

AD-A069 847

COMPUTER SCIENCES CORP SILVER SPRING MD SYSTEM SCIEN--ETC F/G 14/2
CENTRAL FLOW CONTROL. TEST CASE GENERATOR (TR)/ON-LINE TEST DIR--ETC(U)
JAN 79

UNCLASSIFIED

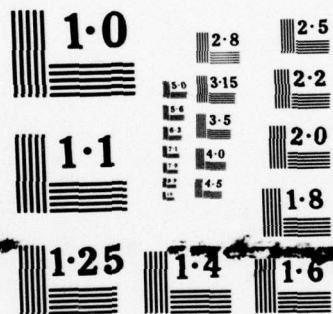
CSC/SD-78-6138

FAA-RD-79-39

NL

1 OF 1
AD
A069847





NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

18
Report No. FAA-RD-79-39

19
LEVEL

12
SC

069847
A

6 **CENTRAL FLOW CONTROL
TEST CASE GENERATOR/ON-LINE TEST DIRECTOR (TA),
COMPONENTS USER'S MANUAL.**

(TR)

12 51 p.

15 DOT-FA77WA-3955



DDC
RECEIVED
JUN 14 1979
C

DDC FILE COPY

11
January 1979
9 Final Report.

14 CSC/SD-78/6738

Document is available to the U.S. public through
the National Technical Information Service,
Springfield, Virginia 22161.

Prepared for
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Systems Research & Development Service
Washington, D.C. 20590

JOB

408 479

79 06 11 069

NOTICE

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

Technical Report Documentation Page

1. Report No. FAA-RD-79-39✓	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Central Flow Control Test Case Generator (TR)/On-Line Test Director (TA) Components User's Manual		5. Report Date January 1979	
		6. Performing Organization Code	
7. Author(s) Computer Sciences Corporation		8. Performing Organization Report No. CSC/SD-78/6138✓	
9. Performing Organization Name and Address Computer Sciences Corporation System Sciences Division 8728 Colesville Road Silver Spring, Maryland 20910		10. Work Unit No. (TRAIS)	
		11. Contract or Grant No. DOT-FA77WA-3955✓	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Federal Aviation Administration Systems Research and Development Service Washington, D.C. 20591		13. Type of Report and Period Covered Final Report	
		14. Sponsoring Agency Code ARD-102	
15. Supplementary Notes			
16. Abstract This document describes the functions performed by the Test Case Generator (TR) and the On-Line Test Director (TA), and details the procedures required to properly exercise them. The purpose of TR and TA is to support test execution of the Central Flow Control (CFC) Operational Complex (OPCX) applications programs by providing simulated message input facilities. The simulation capability enables evaluation of the message processing programs in a controlled environment without requiring actual data, flight plans, communications, or data-entry personnel.			
17. Key Words CENTRAL FLOW CONTROL TEST CASE GENERATOR AUTOMATED TEST TOOLS		18. Distribution Statement This document is available to the public through the National Technical Information Service (NTIS), Springfield, Virginia 22151	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 49	22. Price

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
teaspoon	teaspoons	5	milliliters	ml
fl oz	fluid ounces	15	milliliters	ml
c	cups	30	milliliters	ml
pt	pints	0.24	liters	l
qt	quarts	0.47	liters	l
gal	gallons	0.96	liters	l
cu ft	cubic feet	3.8	liters	l
cu yd	cubic yards	0.03	cubic meters	m ³
		0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 296, Units of Weights and Measures, Price \$2.25, SD Catalog No. C-1310-296.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
m ³	cubic meters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

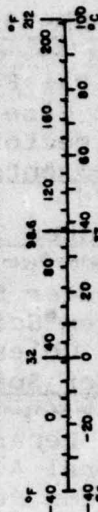


TABLE OF CONTENTS

Section 1 -	INTRODUCTION.	1-1
1.1	Purpose and Scope.	1-1
1.2	Background Information	1-1
1.3	Reference Documents.	1-2
Section 2 -	PROGRAM DESCRIPTION	2-1
2.1	Test Case Generator.	2-1
2.1.1	Program Operation.	2-1
2.1.2	Inputs	2-2
2.1.2.1	Control Cards.	2-2
2.1.2.2	Data Cards	2-11
2.1.2.3	Archive Log Queue (ALQ)	
	Enhanced Message Input.	2-11
2.1.2.4	Error Message File	2-12
2.1.2.5	Simulation Tapes	2-12
2.1.3	Data Sets.	2-12
2.1.3.1	Control Card Input	2-12
2.1.3.2	Data Card Input.	2-13
2.1.3.3	Error Message Data Set	2-13
2.1.3.4	ALQ Input Data Set	2-13
2.1.3.5	Output Simulation Tape	2-14
2.1.3.6	Input Simulation Tape.	2-14
2.1.3.7	Control Card Print Data Set.	2-15
2.1.3.8	Input Data Print Data Set.	2-16
2.1.3.9	Simulation Tape Print.	2-17
2.1.3.10	Job Control Language Examples.	2-18
2.1.4	Program Output	2-20
2.1.5	Diagnostics.	2-26
2.2	On-Line Test Director.	2-28
2.2.1	Program Operation.	2-28
2.2.2	Program Inputs	2-30
2.2.2.1	Control Information.	2-30
2.2.2.2	TA Simulation Tape	2-37
2.2.3	Program Outputs.	2-38
2.2.4	Diagnostics.	2-38

Accession For	
NTIS GRA&I	☒
DDC TAB	☐
Unannounced	☐
Justification	☐
By _____	
Distribution/	
Availability Codes	
Dist	Available/or special
A	

LIST OF ILLUSTRATIONS

Figure

2-1	Sample Control Card Deck.	2-5
2-2	Simulation Tape Format.	2-21
2-3	Control Card Listing.	2-22
2-4	Error Diagnostic Printout	2-23
2-5	Listing in Time Sequence Order.	2-24
2-6	Listing Sorted by Message Type.	2-25
2-7	Sample Simulation Using IOT Input	2-41
2-8	Summary Status Report	2-43

Table

2-1	Valid CFC Messages.	2-3
-----	-----------------------------	-----

SECTION 1 - INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of the Test Case Generator (TR) and the Online Test Director (TA) is to support execution of the Central Flow Control (CFC) Operational Complex (OPCX) applications programs using simulated message input. The simulation capability enables the operation of the CFC applications programs, known as transaction load modules (TLM), in a controlled environment without requiring actual data, flight plans, communications, or controllers. TR/TA does not support the testing of the CFC Monitor. To test the CFC Monitor, the user should consult the Operating System (OS) Simulation Subprogram (SIM), NASP-9278-02.

1.2 BACKGROUND INFORMATION

The Test Case Generator generates simulation tapes that completely test the Operational Software Complex, exclusive of its communications interfaces. The generated simulation tape contains simulated or actual CFC Archive Log Queue messages sorted by message transmission time. The user of the simulation function is capable (through the use of user-supplied control parameters) of generating offline any desired scenario for subsequent testing of the OPCX. The generated simulation tape is used as input to the CFC Monitor to simulate live inputs to the system. The Test Case Generator processes source messages on either cards or tape and creates a simulation tape containing each type of simulated data in a format compatible with CFC Monitor

operation. The three major capabilities of the Test Case Generator Component include:

- Generation of a CFC simulation tape
- Merging of two CFC simulation tapes
- Formatted listings of CFC simulation tapes

The Online Test Director is a TLM executed as part of the OPCX during simulation sessions. It is activated by the Transaction Control Component (TCC) when the TCC receives a simulation initialization message. This message allows the specification of: 1) simulation tape to be used; 2) simulation start and stop times; 3) message selection/deletion criteria; and 4) the mode of the simulation. The mode may be either "batch" or "interactive". In the batch mode, the CFC simulation messages are read from the tape created by TR; in the interactive mode, the user may input simulation messages via the Input/Output Typewriter (IOT), as well as read simulation messages from the tape. In either mode, the user receives a status report containing simulation statistics for all messages.

1.3 REFERENCES

1. Data Reduction and Analysis Component User's Manual,
CSC/SD-78/6153
2. Operating System (OS) Simulation Subprogram (SIM),
NASP-9278-02, 19 May 77, A3d2.5

SECTION 2 - PROGRAM DESCRIPTION

2.1 TEST CASE GENERATOR

2.1.1 Program Operation

The Test Case Generator (TR) performs three major functions:

- Creation of a simulation tape
- Merging two simulation tapes to produce a third
- Printing the contents of a simulation tape

To specify one of these options, the user prepares a deck of control cards which, in addition to selecting the function, specifies various input/output files needed by TR as well as parameters used to control the program's operations.

If creation of a simulation tape is selected through the control cards, TR will then read a user-specified data set to retrieve a simulation message text and time of transmission. This data set may be in card image form or may be in the form of enhanced messages from the OPCX Archive Log Queue (ALQ). A file of enhanced messages is created by the ALQFLTR DR and a program which reads the ALQ file and calls the enhanced messages. The enhanced message originates in the TCC of the OPCX Executive Subsystem. Whatever the input message text source, TR can optionally validate the message identifier prior to writing the text to tape. This optional validation feature allows illegal or non-CFC messages to be written to the tape. If validation is enabled, the input message identifier must be one of those listed

in Table 2-1 or it will be discarded. Once all input message texts have been processed and the tape created, TR will print both the input messages and those written to the tape in either time-ascending order or alphabetically by message identifier.

In the merge mode of operation where two simulation tapes are merged into one, the user control cards specify which messages are to be used and written to the output tape. For each input tape, the user may select or exclude either certain message identifiers or a time interval contained on that tape. Once the merged output tape has been created, its contents may be printed in time-ascending or alphabetic message identifier order.

The options of the print mode are similar in some respects to the merge mode. Message identifiers or a time interval can be either printed or ignored. The listing can be performed in time-ascending or alphabetic message identifier order.

2.1.2 Program Inputs

The inputs to TR consist of control cards; message text data cards or ALQ enhanced messages; and an error diagnostic message file.

2.1.2.1 Control Cards

There are three control cards for TR: one each for the Create, Merge, and Print modes of operation. The following sections describe the parameters and values associated with each control card. General rules of card format and syntax are as follows:

Table 2-1. Valid CFC Messages

ACTV
ARRD
CAPL
CAPS
CXSD
GAEL
DEMA
DEMD
DESA
DESD
DLDY
DM
GAES
FADF
FADP
FADT
FIXL
FP
FPSD
INHB
LIFP
LISA
LISD
QLFW
QLLZ
RS

- All control cards are read from the SYSIN-associated file
- All control cards are preceded by a START\$ card and followed by a TERM\$ card as shown below.

```

START $
.
.
.
control cards
.
.
.
TERM $

```

- All parameters are specified in the form
keyword=value;
- Control cards may contain information only in columns 1 through 72, inclusive
- The "\$" delimiter on each card is optional; if present, the remaining card columns are ignored. Thus comments may be entered on cards.
- Multi-valued keywords (lists of values) are specified without parentheses with each value separated by a comma:

```
MSGTYP=DEMA,FPSD,CXSD
```

- A control card is continued on the next card if a plus sign (+) appears on the card. The remainder of the card is ignored.

A sample deck of control cards is shown in Figure 2-1.

2.1.2.1.1 Create Control Card

The Create control card provides TR with the information necessary to create a CFC simulation tape. Some of the parameters are mandatory; other optional parameters allow variations in input, output, and processing.

//SYSIN DD *

STARTVS

TAPEIN1=SYSTAPE1;TAPEIN2=SYSTAPE2;SIMOUT=SYSTAPE;CNTLST=SYSPRINT;VS+

ERRIN=SYSERROR;RPTLST=SYSREPT;VS+

MODE=MERGE;HDRID=ABC99;SIMSRT=010010;SIMLEN=100000;VS+

TAPE1=SELECT;MSGTYP=GAEL,DEMA;VS+

TAPE2=DELETE;TIME=042000-085000VS

TERMVS

/*

Figure 2-1. Sample Control Card Deck

KEYWORD	VALUES	REQUIRED/ OPTIONAL	DESCRIPTION
ERRIN	max. 8 characters	R	DDname specifying the TR error message data set
DATAIN	max. 8 characters	R	DDname of the input file containing CFC messages to be written to tape
SIMOUT	max. 8 characters	R	DDname of the output simulation tape
MODE	CREATE	R	Specifies creation of CFC simulation tape
HDRID	5 characters	R	Simulation tape header identification. Must be 5 alphanumeric characters starting with an alpha character
SIMSRT	6 digits	R	Start time in the form HHMMSS where HH=hour, MM=minutes, SS=seconds. Input CFC messages with time less than SIMSRT will be ignored
SIMLEN	6 digits	R	Length of input message selection interval in the form HHMMSS where HH=hour, MM=minute, SS=seconds. SIMSRT and SIMLEN define a selection time interval for the input message text cards
CNTLST	max. 8 characters	R	DDname specifying an output file for printing control cards and diagnostic messages
INPLST	max. 8 characters	O	DDname specifying an output file for printing input simulation messages. Required if INPSRT is specified
RPTLST	max. 8 characters	O	DDname specifying an output file for printing the simulation tape. Required if OUTSRT is specified

KEYWORD	VALUES	REQUIRED/ OPTIONAL	DESCRIPTION
INPSRT	MSTPS	0	Specifies that input simulation messages are to be printed in alphabetical order by message identifier. If omitted, messages are printed in ascending time order
OUTSRT	MSTPS	0	Specifies that simulation tape is to be printed in alphabetical order by message identifier. If omitted, messages are printed in time ascending order
VERIFY	YES	0	Specifies that input messages are to be validated. Only the 26 CFC message types are to be processed
TRNSRT	6 digits	0	Specifies adjusted simulation start time in the form HHMMSS where HH=hour, MM=minute, SS=seconds. If supplied, this time will be the simulation start time instead of the time on the first simulation message. The difference between TRNSRT and the first simulation message time represents a time adjustment to be applied to all input simulation messages
INPUT	ALQ	0	Specifies that the input simulation messages originate from a file of enhanced messages on an ALQ file. The DR & A program ALQFLTR must be run to produce the enhanced message file. Refer to the TAPEIN1 and TAPEIN2 parameters in this section for additional information
TAPEIN1	SORTIN	0	Specifies SORTIN as the DDname pointing to the input file of ALQ enhanced messages. This input file will be sorted first and the sorted information written to the DDname specified by TAPEIN2
TAPEIN2	SORTOUT	0	

2.1.2.1.2 Merge Control Card

The Merge control card provides TR with the information needed to merge two previously created CFC simulation tapes. Certain parameters are required in the Merge mode and others are optional as specified below.

KEYWORD	VALUES	REQUIRED/ OPTIONAL	DESCRIPTION
TAPEIN1	max. 8 characters	R	Specifies DDname of first input simulation tape
TAPEIN2	max. 8 characters	R	Specifies DDname of second input simulation tape
SIMOUT	max. 8 characters	R	Specifies DDname of output merged simulation tape
ERRIN	max. 8 characters	R	DDname specifying TR error message data set
MODE	MERGE	R	Specifies Merge mode of operation
HDRID	5 characters	R	Specifies output Merge tape header identification, alpha-numeric format
SIMSRT	6 digits	R	Start time in the form HHMMSS where HH=hours, MM=minutes, SS=seconds. Input CFC messages with times less than SIMSRT are ignored
SIMLEN	6 digits	R	Length of input message selection interval in the form HHMMSS where HH=hour, MM=minute, SS=seconds. SIMSRT and SIMLEN define a time selection interval from which the input messages will be selected. All others are ignored
CNTLST	max. 8 characters	R	DDname specifying an output file for printing control cards and diagnostics

KEYWORD	VALUES	REQUIRED/ OPTIONAL	DESCRIPTION
RPTLST	max. 8 characters	0	Defines a print file for the formatted listing of the merged simulation tape
OUTSRT	MSTPS	0	Specifies that the merged simulation tape is to be printed in alphabetical order by message identifier. If omitted, the messages will be printed in time ascending order. If specified, RPTLST must be provided
TRNSRT	6 digits	0	Specifies adjusted simulation start time in the form HHMMSS where HH=hours, MM=minutes, SS=seconds. If provided, this time will be the simulation start time instead of the earliest input message time. The difference between TRNSRT and the first time on the first tape represents a time adjustment factor applied to all input messages
TAPE1 TAPE2	SELECT DELETE	0	Indicates whether certain input messages from the first input tape are to be processed or ignored. The selection/deletion criteria are specified by the MSGTYP and time parameters
MSGTYP		0	Specifies a list of valid CFC messages, each message identifier separated by a comma. Depending on the value of TAPE1/TAPE2, this list of messages represents those to be processed from the respective tape or to be ignored from that tape. If MSGTYP is specified, time must not be
TIME		0	Specifies a time span of messages to be processed or ignored from each tape, depending on the value of TAPE1/TAPE2. The format of time is HHMMSS-HHMMSS where HH=hour, MM=minute, SS=seconds. If time is specified, MSGTYP must be omitted

2.1.2.1.3 Print Control Card

The Print control card is needed to request the printing of a previously created TR simulation tape. The table below identifies the mandatory and optional parameters:

KEYWORD	VALUE	REQUIRED/ OPTIONAL	DESCRIPTION
ERRIN	max. 8 characters	R	DDname specifying the TR error message data set
SIMOUT	max. 8 characters	R	DDname of the file specifying the simulation tape to be printed
RPTLST	max. 8 characters	R	DDname of an output file where tape is printed
MODE	TPPRNT	R	Specifies TR Print mode of operation
CNTLST	max. 8 characters	R	Defines the file for printing control cards and diagnostics
REPORT	SELECT DELETE	O	Indicates whether certain messages from the tape are to be printed or ignored. The selection/deletion criteria are specified by the MSGTYP and time parameters
MSGTYP		O	Specifies a list of valid CFC message identifiers to be processed or ignored according to the value of report. If MSGTYP is provided, time must be omitted
TIME		O	Specifies a time interval of messages to be printed or ignored depending on the value of report. If time is provided, MSGTYP must be omitted

KEYWORD	VALUE	REQUIRED/ OPTIONAL	DESCRIPTION
OUTSRT	MSTPS	0	Specifies that the messages to be printed be printed in alphabetical order by message identifier

2.1.2.2 Data Cards

Data cards are provided by the user to specify simulation message texts and transmission times. These cards are read from the file associated with the value provided by the DATAIN keyword. At least two data cards are associated with each simulation message. The first card specifies the transmission time in the form of *HHMMSS where HH=hour, MM=minute, and SS=second. This seven character/digit string starts in card column 1.

Starting with the second card, the user may provide the message text using up to three cards to specify a message. All 80 card columns may be used.

EXAMPLES

```
*000000
DEMA ATL 05/08
*000500
FADT QPA 07/20/2-12-14/1
*120000
LISA QPA 09/16
*123000
FP ACID4 B727 QPA 1002 QNB 35
*123001
INHB AA11111
```

2.1.2.3 Archive Log Queue (ALQ) Enhanced Message Input

The ALQ tape produced by the OPCX represents a "live" recording of actual system message inputs. The original input message to the OPCX is enhanced

by the OPCX TCC by adding a header containing a time tag. These enhanced messages may be input to TR for purposes of creating a simulation tape of a real scenario. To extract the enhanced messages from the ALQ tape, the user will need to run the ALQFLTR program. The output of this program is then input to TR in the manner described by the Create mode control card.

2.1.2.4 Error Message File

The error message file is a partitioned data set (PDS) whose members are error diagnostic messages necessary to the execution of TR.

2.1.2.5 Simulation Tapes

In Merge mode, TR will read two previously created CFC simulation tapes to produce a third simulation tape.

2.1.3 Data Sets

This section discusses the input and output data sets required by TR and the possible Job Control Language (JCL) the user may employ to specify these datasets. The user is assumed to have a working knowledge of JCL and the ability to substitute or modify the JCL shown here to his specific purpose.

2.1.3.1 Control Card Input

All control cards are read from the SYSIN DD card. A typical specification would be:

```
//SYSIN DD *
START $
ERRIN=SYSERROR;DATAIN=DATACARD;SIMOUT=SIMTAP;+
MODE=CREATE;HDRID=SIM01;SIMSRT=000000;+
SIMLEN=235959;CNTLST=SYSPRINT;TRNSRT=000000;+
INPLST=INLIST;RPTLST=SYSREPT $
TERM $
/*
```

2.1.3.2 Data Card Input

If data cards are used instead of an ALQ enhanced message file, the user must specify the input DDNAME using the DATAIN keyword. For example, if the input control cards contain DATAIN=DATACARD, then the corresponding JCL would be:

```
//DATACARD DD *
*000235
GAES QPA 10/15/11
```

2.1.3.3 Error Message Data Set

This input data set contains diagnostic messages used by TR. It is a partitioned data set whose records are 80 bytes in length. The DDNAME for this file is ERRIN. If the user's control cards contain ERRIN=MSGIN then the associated JCL would be:

```
//MSGIN DD DSN=SPCX.LIB.ERROR.CURRENT,DISP=SHR
```

2.1.3.4 ALQ Input Data Set

The data set of enhanced messages from the ALQ tape is created by the ALQFLTR program. It consists of unblocked, fixed-length records of 512 bytes. Eleven records will fit on one 2314 disk track. To use such a file as input to TR, the following keywords would be used in the control cards:

```
INPUT=ALQ;TAPEIN1=SORTIN,TAPEIN2=SORTOUT;
```

For this example, the corresponding JCL would be:

```
//SORTIN DD DSN=ENHANCED.ALQ.DATA,UNIT={tape  
disk},  
// DCB=(RECFM=F,BLKSIZE=512),...  
//SORTOUT DD DSN=SORTED.ENHANCED.ALQ.DATA,UNIT={tape  
disk},  
// DCB=*.SORTIN
```

Since the OS/9020 SORT utility will be used, additional data sets will be required. These are specified as follows:

```
//SORTWK01 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)  
//SORTWK02 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)  
//SORTWK03 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)  
//SYSOUT DD SYSOUT=A  
✓//SORTLIB DD DSN=SYS1.SORTLIB,DISP=SHR
```

2.1.3.5 Output Simulation Tape

The TR output simulation data is written to the file associated with the DDNAME which the user specifies by the SIMOUT keyword. The output records are fixed length at 258 bytes per record. For example, if SIMOUT=SIMTAPE, then appropriate JCL would be:

```
//SIMTAPE DD DSN=CFC.SIMTAPE,UNIT=TAPE,LABEL=(1,NL),  
// DISP=(NEW,KEEP),DCB=(RECFM=F,BLKSIZE=258)
```

2.1.3.6 Input Simulation Tapes

In Merge mode, TR requires two input simulation tapes in order to create the output merge tape. To do this, the user would specify, for example,

```
TAPEIN1=TAPE1;TAPEIN2=TAPE2;
```

with the corresponding JCL as follows:

```
//TAPE1 DD DSN=FIRST.SIMTAPE,UNIT=TAPE,LABEL=(1,NL),
// VOL=SER=xxxxxx,DCB=(RECFM=F,BLKSIZE=258)
//TAPE2 DD DSN=SECOND.SIMTAPE,UNIT=TAPE,LABEL=(1,NL),
// VOL=SER=yyyyyy,DCB=(RECFM=F,BLKSIZE=258)
```

2.1.3.7 Control Card Print Data Set

The user-supplied control cards are printed on the file associated with the DDNAME provided by the CNTLST keyword. For example, if CNTLST = SYSPRINT appears in the control cards, then the following JCL should also appear:

```
//SYSPRINT DD SYSOUT=A,DCB=(LRECL=80,BLKSIZE=80,RECFM=F)
```

2.1.3.8 Input Data Print Data Set

The input simulation messages may be printed in one of two ways: time-ascending order or alphabetical order by message identifier. The DDNAME is specified by the INPLST keyword on the control cards. For example, to have the input messages printed as they appear in time-ascending order, the control cards could contain:

```
INPLST=INLST
```

with the corresponding JCL as follows:

```
//INLST DD SYSOUT=A,DCB=(RECFM=F,BLKSIZE=95)
```

If the input simulation messages are to be printed in alphabetical order by message identifier, then the value of the INPLST keyword must be of the form xxxIN and INPSRT=MSTPS. For example, INPLST=INPTIN is valid and the associated JCL would be:

```
//INPTIN DD DSN=UNSORTED.MESSAGE.INPUT,DISP=(,PASS),  
// UNIT=DISK,DCB=(RECFM=F,BLKSIZE=95),  
// SPACE=(TRK,x)
```

The value of x in the SPACE parameter may be computed by the user calculating the number of simulation messages and dividing by 36.

Additional JCL statements are needed to print the messages in alphabetical order as shown below.

```
//XXXXOUT DD SYSOUT=A,DCB=(BLKSIZE=95,LRECL=95,RECFM=F)
```

```
//XXXXWK01 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)
```

```
//XXXXWK02 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)
```

```
//XXXXWK03 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)
```

```
//SYSOUT DD SYSOUT=A
```

```
//SORTLIB DD DSN=SYS1.SORTLIB.DISP=SHR
```

where xxxx represents the first four characters of the value provided for INPLST. Continuing the example above, where INPLST=INPTIN, xxxx in the JCL is replaced by INPT so that the user provided JCL would contain the DDNAMES INPTIN, INPTOUT, INPTWK01, INPTWK02, INPTWK03.

2.1.3.9 Simulation Tape Print

The output simulation tape created by TR may be printed in either time-ascending order or alphabetical order by message identifier. The DDNAME is specified by the RPTLST keyword of the control cards.

To print the tape in time-ascending order, the user should specify the RPTLST keyword and a JCL statement corresponding to the value provided for RPTLST. For example, if RPTLST=SYSREPT then the JCL would be:

```
//SYSREPT DD SYSOUT=A,DCB=(RECFM=F,BLKSIZE=95)
```

To print the simulation tape in alphabetical order by message order, the value of RPTLST must be specified in the form xxxxIN and OUTSRT=MSTPS. For example, RPTLST=RPRTIN and the associated JCL would be:

```
//RPRTIN DD DSN=UNSORTED.TAPE.OUTPUT,DISP=(NEW,PASS),  
// UNIT=DISK,DCB=(RECFM=F,BLKSIZE=95),SPACE=(TRK,X)
```

The value of x in the SPACE parameter is computed by dividing the number of input messages by 36.

Additional JCL statements are needed to print the messages in alphabetical order as shown below:

```
//XXXXOUT DD SYSOUT=A,DCB=(BLKSIZE=95,LRECL=95,RECFM=F)

//XXXXWK01 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)
//XXXXWK02 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)
//XXXXWK03 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)

//SYSOUT DD SYSOUT=A
//SORTLIB DD DSN=SYS1.SORTLIB.DISP=SHR
```

where xxxx represents the first four characters of the value provided for RPTLST. In the example above where RPTLST=RPRTIN, the user must then specify DDNAMES RPRTOUT, RPRTWK01, RPRTWK02, and RPRTWK03.

2.1.3.10 Job Control Language Examples

Example 1

The following JCL creates a CFC simulation tape from user-provided data cards. The input cards and the simulation tape are printed in time-ascending order.

```
// EXEC PGM=TR6,REGION=200K
//STEPLIB DD DSN=TR.LOAD,DISP=SHR
//SYSIN DD *
START $
ERRIN=SYSERROR;DATAIN=DATA CRDS;SIMOUT=SIMTAP1MODE=CREATE; +
HDRID=SIM01;SIMSRT=000000;SIMLEN=235959;CNTLST=SYSPRINT; +
TRNSRT=000000; +
INPLST=INLIST;RPTLST=SYSREPRT $
TERM $

//SYSPRINT DD SYSOUT=A,DCB=(BLKSIZE=800,LRECL=80)
//SYSERROR DD DSN=SPCX.LIB.ERROR.CURRENT,DISP=SHR
//SYSREPRT DD SYSOUT=A,DCB=(RECFM=FB,LRECL=95,BLKSIZE=950)
//INLIST DD SYSOUT=A,DCB=(RECFM=FB,LRECL=95,BLKSIZE=950)
//SIMTAP DD DISP=(,CATLG),VOL=(,RETAIN),UNIT=(TAPE,,DEFER),
// DSN=TA.SIM2.DATA,
// DCB=(RECFM=F,LRECL=258,BLKSIZE=258)
//DATA CRDS DD *
                (Simulation message cards)
```

Example 2

This example creates Simulation messages on a disk data set and prints them in alphabetical order.

```
// EXEC PGM=TR6,REGION=200K
//STEPLIB DD DSN=TR.LOAD,DISP=SHR
//SYSIN DD *
START $
ERRIN=ERRDIAGS;DATAIN=DATA CRDS;SIMOUT=SIMUTAP; +
MODE=CREATE;HDRID=SIM01;SIMSRT=000000; +
SIMLEN=010000;CNTLST=PRINTFIL;RPTLST=ABCDIN $
TERM $

//ERRDIAGS DD DSN=SPCX.LIB.ERROR.CURRENT,DISP=SHR
//PRINTFIL DD SYSOUT=A,DCB=(RECFM=F,BLKSIZE=80)
//SIMUTAPE DD DSN=SIMTAPE,UNIT=DISK,SPACE=(TRK,2),
// DISP=(,KEEP),DCB=(RECFM=F,BLKSIZE=258)
//ABCDIN DD DSN=UNSORTED.PRINT,DISP=(NEW,PASS),
// SPACE=(TRK,2),UNIT=SYSDA,DCB=(RECFM=F,BLKSIZE=95)
//SORTLIB DD DSN=SYS1.SORTLIB,DISP=SHR
//ABCDWK01 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)
//ABCDWK02 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)
//ABCDWK03 DD UNIT=SYSDA,SPACE=(TRK,(15,1),,CONTIG)
//ABCDOUT DD SYSOUT=A,DCB=(BLKSIZE=95,LRECL=95,RECFM=F)
//SYSOUT DD SYSOUT=A
//DATA CRDS DD *
(Simulation message cards)
```

Example 3

This example prints (MODE=TPRNT) selected messages (MSGTYP=DEMA,ARRD,CAPS) from the simulation tape in time-ascending order.

```
// EXEC PGM=TR6,REGION=200K
//STEPLIB DD DSN=TR.LOAD,DISP=SHR
//SYSPRINT DD SYSOUT=A,DCB=(RECFM=F,BLKSIZE=80)
//SYSIN DD *
START $
ERRIN=ERRMSG;SIMOUT=SIMTAPE;RPTLST=TAPELIST;MODE=TPRNT;+
CNTLST=SYSPRINT;REPORT=SELECT;MSGTYP=DEMA,ARRD,CAPS;
TERM $
//ERRMSG DD DSN=SPCX.LIB.ERROR.CURRENT,DISP=SHR
//SIMTAPE DD UNIT=2400,LABEL=(1,NL),VOL=SER=CF1873,DISP=(OLD,KEEP),
// DCB=(RECFM=F,BLKSIZE=258)
//TAPELIST DD SYSOUT=A,DCB=(RECFM=F,BLKSIZE=95)
```

2.1.4 Program Output

TR generates the following outputs:

- An output simulation tape
- Control card listing
- Diagnostic messages
- Input message text listing
- Output simulation tape listing

The output simulation tape produced by TR is intended to be read by TA. Its format is given in Figure 2-2. User-provided control cards are listed as shown in Figure 2-3. If errors occur on the control cards, they are listed as shown in Figure 2-4. The formatted listings of input messages in time-ascending and alphabetical order are shown in Figures 2-5 and 2-6, respectively. The first column of numbers represents the time in HHMMSS format, followed by the message identifier, then the card number for that message and the message text. Listings of the output simulation tape are in the same format as Figures 2-5 and 2-6.

<u>Field</u>	<u>Bytes</u>	<u>Value</u>	<u>Type</u>	<u>Description</u>
Transmission Time	1-6	HHMMSS	N	Transmission time of CFC simulation message in EBCDIC
Transmission Time	10-13	Seconds	Binary	Transmission time of CFC simulation message in binary seconds
Message Length	14-15	Num of Bytes	N	CFC message length
CFC Message	16-256	Msg text	AN	CFC message text
End of Block	257-258	0	N	End of message block indicator

Figure 2-2. Simulation Tape Format

THIS PAGE IS BEST QUALITY PRACTICABLE
FROM COPY FURNISHED TO DDC

START\$
ERRIN=ERRDIAGS;DATAIN=DATACARD;SIMCUT=SIMUTAPE;+
MODE=CREATE;HDR ID=CFCSIM10;SIMSRI=C00000;+
SIMLEN=C100000;CNTLST=PRINIFIL;RPTLST=SCRTIN;
TERM\$

00000070
00000080
00000090
00000100
00000110

Figure 2-3. Control Card Listing

THIS PAGE IS BEST QUALITY PRACTICABLE
FROM COPY FURNISHED TO DDC

START \$
ERRIN=ERRMSG\$;SIMOUT=SIMTAPE;RPILST=TAPELIST;MODE=TTPRINT;+

**** ERROR TR016 FATAL **** INVALID VALUE FOR GIVEN KEYWORD

Figure 2-4. Error Diagnostic Printout

THIS PAGE IS BEST QUALITY PRACTICABLE
FROM COPY FURNISHED TO DDC

001100	DLV	1	DLV	JFK	ATL/04/09/45
001600	LISA	1	LISA	ATL	10/17/DL/J//
002100	LISA	1	LISA	ATL	10/17/DL/J//
002600	GAES	1	GAES	DEN	00/23/10
003100	DLX	1	DLX	PHL	//5
003600	DESB	1	DESB	PHL	0116/08/016/17/T/S47
004100	DESD	1	DESD	ATL	1001//1001//
005100	LISA	1	LISA	ZNY	10/12/AAR,ACH,BLT,CMT,PK4,GCS,AAI,AOS,AGE,CNG/R107,9720,9727,P747,DC8,D
005100	LISA	2	9,DC10/100	DEP,PGID,ARR,DTA,CTR,TYPE,ETE/G,I,H,K,U,J,K,T	
005600	CCPS	1	CCPS	JFK	01/03/3
006100	CAPS	1	CAPS	JFK	01/03/3,04,06/6,07/09/9

Figure 2-5. Listing in Time Sequence Order

2.1.5 Diagnostics

MESSAGE NUMBER

MESSAGE TEXT

TR001

Fatal message from TRKWCK
Expect keyword, could not identify

TR002

Fatal message from TRKWCK
Invalid error diagnostic code

TR003

Fatal message from TRVER
Could not identify as valid keyword

TR004

Fatal message from TRVER
Expecting equal sign after keyword

TR005

Fatal message from TRVER
Expect value of keyword after equal

TR006

Is not used.

TR007

Fatal message from TRVER
Expecting a delimiter after value

TR008

Fatal message from TRVER
Expecting value or plus after comma

TR009

Fatal message from TRVER
Expecting a keyword after semicolon

TR010

Fatal message from TRVER
Expect value of keyword after dash

TR011

Warning message from TRCCEX
Expecting start card, assume start

TR012

Fatal message from TRCCEX
Illegal character found

TR013

Fatal message from TRCCEX
Word exceeds eight character maximum

TR014

Fatal message from TRCCEX
Term card missing

TR015

Fatal message from TRKWPR
Could not identify keyword

TR016

Fatal message from TRKWPR
Invalid value for given keyword

TR017

Fatal message from TRKWPR
Keyword previously found

MESSAGE NUMBERMESSAGE TEXT

TR018	Fatal message from TRMTST Invalid site identification code
TR019	Fatal message from TRMTST Invalid time range
TR020	Fatal message from TRMTST Value of keyword previously found
TR021	Fatal message from TRMTST Invalid message type ID code
TR022	Fatal message from TRMTST Time range not within simulation time
TR023	Fatal message from TRCCER Invalid error diagnostic code
TR024	Fatal message from TRVER Expect value of keyword after plus
TR025	Fatal message from TRKWPR Invalid keyword for TR subsystem
TR027	Fatal message from TRMTST Invalid selection value
TR026	Is not used.

2.2 ON-LINE TEST DIRECTOR

2.2.1 Program Operation

The On-Line Test Director provides the capability of transmitting and receiving simulated CFC message traffic. TA operates in either an interactive mode or a batch mode. In the interactive mode, user-supplied control information is input via the IOT. In the batch mode, user-supplied control cards provide the control input. This control input is used to control processing functions. In either mode, CFC messages are read from a simulation tape generated by the Test Case Generator. CFC messages to be transmitted may be selected by message type and may be optionally invalidated before transmission. At the specified transmission time, messages are sent to the TCC, and are optionally listed on the high-speed printer. Messages received from the TCC are also listed optionally. These messages include echoes of CFC messages, output reports, and diagnostics. In the interactive mode, the user may enter simulated CFC messages for immediate transmission.

TA consists of three transaction load modules which perform the following functions: execute, transmit, and receive. The On-Line Test Executive TLM (TAEXEC) is activated by the user-supplied control information. Upon execution, it waits for, and accepts, the control inputs relayed to it by the CFC Monitor. Based on these control inputs, TAEXEC directs the execution of the simulation. Upon entry of a control information termination message, the On-Line Test Transmit TLM (TATRAN) is scheduled.

The TATTRAN TLM reads CFC messages from the simulation tape, processes them as specified by the control inputs, and sends them to the TCC via the CFC Monitor at the transmission time associated with the message.

The On-Line Test Receive TLM (TARECV) is scheduled for execution by the TCC when the TCC sends a message to the On-Line Test Director. Such messages, i.e., echoes of CFC messages, output reports, and diagnostics, are sent following the transmission of a CFC message which was input from the tape or the IOT.

There are four classes of input to the On-Line Test Director: initialization control information, simulation options, IOT-only input, and the control information termination message.

Initialization control input specifies the starting environment for testing. All initialization control parameters are required for an execution. They may not be respecified once the simulation begins.

Simulation option control input allows the user to specify which message types are to be selected, which messages are to be invalidated, and how they are to be changed. Additional simulation options allow the user to adjust the rate of simulation and selectively turn on or off the listing of transmitted and received messages. In interactive mode, simulation options control may be input from the IOT after the simulation has started.

IOT-only control input allows the user to enter CFC messages for immediate transmission and to request simulation status reports. When the On-Line Test Director is in execution, it continues to accept initialization and

option control input from cards or IOT. When a control input termination message is received, the simulation begins immediately, or at simulation start time. Changes to simulation options may then be made via IOT input.

Output from the On-Line Test Director consists of a control card listing and listings of selected input and output messages. Transmitted and received messages are logged on the ALQ tape by the TCC. All inputs to and outputs from the On-Line Test Director are handled through the facilities of the Executive Subsystem.

2.2.2 Program Inputs

2.2.2.1 Control Information

Control information to the On-Line Test Director is provided by the following messages: TACI, TAMG, TASR, TACT, and TAST. Initialization control and simulation options are prefixed by TACI, simulation messages entered at the IOT are prefixed by TAMG, requests for status reports are identified by TASR and TAST, and control information termination is indicated by TACT. These control input message identifiers occupy the first four positions of the appropriate control card or IOT entry, followed by at least one blank. Initialization control information and simulation option parameters are specified as follows:

- All parameters are of the form:
KEYWORD = VALUE;
- Parameter specification may be in free-format
- Input message line may not exceed 72 characters, including blanks.

- Message continuation may be specified by $\backslash$ + after any semi-colon.
- The last parameter specification may be followed by a $\backslash$ \$ after the semi-colon.

2.2.2.1.1 Required Initialization Control Input (TACT Message).

Initialization control parameters define the testing environment for a simulation, by specifying the mode of simulation, tape header identifier, and timing requirements. The following parameters are required for initialization:

KEYWORD	VALUES	REQUIRED/ OPTIONAL	DESCRIPTION
MODE	[Batch Active]	R	Mode of simulation. Batch Mode specifies input of control information via the card reader. Active Mode specifies input of control information via the IOT.
TAPEID	5 characters	R	Header identification of simulation tape as generated by TR.
EXECTM	6 digits	R	Start time of simulation. Execution of the simulation starts at the time specified by this parameter, relative to the entry of the TACT message. Time value has HHMMSS format where HH=HOUR, MM=MINUTE, SS=SECONDS.
BGNSIM	6 digits	R	Message transmission time of the first message to be processed from the simulation tape. Time value has HHMMSS format where HH=HOUR, MM=MINUTE, SS=SECONDS.
SPNSIM	6 digits	R	Elapsed time span of the simulation. The time value has the HHMMSS format where HH=HOUR, MM=MINUTE, SS=SECONDS.

For example:

```
TACI  MODE=ACTIVE: TAPEID=SIM01; EXECTM=000010; +
TACI  BGNSIM=000005; SPNSIM=000500; MSGIN=ON; +
TACI  MSGOUT=ON $
TACT
```

In this example, the user is in interactive mode, using a simulation tape with header identification SIM01. The simulation will begin execution 10 seconds after entry of the TACT message which causes the tape header to be read. The first simulation message transmitted will have a transmission time of 5 seconds. The total simulation execution time will not exceed 5 minutes. Transmitted and received messages will be listed on the high speed printer.

2.2.2.1.2 Simulation Options Input (TACI Message)

Simulation option parameters allow the user to select, invalidate, and modify simulation tape messages, as well as adjust the rate at which messages are transmitted. Listing options may also be specified.

KEYWORD	VALUES	REQUIRED/ OPTIONAL	DESCRIPTION
SMSG	2 or 4 Alpha- betic characters	0	Message type(s) to be selected from tape for transmission. Multiple message types are separated by commas. Reference Table 2-1 for message type values.
DMSG	2 or 4 Alpha- betic characters	0	Message type(s) which will not be selected from tape for transmission. Multiple message types are separated by commas. Reference Table 2-1 for message type values.

KEYWORD	VALUES	REQUIRED/ OPTIONAL	DESCRIPTION
GARBLE	6 digit transmission time followed by message and '\$' sign	0	Message to be transmitted at transmission time specified in HHMMSS format where HH=HOUR, MM=MINUTE, SS= SECONDS.
RATE	Max. 3 digits	0	Message transmission time rate. This value specifies an adjustment factor to increase or decrease all message transmission times.
MSGIN	{ ON } { OFF }	0	List/No List of received messages on high speed printer. Default value is off, i.e., no listing.
MSGOUT	{ ON } { OFF }	0	List/No List of transmitted messages on high speed printer. Default value is off, i.e., no listing.
DSPIN	{ ON } { OFF }	0	Display/No Display of received CFC messages on IOT. Default value is OFF, i.e., no display.
DSPOUT	{ ON } { OFF }	0	Display/No Display of transmitted CFC messages on IOT. Default value is OFF, i.e., no display.

2.2.2.1.2.1 Example of SMSG, DMSG Parameters

The following example illustrates the use of the SMSG option parameter:

```

TACI    MODE=BATCH; TAPEID=SIM01; EXECTM=000000; +
TACI    BGNSIM=000000; SPNSIM=000500; +
TACI    SMSG=LISA, FADT, GAEL, RS  $
TACT

```

In this simulation run, only the LISA, FADT, GAEL, and RS messages will be selected from the tape and transmitted. If the user chooses to inhibit transmission of messages, then he may specify DMSG=INHB, FP, LISA, FADF

which would cause all messages on the tape to be transmitted with the exception of INHB, FP, LISA, and FADF messages. Omission of the SMSG and DMSG parameters causes all messages from the simulation tape to be transmitted for the specified simulation start time (BGNSIM) and simulation time span (SPNSIM).

2.2.2.1.2.2 Example of GARBLE parameter

The GARBLE parameter allows the user to replace the message to be transmitted from the simulation tape for a given transmission time. The message specified may be a valid CFC message or an invalid message, i.e., "garbled" message. The message cannot exceed 240 characters, and a maximum of 5 GARBLE parameters may be specified per simulation run. If multiple GARBLE parameters are specified, subsequent GARBLE parameters must be preceded by a semi-colon. For example:

```
TACI      GARBLE = 000200 LISA ATL 00/22/EA $
TACI      ;GARBLE = 000230 FIXL ATL $
TACI      ;GARBLE = 000300 GAEL FIXL $
TACI      ;GARBLE = 000350 GARBLE THIS MESSAGE +
TACI      FOR INVALIDATION $
```

If the user is in interactive mode and has entered an incomplete message, he may ignore the input line by entering '+' sign followed by an IGNORE message on the next input line. For example:

```
TACI      MODE=ACTIVE; EXECTM=000000; BGNSIM=000010;+
TACI      SPNSIM=000500; TAPEID=SIM02; +
TACI      GARBLE=000230 GARBLE TEST MESSAGE +
TACI      GARBLE=IGNORE
```

The IGNORE parameter in this example nullifies the previous GARBLE parameter and allows the user to resume input. If the RATE parameter has been specified for the simulation, then the transmission time specified in the GARBLE parameter(s) must reflect the rate adjustment.

2.2.2.1.2.3 Example of RATE Parameter

The RATE parameter allows the user to increase or decrease the rate at which messages are transmitted from the simulation tape. For example:

```
TACI      MODE=BATCH;TAPEID=SIM02; BEGNSIM=000000; +  
TACI      EXECTM=000000; SPNSIM=000300; RATE=15; +  
TACI      MSGIN=ON; MSGOUT=ON $
```

In this instance, a RATE=15 causes each message to be transmitted at a rate equal to 15% of the transmission time as designated on the tape, thus speeding up the overall simulation. A RATE=200 would cause all transmission times to double, and thus slow down the simulation. If no RATE parameter is specified, the message transmission times default to those assigned when the tape was generated.

2.2.2.1.3 IOT-Only Input

Transmission of simulation messages for immediate transmission and requests for simulation status may be input via the IOT when the user is in interactive mode. To input a message, the user must enter TAMG followed by a blank and the CFC message (Ref. CFC User's Manual). Continuation of a message on the next input line is indicated by a '+' sign. A dollar sign

must follow the end of the message. For example:

TAMG ARRD ATL 00/06 \$

TAMG FADT ATL +

TAMG 10/18/////30 \$

If the user has entered an incomplete CFC message and wishes to ignore the input line, he must enter a '+' sign on the current input line, and then enter an IGNORE message. For example:

TAMG FP AA111Z JFK 1023 +

TAMG IGNORE

Transmission of the FP message is inhibited by the IGNORE message.

Requests for simulation status reports may be made by entering a TASR message followed by the message type or 'TOTAL' for a summary report. By entering the message type, a status report for that message is generated. Two character message types (FP, DM, RS) must be followed by two blanks to generate the appropriate report. If 'TOTAL' is specified, a summary status report is generated. See Figure 2-7 for sample inputs and outputs.

The report provides the following information:

1. Number of messages transmitted according to input source (tape or IOT), and total messages transmitted.
2. Number of messages accepted and rejected by the message processor and total messages received.
3. Number of active messages. An active message is one which is still being processed and has not been received at the time the report is generated.
4. Number of invalid messages. An invalid message is one which has been rejected by the CFC Monitor, and therefore has an invalid message type. Reference Table 2-1 for valid message types.

A status report according to all message types may also be requested by entering the TAST message. See Figure 2-8 for a sample of this report. Input of the TAST message also terminates the simulation.

2.2.2.1.4 Control Information Termination Message (TACT)

When initializing a simulation using the simulation tape, it is necessary to provide a TACT message to indicate the end of control inputs and to invoke the TATRAN TLM which reads the simulation tape. For example:

```
TACT    MODE=BATCH; TAPEID=SIM01; EXECTM=000000; +
TACT    SPNSIM=000500; BGNSIM=000010; MSGIN=ON; +
TACT    MSGOUT=ON $
TACT
```

The TACT message is required in both interactive and batch modes when executing a simulation using a simulation tape.

2.2.2.2 TA Simulation Tape

RECORD FORMAT:

Field	Bytes	Value	Type	Description
Transmission Time	1-6	HHMMSS	Numeric	Transmission time of CFC simulation message in EBCDIC where HH=HOUR, MM=MINUTES, SS=SECONDS.
Transmission Time	10-13	Seconds	Numeric	Transmission time of CFC simulation message in binary seconds
Message Length	14-15	No. of Bytes	Numeric	CFC message length
CFC Message	16-256	Msg text	Alpha-numeric	CFC message text
End of Block	257-258	0	Numeric	End of message block indicator

2.2.3 Program Outputs

TA outputs consist of all CFC responses generated through normal message processing, i.e., echoes of original messages, diagnostics, and output reports. These messages are printed or displayed, as requested by the user, in the format generated by the message processors. Output reports generated by CFC messages are always routed to the high speed printer.

In addition, simulation statistics for the run or for a specific message type may be displayed on the IOT, upon user request, during an interactive simulation run. A final simulation statistics report may be displayed at the IOT on conclusion a simulation run in either batch or interactive mode. See Figures 2-7 and 2-8 for example of these reports.

2.2.4 Diagnostics

The following error diagnostics may be generated by TA. The messages are either printed or displayed as specified by the user in the control inputs.

TA001 DATA FIELD TOO LONG

DESCRIPTION:

Statement and column number gives starting location of erroneous data. Data fields must not exceed eight characters.

TA002 DATA FIELD CONTAINS ILLEGAL CHARACTER

DESCRIPTION:

Statement and column number gives starting location of erroneous data. Illegal character must be removed and data reentered.

Reference Section 2.2.2.1

TA003 (INSERT) INVALID DELIMETER OR DELIMETER USED IMPROPERLY

DESCRIPTION:

Statement and column number gives starting location of erroneous data. The insert will also contain the erroneous data. Correct and reenter. Reference Section 2.2.2.1.

TA004 (INSERT) IS AN INVALID KEYWORD

DESCRIPTION:

Statement and column number gives starting location of erroneous data. The insert will also contain the erroneous data. Correct and reenter. Reference Section 2.2.2.1.1 of User's Manual for valid keywords.

TA005 (INSERT) KEYWORD USED IMPROPERLY

DESCRIPTION:

Statement and column number gives starting location of erroneous data. The insert will also contain the erroneous data. Correct and reenter. Reference Section 2.2.2.1.1 of User's Manual for valid keywords.

NOTE: Keywords may not be used as values of keywords nor as delimiters.

TA006 (INSERT) INVALID VALUE FOR GIVEN KEYWORD

DESCRIPTION:

Statement and column number gives starting location of erroneous data. The insert will also contain the erroneous data. Correct and reenter. Reference Section 2.2.2.1.1.

TA007 (INSERT) SELECT AND DELETE ENTRIES MAY NOT BE GIVEN IN SAME RUN

DESCRIPTION:

Statement and column number gives starting location of erroneous data. The insert will also contain the erroneous data. SMSG and DMSG keywords may not be specified in the same simulation execution. By default, any message type not specified in an SMSG entry will be deleted.

TA008 (INSERT) INVALID MESSAGE TYPE

DESCRIPTION:

Statement and column number gives starting location of erroneous data. The insert will also contain the erroneous data. Correct and reenter. Reference Table 2-1.

TA009 (INSERT) UNABLE TO STORE MESSAGE, TABLE IS FULL.
AT A LATER TIME, REENTER LINE

DESCRIPTION:

Statement and column number gives starting location of erroneous data. The insert will contain the transmission time of the CFC message not accepted. As garbled messages are transmitted, entries will become available in the garble table and the message can be stored. The garble table can hold five messages.

TA0010 (INSERT) NOT ABLE TO STORE MESSAGE, TABLE FULL

DESCRIPTION:

Statement and column number gives starting location of erroneous data. The insert will contain the transmission time of the CFC message not accepted. In a batch mode, only five garbled messages may be entered.

TA0012 SIM TAPE READ ERROR, PROCESSING TERMINATED

DESCRIPTION:

Hardware device error or damaged simulation tape. The simulation run is terminated.

TA0013 SIM TAPE HEADER NOT IDENTICAL TO USER TAPE ID

DESCRIPTION:

Simulation tape header ID and user supplied tape ID does not match. Enter TAST message to terminate mode simulation or enter simulation tape header ID, (TACI TAPEID=aaaa), and reenter TACT message.

TA0014 SIM TAPE HEADER READ ERROR, PROCESSING TERMINATED

DESCRIPTION:

System unable to read simulation tape header record. The simulation run is terminated.

```

total no. active; use in=on; account=on;
tang arrd at 1 20/10 ↓
tang arrd
MESSAGES:
ARRD
TRANSMITTED
TAPES KEYBOARD TOTAL* ACCEPT REJECT TOTAL*
1 1 1 0 1*
ACTIVE INVALID

tang lifp ca 1010 at 1 ↓
tang lifp
MESSAGES:
TRANSMITTED
TAPES KEYBOARD TOTAL* ACCEPT REJECT TOTAL*
1 1 1 0 1*
ACTIVE INVALID

tang lifp at 1 15/12 ↓
tang lifp
MESSAGES:
TRANSMITTED
TAPES KEYBOARD TOTAL* ACCEPT REJECT TOTAL*
1 1 1 0 1*
ACTIVE INVALID

tang lifp at 1 10/12 ↓
tang lifp
MESSAGES:
TRANSMITTED
TAPES KEYBOARD TOTAL* ACCEPT REJECT TOTAL*
1 1 1 0 1*
ACTIVE INVALID

```

Figure 2-7. Sample Simulation Using IOT Input - Page 1 of 2

MESSAGE:		TRANSMITTED		RECEIVED		ACTIVE		INVALID	
TAP	RECEIVED	TOTAL*	ACCEPT*	REJECT	TOTAL*	ACTIVE	INVALID		
SUMMARY	5	5*	5	2	5*	*	*	*	*
ACTV	0	0	0	0	0	*	*	*	*
ARRD	0	0	0	0	0	*	*	*	*
CAPL	0	0	0	0	0	*	*	*	*
CAPS	0	0	0	0	0	*	*	*	*
CXSD	0	0	0	0	0	*	*	*	*
CCEL	0	0	0	0	0	*	*	*	*
DEMA	0	0	0	0	0	*	*	*	*
DEMD	0	0	0	0	0	*	*	*	*
DESA	0	0	0	0	0	*	*	*	*
DESD	0	0	0	0	0	*	*	*	*
DLDY	0	0	0	0	0	*	*	*	*
LISD	0	0	0	0	0	*	*	*	*
DI	0	0	0	0	0	*	*	*	*
GAES	0	0	0	0	0	*	*	*	*
GADE	0	0	0	0	0	*	*	*	*
FACT	0	0	0	0	0	*	*	*	*
FIXL	0	0	0	0	0	*	*	*	*
FP	0	0	0	0	0	*	*	*	*
FPSP	0	0	0	0	0	*	*	*	*
INHB	0	0	0	0	0	*	*	*	*
LIEP	0	0	0	0	0	*	*	*	*
LISA	0	0	0	0	0	*	*	*	*
QFLI	0	0	0	0	0	*	*	*	*
QFLZ	0	0	0	0	0	*	*	*	*
RS	0	0	0	0	0	*	*	*	*

Figure 2-8. Summary Status Report