SH20-1043-4

Program Product

Customer Information Control System (CICS) System Programmer's Reference Manual

Program Nos. 5736-XX6 (DOS-ENTRY)
5736-XX7 (DOS-STANDARD)
5734-XX7 (OS-STANDARD V2)

The IBM Customer Information Control System (CICS) is a transaction-oriented, multiapplication data base/data communication interface between a System/360 or System/370 operating system and user-written application programs. Applicable to most online systems,CICS provides many of the facilities necessary for standard terminal applications: message switching, inquiry. data collection, order entry, and conversational data entry.

CICS is available in three systems – two for DOS users and one for OS users. Because the two CICS/DOS systems are compatible with each other and with the CICS/OS system, it is possible to start with a small data base/data communication configuration and move up through DOS into OS.

This manual provides information essential for persons who have the responsibility to define, prepare, and administer CICS in the environment it supports.

IBM

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This edition is a major revision obsoleting SH20-1043-3.

This edition applies to Version 1, Modification Level 1, of the CICS/DOS-ENTRY (5736-XX6) and CICS/DOS-STANDARD (5736-XX7) program products and to Version 2, Modification Level 3, of the CICS/OS-STANDARD (5734-XX7) program product; it also applies to all subsequent versions and modifications unless otherwise indicated in new editions or Technical Newsletters.

If changes are made to the information herein, the edition that is applicable and current will be indicated in the latest System/360 and System/370 SRL Newsletter (GN20-0360).

Copies of this and other IBM publication can be obtained through IBM branch offices.

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PREFACE

This publication contains detailed information necessary to implement three IBM program products: CICS/DOS-ENTRY, CICS/DOS-STANDARD, and CICS/OS-STANDARD V2. It provides system programmers, system analysts, and system administrators with information that is primarily independent of the operating system involved; for example, the use of CICS macro instructions to selectively generate CICS management programs and service programs and selectively prepare system control tables and service tables. It is assumed that the reader of this publication has some knowledge and/or experience concerning the Basic Telecommunications Access Method (BTAM) or has access to persons with such knowledge and/or experience.

This publication should be used in conjunction with the appropriate CICS Operations Guide when generating CICS and when preparing the system tables that describe the environment CICS is to support.

Throughout this publication, parentheses are used in the notation of CICS macro instructions to indicate those operands where more than one applicable parameter can be specified with a single use of the operand. Where parentheses are not used, only one parameter at a time can be specified as part of the operand. An asterisk in (card) column 72 indicates that the macro instruction is continued on the next line (card). The first operand on a continuation card must begin in column 16.

The words "transaction" and "task" have the same connotation in CICS and are used interchangeably throughout this publication; the processing of a transaction may involve the execution of one or more "programs".

For further information concerning CICS, see the following IBM publications:

General Information Manual (GH20-1028)
Application Programmer's Reference Manual (SH20-1047)
Terminal Operator's Guide (SH20-1044)
Operations Guide (CICS/DOS) (SH20-1034)
Operations Guide (CICS/OS) (SH20-1048)
Logic Manual (CICS/DOS-ENTRY) (LY20-0712)
Logic Manual (CICS/DOS-STANDARD) (LY20-0713)
Logic Manual (CICS/OS-STANDARD V2) (LY20-0714)

All references to CICS/OS and CICS/OS-STANDARD in this publication are references to the CICS/OS-STANDARD V2 system.

Note: Information in this publication concerning TCAM and 3735 support is applicable only to the CICS/OS system.

CONTENTS

INTRODUCTION

The IBM Customer Information Control System (CICS) is a multi-application data base/data communication interface between OS or DOS and user-written application programs. Applicable to most online systems, CICS provides many of the facilities for standard terminal applications: message switching, inquiry, data collection, order entry, and conversational data entry.

Functions performed by CICS include:

- Control of a mixed telecommunications network
- Concurrent management of a variety of programs
- Controlled access to the data base
- Management of resources for continuous operation
- Prioritization of processing

By eliminating many of the development requirements for such functions of a real-time control system, CICS allows programmers to concentrate instead on implementing applications, dramatically reducing implementation time and cost.

Functions needed to support a data base/data communication system and standard terminal applications are provided by the following CICS management programs:

- Task Management - Provides the dynamic multitasking facilities necessary for effective, concurrent transaction processing. Functions associated with this facility include priority scheduling, transaction synchronization, and control of serially reusable resources.

- Storage Management - Controls main storage allocated to CICS. Storage acquisition, disposition, initialization, and request queuing are among the services and functions performed by this component of CICS.

- Program Management - Provides a multiprogramming capability through dynamic program management while offering a real-time program fetch capability.

- Program Interrupt Management - Provides for the interception of program interrupts by CICS to prevent total system termination. Individual transactions that program check are terminated by CICS with a dump (if Dump Management is used), thus preventing the entire CICS partition/region from terminating. Under CICS/OS, supports the runaway task control function of CICS Time Management.

- Time Management - Provides control of various optional task functions (system stall detection, runaway task control, task synchronization, etc.) based on specified intervals of time or the time of day.

- Dump Management - Provides a facility to assist in analysis of programs and transactions undergoing development or modification. Specified areas of main storage are dumped onto a sequential data set, either tape or disk, for subsequent offline formatting and printing using a CICS utility program.

- Terminal Management - Provides polling according to user-specified line traffic control as well as user requested reading and writing.

This facility supports automatic task initiation to process new transactions. Optionally, the user can request that certain lines be under control of TCAM (rather than BTAM) in which case polling and other netwcrk control functions are performed by the Message Contrcl program (MCP) residing in another partition/region. The testing of application programs is accommodated by the simulation of terminals through sequential devices such as card readers, line printers, disk, tape, etc.

- File Management - Provides a data base facility using direct access and indexed sequential data management. This function supports updates, additions, random retrieval, and selective retrieval (browsing) of logical data on the data base. Optional access to the Data Language/I (DL/I) facility of the IBM Information Management System (IMS/360) is also provided under CICS/OS. Use of DL/I requires the installation of the IMS/360 Version 2, Modification Level 2 (or later) Data Base System (5734-XX6).

- Transient Data Management - Provides the optional queuing facility for the management of data in transit to and from user-defined destinations. This function facilitates message switching, data collection, and logging.

- Temporary Storage Management - Provides the optional general purpose "scratch pad" facility. This facility is intended for video display paging, broadcasting, data collection suspension, conservation of main storage, retention of control information, etc.

In addition to these management functions, CICS provides system service programming to identify terminal operators, to give dynamic ccntrol of the entire system to a master terminal, to display real-time system statistics, to intercept abnormal conditions not handled directly by the operating system, and to end operation by gathering summary statistics, closing data sets, and returning control to the operating system.

GENERAL DESCRIPTION

THE REAL-TIME SYSTEM ENVIRONMENT

The real-time data base/data communications (DB/DC) environment is characterized by a number of factors which distinguish it from the conventional batch processing environment. For example, the system programmer must be aware of considerations inherent to the real-time system environment, such as:

- Transactions are not batched by type, but arrive randomly.
- Online data storage is expensive, so that storing redundant subsets of data is an undesirable approach to providing the data access required by other applications and programs.
- Sorting and scanning data prohibits the rapid access needed by a single transaction.
- A number of transactions can simultaneously try to change the same data.
- A terminal user may attempt an unauthorized access of confidential data.
- A (software) recovery capability is required to prevent data losses.

REAL-TIME SYSTEM PROGRAMMING

The real-time data base/data communications environment (DB/DC) differs from the traditional batch processing environment primarily in the amount and types of concurrent activities that are likely to occur within the system at a given time. Whereas a batch processing system schedules each application independently and provides data support unique to each application, a DB/DC system controls many transactions arriving on a random nonscheduled basis and provides a data base (with integrated data) supporting each application.

In the conventional batch processing environment, the application programmer plans a series of runs to edit batches of input transactions, update master files, and write output reports. To optimize total run time and streamline the cycle, he must concentrate on careful manipulation of data. In accomplishing this, the data becomes intricately tied to his program logic and is of little value in other applications.

CICS solves many of these complexities by managing data centrally in a data base on behalf of all applications. This relieves the application programmer of system management considerations, allowing him to concentrate instead on the application, and shifts the responsibility for an integrated data base to the system programmer.

As an effective interface, the system programmer must organize all the data and optimize its storage, making tradeoffs between cost of storage, performance, and service level according to management guidelines. The DB/DC system has a common data set (data base) manager, and usually provides the system programmer with specialized interfaces.

PREPARING THE SYSTEM

CICS is modularly designed to allow the user to configure a data tase/data communications system appropriate to his needs. While some of the system components are essential, many are optional and can be configured into the system under user control.

CICS modularity allows the user to:

1. Include or omit functions or components.
2. Replace or extend a function or component.
3. Evolve and expand the support of the user's environment.
4. Conduct maintenance on a component level.
5. Bring the most current individual components together at execution time to support the desired environment.

To assist the user in tailoring the system to meet his needs, source code is distributed to the user which must be assembled to provide the specific functions and components the user desires. The detailed instructions in preparing the system from the distributed machine-readable material is contained in the appropriate CICS Operations Guide.

SYSTEM GENERATION

CICS provides a system generation facility whereby the user can define what CICS-provided functions or components he desires as well as certain variables he wants included. The system is then generated according to that description.

CICS provides ten executable management programs which can be selected and generated by the user to perform the following functions:

1. Task Management
2. Storage Management
3. Program Management
4. Program Interrupt Management
5. Time Management (Interval Control)
6. Dump Management
7. Terminal Management
8. File Management
9. Transient Data Management
10. Temporary Storage Management

In addition to the managment programs, a number of system service programs (which run as application programs) can be generated. The service functions which these programs provide are:

1. Sign on/sign off
2. Master terminal
3. Supervisor terminal
4. Operator terminal
5. System statistics
6. Abnormal condition handling
7. Terminal abnormal condition handling
8. Asynchronous Transaction Processing
9. System termination
10. Terminal test
11. Time of day control

Two utility programs can also be generated. These are the Dump Utility program for formatting and printing the dumps (produced during execution), and the High-Level Language Preprocessor which is used to prepare the ANS COBOL and PL/I application programs for execution under CICS. In the CICS/DOS systems, a special linkage-editor facility is also generated for use in preparing the object modules for execution.

An optional user-defined Common Work Area (CWA) is provided as an extension of the Common System Area (CSA) in static main storage. This work area is available for the use of all user-written programs and can be used to contain user-defined data (which is not to be altered by CICS) such as tables, accumulators, and sequence numbers. The length of the CWA must be specified during system generation.

The details concerning how to use the DFHSG macro instruction to generate the system are provided in the System Generation section of this manual. The necessary JCL is detailed in the appropriate CICS Operations Guide.

SYSTEM TABLE PREPARATION

CICS is table-oriented. This feature gives the user flexibility in describing his terminal, data base, and queuing environments. It allows him to describe several versions of existing environments, simplifying evolution and growth to new environments. Because of the table orientation, the user need change only that part of his environment that needs to be changed.

All tables are specified and constructed by the user with assistance provided by CICS. These tables are declarative in nature and are used by CICS to control the environment according to the design criteria established by the user. Major tables are used to describe System Initialization and terminal, data set, and queuing environments. Other tables identify user programs, transactions, operators, etc.

Detailed information on the contents of these tables and the macro instruction used to prepare them are provided in the section "System Table Preparation".

The Process Control Information field (PCI) is an optional user-defined terminal work area which is provided as an extension of the Terminal Control Table (TCT) in static main storage. The PCI is associated with a particular TCT terminal entry (TCTTE) and is available for the use of all user-written programs that are logically attached to that TCTTE. The PCI can be used to contain user-defined data (which is not to be altered by CICS) such as user statistics and sequence numbers.

The PCI is a variable-length field (0-255 bytes) which is specified during system generation. For CICS/OS, PCI's of fixed length (15 bytes) may also be specified during system generation for the purpose cf upward compatiblity from CICS/OS-STANDARD V1 to CICS/OS-STANDARD V2. The length of the PCI is specified during preparation of the TCT.

SYSTEM MAINTENANCE

Because CICS is both modular and table-oriented, maintenance is simplified considerably. If a change in the user's environment should occur which, in turn, requires a change to a CICS management program and/or table, only the affected program or table needs to be generated again. This, of course, is also true of any corrections that must be applied to the system. To make a correction to a particular program only the source code for that program needs to be updated, using the appropriate operating system update facility, and then reassembled and link edited.

SYSTEM DATA SET CONSIDERATIONS

The access methods and record content of the system data sets are predefined within CICS. Any required formatting is performed by CICS during system initialization or by the maintenance functions. For space considerations and requirements, see the appropriate CICS Operations Guide.

The system data sets (files) include:

- Real-Time Relocatable Program Library
- Real-time Pre-Located Program Library
- Transaction Rollout Data Set
- Dump Data Set
- Intrapartition Data Set
- Temporary Storage Data Set

Real-Time Relocatable Program Library

The Real-Time Relocatable Program Library contains all user programs and CICS programs to be loaded and executed in real-time including the control system itself and certain user-prepared System Control Tables. The library contains program text and, where applicable, a relocation dictionary for each program. The contents of this library are asynchronously fetched into main storage for real-time execution in the CICS/DOS-STANDARD and CICS/OS-STANDARD systems by the Program Control Program. This library is not used for real-time execution in the CICS/DOS-ENTRY system.

For the CICS/DOS-STANDARD system, the Real-Time Relocatable Program Library is a user allocated extent. Programs are prepared for this library by DFHLINK. For the CICS/OS-STANDARD system, the Real-Time Relocatable Program Library is a standard partitioned data set. Programs are prepared for this library by the OS Linkage Editor. CICS/OS users may concatenate other private libraries to this library.

Real-Time Pre-Located Program Library

The CICS Real-Time Pre-Located Program Library is used in the CICS/DOS-ENTRY system to retain the nonresident application programs during real-time execution. All application programs, so designated by the user, are loaded into main storage by the CICS System Initialization program and are written into the library for subsequent fetch and refresh. The Processing Program Table in main storage serves as the directory for this library.

Transaction Rollout Data Set

The Transaction Rollout data set (file) is used in the CICS/DOS-ENTRY system to retain certain transaction information in order to support conversational interaction with a terminal. The types of transaction information that may be expected to be rolled into this data set include:

1. Task Control Area
2. Transaction Work Area
3. User-acquired work areas
4. File, Temporary Storage, Transient Data input/output areas, work areas, and control areas
5. Register storage areas
6. Loaded programs

Dump Data Set

The optional dump data set is used by the Dump Control program to record dumps of transactions within the system. It is a sequential data set located on either magnetic tape or direct access and can be subsequently formatted and printed by the CICS Dump Utility program.

CICS provides the capability to open/close the active dump data set during the real-time execution of the system. Optionally, the user can define two dump data sets (DFHDMPA and DFHDMPB), alternating between them during real-time execution of CICS.

Intrapartition Data Set

The Intrapartition data set is a system option and is used for the queuing of user data and, optionally, CICS data by the Transient Data Control program (CICS's general purpose queuing facility). Data, as requested, is stored chronologically into this data set according to previously identified symbolic destinations for subsequent retrieval when all applicable system conditions and facilities are in the appropriate status. This data set is reusable and is required for applications such as message switching, broadcasting, order distribution, etc. The record format for this data set is standard System/360 variable length.

Temporary Storage Data Set

The Temporary Storage data set is a system option, and should be allocated, if required, by the user as general purpose scratch pad storage for use by the Temporary Storage Control program. User data, as requested, is stored into this data set under a dynamically-provided symbolic identification for subsequent retrieval and release (when appropriate). This data set is intended for applications such as broadcasting, video display paging, transaction suspension, main storage conservation, etc. This data set consists of variable-length records within a preformatted fixed-length DAM data set record and is required if the "time ordered" autcmatic task initiation feature of CICS is generated.

USER DATA BASE CONSIDERATIONS

CICS File Management allows the user a high degree of flexibility when defining the structure of his data base. Individual data sets (files) within the data base can be accessed under control of the Direct Access Method (DAM) or the Indexed Sequential Access Method (ISAM). The following optional CICS features allow certain variations in data organizaticn to provide the user with the most efficient data base structure suitable to his environment.

Segmented Records

CICS stores data in and retrieves data from the user's data sets. It is possible to retrieve an individual record or selected segments of an individual record. A segmented record is one in which the components of the record have been identified and grouped according to frequency of use, function, and logical relationship. The identifiable groups are called segments. Some segments are in all records, such as those that contain identification or major record control fields. Other segments apply only in certain records. The primary reason for segmenting records is to conserve main storage, or, in the case of variable-length records, to conserve direct access storage.

If additional information is to be included in a segmented record, either a new segment is created or an existing segment is altered. In either case, only the affected segment descriptions need be changed and the new programming added to support the change. Symbolic references to unchanged segments are not affected. Adding information to a fixed format record could require considerably more programming than using the segmented record approach.

The user must define the record segments to CICS. In addition, each record to be retrieved in segments must have control information in the first segment which is used to indicate the presence or absence of each segment. A segment should contain logically related data so that only selected segments are required to satisfy the processing requirements of a transaction. A transaction that uses only selected record segments requires less main storage for its processing.

The user, in selecting those segments necessary for processing transaction groups, identifies them to CICS as a part of the data set (file) definitions in the File Control Table. Such a group of segments is a segment set. A segment set can include a single segment, a number of segments, or all segments of a record. When a request is made to File Control identifying a segment set in the request, CICS always returns the header control segment plus the segments in that set.

Segmented records can be used with either DAM or ISAM data set organizations. For further details concerning segmented records, see "Data Base Considerations" in the _CICS Application Programmer's Reference Manual_ (SH20-1047).

Deblocking Services for DAM Data Sets

CICS provides deblocking of logical records which are blocked and written on a direct access (DAM) data set. This service is provided for both fixed- and variable-length records. The data set must be created according to standard System/360 record formatting conventions.

Indexed Data Sets - Indirect Accessing

CICS (optionally) allows the use of cross-index data sets to access another data set which may be the main data set or another level of index data set. If a record retrieved from a cross-index data set indicates multiple entries in the main data set, information is returned to the user-written application programs to be used in selecting the appropriate main data set entry. When the cross index does not indicate multiple entries in the main data set, the File Control program reads the requested record from the main data set.

Organization of the cross-index data set may be either indexed sequential or basic direct access. The index record contains, in addition to the information used to find it, the search argument for the record on the data set which the index data set references. The index record may contain any other information desired by the user. The location of the search argument, its length, and the data set identification for the referenced data set are supplied to CICS as part of the data set definitions in the File Control Table. For further details concerning indirect accessing, see "Data Base Considerations" in the _CICS Application Programmer's Reference Manual_ (SH20-1047).

DOS ISAM Variable-Length Records

The CICS/DOS systems support the retrieval and static update (no length variation) of variable-length logical records within fixed-length blocks under an ISAM organization. These pseudo-variable blocks must conform to System 360/370 variable-length record format conventions. That is, the first four bytes must contain the block length of the form LLbb. Since all blocks are fixed length, this value will be the same for all blocks. Each logical record within the block must reflect the length of the record in the first four bytes (LLbb). A logical record may not be continued onto the next block. The first byte of any unused portion of a block must contain a hexadecimal FF.

The addition and deletion of records on a DOS ISAM variable-length record data set must be handled by the user in an offline batch environment. When creating the data set, it must be defined as fixed unblocked, and the key for each block must be the same as the last logical record in that block. The block size must be an even number of bytes. All records must reside in the prime data area; no overflow records are allowed. For details concerning the CICS definition of a DOS ISAM variable-length record data set, see the discussion of the File Control Table in the section "System Table Preparation".

Data Language/I Data Sets

Optional access to the Data Language/I (DL/I) facility of the IBM Information Management System (IMS/360) requires the installation of the IMS/360 Version 2, Modification Level 2 (or later) Data Base System (5734-XX6).

As CICS is initialized, an IMS batch job is attached (via OS) as an OS subtask of CICS in much the same fashion as a regular IMS system is executed as an OS job. All data sets required for a batch IMS job are required for access to DL/I under CICS.

USER EXTRAPARTITION DATA SETS

Extrapartition data is the name given in CICS to transient stream data which is coming into or going out of the data base/data communication system environment. This data is usually coming from or going to high-speed magnetic devices and is characterized by, but not required to be, blocked, variable-length stream data. The extrapartition disposition facility is intended for use with the following types of data and applications:

1. Message logging
2. Transaction logging
3. Reconstruction records and information
4. Data collection
5. Data entry

and all other output stream data intended for subsequent processing (usually offline). The user defines this data consistent with his requirements and facilities. The extrapartition acquisition facility is intended for limited stream (batch-like) data processing in the data base/data communication environment.

USER EXITS

Exit routines may be provided by the user to extend or add functions to CICS management programs. All CICS management program exits are included at the source level and are assembled with the management program during system generation. The user exits provided for are as follows:

CICS MANAGEMENT PROGRAM	USER EXIT
Task Control (DFHKCP)	Before request analysis Before task dispatch
Storage Control (DFHSCP)	Before request analysis
Program Control (DFHPCP)	After program load
Interval Control (DFHICP)	Before request analysis At expiration of time interval
Terminal Control (DFHTCP)	Before transaction attach Before output event initiation After input event completion
File Control (DFHFCP)	Before service request analysis Before output event initiation Before input event initiation After input event completion
Transient Data Control (DFHTDP)	Before service request analysis Before output event initiation After input event completion
Temporary Storage Control (DFHTSP)	Before service request analysis Before output event initiation After input event completion

For further information concerning user exits, see the discussion of the individual CICS management programs in the section "System Generation"; see also the section "Creating User Exits for CICS Management Programs".

EXECUTING THE SYSTEM

CICS is designed to bring together at execution time the most current individual compcnents to support the environment requirements present at that time. Through the use of the appropriate System Initialization Table and the necessary overrides, any combination of CICS management programs and tables may be loaded and executed. Thus, the user may have a test module and a standard module of any of the various CICS management programs and tables (only one of which may be in main storage for a given execution). He can then execute CICS using the test module; if it dcesn't work satisfactorily, he can execute CICS again using the standard module that he knows is working.

JOB CCNTROL

The job control language (JCL) statements needed to execute CICS varies not only with the operating system environment desired but also with the choice of CICS functions and types of data organization.

Specific examples of JCL can be found in the appropriate CICS Operations Guide.

In a CICS/OS environment, a procedure may be set up so that execution of a "standard" system requires a minimal amount of JCL to be submitted as a job. Only for execution of a test system or for other than the defined standard system would a larger JCL deck be necessary.

In a CICS/DOS environment, the user can elect to use Single Program Initiate (SPI) to activate CICS with a minimal amount of JCL.

SYSTEM INITIALIZATION

The flexibility in specifying which CICS management programs and tables are to be loaded for a particular execution is accomplished through the System Initialization program (DFHSIP). This program is named on the EXEC card in the JCL and is used to accomplish the fcllowing:

1. Load the specified System Initialization Table.
2. Request any overrides that are desired.
3. Load the requested CICS management programs and tables.
4. Initialize tables and areas.
5. Open all required data sets.
6. Load any resident application programs.
7. Pass contrcl to the Terminal Control program (which then executes as the initial task).

TERMINATING THE SYSTEM

System termination is provided for through use of the master terminal transaction (CSMT) and several CICS-provided programs (DFHMTP, DFHSTP, DFHSTKC, DFHSTTD, DFHSTTR). The Termination program (DFHSTP) allows normal completion of transactions currently in progress, prepares statistics, closes data sets, and optionally, takes a dump before exiting to the operating system.

A detailed description of the use of the transaction CSMT in terminating the system is found in the appropriate CICS Operations Guide.

PROCESSING DUMP DATA SETS

The dump data set produced by the Dump Management facility of CICS is a sequential data set, on either magnetic tape or disk, which exists in a semi-processed form. The CICS-provided utility program (DFHDUP) is used to produce the final formatted dump. The user can define an alternate as well as a primary dump data set.

Unless the user chooses to provide an alternate dump data set, DFHDUP must be used only when CICS is not in real-time execution. That is, if the user wishes to print the dump data set, he must first terminate CICS, run DFHDUP, then reinitialize CICS. This may satisfy the user who only requires CICS for a part of the day.

However, for the user who requires CICS operations for a long period of time, an alternate dump data set may be allocated. Thus, at periodic intervals, the user may request, through the CICS Master Terminal switch function, that CICS begin using the alternate dump data set so that the primary data set can be processed by DFHDUP in another partition/region. When the primary data set has been processed, the user may again "switch" back to the primary data set and then process the alternate data set. This procedure can be repeated any number of times. If tapes are being used, this switching procedure causes the old dump tape to be closed and dismounted, and a new tape to be mounted and opened.

If the user switches to the alternate dump data set, then fails to process the primary data set before again switching, the dumps on the primary data set are destroyed by the CICS Dump Management facility when new dumps are recorded.

A detailed description of the use of the Dump Utility program is found in the appropriate CICS Operations Guide.

SYSTEM GENERATION

GENERAL DESCRIPTION

Generation of CICS/DOS is accomplished in three stages: Stage I consists of the assembly of the CICS/DOS generation macro instructions and the preparation of the input for Stage II; Stage II consists of the assembly of the CICS/DOS system; and Stage III consists of the link editing of the non-real-time system and tables used by the System Initialization program to the DOS Core Image Library using the DOS Linkage Editor (LNKEDT) and the link editing of the CICS/DOS real-time system to the CICS/DOS Real-Time Relocatable Program Library (DFHRPL) using the CICS/DOS Linkage Editor (DFHLINK).

Generation of CICS/OS is accomplished in a two-stage operation: (1) assembly of the generation macro statements and (2) the running of the job stream produced by this assembly.

During the generation of CICS, the user must specify the CICS management programs and system service programs he requires to meet his environmental needs. The specification and naming of the desired programs are accomplished through the use of DFHSG system generation macro instructions, which are processed by the Assembler.

The order in which DFHSG macro instructions are specified is not important, except that the first macro instruction specified must be the DFHSG TYPE=INITIAL macro instruction. In the CICS/DOS systems, the DFHSG TYPE=FINAL macro instruction must be the last statement of the system generation input stream preceding the Assembler END statement.

DFHSG macro instructions are written in Assembler language and, as all Assembler language instructions, are written in the following format:

Name	Operation	Operands	Comments
blank or symbol	DFHSG	One or more operands separated by commas	

In this publication, parentheses are used to indicate those operands where more than one applicable parameter (keyword and otherwise) can be specified with a single use of the operand. Where parentheses are not used, only one parameter at a time can be specified as part of the operand; a choice must be made in the case of more than one applicable parameter. Since a blank character indicates the end of the operand field, the operand field must not contain blanks except after a comma on a continued card or after the last operand of the macro instruction. The first operand of a continued card must begin in column 16.

The following operands can be included in the DFHSG macro instruction:

```
DFHSG TYPE=INITIAL,                                            *
      STATUS=FIRST,                                            *
      ASMBLR=Assembler name,                                   *
      TRACE=YES,NO,                                            *
      TIMECTL=YES,NO,                                          *
      DSIZE=number,                                            *
      MPS=YES,NO,                                               *
      JOBNAME=jobname,                                          *
      ACCTID=accounting information,                            *
      PGMERID='programmer's name',                              *
      MSGLVL=0,1,                                               *
      DEVICE=2311,2314,                                         *
      CONDCD=((code,operator),...,(code,operator)),             *
      PRIORTY=nn,                                               *
      MSGCLAS=x,                                                *
      CLASS=jobclass,                                           *
      REGION=(n1K,n2K),                                         *
      PROCNMS=(procedure names),                                *
      DL1=YES,NO,                                               *
      ATP=YES,NO,                                               *
      PREFIX=prefix,                                            *
      TCTUA=(V1COMPAT,VARIABLE)

DFHSG PROGRAM=CSO,                                              *
      MPS=YES,NO,                                               *
      NSD=number,                                               *
      DEVICE=2311,2314,3330,                                    *
      SVC=number,                                               *
      CAA=appendage suffix,                                     *
      V1CMPAT=YES,                                              *
      TCAMSIP=YES

DFHSG PROGRAM=CSS

DFHSG PROGRAM=CSD

DFHSG PROGRAM=CSU,                                              *
      DEVICE=(TAPE,2311,2314,3330)

DFHSG PROGRAM=KCP,                                              *
      CONSEC=YES,                                               *
      RUNAWAY=YES,                                              *
      STALCTL=YES,                                              *
      ENQUEUE=YES,                                              *
      OPSECUR=YES,                                              *
      ICPTIME=YES,                                              *
      ICPAUTO=YES,                                              *
      ICPSYNC=YES,                                              *
      SUFFIX=program suffix,                                    *
      XTYPREQ=symbolic name,                                    *
      XDSPCHR=symbolic name,                                    *
      DEVICE=(2311,2314,3330)

DFHSG PROGRAM=SCP,                                              *
      XTYPREQ=symbolic name,                                    *
      SUFFIX=program suffix

DFHSG PROGRAM=PCP,                                              *
      PCPLOAD=YES,NO,                                           *
      LANG=(COBOL,PL/I),                                        *
      HLLTR=YES,NO,                                             *
      COBOL=(V2,V3,V4,SUBSET),                                  *
      XFETCH=symbolic name,                                     *
      SUFFIX=program suffix

DFHSG PROGRAM=PIP,                                              *
      SUFFIX=program suffix

DFHSG PROGRAM=ICP,                                              *
      RUNAWAY=YES,                                              *
      ICPTIME=YES,                                              *
      ICPAUTO=YES,                                                  *
      ICPSYNC=YES,                                                  *
      SUFFIX=program suffix,                                        *
      XTYPREQ=symbolic name,                                        *
      XICEEXP=symbolic name,                                        *
      DUMMY=YES

DFHSG PROGRAM=DCP,                                                  *
      DEVICE=TAPE,2311,2314,3330,                                   *
      DEVADDR=nnn,                                                  *
      CICSDMP=YES,                                                  *
      SUFFIX=program suffix,                                        *
      DUMMY=YES

DFHSG PROGRAM=TCP,                                                  *
      ACCMETH=(BTAM,BSAM,SAM,BGAM,TCAM),                            *
      DEVICE=(1403,1404,1442,1443,1445,2311,2314,3330,              *
             2501,2520,2540,CRLP,DASD,DISK,TAPE),                   *
      BTAMDEV=(1030,1050,1050D,1053,1130,1130D,2020,2020D,          *
              2260,L2260,2265,2740,2740D,2740-2,2741C,              *
              2741E,2741DC,2741DE,2760,2770,2770D,2780,2780D,       *
              2980/1,2980/2,2980/4,3275,3277,L3277,3284,            *
              L3284,3286,L3286,3735D,7770,SYS/3,SYS/3D,SYS/7,       *
              SYS/7D,S/360,S/360D,S/370,S/370D,TWX,BISYNC),         *
      FEATURE=(AUTOANSW,AUTOPOLL,BUFFRECV,PSEUDOBIN),               *
      ANSWRBK=(EXIDVER,TERMINAL,AUTOMATIC,7770TERM,7770NULL),       *
      INITRL=YES,                                                   *
      LOCKF=YES,                                                    *
      WRAPLST=YES,                                                  *
      BSCODE=(EBCDIC,ASCII,TRANSCODE),                              *
      AUTOTRN=YES,                                                  *
      UCTRAN=NO,(EBCDIC,ASCII),                                     *
      COMPAT=NO,(FORMAT,FULLBUF),                                   *
      FMT2260=(6X40,12X40,12X80,15X64),                             *
      FMT3270=(12X40,24X80),                                        *
      SMI=user character,                                           *
      TAB=YES,NO,                                                   *
      CONVTAB=(ABB,ABC),                                            *
      XATTACH=symbolic name,                                        *
      XOUTPUT=symbolic name,                                        *
      XINPUT=symbolic name,                                         *
      XTCMIN=symbolic name,                                         *
      XTCMOUT=symbolic name,                                        *
      TCM3270=YES,                                                  *
      TCM7770=YES,                                                  *
      BMS=YES,NO,                                                   *
      SUFFIX=program suffix

DFHSG PROGRAM=FCP,                                                  *
      CONSEC=YES,                                                   *
      FILSERV=(INDA,INIS,DAUPD,ISUPD,DAADD,ISADD,INDIRACC,          *
              EXCTL,INSEG,OUTSEG,DABLKNG,VLR,HEXAD,DECAD,           *
              ACTAD,IVBR,LOCATE,IBROWSE,DBROWSE),                   *
      SUFFIX=program suffix,                                        *
      XTYPREQ=symbolic name,                                        *
      XOUTPUT=symbolic name,                                        *
      XINPUT=symbolic name,                                         *
      XINPUTC=symbolic name,                                        *
      DUMMY=YES

DFHSG PROGRAM=TDP,                                                  *
      INTRA=YES,TRANSINIT,                                          *
      EXTRA=(ACQUISITION,DISPOSITION),                              *
      SUFFIX=program suffix,                                        *
      DEVICE=2311,2314,3330,                                        *
      XTYPREQ=symbolic name,                                    *
      XOUTPUT=symbolic name,                                    *
      XINPUT=symbolic name,                                     *
      DUMMY=YES

DFHSG PROGRAM=TSP,                                              *
      DEVICE=2311,2314,3330,                                    *
      SUFFIX=program suffix,                                    *
      XTYPREQ=symbolic name,                                    *
      XOUTPUT=symbolic name,                                    *
      XINPUT=symbolic name,                                     *
      DUMMY=YES

DFHSG PROGRAM=CSA,                                              *
      WRKAREA=number,                                           *
      SUFFIX=program suffix

DFHSG PROGRAM=MTP,                                              *
      TLT=YES,NO

DFHSG PROGRAM=OCP

DFHSG PROGRAM=GAP

DFHSG PROGRAM=HLL,                                              *
      LANG=(COBOL,PL/I),                                        *
      PL1=(O,F)

DFHSG PROGRAM=DDM

DFHSG PROGRAM=ATP,                                              *
      INBUFF=number,                                            *
      OUTBUFF=number

DFHSG TYPE=FINAL
```

Table 1 shows the symbolic names and program codes used during CICS generation in the specification and naming of CICS management programs and system service programs.

Table 1 (Part 1 of 2). Symbolic names and program codes used in system generation

PROGRAM NAME	SYMBOLIC NAME (Note 1)	PROGRAM CODE (Note 2)	PROGRAM TYPE
Terminal Control	DFHTCP (Note 6)	TCP	Control program
3270 Basic Mapping Support	DFHBMSMM	TCP	Service program
Terminal Dependent Control	DFHTDCP	Note 9	Service program
Task Control	DFHKCP (Note 6)	KCP	Control program
File Control	DFHFCP (Note 6)	FCP	Control program
Program Control	DFHPCP (Note 6)	PCP	Control program
Storage Control	DFHSCP (Note 6)	SCP	Control program
Dump Control	DFHDCP (Note 6)	DCP	Control program
Transient Data Control	DFHTDP (Note 6)	TDP	Control program
Common System Area	DFHCSA (Note 6)	CSA	Control program
CICS Dummy CSA	DFHDCSA	Note 10	Control program
Temporary Storage Control	DFHTSP (Note 6)	TSP	Control program
Interval Control	DFHICP (Note 6)	ICP	Control program
Program Interrupt	DFHPIP (Note 6)	PIP	Control program
Dump Utility	DFHDUP	CSU	Service program
CICS/DOS Linkage Editor	DFHLINK	INITIAL	Service program
Master Terminal programs	DFHMTPA	MTP	Service program
	DFHMTPB	MTP	Service program
	DFHMTPC	MTP	Service program
	DFHMTPD	MTP	Service program
	DFHMTPE	MTP	Service program
	DFHMTPF	MTP	Service program
Asynchronous Transaction Processor	DFHATP	ATP	Service program
Asynchronous Transaction Reader	DFHRD1	ATP	Service program
	DFHRD2	ATP	Service program
Asynchronous Transaction Writer	DFHWT1	ATP	Service program
	DFHWT2	ATP	Service program
Asynchronous Transaction Queue Purge	DFHAQP	ATP	Service program
Dynamic Open/Close	DFHOCP	OCP	Service program
Graphic Attention	DFHGAP	GAP	Control program
System Service programs		CSS	Service program
Sign-On	DFHSNP	Note 3	Service program
Sign-Off	DFHSFP	Note 3	Service program
Field Engineering	DFHFEP	Note 3	Service program
Control System Dummy programs		CSD	Control program
Transient Data dummy	DFHTDPDY	Note 4	Control program
Dump Control dummy	DFHDCPDY	Note 4	Control program
File Control dummy	DFHFCPDY	Note 4	Control program
Temporary Storage dummy	DFHTSPDY	Note 4	Control program
Interval Control dummy	DFHICPDY	Note 4	Control program
Control System Operational programs		CSO	Control program
Abnormal Condition	DFHACP	Note 5	Service program
Terminal Abnormal Condition	DFHTACP	Note 5	Service program
Time Adjustment	DFHTAJP	Note 5	Service program
Transmission Error	DFHTEP	Note 5	Service program
System Initialization	DFHSIP	Note 5	Control program

Table 1 (Part 2 of 2). Symbolic names and program codes used in system generation

PROGRAM NAME	SYMBOLIC NAME (Note 1)	PROGRAM CODE (Note 2)	PROGRAM TYPE
System Termination	DFHSTP	Note 5	Service program
System Statistics programs	DFHSTTR	Note 5	Service program
	DFHSTTD	Note 5	Service program
	DFHSTKC	Note 5	Service program
Trace programs	DFHTRP	Note 5	Service program
	DFHTRPDY	Note 5	Service program
7770 Read/Write	DFHRWP70	Note 5	Feature program
7770 Channel/Abnormal End Appendage	DFHCAA70	Note 5	Appendage
7770 SVC	DFHDEB70	Note 5	SVC
DL/I Interface	DFHDLI	Note 11	Feature program
DL/I Interface dummy	DFHDLIDY	Note 4	Feature program
DL/I Initialization	DFHDLA	Note 11	Feature program
DL/I Application	DFHDLQ	Note 11	Feature program
DL/I CALL Execution	DFHDLE	Note 11	Feature program
High-Level Language programs		HLL	Feature program
PL/I-OPT Entry Interface	DFHPL1OI	Note 7	Feature program
PL/I-F Entry Interface	DFHPL1I	Note 7	Feature program
PL/I Interface	DFHSAP	Note 7	Feature program
CICS Preprocessor	DFHPRPR	Note 8	Feature program

Note 1: The symbolic name is the name supplied to the linkage edit procedure.

Note 2: The program code is the keyword parameter used in the system generation macro instruction (DFHSG).

Note 3: These programs are included in CICS if the user specifies the system service programs with a DFHSG PROGRAM=CSS macro instruction.

Note 4: These programs are included in CICS if the user specifies the control system dummy programs with a DFHSG PROGRAM=CSD macro instruction.

Note 5: These programs are included in the generation of CICS if the user specifies the control system operational programs with a DFHSG PROGRAM=CSO macro instruction.

Note 6: A two-character suffix (other than 'DY' and 'NO' which are reserved) may be appended to these symbolic names. Suffix 'DY' is reserved for dummy programs.

Note 7: These programs are included in CICS if the user specifies the high-level language feature with a DFHSG PROGRAM=HLL, LANG=PL/I macro instruction. PL1=(O,F) causes appropriate program selection.

Note 8: This program is included in CICS if the user specifies the high-level language feature with a DFHSG PROGRAM=HLL, LANG=(COBOL,PL/I) macro instruction.

Note 9: This program is included in CICS if the user specifies BTAMDEV=1030.

Note 10: For CICS/OS, this program is given control by the System Initialization program (DFHSIP) via an OS XCTL macro instruction to function as the Request Block (RB) for CICS.

Note 11: These programs are included in CICS if the user specifies DL1=YES in the DFHSG TYPE=INITIAL macro instruction.

INITIALIZATION OF SYSTEM GENERATION

The DFHSG TYPE=INITIAL macro instruction must be the first of the system generation macro instructions. Procedures developed from the use of this macro instruction can be reused for subsequent generations of the entire system or for parts of the system. The following operands can be included in this macro instruction:

```
       DFHSG TYPE=INITIAL,                                             *
             STATUS=FIRST,                                             *
             ASMBLR=Assembler name,                                    *
             TRACE=YES,NO,                                             *
             TIMECTL=YES,NO,                                           *
             DSIZE=number,                                             *
             MPS=YES,NO,                                               *
             JOBNAME=jobname,                                          *
             ACCTID=accounting information,                            *
             PGMERID='programmer's name',                              *
             MSGLVL=0,1,                                               *
             DEVICE=2311,2314,3330,                                    *
             CONDCD=((code,operator),...,(code,operator)),             *
             PRIORTY=nn,                                               *
             MSGCLAS=x,                                                *
             CLASS=jobclass,                                           *
             REGION=(n1K,n2K),                                         *
             PROCNMS=(procedure names),                                *
             DL1=YES,NO,                                               *
             ATP=YES,NO,                                               *
             PREFIX=prefix,                                            *
             TCTUA=(V1COMPAT,VARIABLE)
```

TYPE: The TYPE=INITIAL operand specifies that this is the initial macro instruction in a CICS system generation run.

STATUS: In the CICS/DOS systems, the STATUS=FIRST operand must be used during the very first CICS/DOS system generation. The presence cf this operand results in the generation of the CICS/DOS Linkage Editor and Library Maintenance program (DFHLINK). This program is used to place all CICS management and application programs in the Real-Time Relocatable Program Library (DFHRPL).

Once the generation of DFHLINK is complete, it is used to format the Real-time Relocatable Program Library. The user must provide a label set for DFHNPL in the partition standard label definitions and include the DSIZE operand.

In the CICS/OS system, the STATUS=FIRST operand is used to cause the CICS cataloged procedures to be placed in SYS1.PROCLIB. If TCTUA=V1COMPAT is specified, jobs are created during stage II of system generaticn that modify the DFHTCT macro and DFHTCT symbolic storage definition (DSECT) to provide upward compability from CICS/OS Version 1 to CICS/OS Version 2.

ASMBLR: This operand is used to identify the name of the Assembler to be used during Stage II of system generation and to produce the proper JCL. The default is ASMBLR=ASSEMBLY for CICS/DOS and ASMBLR=IEUASM for CICS/OS.

For CICS/OS, if the first three characters of the Assembler name are 'IEV', Assembler H is assumed and only one work data set is allocated (SYSUT1). Otherwise, Assembler F is assumed and three work data sets are allocated (SYSUT1, SYSUT2, and SYSUT3).

TRACE: The TRACE=NO operand is used to indicate that the optional trace function is not to be used during execution of CICS. The default is TRACE=YES.

TIMECTL: The TIMECTL=NO operand is used to indicate that none of the cptional time management functions are to be included in any of the CICS management programs. If TIMECTL=NO is specified, the macro instructions of the Interval Control program (ICP) are not expanded and warning messages appear on the assembly listings of the affected CICS management programs. The time management functions excluded include runaway task control and support of ICP macro instructions. The default is TIMECTL=YES.

DSIZE: Applicable only to the CICS/DOS systems, this operand is used to specify the number of directory tracks to be used for the Real-Time Relocatable Program Library (created if the STATUS=FIRST operand is included). The default is DSIZE=2.

MPS: Applicable only to the CICS/DOS systems, this operand is used to indicate whether the DOS system for which CICS is being generated has multiprogramming system (MPS) support. The default is MPS=YES.

JOBNAME: This operand is used to specify a JCL jobname of not more than four characters for the system generation. 'GEN' is automatically appended as a suffix to the user-supplied jobname. The default is JOBNAME=CICS.

ACCTID: Applicable only to the CICS/OS-STANDARD system, this operand is used to specify the JCL accounting information for the system generation procedure. The default is ACCTID=CICSGEN.

PGMERID: Applicable only to the CICS/OS-STANDARD system, this operand is used to specify the programmer's name to be placed in the JCL. The name must be enclosed in quotation marks and should not exceed 20 positions. The default is PGMERID='SYSTEM PROGRAMMER'.

MSGLVL: Applicable only to the CICS/OS-STANDARD system, this operand is used to specify the message level desired for the JCL during Stage II. The default is MSGLVL=0.

DEVICE: Applicable only to the CICS/DOS systems, this operand specifies the device type on which the Real-Time Relocatable Program Library is resident.

CONDCD: Applicable only to the CICS/OS-STANDARD system, this operand is used to specify up to eight condition codes which, if met on any job step, cause further processing of that job to be bypassed. "code" can be any decimal number from 0 through 4095. "operator" can be any of the following: GT, GE, EQ, LT, LE, NE. For further details, see the publication OS Job Control Language (GC28-6539).

PRIORTY: Applicable only to the CICS/OS-STANDARD system, this operand is used to assign a priority to the jobs in Stage II of system generation. All jobs are given the same priority, where "nn" can be any decimal number from 0 through 13. For further details, see the publication OS Job Control Language (GC28-6539).

MSGCLAS: Applicable only to the CICS/OS-STANDARD system, this operand is used to route all messages issued by the OS Job Scheduler to an output class other than the normal message class (A). "x" can be any alphabetic (A-Z) or numeric (0-9) character. If this operand is cmitted, or if MSGCLAS=A is specified, job scheduler messages are routed to the standard output class, A. For further details, see the publication OS Job Control Language (GC28-6539).

CLASS: Applicable only to the CICS/OS-STANDARD system, this operand is used to assign a jobclass to all Stage II jobs. "jobclass" can be an alphabetic character A through O. If this operand is omitted, or if CLASS=A is specified, A is the default jobclass assigned to the jobs. For further details, see the publication OS Job Control Language (GC28-6539).

REGION: Applicable only to the CICS/OS-STANDARD system, this operand allows the user to (1) specify the maximum amount of main storage to be allocated to the job, or (2) specify the maximum amount of main storage to be allocated to the job and specify in which storage heirarchy or heirarchies (if OS/MVT is generated with heirarchy support) the space is to be allocated.

If REGION=n1K is specified (for example, REGION=52K), "n1" indicates the number of contiguous 1024-byte areas of main storage to be allocated for the job (n1 should be an even number and must not exceed 16383). If REGION=(n1K,n2K) is specified (for example, REGION=(60K,150K), "n1" indicates the number of contiguous 1024-byte areas to be allocated in main storage (hierarchy 0), and "n2" indicates the number of contiguous 1024-byte areas to be allocated in LCS (heirarchy 1). For further details, see the publication OS Job Control Language (GC28-6539).

If this operand is omitted, the default value (as established in the input reader procedure) is assumed.

PROCNMS: Applicable only to the CICS/OS-STANDARD system, this operand allows the user to specify the names of CICS cataloged procedures to be used for (1) assembly, link edit, and temporary update during system generation, (2) for assembly and link edit during the preparation of the system tables, or (3) for assembly and link edit of user-written Assembler language application programs. The default is PROCNMS=(DFHASMV2,DFHLNKV2,DFHUPDV2,DFHAUPLK).

DL1: Applicable only to the CICS/OS-STANDARD system, this operand allows the user to specify whether or not the Data Language/I (DL/I) interface is to be included in this generation of CICS. The default is DL1=NO.

<u>Note</u>: The Program Specification Directory (PDIR) and Data Management Block Directory (DDIR) lists must be in CICS.LOADLIB for the link edit of the CICS-DL/I interface modules. Therefore, if DL/I is being generated, the lists must be assembled and link edited before Stage II of system generation is executed. For further information, see the section "Generation of CICS/OS Data Language/I Facilities".

ATP: Applicable only to the CICS/OS-STANDARD and CICS/DOS-STANDARD systems, this operand allows the user to specify whether or not Asynchronous Transaction Processing (ATP) support is to be included in this generation of CICS. The default is ATP=NO.

PREFIX: Applicable only to the CICS/OS-STANDARD system, this operand is used to specify the index name for CICS system data sets. The Job Control Language (JCL) generated specifies these data sets as prefix.LOADLIB, prefix.MACLIB, and prefix.SOURCE, where "prefix" can contain from one to eight characters and must conform to the data set naming conventions outlined in the publication <u>OS Job Control Language</u> (GC28-6539). The default is PREFIX=CICS.

TCTUA: This operand is used to specify user-defined Process Control Information (PCI) fields of fixed length (15 bytes) and/or variable length (0-255 bytes). These fields are located in the Terminal Control Table and can be used as terminal work areas.

TCTUA=V1COMPAT should only be used by CICS/OS Version 1 users who are currently using the fixed-length 15-byte PCI field (the address of which is at TCTTECI) and who desire Version 2 PCI compatibility with Version 1. This operand must be specified in conjunction with the STATUS=FIRST operand.

TCTUA=VARIABLE is used to specify a variable-length (byte aligned) PCI field (the address of which is at TCTTECIA and the length of which is at TCTTECIL) and should be used by all but CICS/OS Version 1 users (who have used PCI fields) if a terminal work area is desired. The default is TCTUA=VARIABLE.

<u>CONTROL SYSTEM OPERATIONAL GROUP</u> (CSO)

The system generation macro instruction necessary to generate the Control System Operational group is:

```
DFHSG PROGRAM=CSO,                                              *
      MPS=YES,NO,                                               *
      NSD=number,                                               *
      DEVICE=2311,2314,3330,                                    *
      SVC=number,                                               *
      CAA=appendage suffix,                                     *
      V1CMPAT=YES,                                              *
      TCAMSIP=YES
```

The following Control System Operational modules are generated in response to this macro instruction:

1. System Initialization program (DFHSIP) and its overlays
2. Trace Control program (DFHTRP), unless TRACE=NO was specified in the DFHSG TYPE=INITIAL macro instruction

3. A dummy trace program (DFHTRPDY), unless TRACE=NO was specified in the DFHSG TYPE=INITIAL macro instruction
4. System Termination program (DFHSTP)
5. Abnormal Condition program (DFHACP)
6. Terminal Abnormal Condition program (DFHTACP)
7. Terminal Error program (DFHTEP)
8. Time Adjustment program (DFHTAJP), unless TIMECTL=NO was specified in the DFHSG TYPE=INITIAL macro instruction
9. File and Terminal Statistics program (DFHSTTR)
10. Supervisory Statistics programs (DFHSTKC)
11. Data Management Statistics program (DFHSTTD)
12. Real-Time Pre-Located Program Library DTF - CICS/DOS systems only
13. 7770 Read/Write program (DFHRWP70) - CICS/OS-STANDARD system only, and only if SVC and CAA operands are specified
14. 7770 Channel/Abnormal End Appendage program (DFHCAA70) - CICS/OS-STANDARD system only, and only if SVC and CAA operands are specified
15. 7770 SVC program (DFHDEB70) - CICS/OS-STANDARD system only, and only if SVC and CAA operands are specifeid
16. DL/I Interface program (DFHDLI) - CICS/OS-STANDARD system only, and only if DL1=YES was specified in the DFHSG TYPE=INITIAL macro instruction
17. DL/I Interface dummy program (DFHDLIDY) - CICS/OS-STANDARD system only, and only if DL1=YES was specified in the DFHSG TYPE=INITIAL macro instruction
18. DL/I Initialization program (DFHDLA) - CICS/OS-STANDARD system only, and only if DL1=YES was specified in the DFHSG TYPE=INITIAL macro instruction
19. DL/I Application program (DFHDLQ) - CICS/OS-STANDARD system only, and only if DL1=YES was specified in the DFHSG TYPE=INITIAL macro instruction
20. DL/I CALL Execution program (DFHDLE) - CICS/OS-STANDARD system only, and only if DL1=YES was specified in the DFHSG TYPE=INITIAL macro instruction

PROGRAM: The PROGRAM=CSO operand is used to indicate that the Control System Operational group is being generated.

MPS: The MPS=NO operand is used to indicate that the DOS system for which CICS/DOS is being generated dces not have multiprogramming system (MPS) support. The default is MPS=YES. This operand is effective only in the CICS/DOS systems.

NSD: Applicable only to the CICS/DOS systems, this operand is used to specify the maximum number of nonsequential disk extents that will exist for any data set involved in the real-time execution of CICS. CICS system generation uses this value to determine the amount of main storage to be reserved at the beginning of the partition for label processing when the data sets are opened. Although most data sets are opened during system initialization, the dynamic open/close feature of the CICS Master Terminal program may require the use of this label processing area at any time during CICS execution. The presence of this operand makes it unnecessary for the user to supply a DOS LBLTYP job control statement with his CICS execution deck. If this operand is omitted, the default is NSD=9.

DEVICE: Applicable only to the CICS/DOS systems, this operand is used to specify the type of device upon which the Real-Time Pre-Located Program Library is to reside. The default is DEVICE=2311.

SVC: Applicable only to the CICS/OS-STANDARD system, this operand is used to specify the SVC number under which the 7770 SVC routine provided by CICS is to be link edited to SYS1.SVCLIB. The number specified must be in the range 200-255. The default is SVC=200 for system generation purposes; however, the SVC is not link edited. This operand is required if the ACCMETH=BTAM and BTAMDEV=7770 operands are included in the DFHSG PROGRAM=TCP macro instruction. For information concerning adding SVC routines to the operating system, see the publication _OS System Programmer's Guide_ (GC28-6550).

CAA: Applicable only to the CICS/OS-STANCARD system, this operand is used to specify the two-character alphameric suffix to be assigned to the 7770 Channel End/Abnormal End Appendage routine provided by CICS when that routine is link edited to SYS1.SVCLIB. The suffix specified must be in the range WA-Z9. This operand is required if the ACCMETH=BTAM and BTAMDEV=7770 operands are included in the DFHSG PROGRAM=TCP macro instruction and if the APPENDG operand is included in the DFHTCT TYPE=SDSCI macro instruction during preparation of the Terminal Control Table. For information concerning adding appendages to the operating system, see the publication _OS System Programmer's Guide_ (GC28-6550).

V1CMPAT: Applicable only to the CICS/OS STANDARD system, V1CMPAT=YES must be specified if the user wishes to have the Terminal Abnormal Condition program (DFHTACP) provide a CICS/OS Version 1 interface when linking to the user-written Terminal Error program (DFHTEP) under CICS/OS Version 2. This operand is to be used only by those former CICS/OS Version 1 users who have an existing DFHTEP.

TCAMSIP: Applicable only if TCAM is used in the CICS/OS-STANDARD system, this operand is used to generate TCAM support in the System Initialization program (DFHSIP).

CONTROL SYSTEM SERVICE GROUP (CSS)

The system generation macro instruction necessary to generate the Control System Service group is:

```
DFHSG PROGRAM=CSS
```

The programs generated by this macro instruction are as follows:

1. Sign-on program (DFHSNP)
2. Sign-off program (DFHSFP)
3. F.E. Terminal Test program (DFHFEP)

CONTROL SYSTEM DUMMY GROUP (CSD)

If the user does not require a particular CICS management program (for example, File Control), he can elect to not generate that program and, as a result, save the amount of static main storage that would be required to contain the program. However, a dummy program must be provided for every CICS management program not actually generated.

If the Control System Dummy group is generated in response to the

```
DFHSG PROGRAM=CSD
```

macro instruction, dummy programs with the suffix 'DY' are produced for the following:

1. File Control program
2. Transient Data Control program
3. Dump Control program
4. Temporary Storage Ccntrcl program
5. Interval Ccntrol program
6. DL/I Interface program

This facility permits all dummy programs to be generated without generating each one separately.

CONTROL SYSTEM UTILITY GROUP (CSU)

The system generation macro instruction necessary to generate the Ccntrol System Utility group is:

```
        DFHSG PROGRAM=CSU,                                               *
              DEVICE=(TAPE,2311,2314,3330)
```

The Dump Utility program (DFHDUP) is generated in response to this macro instruction.

PROGRAM: The PROGRAM=CSU operand indicates that the Control System Utility group (currently consistently only of DFHDUP) is to be generated.

DEVICE: Applicable only to the CICS/DOS systems, this operand is used to specify the type(s) of input devices(s). The default is DEVICE=(TAPE,2311,2314,3330).

CONTROL SYSTEM MANAGEMENT PROGRAMS

TASK CONTROL PROGRAM (KCP)

The system generation macro instruction necessary to generate the Task Contrcl program is as follows:

```
        DFHSG PROGRAM=KCP,                                               *
              CONSEC=YES,                                                *
              RUNAWAY=YES,                                               *
              STALCTL=YES,                                               *
              ENQUEUE=YES,                                               *
              OPSECUR=YES,                                               *
              ICPTIME=YES,                                               *
              ICPAUTO=YES,                                               *
              ICPSYNC=YES,                                               *
              SUFFIX=program suffix,                                     *
              XTYPREQ=symbolic name,                                     *
              XDSPCHR=symbolic name,                                     *
              DEVICE=(2311,2314,3330)
```

Unless otherwise indicated, the omission of an operand results in the corresponding function not being included.

PROGRAM: The PROGRAM=KCP operand indicates that the Task Control Program is to be generated.

CONSEC: Applicable only to the CICS/DOS-ENTRY system, the CONSEC=YES operand causes logic to be generated in Task Control that limits the number of consecutive I/O's initiated by File Control. When the specified limit (contained in the CSA at CSAKCCDL) is reached, the task is rolled out.

RUNAWAY: The RUNAWAY=YES operand indicates that the optional runaway task control feature cf Interval Control is to be supported by Task Ccntrol.

STALCTL: The STALCTL=YES operand indicates that the optional stall detection feature of Task Control is to be included in CICS.

ENQUEUE: The ENQUEUE=YES operand indicates that the optional enqueue/dequeue feature of Task Control is to be included in CICS. This operand must be included if the exclusive control feature is to be generated as part of the File Control program.

OPSECUR: The OPSECUR=YES operand indicates that the optional operator security checking feature of Task Control is to be included in CICS.

ICPTIME: The ICPTIME=YES operand indicates that the optional time-of-day feature cf Interval Control is to be supported by Task Control.

ICPAUTO: The ICPAUTO=YES operand indicates that the optional automatic task initiation feature of Interval Control is to be supported by Task Control.

ICPSYNC: The ICPSYNC=YES operand indicates that the optional task synchronization service of Interval Control is to be supported by Task Ccntrol.

SUFFIX: This operand is used to provide a two-character alphameric suffix for the Task Contrcl program being assembled. If this operand is omitted, a suffix is not provided.

XTYPREQ: This operand is used to generate linkage to a user-written exit routine at the point in Task Control prior to determining what type of request for task services was issued. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XDSPCHR: This operand is used to generate linkage to a user-written exit routine at a point in the Task Dispatcher subsequent to determining which task to dispatch but prior to passing control to the task. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

DEVICE: Effective only in the CICS/DOS-ENTRY system, a rollout data set DTF is generated for the device(s) specified. The default is DEVICE=2311.

STORAGE CCNTRCL PROGRAM (SCP)

The system generation macro instruction necessary to generate the Storage Contrcl program is:

```
       DFHSG PROGRAM=SCP,                                                  *
             XTYPREQ=symbolic name,                                        *
             SUFFIX=program suffix
```

PROGRAM: The PROGRAM=SCP operand indicates that the Storage Control program is to be generated.

XTYPREQ: This operand is used to generate linkage to a user-written exit routine at the entry point of Storage Control. For further informaticn concerning user exits, see the section "Creating User Exits for CICS Management Programs".

SUFFIX: This operand is used to provide a two-character alphameric suffix for the Storage Control program being assembled. If this operand is omitted, a suffix is not provided.

PROGRAM CONTROL PROGRAM (PCP)

The system generation macro instruction necessary to generate the Program Contrcl program is:

```
       DFHSG PROGRAM=PCP,                                                  *
             PCPLOAD=YES,NO,                                               *
             LANG=(COBOL,PL/I),                                            *
             HLLTR=YES,NO,                                                 *
             COBOL=(V2,V3,V4,SUBSET),                                      *
             XFETCH=symbolic name,                                         *
             SUFFIX=program suffix
```

Unless otherwise indicated, the omission of an operand results in the corresponding functicn not being included.

PROGRAM: The PROGRAM=PCP operand indicates that the Program Control program is to be generated.

ΡCPLOAD: The PCPLOAD=NO operand is used to specify that the optional support for the Program Ccntrol Load feature is not to be generated. ΡCPLOAD=YES must be specified in order to use a Sign-on Table or a Terminal List Table. See System Service Tables. The default is ΡCPLOAD=YES.

LANG: This operand is used to specify that the optional support for ANS COBOL and/or PL/I is to be generated.

HLLTR: This operand is used to specify that support for DFHTR (trace) macro instructions is to be generated for high-level language application programs. If this operand is used, the LANG operand must also be used. The default is HLLTR=NO.

COBOL: This operand is used to indicate which ANS COBOL compilers are to be used to compile user-written application programs. COBOL=V2 indicates that the ANS COBOL Version 2 Compiler (360N-CB-482 for DOS, 360S-CB-545 for OS) is to be used; COBOL=V3 indicates that the ANS COBOL Version 3 Compiler (5736-CB2 for DOS, 5734-CB1 for OS) is to be used; COBOL=V4 indicates that the ANS COBOL Version 4 Compiler (5734-CB2) for OS is to be used. The SUBSET parameter indicates that the DOS Subset Compiler (5736-CB1) is to be used. If this operand is used, LANG=COBOL must also be specified. The default is COBOL=V3.

XFETCH: This operand is used to generate linkage to a user-written exit routine at the point in Program Control following the loading of the requested program. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

SUFFIX: This operand is used to provide a two-character alphameric suffix for the Program Control program being assembled. If this operand is omitted, a suffix is not provided.

PROGRAM INTERRUPT CONTRCL PROGRAM (PIP)

The Program Interrupt Ccntrcl program is a generalized program interrupt handler that is given control by the operating system via the STXIT (DOS) or SPIE (OS) macro instruction. This program is required under CICS/OS if the runaway task control feature of Interval Control is to be supported.

The system generation macro instruction necessary to generate the Program Interrupt program is:

```
       DFHSG PROGRAM=PIP,                                             *
             SUFFIX=program suffix
```

PROGRAM: The PROGRAM=PIP operand is used to indicate that the Program Interrupt program is to be generated.

SUFFIX: This operand is used to provide a two-character alphameric suffix (other than 'NO' which is reserved) for the Program Interrupt program being assembled. If this operand is omitted, a suffix is not provided.

INTERVAL CONTROL PROGRAM (ICP)

The system generation macro instruction necessary to generate the Interval Control program is as follows:

```
       DFHSG PROGRAM=ICP,                                             *
             RUNAWAY=YES,                                             *
             ICPTIME=YES,                                             *
             ICPAUTO=YES,                                             *
             ICPSYNC=YES,                                             *
             SUFFIX=program suffix,                                   *
             XTYPREQ=symbolic name,                                   *
             XICEEXP=symbolic name,                                   *
             DUMMY=YES
```

Unless otherwise indicated, the omission of an operand results in the corresponding functicn not being included.

PROGRAM: The PROGRAM=ICP operand indicates that the Interval Control program is to be generated.

If the TIMECTL=NO operand was included in the DFHSG TYPE=INITIAL macro instruction, only a dummy Interval Control program is generated. If the TIMECTL=NO operand was not included, the remaining operands of the DFHSG PROGRAM=ICP macro instruction are applicable and must be compatible with the corresponding operands included in the DFHSG PROGRAM=KCP macro instruction.

RUNAWAY: The RUNAWAY=YES operand indicates that the optional runaway task control feature of Interval Control is to be included in CICS. Note that the Program Interrupt Control program (PIP) is used to support this feature and must be generated if the RUNAWAY=YES operand is used.

ICPTIME: The ICPTIME=YES operand indicates that the optional time-of-day feature cf Interval Control is to be included in CICS. Note that this operand must be used unless TIMECTL=NO was specified in the DFHSG TYPE=INITIAL macro instruction.

ICPAUTO: The ICPAUTO=YES operand indicates that the optional "time-ordered" automatic task initiation feature of Interval Control is to be included in CICS. This feature allows tasks to be automatically initiated by CICS at a specified time of day or after a specified interval of time has elapsed. Note that the Temporary Storage Control program (TSP) is used to support this feature and must be generated if the ICPAUTO=YES operand is used. Either this operand or ICPSYNC=YES operand must be used unless TIMECTL=NO was specified in the DFHSG TYPE=INITIAL macro instruction.

ICPSYNC: The ICPSYNC=YES operand indicates that the optional task synchronization feature of Interval Control is to be included in CICS. This feature allows tasks to be synchronized with a specified time of day or with a specified interval of time. Either this operand or the ICPAUTO=YES operand must be used unless TIMECTL=NO was specified in the DFHSG TYPE=INITIAL macro instruction.

SUFFIX: This operand is used to provide a two-character alphameric suffix (other than 'NO' or 'DY' which are reserved) for the Interval Control program being generated. If this operand is omitted, a suffix is not provided.

XTYPREQ: This operand is used to generate linkage to a user-written exit routine at the entry point of Interval Control. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XICEEXP: This operand is used to allow the Interval Control program to generate linkage to a user-written exit routine when an Interval Control Element (ICE) has expired. For further informaticn concerning user exits, see the section "Creating User Exits for CICS Management Programs".

DUMMY: The DUMMY=YES operand is used to specify that a dummy Interval Control program is to be generated. If this operand is used, a 'DY' suffix is autcmatically generated for the dummy program; any use of the SUFFIX operand is ignored.

This operand is used in lieu of the DFHSG PROGRAM=CSD macro instruction to selectively generate a dummy Interval Control program. Any other operands which may have been included in the DFHSG PROGRAM=ICP macro instruction are ignored.

DUMP CONTROL PROGRAM (DCP)

The system generation macro instruction necessary to generate the Dump Control program is as follows:

```
       DFHSG PROGRAM=DCP,                                              *
             DEVICE=TAPE,2311,2314,3330,                               *
             DEVADDR=nnn,                                              *
             CICSDMP=YES,                                              *
             SUFFIX=program suffix,                                    *
             DUMMY=YES
```

Unless otherwise indicated, the omission of an operand results in the corresponding function not being included.

PROGRAM: The Program=DCP operand indicates that the Dump Control program is to be generated.

DEVICE: Applicable only to the CICS/DOS systems, this operand is used to specify the type of output device. If this operand is omitted, DEVICE=TAPE is assumed.

A particular Dump Control program in the CICS/DOS systems will support only one type of output device. If it is desired that different device types be used on different runs, more than one Dump Control program must be generated using the SUFFIX operand.

DEVADDR: If the DEVICE=TAPE operand is used, the DEVADDR=nnn operand must be used to specify the DOS device address to be assigned for the tape drive. It should be a three-digit decimal number with leading zeros, if necessary. For example, if SYS008 is the device address to be used, DEVADDR=008 must be specified. If the DEVICE=2311 operand or the DEVICE=2314 operand is used, the DEVADDR value is picked up from the label information supplied for the Dump Control data set. This operand is applicable only to the CICS/DOS systems.

CICSDMP: The CICSDMP=YES operand is used to specify that the optional feature of dumping CICS management programs and tables is to be generated.

SUFFIX: This operand is used to provide a two-character alphameric suffix (other than 'NO' or 'DY' which are reserved) for the Dump Control program being assembled. If this operand is omitted, a suffix is not provided.

DUMMY: The DUMMY=YES operand is used to specify that a dummy Dump Control program is to be generated. If this operand is used, a 'DY' suffix is automatically generated for the dummy program; any use of the SUFFIX operand is ignored.

This operand is used in lieu of the DFHSG PROGRAM=CSD macro instruction to selectively generate a dummy Dump Control program.

Any other operands which may have been included in the DFHSG PROGRAM=DCP macro instruction are ignored.

TERMINAL CONTROL PROGRAM (TCP)

The system generation macro instruction necessary to generate the Terminal Control program is as follows:

```
      DFHSG PROGRAM=TCP,                                                   *
            ACCMETH=(BTAM,BSAM,SAM,BGAM,TCAM),                             *
            DEVICE=(1403,1404,1442,1443,1445,2311,2314,3330,               *
                   2501,2520,2540,CRLP,DASD,DISK,TAPE),                    *
            BTAMDEV=(1030,1050,1050D,1053,1130,1130D,2020,2020D,           *
                    2260,L2260,2265,2740,2740D,2740-2,2741C,               *
                    2741E,2741DC,2741DE,2760,2770,2770D,2780,2780D,        *
                    2980/1,2980/2,2980/4,3275,3277,L3277,3284,             *
                    L3284,3286,L3286,3735D,7770,SYS/3,SYS/3D,SYS/7,        *
                    SYS/7D,S/360,S/360D,S/370,S/370D,TWX,BISYNC),          *
            FEATURE=(AUTOANSW,AUTOPOLL,BUFFRECV,PSEUDOBIN),                *
            ANSWRBK=(EXIDVER,TERMINAL,AUTOMATIC,7770TERM,7770NULL),        *
            INITRL=YES,                                                    *
            LOCKF=YES,                                                     *
            WRAPLST=YES,                                                   *
            BSCODE=(EBCDIC,ASCII,TRANSCODE),                               *
            AUTOTRN=YES,                                                   *
            UCTRAN=NO,(EBCDIC,ASCII),                                      *
            COMPAT=NO,(FORMAT,FULLBUF),                                    *
            FMT2260=(6X40,12X40,12X80,15X64),                              *
            FMT3270=(12X40,24X80),                                         *
            SMI=user character,                                            *
            TAB=YES,NO,                                                    *
            CONVTAB=(ABB,ABC),                                             *
            XATTACH=symbolic name,                                         *
            XOUTPUT=symbolic name,                                         *
            XINPUT=symbolic name,                                          *
            XTCMIN=symbolic name,                                          *
            XTCMOUT=symbolic name,                                         *
            TCM3270=YES,                                                   *
            TCM7770=YES,                                                   *
            BMS=YES,NO,                                                    *
            SUFFIX=program suffix
```

Unless otherwise indicated, the omission of an operand results in the corresponding function not being included.

PROGRAM: The PROGRAM=TCP operand indicates that the Terminal Control program is to be generated.

ACCMETH: This operand identifies the access methods to be used in the terminal environment. One or more of the following keyword parameters must be specified:

			<u>OTHER OPERAND REQUIRED</u>
1.	BTAM	Basic Telecommunication Access Method	BTAMDEV
2.	BSAM	Basic Sequential Access Method	DEVICE
3.	SAM	Sequential Access Method	DEVICE
4.	BGAM	Graphics Access Method	
5.	TCAM	Telecommunication Access Method	

BGAM and TCAM are applicable only to the CICS/OS system. BGAM causes support for local 2260's to be generated. If TCAM is specified, CICS support for TCAM (360S-CQ-548) is generated. SAM and BSAM are functionally synonymous in CICS and can be used interchangeably.

DEVICE: This operand identifies the direct access or sequential devices that are to be used in the terminal environment. This operand must be used if ACCMETH=SAM or ACCMETH=BSAM is specified.

ETAMDEV: This operand identifies the BTAM device types and must be present if ACCMETH=BTAM is specified. The applicable keyword parameters are:

1.	1030	1030 Data Collection System
2.	1050	1050 Data Communication System
3.	1050D	1050 Data Communication System (dial-up)
4.	1053	1053 Printer on a local/remote 2848 Display Control
5.	1130	1130 Computing System
6.	1130D	1130 Computing System (dial-up)
7.	2020	System/360 Model 20
8.	2020D	System/360 Model 20 (dial-up)
9.	2260	2260 Display Station (remote)
10.	L2260	2260 Display Station (local)
11.	2265	2265 Display Station
12.	2740	2740 Communication Terminal Models 1 and 2
13.	2740D	2740 Communication Terminal Models 1 and 2 (dial-up)
14.	2740-2	2740 Communication Terminal Model 2 (2740 must also be specified)
15.	2741C	2741 Communication Terminal with correspondence code
16.	2741E	2741 Communication Terminal with PTTC/EBCD code
17.	2741DC	2741 Communication Terminal with correspondence code (dial-up)
18.	2741DE	2741 Communication Terminal with PTTC/EBCD code (dial-up)
19.	2760	2760 Optical Image Unit
20.	2770	2770 Data Communication System
21.	2770D	2770 Data Communication System (dial-up)
22.	2780	2780 Data Transmission Terminal
23.	2780D	2780 Data Transmission Terminal (dial-up)
24.	2980/1	2980 General Banking Terminal System Model 1
25.	2980/2	2980 General Banking Terminal System Model 2
26.	2980/4	2980 General Banking Terminal System Model 4
27.	3275	3275 Display Station (remote)
28.	3277	3277 Display Station (remote)
29.	L3277	3277 Display Station (local)
30.	3284	3284 Printer on a remote 3271 Control Unit
31.	L3284	3284 Printer on a local 3272 Control Unit
32.	3286	3286 Printer on a remote 3271 Control Unit
33.	L3286	3286 Printer on a local 3272 Control Unit
34.	3735D	3735 Programmable Buffered Terminal (dial-up)
35.	7770	7770 Audio Response Unit Model 3
36.	SYS/3	System/3 Models 6 and 10
37.	SYS/3D	System/3 Models 6 and 10 (dial-up)
38.	SYS/7	System/7
39.	SYS/7D	System/7 (dial-up)
40.	S/360	System/360
41.	S/360D	System/360 (dial-up)
42.	S/370	System/370
43.	S/370D	System/370 (dial-up)
44.	TWX	Common Carrier Teletypewriter Exchange Terminal (Model 33/35)
45.	BISYNC	Binary synchronous devices (for CICS/OS-STANDARD V1 compatibility)

The L2260 parameter is applicable only to the CICS/DOS systems. The BISYNC parameter includes 1130, System/360 Model 20, and System/360 Model 25 or higher. One or more parameters can be included in the BTAMDEV operand.

Individual device type parameters are provided for the BTAMDEV operand so that system generation input is self documenting. If the parameter length for this operand exceeds assembler limit of 255 characters for the particular system being generated, synonymous parameters can be omitted. Specifying any one of the parameters from a group produces supportive code for all devices in the group. These groups are:

1. 2020,SYS/3,S/360,S/370,1130,BISYNC
2. 2020D,SYS/3D,SYS/360D,SYS/370D,1130D
3. 3275,3277,3284,3286
4. L3277,L3284,L3286
5. 1053,2260,2265

Note: When binary synchronous communication lines are part of the user's configuration, it is possible for these communication lines to time out if control is not returned to the terminal before a timeout can occur. The user can alleviate this condition in either of two ways: (1) by having the application program issue a CICS Task Control WAIT macro instruction to voluntarily relinquish control, or (2) by setting the runaway task time interval to a value that causes the long-running task to be terminated before the line timeout can occur.

FEATURE: This operand is used to specify the special features present in the terminal environment. The applicable keyword parameters are:

1.	AUTOANSW	Switched lines
2.	AUTOPOLL	Automatic polling feature required for multipoint binary synchronous communication terminals
3.	BUFFRECV	Buffer feature support for 2740 Model 2
4.	PSEUDOBIN	Pseudo-binary transmission code for System/7

One or more parameters can be included in the FEATURE operand.

ANSWRBK: This operand is used to specify the type of terminal identification; it must be used if FEATURE=AUTOANSW is specified.

ANSWRBK=EXIDVER specifies that BTAM-expanded ID verification is to be employed to identify those terminals which transmit unique identification sequences. ANSWRBK=EXIDVER must be specified if BTAMDEV=3735D.

ANSWRBK=TERMINAL specifies that the operator will supply the identification for switched lines. ANSWRBK=AUTOMATIC specifies that automatic terminal identification is to be sent by the terminal.

For terminals that communicate with a 7770 Audio Response Unit, the applicable keyword parameters are 7770TERM and 7770NULL. ANSWRBK=7770TERM specifies that the operator will supply the terminal identification. ANSWRBK=7770NULL specifies that no terminal identification is to be sent by either the terminal or operator; instead, the Terminal Control program will connect the line to the next available terminal in the terminal pool. The default is ANSWRBK=7770TERM, providing BTAMDEV=7770 has also been specified.

<u>Note</u>: The ANSWRBK operand must include all keyword parameters for which the corresponding parameter is to be included in the DFHTCT TYPE=LINE specification during Terminal Control Table preparation.

INITRL: Applicable only to the CICS/OS-STANDARD system, the INITRL=YES operand (initial read lock) is used to indicate that all reads from other than an application program are with the keyboard lock option. The FEATURE=KBRDLOCK operand must be included in the DFHTCT TYPE=LINE macro instruction to have the keyboard lock feature operative for that line.

LOCKF: The LOCKF=YES operand is used to indicate that the optional keyboard lock feature, supporting the 2848 models 21 and 22, is to be included in CICS. The FEATURE=KBRDLOCK operand must be included in the DFHTCT TYPE=LINE macro instruction to have the keyboard lock feature operative for that line. For the CICS/DOS systems, if LOCKF=YES is specified and if FEATURE=KBRDLOCK is included in the DFHTCT TYPE=LINE macro instruction, the keyboard is locked on all reads including the initial read.

WRAPLST: The WRAPLST=YES operand is used to specify that the optional wrap list feature is to be included in CICS. The list to be constructed is a wraparound polling list for a nonswitched line.

BSCODE: This operand is used to indicate what types of binary synchronous communication code are to be supported. The default is BSCODE=(EBCDIC,ASCII,TRANSCODE).

AUTOTRN: The AUTOTRN=YES operand is used to specify that the optional automatic transaction initiation feature is to be included in CICS.

UCTRAN: This operand is used to generate support for the translation cf lowercase data to uppercase in 3270 input data streams. If UCTRAN=NO is specified, uppercase translaticn support for the 3270 is not generated. The default is UCTRAN=NO.

If BSCODE=EBCDIC and/or CONVTAB=EBCDIC have been specified for particular lines, UCTRAN=EBCDIC specifies that support is to be generated for local and remote 3270's on those lines. If BSCODE=ASCII and/or CONVTAB=ASCII have been specified for particular lines, UCTRAN=ASCII indicates that support is to be generated for remote 3270's on those lines.

Uppercase translation for the 3270 is performed only on input data streams received from those 3270's for which FEATURE=UCTRAN was specified during preparation of the Terminal Control Table.

COMPAT: This operand is used to generate 2260-compatibility support for the 3270 Information Display System. Such support allows the user to run his currently operational 2260-based transactions from a 3270. If COMPAT=NO is specified, 2260-compatibility support for the 3270 is not generated. The default is COMPAT=NO.

Two modes of compatibility operaticn are provided: FORMAT and FULLBUF. Either or both may be specified with a single use of the COMPAT operand.

COMPAT=FORMAT indicates that FORMAT compatibility mode is to be generated. FORMAT mode takes full advantage of the 3270 formatting and data compression facilities, and is the preferred method of 2260-compatibility operation, particularly for the operation of remote 3270's.

COMPAT=FULLBUF indicates that FULLBUF compatibility mode is to be generated. FULLBUF mode does not use the 3270 data compression facilities and must therefore be used when all lines of input data are desired.

Note: If a 480-character 2260 is mapped onto a 480-character 3270, use of FORMAT mode causes the loss of the last character of each 2260 output line. Use of FULLBUF mode limits the data loss to the last character position of the last line but at the expense of transferring a full 480 characters for each interaction involving a data entry key.

FMT2260: This operand is used to specify the various 2260 screen formats to be simulated for 2260-based transactions on the 3270 Information Display System. The applicable keyword parameters are:

1.	6X40	240-character 2260 Display Station
2.	12X40	480-character 2260 Display Station
3.	12X80	960-character 2260 Display Station or 12-row, 80-column format for the 2265 Display Station
4.	15X64	15-row, 64-column format for the 2265 Display Station

FMT3270: This operand is used to specify the 3270 screen formats on which 2260 screen formats are to be simulated for 2260-based transactions. The applicable keyword parameters are:

1.	12X40	480-character 3275/3277 Display Station
2.	24X8C	1920-character 3275/3277 Display Station

SMI: This operand is used to specify the character that is to represent the start of message indicator (SMI) in all messages to and from the 3270 operating in 2260 compatibility mode. This character is generated as a X'4A' and must be a valid alphameric displayable character. If the SMI character is contained in an output data stream, its display is dependent upon the language feature specified for the 3270. Whatever character is chosen, it remains the same for all transactions. The default is SMI=¢.

TAB: TAB=YES must be specified if any of the 2260-compatible 3270 transactions make use of the 2260 tab feature. In this case, all colon (:) characters are honored as 2260 tab characters when included in the output data stream. The default is TAB=NO.

CONVTAB: This operand is used to specify the type of conversion to be perfcrmed on the data received from the 7770 Audio Response Unit. CONVTAB=ABB specifies conversion from ABB' transmission code; CONVTAB=ABC specifies conversicn from ABC transmission code. Either cr both may be specified with a single use of the CONVTAB operand. If this operand is used, ACCMETH=BTAM and BTAMDEV=7770 must also be specified. The default is CONVTAB=(ABB,ABC).

XATTACH: This operand is used to generate linkage in the Terminal Ccntrol program to a user-written exit routine. The linkage is generated at the point prior to issuing a Task Control ATTACH for a transaction identification which is received in response to polling. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs" or the section "CICS/TCAM Interface Considerations".

XOUTPUT: This operand is used to generate linkage in the Terminal Control program to a user-written exit routine. The linkage is generated for output events at the point prior to translating or framing output data. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XINPUT: This operand is used to generate linkage in the Terminal Control program to a user-written exit routine. The linkage is generated at the point following completion of any input event. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XTCMIN: Applicable only to the CICS/OS system, this operand is used to generate linkage in the Terminal Control program TCAM module to a user written exit routine. The linkage is generated following completion of any input event. For further information concerning TCAM user exits, see the section "CICS/TCAM Interface Considerations".

XTCMOUT: Applicable only to the CICS/OS system, this operand is used to generate linkage in the Terminal Control program TCAM module to a user written exit routine. The linkage is generated for output events at the point prior to placing data on the output queue. For further information concerning TCAM user exits, see the section "CICS/TCAM Interface Considerations".

TCM3270: Applicable only to the CICS/OS system, this operand is required if TCAM support is to include the 3270 Information Display System.

TCM7770: Applicable only to the CICS/OS system, this operand is required if TCAM support is to include the 7770 Audio Response Unit.

BMS: This operand is used to generate basic mapping support (BMS) for the 3270 Information Display System. If BMS=YES is specified, a corresponding entry (DFHBMSMM) must be included during preparation of the Processing Program Table (PPT). The default is BMS=NO.

SUFFIX: This operand is used to provide a two-character alphameric suffix for the Terminal Control program being assembled. If this operand is omitted, a suffix is not provided.

FILE CONTROL PROGRAM (FCP)

The system generation macro instruction necessary to generate the File Control prcgram is as follows:

```
       DFHSG PROGRAM=FCP,                                             *
             CONSEC=YES,                                              *
             FILSERV=(INDA,INIS,DAUPD,ISUPD,DAADD,ISADD,INDIRACC,     *
                     EXCTL,INSEG,OUTSEG,DABLKNG,VLR,HEXAD,DECAD,ACTAD,*
                     IVBR,LOCATE,IBROWSE,DBROWSE),                    *
             SUFFIX=program suffix,                                   *
             XTYPREQ=symbolic name,                                   *
             XOUTPUT=symbolic name,                                   *
             XINPUT=symbolic name,                                    *
             XINPUTC=symbolic name,                                   *
             DUMMY=YES
```

Unless otherwise indicated, the omission of an operand results in the corresponding functicn not being included.

PROGRAM: The PROGRAM=FCP operand indicates that the File Control program is to be generated.

CONSEC: This operand is effective only in the CICS/DOS-ENTRY system; it causes logic to be generated in File Control that limits the number cf consecutive I/O events initiated by File Control that can occur cn behalf of a given task. When the limit (contained in the CSA at CSAKCCDL) is reached, the task is rolled out by Task Control. This facility helps protect CICS from being "seized" by a single task.

FILSERV: This operand is used to specify which of the file services are to be generated into the File Ccntrol program. The applicable keyword parameters are as follows:

1.	INDA	Input DAM
2.	INIS	Input ISAM
3.	DAUPD	Update DAM
4.	ISUPD	Update ISAM
5.	DAADD	Add DAM
6.	ISADD	Add ISAM
7.	INDIRACC	Indirect accessing
8.	EXCTL	Exclusive ccntrol (requires Task Control enqueue feature)
9.	INSEG	Input segmenting
10.	OUTSEG	Output segmenting
11.	DABLKNG	Direct access blocking
12.	VLR	Variable length-records
13.	HEXAD	Hexadecimal relative track addressing (DAM)
14.	DECAD	Zoned decimal relative track addressing (DAM)
15.	ACTAD	Actual track addressing (DAM)
16.	IVBR	ISAM variable-length records (CICS/DOS only)
17.	LOCATE	Dynamic open/close/locate
18.	IBROWSE	ISAM sequential record retrieval
19.	DBROWSE	DAM sequential record retrieval

Any number of these keyword parameters can be included in the FILSERV operand.

Note: Use of the file browse option under CICS/OS requires that the user create the CVT macro and place it in SYS1.MACLIB. For guidance in creating the CVT macro, see the CICS/OS Operations Guide.

SUFFIX: This operand is used to provide a two-character alphameric suffix (other than 'DY' which is reserved) fot the File Control program being assembled. If this operand is omitted, a suffix is not provided.

XTYPREQ: This operand is used to generate linkage in the File Control program to a user-written exit routine. The linkage is provided prior to determining what type of request for file services was issued. For further informaticn concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XOUTPUT: This operand is used to generate linkage in the File Control program to a user-written exit routine. The linkage is provided prior to writing data in response to an output request. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XINPUT: This operand is used to generate linkage in the File Control program to a user-written exit routine. The linkage is provided after the File Control Table (FCT) is searched in response to an input request. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XINPUTC: This operand is used to generate linkage in the File Control program to a user-written exit routine. The linkage is provided upon completion cf an input event but prior to deblocking requested input records. For further infcrmation concerning user exits, see the section "Creating User Exits for CICS Management Programs".

DUMMY: The DUMMY=YES operand is used to specify that a dummy File Control program is to be generated. If this operand is used, a 'DY' suffix is autcmatically generated for the dummy program; any use of the SUFFIX operand is ignored.

This operand is used in lieu of the DFHSG PROGRAM=CSD macro instruction to selectively generate a dummy File Control program. Any other operands which may have been included in the DFHSG PROGRAM=FCP macro instruction are ignored.

TRANSIENT DATA CONTROL PRCGRAM (TDP)

The system generation macro instruction necessary to generate the Transient Data Control prcgram is as follows:

```
       DFHSG PROGRAM=TDP,                                                *
             INTRA=YES,TRANSINIT,                                        *
             EXTRA=(ACQUISITION,DISPOSITION),                            *
             SUFFIX=program suffix,                                      *
             DEVICE=2311,2314,3330,                                      *
             XTYPREQ=symbolic name,                                      *
             XOUTPUT=symbolic name,                                      *
             XINPUT=symbolic name,                                       *
             DUMMY=YES
```

Unless otherwise indicated, the omission of an operand results in the corresponding functicn not being included.

PROGRAM: The PROGRAM=TDP operand indicates that the Transient Data Control program is to be generated.

INTRA: The INTRA=YES operand specifies that intrapartition data sets are to be used. The INTRA=TRANSINIT operand is used to specify that intrapartition data sets are to be used and that the automatic task initiation feature is also to be included.

EXTRA: This operand specifies that extrapartition data sets are to be used. EXTRA=ACQUISITION indicates input from an extrapartion data set. EXTRA=DISPOSITION indicates output to an extrapartition data set. One or both of these parameters can be included in this operand.

SUFFIX: This operand is used to provide a two-character suffix (other than 'DY' which is reserved) for the Transient Data Control program being assembled. If this operand omitted, a suffix is not provided.

DEVICE: Applicable only to the CICS/DOS systems, this operand is used to specify the type of device on which the intrapartition data set resides. The default is DEVICE=2311.

XTYPREQ: This operand is used to generate linkage in the Transient Data Control program to a user-written exit routine. The linkage is provided prior to determining what type of request for Transient Data services was issued. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XOUTPUT: This operand is used to generate linkage in the Transient Data Control program to a user-written exit routine. The linkage is provided after locating the appropriate entry in the Destination Control Table (DCT) but prior to writing data in response to an output request. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XINPUT: This operand is used to generate linkage in the Transient Data Control program to a user-written exit routine. The linkage is provided after acquiring data in response to an input request. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

DUMMY: The DUMMY=YES operand is used to specify that a dummy Transient Data Control program is to be generated. If this operand is used, a 'DY' suffix is automatically generated for the dummy program; any use of the SUFFIX operand is ignored.

This operand is used in lieu of the DFHSG PROGRAM=CSD macro instruction to selectively generate a dummy Transient Data Control program. Any other operands which may have been included in the DFHSG PROGRAM=TDP macro instruction are ignored.

TEMPORARY STORAGE CONTROL PROGRAM (TSP)

The system generation macro instruction necessary to generate the Temporary Storage Control program is as follows:

```
       DFHSG PROGRAM=TSP,                                                *
             DEVICE=2311,2314,3330,                                      *
             SUFFIX=program suffix,                                      *
             XTYPREQ=symbolic name,                                      *
             XOUTPUT=symbolic name,                                      *
             XINPUT=symbolic name,                                       *
             DUMMY=YES
```

Unless otherwise indicated, the omission of an operand results in the corresponding functicn not being included.

PROGRAM: The PROGRAM=TSP operand indicates that the Temporary Storage Ccntrol program is to be generated.

DEVICE: Applicable only to the CICS/DOS systems, this operand is used to specify the type of device on which the temporary storage data set resides. This operand is required in the CICS/DOS-ENTRY system; it can be omitted in the CICS/DOS-STANDARD system if the temporary storage data set resides in main storage. The default is DEVICE=2311.

SUFFIX: This operand is used to provide a two-character suffix (other than 'NO' or 'DY' which are reserved) for the Temporary Storage program being assembled. If this operand is omitted, a suffix is not provided.

XTYPREQ: This operand is used to generate linkage in the Temporary Storage Control program to a user-written exit routine. The linkage is provided prior to determining what type of request for Temporary Storage services was issued. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XOUTPUT: This operand is used to generate linkage in the Temporary Storage Contrcl program to a user-written exit routine. The linkage is provided prior to writing data in response to an output request. For further informaticn concerning user exits, see the section "Creating User Exits for CICS Management Programs".

XINPUT: This operand is used to generate linkage in the Temporary Storage Control program to a user-written exit routine. The linkage is provided prior to returning control to the application program after servicing an input request. For further information concerning user exits, see the section "Creating User Exits for CICS Management Programs".

DUMMY: The DUMMY=YES operand is used to specify that a dummy Temporary Storage program is to be generated. If this operand is used, a 'DY' suffix is automatically generated for the dummy program; any use of the SUFFIX operand is ignored.

This operand is used in lieu of the DFHSG PROGRAM=CSD macro instruction to selectively generate a dummy Temporary Storage Control program. Any other operands which may have been included in the DFHSG PROGRAM=TSP macro instruction are ignored.

CCMMON SYSTEM AREA (CSA)

The system generation macro instruction necessary to generate the Ccmmon System Area is as follows:

```
       DFHSG PROGRAM=CSA,                                              *
             WRKAREA=number,                                           *
             SUFFIX=program suffix
```

In addition to generating the CSA, the execution of this macro instruction causes the assembly of Terminal Control's TCA, Task Control's TCA, and, in the CICS/DOS systems, a Write to Operator (WTO) routine. In the CICS/OS system, a dummy CSA is also generated.

PROGRAM: The PROGRAM=CSA operand indicates that the Common System Area is to be generated.

WRKAREA: This operand is used to specify the number of bytes to be allocated to the common work area portion of the CSA. This area is initially set to binary zeros and is available to all programs. If the WRKAREA operand is omitted, the size of the work area defaults to 512. The maximum size for the work area is 3584 bytes.

SUFFIX: This operand is used to provide a two-character suffix for the CSA being generated. If this operand is omitted, a suffix is not provided.

MASTER TERMINAL PROGRAM (MTP)

The system generation macro instruction necessary to generate the Master Terminal program is:

```
       DFHSG PROGRAM=MTP,                                              *
             TLT=YES,NO
```

PROGRAM: The PROGRAM=MTP operand indicates that the Master Terminal program is to be generated.

TLT: The TLT=NO operand indicates that the user does not desire to use the Master Terminal prcgram to load Terminal List Tables during real-time execution of CICS. TLT=YES indicates that the Master Terminal program will be used to load a Terminal List Table to change the status of a class of terminals and/or ensure that a supervisory terminal operator can change the status of only those terminals under his control. The default is TLT=YES.

DYNAMIC OPEN/CLOSE PROGRAM (OCP)

The system generation macro instruction necessary to generate the Dynamic Open/Close program is:

```
       DFHSG PROGRAM=OCP
```

This macro instruction must be issued if the Dynamic Open/Close program is to be used either through the Master Terminal facility or in response to a DFHOC request in an application program.

GRAPHIC ATTENTION PROGRAM (GAP)

The system generation macro instruction necessary to generate the Graphic Attention program is:

```
       DFHSG PROGRAM=GAP
```

This macro instruction is effective only in the CICS/OS-STANDARD system and is used to generate support for the local 2260.

HIGH-LEVEL LANGUAGE SUPPORT GROUP (HLL)

The system generation macro instruction necessary to generate the High-Level Language Support group is:

```
       DFHSG PROGRAM=HLL,                                              *
             LANG=(COBOL,PL/I),                                        *
             PL1=(O,F)
```

The support programs generated in response to this macro instruction are as follows:

1. CICS preprocessor program (DFHPRPR) - for either or both languages
2. Entry Interface program (DFHPL1I) for PL/I F and/or for PL/I Optimizer (DFHPL1OI)
3. PL/I Interface program (DFHSAP) for PL/I F and/or for PL/I Optimizer (DFHPL1OI)

PROGRAM: The PROGRAM=HLL operand indicates that the High-Level Language Support group is to be generated.

LANG: This operand is used to identify the languages for which support is to be generated.

PL1: Applicable only to the CICS/OS system, this operand is used to identify the PL/I compilers for which support is to be generated. The default is PL1=F. If both compilers are to be used, PL1=(O,F) must be specified.

TERMINAL DEPENDENT CONTROL PROGRAM (TDCP)

The system generation macro instruction necessary to generate the Terminal Dependent Contrcl program is:

```
       DFHSG PROGRAM=DDM
```

This macro instruction must be issued when using 1030 terminals.

ASYNCHRONOUS TRANSACTION PROCESSING GROUP (ATP)

The system generation macro instruction necessary to generate the Asynchronous Transaction Processing group is:

```
       DFHSG PROGRAM=ATP,                                              *
             INBUFF=number,                                            *
             OUTBUFF=number
```

The following programs are generated in response to this macro instruction:

1. Asynchronous Transaction Control program (DFHATP)
2. Asynchronous Transaction Input Processing programs (DFHRD1 and DFHRD2)
3. Asynchronous Transaction Output Processing programs (DFHWT1 and DFHWT2)
4. Asynchronous Queue Purge program (DFHAQP)

Note that this macro instruction is effective only if ATP=YES was included in the DFHSG TYPE=INITIAL macro instruction.

PROGRAM: The PROGRAM=ATP operand indicates that the Asynchronous Transaction Processing group is to be generated.

INBUFF: This operand is used to specify the size (in bytes) of the input buffer used by the Asynchronous Transaction Input Processing programs. The value specified should not exceed full track capacity for the device being used, or, in the case of CICS/OS, should not exceed the block size specified on the intrapartition data set data definition (DD) card at start-up time.

OUTBUFF: This operand is used to specify the size (in bytes) of the output buffer used by the Asynchronous Transaction Control program. The value specified should not exceed full track capacity for the device being used, or, in the case of CICS/OS, should not exceed the block size specified on the intrapartition data set data definition (DD) card at startup time.

TERMINATION OF CICS/DOS SYSTEM GENERATION

Terminating JCL for Stage II is produced in response to the

```
DFHSG TYPE=FINAL
```

macro instruction. This macro instruction is effective only in the CICS/DOS systems and must be the last statement of the CICS/DOS system generation input stream preceding the Assembler END card.

GENERATION OF CICS/OS DATA LANGUAGE/I FACILITIES

To provide CICS/OS application programs optional access to the Data Language/I (DL/I) facility of the IBM Information Management System (IMS/360), the following steps are necessary:

1. Generate an IMS/360 Version 2 Data Base System capable of executing batch IMS/360 programs. This system must be Modification Level 2 or later.

2. Indicate during generation of CICS that application programs can access DL/I. This is done by coding

   ```
   DFHSG TYPE=INITIAL,DL1=YES
   ```

3. Generate a System Initialization Table (SIT) which includes parameters for the CICS-DL/I interface. Applicable parameters are DL1, PSB, BUFPL, PSBPL and DMBPL; these parameters may be included or overridden at execution time.

4. Include the following CICS options during generation of CICS:

    a. Task Control ENQUEUE/DEQUEUE
    b. File Control LOCATE
    c. Interval Contrcl program (ICP)

5. Generate IMS/360 Ccntrol Blocks as detailed below.

DEFINING PSB'S ANC PCB'S

The CICS-DL/I interface has the following requirements for Program Specification Block (PSB) generation:

1. A special initialization PSB is used by CICS-DL/I Initialization to bring the proper DL/I modules into storage. This PSB, called the "initialization" PSB is not used by any transaction. Program Communication Blocks (PCB's) are defined within the PSB to indicate what type of CALL's and data bases DL/I will be called upon to service. The following rules apply.

    a. Define one data base PCB (TYPE=DB) for each of the following access methods to be used: HSAM, HDAM.

    b. Define two data base PCB's for the same data base for each of the fcllowing access methods to be used: HISAM, HIDAM. These PCB's will be referred tc as a PCB pair. Their specification causes BISAM rather than QISAM to be used.

    c. Within each PCB, define PROCOPT (processing options) to include all processing options to be performed against all the data bases using that access method. That is, if one HDAM data base is to be accessed via PROCOPT=GE and another via PRCCOPT=GRP, the combined PROCOPT to be specified is PROCOPT=GRPE.

    d. For each PCB being defined, provide one SENSEG statement. For the PCB pairs required for HISAM or HIDAM (see above), the SENSEG statements must refer to the same segment type. If the use of QISAM is desired in addition to BISAM, provide an additional SENSEG statement in one PCB of the PCB pair.

    e. In the PCB statement, specify KEYLEN to be the length of the key field defined in the SENSEG statement in (d) above.

    f. The last statement preceding the END statement in the assembly should be written:

    ```
    PSBGEN  LANG=ASSEM,PSBNAME=psbname
    ```

    If DL1=YES is specified during CICS System Initialization, the PSB used is named CICS PSB unless overriden in the System Initialization Table or by the execution time PSB parameter.

2. If an application programmer does not name a PSB in the DL/I CAlL, the PSB used has the name of the program whose name is in the Program Control Table (PCT) entry for this transaction. Therefore, for all transactions with DL/I CALL's where the PSB name is not specified, there must be a PSB generated with the same name as the program name in the PCT entry for the transaction. For PL/I programs, specify that the PSB is for PL/I.

3. If an application programmer names a PSB in the DL/I CALL, there must be a PSB generated with the name used in that CALL. For PL/I programs, specify that the PSB is for PL/I.

The CICS-DL/I Interface uses the pre-built blocks feature of DL/I. After all Program Specification Blocks (PSB's) and Data Base Descriptions (DBD's) have been generated, the user must then generate Application Control Blocks (ACB's) in the IMS/360 ACB Library for all PSB's to be used. The instructions for this generation are included in the _IMS/360 Utilities Manual_.

DEFINING PSB AND DMB DIRECTORIES DURING CICS GENERATION

A PSB Directory (PDIR) list and DMB Directory (DDIR) list must be built for the CICS-DL/I Interface. Each of these lists is built by a separate assembly and link edit. Both lists are then included in the link edit of DFHDLQ as described in the CICS/OS Operations Guide.

PSB Directory List

Each PSB excluding the initialization PSB, to be used by transactions is defined via the statement:

```
label    DFHDLPSB PSB=psbname
```

The last statement in the assembly preceding the END statement is:

```
label    DFHDLPSB TYPE=FINAL
```

The NAME card for the Linkage Editor is written:

```
NAME DFHDLPSB(R)
```

DMB Directory List

Each Data Base Description (DBD) used by the system is defined via the statement:

```
label    DFHDLDBD (INDEX,)DBD=dbdname
```

where the positional operand, INDEX, indicates that this is a DFHDLDBD statement for the INDEX DBD of a HIDAM data base.

The last statement in the assembly preceding the END statement is:

```
(label) DFHDLDBD TYPE=FINAL
```

The NAME card for the Linkage Editor is written:

```
NAME DFHDLDBD(R)
```

SYSTEM TABLE PREPARATION

CICS is dependent upon user-created system tables which describe the user's data base/data communications environment and the treatment the user wishes given to the elements of that environment. Contained in the system tables is information regarding the user's terminals, data sets (permanent and temporary), programs, and transactions. These tables are created independently of system generation. However, they are required for the system to be operational.

CICS is dynamically configured under user control during system initialization. The desired system tables are selected by the user, based on a standard naming and suffixing convention. Each of the tables is created separately and may be recreated at any time prior to system initialization. More than one system table of each type can be maintained at the same time. This allows the user to maintain special tables for testing in addition to the operational tables.

The system tables are prepared (generated) by assembling the appropriate macro instruction and its associated operands using the Assembler program. The output of each assembly contains the required Linkage Editor control cards. The tables are named in the following manner:

TABLE	NAME
System Initialization Table	DFHSITxx
Terminal Control Table	DFHTCTxx
File Control Table	DFHFCTxx
Destination Control Table	DFHDCTxx
Program Control Table	DFHPCTxx
Processing Program Table	DFHPPTxx

The first six positions are standard for each of the tables. The last two positions (xx) may be specified by the user to allow several versions of a table to be maintained; any two characters (other than 'NO') are valid. The suffix which the user assigns to a table is used to determine which version of that table is to be loaded into the system during system initialization.

When generating system tables, the assembly of each table must be terminated by an Assembler END statement which includes a mandatory label (symbol) of the form DFHxxxBA, where xxx is the three-character table designation (for example, END DFHFCTBA terminates the assembly of the File Control Table).

See the appropriate CICS Operations Guide for details concerning the link editing of the tables.

A detailed description follows of what is required to complete the control cards or macro instructions for each of the system tables.

SYSTEM INITIALIZATION TABLE (SIT)

The initialization of CICS is both flexible and dynamic. The flexibility at the time of initialization is provided by the System Initialization Table (base name: DFHSIT). The contents of the DFHSIT macro which is assembled as a table supplies the System Initialization program with the information to initialize the system to meet the user's unique environment. During the initialization process, the user is given an opportunity to dynamically change some of the parameters, as required.

The information contained in DFHSIT may be grouped into three catagories for purposes of discussion:

1. Information used to initialize and control system functions (for example, storage cushion size, system partition/region exit time interval, etc.).
2. Module suffixes used to load the user-specified version of the CICS contrcl modules and tables (for example, DFHPCTxx, DFHFCPxx, etc.).
3. Special information used to control the initialization process.

The user also has the flexibility of generating several System Initialization Tables and selecting the appropriate one at the time of initialization.

The following operands can be included in the DFHSIT macro instruction:

```
       DFHSIT TYPE=CSECT,DSECT,                                        *
              SUFFIX=xx,                                               *
              TRT=decimal value,                                       *
              SCS=decimal value,                                       *
              SP1=decimal value,                                       *
              DVT=2311,2314,3330,                                      *
              MSGLVL=0,1,                                              *
              TSBLK=decimal value,                                     *
              ICV=decimal value,                                       *
              ICVS=decimal value,                                      *
              ICVR=decimal value,                                      *
              CDL=decimal value,                                       *
              MXT=decimal value,                                       *
              TCT=xx,                                                  *
              PPT=xx,                                                  *
              PCT=xx,                                                  *
              FCT=xx,NO,                                               *
              DCT=xx,NO,                                               *
              CSA=xx,                                                  *
              KCP=xx,                                                  *
              SCP=xx,                                                  *
              PCP=xx,                                                  *
              DCP=xx,NO,                                               *
              ICP=xx,NO,                                               *
              TCP=xx,                                                  *
              FCP=xx,                                                  *
              TDP=xx,                                                  *
              TRP=xx,                                                  *
              PIP=xx,NO,                                               *
              TSP=xx,NO,                                               *
              OSCOR=decimal value,                                     *
              PL1=YES,NO,                                              *
              DL1=YES,NO,                                              *
              PSB=name,                                                *
              PSBPL=number,                                            *
              DMBPL=number,                                            *
              BUFPL=number,                                            *
              ATP=YES,NO,                                              *
              ATPMT=number,                                            *
              ATPMB=number,                                            *
              SIMODS=(A2,B1,C1,C2,C3,D1,E1) or
                     (A2,B1,C1,D1,E1)
```

TYPE: Specifies whether a CSECT or DSECT of the System Initialization Table is to be generated. If alternate or additional System Initialization modules are coded by the user, a DSECT may be required to provide symbolic addressability to values in the table. The default is TYPE=CSECT.

SUFFIX: Specifies a two-character alphameric suffix for the System Initialization Table being assembled. This suffix, if specified, is appended to the standard module name (DFHSIT) and is used to name the module on the linkage editor output library. If this operand is cmitted, a suffix is not provided.

TRT: Specifies the number of entries that are to be provided in the CICS Trace Table. If the user has not generated the Trace facility, this operand should be ignored or set to 0. (See the discussion of DFHSG TYPE=INITIAL.) If Trace has been generated and this parameter is 0, a dummy Trace facility is loaded (DFHTRPDY). The default is TRT=0.

SCS: Specifies the number of bytes (minimum 20) which are to be reserved for the storage cushion. The default is SCS=500.

SP1: Specifies the number of bytes to be reserved for subpool 1 storage in the CICS/DOS-ENTRY system. The default is SP1=0. To arrive at the size required, refer to "Storage Estimates and Considerations" in the CICS General Information Manual (GH20-1028).

DVT: Applicable only to the CICS/DOS systems, this operand specifies the device type on which the CICS/DOS system data sets reside. These data sets include the following:

1. CICS Real-Time Relocatable Program Library
2. CICS Real-Time Pre-Located Program Library (CICS/DOS-ENTRY system only)
3. CICS Transaction Rollout Data Set (CICS/DOS-ENTRY system only)

Since no default is provided, 2311, 2314 or 3330 must be specified.

MSGLVL: Specifies a message level of either 0 or 1 which controls the generation of messages to the console during system initialization. MSGLVL=0 allows only critical I/O errors or interactive messages to appear. MSGLVL=1 allows all messages to be printed. The default is MSGLVL=1.

TSBLK: Applicable only to the CICS/DOS systems, this operand specifies the block size (as a decimal value) for records on the auxiliary temporary storage data set. The default is TSBLK=3625.

ICV: Specifies the system partition/region exit time interval in milliseconds. The default is ICV=1000.

ICVS: Specifies the system stall time interval in milliseconds as a decimal value. The default is ICVS=20000.

ICVR: Specifies the runaway task time interval in milliseconds as a decimal value. The default is ICVR=5000. If ICVR=0000, runaway task control is suspended for the duration of the current execution of CICS.

CDL: Applicable only to the CICS/DOS-ENTRY system, this operand specifies the consecutive dispatch limit as a decimal value. The default is CDL=5.

MXT: This operand is used to specify the maximum number of tasks (both synchronous and asynchronous tasks in the case of the CICS/DOS-STANDARD and CICS/OS-STANDARD systems) that can be initiated concurrently within CICS. When the number of active tasks reaches this level, no new tasks are initiated by the Terminal Control program. The default is MXT=5.

TCT...TSP: Each of the operands contained in Figure 1 allows the user to specify a two-character suffix which is appended to the standard name before loading the CICS nucleus. For example, KCP=B1 causes the DFHKCPB1 Task Control module to be included in the CICS nucleus. In each case, the default suffix is blank.

OPERAND	STANDARD NAME	PROGRAM
TCT=xx	DFHTCT	Terminal Control Table
PPT=xx	DFHPPT	Processing Program Table
PCT=xx	DFHPCT	Program Control Table
FCT=xx,NO	DFHFCT	File Control Table
DCT=xx,NO	DFHDCT	Destination Control Table
CSA=xx	DFHCSA	Common System Area
KCP=xx	DFHKCP	Task Control Program
SCP=xx	DFHSCP	Storage Control Program
PCP=xx	DFHPCP	Program Control Program
DCP=xx,NO	DFHDCP	Dump Control Program
ICP=xx,NO	DFHICP	Interval Control Program
TCP=xx	DFHTCP	Terminal Control Program
FCP=xx	DFHFCP	File Control Program
TDP=xx	DFHTDP	Transient Data Program
TRP=xx	DFHTRP	Trace Control Program
PIP=xx,NO	DFHPIP	Program Interrupt Program
TSP=xx,NO	DFHTSP	Temporary Storage Program

Note: If NO is coded, a dummy module is loaded (except in the case of PIP where the program interrupt facility is not provided if NO is coded). FCT=Nc and DCT=NO cause a dummy FCP and a dummy TDP to be loaded, respectively. For CICS/OS, PIP must be included in the CICS nucleus if the runaway task ccntrol feature is to be supported.

Since CICS does not provide generatable options for DFHPIP and DFHTRP, PIP=xx and TRP=xx are used, respectively, only if the user wishes to provide his own version of these programs.

Figure 1. Resident program suffixes

OSCOR: Applicable only to the CICS/OS-STANDARD system, this operand specifies a one- to six-digit decimal value indicating the amount of main storage to be provided from the CICS partition/region for the use of the operating system during CICS execution. The default is

OSCOR=0; however, the minimum amount of main storage available to the operating system is equal to the size of the System Initialization program (DFHSIP).

If the value specified is greater than the size of DFHSIP, the amount of main storage provided for the use of the operating system is equal to the size of DFHSIP plus the amount specified in excess of the size of DFHSIP. Note that this main storage is not available to the operating system until DFHSIP transfers control to the Dummy CSA program (DFHDCSA).

The user should be aware that an incorrect OSCOR specification could adversely affect system performance. The value specified should accurately reflect the amount of main storage required by the operating system, depending upon the CICS configuration.

| PL1: The PL1=YES operand indicates that programs coded in PL/I are to be processed. The default is PL1=NO.

DL1: Applicable only to the CICS/OS-STANDARD system, this operand is used to indicate whether or not Data Language/I (DL/I) data bases are to be accessed during execution of CICS. The default is DL1=NO.

PSB: Applicable only to the CICS/OS-STANDARD system and only if the CICS-DL/I Interface is being generated, this operand is used to specify the one- to eight-character name of the Program Specification Block (PSB) used during IMS initialization. This PSB contains a Program Communication Block (PCB) for each DL/I access method to be used (two PCB's in the case of HISAM), and is used to load all required DL/I modules during initialization. The default is PSB=CICSPSB.

PSBPL: Applicable only to the CICS/OS-STANDARD system and only if the CICS-DL/I Interface is being generated, this operand is used to specify the Program Specification Block (PSB) pool size in 1024-byte blocks for CICS-DL/I Interface support. The number of 1024-byte blocks specified must be in the range 0-999. This operand corresponds to the PSB operand of the IMS/360 BUFPOOLS system generation macro instruction and to the III parameter of the IMS/360 CTL or CTX parameter list for online execution. The default is PSBPL=4.

DMBPL: Applicable only to the CICS/OS-STANDARD system and only if the CICS-DL/I Interface is being generated, this operand is used to specify the Data Management Block (DMB) pool size in 1024-byte blocks for CICS-DL/I Interface support. The number of 1024-byte blocks specified must be in the range 0-999. This operand corresponds to the DMB operand of the IMS/360 BUFPOOLS system generation macro instruction and to the JJJ parameter of the IMS/360 CTL or CTX parameter list for online execution. The default is DMBPL=4.

BUFPL: Applicable only to the CICS/OS-STANDARD system and only if the CICS-DL/I Interface is being generated, this operand is used to specify the DL/I data base buffer pool size in 1024-byte blocks. The number of 1024-byte blocks specified must be in the range 0-999. This operand corresponds to the DBASE operand of the IMS/360 BUFPOOLS system generation macro instruction and to the HHH parameter of the IMS/360 CTL or CTX parameter list for online execution. The default is BUFPL=8.

ATP: Applicable only to the CICS/DOS-STANDARD and CICS/OS-STANDARD systems, this operand is used to indicate whether or not the Asynchronous Transaction Processing facility (ATP) is to be generated. The default is ATP=NO.

ATPMT: Applicable only to the CICS/DOS-STANDARD and CICS/OS-STANDARD systems, this operand is used to specify, as a decimal value, the maximum number of asynchronous tasks that can be initiated concurrently within CICS by the Asynchronous Transaction Processing Control program (DFHATP). When the number of active asynchronous tasks reaches this level, no new asynchronous tasks are initiated by DFHATP. The default is ATPMT=1.

ATPMB: Applicable only to the CICS/DOS-STANDARD and CICS/OS-STANDARD systems, this operand is used to specify, as a decimal value, the asynchronous task inhibitor value. When the number of active tasks (both synchronous and asynchronous) reaches this level, the Asynchronous Transaction Processing Control program (DFHATP) does not initiate any new asynchronous tasks, even though the number of asynchronous tasks currently active is less than the value specified in the ATPMT operand. Thus, even though no asynchronous tasks are active, none are initiated if the total of all other active tasks has reached the level specified in this operand. If this operand is omitted, the default value is equal to one less than the value specified in the MXT operand.

SIMODS: Applicable only to the CICS/DOS systems, this operand is used to change the last two characters of the phase names of the System Initialization overlays and/or allow the addition of one user-written overlay. The phase names of the System Initialization overlays are located in the DOS Core Image Library and must be seven characters in length; the first five characters are DFHSI and the last two characters are specified through use of this operand. The default is SIMODS=(A2,B1,C1,C2,C3,D1,E1) for the CICS/DOS-ENTRY system and SIMODS=(A2,B1,C1,D1,E1) for the CICS/DOS-STANDARD system.

The order in which the overlays are executed is determined by the sequence of the parameters of the SIMODS specification. For example, in response to the SIMODS=(AS,BS,CS,DS,ES) specification, the overlays are loaded in the order DFHSIAS, DFHSIBS, DFHSICS, DFHSIDS, DFHSIES. In response to the SIMODS=(AS,BS,CS,DS,US,ES) specification, the overlays are loaded in the order DFHSIAS, DFHSIBS, DFHSICS, DFHSIDS, DFHSIUS, DFHSIES.

If an additional user-written overlay is to be provided, the SIMODS specification for the CICS/DOS-ENTRY and CICS/DOS-STANDARD systems would contain eight parameters and six parameters, respectively.

TERMINAL CONTROL TABLE (TCT)

The Terminal Control Table provides a means whereby the user of CICS can specify the terminal environment in which the system will operate. The Terminal Control Table contains the data needed by the control system to perform its terminal management functions. The user can create more than one Terminal Control Table to describe both his operational and his terminal testing environment.

The Terminal Control Table macro instruction (DFHTCT) is used to specify the user's terminal environment which can include telecommunication devices, sequential processing devices, and graphic devices. The following operands can be included in the DFHTCT macro instruction:

```
       DFHTCT TYPE=INITIAL,                                            *
              SUFFIX=xx

       DFHTCT TYPE=SDSCI,                                              *
              DEVADDR=SYSnnn,                                          *
              DEVICE=1030,1050,1130,1403,1404,1442,1443,1445,          *
                     2020,2260,L2260,2265,2311,2314,2501,2520,         *
                     2540,2740,2740/2760,2741C,2741E,2770,2780,        *
                     2980,3275,3277,L3277,3284,L3284,3286,L3286,       *
                     3330,3735,7770,BSCMDMPT,BSCMDPPT,BSCMDSW,DASD,    *
                     DISK,SYS/3,SYS/7,S360,TAPE,TW33,TW35,TCAM,        *
              DSCNAME=name,                                            *
              ERROPT=E,R,W,C,N,RW,T,                                   *
              FEATURE=(STC,CHK,BSC,KBL,OIU,SIX,SXW,SIW,RIX,            *
                      RXW,RIW,MAS,SLV,APL),                            *
              LINELST=(nnn1,...,nnn31),                                *
              SWITCH=YES,NO,                                           *
              CU=2701,2702,2703,2848,3272,                             *
              CONFIG=PPT,MPT,                                          *
              BSCODE=EBCDIC,ASCII,TRANSCODE,                           *
              MODELST=(n1,...,n31),                                    *
              RETRY=number,                                            *
              TERMTST=YES,NO,                                          *
              LERBADR=symbolic address,                                *
              DDNAME=name,                                             *
              MACRF=(R,W),                                             *
              FLNNAME=name,                                            *
              NCP=number,                                              *
              MODE=(,CNTRL,A or B,A or B),                             *
              BLKSIZE=length,                                          *
              RECFM=F,V,U,                                             *
              SYNAD=symbolic name,                                     *
              OPTCD=W,WU,WC,WUC,                                       *
              APPENDG=appendage suffix

symbol DFHTCT TYPE=LINE,                                               *
              ACCMETH=SAM,BSAM,BTAM,BGAM,TCAM,SEQUENTIAL,GRAPHIC,      *
                      TELECOMMUNICATION,                               *
              TRMTYPE=1030,1050,1053,1130,2020,2260,L2260,2265,        *
                      2740,2740/2760,2741C,2741E,2770,2780,2980,       *
                      3275,3277,L3277,3284,L3284,3286,L3286,3735,7770, *
                      SYS/3,SYS/7,S360,CRLP,DASD,TAPE,TWX,U/R,         *
              CLASS=(CONV,BATCH,VIDEO,HARDCOPY,BISYNC,AUDIO),          *
              DSCNAME=name,                                            *
              ISADSCN=name,                                            *
              OSADSCN=name,                                            *
              INAREAL=length,                                          *
              TRMMODL=number or character,                             *
              BTAMRLN=number,                                          *
              LISTADR=(name,WRAP),                                     *
              FEATURE=(AUTOANSR,AUTOCALL,AUTOPOLL,CHECKING,            *
                      SCONTROL,BUFFRECV,KBRDLOCK),                     *
              NPDELAY=number,                                          *
              POOLADR=symbolic address,                                *
              ANSWRBK=AUTOMATIC,TERMINAL,NULL,EXIDVER,                 *
              LINSTAT='OUT OF SERVICE',                                *
              BSCODE=EBCDIC,ASCII,TRANSCODE,                           *
              CONVTAB=EBCDIC,ASCII,TRANSCODE,TEXTMODE,ABB,ABC,         *
              RDYMSG=symbolic address,                                 *
              ERRMSG=symbolic address,                                 *
              GENPOLL=YES,                                             *
              POOLCNT=number,                                          *
              TCTUAL=number,                                           *
              OUTQ=symbolic name,                                      *
              POOL=YES,                                                *
              QUEUEID=hexadecimal number                               *

symbol DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=name,                                            *
              TRMPRTY=number,                                          *
              TRMMODL=number,character,                                *
              TRMTYPE=1030,1050,1053,1130,2020,2260,L2260,2265,        *
                     2740,2740/2760,2741C,2741E,2770,2780,2980,        *
                     3275,3277,L3277,3284,L3284,3286,L3286,3735,7770,  *
                     SYS/3,SYS/7,S360,CRLP,DASD,TAPE,TWX,U/R,          *
              CLASS=(CONV,BATCH,VIDEO,HARDCOPY,BISYNC,AUDIO),          *
              LVUNIT=number,                                           *
              LASTTRM=LINE,GACB,POOL,                                  *
              TRMADDR=address,name,                                    *
              TRMSTAT=(TRANSACTION,TRANSCEIVE,RECEIVE,'OUT OF SERVICE',*
                     INPUT),                                           *
              COMPAT=NO,(number of characters,number of lines,         *
                    device type,model number),                         *
              FEATURE=(PTRADAPT,SELECTPEN,AUDALARM,COPY,BUFEXP,        *
                     DCKYBD,UCTRAN),                                   *
              POLLPOS=number,                                          *
              TRANSID=name,                                            *
              STN2980=number,                                          *
              TAB2980=number,                                          *
              TIOAL=number,                                            *
              TCTUAL=number

symbol DFHTCT TYPE=7770MSG,                                            *
              MESSAGE='message'

       DFHTCT TYPE=FINAL
```

ESTABLISH CONTROL SECTION FOR TERMINAL CONTROL TABLE

The area of main storage into which the Terminal Control Table is assembled is established in response to the

```
       DFHTCT TYPE=INITIAL,                                            *
              SUFFIX=xx
```

macro instruction, which must precede all other DFHTCT macro instructions in a Terminal Control Table assembly.

SUFFIX: This operand specifies a two-character alphameric suffix for the Terminal Control Table being assembled. This suffix, if specified, is appended to the standard module name (DFHTCT) and is used to name the module on the linkage editor output library. If this operand is cmitted, a suffix is not provided.

SPECIFY DATA SET CONTROL INFORMATION

The user must specify data set control information through use of the

```
       DFHTCT TYPE=SDSCI
```

macro instruction, which causes the control system to generate the appropriate data set control information. DTF information is generated in the CICS/DOS systems; DCB information is generated in the CICS/OS system. This macro instruction can include the following operands:

```
       DFHTCT TYPE=SDSCI,                                             *
              DEVADDR=SYSnnn,                                         *
              DEVICE=1030,1050,1130,1403,1404,1442,1443,1445,         *
                     2020,2260,L2260,2265,2311,2314,2501,2520,        *
                     2540,2740,2740/2760,2741C,2741E,2770,2780,       *
                     2980,3275,3277,L3277,3284,L3284,3286,L3286,      *
                     3330,3735,7770,BSCMDMPT,BSCMDPPT,BSCMDSW,DASD,   *
                     DISK,SYS/3,SYS/7,S360,TAPE,TW33,TW35,TCAM,       *
              DSCNAME=name,                                           *
              ERROPT=E,R,W,C,N,RW,T,                                  *
              FEATURE=(STC,CHK,TRC,BSC,KBL,OIU,SIX,SXW,SIW,RIX,       *
                      RXW,RIW,MAS,SLV,APL),                           *
              LINELST=(nnn1,...,nnn31),                               *
              SWITCH=YES,NO,                                          *
              CU=2701,2702,2703,2848,3272,                            *
              CCNFIG=PPT,MPT,                                         *
              BSCODE=EBCDIC,ASCII,TRANSCODE,                          *
              MODELST=(n1,...,n31),                                   *
              RETRY=number,                                           *
              TERMTST=YES,NO,                                         *
              LERBADR=symbclic address,                               *
              DDNAME=name,                                            *
              MACRF=(R,W),                                            *
              FLNNAME=name,                                           *
              NCP=number,                                             *
              MODE=(,CNTRL,A or B,A or B),                            *
              BLKSIZE=length,                                         *
              RECFM=F,V,U,                                            *
              SYNAD=symbolic name,                                    *
              OPTCD=W,WU,WC,WUC,                                      *
              APPENDG=appendage suffix
```

Two DFHTCT TYPE=SDSCI macro instructions must be coded for each sequential terminal. One macro instruction is for the sequential input data set and the cther macro instruction is for the sequential output data set. This input/output data set combination simulates the input and output functions of a terminal. One DFHTCT TYPE=LINE macro instruction must be coded for this I/O combination.

One DFHTCT TYPE=SDSCI macro instruction must be coded for each BTAM line group, where a line group is a group of communication lines that meet the following operational requirements:

1. All lines in the group are attached to the channel through the same type of telecommunications control unit; for example, a 2701. (This is true only for the CICS/DOS systems.)
2. The line ccnnection between the control unit and the remote devices is of the same type; for example, a switched network.
3. All devices within the line group have the same line features and operating characteristics; for example, autopoll.

DEVADDR: Applicable only to the CICS/DOS systems, this operand specifies the symbolic unit address (sequential device) used for sequential terminal data sets.

DEVICE: Specifies the valid device types for this Terminal Control Table. L2260 signifies "local video attachment". 2260 and 2265 signify "remote video attachment". L3277, L3284, and L3286 signify "local 3270 attachment". 3275, 3277, 3284, and 3286 signify "remote 3270 attachment". BSCMDPPT signifies "mixed binary synchronous point-to-point devices". BSCMDSW signifies "mixed binary synchronous switched devices". BSCMDMPT signifies "mixed binary synchronous multipoint devices".

Support for a 1053 printer is included when 2260, L2260, or 2265 is specified. In the CICS/OS-STANDARD system, this operand automatically generates the MACRF operand.

A 2740 Communication Terminal with 2760 Optical Image Unit can be specified as either a 2740 or 2740/2760.

DEVICE=TCAM (applicable only to CICS/OS) causes CICS to generate the appropriate data set control information to handle the TCAM input cr output process queue.

DSCNAME: Specifies the symbolic data set control name associated with the data set control information.

The DSCNAME for the sequential input data set must be the same name as that specified in the ISADSCN=name operand of the DFHTCT TYPE=LINE macro instruction. The DSCNAME for the sequential output data set must be the same name as that specified in the OSADSCN=name operand of the DFHTCT TYPE=LINE macro instruction.

The DSCNAME for BTAM data sets must be the same name as that specified in the DSCNAME=name operand of the DFHTCT TYPE=LINE macro instruction.

ERROPT: Specifies the error recovery, error recording, and online test options to be provided for the line group. The applicable keyword parameters are:

1. E, specifies that the basic error recovery procedures are to be provided for the line group. If ERROPT is omitted, ERROPT=E is assumed.
2. R, specifies that text-read errors are to be retried in addition to the basic error recovery procedures. This option is valid only for the following terminals: 1050 terminals (valid for the card reader and paper tape reader only if the line correction feature is installed), 2740 terminals with the checking feature, and 2260 terminals.
3. W, specifies that text-write errors are to be retried in addition to the basic error recovery procedures. This option is valid for all start-stop terminals. It is invalid for binary synchronous terminals. It results in an additional copy of the message for each retry (except for the 2260 with the line address feature, and the 1050 card punch and paper tape punch with the line correcticn feature). This parameter is ignored for binary synchronous terminals.
4. C, specifies that threshold error counts and cumulative error counts are to be maintained in the line error recording block (LERB) for the line for data check, intervention required, and

nontext timeout errors. This parameter is applicable only to the CICS/OS-STANDARD system.

5. N, specifies that no error recovery procedures are to be provided for the line group. This parameter and E,R,W, and C are mutually exclusive. This parameter is invalid for binary synchronous stations; if coded, it is ignored.
6. RW, specifies that error recovery is to be performed with "read text retry" and "write text retry".
7. T, specifies that the online test facility is to be used for the line group. Applicable only to the CICS/OS-STANDARD system, this parameter is valid for all IBM terminals with or without error recovery capability.

For CICS/OS, EROPT is also a valid spelling of this operand.

FEATURE: Applicable only to the CICS/DOS systems, this operand specifies device-dependent machine special features and programming special features. The applicable keyword parameters are:

1. STC, specifies that the 2740 is equipped with the station control feature.
2. CHK, specifies that the 2740 is equipped with checking feature.
3. BSC, must be coded when the DEVICE operand specifies a binary synchronous device.
4. KBL, specifies that the 2848 control unit is equipped with the data entry feature. The Lock optypes are rejected as undefined if this parameter is not used.
5. OIU, specifies that a 2760 Optical Image Unit is attached to a 2740 with the checking feature and, optionally, the dial feature.
6. SIX, SXW, or SIW, used if ID verification for a calling operation is to occur in a binary synchronous point-to-point dial system. A more detailed explanation of these codes is given in the publication, <u>DOS Basic Telecommunications Access Method</u> (GC30-5001).
7. RIX, RXW, or RIW, used if ID verification for an answering operation is to occur in a binary synchronous point-to-point dial system. A more detailed explanation of these codes is given in the publication, <u>DOS Basic Telecommunications Access Method</u> (GC30-5001).
8. MAS or SLV, used to specify whether the CPU is to be Master (MAS) or Slave (SLV) when contention occurs in a binary synchronous CPU-to-CPU contention system (private line). If this operand is not used, FEATURE=MAS is assumed for this system. If FEATURE=MAS is specified, the remote device is to be the slave when contention occurs. If FEATURE=SLV is specified, the remote device is the master. When the remote device is the 2780, FEATURE=SLV must always be coded. The CPU must always be the slave when contention occurs between the CPU and the remote 2780.
9. APL, specifies that the autopoll feature is to be employed for the start-stop devices. If FEATURE=APL is omitted, the generated channel programs for these devices will perform the standard programmed polling. A more detailed explanation of this code is given in the publication, <u>DOS Basic Telecommunications Access Method</u> (GC30-5001).

IINELST: Applicable only to the CICS/DOS systems, this operand specifies the correspondence between symbolic unit (SYSnnn) and relative line number. The user codes one three-digit number (nnn of SYSnnn) for each line in the line group. The order in which the three-digit numbers are coded determines which symbolic units are associated with the individual lines in the line group. As many as 31 three-digit numbers from 000-244 may be coded in this operand.

For local 2260's and local 3270's, each number entry represents a physical device; all lccal devices attached to the same control unit must be specified in the same LINELST operand.

SWITCH: Applicable only to the CICS/DOS systems, this operand specifies the type of line connection between the system and the remote device. SWITCH=YES indicates that the line connection is through a switched network. SWITCH=NO indicates that the line connection is dedicated. The default is SWITCH=NO.

CU: Applicable only to the CICS/DOS systems, this operand defines the contrcl unit attached to the channel (such as a 2701, 2702, 2703, 2848, or 3272). This operand is required for all non-sequential devices. If using the System/360 Model 25 with the Integrated Communications Attachment, CU=2703 must be specified.

CONFIG: Applicable only to the CICS/DOS systems, this operand specifies the type cf binary synchronous line configuration. CONFIG=PPT indicates that the data link between the CPU and the remote binary synchronous device is point-to-point. CONFIG=MPT indicates that the data link between the CPU and the remote binary synchronous devices is a multipoint link. The default is CONFIG=PPT.

BSCODE: Specifies the type of binary synchronous transmission code. BSCODE=EBCDIC indicates transmission in Extended Binary Coded Decimal Interchange Code. BSCODE=ASCII indicates transmission in American Standard Code for Information Interchange. BSCODE=TRANSCODE indicates transmission in six-bit TRANSCODE.

MODELST: Applicable only to the CICS/DOS systems, this operand is used to specify a code (0,1,2,3) for each line in a binary synchronous line group to be used by BTAM at OPEN time. If this operand is omitted, code 0 is assumed for each line in the line group. A more detailed explanation of this operand is given in the publication _DOS Basic Telecommunications Access Method_ (GC30-5001). CICS does not support the use of codes 4, 5, 6, and 7. If converting from CICS/DOS to CICS/OS, this operand must be recoded as MODE.

RETRY: Specifies the number of retries (0-15) by BTAM for recoverable errors that occur on I/O operations for binary synchronous communication. If this operand is omitted, RETRY=7 is assumed.

TERMTST: Applicable only to the CICS/DOS systems, this operand specifies whether or not the online terminal test facility is to be used. The default is TERMTST=NO. A more detailed explanation of this operand is given in the publication, _DOS Basic Telecommunications Access Method_ (GC30-5001). For CICS/OS, the online terminal test facility is specified through the ERROPT operand.

LERBADR: Specifies the label of the BTAM line error recording block (LERB) in which the user has specified his LERB parameters. This operand is valid only if ERROPT=C is also specified. For CICS/OS, LERB is also a valid spelling of this operand.

DDNAME: Applicable only to the CICS/OS-STANDARD system, this operand is used to supply the name of the data definition (DD) statement associated with a particular data set (line group). If converting from CICS/DOS to CICS/OS and this operand is omitted, the DSCNAME becomes the DDNAME.

MACRF: Applicable only to the CICS/OS-STANDARD system, MACRF=(R,W) indicates that access to the BTAM line group or to sequential devices is to be gained via either READ or WRITE macro instructions, or both. The default for BTAM line groups is MACRF=(R,W); the OPEN option for BTAM line groups defaults to input.

For sequential devices (other than card reader and line printer), MACRF=R or MACRF=W must be specified. The default is MACRF=R for a card reader and MACRF=W for a line printer.

FLNNAME: Applicable only to the CICS/OS-STANDARD system, this operand is used to supply the name of the first communication line entry that is defined by the DFHTCT TYPE=LINE macro instruction for local 2260's.

NCP: Applicable only to the CICS/OS-STANDARD system, this operand is used to indicate the number of channel programs that are to be specified when using the Graphics Access Method. The default is NCP=1.

MODE: Applicable only to the CICS/OS-STANDARD system, this operand specifies the mode of communication for a binary synchronous line group. A more detailed explanation of this operand is given in the publication, OS Basic Telecommunications Access Method (GC30-2004). Note that since CICS does not support the IBC parameter described in GC30-2004, a comma must be substituted in place of the IBC parameter.

BLKSIZE: This operand is used for sequential data sets and 7770 Model 3's to specify the maximum length (in bytes) of a block. For 7770 Model 3's this value should be the same as that specified for INAREAL in the line entries that reference the DSCNAME of this DFHTCT TYPE=SDSCI macro instruction.

For the CICS/OS-STANDARD system, the default is BLKSIZE=0. If this operand is omitted, the block size can be specified in the data definition (DD) statement associated with the data set. A more detailed explanation of this operand is given in the publication OS Supervisor and Data Management Macro Instructions, GC28-6647.

For the CICS/DOS systems, the default is BLKSIZE=80. A more detailed explanation of this operand is given in the publication DOS Supervisor and I/O Macros, GC24-5037.

RECFM: Applicable only to the CICS/OS-STANDARD system, this operand is used for sequential data sets to specify the record fromat for the DCB. Applicable keyword parameters are F (fixed-length records), V (variable-length records), and U (undefined records). The default is RECFM=U. If this operand is omitted, the record format can be specified in the data definition (DD) statement associated with the sequential data set.

SYNAD: Applicable only to CICS/OS with TCAM, this symbolic name specifies the address of a subroutine to be given control if message processing is used; the work unit is larger than the work area, and CPTCD=C is not specified.

For input queues, the user has the option of specifying his own SYNAD routine for which an EXTRN is generated. If SYNAD is not specified, a CICS generated SYNAD routine is provided. If CICS SYNAD is used and the exit occurs:

1. Message DFH4000 is issued.
2. The DCB is closed.
3. The DCB is reopened.
4. Data is truncated to the specified blocksize and is passed to the CICS application program.

OPTCD: Applicable only to CICS/OS, this operand specifies the optional fields for the TCAM work unit. The W specifies that for input, the name of the source of each message is to be placed in an eight-byte origin field in the work area. For output, it specifies that TCAM expects the name of the destination of the message to be placed in an eight-byte destination field in the work area before a TCAM WRITE macro instruction is executed. OPTCD=W must be specified for both the input and output macro instruction.

U specifies that the work unit to be handled is either a message or a message segment that is not a record. If U is omitted, the work unit is assumed to be a record.

C specifies that a one-byte field in the work area, called the position field, indicates whether the work unit being handled is the first, an intermediate, or the last segment of the message, and, on input, whether a record delimiter has been detected in the data.

For further information concerning the OPTCD operand, see the _OS/MFT and OS/MVT TCAM Programmer's Guide_ (GC30-2024).

APPENDG: Applicable only to the CICS/OS-STANDARD system when DEVICE=7770 is specified, this operand is used to specify a two-character alphameric suffix for the 7770 Channel End/Abnormal End Appendage routine. The suffix specified must be in the range WA-Z9 and must be the same suffix as was specified in the CAA operand of the DFHSG PROGRAM=CSO macro instruction.

DESCRIBE COMMUNICATION LINES

Communication paths to the terminals on the system are described by the DFHTCT TYPE=LINE macro instruction. The expansion of this macro instruction is the Terminal Control Table line entry (TCTLE) and contains the Data Event Control Block (DECB) that is used to communicate with the appropriate access method. The terminals related to this line must be described immediately following this macro instruction through use of the DFHTCT TYPE=TERMINAL macro instruction. However, when describing a switched-line network, all the lines for a given pool should be described before describing the terminals for that line pool.

If TCAM is used, the TCTTE's that follow a TCAM TCTLE represent:

1. Physical terminals, if POOL=YES is not coded.
2. The maximum number of tasks (transactions) that can be initiated for this TCTLE, if POOL=YES is coded.

The following operands can be included in the DFHTCT TYPE=LINE macro instruction:

```
symbol DFHTCT TYPE=LINE,                                               *
              ACCMETH=SAM,BSAM,BTAM,BGAM,TCAM,SEQUENTIAL,GRAPHIC       *
                      TELECOMMUNICATION,                               *
              TRMTYPE=1030,1050,1053,1130,2020,2260,L2260,2265,        *
                      2740,2740/2760,2741C,2741E,2770,2780,2980,       *
                      3275,3277,L3277,3284,L3284,3286,L3286,3735,7770, *
                      SYS/3,SYS/7,S360,CRLP,DASD,TAPE,TWX,U/R,         *
              CLASS=(CONV,BATCH,VIDEO,HARDCOPY,BISYNC,AUDIO),          *
              DSCNAME=name,                                            *
              ISADSCN=name,                                            *
              OSADSCN=name,                                            *
              INAREAL=length,                                          *
              TRMMODL=number,character,                                *
              BTAMRLN=number,                                          *
              LISTADR=(name,WRAP),                                     *
              FEATURE=(AUTOANSR,AUTOCALL,AUTOPOLL,CHECKING,            *
                      SCONTROL,BUFFRECV,KBRDLOCK),                     *
              NPDELAY=number,                                          *
              POOLADR=symbolic address,                                *
              ANSWRBK=AUTOMATIC,TERMINAL,NULL,EXIDVER,                 *
              LINSTAT='OUT OF SERVICE',                                *
              BSCODE=EBCDIC,ASCII,TRANSCODE,                           *
              CONVTAB=EBCDIC,ASCII,TRANSCODE,TEXTMODE,ABB,ABC,         *
              RDYMSG=symbolic address,                                 *
              ERRMSG=symbolic address,                                 *
              GENPOLL=YES,                                             *
              POOLCNT=number,                                          *
              TCTUAL=number,                                           *
              OUTQ=symbolic name,                                      *
              POOL=YES,                                                *
              QUEUEID=hexadecimal number
```

One or more DFHTCT TYPE=LINE macro instructions must be coded for each line group. The DSCNAME=name operand of each of the DFHTCT TYPE=LINE macro instructions must contain the same name as was specified in the DSCNAME=name operand of the related DFHTCT TYPE=SDSCI macro instruction.

A DFHTCT TYPE=LINE macro instruction must be coded for each logical pair of sequential SDSCI macro instructions.

A DFHTCT TYPE=LINE macro instruction must be coded for each symbolic unit (relative line) coded in the LINELST=parameter operand of the BTAM SDSCI macro instruction. The DFHTCT TYPE=LINE macro instruction entries must be contiguous on switched-line pools. For the local 2260 Display Station under CICS/DOS and the local 3270 Information Display System under CICS/DOS or CICS/OS, only one DFHTCT TYPE=LINE macro instruction is coded for each line group.

Note: For sequential devices, the last entry in the input stream must be 'CSSF GOODNIGHT' to provide a logical close. If all input is sequential, 'CSMT SHUTDOWN' must be entered at one of the terminals to terminate CICS.

ACCMETH: This operand is used to specify the access method to be used. Grouped according to synonymity of function, the applicable keyword parameters are:

1. SAM, BSAM, SEQUENTIAL
2. BGAM, GRAPHICS (CICS/OS only)
3. BTAM, TELECOMMUNICATION
4. TCAM, TELECOMMUNICATION (CICS/OS only)

TRMTYPE: This operand is used to specify the terminal type associated with this communication line. Only one TRMTYPE operand can be included in each DFHTCT TYPE=LINE macro instruction. This operand, when specified, establishes the default specification that will be used when the TRMTYPE operand is not specified in a DFHTCT TYPE=TERMINAL macro instruction associated with this line. If no TRMTYPE operand is specified in the DFHTCT TYPE=LINE macro instruction, a TRMTYPE operand must be supplied in each DFHTCT TYPE=TERMINAL macro instruction for that line.

The use of the TRMTYPE operand in the DFHTCT TYPE=LINE macro instruction is optional unless one of the following conditions exists:

1. A 7770 is associated with the line.
2. A local 3270 is associated with the line.
3. One or more remote 3270's are associated with the line.

In each of these cases an appropriate device-type parameter must be specified in the TRMTYPE operand; for example:

1. TRMTYPE=7770 for the 7770.
2. TRMTYPE=L3277, TRMTYPE=L3284, or TRMTYPE=L3286 for a local 3270.
3. TRMTYPE=3275, TRMTYPE=3277, TRMTYPE=3284, or TRYTYPE=3286 for a remote 3270.

TWX is the Ccmmon Carrier Teletypewriter Exchange Terminal Station (Model 33/35), DASD is the direct access storage device, CRLP is the card reader and line printer, TAPE is the magnetic tape device, and U/R is the unit record device. 1053 indicates a 1053 Printer Model 4.

CLASS: This operand is used to indicate the device classification associated with this communication line. The applicable keyword parameters are:

1.	CONV	Device with conversational type application
2.	BATCH	Data collection type device
3.	VIDEO	Device with cathode ray tube
4.	HARDCOPY	Start/stop hard-copy device
5.	BISYNC	Binary synchronous device
6.	AUDIO	Audio response device

DSCNAME: Specifies the data set control information for this communication line. It is not applicable for BSAM. The DSCNAME for BTAM data sets must be the same name as that specified in the DSCNAME=name operand of the related DFHTCT TYPE=SDSCI macro instruction.

ISADSCN: Specifies the input BSAM data set control name for a particular communication line. This data set control name must be the same name as that specified in the DSCNAME=name operand of the related DFHTCT TYPE=SDSCI macro instruction. This operand is not applicable to BTAM or GAM. In case of TCAM, this operand specifies the data set control name for an input TPROCESS queue; the OUTQ operand is also required.

OSADSCN: Specifies the output BSAM data set control name for a particular communication line. This data set control name must be the same name as that specified in the DSCNAME=name operand of the related DFHTCT TYPE=SDSCI macro instruction. This operand is not applicable to BTAM or GAM. In the case of TCAM, this operand specifies the data set control name for an output TPROCESS queue; the OUTQ operand may not be used.

INAREAL: Specifies the message input area length. This value, as a minimum, must be specified as follows:

1. For start/stop devices, the length should be equal to the length of the longest initial sentence of a transaction.
2. For start/stop devices with the buffer receive feature (for example, the 2740 Communication Terminal Model 2), the length should be equal to the length of the buffer less two bytes.
3. For binary synchronous devices, the length may be calculated as (a+1) (b+2) + 1, where "a" is the number of blocks sent by a device in response to an RVI (reverse interrupt) from CICS, and "b" is the size, in bytes, of each block.
4. For the local 2260 Display Station under CICS/DOS, the length of the input message can at no time be greater than the length specified through this operand.
5. For the remote 3270 Information Display System, the length specified should not be less than 254.
6. For the local 3270 Information Display System, the value specified may be any number greater than zero. This value indicates the minumum size of the Terminal Input/Output Area (TIOA) that will be passed to the transaction by the Terminal Control program. However, for performance considerations, the value specified should be equal to or greater than the length of the expected input message; at no time can a message be read whose length exceeds the INAREAL value by more than 2000 bytes (unless the transaction provides a TIOA for the read large enough to contain the message).

TRMMODL: This operand specifies the model number of the terminal associated with this communication line. This operand must be used if the device is one of the following:

1. Component of the 1050 Data Communication System
2. 2740 Communication Terminal Model 2
3. Component of the 2980 General Banking Terminal System
4. Component of the 3270 Information Display System
5. 2740 Communication Terminal with 2760 Optical Image Unit
6. 2260 Display Station
7. 2265 Display Station

The TRMMODL parameter sets the default value that will be taken when it is not specified in the DFHTCT TYPE=TERMINAL macro instruction associated with that line. If models vary on a line, the macro instruction can have a TRMMODL parameter associated with it which is different from that specified in the DFHTCT TYPE=LINE. This will cverride the DFHTCT TYPE=LINE macro for that DFHTCT TYPE=TERMINAL macro.

TRMMODL=1 is used to specify the 2980 Teller Station Model 1, 3275 Display Station Model 1, 3277 Display Station Model 1, 3284 Printer

Model 1, or 3286 Printer Model 1. TRMMODL=1 is the default for the 3270 Information Display System.

TRMMODL=2 is used to specify the 2740 Communication Terminal Model 2, 2980 Administrative Station Model 2, 3275 Display Station Model 2, 3277 Display Station Model 2, 3284 Printer Model 2, or 3286 Printer Model 2.

TRMMODL=4 is used to specify the 2980 Teller Station Model 4.

TRMMODL=5 is used to specify component polling of the keyboard for the 1050 Data Communication System using non-switched communication lines. Component selection character 5 (0B) must be coded in the polling list (DFTRMLST).

TRMMODL=6 is used to specify component polling of reader 1 for the 1050 Data Communication System using non-switched communication lines. Ccmponent selection character 6 (0D) must be coded in the polling list (DFTRMLST).

TRMMODL=7 is used to specify (1) the 2740 Communication Terminal with 2760 Optical Image Unit, or (2) component polling of reader 2 for the 1050 Data Communication System using non-switched communication lines. Component selection character 7 (0E) must be coded in the polling list (DFTRMLST).

TRMMODL=0 is used to specify an input component for the 1050 Data Communication System. Common polling character 0 (15) must be coded in the polling list (DFTRMLST). TRMMODL=0 is the default specification for a 1050 Data Communication System.

The TRMMODL=character operand is used to specify the applicable screen format for a 2260/2265 Display Station as follows:

SPECIFICATION	SCREEN FORMAT
TRMMODL=A	6x40 2260
TRMMODL=B	12x40 2260
TRMMODL=C	12x80 2260
TRMMODL=D	15x64 2265
TRMMODL=E	12x80 2265

For example, TRMMODL=A specifies a 2260 Display Station with a 6x40 screen format.

ETAMRLN: Specifies the relative line number within a line group. The relative line number can be specified in the range 1-31 for CICS/DOS and 1-256 for CICS/OS. This operand is not applicable to BSAM, BGAM, TCAM, or local 2260's under DOS.

LISTADR: Specifies the label of the BTAM Define Terminal List macro statement (DFTRMLST) in which the user has specified his polling list for the communication line. (A terminal may not be specified more than once in a polling list.) DFTRMLST entries should be coded immediately preceding DFHTCT TYPE=LINE entries or immediately following DFHTCT TYPE=TERMINAL entries. If a wraplist is specified in the DFTRMLST, the WRAP operand must be included. The default is to an open list. LISTADR is not applicable when ACCMETH=BSAM, ACCMETH=GAM, or for some devices when ACCMETH=BTAM (for example, dial-up 2741's).

For more information, see the publication _DOS Basic Telecommunications Access Method_ (GC30-5001) or the publication _OS Basic Telecommunications Access Method_ (GC30-2004).

Note: Polling list entries for remote 2260/2265 and remote 3275/3277 systems must specify a general poll. The use of a general poll allows a single entry in the polling list to invite input from all devices attached to each remote control unit or display station.

In this form of operation, the polling list should contain only one entry for each 2845, 2848, or 3271 Control Unit or for each 3275 Display Station on the line. For 2260/2265 display systems, this form of operation is achieved by coding X'FF' as the second byte of each entry in the polling list. For 3270 systems, this form of operation is achieved by using a device address code of X'7F' (EBCDIC) or X'22' (ASCII) in each polling list entry applicable to a 3271 Control Unit or 3275 Display Station. For remote 3270's, see the discussion of GENPOLL in this section and the discussion of POLLPOS in the section "Describe Terminal Types".

If ANSWRBK=EXIDVER is specified, the LISTADR operand must specify the label of a DFTRMLST macro instruction of the SWLST,AN format. The user data portion of the entries in this list must be either of the following:

1. The label of the corresponding DFHTCT TYPE=TERMINAL macro instruction for each 3735; or
2. Hexadecimal zeros for terminals that share the line with the 3735 but do not transmit unique ID sequences.

FEATURE: This operand is used to indicate that one or more optional features are present on a given terminal. These features can be specified in any order using the following keyword parameters:

1. AUTOANSR, the automatic answering capability for switched lines.
2. AUTOCALL, the automatic calling capability for switched lines.
3. AUTOPOLL, the automatic polling capability required for multipoint binary synchronous communication terminals and optional for the 1050 Communication System and 2740 Communication Terminal. If AUTOPOLL is specified for the 2740, SCONTROL must also be specified.
4. CHECKING, the VRC/LRC feature on the 2740 Communication Terminal.
5. SCONTROL, the station control feature on the 2740 Communication Terminal and on the System/7.
6. BUFFRECV, the buffer receive capability for the 2740 Communication Terminal Model 2. If BUFFRECV is specified, SCONTROL must also be specified.
7. KBRDLOCK, the lock option capability for the 2848 Display Control Models 21 and 22.

For terminals on switched-line networks, FEATURE=AUTOANSR must always be specified.

NPDELAY: Applicable only to start/stop devices, this operand is used to specify the interval of time, in milliseconds, between line polls (invitations) when a negative response to a poll is detected. This number can be specified in the range 0 to 20000, with default values varying by device type. NPDELAY signifies "negative poll delay".

When used with a TCAM line, this operand specifies the time interval that is to expire before control is passed to TEP when a CICS task is not ready to accept a subsequent record from the input process queues. If the CICS task issues a read before the time interval expires, processing continues normally and TEP is not notified. This number can be specified in the range of 0 to 20,000 milliseconds. The default value is 0.

POOLADR: This operand must be used for switched-line processing and for the local 3270 Information Display System. Used for switched-line processing, this operand specifies the label assigned to the first terminal description (DFHTCT TYPE=TERMINAL) associated with a particular pool of communication lines. POOLADR should be coded only for the first line in a given line pool; FEATURE=AUTOANSR must also be specified.

Used for the local 3270 Information Display System, this operand specifies the label assigned to the first terminal description associated with a particular pool of local 3270's. FEATURE=AUTOANSR need not be specified.

ANSWRBK: This operand must be coded for switched lines to specify the terminal identificaticn to be used. If this operand is used, FEATURE=AUTOANSR must also be specified. Only one of the following keyword parameters may be specified:

1. AUTOMATIC, indicates automatic terminal identification. This parameter may be coded only for the Common Carrier Teletypewriter Exchange Terminal Station (Model 33/35).

2. TERMINAL, indicates that the terminal will be identified by the operator. This parameter may be coded for the TWX, 1050, 2740, 2741, and dial-up binary synchronous devices. (After the dial-up connection has been made, the operator must enter the Terminal Identification as it appears in the Terminal Control Table.) If 3735's share the line, specify EXIDVER.

3. NULL, indicates that the terminal will not be identified by either the terminal or operator. This parameter may be coded only for the 7770. (After the dial-up connection has been made, the Terminal Contrcl program connects this line to the next available terminal in the terminal pool.)

4. EXIDVER, applicable only to CICS/OS, indicates that the terminal's unique ID sequence will be identified by BTAM-expanded ID verification. This parameter must be coded for any line on which there is a 3735. If devices which do not transmit unique ID sequences share the line with 3735's, the non-3735 operator must enter the terminal identification after the dial-up connection has been made.

Note: These keyword parameters are valid only if the corresponding keyword parameters have been included in the DFHSG PROGRAM=TCP,ANSWRBK=(parameters) specification during system generation.

LINSTAT: The LINSTAT='OUT OF SERVICE' operand indicates that the line is to be initiated with an "out of service" status.

BSCODE: This operand is used to specify the type of communication code to be used for a given binary synchronous communication device. The applicable keyword parameters are EBCDIC, ASCII, and TRANSCODE. The default is BSCODE=EBCDIC.

CONVTAB: This operand is used to specify the type of transmission code, and may be used in lieu of the BSCODE operand for binary synchronous devices. The applicable keyword parameters are:

1.	EBCDIC	Extended Binary Coded Decimal Interchange Code
2.	ASCII	American Standard Code for Information Interchange
3.	TRANSCODE	Six-bit transmission code
4.	TEXTMODE	Text mode for the 2741 Communication Terminal
5.	ABB	ABB' code for the 7770 Audio Response Unit Model 3
6.	ABC	ABC code for the 7770 Audio Response Unit Model 3

RDYMSG: Required when TRMTYPE=7770 is specified, this operand is used to specify the symbolic address of the ready message used by CICS to communicate with terminals attached to the 7770 Audio Response Unit. The ready message is defined through the DFHTCT TYPE=7770MSG macro instruction. (See the section "Define Digital Response Messages for the 7770 Audio Response Unit".)

ERRMSG: Required when TRMTYPE=7770 is specified, this operand is used to specify the symbolic address of the error message used by CICS to communicate with terminals attached to the 7770 Audio Response Unit. The error message is defined through the DFHTCT TYPE=7770MSG macro instruction. (See the section "Define Digital Response Messages for the 7770 Audio Response Unit".)

GENPOLL: GENPOLL=YES must be specified for a multipoint binary synchronous communication line if one or more of the polling sequences in the DFTRMLST (pointed to by the label specified in the LISTADR operand) is a general poll sequence. If this operand is used, the POLLPOS operand must be included in each DFHTCT TYPE=TERMINAL specification associated with the line. For 2980's and 3270's, GENPOLL=YES is a default specification.

POOLCNT: Applicable only to the CICS/OS system, this operand is used to specify the number of Terminal Control Table line entries (TCTLE's) to be included in the pool of TCTLE's for a line group comprised of local 3270 Information Display Systems. The pool of TCTLE's is used by CICS to support concurrent operations on the BTAM local line group.

The number of TCTLE's specified should reflect the expected activity on the local line group and the anticipated maximum number of concurrent requests. For a local line group containing printers, the number specified should be the actual number of printers plus one to avoid locking out any screen keyboards when all printers are busy.

When a READ or WRITE for a particular 3270 is issued, CICS allocates the first available TCTLE from the pool. This TCTLE is freed when the operation at the device is complete. For WRITE operations at a printer, the operation at the device is considered complete when the printing operation is complete.

CICS supports as many concurrent operations on the line group as there are TCTLE's in the pool. If no TCTLE is available to support a requested operation, the request remains pending until a TCTLE becomes available.

For CICS/OS, local 3270's can be arranged in line groups in any desired manner.

TCTUAL: This operand is used to specify the length, in bytes (0-255), of the Process Control Information field (PCI) for all terminal entries (TCTTE's) associated with this line. The default is TCTUAL=0.

If fields of different (variable) lengths are desired, the TCTUAL value can be specified in one or more DFHTCT TYPE=TERMINAL macro instructions for terminals associated with this line. In any case, the PCI field is generated for each terminal after the last terminal entry of the last line. The address of the PCI field is located at TCTTECIA; the length is located at TCTTECIL.

For CICS/OS, PCI fields of fixed length (15 bytes) and/or variable length (0-255 bytes) can be specified via the TCTUA operand of the DFHSG TYPE=INITIAL macro instruction. In the case of a fixed-length PCI field (the address of which is located at TCTTECI), the TCTUAL operand need not be specified. In the case of a variable-length PCI field (the address of which is located at TCTTECIA), the TCTUAL operand should be specified in the DFHTCT TYPE=LINE macro instruction and/or DFHTCT TYPE=TERMINAL macro instruction.

OUTQ: Required in all TCAM input process queue Terminal Control Table line entries (TCTLE's), the symbolic name identifies the corresponding TCAM output process queue TCTLE. Multiple input process queues may reference the same output process queue.

POOL: By specifying POOL=YES on the TCAM output process queue, the POOL feature is supported for that TCAM line. The user should analyze the restrictions prior to specifying the POOL feature. For further information concerning line pool restrictions, see the section "CICS/TCAM Interface Considerations".

QUEUEID: This optional operand is used to specify a unique user identification for the TCAM process queue. The identification is an unframed, one-byte hexadecimal number (00-FF) which is placed in both the input and output line entry at TCTLEQID to provide unique queue identification while executing a user exit.

DESCRIBE TERMINAL TYPES

The types of terminals on the system are described to CICS by the

symbol DFHTCT TYPE=TERMINAL

macro instruction. The expansion of this macro instruction is the Terminal Control Table terminal entry (TCTTE). These terminal definitions must immediately follow the corresponding line entry (DFHTCT TYPE=LINE). The sequential terminals (TRMTYPE=CRLP,DISK,TAPE) support only one entry each.

A DFHTCT TYPE=TERMINAL macro instruction must be coded for each terminal on a line. On single dropped and multidropped terminals on non-switched lines, the DFHTCT TYPE=TERMINAL macro instruction must immediately follow the DFHTCT TYPE=LINE macro instruction. The DFHTCT TYPE=TERMINAL macro instruction entries must be contiguous for multidropped terminals on non-switched lines and for terminals in a terminal pool on switched lines.

For TCAM, the user must specify a single TCTTE for the input process queue line. This may be considered to be a "dummy" TCTTE in that it does not relate to any physical terminal. On the output process queue line (TCTLE), the user identifies each terminal to be associated with that line set. Therefore, if the user has ten terminals associated with a particular TCAM process queue, he must code eleven DFHTCT TYPE=TERMINAL macro instructions; one follows the input DFHTCT TYPE=LINE macro instruction while the remaining ten fcllow the output DFHTCT TYPE=LINE macro instruction.

The following operands can be used in the DFHTCT TYPE=TERMINAL macro instruction:

```
symbol DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=name,                                            *
              TRMPRTY=number,                                          *
              TRMMODL=number,character,                                *
              TRMTYPE=1030,1050,1053,1130,2020,2260,L2260,2265,        *
                      2740,2740/2760,2741C,2741E,2770,2780,2980,       *
                      3275,3277,L3277,3284,L3284,3286,L3286,3735,7770, *
                      SYS/3,SYS/7,S360,CRLP,DASD,TAPE,TWX,U/R,         *
              CLASS=(CONV,BATCH,VIDEO,HARDCOPY,BISYNC,AUDIO),          *
              LVUNIT=number,                                           *
              LASTTRM=LINE,GACB,POOL,                                  *
              TRMADDR=address,name,                                    *
              TRMSTAT=(TRANSACTION,TRANSCEIVE,RECEIVE,'OUT OF SERVICE',*
                      INPUT),                                          *
              COMPAT=NO,(number of characters,number of lines,         *
                     device type,model number),                        *
              FEATURE=(PTRADAPT,SELCTPEN,AUDALARM,COPY,BUFEXP,         *
                      DCKYBD,UCTRAN),                                  *
              POLLPOS=number,                                          *
              TRANSID=name,                                            *
              STN2980=number,                                          *
              TAB2980=number,                                          *
              TIOAL=number,                                            *
              TCTUAL=number
```

TRMIDNT: Used to supply a unique four-character symbolic identification to each terminal. The TRMIDNT parameter and the destination identification in the Destination Control Table, when applicable, must be the same. The identification supplied will be left justified and padded with blanks to four characters if less than four characters are supplied. This is necessary as the system always searches for a four-character match when searching tables. This operand may be omitted if POOL=YES is included in the DFHTCT TYPE=LINE specification.

TRMPRTY: Used to establish terminal priority. This decimal value (000-255) is used in establishing the overall transaction processing priority. (Transaction processing priority is equal to the sum of the terminal priority, transaction priority, and operator priority, nct to exceed 255.)

TRMMODL: Specifies the model number of the terminal associated with this communication line. If the device is one of the following, this operand must be included in either the DFHTCT TYPE=LINE or DFHTCT TYPE=TERMINAL specification:

1. Component of the 1050 Data Communication System
2. 2740 Communication Terminal Model 2
3. Component of the 2980 General Banking Terminal System
4. Component of the 3270 Information Display System
5. 2740 Communication Terminal with 2760 Optical Image Unit
6. 2260 Display Station
7. 2265 Display Station

TRMMODL=1 is used to specify the 2980 Teller Station Model 1, 3275 Display Station Model 1, 3277 Display Station Model 1, 3284 Printer Model 1, or 3286 Printer Model 1. TRMMODL=1 is the default for the 3270 Information Display System.

TRMMODL=2 is used to specify the 2740 Communication Terminal Model 2, 2980 Administrative Station Model 2, 3275 Display Station Model 2, 3277 Display Station Model 2, 3284 Printer Model 2, or 3286 Printer Model 2.

TRMMODL=4 is used to specify the 2980 Teller Station Model 4.

TRMMODL=5 is used to specify component polling of the keyboard for the 1050 Data Communication System using non-switched communication lines. Component selection character 5 (0B) must be coded in the polling list (DFTRMLST).

TRMMODL=6 is used to specify component polling of reader 1 for the 1050 Data Communication System using non-switched communication lines. Ccmponent selection character 6 (0D) must be coded in the polling list (DFTRMLST).

TRMMODL=7 is used to specify (1) the 2740 Communication Terminal with 2760 Optical Image Unit, or (2) component polling of reader 2 for the 1050 Data Communication System using non-switched communication lines. Component selection character 7 (0E) must be coded in the polling list (DFTRMLST).

TRMMODL=0 is used to specify an input component for the 1050 Data Communication System. Common polling character 0 (15) must be coded in the polling list (DFTRMLST). TRMMODL=0 is the default specification for a 1050 Data Communication System.

The TRMMODL=character operand is used to specify the applicable screen format for a 2260/2265 Display Station as follows:

SPECIFICATION	SCREEN FORMAT
TRMMODL=A	6x40 2260
TRMMODL=B	12x40 2260
TRMMODL=C	12x80 2260
TRMMODL=D	15x64 2265
TRMMODL=E	12x80 2265

For example, TRMMODL=A specifies a 2260 Display Station with a 6x40 screen format.

TRMTYPE: This operand is used to specify the terminal type if (1) the terminal type has not already been specified in the DFHTCT TYPE=LINE macro instruction, or (2) the user wishes to override the TRMTYPE specification in the DFHTCT TYPE=LINE macro instruction.

CRLP is the card reader and line printer. DASD is the direct access device. TAPE is the magnetic tape device. A 1053 is a 1053 printer on a local or remote 2848 control unit. TWX is the Common Carrier Teletypewriter Exchange Terminal Station (Model 33/35). U/R is the unit record device.

CLASS: This operand is used to indicate the device classification associated with a particular line. The applicable keyword parameters are:

1. CONV Device with conversational type application

2.	BATCH	Data collection type device
3.	VIDEO	Device with cathode ray tube
4.	HARDCOPY	Start/stop hard-copy device
5.	BISYNC	Binary synchronous device
6.	AUDIO	Audio response device

LVUNIT: This operand is applicable only when TRMTYPE=L2260, TRMTYPE=L3277, TRMTYPE=L3284, or TRMTYPE=L3286 is specified, or when TRMTYPE=1053 is specified for a local 2260 line. LVUNIT specifies a decimal number from 1 to N which is used to identify the local video unit. The maximum value of N for local 2260 is 25. For local 3270, N maximum is 32 (use of Assembler D restricts N to a maximum of 31).

For the CICS/DOS systems, the LVUNIT specification indicates the local video unit's relative position in the corresponding DFHTCT TYPE=SDSCI, LINELST=parameter specification. For the CICS/OS system, the LVUNIT specification indicates the local video unit's relative position in the concatenation of data definition (DD) statements for the corresponding DFHTCT TYPE=SDSCI specification.

LASTTRM: This operand is used to indicate a "last terminal" condition. The applicable keyword parameters are:

1. GACB, used for GAM only, identifies both the last terminal entry on a given line entry and the last terminal entry on a graphics attention control block.
2. LINE, used for BTAM non-switched line processing (except local 3270), BGAM (if GACB conditions do not apply), and TCAM (if POOL=YES has not been specified).
3. POOL, used for BTAM switched-line processing, for the local 3270 Information Display System, and for TCAM, identifies the last terminal in the pool. For TCAM, POOL is used if POOL=YES has been specified.

TRMADDR: The TRMADDR=address operand specifies the device address associated with a given terminal and is required only for BTAM output devices. (This operand is not required for some BTAM output devices; for example, a dial-up 2741.) For most non-switched lines, the hexadecimal addressing characters associated with the terminal must be specified. (This operand should not be used if the devices are local 2260's or local 3270's). For binary synchronous devices and switched lines, the label of the BTAM DFTRMLST must be specified using the TRMADDR=name operand.

Note: For a 3735, the BTAM DFTRMLST must be of the SWLST,AD type.

TRMSTAT: Specifies the type of activity that may occur at a given terminal. This terminal status is initially set in the TCTTE and is a combination of the processing status and the service status. Possible status designations are TRANSACTION, TRANSCEIVE, RECEIVE, INPUT and/or 'OUT OF SERVICE'.

A terminal with TRANSACTION status is used in the processing of transactions such as inquiries or order entries. A display station is normally classified as a TRANSACTION terminal. A hard-copy terminal to which no messages are sent without a terminal request and through which transactions are entered is a TRANSACTION terminal. If no other status designation is made, the terminal status defaults to TRANSACTION.

A terminal with TRANSCEIVE status is a TRANSACTION terminal but one to which messages are sent automatically by the user. The automatic transaction initiation created by a transient data destination reaching a trigger level sets a condition in an appropriate Terminal Control Table terminal entry. If the terminal status is TRANSCEIVE and if there is no transaction at the terminal, Terminal Control initiates the user-defined task. This task is expected to send messages to the terminal.

A terminal with RECEIVE status is one to which messages are sent but from which no input is allowed. An example of this type of terminal is one which is located in a remote location, such as a warehouse, is unattended, but may receive messages.

Note: RECEIVE should be specified for a System/7 with the Station Control feature. This allows polling to be suspended until the System/7 is IPL'd by the host, at which time the status is changed to TRANSCEIVE. If the System/7 is IPL'd remotely, the master terminal must be used to change the terminal status to enable the System/7 to transmit.

A terminal with INPUT status is one which can send messages to CICS but cannot receive messages from CICS.

A terminal with an 'OUT OF SERVICE' designation is one which can neither receive messages nor transmit input. Such terminals are not polled by CICS. The 'OUT OF SERVICE' parameter can be used in combination with TRANSACTION, TRANSCEIVE, or RECEIVE; if such a combination is not specified, the terminal status defaults to TRANSACTION.

All terminals except the master terminal can be designated as 'OUT OF SERVICE'. When appropriate, the terminals can be placed IN SERVICE by the master terminal and polling is resumed.

COMPAT: This operand is used to indicate that the 2260/2265 terminal or 1053 printer specified in the "device type" parameter is to be simulated on the 3270 Information Display System. The keyword parameters are positional and must be replaced by a comma if they are omitted. The default is COMPAT=NO.

The "number of characters" parameter is used to specify the screen size of the 2260/2265 terminal. Applicable parameters are 240, 480, and 960.

The "number of lines" parameter is used to indicate the number of lines applicable to the 2260/2265 terminal or to insert new line (NL) symbols into the 3284/3286 printer output data stream where NL symbols are not provided by the user in the output data stream. Applicable parameter values are 6, 12, and 15. The default value for a 960-character screen is 12.

The "device type" parameter is used to specify either a 1053, 2260, L2260, or 2265 terminal. The default is 2260. Note that the specification COMPAT=(960,15) results in an error condition since the 2260 (assumed by default) cannot support 15 lines.

The "model number" parameter is used to specify a model number for the 2260 terminal being simulated. This parameter provides an interface for any user-written application programs that currently test the TCTTEMN field before building device-dependent 2260 data streams.

For further information concerning the use of the COMPAT operand, see the section "2260 Compatibility for the 3270".

FEATURE: This operand is used to specify applicable features for the 3270 Information Display System and corresponding 3284 Printer Model 3 on the 3275 Display Station.

FEATURE=PTRADAPT specifies the Printer Adapter feature and corresponding 3284 Printer Model 3 on the 3275 Display Station. Note that a separate DFHTCT TYPE=TERMINAL macro instruction cannot be coded for the 3284 Printer Model 3 because the 3284 Model 3 shares the buffer of the 3275 Display Staticn.

FEATURE=SELCTPEN specifies the Selector Pen feature for a 3275 Display Staticn or a 3277 Display Station.

FEATURE=AUDALARM specifies the Audible Alarm feature for a 3275 Display Station or a 3277 Display Station.

FEATURE=COPY specifies the Copy feature for a 3277 Display Station, 3284 Printer, or 3286 Printer attached to a 3271 Control Unit.

FEATURE=BUFEXP specifies the Buffer Expansion feature (RPQ835503) for the 2980 General Banking Terminal System. Applicable only to the first terminal entry of a control group, the BUFEXP parameter increases the staticn buffer size to 96 characters.

FEATURE=DCKYBD specifies the typewriter keyboard and/or operator console keyboard for a 3275 Display Station or a 3277 Display Station. Both uppercase and lowercase data can be transmitted with either of these keyboards.

FEATURE=UCTRAN specifies translation of all lowercase data to uppercase. If FEATURE=UCTRAN is specified, the EBCDIC and/or ASCII parameter must be specified through the UCTRAN operand of the DFHSG PROGRAM=TCP macro instruction.

For further information concerning the use of the FEATURE operand, see the section "2260 Compatibility for the 3270".

POLLPOS: This operand is used to specify, as a decimal integer, the position (relative to 1) of the polling characters associated with this terminal in the DFTRMLST supplied for the line.

TRANSID: The TRANSID operand is used to specify a four-character transaction code whose use is dependent upon the terminal type for which it has been specified. If the access method being used is TCAM, the TRANSID operand is applicable only to Terminal Control Table terminal entries associated with the TCAM output queue.

For the 2740 Communication Terminal/2760 Optical Image Unit combination (TRMTYPE=2740,TRMMODL=7), the TRANSID operand is used to specify the transaction code of the transaction that is to be initiated when input is received from the 2760 and there is no active task. If input is received from the 2740, the first four characters of the input data stream are used as the transaction code.

For the 3735 Programmable Buffered Terminal, the TRANSID operand is used to specify the transaction code of the transaction that is to be initiated for a batch transmission initiated by the terminal operator. If an inquiry message is received from the 3735, the transaction code used consists of the first four characters following the inquiry header (NULL I NULL). See Appendix G for an example of a user-written 3735 transaction.

For all other terminals, the TRANSID operand is used to specify the transaction code of a transaction that is to be initiated each time input is received from the terminal and there is no active task. If the TRANSID operand is omitted, the first four characters of the data passed in the TIOA, or, in the case of a formatted 3270 data stream, the four characters following the first Set Buffer Address (SBA) order sequence, are used as the transaction code unless a TRANSID specification has been made in a DFHPC TYPE=RETURN request issued by the previous transaction. The transaction code used is the one supplied by the last specification of the TRANSID operand in the DFHPC macro instruction.

The TRANSID operand is required for the following terminals.

1. 1030 Badge Reader
2. 2740 Communication Terminal/2760 Optical Image Unit combination
3. 3735 Programmable Buffered Terminal

STN2980: This operand is used to specify the station for which the alternate station address and normal station address are to be generated for each terminal entry in the Terminal Control Table corresponding to a 2980 General Banking Terminal System. In response to a given STN2980 specification, an appropriate (hexadecimal) alternate station address and normal station address are generated by CICS as follows:

	ALTERNATE	NORMAL
Station 0	F4	40
Station 1	F5	F1
Station 2	F6	F2
Station 3	F7	F3
Station 4	34	F8
Station 5	E4	5C
Station 6	E5	61
Station 7	E6	E2
Station 8	E7	E3
Station 9	24	E8

For example, in response to a STN2980=0 specification, X'F4' is generated as the alternate station address and X'40' is generated as the normal station address.

TAB2980: This operand is used to specify, as a single-digit hexadecimal value (0-F), the number of tabs to the passbook area as defined by the user and physically (uniquely) set on the terminal. The default is TAB2980=0.

TIOAL: Applicable only tc terminals on binary synchronous lines, this operand is used to specify the minimum size of the Terminal Input/Output Area (TIOA) to be passed to a transaction by the Terminal Control program. If the size of an input message exceeds the value specified in this operand, the size of the TIOA corresponds to the size of the message.

TCTUAL: This operand is used to specify the length, in bytes (0-255), of the Process Ccntrol Information field (PCI) for this terminal. The default is the TCTUAL value specified in the DFHTCT TYPE=LINE macro instruction; if not specified in the DFHTCT TYPE=LINE macro instruction, the default is TCTUAL=0.

DEFINE DIGITAL RESPONSE MESSAGES FOR 7770 AUDIO RESPONSE UNIT

For CICS to communicate with an audio terminal (for example, the 2721 Portable Audio Terminal), two digital response messages (an error message and a ready message) must be defined in the Terminal Control Table for each line. This is accomplished by issuing the

```
symbol DFHTCT TYPE=7770MSG,                                          *
              MESSAGE='message'
```

macro instruction, which must immediately precede the DFHTCT TYPE=FINAL macro instruction. To avoid confusion, these messages should be unique; that is, these messages should not also be defined in user-written application programs.

The ready message is used by CICS:

1. In response to a valid Terminal Identification being entered subsequent to line connection.
2. When the sign-on sequence has been completed.
3. When a 7770 Audio Response Unit is connected to a line and no transaction is associated with the 7770.
4. In response to a READ request if the request sequence was not a WRITE, READ.

The error message is used by CICS:

1. In response to an invalid Terminal Identification being entered subsequent to line connection.
2. When a valid Terminal Identification has been entered but (1) the terminal has an "out of service" status, or (2) the terminal has an "in service" status but the Terminal Identification has already been entered on another line.
3. In response to an invalid Transaction Identification.
4. In response to an error during the sign-on/sign-off sequence.
5. If the input message is tcc long.
6. If the transaction associated with the 7770 is abnormally terminated.
7. If a 32-second timeout occurs, or if a five-second time out occurs while entering information required by CICS.

MESSAGE: This operand is used to define digital response messages for the 7770 Audio Response Unit. These messages must be constructed in the form of hexadecimal constants, enclosed within single quotes, and may contain up to 48 hexadecimal digits (24 bytes). The first two digits must contain binary zeros (00) to represent a one-byte "silence" track address on the 7770; subsequent digits may be used to represent up to 23 additional one-byte 7770 track addresses. For further details, see the publication _Component Description 7770 Audio Response Unit Model 3_ (GA27-2712).

See Appendix B for an example of a typical digital response specification.

SPECIFY END OF TERMINAL CONTROL TABLE

The end of the Terminal Control Table is indicated to the control system by the

```
DFHTCT TYPE=FINAL
```

macro instruction, which must be contained on the last control card for the Terminal Control Table assembly. An Assembler END card that includes the label DFHTCTBA must be provided by the user to end the assembly.

TERMINAL CONTROL TABLE EXAMPLE

Figure 2 illustrates the coding that is required to create a CICS Terminal Control Table. The terminal network described includes:

1. One DASD sequential terminal
2. Two 2260 Display Stations and one 1053 printer (local attachment)
3. Two 2740 Telecommunication terminals with the Station Control feature
4. Two 1050 Data Communication terminals (dial-up)

Note: DFTRMLST macro definitions are required by BTAM devices. These entries should be coded immmediately preceding DFHTCT TYPE=LINE entries cr immediately following DFHTCT TYPE=TERMINAL entries.

To be applicable to CICS/OS, or if converting from CICS/DOS to CICS/OS, the following changes must be made to Figure 2:

1. The DDNAME operand must be included unless the name specified in the DSCNAME operand is an acceptable default.
2. The MODELST operand must be recoded as the MODE operand.
3. The MACRF and NCP operands must be included unless the respective default values for these operands are acceptable.
4. The FLNNAME operand must be included to specify the name of the first communication line entry defined by the DFHTCT TYPE=LINE macro instruction.

If converting from CICS/DOS to CICS/OS, operands applicable only to CICS/DOS need not be removed, since they are ignored by CICS/OS.

For other examples of Terminal Control Table preparation, see Appendix B.

```
DFHTCT TYPE=INITIAL               START OF TCT
DFHTCT TYPE=SDSCI,                SPECIFY DATA SET CONTROL    *
       DEVADDR=SYS001,            INFORMATION                 *
       DEVICE=2314,                                           *
       DSCNAME=DISKIN1
DFHTCT TYPE=SDSCI,                SPECIFY DATA SET CONTROL    *
       DEVADDR=SYS006,            INFORMATION                 *
       DEVICE=2314,                                           *
       DSCNAME=DISKOT1
DFHTCT TYPE=LINE,                 DASD LINE ENTRY             *
       ACCMETH=SEQUENTIAL,                                    *
       TRMTYPE=DASD,                                          *
       ISADSCN=DISKIN1,                                       *
       OSADSCN=DISKOT1,                                       *
       INAREAL=80
DFHTCT TYPE=TERMINAL,             DASD TERMINAL ENTRY         *
       TRMIDNT=SAMB,              DASD SYMBOLIC NAME          *
       TRMPRTY=11,                                            *
       TRMSTAT=TRANSCEIVE
DFHTCT TYPE=SDSCI,                SPECIFY DATA SET CONTROL    *
       CU=2848,                   INFORMATION                 *
       DEVICE=L2260,                                          *
       LINELST=(037,038,039),                                 *
       SWITCH=NO,                                             *
       DSCNAME=DTF60L
DFHTCT TYPE=LINE,                 LOCAL 2260 LINE ENTRY       *
       ACCMETH=BTAM,                                          *
       TRMTYPE=L2260,                                         *
       DSCNAME=DTF60L,                                        *
       INAREAL=960
DFHTCT TYPE=TERMINAL,             2260 TERMINAL ENTRY         *
       TRMIDNT=L60A,              2260 SYMBOLIC NAME          *
       TRMPRTY=64,                                            *
       LVUNIT=1                   FIRST UNIT ON A DTF
DFHTCT TYPE=TERMINAL,             2260 TERMINAL ENTRY         *
       TRMIDNT=GAMB,              2260 SYMBOLIC NAME          *
       TRMPRTY=63,                                            *
       LVUNIT=2                   SECOND UNIT ON A DTF
DFHTCT TYPE=TERMINAL,             1053 TERMINAL ENTRY         *
       TRMIDNT=L600,                                          *
       TRMTYPE=1053,                                          *
       LVUNIT=3,                  THIRD UNIT ON A DTF         *
       TRMPRTY=32,                                            *
       TRMSTAT=RECEIVE,                                       *
       LASTTRM=LINE
DFHTCT TYPE=SDSCI,                SPECIFY DATA SET CONTROL    *
       CU=2703,                   INFORMATION                 *
       DEVICE=2740,                                           *
       FEATURE=(STC,CHK),                                     *
       LINELST=(027),                                         *
       SWITCH=NO,                                             *
       DSCNAME=DTF40MD
```

Figure 2 (Part 1 of 2). Coding for terminal control table

```
   PL2740L1 DFTRMLST OPENLST,(46,45)       POLL LIST TERMINAL
         DFHTCT TYPE=LINE,                 2740 LINE ENTRY             *
                ACCMETH=BTAM,                                          *
                TRMTYPE=2740,                                          *
                TRMMODL=1,                                             *
                DSCNAME=DTF40MD,                                       *
                BTAMRLN=1,                                             *
                LISTADR=PL2740L1,          POLL LIST NAME              *
                INAREAL=240,                                           *
                FEATURE=(SCONTROL,CHECKING)
         DFHTCT TYPE=TERMINAL,             2740 TERMINAL ENTRY         *
                TRMIDNT=T41L,              2740 SYMBOLIC NAME          *
                TRMADDR=46,                TERMINAL ADDRESS = L        *
                TRMPRTY=127,                                           *
                TRMSTAT=TRANSCEIVE
         DFHTCT TYPE=TERMINAL,             2740 TERMINAL ENTRY         *
                TRMIDNT=T41K,              2740 SYMBOLIC NAME          *
                TRMADDR=45,                TERMINAL ADDRESS = K        *
                TRMPRTY=128,                                           *
                TRMSTAT=TRANSCEIVE,                                    *
                LASTTRM=LINE               LAST TERMINAL ON LINE
         DFHTCT TYPE=SDSCI,                SPECIFY DATA SET CONTROL    *
                CU=2703,                   INFORMATION                 *
                DEVICE=1050,                                           *
                LINELST=(031) ,                                        *
                SWITCH=YES,                                            *
                DSCNAME=DTF1050
   IDL1050 DFTRMLST DIALST,0,(6215,6415)
   DIL1050A DFTRMLST DIALST,7,1239876,(6213)
   DIL1050B DFTRMLST DIALST,7,1239875,(6413)
         DFHTCT TYPE=LINE,                 1050 LINE ENTRY             *
                ACCMETH=BTAM,                                          *
                TRMTYPE=1050,                                          *
                DSCNAME=DTF1050,                                       *
                INAREAL=80,                                            *
                BTAMRLN=1,                                             *
                LISTADR=IDL1050,           POLL LIST NAME              *
                FEATURE=(AUTOANSR,AUTOCALL) ,                          *
                POOLADR=T50POOL,                                       *
                ANSWRBK=TERMINAL
T50POOL  DFHTCT TYPE=TERMINAL,             1050 TERMINAL ENTRY         *
                TRMIDNT=T50A,                                          *
                TRMADDR=DIL1050A,                                      *
                TRMPRTY=203,                                           *
                TRMSTAT=TRANSCEIVE
         DFHTCT TYPE=TERMINAL,             1050 TERMINAL ENTRY         *
                TRMIDNT=T50B,                                          *
                TRMADDR=DIL1050B,                                      *
                TRMPRTY=204,                                           *
                TRMSTAT=TRANSCEIVE,                                    *
                LASTTRM=POOL               LAST TERMINAL ON LINE
         DFHTCT TYPE=FINAL                 END OF TCT
         END DFHTCTBA                      POINT TO REQUIRED ENTRY LABEL
```

Figure 2 (Part 2 of 2). Coding for terminal control table

FILE CONTROL TABLE (FCT)

The File Control Table is used to describe to CICS any user data sets (files) that are processed by file management. The DFHFCT macro instruction is used to generate entries to the table and to request the following services:

1. Set up the open list for the data sets to be used when initializing and terminating the system.
2. Describe characteristics of the data sets, such as access method used, record characteristics, types of service allowed.
3. Define use of the data set as a cross index and provide the information to locate the next data set via indirect access.
4. Define the segments and segment sets of a record.

The data control information for each data set is included in the DFHFCT macro instruction. The indirect access and segmenting services are mutually exclusive; the entry for one data set cannot specify both services.

The following operands can be included in the DFHFCT macro instruction:

```
       DFHFCT TYPE=INITIAL,                                            *
              SUFFIX=xx

       DFHFCT TYPE=DATASET,                                            *
              DATASET=name,                                            *
              ACCMETH=BDAM,ISAM,DL/I,                                  *
              SERVREQ=(GET,PUT,UPDATE,NEWREC,INDACC,SEGMENT,BROWSE,    *
                       KEY,NOEXCTL),                                   *
              BLKKEYL=decimal value,                                   *
              EXTENT=number,                                           *
              CYLOFL=number,                                           *
              INDAREA=symbolic name,                                   *
              INDSIZE=number,                                          *
              INDSKIP=YES,                                             *
              MSTIND=YES,                                              *
              NRECDS=number,                                           *
              IOSIZE=number,                                           *
              IOWORK=symbolic name,                                    *
              DEVICE=(n,m),                                            *
              SRCHM=YES,number,                                        *
              VERIFY=YES,                                              *
              RELTYPE=DEC,HEX,BLK,                                     *
              LRECL=(length,length),                                   *
              BLKSIZE=(length,length),                                 *
              RKP=number,                                              *
              RECFORM=(format,characteristic,DCB record format),       *
              OPEN=INITIAL,DEFERRED,                                   *
              KEYLEN=length

       DFHFCT TYPE=INDACC,                                             *
              OBJDSID=name,                                            *
              IARLKP=number,                                           *
              IALKFL=length,                                           *
              IADADMI=RELREC,KEY,                                      *
              IADIII=hexadecimal character,                            *
              DUPDSID=name

       DFHFCT TYPE=SEGHEAD,                                            *
              SEGLENG=length,                                          *
              INDDISP=number,                                          *
              TSEGIND=BIT,DISPLACEMENT

       DFHFCT TYPE=SEGDEF,                                             *
              SEGNAME=name,                                            *
              SEGCHAR=(format,alignment),                              *
              SEGLENG=length
       DFHFCT TYPE=SEGSET,                                             *
              SEGSET=name,                                             *
              SEGNAME=(name1,...,nameN)

       DFHFCT TYPE=SEGLAST

       DFHFCT TYPE=FINAL

       DFHFCT TYPE=LOGICMOD
```

ESTABLISH CONTROL SECTION FOR FILE CONTROL TABLE

The control section into which the File Control Table is assembled is established by means of the

```
       DFHFCT TYPE=INITIAL,                                            *
              SUFFIX=xx
```

macro instruction, which must be coded as the first statement in the source deck used to assemble the File Control Table.

SUFFIX: This operand specifies a two-character alphameric suffix (other than 'NO' which is reserved) for the File Control Table being assembled. This suffix, if specified, is appended to the standard module name (DFHFCT) and is used to name the module on the linkage editor output library. If this operand is omitted, a suffix is not provided.

DESCRIBE DATA SET FOR FILE MANAGEMENT

The physical characteristics of a data set are described to CICS File Management by the

```
       DFHFCT TYPE=DATASET
```

macro instruction. This macro instruction includes operands that provide information about the access method, record characteristics, and the types of service allowed for the data set. This information is used to generate a DTF for CICS/DOS or a DCB for CICS/OS.

If the DL/I facility of the IBM Information Management System (IMS/360) is to be accessed under CICS/OS, the DFHFCT TYPE=DATASET macro instruction is used to provide information about Data Language/I (DL/I) data bases. In this case, DATASET and ACCMETH are the only operands required. Physical characteristics of the DL/I data bases need not be specified since they are specified during generation of IMS Data Base Descriptions (DBD's).

The DFHFCT TYPE=DATASET macro instruction can include the following operands:

```
       DFHFCT TYPE=DATASET,                                            *
              DATASET=name,                                            *
              ACCMETH=BDAM,ISAM,DL/I,                                  *
              SERVREQ=(GET,PUT,UPDATE,NEWREC,INDACC,SEGMENT,BROWSE,    *
                       KEY,NOEXCTL),                                   *
              BLKKEYL=decimal value,                                   *
              EXTENT=number,                                           *
              CYLOFL=number,                                           *
              INDAREA=symbolic name,                                   *
              INDSIZE=number,                                          *
              INDSKIP=YES,                                             *
```

```
MSTIND=YES,                                               *
NRECDS=number,                                            *
IOSIZE=number,                                            *
IOWORK=symbolic name,                                     *
DEVICE=(n,m),                                             *
SRCHM=YES,number,                                         *
VERIFY=YES,                                               *
RELTYPE=DEC,HEX,BLK,                                      *
LRECL=(length,length),                                    *
BLKSIZE=(length,length),                                  *
RKP=number,                                               *
RECFORM=(format,characteristic,DCB record format),        *
OPEN=INITIAL,DEFERRED,                                    *
KEYLEN=length
```

DATASET: Specifies the symbolic data set name to be used as the File Ccntrol Table entry for a specific data set. This data set name can consist of from one to seven characters in the CICS/DOS systems or from one to eight characters in the CICS/OS system. Since this data set name is used when generating the operating system control block (DCB/DTF), it must be the same as the DOS file name or the OS DDNAME used in the job control statement defining the data set.

For a DL/I data base the DATASET operand must specify the same data tase name as was specified in the Program Communication Block (PCB) statements of Program Specification Block (PSB) generation (PSBGEN).

ACCMETH: Specifies the method of organization for a specific data set. ACCMETH=ISAM, ACCMETH=BDAM, or ACCMETH=DL/I must be specified.

SERVREQ: Used to define the types of service request that can be processed against the data set. The parameters that can be included are as follows:

1. GET Records on this data set may be read.
2. PUT Records may be written on this data set.
3. UPDATE Records may be updated on this data set. UPDATE requires that GET and PUT also be specified.
4. NEWREC Records may be added to the data set. NEWREC requires that PUT also be specified. NEWREC must be specified for OS ISAM data sets with variable-length records if updating is to be performed.
5. INDACC Data set is used as a cross index. If INDACC is specified, the DFHFCT TYPE=INDACC macro instruction must be coded immediately following this DATASET definition.
6. SEGMENT Records are segmented. If SEGMENT is specified, the DFHFCT TYPE=SEGHEAD, DFHFCT TYPE=SEGDEF, DFHFCT TYPE=SEGSET, and DFHFCT TYPE=SEGLAST macro instructions must be coded immediately fcllowing this DATASET definition.
7. BROWSE Records may be sequentially retrieved from the data set.
8. KEY Records are to be retrieved by key from DAM data set. This parameter should be specified only if ACCMETH=BDAM.
9. NOEXCTL Records are not to be placed under exclusive control when a read for update is requested. Unless this parameter is specified, a read-for-update will cause the record to be placed under exclusive control (within the CICS partition/region).

Note: INDACC and SEGMENT cannot both be coded for the same data set. A data set used as a cross-index data set may not be defined as blocked BDAM.

BLKKEYL: Specifies a decimal value from 1-255 which represents the physical key length for a direct access record. This operand must always be specified for ISAM data sets and DAM data sets with physical keys. If a DAM data set contains blocked records, and deblocking is to be performed by using a logical key (that is, a key embedded within each logical record), the logical key length is specified by using the KEYLEN operand. If records are to be placed under exclusive control during update operations, the physical key may not exceed 225 bytes.

EXTENT: Applicable only to the CICS/DOS systems, this operand represents the maximum number of extents that are specified for a data set. This operand is required if ACCMETH=ISAM. EXTENT=2 represents a minimum value (one for prime data area and one for cylinder index). If ACCMETH=BDAM, the presence of the EXTENT operand indicates that relative addressing (as opposed to actual addressing) is being used and the RELTYPE operand must also be used.

CYLOFL: Applicable only to the CICS/DOS systems, this operand is required only if ACCMETH=ISAM. It is used to specify the number of tracks per cylinder which are reserved for cylinder overflow records.

INDAREA: This operand is applicable only if ACCMETH=ISAM and specifies the unique symbolic name which is used by the DFHFCT macro to automatically generate a main storage area (within the File Control Table) that will contain all or part of the cylinder index. This operand is required only if the cylinder index is to be processed in main storage.

INDSIZE: This operand specifies the length (in bytes) of the cylinder index area specified in the INDAREA operand. The minimum number of bytes can be calculated as:

(m+3) (keylength + 6)

where "m" is the number of entries to be read into main storage at one time, 3 is the number of dummy entries, and 6 is an abbreviated pointer to the cylinder. If m is set to the number of prime data cylinders + 1, all of the cylinder index is read into main storage at one time. This operand is applicable only if ACCMETH=ISAM and the INDAREA operand is specified.

INDSKIP: Applicable only to the CICS/DOS systems, the INDSKIP=YES operand indicates that the index skip feature is to be used if index entries reside in main storage. This operand is applicable only if ACCMETH=ISAM and the INDAREA operand are specified.

MSTIND: Applicable only to the CICS/DOS systems, the MSTIND=YES operand indicates that a master index exists for the ISAM data set. This operand is applicable only if ACCMETH=ISAM and should be specified only if a master index exists for the data set.

NRECDS: This operand specifies the number of logical records in a block, and is called the blocking factor. This operand is applicable only to the CICS/DOS systems and only if ACCMETH=ISAM, and should be specified only if the records are blocked. For DOS ISAM data sets with variable-length records within fixed-length blocks, this number has no relaticn to the actual number of records within the block. However, the number specified multiplied by the LRECL parameter must equal the actual block size on the data set.

IOSIZE: This operand specifies the number of bytes in the main storage area used when adding records to an ISAM data set. This operand should be used only when SERVREQ=NEWREC is also specified. For CICS/DOS systems, this operand causes a static work area to be generated as part of the FCT entry for the data set being defined. For the CICS/OS system, the IOWORK operand must also be used to supply a symbolic name to be associated with the work area. For further details, refer to DTFIS generaticn in the publication, DOS Supervisor and I/O Macros (GC24-5037) or ISAM data set processing in the publication, OS Data Management Services (GC26-3746).

IOWORK: Applicable only to the CICS/OS-STANDARD system, this operand is used to specify the symbolic name of a main storage work area to be used by the access method when adding records to ISAM data sets. If the data set contains variable-length records, this operand must be specified.

It is permissible for the same symbolic name to be specified in more than one data set definition, thus causing an area to be shared. CICS prevents the shared area from being used concurrently by more than one transaction.

A static work area is generated within the FCT for each unique symbolic name encountered during FCT generation. The size of each area is equal to the largest IOSIZE specified for each symbolic name.

DEVICE: Applicable only to the CICS/DOS systems, the DEVICE=(n,m) operand is used for both DAM and ISAM data sets. "n" and "m" specify 2311, 2314, 2321, or 3330. For DAM, "n" specifies the device type on which the data set resides. ("m" does not apply to DAM.) For ISAM, "n" specifies the device type on which the prime data area (and overflow area if present) resude. For ISAM, "m" specifies the device type containing the high-level index. If this operand is omitted, the default is DEVICE=(2314,2314).

SRCHM: This operand is applicable only to DAM keyed data sets and provides for a multiple track search for keyed records. If this operand is omitted, multiple track search does not occur.

For CICS/DOS systems, SRCHM=YES is the only allowable form of the operand. For the CICS/OS system, SRCHM=number is the only applicable form of the operand, where "number" represents the number of tracks or blocks to be searched. For the CICS/OS system, the default is SRCHM=0.

For further details, see the SRCHM operand under DTFDA generation in the publication, DOS Supervisor and I/O Macros (GC24-5037) or BDAM data set processing in the publication, OS Data Management Services (GC26-3746).

VERIFY: The VERIFY=YES operand indicates that the user wants to check the parity of disk records after they are written. If this operand is omitted, records are not verified after a write request.

RELTYPE: This operand applies only to DAM data sets and specifies that relative addressing is being used in the block reference portion of the Record Identification field. If the RELTYPE operand is omitted, absolute addressing is assumed (that is, MBBCCHHR). If RELTYPE=DEC, the zoned decimal format is being used. If RELTYPE=HEX, the hexadecimal relative track and record format is being used. If RELTYPE=BLK (CICS/OS cnly), relative block addressing is being used. For further details, see "Data Base Considerations" in the CICS Application Prcgrammer's Reference Manual (SH20-1047).

IRECL: Specifies the maximum length (in bytes) of the logical record. For DOS ISAM data sets with variable-length records within fixed-length blocks, this number has no relation to the actual length of any logical record. However, the number specified, multiplied by the NRECDS parameter, must equal the actual block size on the data set. This cperand must always be specified.

For CICS/DOS, this operand should contain only one value (parameter). This value shculd not be enclosed within parentheses.

If the user of CICS/OS wishes to have a LRECL value generated in the DCB, he must specify that value in the second parameter of the operand; for example, LRECL=(50,50), where the first "50" pertains to the FCT and the second "50" pertains to the DCB. If the second parameter is not specified, the DCB is generated without a LRECL value. If the data set is BDAM organized, the second parameter should never be specified.

Note: NRECDS=1,LRECL=blocksize, is not allowed. The most advantageous specification is NRECDS=2,LRECL=(blocksize/2).

BLKSIZE: Specifies the length (in bytes) of the block. If blocks are variable-length or undefined, the length specified should be the maximum block length. If the NEWREC or BROWSE operands are used for DAM fixed-length data sets with keys, BLKSIZE must be (LRECL + BLKKEYL) for unblocked records or (LRECL * BLOCKING FACTOR + BLKKEYL) for blocked records. This operand must always be specified.

For CICS/DOS, this operand should contain only one value (parameter). This value should not be enclosed within parentheses.

If the user of CICS/OS wishes to have a BLKSIZE value generated in the DCB, he must specify that value in the second parameter of the operand; for example, BLKSIZE=(250,250), where the first "250" pertains to the FCT and the second "250" pertains to the DCB. If the second parameter is not specified, the DCB is generated without a BLKSIZE value. The DCB value (second parameter) should always specify the true block size while the FCT value (first parameter) may, for DAM data sets, include the BLKKEYL value.

RKP: Specifies the starting position of the key field in the record relative to the beginning of the record (position zero for DAM and ISAM data sets except position one for DOS ISAM data sets). With variable-length records, this operand must include the four-byte LLbb field at the beginning of each logical record. This operand must always be specified for data sets that have keys within each logical record.

RECFORM: Describes the format and characteristics of records on the data set. If this operand is omitted, the default is UNDEFINED.

For CICS/DOS, if NEWREC is specified for undefined records, BLKSIZE must include an additional eight bytes for the count field.

The format of the data set is described using one of the following parameters:

1.	FIXED	Records are fixed length.
2.	VARIABLE	Records are variable length.
3.	UNDEFINED	Records are of undefined length.

The characteristic of the data set is specified using one of the following parameters:

1.	BLOCKED	Records are blocked.
2.	UNBLOCKED	Records are not blocked.

If the user of CICS/OS wishes to have the record format specified in the DCB, he must specify that value in the third parameter of the operand; for example, RECFORM=(FIXED,BLOCKED,FBS). If the third parameter is not specified, the record format is not specified in the ICB.

Note: For CICS/OS ISAM data sets with BROWSE option specified, a DCB RECFM parameter of VB or FB is always generated regardless of whether or not the data set is blocked.

OPEN: The OPEN operand is used to specify the initial status of the data set. OPEN=INITIAL causes the data set to be opened by System Initialization, while OPEN=DEFERRRED will not open the data set until the user indicates he wishes it opened by using the Master Terminal Open/Close service function. If this operand is omitted, the default is OPEN=INITIAL.

KEYLEN: The KEYLEN operand is used only to specify the length of the logical key for the deblocking of DAM data sets. This key is usually embedded and located through use of the RKP operand. The length of the recorded (physical) key for DAM and ISAM data sets is specified in the BLKKEYL operand, and may be different from the value specified for KEYLEN. This operand must always be specified when logical keys are used.

DESCRIBE CROSS-INDEX DATA SET RECORD

The record on a cross-index data set that points to the next data set to be read is described using the

```
DFHFCT TYPE=INDACC
```

macro instruction. This macro instruction may also contain information regarding duplicate records which may be referenced by this index record, including a pointer to a duplicate data set which contains additional identifying information. If this macro instruction is used, the SERVREQ operand of the DFHFCT TYPE=DATASET macro instruction must include GET and INDACC. For further information on indirect accessing, refer to "Data Base Considerations" in the CICS Application Programmer's Reference Manual (SH20-1047).

The DFHFCT TYPE=INDACC macro instruction can include the following operands:

```
DFHFCT TYPE=INDACC,
OBJDSID=name,                                                  *
IARLKP=number,                                                 *
IALKFL=length,                                                 *
IADADMI=RELREC,KEY,                                            *
IADIII=hexadecimal character,                                  *
DUPDSID=name
```

OBJDSID: Specifies the name of the data set referenced by the cross-index data set record. This name can consist of from one to seven characters in the CICS/DOS systems or from one to eight characters in the CICS/OS system. This operand must always be specified.

IARLKP: Specifies the relative location within the cross-index data set record of the Record Identification field which is to be used to access the object data set. The displacement is relative to the beginning of the record (position zero). This operand must always be specified.

IALKFL: Specifies the length (in bytes) of the Record Identification field that is to be used to access the object data set. This operand must always be specified.

IADADMI: Supplies the argument type (RELREC or KEY) for the deblocking cf a record from a blocked BDAM data set. IADADMI=RELREC signifies that the deblocking technique is relative record. IADADMI=KEY signifies that the deblocking technique is key. This operand can be used only if the data set (file) to which this index data set points is the primary (target) data set. If this operand is omitted, and if the data set to which this index data set points is a blocked BDAM data set, the entire block is returned to the user in the File Ccntrol area.

IADIII: This operand is used to specify a one-byte user-assigned code which signifies that the data in the Record Identification field refers to a duplicate data set rather than the normal object data set. This code must be contained in the first position of the Record Identification field and must be different from any other data that would normally appear in this position. This operand must always be specified if a duplicates data set name is specified (DUPDSID).

DUPDSID: This operand is used to specify the identification for the duplicate data set associated with the cross-index data set. This identification can contain up to seven characters for CICS/DOS and up to eight characters for CICS/OS. This operand may be omitted if a duplicates data set does not exist.

DEFINE HEADER OF SEGMENTED RECORD

If the records on a data set are segmented, the

```
DFHFCT TYPE=SEGHEAD
```

macro instruction defines for File Management the header portion (root cr control segment) of a segmented record. TYPE=SFGHEAD is the first cf four operands which must be coded to specify segmented records.

The DFHFCT TYPE=SEGHEAD macro instruction includes the following operands:

```
       DFHFCT TYPE=SEGHEAD,                                            *
              SEGLENG=length,                                          *
              INDDISP=number,                                          *
              TSEGIND=BIT,DISPLACEMENT
```

SEGLENG: Specifies the length (in bytes) of the header portion (root segment) of the record. This operand must always be specified.

INDDISP: Provides the displacement of the segment indicator field relative to the beginning of the record (position zero). This operand must always be specified.

TSEGIND: Specifies the type of segment indicator field (BIT or DISPLACEMENT). The default is TSEGIND=BIT.

DESCRIBE EACH SEGMENT OF A SEGMENTED RECORD

Each segment of a segmented record is described by means of the

```
       DFHFCT TYPE=SEGDEF
```

macro instruction. TYPE=SEGDEF must be coded for every segment in the record in the sequence in which it occurs within the record. Definition of the last segment must be followed by the TYPE=SEGLAST operand which must precede the coding of the TYPE=SEGSET operands to automatically generate SEGSET=ALL as the first segment pattern in the File Control Table.

The DFHFCT TYPE=SEGDEF macro instruction includes the following operands:

```
       DFHFCT TYPE=SEGDEF,                                             *
              SEGNAME=name,                                            *
              SEGCHAR=(format,alignment),                              *
              SEGLENG=length
```

SEGNAME: Specifies the eight-character symbolic name (label) of the segment. This operand must always be specified.

SEGCHAR: Indicates characteristics (format, alignment) of the segment. If the SEGCHAR operand is omitted, the defaults are FIXED format, BYTE alignment. If one characteristic is specified, both must be specified.

The format of a segment is described using one of the following parameters:

1. FIXED, the segment is fixed length.
2. VARIABLE, the segment is variable length. The first byte of the segment indicates the length of the segment.

When a segment is brought into main storage, the alignment is described using one of the following parameters:

1. BYTE, the segment has no alignment.
2. HALF, the segment is halfword aligned.
3. FULL, the segment is fullword aligned.

4. DOUBLE, the segment is doubleword aligned.

SEGLENG: Specifies the length (in bytes) of the segment; up to 255 bytes can be specified (the length of the largest segment allowed). If the segment is variable length, this value represents the maximum length. This operand must always be specified.

DESCRIBE SEGMENT SETS

The pattern of segments for a particular data set is described using the

```
DFHFCT TYPE=SEGSET
```

macro instruction. As many segment sets as desired may be specified.

The DFHFCT TYPE=SEGSET macro instruction includes the following operands:

```
DFHFCT TYPE=SEGSET,                                              *
       SEGSET=name,                                              *
       SEGNAME=(name1,...,nameN)
```

SEGSET: Specifies the eight-character symbolic name (label) assigned to a particular pattern of segments. This label is used in coding the DFHFC macro instruction when segment services are required. The label may be the same as one of the segment names specified previously in a SEGDEF macro instruction but must be different from any other SEGSET name specified. The label ALL should not be used since CICS automatically creates a universal segment set with this label. This operand must always be specified.

SEGNAME: Specifies the name of each segment to be included in the segment set, in the sequence in which the segment occurs in the segmented record. SEGNAME must the same name as that specified in a previous DFHFCT TYPE=SEGDEF macro instruction.

SPECIFY LAST SEGMENT SET

The end of the segment definitions and the end of the segment set definitions is indicated by the

```
DFHFCT TYPE=SEGLAST
```

macro instruction, which must be coded immediately following the last macro segment definition (TYPE=SEGDEF) and immediately following the last segment set (TYPE=SEGSET) for a data set. This macro instruction generates SEGSET=ALL, which includes all the segments in the record, as the first entry in the segment set portion of the File Control Table.

SPECIFY END OF FILE CONTROL TABLE

The end of the File Control Table is indicated by the

```
DFHFCT TYPE=FINAL
```

macro instruction, which creates a dummy table entry to signal the table end. This macro instruction is the last statement before the

Assembler END statement, except in the CICS/DOS systems where the user may also elect to code the DFHFCT TYPE=LOGICMOD macro instruction. The Assembler END statement must include the label DFHFCTBA.

CREATE SUPERSET ISAM LOGIC MODULE (CICS/DOS only)

A superset ISAM logic module can be assembled in the CICS/DOS systems by issuing the

```
       DFHFCT TYPE=LOGICMOD
```

macro instruction as the last statement before the Assembler END statement. The resulting logic module meets all the processing requirements for defined ISAM data sets with the following exception.

If multiple ISAM data sets have been defined with the "add" function (SERVREQ=NEWREC) and some of the data sets have the "prime data in main storage" characteristic while other data sets do not, an additional logic module is required to support those data sets which do not have the "prime data in main storage" characteristic. The user can circumvent this situation by ensuring that ISAM data sets with the "add" feature are all defined either with or without the "prime data in main storage" characteristics.

If the user is required to assemble an additional ISAM logic module, he is so notified in a series of diagnostic messages at the end of the File Control Table listing. Also included in these messages are the required parameter values he must specify to create a superset logic module.

For further details concerning logic module preparation, see the *CICS/DOS Operations Guide*.

FILE CONTROL TABLE EXAMPLE

Figure 3 illustrates the coding that is required to create a File Control Table for three data sets. The first data set in the table is a cross-index data set that provides indirect access to a master data set and may reference a duplicate data set. The master data set requires segmenting services.

```
DFHFCT TYPE=INITIAL             START OF FILE CONTROL TABLE
DFHFCT TYPE=DATASET,            TABLE ENTRY FOR AN ISAM        *
       DATASET=INDEX,           DATA SET USED AS A CROSS-      *
       ACCMETH=ISAM,            INDEX DATA SET FOR A DATA SET  *
       SERVREQ=(GET,            NAMED MASTER.                  *
       PUT,                     THIS DATA SET MAY BE           *
       UPDATE,                  UPDATED AND ADDED TO.          *
       NEWREC,                                                 *
       INDACC),                                                *
       RECFORM=(FIXED,BLOCKED),                                *
       LRECL=37,                                               *
       BLKSIZE=370
       .
       .
       .
```

Figure 3 (Part 1 of 2). Coding for file control table

```
DFHFCT TYPE=INDACC,           THIS DATA SET REFERENCES         *
       OBJDSID=MASTER,        A DATA SET NAMED MASTER,         *
       IARLKP=26,             WHOSE KEY IS FOUND AT            *
       IALKFL=11,             POSITION 26 OF THIS              *
                              RECORD.  IT IS 11 CHARACTERS.    *
       IADIII=FF,             IT MAY POINT TO A DUPLICATES     *
       DUPDSID=DUPLICA        DATA SET NAMED DUPLICA.
DFHFCT TYPE=DATASET,          TABLE ENTRY FOR A BDAM           *
       DATASET=DUPLICA,       DUPLICATES DATA SET WHICH        *
       ACCMETH=BDAM,          CONTAINS KEYS TO THE MASTER      *
       LRECL=22,              DATA SET.  IT IS A READ-ONLY     *
       SERVREQ=(GET),         DATA SET.                        *
       RECFORM=(FIXED,UNBLOCKED)
       .
       .
       .
DFHFCT TYPE=DATASET,          TABLE ENTRY FOR AN ISAM DATA     *
       DATASET=MASTER,        SET WHICH MAY BE UPDATED AND     *
       ACCMETH=ISAM,          ADDED TO, AND WHOSE RECORDS      *
       SERVREQ=(GET,          ARE SEGMENTED.                   *
       PUT,                                                    *
       UPDATE,                                                 *
       NEWREC,                                                 *
       SEGMENT),                                               *
       RECFORM=(FIXED,BLOCKED),                                *
       LRECL=310,                                              *
       BLKSIZE=1550,                                           *
       RKP=11
       .
       .
       .
DFHFCT TYPE=SEGHEAD,          SEGMENT HEADER DESCRIPTION       *
       SEGLENG=2,                                              *
       INDDISP=2,                                              *
       TSEGIND=BIT
DFHFCT TYPE=SEGDEF,           SEGMENT #1 OF THE RECORD IS      *
       SEGNAME=SEGMENT1,      A FIXED-LENGTH, DOUBLEWORD       *
       SEGCHAR=(FIXED,        ALIGNED FIELD.                   *
       DOUBLE),                                                *
       SEGLENG=50
DFHFCT TYPE=SEGDEF,           SEGMENT #2 OF THIS RECORD IS     *
       SEGNAME=SEGMENT2,      A VARIABLE LENGTH HALFWORD       *
       SEGCHAR=(VARIABLE,     ALIGNED FIELD WHOSE MAXIMUM      *
       HALF),                                                  *
       SEGLENG=70             LENGTH IS 70 BYTES.
DFHFCT TYPE=SEGDEF,           SEGMENT #3 OF THE RECORD IS      *
       SEGNAME=SEGMENT3,      A FIXED-LENGTH UNALIGNED         *
       SEGLENG=45             FIELD
DFHFCT TYPE=SEGLAST           END OF SEGMENT DEFINITIONS
DFHFCT TYPE=SEGSET,                                            *
       SEGSET=PATTERN1,                                        *
       SEGNAME=(SEGMENT1,SEGMENT2,SEGMENT3)
DFHFCT TYPE=SEGLAST           LAST SEGMENT ENTRY FOR MASTER
DFHFCT TYPE=FINAL             END OF FILE CONTROL TABLE
DFHFCT TYPE=LOGICMOD          CREATE DOS ISAM LOGIC MODULE
END DFHFCTBA                  POINT TO REQUIRED ENTRY LABEL
```

Figure 3 (Part 2 of 2). Coding for file control table

DESTINATION CONTROL TABLE (DCT)

The Destination Control Table (DCT) is used to describe to CICS the destination name and certain cther characteristics of data that is transient to CICS (that is, to be processed by the Transient Data Control program). Entries are made to the DCT by coding the Destination Control Table macro instruction (DFHDCT).

Sequential extrapartition destinations are used for storing data external to the CICS partition/region or for retrieving data from outside the partition/region. Data stored for this purpose includes data received from terminals or other data created internally as the result of some transaction requirement identified by a user-written program. Extrapartition data may be both input and output data and is processed using QSAM under CICS/OS or SAM under CICS/DOS.

Destination Control Table macro instructions are also used to specify intrapartition destinations. A single data set is used as intermediate storage for data to be directed to multiple intrapartition data destinations. Intrapartition data may be ultimately either transmitted upon request to the destination terminal or retrieved sequentially from the temporary data set for other uses. The user can specify, through the Destination Control Table, that a task is to be created when a certain number of records (trigger level) has been accumulated for an intrapartition destination.

Included in the Destination Control Table is the appropriate user-prepared data set control information for all resident extrapartition data sets. This data set control information must follow the DFHDCT TYPE=INITIAL macro instruction. The extrapartition data sets supported under CICS are: blocked, unblocked, fixed, variable, or undefined.

CICS provides the capability, in conjunction with the Dynamic Open/Close facility, to have nonresident (transient) data set control blocks and associated input/output areas and logic modules. Main storage normally encumbered for these storage areas is therefore available to the dynamic main storage area until the use of the storage areas is required. Nonresident data set control blocks are defined through the combination of DFHDCT TYPE=INITIAL and DFHDCT TYPE=SDSCI macro instructions.

Whether the specified destinations are extrapartition or intrapartition (or indirect destinations pointing to either extrapartition or intrapartition destinations), the symbolic names of the destinations must be provided by the user. Refer to Appendix A for a listing of the required destination identification (DESTID) entries.

The following operands can be included in the Destination Control Table (DFHDCT) macro instruction:

```
DFHDCT TYPE=INITIAL,                                                    *
       SUFFIX=xx,                                                       *
       TRNSUFX=(xx,...),                                                *
       SEPASMB=YES,NO

DFHDCT TYPE=SDSCI,                                                      *
       DSCNAME=name,                                                    *
       MODNAME=name,                                                    *
       DEVICE=1403,1404,1443,1445,2311,2314,3330,TAPE,                  *
       BLKSIZE=length,                                                  *
       DEVADDR=symbolic address,                                        *
       RECFORM=FIXUNB,FIXBLK,VARUNB,VARBLK,UNDEFINED,                   *
       FILABL=STD,NO,                                                   *
       TYPEFLE=INPUT,OUTPUT,RDBACK,                                     *
       RECSIZE=length,                                                  *
       REWIND=UNLOAD,NORWD,LEAVE,REREAD,                                *
       TPMARK=NO,                                                       *
       BUFNO=number,                                                    *
       ERROPT=SKIP,IGNORE,                                      *
       SUFFIX=xx

DFHDCT TYPE=EXTRA,                                              *
       DSCNAME=name,                                            *
       DESTID=name,                                             *
       OPEN=INITIAL,DEFERRED,                                   *
       RESIDNT=YES,NO

DFHDCT TYPE=INTRA,                                              *
       DESTID=name,                                             *
       REUSE=YES,NO,                                            *
       TRIGLEV=number,                                          *
       DESTFAC=TERMINAL,FILE,                                   *
       TRANSID=name

DFHDCT TYPE=INDIRECT,                                           *
       DESTID=name,                                             *
       INDDEST=name

DFHDCT TYPE=FINAL
```

ESTABLISH CONTROL SECTION FOR DESTINATION CONTROL TABLE

The entry point and beginning address for the Destination Control Table being defined are established by the

```
DFHDCT TYPE=INITIAL,                                            *
       SUFFIX=xx,                                               *
       TRNSUFX=(xx,...),                                        *
       SEPASMB=YES,NO
```

macro instruction.

SUFFIX: Specifies a two-character alphameric suffix (other than 'NO' which is reserved) for the Destination Control Table being assembled. This suffix, if specified, is appended to the standard module name (DFHDCT) and is used to name the module on the linkage editor output library. If this operand is omitted, a suffix is not provided.

TRNSUFX: Specifies a list of one- or two-character alphameric suffixes associated with nonresident data set control blocks. Any suffix appearing subsequently in the SUFFIX operand of the DFHDCT TYPE=SDSCI macro instruction must also appear in this list. These suffixes are used to punch the control cards for the CICS/DOS Linkage Editor (DFHLINK) or for the OS Linkage Editor (LINKEDIT). Up to 255 suffixes can be specified.

SEPASMB: The SEPASMB=YES operand is used to indicate that only data set control information is to be generated; that is, the DFHDCT TYPE=INITIAL, DFHDCT TYPE=SDSCI, and DFHDCT TYPE=FINAL macro instructions are the only DFHDCT macro instructions to be included. The default is SEPASMB=NO.

SPECIFY DATA SET CONTROL INFORMATION

The data set control blocks (DTF's in CICS/DOS; DCB's in CICS/OS) are generated in response to the

```
        DFHDCT TYPE=SDSCI
```

macro instruction. This macro instruction is needed only for extrapartition transient data and must have a DFHDCT TYPE=EXTRA macro instruction associated with it for resident data set control blocks. Note that all DFHDCT TYPE=SDSCI macro instructions must be issued immediately following the DFHDCT TYPE=INITIAL macro instruction and preceding any DFHDCT TYPE=EXTRA, DFHDCT TYPE=INTRA, or DFHDCT TYPE=INDIRECT macro instructions.

The DFHDCT TYPE=SDSCI macro instruction can include the following operands:

```
        DFHDCT TYPE=SDSCI,                                         *
               DSCNAME=name,                                       *
               MODNAME=name,                                       *
               DEVICE=1403,1404,1443,1445,2311,2314,3330,TAPE,     *
               BLKSIZE=length,                                     *
               DEVADDR=symbolic address,                           *
               RECFORM=FIXUNB,FIXBLK,VARUNB,VARBLK,UNDEFINED,      *
               FILABL=STD,NO,                                      *
               TYPEFLE=INPUT,OUTPUT,RDBACK,                        *
               RECSIZE=length,                                     *
               REWIND=UNLOAD,NORWD,LEAVE,REREAD,                   *
               TPMARK=NO,                                          *
               BUFNO=number,                                       *
               ERROPT=SKIP,IGNORE,                                 *
               SUFFIX=xx
```

DSCNAME: Specifies the data set control name. This name must be the same as that specified in the DSCNAME operand of the DFHDCT TYPE=EXTRA macro instruction and is limited to seven characters in CICS/DOS or eight characters in CICS/OS. For CICS/OS, the DSCNAME is also the DDNAME and DCBNAME.

MODNAME: Applicable only to the CICS/DOS systems, this operand is used to specify the name of the logic module to be used to process the transient data set. If this operand is omitted, a standard DOS name is generated for calling the logic module.

This operand can be used in conjunction with the DOS Subset/Superset Logic Module facility to reduce the number of logic modules required to process sequential data sets (where supersetting is permissible).

DEVICE: Applicable only to CICS/DOS, this operand specifies the type of input/output device. Valid device types are: 1403, 1404, 1443, 1445, 2311, 2314, 3330, and TAPE. This operand is ignored in CICS/OS; instead, the device specified through the data definition (DD) statement is used.

BLKSIZE: Specifies the length (in bytes) of the block (maximum length for variable length records). For DOS disk output data sets, add eight bytes required by Logical IOCS for creation of the count field.

DEVADDR: Applicable only to CICS/DOS, this operand specifies the symbolic unit address. This operand is not required for disk data sets when the symbolic address is provided via the CICS/DOS EXTENT card.

RECFORM: Specifies the record format of the data set. Valid entries are: FIXUNB, FIXBLK, VARUNB, VARBLK, and UNDEFINED. For CICS/DOS, the default is RECFORM=FIXUNB. For CICS/OS, no default is provided; the record format specified in the data definition (DD) statement is used.

FILABL: Applicable only to CICS/DOS, this operand specifies the type of label on tape data sets. Valid entries are STD or NO. The default is FILABL=NO.

TYPEFLE: Indicates whether the data set is an input or output data set. The default is TYPEFLE=INPUT. For CICS/OS, TYPEFLE=RDBACK specifies an input data set to be read backwards.

RECSIZE: Specifies the length (in bytes) of the record (maximum length for variable length records).

REWIND: Indicates the disposition of a tape data set. Valid entries are UNLOAD and NORWD for CICS/DOS, and LEAVE and REREAD for CICS/OS.

TPMARK: Applicable only to CICS/DOS, the TPMARK=NO operand indicates that the writing of a tapemark at end of data set (file) is to be suppressed.

BUFNO: Specifies the number of buffers to be provided. For CICS/DOS, any value other than 2 defaults to 1. For CICS/OS, any number up to 255 may be specified; the default value is 1.

ERROPT: Specifies the error option to be performed in the event of error. Valid parameters are SKIP and IGNORE. ERROPT=SKIP causes the block that caused the error to be skipped. ERROPT=IGNORE causes the block to be accepted. The default is ERROPT=IGNORE.

SUFFIX: Specifies a one- or two-character alphameric suffix for the nonresident data set control block being generated. The use of this operand indicates that the data set control block being generated is nonresident. Nonresident data set control blocks reside on the Real-Time Relocatable Library (DFHRPL) under the unique name DFHTRNxx, where "xx" is the suffix specified in this operand. The user-provided suffix characters must also be specified in the DFHDCT TYPE=INITIAL, TRNSUFX=(xx,...) list.

For each data set control block generated via the DFHDCT TYPE=SDSCI, SUFFIX=xx macro instruction, the same suffixed name must be specified in the preparation of the Program Processing Table (DFHPPT TYPE=ENTRY, PROGRAM=DFHTRNxx).

For further information on the above operands, refer to the publication _DOS Supervisor and Input/Output Macros_ (GC24-5037) or the publication _OS Supervisor and Data Management Macro Instructions_ (GC28-6647).

SPECIFY EXTRAPARTITION DESTINATIONS

Destinations external to the system are specified using the

```
DFHDCT TYPE=EXTRA
```

macro instruction. This macro instruction must be coded once for every extrapartition destinaticn.

Extrapartition destinations that use nonresident data set control blocks are not required to be associated with a specific data set definition. When such destinations are opened, a one- or two-character suffix must be supplied to the Dynamic Open/Close program that indicates which nonresident data set control blocks are to be used for the destinations.

The DFHDCT TYPE=EXTRA macro instruction includes the following operands:

```
DFHDCT TYPE=EXTRA,                                              *
       DSCNAME=name,                                            *
       DESTID=name,                                             *
       OPEN=INITIAL,DEFERRED,                                   *
       RESIDNT=YES,NO
```

DSCNAME: Specifies the data set name the user must include in the DFHDCT TYPE=SDSCI macro instruction for destinations that use resident data set ccntrol blocks. This operand is not applicable for destinations that use nonresident data set control blocks. Nonresident data set control blocks are identified when the destination is opened.

DESTID: Specifies the symbolic name of the extrapartition destination. The symbolic name is the same as that used in the transient data macro instruction (DFHTD) to specify the destination. Any destination identification of more than four characters is truncated on the right. Refer to Appendix A for a listing of the required destination identification entries.

OPEN: Applicable only to extrapartition destinations that use resident data set control blocks, this operand is used to specify how the data set associated with this destination is to be opened. OPEN=INITIAL indicates that the data set is to be opened during system initialization. OPEN=DEFERRED indicates that the user will open the data set during real-time execution of CICS. The default is OPEN=INITIAL for destinations that use resident data set control blocks.

RESIDNT: Indicates whether this destination is to use resident or nonresident data set control blocks. The default is RESIDNT=YES.

SPECIFY INTRAPARTITION DESTINATIONS

Destinations for messages that are to be logged temporarily by CICS are specified using the

```
DFHDCT TYPE=INTRA
```

macro instruction. This macro instruction must be coded once for every intrapartition destination.

The DFHDCT TYPE=INTRA macro instruction can include the following operands:

```
      DFHDCT TYPE=INTRA,                                                *
             DESTID=name,                                               *
             REUSE=YES,NO,                                              *
             TRIGLEV=number,                                            *
             DESTFAC=TERMINAL,FILE,                                     *
             TRANSID=name
```

DESTID: Specifies the symbolic name of the intrapartition destination. The symbolic name is the same as that used in the Transient Data macro instruction (DFHTD) to specify the destination. Any destination identification of more than four characters is truncated on the right. Refer to Appendix A for a listing of the required destination identification entries.

If the ultimate destination of the data is a terminal and if automatic task initiation is associated with the destination, the name specified in the DESTID operand must be the same as the name specified in the TRMIDNT operand of the DFHTCT TYPE=TERMINAL macro instruction. The user may find it convenient to use the same naming convention for terminal destinations and data set destinations, regardless of whether automatic task initiation is requested.

REUSE: REUSE=YES specifies that intrapartition storage tracks for this destination are to be released as they are read and returned to the pool of available tracks. REUSE=NO specifies that intrapartition storage tracks for this destination are not to be released until a Transient Data PURGE macro instruction is issued; the PURGE macro instruction causes all tracks associated with this DESTID to be released. The default is REUSE=YES.

TRIGLEV: Specifies the number of data records (trigger level) to be accumulated for a destination before automatically requesting the creation of a task to process these records. The ultimate destination is normally a data set or terminal. If the TRANSID operand has been used, and if no trigger level has been specified, TRIGLEV defaults to a value of 1. (If the ultimate destination is a 2741 Communication terminal, the task to be initiated is not initiated until that terminal receives data.)

If TRIGLEV=0, automatic task initiation does not occur; the data records accumulate until some program, however initiated, is executed and issues a DFHTD TYPE=GET macro instruction to access the records. If the execution of a DFHTD TYPE=PUT macro instruction results in the trigger level being reached (or exceeded) for a non-terminal destination, and if either a "maximum tasks" or "short on storage" condition exists for CICS, the task to be automatically initiated is not initiated until a subsequent PUT to the same destination occurs with the stress condition no longer existing.

DESTFAC: If TRANSID has been specified, DESTFAC specifies the type of destination (TERMINAL or FILE) that the queue represents. If no destination is specified, the default is DESTFAC=TERMINAL.

If DESTFAC=TERMINAL, task initiation to process the queue is by Terminal Control. If DESTFAC=FILE, task initiation is by Transient Data Control.

TRANSID: Provides identification for the transaction that is to be automatically initiated when the trigger level is reached. If this operand is omitted, the application program must initiate the read operation.

SPECIFY INDIRECT DATA DESTINATIONS

Indirect data destinations can be specified within the Destination Control Table using the

```
       DFHDCT TYPE=INDIRECT
```

macro instruction. This optional facility is used primarily with intrapartition destinations. The indirect data destination does not point to an actual data set but instead points to another destination.

For example, assume the user develops functional symbolic names for the destinations of several message types. These, in turn, may point to one actual destination. At a later time the user might choose to direct one of the message types to another destination. The user does not change his programs but only alters the indirect destination name.

The DFHDCT TYPE=INDIRECT macro instruction can include the following operands:

```
       DFHDCT TYPE=INDIRECT,                                           *
              DESTID=name,                                             *
              INDDEST=name
```

DESTID: Specifies the four-character symbolic name of a particular indirect destination. The symbolic name is the same as that used in the Transient Data macro instruction (DFHTD). Refer to Appendix A for a listing of the required destination identification entries.

INDDEST: Specifies the symbolic identification of an intrapartition or extrapartition destination. This identification must be the same as the DESTID of the actual destination.

TERMINATE ENTRIES FOR THE DESTINATION CONTROL TABLE

Entries for the Destination Control Table are terminated by the

```
       DFHDCT TYPE=FINAL
```

macro instruction. This macro instruction must be the last statement in the assembly of every Destination Control Table before the Assembler END statement. The Assembler END statement must include the label DFHDCTBA.

NONRESIDENT EXTRAPARTITION DATA SET DEFINITION

The definition of nonresident extrapartition data sets is accomplished through use of the DFHDCT TYPE=INITIAL and DFHDCT TYPE=SDSCI macro instructions. The data set control blocks and associated input/output areas are generated and cataloged to the Real-Time Relocatable Program Library (DFHRPL) as a separate table for each nonresident data set control block to be used. There must be an entry in the Processing Program Table (PPT) for each nonresident data set control block. The format of the name is DFHTRNxx, where "xx" represents the suffix character(s) specified in the DFHDCT TYPE=SDSCI, SUFFIX=xx macro instruction. The PPT entry for these data set control blocks must include the RELOAD=YES operand.

In CICS/OS, the necessary access methods are acquired when data sets are opened. Therefore references to transient access methods (logic modules) in the following discussion are applicable primarily to CICS/DOS.

In the CICS/DOS systems, the logic modules for the nonresident data set control blocks may also be transient. If the use of nonresident logic modules is desired, the logic modules must be assembled and cataloged to DFHRPL prior to execution. The logic modules are assembled using the standard DOS SAM macro instructions and must be cataloged with the same program name generated by the nonresident data set control block for which it is to be used. The name can be found in the assembly of the data set control block. Unless otherwise specified in the DFHDCT TYPE=SDSCI macro instruction, this name is the standard DOS logic module name.

The PPT entry for each nonresident logic module must include the RELOAD=YES operand.

In CICS/DOS, if the DCT is generated to include the nonresident data set control block definitions, the logic modules for both the resident and nonresident data set control blocks are link edited into the DCT. To allow the logic modules to be transient, the DCT should be assembled including only the resident data set control block definitions (DFHDCT TYPE=SDSCI). A separate assembly can then be accomplished to generate only the nonresident data set control blocks. To perform this operation, include a DFHDCT TYPE=INITIAL, TRNSUFX=(xx,...),SEPASMB=YES macro instruction, followed by DFHDCT TYPE=SDSCI macro instructions for all nonresident data set definitions, followed by the DFHDCT TYPE=FINAL macro instruction.

DESTINATION CONTROL TABLE EXAMPLES

Figure 4 contains an example of the coding required to generate a Destination Control Table that uses resident data set control blocks.

```
DFHDCT TYPE=INITIAL          START OF DEST CONTROL TABLE
DFHDCT TYPE=SDSCI,           SPECIFY DATA SET CONTROL INFO      *
       DSCNAME=DFHXTRA,      RELATED DESTINATION                *
       DEVADDR=SYSLST,       SYMBOLIC UNIT ADDRESS              *
       DEVICE=1403,          DEVICE TYPE                        *
       RECFORM=FIXUNB        RECORD FORMAT
DFHDCT TYPE=EXTRA,           EXTRAPARTITION DESTINATION         *
       DSCNAME=DFHXTRA,                                         *
       DESTID=CASH           SYMBOLIC NAME
DFHDCT TYPE=INTRA,           INTRAPARTITION DESTINATION         *
       DESTID=GAMA           SYMBOLIC NAME
DFHDCT TYPE=INTRA,                                              *
       DESTID=SAMA           SYMBOLIC NAME
DFHDCT TYPE=INTRA,                                              *
       DESTID=DAMA,          SYMBOLIC NAME                      *
       TRIGLEV=5                                                *
       DESTFAC=TERMINAL                                         *
       TRANSID=AUTO          TRANSACTION ID
DFHDCT TYPE=FINAL            END OF DEST CONTROL TABLE
END DFHDCTBA                 POINT TO REQUIRED ENTRY LABEL
```

Figure 4. DCT using resident data set control blocks

Figures 5 and 6 show how the generation of a DCT can include extrapartition destinations that use nonresident data set control blocks. Figure 5 shows a DCT with nonresident data set control blocks and resident logic modules. Figure 6 shows a DCT with nonresident data set control blocks and nonresident logic modules.

```
DFHDCT TYPE=INITIAL,                                       *
       TRNSUFX=(AA,BB,CC,DD),                              *
       SUFFIX=22
DFHDCT TYPE=SDSCI,                                         *
       DSCNAME=TAPE1,                                      *
       RECFORM=FIXBLK,                                     *
       TYPEFLE=OUTPUT,                                     *
       BLKSIZE=2000,                                       *
       DEVADDR=SYS011,                                     *
       DEVICE=TAPE,                                        *
       BUFNO=2,                                            *
       RECSIZE=200,                                        *
       SUFFIX=AA
DFHDCT TYPE=SDSCI,                                         *
       DSCNAME=TAPE2,                                      *
       RECFORM=FIXBLK,                                     *
       TYPEFLE=INPUT,                                      *
       BLKSIZE=2000,                                       *
       DEVADDR=SYS011,                                     *
       DEVICE=TAPE,                                        *
       BUFNO=2,                                            *
       RECSIZE=200,                                        *
       SUFFIX=BB
DFHDCT TYPE=SDSCI,                                         *
       DSCNAME=TAPE3,                                      *
       RECFORM=FIXUNB,                                     *
       BLKSIZE=1240,                                       *
       TYPEFLE=INPUT,                                      *
       DEVADDR=SYS011,                                     *
       DEVICE=TAPE,                                        *
       SUFFIX=CC
DFHDCT TYPE=SDSCI,                                         *
       DSCNAME=TAPE4,                                      *
       RECFORM=FIXUNB,                                     *
       BLKSIZE=1240,                                       *
       TYPEFLE=OUTPUT,                                     *
       DEVADDR=SYS011,                                     *
       DEVICE=TAPE,                                        *
       SUFFIX=DD
DFHDCT TYPE=SDSCI,                                         *
       DSCNAME=PRINT,                                      *
       RECFORM=VARUNB,                                     *
       BLKSIZE=121,                                        *
       DEVADDR=SYSLST,                                     *
       DEVICE=1403
DFHDCT TYPE=EXTRA,                                         *
       DSCNAME=PRINT,                                      *
       DESTID=PRNT
DFHDCT TYPE=EXTRA,                                         *
       RESIDNT=NO,                                         *
       DESTID=TAPE
DFHDCT TYPE=FINAL
END DFHDCTBA
```

Figure 5. DCT using nonresident data set control blocks and resident logic modules

The assembly of the macro instructions contained in Figure 5 results in a Destination Control Table with suffix 22 (DFHDCT22) that contains one data set control block for the printer (TYPE=SDSCI,DESTID=PRNT). When the output of this generation is link edited, the logic modules for tape and printer are automatically included, and the four tape data set control blocks are cataloged separately to DFHRPL as DFHTRNAA, DFHTRNBB, DFHTRNCC, and DFHTRNDD.

The extrapartition destination (DESTID=TAPE) can be opened through the CICS Dynamic Open/Close program with any of the four suffixed data set control blocks (DFHTRNAA, DFHTRNBB, DFHTRNCC, or DFHTRNDD). It can then be closed and reopened with any of the other nonresident data set control blocks.

Program Processing Table (PPT) entries must be included for the four data set control blocks cataloged separately. PPT entries must include the RELOAD=YES operand.

```
DFHDCT TYPE=INITIAL,                                            *
       TRNSUFX=(AA,BB,CC,DD) ,                                  *
       SEPASMB=YES
DFHDCT TYPE=SDSCI,                                              *
       DSCNAME=TAPE1,                                           *
       RECFORM=FIXBLK,                                          *
       TYPEFLE=OUTPUT,                                          *
       BLKSIZE=2000,                                            *
       DEVADDR=SYS011,                                          *
       DEVICE=TAPE,                                             *
       BUFNO=2,                                                 *
       RECSIZE=200,                                             *
       SUFFIX=AA
DFHDCT TYPE=SDSCI,                                              *
       DSCNAME=TAPE2,                                           *
       RECFORM=FIXBLK,                                          *
       TYPEFLE=INPUT,                                           *
       BLKSIZE=2000,                                            *
       DEVADDR=SYS011,                                          *
       DEVICE=TAPE,                                             *
       BUFNO=2,                                                 *
       RECSIZE=200,                                             *
       SUFFIX=BB
DFHDCT TYPE=SDSCI,                                              *
       DSCNAME=TAPE3,                                           *
       RECFORM=FIXUNB,                                          *
       BLKSIZE=1240,                                            *
       TYPEFLE=INPUT,                                           *
       DEVADDR=SYS011,                                          *
       DEVICE=TAPE,                                             *
       SUFFIX=CC
DFHDCT TYPE=SDSCI,                                              *
       DSCNAME=TAPE4,                                           *
       RECFORM=FIXUNB,                                          *
       BLKSIZE=1240,                                            *
       TYPEFLE=OUTPUT,                                          *
       DEVADDR=SYS011,                                          *
       DEVICE=TAPE,                                             *
       SUFFIX=DD
DFHDCT TYPE=FINAL
END DFHDCTBA
```

Figure 6 (Part 1 of 2). DCT using nonresident data set control blocks and nonresident logic modules

```
       DFHDCT TYPE=INITIAL,                                            *
              SUFFIX=YY
       DFHDCT TYPE=SDSCI,                                              *
              DSCNAME=PRINT,                                           *
              RECFORM=VARUNB,                                          *
              BLKSIZE=121,                                             *
              DEVADDR=SYSLST,                                          *
              DEVICE=1403
       DFHDCT TYPE=EXTRA,                                              *
              DSCNAME=PRINT,                                           *
              DESTID=PRNT
       DFHDCT TYPE=EXTRA,                                              *
              RESIDNT=NO,                                              *
              DESTID=TAPE
       DFHDCT TYPE=FINAL
       END DFHDCTBA
```

Figure 6 (Part 2 of 2). DCT using nonresident data set control blocks and nonresident logic modules

The result of the generation of the macro instructions contained in Figure 6 (Part 2 of 2) is a Destination Control Table with a suffix of YY (DFHDCTYY). The DCT contains one data set control block for the printer (TYPE=SDSCI, DESTID=PRNT) and one logic module for the printer.

The four data set control blocks for tape are generated by the assembly of the macro instructions contained in Figure 6 (Part 1 of 2). When the cutput of that assembly is link edited, the data set control blocks are cataloged as DFHTRNAA, DFHTRNBB, DFHTRNCC, and DFHTRNDD. However, the user must have cataloged the logic modules used by these four data set control blocks to DFHRPL using DFHLINK, and must have included entries in the PPT that specify the RELOAD=YES cperand for those logic modules.

When using the generated DCT of Figure 6, no storage is used for the data set control blccks or for the logic modules until the extrapartition destination (DESTID=TAPE) is opened via the CICS Dynamic Open/Close program (DFHOCP). The Dynamic Open/Close program will ensure that cnly one logic module of the same name is in storage at any one time. If the logic module is not resident in the DCT, the Dynamic Open/Close program frees the storage associated with the logic module when the data set is closed.

For further details concerning the use of the Dynamic Open/Close facility, see the discussion of dynamic open/close in the "Master Terminal" section and the "Dynamic Open/Close Function" section of this manual.

PROGRAM CONTROL TABLE (PCT)

The Program Control Table is the means for the user to describe the control information to be used by CICS for identifying and initializing a newly-arrived transaction. Task Control uses a portion of each PCT entry for the purpose of accumulating transaction statistics. This table is required by the control system to verify the incoming transaction, supply the transaction priority and security key, supply the length of the Transaction Work Area, and keep transaction statistics.

The following operands can be included in the DFHPCT macro instruction:

```
       DFHPCT TYPE=INITIAL,                                                *
              SUFFIX=xx

       DFHPCT TYPE=ENTRY,                                                  *
              TRANSID=name,                                                *
              TRNPRTY=decimal value,                                       *
              TRANSEC=decimal value,                                       *
              TWASIZE=decimal value,                                       *
              PROGRAM=name,                                                *
              TPURGE=YES,NO,                                               *
              SPURGE=YES,NO,                                               *
              COMPAT=NO,FORMAT,FULLBUF

       DFHPCT TYPE=FINAL
```

ESTABLISH CONTROL SECTION FOR PROGRAM CONTROL TABLE

The control section into which the Program Control Table is assembled is established by the

```
       DFHPCT TYPE=INITIAL,                                                *
              SUFFIX=xx
```

macro instruction. This macro instruction must be coded as the first statement in the source deck used to assemble the Program Control Table.

SUFFIX: Specifies a two-character alphameric suffix for the Program Control Table being assembled. This suffix, if specified, is appended to the standard module name (DFHPCT) and is used to name the module cn the linkage editor output library. If this operand is omitted, a suffix is not provided.

SPECIFY TRANSACTION CONTROL INFORMATION

Transaction control information is provided to CICS program management services by the

```
       DFHPCT TYPE=ENTRY
```

macro instruction. Included in this macro instruction is information cn priority, security key, program identification, purge indicators, and size of the Transaction Work Area.

The DFHPCT TYPE=ENTRY macro instruction includes the following operands:

```
       DFHPCT TYPE=ENTRY,                                                  *
              TRANSID=name,                                                *
              TRNPRTY=decimal value,                                       *
              TRANSEC=decimal value,                                       *
              TWASIZE=decimal value,                                       *
              PROGRAM=name,                                                *
              TPURGE=YES,NO,                                               *
              SPURGE=YES,NO,                                               *
              COMPAT=NO,FORMAT,FULLBUF
```

TRANSID: Used to specify the four-character identification assigned to the individual transaction. Note that TRANSID=DISC should not be specified if terminals are to be supported on switched lines. For further details concerning the use of terminals on switched lines, see the CICS Terminal Operator's Guide.

TRNPRTY: Used to define the transaction priority. This three-position decimal value (000-255) is used in establishing the overall transaction processing priority. (Transaction processing priority is equal to the sum of the terminal priority, transaction priority, and operator priority, not to exceed 255.) If this operand is omitted, the default is TRNPRTY=001.

TRANSEC: Used to define the transaction security, the TRANSEC parameter is a three-position decimal value with a range 001 through 024. The default is TRANSEC=001.

TWASIZE: Used to define the Transaction Work Area required. A five-position decimal value that determines the size (in bytes) of the Transaction Work Area to be acquired for this transaction. Refer to Appendix A for the minimum values that must be specified for programs provided by CICS. The default is TWASIZE=0.

PROGRAM: Used to define the initial program identification; this operand specifies the name of the program to which control is to be given to process this transaction.

TPURGE: Used to set the terminal error purge indicator. TPURGE=YES indicates that the terminal error purge indicator is to be set to allow the transaction to be purged when a terminal error occurs. The default is TPURGE=NO.

SPURGE: Used to set the system stall purge indicator. SPURGE=NO indicates that the transaction is not purgeable when a system stall condition is detected. The default is SPURGE=NO.

COMPAT: Used to flag those transactions that are to be run in 2260 compatibility mode on the 3270 Information Display System. The default is COMPAT=NO.

COMPAT=FORMAT indicates that the transaction is to be run in FORMAT mode; COMPAT=FULLBUF indicates that the transaction is to be run in FULLBUF mode. For a discussion of FORMAT and FULLBUF modes of compatibility operation, see the section "2260 Compatibility for the 3270".

SPECIFY END OF PROGRAM CONTROL TABLE

The end of the Program Control Table is indicated by the

```
DFHPCT TYPE=FINAL
```

macro instruction, which is the last statement in the assembly of the Program Control Table before the Assembler END statement. This macro instruction creates a dummy entry to signal the table end. The Assembler END statement must include the label DFHPCTBA.

PROGRAM CONTROL TABLE EXAMPLE

Figure 7 illustrates the coding that is required to create a Program Control Table. The transactions include:

1. Three transactions of a higher priority than the default priority (TRNPRTY=1 is the default)
2. Two transactions with security key protection
3. Total of nine transactions

See Appendix A for a list of all the entries required to create a Program Control Table.

```
DFHPCT TYPE=INITIAL
DFHPCT TYPE=ENTRY,                                              *
       TRANSID=COB1,                                            *
       TWASIZE=64,                                              *
       PROGRAM=COBPGM1
DFHPCT TYPE=ENTRY,                                              *
       TRANSID=COB2,                                            *
       TRNPRTY=100,                                             *
       TRANSEC=10,                                              *
       PROGRAM=COBPGM2
DFHPCT TYPE=ENTRY,                                              *
       TRANSID=COB3,                                            *
       TWASIZE=100,                                             *
       TRANSEC=5,                                               *
       PROGRAM=COBPGM3,                                         *
       TPURGE=YES
DFHPCT TYPE=ENTRY,                                              *
       TRANSID=COB4,                                            *
       PROGRAM=COBPGM4,                                         *
       TPURGE=YES
DFHPCT TYPE=ENTRY,                                              *
       TRANSID=CSAC,                                            *
       TRNPRTY=5,                                               *
       TWASIZE=40,                                              *
       PROGRAM=DFHACP
DFHPCT TYPE=ENTRY,                                              *
       TRANSID=CSMT,                                            *
       TWASIZE=160,                                             *
       PROGRAM=DFHMTPA
DFHPCT TYPE=ENTRY,                                              *
       TRANSID=CSST,                                            *
       TWASIZE=100,                                             *
       PROGRAM=DFHMTPA
DFHPCT TYPE=ENTRY,                                              *
       TRANSID=CSTA,                                            *
       TWASIZE=000,                                             *
       PROGRAM=DFHTAJP
DFHPCT TYPE=ENTRY,                                              *
       TRANSID=CSSN,                                            *
       TRNPRTY=99,                                              *
       TWASIZE=000,                                             *
       PROGRAM=DFHSNP,                                          *
       SPURGE=YES
DFHPCT TYPE=FINAL
END DFHPCTBA
```

Figure 7. Coding for program control table

PROCESSING PROGRAM TABLE (PPT)

The Processing Program Table provides a means for the user to describe to Program Control the control information concerning the processing programs. In addition, Program Control uses portions of each table entry to retain certain information for maintaining control of the user's programs and to capture specified program statistics.

This table is required by CICS to verify the processing program identification, to keep count of the number of transactions using that program, to maintain the address of the processing program, to communicate to CICS the type of load used for the program, to maintain the direct access address and size of the program, and to maintain statistics on the processing program.

The Processing Program Table macro instruction (DFHPPT) specifies processing programs to be recognized by CICS. The following operands can be included in the DFHPPT macro instruction:

```
       DFHPPT TYPE=INITIAL,                                           *
              SUFFIX=xx

       DFHPPT TYPE=ENTRY,                                             *
              PROGRAM=name,                                           *
              PGMLANG=ASSEMBLER,COBOL,PL/I,                           *
              RES=YES,NO,                                             *
              RELOAD=YES,NO

       DFHPPT TYPE=FINAL
```

Those programs most often used during execution of CICS should be specified first during preparation of the Processing Program Table.

ESTABLISH CONTROL SECTION FOR PROCESSING PROGRAM TABLE

The control section into which the Processing Program Table is assembled is established by the

```
       DFHPPT TYPE=INITIAL,                                           *
              SUFFIX=xx
```

macro instruction, which must be coded as the first statement in the source deck used to assemble the Processing Program Table.

SUFFIX: Specifies a two-character alphameric suffix for the Processing Program Table being assembled. This suffix, if specified, is appended to the standard module name (DFHPPT) and is used to name the module on the linkage editor output library. If this operand is omitted, a suffix is not provided.

DESCRIBE PROCESSING PROGRAMS

A specific processing program is described to CICS program management services by the

```
       DFHPPT TYPE=ENTRY
```

macro instruction. Included is infcrmation on the program name and the type of program.

The DFHPPT TYPE=ENTRY macro instruction includes the following operands:

```
        DFHPPT TYPE=ENTRY,                                                  *
               PROGRAM=name,                                                *
               PGMLANG=ASSEMBLER,COBOL,PL/I,                                *
               RES=YES,NO,                                                  *
               RELOAD=YES,NO
```

PROGRAM: Specifies the program identification, up to eight characters in length. The indicated program must have been previously link edited into the Real-Time Relocatable Program Library (DFHRPL).

PGMLANG: Specifies the type of program. The default is PGMLANG=ASSEMBLER.

RES: Used to indicate whether or not the program is to be made resident in main storage when CICS is initialized. In the CICS/DOS-ENTRY system, the designated programs become permanently resident, and the size of dynamic storage (subpool 0) is reduced. For the CICS/DOS-STANDARD and CICS/OS-STANDARD systems, the designated programs are "packed" into the high portion of the user's dynamic main storage. The default is RES=NO.

RELOAD: RELOAD=YES indicates that a fresh copy of the program is to be loaded by the Program Control program each time a load request for that program is issued. A Storage Control FREEMAIN, rather than a Program Control DELETE, must be used to free the storage. The default is RELOAD=NO.

If the Dynamic Open/Close program is to be used, RELOAD=YES must be specified in each PPT entry that defines a nonresident data set control block.

RELOAD=YES must also be specified for all CICS/DOS transient logic modules. The Dynamic Open/Close program maintains a use count for the logic modules to ensure that only one copy is in main storage at any one time. If the logic module is resident in the Destination Control Table, no entry is necessary in the PPT.

SPECIFY END OF PROCESSING PROGRAM TABLE

The end of the Processing Program Table is indicated to the control system by the

```
        DFHPPT TYPE=FINAL
```

macro instruction, which is the last statement in the assembly of the Processing Program Table before the Assembler END statement. This macro instruction creates a dummy entry to signal the table end. The Assembler END statement must include the label DFHPPTBA.

PROCESSING PROGRAM TABLE EXAMPLE

Figure 8 illustrates the coding that is required to create a Processing Program Table. The programs include:

1. Four Assembler language programs, one of which is resident
2. Four ANS COBOL programs

See Appendix A for a list of all the entries required to create a Processing Program Table.

```
DFHPPT TYPE=INITIAL
DFHPPT TYPE=ENTRY,                                               *
       PROGRAM=COBPGM1,                                          *
       PGMLANG=COBOL
DFHPPT TYPE=ENTRY,                                               *
       PROGRAM=COBPGM2,                                          *
       PGMLANG=COBOL
DFHPPT TYPE=ENTRY,                                               *
       PROGRAM=COBPGM3,                                          *
       PGMLANG=COBOL,                                            *
       RELOAD=YES
DFHPPT TYPE=ENTRY,                                               *
       PROGRAM=COBPGM4,                                          *
       PGMLANG=COBOL
DFHPPT TYPE=ENTRY,                                               *
       PROGRAM=DFHACP
DFHPPT TYPE=ENTRY,                                               *
       PROGRAM=DFHTAJP
DFHPPT TYPE=ENTRY,                                               *
       PROGRAM=DFHMTPA
DFHPPT TYPE=ENTRY,                                               *
       PROGRAM=DFHSNP
DFHPPT TYPE=FINAL
END DFHPPTBA
```

Figure 8. Coding for processing program table

SYSTEM SERVICE TABLES

The system service tables (optional) provide the user with increased control over the operation of CICS. The system service tables are:

1. Sign-on Table that contains the operator security and priority data to permit an operator to sign on the system.

2. Terminal List Tables that contain, by groups, the identification of terminals that are related logically; for example, the terminals in a remote locaticn or all terminals whose operators are under the control of a supervisor. A supervisor, through his table, may alter the status of a terminal under his control. For example, he could place a terminal in an out-of-service condition.

The Sign-on Table and the Terminal List Tables reside on a direct access storage device and are called into main storage as required. The use of a Sign-on Table or a Terminal List Table requires that PCPLOAD=YES be specified for DFHSG PROGRAM=PCP macro instruction. Refer to the CICS Terminal Operator's Guide for the terminal operator procedure in the use of the system service tables and programs.

SIGN-ON TABLE (SNT)

The Sign-on Table provides the means for permanently retaining terminal operator data. It is accessed when a terminal operator initiates the sign-on procedure.

During the sign-on procedure, the name of the terminal operator is entered at the terminal and is used to locate the appropriate operator entry in the table. The operator entry in the table contains data used to verify the operator name and to establish a priority and a security key for the transactions which the operator subsequently enters.

The priority value related to the operator is used to develop the task priority for processing a transaction. The operator's security key is used in a security check of all transactions subsequently entered. The security key which is placed in the appropriate Terminal Control Table entry for the operator is matched with the transaction security contained in the transaction's Program Control Table (PCT) entry.

If the operator security key contains any position that matches the security value in the PCT entry, the transaction is accepted. Otherwise, a security check has occurred and the transaction is terminated. A security key of 1 is the default option in the creation of the Sign-on Table, the Program Control Table, and the Terminal Control Table; this value is present in the Terminal Control Table until altered by a sign-on procedure. The security key default option allows transactions with a transaction security of 1 to be entered into the system by the operator without the sign-on procedure.

The Sign-on Table macro instruction (DFHSNT) specifies the terminal operator data for the users of CICS. A DFHSNT entry should be present in the Sign-on Table for each terminal operator who is expected to sign on.

The Sign-on Table must be assembled, link edited with the name DFHSNT, and represented in the Processing Program Table (PPT).

The following operands can be included in the DFHSNT macro instruction:

```
DFHSNT TYPE=INITIAL

DFHSNT TYPE=ENTRY,                                            *
       CPNAME='operator name',                                *
       PASSWRD=password,                                      *
       OPIDENT=operator identification,                       *
       SCTYKEY=(n1,...,n24),                                  *
       OPPRTY=operator priority

DFHSNT TYPE=FINAL
```

Establish Sign-on Table Control Section

The control section into which the Sign-on Table is assembled is established by the

```
DFHSNT TYPE=INITIAL
```

macro instruction, which must be coded as the first statement in the source deck used to assemble the Sign-on Table.

Describe Terminal Operators

Each terminal operator is described to CICS through an entry in the Sign-on Table. These entries are made by issuing the

```
DFHSNT TYPE=ENTRY
```

macro instruction. Included in this macro instruction is information on password, operator identification, security key, and operator priority.

The DFHSNT TYPE=ENTRY macro instruction includes the following operands:

```
      DFHSNT TYPE=ENTRY,                                               *
             OPNAME='operator name',                                   *
             PASSWRD=password,                                         *
             OPIDENT=operator identification,                          *
             SCTYKEY=(n1,...,n24),                                     *
             OPPRTY=operator priority
```

OPNAME: Specifies the name of the terminal operator for this table entry. The operator name may be 1 to 20 characters long and must be unique for each entry. The operator name in this entry must be matched exactly by the operator name entered in the sign-on procedure.

PASSWRD: Specifies a four-character password (identification) created by the user. The password entered by a terminal operator as a part of the sign-on procedure must be matched exactly by the password in the operator's Sign-on Table entry. Passwords may be unique to each operator or the same for a logical group of operators.

OPIDENT: Used to specify the three-character operator identification code assigned by the user to each operator. This code is placed in the appropriate Terminal Control Table terminal entry (TCTTE) when the operator signs on so that the identity of the operator is known to CICS. This operator identification is made available to the master terminal when a security violation is detected.

SCTYKEY: Specifies one or more decimal security-key values from 1 to 24. The security key for a terminal operator is comprised of those values which are to be matched with the transaction security of an appropriate program control table entry. The security key may be built with from 1 to 24 individual values. Each decimal value in the range of 1 to 24 specified in the operand of the SCTYKEY keyword has a corresponding bit position in a three-byte SCTYKEY field. The presence of each value in the operand causes the corresponding relative bit position to be set on. Note that bit position one is set on regardless of whether the operand is omitted or the value 1 is specified as a SCTYKEY parameter.

The transaction security in a Program Control Table entry is specified as only one of the possible 24 individual values. The same value must be contained in the operator's security key to allow the operator to process that transaction. The operator's security key is not limited to just one value and likely contains several values.

OPPRTY: Specifies a decimal operator priority value from 0 to 255. An operator priority is assigned optionally by the user and is used in developing the task processing priority for each transaction. The default is OPPRTY=0.

Specify End of Sign-on Table

The end of the Sign-on Table is indicated by the

```
DFHSNT TYPE=FINAL
```

macro instruction, which is the last statement in the assembly of the Sign-on Table before the Assembler END statement. This macro instruction creates a dummy entry to signal the table end. The Assembler END statement must include the label DFHSNTBA.

Sign-on Table Example

Figure 9 contains an example of coding for the Sign-on Table. In this example, there are two cases of the operator name being actual names and one instance of the name being a function. The first operator has access to transactions whose transaction securities are 1,2,7, or 24. The other two operators have access to the same transactions as the first plus additional transactions. The second operator has a default priority of zero.

```
DFHSNT TYPE=INITIAL
DFHSNT TYPE=ENTRY,                                              *
       OPNAME='DON GIBSON',                                     *
       PASSWRD=DIST,                                            *
       OPIDENT=DG,                                              *
       SCTYKEY=(1,2,7,24),                                      *
       OPPRTY=128
DFHSNT TYPE=ENTRY,                                              *
       OPNAME='R. J. JCNES',                                    *
       PASSWRD=DIST,                                            *
       CPIDENT=RJJ,                                             *
       SCTYKEY=(1,2,7,9,24)
DFHSNT TYPE=ENTRY,                                              *
       OPNAME='MASTER TERMINAL 1',                              *
       PASSWRD=MAST,                                            *
       OPIDENT=MT1,                                             *
       SCTYKEY=(1,2,3,4,7,9,24),                                *
       OPPRTY=255
DFHSNT TYPE=FINAL
END DFHSNTBA
```

Figure 9. Coding for sign-on table

TERMINAL LIST TABLES (TLT)

The Terminal List Tables provide the user of CICS with the means of retaining the terminal identifications in logical groupings. A logical grouping of terminals could be all the terminals that are under the control of a supervisor. Each supervisor might have a Terminal List Table. All terminals which serve a similar function represent a logical grouping, or class of terminals. The user might create a grouping of terminal identifications to facilitate the dispatching of general messages to terminals.

The system service programs of CICS use Terminal List Tables to perform terminal status change operations. A unique Terminal List Table must be created for each supervisor who is to have the ability to alter the terminal status of any terminal under his control. Any operation which is to change the status of an entire group of terminals requires a Terminal List Table containing the identifications of all terminals in that group. Unique identification is assigned to each table by the user.

The creation of the Terminal List Tables is accomplished through the assembly procedure by using the DFHTLT macro instruction. The following operands can be included in this macro instruction:

```
       DFHTLT TYPE=INITIAL,                                               *
              SUFFIX=xx

       DFHTLT TYPE=ENTRY,                                                 *
              TRMIDNT=terminal identification

       DFHTLT TYPE=FINAL
```

The Terminal List Table must be assembled and link edited with a name that conforms to the format: DFHTLTxx. The base name is DFHTLT. The two-character suffix (xx), uniquely identifying this table, consists of the same characters entered by a user of the system service programs for terminal status change. These two characters are appended to the base name (DFHTLT) for the retrieval process, and may represent either a supervisor's identification or the identification of a class of terminals.

There must be an entry in the Processing Program Table (PPT) for each Terminal List Table the user wishes to access.

Establish Terminal List Table Control Section

The control section into which the Terminal List Table is assembled is established by the

```
       DFHTLT TYPE=INITIAL,                                               *
              SUFFIX=xx
```

macro instruction, which must be coded as the first statement in the source deck used to assemble the Terminal List Table.

SUFFIX: This operand is used to specify a two-character suffix for the Terminal List Table being assembled. This suffix, if specified, is appended to the standard module name (DFHTLT) and is used to name the module on the linkage editor output library. If this operand is omitted, a suffix is not provided.

Specify Terminal Identification

The terminal identifications to be included in the Terminal List Table are specified through the

```
       DFHTLT TYPE=ENTRY,                                                 *
              TRMIDNT=terminal identification list
```

macro instruction. Any number of these macro instructions can appear in a Terminal List Table assembly.

TRMIDNT: Specifies a list of terminal identifications to be included in the table. Any symbolic identification used must first have been defined in the TRMIDNT operand of the DFHTCT macro instruction.

Specify End of Terminal List Table

The end of the Terminal List Table is indicated by the

```
       DFHTLT TYPE=FINAL
```

macro instruction, which is the last statement in the assembly of the Terminal List Table before the Assembler END statement. The Assembler END statement must include the label DFHTLTBA.

Terminal List Table Example

Figure 10 illustrates the coding required to create a Terminal List Table.

```
       DFHTLT TYPE=INITIAL,                                            *
              SUFFIX=AA
       DFHTLT TYPE=ENTRY,                                              *
              TRMIDNT=(NYC,CHI,LA,WDC)
       DFHTLT TYPE=ENTRY,                                              *
              TRMIDNT=(SF,ATL)
       DFHTLT TYPE=FINAL
       END DFHTLTBA
```

Figure 10. Coding for terminal list table

CREATING USER EXITS FOR CICS MANAGEMENT PROGRAMS

CICS provides a technique for incorporating user-written source code into most of the CICS management programs. This source code may extend various CICS management functions. So long as the user conforms to certain restrictions and conventions, this facility should minimize the impact of CICS source code modifications when installing new releases of CICS.

To include a user-written exit routine in a particular CICS management program, the user must place his source code in a CICS source library member (book) which has the naming convention:

DFHxxEXT

where xx is the two-character designation for the management program into which the user-written code is to be included. The two-character designations are:

KC	(Task Control)
SC	(Storage Control)
PC	(Program Control)
TC	(Terminal Control)
FC	(File Control)
IC	(Interval Control)
TD	(Transient Data Control)
TS	(Temporary Storage Control)

The code provided by the user in a given member (book) may consist cf more than cne routine (function) depending upon the number of linkages provided in the particular CICS management program. For example, File Management provides linkage to user-written exit routines both before and after an input operation. Thus, user-supplied code in the member (book) DFHFCEXT might contain two routines, each identified by a unique symbolic name.

Linkage from the CICS management program to the appropriate user-written exit routine is accomplished by one of the following methods:

1. An Assembler BAL instruction that uses the user-defined symbolic name as the "branch to" label and general register 14 as a return register.

2. Register 14 is loaded with an address constant for the user defined symbolic name and a BALR 14, 14 instruction is issued.

Note: The user-written exit routines are located at the end of the management programs. The length of some programs is such that the exit routines are not addressable by the program's base register(s). This situation forces the use of method two above, and requires the exit routine to establish its own addressability upon gaining control.

Under method one at least some beginning part of the user exit routine is addressable by a management program base register. Another base register may be required for the rest of the exit routine.

The symbolic name of the exit routine is specified in the appropriate operand when the management program is generated. For example, in response to the

```
       DFHSG PROGRAM=SCP,                                              *
             XTYPREQ=ORANGE
```

specification, user exit linkage in the form of an Assembler

```
       BAL   14,ORANGE
```

instruction is generated in the appropriate place in the Storage Control program. In this example, source code similar to the following should have been provided by the user in the member (book) DFHSCEXT:

```
ORANGE DS    0H                           USER EXIT ENTRY
       .
       .
       .
    User code
       .
       .
       .
       BR    14
```

Upon entry to a user exit routine, registers can be saved in the CSA register save area (CSAOSRSA). The following example shows the use of OS/DOS SAVE and RETURN macro instructions to save registers 4 through 6 and to use register 4 as a base register.

```
ORANGE DS    0H                           USER EXIT ENTRY
       SAVE (4,6)                         SAVE REGS 4,5,6
                                          IN CSAOSRSA
       BALR 4,0                           USE REG 4 AS BASE REG
       USING *,4
       .
       .
       .
       RETURN (4,6)                       RESTORE REGS 4,5,6
                                          AND RETURN VIA REG 14
```

Using the CSA for register saving is a non-reentrant method and therefore the exit routine should not issue any CICS or OS/DOS macro instructions that might require use of this CSA area. This includes releasing control to another task which might use this same (or another) exit routine that saves registers in the CSA.

When creating the CICS management program assembly jobs during system generation, a COPY DFHxxEXT statement is included immediately preceding the Assembler END statement. In the above example, the following would be generated:

```
       COPY DFHCSADS
       COPY DFHTCADS
       .
       .
       .
       COPY DFHSCP
       COPY DFHSCEXT
       END DFHSCNA
```

When coding user exits for CICS management programs, the user should adhere to the following conventions and guidelines:

1. Since user exits are essentially "in line" with the management programs, the coder should be familiar with the functions of the program to which the exit code is being added.

2. User-written exit routines must never alter the contents of registers that provide addressability to control blocks, unless the original contents are restored before return to the CICS management program.

3. User-written exit routines must never violate restrictions of the management programs. For example, an exit routine in Storage Control cannot issue a DFHSC TYPE=GETMAIN macro instruction. In general, it is best if exit routines do not issues requests for CICS services.

4. User-written exit routines must be coded in Assembler language.

5. Symbolic names (labels) used to define user exit entry points must not be duplicates of labels in the CICS management program.

6. Base register addressability for the user-written exit routine exists only to the extent of the base register(s) associated with the management program. The user exit must never alter the base register(s) of the management program. The user is responsible for saving registers and establishing addressability.

7. Register contents differ depending on the management program and particular exit function. However, the contents of the following registers are always constant:

REGISTER	CONTENTS
14	Return address
13	CSA address
12	TCA address

Depending on the management program and functional user exit, certain general registers contain information that the user may find useful. The following is a summary, by exit, of the contents of these registers:

PROGRAM	SYSGEN EXIT IDENT	LINKAGE LOCATION	REGISTER	REGISTER CONTENTS
DFHKCP	XDSPCHR	Before dispatch	TCACBAR	Address of TCA being dispatched
	XTYPREQ	Before request analysis	TXACBAR	Address of TXA associated with task (CICS/DOSE only)
DFHPCP	XFETCH	After load	PPTCBAR	Address of PPT entry for loaded program
			PCECREG	Entry point address of loaded program
DFHICP	XICEEXP	After expiration of time interval	ICECBAR	Address of Interval Control Element (ICE) just expired
	XTYPREQ	Before request analysis	N.A.	N.A.
DFHSCP	XTYPREQ	Before request analysis	N.A.	N.A.
DFHTCP	XATTACH	Before task attach	TCTTEAR	Address of TCTTE
			TCTLEAR	Address of TCTLE
			TIOABAR	Address of TIOA
	XOUTPUT	Before output event	TCTTEAR	Address of TCTTE
			TCTLEAR	Address of TCTLE
			TIOABAR	Address of TIOA
	XINPUT	After input event	TCTTEAR	Address of TCTTE
			TCTLEAR	Address of TCTLE
			TIOABAR	Address of TIOA
DFHFCP	XOUTPUT	Before output event	FWACBAR	Address of FWA
			FCTDSBAR	Address of FCT entry for target data set
	XINPUT	Before input event	FCTDSBAR	Address of FCT entry for target data set
	XINPUTC	After input event	FCTDSBAR	Address of FCT entry for target data set
			FIOABAR	Address of FIOA
	XTYPREQ	Before entry Analysis	N.A.	N.A.
DFHTDP	XOUTPUT	Before output event	DCTCBAR	Address of DCT entry for target destination
	XINPUT	Before input event	DCTCBAR	Address of DCT entry for target destination
	XYTPREQ	Before request analysis	DCTCBAR	Address of DCT entry for target destination
DFHTSP	XOUTPUT	Before output event	TSWKREG	Address of data being read or written
	XINPUT	After input event	TSWKREG	Address of data being read or written
	XTYPREQ	Before request analysis	TSDA	Address of data area specified by requesting program

Note: CICS provides a set of dummy exit members (books) as part of its distributed source library. These members contain only dummy labels and a BR 14 instruction, and should be replaced by user-written exit routines.

CREATING A TERMINAL ERROR PROGRAM (DFHTEP)

The CICS terminal error handling structure is based on the assumption that most users will want to expand and refine certain CICS operations in response to various terminal errors. Since it is impossible for CICS to anticipate all courses of action, the error handling facilities have been designed to allow the user maximum freedom in providing unique solutions for errors occurring within his terminal network.

Three CICS components are involved in the detection and correction of terminal errors:

1. Terminal Control program (DFHTCP)
2. Terminal Abnormal Condition program (DFHTACP)
3. Terminal Error program (DFHTEP)

DFHTCP and DFHTACP are provided by CICS to perform certain basic detection and correction functions. DFHTEP is provided by the user who wishes to expand or alter the basic functions performed by DFHTCP and DFHTACP. A dummy DFHTEP is distributed with CICS containing only a DFHPC TYPE=RETURN macro instruction.

TERMINAL ABNORMAL CONDITION LINE ENTRY (TACLE)

When an abnormal condition occurs that is associated with a terminal or line, DFHTCP places the terminal out of service and dynamically creates a Terminal Abnormal Condition Line Entry (TACLE) which is chained off the real line entry on which the error occurred. The TACLE contains all the error information necessary for proper evaluation of the error, plus special action indicators that can be manipulated to alter the error correction procedure.

DFHTACP is then attached by the Terminal Control program and provided with a pointer to the real line entry (TCTLE) on which the error occurred. After performing certain basic error analysis and establishing default actions to be taken, DFHTACP gives control to DFHTEP by issuing a DFHPC TYPE=LINK macro instruction. DFHTACP passes the TACLE to DFHTEP so DFHTEP can examine the error and provide an alternate course of action.

Once the user has performed his desired function in DFHTEP, he should return control to DFHTACP by issuing a DFHPC TYPE=RETURN macro instruction. DFHTACP then performs the necessary actions as dictated by the action flags within the TACLE.

When DFHTEP receives control from DFHTACP, the TCA Facility Control Address (TCAFCAAA) contains the address of a TACLE. The TACLE is created by the Terminal Control program when the error occurs and contains all the I/O error information provided by BTAM.

To symbolically access the information contained in the TACLE, CICS provides two symbolic storage definitions (DSECT's) which can be copied into DFHTEP. These DSECT's are DFHTACLE and DFHTCTLE. DFHTACLE describes the first twelve bytes of the TACLE which contain CICS error information; DFHTCTLE describes the remainder of the TACLE which contains a copy of the Data Extent Control Block (DECB) at the time the error occurred, plus other valuable information.

To establish addressability to the TACLE, DFHTEP must provide, upon entry, the instruction:

```
         L   TCTLEAR,TCAFCAAA              LOAD TACLE BASE REGISTER
```

where TCTLEAR is symbolically defined as the base register for the TACLE. If the user desires to access the real line entry in the TCT, its address is at location TCTLEDCB within the TACLE. It is the user's responsiblitity, under these circumstances, to maintain addressablity between the TACLE and the real line entry.

DFHTEP PROGRAMMING CONSIDERATIONS

The TACLE is the basic interface that should be used by user-written DFHTEP to determine the nature of the error that occurred and to indicate what course of action is to be taken.

Before giving DFHTEP control, DFHTACP establishes certain default actions to be taken, depending upon the error condition. Within DFHTEP, the user may choose to accept the default action under certain circumstances and alter the action under other circumstances. To indicate that an alternate action is to be taken, the user must modify the action flags contained in the two-byte field of the TACLE labeled TCTLEECB+1 and TCTLEECB+2 (the second and third bytes in the DECB copy).

The default actions scheduled by DFHTACP before entry to DFHTEP are described in the following; the error code is found in the TACLE at TCTLEPFL.

1 = Line out of service	(X'80' at TCTLEECB+1)
2 = Terminal out of service	(X'08' at TCTLEECB+1)
3 = Abend transaction	(X'04' at TCTLEECB+1)
4 = Switched line disconnected	(X'20' at TCTLEECB+1)
5 = Disconnect switched line	(X'10' at TCTLEECB+1)
6 = Release TCAM TIOA	(X'80' at TCTLEECB+2)

ERROR CODE (SYMBOLIC LABEL)	CONDITION	ACTION SET BY DFHTACP
X'81' (TCEMCMTL)	Input msg exceeds read length	3
X'82' (TCEMCTRL)	Translation error (TCT does not correspond to TCP)	2
X'84' (TCEMCTCT)	TCT search error	
	a. Switched line	
	b. Non-switched line	1
X'85' (TCEMCROT)	Invalid write request	
	a. A write request was made to a terminal in INPUT status.	3
	b. A write request was made to a 3735 before 'EOT' (EOF condition) was received from the 3735 during batch transmission.	3
X'86' (TCEMCPL)	Polling list error	2
X'87' (TCEMCUI)	Unsolicited input	
	a. TCAM	
	Terminal "Receive Only";	6
	Terminal "Out of Service";	2,6
	Task has not issued READ (no default actions).	
	b. Input has occurred on an out-of-service terminal. (3735)	2
X'88' (TCEMCIER)	BTAM return code on read	
	a. Local 3270 open failure,	2

ERROR CODE (SYMBOLIC LABEL)	CONDITION	ACTION SET BY DFHTACP
	Invalid RLN, unreliable information (DOS), device under OPTEP	
	b. All cther conditions	1,3
X'89' (TCEMCSM)	Error status received	
	a. 3270 operation check	3
	b. 3270 intervention required	
	c. 3270 all other conditions	2,3
	d. 3735 all conditions	
X'8A' (TCEMCTO)	7770 32-second timeout	3,5
X'8B' (TCEMCOBE)	Hardware buffer exceeded (shift character not properly accounted for)	3
X'8C' (TCEMCOER)	BTAM return code on write	
	a. Local 3270 open failure, Invalid RLN, unreliable information (DOS), device under OLTEP	2
	b. All other conditions	1,3
X'8D' (TCEMCOLZ)	Output length zero	3
X'8E' (TCEMCNOA)	No output area provided	3
X'8F' (TCEMCOAE)	Output area exceeded (TIOATDL value larger than output area)	3
X'94' (TCEMCUC)	Unit check (actions same as TCEMCUCS)	
X'95' (TCEMCUCS)	Unit check (should nct occur)	
	a. Not BTAM line or L3270	1
	b. Switched line disabled (CICS/OS) in combination with following:	4
	Intervention sense	
	c. Switched line	3,4
	d. Non-switched line	2,3
	e. Dummy terminal	1
	Data check sense	
	f. Real terminal	2,3
	g. Dummy terminal	1
	Timeout sense	
	h. READ text command	
	i. Real terminal	2,3
	j. Dummy terminal	1
	All other sense	1
X'96' (TCEMCUE)	Unit exception (actions same as TCEMCUES)	
X'97' (TCEMCUES)	Unit exception (should not occur)	
	a. Switched line	3,4
	t. Real terminal	2,3
	c. Dummy terminal	1
X'98' (TCEMCNR)	Negative response to addressing	2,3
X'99' (TCEMCUDT)	Undetermined unit error	1,3
X'9B' (TCEMCICR)	The terminal entries on the 'to' and 'from' device did not specify the COPY feature (3270).	3

ERROR CODE (SYMBOLIC LABEL)	CONDITION	ACTION SET BY DFHTACP
	The device address specified for the 'to' device does not exist on the control unit.	
	The length of the COPY command was not specified as one.	
X'9C' (TCEMCIMB)	Invalid message block received.	
	a. An unidentified message block was received from a local or remote 3270.	2,3
	b. The type of input block received from a 3735 did not agree with the mode of the active transaction inquiry/batch.	2,3
X'9D' (TCEMCICM)	An incomplete message was received from a remote 3270. The device terminated transmission prior to message completion (that is, EOT received prior to ETX).	2,3
X'9F' (TCEMIDR)	TCAM has issued an invalid destination return code to CICS.	3
X'A0' (TCEMCWOT)	A transaction has requested an input on a Write Only Terminal	3
X'A1" (TCEMCIDR)	A transaction has requested a DFHTC TYPE=(RESET,DISCONNECT) on a switched binary synchronous line and no EOT has been received from the terminal; this indicates more data is to follow. Terminal Control issues a read to the terminal if an EOT has been received. If the EOT is not received on that read, the error code is set and passed to DFHTACP.	

Following is a diagram of the Terminal Abnormal Condition Line Entry (TACLE) which is pointed to by the TCAFCAAA field upon entry to DFHTEP:

TERMINAL ABNORMAL CONDITION LINE ENTRY

```
               ┌──────────────────────────────────────────────────────┐
               *                                                      *
Dec.    Hex.*  <──────────────────────4 BYTES──────────────────────>*
               *                                                      *
  0       0    ********************************************************
               *                    TCTLEPSA                          *
               *                                                      *
               *          STORAGE ACCOUNTING AREA                     *
  4       4    *------------------------------------------------------*
               *                    TCTLEPCH                          *
               *                                                      *
|              *        ADDRESS OF TACLE WORK AREA                    *
  8       8    *------------------------------------------------------*
               *   TCTLEPFL   *  TCTLEPF2   *      TCTLEPTE           *
               *              *             *                         *
               * ERROR FLAGS  * SPECIAL IND *  TCTTE DISPLACEMENT     *
  C       C    *------------------------------------------------------*
               *   TCTLEECB   *             *            *   BTAM     *
               *  BEGINNING   *   ACTION    *  RESERVED  *  RETURN    *
               *   OF DECB    *    FLAGS    *FOR DFHTACP*   CODE      *
 16      10    *------------------------------------------------------*
               *                                                      *
               *                  NOT USED                            *
               *                                                      *
| 14      E    *------------------------------------------------------*
               *                    TCTLEDCB                          *
               *                                                      *
               *        ACTUAL LINE ENTRY ADDRESS                     *
| 18     12    *------------------------------------------------------*
               *                                                      *
               *                    NOT USED                          *
               *                                                      *
| 28     1C    *------------------------------------------------------*
               *                         *        TCTLECSW            *
               *     NOT USED            *                            *
               *                         *       BSAM STATUS          *
 44      2C    *------------------------------------------------------*
               *  TCTLGALP  *                                         *
               *    BSAM    *              NOT USED                   *
               *   SENSE    *                                         *
               ********************************************************
```

Displacement

Dec.	Hex.	Code	Bytes	Label	Meaning
0	0		4	TCTLEPSA	Storage accounting
4	4		4	TCTLEPCH	Pointer to 100 bytes of user storage that can be used to write to Transient Data. This storage must not be freed by DFHTEP, as DFHTACP may reuse it.
8	8		1	TCTLEPFL	Error flags
		81			Input error
		82			Translation error
		84			TCT search error
		85			Output rejected; "read only" terminal
		86			Polling list error

Displacement					
Dec.	Hex.	Code	Bytes	Label	Meaning
		87			Unsolicited input
		88			Input event rejected
		89			Status message received
		8A			7770 32-second timeout
		8B			Hardware buffer exceeded
		8C			Output event rejected
		8D			Output length of zero
		8E			No output area
		8F			Output area exceeded
		94			Unit check
		95			Unit check (should not occur)
		96			Unit exception
		97			Unit exception (should not occur)
		98			Negative response
		99			Undetermined I/O error
		9B			Copy error (3270)
		9C			Invalid message block
		9D			Incomplete message
		9F			Invalid TCAM destination
		A0			Read to write only terminal
		.			
		.	(All codes not listed are reserved)		
		.			
9	9		1	TCTLEPF2	Special indicator
		01			Dummy terminal
10	A		2	TCTLEPTE	Displacement from line entry to terminal in error
12	C		48	TCTLEECB	DECB/copy of line when error occurred

Following is the definition of the action bits (0,3,4,5,6 and 7) and information bits (1 and 2) and is the only portion of the copy cf the DECB that can be altered. They are located at label TCTLEECB+1.

In the second interface byte (TCTLEECB+2), bit 0 is used to process TCAM unsolicited errors. Upon entry to TEP if this bit is set for unsolicited input, it indicates that the data is destined for a terminal entry that is either Out of Service or in Receive Only status. If not set in this manner, the terminal entry for which the data is destined has a task which has not issued a READ request. Upon entry to TEP, this data is on the Input Queue Terminal Entry storage chain, and is located by label TCTLEIOA in the TACLE. Upon return to TACP from TEP, this bit (if set) is used to free unsolicited data or to allow another time delay cycle if not set.

Dec.	Hex.		Bytes	Label	Meaning
13	D		1	TCTLEECB+1	Interface byte
		Bit 0		0...	Place line in service
				1...	Place line out of service
		Bit 1			Information Bit
				.0..	Not used
				.1..	Non purgeable task exists on terminal

Dec.	Hex.		Bytes	Label	Meaning
		Bit 2			Information Bit
				..0.	Not used
				..1.	Switched line has been disconnected by BTAM
		Bit 3		...0	Do not disconnect line
				...1	Disconnect line
		Bit 4		.... 0...	Place terminal in service
				.... 1...	Place terminal out of service
		Bit 5		.... .0..	Do not abend task
				.... .1..	Abend task
		Bit 6		.... ..0.	Take terminal's associated control unit off poll list
				.... ..1.	Leave terminal's associated control unit on poll list
		Bit 7		0	Do not abort WRITE or free terminal storage on task abend or no task present on terminal
				1	Abort terminal WRITE requests and free terminal storage on task abend or no task present on terminal
14	E		1	TCTLEECB+2	Interface byte 2
		Bit 0		0...	Do not release TCAM TIOA
				1...	Release TCAM unsolicited input TIOA
		Bit 1-7			Reserved
15	F		1	TCTLEECB+3	BTAM return code
20	14		4	TCTLEDCB	Actual line entry address
42	2A		2	TCTLECSW	BSAM Status
44	2C		1	TCTLEALP	BSAM Sense

The following factors should be considered when altering the action bits in the TACLE:

1. If the "task abend" flag is set by DFHTACP (X'04' at TCTLEECB+1), the "non-purgeable" flag (X'40') is also set if the task is non-purgeable.

2. If the "task abend" bit is on upon return to DFHTACP from DFHTEP and a non-purgeable task exists on the terminal, the terminal is placed out of service and the task remains attached to the terminal.

3. If a dummy terminal is indicated (X'01') at TCTLEPF2, a disconnect request from DFHTEP is not honored by DFHTACP. (A dummy terminal is created whenever an error occurs on a terminal whose address does not exist in the TCT.)

4. The "switched line disconnected" bit is used by DFHTACP upon return from DFHTEP to logically disconnect the switched line that has been physically disconnected. If DFHTEP determines that the line has not been physically disconnected, DFHTEP may reset this bit.

5. If the "switched line disconnected" bit or the "disconnect switched line" bit is on, upon return from DFHTEP, the "task abend" bit should also be set to purge the task from the disconnected terminal. If this is the case and if the task is not terminal purgeable, DFHTACP writes an INTERCEPT REQUIRED message to destination CSMT and places the terminal out of service.

6. The dummy terminal indicator at TCTLEPF2 is set on errors such as: (1) BTAM return on input, (2) binary synchronous outputs performed for TCP where no terminal is indicated, and (3) other errors where no terminal error conditions are indicated. Therefore, if Dummy Terminal is indicated, task abend and write abort are not set. The Dummy Terminal is only used to identify the line.

7. The write abort bit (bit 7 at TCTLFECB+2) is always set with task abend request in TACP as a default. Upon return from TACP, the write abort bit is used as follows:

   a. Causes the Terminal Control write requests to be aborted.

   b. If the task is being abended and is terminal purgeable or task exists on the terminal, the Terminal Storage will be freed.

The following is an example of the logic steps necessary to design a portion of the Terminal Error program. In this example ten retries are provided per terminal; however, the lcgic could be used for any rumber of retries. The fcllowing assumptions are made:

USER FIELD A (PCISAVE) Represents a six-byte field in the Process Control Infcrmation (PCI) area of the TCTTE (see the TCT macro definition of the TCTUAL operand). This field is used to preserve the count of input and output from the TCTTE when the first error occurs. These counts are contained in three-byte fields located at TCTTENI and TCTTENO within the TCTTE.

USER FIELD B (PCICNT) Represents a user-defined field used to accumulate the count of recursive errors. It would most likely be in the Process Control Information (PCI) area of the TCTTE.

SYSTEM COUNT (TCTTENI) Represents the six-byte field in the TCTTE that contains the terminal input and output counts (TCTTENI+TCTTENO). In the example, these two adjacent fields are considered as one six-byte field.

Since this example requires access to the TCT terminal entry (TCTTE) to examine the SYSTEM COUNT and to also locate the Process Control Informaticn (PCI) area, the DFHTCTTE symbolic storage definition is included so fields may be symbolically referenced.

```
***********************************************************************
*                                                                     *
*                    DFHTEP RECURSIVE RETRY ROUTINE                   *
*                                                                     *
***********************************************************************
TEPBAR   EQU   2                            TEP PROGRAM BASE
TCTTEAR  EQU   9                            BASE REGISTER FOR TCTTE
PCIBAR   EQU   8                            BASE FOR PCI
         COPY  DFHTCTTE                     COPY TCTTE DEFINITION
```

```
        EJECT
        COPY  DFHTACLE                COPY TACLE SYMBOLIC DEFINITIONS
        COPY  DFHTCTLE                COPY DECB DEFINITION
        EJECT
PCIAREA DSECT
PCISAVE DS    6X                      USER FIELD A
PCICNT  DS    PL2                     USER FIELD B
        EJECT
DFHTEP  CSECT
        BALR  TEPBAR,0                ESTABLISH PROGRAM ADDRESSABILITY
        USING *,TEPBAR
        L     TCTLEAR,TCAFCAAA        LOAD TACLE ADDRESS
        L     TCTTEAR,TCTLEDCB        LOAD TCTTE BASE WITH
*                                     REAL LINE ADDRESS
        AH    TCTTEAR,TCTLEPTE        INCREMENT BASE BY THE
*                                     TCTTE DISPLACEMENT.  THIS
*                                     GIVES ADDRESSABILITY TO TCTTE.
        L     PCIBAR,TCTTECIA         LOAD PCI AREA ADDRESS
        USING PCIAREA,PCIBAR          ESTABLISH ADDRESSABILITY
        TM    PCICNT+1,X'0C'          HAS USER FIELD B EVER BEEN
*                                     INITIALIZED TO A PACKED
*                                     DECIMAL NUMBER?
        BO    CKCOUNT                 .. YES, SO COMPARE THE
*                                     SYSTEM COUNT WITH THE
*                                     EXISTING COUNT IN FIELD B;
RESET   MVC   PCICNT,=PL2'+0'         .. NO, SO INITIALIZE FIELD
*                                     B TO A PACKED DECIMAL 0.
        MVC   PCISAVE(6),TCTTENI      SAVE THE CURRENT SYSTEM
*                                     COUNTS.  THIS IS A NEW
*                                     ERROR, OR FIRST TIME THROUGH
INCR    AP    PCICNT,=P'1'            INCREMENT THE NUMBER OF
*                                     TIMES THIS SAME ERROR HAS
*                                     OCCURRED.  (RECURSIVE COUNT)
        CP    PCICNT,=P'10'           HAS THE MAXIMUM RECURSIVE
*                                     ERROR LIMIT BEEN REACHED?
        BNE   RETRY                   .. NO, SET ACTION
*                                     INDICATORS FOR RETRY ATTEMPT
        ZAP   PCICNT,=P'0'            *  CLEAR AND RESET USER FIELDS
        MVC   PCISAVE(6),TCTTENI      *  FOR NEXT ERROR SET
        B     NORETRY                 ACTION INDICATORS FOR NO-RETRY.
CKCOUNT CLC   PCISAVE(6),TCTTENI      HAS SYSTEM COUNT CHANGED SINCE
*                                     LAST ENTRY TO TEP?
        BNE   RESET                   .. YES; THAT MEANS THIS IS
*                                     A NEW ERROR SINCE SOME I/O
*                                     ACTIVITY HAS OCCURRED ON
*                                     TERMINAL
        B     INCR                    .. NO; THAT MEANS THIS IS A
*                                     RECURSIVE ERROR, SO
*                                     INCREMENT THE RECURSIVE COUNT
*                                     AND CHECK FOR RETRY.
RETRY   DS    0H                      THE USER WOULD INCLUDE HERE
        .                             THE CODE NECESSARY TO ALTER
        .                             THE FLAGS IN THE TACLE SO
        .                             THAT A RETRY CAN BE PERFORMED
                                      ON THE TERMINAL.
NORETRY DS    0H                      THE USER WOULD INCLUDE HERE
        .                             THE CODE NECESSARY TO ALLOW
        .                             DFHTACP TO TAKE FINAL ACTION
        .                             ON THE TERMINAL (I.E., ABEND
        .                             TASK, PUT LINE OUT OF SERVICE,
                                      ETC.)
```

The above example is intended only to serve as an illustration of a recursive error handling technique and the steps necessary to establish addressability to the applicable control blocks.

DFHTEP ALTERNATE INTERFACE (CICS/OS only)

An alternate interface is provided in the CICS/OS-STANDARD system for the purpose of maintaining compatibility with the CICS/OS-STANDARD Version 1 user who currently has code dependent upon this interface. This interface is provided when the user specifies V1CMPAT=YES in the DFHSG TYPE=CSO macro instruction during system generation.

Upon detection of an error, control is passed to DFHTEP for analysis; the TWA contains the following information:

BYTES	LABEL	DEFINITION
1	TWACOBA	Contains the status byte from BTAM
1	TWACOBA+1	Contains the sense byte from BTAM
1	TWACOBA+2	Contains the teleprocessing OP code being issued
1	TWACOBA+3	Reserved
4	TWACOBA+4	Contains the transaction ID if one exists for the terminal in error

User-written DFHTEP must place the line or terminal in service or out of service if so desired. If the task is to be abended, DFHTEP must place a X'FE' at label TWACOBA before returning control to DFHTACP.

7770 32-SECOND TIMEOUT CONSIDERATIONS

If a terminal connected to the 7770 Audio Response Unit goes "on hook" while no I/O operation is outstanding, the 7770 does not present the unit exception to the channel. This situation can occur when the terminal operator makes an inquiry and hangs up before receiving a response. After this occurs, all writes to the line appear to complete normally. All reads complete normally at the end of the 32-second timeout with a zero data length.

When a 32-second timeout occurs, either the terminal operator has not entered anything for 32 seconds, or the terminal operator has hung up and the 7770 did not inform CICS. CICS cannot distinguish between these two conditions; therefore, CICS handles every 32-second timeout as an error condition. DFHTACP goes to DFHTEP with defaults of DISCONNECT SWITCHED LINE and ABEND THE TRANSACTION. If DFHTEP does not disconnect the switched line, CICS writes the "ready" message and initiates another read.

WRITING A TRANSACTION TO IPL THE SYSTEM/7

To initial program load (IPL) the System/7 from CICS, the user must write a transaction that issues an automatic transaction initiation request to either Interval Control or Transient Data Control. This transaction is usually initiated from the master terminal or from a sequential terminal. The initiated transaction is started on the System/7; it then writes the IPL records to the System/7.

The IPL records are prepared by the user and consist of:

1. UZERO, a utility module
2. UTIPL, a utility module
3. System/7 storage load

UZERO and UTIPL are provided in object deck form on the MSP/7 distribution tape under member names CAAUZERO and CAAUTIPL, respectively. If link edited into the user-written application program, UZERO and UTIPL are available for transmission in a suitably translated format.

The first two bytes of each of these modules is a count of the number of characters in the remainder of the module. These two bytes must be placed in the user's TIOA at TIOATDL by the application program. The remainder of the module is moved to TIOADBA. UZERO and UTIPL may then be transmitted to the System/7 by issuing the DFHTC TYPE=(WRITE, WAIT) macro instruction in the application program.

The System/7 storage load is generated using the TELETRANS option of the MSP/7 Output Handler. The storage load is comprised of 80-character records that may be read via the Transient Data or File Control facilities of CICS and transmitted to the System/7 by issuing a series of DFHTC TYPE=(WRITE, WAIT) macro instructions. If a DFHPC Type=Return macro instruction is used to allow the System/7 to begin execution, the user must ensure that no automatically initiated transaction is scheduled to begin on the System/7 until at least 10 seconds have elapsed following execution of the DFHPC Type=Return macro instruction.

For more information concerning the preparation of IPL records for the System/7, see the publication _Modular System Programs (MSP/7) Programming Guide_ (GC34-0013).

2260 COMPATIBILITY FOR THE 3270

2260-compatibility support for the 3270 Information Display System allows the user to run his currently operational 2260-based transactions from a 3270.

During CICS system generation, the user must request 2260 compatibility to be included, thereby generating the necessary code to provide conversion of 2260 data streams from user-written application programs to the appropriate 3270 data stream format. When the 3270 operates with a "compatibility" transaction, incoming data from the 3270 is converted and presented to the user-written application program in 2260 format. In most cases, no changes are required to the user-written program.

Because 2260 compatibility is specified by transaction as well as by terminal, non-2260-based transactions have full access to all facilities of the 3270. Only when a 2260-compatible transaction is attached to a 2260-compatible 3270 does CICS perform the editing of the input and output data streams. If the transaction is not specified as 2260 compatible, or if the terminal is not specified as supporting 2260 compatibility, no editing occurs for the data streams. In that case, if the data streams are not valid 3270 data streams, the results are unpredictable.

Two modes of compatibility operation are provided: FORMAT and FULLBUF.

FORMAT mode takes full advantage of the 3270 formatting and data compression facilities, and is the preferred method of 2260 ccmpatibility, particularly for the operation of remote 3270's. However, some 2260 facilities cannot be supported under FORMAT mode. Fcr informaticn concerning which facilities are available, see the discussion under the topic "Screen Techniques".

FULLBUF mode does not use the 3270 data compression facilities and must therefore be used when all lines of input data are desired. For each operator interaction involving a data entry key (ENTER, PF1 - PF12), the number of characters transferred is approximately equal to the total number of characters on the simulated 2260 screen. The exact number of characters transferred varies depending upon whether the 3270 is local or remote and which model of the 2260 is being mapped cnto which model of the 3270.

Note: A terminal is considered to be in compatibility mode from the time a 2260-compatible transaction is initiated until (1) the CLEAR key is depressed, or (2) a 3270 native mode transaction is initiated.

For local 3270 operation, the extra data transfer of FULLBUF mode should be transparent to the user with regard to response time. For remote 3270 operation, the response time is a complex function of the present method of 2260 operation and the line speeds used for the 2260 and 3270; however, the increase in the response time (on a transaction basis) should be less than 20% at the same line speed.

CICS TABLE PREPARATION FOR 2260 COMPATIBILITY

Individual transactions can be flagged for FORMAT or FULLBUF 2260 compatibility through the DFHPCT TYPE=ENTRY macro instruction. The mode of compatibility chosen depends on the 2260 functions required for the application programs that run under this particular transaction code.

The characteristics of the 2260/2265 terminal (which the 3277/3275 replaces) are specified by additional operands for the DFHTCT TYPE=TERMINAL macro instruction. They are as follows:

```
COMPAT=NO,(number of characters,number of lines,                   *
      device type,model number),                                   *
FEATURE=(PTRADAPT,SELCTPEN,AUDALARM,COPY,BUFEXP,                   *
       DCKYBD,UCTRAN)
```

The "number of characters" parameter is used to specify the screen size of the 2260/2265 terminal. Applicable parameter values are 240, 480, and 960.

The "number of lines" parameter is used to indicate the number of lines applicable to the 2260/2265 terminal or to insert new line (NL) symbols into the 3284/3286 printer output data stream where NL symbols are not provided by the user in the output data stream. Applicable parameter values are 6, 12, and 15. The default value for a 960-character screen is 12.

The "device type" parameter is used to specify a 2260 or 2265 terminal or a 1053 printer. The default is 2260. Note that the specification COMPAT=(960,15) results in an error condition since the 2260 (assumed by default) cannot support 15 lines.

The "model number" parameter is used to specify a model number for the 2260 terminal being simulated. This parameter provides an interface for any user-written application programs that currently test the TCTTETM field before building device-dependent 2260 data streams.

The FEATURE operand has been included in the CICS DFHTCT TYPE=TERMINAL macro instruction to indicate the presence of 3270 Information Display System features (for example, Printer Adapter, Selector Pen, Audible Alarm, Copy feature, Buffer Expansion, uppercase translation, dual case keyboard) and to specify the corresponding 3284 Model 3 Printer on the 3275 Display Station.

Note: A separate DFHTCT TYPE=TERMINAL macro instruction cannot be coded for the 3284 Model 3 Printer because the 3284 Model 3 shares the buffer of the 3275 Display Station.

2260 MODEL-DEPENDENT DATA STREAM

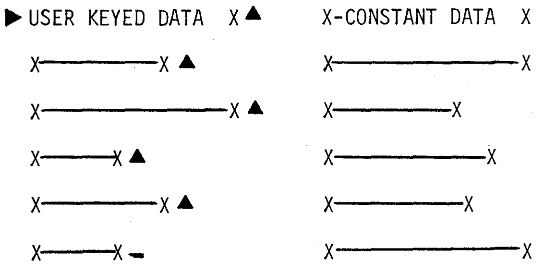
Some users require the capability of building 2260 device-dependent data streams. CICS allows the user to build such data streams by providing the terminal type at TCTTETT in the Terminal Control Table (TCT) and the terminal model number at TCTTETM in the TCT.

The TCTTETT and TCTTETM fields always contain the 2260 or 2265 terminal type codes and user-assigned model number (as specified in the DFHTCT TYPE=TERMINAL macro instruction) whenever a transaction flagged for CICS 2260 compatibility is dispatched. At all other times, TCTTETT and TCTTETM contain the codes for the 3270 terminal.

SCREEN TECHNIQUES

Various techniques have been used for entering data using a 2260 screen and keyboard. The following are examples of four basic techniques that may be used.

1. Formatted 2260 screen technique; for example:



With this technique, the constant data is optional and is sent to the user at the start of the transaction. Either FORMAT or FULLBUF mode may be specified, depending upon the user's formatting requirements.

2. 2260 tab feature technique; for example:

```
▶ NAME:                INITIAL:

  STREET:              NUMBER:

  CITY:                STATE:
```

For CICS 2260 compatibility operation, the colon-tab character combination is replaced by 3270 "unprotected attribute" characters. FORMAT mode may be specified if data is always keyed into every field. FULLBUF mode must specified if any field is to be left blank. (Unlike the 2260, the 3270 does not transmit blank characters unless FULLBUF is specified.) If FULLBUF is not specified, any heading following the blank field is not transmitted to the application program.

```
▶ NAME:    JONES          INITIAL:   J▲

  STREET:                 NUMBER:  1515▲

  CITY:  NEW YORK ▬       STATE:
```

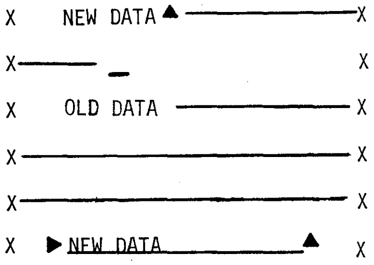
FORMAT data stream:

```
NAME:JONES        INITIAL:J(NL)          :1515(NL)       :NEW YORK
```

FULLBUF data stream:

```
NAME:JONES    INITIAL:J(NL)          STREET:      NUMBER:1515(NL)   CITY:NEW YORK
```

3. "Endless screen" technique; for example:



With this technique, the 2260 screen is treated as unformatted. The operatcr keys off the screen, and, wrapping around to the start of the screen, overkeys any old data still there. The 2260 transmits a data stream delimited by SMI (start of message) and EOM (end of message) characters, irrespective of any screen wraparound.

Either FORMAT or FULLBUF can be specified. In either case, CICS ensures that the data stream is correctly ordered before sending it to the 2260-based transaction.

With this technique, there is a difference in operation between FORMAT and FULLBUF modes only in the case of a 480-character 2260 mapped onto a 480-character 3270. Use of FORMAT mode causes the loss of the last character of every 2260 output line. Use of FULLBUF mode limits the data loss to the last character position of the last line but at the expense of transferring a full 480 characters (479 characters plus one attribute character) for each interaction involving a data entry key.

It is the responsibility of the user to determine whether his 2260 transaction can tolerate the loss of the last character of each output line. CICS appends a blank character to the end of each 2260 input line, except where the line is terminated prematurely by a new-line (NL) symbol.

4. "Change and enter" technique; for example:

```
►JONES        J  H
 1515         OLD ROAD EAST                  ORIGINAL
 NEW YORK                                    RECORD


 N.Y.   10010 _


►JONES        J  H
 1515         OLD ROAD WEST                  UPDATED
 NEW YORK                                    RECORD
 N. Y.  10010 _
```

The FORMAT data stream looks like this:

```
JONES        J  H      1515    OLD ROAD WEST
```

The FULLBUF data stream looks like this:

```
JONES        J  H      1515    OLD ROAD WEST
NEW YORK               N.Y.  10010
```

The 2260 transaction sends an existing record to the screen. After making any necessary corrections to data fields, the operator depresses the ENTER key; the 2260 transaction receives the entire record in its updated version.

With this technique, FULLBUF must be specified for this transaction to ensure that the transaction receives a 2260-compatible data stream.

START OF MESSAGE INDICATOR (SMI)

For the 2260, X'4A' is displayed as the SMI (▶) character. If the SMI character is contained in an output data stream, it is displayed on the 3270 screen as follows:

COUNTRY	SMI SYMBOL
U.S.A.	¢
U.K.	$
France	¢ or ç
Germany	ö

At the user's discretion, a different character may be specified during CICS system generation to represent the SMI. Whatever character is chosen, it remains the same for all transactions.

If an SMI character is not placed on the screen by the user's 2260 data stream, the operator must then key an SMI character somewhere on the screen. Failure tc do so results in no data being transmitted to the application program.

After the data has been read in, CICS 2260 compatibility transmits a single blank character to overwrite the SMI character.

NEW LINE SYMBOL (NL)

For CICS 2260 compatibility, the new line (NL) function is replaced by a field mark character followed by the NL key. Any incoming field mark characters are treated as 2260 NL characters, and the remainder of the line is discarded.

Including the NL symbol in the 2260 output data stream causes the substitution of a 3270 field mark character; the output continues at the beginning of the next line. (The 3270 field mark character displays as a semicolon.)

LINE ADDRESSING

For a 3270 operating under CICS compatibility, any requests for write at line address are honored. CICS 2260 compatibility converts the line address to the equivalent 3270 buffer address before transmitting the data stream to the screen.

2848 LOCK FEATURE

The optional lock feature available on the 2848 Display Control Models 21 and 22 is supported by CICS 2260 compatibility. Any read/lock request is honored by CICS 2260 compatibility by leaving the 3270 keyboard inhibited. The keyboard is reset only if the transaction changes or if a WRITE macro instruction is issued by the application program.

2845/2848 TAB FEATURE

The optional tab feature available on the 2845/2848 Display Control is supported by CICS 2260 compatibility. Any tab character (colon) found in the output data stream is replaced by an attribute byte. This attribute byte is converted back to a 2260 tab character on a read operation.

Because the tab feature uses an attribute byte, the terminal operator cannot key a tab character frcm the keyboard. The tab does not display on the screen, but is present in the user's input data stream.

For proper operation, transactions using the tab technique are required to operate in FULLBUF mode. A tab character should not be inserted as the last character of a line.

Because the tab feature uses an attribute byte, the cursor stops at the beginning of each line before stopping at the authorized attribute position, except in the case of 480/480 FULLBUF conversion. The cursor stops cnly at the authorized attribute position and the last position in the buffer.

INITIATING TRANSACTIONS

The terminal operator can initiate either 2260 compatibility or 3270 native mode transactions by entering the appropriate four-character CICS transaction code. While in compatibility mode, any Start of Message Indicator (SMI) character in the input data stream is recognized by CICS; the succeeding four characters are interpreted as a CICS transaction code. The transaction code must be contiguous and may not span two fields.

CICS then initiates the specified transaction. If the specified transaction is a 2260 compatibility transaction, CICS automatically formats the 3270 screen.

To allow easy transition between 2260 compatibility and 3270 native mode transactions, some ccnventions should be followed. Three acceptable methods of transition between transactions are:

1. Clear the screen; then enter the transaction code and any data to be presented to the transaction.

   In this case, the operator must enter the transaction code at the first position of the screen. The transaction code may be preceded by the SMI character, in which case the next four characters are interpreted as the transaction code. A transaction code may not contain an SMI character.

2. For a terminal in compatibility mode, enter the SMI character, the transaction code, and data. If the transaction to be initiated is a compatibility transaction, all data from the SMI character to the cursor position is treated as a 2260 compatibility data stream and is mapped into 2260 format. For a native mode transaction, the data stream is identical with the data stream from an unformatted screen buffer.

3. For a terminal in native mode with a formatted screen, the SMI character and transaction code must be the first data characters in the data stream. If the transaction code calls for a compatibility transaction, the screen is formatted for 2260 compatibility but no data is presented to the transaction.

3735 PROGRAMMING CONSIDERATIONS (CICS/OS only)

SYSTEM GENERATION

BTAMDEV=3735D and ANSWRBK=EXIDVER must be included in the DFHSG PROGRAM=TCP macro instruction during system generation if support for the 3735 Programmable Buffered Terminal is to be generated for switched lines.

TERMINAL CONTROL TABLE PREPARATION

FEATURE=AUTOANSR must be specified in the DFHTCT TYPE=LINE macro instruction for all terminals on switched-line networks. To support the 3735 Programmable Buffered Terminal, the following must also be specified:

1. DFHTCT TYPE=LINE,ANSWRBK=EXIDVER.
2. BTAM DFTRMLST macro instruction of the form: SWLST,AN; the user portion of each 3735 DFTRMLST entry must point to the corresponding TCTTE.
3. DFHTCT TYPE=TERMINAL,TRMTYPE=3735.

If FEATURE=AUTOCALL is specified in the DFHTCT TYPE=LINE macro instruction, the following must also be specified:

1. BTAM DFTRMLST macro instruction of the form: SWLST,AD.
2. DFHTCT TYPE=TERMINAL,TRMADDR=parameter.

INQUIRY MODE

CICS deletes the inquiry header on input and inserts it on output. Therefore, inquiry applications require that:

1. A single output record is transmitted.
2. The output block does not exceed 233 bytes (plus a three-byte inquiry header).
3. The output data stream does not contain characters which are invalid for a 3735. (See the <u>3735 Programmer's Guide</u>, GC30-3001.)

If multiple inquiries are required in a single connection on a switched line, the user must make provision in his DFHTEP program to keep the line open. To accomplish this he may check for the IOERROR - TIMEOUT condition, a WRITE TR or READ TQ instruction, and TCTTEMIQ set to a hexadecimal blank character (X'40') in TCTTEMCI.

CICS/TCAM INTERFACE CONSIDERATIONS

Most independent teleprocessing applications require a dedicated network. The Telecommunications Access Method (TCAM) permits multiple applications to share a single network, resulting in more efficient use of terminals and lines. The CICS/TCAM Interface enables CICS to run as an application under TCAM.

TCAM is an optional access method that may be used alone or in combination with other access methods currently supported (BTAM, BSAM, and BGAM).

One practical use of the CICS/TCAM Interface is to run a "production" CICS in one region and a "test" CICS in another. Running in separate regions, the applications are protected from one another. Operating under TCAM, terminals and lines can be shared by the two CICS applications. Other TCAM applications such as the Time Sharing Option (TSO) can also be running concurrently.

In most cases, CICS user tasks that run under BTAM can run under TCAM without modification to the task code. This assumes that the user has properly designed and coded his TCAM Message Control program (MCP). Modifications to his CICS Terminal Error program (DFHTEP) are required to take advantage of the new error codes used in the CICS/TCAM Interface.

There are basic differences between TCAM and BTAM design methods. CICS was designed to operate in the BTAM environment. The CICS/TCAM Interface, although resolving most of the differences, must impose scme restrictions when CICS is run in a TCAM environment. These restrictions as well as some of the ramifications of selecting various user options are addressed in this section. Also described are the user facilities available and how the user implements and operates his system via the interface.

TCAM APPLICATION PROGRAM INTERFACE

The TCAM Application Program Interface is a portion of the TCAM Message Control program (MCP). It consists of two types of control blocks, the Process Control Block (PCB) and the TPROCESS block.

The PCB defines the application program interface of a partition/region in the system using TCAM. Its purpose is to control communication and storage protection across partition/region boundaries. It also defines the user-written message handler (MH) responsible for processing messages to and from the application program. Since a PCB is required for each application program running with the MCP, a PCB is required to define the CICS application program.

The TPROCESS control block controls communication to and from the application program. A separate block is required for both input and output to the application program. The application program is frequently referred to in TCAM as the Message Processing program (MPP). A TPROCESS block is required for each input queue to CICS and for each output queue from CICS. In CICS there are corresponding Terminal Control Table line entries (TCTLE's) for each input queue and for each output queue (that is, for each TPROCESS block).

DD cards (such as those shown in Figure 11) are used to correlate the TCAM control blocks with the CICS control blocks. The CICS Terminal Control Table contains the DCB. The DDNAME specified in the Terminal Control Table macro instruction (DFHTCT TYPE=SDSCI,DDNAME=name) names the DD card. In the DD card, the QNAME field names the TCAM TPROCESS block.

No exceptions are required for CICS to the TCAM Application Program Interface just described. For additional information, refer to the *TCAM Programmer's Guide and Reference Manual* (GC30-2024).

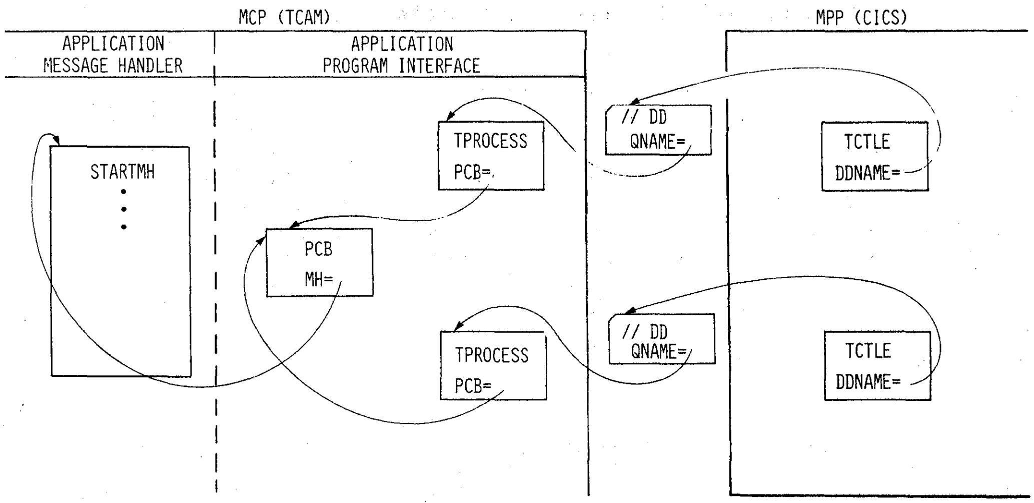


Figure 11. DD card correlation of TCAM and CICS control blocks

CICS/TCAM INTERFACE

A TCAM input process queue is considered to be a "line" to CICS. For each input process queue there is a CICS Terminal Control Table line entry (TCTLE). Note that TCAM requires the application program (CICS) to have a DCB for each TPROCESS block; separate TPROCESS blocks are required for input to and output from the application. Therefore, each TCAM output process queue is also considered to be a line and has a corresponding CICS TCTLE. Each TCTLE references its own DCB generated by the DFHTCT TYPE=SDSCI macro instruction in CICS.

The CICS Terminal Control Table terminal entries (TCTTE's) define the terminals associated with a particular line entry (TCTLE). For each physical terminal communicating with CICS via TCAM, a corresponding TCTTE containing the terminal identification must be associated with a TCTLE. Duplicating individual TCTTE's for both the input TCTLE and the output TCTLE is avoided by attaching a single, special TCTTE to the input TCTLE and attaching all the individual TCTTE's to the output TCTLE. Although attached to the output TCTLE, they are used for both input and output processing.

Each input record from TCAM must contain the source terminal identification (OPTCD=W specified in the CICS DFHTCT TYPE=SDSCI macro instruction). Using this identification as a search argument, the corresponding TCTTE can be located by CICS.

Using the POOL feature (POOL=YES of the DFHTCT TYPE=LINE macro instruction), it is possible to establish a pool of common TCTTE's on the output TCTLE that do not contain terminal identifiers. As required, terminal identifiers are assigned to the TCTTE's or removed from association with the TCTTE's. This POOL feature necessarily imposes a number of restrictions and should be thoroughly understood before being implemented. For additional information, see the discussion of the POOL operand.

Data Format

When TCAM is specified, CICS assumes that the user transaction data passed to it from the TCAM queue is in the proper format to be passed directly to the user task. Except for the removal of the source terminal identification, CICS does not alter the data it receives. It is the user's responsibility (via his MCP) to properly prepare the data, such as translating to EBCDIC, stripping line control characters, and deblocking. The user may optionally bypass the CICS routine that removes the source terminal identification by returning from the user-written input exit (XTCMIN) in TCP with a displacement of zero bytes.

Similarly, CICS assumes that the user transaction data passed to it for TCAM has been properly formatted for direct placement on the TCAM output process queue. Except for the insertion of the destination identification and the device-dependent control character, CICS does not alter the data it receives. It is the user's responsibility (via his MCP) to properly prepare the data for the destination terminal, such as translating and inserting line control characters.

Logic Flow

Below is a generalized description of the sequence of events that occurs in CICS when interfacing with TCAM.

INPUT STEP	ACTION
A	TCAM notifies CICS that it has data for a particular input TCTLE by posting its ECB.
B	CICS gets a TIOA and attaches it to the special input TCTTE in the TCTLE.
C	CICS issues a READ to TCAM which results in TCAM passing the data over the partition or region boundaries to the CICS TIOA. CICS indicates at this time that it has data to process. (See Figure 12.)
D	The input TCTLE points to the corresponding output TCTLE in response to the OUTQ specification of the DFHTCT TYPE=LINE macro instruction.
E	The individual TCTTE's on the output TCTLE are searched for a matching source terminal identification. If POOL=YES has been specified, a free TCTTE is assigned to this source terminal identification. (See Figure 13.)
F	If an input user exit (XTCMIN) has been specified, CICS links to the user exit routine where the user may edit his input data prior to passing it to his task. (See the discussion of XTCMIN in the section "TCAM User Exits".) If no exit has been specified, CICS removes the eight-byte source terminal identification field inserted by TCAM. No other editing of the data is performed.

INPUT STEP	ACTION
G	A check is made to determine whether a task is attached to the individual TCTTE. If not, go to Step H. If a task is attached, a check is made to see if the task has issued a READ. If a READ request exists, go to Step J. If not, CICS halts the processing of data in the queue until the TCTTE becomes available or the attached task issues a READ.
H	CICS attaches the appropriate task. A user exit is available prior to the actual attach. (See the discussion of XATTACH in the section "TCAM User Exits".) If the task could not be attached (e.g., a "maximum task" or "short on storage" condition exists), CICS remembers it has data to process and exits DFHTCP. On the next scan, it again tries to attach the task.
I	Once a task is attached, CICS stores the TCAM segment identifier in the TCTTE (if segment processing was specified by including the C parameter in the OPTCD operand of the DFHTCT TYPE=SDSCI macro instruction).
J	CICS passes control to the attached task.

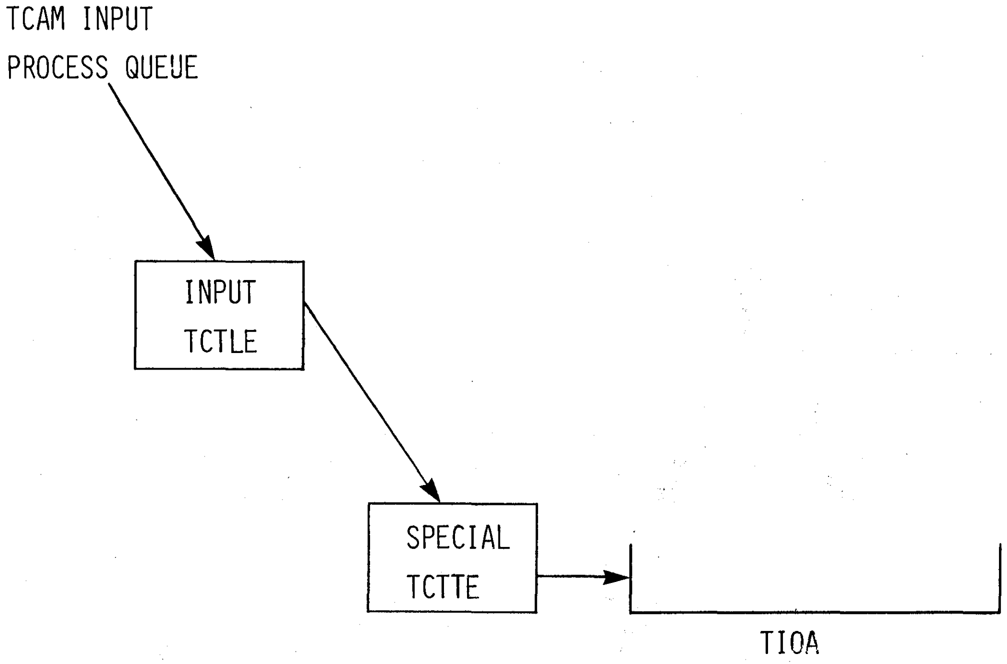


Figure 12. CICS issues a TCAM read

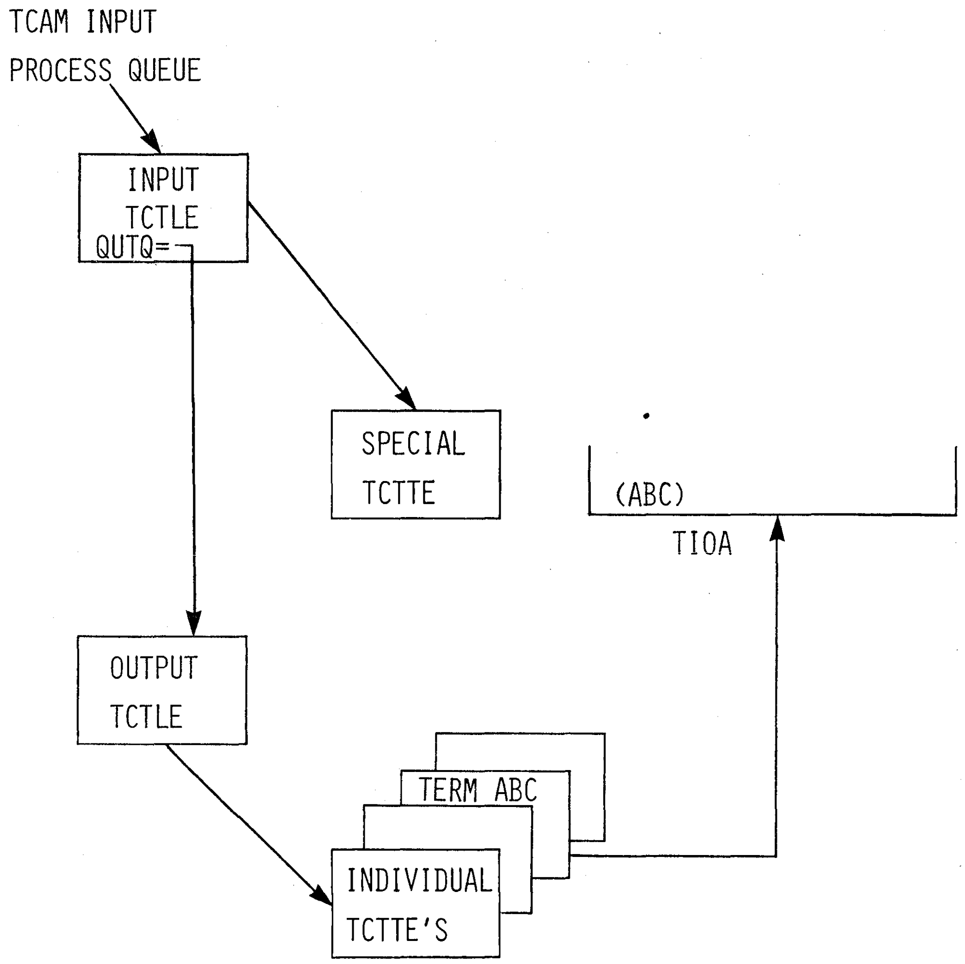


Figure 13. After TCAM read CICS attaches TIOA to corresponding TCTTE

OUTPUT STEP	ACTION
A	The user issues a WRITE request in his application program.
B	The TCP terminal scan recognizes the WRITE request.
C	CICS checks to determine if an output user exit (XTCMOUT) has been specified. If specified, CICS links to the user exit routine where the user may edit his output data prior to passing it to TCAM. (See the discussion of XTCMOUT in the section "TCAM User Exits".)
D	CICS checks the four-byte TCTTE field TCTTEDES for a destination saved as a result of DEST=NAME or DEST=YES having been specified in the DFHTC TYPE=WRITE macro instruction. If present, CICS inserts it in the eight-byte destination field and left justifies the field, padding blanks to the right. Otherwise, CICS moves the source terminal identification from the TCTTE to the destination field.
E	CICS moves a one-byte communication control character into the ninth byte of the TCAM work

OUTPUT STEP	ACTION
	area. See the section "Device Dependent Considerations".
F	CICS issues a TCAM WRITE to transfer the data to TCAM.
G	After checking for successful completion of the WRITE to TCAM, CICS posts the user task "dispatchable" if a task is still attached to the TCTTE. Otherwise, CICS frees the TCTTE for a new task.

Terminal Error Program

The CICS/TCAM Interface implementation has resulted in the expansion of the CICS Terminal Error program (DFHTEP) error codes and conditions previously existing in CICS. The additional codes and conditions are described in the section "Creating a Terminal Error Program (DFHTEP)".

Message Routing

The DEST operand of the DFHTC TYPE=WRITE macro instruction can be used to route an output message to a destination defined by the user in the TCAM MCP. This operand can be used to send a message to a destination other than the source terminal (such as to another terminal, a list of terminals, or another application).

If DEST=name is specified, "name" is stored in the four-byte field TCTTEDES. If DEST=YES is specified, it is the user's responsibility to have placed the destination name in TCTTEDES prior to issuing the WRITE macro instruction.

CICS moves the data from TCTTEDES into the destination identification field prior to placing the data on the TCAM output process queue. The user may bypass the CICS routine that inserts the destination field by taking the XTCMOUT user exit and returning to CICS from the exit with a displacement of zero. In this case the user must ensure that the TCAM header is properly formatted for output.

If the DEST operand is omitted, CICS inserts the source terminal identification from the TCTTE into the destination identification field.

Segment Processing

The CICS/TCAM Interface supports the TCAM segment processing capability. It permits segments of a message to be forwarded to CICS rather than waiting for the entire message to be received. If the user specifies segment processing (by including the parameter "C" in the OPTCD operand of the DFHTCT TYPE=SDSCI macro instruction), CICS passes the segment to the user and places the one-byte position field control byte in the TCTTE field labeled TCTTETCM. Similarly on output, the user must supply the control byte in TCTTETCM for CICS to pass to TCAM. For additional information on segment processing, refer to the discussion of the OPTCD operand of the application input and output ICB in the <u>OS/MFT and OS/MVT TCAM Programmer's Guide</u> (GC30-2024).

Line Pool Specification

In generating the TCAM Message Control program the user defines each physical terminal to TCAM by means of a TCAM TERMINAL macro instruction. Since CICS also requires terminal definitions, the user must prepare a Terminal Control Table terminal entry (TCTTE) for each terminal through use of the DFHTCT TYPE=TERMINAL macro instruction. As a result, a one-for-one correlation exists between terminal definitions in TCAM and in CICS.

In a highly restricted environment, this duplication of terminal definitions can be reduced through use of the POOL feature (DFHTCT TYPE=LINE,POOL=YES). Instead of a one-for-one relationship, a "pool" of generalized TCTTE's is defined for a TCAM process queue (line). When a transaction is received over the TCAM "line", a search is made for an available TCTTE in the pool. When one is found, it is assigned the source terminal identification for the duration of the task. Upon completion of the task, the TCTTE is available for reassignment. If there are no available TCTTE's to handle the next transaction from the line, the line remains locked until a TCTTE becomes available through task completion. The number of TCTTE's in the pool influences the degree of multitasking.

Because the TCTTE's are not permanently assigned, the use of the POOL feature is possible only in a restricted environment. The POOL feature is applicable only for those applications in which each record received over the input process queue is a new transaction. Thus, the user should thoroughly analyze his environment before specifying the POOL=YES option in the DFHTCT TYPE=LINE macro instruction.

Line Pool Restrictions

The following are line pool restrictions of which the user must be aware:

1. Only one terminal type is permitted per TCAM line (process queue) because of certain device dependencies within CICS.

2. Tasks attached from transactions over the TCAM line are not permitted to issue Terminal Control READ requests. This includes GET, PAGE, and CONVERSE because they contain implied READ's. Violation of this restriction can cause a permanent line lock on the input process queue, thereby preventing any further transactions on the queue from reaching CICS.

3. Segment processing requires multiple READ's which can cause a permanent line lock. Therefore, segment processing (OPTCD=WUC) must not be specified.

4. Automatic task initiation is not applicable in the pool environment.

5. Statistics are accumulated for each TCTTE in the pool; however, the statistics cannot be correlated to the physical terminals.

6. Only one sign on can exist for all terminal entries in a given line pool at any one time. The first sign on received by CICS is propagated to all terminals in the pool. Any subsequent sign on is rejected. A sign off clears the sign-on data from all terminal entries in the pool; a subsequent sign on is then accepted.

7. Master terminal functions require multiple READ's and cannot, therefore, be used on terminals with pooled TCTTE's.

Line Locking

Line locking of two types can occur: (1) a temporary lock that resolves itself in time, and (2) a permanent lock that remains permanent unless the user takes action in his Terminal Error program. Adherence to the pool restrictions outlined in the previous topic should eliminate the permanent lock situation.

A temporary line lock occurs when no TCTTE's are available in the pool and a new transaction appears on the input queue. CICS locks the queue until an existing task completes execution, thus freeing a TCTTE. In this case, the completion of existing tasks is not dependent upon additional input from the queue.

A permanent line lock can occur when multiple reads are required to complete a task. For example, assume that there are two TCTTE's in the pool, that a task is attached to each, and that the segments in the input queue are in the following order:

1. Segment #1 for a third transaction
2. Subsequent segments for the two active tasks

Since no TCTTE is available in the pool for the third transaction, it must wait for a task to complete for a TCTTE to become available. Because the TCAM input queue is processed sequentially, tasks 1 and 2 are unable to receive their subsequent segments. Hence, they cannot complete, and the queue remains permanently locked (because line pool restriction 2 of the previous topic was not observed).

Queue Considerations

Since a queue is a sequential data set, the second record on the queue cannot be retrieved until the first record has been processed. To keep records flowing smoothly through the queue, it is essential that each record be processed as soon as it arrives. In the CICS/TCAM Interface, "processing the record" means detaching the TIOA (containing the record) from the special input TCTTE and attaching it to the individual TCTTE correlated to the actual physical terminal. Each individual TCTTE may be considered to be a "destination" for the purpose of this discussion.

If a particular destination (TCTTE) is not ready to accept the current record on the queue, the queue necessarily "locks" until the destination can accept the record. Queue locks are only a problem when a queue is serving more than one destination. Then, if a queue locks, any new transaction on the queue or data records queued for existing tasks are not processed until the required destination has accepted the current record.

Since queue locks can adversely affect system performance, it is important that the user understand their cause and effect. Proper configuration of TCAM process queues and CICS Terminal Control Tables, reduces to a minimum the occurrences and duration of queue locks.

Because TCAM can read ahead from the terminals, it is possible for TCAM to present to CICS a new transaction record destined for a TCTTE that is already processing a task. Also, TCAM can present a data record for an existing task prior to that task issuing a READ request. In either case, CICS cannot "process" the record (as described above) until the TCTTE is ready to accept the new TIOA. Such input is called "unsolicited input".

Three conditions can produce unsolicited input: (1) the CICS terminal for which the data is destined is OUT OF SERVICE, (2) the CICS terminal for which the data is destined is in RECEIVE status, or (3) the CICS terminal for which the data is destined has an associated task that has not issued a READ and the period of time indicated by the NPDELAY specification has expired. In all cases, the action taken by the CICS/TCAM Interface is to place the input line OUT OF SERVICE and attach DFHTACP to process the error condition.

The default action taken by DFHTACP (which can be altered by user-written DFHTEP) for conditions 1 and 2 is to discard the data and place the input line IN SERVICE. No default action is taken by DFHTACP for condition 3; therefore, the input line remains OUT OF SERVICE, thereby preventing CICS from reading any subsequent records from the input queue.

To allow processing of input to continue, DFHTEP must take appropriate action. If the input line is placed IN SERVICE by DFHTEP, the CICS/TCAM Interface retries the operation; in this case, a count mechanism is recommended in DFHTEP to prevent a loop in the event the task never issues a READ. Alternative action, perhaps when a count limit is reached, might be to abend the task, dispose of the data, and place the line IN SERVICE. For further information concerning DFHTEP, see the section "Creating a Terminal Error Program".

The problem of unsolicited input can be eliminated entirely by having a separate TCAM input process queue for each CICS terminal (TCTTE). However, as the number of terminals increases, this solution may quickly become prohibitive in terms of main storage requirements.

The user should analyze the type of traffic he anticipates over the queues. If he uses a 2770 Data Communication System or 2780 Data Transmission Terminal to read in volumes of cards, he should consider separate queues for these devices. The Asynchronous Transaction Processing (ATP) function in CICS should be seriously considered for processing batches of data to minimize the time between task READ requests. For conversational traffic with short-lived tasks, the sharing of queues is certainly feasible. The same TCAM output process queue can be specified for multiple input process queues. (See the discussion of the DFHTCT TYPE=LINE,OUTQ=symbolic name specification in the section "System Table Preparation".)

The user need not be concerned with locking of the TCAM output process queue since TCAM requeues the data by final destination once it arrives over the output queue.

It is possible for the TCAM output process queue to become congested due to lack of queuing space. In this case, CICS has a WRITE to the queue outstanding until TCAM accepts the data.

TCAM DEVICE CONSIDERATIONS

In the non-TCAM environment, the CICS Terminal Control program is responsible for polling and addressing terminals, code translation, transaction initiation, task and line synchronization, and the line control necessary to read from or write to a terminal. When TCAM is specified, Terminal Control relinquishes responsibility to the TCAM MCP for polling and addressing terminals, code translation, and line control. To take advantage of TCAM facilities, the user must accept the responsibility of coding in the MCP Message Handler functions such as code translation previously handled by the CICS Terminal Control program.

For some terminal services, it is necessary for CICS to pass the user request on to the TCAM MCP Message Handler. A communication control byte in the TCAM work area has been established for this purpose. It is passed to TCAM along with the eight-byte destination name field. Based on the communication byte, the user must execute the proper MCP Message Handler macro instructions to accomplish the necessary function.

The terminal services parameters that do not set bits in the communications byte are WRITE, READ, WAIT, and SAVE. Bits in the communications byte are set for the 2260 parameters WRITEL and READL, the 2760 parameter OIU, and the DISCONNECT parameter.

The CICS/TCAM Interface does not support the RESET parameter or the 3270 parameters READB and COPY.

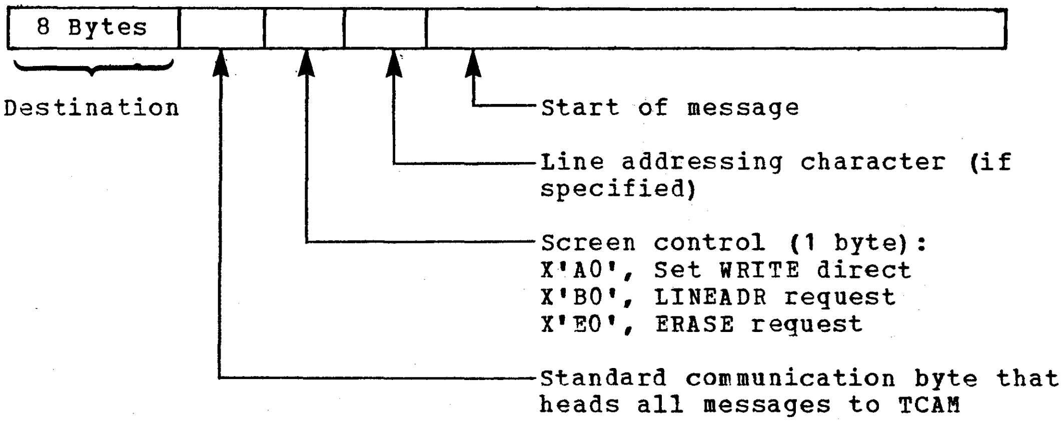
All messages to TCAM from CICS are prefixed with the standard CICS/TCAM communication byte. This byte is used to convey to TCAM request functions that cannot be issued within CICS (such as WRITEL to a 2260). Request functions maintained are DISCONNECT (X'08'), READL (X'10'), and WRITEL (X'20').

TCAM/2260 Device Considerations

The following CICS screen control macro instructions are passed to the TCAM Message Contrcl program (MCP):

1. DFHTC TYPE=WRITE,LINEADR=number
2. DFHTC TYPE=WRITE,LINEADR=YES
3. DFHTC TYPE=(WRITE,ERASE)

These macro instructions are passed in the following format:



Start of message

Line addressing character (if specified)

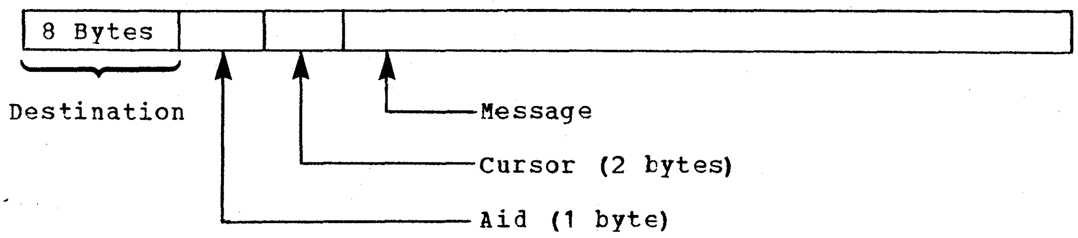
Screen control (1 byte):
X'A0', Set WRITE direct
X'B0', LINEADR request
X'E0', ERASE request

Standard communication byte that heads all messages to TCAM

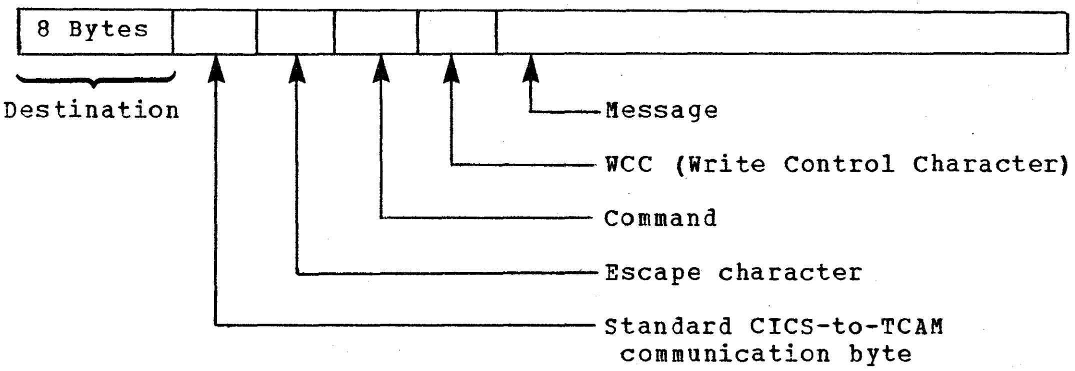
For a 2848 Control Unit Model 21 or 22, the communication byte is used to transmit READL and WRITEL requests to be executed by the TCAM MCP.

TCAM/3270 Device Considerations

Messages passed to CICS from TCAM are of the following format:



Messages passed from CICS to TCAM are of the following format:


8 Bytes
Destination
Message
WCC (Write Control Character)
Command
Escape character
Standard CICS-to-TCAM communication byte

All SOH% status messages input to CICS are passed to DFHTACP/DFHTEP.

DFHTC TYPE=COPY and DFHTC TYPE=READB are not supported by the CICS/TCAM Interface.

In addition to normal read/write functions, the ERASEAUP, CTLCHAR, UCTRAN, and COMPAT operands are also valid for the 3270.

TCAM USER EXITS

The three user exits applicable to the TCAM user are XATTACH, XTCMIN, and XTCMOUT. Whereas XATTACH is shared by other users, XTCMIN and XTCMOUT are applicable only to TCAM users and are used in place of the XINPUT and XOUTPUT exits used by others. See the section "Creating User Exits for CICS Management Programs" for further information concerning CICS user exits.

Task Attach User Exit (XATTACH)

This operand is used to generate linkage in the Terminal Control program TCAM module in TCP to a user-written exit routine. The linkage is generated at the point prior to issuing a Task Control ATTACH for a transaction identification received in response to polling. In the CICS/TCAM Interface this information is received over the TCAM input process queue.

Input User Exit (XTCMIN)

This operand is used to generate linkage in the Terminal Control program TCAM module to a user-written exit routine. The linkage is generated at the point following the completion of any input event. If specified, the linkage is executed after the individual TCTTE is located, just before CICS checks to see if a task is attached to the TCTTE. At this time the TIOA contains the 12-byte storage accounting field and the work area from TCAM. The work area contains an eight-byte source terminal identfication header and the work unit (user data). TIOADBA points to the user data area.

The user has two options in returning from the user exit. If the user returns with a displacement of four bytes (an Assembler B 4(14) instructicn), CICS removes the eight-byte source terminal identification field. Upon completion, the TIOA contains the 12-byte CICS storage accounting field and the work unit. (See Figure 14.)

If the user returns from the exit with a zero displacement (an Assembler B 0(14) instruction), CICS does not alter the data in the TIOA. It is then the user's responsibility to handle the TCAM header.

For a discussion of TCAM work areas and work units, refer to the section "Defining the Application Program Work Area" in the *OS/MFT and OS/MVT TCAM Programmer's Guide* (GC30-2024).

Output User Exit (XTCMOUT)

This operand is used to generate linkage in the Terminal Control program TCAM module to a user-written exit routine. The linkage is generated for output events at the point prior to placing data on the TCAM output process queue.

The user has two options in returning from the exit. If the user returns from the exit with an Assembler B 4(14) instruction, CICS inserts in the TIOA, between the 12-byte CICS storage accounting field and the work unit, a TCAM header consisting of an eight-byte destination field and a one-byte communication control character required for TCAM. If the user returns from the exit with an Assembler B 0(14) instruction, CICS bypasses this insertion routine. It is then the user's responsibility to ensure that the TCAM header is properly formatted.

Figure 14 shows the composition of the TCAM Work Area and the CICS Terminal Input/Output Area (TIOA) at the various stages of operation. On input, it shows the information available from the TCAM input process queue, the TIOA after input event completion, and the TIOA as it is passed to the user task after CICS has edited out the origin field. On output, it shows the TIOA (after CICS has edited in the destination field) in the format in which it is placed on the TCAM output process queue.

The TCAM origin field contains the source terminal identification field. Since CICS uses four-byte Terminal ID's, the name is left-justified and the field is padded to the right with four blanks.

Note: The TCAM destination field contains the destination identification for TCAM to properly route the data.

If the user specifies the output user exit and returns from the exit with a zero displacement, CICS does not alter the TIOA work area. The user must provide the data length at TIOATDL and must prepare the work area for TCAM, including the eight-byte destination field and the communication control byte.

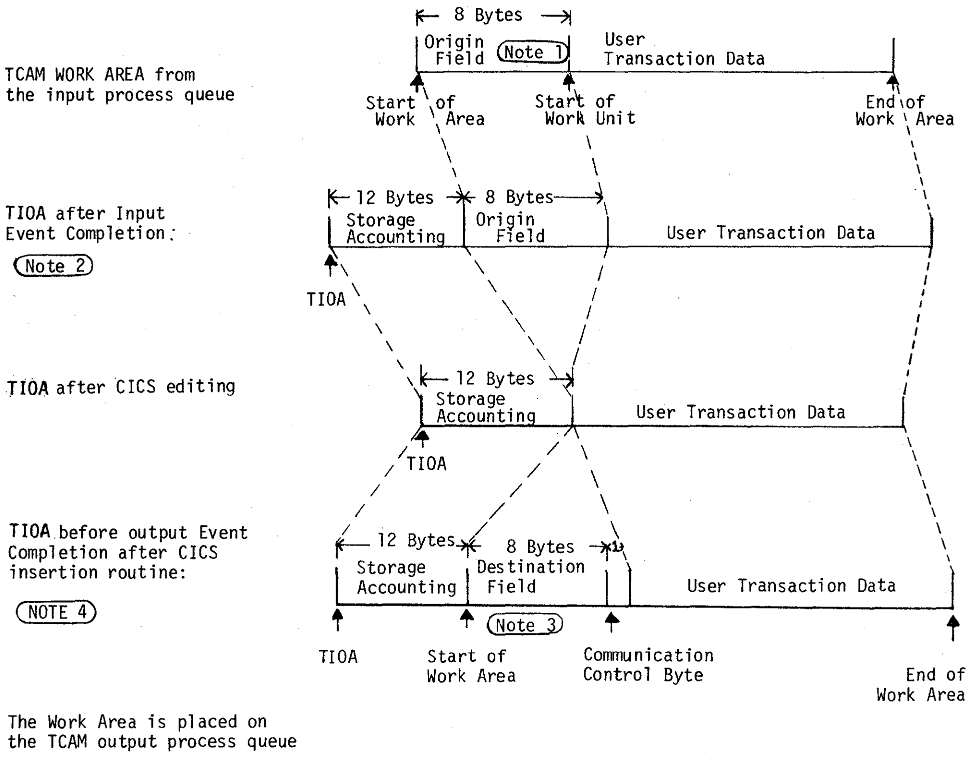


Figure 14. Stages of the TCAM work area and CICS terminal input/output area (TIOA)

CICS/TCAM STARTUP

The TCAM MCP must be in operation prior to completing CICS system initialization. When the user brings up CICS with the CICS/TCAM Interface, CICS checks for the presence of a TCAM partition/region and issues the operator message:

```
DFH1500 - CICS CHECKING FOR TCAM MCP
```

If CICS discovers the MCP is not operational, the following messages are issued:

```
DFH1520 - TCAM MCP IS NOT CURRENTLY AVAILABLE
DFH1520 - REPLY RETRY OR CANCEL OR CONTINUE
```

The operator must then respond:

```
RETRY
```

when the TCAM partition/region becomes active; or

```
CANCEL
```

to terminate CICS; or

```
CONTINUE
```

to continue initialization of CICS in the absence of the TCAM partition/region.

If the operator responds CONTINUE, all DD cards that reference a TCAM queue must have been previously removed from the startup deck to avoid an abnormal termination of CICS. The CONTINUE response is applicable to a mixed BTAM/TCAM mode of operation when TCAM lines are not being used during execution of CICS.

CICS/TCAM ABEND/RESTART

If the TCAM Message Control program (MCP) terminates abnormally, any TCAM application programs currently active are automatically terminated abnormally, providing there is at least one open line group in the MCP. The CICS application program is no exception. For further information, see the discussion concerning "Coordinating MCP and Application Program Restarts" in the OS/MFT and OS/MVT TCAM Programmer's Guide (GC30-2024). CICS does not provide RESTART capability.

CICS/TCAM TERMINATION

CICS is terminated in the normal manner. No modifications to termination procedures are required to support the CICS/TCAM Interface. If both CICS and TCAM are being terminated, CICS ahould be terminated first to avoid an abnormal termination of CICS.

SYSTEM ADMINISTRATION

REAL-TIME SYSTEM ADMINISTRATION

Administration of a real-time data base/data communications (DB/DC) system involves considerations not ordinarily applicable to the traditional batch processing environment. These real-time DB/DC considerations include:

1. Multiple application environment, often involving common or related data bases
2. Managing data centrally on behalf of all applications
3. Transactions arriving on a random nonscheduled basis for asynchronous (concurrent) processing upon arrival
4. Transaction processing sometimes of long duration (for example, continuous 24-hour operation)
5. Communication across multiple time zones (sometimes involving foreign as well as domestic interstate communication)
6. Interface with multiple vendors of data processing services and equipment

It is the responsibility of the system administrator to deal creatively with these new dimensions and complexities in data processing, seeing to it that the system is "tuned" for optimum performance and service.

SYSTEM CONTROL FUNCTIONS

The dynamics of the data base/data communication (DB/DC) environment make it necessary to be able to change system control parameters. Certain of the parameters are changeable, if allowed by the system administrator or by the supervisor and terminal operators. Those facilities and the considerations for invoking them are described in the _Terminal Operator's Guide_ (SH20-1044). The primary system control is provided through the master terminal.

The master terminal function is a logical rather than a physical consideration. This function can be invoked from any terminal that the system administrator allows, but is intended for use by a master terminal operator. In addition to the administrative terminal facilities described in the _Terminal Operator's Guide_, the master terminal may alter other system parameters that control the performance of the system. These control parameters are to be changed in the day-to-day operation of the system to effect the desired performance. They can also be changed in the process of tuning the system to obtain optimum performance under differing conditions.

The terminal administration facilities are described in the _Terminal Operator's Guide_. The system administration functions intended for exclusive use from a master terminal are described below.

MASTER TERMINAL

The Master Terminal program is a conversational program that leads the user through each transaction if sufficient information to perform the requested service was not entered in the original data entry.

The services provided by the Master Terminal program allow the master terminal operator to:

1. Inquire about or change the partition exit time interval value.
2. Inquire about or change the runaway task interval value.
3. Inquire about or change the stall detection interval value.
4. Inquire about or change the storage cushion size.
5. Inquire about or change the maximum number of tasks value.
6. Inquire about or change the maximum number of batch tasks value.
7. Inquire about or change the maximum number of ATP tasks value.
8. Inquire about or change the negative poll delay for a terminal.
9. Inquire about or change the trigger level or a transient data intrapartition data set.
10. Turn the CICS Trace function on or off.
11. Inquire about or change the status of a single terminal.
12. Change the status of a list of terminals.
13. Change the status of a class of terminals.
14. Change the status of all the terminals in the system.
15. Inquire about or change the status of a line.
16. Inquire about or change the status of a control unit.
17. Inquire about or change the status of one or more data base data sets.
18. Open one or more data base data sets.
19. Open one or more transient data extrapartition data sets.
20. Open the dump data set.
21. Close one or more data base data sets.
22. Close one or more transient data extrapartition data sets.
23. Close the dump data set.
24. Switch the dump data set to the alternate dump data set.
25. Inquire about the status of a program.
26. Terminate a task.
27. Terminate CICS.

System Partition/Region Exit Time Interval

The partition/region exit time interval is the maximum interval of time that CICS will release control to the operating system in the event there are no transactions ready to resume processing. This binary time interval can be any three-to-ten-digit decimal value in the range from 100 to 27962020 milliseconds. A typical range of operation might be 100 to 2000 milliseconds.

Runaway Task Time Interval

Any task given control through the Task Control program returns control to Task Control within a user-defined interval of time. Tasks not meeting this time requirement are considered to be in a runaway (logical loop) state and are deleted from the system. This binary time interval can be any three-to-ten-digit decimal value that is not less than the partition/region exit time interval and not greater than 27962020 milliseconds. A typical runaway task time interval might be 5000 milliseconds. If the runaway task time interval is set to zero, the feature is made inoperative.

Stall Time Interval

If CICS remains in an overload condition for the duration of the stall time interval, it is assumed that a system stall exists and corrective action is initiated. This binary time interval can be any three-to-five-digit decimal value that is not less than the partition/region exit time interval and not greater than 32767 milliseconds. A typical stall time interval might be 20000 milliseconds.

Storage Cushion Size

The system storage cushion is used by CICS to minimize system overload conditions. The cushion size does not actually change until the existing cushion is released. When the cushion is then regained, the cushion is of the size indicated by the new value. If a cushion size change is requested and the existing cushion is not released, the cushion size remains unchanged. The cushion size can be any two-to-five-digit decimal value (representing number of bytes) in the range from 20 to 65535.

Negative Poll Delay

The negative pcll delay function allows the user of CICS to delay the polling of BTAM devices on a line when negative responses are detected. This facility allows some control over the CPU overhead required to service negative pcll interrupts. The request must be made in milliseconds and has a range from 0 to 20000. Once a terminal cn that line enters into a conversational-mode transaction, that terminal receives a full poll until the transaction is completed.

Maximum Number of Tasks

CICS limits the number of tasks that can be in the system at any cne time to the number indicated by this user-defined value. This value can be changed dynamically in the range from 1 to 999. In the CICS/DOS-ENTRY system, the maximum number of tasks cannot be changed dynamically since the Rollout facility is initialized at a specified number during system initialization and cannot change unless CICS is reinitialized.

Consecutive Dispatch Limit

The consecutive dispatch limit is valid only in the CICS/DOS-ENTRY system. When a transaction has performed the number of input/output operations (cther than terminal input/output) specified by the consecutive dispatch limit, a task switch is initiated by CICS. The consecutive dispatch limit can be any value between 1 and 999.

Trigger Level

If a Transient Data intrapartition data set is marked for automatic task initiation, CICS automatically initiates the task when the specified number of requests for output operations (indicated by the trigger level for that destination) have been issued for that destination. The trigger level can be any value between 0 and 255.

Trace

If the CICS trace function is not generated as part of the CICS nucleus, the trace function cannot be turned on. If the CICS trace function is generated as part of the CICS nucleus, turning it off does not remove it from the system; the trace function is still in main storage, but is not executed.

Data Base Data Sets

The status of data base data sets reflects one or more of the fcllowing:

1. Read
2. Update
3. Add
4. Exclusive Control

Dump Data Set

Optionally, the user can define two dump data sets (DFHDMPA and CFHDMPB), alternating between them during real-time execution of CICS. If there are twc dump data sets, a 'switch' request closes the dump data set that is currently open and opens the other dump data set. This allows the user to print the CICS formatted dumps on the first dump data set without having to terminate CICS.

Program Status

The status of a program is comprised of the following:

1. The language in which the program was written
2. The size of the program in bytes
3. Whether or not the program is permanently resident in main storage
4. Whether or not the program is currently in main storage
5. The number of times the program has been used
6. The number of transactions that are currently using the program

Dynamic Open/Close

The optional CICS dynamic open/close facility allows the user to dynamically open/close his data sets as often as desired during the real-time execution of CICS. For example, this makes it possible for the user to defer the opening of data sets at System Initialization and open/close them later through the master terminal as they are needed. The dynamic open/close capability is applicable to File Management (data tase data sets), Dump Management (dump data sets), and Transient Data Management (extrapartition data sets).

Terminate a Task

The only time a task is not terminated upon request is when the requested task is currently reading from or writing to a terminal.

System Termination

CICS can te terminated from the master terminal by entering the transaction identification:

```
CSMT
```

The system responds:

```
WHAT SERVICE IS REQUESTED?
```

The master terminal operator should enter:

```
SHUTDOWN
```

The system will respond:

```
IS SHUTDOWN TO BE IMMEDIATE?
```

The operator can respond with one of the following:

```
NO
NO,DUMP
YES
YES,DUMP
```

If the system is to be terminated without regard to the existence of any active transactions (tasks), the operator should enter 'YES'. If the operator wishes to wait until there are no active transactions in the system, he should respond 'NO'.

Note: If the user of the CICS/DOS-STANDARD system requests immediate termination of CICS while active transactions are communicating with terminals, unpredictable results could occur; that is, active terminals could receive input/output data from other active terminals within CICS.

If the master terminal operator wishes to receive a main storage dump upon completion of the termination process, he should respond either 'YES,DUMP' or 'NO,DUMP'.

If immediate termination is not requested, if Asynchronous Transaction Processing (ATP) is being used, and if there are batches currently in a HOLD status, the operator must respond:

```
CATP STOP
```

to complete the quiescing process.

When termination is initiated, the following message is displayed cn the system console and on the master terminal:

```
DFH1701 - CICS IS BEING TERMINATED
```

When termination is complete, the following message is displayed cn the system console:

```
DFH1702 - NORMAL TERMINATION COMPLETE
```

If a dump is requested, the fcllowing message is displayed on the system console when termination is complete:

```
DFH1791 - ABNORMAL TERMINATICN COMPLETE
```

LATE AND TIME OF LAY CONTECL

In the course cf normal operation, CICS maintains the current date and time of day within the Common System Area (CSA). The current (Julian) date of the form YYDDD is maintained in packed decimal representation at CSAJYDP, where YY is years and DDD is days. The current time of day is maintained in three formats: (1) in packed decimal at CSATODP of the form HHMMSSS, where HH is hours, MM is minutes, and SSS is seconds to tenths of a second, (2) in binary decimal at CSACTODB to hundredths of a second, and (3) in binary decimal timer units at CSATADJT to 300ths of a second. The current date is initially set by the CICS System Initialization program to agree with the date maintained by the operating system. The time of day values are updated during task dispatching to reflect the time of day maintained by the operating system. The accuracy of these values depends upon the task mix and frequency of task switching occurrences.

Since the time of day maintained by the operating system can be changed either by the operating system (fcr example, OS resetting the clock to zero at midnight) or by the console operator, CICS must recognize the situation where a "negative" change in the time of day has occurred, and must adjust expiration times maintained by CICS accordingly.

If the optional time adjustment feature of CICS Time Management is not included in CICS, any change to the operating system time of day involving midnight is represented by CICS as a value larger than the previous value (for example, 1:00 a.m. is represented as 2500 hours); the date remains unchanged. If the optional time adjustment feature is included in CICS (by including the ICPTIME=YES operand in the DFHSG PROGRAM=ICP specification), and if either the time-ordered task synchronization feature or automatic task initiation feature of CICS Time Management is also included, any change to the operating system time of day is automatically reflected in the expiration times maintained by CICS; the date maintained by CICS is reset to agree with the data maintained by the operating system.

In the case of CICS/OS, when the operating system time of day is set to zero at midnight (and the time adjustment feature has been included in CICS), CICS/OS adjusts the expiration times of day it maintains, changes the date, and then resets its time of day to zero. In the case of both CICS/OS and CICS/DOS, when the operating system time of day is changed by the console operator to a value less than the previous value, CICS adjusts the expiration times it maintains to reflect the negative value and then resets its date and time of day to those values maintained by the operating system. The optional time adjustment feature thus makes it possible for CICS to be operated on a continuous round-the-clock basis.

The optional time adjustment feature is included in CICS by generating the Time Adjustment program (DFHTAJP) as part of the Control System Operational group (CSO). The user must provide a corresponding entry in the Processing Program Table (PPT) and the appropriate Transaction Identification (CSTA) as an entry in the Program Control Table (PCT) referencing DFHTAJP.

When a negative change in the time of day maintained by the operating system is detected by CICS, transaction CSTA is automatically initiated. A message is then sent to the console operator informing him that the CICS time of day has been changed to reflect the change in the time of day maintained by the operating system.

CICS does not recognize a change to just the date field. However, if transaction CSTA is initialized after the date maintained by the operating system has been changed, the date maintained by CICS is updated accordingly.

SYSTEM STATISTICS

Statistics maintained by the various CICS management programs can be displayed during the day in part or in their entirety on the request of any terminal operator whose security code allows the request of such information.

Statistics are transmitted to the Transient Data destination CSSL as variable-length, unblocked records (maximum block size equal to 136) when the system is normally terminated or when requested by the terminal operator. When requested by a terminal operator, an alternate destination may be specified.

To request all system statistics, the following transaction is entered by the terminal operator:

```
CSTT AOR destid
```

To request selected statistics, the following transaction is entered by the terminal operator:

```
CSTT SOR destid label,label,label,DONE
```

The 'destid' is used to specify the four-character destination identificaticn to which statistics are to be sent. If this field is blank (consisting of six blank characters between "SOR" and "label"), CSSL is the default destination.

The 'label' corresponds to any of the following labels which request a particular set of statistics.

LABEL	SET OF STATISTICS
TERM	Terminal statistics
PROG	Program statistics
FILE	File statistics
TASK	Task statistics
STOR	Storage statistics
DUMP	Dump statistics
TRAN	Transient data statistics
TEMP	Temporary storage statistics

DYNAMIC OPEN/CLOSE FUNCTION

The optional CICS Dynamic Open/Close facility allows the user to dynamically open/close his data sets as often as desired during the real-time execution of CICS. This makes it possible for the user to defer the opening of data sets during system initialization and open/close them later as they are needed. The dynamic open/close capability is applicable to File Management (data base data sets), Dump Management (dump data sets), and Transient Data Management (extrapartition data sets) and may be invoked via the Master Terminal program or through the use of the DFHOC macro instruction in an Assembler language application program.

For a discussion of open/close via the Master Terminal program, see the section "Master Terminal" in this publication.

The Open/Close macro instruction (DFHOC) is used to request any cf the following services:

1. Open, close, or switch dump data sets.
2. Open or close data base data sets.
3. Open or close transient data extrapartition data sets.

Note: The DFHOC macro instruction is intended for use by the system programmer as a means of system control; it should not be used by the application programmer to open/close his data sets , as improper use of this macro instruction can cause serious degradation of system performance.

The fcllowing operands can be included in the DFHOC macro instruction:

```
DFHOC TYPE=OPEN,                                                *
      DATASET=TRANSDATA,DATABASE,DUMP,                          *
      LISTADR=(register),(symbolic register),YES,               *
      SYMBADR=symbclic address,                                 *
      DSETID=(namexx),...),                                     *
      CHECK=symbolic address
```

```
        DFHOC TYPE=CLOSE,                                               *
              DATASET=TRANSDATA,DATABASE,DUMP,                          *
              LISTADR=(register),(symbolic register),YES,               *
              SYMBADR=symbclic address,                                 *
              DSETID=(name,...),                                        *
              CHECK=symbclic address

        DFHOC TYPE=SWITCH,                                              *
              DATASET=DUMP
```

CPEN DATA SETS (OPEN)

The programmer can open a data set or series of data sets by issuing the

```
        DFHOC TYPE=OPEN,                                                *
              DATASET=TRANSDATA,DATABASE,DUMP,                          *
              LISTADR=(register),(symbolic register),YES,               *
              SYMBADR=symbclic address,                                 *
              DSETID=(namexx),...),                                     *
              CHECK=symbolic address
```

macro instruction. He must provide the parameters needed by specifying them in the macro instructicn or, in the case of LISTADR, by placing the address of the parameter list (built by the user) in the TCA at TCAOCLA and specifying LISTADR=YES.

A discussion of the operands that can be included in the DFHOC TYPE=OPEN macro instruction follows.

DATASET: Specifies whether the request is for a transient data extrapartition data set (TRANSDATA), a data base data set (DATABASE), cr a dump data set (DUMP).

LISTADR: Specifies the register or symbolic register name containing the address of the open/close parameter list built by the user. If LISTADR=YES is specified, this address can be placed in the TCA at TCAOCLA. If the LISTADR operand and SYMBADR operand are omitted, execution of the DFHOC macro instruction causes the list to be built for the user starting with the first byte of the TWA. In this case, it is the user's responsibility to make sure that the required space is available in the TWA. The space can be calculated using the formula:

Space = (n x 12) + 4

where "n" is the decimal number of twelve-byte entries in the open/close parameter list and the "4" represents four bytes of hexadecimal F's to signify the end of the parameter list.

The symbolic storage definition (DFHOCLDS) of a parameter list entry is provided by CICS. The format of a twelve-byte entry in the cpen/close parameter list is:

<u>TRANSDATA</u>

WORD 1: Four-byte Destination ID.
WORD 2: Four bytes of the form bbxx where bb is two bytes of blanks and xx is a two-byte suffix of the data set control block created by the DCT assembly.

WORD 3: Error byte plus three-byte address of DCT entry (after completion).

DATABASE

WORDS 1 and 2:
Data set name (left justified, padded with blanks).
WORD 3: Error byte plus three-byte address of FCT entry (after completion).

In CICS/OS, the user can optionally specify, in WORD 2 of a TRANSDATA entry, the parameter list address pointing to a storage area. This storage area contains information to be placed into a dummy DCB before opening it. If an address is placed in this field, the first byte must be set to a hexadecimal FF. The symbolic storage definition (DFHOCODS) of this parameter list is provided by CICS. The format of the parameter list is as follows:

Byte 1:	Open Options byte
Byte 2:	BUFNO byte
Byte 3:	RECFM byte
Byte 4:	ERROPT byte
Bytes 5,6:	LRECL
Bytes 7,8:	BLKSIZE
Bytes 9-16:	DDNAME

The first eight bytes must contain the correct hexadecimal codes for the desired parameters, since the 16 bytes of the open/close parameter list are moved into the DCB.

SYMBADR: Not applicable if DATASET=DUMP is specified, this operand indicates the symbolic address of an open/close parameter list built by the user. If the SYMBADR and LISTADR operands are omitted, execution of the DFHOC macro instruction causes the parameter list to be built for the user starting with the first byte of the TWA. For a discussion of the parameter list, see the discussion of the LISTADR operand in this section.

DSETID: Not applicable if DATASET=DUMP is coded or if the LISTADR or SYMBADR operand is used, this operand specifies the data set names or destination identifications to be used in constructing a parameter list.

If DATASET=DATABASE is coded, up to 255 data set names can be specified with a single use of the DSETID operand. If DATASET=TRANSDATA is coded, up to 255 destination identifications can be specifed with a single use of the DSETID operand. If TYPE=OPEN is coded and if the destinations are nonresident, "xx", a two-character suffix of the data set control block (DCB for CICS/OS, DTF for CICS/DOS) must be provided with each destination identification; if the destination is resident, the "xx" suffix is ignored.

In CICS/OS, if "xx" consists of more than two characters, it is assumed to be the symbolic address of a list of options and parameters to be moved into the DCB. For the format of this list, see the discussion of the LISTADR operand in this section.

CHECK: Specifies the symbolic address of a user-written routine to which control is passed if any error is detected during the OPEN operation. The user-written routine is given control whenever TCAOCTR in the TCA contains a nonzero return code. It is the responsibility of the user to examine the return code in the TCA and, if necessary, examine the individual error codes in the list that was built either by the user or by the expansion of the DFHOC macro instruction. The error code appears in the first byte of the third word of each entry in the parameter list.

Upon return from the Dynamic Open/Close program, TCAOCTR may contain cne of the hexadecimal codes:

```
00 - No error
FF - Invalid request
```

or, if TCAOCTR contains neither of these codes, it will contain one cr more of the following hexadecimal codes:

```
80 - Open error
40 - Close error
20 - No space available for OPEN
10 - Invalid control block name
```

While performing the requested service on the list of data sets, the individual error bytes in the list entry are filled with a hexadecimal 00 or with the proper error code each time an error is encountered. If more than one error is encountered while processing the parameter list, TCAOCTR reflects all the errors and may show a tit configuration different from those shown above. For example, if there are six data sets to be opened, if four are successfully opened, if one has an invalid control block identification, and if one has an open error, the TCAOCTR field contains a hexadecimal 90.

When there is not enough main storage available to open any data sets, TCAOCTR contains a hexadecimal 20, and all the entries contain a fullword (four bytes) of zeros in the third word.

CLOSE DATA SETS (CLOSE)

The programmer can close a data set or series of data sets by issuing the

```
DFHOC TYPE=CLOSE,                                                  *
      DATASET=TRANSDATA,DATABASE,DUMP,                             *
      LISTADR=(register),(symbolic register),YES,                  *
      SYMBADR=symbclic address,                                    *
      DSETID=(name,...),                                           *
      CHECK=symbolic address
```

macro instruction. The DATASET, LISTADR, SYMBADR, and CHECK operands have the same significance as for the DFHOC TYPE=OPEN macro instruction. The DESTID operand is used as follows.

DSETID: Specifies the names of the data sets to be closed. No suffix is required. Up to 255 data set names can be specified with a single use of this operand.

SWITCH DUMP DATA SETS (SWITCH)

The programmer can switch from the dump data set currently being used to the alternate dump data set by issuing the

```
DFHOC TYPE=SWITCH,                                                 *
      DAIASET=DUMP
```

macro instruction. This macrc instruction causes the current dump data set, if open, to be closed, and the alternate dump data set to be opened. A TYPE=CLOSE,DATASET=DUMP macro instruction does not cause a switch but only closes the current dump data set.

CONTROL SYSTEM MESSAGES

During the course of CICS execution, certain exceptional conditions can occur of which system administration should be aware. These conditions cause control system messages to be sent to appropriate destinations through the CICS Transient Data Control facility. The user interested in this informaticn should direct it to the desired queue or log by defining the appropriate entries in the Destination Control Table (DCT).

Although these control system messages may be routed to an extrapartition output log, it is strongly recommended that the user route them to a terminal (preferably hard copy) so that appropriate administrative action can be taken.

Control system messages that originate in the Terminal Abnormal Condition program (DFHTACP) are time stamped; that is, the time that the exceptional condition occurred is printed as part of the message. The time is expressed in the form "hhmmsss", where "hh" represents hours, "mm" represents minutes, and "sss" represents seconds to tenths of a second. Control system messages that originate in the Abnormal Condition program (DFHACP) are not time stamped.

The system actions described in connection with the following messages are the default actions provided by DFHTACP. These system actions are subject to modification by the user-written Terminal Error program (DFHTEP).

In the CICS/DOS-ENTRY system, it is not always possible to determine the transaction identification. Therefore, in the following message, the program identification (PROG yyyyyyyy) may be substituted for the transaction identification in the case of the CICS/DOS-ENTRY system.

1. TCT SEARCH ERROR ON LINE W/TERM xxxx, hhmmsss
   TCT SEARCH ERROR ON LINE W/TERM xxxx, RELATIVE LINE zz, hhmmsss

   Destination: CSMT

   Explanation: BTAM input only. An invalid terminal address was received for a read operation on a line defined by terminal xxxx. If the line supports the TWX, relative line zz is also printed.

   System Action: Terminal request for service is ignored and the data which was input is lost. The line associated with terminal xxxx is placed out of service on non-switched lines; the system continues polling other lines. On remote 2260 terminals, the control unit skip flag is turned on in the polling list and the line continues in service.

   Programmer Action: Examine the Terminal Control Table to be sure there is an entry for every terminal on each line. Regenerate it to include a missing terminal. Bad transmission of data on remote 2260 terminals can cause this message to occur.

2. TRANSLATE ERROR AT TERM xxxx, TRANS yyyy, hhmmsss
TRANSLATE ERROR ON LINE W/TERM xxxx, hhmmsss
TRANSLATE ERROR ON LINE W/TERM xxxx, RELATIVE LINE zz, hhmmsss

Destination: CSMT

Explanation: BTAM. Terminal type for Terminal Identification xxxx is not present in the Terminal Control Table, or the Terminal Control program was not generated to support the device type specified in the Terminal Control Table.

System Action: Request for service is ignored and the data is lost. The system continues polling. Terminal xxxx is put out of service.

Programmer Action: Regenerate the Terminal Control Table to provide the correct terminal type, or regenerate the Terminal Control program to support the required terminal type.

3. POLLING LIST ERROR ON LINE W/TERM xxxx, hhmmsss

Destination: CSMT

Explanation: The address for a terminal identified as xxxx in the Terminal Control Table does not correspond to the polling list.

System Action: The system continues processing. Terminal xxxx is put out of service.

Programmer Action: Examine the Terminal Control Table and polling list for discrepancies. If the assemblies of each are correct, check to see if the program has inadvertently affected either the table or the list. Correct the error and either regenerate the table or resubmit the program.

4. OUTPUT EVENT REJECTED AT TERM xxxx, TRANS yyyy, RETURN CODE zz, hhmmsss

Destination: CSMT

Explanation: BTAM output only. The return code zz was generated by BTAM when the write was attempted.

System Action: The line (defined by terminal xxxx) is placed out of service, and the transaction yyyy is abended.

Programmer Action: Take appropriate action as determined from the BTAM return code.

5. INPUT EVENT REJECTED AT TERM xxxx, TRANS yyyy, RETURN CODE zz, hhmmsss
INPUT EVENT REJECTED ON LINE W/TERM xxxx RETURN CODE zz, hhmmsss
INPUT EVENT REJECTED ON LINE W/TERM xxxx, RELATIVE LINE aa, RETURN CODE zz, hhmmsss

Destination: CSMT

Explanation: BTAM input only. Return code zz was generated by BTAM when the READ was attempted.

System Action: The line defined by terminal xxxx and relative line aa (for switched lines) is placed out of service. The transaction yyyy is abended.

Programmer Action: Take appropriate action as determined from the BTAM return code.

6. TCT CODING OR TCP PROGRAM ERROR AT TERM xxxx, TRANS yyyy, hhmmsss
TCT CODING OR TCP PROGRAM ERROR ON LINE W/TERM xxxx, hhmmsss
TCT CODING OR TCP PROGRAM ERROR ON LINE W/TERM xxxx, RELATIVE LINE aa, hhmmsss

Destination: CSTL

Explanation: Generated as a result of a BTAM return code of 04 (BUSY), OC (invalid OPTYPE), or 10 (AUTOPOLL or program polling error).

System Action: None.

Programmer Action: To further analyze the BTAM READ/WRITE return code, see the publication OS/360 Basic Telecommunications Access Method, Version 2 (GC30-2004).

7. OPEN FAILURE, USE LOPEN TO RECOVER ON LINE W/TERM xxxx, hhmmsss
OPEN FAILURE, USE LCPEN TO RECOVER ON LINE W/TERM xxxx, RELATIVE LINE aa, hhmmsss

Destination: CSTL

Explanation: Generated as a result of BTAM return code 14 (line error during OPEN).

System Action: None.

Programmer Action: Use the Master Terminal facility to place the line in service.

8. MISSING DD CARD ON LINE W/TERM xxxx, RELATIVE LINE aa, hhmmsss

Destination: CSTL

Explanation: Generated as a result of BTAM return code 08 (invalid RLN). This error most commonly occurs as a result of omitting one of the DD cards of a switched-line pool.

System Action: None.

Programmer Action: Ensure that all DD cards for a switched-line pocl are present in the job stream used to bring up CICS.

9. SHOULD NOT OCCUR RETURN CODE zz AT TERM xxxx, TRANS yyyy, hhmmsss
SHOULD NCT OCCUR RETURN CODE zz ON LINE W/TERM xxxx, hhmmsss
SHOULD NOT OCCUR RETURN CODE zz ON LINE W/TERM xxxx, RELATIVE LINE aa, hhmmsss

Destination: CSTL

Explanation: Generated as a result of BTAM return codes 18, 1C, or 20. These return codes are undefined for CICS and indicate that the DCB probably contains dynamic buffering operands.

System Action: None.

Programmer Action: Ensure that no buffering operands exist in the DCB for the line involved.

10. BUFFERED DEVICE BUFFER EXCEEDED AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSTL

Explanation: On a device with the buffer receive feature (for example, the 2740-2), the output message length exceeded the hardware buffer size.

System Action: The write request is aborted, the terminal write storage is freed (if possible), and the task is abended.

Programmer Action: Ensure that the data length plus the carrier control characters does not exceed the hardware buffer size.

11. OUTPUT LENGTH ZERO AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSMT

Explanation: A write was requested on terminal xxxx by transaction yyyy, but the contents of the TIOATDL field was zero.

System Action: The write request is aborted, the terminal write storage is freed (if possible), and the task is abended.

Programmer Action: Ensure that the transaction in error initializes the TIOATDL field of the TIOA.

12. NO OUTPUT AREA PROVIDED AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSTL

Explanation: A write was requested on terminal xxxx by transaction yyyy; the TCTTEDA field was not initialized.

System Action: The write request is aborted and the task is abended.

Programmer Action: Ensure that the transaction in progress obtains necessary storage and initializes the TCTTEDA field, as necessary.

13. OUTPUT AREA EXCEEDED AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSTL

Explanation: The Terminal I/O Area (TIOA) was not large enough to contain both the data and carrier control characters.

System Action: The write request is aborted, the terminal write storage is freed (if possible), and the task is abended.

Programmer Action: Ensure that the transaction in error obtains TIOA's large enough to contain messages in addition to carrier control characters.

14. UNIT CHECK AT TERM xxxx, TRANS yyyy, hhmmsss
UNIT CHECK ON LINE W/TERM xxxx, hhmmsss
UNIT CHECK ON LINE W/TERM xxxx, RELATIVE LINE zz, hhmmsss

Destination: CSMT

Explanation: A unit check error occurred on the line defined by terminal xxxx, transaction yyyy, and relative line zz (as appropriate).

System Action: The line is placed out of service on GAM or SAM lines and on BTAM I/O errors (with the exception of Intervention, Data Check, or Time Out error conditions).

Intervention on a switched line causes the task to be abended and the line to be logically disconnected. Intervention on a non-switched line with a dummy (unidentified) terminal causes the line to be placed out of service; with a real terminal, causes the terminal to be placed out of service and the transaction (task) to be abended.

Data check with a dummy terminal causes the line to be placed out of service; with a real terminal, causes the terminal to be placed out of service and the transaction to be abended.

Time Out on a Read Text command causes a MESSAGE TOO LONG response to be sent to the terminal. Time Out with a dummy terminal causes the line to be placed out of service; with a real terminal, causes the terminal to be placed out of service and the transaction to be abended.

Programmer Action: Examine the System Console Log message generated by BTAM for this error and have the unit error corrected.

15. UNIT CHECK SHOULD NOT OCCUR AT TERM xxxx, TRANS yyyy, hhmmsss
UNIT CHECK SHOULD NCT CCCUR ON LINE W/TERM xxxx, hhmmsss
UNIT CHECK SHOULD NOT OCCUR ON LINE W/TERM xxxx, RELATIVE LINE zz, hhmmsss

Destination: CSMT

Explanation: A unit check error (which is undefined by BTAM) occurred on the line defined by terminal xxxx, transaction yyyy, and relative line zz (as appropriate).

System Action: The line is placed out of service on GAM or SAM lines and on BTAM I/O errors (with the exception of Intervention, Data Check, or Time Out error conditions).

Intervention on a switched line causes the task to be abended and the line to be logically disconnected. Intervention on a non-switched line with a dummy (unidentified) terminal causes the terminal to be placed out of service and the transaction (task) to be abended.

Data check with a dummy terminal causes the line to be placed out of service; with a real terminal, causes the terminal to be placed out of service and the transaction to be abended.

Time Out on a Read Text command causes a MESSAGE TOO LONG response to be sent to the terminal. Time Out with a dummy terminal causes the line to be placed out of service; with a real terminal, causes the terminal to be placed out of service and the transaction to be abended.

Programmer Action: Examine the System Console Log message generated by BTAM for this error and have the unit error corrected.

16. UNIT EXCEPTION AT TERM xxxx, TRANS yyyy, hhmmsss
UNIT EXCEPTION ON LINE W/TERM xxxx, hhmmsss
UNIT EXCEPTION ON LINE W/TERM xxxx, RELATIVE LINE zz, hhmmsss

Destination: CSMT

Explanation: A unit exception error occurred on the line defined by terminal xxxx, transaction yyyy, and relative line zz (as appropriate). This error was posted 41 by BTAM.

System_Action: With a switched line, the transaction is abended and the line is logically disconnected. With a dummy terminal, the line is placed out of service; with a real terminal, the terminal is placed out of service and the transaction is abended.

Programmer Action: Examine the System Console Log message generated by BTAM for this error and have the unit error corrected.

17. UNIT EXCEPTION SHOULD NOT OCCUR AT TERM xxxx, TRANS yyyy, hhmmsss
UNIT EXCEPTION SHOULD NOT OCCUR ON LINE W/TERM xxxx, hhmmsss
UNIT EXCEPTION SHOULD NOT OCCUR ON LINE W/TERM xxxx, RELATIVE LINE zz, hhmmsss

Destination: CSMT

Explanation: A unit exception errror (undefined by BTAM) occurred on the line defined by terminal xxxx, transaction yyyy, and relative line zz (as appropriate).

System_Action: With a switched line, the transaction is abended and the line is logically disconnected. With a dummy terminal, the line is placed out of service; with a real terminal, the terminal is placed out of service and the transaction is abended.

Programmer Action: Examine the System Console Log message generated by BTAM for this error and have the unit error corrected.

18. NEGATIVE RESPONSE AT TERM xxxx, TRANS yyyy, hhmmsss
NEGATIVE RESPONSE ON LINE W/TERM xxxx, hhmmsss
NEGATIVE RESPONSE ON LINE W/TERM xxxx, RELATIVE LINE zz, hhmmsss

Destination: CSMT

Explanation: An invalid negative response occurred on the line defined by terminal xxxx, transaction yyyy, and relative line zz (as appropriate).

System Action: The terminal is placed out of service and the transaction is abended.

Programmer Action: Examine the System Console Log message generated by BTAM for this error and have the unit error corrected.

19. UNDETERMINED UNIT ERROR AT TERM xxxx, TRANS yyyy, hhmmsss
UNDETERMINED UNIT ERROR ON LINE W/TERM xxxx, hhmmsss
UNDETERMINED UNIT ERROR ON LINE W/TERM xxxx, RELATIVE LINE zz, hhmmsss

Destination: CSMT

Explanation: An I/O error (which was not unit check, unit exception, or negative response) occurred on the line defined by terminal xxxx, transacton yyyy, and relative line zz (as appropriate).

System Action: The line associated with terminal xxxx is placed out of service.

Programmer Action: Examine the System Console Log message generated by BTAM for this error and have the unit error corrected.

20. SECURITY VIOLATION HAS BEEN DETECTED TERM ID=xxxx, TRANS ID=xxxx, OPERATOR NAME=xxxxxxxx

Destination: CSMT

Explanation: The operator at terminal xxxx has requested a transaction whose security key does not match the corresponding security key for the operator who is signed on.

System Action: Continues polling cycle.

Programmer Action: Determine whether the operator should be allowed to request the transaction. If so, correct the security key for the operator in the Sign-on Table (DFHSNT).

21. INTERCEPT REQUIRED AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSMT

Explanation: The task associated with terminal xxxx, transaction yyyy, and relative line zz (as appropriate) was to have been abnormally terminated, but TPURGE=NO was specified in the corresponding entry of the Program Control Table (PCT).

System Action: The terminal is placed out of service.

Programmer Action: Use the Master Terminal facility to intercept or terminate the task.

22. TRANSACTION xxxx ABEND xxxx AT xxxx

Destination: CSMT

Explanation: The identified transaction attached to the identified terminal has been abnormally terminated. The ABEND code indicates the origin or cause, and may be originated by the user or by CICS. Following are the ABEND codes for abnormal terminations initiated by CICS.

Code	Detecting Program	Cause
AACA	Abnormal Condition	Should not occur. Invalid error code passed to DFHACP in the TCA at location TCAPCABR. A complete system dump is provided to assist in problem determination.
AICA	Interval Control	A runaway task condition has been detected and the task is being abnormally terminated. The condition indicates a possible logical loop within the user's program.
AKCA	Task Control	Another CICS task has requested Task Control to abnormally terminate this task as a result of actions initiated by: • Terminal Abnormal Condition program (DFHTACP); the appropriate message is found at destination CSMT. • Task Termination portion of the Master Terminal facility. The Asynchronous Transaction Control program (DFHATP) terminates asynchronous tasks when: • User requests deletion of a batch via CWTR delete option while CICS is actively processing that batch; DFHATP abnormally terminates the task and purges all remaining data from the queues. • An asynchronous task tries to read more data than is available; DFHATP abnormally terminates the task.
AKCD	Task Control	Invalid code in the dispatch control indicator field. The invalid code can be found in the TCA at symbolic location TCATCDC. Valid Codes: X'10' Not dispatchable (not applicable to CICS/DOS-ENTRY) X'20' Dispatchable X'40' Wait on list of events X'80' Wait on single event
AKCP	Task Contrcl	A stall condition has been detected and this task is being abnormally terminated. This task carries a code indicating it is purgeable.
AKCR	Task Control	The type of request code is invalid. The invalid code can be located in the TCA at symbolic location TCATCTR. Valid Codes: X'01' Enqueue X'02' Dequeue X'04' Reserved X'08' Reserved X'10' Task Origination

Code	Detecting Program	Cause
		X'11' Reserved X'12' Reserved X'14' Reserved X'20' Priority Change X'40' Task Wait X'80' Task Termination
AKCS	Task Control	The request exceeds available Subpool 1 storage. CICS/DOS-ENTRY only.
APCC	Program Control	An attempt was made to execute an ANS COBOL program but ANS COBOL support was not generated in Program Control.
APCI	Program Control	An attempt was made to execute a PL/I program but PL/I support was not generated in Program Control.
APCL	Program Control	There is insufficient main storage available for the requested program.
APCP	Program Control	An error occurred on the read of a requested program from the library.
APCR	Program Control	Task request for service is invalid. The invalid code can be located in the TCA at TCAPCTR. Valid Codes: X'01' LINK X'02' XCTL X'04' LOAD X'08' DELETE X'10' RETURN X'40' ABEND X'60' ABEND with DUMP X'90' RETURN from Task Control program
APCT	Program Control	A task issued a request for a program which is not in the PPT. The invalid program ID is in the TCA at TCAPCPI.
APIA	Program Interrupt	A program check has occurred during the subject task execution. The PSW at the time of interrupt is saved in the task's TCA.
ASCR	Storage Control	The request for service is invalid. Valid codes: X'20' Released Storage X'40' Release Storage X'80' Acquire Storage
ASCT	Storage Control	The request exceeds available Subpool 1 storage. CICS/DOS-ENTRY only.

Code	Detecting Program	Cause
ATDI	Transient Data	The type of destination code is invalid. The invalid code can be located in the DCT at symbolic location TDDCTDT. Valid Codes: X'20' Indirect X'40' Extrapartition X'80' Intrapartition
ATDT	Transient Data	Request for service is invalid. The invalid code is in the TCA and can be located at TCATDTR. Valid codes; X'20' Forced end of volume on extrapartition data set. X'40' Output service on intrapartition. X'80' Input service on intrapartition.
DLDY	DL/I Interface	A DL/I CALL was issued, but the DL/I Interface dummy program under CICS/OS was loaded at system initialization.
DLIA	DL/I Interface	An irrecoverable error occurred during execution of the CICS-DL/I Interface program under CICS/OS. The DLIA code is returned to all transactions from which DL/I CALL's are subsequently issued.
DLPA	DL/I Interface	A DL/I abend (or pseudo abend) occurred during transaction processing. The ABEND code is found in the TCA at TCADLECB.

System Action: In addition to the dump services requested by application programs, CICS also requests dumps for abnormal conditions and places specific dump codes in the dumps for ready identification.

Action: Analyze the error condition indicated by the abend code.

23. INVALID COPY REQUEST AT TERM xxxx, TRANS yyy, hhmmsss

Destination: CSMT

Explanation:
a. The Terminal Control Table Terminal entry of the "from" device did not specify the COPY feature.
b. The device address specified for the "from" device does not exist on the requested control unit.
c. The length specified for the COPY request was not one.

System Action: The transaction is abended.

Programmer Action: Ensure that the application program is aware of the device configuration as necessary.

24. INVALID MSG BLOCK ON LINE W/TERM xxxx, hhmmsss

Destination: CSMT

Explanation:
a. An unidentifiable message was received from a remote 3270 device. The message block did not correspond with known identification patterns.
b. The type of data block received from a 3735 was incorrect for the mode of the active CICS transaction. For example an inquiry message block was received for a batch transaction or conversely. This will probably occur if the 3735 is disconnected during a transaction and, upon reconnection, the operator initiates a different mode of operation.

System Action: The terminal is placed out of service and the transaction is abended.

Programmer Action: For condition (a), ensure that the hardware difficulty is corrected. For condition (b), ensure that the terminal operator understands the correct operating and recovery procedures for 3735 transactions.

25. INCMPLT MSG BLOCK ON LINE W/TERM xxxx, hhmmsss
INCMPLT MSG BLOCK AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSMT

Explanation: An incomplete message was received on term xxxx; that is, end of transmission was received prematurely or prior to end of text.

System Action: The terminal is placed out of service and the transaction is abended.

Programmer Action: Ensure that the hardware difficulty is corrected.

26. INTERV ON PRINTER ON LINE W/TERM xxxx, hhmmsss
INTERV ON PRINTER AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSMT

Explanation: This message is sent to the 3270 Information Display System on a printer intervention situation:
a. Normal out of paper condition, cover open, offline, etc.
b. No printer present, but transaction request to start printer.
c. Printer adapter feature not present.

System Action: No action is performed.

Programmer Action: Ensure that the Terminal Control Table is properly defined and that the transaction requests proper printer operations. If the 3277 Display Station is plugged in the wrong position on the 3270 Information Display System, the operator may depress the CLEAR key to proceed.

27. INTERV REQUIRED ON LINE W/TERM xxxx, hhmmsss
INTERV REQUIRED AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSMT

Explanation: This message occurs when an intervention situation arises on the 3270 Information Display System.

System Action: No action is performed

Programmer Action: Correct the intervention situation.

28. ERROR STATUS MSG eeee RECEIVED ON LINE w/TERM xxxx, hhmmsss
ERROR STATUS MSG eeee RECEIVED AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSMT

Explanation: Error status message "eeee" was received from a remote 3270 Information Display System or from a 3735 Programmable Buffered Terminal. For a remote 3270, an "intervention required" condition causes an INTERVENTION REQUIRED message in lieu of this message.

System Action: The transaction is abended and the terminal is placed out of service; however, if operation check status is present and if the terminal is a 3270, the terminal is left in service.

Programmer Action: Analyze the error status to determine the proper course of action to correct the unit error or program error.

29. UNSOLICITED INPUT ONLINE W/TERM xxxx, hhmmsss

Destination: CSMT

Explanation: Input has occurred on a control unit (general poll) for which the associated terminal is "out of service" or has a task that has not issued a DFHTC TYPE=READ macro instruction.

System Action: No action is performed by CICS. Control is given to user-written DFHTEP.

Programmer Action: Code DFHTEP as dictated by environmental needs.

30. DESTINATION dddd INVALID ONLINE W/TERM xxxx, hhmmsss
DESTINATION dddd INVALID AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSTL

Explanation: An application program has attempted to write to an invalid TCAM destination.

System Action: Abend the transaction and abort the write request.

Programmer Action: Ensure that application programs write to proper TCAM destinations.

31. INVALID READ REQUEST AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSMT

Explanation:
a. A transaction has requested a READ from a terminal that presently has a terminal status of RECEIVE.

b. A transaction has issued a READ request to a 3735 terminal during batch transmission after receipt of the end-of-file (EOF) condition.

System Action: Abort the READ request and abend the transaction.

Programmer Action: For condition (a), ensure that transactions do not issue DFHTC TYPE=READ macro instructions to terminals in RECEIVE status. For condition (b), ensure that the 3735 batch transaction makes proper use of the EOF operand in the DFHTC macro instruction so that no reads are issued after the EOF condition has occurred.

32. INVALID WRITE REQUEST AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSMT

Explanation:
a. A transaction has issued a WRITE to a terminal that presently has a terminal status of INPUT.

b. A transaction has issued a WRITE to a 3735 during batch transmission prior to receipt of the 'EOF' condition.

System Action: Abort the WRITE request and abend the transaction.

Programmer Action: For condition (a), ensure that transactions do not issue WRITE requests to terminals in INPUT status. For condition (b), ensure that the 3735 batch transaction does not issue its first WRITE request before receiving the EOF condition.

33. TIME OUT ONLINE W/TERM xxxx, hhmmsss
TIME OUT AT TERM xxxx, TRANS yyyy, hhmmsss

Destination: CSMT

Explanation: A 32-second timeout has occurred on a 7770 Audio Response Unit.

System Action: The 7770 terminal received an error message and is disconnected, and the transaction abended.

Programmer Action: None

34. DFHSF001 xxx yyyyy zzz

Destination: CSML

Explanation: The operator has signed off a terminal where:

xxx = operator identification from Sign-on Table;
yyyyy = number of transactions processed;
zzz = number of transaction errors.

System Action: CICS continues processing. The operator is no longer signed on the terminal. The message SIGN OFF IS COMPLETE is returned to the terminal.

Programmer Action: None

APPENDIX A: REQUIRED ENTRIES TO CICS CONTROL TABLES

ENTRIES REQUIRED IN DESTINATION CONTROL TABLE (DCT)

The following destination identification entries are required and must be provided by the user in the DFHDCT TYPE=EXTRA, DFHDCT TYPE=INTRA, or DFHDCT TYPE=INDIRECT specification:

1. DESTID=CSMT — The Terminal Abnormal Condition program (DFHTACP) and Abnormal Condition program (DFHACP) write terminal error and abend messages, respectively, to this destination.
2. DESTID=CSTL — DFHTACP writes terminal I/O error messages to this destination.
3. DESTID=CSSL — Statistics programs write data to this destination.
4. DESTID=CSML — Sign-off program outputs data to this destination.

If the Transient Data Control program (DFHTDP) is not included in the generation of CICS, messages to these destinations are lost (ignored).

ENTRIES REQUIRED IN PROGRAM CONTROL TABLE (PCT)

The following entries are required in the PCT and must be provided through the DFHPCT TYPE=ENTRY macro instruction. Minimum values for TWASIZE are indicated.

TRANSID	PROGRAM	TWASIZE
CACP***	DFHAQP	100
CATP***	DFHATP	100
CRDR***	DFHRD1	100
CSAC	DFHACP	40
CSFE**	DFHFEP	100
CSMT**	DFHMTPA	160
CSOT**	DFHMTPA	100
CSSF**	DFHSNP	0
CSSN**	DFHSNP	0
CSST**	DFHMTPA	100
CSTA**	DFHTAJP	0
CSTE	DFHTACP	0
CSTT	DFHSTKC	100
CWTR***	DFHWT1	160
8888*	DFHSNP	0
9999*	DFHSNP	0

Note: Entries marked with a single asterisk are required only when numeric-only terminals are used to sign on.

Entries marked with a double asterisk are required only when the associated program is desired.

Entries marked with a triple asterisk are required only when the Asynchronous Transaction Processing facility is being used.

Any transaction codes specified for the TRANSID parameter in any DFHTCT TYPE=TERMINAL macro instruction must also be included in the PCT.

Transaction code CSXX is reserved for 3270 support and should not be generated in the PCT. (CSXX is used to generate an "invalid transaction code" message when a zero length data message is received.)

The user-assigned transaction security key for entries CSAC, CSSN, and CSSF must always be the value 1.

A high priority (for example, 255) is recommended for transactions CSAC, CSTA, CSMT, CSOT, and CSST. A low priority (for example, 001) is recommended for transactions CSFE, CSSF, CSSN, and CSTT.

CSMT, CSOT, and CSST do not run in 2260 compatibility mode. COMPAT=NO must be specified or the operand omitted.

ENTRIES REQUIRED IN PROCESSING PROGRAM TABLE (PPT)

The following entries are required in the PPT and must be provided through the DFHPPT TYPE=ENTRY macro instruction:

PROGRAM NAME	USAGE
DFHACP	Abnormal Condition program.
DFHAQP	Asynchronous Queue Purge program (required only if the Asynchronous Transaction Processing facility is being used).
DFHATP	Asynchronous Transaction Control program (required only if the Asynchronous Transaction Processing facility is being used).
DFHBMSMM	Basic Mapping Support program (required only if 3270 Basic Mapping support is desired).
DFHFEP	Terminal Test program (optional).
DFHMTPA DFHMTPB DFHMTPC DFHMTPD DFHMTPE DFHMTPF	Master Terminal program (required only if master terminal or system termination functions are desired).
DFHOCP	Dynamic Open/Close program (required only if dynamic open/close facility is desired).
DFHRD1 DFHRD2	Asynchronous Transaction Input Processing programs (required only if the Asynchronous Transaction Processing facility is being used).
DFHSFP	Sign-off program linked to by DFHSNP (required only if sign-on/sign-off function is desired).
DFHSNP	Sign-on program (required only if sign-on/sign-off function is desired).
DFHSNT	Sign-on Table (required only if sign-on/sign-off function is desired).
DFHSTKC	System Statistics program.
DFHSTP	System Termination program linked to by DFHMTP.

PROGRAM NAME	USAGE
DFHSTTD	Transient Data and Temporary Storage Statistics program linked to by DFHSTKC.
DFHSTTR	Terminal and Data Base Statistics program linked to by DFHSTKC.
DFHTACP	Terminal Abnormal Condition program.
DFHTAJP	Optional Time Adjustment program that automatically adjusts the date and time of day maintained by CICS to reflect the date and time of day maintained by the operating system.
DFHTDCP	Device-Dependent Output program for 1030 terminals.
DFHTEP	Terminal Error program linked to by DFHTACP.
DFHTRNxx	Non-resident data set control blocks as specified by the user in DCT.
DFHWT1 DFHWT2	Asynchronous Transaction Output Processing prcgrams (required only if the Asynchronous Transaction Processing facility is being used).
DFHXITxx	User-written exit routine used with Asynchronous Transaction Processing transactions CRDR and CWTR.
User-specified name	User-written program to edit input data and transfer control to the appropriate transaction.

APPENDIX B: EXAMPLES OF TERMINAL CONTROL TABLE PREPARATION

This section illustrates the coding required to prepare the CICS Terminal Control Table (TCT). The terminal network described includes:

1. Start/stop transmission
   a. Multipoint line (serving more than one terminal)
      (1) 1030 Data Collection System
      (2) 2260 Display Station (remote)
   b. Point-to-point line (serving only one terminal)
      (1) 2740 Communication Terminal and 2760 Optical Image Unit
      (2) 2741 Communication Terminal with correspondence code
   c. Switched line (dial-up)
      (1) 7770 Audio Response Unit under CICS/OS
      (2) 7770 Audio Response Unit under CICS/DOS
      (3) Common Carrier Teletypewriter Exchange Terminal (TWX)

2. Binary synchronous transmission
   a. Multipcint line (serving more than one terminal)
      (1) 2980 General Banking Terminal System
      (2) 3270 Information Display System (remote)
   b. Point-to-point (serving only one terminal)
      (1) 2780 Data Transmission Terminal
   c. Switched line (dial-up)
      (1) 2770 Data Communication System
      (2) System/3
      (3) 3735 Programmable Buffered Terminal (CICS/OS only)

3. Transmission via sequential devices
   a. Card reader/line printer
      (1) 2540 Card Read Punch and 1403 Printer
   b. Disk
      (1) 2314 Direct Access Storage Facility

4. Transmission via devices locally attached
   a. Graphics devices
      (1) 2260 Display Station (local)
      (2) 3270 Information Display System (local)

Each of the following is a functional example if (1) the DFHTCT TYPE=INITIAL macro instruction is inserted at the beginning of each example, (2) the DFHTCT TYPE=FINAL macro instruction is inserted at the end of each example, and (3) an Assembler END card that includes the operand DFHTCTBA is inserted following the DFHTCT TYPE=FINAL macro instruction.

1030 DATA COLLECTION SYSTEM

```
       DFHTCT TYPE=SDSCI,                                          *
              CU=2702,                                             *
              DEVICE=1030,                                         *
              LINELST=024,                                         *
              SWITCH=NO,                                           *
              DSCNAME=DTF1030
CPL1030 DFTRMLST OPENLST,(64,62)
       DFHTCT TYPE=LINE,
              ACCMETH=BTAM,                                        *
              TRMTYPE=1030,                                        *
              DSCNAME=DTF1030,                                     *
              BTAMRLN=1,                                           *
              LISTADR=OPL1030,                                         *
              INAREAL=120
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=T30A,                                            *
              TRANSID=1030,                                            *
              TRMADDR=64,                                              *
              TRMPRTY=202,                                             *
              TRMSTAT=TRANSCEIVE
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=T30B,                                            *
              TRANSID=1030,                                            *
              TRMADDR=62,                                              *
              TRMPRTY=201,                                             *
              TRMSTAT=TRANSCEIVE,                                      *
              LASTTRM=LINE
```

2260 DISPLAY STATION (REMOTE)

```
       DFHTCT TYPE=SDSCI,                                              *
              CU=2701,                                                 *
              DEVICE=2260,                                             *
              LINELST=026,                                             *
              SWITCH=NO,                                               *
              DSCNAME=DTF60R
OPL2260 DFTRMLST OPENLST,(40FF,41FF)
       DFHTCT TYPE=LINE,                                               *
              ACCMETH=BTAM,                                            *
              TRMTYPE=2260,                                            *
              TRMMODL=3,                                               *
              DSCNAME=DTF60R,                                          *
              BTAMRLN=1,                                               *
              LISTADR=OPL2260,                                         *
              INAREAL=960
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=R60A,                                            *
              TRMADDR=40A0,                                            *
              TRMPRTY=61,                                              *
              TRMSTAT=TRANSCEIVE
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=R60B,                                            *
              TRMADDR=40A1,                                            *
              TRMPRTY=62,                                              *
              TRMSTAT=TRANSCEIVE
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=R530,                                            *
              TRMTYPE=1053,                                            *
              TRMADDR=40A4,                                            *
              TRMPRTY=32,                                              *
              TRMSTAT=RECEIVE
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=R65A,                                            *
              TRMTYPE=2265,                                            *
              TRMADDR=4151,                                            *
              TRMPRTY=64,                                              *
              TRMSTAT=TRANSCEIVE,                                      *
              LASTTRM=LINE
```

2740 COMMUNICATION TERMINAL/2760 OPTICAL IMAGE UNIT

```
       DFHTCT TYPE=SDSCI,                                              *
              CU=2703,                                                 *
              DEVICE=2740,                                             *
              FEATURE=(CHK,OIU),                                       *
              LINELST=029,                                              *
              SWITCH=NO,                                                *
              DSCNAME=DTF40B
       DFHTCT TYPE=LINE,                                                *
              ACCMETH=BTAM,                                             *
              TRMTYPE=2740/2760,                                        *
              FEATURE=CHECKING,                                         *
              DSCNAME=DTF40B,                                           *
              INAREAL=120,                                              *
              BTAMRLN=1
       DFHTCT TYPE=TERMINAL,                                            *
              TRMIDNT=T40C,                                             *
              TRANSID=2760,                                             *
              TRMPRTY=202,                                              *
              TRMSTAT=TRANSCEIVE,                                       *
              LASTTRM=LINE
```

2471 COMMUNICATION TERMINAL

```
       DFHTCT TYPE=SDSCI,                                               *
              CU=2703,                                                  *
              DEVICE=2741C,                                             *
              LINELST=030,                                              *
              SWITCH=NO,                                                *
              DSCNAME=DTF41C
       DFHTCT TYPE=LINE,                                                *
              ACCMETH=BTAM,                                             *
              TRMTYPE=2741C,                                            *
              DSCNAME=DTF41C,                                           *
              INAREAL=120,                                              *
              BTAMRLN=1
       DFHTCT TYPE=TERMINAL,                                            *
              TRMIDNT=T41A,                                             *
              TRMPRTY=129,                                              *
              TRMSTAT=TRANSCEIVE,                                       *
              LASTTRM=LINE
```

7770 AUDIO RESPONSE UNIT UNDER CICS/OS

```
DCB    DFHTCT TYPE=SDSCI,                                               *
              DEVICE=7770,                                              *
              DSCNAME=DCB7770,                                          *
              APPENDG=Z3
L17770     DFHTCT TYPE=LINE,                                            *
              ACCMETH=BTAM,                                             *
              TRMTYPE=7770,                                             *
              DSCNAME=DCB7770,                                          *
              INAREAL=256,                                              *
              BTAMRLN=1,                                                *
              FEATURE=AUTOANSR,                                         *
              ANSWRBK=TERMINAL,                                         *
              CONVTAB=ABB,                                              *
              RDYMSG=READY,                                             *
              ERRMSG=ERROR,                                             *
              POOLADR=T17770
L27770 DFHTCT TYPE=LINE,                                                *
              ACCMETH=BTAM,                                             *
              TRMTYPE=7770,                                             *
              DSCNAME=DCB7770,                                          *
              INAREAL=256,                                              *
              BTAMRLN=2,                                                *
              FEATURE=AUTOANSR,                                         *
              ANSWRBK=TERMINAL,                                         *
```

```
                CONVTAB=ABB,                                           *
                RDYMSG=READY,                                          *
                ERRMSG=ERROR
L37770   DFHTCT TYPE=LINE,                                             *
                ACCMETH=BTAM,                                          *
                TRMTYPE=7770,                                          *
                DSCNAME=DCB7770,                                       *
                INAREAL=256,                                           *
                BTAMRLN=3,                                             *
                FEATURE=AUTOANSR,                                      *
                ANSWRBK=TERMINAL,                                      *
                CONVTAB=ABB,                                           *
                RDYMSG=READY,                                          *
                ERRMSG=ERROR
L47770   DFHTCT TYPE=LINE,                                             *
                ACCMETH=BTAM,                                          *
                TRMTYPE=7770,                                          *
                DSCNAME=DCB7770,                                       *
                INAREAL=256,                                           *
                BTAMRLN=4,                                             *
                FEATURE=AUTOANSR,                                      *
                ANSWRBK=TERMINAL,                                      *
                CONVTAB=ABB,                                           *
                RDYMSG=READY,                                          *
                ERRMSG=ERROR
T17770   DFHTCT TYPE=TERMINAL,                                         *
                TRMIDNT=7771,                                          *
                TRMPRTY=30,                                            *
                TRMTYPE=7770,                                          *
                TRMSTAT=TRANSCEIVE
T27770   DFHTCT TYPE=TERMINAL,                                         *
                TRMIDNT=7772,                                          *
                TRMPRTY=30,                                            *
                TRMTYPE=7770,                                          *
                TRMSTAT=TRANSCEIVE
T37770   DFHTCT TYPE=TERMINAL,                                         *
                TRMIDNT=7773,                                          *
                TRMPRTY=30,                                            *
                TRMTYPE=7770,                                          *
                TRMSTAT=TRANSCEIVE
T47770   DFHTCT TYPE=TERMINAL,                                         *
                TRMIDNT=7774,                                          *
                TRMPRTY=30,                                            *
                TRMTYPE=7770,                                          *
                TRMSTAT=TRANSCEIVE,                                    *
                LASTTRM=POOL
READY    DFHTCT TYPE=7770MSG,                                          *
                MESSAGE='001D0B'
ERROR    DFHTCT TYPE=7770MSG,                                          *
                MESSAGE='000A0F'
```

7770 AUDIO RESPONSE UNIT UNDER CICS/DOS

```
DTF      DFHTCT TYPE=SDSCI,                                            *
                DEVICE=7770,                                           *
                DSCNAME=DTF7770,                                       *
                SWITCH=YES,                                            *
                LINELST=(080,081,082,083),                             *
                BLKSIZE=256,                                           *
                FLNNAME=L17770
L17770   DFHTCT TYPE=LINE,                                             *
                ACCMETH=BTAM,                                          *
                TRMTYPE=7770,                                          *
                DSCNAME=DTF7770,                                       *
                INAREAL=256,                                           *
                BTAMRLN=1,                                             *
                FEATURE=AUTOANSR,                                      *
                ANSWRBK=TERMINAL,                                      *
                CONVTAB=ABB,                                           *
                RDYMSG=READY,                                          *
                ERRMSG=ERROR,                                          *
                POOLADR=T17770
L27770   DFHTCT TYPE=LINE,                                             *
                ACCMETH=BTAM,                                          *
                TRMTYPE=7770,                                          *
                DSCNAME=DTF7770,                                       *
                INAREAL=256,                                           *
                BTAMRLN=2,                                             *
                FEATURE=AUTOANSR,                                      *
                ANSWRBK=TERMINAL,                                      *
                CONVTAB=ABB,                                           *
                RDYMSG=READY,                                          *
                ERRMSG=ERROR
L37770   DFHTCT TYPE=LINE,                                             *
                ACCMETH=BTAM,                                          *
                TRMTYPE=7770,                                          *
                DSCNAME=DTF7770,                                       *
                INAREAL=256,                                           *
                BTAMRLN=3,                                             *
                FEATURE=AUTOANSR,                                      *
                ANSWRBK=TERMINAL,                                      *
                CONVTAB=ABB,                                           *
                RDYMSG=READY,                                          *
                ERRMSG=ERROR
L47770   DFHTCT TYPE=LINE,                                             *
                ACCMETH=BTAM,                                          *
                TRMTYPE=7770,                                          *
                DSCNAME=DTF7770,                                       *
                INAREAL=256,                                           *
                BTAMRLN=4,                                             *
                FEATURE=AUTOANSR,                                      *
                ANSWRBK=TERMINAL,                                      *
                CONVTAB=ABB,                                           *
                RDYMSG=READY,                                          *
                ERRMSG=ERROR
T17770   DFHTCT TYPE=TERMINAL,                                         *
                TRMIDNT=7771,                                          *
                TRMPRTY=30,                                            *
                TRMTYPE=7770,                                          *
                TRMSTAT=TRANSCEIVE
T27770   DFHTCT TYPE=TERMINAL,                                         *
                TRMIDNT=7772,                                          *
                TRMPRTY=30,                                            *
                TRMTYPE=7770,                                          *
                TRMSTAT=TRANSCEIVE
T37770   DFHTCT TYPE=TERMINAL,                                         *
                TRMIDNT=7773,                                          *
                TRMPRTY=30,                                            *
                TRMTYPE=7770,                                          *
                TRMSTAT=TRANSCEIVE
T47770   DFHTCT TYPE=TERMINAL,                                         *
                TRMIDNT=7774,                                          *
                TRMPRTY=30,                                            *
                TRMTYPE=7770,                                          *
                TRMSTAT=TRANSCEIVE,                                    *
                LASTTRM=POOL
READY    DFHTCT TYPE=7770MSG,                                          *
                MESSAGE='001D0B'
ERROR    DFHTCT TYPE=7770MSG,                                          *
```

```
              MESSAGE='000A0F'
```

COMMON CARRIER TELETYPEWRITER EXCHANGE TERMINAL (TWX)

```
       DFHTCT TYPE=SDSCI,                                              *
              CU=2702,                                                 *
              DEVICE=TW35,                                             *
              LINELST=039,                                             *
              SWITCH=YES,                                              *
              DSCNAME=TWXONE
IDLTWX DFTRMLST IDLST,0,19,01B151FFC393C3CB052BEB1BB151E1E1E1E1A1
TWXIDA DFTRMLST IDLST,7,4931683,10,500AB222C3052B2B9AB1
       DFHTCT TYPE=LINE,                                               *
              ACCMETH=BTAM,                                            *
              TRMTYPE=TWX,                                             *
              DSCNAME=TWXONE,                                          *
              INAREAL=120,                                             *
              BTAMRLN=1,                                               *
              LISTADR=IDLTWX,                                          *
              FEATURE=(AUTOANSR,AUTOCALL),                             *
              POOLADR=TWXAUTO,                                         *
              ANSWRBK=AUTO
TWXAUTO DFHTCT TYPE=TERMINAL,                                          *
              TRMIDNT=TWXA,                                            *
              TRMADDR=TWXIDA,                                          *
              TRMPRTY=201,                                             *
              TRMSTAT=TRANSCEIVE,                                      *
              LASTTRM=POOL
```

2980 GENERAL BANKING TERMINAL SYSTEM

```
       DFHTCT TYPE=SDSCI,                                              *
              CU=2703,                                                 *
              DEVICE=BSCMDMPT,                                         *
              BSCODE=EBCDIC,                                           *
              SWITCH=NO,                                               *
              DSCNAME=DTF2980
TCT29POL DFTRMLST AUTOWLST,(C1C1F02D,37373737) POLL CU
TCT29PA1 DFTRMLST OPENLST,(8181402D)           ADDRESS STATION 1
TCT29PA2 DFTRMLST OPENLST,(8181F12D)           ADDRESS STATION 2
TCT29PA3 DFTRMLST OPENLST,(8181F22D)           ADDRESS STATION 3
       DFHTCT TYPE=LINE,                                               *
              ACCMETH=BTAM,                                            *
              TRMTYPE=2980,                                            *
              DSCNAME=DTF2980,                                         *
              INAREAL=480,                                             *
              BTAMRLN=1,                                               *
              LISTADR=(TCT29POL,WRAP),                                 *
              FEATURE=AUTOPOLL
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=T801,                                            *
              STN2980=0,                                               *
              TAB2980=04,                                              *
              POLLPOS=01,                                              *
              TRMADDR=TCT29PA1,                                        *
              TRMMODL=1,                                               *
              TRMPRTY=10,                                              *
              TIOAL=200,                                               *
              TRMSTAT=TRANSCEIVE
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=T802,                                            *
              STN2980=1,                                               *
              TRMADDR=TCT29PA2,                                        *
              TRMMODL=2,                                               *
              TRMPRTY=10,                                              *
              TIOAL=200,                                               *
              TRMSTAT=TRANSCEIVE
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=T803,                                            *
              STN2980=2,                                               *
              TAB2980=02,                                              *
              TRMADDR=TCT29PA3,                                        *
              TRMMODL=4,                                               *
              TRMPRTY=10,                                              *
              TIOAL=200,                                               *
              TRMSTAT=TRANSCEIVE,                                      *
              LASTTRM=LINE
```

Note: This is a functional example for CICS/DOS if the (C1C1F02D,37373737) parameters in the above TCT29POL DFTRMLST statement are changed to 3732,C1C1F02D.

3270 INFORMATION DISPLAY SYSTEM

```
POLL77  DFTRMLST AUTOWLST,(40407F7F2D,C1C17F7F2D,3737373737)
LSTR77A DFTRMLST OPENLST,(606040402D)
LSTR77B DFTRMLST OPENLST,(616140402D)
LSTR77C DFTRMLST OPENLST,(6161C1C12D)
       DFHTCT TYPE=SDSCI,                                              *
              DEVICE=BSCMDMPT,                                         *
              DSCNAME=REMOTE77,                                        *
              BSCODE=EBCDIC
       DFHTCT TYPE=LINE,                                               *
              ACCMETH=BTAM,                                            *
              TRMTYPE=3277,                                            *
              LISTADR=(POLL77,WRAP),                                   *
              BTAMRLN=1,                                               *
              DSCNAME=REMOTE77,                                        *
              INAREAL=256,                                             *
              TRMMODL=2,                                               *
              FEATURE=AUTOPOLL
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=R77A,                                            *
              TRMMODL=1,                                               *
              TRMTYPE=3275,                                            *
              TRMADDR=LSTR77A,                                         *
              POLLPOS=1,                                               *
              COMPAT=(480,12,2260,2),                                  *
              FEATURE=PTRADAPT,                                        *
              TIOAL=500
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=R77B,                                            *
              TRMADDR=LSTR77B,                                         *
              POLLPOS=2,                                               *
              COMPAT=(960,15,2265,2),                                  *
              FEATURE=(COPY,DCKYBD,SELCTPEN),                          *
              TIOAL=1500
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=R77C,                                            *
              TRMTYPE=3286,                                            *
              FEATURE=COPY,                                            *
              TRMADDR=LSTR77C,                                         *
              LASTTRM=LINE,                                            *
              TRMSTAT=TRANSCEIVE,                                      *
              TIOAL=1500
```

Note: This is a functional example for CICS/DOS if (1) the (40407F7F2D, C1C17F7F2D,3737373737) parameters in the above POLL77 DFTRMLIST statement are changed to 3732,40407F7F2D,C1C17F7F2D, and (2) the LINELST=029 and CU=2703 operands are included in the DFHTCT TYPE=SDSCI specification.

2780 DATA TRANSMISSION TERMINAL

```
       DFHTCT TYPE=SDSCI,                                        *
              BSCODE=EBCDIC,                                     *
              DDNAME=DDN2780,                                    *
              DEVICE=2780,                                       *
              DSCNAME=DCBN2780,                                  *
              CU=2703,                                           *
              LINELST=023,                                       *
              FEATURE=(BSC,SLV),                                 *
              MODELST=0,                                         *
              CONFIG=PPT,                                        *
              SWITCH=NO,                                         *
              DSORG=CX,                                          *
              MACRF=(R,W),                                       *
              DEVD=BS
       DFHTCT TYPE=LINE,                                         *
              TRMTYPE=2780,                                      *
              DSCNAME=DCBN2780,                                  *
              ACCMETH=BTAM,                                      *
              BTAMRLN=1,                                         *
              BSCODE=EBCDIC,                                     *
              INAREAL=520
N2780  DFHTCT TYPE=TERMINAL,                                     *
              TRMIDNT=T80A,                                      *
              LASTTRM=LINE,                                      *
              TRMTYPE=2780,                                      *
              TIOAL=100,                                         *
              TRMSTAT=TRANSCEIVE,                                *
              TRMPRTY=126
```

2770 DATA COMMUNICATION SYSTEM

```
       DFHTCT TYPE=SDSCI,                                        *
              BSCODE=EBCDIC,                                     *
              DDNAME=DDD2770,                                    *
              DEVICE=2770,                                       *
              DSCNAME=DCBD2770,                                  *
              DSORG=CX,                                          *
              MACRF=(R,W),                                       *
              CU=2703,                                           *
              LINELST=020,                                       *
              FEATURE=(BSC,SLV),                                 *
              MODELST=0,                                         *
              CONFIG=PPT,                                        *
              SWITCH=YES,                                        *
              DEVD=BS
       DFHTCT TYPE=LINE,                                         *
              TRMTYPE=2770,                                      *
              DSCNAME=DCBD2770,                                  *
              ACCMETH=BTAM,                                      *
              BTAMRLN=1,                                         *
              BSCODE=EBCDIC,                                     *
              POOLADR=D2770,                                     *
              INAREAL=520,                                       *
              FEATURE=AUTOANSR,                                  *
              LISTADR=LA2770,                                    *
              ANSWRBK=TERMINAL
```

```
D2770  DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=D70A,                                            *
              LASTTRM=POOL,                                            *
              TIOAL=100,                                               *
              TRMTYPE=2770,                                            *
              TRMADDR=TA2770,                                          *
              TRMSTAT=TRANSCEIVE,                                      *
              TRMPRTY=126
LA2770 DFTRMLST BSCLST,0,1,2D,2,1070
TA2770 DFTRMLST BSCLST,0,2,1070,1,2D
```

SYSTEM/3

```
       DFHTCT TYPE=SDSCI,                                              *
              BSCODE=EBCDIC,                                           *
              DDNAME=DDDSYS3,                                          *
              DEVICE=SYS/3,                                            *
              DSCNAME=DCBDSYS3,                                        *
              DSORG=CX,                                                *
              MACRF=(R,W),                                             *
              CU=2703,                                                 *
              LINELST=020,                                             *
              FEATURE=(BSC,SLV),                                       *
              MODELST=0,                                               *
              CONFIG=PPT,                                              *
              SWITCH=YES,                                              *
              DEVD=BS,                                                 *
       DFHTCT TYPE=LINE,                                               *
              TRMTYPE=SYS/3,                                           *
              DSCNAME=DCBDSYS3,                                        *
              ACCMETH=BTAM,                                            *
              BTAMRLN=1,                                               *
              BSCODE=EBCDIC,                                           *
              POOLADR=SYS3D,                                           *
              INAREAL=500,             96 X 5 + 20 PAD                 *
              FEATURE=AUTOANSR,                                        *
              LISTADR=LASYS3,                                          *
              ANSWRBK=TERMINAL
SYS3D  DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=DSY3,                                            *
              LASTTRM=POOL,                                            *
              TIOAL=100,                                               *
              TRMTYPE=SYS/3,                                           *
              TRMADDR=TASYS3,                                          *
              TRMSTAT=TRANSCEIVE,                                      *
              TRMPRTY=126
LASYS3 DFTRMLST BSCLST,0,1,2D,2,1070
TASYS3 DFTRMLST BSCLST,0,2,1070,1,2D
```

3735 PROGRAMMABLE BUFFERED TERMINAL (CICS/OS only)

```
       DFHTCT TYPE=SDSCI,                                              *
              DEVICE=BSCMDSW                                           *
              BSCODE=EBCDIC,                                           *
              DSCNAME=DTF35D
       DFHTCT TYPE=LINE,                                               *
              ACCMETH=BTAM,                                            *
              TRMTYPE=3735,                                            *
              DSCNAME=DCB,                                             *
              INAREAL=480,                                             *
              BTAMRLN=1,                                               *
              LISTADR=LISTA,                                           *
              FEATURE=(AUTOANSR,AUTOCALL),                             *
              POOLADR=POOL,                                            *
              BSCODE=EBCDIC,                                           *
              ANSWRBK=EXIDVER
 A3735 DFHTC  TYPE=TERMINAL,                                           *
              TRMIDNT=3735,                                            *
              TRMTYPE=3735,                                            *
              LASTTRM=POOL,                                            *
              TRMADDR=LISTB,                                           *
              TRMSTAT=TRANSCEIVE,                                      *
              TRANSID=3735,                                            *
              TIOAL=476
LISTA DFTRMLST SWLST,AN,11,4,2,1070,(98F0F3F5182D,,A3735)
LISTB DFTRMLST SWLST,AD,4,3374,8,0,1,2D,(98F0F3F5181070,1)
```

2540 CARD READ PUNCH/1403 PRINTER

```
       DFHTCT TYPE=SDSCI,                                              *
              DEVADDR=SYSIPT,                                          *
              DEVICE=2540,                                             *
              DSCNAME=READER
       DFHTCT TYPE=SDSCI,                                              *
              DEVADDR=SYSLST,                                          *
              DEVICE=1403,                                             *
              DSCNAME=PRINTER
       DFHTCT TYPE=LINE,                                               *
              ACCMETH=BSAM,                                            *
              TRMTYPE=CRLP,                                            *
              ISADSCN=READER,                                          *
              OSADSCN=PRINTER,                                         *
              INAREAL=80
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=SAMA,                                            *
              TRMTYPE=CRLP,                                            *
              TRMSTAT=TRANSCEIVE
```

2314 DIRECT ACCESS STORAGE FACILITY

```
       DFHTCT TYPE=SDSCI,                                              *
              DEVADDR=SYS001,                                          *
              DEVICE=2314,                                             *
              DSCNAME=DISKIN1
       DFHTCT TYPE=SDSCI,                                              *
              DEVADDR=SYS006,                                          *
              DEVICE=2314,                                             *
              DSCNAME=DISKOT1
       DFHTCT TYPE=LINE,                                               *
              ACCMETH=SEQUENTIAL,                                      *
              TRMTYPE=DASD,                                            *
              ISADSCN=DISKIN1,                                         *
              OSADSCN=DISKOT1,                                         *
              INAREAL=80
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=SAMB,                                            *
              TRMPRTY=11,                                              *
              TRMSTAT=(TRANSCEIVE,'OUT OF SERVICE')
```

2260 DISPLAY STATION (LOCAL)

```
       DFHTCT TYPE=SDSCI,                                              *
              CU=2848,                                                 *
              DEVICE=L2260,                                            *
              LINELST=(021,022,023),                                   *
              FEATURE=KBL,                                              *
              SWITCH=NO,                                                *
              FLNNAME=LINE1,                                            *
              DSCNAME=DTF60L
LINE1  DFHTCT TYPE=LINE,                                                *
              ACCMETH=BTAM,            ACCMETH=BGAM FOR CICS/OS         *
              TRMTYPE=L2260,                                            *
              CLASS=VIDEO,                                              *
              DSCNAME=DTF60L,                                           *
              INAREAL=960,                                              *
              FEATURE=KBRDLOCK
       DFHTCT TYPE=TERMINAL,                                            *
              TRMIDNT=L60A,                                             *
              LVUNIT=1,                                                 *
              TRMPRTY=32,                                               *
              TRMSTAT=TRANSCEIVE
       DFHTCT TYPE=TERMINAL,                                            *
              TRMIDNT=L60B,                                             *
              LVUNIT=2,                                                 *
              TRMPRTY=32,                                               *
              TRMSTAT=TRANSCEIVE
       DFHTCT TYPE=TERMINAL,                                            *
              TRMIDNT=L530,                                             *
              TRMTYPE=1053,                                             *
              LVUNIT=3,                                                 *
              TRMPRTY=32,                                               *
              TRMSTAT=RECEIVE,                                          *
              LASTTRM=LINE
```

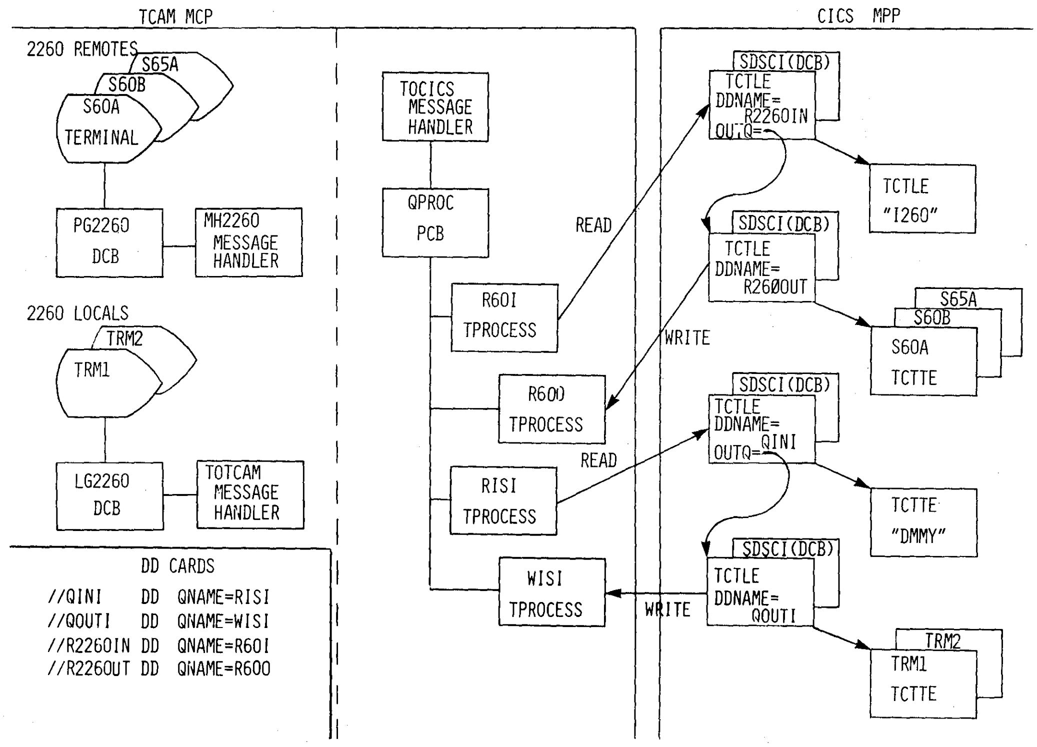
3270 INFORMATION DISPLAY SYSTEM (LOCAL)

```
       DFHTCT TYPE=SDSCI,                                               *
              DEVICE=L3277,                                             *
              DSCNAME=L3270
       DFHTCT TYPE=LINE,                                                *
              ACCMETH=BTAM,                                             *
              DSCNAME=L3270,                                            *
              TRMMODL=2,                                                *
              TRMTYPE=L3277,                                            *
              POOLADR=T010,                                             *
              INAREAL=2500,                                             *
              PCOLCNT=2
T010   DFHTCT TYPE=TERMINAL,                                            *
              TRMIDNT=L77A,                                             *
              LVUNIT=1,                                                 *
              FEATURE=(SELCTPEN,AUDALARM),                              *
              COMPAT=(480,12,2260,2)
       DFHTCT TYPE=TERMINAL,                                            *
              TRMIDNT=L77B,                                             *
              LVUNIT=2,                                                 *
              TRMTYPE=L3277,                                            *
              LASTTRM=POOL,                                             *
              TRMSTAT=TRANSCEIVE
```

Note: This is a functional example for CICS/DOS if (1) the CU=3272 and LINELST=(030,031) operands are included in the DFHTCT TYPE=SDSCI specification, and (2) if the POOLCNT=2 operand is deleted from the DFHTCT TYPE=LINE specification.

APPENDIX C: CICS/TCAM PROGRAM INTERRELATIONSHIP

The following illustrates the interrelationship between the TCAM Message Contrcl program (MCP) and the TCAM Message Processing program (MPP). CICS is regarded as a Message Processing program by TCAM.



The following is an example of a CICS Terminal Control Table and a TCAM Message Control prcgram.

CICS TERMINAL CONTROL TABLE

```
      DFHTCT TYPE=INITIAL,SUFFIX=TV
      DFHTCT TYPE=SDSCI,                                        *
             DEVICE=TCAM,                                       *
             DSCNAME=L1,                                        *
             DDNAME=QIN1,                                       *
             OPTCD=WU,                                          *
             MACRF=R,                                           *
             RECFM=U,                                           *
             BLKSIZE=500
      DFHTCT TYPE=SDSCI,                                        *
             DEVICE=TCAM,                                       *
             DSCNAME=L2,                                        *
             DDNAME=QOUT1,                                      *
             OPTCD=WU,                                          *
             MACRF=W,                                           *
             RECFM=U,                                           *
```

```
              BLKSIZE=500
       DFHTCT TYPE=LINE,                                               *
              ACCMETH=TCAM,                                            *
              QUEUEID=F1,                                              *
              INAREAL=500,                                             *
              TRMTYPE=L2260,                                           *
              DSCNAME=L1,                                              *
              OUTQ=OUTQ
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=DMMY,                                            *
              TRMPRTY=32,                                              *
              LASTTRM=POOL
OUTQ   DFHTCT TYPE=LINE,                                               *
              ACCMETH=TCAM,                                            *
              QUEUEID=F0,                                              *
              INAREAL=500,                                             *
              TRMTYPE=L2260,                                           *
              DSCNAME=L2
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=TRM1,                                            *
              TRMPRTY=32
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=TRM2,                                            *
              LASTTRM=POOL,                                            *
              TRMPRTY=32
       DFHTCT TYPE=SDSCI,                                              *
              DEVICE=TCAM,                                             *
              DSCNAME=R60IN,                                           *
              DDNAME=R2260IN,                                          *
              OPTCD=WU,                                                *
              MACRF=R,                                                 *
              RECFM=U,                                                 *
              BLKSIZE=500
       DFHTCT TYPE=SDSCI,                                              *
              DEVICE=TCAM,                                             *
              DSCNAME=R60OUT,                                          *
              DDNAME=R260OUT,                                          *
              OPTCD=WU,                                                *
              MACRF=W,                                                 *
              RECFM=U,                                                 *
              BLKSIZE=500
       DFHTCT TYPE=LINE,                                               *
              ACCMETH=TCAM,                                            *
              INAREAL=500,                                             *
              DSNAME=R60IN,                                            *
              OUTQ=OUTQ60,                                             *
              TRMTYPE=2260
       DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=1260,                                            *
              TRMPRTY=32,                                              *
              LASTTRM=POOL
OUTQ60 DFHTCT TYPE=LINE,                                               *
              ACCMETH=TCAM,                                            *
              INAREAL=500,                                             *
              DSCNAME=R60OUT,                                          *
              TRMTYPE=2260
       DFHTCT TYPE=TERMINAL,                                           *
              TRMPRTY=32,                                              *
              TRMIDNT=S60A
       DFHTCT TYPE=TERMINAL,                                           *
              TRMPRTY=32,                                              *
              TRMIDNT=S60B
       DFHTCT TYPE=TERMINAL,                                           *
              TRMPRTY=32,                                              *
              TRMIDNT=S65A,                                            *
              LASTTRM=POOL
       DFHTCT TYPE=FINAL
       END    DFHTCTBA
```

TCAM MESSAGE CONTROL PROGRAM

```
MCPCICS    CSECT
TCAMINIT   INTRO   DISK=NO,                                                *
                   PROGID=TCAM/CICS,                                       *
                   LNUNITS=40,                                             *
                   MSUNITS=20,                                             *
                   KEYLEN=133,                                             *
                   CROSSRF=4,                                              *
                   DLQ=TRM1,                                               *
                   STARTUP=CY,                                             *
                   TRACE=10,                                               *
                   LINETYP=BOTH,                                           *
                   OLTEST=0
           LTR     15,15
           BZ      OPENLINE
NOEXEC     ABEND   123,DUMP
OPENLINE   OPEN    (LG2260,(INOUT),PG2260,(INOUT))
           TM      LG2260+48,DCBOFLGS
           BNO     NOEXEC
           TM      PG2260+48,DCBOFLGS
           BNO     NOEXEC
           WTO     'TIME TO START APPLICATION PROGRAM'
           READY
FINISH     CLOSE   (LG2260,,PG2260)
           L       13,4(13)
           RETURN  (14,12)
LG2260     DCB     DSORG=TX,                                               *
                   MACRF=(G,P),                                            *
                   CPRI=S,                                                 *
                   DDNAME=DDLG2260,                                        *
                   MH=TOTCAM,                                              *
                   PCI=(N,N),                                              *
                   BUFSIZE=464,                                            *
                   INVLIST=(POLLST1,,,POLLST2),TRANS=EBCD
PG2260     DCB     DSORG=TX,MACRF=(G,P),CPRI=S,DDNAME=DDPG2260,            *
                   MH=MH2260,PCI=(N,N),BUFSIZE=464,                        *
                   INVLIST=(POLL60R,,),TRANS=2260
QPROC      PCB     MH=TOCICS,                                              *
                   BULSIZE=464,                                            *
                   RESERVE=(20)
           TTABLE  LAST=TRM2
RIS1       TPROCESS PCB=QPROC
                   QUEUES=MO
WIS1       TPROCESS PCB=QPROC
R60I       TPROCESS PCB=QPROC,QUEUES=MO
R600       TPROCESS PCB=QPROC
S60A       TERMINAL QBY=T,DCB=PG2260,RLN=1,TERM=226R,QUEUES=MO,            *
                   ADDR=40A0EOFF
S60B       TERMINAL QBY=T,DCB=PG2260,RLN=1,TERM=226R,QUEUES=MO,            *
                   ADDR=40A1EOFF
S65A       TERMINAL QBY=T,DCB=PG2260,RLN=1,TERM=2265,QUEUES=MO,            *
                   ADDR=4151EOFF
TRM1       TERMINAL QBY=L,                                                 *
                   DCB=LG2260,                                             *
                   RLN=1,                                                  *
                   TERM=226L,                                              *
                   QUEUES=MO,                                              *
                   ADDR=FFFFFFFF,                                          *
                   SECTERM=YES
```

```
TRM2     TERMINAL QBY=L,                                               *
               DCB=LG2260,                                             *
               RLN=2,                                                  *
               TERM=226L,                                              *
               ADDR=FFFFFFFF,                                          *
               QUEUES=MO
POLLST1  INVLIST ORDER=(TRM1+02)
POLLST2  INVLIST ORDER=(TRM2+02)
POLL60R  INVLIST ORDER=(S60A+40A040,S60B+40A140,S65A+415140)
TOTCAM   STARTMH LC=OUT
         INHDR
         CODE
         FORWARD DEST=C'RIS1'
INMSG    EQU     *
         INMSG
         INEND
         OUTHDR
         OUTEND
MH2260   STARTMH LC=OUT
         INHDR
         CODE
         SETSCAN 1
         MSGEDIT ((R,,SCAN))
         FORWARD DEST=C'R60I'
         INMSG
         INEND
         OUTHDR
         SETSCAN 1
         MSGEDIT ((R,,SCAN))
         MSGFORM BLOCK=460
         CODE
         OUTEND
TOCICS   STARTMH LC=OUT
         INHDR
         CODE
         FORWARD DEST=PUT
         INEND
         OUTHDR
         OUTEND
DCBOFLGS EQU     X'10'
         END
```

APPENDIX D: TERMINAL CONTROL TABLE CONFIGURATOR

This section is intended to aid the system programmer in the preparation of the Terminal Control Table (TCT) as he uses operands of the DFHTCT macro instructicn to:

1. Specify data set control information
2. Describe communication lines
3. Describe terminal types

Included in this section is an indication of whether the operands of the DFHTCT macro instruction are:

1. Optional or required
2. Applicable only to CICS/DOS, only to CICS/OS, or to both CICS/DOS and CICS/OS
3. Applicable or required only under special circumstances

SPECIFY DATA SET CCNTROL INFORMATION

DEVICE	DEVADDR *	DSCNAME	ERROPT	FEATURE *	LINELIST *	SWITCH *	CU *	CONFIG *	BSCODE	MODELS·T *	RETRY *	TERMTST *	LERBADR	DDNAME #	MACRF #	FLNNAME #	NCP #	MODE #	BLKSIZE #	RECFM #	SYNAD #	OPTCD #	APPENDG #
1030		R	O		R	O	R					O	O	O	O								
1050		R	O		R	O	R					O	O	O	O								
1130		R	O	O	R	O	R	O	O	O	O	O	O	O				O					
1403	R	R												O	O				O	O			
1404	R	R												O	O				O	O			
1442	R	R												O	O				O	O			
1443	R	R												O	O				O	O			
1445	R	R												O	O				O	O			
2020		R	O	O	R	O	R	O	O	O	O	O	O	O				O					
2260		R	O		R		R					O	O	O	O								
L2260		R		O	R		R					O	O	O	O	R	O						
2265		R	O		R		R					O	O	O	O								
2311	R	R												O	O				O	O			
2314	R	R												O	O				O	O			
2501	R	R												O	O				O	O			
2520	R	R												O	O				O	O			
2540	R	R												O	O				O	O			
2740		R	O	O	R	O	R					O	O	O									
2740/2760		R	O	O	R	O	R					O	O	O									
2741C		R	O		R	O	R					O	O	O									
2741E		R	O		R	O	R					O	O	O									
2770		R	O	O	R	O	R	O	O	O	O	O	O	O	O			O					
2780		R	O	O	R	O	R	O	O	O	O	O	O	O	O			O					
2980		R	O		R		R	O	O	O	O		O	O				O					
3275		R	O		R		R	O	O	O	O		O	O				O					
3277		R	O		R		R	O	O	O	O		O	O				O					
L3277		R			R		R						O	O									
3284		R	O		R		R	O	O	O	O		O	O				O					
L3284		R			R		R						O	O									
3286		R	O		R		R	O	O	O	O		O	O				O					
L3286		R			R		R						O	O									
3330	R	R												O	O				O	O			
3735		R	O		R	O	R	O	O	O	O	O	O					O					
7770		R			R	R								O					R				R
BSCMDMPT		R	O		R		R		O	O	O	O	O	O	O			O					
BSCMDPPT		R	O		R		R		O	O	O	O	O	O	O			O					
BSCMDSW		R	O	O	R	O	R		O	O	O	O	O	O				O					
DASD	R	R												O	O				O	O			
DISK	R	R												O	O				O	O			
SYS/3		R	O	O	R	O	R	O	O	O	O	O	O	O				O					
SYS/7		R	O	O	R	O	R					O	O	O									
S360		R	O	O	R	O	R	O	O	O	O	O	O	O				O					
TAPE	R	R												O	O				O	O			
TW33		R	O		R	O	R	O	O	O	O	O	O	O									
TW35		R	O		R	O	R	O	O	O	O	O	O	O									
TCAM		R												R	R				R	R	O	R	

Note: R Required.
O Optional.

* CICS/DOS only.
CICS/OS only.

DESCRIBE COMMUNICATION LINES

TRMTYPE	ACCMETH	CLASS	DSCNAME	ISADSCN	OSADSCN	INAREAL	TRMMODL *	BTAMRLN	LISTADR	FEATURE	NPDELAY	POOLADR	ANSWRBK	LINSTAT	BSCODE	CONVTAB	RDYMSG	ERRMSG	GENPOLL	POOLCNT #	TCTUAL
1030	R[3]	O	R			R	O	R	R		O			O							R[0]
1050	R[3]	O	R			R	R[8]	R	R	O	O	R[6]	R[6]	O							R[0]
1053 OS	R[2]	O	R			R	O							O							R[0]
1053 DOS	R[3]	O	R			R	O							O							R[0]
1130	R[3]	O	R			R	O	R	R[4]	O		R[6]		O	O	O			O		R[0]
2020	R[3]	O	R			R	O	R	R[4]	O		R[6]		O	O	O			O		R[0]
2260	R[3]	O	R			R	O	R	R		O			O							R[0]
L2260 OS	R[2]	O	R			R	O			O				O							R[0]
L2260 DOS	R[3]	O	R			R	O			O				O							R[0]
2265	R[3]	O	R			R	O	R	R		O			O							R[0]
2740	R[3]	O	R			R	R[9]	R	R[5]	O	O	R[6]	R[6]	O							R[0]
2740/2760	R[3]	O	R			R	R[9]	R	R[5]	O		R[6]	R[6]	O							R[0]
2741C	R[3]	O	R			R	O	R		O		R[6]	R[6]	O							R[0]
2741E	R[3]	O	R			R	O	R		O		R[6]	R[6]	O							R[0]
2770	R[3]	O	R			R	O	R	R[4]	O		R[6]	R[6]	O	O	O			O		R[0]
2780	R[3]	O	R			R	O	R	R[4]	O		R[6]	R[6]	O	O	O			O		R[0]
2980	R[3]	O	R			R	R	R	R	R				O	O	O					R[0]
3275	R[3]	O	R			R	R	R	R	O				O		O					R[0]
3277	R[3]	O	R			R	R	R	R	O				O		O					R[0]
L3277	R[3]	O	R			R	R			O		R		O						R	R[0]
3284	R[3]	O	R			R	R	R	R	O				O		O					R[0]
L3284	R[3]	O	R			R	R			O		R		O						R	R[0]
3286	R[3]	O	R			R	R	R	R	O				O		O					R[0]
L3286	R[3]	O	R			R	R			O		R		O						R	R[0]
3735	R[3]	O	R			R		R	R	R		R[6]	R[6]	O	O					R	R[0]
7770	R[3]	O	R			R	O	R		R		R[6]	R[6]	O		R	R	R			R[0]
SYS/3	R[3]	O	R			R		R	R[4]	O		R[6]	R[6]	O	O	O					R[0]
SYS/7	R[3]	O	R			R	O	R	R[5]	R[7]		R[6]	R[6]	O							R[0]
S360	R[3]	O	R			R	O	R	R[4]	O		R[6]	R[6]	O	O	O			O		R[0]
CRLP	R[1]	O		R	R	R	O							O							R[0]
DASD	R[1]	O		R	R	R	O							O							R[0]
TAPE	R[1]	O		R	R	R	O							O							R[0]
TWX	R[3]	O	R			R	O	R	R			R	R	O							R[0]
U/R	R[1]	O		R	R	R	O							O							R[0]

Note:
R Required.
O Optional.

# CICS/OS only.
* TRMMODL may be specified in TYPE=LINE or TYPE=TERMINAL.

0 Required if a terminal work area (PCI) field is to be defined for all terminal entries associated with this line.
1 Specify ACCMETH=SAM, ACCMETH=BSAM, or ACCMETH=SEQUENTIAL.
2 Specify ACCMETH=BGAM or ACCMETH=GRAPHICS.
3 Specify ACCMETH=BTAM or ACCMETH=TELECOMMUNICATION.
4 Required for switched (dial-up) lines and multipoint lines.
5 Required if FEATURE=(AUTOANSR,AUTOCALL,SCONTROL).
6 Required for first line in switched-line pool; specify ANSWRBK=EXIDVER for 3735 under CICS/OS.
7 Checking required; other features optional.
8 Required for component polling; default: poll all components.
9 Required for the 2740 Model 2 or the 2740 with 2760.

DESCRIBE TERMINAL TYPES

TRMTYPE	TRMIDNT	TRMPRTY	TRMMODL	CLASS	LVUNIT	LASTTRM	TRMADDR	TRMSTAT	COMPAT	PRINTER	FEATURE	POLLPOS	TRANSID	STN2980	TAB298	TIOAL	TCTUAL
1030	R	O	O	O		O	R[3]	O					R				R[7]
1050	R	O	R[5]	O		O	R[3]	O					O				R[7]
1053 OS	R	O	O	O	R[1]	O	R[2]	O					O				R[7]
1053 DOS	R	O	O	O	R[1]	O	R[2]	O					O				R[7]
1130	R	O	O	O		O	R[4]	O				O	O			O	R[7]
2020	R	O	O	O		O	R[4]	O				O	O			O	R[7]
2260	R	O	O	O		O	R[3]	O					O				R[7]
L2260	R	O	O	O	R	O		O					O				R[7]
2265	R	O	O	O		O	R[3]	O					O				R[7]
2740	R	O	R[6]	O		O	R[3]	O					O				R[7]
2740/2760	R	O	R	O		O	R[3]	O					R				R[7]
2741C	R	O	O	O		O		O					O				R[7]
2741E	R	O	O	O		O		O					O				R[7]
2770	R	O	O	O		O	R[4]	O				O	O			O	R[7]
2780	R	O	O	O		O	R[4]	O				O	O			O	R[7]
2980	R	O	R	O		O	R	O				R	O	R	R	O	R[7]
3275	R	O	R	O		O	R	O	O	O	O	R	O			O	R[7]
3277	R	O	R	O		O	R	O	O	O	O	R	O			O	R[7]
L3277	R	O	R	O	R	O		O	O	O	O		O				R[7]
3284	R	O	R	O		O	R	O	O	O	O	R	O			O	R[7]
L3284	R	O	R	O	R	O		O	O	O	O		O				R[7]
3286	R	O	R	O		O	R	O	O	O	O	R	O			O	R[7]
L3286	R	O	R	O	R	C		O	O	O	O		O				R[7]
3735	R	O		O		O	R[4]	O					O				R[7]
7770	R	O	O	O		O		O					O				R[7]
SYS/3	R	O	O	O		O		O				O	O			O	R[7]
SYS/7	R	O	O	O		O	R[3]	O					O				R7
S360	R	O	O	O		O	R[4]	O				O	O			O	R[7]
CRLP	R	O	O	O		O		O					O				R[7]
DASD	R	O	O	O		O		O					O				R[7]
TAPE	R	O	O	O		O		O					O				R[7]
TWX	R	O	O	O		O	R[3]	O					O				R[7]
U/R	R	O	O	O		O		O					O				R[7]

Note: R Required.
O Optional.

[1] Required only fcr local devices.

[2] Required only for remote devices; specify hexadecimal addressing characters.

[3] Required; specify hexadecimal addressing characters for non-switched lines; specify name of DFTRMLST for switched lines.

[4] Required for multipoint lines and for switched lines if FEATURE=AUTOCALL has been specified in the DFHTCT TYPE=LINE macro instruction; specify name of DFTRMLST.

[5] Required for component polling; defaults to polling all components.

[6] Required for the 2740 Model 2 or the 2740 with 2760.

[7] Required for terminals when the user defines a 0-255 byte terminal work area (Process Control Information field).

APPENDIX E: FILE CONTROL TABLE CONFIGURATOR

This section is intended to aid the system programmer in the preparation of the File Control Table (FCT) as he uses the DFHFCT TYPE=DATASET macro instruction to describe the physical characteristics of the data sets. These descriptions include information about the access method (BDAM or ISAM) and record characteristics for the data sets.

	CICS/DOS						CICS/OS					
	ISAM		DAM				ISAM		BDAM			
			BLOCKED		UNBLOCKED				BLOCKED		UNBLOCKED	
	BLOCKED	UNBLKED	W/KEY	WO/KEY	W/KEY	WO/KEY	BLOCKED	UNBLKED	W/KEY	WO/KEY	W/KEY	WO/KEY
BLKKEYL	R	R	R		R		R	R	R		R	
EXTENT	R	R	R[1]	R[1]	R[1]	R[1]						
CYLOFL	R	R										
INDAREA	R[2]	R[2]					R[2]	R[2]				
INDSIZE	R[3]	R[3]					R[3]	R[3]				
INDSKIP	O	O										
MSTIND	R[4]	R[4]										
NRECDS	R											
IOSIZE	C[5]	O[5]					O[5]	O[5]				
IOWORK							O[5]	O[5]				
DEVICE	O	O	O	O	O	O						
SRCHM			O	O	O	O			O	O	O	O
VERIFY	O	O	O	O	O	O	O	O	O	O	O	O
RELTYPE			R[1]	R[1]	R[1]	R[1]			R[1]	R[1]	R[1]	R[1]
LRECL	R	R	R	R	R	R	R	R	R	R	R	R
BLKSIZE	R	R	R[6]	R	R[6]	R	R	R	R[6]	R	R[6]	R
RKP	R		R[7]	R[7]	R[7]	R[7]	R	R	R[7]	R[7]	R[7]	R[7]
RECFORM	R	R	R	R	R	R	R	R	R	R	R	R
CPEN	O	O	O	O	O	O	O	O	O	O	O	O
KEYLEN			R[8]						R[8]			
SERVREQ=KEY			R		R				R		R	

Note: R Required.
O Optional.

1 Specifies relative type addressing; RELTYPE must also be specified.
2 Required if main storage high-level index processing is used.
3 Required if INDAREA is specified.
4 Required only if a master index exists.
5 Optional; used only if SERVREQ=NEWREC; for ISAM data sets under CICS/OS, IOWORK should also be specified.
6 If SERVREQ=BROWSE or SERVREQ=NEWREC, this value must be BLKSIZE plus BLKKEYL.
7 Required if key exists within logical records.
8 Required if deblocking by key for BDAM (CICS/DOS and CICS/OS); required for variable-length ISAM records in fixed-length blocks (CICS/DOS only).

APPENDIX F: CICS MACRO INSTRUCTIONS

This section lists the CICS macro instructions used for system generation and table preparation. These macro instructions are written in Assembler language and, as all Assembler language instructions, are written in the following format:

Name	Operation	Operands	Comments
blank or symbol	DFHxxxxx	One or more operands separated by commas	

The name field of a CICS macro instruction must be left blank if the macro instruction is used in conjunction with a high-level language (ANS COBOL or PL/I); if a label is desired for the macro instruction, it may be placed on the card preceding the macro instruction.

The operation field of a CICS macro instruction must begin before card column 16 and must contain the three-character combination "DFH" in the first three positions of the operation field. Up to five additional characters can be appended to DFH to complete the symbolic name for the appropriate program or table. Since DFH is reserved for CICS macro instructions, no other statement may begin with this three-character combination.

The operand field of a CICS macro instruction contains one or more operands separated by commas. In this publication, parentheses are used to indicate those operands where more than one applicable parameter (keyword and otherwise) can be specified with a single use of the operand. Where parentheses are not used, only one parameter at a time can be specified as part of the operand; a choice must be made in the case of more than one applicable parameter. Since a blank character indicates the end of the operand field, the operand field must not contain blanks except after a comma on a continued card or after the last operand of the macro instruction. The first operand on a continuation card must begin in column 16.

When a CICS macro instruction is coded on more than one card, each card containing part of the macro instruction (except the last card) must contain a character (for example, an asterisk) in column 72 indicating that the macro instruction has been continued on the next card.

In the following listing of CICS macro instructions, default parameters (where applicable) are indicated by an underscore. An asterisk in card column 72 indicates that the macro instruction is continued on the next card.

Because the flexibility and modularity of CICS allows a wide combination of options during system generation and table preparation, no attempt is made in this section to indicate which operands are cptional and which are mandatory. For this information, refer to the previous sections of this publication.

INITIALIZATION OF SYSTEM GENERATION

```
       DFHSG TYPE=INITIAL,                                              *
             STATUS=FIRST,                                              *
             ASMBLR=Assembler name,                                     *
             TRACE=YES,NO,                                              *
             TIMECTL=YES,NO,                                            *
             DSIZE=number,2,                                            *
             MPS=YES,NO,                                                *
             JOBNAME=jobname,CICS,                                      *
             ACCTID=accounting information,CICSGEN,                     *
             PGMERID='programmer's name','SYSTEM PROGRAMMER',           *
             MSGLVL=0,1,                                                *
             DEVICE=2311,2314,3330,                                     *
             CONDCD=((code,operator),...,(code,operator)),              *
             PRIORTY=nn,                                                *
             MSGCLAS=x,A,                                               *
             CLASS=jobclass,A,                                          *
             REGION=(n1K,n2K),                                          *
             PROCNMS=procedure names,(DFHASMV2,DFHLNKV2,                *
                    DFHUPDV2,DFHAUPLK),                                 *
             DL1=YES,NO,                                                *
             ATP=YES,NO,                                                *
             PREFIX=prefix,                                             *
             TCTUA=(V1CMPAT,VARIABLE)
```

CONTROL SYSTEM OPERATIONAL GROUP (CSO)

```
       DFHSG PROGRAM=CSO,                                               *
             MPS=YES,NO,                                                *
             NSD=number,9,                                              *
             DEVICE=2311,2314,3330,                                     *
             SVC=number,200,                                            *
             CAA=appendage suffix,                                      *
             V1CMPAT=YES,                                               *
             TCAMSIP=YES
```

CONTROL SYSTEM SERVICE GROUP (CSS)

```
       DFHSG PROGRAM=CSS
```

CONTROL SYSTEM DUMMY GROUP (CSD)

```
       DFHSG PROGRAM=CSD
```

CONTROL SYSTEM UTILITY GROUP (CSU)

```
       DFHSG PROGRAM=CSU,                                               *
             DEVICE=(TAPE,2311,2314,3330)
```

TASK CONTROL PROGRAM (KCP)

```
       DFHSG PROGRAM=KCP,                                               *
             CONSEC=YES,                                                *
             RUNAWAY=YES,                                               *
             STALCTL=YES,                                               *
             ENQUEUE=YES,                                               *
             OPSECUR=YES,                                               *
             ICPTIME=YES,                                               *
             ICPAUTO=YES,                                               *
```

```
          ICPSYNC=YES,                                                 *
          SUFFIX=program suffix,                                       *
          XTYPREQ=symbolic name,                                       *
          XDSPCHR=symbolic name,                                       *
          DEVICE=(2311,2314,3330)
```

STORAGE CONTROL PROGRAM (SCP)

```
    DFHSG PROGRAM=SCP,                                                 *
          XTYPREQ=symbolic name,                                       *
          SUFFIX=program suffix
```

PROGRAM CONTROL PROGRAM (PCP)

```
    DFHSG PROGRAM=PCP,                                                 *
          PCPLOAD=YES,NO,                                              *
          LANG=(COBOL,PL/I),                                           *
          HLLTR=YES,NO,                                                *
          COBOL=(V2,V3,V4,SUBSET),                                     *
          XFETCH=symbolic name,                                        *
          SUFFIX=program suffix
```

PROGRAM INTERRUPT CONTROL PROGRAM (PIP)

```
    DFHSG PROGRAM=PIP,                                                 *
          SUFFIX=program suffix
```

INTERVAL CONTROL PROGRAM (ICP)

```
    DFHSG PROGRAM=ICP,                                                 *
          RUNAWAY=YES,                                                 *
          ICPTIME=YES,                                                 *
          ICPAUTO=YES,                                                 *
          ICPSYNC=YES,                                                 *
          SUFFIX=program suffix,                                       *
          XTYPREQ=symbolic name,                                       *
          XICEEXP=symbolic name,                                       *
          DUMMY=YES
```

DUMP CONTROL PROGRAM (DCP)

```
    DFHSG PROGRAM=DCP,                                                 *
          DEVICE=TAPE,2311,2314,3330,                                  *
          DEVADDR=nnn,                                                 *
          CICSDMP=YES,                                                 *
          SUFFIX=program suffix,                                       *
          DUMMY=YES
```

TERMINAL CONTROL PROGRAM (TCP)

```
    DFHSG PROGRAM=TCP,                                                 *
          ACCMETH=(BTAM,BSAM,SAM,BGAM,TCAM),                           *
          DEVICE=(1403,1404,1442,1443,1445,2311,2314,3330,             *
                2501,2520,2540,CRLP,DASD,DISK,TAPE),                   *
          BTAMDEV=(1030,1050,1050D,1053,1130,1130D,2020,2020D,         *
                 2260,L2260,2265,2740,2740D,2740-2,2741C,2741E,        *
                 2741DC,2741DE,2760,2770,2770D,2780,2780D,             *
                 2980/1,2980/2,2980/4,3275,3277,L3277,3284,            *
                L3284,3286,L3286,3735D,7770,SYS/3,SYS/3D,SYS/7,        *
                SYS/7D,S/360,S/360D,S/370,S/370D,TWX,BISYNC),         *
          FEATURE=(AUTOANSW,AUTOPOLL,BUFFRECV,PSEUDOBIN),             *
          ANSWRBK=(EXIDVER,TERMINAL,AUTOMATIC,7770TERM,7770NULL),     *
          INITRL=YES,                                                 *
          LOCKF=YES,                                                  *
          WRAPLST=YES,                                                *
          BSCODE=(EBCDIC,ASCII,TRANSCODE),                            *
          AUTOTRN=YES,                                                *
          UCTRAN=NO,(EBCDIC,ASCII),                                   *
          COMPAT=NO,(FORMAT,FULLBUF),                                 *
          FMT2260=(6X40,12X40,12X80,15X64),                           *
          FMT3270=(12X40,24X80),                                      *
          SMI=user character,¢,                                       *
          TAB=YES,NO,                                                 *
          CONVTAB=(ABB,ABC),                                          *
          XATTACH=symbolic name,                                      *
          XOUTPUT=symbolic name,                                      *
          XINPUT=symbolic name,                                       *
          XTCMIN=symbolic name,                                       *
          XTCMOUT=symbolic name,                                      *
          TCM3270=YES,                                                *
          TCM7770=YES,                                                *
          BMS=YES,NO,                                                 *
          SUFFIX=program suffix
```

FILE CONTROL PROGRAM (FCP)

```
    DFHSG PROGRAM=FCP,                                                *
          CONSEC=YES,                                                 *
          FILSERV=(INDA,INIS,DAUPD,ISUPD,DAADD,ISADD,INDIRACC,        *
                EXCTL,INSEG,OUTSEG,DABLKNG,VLR,HEXAD,DECAD,           *
                ACTAD,IVBR,LOCATE,IBROWSE,DBROWSE),                   *
          SUFFIX=program suffix,                                      *
          XTYPREQ=symbolic name,                                      *
          XOUTPUT=symbolic name,                                      *
          XINPUT=symbolic name,                                       *
          XINPUTC=symbolic name,                                      *
          DUMMY=YES
```

TRANSIENT DATA CONTROL PROGRAM (TDP)

```
    DFHSG PROGRAM=TDP,                                                *
          INTRA=YES,TRANSINIT,                                        *
          EXTRA=(ACQUISITION,DISPOSITION),                            *
          SUFFIX=program suffix,                                      *
          DEVICE=2311,2314,3330,                                      *
          XTYPREQ=symbolic name,                                      *
          XOUTPUT=symbolic name,                                      *
          XINPUT=symbolic name,                                       *
          DUMMY=YES
```

TEMPORARY STORAGE CONTROL PROGRAM (TSP)

```
    DFHSG PROGRAM=TSP,                                                *
          DEVICE=2311,2314,3330,                                      *
          SUFFIX=program suffix,                                      *
          XTYPREQ=symbolic name,                                      *
          XOUTPUT=symbolic name,                                      *
          XINPUT=symbolic name,                                       *
          DUMMY=YES
```

COMMON SYSTEM AREA (CSA)

```
       DFHSG PROGRAM=CSA,                                              *
             WRKAREA=number,512,                                       *
             SUFFIX=program suffix
```

MASTER TERMINAL PROGRAM (MTP)

```
       DFHSG PROGRAM=MTP,                                              *
             TLT=YES,NO
```

DYNAMIC OPEN/CLOSE PROGRAM (OCP)

```
       DFHSG PROGRAM=OCP
```

GRAPHIC ATTENTION PROGRAM (GAP)

```
       DFHSG PROGRAM=GAP
```

HIGH-LEVEL LANGUAGE SUPPORT GROUP (HLL)

```
       DFHSG PROGRAM=HLL,                                              *
             LANG=(COBOL,PL/I),                                        *
             PL1=(O,F)
```

TERMINAL DEPENDENT CONTROL PROGRAM (TDCP)

```
       DFHSG PROGRAM=DDM
```

ASYNCHRONOUS TRANSACTION PROCESSING GROUP (ATP)

```
       DFHSG PROGRAM=ATP,                                              *
             INBUFF=number,                                            *
             OUTBUFF=number
```

TERMINATION OF CICS/DOS SYSTEM GENERATION

```
       DFHSG TYPE=FINAL
```

SYSTEM INITIALIZATION TABLE (SIT)

```
DFHSIT TYPE=CSECT,DSECT,                                        *
       SUFFIX=xx,                                               *
       TRT=decimal value,0,                                     *
       SCS=decimal value,500,                                   *
       SP1=decimal value,0,                                     *
       DVT=2311,2314,3330,                                      *
       MSGLVL=0,1,                                              *
       TSBLK=decimal value,3625,                                *
       ICV=decimal value,1000,                                  *
       ICVS=decimal value,20000,                                *
       ICVR=decimal value,5000,                                 *
       CDL=decimal value,5,                                     *
       MXT=decimal value,5,                                     *
       TCT=xx,                                                  *
       PPT=xx,                                                  *
       PCT=xx,                                                  *
       FCT=xx,NO,                                               *
       DCT=xx,NO,                                               *
       CSA=xx,                                                  *
       KCP=xx,                                                  *
       SCP=xx,                                                  *
       PCP=xx,                                                  *
       DCP=xx,NO,                                               *
       ICP=xx,NO,                                               *
       TCP=xx,                                                  *
       FCP=xx,                                                  *
       TDP=xx,                                                  *
       TRP=xx,NO,                                               *
       PIP=xx,NO,                                               *
       TSP=xx,NO,                                               *
       OSCOR=decimal value,0,                                   *
       PL1=YES,NO,                                              *
       DL1=YES,NO,                                              *
       PSB=name,CICSPSB,                                        *
       PSBPL=number,4,                                          *
       DMBPL=number,4,                                          *
       BUFPL=number,8,                                          *
       ATP=YES,NO,                                              *
       ATPMT=number,1                                           *
       ATPMB=number,MXT specification minus one,                *
       SIMODS=(A2,B1,C1,C2,C3,D1,E1) or
              (A2,B1,C1,D1,E1)
```

TERMINAL CONTROL TABLE (TCT)

```
       DFHTCT TYPE=INITIAL,                                           *
              SUFFIX=xx

       DFHTCT TYPE=SDSCI,                                             *
              DEVADDR=SYSnnn,                                         *
              DEVICE=1030,1050,1130,1403,1404,1442,1443,1445,         *
                     2020,2260,L2260,2265,2311,2314,2501,2520,        *
                     2540,2740,2740/2760,2741C,2741E,2770,2780,       *
                     2980,3275,3277,L3277,3284,L3284,3286,L3286,      *
                     3330,3735,7770,BSCMDMPT,BSCMDPPT,BSCMDSW,DASD,   *
                     DISK,SYS/3,SYS/7,S360,TAPE,TW33,TW35,TCAM,       *
              DSCNAME=name,                                           *
              ERROPT=E,R,W,C,N,RW,T,                                  *
              FEATURE=(STC,CHK,BSC,KBL,OIU,SIX,SXW,SIW,RIX,           *
                      RXW,RIW,MAS,SLV,APL),                           *
              LINELST=(nnn1,...,nnn31),                               *
              SWITCH=YES,NO,                                          *
              CU=2701,2702,2703,2848,3272,                            *
              CONFIG=PPT,MPT,                                         *
              BSCODE=EBCDIC,ASCII,TRANSCODE,                          *
              MODELST=(n1,...,n31),                                   *
              RETRY=number,7,                                         *
              TERMTST=YES,NO,                                         *
              LERBADR=symbolic address,                               *
              DDNAME=name,defaults to DSCNAME,                        *
              MACRF=(R,W),                                            *
              FLNNAME=name,                                           *
              NCP=number,1,                                           *
              MODE=(,CNTRL,A or B,A or B),                            *
              BLKSIZE=length,0,                                       *
              RECFM=F,V,U,                                            *
              SYNAD=symbolic name,                                    *
              OPTCD=W,WU,WC,WUC,                                      *
              APPENDG=appendage suffix

symbol DFHTCT TYPE=LINE,                                              *
              ACCMETH=SAM,BSAM,BTAM,BGAM,TCAM,SEQUENTIAL,GRAPHIC,     *
                      TELECOMMUNICATION,                              *
              TRMTYPE=1030,1050,1053,1130,2020,2260,L2260,2265,       *
                      2740,2740/2760,2741C,2741E,2770,2780,2980,      *
                      3275,3277,L3277,3284,L3284,3286,L3286,3735,7770, *
                      SYS/3,SYS/7,S360,CRLP,DASD,TAPE,TWX,U/R,        *
              CLASS=(CONV,BATCH,VIDEO,HARDCOPY,BISYNC,AUDIO),         *
              DSCNAME=name,                                           *
              ISADSCN=name,                                           *
              OSADSCN=name,                                           *
              INAREAL=length,                                         *
              TRMMODL=number or character,                            *
              BTAMRLN=number,                                         *
              LISTADR=(name,WRAP),                                    *
              FEATURE=(AUTOANSR,AUTOCALL,AUTOPOLL,CHECKING,           *
                      SCONTROL,BUFFRECV,KBRDLOCK),                    *
              NPDELAY=number,                                         *
              POOLADR=symbolic address,                               *
              ANSWRBK=AUTOMATIC,TERMINAL,NULL,EXIDVER,                *
              LINSTAT='OUT OF SERVICE',                               *
              BSCODE=EBCDIC,ASCII,TRANSCODE,                          *
              CONVTAB=EBCDIC,ASCII,TRANSCODE,TEXTMODE,AEB,ABC,        *
              RDYMSG=symbolic address,                                *
              ERRMSG=symbolic address,                                *
              GENPOLL=YES,                                            *
              POOLCNT=number,                                         *
              TCTUAL=number,0,                                        *
              OUTQ=symbolic name,                                      *
              POOL=YES,                                                *
              QUEUEID=hexadecimal number

symbol DFHTCT TYPE=TERMINAL,                                           *
              TRMIDNT=name,                                            *
              TRMPRTY=number,                                          *
              TRMMODL=number,character,                                *
              TRMTYPE=1030,1050,1053,1130,2020,2260,L2260,2265,        *
                      2740,2740/2760,2741C,2741E,2770,2780,2980,       *
                      3275,3277,L3277,3284,L3284,3286,L3286,3735,7770, *
                      SYS/3,SYS/7,S360,CRLP,DASD,TAPE,TWX,U/R,         *
              CLASS=(CONV,BATCH,VIDEO,HARDCOPY,BISYNC,AUDIO),          *
              LVUNIT=number,                                           *
              LASTTRM=LINE,GACB,POOL,                                  *
              TRMADDR=address,name,                                    *
              TRMSTAT=(TRANSACTION,TRANSCEIVE,RECEIVE,'OUT OF SERVICE',*
                      INPUT),                                          *
              COMPAT=NO,(number of characters,number of lines,         *
                     device type,model number),                        *
              FEATURE=(PTRADAPT,SELCTPEN,AUDALARM,COPY,BUFEXP,         *
                      UCTRAN,DCKYBD),                                  *
              POLLPOS=number,                                          *
              TRANSID=name,                                            *
              STN2980=number,                                          *
              TAB2980=number,0,                                        *
              TICAL=number,                                            *
              TCTUAL=number

symbol DFHTCT TYPE=7770MSG,                                            *
              MESSAGE='message'

       DFHTCT TYPE=FINAL
```

FILE CONTROL TABLE (FCT)

```
       DFHFCT TYPE=INITIAL,                                            *
              SUFFIX=xx

       DFHFCT TYPE=DATASET,                                            *
              DATASET=name,                                            *
              ACCMETH=BDAM,ISAM,DL/I,                                  *
              SERVREQ=(GET,PUT,UPDATE,NEWREC,INDACC,SEGMENT,BROWSE,    *
                      KEY,NOEXCTL),                                    *
              BLKKEYL=decimal value,                                   *
              EXTENT=number,                                           *
              CYLOFL=number,                                           *
              INDAREA=symbolic name,                                   *
              INDSIZE=number,                                          *
              INDSKIP=YES,                                             *
              MSTIND=YES,                                              *
              NRECDS=number,                                           *
              IOSIZE=number,                                           *
              IOWORK=symbolic name,                                    *
              DEVICE=(n,m),(2314,2314),                                *
              SRCHM=YES,number,                                        *
              VERIFY=YES,                                              *
              RELTYPE=DEC,HEX,BLK,                                     *
              LRECL=(length,length),                                   *
              BLKSIZE=(length,length),                                 *
              RKP=number,                                              *
              RECFORM=(format,characteristic,DCB record format),       *
              OPEN=INITIAL,DEFERRED,                                   *
              KEYLEN=length
```

```
DFHFCT TYPE=INDACC,                                             *
       OBJDSID=name,                                            *
       IARLKP=number,                                           *
       IALKFL=length,                                           *
       IADADMI=RELREC,KEY,                                      *
       IADIII=hexadecimal character,                            *
       DUPDSID=name

DFHFCT TYPE=SEGHEAD,                                            *
       SEGLENG=length,                                          *
       INDDISP=number,                                          *
       TSEGIND=BIT,DISPLACEMENT

DFHFCT TYPE=SEGDEF,                                             *
       SEGNAME=name,                                            *
       SEGCHAR=(format,alignment),                              *
       SEGLENG=length

DFHFCT TYPE=SEGSET,                                             *
       SEGSET=name,                                             *
       SEGNAME=(name1,...,nameN)

DFHFCT TYPE=SEGLAST

DFHFCT TYPE=FINAL

DFHFCT TYPE=LOGICMOD
```

DESTINATICN CONTROL TABLE (DCT)

```
DFHDCT TYPE=INITIAL,                                            *
       SUFFIX=xx,                                               *
       TRNSUFX=(xx,...),                                        *
       SEPASMB=YES,NO

DFHDCT TYPE=SDSCI,                                              *
       DSCNAME=name,                                            *
       MODNAME=name,                                            *
       DEVICE=1403,1404,1443,1445,2311,2314,3330,TAPE,          *
       BLKSIZE=length,                                          *
       DEVADDR=symbclic address,                                *
       RECFORM=FIXUNB,FIXBLK,VARUNB,VARBLK,UNDEFINED,           *
       FILABL=STD,NO,                                           *
       TYPEFLE=INPUT,OUTPUT,RDBACK,                             *
       RECSIZE=length,                                          *
       REWIND=UNLOAD,NORWD,LEAVE,REREAD,                        *
       TPMARK=NO,                                               *
       BUFNO=number,1,                                          *
       ERROPT=SKIP,IGNORE,                                      *
       SUFFIX=xx

DFHDCT TYPE=EXTRA,                                              *
       DSCNAME=name,                                            *
       DESTID=name,                                             *
       OPEN=INITIAL,DEFERRED,                                   *
       RESIDNT=YES,NO

DFHDCT TYPE=INTRA,                                              *
       DESTID=name,                                             *
       REUSE=YES,NO,                                            *
       TRIGLEV=number,                                          *
       DESTFAC=TERMINAL,FILE,                                   *
       TRANSID=name
       DFHDCT TYPE=INDIRECT,                                           *
              DESTID=name,                                             *
              INDDEST=name

       DFHDCT TYPE=FINAL
```

PROGRAM CONTROL TABLE (PCT)

```
       DFHPCT TYPE=INITIAL,                                            *
              SUFFIX=xx

       DFHPCT TYPE=ENTRY,                                              *
              TRANSID=name,                                            *
              TRNPRTY=decimal value,001,                               *
              TRANSEC=decimal value,001,                               *
              TWASIZE=decimal value,0,                                 *
              PROGRAM=name,                                            *
              TPURGE=YES,NO,                                           *
              SPURGE=YES,NO,                                           *
              COMPAT=NO,FORMAT,FULLBUF

       DFHPCT TYPE=FINAL
```

PROCESSING PROGRAM TABLE (PPT)

```
       DFHPPT TYPE=INITIAL,                                            *
              SUFFIX=xx

       DFHPPT TYPE=ENTRY,                                              *
              PROGRAM=name,                                            *
              PGMLANG=ASSEMBLER,COBOL,PL/I,                            *
              RES=YES,NO,                                              *
              RELOAD=YES,NO

       DFHPPT TYPE=FINAL
```

SIGN-ON TABLE (SNT)

```
       DFHSNT TYPE=INITIAL

       DFHSNT TYPE=ENTRY,                                              *
              OPNAME='operator name',                                  *
              PASSWRD=password,                                        *
              OPIDENT=operator identification,                         *
|             SCTYKEY=(n1,...,n24),1,                                  *
              OPPRTY=operator priority,0

       DFHSNT TYPE=FINAL
```

TERMINAL LIST TABLES (TLT)

```
       DFHTLT TYPE=INITIAL,                                            *
              SUFFIX=xx

       DFHTLT TYPE=ENTRY,                                              *
              TRMIDNT=terminal identification

       DFHTLT TYPE=FINAL
```

DYNAMIC OPEN/CLOSE MACRO INSTRUCTIONS

```
DFHOC TYPE=OPEN,                                                *
      DATASET=TRANSDATA,DATABASE,DUMP,                          *
      LISTADR=(register),(symbolic register),YES,               *
      SYMBADR=symbolic address,                                 *
      DSETID=(name xx),...),                                    *
      CHECK=symbolic address

DFHOC TYPE=CLOSE,                                               *
      DATASET=TRANSDATA,DATABASE,DUMP,                          *
      LISTADR=(register),(symbolic register),YES,               *
      SYMBADR=symbolic address,                                 *
      DSETID=(name,...),                                        *
      CHECK=symbolic address

DFHOC TYPE=SWITCH,                                              *
      DATASET=DUMP
```

APPENDIX G: EXAMPLES OF USER-WRITTEN TRANSACTIONS

This section contains examples of user-written transactions. The source coding is written in Assembler language.

EXAMPLE OF A 1030 TRANSACTION

The following example of a 1030 transaction:

1. Analyzes the terminal transaction code in the first byte of data.

2. Matches the transaction code with the entry in the Program Control Table (PCT) for the desired transaction.

3. Issues a Program Control XCTL macro instruction for the program name found in the table search.

Note: The 1030 transaction must take into account the size of the largest Transaction Work Area (TWA) needed by the program to which control is to be transferred.

```
         COPY  DFHCSADS                COPY CSA SYMBOLIC STRG DEFN
         COPY  DFHTCADS                COPY TCA SYMBOLIC STRG DEFN
TCTTEAR  EQU   7                       TERM CONTROL TABLE ADDRESS REG
         COPY  DFHTCTTE                COPY TCT SYMBOLIC STRG DEFN
TIOABAR  EQU   6                       TERMINAL I/O AREA ADDRESS REG
         COPY  DFHTIOA                 COPY TIOA SYMBOLIC STRG DEFN
PCTCBAR  EQU   5                       PROG CONTROL TABLE ADDRESS REG
         COPY  DFHPCTDS                COPY PCT SYMBOLIC STRG DEFN
TRAN1030 CSECT                         CONTROL SECTION - 1030 INPUT ED
         ENTRY T1030                   1030 INPUT EDIT ENTRY ADDRESS
T1030    EQU   *                       1030 INPUT EDIT ENTRY ADDRESS
         BALR  2,0                     ESTABLISH BASE ADDRESS REGISTER
         USING *,2                     USING REGISTER 2 FOR BASE REG
         L     TCTTEAR,TCAFCAAA        LOAD FACILITY CONTROL ADDRESS
         L     TIOABAR,TCTTEDA         LOAD TERMINAL I/O AREA ADDRESS
         L     PCTCBAR,CSAPCTBA        LOAD PROGRAM CONTROL TABLE ADDR
         MVC   TIOADBA(80),TIOADBA+1   SHIFT INPUT DATA ONE BYTE
PCTLOOP  EQU   *                       PROGRAM CTL TABLE SEARCH ENTRY
         CLC   PCTTI,TIOADBA           COMPARE TRANSACTION IDENT
         BE    TRANCTL                 GO TO TRANSFER CONTROL IF EQUAL
         LA    PCTCBAR,PCTEA           ADVANCE TO NEXT TABLE ENTRY
         CLI   PCTTI,X'FF'             TEST FOR END OF TABLE
         BNE   PCTLOOP                 CONTINUE SEARCH IF NOT EQUAL
END      EQU   *                       END OF TABLE SEARCH ENTRY
         DFHPC TYPE=RETURN             PROGRAM CONTROL RETURN
TRANCTL  EQU   *                       TRANSFER CONTROL ENTRY
         MVC   TCAPCPI,PCTIPIA         MOVE PROGRAM NAME TO TCA
         DFHPC TYPE=XCTL               PROGRAM CONTROL TRANSFER CONTROL
         END   T1030
```

EXAMPLE OF A 2760 TRANSACTION

The following example of a 2760 transaction:

1. Analyzes input data that CICS has translated to EBCDIC representation.

2. Changes index numbers (I1, I2) to frame numbers.

3. Converts horizontal/vertical coordinates received from the 2760 to points ranging from 1 to 252. These points represent screen positions arranged (top to bottom, left to right) on a screen of 21 vertical columns and 12 horizontal rows.

4. Indicates how to detect reserved points on the screen, some of which are built into the hardware and some of which are assigned by the user.

5. Shows a procedure for generating the necessary control (function) information and Move Amount Character codes so that CICS can transmit output data to the 2760. Before output transmission to the 2760 occurs, CICS translates the data to 2740 code.

```
         COPY  DFHCSADS               COPY CSA SYMBOLIC STRG DEFN
         COPY  DFHTCADS               COPY TCA SYMBOLIC STRG DEFN
TCTTEAR  EQU   7                      TERM CONTROL TABLE ADDRESS REG
         COPY  DFHTCTTE               COPY TCT SYMBOLIC STRG DEFN
TIOABAR  EQU   6                      TERMINAL I/O AREA ADDRESS REG
         COPY  DFHTIOA                COPY TIOA SYMBOLIC STRG DEFN
PCTCBAR  EQU   5                      PROG CONTROL TABLE ADDRESS REG
         COPY  DFHPCTDS               COPY PCT SYMBOLIC STRG DEFN
REG8     EQU   8                      REGISTER EIGHT
REG9     EQU   9                      REGISTER NINE
REG10    EQU   10                     REGISTER TEN
REG15    EQU   15                     REGISTER FIFTEEN
TRAN2760 CSECT                        CONTROL SECTION - 2760 INPUT ED
         ENTRY T2760                  2760 INPUT EDIT ENTRY ADDRESS
T2760    EQU   *                      2760 INPUT EDIT ENTRY ADDRESS
         BALR  2,0                    ESTABLISH BASE ADDRESS REGISTER
         USING *,2                    USING REGISTER 2 FOR BASE REG
         L     TCTTEAR,TCAFCAAA       LOAD FACILITY CONTROL ADDRESS
         L     TIOABAR,TCTTEDA        LOAD TERMINAL I/O AREA ADDRESS
         L     PCTCBAR,CSAPCTBA       LOAD PROGRAM CONTROL TABLE ADDR
         BAL   REG10,COMPIHV          LINK TO COMPUTE I1, I2, H, & V
         CLI   POINTNO+1,132          FORWARD ONE
         BE    FORWARD1
         CLI   POINTNO+1,144          FORWARD TWO
         BE    FORWARD2
         CLI   POINTNO+1,156          FORWARD THREE
         BE    FORWARD3
         CLI   PCINTNO+1,168          FORWARD FOUR
         BE    FORWARD4
         CLI   POINTNO+1,180          FORWARD FIVE
         BE    FORWARD5
         CLI   POINTNO+1,240          REVERSE ONE
         BE    REVERSE1
         CLI   POINTNO+1,228          REVERSE TWO
         BE    REVERSE2
         CLI   PCINTNO+1,216          REVERSE THREE
         BE    REVERSE3
         CLI   POINTNO+1,204          REVERSE FOUR
         BE    REVERSE4
         CLI   POINTNO+1,192          REVERSE FIVE
         BE    REVERSE5
         CLI   POINTNO+1,245          UNLOAD
         BE    UNLOAD
         CLI   POINTNO+1,246          LOAD
         BE    LOAD
         B     END
FORWARD1 EQU   *
         MVI   FUNCTION,X'F1'         FORWARD, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'1'           FORWARD ONE FRAME
         B     WR2760
FORWARD2 EQU   *
         MVI   FUNCTION,X'F1'          FORWARD, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'2'           FORWARD TWO FRAMES
         B     WR2760
FORWARD3 EQU   *
         MVI   FUNCTION,X'F1'          FORWARD, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'3'           FORWARD THREE FRAMES
         B     WR2760
FORWARD4 EQU   *
         MVI   FUNCTION,X'F1'          FORWARD, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'4'           FORWARD FOUR FRAMES
         B     WR2760
FORWARD5 EQU   *
         MVI   FUNCTION,X'F1'          FORWARD, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'5'           FORWARD FIVE FRAMES
         B     WR2760
REVERSE1 EQU   *
         MVI   FUNCTION,X'40'          REVERSE, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'1'           REVERSE ONE FRAME
         B     WR2760
REVERSE2 EQU   *
         MVI   FUNCTION,X'40'          REVERSE, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'2'           REVERSE TWO FRAMES
         B     WR2760
REVERSE3 EQU   *
         MVI   FUNCTION,X'40'          REVERSE, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'3'           REVERSE THREE FRAMES
         B     WR2760
REVERSE4 EQU   *
         MVI   FUNCTION,X'40'          REVERSE, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'4'           REVERSE FOUR FRAMES
         B     WR2760
REVERSE5 EQU   *
         MVI   FUNCTION,X'40'          REVERSE, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'5'           REVERSE FIVE FRAMES
         B     WR2760
LOAD     EQU   *                       LOAD
         MVI   FUNCTION,X'F1'          FORWARD, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'8'           FORWARD EIGHT FRAMES
         B     WR2760
UNLOAD   EQU   *                       UNLOAD
         MVI   FUNCTION,X'40'          REVERSE, AUTO EOM, MFA DISABLED
         MVC   ADVANCE,=H'255'         REVERSE 255 FRAMES
WR2760   EQU   *
         LA    REG9,3
         STH   REG9,TIOATDL
         MVC   TIOADBA(1),FUNCTION
         BAL   REG10,COMPADV           LINK TO COMPUTE FRAME ADVANCE
         MVC   TIOADBA+1(2),ADVANCE
         DFHTC TYPE=(WRITE,OIU)
         B     END
END      EQU   *                       END OF TABLE SEARCH ENTRY
         DFHPC TYPE=RETURN             PROGRAM CONTROL RETURN
COMPIHV  EQU   *                       COMPUTE I1, I2, HORIZ, AND VERT
         TR    TIOADBA+2(2),TRTBL      TRANSLATE 2 CHARS I1 AND I2
         SR    REG9,REG9               CLEAR REGISTER NINE
         IC    REG9,TIOADBA+2          PLACE I1 IN REGISTER NINE
         SLL   REG9,5                  MULTIPLY I1 BY 32
         SR    REG8,REG8               CLEAR REGISTER EIGHT
         IC    REG8,TIOADBA+3          PLACE I2 IN REGISTER EIGHT
         AR    REG8,REG9               SUM OF I1X32 AND I2 IN REG 8
         STH   REG8,FRAMENO            STORE 2760 FRAME NUMBER
         TR    TIOADBA+4(2),TRTBL      TRANSLATE 2 CHARS VERT & HORIZ
         SR    REG8,REG8                CLEAR REGISTER EIGHT
         IC    REG8,TIOADBA+5           PLACE HORIZONTAL IN REGISTER 8
         MH    REG8,=H'12'              MULTIPLY HORIZONTAL BY TWELVE
         LR    REG9,REG8                12H RESULT IN REGISTER NINE
         SR    REG8,REG8                CLEAR REGISTER EIGHT
         IC    REG8,TIOADBA+4           PLACE VERTICAL IN REGISTER 8
         AR    REG9,REG8                12H + V RESULT IN REGISTER NINE
         LA    REG8,255                 LOAD 255 IN REGISTER EIGHT
         SR    REG8,REG9                255-12H-V RESULT IN REGISTER 8
         STH   REG8,POINTNO             STORE 2760 POINT NUMBER
         BR    REG10                    COMPUTE I1, I2, H, AND V EXIT
FRAMENO  DC    H'0'                     2760 FRAME NUMBER
POINTNO  DC    H'0'                     2760 POINT NUMBER
TRTBL    DC    X'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'00FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'03FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'0205FFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'FFFFFFFFFFFFFFFFFFFFFFFF01FFFFFF'
         DC    X'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF'
         DC    X'FF070B0F13171B1FFFFFFFFFFFFFFFFF'
         DC    X'FF060A0E12161A1EFFFFFFFFFFFFFFFF'
         DC    X'FFFF090D1115191DFFFFFFFFFFFFFFFF'
         DC    X'FF04080C1014181CFFFFFFFFFFFFFFFF'
COMPADV  DS    0H                       COMPUTE MANUAL FRAME ADVANCE
         LH    REG9,ADVANCE             LOAD 2760 MANUAL FRAME ADVANCE
         SR    REG8,REG8                CLEAR REGISTER EIGHT
         LA    REG15,32                 LOAD DIVISOR OF 32
         DR    REG8,REG15               DIVIDE FRAME ADVANCE BY 32
         STC   REG9,ADVANCE             STORE SECOND BYTE OF ADVANCE
         STC   REG8,ADVANCE+1           STORE FIRST BYTE OF ADVANCE
         TR    ADVANCE(2),LCXTRTBL      TRANSLATE MANUAL FRAME ADVANCE
         BR    REG10                    COMPUTE FRAME ADVANCE EXIT
FUNCTION DC    X'00'                    2760 FUNCTION
ADVANCE  DS    H'0'                     2760 MANUAL FRAME ADVANCE
LCXTRTBL DC    X'407C6050F1619181F2A29282F3A39383'
         DC    X'F4A49484F5A59585F6A69686F7A79787'
         END   T2760
```

EXAMPLE OF A 3735 TRANSACTION (CICS/OS only)

The following example of a 3735 transaction:

1. Reads data from the 3735 and spools to an extrapartition data set.
2. Upon receipt of the end-of-file condition, writes an FDP header record, FDP records, an FDP trailer record, and data.
3. Sends a powerdown message.
4. Disconnects the line.

```
         COPY  DFHCSADS                 COMMON SYSTEM AREA DSECT
         COPY  DFHTCADS                 TASK CONTROL AREA DSECT
         COPY  DFHTCTTE                 TERMINAL CONT TABLE DSECT
         COPY  DFHTIOA                  TERMINAL I/O AREA DSECT
         COPY  DFHTDIA                  TRANSIENT DATA I/O AREA DSECT
```

```
TCTTEAR  EQU   3                       TCTTE BASE REGISTER
TIOABAR  EQU   4                       TIOA BASE REGISTER
TDIABAR  EQU   5                       TDIA BASE REGISTER
BASEREG  EQU   6                       PROGRAM BASE REGISTER
WORKREG  EQU   7                       WORK REGISTER
         CSECT
         BALR  BASEREG,0               LOAD PROGRAM BASE REGISTER
         USING *,BASEREG
         L     TCTTEAR,TCAFCAAA        ADDRESSABILITY TO TERM CONT TBL
         L     TIOABAR,TCTTEDA         ADDRESSABILITY TO TERM I/O AREA
         DFHTC EOF=HEADER              TEST FOR END-OF-FILE CONDITION
RLOOP    EQU   *                       BATCH READ LOOP
         DFHTD TYPE=PUT,               WRITE DATA RECORD               *
               DESTID=OUTQ,            TO OUTPUT QUEUE                 *
               TDADDR=TIOADBA          DATA IS IN TIOA
         DFHTC TYPE=GET,               READ NEXT RECORD                *
               EOF=HEADER              AND TEST FOR END-OF-FILE
         L     TIOABAR,TCTTEDA         ADDRESSABILITY TO TIOA
         B     RLOOP                   LOOP
HEADER   EQU   *                       WRITE FDP HEADER RECORD
         L     TIOABAR,TCTTEDA         ADDRESSABILITY TO TIOA
         MVC   TIOATDL(7),HREC         MOVE HEADER RECORD TO TIOA
         ST    TIOABAR,TCTTEDA         SPECIFY TIOA ADDRESS
         DFHTC TYPE=(PUT,SAVE)         WRITE TO 3735, SAVE TIOA
WLOOPF   EQU   *                       BATCH FDP WRITE LOOP
         DFHTD TYPE=GET,               GET FDP RECORD                  *
               DESTID=FDPQ,            FROM FDP QUEUE                  *
               QUEZERO=TRAILER         SEND TRAILER WHEN DONE
         L     TDIABAR,TCATDAA         ADDRESSABILITY TO DATA
         SH    TDIABAR,FORTY           ADJUST FOR EXTRAPARITITION
         MVC   TIOADBA(240),TDIADBA    MOVE DATA
         MVC   TIOADBA+240(236),TDIADBA+240 TO TIOA
         MVC   TIOATDL,BLKLGTH         SET LENGTH FOR WRITE
         ST    TIOABAR,TCTTEDA         SPECIFY TIOA ADDRESS
         DFHTC TYPE=(PUT,SAVE,NOTRANSLATE)      WRITE TO 3735
         B     WLOOPF                  LOOP
TRAILER  EQU   *                       WRITE FDP TRAILER RECORD
         MVC   TIOATDL(7),TREC         MOVE TRAILER RECORD TO TIOA
         ST    TIOABAR,TCTTEDA         SPECIFY TIOA ADDRESS
         DFHTC TYPE=(PUT,SAVE)         WRITE TO 3735, SAVE TIOA
WLOOPD   EQU   *                       BATCH DATA WRITE LOOP
         DFHTD TYPE=GET,               GET DATA                        *
               DESTID=DATQ,            FROM DATA QUEUE                 *
               QUEZERO=FINISH          EXIT WHEN DONE
         L     TDIABAR,TCATDAA         ADDRESSABILITY TO DATA
         SH    TDIABAR,FORTY           ADJUST FOR EXTRAPARTITION
         MVC   TIOADBA(240),TDIADBA    MOVE DATA
         MVC   TIOADBA+240(236),TDIADBA+240 TO TIOA
         MVC   TIOATDL,BLKLGTH         SET LENGTH FOR WRITE
         ST    TIOABAR,TCTTEDA         SPECIFY TIOA ADDRESS
         DFHTC TYPE=(PUT,SAVE)         WRITE TO 3735, SAVE TIOA
         B     WLOOPD                  LOOP
FINISH   EQU   *                       END UP
         DFHTC TYPE=DISC               DISCONNECT LINE REQUEST
         DFHPC TYPE=RETURN             EXIT
FORTY    DC    H'40'
BLKLGTH  DC    H'476'
HREC     DC    H'3'
         DC    C'  '
         DC    X'00C600'               NULL F NULL
TREC     DC    H'3'
         DC    C'  '
         DC    X'00C500'               NULL E NULL
         LTORG
         END
```

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