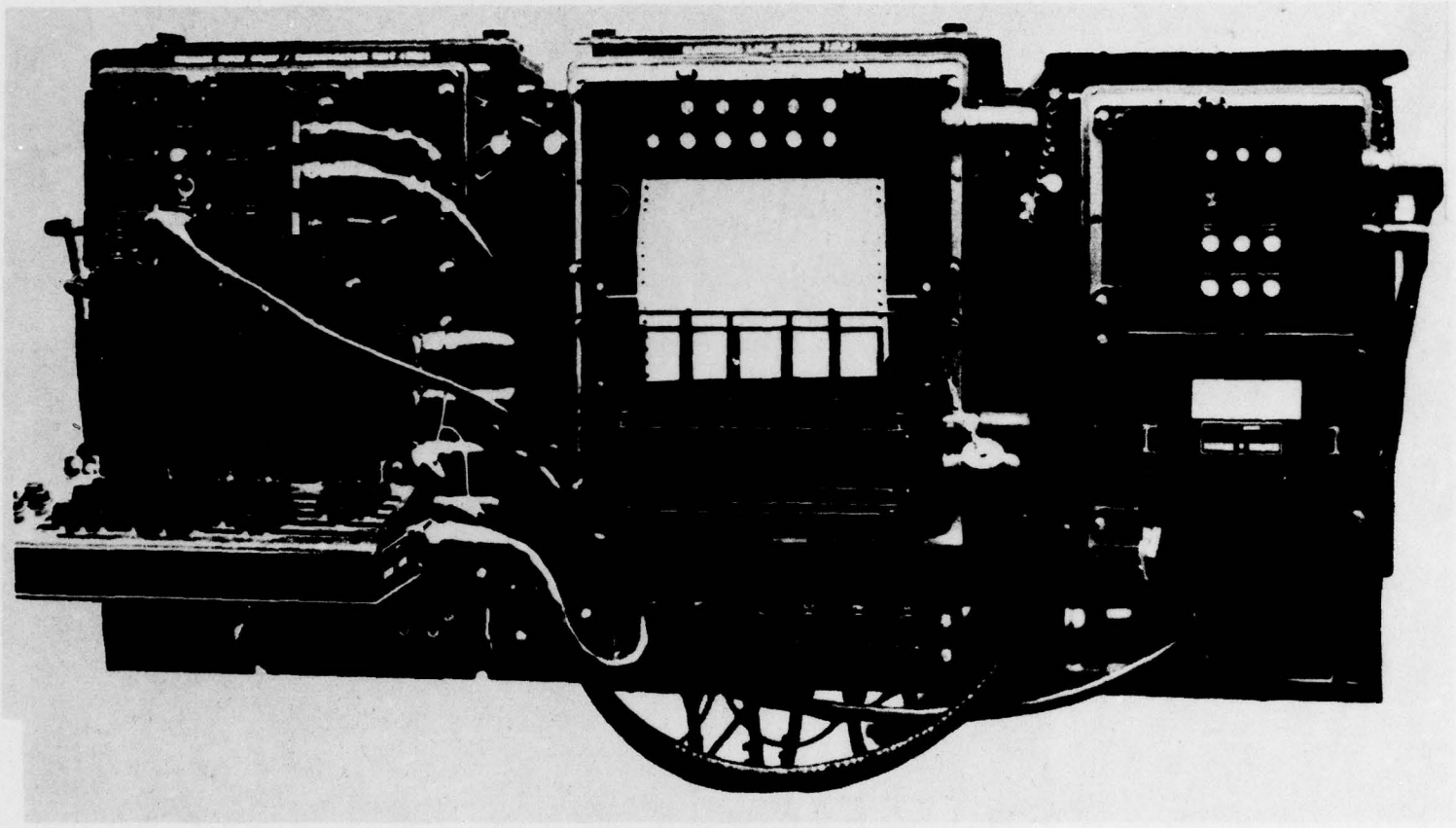


Figure H-3. Message Input/Output Device (MIOD)

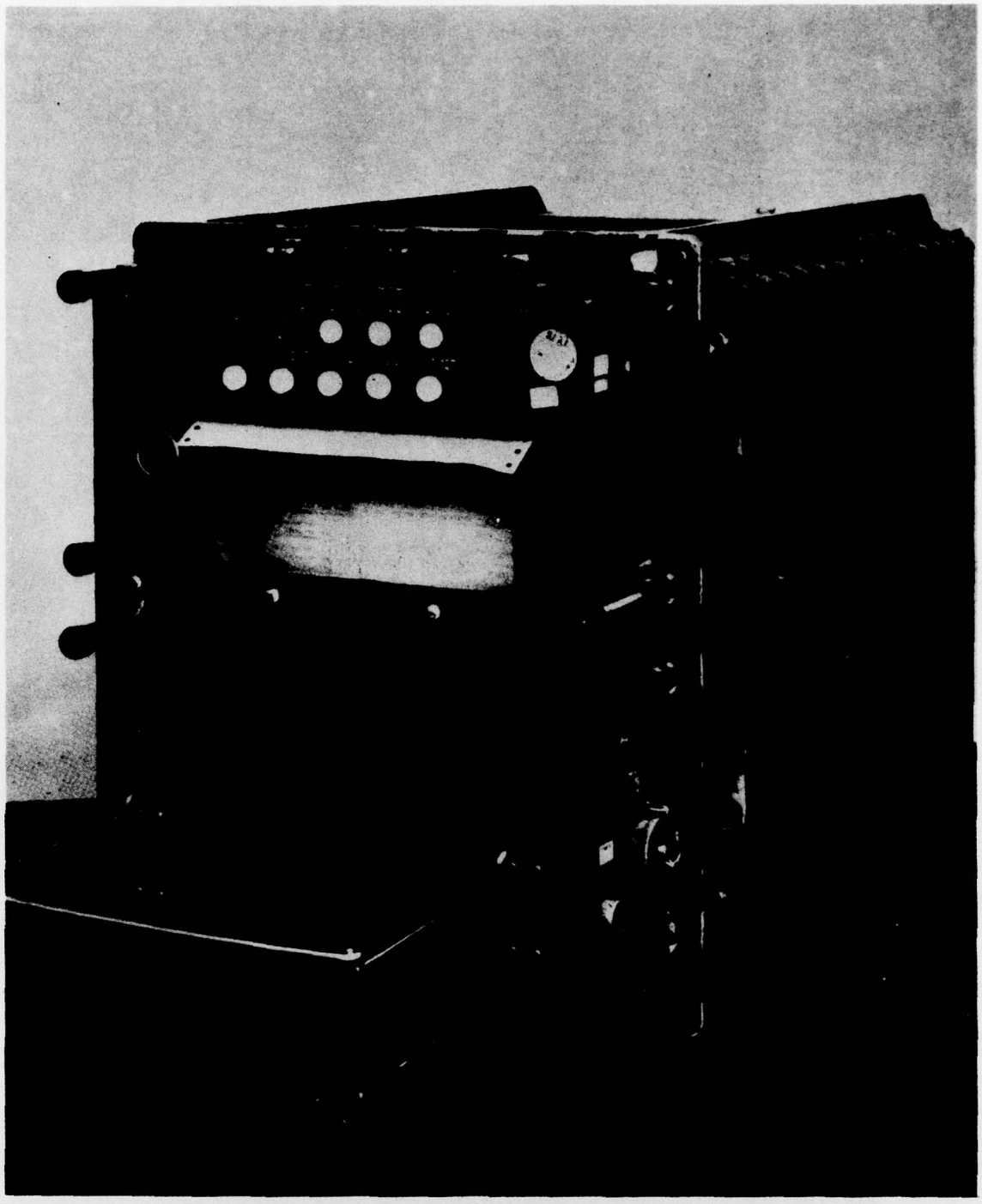


Figure H-4. Electronic Line Printer (ELP)

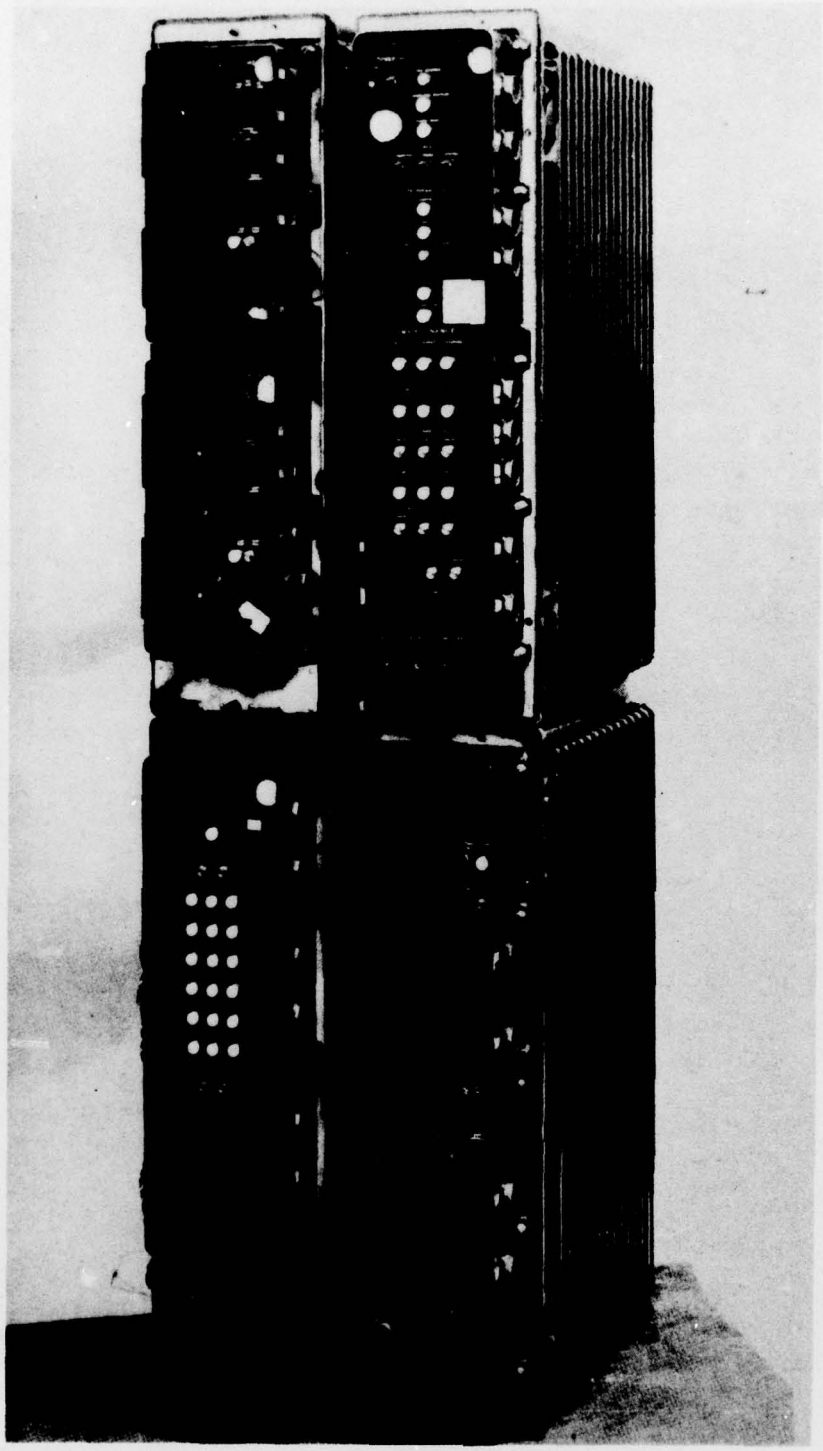


Figure H-5. AN/GYK-12 Computer

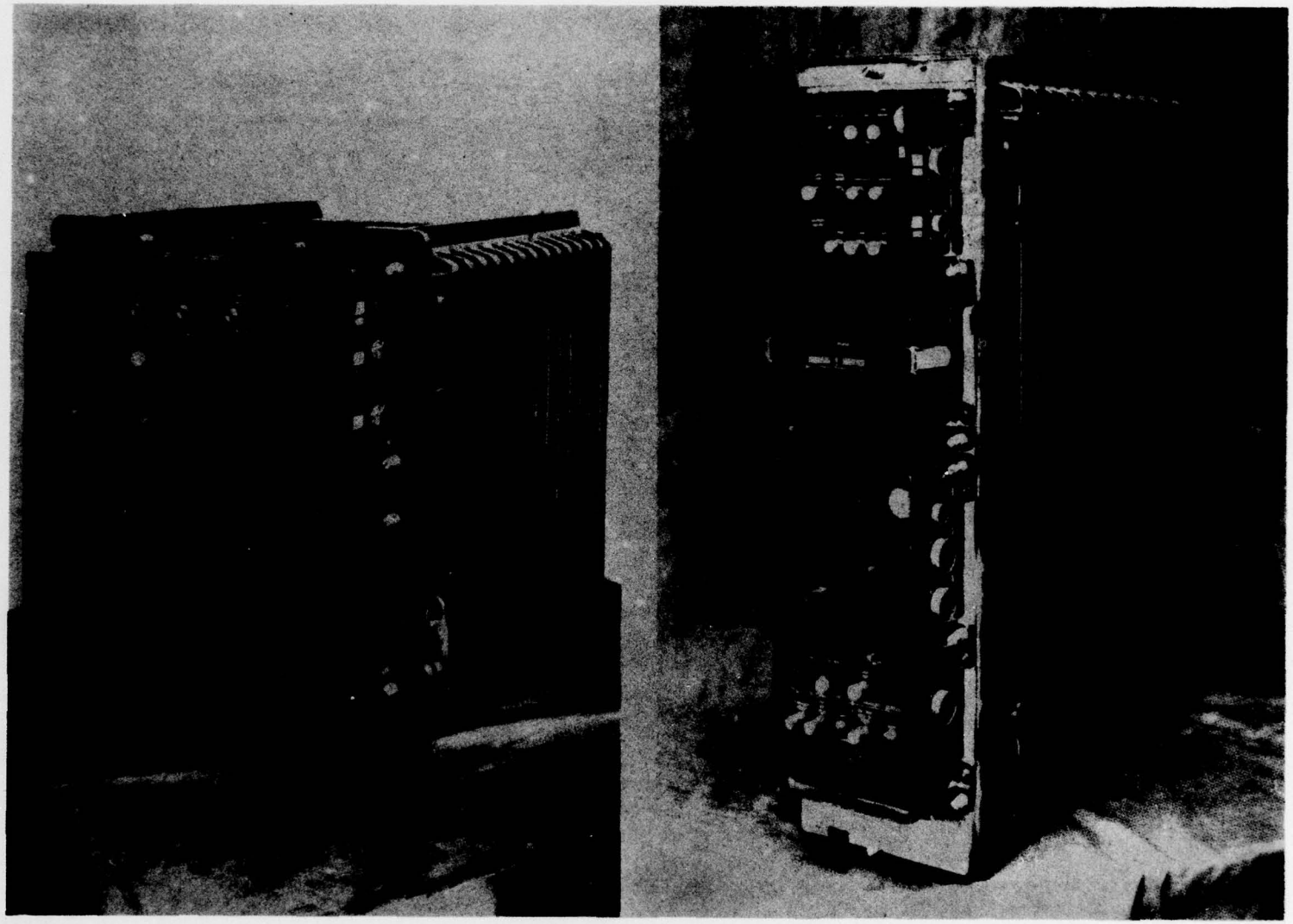


Figure H-6. Auxiliary Removable Media Memory (ARMM) and Random Access Memory (RAM)

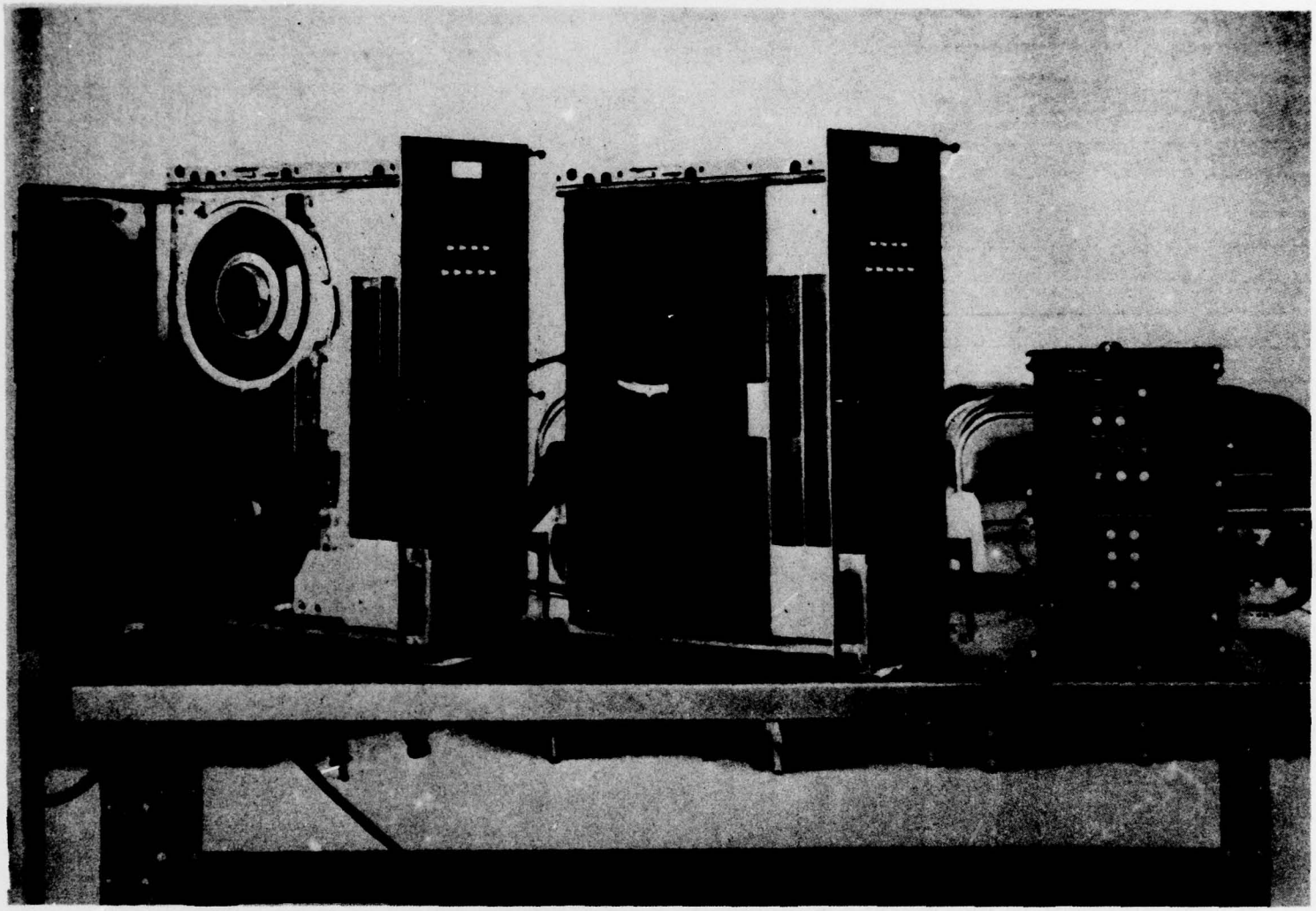


Figure H-7. (TOS^2) Potter Tape Unit

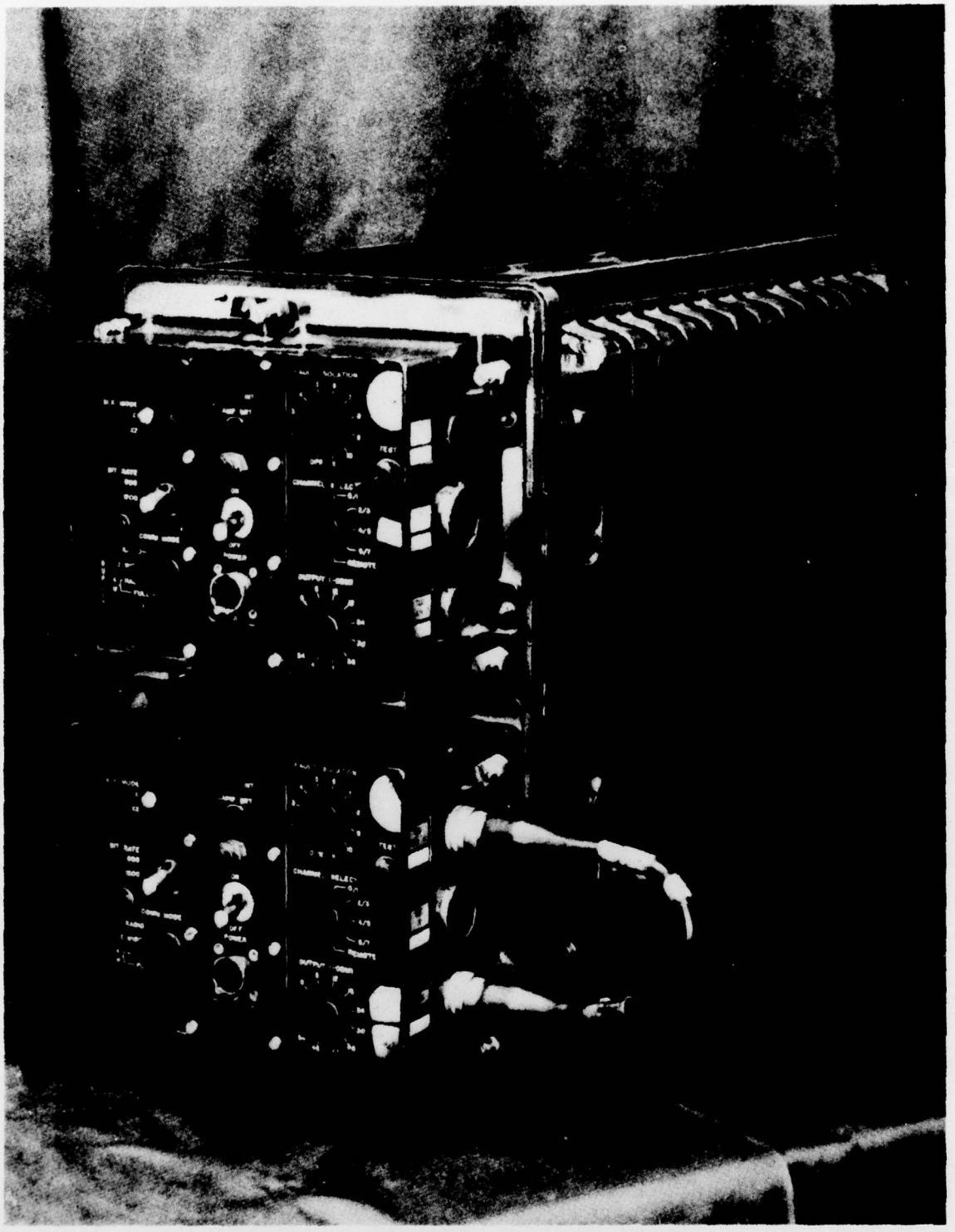


Figure H-8. Digital Data Terminal (DDT)

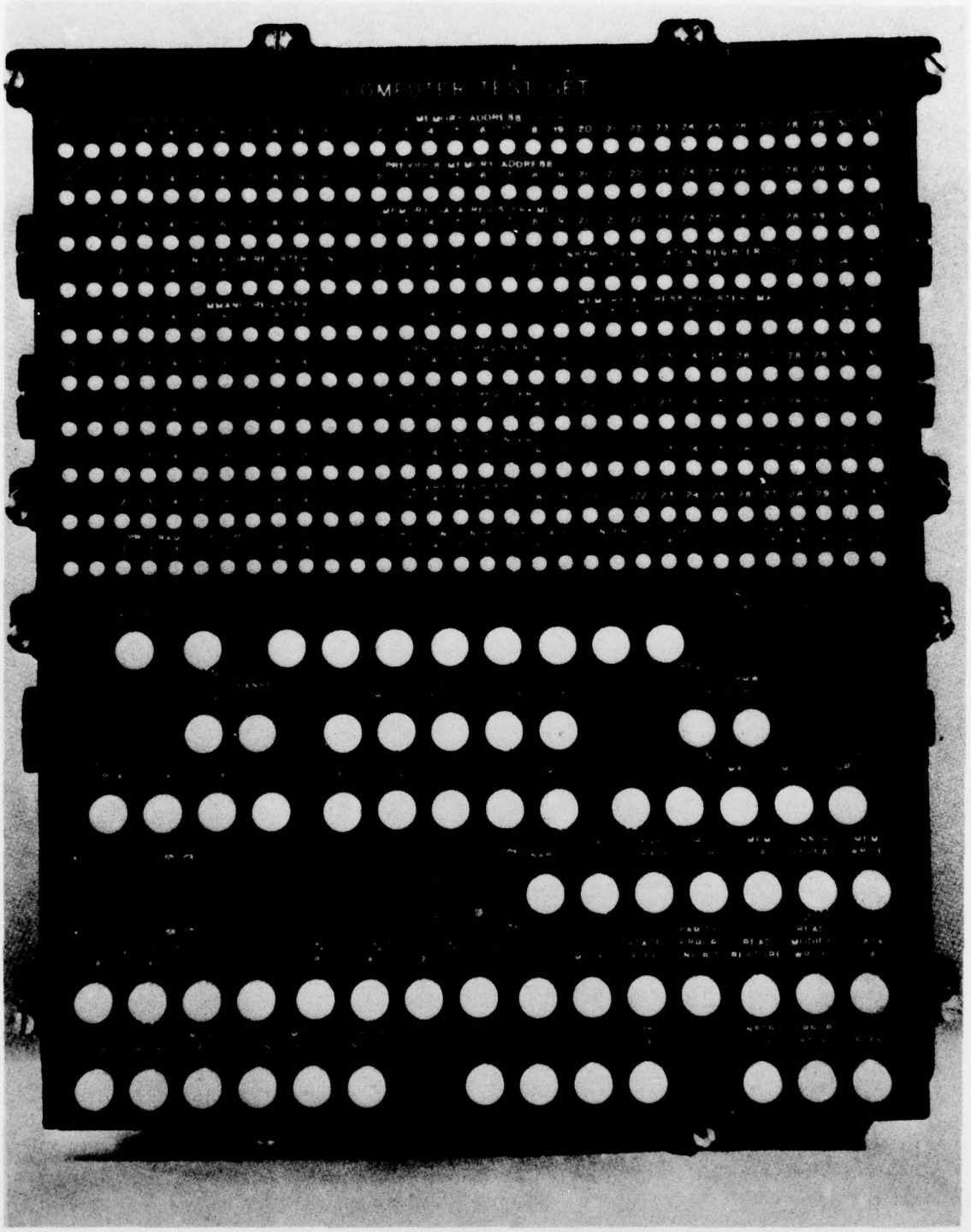


Figure H-9. Computer Test Set (CTS)

APPENDIX I

GLOSSARY OF TERMS

A

ACC - (TACFIRE) Artillery Control Console

ACCCE/ACCCED - (ACC) Compose Edit (lower) Display

ACCRD - (ACC) Receive (upper) Display

ACCSA - (ACC) Switch Assembly

ARMM - Auxiliary Removable Media Memory Unit (includes MLU)

B

BOT - Beginning of Tape

BSL - Bootstrap Load

C

CE/CED - Compose Edit Display on the ACC or OCC (Same as ACCCED
(C/E) or OCCCED)

CPU - AN/GYK-12 Computer Central Processing Unit

CTS - Computer Test Set

D

DDT - Digital Data Terminal

DE - Display Editor

DIG - (CPU) Diagnose Status Lights

DPM - Digital Plotter Map (not used with PLANIT)

E

ELP - Electronic Line Printer

EOT - End of Tape

ETD - Electronic Tactical Display (not used with PLANIT)

F

FI - Fault Isolation program(s), part of AN/GYK-12 system software (not a part of PLANIT system)

FINAL - AN/GYK-12 PLANIT System Final (termination of PLANIT System operations) program module

FSU - (MIOD) Format Storage Unit (not used with PLANIT)

H

HSP - High Speed Printer (commercial peripheral printer in SSS and PSSB)

I

IOU - AN/GYK-12 Computer Input/Output Unit

K

KB - Alphanumeric Keyboard

L

LSS - L-3050 Support Software (General Utility Programs)

M

MADCAP - Maintenance and Diagnostic Control and Activation Program (MADCAP Operating System used as basic building block for POS)

MCMU - Mass Core Memory Unit (131 k words, 32 bits plus parity per word)

MEOF - MADCAP End of File

MIOD - (TOS^2) Message Input/Output Device

MIOP - Machine Input/Output Program

MLU - Memory Load Unit (part of ARMM, includes TTC)

O

OCC - (TOS^2) Operator Control Console

OCCCE/OCCCED - (OCC) Compose Edit (lower) Display

OCCRD - (OCC) Receive (upper) Display

OCCSA - (OCC) Switch Assembly

P

PCG - Power Converter Group

PEBU - Peripheral Equipment Buffer Unit

PLAN 1 - PLANIT Overlay 1 Program Module

PLAN 2 - PLANIT Overlay 2 Program Module

PLAN 3 - PLANIT Overlay 3 Program Module

PLAN 4 - PLANIT Overlay 4 Program Module

PLAN 5 - PLANIT Overlay 5 Program Module

PLAN 6 - PLANIT Overlay 6 Program Module

PLAN 7 - PLANIT Overlay 7 Program Module

PLAN 8 - PLANIT Overlay 8 Program Module

P

(Continued)

PLANIT - Programming Language for Interactive Teaching
Note: This is also the name given to the PLANIT MAIN program module.

POS - PLANIT Operating System

PSSB - (TACFIRE) Programming Support System B

PUP - PLANIT Utility Program

R

RAM - Random Access Memory (drum)

RAMCHECK - RAM track check program

RAMFI - RAM Fault Isolati n program, part of AN/GYK-12 system software (not a part of PLANIT system)

RD - Read-only Display on the ACC or OCC (same as ACCRD or OCCRD)

RMMU - Removable Media Memory Unit (Same as ARMM)

S

SA - (ACC/OCC) Switch Assembly

SSS - (TOS^2) Software Support System

START - AN/GYK-12 PLANIT System Start program module

T

TACFIRE - Tactical Fire Direction System (U. S. Army Artillery)

TACPOL - Tactical Procedure Oriented Language (programming language for the AN/GYK-12 computer)

TMIOP - Terminal MIOP

TOS^2 - Tactical Operating System Operable Segment

TTC - (ARMM/MLU) Tape Transport Cartridge

VFMED - (TACFIRE) Variable Format Message Entry Device