Honeywell Level 66 system

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I. INTRODUCTION

Within the Honeywell Level 66 system a priviledged program provides time sharing service to remote users. To effectively provide a wide array of services to a varied user load, the time sharing system (TSS) has two levels of customer support: 1) executive service and 2) subsystem service.

The TSS executive can be thought of as a subordinate, miniature operating system running within the constraints of the GCOS supervisor. It is impractical for a vast set of service programs to be concurrently resident in memory so only those more permanent, recurring and critical functions are contained in the executive.

The TSS subsystems are free standing units that provide more of the interactive support for the users. In a sense, the various subsystems can be thought of as extensions to the core of services provided by the executive. The subsystems perform the necessary interface functions required to build text, edit files, submit jobs, examine output and manipulate file structures (to name a few features).

During the course of a user's entire session many subsystems are called on behalf of the user by the executive level detection of certain conditions, and other subsystems are called in response to user entered data or commands at the terminal.

It is possible for a site to record system behavior on its statistic collection file (SCF). A particular type of SCF record is known as the TYPE-19 or TSS Instrumentation Record. The TYPE-19 record contains selected data gathered by the executive on behalf of each user. All users in the TSS environment have a working space maintained by the executive called the User Status Table (UST). As each user session proceeds and the various subsystems invoked for or by the user terminate, an optional site parameter setting may cause the selected UST fields to be written to the SCF file along with some executive data. The buffering of TYPE-19 records to the accounting file (SCF) is enabled by altering the contents of a cell (TSSAS) within the TSS executive communication region module (TSSA) to a non-zero value.

The TYPE-19 Analysis package is an assembly level program capable of gathering all the TSS TYPE-19 records together for processing. The output from the program's processing of SCF records can take several detailed forms as directed by various input parameters. The output from the program is intended for use by those persons maintaining, measuring, and enhancing the TSS executive and subsystems. The detailed nature of the reports makes the output more suited to site analysts rather than upper levels of management; however, the generalized reduction of information must be based on detailed data.

II. EXECUTION PARAMETERS

The TYPE-19 Analysis package is a simple activity to run because all file handling can be defaulted to program control or user specified. The program accepts two files as inputs - 1) AT is the accounting tape(s) and 2) I* is the input option file. A primary work file (XD) is established by the JCL or program to contain only the TYPE-19 records as they are separated from the remaining records on file AT. The JCL required to run the TYPE-19 analysis is as follows:

```
        $   SNUMB       99999
        $   IDENT       SITE STANDARD, NAME
        $   LOWLOAD
        $   OBJECT
              BINARY OBJECT DECK
        $   DKEND
        $   EXECUTE     DUMP
              INPUT OPTIONS
        $   LIMITS      50,40K,, 50K
(*)     $   FILE        XD, X1R, 300L
(*)     $   TAPE        AT, A1D,, 99999,, ACCNT,, DENSIT
        $   ENDJOB
```

The two starred files (*) may be omitted in the JCL declarations and dynamically acquired by the program during its execution using the MME GEMORE facility.

Practically, the program is best run against a single day's accounting tape or portions of a daily tape. The volume of data over extended periods of time may be inordinately large to process in a single run.

The output products are generated in response to several input option selections. The possible input options that can be supplied by the user are shown below with their associated interpretation. As evidenced, all options with the exception of time values are expressed as three-character strings, one per logical record.

OPTION	
ALL	DISPLAY THE FORMATTED FIELDS FROM ALL RECORDS FOUND.
SUB-ssss	DISPLAY INFORMATION FOR ONLY THOSE RECORDS CONTAINING THE SUBSYSTEM NAME ssss. (e.g. SUB-JOUT, SUB-NEWU, etc.)
USE-uuu. . .uuu	DISPLAY INFORMATION FOR ONLY THOSE RECORDS CONTAINING THE USER ID uuu. . .uuu. (e.g. USE-ABC, USE-TRAINING ID)
SUM	PROVIDE A SUMMARY, BY SUBSYSTEM, OF THE RECORDS
PRO	DISPLAY A PROFILE OF EACH USER SESSION
MEM	PLOT MEMORY UTILIZATION
LOD	PLOT USER LOAD
DEM	PLOT USER MEMORY DEMANDS
MAP	DISPLAY THE MEMORY MAPPING OF USER ID's AND SUBSYSTEMS

UTL	DISPLAY MEMORY UTILIZATION DATA
SSS	DISPLAY SUBSYSTEM SIZE DISTRIBUTIONS
RES	DISPLAY RESPONSE TIME DISTRIBUTIONS
WLF	DISPLAY AN ONGOING "WORK LOAD FACTOR."
TM1	SELECT INFORMATION FROM 00.000 TO 06.000
TM2	SELECT INFORMATION FROM 06.000 TO 12.000
TM3	SELECT INFORMATION FROM 12.000 TO 18.000
TM4	SELECT INFORMATION FROM 18.000 TO 24.000
TT.TTT-TT.TTT	SELECT INFORMATION FROM TIME INTERVAL T1 TO T2
-TT.TTT	SELECT INFORMATION STARTING WITH THE FIRST RECORD AND ENDING AT TT.TTT
TT.TTT	SELECT INFORMATION STARTING WITH TT.TTT AND ENDING AT THE LAST RECORD

III. OUTPUT DESCRIPTIONS

The output products consist of three parts - 1) The input summarization portion 2) the record summarization portion, and 3) the input directed portions.

The input options are scanned for validity and echoed to the printer. Any errors in syntax are displayed. Appendix A is a sample of the input option display.

The items in Appendix B are produced for each run and are not selectable by an input option. There are three main topics addressed as part of the summary- 1) elapsed time and counters, 2) userid's and stations present, and 3) the counts of each subsystem occurrence. Within the userid/station id portion any zero userid field is replaced by the "**UNKNOWN**" string. A zero userid can occur during logon of a user under certain conditions.

The combination of userid/station id is considered to be a unique identifier for a session. For those sites with fixed terminal identities (e.g. VIPS) the uniqueness of a session becomes a bit more clouded.

The displays from Appendix C and beyond constitute examples of input directed output.

Appendix C is a sample plot produced by the selection of the MEM option. The plot time span is sensitive to any user specified time values. Within any time span the plot increment for the y-axis is automatically scaled to produce a paged plot. The x-axis increment represents a 2K increase with each plot point (e.g. 0, 2, 4, 6, 8, 10, etc.) shown in the heading. The numbers between the dashes can be thought of as a tens value number. For each plot time shown along the y-axis, the memory utilization is represented by executive entries (E), available space holes (-), subsystems (S) and upper limit of memory (*). As more users are detected the size of the exec may expand to contain the UST's. No distinction is made for a graphed line to show where adjacent subsystems break. It is possible for 1K subsystems and 1K BTOS buffers to not be represented as plot points, and that is usually reflected by spaces between the last entry and TSS's upper memory limit. A sample interpretation using times 13.148 and 13.275 show an executive size of 22K and 24K respectively indicating an increase for UST space occurred. The line for time 13.148 shows more available space than is available at 13.275. Each entry reflects either 1K subsystems or 1K BTOS buffers present- in the first line, 4K is not plotted and in the second line, 8K is not plotted.

Appendix D is a sample plot produced by selecting the LOD option. All plots are sensitive to the time span and are automatically scaled. In this plot the x-axis increment of 1 means the header values represent an increase of 5 for each numbered plot point (e.g. 0, 5, 10, 15, 20 etc.). Within the plot the number of users (#), maximum number of users(*), number of users waiting memory (W), and number of urgent users (U) is shown. Coincident plot points are not resolved by using alternative plot characters. As an example, the plot line at 13.275 shows 1 user waiting memory, no urgent users, 12 current users, and a maximum number of users equal to 15.

Appendix E is a sample plot produced in response to the DEM option. This plot has a 2K x-axis increment and reflects the number of users waiting memory (U), the memory needed (K) and the maximum number of users (*). As an example, line 14.736 reflects 1 user waiting for 14K with 16 users maximum.

Appendixes F and G are samples from the ALL/SUB/USE options showing the chronological occurrence of each record. All fields within the record are split out beneath appropriate headings. For time related values the numbers are representing seconds. The numbers to the extreme right are record sequence numbers. The field headings, their parent UST cell, and meanings are shown below:

STAT ID	(station identifier) is obtained from LBUF
TRM TYP	(terminal type) is obtained from LBUF
BAR/SS SIZE	(subsystem base address and size) are obtained from .LSIZE
#SWAPS WT IN	(number of swapouts waiting input) is obtained from .LTCO
#SWAPS WT OT	(number of swapouts waiting output) is obtained from .LTCO
#TRO FAULTS	(number of timer runout faults) is obtained from .LTC1
#DISPS NO-INT	(number of dispatches met interrupted) is obtained from .LTC1

#INPUT REQ's	(number of terminal input requests) is obtained from .LTC2
#TERM OUTPUT	(number of terminal output transmissions) is obtained from .LTC2
#FORCE SWAPS	(number of forced swapouts) is obtained from .LTC3
TOTAL# SWAPS	(number of swapouts, swapins, loads) is obtained from .LTC3
#KEYIO DRLS	(number key I/O derails) is obtained from .LTC4
NUMBER DRLS	(total number of derails) is obtained from .LTC4
#EBM ADDS	(number of times extra buffer memory was added) is obtained from .LTC5
#BUFF READS	(number of buffer reads from swapped buffers) is obtained from .LTC5
#KEYIO CHAR/8	(number of keyboard output characters divided by 8) is obtained from .LST10
#DISK I/O's	(number of disk I/O's) is obtained from .LST10
#CHR/8 IN SS	(number of keyboard output characters counted within this subsystem) is obtained using .LST10 and .LKDSS
#DIO IN SS	(number of disk I/O's within this subsystem) is obtained using .LST10 and .LKDSS
MAX # USRS	(maximum number of users)
CUR# USRS	(current number of users)
#URG USRS	(number of urgent users)
TOTAL PROC	(total processor time used by user) is obtained from .LSTP

PROC IN SS	(processor time used within this subsystem)
IN MEM RDBLCK	(non-useful time spent in memory but roadblocked) is obtained from .LTMO
SWPING TIME	(time spent swapping the subsystem) is obtained from .LTM1
IN MEM PROC Q	(useful memory residence time when subsystem is waiting for the processor) is obtained from .LTM3
SWAPOT TIME	(time subsystem is swapped out, not waiting for memory) is obtained from .LTM3
WT MEM NOFSWP	(time spent waiting memory not after forced swap) is obtained from .LTM4
WT MEM FSWP	(time spent waiting memory after forced swap) is obtained from .LTM5
RESP TIME	(accumulated response time) is obtained from .LTMRS
CONTRL TIME	(START TIME OF PROCESS USED AS WORKING TIMER) is obtained from .LTMWT

Appendixes H and I illustrate how a sample output from the UTL option might appear. Each entry represents a step in time from which memory utilization data is extracted. Each line consists of entries which detail the following:

1) number of subsystems in memory
2) the smallest, average and largest sizes for subsystems in memory
3) the number of available space holes
4) the largest amount of memory available
5) the number of BTOS buffers present
6) the values of memory used and available
7) the percentage of memory used and available

Appendixes J and K illustrate how a sample report using the MAP option might appear. For each record occurrence the memory entries are broken out to show which users are present and what they are involved with. An attempt is made to correlate the station id back to the userid and if a unique entry cannot be found the "*NON-UNIQUE*" string is inserted. The user's subsystem size and subsystem name are followed by the number of dispatches and an interpretation

showing either .LFLAG bits or BTOS usage. As an example, the entries for 12.946 at the bottom of page 443 (appendix J) show 7 users in memory with one user (LINE-ID = 4460) having a BTOS buffer in use. All but two users are running routines from the CMDLIB (CMDL) facility. The other two users are running a 24K RUN Y subsystem and an 11K EDTX subsystem. Of interest is the trends that can be seen from previous entries (e.g. userid L66VU on line 5200 had 3 dispatches between the record occurrences at 12.939 and 12.946.

Appendixes L through O are sample reports generated from the SUM option. Each report shows the summarized statistics for the single specified subsystem. For each headed value the highest value, lowest value, average value and total value are shown. All times are shown in seconds.

Appendixes P, Q and R are samples using the PRO option. Each unique userid/station-id identified session is shown in terms of the subsystems used by that user. The headings for the columnar data represent the same data fields used for earlier reports. For sessions where the userid and station-id reflect multiple sessions a blank line occurs between the TERM and NEW subsystem entries. After all subsystems have been listed for a user, the user's session is summarized showing totals lines, low values, average values, and high values. When all user sessions are listed, a summary for all users shows the total sessions, the low, average and high values for the number of subsystems the low, average, and high values for elapsed time and the total number of subsystems.

Appendix S is a sample report that results from the SSS option that shows the distribution of subsystem sizes. The histogram-like display is a more finely detailed breakout than is used in TSSA. The occurrences, percent values and cummulative percentages are shown in integer values.

Appendix T is a sample output from the RES option showing distributions of response times gathered from the records. Again, this is a more refined sieve for times than is currently kept in TSSA.

Appendixes U and Y are examples showing the represention of a work load factor as requested by the WLF option. The work load factor (WLF) is a single expression that is listed as a number and in pictorial form. The fields within the Type-19 record that are sensitive indicators of TSS performance are grouped into a numeric expression and reduced to a single number expressing periods of utilization that require further examination. The factors used in the WLF computation are:

A = memory available
B = total hole size
C = amount of memory needed
D = number users waiting memory
E = number of subsystems in memory
F = maximum number of users
G = current number of users
H = number of urgent users

The WLF is then computed as follows:

WLF = ((A-B)*E) / ((C/D)*(F-G)*H)

IV. USAGE

The Type-19 reports can be used by a person familiar with the operation of TSS to determine which conflicts between users and resources result in reduced TSS performance.

Critical areas of TSS that may be affected by user loads include:

maximum user load
memory assigned to TSS
rate at which users wait for memory

frequency of urgent users appearing
use of CMDLIB routines
effects of memory acquisition and release amounts settable within TSS

amounts of memory needed when users are found waiting memory

excessive swap activity
impact of large BTOS requirements
clash between specific users and their unique applications

trends in the way subsystems are utilized

delays in bringing subsystems into memory

ratio of productive work prior to timer runouts or interrupts
amount of keyboard I/O

amount of subsystem disk I/O

trends reflected in the average session

subsystem size distributions

subystem response time distributions

An analyst has a wide number of cells in the executive communication region (TSSA) that can be altered to effect different results. It is impossible to issue many hard edicts regarding parameter tuning for a site. Each site workload is unique and global tuning recommendations are hard to arrive at. Once a site goes beyond the "allocation of TSS files, FMS modules in memory, use of SSA cache" effort a continuous cycle of definition of objectives, measurement, analysis, alteration of values is required to spot the trends that make a site unique or the user whose presence introduces system perturbations.

V. MAINTENANCE

The analysis package is coded in GMAP using liberal E**S** instructions. All I/O is performed using standard GFRC subroutine calls. All references to fields within records are made using assembly defined symbols. The format of the Type-19 record is shown in Appendix W.

INPUT OPTION PROCESSING

SUM

ALL

PRC

TMB

MEM

LOG

DEM

MAP

UTL

SSS

RES

NLP

SUMMARY OF RECORD CONTENTS

RECORDS PROCESSED REFLECT A TIME SPAN OF

101378 09.098 TO 101378 21.142

NUMBER OF RECORDS PROCESSED	=	2115
LARGEST VALUE FOR MAXIMUM NUMBER OF USERS	=	16
LARGEST MEMORY LIMITS	=	126
AVERAGE NUMBER OF CURRENT USERS	=	10
LARGEST NUMBER OF URGENT USERS	=	2

USERID'S / STATION-ID'S PRESENT

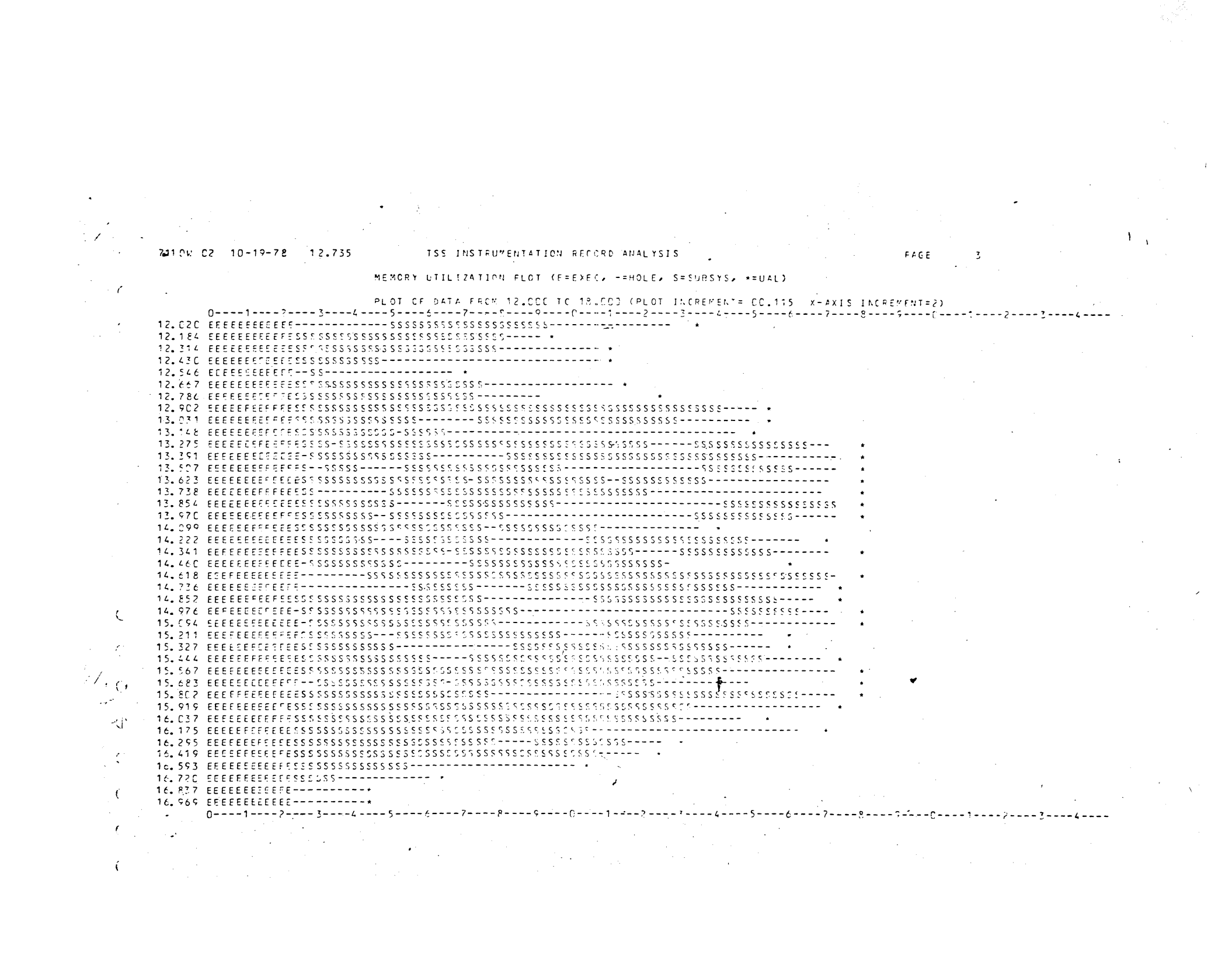
UNKNOWN	/2020	R.BARSTAD	/5370	L66VD	/5200	L66E	/5160	GEDIT	/5150	MPCMAN	/5170
.SD	/5270	**UNKNOWN**	/5370	WALT	/5170	NJPJ	/5100	**UNKNOWN**	/5400	LBD	/5230
.L66E	/5330	SED	/5310	MAN	/5300	NJPJ	/5260	SMCPM	/5210	WASB1	/5110
ISDE	/5250	L66E	/5410	BPP	/4460	**UNKNOWN**	/5210	LIMSP	/5210	TMPLP	/5170
SED	/7777	MAN	/7777	DBARNEY	/5250	LBD	/7777	PARSUP	/5260	L66E	/4460
GODDARD	/5270	.5	/5310	60455	/5210	L66VD	/5270	**UNKNOWN**	/5110	SMCPM	/5110
WALT	/5270	WASB1	/5260	GEDIT	/5490	L66VD	/5410	LOGICL.0	/5450	WALT	/5210
LOGICL.0	/5270	INSTL	/5300	NSYSD	/5110	MCC	/5170	BPP	/5210	INSTL	/5110
INSTL	/7777	WASB1	/7777	WALT	/5110	NSYSD	/5210	BLDORE	/5260	PERT	/5450
PERT	/5170	WGED	/5310	L66VD	/5160	.5	/5300	MAN	/5310	ARTWORK	/5330
.5	/7777	SED	/5250	**UNKNOWN**	/5300	WGED	/5310	BLDORE	/5210	WALT	/5460
.L66E	/5470	L66E	/5500	TECH	/5510	L66E	/5530	TECH	/2720	GRAPHIC	/5550

SUBSYSTEMS / NUMBER OF OCCURRENCES PRESENT

COUT	70	TERM	106	NEW	124	CODE	650	DATA	47	ACCE	49	GLOB	124	LIST	184	REMO	130	SET	32
PERM	55	LOGO	39	MEMO	17	BSED	52	-	1	RUN	41	.XMO	27	RESA	119	EDTX	52	SAVE	20
ASC	2	CONN	1	RUNO	14	CROM	80	RELE	21	SAVE	17	.000	11	CPY	9	RESE	5	DELE	7
USTS	4	STAT	1	BASY	6	CONV	9	LINE	2	SAVE	1	BYRI	1	LENG	1	RUNS	1	RUNS	1
JMES	1	JOUT	1	CMOS	1	EDIS	1	CMOD	1	CROM	1	-.01	1						

MEMORY UTILIZATION PLOT (E=EXEC, -=HOLE, S=SUBSYS, *=UAL)

PLOT OF DATA FROM 12.000 TO 18.000 (PLOT INCREMENT= 00.115 X-AXIS INCREMENT=2)



```
711CW 03  10-19-78   12.744          ISS INSTRUMENTATION RECORD ANALYSIS                                       PAGE     4

                    LOAD PLOT DATA (#=#USERS, *=MAX USERS, W=#USERS WAIT MEMORY, U=#URGENT USERS)

                    PLOT OF DATA FROM 12.000 TO 19.000 (PLOT INCREMENT= 00.115  X-AXIS INCREMENT=1)
        0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----
12.020        #        *
12.134       #         *
12.214       #         *
12.430      #          *
12.546       #         *
12.667       #         *
12.786         #       *
12.907          #      *
13.031         #       *
13.149         #       *
13.275  W           #  *
13.391               # *
13.507              #  *
13.623              #  *
13.738              #  *
13.854               # *
13.970              #  *
14.099             #   *
14.222               # *
14.341               # *
14.46?            #    *
14.618           #     *
14.736  W         #    *
14.852            #    *
14.976            #    *
15.094             #   *
15.211              #  *
15.327              #  *
15.444               # *
15.567                # *
15.683              #   *
15.802              #   *
15.919             #    *
16.037             #    *
16.175        #         *
16.295       #          *
16.419       #          *
16.593     #            *
16.720     #            *
16.837   #              *
16.969   #              *
        0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----5----0----
```

DEMAND PLOT (U=#USERS WAIT MEMORY, M=MEMORY NEEDED, *=MAX #USERS)

PLOT OF DATA FROM 12.000 TO 16.[illegible] (PLOT INCREMENT= 0(.115 Y-AXIS INCREMENT=3)

```
       0----1----2----3----4----5----6----7----8----9----0----1----2----3----4----5----6----7----8----9----0----1----2----3----4----
12.020
12.184
12.314
12.430
12.546
12.667
12.786
12.902
13.031
13.148
13.275 U
13.391
13.507
13.623
13.738
13.854
13.970
14.099
14.222
14.341
14.460
14.618
14.736 U
14.852
14.976
15.094
15.211
15.327
15.444
15.567
15.683
15.802
15.919
16.037
16.175
16.295
16.419
16.593
16.720
16.837
16.969
       0----1----2----3----4----5----6----7----8----9----0----1----2----3----4----5----6----7----8----9----0----1----2----3----4----
```

INSTRUMENTATION RECORD REPORT

	DATE	TIME	SS NAME	USERID	STAT ID	TRM TYP	BAR	SS SIZE	#SWAPS WT IN	#SWAPS WT OUT	#TRO FAULTS	#DISPS NO-INT	#INPUT REQ'S	#TERM OUTPUT	#FORCE SWAPS	TOTAL# SWAPS	
	101378	12.010	CRUN	ADMIN	5210	TTY	250002	002000	3	1	0	12	4	4	0	10	1
			#KEYIO DRLS	NUMBER DRLS	#EBM ADDS	#BUFF READS	#KEYIO CHAR/B	#DISK I/O'S	#CHR/B IN SS	#DIO IN SS	MAX# USRS	CUR# USRS	#JRG USRS				
			9	24	1	0	127	5	5	0	15	6	0				
			TOTAL PROC	PROC IN SS	IN MEM RDBLCK	SWPING TIME	IN MEM PROC 0	SWAPOT TIME	WT MEM NOFSWP	WT MEM FSWP	RESP TIME	CONTRL TIME					
			0	0	49	2	1	130	1	0	1	10866					
	DATE	TIME	SS NAME	USERID	STAT ID	TRM TYP	BAR	SS SIZE	#SWAPS WT IN	#SWAPS WT OUT	#TRO FAULTS	#DISPS NO-INT	#INPUT REQ'S	#TERM OUTPUT	#FORCE SWAPS	TOTAL# SWAPS	
	101378	12.020	CMDL	ADMIN	5100	TTY	330002	002000	144	48	0	32452	365	3070	39	475	2
			#KEYIO DRLS	NUMBER DRLS	#EBM ADDS	#BUFF READS	#KEYIO CHAR/B	#DISK I/O'S	#CHR/B IN SS	#DIO IN SS	MAX# USRS	CUR# USRS	#JRG USRS				
			5190	13460	246	103	238446	24451	3	689	15	6	0				
			TOTAL PROC	PROC IN SS	IN MEM RDBLCK	SWPING TIME	IN MEM PROC 0	SWAPOT TIME	WT MEM NOFSWP	WT MEM FSWP	RESP TIME	CONTRL TIME					
			1325	2	625	137	1484	1618	40	30	933	10721					
	DATE	TIME	SS NAME	USERID	STAT ID	TRM TYP	BAR	SS SIZE	#SWAPS WT IN	#SWAPS WT OUT	#TRO FAULTS	#DISPS NO-INT	#INPUT REQ'S	#TERM OUTPUT	#FORCE SWAPS	TOTAL# SWAPS	
	101378	12.020	CMDL	MAN	5300	TTY	062002	002000	145	39	0	3277	297	770	0	361	3
			#KEYIO DRLS	NUMBER DRLS	#EBM ADDS	#BUFF READS	#KEYIO CHAR/B	#DISK I/O'S	#CHR/B IN SS	#DIO IN SS	MAX# USRS	CUR# USRS	#JRG USRS				
			1992	2930	396	186	24693	274	17418	193	15	6	0				
			TOTAL PROC	PROC IN SS	IN MEM RDBLCK	SWPING TIME	IN MEM PROC 0	SWAPOT TIME	WT MEM NOFSWP	WT MEM FSWP	RESP TIME	CONTRL TIME					
			17	37	757	78	123	991	46	0	909	10722					
	DATE	TIME	SS NAME	USERID	STAT ID	TRM TYP	BAR	SS SIZE	#SWAPS WT IN	#SWAPS WT OUT	#TRO FAULTS	#DISPS NO-INT	#INPUT REQ'S	#TERM OUTPUT	#FORCE SWAPS	TOTAL# SWAPS	
	101378	12.020	REMO	MAN	5300	TTY	062002	002000	0	0	0	2	0	2	0	3	4
			#KEYIO DRLS	NUMBER DRLS	#EBM ADDS	#BUFF READS	#KEYIO CHAR/B	#DISK I/O'S	#CHR/B IN SS	#DIO IN SS	MAX# USRS	CUR# USRS	#JRG USRS				
			0	2	0	0	24693	274	0	0	15	6	0				
			TOTAL PROC	PROC IN SS	IN MEM RDBLCK	SWPING TIME	IN MEM PROC 0	SWAPOT TIME	WT MEM NOFSWP	WT MEM FSWP	RESP TIME	CONTRL TIME					
			54		0	0	1		0	2		10723					

APPENDIX G

INSTRUMENTATION RECORD REPORT

DATE	TIME	SS NAME	USERID	STAT ID	TRM TYP	BAR	SS SIZE	#SWAPS WT IN	#SWAPS WT OUT	#TRO FAULTS	#DISMS NO-INT	#INPUT REQ'S	#TERM OUTPUT	#FORCE SWAPS	TOTAL# SWAPS	
101378	12.021	CODE	AM	5300	TTY	062002	002000	0	0	0	7	1	0	0	1	5
				*KEYIO DRLS	NUMBER DRLS	#LBM ADDS	#BUFF READS	*KEYIO CHAR/S	*DISK I/O'S	*CHR/S IN SS	*DIC IN SS	MAX USRS	CUR* USRS	*ORG USRS		
				1	9	0	0	24656	277	3	3	15	5	0		
				TOTAL PROC	PROC IN SS	IN MEM RDBLCK	SWPING TIME	IN MEM PROC S	SWAPOT TIME	WT MEM NOFSWP	WT MEM FSWP	RESP TIME		CONTRL TIME		
				54	0	0	0	3	0	0	0	2		10726		
DATE	TIME	SS NAME	USERID	STAT ID	TRM TYP	BAR	SS SIZE	#SWAPS WT IN	#SWAPS WT OUT	#TRO FAULTS	#DISMS NO-INT	#INPUT REQ'S	#TERM OUTPUT	#FORCE SWAPS	TOTAL# SWAPS	
101378	12.022	TERM	MAN	5300	TTY	164002	002000	0	0	0	1	0	0	0	1	6
				*KEYIO DRLS	NUMBER DRLS	#LBM ADDS	#BUFF READS	*KEYIO CHAR/S	*DISK I/O'S	*CHR/S IN SS	*DIC IN SS	MAX USRS	CUR* USRS	*ORG USRS		
				0	3	0	0	24656	277	0	0	15	6	0		
				TOTAL PROC	PROC IN SS	IN MEM RDBLCK	SWPING TIME	IN MEM PROC S	SWAPOT TIME	WT MEM NOFSWP	WT MEM FSWP	RESP TIME		CONTRL TIME		
				54	0	0	0	0	3	0	0	0		10726		
DATE	TIME	SS NAME	USERID	STAT ID	TRM TYP	BAR	SS SIZE	#SWAPS WT IN	#SWAPS WT OUT	#TRO FAULTS	#DISMS NO-INT	#INPUT REQ'S	#TERM OUTPUT	#FORCE SWAPS	TOTAL# SWAPS	
101378	12.022	LOGO	MAN	5300	TTY	062002	002000	0	0	0	4	0	1	0	1	7
				*KEYIO DRLS	NUMBER DRLS	#LBM ADDS	#BUFF READS	*KEYIO CHAR/S	*DISK I/O'S	*CHR/S IN SS	*DIC IN SS	MAX USRS	CUR* USRS	*ORG USRS		
				1	5	0	0	24670	277	14	1	15	6	0		
				TOTAL PROC	PROC IN SS	IN MEM RDBLCK	SWPING TIME	IN MEM PROC S	SWAPOT TIME	WT MEM NOFSWP	WT MEM FSWP	RESP TIME		CONTRL TIME		
				54	0	0	0	1	0	0	0	1		10729		
DATE	TIME	SS NAME	USERID	STAT ID	TRM TYP	BAR	SS SIZE	#SWAPS WT IN	#SWAPS WT OUT	#TRO FAULTS	#DISMS NO-INT	#INPUT REQ'S	#TERM OUTPUT	#FORCE SWAPS	TOTAL# SWAPS	
101378	12.022	TERM	MAN	5300	TTY	062002	002000	0	0	0	2	0	0	0	1	8
				*KEYIO DRLS	NUMBER DRLS	#LBM ADDS	#BUFF READS	*KEYIO CHAR/S	*DISK I/O'S	*CHR/S IN SS	*DIC IN SS	MAX USRS	CUR* USRS	*ORG USRS		
				0	3	0	0	24670	277	0	0	15	6	0		
				TOTAL PROC	PROC IN SS	IN MEM RDBLCK	SWPING TIME	IN MEM PROC S	SWAPOT TIME	WT MEM NOFSWP	WT MEM FSWP	RESP TIME		CONTRL TIME		