

**GENERAL DESCRIPTION**  
**SOFTWARE SUBSYSTEM DESCRIPTION**  
**NO. 3 ELECTRONIC SWITCHING SYSTEM**

	PAGE		PAGE
<b>1. GENERAL</b> . . . . .	2	<b>4. NO. 3 ELECTRONIC SWITCHING SYSTEM SOFTWARE</b> . . . . .	8
<b>INTRODUCTION</b> . . . . .	2	<b>GENERIC ISSUES</b> . . . . .	8
<b>SOFTWARE DOCUMENTATION</b> . . . . .	2	<b>PROGRAM STRUCTURE OVERVIEW</b> . . . . .	8
<b>A. Structure</b> . . . . .	2	<b>A. Base Level Functions</b> . . . . .	9
<b>B. Coverage</b> . . . . .	2	<b>Base Level Loop</b> . . . . .	9
<b>C. Support Information</b> . . . . .	3	<b>Base Level Transient Call Record Scan</b> . . . . .	9
<b>2. STORED PROGRAM CONTROL</b> . . . . .	3	<b>Base Level Monitor Functions (Traffic Measurements)</b> . . . . .	10
<b>SYSTEM CONCEPTS</b> . . . . .	3	<b>Input Processing</b> . . . . .	10
<b>SYSTEM ORGANIZATION</b> . . . . .	3	<b>Audits</b> . . . . .	10
<b>3. PROGRAM LANGUAGES AND RELATED DOCUMENTATION</b> . . . . .	5	<b>B. 3E3 Base Level Loop</b> . . . . .	10
<b>INTRODUCTION</b> . . . . .	5	<b>General Scheduler</b> . . . . .	12
<b>PROGRAM DEVELOPMENT</b> . . . . .	5	<b>Dispatcher</b> . . . . .	12
<b>3A LANGUAGE</b> . . . . .	6	<b>C. Interrupts</b> . . . . .	12
<b>ESS PROGRAMMING LANGUAGE (EPL)</b> . . . . .	6	<b>Timed</b> . . . . .	12
<b>MACROS</b> . . . . .	7	<b>Demand Interrupts</b> . . . . .	13
<b>ASSEMBLY LANGUAGE</b> . . . . .	7	<b>5. ORGANIZATION OF SOFTWARE SUBSYSTEM DESCRIPTIONS (SSDs)</b> . . . . .	13
<b>OFFICE DATA ASSEMBLER</b> . . . . .	7	<b>GENERAL</b> . . . . .	13
<b>PROGRAM LISTINGS (PRs)</b> . . . . .	8	<b>FUNCTIONAL PROGRAM CATEGORIES</b> . . . . .	13
<b>RELATED DOCUMENTATION</b> . . . . .	8		

**NOTICE**

Not for use or disclosure outside the  
Bell System except under written agreement

<b>CONTENTS</b>	<b>PAGE</b>
<b>FUNCTIONAL ORGANIZATION OF SSDs</b> . . . . .	<b>14</b>
<b>CONTENT DESCRIPTIONS OF SSDs</b> . . . . .	<b>17</b>
<b>LISTING OF PROGRAMS</b> . . . . .	<b>17</b>
<b>RELATED SUPPORT INFORMATION</b> . . . . .	<b>17</b>

**Figures**

<b>1. System Control (SYC 0, SYC 1) Within No. 3 ESS</b> . . . . .	<b>4</b>
<b>2. Program Development Process</b> . . . . .	<b>6</b>
<b>3. Base Level Loop</b> . . . . .	<b>9</b>
<b>4. 3E3 Base Level Loop</b> . . . . .	<b>11</b>
<b>5. Timed Interrupts</b> . . . . .	<b>13</b>
<b>6. No. 3 ESS Functional Listing of Programs</b> . . . . .	<b>14</b>
<b>7. Functional Organization of No. 3 ESS Software Descriptions</b> . . . . .	<b>15</b>

**Tables**

<b>A. Content Descriptions of SSDs</b> . . . . .	<b>18</b>
<b>B. Listing of Programs</b> . . . . .	<b>22</b>
<b>C. Related Support Information</b> . . . . .	<b>29</b>

**1. GENERAL**

**INTRODUCTION**

**1.01** This section provides an introduction to:

- (a) The software structure and programs used in operation and maintenance of the No. 3 Electronic Switching System (ESS).
- (b) The source programming languages, including the assembly process and program listings.

(c) A series of Bell System Practices (BSPs) which describe the functions of the software programs. These software practices are referred to as Software Subsystem Descriptions (SSDs).

**1.02** This section is being reissued to include two major changes applying to the base level loop for 3E3 generic. Significant changes will be designated by change arrows.

**SOFTWARE DOCUMENTATION**

**A. Structure**

**1.03** Program control of the No. 3 ESS is administered by the 3A Central Control (3A CC), a stored program-controlled real-time data processing unit. The 3A CC may also be used to control the operation of other switching systems. Therefore, SSDs for the No. 3 ESS are designated under one of two numbered series:

<b>NUMBER</b>	<b>DESCRIPTION</b>
254-340-XXX	3A CC programs/reference manuals etc, which are common to No. 3 ESS and other systems
233-15X-XXX	Programs/manuals applicable only to No. 3 ESS.

The sixth digit in the 233 series further designates the functional position of the programs described by each SSD within an overall software structure concept. This structure, including a complete listing of all documents and their contents, is provided in Part 5 of this section.

**B. Coverage**

**1.04** Software descriptive documents provide high-level descriptions of major software functions. Many of these SSDs encompass two or more separate programs, where these programs must operate together to perform the functions described. Each SSD provides:

- (a) The purpose and structure of the program(s)
- (b) Explanations of the primary functions at each appropriate level within the program structure

- (c) Identification of interfacing programs and the inter-program relationships.

### C. Support Information

**1.05** In addition to the above, each description identifies pertinent program entry/exit points to enable the reader to easily access the program listing for further detail required. These listings have been prepared using standards which provide for sufficient commented information to aid in understanding the contents and flow of the program.

**1.06** Support SSDs are provided as reference manuals for source languages used to develop these programs, description of the program listings, and other useful software related data.

## 2. STORED PROGRAM CONTROL

### SYSTEM CONCEPTS

**2.01** The No. 3 ESS performs the functions of a 2-wire central office under stored program control. Virtually all actions of the systems are determined by sequences of instructions coded and stored in memory. These instructions are grouped into functional categories called programs. These programs consist of combinations of precisely defined instructions which are read from memory and transferred one at a time to the 3A CC for execution via microprogram circuitry. The stored program utilizes stored (office) data which contains information pertaining to customer lines, routing, charging, etc. To alter system operation, changes are normally made to the stored program or office data rather than to hardware or wiring.

**2.02** The microcode of the 3A CC is a separately stored set of control functions necessary to implement the stored program in its operational control of the system. It is comparable to the command functions of other data processing machines. Because of its major importance, it is stored in read-only memory (ROM). Code changes involve replacing circuit packs with no alteration to backplane wiring.

**2.03** Microcode also executes functions independent of the stored program such as of interrupt processing, front panel functions of the 3A CC, and a certain amount of the recovery code including bootstrap.

### SYSTEM ORGANIZATION

**2.04** Functionally, the No. 3 ESS consists of three major equipment areas:

- (1) Control complex
- (2) Periphery
- (3) Power equipment.

**2.05** The **control complex** consists of equipment necessary to access the system for administration, operation (call processing), and maintenance. It is the area where man-machine interface functions are accomplished.

**2.06** The **periphery** consists of necessary equipment selected by the control complex to switch calls through the office and to perform various integrity checks. Upon command from the control complex, the periphery performs tasks such as scanning customer lines, connecting paths through the office network, and changing state relays of selected circuits.

**2.07** The major **power equipment** consists of rectifiers, converters, inverters, fuses, and controls necessary to supply office power requirements.

**2.08** The functional areas are arranged in such a manner as to provide two control systems, each capable of assuming total office operational responsibility. System Control (SYC) (0 or 1) consists of a control unit (CU) and associated controllers of the periphery (Fig. 1). A CU (which is part of the control complex) consists of the 3A CC, main store (MAS), and the system status panel (SSP-not duplicated). The controllers located in the periphery (and referred to as peripheral controllers) include the frame input/output controller (FIOC), the scanner controller (SC), the network controller (NWC), and the peripheral pulse distributor (PPD).

**2.09** Each SYC is switched as a unit since the supporting components assigned to each SYC cannot be interchanged. It should be noted, however, that the active (on-line) SYC has the responsibility to update the standby (off-line) SYC memory. There are two equipment units (duplicated)

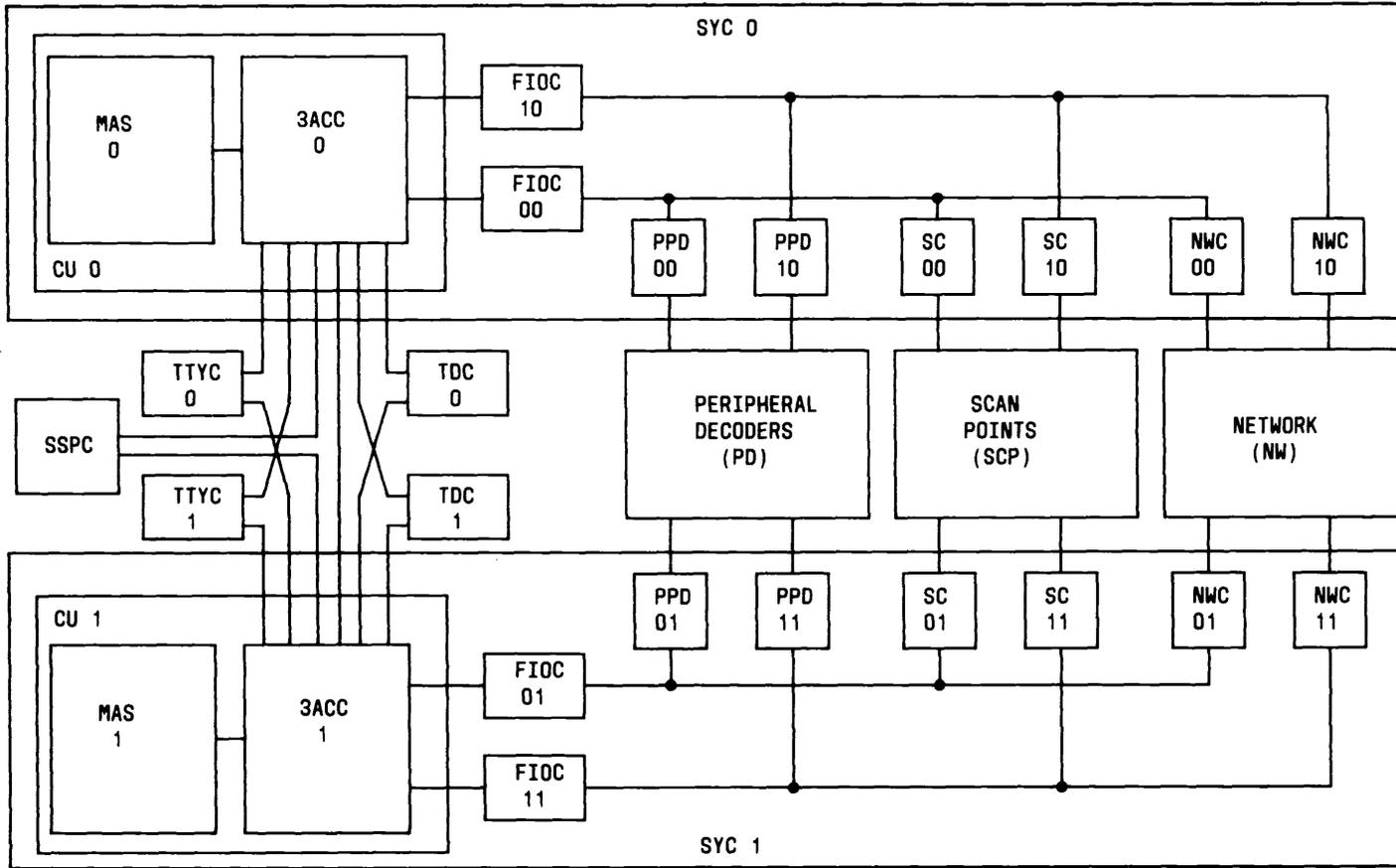


Fig. 1—System Control (SYC 0, SYC 1) Within No. 3 ESS

which support both SYCs but which are not specifically assigned to either SYC. These are:

- (1) Teletypewriter controllers (TTYCs) 0 and 1
- (2) Tape data controllers (TDCs) 0 and 1.

**2.10** Program control in a No. 3 ESS is performed by the 3A CCs, which communicate with the peripheral equipment via an input/output channel.

**2.11** The semiconductor-type main memory or main store (part of each CU) is functionally divided into program store, translation store, and temporary (call) store areas. The temporary store portion is used by the 3A CC to store transitory data; the program store contains the generic program; and the translation store provides call processing necessary data about all lines, trunks, and peripheral equipment. Additionally, as a memory backup, the programs, translations, and office data are stored on the cartridge tape system.

### **3. PROGRAMMING LANGUAGES AND RELATED DOCUMENTATION**

#### **INTRODUCTION**

**3.01** This part provides a brief introduction to the No. 3 ESS programming languages, program development, and associated documentation. More detailed information is available in Section 254-340-100.

**3.02** The 3A CC obtains program instructions from main store, interpolates each, and performs the actions indicated. Input information is also received from lines, trunks scanners, controllers, etc, and the 3A CC then performs the programmed logical operations on this input data or stimulus to accomplish call processing.

**3.03** Each program instruction is primarily a pointer to the starting address of a series of microinstructions stored in the microstore of the 3A CC, which, when executed, will implement the programs. Since programming the 3A CC basically consists of organizing a series of instructions and data into a specific sequence which will accomplish a given function, a knowledge of the instruction flow within the machine is necessary for a complete understanding of the system language and software. This type of information is available

in the 3A CC Description (Section 254-300-110) and 3A CC Theory of Operation (Section 254-300-120).

**3.04** In the case of electronic switching systems, the programs are words (instructions) contained in MAS. These words can be accessed randomly and thus provide a great deal of flexibility and speed, thereby making it possible for several calls (in various stages of completion) to be processed simultaneously. To accomplish this, communication with the processor must be in language intelligible to the processor, or machine code; however, preparation of programs in machine code would be an almost impossible task, and highly error-prone. In order to accomplish the task, special methods have been developed to simplify programming. These methods are essentially based on a language which may be readily used by a programmer, which then can be translated into the form usable by the processor. In addition to the language, a set of procedural rules is established which provides for an orderly sequential progression from symbols meaningful to a programmer to a set of sequential instructions on which the processor can act.

#### **PROGRAM DEVELOPMENT**

**3.05** The source language statements, when generated by the programmer, form a source program. This program is not executable by the 3A Processor; operation codes and symbolic addresses must first be translated into binary code (machine language). This translation process is the function of the assembly program, designated the Switching Assembly Program (SWAP). As shown in Fig. 2, the libraries are also input to the assembly program in order that all commonly used symbols, macros, and other data referred to in the program are defined for the assembler.

**3.06** The assembler translates the assembly language statements to machine instructions on a one-to-one basis. Macros (3.12) and ESS Programming Language (3.10) are first converted to assembly language statements and then to machine instructions. The primary output of the assembler is the object program module containing the executable code. Another output of the assembler is the program listing. The object program module is then input to the loader program which loads and links all pieces of the program by assigning program store addresses and resolving all external references.

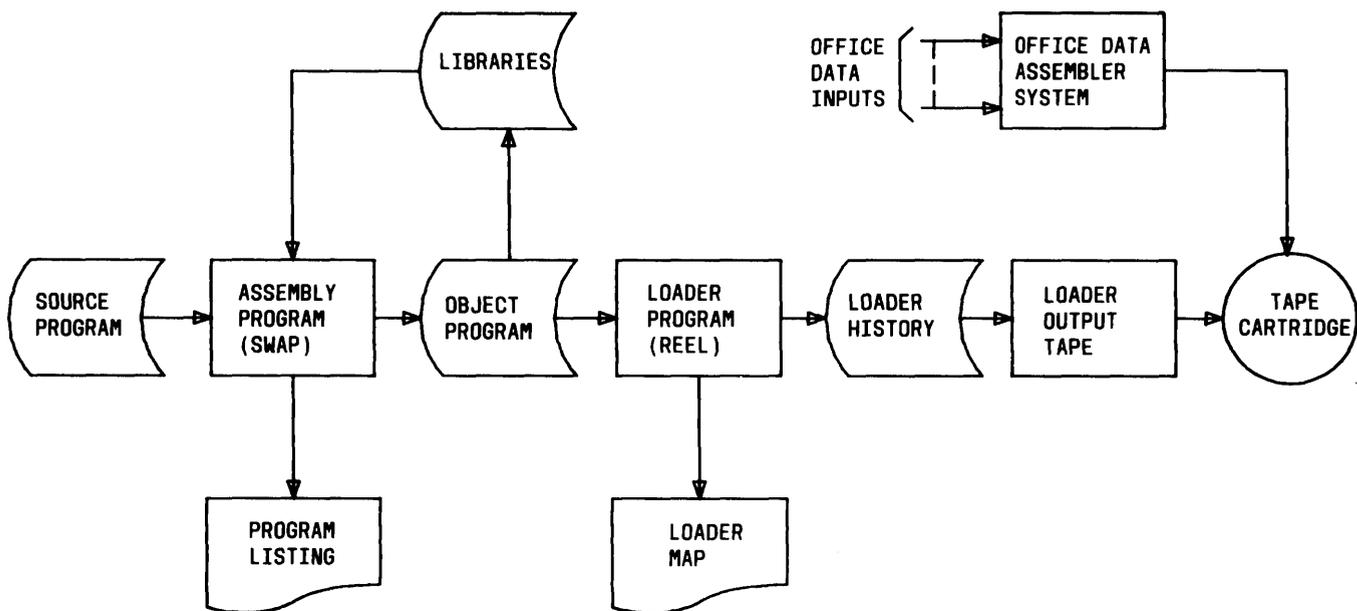


Fig. 2—Program Development Process

### 3.07 Output from the loader program, LOADER

II, includes a series of loader maps which list all programs and their starting and ending addresses, store program addresses, and available locations remaining in program store. The primary output from the loader program is an input to the loader history tape which contains all programs previously loaded. The history tape is then used by the loader output tape program to produce a No. 3 ESS generic cartridge tape.

## 3A LANGUAGE

**3.08** The 3A instruction set is the basic tool for developing programs which are understood by the machine. The instruction set is an assembly language consisting of a set of mnemonic instructions which are translated by an assembly program into machine language. However, the assembly language instructions and rules for their usage are based on the specifics inherent in the hardware design of the machine.

**3.09** Instructions in the 3A instruction set are of two types, the single (16 information bits and 2 parity bits) word instruction and the double word instructions. This combination of single word and double word provides a highly flexible basic instruction set. Single word instructions are most commonly used within the system. An instruction

is coded in one or two words depending on the size required of the data field, in addition to the number of options, or additional actions, which are included in the instruction. A complete description of each instruction is contained in Section 254-340-102, Introduction to 3A Basic and Extended Instruction Set.

## ESS PROGRAMMING LANGUAGE (EPL)

**3.10** The 3A Language was previously defined as a language used by the programmer (and assembly program) to transform program requirements into machine instructions. The EPL is a higher-level language, with statements approaching English language statements. This adds one more element of simplification to the programmer's task. Instead of coding on a one-for-one basis required at the assembly level, the programmer can use higher level statements which represent a number of assembly level statements for a given program operation. Thus, the programming procedure is simplified even further.

**3.11** Programs may contain EPL statements and assembly language statements intermixed. During assembly of the program:

- (a) An EPL compiler transforms the EPL statements to assembly language statements.

- (b) The assembly program then converts these to binary encoded machine instructions.

## MACROS

**3.12** Many similar functions are performed repetitively throughout the 3A Processor and No. 3 ESS software programs. The programming of these functions is simplified by the use of macros. A macro is essentially a language element which can be created by the programmer. It is basically the assignment of a symbol or name to a small routine or defined sequence of instructions or assembler operation such as LAYOUT. When the macro name is called, the assembler will replace the called macro name with the actual sequence of code it represents. This minimizes programmer time requirements by eliminating the need for recording certain sequences of code each time they are required.

**3.13** If a macro is defined by a programmer for use in only one program, it is called a programmer-defined macro and its definition appears in the program listing for that program. If the macro is used in more than one program, it is a system-defined macro and is defined in a macro library. Macro expansion is always present within a listing. When the code expansions generated by the macro are printed, they can be identified in the listing by a macro number surrounded by dashes.

## ASSEMBLY LANGUAGE

**3.14** The assembly process is the task of translating symbolic code to machine language. This automated process is performed by machine, which may or may not be the same machine being programmed. A symbolic assembler is a translation program in the same sense as a compiler. Both transform a source code or language into an object language. The basic difference between an assembler and a compiler is in the complexity of the source language. Assemblers normally perform a one-for-one translation of symbolic statements into machine code. Compilers normally produce many machine language statements from one source statement. In general, the assembly process requires:

- (a) Keeping track of instructions and where they are stored in memory

- (b) Keeping track of the symbols used and their values

- (c) A translation technique for converting the op code and symbols into their machine language equivalents.

**3.15** Most symbolic programs are written to be executed from successive memory locations. If the programmer assigned an absolute location to the first instruction and the assembler is instructed to assign the next instructions to following locations sequentially, then the assembler location counter keeps track of where the next instruction or operand is to be placed in memory. As each symbolic instruction is translated, the value of the location counter is updated to indicate that the current location has been used.

**3.16** The programmer does not know initially which locations to use to hold initial values or constants or at which location results should be stored. Therefore, symbolic names are assigned to reference locations, and address values are assigned to these names. As each of these symbolic locations is encountered by the assembler, the symbol is taken to be a label or location tag. A value, taken from the location counter, is then assigned to locate the use of the symbol. In order to remember the location values of all such symbols, the assembler maintains a symbol table in which it records a location value for all symbol labels.

## OFFICE DATA ASSEMBLER

**3.17** The generic tape cartridge contains the operational programs and data which are the same in each office. In addition to the generic data, all office-dependent data, unique in each office, must be developed and installed. Office data includes translation data and reflects unique office equipment and connections in addition to trunks and routing.

**3.18** All office-dependent data is developed by the Office Data Assembler System (ODA). The ODA is an off-line processing system which compiles all office data from various input forms, validates the information and formats the data into the indexes, blocks, and tables required by the generic program. The output of this process is then placed on a tape cartridge to be used in a No. 3 ESS office.

**PROGRAM LISTINGS (PRs)**

**3.19** A program listing is a hard-copy record of a program which states the objectives of the program, lists all instructions, and defines all data unique to the program. The listing is one product of the assembly process. There are two types of listings: the standard program listing and a diagnostic program listing. Diagnostic programs are divided into phases, where each phase contains a grouping of tests. Although the formats of each type of listing are different, each is comprised of five sections.

- Prologue section
- Macro definition section
- Data definition section
- Program section
- Cross reference section.

**3.20** In general, the program portion of an assembly level program listing may contain any of the basic 3A language instructions and any number of macros, both library or program types. In most cases, a program can be understood by careful study of the prologue, instruction comments, and data elements; and then by following the various subroutine calls being particularly aware of decisions and branches affecting the programs progress. Much of the detailed data manipulation and computation, which comprises a large portion of code, is not absolutely necessary for a functional understanding of the program's objective.

**3.21** More detailed information on program listings is available in Section 254-340-104.

**RELATED DOCUMENTATION**

**3.22** Software documents applying to the No. 3 ESS other than SSDs and PRs include:

- Program and Documentation Guide—The program and documentation guide (PG) is an index of the program documents (such as PRs, Input/Output Manuals, Trouble Locating Manuals) associated with a given generic.

- Program Application Instruction—The program application instruction (PA) contains specifications for such items as office data tables layout or translations.
- Program Load Map—The program load map (PK) is a list of all programs in the system together with their starting and ending addresses. Other PKs are available dealing with No. 3 commands, network trouble shooting, maintenance reference, and miscellaneous alarms.
- Input/Output Message Manuals—The input manual (IM) and output manual (OM) lists all the teletypewriter messages used in the No. 3 ESS.
- Trouble Locating Manual—The trouble locating manuals (TLMs) are maintenance documents which supplement the OM to aid in locating troubles within system units.

**4. NO. 3 ELECTRONIC SWITCHING SYSTEM SOFTWARE**

**GENERIC ISSUES**

**4.01** ♦There are currently two generic issues for No. 3 ESS identified as SO-2 and the 3E3. The SO-2 generic issue requires a minimum of 98,304 program words for generic program only while the 3E3 requires a minimum of 163,840 program words. Additional memory is required depending on translations, etc. Actual equipped memory is also dependent upon which equipment version (32K versus 128K main store modules) is installed. Each generic can process traffic from up to 15 concentrator groups or 4500 subscriber lines.♦

**PROGRAM STRUCTURE OVERVIEW**

**4.02** The No. 3 ESS programs are controlled under a structure designed primarily to handle call processing requirements of the office, but in addition, provide for other operational and maintenance functions. Under normal operating conditions, an executive control program is responsible for the orderly scheduling and execution of all programs. It schedules, on a cyclical basis, a string of programs, most of which are primarily concerned with the processing of calls.

**4.03** The No. 3 ESS stored program is comprised of the common systems division and the applications division. The common systems division consists of programs used by any ESS equipped with a 3A CC. The applications division consists of programs written to perform tasks specifically for the No. 3 ESS.

**4.04** Stored programs are either resident or nonresident.

- The resident programs are stored in the write protected portion of the MAS of the 3A CC processor. These programs include most call processing programs and some administrative (eg, TTY) and maintenance programs (eg, fault detection, recovery programs).
- The nonresident programs are stored on cartridge tape and are transferred to the MAS as required. These remaining administrative (eg, traffic, most recent change programs) and maintenance (e.g., diagnostics) programs are not used for the normal operation of the system and are requested from the tape as required. The tape also includes a backup of all main store memory data and past translation data. The software program required by the trunk and line test panel was made a resident program in 3E3.

**4.05** Subroutines are used extensively to provide for efficient use of the main store. The subroutine is a short group of instructions which performs a specific task. Control is passed by the requesting program/subroutine to the called program (subroutine) until completion of the task, at which time control is returned and normal processing continues.

**4.06** The No. 3 ESS programs operate time-shared in base level loop, timed and demand interrupt modes. Depending on priorities, interrupts break in to perform necessary work, after which control is returned to the program that was operating when the interrupt occurred.

#### A. Base Level Functions

##### Base Level Loop

**4.07** The base level loop is a set of major programs which administer call processing, provide

traffic information, and maintain software accuracy. In addition, required maintenance functions are performed, and nonresident software programs are scheduled to perform their function once they are requested (Fig. 3). These major programs are executed sequentially in a continuous loop (normally requiring approximately 100 to 200 milliseconds depending on office activity). Approximately 80 percent of the loop time is used for call processing and audit programs. The remaining 20 percent of the base time is used to collect plant and traffic data and to perform the base level monitor functions (maintenance, nonresident, and multiscan functions).

#### Base Level Transient Call Record (TCR) Scan

**4.08** A TCR is a block used to store data such as control information, terminal and path information, and receiving/sending data applicable to a call in the transient state (undergoing call

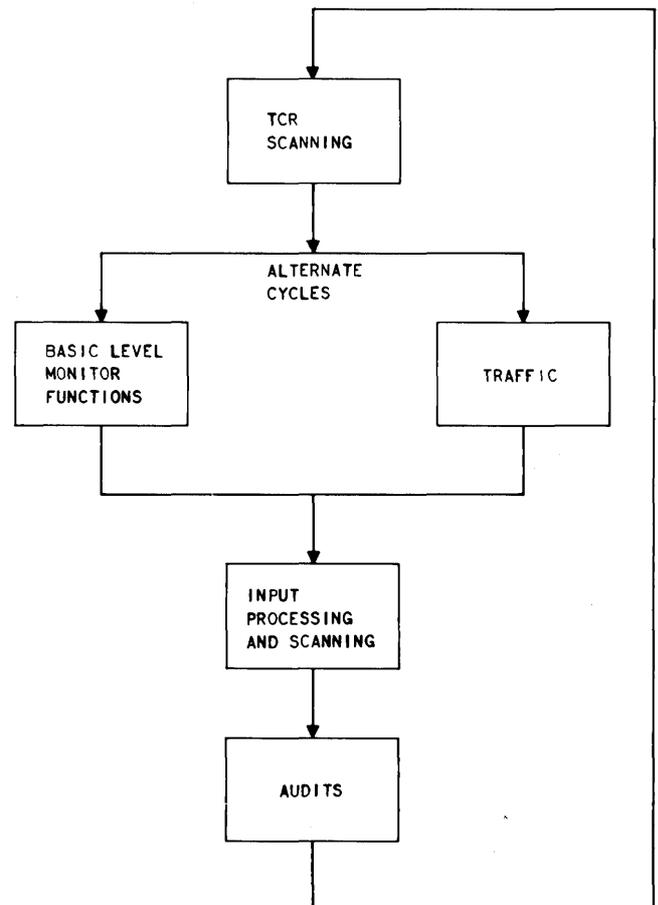


Fig. 3—Base Level Loop

## SECTION 233-150-100

processing functions). The TCRs of calls being processed are all scanned at base level and when necessary a branch is made to appropriate routines. These routines perform various call handling, equipment selection, and translation functions. ♦Scan and distribute orders are not necessarily executed at the interrupt level. Peripheral actions required to operate the network controller are initiated at base level and stored in a network controller queue for processing during the 10ms timed interrupt level. ♦

### Base Level Monitor Functions (Traffic Measurements)

**4.09** After the base level TCR scan, other noncall processing related base functions are performed. Traffic and plant measurements are performed on alternate loops with base level monitor functions. The base level monitor functions include:

- System state detector critical audits
- System status panel controller
- Multiscan functions (ie, call trace, off-line store update, certain maintenance and diagnostic tasks)
- Timing functions
- Tape handler
- Teletype handler
- Common system utilities.

### Input Processing

**4.10** Reports of state changes of lines, trunks, junctors, and service circuits previously detected and entered into hoppers are processed by comparing the present state to the previous state. An analysis of the comparison indicates that an origination, disconnect, or a hit has occurred. At this point, processor overload control and dynamic

service protection are implemented if required. On a line origination, the input processing programs perform the following, as required:

- Hit timing
- Base level loop time test
- Dynamic service protection
- Obtain a TCR from the common pool
- Obtain translation data
- Obtain an idle customer dial pulse receiver (CDPR) of the proper type and a connecting network path to it
- Place an indication in the TCR for a subsequent routine to obtain dial tone.

### Audits

**4.11** The base level loop is considered to start at the TCR scan and end with the deferrable routines. The end of the base level loop is a strategic point to control loop timing. Audits and maintenance functions are run in quantities necessary to maintain the minimum base loop time.

### B. ♦3E3 Base Level Loop

**4.12** The 3E3 base level loop (Fig. 4) for the 3E3 generic has been improved to include two major changes. First, the major components of the base level loop routines are reordered so that all maintenance work is performed after normal call processing tasks have finished. Secondly, a dispatcher controls the deferrable maintenance (the multiscan functions, call processing audits, and main store audits). The dispatcher runs these jobs in a "waste time" mode which will allow these jobs to run faster than the unconditional one-transfer-per-scan mode used in the S0-2 generic.

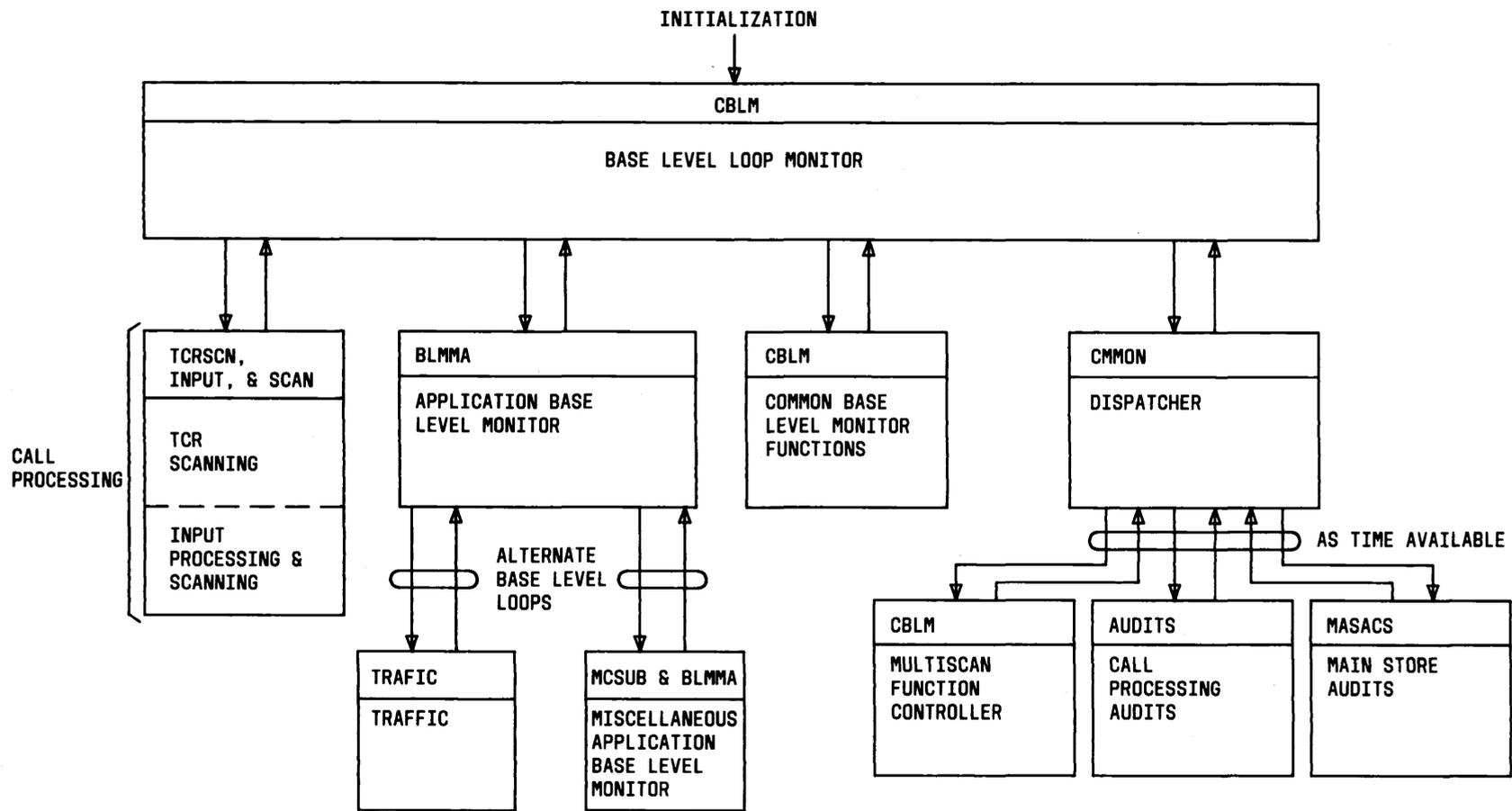


Fig. 4—3E3 Base Level Loop

### General Scheduler

**4.13** The general scheduler executes out of the CBLM time monitor in CMMON and controls the sequential execution of routines defined by MMONA. The manner in which this is done is flexible and convenient since the program is designed to interface with the client programs through their TTY entry points.

**4.14** The scheduler can be thought of as a system of tables since the order and conditions for the execution are all presented in table forms. There are three levels of tables: Master table, Major sequence, Minor sequence table.

### Dispatcher

**4.15** The dispatcher is a real time task dispenser for the class of routines generally thought of as deferrable. The dispatcher is given control after the more critical nondeferrable work has completed in each base level loop. When time remains in the base level loop, the dispatcher executes the deferrable routines (jobs) based on defined preferences. These deferrable jobs, together with associated parameters such as job preference/priority and minimum rate of repetition, are defined in a table called JOBADDR in MMONA. When the system is temporarily overloaded and no time remains in the base level loop, the dispatcher skips the job. However, skipped jobs which fall behind a performance schedule are automatically given priority and/or forced regardless of system conditions.

**4.16** The deferrable jobs controlled by the dispatcher include all major audits and multiscan functions. While the amount of time taken by a routine on each transfer is beyond the control of the dispatcher, the average time taken by deferrable jobs is between 2 and 5 msec.

### C. Interrupts

#### Timed

**4.17** The base loop is periodically interrupted every 10 ms for the performance of higher priority, time-dependent tasks that require execution more frequently than once every loop interval. The timed interruption period is normally once every 10 ms. All functions performed during the

timed interrupt interval (Fig. 5) are call processing related. These include:

(a) Receiver Scan—The supervisory and tone present scan points associated with the CDPs are interrogated for the detection and analysis necessary to receive dial pulses, TOUCH-TONE®, and multifrequency tones.

(b) Trunk Receiving—Dial pulse trunks are scanned and digits collected, counted, and stored in the TCR.

(c) Network Processing—The network queue is processed and network orders are issued for calls requiring such actions.

(d) Fast Trunks Scan—Immediate start trunks such as operator and step-by-step may start to in-pulse without notice and require scanning at the interrupt level to avoid missing any pulses. One quarter of the immediate start trunks are scanned during each timed interrupt. This results in a 40ms scan rate.

(e) Directed Trunk Scan—Programs processing outgoing interoffice calls load an interrupt hopper at base level with scan point numbers of trunks to be scanned for the output of delay-dial or wink-start signals. Timing is performed on detected signals to discern possible circuit hits.

(f) Timing Hopper Processing—Timing periods required by circuits to respond (real-time breaks) are required between commands issued by the software to the circuits. This hopper is processed during the interrupt level, timers are decremented, and appropriate software is invoked to perform peripheral action for any TCRs that have timed out. As an example, one of the major real-time breaks during call processing will be used for the performance of power-cross and false-cross-and-ground tests prior to closing network paths.

**4.18** After the interrupt level has completed its allocated work, control is returned to the base level loop which continues from the point at which it was interrupted.

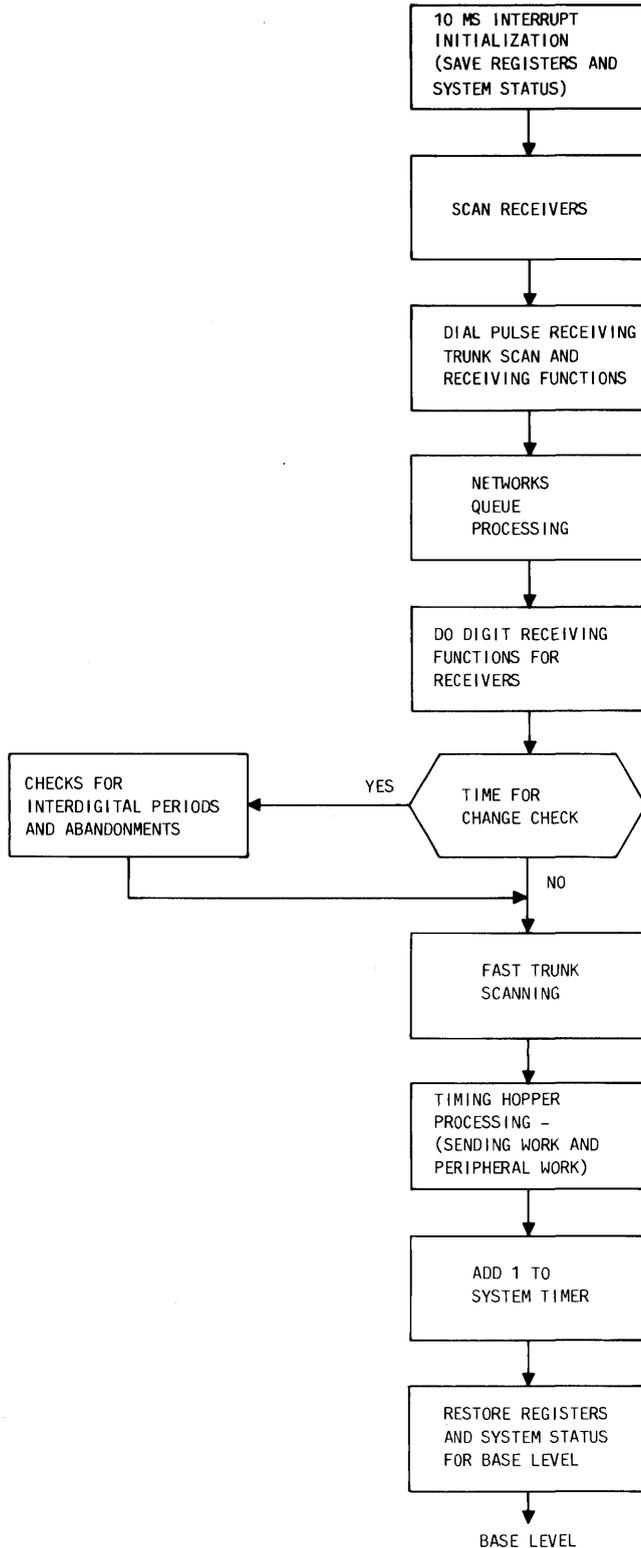


Fig. 5—Timed Interrupts

**Demand Interrupts**

4.19 Those system functions which require immediate attention and which must be serviced before the execution of the next program instruction are referred to as demand interrupts. A demand interrupt is processed immediately upon occurrence; some even if the program loop is in a timed interrupt sequence. The demand interrupts are:

- Maintenance channel interrupt
- Tape cartridge interrupt
- Teletype input occurrence
- Break character received during teletype output
- ♦AMA sending data to AMARC♦
- Maintenance interrupt initiated by mismatches between the on-line and off-line control units, or some peripheral I/O errors.
- ERROR register set conditions
- Manual CC panel executions.

**5. ORGANIZATION OF SOFTWARE SUBSYSTEM DESCRIPTIONS (SSDs)**

**GENERAL**

5.01 Figures and tables are referenced and described in this part to:

- (a) Describe the organization and assignments of SSDs under the individual major system software functions
- (b) Provide program references to facilitate access to more detailed information.

An explanation of each table and figure is given in the following paragraphs.

**FUNCTIONAL PROGRAM CATEGORIES**

5.02 The No. 3 ESS programs are functionally identified by three categories (Fig. 6).

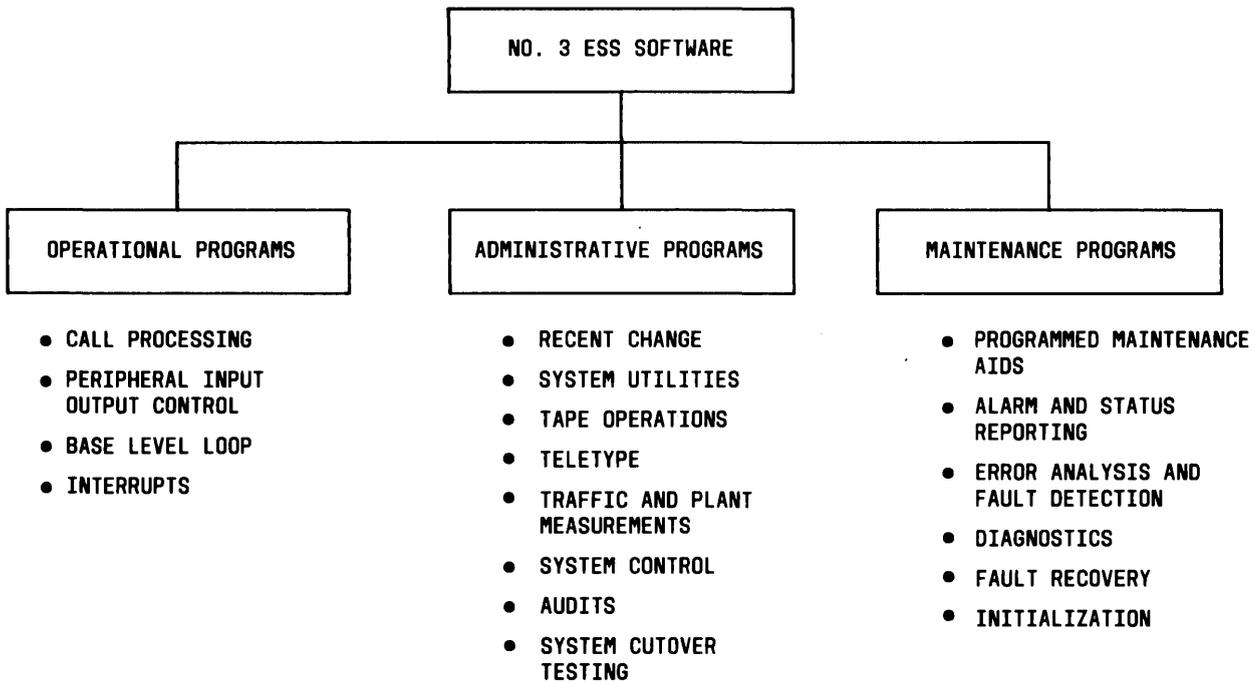


Fig. 6—No. 3 ESS Functional Listing of Programs

- (1) Operational—The operational software includes functions which control office traffic processing under normal operating conditions.
- (2) Administrative—The administrative software performs the functions which are related to office operations such as an automatic means for changing office parameters and initiating service orders, audits, tape handling, and TTY operation.
- (3) Maintenance—Software and hardware are arranged to detect service-affecting troubles by making the appropriate per-call checks or by performing maintenance checks on the hardware. The maintenance programs perform the functions related to detection, diagnosis, and reaction to abnormal office operation.

and associated information. The three levels of SSD documentation are:

- (a) System Level—One system level SSD is provided as an introduction both to the system software and the overall set of SSD documentation.
- (b) Major Control Structure Level—This level may contain SSDs describing a major function or subset of the total generic. Section 233-151-105, Call Processing, is an example of this level SSD for No. 3 ESS.
- (c) Software Subsystem Program Functional Level—This level comprises the body of the SSD documentation and is related to subfunctional divisions of the previous level.

**FUNCTIONAL ORGANIZATION OF SSDs**

5.03 There are three functional SSD levels (Fig. 7). In addition, a fourth set of support information is provided to describe the programming languages

In general, interrelated programs, which serve the same function, are covered in one SSD; otherwise the programs are assigned to separate SSDs.

5.04 The first five digits of the SSD numbers have been assigned to show the breakout

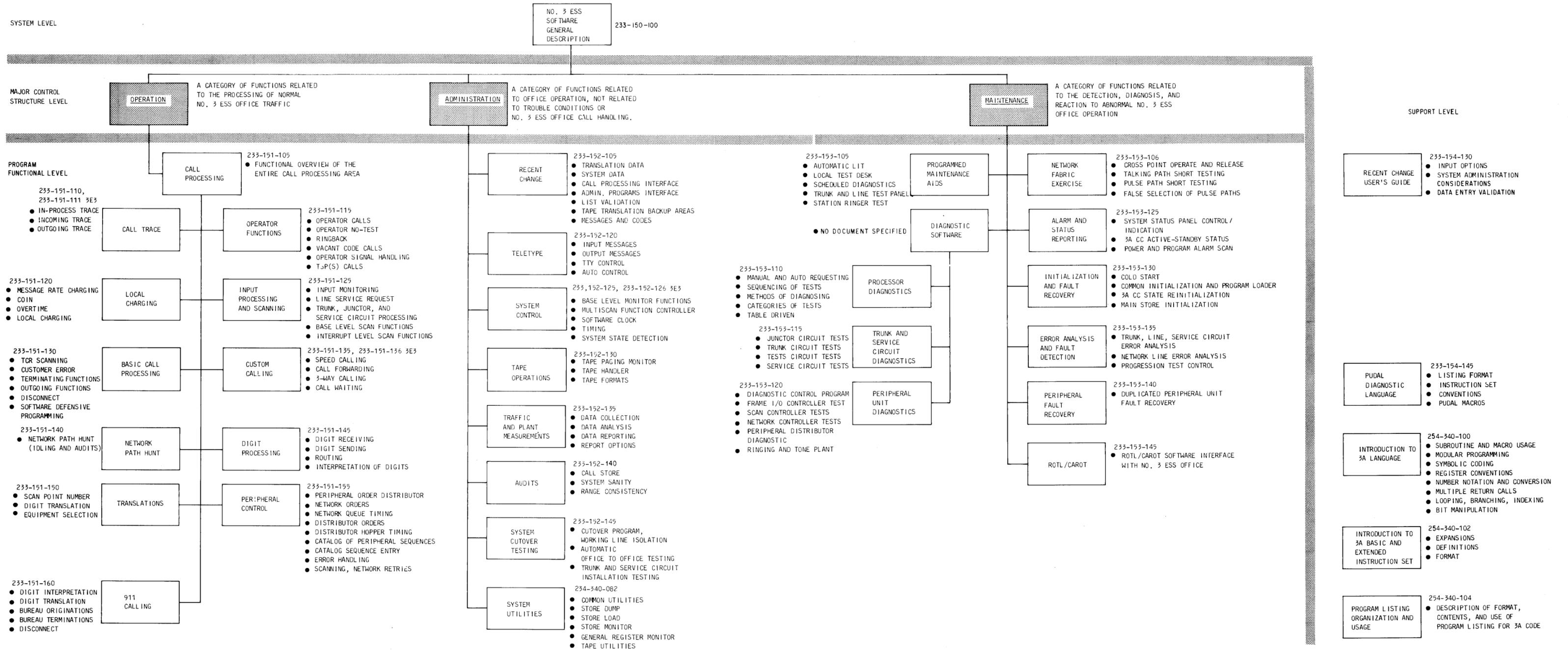


Fig. 7—Functional Organization of No. 3 ESS Software Descriptions



of 3A Processor and No. 3 ESS programs as follows:

NUMBER	DESCRIPTION
233-15X-YYY	No. 3 ESS Program/Documents
254-340-YYY	3A Processor Program/Documents

The Y digits may be any digit from 0 through 9. The X digit designates the functional portion of No. 3 ESS SSDs as follows:

- 0—General Description
- 1—Operational Software Structure
- 2—Administrative Software Structure
- 3—Maintenance Software Structure
- 4—Support Documents.

#### CONTENT DESCRIPTIONS OF SSDs

5.05 Table A provides brief descriptions of:

- (a) The major software functions covered in each SSD
- (b) In general terms, the content of each software support document.

#### LISTING OF PROGRAMS

5.06 Table B identifies the program names and numbers of programs within the SO-2 and 3E3 generic. Because programs may be added or deleted for different issues of the generic, the PG should be referenced for an up-to-date listing of programs.

#### RELATED SUPPORT INFORMATION

5.07 In addition to the listing of programs contained in Table B and the SSD content references in Table A, additional software-related information is listed in Table C.

TABLE A

CONTENT DESCRIPTIONS OF SSDs

SSD NO.	TITLE/SOFTWARE FUNCTION	MAJOR CONTENTS
233-151-105	Call Processing	Describes, in a generalized functional overview, the entire call processing software.
233-151-110	Call Trace (SO-2)	Describes software used to determine the source of threatening or nuisance calls and to identify lines in emergency situations.
233-151-111	Call Trace (3E3)	Describes the software required to perform call tracing operations in a No. 3 ESS office.
233-151-115	Operator Functions	Describes the processing of calls to an operator as well as operator trunk requests for action such as multiple winks and inband signals.
233-151-120	Local Charging	Describes the software which does charging for local calls, message rate service charging, and coin control functions.
233-151-125	Input Processing and Scanning	Describes the software which scans lines, trunks, junctors, and service circuits for service requests and supervisory state changes and the software which processes these inputs and distributes them to other routines for further processing.
233-151-130	Basic Call Processing	Describes in detail the programs performing transient call record scanning, call terminating functions, ringing and answer supervision, outgoing call functions, disconnect functions, customer error processing, and software defensive processing.
233-151-135	Custom Calling (SO-2)	Describes the software which handles the custom calling features like speed calling, call forwarding, conference, and call waiting.
233-151-136	Custom Calling (Generic 3E3)	Describes the software that handles custom calling features; speed calling, call forwarding, call waiting, threeway calling.
233-151-140	Network Path Hunt	Describes the software required for network path hunting, path idling, and network auditing functions.
233-151-145	Digit Processing	Describes the digit processing software involved with digit receiving and sending, interpretation of digits, and routing of calls to the appropriate call processing software.
233-151-150	Translations	Describes the software involving scan point number translation, digit translations, equipment selection, and class-of-service information.
233-151-155	Peripheral Control	Describes the software controlling the peripheral functions such as the processing of orders to the periphery.

TABLE A (Contd)

## CONTENT DESCRIPTIONS OF SSDs

SSD NO.	TITLE/SOFTWARE FUNCTION	MAJOR CONTENTS
233-151-160	911 Emergency Bureau Service	Describes the software used in reporting an emergency or requesting emergency assistance via dialing the 3-digit telephone number (911).
233-152-105	Recent Change Processing and Translation Data	Describes programs handling recent change messages and codes, translation data, system data, call processing interfaces, verify routines, administrative programs interfaces, service denials, and tape translation backup areas.
233-152-120	Teletypewriter	Describes programs that deal with the processing of input messages from the TTY, formatting and processing output TTY messages, TTY control, and autoconnect capabilities.
233-152-125	System Control	Describes software which controls the sequencing of all programs and contains such major functions as system state detection, system status panel control, multiscan function control, and time monitoring.
233-152-126	System Control 3E3 Generic	Describes the software required for system control for the No. 3 Electronic Switching System (ESS).
233-152-130	Tape Operations	Describes the software required to perform tape operations. Areas include: tape format, tape handler functions, paging functions, and tape "Client" program interfacing.
233-152-135	Traffic and Plant Measurement	Describes the programs concerning traffic data collection, analysis, reporting options, and reporting.
233-152-140	Audits	Describes programs performing system and temporary store cleanup functions to maintain consistency in the system.
233-152-145	Cutover Tests	Describes the software tests performed during the cutover interval.
233-153-105	Programmed Maintenance Aids	Describes the software programs developed to perform tests on crosspoints, line insulation, stations, trunks, and lines to be used as an aid in maintaining a No. 3 ESS office.
233-153-106	Network Fabric Exercise	Describes the software program required to test the input switch, output switch, test vertical, and junctor switch crosspoints.
233-153-115	Trunk Test, and Service Circuit Diagnostics	Describes the software used to assist in locating faults in either trunk or service circuit tests.

TABLE A (Contd)

## CONTENT DESCRIPTIONS OF SSDs

SSD NO.	TITLE/SOFTWARE FUNCTION	MAJOR CONTENTS
233-153-120	Peripheral Unit Diagnostics	Describes the software used to assist in locating faults in one of the following units: Frame Input/Output Controller Network Controller Peripheral Pulse Distributor Ringing and Tone Plant Scanner Controller Tape Data Controller Teletypewriter Controller
233-153-125	Alarm and Status Reporting	Describes the software which reports changes in equipment or system status or the occurrence of an alarm producing condition. This software is dependent on client programs for input.
233-153-130	Initialization and Processor Fault Recovery	Describes the software utilized during the initialization and fault recovery process of the 3A CC and its memory.
233-153-135	Error Analysis and Fault Detection	Describes the software programs which direct the detection and analysis of faults occurring during call processing and network peripheral sequences.
233-153-140	Peripheral Unit Fault Recovery	Describes the software programs which perform recovery actions after a fault has occurred in one of the peripheral units.
233-154-130	Recent Change User's Guide	Describes the recent change messages and provides procedures for implementing recent changes in the No. 3 ESS office.
233-154-135	Recent Change Users 3E3 Generic	Describes the recent change messages and provides procedures for implementing recent changes in a No. 3 ESS office with an Issue 3E3 generic program.
233-154-145	Peripheral Unit Diagnostic Assembly Language	Describes the peripheral unit diagnostic assembly language (PUDAL) and its operation and control with respect to the No. 3 ESS.
254-340-082	System Utilities	Describes the software used for loading, storing, and/or monitoring various registers and memory locations and for tape utility functions.
254-340-088	Processor Diagnostics	Describes the software used to assist in locating control unit faults as well as ensuring operational integrity on a routine basis. Also describes the processor diagnostic language macros used in programming the diagnostic tests.

TABLE A (Contd)

## CONTENT DESCRIPTIONS OF SSDs

SSD NO.	TITLE/SOFTWARE FUNCTION	MAJOR CONTENTS
254-340-100	Introduction to 3A Language	Describes the language, methodology, conventions, and supporting information used to program the 3A processor.
254-340-102	Introduction to 3A Basic and Extended Instruction Set	Description of format, function, options, and execution time for each 3A instruction.
254-340-104	Program Listing Standards and Usage	Description of format, contents, and use of program listings.

TABLE B

PR	NAME	PROGRAM TITLE
<b>COMMON SYSTEMS PROGRAMS</b>		
1C910	CDGNM	Common Diagnostic Monitor
1C911	CDGDSR	Double Store Read Test
1C912	CDGMCH	MCH, Gating Bus, Clock and Register Initialization Test
1C913	CDGTO	To and From Field Crosspoint Test
1C914	CDGMLT	Multiple Crosspoint Tests
1C915	CDGREG	Register Gating Tests
1C916	CDGMIC	Microstore Content Test
1C917	CDGFN	Data Manipulation Logic (DML) Tests
1C918	CDGS3A	Off-Line Store Diagnostic Code
1C919	CDGMC1	Micro Control Tests
1C920	CDSFA1	DS and PA+ 1 Adder Tests
1C921	CDGMSQ	Store Bus Controller Tests
1C922	CDGSIO	Store IO Access Test
1C923	CDGSMX	Store Multiplex Circuit Test
1C924	CDGSBS	Store Bus Communication Test
1C925	CDGSFA	Store Fanout Boards Test — Part A
1C926	CDGSFB	Store Fanout Boards Test — Part B
1C927	CDGSWP	Store Write Protect Test
1C928	CDGSON	Interprocessor Store Bus Test
1C929	CDGSD	Memory Element Test
1C930	CDGMI	Micro Interpret, Multiple Crosspoint, and Parity Check Tests
1C931	CDGNTI	Timing Counter, Interrupt, Address and Data Matcher, and IO Tests
1C932	CSTATS	System Status Bits, Switching and System Status Panel Tests
1C933	CDGNOF	Off-Line Diagnostic Code
1C934	CDGSCP	Store Control and Parity Test
1C935	CDGSDF	Store Controller Data Register Test
1C950	CBLM	Common Base Level Monitor
1C952	CINIT	Common Initialization
1C953	CIPL	Common Initial Program Loader
1C954	CNRUTL	Common Nonresident Utilities
1C955	CPAGM	Common Tape Paging Monitor
1C956	CSYSUB	Common System Subroutine
1C957	CTAPH	Common Tape Handler
1C958	CTAPM	Common Tape Maintenance
1C959	CTSD	Common Temporary Store Definition
1C962	CUTIL	Common Utilities
1C963	CMMON	Common Maintenance Monitor Program <sup>1</sup> *
1C968	CTC	Common System Temporary Change Area <sup>3</sup>
1C970	CPATCH	Common Patch Area <sup>2</sup>
1C981	CTVTAB	Common System BSAI Transfer Vectors
<b>RESIDENT ADMINISTRATION PROGRAMS</b>		
3H000	ATC	Application Temporary Change Program <sup>2</sup>
3H001	AUDB	Audit Programs
3H002	AUDITS	Audit Monitor, Audit Subroutines, and Some Audit Programs
3H003	AUDNET	Network Audit Program

\* See Footnote References at end of Table.

TABLE B (Contd)

PR	NAME	PROGRAM TITLE
<b>RESIDENT ADMINISTRATION PROGRAMS (Contd)</b>		
3H004	BLMMA	Application Portion of Base Level Monitor
3H005	CTRACR	Resident Portion of the Call Trace Program
3H006	INITA	Allocation Portion of the Initialization Programs
3H007	RCWTE	Recent Change — Translation Store Modification Subroutines
3H008	TRAFIC	Traffic and Plant Measurements
3H009	TVTAB	Transfer Vector Table
3H010	APATCH	Application Patch Area <sup>2</sup>
3H011	ATSD	Application Temporary Store Definition
3H012	CTTYH	Application Version of Common TTY Handler Program
3H013	CTTYT	Application Version of Common TTY Tables
3H014	MASACS	Main Store Access Routines
3H015	TTYAPP	Compatibility Package for Common System TTY
3H016	T1AREA	TTY Phrase Table and Word Dictionary Definitions
3H017	TRSUBS	Traffic Subroutines
3H018	TDATA	Translations Data
3H203	MMONA	Maintenance Monitor Application Program <sup>1</sup>
<b>NONRESIDENT ADMINISTRATION PROGRAMS</b>		
3H020	ADMCON	Administrative Functions Control Programs
3H021	CDISUB	Code Index Print Subroutine
3H022	COPYLC	Line Class Code Translation Update Program
3H023	CUT	Cutover Program
3H024	CVTSUB	Data Conversion Subroutines
3H025	LCSUB	Line Class Code Table Access Routine
3H026	LINSUB	Verify Line — Utility Subroutine
3H027	LNKSUB	Linked Output Message Subroutine
3H028	MEMSUB	Group Member Print Subroutine
3H030	OPDATA	Office Data File Update Program
3H031	PBXSUB	Print PBX/MLH Group Data
3H032	PRTSUB	Line Print Subroutine
3H034	RCBTN	Recent Change — Define Group of One Thousand Numbers as Billing Number
3H035	RCCDI	Recent Change — Code Index Expansion Entries
3H036	RCCFN	Recent Change — Call Forwarding
3H037	RCCHI	Recent Change — Charge Index
3H038	RCCKT	Recent Change — Trunk or Service Circuit
3H039	RCDIG	Recent Change — Define 1- or 6- Digit Code
3H040	RCDP	Recent Change — Define or Remove a Peripheral Decoder
3H041	RCGRP	Recent Change — Define Features for Trunks or Service Circuits
3H042	RCLCC	Recent Change — Line Class Code
3H043	RCLINE	Recent Change — Line Service Orders
3H044	RCMLHG	Recent Change — Multiline Hunt Group Information
3H045	RCMOVE	Recent Change — Subroutines to Move Data
3H046	RCMPTY	Recent Change — Multiparty Line Service Order
3H047	RCMTL	Recent Change — Multiline Hunt Group Terminal Information
3H048	RCNG	Recent Change — Number Group Definition
3H049	RCODIG	Recent Change — One-Digit Translator
3H050	RCOE	Recent Change — Specify Miscellaneous Terminal Equipment

TABLE B (Contd)

PR	NAME	PROGRAM TITLE
<b>NONRESIDENT ADMINISTRATION PROGRAMS (Contd)</b>		
3H051	RCOFIC	Recent Change — Office Identification Parameters
3H052	RCPCH	Recent Change — Specify Punching of Customer-Dialed Changes
3H053	RCREAD	Recent Change — Subroutines to Load Translation Data Into Translation Buffer
3H054	RCRTI	Recent Change — For Route Indices
3H055	RCSCN	Recent Change — Change a Speed Calling List
3H056	RCSCR	Recent Change — Screening Class Expansion Entry
3H057	RCSP	Recent Change — Miscellaneous Scan Point Definition
3H058	RCSUB	Recent Change — Subroutines
3H059	RCTOTA	Recent Change — Specify Terminal Office Test Access Number
3H060	RCTTY	Recent Change — TTY Definitions
3H061	RCTWOP	Recent Change — Two-Party Line Service Orders
3H062	RCZERO	Recent Change — Zero Incorrect Office Data
3H063	RTISUB	Route Index Printing Subroutines
3H064	SCFSUB	Verify Call Forwarding and Speed Calling
3H065	SNGSUB	Single Line Output Message Subroutine
3H066	VRCFN	Verify Call Forwarding Telephone Number
3H067	VRCIRI	Verify Code Index and Route Index Translations
3H068	VRDATE	Verify Data of Translation Files
3H069	VRDIG	Verify 1 Digit — 6 Digit Translation
3H070	VRFATD	Verify Search Type Foreign Area Translation Default Code Index
3H071	VRGRP	Print Group and Member Data for Trunk or Service Circuit
3H072	VRLINE	Verify Line Translations
3H073	VRLSTR	List Route Indices Pointing to a Trunk Group
3H074	WRTSUB	Recent Change — Resident Translation Store Modification Subroutines
3H075	VRLST3	List 3-Digit Codes Pointing to a Route Index
3H076	VROCDN	List Normalized Office Codes with Office Data
3H077	VRSCN	Verify Speed Calling
3H078	VRTHDI	Verify Thousands Digit Translation
3H079	CTRACN	Call Trace Program — Nonresident
3H080	OFR	Office Records
3H081	OTOTST	Office to Office Test Program
3H082	TRKSUB	Trunk Group Data Print Subroutines
3H083	VRLSTO	List Working Terminals (OEs) in a Concentrator
3H084	VRSCR	Verify Screening Table
3H085	VRLCC	Verify Line Class Table Store on Tape
3H086	NRTRAF	Nonresident Traffic Routines
3H087	RCCLS	Recent Change Class of Service
3H088	RCG TSA	Recent Change Trunks, Service Circuits, and Multiline Hunt Groups Traffic Assignments
3H089	RCINCP	Recent Change — Intercepts
3H090	RCQDUM	Recent Change — Quarter Hourly Report
3H091	RCQH	Recent Change — Quarter Hourly Schedules
3H092	RCREPT	Recent Change — Traffic Report Schedules
3H093	RCSCHE	Recent Change — Schedule Assignments
3H094	ATCA	Auxiliary Application Temporary Change Program <sup>2</sup>
3H095	CTC	Common Systems Temporary Change Program <sup>2</sup>
3H096	DTC	Common Systems Diagnostic Temporary Change Program <sup>2</sup>

TABLE B (Contd)

PR	NAME	PROGRAM TITLE
<b>NONRESIDENT ADMINISTRATION PROGRAMS (Contd)</b>		
3H097	FILPUB	Read and Write Subroutines for Office Record Generation
3H098	CAUDIT	Custom Calling Audit Program
3H099	PCHSUB	Punch Customer Dial Changes <sup>2</sup>
3H100	RMKSUB	Office Records — Remark Subroutines
3H101	OFRTSD	Office Records — Temporary Store Definition
3H102	PRTSBO	Office Records — Print Data Collection Subroutines
3H104	F171	Office Records — 3171 Form
3H105	OFRUTL	Office Records — Tape Dumping and Clearing Routines
3H106	DISTR	Reallocation — Miscellaneous Subroutines
3H107	DSTABT	Reallocation — DIST:ABT Message
3H108	DSTCDI	Reallocation — DIST:CDI Message
3H109	DSTCF	Reallocation — DIST:CF Message
3H110	DSTEXP	Reallocation — DIST:EXP1 Message
3H111	DSTM	Reallocation — DIST:MR Message
3H112	DSTNG	Reallocation — DIST:NG Message
3H113	DSTODG	Reallocation — DIST:ODIG Message
3H114	DSTPRC	Reallocation — DIST:PRECUT Message
3H115	DSTRTI	Reallocation — DIST:RII Message
3H116	DSTSCL	Reallocation — DIST:SCRCLS Message
3H117	DSTSCN	Reallocation — DIST:SCAN Message
3H118	DSTSCT	Reallocation — DIST:SCR TBL Message
3H119	DSTSW	Reallocation — DIST:SW Message
3H120	DSTTOT	Reallocation — DIST:TOTANI Message
3H121	DSTUPD	Reallocation — DIST:UPD Message
3H122	DSTAMA	Reallocation — DIST:AMA Message
3H123	DSTCLB	Reallocation — DIST:CALLBK Message
3H124	DSTCNT	Reallocation — DIST:CNTRIP Message
3H125	DSTDIG	Reallocation — DIST:DIG Message
3H126	DSTPCH	Reallocation — Miscellaneous Patch Area <sup>1</sup>
3H127	DSTCOD	Reallocation — DIST:COD — Message <sup>1</sup>
3H129	DSTGRP	Reallocation — DIST:GRP Message
3H130	DSTSBL	Reallocation — DIST:SBIL Message
3H131	DSTSC3	Reallocation — DIST:SC30 Message
3H132	DSTSC8	Reallocation — DIST:SC8 Message
3H133	DSTCAC	Reallocation — DIST:CAC Message <sup>1</sup>
3H134	DSTLCC	Reallocation — DIST:LCC Message <sup>1</sup>
3H135	OPOFR	Office Records — TTY Input/Output Processing Routines <sup>1</sup>
3H136	VRMRI	Verify Contents of Software Message Register <sup>1</sup>
3H137	ORGRP	Misc. Routines to Collect PBX/TRK/SVC Group Information <sup>1</sup>
3H138	OFR24	Office Records — 24 Hour Program <sup>1</sup>
3H139	F105	Office Records — 3105 Form <sup>1</sup>
3H140	F201	Office Records — 3201 Form <sup>1</sup>
3H141	F2021	Office Records — 3202-1 Form <sup>1</sup>
3H142	F2023	Office Records — 3202-3 Form <sup>1</sup>
3H143	F204	Office Records — 3204 Form <sup>1</sup>
3H144	F302	Office Records — 3302 Form <sup>1</sup>
3H145	F400	Office Records — 3400 Form <sup>1</sup>
3H146	F209	Office Records — 3209 Form <sup>1</sup>

TABLE B (Contd)

PR	NAME	PROGRAM TITLE
<b>NONRESIDENT ADMINISTRATION PROGRAM (Contd)</b>		
3H210	OPSTAT	Miscellaneous Line Statistics Program <sup>1</sup>
3H147	F500	Office Records — 3500-1 Form <sup>1</sup>
3H148	F505	Office Records — 3505 Form <sup>1</sup>
3H199	CDCHG	Customer-Dialed Change Program <sup>1</sup>
<b>CALL PROCESSING PROGRAMS (RESIDENT)</b>		
3H150	COIN	Coin Clean-up Routines
3H151	CUSTER	Customer Error Program
3H152	CUSTOM	Custom Calling Program <sup>2</sup>
3H153	DIGPRO	10 Millisecond Interrupt Program — Digit Receiving and Sending
3H154	DISCON	Disconnect Progress Mark
3H155	DNTRP	Digit Interpretation Progress Marks
3H156	EMERG	911 Service Program
3H157	EQPSEL	Equipment Selection Subroutines
3H158	FALTCR	Call Failure Program
3H159	FASTTK	Fast Trunk Scan Program
3H160	INPUT	Input Monitor Program
3H161	LCLCHG	Local Charge — Coin and Message Register
3H162	LNORIG	Line Origination Program
3H163	NTCONN	No-Test Trace Connection Program
3H164	OPER	Operator Call Program
3H165	OUTCAL	Outgoing Call Program
3H166	PATHNT	Network Path Hunt, Busy and Idle
3H167	PCAT	Catalog of Peripheral Control Sequences
3H168	POINT	Peripheral Order Interpreter
3H169	POPS	Peripheral Order Subroutines
3H170	PSUBS	Peripheral Network Subroutines
3H171	OTMON	Network Queue and Timing Hopper Monitor
3H172	RING	Ring and Answer — Completion of Intraoffice Calls
3H173	SCANS	Base Level Scanning Programs
3H174	TCRSCN	Base Level TCR Scan
3H175	TERM	Completion of Incoming and Intraoffice Calls
3H176	TKORIG	Trunk Origination Program
3H177	TKPROC	Trunk, Junctor, and Service Circuit Input Processing
3H178	TVADM	Test Vertical Status Administration Program
3H179	XSLSPN	Scan Point Number Translation Program
3H180	XSLSUB	Basic Translation Subroutines
3H181	XSL3DB	3-Digit Translation Program
3H182	XSL4DG	4-Digit Translation Program
3H183	STATIM	Stable Timing of TCRs and TMRs
3H184	TREWAY	3-Way Calling
3H185	TRUNKS	Initialize Status of Incoming Trunks
3H186	ABM	AMA Buffer Management Program
3H187	AMA	Automatic Message Accounting Program
3H188	SPDCAL	Speed Calling Activation and Initiation <sup>1</sup>
3H189	CL4WRD	Call Forwarding Activation and Initiation <sup>1</sup>
3H190	CALLW8	Call Waiting Tone Application <sup>1</sup>
3H191	CW8STB	Stable Call Waiting Monitor <sup>1</sup>

TABLE B (Contd)

PR	NAME	PROGRAM TITLE
<b>CALL PROCESSING PROGRAMS (RESIDENT) (Contd)</b>		
3H192	DCSUB1	Disconnect Subroutines — Part 1 <sup>1</sup>
3H193	DCSUB2	Disconnect Subroutines — Part 2 <sup>1</sup>
3H194	TCRDSC	Transient Call Record Disconnect Routine <sup>1</sup>
3H195	DLYTIM	Charge Delay Timing Routine <sup>1</sup>
3H196	NTSUBS	No Test Connection Subroutines <sup>1</sup>
3H197	RROANN	Remote Recorded Overload Announcement <sup>1</sup>
3H204	ADMPAT	Administration Paged Patch Program <sup>1</sup>
3H205	OPEXP	Output Count of Expansion Blocks Program <sup>1</sup>
3H206	OPMTCH	Output Multiple Assignments for Lines <sup>1</sup>
3H207	CLRDEL	Clear Previously Scheduled Office Record Requests <sup>1</sup>
3H208	OPDEL	Output Previously Scheduled Office Record Requests <sup>1</sup>
3H209	OPFEA	Output Main Station Feature Counts <sup>1</sup>
3H211	RCPAT	Recent Change Patch Program <sup>1</sup>
3H212	RCTLU	Recent Change Terminal Line Usage <sup>1</sup>
3H213	RCCAC	Recent Change Country Code <sup>1</sup>
3H219	NWCEA	Remreed Network Error Analysis <sup>1</sup>
3H220	F301	Office Records — 3301 Form <sup>1</sup>
3H221	F890	Office Records — 3890-R Form <sup>1</sup>
3H222	F300	Office Records — 3300 Form <sup>1</sup>
3H223	F306	Office Records — 3306 Form <sup>1</sup>
3H224	F304	Office Records — CDI Form <sup>1</sup>
3H225	F307	Office Records — 3307 Form <sup>1</sup>
3H226	F303	Office Records — 3303 Form <sup>1</sup>
3H227	F5003	Office Records — 3500-3 Form <sup>1</sup>
3H228	F501	Office Records — 3501 Form <sup>1</sup>
3H229	F506	Office Records — 3506 Form <sup>1</sup>
3H230	F576	Office Records — 3576 Form <sup>1</sup>
<b>RESIDENT MAINTENANCE PROGRAMS</b>		
3H200	ROTLA	ROTL Access Handler <sup>1</sup>
3H201	ROTL C	ROTL Communications Handler <sup>1</sup>
3H202	ROTL T	ROTL Trunk Test Handler <sup>1</sup>
3H250	ACPORT	Autoconnect Port Control Program
3H251	MCSUB	Maintenance Subroutines
3H252	MTTYC	Resident TTY Message Program
3H253	OFFTL	Office Test Line Handler
3H254	PURC	Peripheral Controller Fault Recovery
3H255	PWSC	Power and Alarm Scan
3H256	TSVEA	Trunk, Line, Service Circuit and Network Line Error Analysis
3H257	TSVREQ	Trunk, Line, Service Circuit and Network Link TTY Message Handler
3H258	TSVSUB	Maintenance Subroutines for Replicated Circuits and Lines
3H259	TTYMAP	TTY Message Administration Programs
3H260	SCSUBS	Application Conversion Subroutines
3H261	TSVIOM	Trunk and Service Circuit IMOM Program
3H262	DATADM	Data Administration Program
3H263	OPTRF	Output Traffic Counts <sup>1</sup>
3H310	ALIT	Line Insulation Test <sup>3</sup>
3H311	LTDH	Local Test Desk Handler <sup>3</sup>

TABLE B (Contd)

PR	NAME	PROGRAM TITLE
		<b>RESIDENT MAINTENANCE PROGRAMS (Contd)</b>
3H316	SRTH	Station Ringer Test Program <sup>3</sup>
3H317	TLTPC	Trunk and Line Test Panel <sup>3</sup>
		<b>NONRESIDENT MAINTENANCE PROGRAMS AND TEST DATA TABLES</b>
3H265	DCNSUB	Diagnostic PUDAL Statement Execution Subroutines
3H266	DCON	Diagnostic Control Program
3H267	FIOCT	Frame I/O Controller Diagnostic
3H268	NTCT	Network Controller Diagnostic
3H269	PPDT	Peripheral Pulse Distributor Diagnostic
3H270	RTPT	Ring and Tone Plant Diagnostic
3H271	SCNT	Scanner Control Diagnostic
3H272	TTYT	TTY Controller Diagnostic
3H312	MNRSUB	Maintenance Nonresident Miscellaneous
3H313	NFEX	Network Fabric Exercise
3H314	MAUD	Maintenance Audits
3H318	TSVMON	Trunk and Service Circuit Maintenance Aids Programs
3H319	TSVNR	Trunk, Line & Service Circuit Nonresident Routines
3H320	NWGRID	Network Grid Utility Programs
3H321	GRDUTL	Grid Removal Utility Subroutines
3H322	MNRPCH	Patch Area for Non-Resident Maintenance Programs
		<b>TRUNK AND SERVICE CIRCUIT DIAGNOSTICS</b>
3H280	CCCT	Coin Control Circuit Test
3H281	CDPRT	Customer Dial Pulse Receiver Tests
3H282	CNPLT	Continuity and Polarity Test Circuit
3H284	EMTWT	2-Way E&M Trunk Test
3H285	SUPRT	Superimposed Ringing Circuit Test
3H286	JCTRT	Junctor Circuit Test
3H288	MFRT	Multifrequency Receiver Test
3H289	MFTT	Multifrequency Transmitter Test
3H290	MWLAT	Milliwatt and Transmission Environment Test Circuit Test
3H291	ORBT	Outgoing Reverse Battery Trunk Test
3H292	RACT	Recorded Announcement Tests
3H293	RRCT	Regular Ringing Circuit Test
3H294	TDPTT	Dial Pulse Transmitter Circuit Test
3H295	TPDT	Tone Present Test Circuit Tests
3H297	TTRT	Trunk Operational and Transmission Tests
3H298	TVCT	FCG, PC, RV and Test Vertical Circuit Tests
3H299	TONET	Tone Circuit Tests
3H300	TPCCT	Three Port Conference Circuit Tests
3H301	CHEDUM	Diagnostic Paging Buffer Fill Program

*Notes:*

1. Added for 3E3 Generic; not in SO-2 Generic
2. Present for SO-2 Generic; not in 3E3 Generic Resident
3. Resident in 3E3 Generic; nonresident in SO-2

**TABLE C**  
**RELATED SUPPORT INFORMATION**

<b>TROUBLE LOCATING MANUALS</b>	
<b>NUMBER</b>	<b>TITLE (PROGRAM MNEMONIC)</b>
TLM-3H100	Frame I/O Controller (FIOCT)
TLM-3H101	Scanner Controller (SCNT)
TLM-3H102	Peripheral Pulse Distributor (PPDT)
TLM-3H103	Network Controller (NTCT)
TLM-3H104	Ringing and Tone Plant (RTPT)
TLM-3H105	TTY Controller (TTYT)
TLM-3H110	Overall Trunk and Service Circuit TLM
TLM-3H111	Customer Dial Pulse Receiver (CDPRT)
TLM-3H112	Superimposed Ringing Circuit (SUPRT)
TLM-3H113	Multifrequency Receiver (MFRT)
TLM-3H114	Multifrequency Transmitter (MFTT)
TLM-3H115	Test Vertical Circuit (TVCT)
TLM-1C900	Common Systems Processor Trouble Locating Manual
TLM-1C904	Common Systems Tape Data Controller Trouble Locating Manual
<b>OTHER DOCUMENTS</b>	
<b>NUMBER</b>	<b>TITLE</b>
IM-3H300	Input Message Manual
OM-3H300	Output Message Manual
PA-3H303	Office Data Tables Layout Specifications
PG-3H903	Documentation Guide for Generic 3E3
PK-1C900	Maintenance Reference Manual (Common Systems)
PK-1C901	Command Manual
PK-3H300	Load Map
PK-3H301	Network Trouble Shooting Manual
PK-3H302	Miscellaneous Fixed Alarms