

Systems

**OS/VS2
HASP II Version 4
Operator's Guide**

Program Number 370H—TX—001

Release 1



Systems

**OS/VS2
HASP II Version 4
Operator's Guide**

Program Number 370H—TX—001

VS2 SVS Release 1.7



PREFACE

This publication tells the computer operator how to use HASP II Version 4 with OS/VS2 SVS. It presents specific operating techniques and operator commands for:

- Starting, stopping, and restarting the HASP System
- Handling system input and input devices
- Handling system output and output devices
- Controlling devices
- Controlling jobs

Appendixes to this publication list HASP messages and detail operation of HASP remote work stations: 1130, System/360 (Model 20 and up), 2922, 2780, 2770, System/3, and 3780.

RELATED PUBLICATIONS

Information for programmers using HASP is in the OS/VS2 HASP II Version 4 User's Guide, GC27-0052.

First Edition (March, 1973)

This edition, as amended by technical newsletters GN25-0120 and GN27-1554, applies to HASP II Version 4.1 in support of OS/VS2 SVS Release 1.7 and to any subsequent versions of HASP and releases of SVS unless otherwise indicated in new editions or technical newsletters.

Information in this publication is subject to significant change. Before using this publication, consult the latest IBM System/370 Bibliography, GC20-0001, and the technical newsletters that amend the bibliography, to learn which editions and technical newsletters are applicable and current.

Requests for copies of IBM publications should be made to your IBM representative or to the IBM branch office serving your locality.

Forms for readers' comments are provided at the back of this publication. If the forms have been removed, comments may be addressed to IBM Corporation, P.O. Box 50020, Programming Publishing, San Jose, California 95150.



Technical Newsletter

This Newsletter No. GN25-0120
Date May 5, 1975
Base Publication No. GC27-6993-0
Previous Newsletters None

OS/VS2
HASP II Version 4
Operator's Guide
© IBM Corp. 1973

This Technical Newsletter, a part of release 1 of OS/VS2, provides replacement pages for the subject publication. These replacement pages remain in effect for subsequent releases unless specifically altered. Pages to be inserted and/or removed are:

Cover	51, 52	119, 120
25, 26	59, 60	207, 208
47, 48	69, 70	209, 210

A change to the text or to an illustration is indicated by a vertical line to the left of the change.

Summary of Amendments

Miscellaneous technical and editorial changes have been made throughout the book.

Note: Please file this cover letter at the back of the manual to provide a record of changes.

IBM Corporation, Department 63T
Neighborhood Road, Kingston, New York 12401

© IBM Corp. 1975

Printed in U.S.A.



Technical Newsletter

This Newsletter No. GN27-1554
Date September 15, 1976

Base Publication No. GC27-6993-0
File No. S370-36

Previous Newsletters GN25-0120

OS/VS2
HASP II Version 4
Operator's Guide
© IBM Corp, 1973

This technical newsletter, a part of Release 1.7 of OS/VS2 SVS, provides replacement pages for the subject publication. These replacement pages remain in effect for subsequent SVS releases unless specifically altered. Pages to be inserted and removed are:

Cover-4
31,32
43-50.2 (50.1, 50.2 added)
55,56
67,68
73-76 (page 75, text rearranged only)
83-86
99-102 (pages 100-101, text rearranged only)
125-130.2 (130.1, 130.2 added)
229-240

Each technical change is marked by a vertical line to the left of the change.

Summary of Amendments

HASP support for the IBM 3800 Printing Subsystem is now included in this book. In addition, miscellaneous technical and editorial changes have been made throughout the book.

Note: Please file this cover letter at the back of the manual to provide a record of changes.

Contents

How To Use This Book	5
Command Format Conventions	5
Standard Command Response	15
OK Response	15
Job Information Response	15
Standard Error Response	16
Abbreviated WTOR Reply	17
Introduction	18
Starting, Stopping, and Restarting The System	20
Starting The HASP System	20
Preparation	20
Starting The HASP Job	20
Stopping The System	23
Restarting The System	24
System Input	26
The JOB Card	26
The PRIORITY Card	28
The ROUTE Card	28
The MESSAGE Card	29
The SETUP Card	29
The JOBPARM Card	29
The OUTPUT Card	30
The COMMAND Card	32
Input Readers	33
Controlling HASP Readers	33
Local Reader Error Procedures	35
Starting Readers	36
Cancelling A Reader	36
Setting A Reader	37
Halting A Reader	38
Stopping (Draining) A Reader	38
Initiators	39
Starting An Initiator	40
Setting Initiator Classes	41
Displaying An Initiator	41
Stopping (Draining) An Initiator	42
System Output	43
Work Selection By Devices In Automatic Mode	45
Work Selection By Devices In Operator-Controlled Mode	45
Work Selection By Remote Devices	46
Printers	47
Considerations for the IBM 3800 Printing Subsystem	49
Setting A Printer	48
Setting The 3211 Printer FCB Images	51
Starting A Printer	53
Restarting A Printer	54
Repeating A Printer	54
Interrupting A Printer	54
Backspacing A Printer	55
Forward-Spacing A Printer	56
Cancelling A Printer	57
Halting A Printer	57
Stopping (Draining) A Printer	57
Punches	58
Setting A Punch	59
Starting A Punch	60

Restarting A Punch	60
Repeating A Punch	61
Backspacing A Punch	61
Forward-Spacing A Punch	62
Interrupting A Punch	62
Halting A Punch	62
Cancelling A Punch	63
Stopping (Draining) A Punch	63
OS Interfaces	63
Controlling Devices	65
OS Console Support	65
Controlling Console Message Output	65
Controlling Command Entry	66
Redirection Of Command Responses	69
Automatic Redirection Of Display Command Responses	69
Setting Message Routing	70
Displaying Operator Requests	71
Setting Level Of Message Output For Logical Classes	72
Starting And Restarting HASP RJE Lines	73
Starting A Line	73
Stopping (Draining A Line)	73
Restarting A Line	74
Remote Work Stations	75
Displaying Messages At Remote Terminals	76
Routing Job(s) Output	77
Display Special Routed Output	78
Monitoring Devices	79
Displaying Direct-Access Devices	79
Displaying Devices On RJE Lines	79
Displaying Remotes	80
Displaying Units	81
Controlling Jobs	82
Controlling The Job Queue	82
Holding All Jobs	82
Releasing All Jobs	82
Displaying Active Jobs	83
Displaying Output Work Queued On Forms, UCS, FCB, Forms Overlay, or BURST Characteristics	83
Displaying Job Information On Queued Jobs	85
Displaying Number Of Jobs Queued	86
Controlling Specific Jobs	87
Releasing Specified Job(s)	87
Cancelling Specified Job(s)	88
Displaying Job Information On Specified Job(s)	89
Restarting Specified Job(s) In Execution	89
Holding Specified Job(s)	90
Stopping Specified Job(s)	90
Controlling A Specific Job By OS Jobname	91
Releasing A Job	91
Cancelling A Job	91
Displaying Job Information	92
Restarting A Job	93
Holding A Job	94
Stopping a Job	94
Setting Job Class, Priority, Or Number	95
Setting Job Class Or Priority	95
Setting HASP Internal Job Number	96

Appendix A. HASP Messages and Codes.	97
HASP Initialization.	98
HASP System Catastrophic Error Codes	108
HASP Job Processing Messages	112
Appendix B. 1130 Operator's Guide.	131
Appendix C. System/360 Operator's Guide	146
Appendix D. BSC Model 20 and 2922 Operator's Guide	158
Appendix E. 2780 Operator's Guide	171
Appendix F. 2770 Operator's Guide	183
Appendix G. System/3 Operator's Guide	197
Appendix H. 3780 Operator's Guide	215

Illustrations

Figure 1.	HASP Command Verbs	8
Figure 2.	Alternate HASP Command Verbs	9
Figure 3.	HASP Command Summary	11
Figure 4.	Devices Affected By Device List Commands	14
Figure 5.	HASP Initialization Options	22
Figure 6.	HASP Message Classifications	67
Figure 7.	HASP RJE Typical Sense Information On 2701	121
Figure 8.	HASP BSC MULTI-LEAVING Data Stream Control Sequences	122
Figure 9.	Command Codes Utilized By HASP RJE	122
Figure 10.	HASP RJE CCW Internal Sequence Identifiers	123
Figure 11.	HASP RJE CCW Internal Sequence Command Types	123
Figure 12.	RTPLOAD Unusual Conditions	142
Figure 13.	RTPBOOT Unusual Conditions	143
Figure 14.	1130 Local Messages	144
Figure 15.	Communication Adapter Error Messages	154
Figure 16.	HASP/RMT360 Unit Record Error Messages	156
Figure 17.	Local Commands	166
Figure 18.	Communication Adapter Error Messages	168
Figure 19.	HASP/RMTM20 Action On Unit Record I/O Execution Errors	169

HOW TO USE THIS BOOK

The following is a description of the page layout and operator command format conventions and command responses used in the HASP Operator's Guide.

COMMAND FORMAT CONVENTIONS

HASP commands have the following form:

`$verb operand1, operand2, ..., operandn`

where:

- `$` HASP command identification character. All commands to the HASP System begin with the `$` character.
- `verb` HASP command verb. This verb is a single character, which describes the general action to be taken (see Figure 1). A longer form of the verb, which may be used is partially compatible with former versions of the HASP System (see Figure 2).
- `operands` HASP command operands. Operands are used to modify the verb of the command or identify the job or system facility to be acted upon. Commas separate multiple operands.

If more operands are entered than the command is designed to handle, the additional operands will either be ignored or will be concatenated to the last acceptable operand and handled as one.

The HASP command structure allows for much flexibility in entering the text of the command. The following rules apply:

1. For text outside paired apostrophes:
 - a. All alphabetic characters may be entered in upper or lower case.
 - b. Blanks may be inserted at any point in the command (after the initial `$`) for operator convenience.
 - c. Apostrophes may appear in the text of the command as a text character; however, each apostrophe text character must appear in duplicate.
2. For text inside paired apostrophes, all characters must appear as required by the individual command. Text apostrophes must appear in duplicate.

3. Key words for operands may, for the most part, be misspelled. It is only necessary to enter enough information to identify the job or facility desired.

The following examples illustrate these rules:

1. ~~\$r all rmt 4, local~~
\$RALL,RMT4,LOCAL
2. \$dm4, 'If your job's output is deleted, resubmit'
\$DM4, 'IF YOUR JOB'S OUTPUT IS DELETED, RESUBMIT'
3. \$a all or \$a a
\$AA

The first line of each example represents the operator's input. The second line represents the internal meaningful representation with the first character of each operand underlined.

Normally, an operator must correct command input via printer keyboard devices by cancelling the entry and by reentering the entire corrected command. During HASP job processing, HASP provides backspace editing of all commands (HASP and OS) entered via OS consoles. Since most printer keyboards do not have the backspace key the facility is simulated via a substitute backspace character, defined here for purposes of illustration as the "not" character "-". The installation selects the actual substitute backspace at HASP generation time. Rules concerning the "-" character follows:

1. Although the entry of "-" does not physically move the printer position backward, the command text character preceding the "-" and the "-" character itself are removed from the internal image of the command.
2. The backspace edit is unconditional; therefore, "-" cannot be entered for the purpose of contributing to the text of the message, regardless of HASP or OS command entry specifications.
3. Multiple "-" entries produce a logical backspace for each "-" entered. (Backspacing beyond the beginning of the line is prevented.)

The following examples illustrate the above rules:

<u>Entry</u>	<u>Result</u>
\$DN-Q	\$DQ
\$DJ4---CJ4	\$CJ4
\$D'ABE-C'	\$D'ABC'
\$C'---C ABC	C ABC

Only the characters required to recognize the uniqueness of each command are defined in Figure 3. For complete entry format, see the individual command description.

<u>Command</u>	<u>Definition</u>	<u>Operand Types</u>
\$A	RELEASE	All jobs or specific jobs
\$B	BACKSPACE	Printers
\$C	CANCEL	Device functions or jobs
\$D	DISPLAY	Disk, units, lines, remotes, messages, jobs, queues, activity, initiators, or operator requests
\$E	RESTART	Device functions, or jobs in execution
\$F	FORWARD SPACE	Printers
\$H	HOLD	All jobs or specific jobs
\$I	INTERRUPT	Printers
\$N	REPEAT	Device function
\$P	STOP (AFTER CURRENT FUNCTION)	Device, initiator, system, or job
\$R	ROUTE OUTPUT	By routing group or job
\$S	START	Device, initiator, or system
\$T	SET	Device, initiator, job, message routing or system job number base
\$Z	HALT (IMMEDIATE)	Device

Figure 1. HASP Command Verbs

<u>Alternate **</u>	<u>Short *</u>	<u>Sample Input - Comments</u>
\$ALTER	\$T	\$ALTER JOB4, P=+4 - up job 4 priority by 4
\$BACKLOG	\$DQ	\$BACKLOG - display number of queued jobs
\$BACKSPACE	\$B	\$BACKSPACE PRT1 - backspace printer 1
\$DEFINEI	\$TI	\$DEFINE I1,ABC - set initiator classes
\$DEFINE	\$DI	\$DEFINE - list all initiator status information
\$DELETEJ	\$PF	\$DELETE JOB 4 - purge job 4 after current activity
\$DELETE	\$C	\$DELETE PRT2 - cancel current output on printer 2
\$DISPLAY	\$D	\$DISPLAY DISKS \$DISPLAY UNITS \$DISPLAY RMTS
\$DRAIN	\$P	\$DRAIN I - stop all further execution \$DRAIN I2 - stop further execution with initiator 2 \$DRAIN PRT1 - stop printing on printer 1 after current job
\$LIST	\$T	\$LIST CON1,15 - list only message classes above 15
\$LOCATE	\$D	\$LOCATE JOB 4 - display job information about job 4
\$HOLD	\$H	\$HOLD ALL - prevent all jobs from beginning activity \$HOLD JOB 4 - prevent JOB 4 from beginning activity

* The short form listed in this table is the character string to which the alternate form is converted. Verbs, such as \$IDJ, \$LOCATE, and \$DISPLAY, are all converted to \$D and are, therefore, equivalent.

** The alternate form of commands is available for use only when selected by the installation at HASP generation time.

Figure 2. Alternate HASP Command Verbs (Sheet 1 of 2)

<u>Alternate **</u>	<u>Short *</u>	<u>Sample Input - Comments</u>
\$IDJ	\$D	\$IDJ JOB 3 - display job information about job 3 \$IDJ 'ABCJOB' - display job information about all jobs with name 'ABCJOB'
\$RELEASE	\$A	\$RELEASE ALL - release all jobs in queue if held by \$HOLD ALL \$RELEASE JOB 6 - release job 6
\$REPEAT	\$N	\$REPEAT PRT1 - repeat the current function on printer 1
\$RESTART	\$E	\$RESTART LNE3 - abort current activity and start over
\$ROUTE	\$R	\$ROUTE ALL,RMT3,LOCAL - remote output
\$SETJOBNO.TO	\$TJ	\$SET JOB NO. TO 4 - set system-generated job number base
\$SPACE	\$T	\$SPACE PRT1,C=1 - single space each line on printer until next data set
\$START	\$S	\$START - start job processing \$START LNE3,QXZ3 - start line with password
\$STATUS	\$DA	\$STATUS - list current activity
\$STOP	\$Z	\$STOP PRT1 - suspend operations until \$START

* The short form listed in this table is the character string to which the alternate form is converted. Verbs, such as \$IDJ, \$LOCATE, and \$DISPLAY, are all converted to \$D and are, therefore, equivalent.

** The alternate form of commands is available for use only when selected by the installation at HASP generation time.

Figure 2. Alternate HASP Command Verbs (Sheet 2 of 2)

<u>Command</u>	<u>Remote Source</u>	<u>Comments</u>
JOB QUEUE		
\$AA	NO	Release all jobs
\$DA	YES	Display active jobs
\$DF	YES	Display number of queued jobs awaiting different output setups
\$DN	YES	Display job information on queued jobs
\$DQ	YES	Display number of queued jobs
\$HA	NO	Hold all jobs currently in the system
JOB LIST		
\$A job list	IF OWNER	Release specified job(s)
\$C job list	IF OWNER	Cancel specified job(s)
\$D job list	IF OWNER	Display job information on specified job(s)
\$E job list	NO	Restart execution of specified job(s)
\$H job list	IF OWNER	Hold specified job(s)
\$P job list	IF OWNER	Stop specified job(s) after current activity
MISCELLANEOUS JOB		
\$A 'job name'	IF OWNER	Release job by OS job name
\$C 'job name'	IF OWNER	Cancel job by OS job name
\$D 'job name'	YES	Display job information on job(s)
\$E 'job name'	NO	Restart execution of job by OS job name
\$H 'job name'	IF OWNER	Hold job by OS job name
\$P 'job name'	IF OWNER	Stop job by OS job name
\$T Jx...j,operand	NO	Set job class or priority - c=class or p=priority
\$T Jx...j	NO	Set HASP internal job number
DEVICE LIST		
\$B device list	IF OWNER	Backspace device(s)
\$C device list	IF OWNER	Cancel current function on device(s)
\$E device list	IF OWNER	Restart current function on device(s)
\$F device list	IF OWNER	Forward space device(s)
\$I device list	IF OWNER	Interrupt the current function on printer(s)

Figure 3. HASP Command Summary (Sheet 1 of 2)

<u>Command</u>	<u>Remote Source</u>	<u>Comments</u>
\$N device list	IF OWNER	Repeat current function on device(s)
\$P device list	IF OWNER	Stop the device(s)
\$S device list	IF OWNER	Start device(s)
\$T device	IF OWNER	Set device
\$Z device list	IF OWNER	Halt device(s) (suspend operation)
SYSTEM		
\$DI	YES	Display initiator(s), classes and status
\$PI	NO	Stop initiator(s) after current activity
\$SI	NO	Start initiator(s)
\$TI	NO	Set initiator classes
\$P	NO	Stop system
\$PHASP	NO	Terminate HASP job
\$S	NO	Start system
\$TF	NO	Set FCB image for 3211 carriage control C=V
\$TM	NO	Set message routing of command responses
MISCELLANEOUS DISPLAY		
\$DD	YES	Display direct-access devices
\$D line n	YES	Display HASP Remote Job Entry line
\$DO	YES	Display operator requests
\$DR	YES	Display devices on remote(s)
\$DU	YES	Display local unit record devices
REMOTE JOB ENTRY		
\$DM	YES	Display message
\$DS	YES	Display special routing output
\$R	IF OWNER	Route output for specified job or device group to another device group

Figure 3. HASP Command Summary (Sheet 2 of 2)

Most device commands may be used to control several devices simultaneously. Unless the format of the acceptable device list required by a command is explicitly specified, all device list commands accept entries of the following form:

\$verb device 1,device 2,...,device n

Each operand specifies a single device that is to be acted upon by the HASP System. The device may be specified by its full name or abbreviated name as follows:

1. INTRDRn - RDIn (abbreviation must be used)
2. LINEn - LNE n
3. PRINTERn - PRTn
4. PRINTRn - PRTn (used when more than 9 printers are on the system)
5. PUNCHn - PUNn (abbreviation must be used)
6. READERn - RDRn
7. RMr.PRn - (no abbreviation)
8. RMr.PUn - (no abbreviation)
9. RMr.RDn - (no abbreviation)

A maximum of five (5) operands may be specified in a single device list command. Operands that are in excess of the maximum allowed will be considered part of the fifth operand.

In using device commands, note that:

1. Device list commands generally perform their operations after the response to the command; i.e., the OK response to a device list command signifies that the command has been accepted and an attempt will be made to perform the requested action for all devices listed.

Additional messages will be displayed on the operator's console when the action requested is either in process or has been completed as appropriate. See the messages and codes appendix (Appendix A) for the format and meanings of these messages.

2. An error response to a device list command indicates that the action requested by the previous operands will be attempted, but the operand in error and all following operands will be ignored.
3. Many commands will accept operands as valid, even though the devices specified are unable to perform the function requested. Figure 4 identifies the devices affected by each device list command.

	\$B	\$C	\$E	\$F	\$I	\$N	\$P	\$S	\$T	\$Z
Line			Y				Y4	Y	Y7	Y7
Local Reader		Y2					Y	Y	Y	Y
Remote Reader		Y2					Y5	Y	Y	Y
Internal Reader		Y2,3						Y	Y	Y7
Local Printer	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Remote Printer	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Local Punch	Y1	Y	Y	Y1	Y1	Y	Y	Y	Y	Y
Remote Punch	Y1	Y	Y	Y1	Y1	Y	Y	Y	Y	Y

- 1 Restarts function.
- 2 Deletes current job.
- 3 Simulates EOF, if no current EXCP.
- 4 Stop after signoff, or \$E (if remote active).
- 5 Stop at EOF, as opposed to end of function for current job.
- 7 Command accepted but will have no effect.

Figure 4. Devices Affected By Device List Commands

The following conventions are used to describe the format requirements and options of the various HASP commands:

1. Upper case characters - the exact characters should be used when selecting the option.
2. Lower case keyword - appropriate text should be inserted to replace the keyword.
3. Braces {} - one of the options enclosed by the braces must be selected, unless part of an unselected option.

4. Brackets [] - one of the options enclosed by the brackets may be selected.
5. Character string x... - the character(s) preceding the x is sufficient to identify the option and any alphabetic characters following are optional; i.e., Jx... indicates that the single character "J" is sufficient to identify the operand; however, "JOB", "JOBS", or any other alphabetic character strings will be accepted as long as they begin with the character "J".
6. Character(s) j or jj - a job number is desired.
7. Character(s) r or rr - a routing code is desired (routing codes refer to local [r=0] or remote terminal [r=1 to &NUMRJE] output routing of job print or punch).
8. Character n - a device number is desired.
9. Character(s) j-jj or r-rr - a range of numbers is desired, indicating the ability of the command to operate on one or more jobs or routing codes. When a range is specified, the low value should be specified first; otherwise, only the end value will be recognized.

STANDARD COMMAND RESPONSES

A basic philosophy of the HASP System is the display of a response to each HASP command entered during normal job processing. Therefore, the processing of each command entered into the HASP System results in one or more responses, which are displayed on the requesting console or, in the event of card input, on an associated console device.

OK Response

The response "OK" signifies that action requested has been taken or that the request has been noted and action will be taken by the system when appropriate. The "OK" response will be the last message issued as a direct response to the operator; however, many commands will result in action that will issue information messages to the central operator console.

Job Information Response

Many HASP commands will display job information as a response to the operator. The format of the response is as follows:

2. xxxxxxxx INVALID OPERAND - The input stream identified by the eight characters displayed was not recognized as a valid operand. With the exception of device list commands, no action has been taken. In the case of device list commands action has been taken on operands preceding the invalid operand. This response may also be issued to unauthorized entry sources for operands that require a greater degree of authorization than the entire command does.

ABBREVIATED WTOR REPLY

When HASP is in the system, an abbreviated WTOR reply may be used according to the following rules:

1. The R or REPLY keyword can be omitted:

nn,'text'

2. The comma can be omitted:

nn'text'

3. For upper case text characters, the apostrophes can be omitted:

nntext
nn,text

4. The numeric identifier can be one digit, unless the first text character is numeric and the separating comma nor apostrophe nor blank is present:

nntext
n,text
n'text'
n,'text'
n text

If the abbreviated reply begins with the character R, the reply must follow OS syntax rules. If the numeric form is used, the reply number is logged on the HASP Job Log of the job that issued the corresponding WTOR (if the reply element is outstanding when the reply is entered). This logging occurs regardless of the validity of the text to OS and the associated program.

INTRODUCTION

HASP is a program which, when started by the operator, assumes control of selected devices and interfaces with the Operating System (OS) to manage the subsequent flow of jobs submitted for execution. Under normal processing, jobs flow through four distinct major functions of HASP as follows:

1. INPUT - Jobs are read into the system. Each job, made up of Job Control Language (JCL) and optional input data cards, enters the system and is saved on direct-access storage (SPOOL volumes) for subsequent high-speed retrieval.
2. EXECUTION - Jobs are submitted to OS for execution. As each job is selected for execution, the JCL cards are retrieved and submitted to an OS Reader/Interpreter for initiation by OS. During execution, each job is monitored; input data is provided, and print/punch data created by the job, along with system messages, is saved on the SPOOL volumes for later output.
3. OUTPUT - The output for jobs is printed or punched on HASP output devices. The system messages and Job Log data sets are output on devices assigned to the MSGCLASS class. Print and punch data sets are output on devices assigned to the corresponding SYSOUT class.
4. PURGE - Jobs are removed from the system. Upon completion of all processing required for a job, the SPOOL volume space and all HASP resources associated with the job are made available for re-use.

Although each job entering the system passes sequentially through each function, one function at a time, all HASP functions may run concurrently when sufficient jobs are available for processing. Note that more than one output device may be performing its function on a given job at the same time.

As each HASP function completes processing a job, the job is placed in a queue (in order of HASP scheduling priority) with other jobs to wait for the next function. A new job to process is then selected from the queue of eligible jobs. Since jobs are in priority order on the queue, high priority jobs will be selected for processing, in preference to lower priority jobs. The net effect is that high priority jobs will spend less time in the system than low priority jobs.

To illustrate HASP processing of jobs, the following example traces a job through the system:

Job A enters the system and is assigned HASP job number 100. Jobs 1 through 99 have entered the system previously and are being processed by other functions, are queued for processing, or have been deleted from

the system. Assuming that job 100 is placed in the class A execution queue with jobs 97, 98, and 99 and is highest priority, the HASP initiator will select job 100 for OS execution when the next class A job is selected.

At completion of execution, job 100 is placed in the output queue. Again, assuming that the queue contains jobs 70, 71, 73, 80, and 92 and job 100 is highest priority, job 100 will be selected for printing and/or punching when the device is free. After all SYSOUT data has been output, the job is queued for purging and when selected, is removed from the system.

STARTING, STOPPING, AND RESTARTING THE SYSTEM

System operations are controlled mainly through an OS console I/O device. The operator gives commands to the system, and receives messages from it via the console. Refer to the discussion of OS Console Support later in this manual.

STARTING THE HASP SYSTEM

HASP runs as a system task under OS/VS2. Although jobs in the installation may be submitted directly to OS (independent of HASP), it is assumed that all production jobs run by OS will be under the control of HASP and that HASP and OS have been tailored, during the generation processes, to minimize operator action required to start the system.

Preparation

The Operating System must be started and running correctly prior to any attempt to start HASP. All OS readers, writers, and initiators should be stopped. If an OS "warm start" is performed, messages indicating that the HASP System has abnormally terminated should be ignored; these messages result from cleaning out the OS queues from the last IPL of the system.

HASP requires that direct-access volumes be mounted to queue JCL cards and input data awaiting OS execution and to save job output for various printer and punch devices. One of these volumes will be labeled "nnnnn1" (normally SPOOL1). The additional volumes, if present, will be labeled "nnnnnx," where "x" is an alphabetic character or numeric digit (other than 1); no two volumes may have the same volume serial. The maximum number of volumes to be mounted is determined by the installation during HASP generation. If the volumes are online and ready at OS IPL time and OS has not requested that they be removed, the SPOOL volumes are ready for the starting of HASP. Otherwise, the operator should use the OS mount command to ensure all SPOOL volumes are known to OS.

Starting The HASP Job

With the Operating System otherwise dormant and ready for job processing and with the direct-access SPOOL volumes mounted and known to the operating system, the operator starts the HASP job by entering the OS command:

```
S   HASP
```

The start command causes OS to read the procedure "HASP" from SYS1.PROCLIB, which loads the HASP executable module into storage and passes control to HASP.

HASP will issue an initial WTOR requesting directions from the operator. The WTOR message will appear as follows:

```
nn $ SPECIFY HASP OPTIONS -- HASP - id VERSION x.x
```

The operator should respond to this message using the standard OS reply format with the corresponding reply number "nn". The text portion of the reply must be one or more options selected from Figure 5.

If the operator does not want to run the version of HASP indicated by the WTOR message, he can immediately abort that version by responding:

```
R nn,$
```

Each option may be entered in either upper or lower case. A comma must be used to separate the options. Blanks are not permitted. If two options, which are considered opposite, are entered, the latter option overrides the former. The FORMAT option, when used, has the effect of cold starting regardless of the WARM/COLD specification.

<u>Option</u>	<u>Meaning</u>
<u>NOFMT</u>	No SPOOL volume is to be formatted unless HASP determines necessary; opposite option is FORMAT.
FORMAT	All SPOOL volumes are to be formatted; opposite option is NOFMT.
<u>WARM</u>	HASP is to continue processing where it left off during the previous IPL; opposite option is COLD.
COLD	Any job data on the SPOOL volumes is to be ignored; opposite option is WARM.
<u>NOREP</u>	No replacement cards are to be used; opposite option is REP.
REP	Replacement cards are to be used for temporary modifications to HASP during this IPL. Option should be specified only under direct supervision of system programmer responsible for the replacement cards; opposite option is NOREP.
<u>REQ</u>	HASP is to stop and wait for a \$S command before beginning job processing; opposite option is NOREQ.
NOREQ	HASP is to begin job processing when ready to do so; opposite option is REQ.
<u>LIST</u>	HASP is to list, on a designated printer, any replacement cards read; opposite option is NOLIST.
NOLIST	HASP is not to list replacement cards; opposite option is LIST.
<u>TRACE</u>	Tracing of HASP internal execution is allowed. Option is not active on a system generated for production; opposite option is NOTRACE.
NOTRACE	Tracing of HASP internal execution is cut off; opposite action is TRACE.
NONE	All default options are taken.
U	All default options are taken.

Note: The options underlined are the normal default options.

Figure 5. HASP Initialization Options

When the operator has determined that the system is ready for job processing, he should enter the \$S command on the console.

\$S	
-----	--

The console response will be OK.

Example: user - \$S
system - OK

The following examples list the console messages and reply sequence expected during HASP initialization:

1. user - S HASP
system - 08 \$ SPECIFY HASP OPTIONS -- HASP id VERSION x.x
user - R 08, 'COLD,FORMAT'
system - SPOOL1 IS BEING FORMATTED
system - ENTER,HASP REQUESTS
user - \$S
2. user - S HASP
system - 06 \$ SPECIFY HASP OPTIONS -- HASP id VERSION x.x
user - R 06, 'U'
system - ENTER HASP REQUESTS
user - \$S

STOPPING THE SYSTEM

To stop all HASP processing, leaving HASP in a dormant state, enter the \$P command.

\$P	
-----	--

The console response, OK, indicates that the current functions will be allowed to complete, and the system will become dormant.

Although HASP will not voluntarily start new work, new jobs will be accepted through any HASP job input device.

All HASP job processing will be stopped. The HASP initiators, printers, and punches will not begin any new functions. The effects of \$P, under normal conditions, may be negated by the \$S command.

Example: user - \$P
system - OK

To remove HASP from the system, use the \$P HASP command.

\$P	HASP
-----	------

The \$P command will be simulated, and if HASP is in a dormant state (no job processing is in process, and all HASP devices are DRAINED or INACTIVE), the HASP System will withdraw from control of the Operating System.

If HASP is unable to withdraw from the system, the response HASP NOT DORMANT will be received. Since HASP loses control of the system during withdrawal, a response is not issued by HASP to signify completion.

Example: user - \$P HASP
(HASP withdraws)

If the system contains the Execution Batch Scheduling feature (see HASP System Programmer's Guide), it is recommended (but not required) that the \$P I operator command be issued and system activity be allowed to quiesce prior to issuing the \$P HASP command. This will allow any batch programs to be cleared from the OS job queue prior to withdrawal of HASP.

\$P	I
-----	---

All initiators will be stopped. The console response is OK.

RESTARTING THE SYSTEM

When HASP is "warm started," all SPOOL volumes that were up during the last execution of HASP must be present and available. HASP will assume that the volumes are intact and that no formatting will be required to run with the volumes. If a new volume with an "nnnnx" label is present, HASP will determine whether it has been preformatted and will format the volume, if necessary. It is recommended, however, that only preformatted volumes be added at HASP warm start time.

During a HASP warm start, jobs in execution when the CPU was stopped will be scheduled for execution again. For this reason, the operator should enter as a reply to the HASP WTOR:

R 0, 'WARM,REQ' (assuming 00 is the current reply number)

HASP will list the activity in process when the CPU was stopped and will wait for the operator to enter requests. The wait for HASP requests serves the following purposes:

1. Allows OS to flush the interrupted jobs from the OS queues.
2. Allows the operator to examine each job listed to determine whether to:
 - a. Allow the job to be automatically re-executed by HASP
 - b. Queue the job to be printed or punched
 - c. Cancel the job, allowing it to be purged from the system.

For each job that was executing, the operator must respond to a WTOR in order to select one of the options (a or b) above.

3. Allows the operator to examine the activity on the output devices to determine action to be taken prior to starting normal job processing.
4. Allows the operator to change the default status of HASP initiators and devices and to modify the status of jobs in the HASP queue.

When the operator has determined that the system is ready for job processing, he should enter "\$S" on the console.

Example:

```
user      -   S HASP
system    -   10 $ SPECIFY HASP OPTIONS -- HASP id VERSION x.x
user      -   R 10, 'WARM,REQ'
system    -   TEST1 WAS PRINTING/PUNCHING
system    -   ENTER HASP REQUESTS
user      -   $S
```

SYSTEM INPUT

The input job streams submitted to the Operating System via HASP follow the conventions and format described in the OS/VS Job Control Language manual. Within these conventions, HASP requires that some cards be specified in a particular manner and provides for optional control cards (which appear as comments to OS in systems without HASP). This section discusses the use, format, and placement of these cards.

THE JOB CARD

The JOB card is a variable-field control card which defines the beginning of a job (and, of course, the end of the previous job) within an input stream. The format of the JOB card is as described in the OS/VS Job Control Language Reference manual. In addition to recognizing certain keyword entries, HASP may be required to extract information from the accounting field of the JOB card (refer to the HASP System Programmer's Guide section describing the &RJOB OPT HASPGEN parameter).

When HASP utilizes the accounting field, subfields of the accounting field are treated as positional parameters. Each subfield, in accordance with OS/VS JCL standards, may be enclosed in single quotes. To omit a specific subfield, the comma normally following the subfield should be punched in the subfield's place. To omit the remainder of the subfields, the closing right parenthesis should follow the last subfield entered.

HASP assumes the accounting field to be in the following format:

(pano,room,time,lines,cards,forms,copies,log,linect)

where:

- pano = programmer's accounting number. This subfield should consist of one to four alphanumeric characters (example: "4301").
- room = programmer's room number. This subfield should consist of from one to four alphanumeric characters (example: ",E305").
- time = estimated execution time in minutes. This subfield should consist of up to four numeric digits (example: ",30" for 30 minutes). If omitted, a standard value will be assumed.
- lines = estimated line count in thousands of lines. This subfield should consist of up to four numeric digits (example: ",5" for 5000 lines). If omitted, a standard number of lines will be assumed.

- cards = estimated number of cards to be punched. This subfield should consist of up to four numeric digits (example: ",200" for 200 cards to be punched). If omitted, a standard number of cards will be assumed.
- forms = special forms for printing entire job. This subfield should consist of from one to four alphameric characters (example: ",5" for 5-part forms). If omitted, standard forms will be assumed.
- copies = number of times output is to be printed or punched. This subfield should consist of up to three numeric digits and should not exceed an installation-specified limit (maximum 255) (example: ",2" for two copies). If omitted, one copy will be assumed.
- log = HASP Job Log option. This subfield should consist of one character. If this character is an "N", the HASP Job Log will not be produced. If any other character, or if omitted, the log will be produced.
- linect = lines to be printed per page. This subfield should consist of up to three numeric digits (example: ",34" for 34 lines per page) and should not exceed the value 255. If coded as zero, no automatic overflow will be produced. If omitted, a standard value will be assumed.

Note: If HASP has been generated to terminate a job having an accounting field subparameter that is illegal by HASP standards, then the first two subfields (i.e., pano and room) are required.

The following would be a typical JOB card:

```
//ORBIT      JOB (7808,E305,,2,200),           CONTINUED
//           'J. JACKSON',MSGLEVEL=1,CLASS=B
```

In this case:

- pano = 7808
- room = E305
- time = 2 minutes (assumed value)
- lines = 2000 lines
- cards = 200 cards
- forms = standard forms (assumed)
- copies = 1 copy (assumed)
- log = YES (assumed value)
- linect = standard value (assumed)

The other fields on the JOB card are also interpreted for accounting purposes and job control. The JOB card may be continued in accordance with OS JCL specifications.

THE PRIORITY CARD

The PRIORITY card is a fixed-field control card used to assign a set priority to a job. The format of the card is as follows:

<u>Columns</u>	<u>Field</u>
1-10	/*PRIORITY
11-15	Blank
16-17	p (left-justified with no leading zeros)
18-80	Ignored

where "p" is either a number (between 0 and 15) or is the character "*". If "p" is a number, the value of "p" will be assigned as the priority of the job following the PRIORITY card. If "p" is the character "*", or if the PRIORITY card is not present, the priority of the job will then be determined by the estimated execution time, lines, and cards on the JOB card.

The PRIORITY card must immediately precede the JOB card. If it does not, the PRIORITY card will be ignored and the input stream will be flushed until a JOB card (or another PRIORITY card) is found.

THE ROUTE CARD

The ROUTE card is a fixed-field control card, which allows the user to specify the destination of his output. The format of the card is as follows:

<u>Columns</u>	<u>Field</u>
1-7	/*ROUTE
8-9	Blank
10-14	PRINT or PUNCH
15	Blank
16-23	One of the following device specifications: <ol style="list-style-type: none">1. LOCAL - any local device2. RMTn - remote terminal "n"3. PRINTERn - printer "n"4. PRINTRn - printer "n" for n > 95. PUNCHn - punch "n"
24-80	Ignored

When specified, "n" is a 1- or 2-digit numeric value, left-justified with no leading zero. For example: RMT6 and PUNCH2 would be correct; RMT06 and PUNCH02 would be incorrect. For purposes of compatibility, REMOTEn will still be accepted as a valid device specification.

A single ROUTE card can be used to direct either print or punch routing, but not both. If both print and punch are to be routed, two cards must be used. The ROUTE cards should be placed immediately after the JOB card.

The PRINTERn, PRINTRn, and PUNCHn specifications are the same as LOCAL, unless the specified printer or punch is subject to local print/punch routing.

THE MESSAGE CARD

The MESSAGE card is a fixed-field control card, which permits the user to send messages to the operator (via the operator console) at HASP job input time. The format of the card is as follows:

<u>Columns</u>	<u>Field</u>
1-9	/*MESSAGE
10-11	Blank
12-71	Message to be written
72-80	Ignored

All leading and trailing blanks are removed from the message before it is written on the console.

If MESSAGE cards are included as part of a job they should be placed immediately following the JOB card (or after any ROUTE cards). In such cases the job number is appended to the beginning of the message(s). If a MESSAGE card is not included within the boundaries of a job, the input device name is appended to the beginning of the message.

THE SETUP CARD

The SETUP card is a variable-field control card, which permits the user to indicate the need for certain volumes during the execution phase of his job. The format of the card is as follows:

<u>Columns</u>	<u>Field</u>
1-7	/*SETUP
8-15	Blank
16-71	Volume identifiers, separated by commas (i.e., vvvvvv, wwwwww, xxxxxx, ...)
72-80	Ignored

The volumes required are listed on the console, when the job enters the system. The job is then placed in HOLD status, pending subsequent release by the operator when the required volumes are available.

As many SETUP cards as necessary can be used. They should be placed with the other HASP control cards after the JOB card.

THE JOBPARM CARD

The JOBPARM card is a variable-field control card, which permits the user to specify job parameters to HASP. Any parameter that can be specified in the accounting field of the HASP JOB card can be specified on the JOBPARM card with the exception of the programmer's accounting number (pano).

<u>Columns</u>	<u>Field</u>
1-9	/*JOBPARM
10	Blank
11-71	Keywords and values, separated by commas
72-80	Ignored

<u>Keywords</u>	<u>Description and Range</u>
CARDS=cccccc C=cccccc	Estimated card count Numeric value (0-9999999)
COPIES=nnn N=nnn	Job copy count Numeric value (1 - installation limit, max 255)
FORMS=ffff F=ffff	Job forms Alphameric value (0-4 characters)
LINECT=kkk K=kkk	Lines per page Numeric value (0-255)
LINES=llll L=llll	Estimated line count (thousands) Numeric value (0-9999)
NOLOG J	No HASP Job Log (No value should be specified)
ROOM=rrrr R=rrrr	Room number Alphameric value (0-4 characters)
TIME=tttttt T=tttttt	Estimated execution time (minutes) Numeric value (0-279620)

Any JOBPARM card parameter values will supersede the equivalent parameter value on the JOB card or any previous JOBPARM card. As many parameters as desired may be placed on a single JOBPARM card and as many JOBPARM cards as desired may be used within a given job. The JOBPARM cards should be placed with the other HASP control cards after the JOB card.

THE OUTPUT CARD

The OUTPUT card is a variable-field control card, which permits the user to specify characteristics and/or options of specific SYSOUT data sets or groups of SYSOUT data sets.

<u>Columns</u>	<u>Field</u>
1-8	/*OUTPUT

9 Blank
 10-71 A 1- to 4-character alphameric "code," followed by one or more blanks, followed by keywords and values, separated by commas
 72-80 Ignored

<u>Keywords</u>	<u>Description and Range</u>
COPIES=nnn N=nnn	Data set copy count Numeric value (1-255)
DEST=dddddddd D=dddddddd	Data set destination Alphameric value (see following paragraphs)
FCB=cccc C=cccc	Data set forms control buffer specification Alphameric value (1-4 characters)
FORMS=ffff F=ffff	Data set forms specification Alphameric value (0-4 characters)
INDEX=ii I=ii	Data set indexing print position offset (3211 only) Numeric value (1-31)
UCS=tttt T=tttt	Data set universal character set specification Alphameric value (0-4 characters)
CHARS=cccc X=cccc	Character arrangement table specification Alphameric value (1-4 characters), with up to four character arrangement tables
FLASH=oooo O=oooo	Forms overlay name Alphameric value (1-4 characters)
BURST=b B=b	Burster-Trimmer-Stacker threading Alphabetic Y or N
COPYG=ggg G=ggg	Copy group specification Numeric values (1-255); up to eight can be specified
MODIFY=yyyy Y=yyyy	Copy modification module name Alphameric value (1-4 characters)
MODTRC=m M=m	Copy modification table reference character Numeric value (0-3)

The destination value (dddddddd) must be one of the following device specifications:

1. LOCAL - any local device
2. RMTn - remote terminal "n"
3. PRINTERn - printer "n"
4. PRINTRnn - printer "n" for n > 9
5. PUNCHn - punch "n"

When specified, "n" is a 1- or 2-digit numeric value which is left-justified with no leading zero. For example: RMT6 and PUNCH2 would be correct; RMT06 and PUNCH02 would be wrong. For purposes of compatibility, REMOTEn will still be accepted as a valid device specification. Specifying PRINTERn, PRINTRnn, or PUNCHn has the same effect as specifying LOCAL unless the specified printer or punch is subject to local print/punch routing.

Up to four destinations can be indicated by specifying:

DEST=(dest1,dest2,...,dest4) or D=(dest1,dest2,...,dest4)

where dest1-dest4 are any of the destination values described above.

An OUTPUT card refers to all SYSOUT data sets whose form number matches the "code" specified on the OUTPUT card. For instance, the card /*OUTPUT ABCD ... would reference all SYSOUT data sets within the job whose DD card specified SYSOUT=(c,,ABCD). The form number is used only for reference purposes, and when an OUTPUT card is used, the associated forms will default to the installation standard unless specified by the FORMS= keyword on the OUTPUT card. This specification may be identical to or different from the forms number specified on the DD card.

Parameters specified on the OUTPUT card will replace any equivalent parameters specified on the referenced DD card.

As many OUTPUT cards as necessary can be used (up to an installation defined maximum). If more than one OUTPUT card specifies the same "code," the parameters used for the SYSOUT data sets referenced by that forms number are unpredictable.

The OUTPUT cards should be placed with the other HASP control cards after the JOB card. In all cases, they must be placed before the DD cards referenced.

THE COMMAND CARD

The COMMAND card is a "variable-field" control card, used to enter HASP operator commands into the system. The format of the card is as follows:

<u>Columns</u>	<u>Field</u>
1-3	/*\$
4-71	Operator command verb and operands
72	If "N", the command will not be repeated on the operator's console.
73-80	Ignored

Restrictions concerning commands that can be entered from remote terminals were discussed previously under How To Use This Book.

All COMMAND cards must be placed in the input stream prior to any JOB card. COMMAND cards within jobs will be ignored.

The OS COMMAND card is a variable-field control card, described in the OS/VSS2 Operator's Guide. This card, if submitted through the HASP input stream, must fall within a job of the input stream and is passed to OS when the job is submitted for OS execution. Acceptability of the OS COMMAND card is determined by the system programmer when creating the HOSRDR procedure on the SYS1.PROCLIB data set.

INPUT READERS

HASP supports numerous devices for entry of OS commands, HASP commands, control cards, and user jobs to be executed under control of the HASP/OS environment. Via local attachment to the central CPU the following device types are supported:

1. IBM 2501 Card Reader
2. IBM 2540 Card Reader
3. IBM 3505 Card Reader

HASP provides an additional local reader interface that enables programs and system routines to submit commands, control cards, and jobs to HASP as though submitted through a physical reader device. This device-like interface is known as an Internal Reader (INTRDR) and is controlled via OS and HASP commands in a manner similar to 2540 reader devices. Devices connected to HASP remote work stations and supported as readers allow for entry of OS commands, user jobs, and a subset of the HASP commands.

A reader controlled by the HASP System will be in one of four status conditions as follows:

1. ACTIVE - The device is actively performing a function.
2. INACTIVE - The device is available to perform a function; however, no jobs are available for the device.
3. DRAINING - The device is actively performing a function, but at completion of that function, the device will not begin a new activity.
4. DRAINED - The device is not performing a function and will not do so until the operator starts the device.

Controlling HASP Readers

Through HASP operator commands the operator controls the HASP reader devices. Operators at remote work stations may control only those HASP readers attached to the remote work station. Commands that control HASP readers are as follows:

<u>Command</u>	<u>General Use</u>
\$C reader	Cancel the current job on the reader, causing the reader to skip for the next job or HASP control card.
\$P reader	Stop HASP from using the reader device for future job streams.
\$S reader	Start HASP use of the reader device for future job stream input.
\$T reader, HOLD	Set the reader device to place input jobs in the HOLD status (reset by \$S reader).
\$T reader, A=a	Set the command authority for the local reader device.
\$Z reader	Halt the reader device until \$S reader is entered.

With the exception of the \$T command, multiple devices may be operated upon with a single command, using lists of devices separated by commas. Device types may be mixed (i.e., PRT1, RDR1, PUN1) as long as the command verb is defined for all devices in the list. Examples in the following subsections illustrate this technique of command entry.

The following paragraphs discuss special means of controlling local readers. The remote operator should refer to the appendix provided for his work station.

HASP Local Card Readers

Each supported Card Reader on the system is assigned a HASP name at HASP initialization time; responses to the \$DU command display the HASP reader names, along with the corresponding hardware addresses.

There are three methods of causing HASP to begin using a HASP card reader device:

1. Enter the \$S reader command when the device is halted, drained, or inactive.
2. Ready the reader with cards prior to replying to the initialization WTOR. This is equivalent to entering a \$S reader command.
3. If the Automatic Starting Reader feature is selected by the installation, ready the reader with cards at any time, unless the \$P reader command has been entered.

If OS has allocated the card reader for other functions when HASP is initialized, no attempt will be made to use the reader for reading jobs, unless a \$S reader command is entered. To prevent inadvertent OS allocation of the reader to other jobs, HASP simulates an OS vary offline command prior to its initial use of the device and when each \$S reader command is entered.

Because HASP is a long running job, it is desirable that HASP not prevent OS from allocating the card reader devices to other jobs within

the system. The operator can then start OS readers to a HASP card reader or enter jobs that require direct reading from a card reader. The operator should observe the following precautionary rules when other jobs are to use HASP devices:

1. Enter a HASP \$P command for the device, and allow the device to become drained before varying the device online or replying to OS allocation requests.
2. Ensure that the job has finished reading cards and will not attempt to read more cards before a HASP \$S command is entered for the device.

HASP Internal Reader

Although the HASP Internal Readers are not real devices in the system, they may be controlled by the operator in much the same way as real devices. If the operator desires to prevent problem program submission of jobs to HASP, he should enter the OS command:

```
VARY unit,OFFLINE
```

once for each Internal Reader. Each unit specified is the 3-digit address for an Internal Reader, obtained from HASP when the \$DU command is entered. OS will issue an allocation request when a user job requires the unit. The operator then has the option of cancelling the job or allowing the device to be assigned.

In addition to controlling OS allocation, the operator can cause all jobs submitted via the Internal Reader to be placed in the HOLD status via the command:

```
$T Internal Reader,HOLD
```

This allows problem programs to submit jobs to HASP but prevents the submitted jobs from executing, until the operator specifically releases them.

To prevent the problem program from entering unacceptable HASP commands via an Internal Reader, the operator may restrict the command authority of the device by entering:

```
$T Internal Reader,A=0
```

To prevent OS commands from taking effect, the system programmer must properly restrict the OS reader procedure used by HASP to pass jobs to OS.

Local Reader Error Procedures

Unrecoverable errors encountered while reading jobs and SPOOLing the data to direct-access devices will result in an error message to the operator and deletion of the job being read. The operator should resubmit the deleted job.

Errors on local readers, such as read checks, feed stops, etc., will be processed by the Operating System. The operator should follow the procedures described in the appropriate component description manual (supplemented by the OS/VS2 Operator's Guide). Since HASP selects cards (read by the IBM 2540) into pocket 2, cards which are nonprocessed run out (NPRO) will be separated from those read; the last card in pocket 2 will be the card in error on data and validity checks.

Starting Readers

Use the \$S reader command to start a system input reader or the internal reader.

\$S	reader
-----	--------

reader - RDRn or RDIn, where n is the number of the card reader

The console response, OK, indicates that the device(s) listed have been started.

The devices listed will be placed in ACTIVE status. An attempt to select and process a job will be made. Each device started, except internal readers, will be placed in OS offline status to prevent inadvertent OS allocation of an active device.

- Examples:
1. user - \$S RDR1,RDR2
system - OK
 2. user - \$S RDR1,PRT1,PRT2
system - OK

Cancelling A Reader

To cancel current activity on a reader, use the \$C reader command.

\$C	reader
-----	--------

reader - RDRn or RDIn where n is the number of the reader device

A console response of OK indicates that activity on the specified device(s) has been scheduled for cancellation.

Current activity on the designated devices will be terminated. The input stream will be scanned for the next valid job card and reading

will continue. For the Internal Reader, an end-of-file may be simulated, based on the instantaneous status of the device.

A \$C directed to an Internal Reader should only be used when the reader has been left active by a submitting task that has terminated without freeing the Internal Reader.

Example: user - \$C RDR1
 system - OK

Setting A Reader

To set a reader device use the \$T reader command.

\$T	reader, { Hx... { A=authority }
-----	------------------------------------

reader - HASP reader device (RDRn or RDIn)

If Hx... is specified, the designated reader will be set to place all jobs subsequently read by the reader into the execution HOLD queue. Jobs placed into the HOLD queue may be released for execution by entering the \$AJOB command. A successful \$S command, directed to the reader, will negate the effects of the "\$T reader,H" command, causing the reader to revert to normal reading and queuing of jobs.

If A=authority is specified, the HASP command authority of the designated local reader or Internal Reader is set to allow HASP command entry as follows:

- 0 - display only
- 1 - system control
- 2 - device control
- 3 - system and device control
- 4 - job control
- 5 - system and job control
- 6 - device and job control
- 7 - system, device, and job control

An OK response at the console indicates that the specified reader has been set to HOLD subsequent jobs, and/or the reader's HASP command authority has been set.

A reader may not be used to set the command authority of a reader device. See \$TCON commands under OS Console Support. The \$S command does not negate the effect of the "\$T reader, A=authority" command. The A=authority operand requires device and system authority.

Examples: 1. user - \$T RDR1,HOLD
 system - OK

2. user - \$T RDR1,H
 system - OK

3. user - \$T RDR1,A=0
 system - OK

Halting A Reader

To halt a reader device, use the \$Z reader command.

\$Z	reader
-----	--------

reader - RDRn or RDIn, where n is the device number

The specified devices will be HALTED, after the current scheduled operations are complete. The effects of the \$Z command may be negated by the \$S command.

An OK response at the console indicates that the device(s) have been set to HALT operations.

Several reader devices or a reader and another device type may be halted simultaneously. Operands must be separated by commas.

Example: user - \$Z PRT1,PRT2,RDR1,PUN1
 system - OK

Stopping (Draining) A Reader

To drain a reader device, use the \$P reader command.

\$P	reader
-----	--------

reader - RDRn, where n is the device number

The specified devices will be prevented from starting any new activity. If a device is INACTIVE, the device will be immediately stopped (DRAINED). If a device is ACTIVE, the device status will be DRAINING and will revert to the DRAINED status, upon completion of the current activity.

If all operands of the command are entered correctly, the (device) DRAINED message will be displayed for devices that immediately enter the

DRAINED status. Thereafter, whenever ACTIVE devices enter the DRAINED status, the (device) DRAINED informational message will also be issued for them. Note that an Internal Reader cannot be drained. However, it can be varied offline via the OS VARY command.

```
Example: _ user      -   $P RDR1,RDR2,PUN1
          system    -   OK
```

When the device enters the DRAINED status, the HASP message:

```
device IS DRAINED
```

will be displayed on the operator's console.

INITIATORS

Initiators control the actual HASP selection and submission of jobs to OS for processing.

In the following descriptions, a parameter "n" is referred to as the initiator identification. This identification is assigned by the system programmer during the HASPGEN process. However, it is assumed in this manual that the initiator identifications are 1- or 2-character numeric digits 1, 2, 3, and so forth.

An initiator's ability to process jobs depends on the availability of jobs in the input queue of corresponding classes and the status of the initiator. Status conditions are as follows:

1. ACTIVE - the initiator is currently processing a job and has the ability to continue processing.
2. INACTIVE - the initiator has the ability to process jobs but no job of the initiator's current classes is ready for execution.
3. DRAINING - the initiator is currently processing a job but will not select another (on completion of the current job).
4. DRAINED - the initiator is not processing a job and will not attempt to select any job.

When the HASP System finishes reading card images associated with an OS job, the job is placed in one of the HASP logical execution queues. Selection of the appropriate execution queue is based on job class, as specified by:

1. CLASS=class - parameter on the OS JOB card submitted by the programmer.
2. \$T JOBn,C=class - HASP command entered by the operator after queueing.
3. CLASS=A - default specification in lieu of other specifications.

Each job is placed in the appropriate execution queue in order by priority, so higher priority jobs within the queue will be selected for execution before jobs of lower priority and jobs of the same priority will be selected in order (first in - first out). Job selection priority is determined from the following sources:

1. The time, lines, and cards estimates in the HASP accounting field of the OS JOB card - Although the correlation between time estimated and priority is determined at HASPGEN time, it is normally set to give the shortest running jobs highest priority.
2. /*PRIORITY - card which may precede the JOB card. This card overrides the estimated priority setting.
3. \$T JOBn,P=priority - HASP command entered by the operator after previous queueing.

When an initiator becomes INACTIVE, it will attempt to select ready jobs from the HASP job queue in a manner directly controlled by the operator. An initiator will search the logical execution queues for jobs in order by class. If the operator has set the initiator to execute classes "ABX", in that order, the initiator will initiate only class A jobs as long as there are class A jobs ready for execution. When no class A jobs are ready, the initiator will initiate only class B jobs or, if no class B jobs, class X jobs. Therefore, the operator, by altering the initiator classes, controls the selection of jobs, based on job class. By appropriate job classing and setting of initiator class selection lists, jobs with complementary characteristics will tend to execute concurrently.

Starting An Initiator

To start an initiator, use the \$SI command.

\$S	I [i]
-----	-------

i - identification of the initiator to be started

The designated initiator will be allowed to select jobs from the appropriate job classes. If the identification i is omitted, all initiators stopped only by the \$PI command will be started. If an initiator is DRAINING, its status will become ACTIVE: if DRAINED, its status will become INACTIVE. An immediate attempt to select a job will be made.

An OK response at the console indicates that the specified initiator(s) are started.

- Examples:
1. user - \$SI3
system - OK
 2. user - \$SI
system - OK

Setting Initiator Classes

To set initiator classes, use the \$TI command.

\$T	In,list
-----	---------

i - the identification of the initiator to be set

list - list of acceptable job classes for the specified initiator.
Each class is listed in order of selection priority.
The maximum length of the list is specified by the system programmer at HASPGEN time.

The new class list is inserted, without inspection, into the specified initiator's class selection list. All future job selection for the initiator will be based on the new list.

- Examples:
1. user - \$TI1,ABC
system - OK
 2. user - \$TI2,BCA
system - OK
 3. user - \$TI3,CAB
system - OK

Displaying An Initiator

To display an initiator, use the \$DI command.

\$D	I[i]
-----	------

i - the identification of the initiator to be displayed

The status and eligible classes for the initiator(s) indicated will be displayed. If i is not specified, all initiators will be assumed. If an Execution Batch Processing program is active, under control of a logical initiator, its OS job name will also be displayed.

The response:

```
INIT i      { DRAINING
              DRAINED
              ACTIVE
              INACTIVE }
```

gives the status of the initiator requested.

```
Examples:  1.  user   -  $DI1
            system -  INIT 1 (ACTIVE)=ABCD

            2.  user   -  $DI
            system -  INIT 1 (ACTIVE)=ABCE
                   INIT 2 (DRAINING)=BCDA
                   INIT 3 (INACTIVE)=CDAB
                   INIT 4 (DRAINED)=DABC
```

Stopping (Draining) An Initiator

To stop (or drain) an initiator, use the \$PI command.

\$P	I[i]
-----	------

i - the identification of the initiator to be stopped

The designated initiator will be prevented from selecting additional jobs for processing. If a specified initiator is actively processing a job (ACTIVE), its status will be changed to DRAINING, until the current job terminates. If a specified initiator is not actively processing a job (INACTIVE) or upon completion of processing, the status of the initiator will be DRAINED.

If the optional identification is not specified, all initiators will be stopped.

If the system contains the Execution Batch Scheduling feature (see HASP System Programmers' Guide), this command will cause a batch program(s), under control of the designated initiator(s), to be cancelled when the initiator(s) are DRAINED.

The console response, OK, indicates that the specified initiator(s) are stopped or will be stopped.

```
Examples:  1.  user   -  $PI3
            system -  OK

            2.  user   -  $PI
            system -  OK
```

SYSTEM OUTPUT

A job becomes eligible for output processing as a result of:

1. Normal or abnormal termination in the OS execution phase
2. A cancel (\$C job) or stop (\$P job) command during or prior to the OS execution phase.

When a job is made available to the HASP Output Processor, the description of its output requirements is scanned, and a queue of these requirements is constructed. From this queue all printers and punches can intelligently select work. An operator command \$DF lists a summary of this requirements queue by setup characteristics and by SYSOUT class.

There are 36 possible SYSOUT classes, A through Z (inclusive) and 0 through 9 (inclusive). Each output device in the system can be set to process any combination of classes in any order. (A console command has been provided to allow the operator to dynamically change this selection.) HASP assumes, as a default, that printers process classes A and J and punches process classes B and K.

In addition to specifying class and setup, the programmer can request multiple copies of output for a job, either at the job level or by individual data set. Output queueing allows job level copies to print or punch concurrently on all eligible devices. Data set copies are processed serially on each device. For example, if JOB SAMPLE consists of three print data sets, if two copies are requested on the JOB card, and if three copies of data set 2 are requested, two system printers would simultaneously produce the following:

PRT1

Sample data set 1
Sample data set 2
Sample data set 2
Sample data set 2
Sample data set 3

PRT2

Sample data set 1
Sample data set 2
Sample data set 2
Sample data set 2
Sample data set 3

Each step within a job run under HASP should be given a unique step-name. Failure to do this may cause the various SYSOUT data sets within the job to be processed out of order (e.g., a print data set created in the third step of the job may be printed before one produced in the second step).

Each output device operates in one of two modes, automatic or operator-controlled. In automatic mode, a device will print/punch all work in the output queue whose class(es) match the device class. Work is selected in a way that minimizes operator intervention but observes job priority. In operator-controlled mode, a device will print/punch only work in the output queue whose class and setup match those specified by the operator. (Job priority specifies order of selection among multiple available jobs.)

A number of commands allows the operator to control the output phase of job processing. These commands are:

<u>Command</u>	<u>General Use</u>
\$B printer	Backspace the printer the designated number of pages or to the beginning of the current data set.
\$C device	Cancel the current job output on the indicated printer or punch.
\$E device	Restart the job output currently printing or punching on the indicated device by placing the work back on the queue (for selection by the indicated device or other printer or punch, as appropriate).
\$F printer	Forward-space the indicated printer the designated number of pages or to the end of the current data set.
\$I printer	Interrupt the current job output on the indicated printer, allowing the output to be continued by the indicated printer (or other printer, as appropriate).
\$N device	Repeat the job output currently printing or punching on the indicated device by placing the work back on the corresponding queue for selection by the indicated device (or other printer or punch, as appropriate) and by allowing the current job output to continue.
\$P device	Stop the printer or punch, after completion of the current job output.
\$S device	Start the printer or punch device.
\$T device	Set device characteristics.
\$Z device	Halt the printer or punch device until \$S device is entered.

When all queued output requirements of a job have been satisfied, the job is passed to the Purge Processor where the job is removed from the system.

With the exception of the \$T command, multiple devices may be operated upon with a single command using lists of devices separated by commas. Device types may be mixed (ie., PRT1, RDR1, PUN1) as long as the command verb is defined for all devices in the list. Examples in the following paragraphs illustrate this technique of command entry.

A printer or punch controlled by the HASP System will be in one of four status conditions as follows:

1. ACTIVE - The device is actively performing a function and has the ability to continue processing.

2. **INACTIVE** - The device is available to perform a function; however, no work is available for the device.
3. **DRAINING** - The device is actively performing a function, but at completion of that function the device will not begin a new activity.
4. **DRAINED** - The device is not performing a function and will not do so, until the operator starts the device.

WORK SELECTION BY DEVICES IN AUTOMATIC MODE

Local and MULTI-LEAVING output devices are in automatic mode when HASP is started. Devices placed in controlled mode by the operator can be switched to automatic mode by the console command:

\$T device,F=AUTOM

An output device in automatic mode selects work according to certain priorities. All classes for which the device is set are searched:

1. First, for work with a setup that matches that of the device (i.e., matching forms, FCB, and UCS; or, for the 3800, matching forms, FCB, FLASH, and BURST)
2. Second, for work with a setup that is not currently being used on a similar device
3. Third, for work with a standard setup.

If none of these searches provides work, the device goes INACTIVE.

Automatic mode is recommended as standard, since it provides for near optimal work selection that minimizes operator intervention during output. In automatic mode, all work in class queues (but not in HOLD status) will be processed.

WORK SELECTION BY DEVICES IN OPERATOR-CONTROLLED MODE

When the operator requires control of the setup selection made by an output device, the console command:

\$T device,F=form

directs the device to process only work with a setup that matches the setup given in the set command. When no work with the specified setup is available, the device will go INACTIVE, regardless of other work queued in the system. A device can be switched from automatic to controlled mode only when it is INACTIVE or stopped. Controlled mode is the only way to force more than one similar output device to select work with the same (but not standard) setup.

WORK SELECTION BY REMOTE DEVICES

MULTI-LEAVING remote work station operators can use either controlled or automatic mode with output devices attached to their work station.

All other remote work station operators must set their output devices to controlled mode before HASP can use them, because these remotes can not respond to an in line setup change message.

If the demand setup option was set to YES during HASPGEN, users of these non-MULTI-LEAVING remote output devices must not specify setup data for a data set whose class matches the job message class.

Under the standard HASP System, output routing has meaning only when the HASP Remote Job Entry feature is used. In this environment each group of printer or punch devices is considered a pool of output devices, identifiable by routing codes. All local printer and punch devices are assigned route code 0; all printer and punch devices at work station remote 1 (RM1.PRn, RM1.PUn) are assigned route code 1; etc. A job with print output destined to local printers will be printed on any local printer. Likewise, a job with print output destined to remote 4 will be printed on any of the printers assigned to remote 4 (RM4.PR1, RM4.PR2, etc.).

HASP will automatically assign print and punch output routings to each job as it enters the system. This assignment is determined by the system programmer at HASP generation time. Normally, all output for jobs entering local devices will be routed to the local device pool, and all output for jobs entering a remote reader will be routed to the corresponding remote output devices. This may be altered so that, for example, remotes without punch devices will have punch data routed to the local punch pool or to a remote convenient to the submitting work station.

Routing of print and punch output may be directly assigned by the programmer via /*ROUTE control cards (see System Input) or by the operator, after the job has entered the system via the \$R (route) command. Although the central operator has complete routing control over all remotes and jobs, the remote work station operator may only route output that belongs to the remote, i.e., jobs with print or punch routings destined for output at the remote. The following sample command sequence allows the operator to redirect the print output for a job, after printing of the data sets is in process:

1. \$R PRT, JOB25, LOCAL - routes normal print output for job 25 to the central printer pool.
2. One of the following (assume job 25 is printing on remote 3, printer 1):
 - a. \$I RM3.PR1 - interrupts print output and requeues for continuing the print by a local printer.
 - b. \$E RM3.PR1 - restarts print output and requeues for printing by a local printer.

- c. **\$N RM3.PR1** - repeats the print, allowing a local printer to print a copy.

In addition to normal print and punch routing of output on a job basis, the user can directly assign independent routings to data set via the DEST parameter of the OUTPUT control card. These special routing data sets can not be routed by the \$R command unless the command is of the form:

\$R ALL,Jj,to-id

This form of the \$R command alters the normal print and punch routings as well as the special routed data sets. Each special routed output loses its independent status and will be handled as any normal output for the job. If the number of jobs with special routing output are unknown, the \$DS (display special routing) command can be used to list the routings of all special routed work awaiting output for the specified jobs.

PRINTERS

HASP supports several printer devices for output of HASP Job Log messages, OS messages, and problem program SYSOUT data sets. Via local attachment to the CPU, the following printer devices are supported:

1. IBM 1403 Printer
2. IBM 3211 Printer.
3. IBM 3800 Printing Subsystem

The format for standard print output for each work element is:

1. HASP START JOB separator page
2. HASP Job Log (optional)
3. HASP statistics
4. Operating System messages
5. Data sets created by the job that match the printer setup and message class of the job.
6. HASP END JOB separator page.

NOTE: Items 2-5 above may be replaced or terminated by the message "Print Terminated by IO Error" when an IO error occurs while reading a data set from spool.

Items 2-4 are included only in the message class output. HASP START JOB and END JOB separator pages consist of two block-lettered areas, followed by a single line of information duplicated a number of times as specified by each installation. If the separator page line count is less than 30, the two block-lettered areas are omitted.

The first block-lettered area contains up to eight letters (A-Z, 0-9, a, \$, # are acceptable) of job name. The second block-lettered area contains the HASP job number and a single letter (A-Z or 0-9), specifying the SYSOUT class. The format of the duplicated line is:

1-7	HASP identification (HASP-II)
8	*
9	SYSOUT class (A-Z, 0-9)
10	*
11-18	Printer device name (PRINTERn)
19-22	START .CONT ..END
28	Blank
29-31	JOB
32	Blank
33-36	Job number assigned by HASP
37-40	Periods (.)
41-48	Time of printing the page in form: hh.mm.ss
49	Blank
50-51	AM PM
52	Blank
53-61	Date of printing the page in form: dd mmm yy
62-65	Periods (.)
66-69	ROOM
70	Blank
71-74	Room Number
75-78	Periods (.)
79-86	Job name
87-90	Periods (.)
91-110	Programmer's name with trailing blanks
111-114	Periods (.)
115-122	Printer device name (PRINTERn)
123	*
124	SYSOUT class
125	*
126-132	HASP identification (HASP-II)

HASP statistics are printed on a single line after the Job Log and contain:

1. Number of cards read
2. Number of print lines SPOOLed during execution
3. Number of punch cards SPOOLed during execution
4. Execution time (real time).

All job printing for local devices is accomplished by HASP through OS facilities. OS will attempt to recover from printer errors and provide appropriate error messages to the operator. Permanent errors will be ignored and output will continue. Since the accuracy of the output is determined by the presence or lack of error messages, the operator should react in accordance with the severity of the problem.

Considerations for the IBM 3800 Printing Subsystem

The selection criteria for work going to the 3800 are different from that for other printers. The only device features considered are forms, FCB, FLASH, and BURST. The 3800 operates in either automatic or operator-controlled mode with these different criteria.

The specification of 3800-related parameters does not guarantee that a data set will be printed on a 3800. This is intended to be controlled through your installation's choice of the CLASS parameter. If work destined for a 3800 is redirected to a 3211 or a 1403, the 3800-related parameters BURST, FLASH, COPYG, and MODIFY are ignored. If the device that selects the work has the UCS feature and the programmer specified CHARS and not UCS, then the first character arrangement table name specified is used as the UCS id. It must be a name that is valid for UCS. If a piece of work intended for a 3211 or a 1403 is redirected to a 3800 and the UCS parameter is specified but CHARS is not, then the UCS id is used as the character arrangement table name. Once a piece of work is selected and processing has begun, it cannot be redirected to another printer.

Because of the flexibility with which programmers can change character arrangements and copy modifications, the separator pages are always printed with the default setting of the device. This setting can be modified using \$T PRINTER with the X1, C, or Y parameters. \$T is intended to set these values for the separator or any job that has requested a non-existent or invalid character arrangement, FCB, or copy modification.

HASP uses the operating system facility SETPRT to retrieve character arrangement tables, FCBs, and copy modification modules from SYS1.IMAGELIB. This means that these tables can be added at times other than when HASPGEN is being done.

Setting A Printer

To set a printer, use the \$T printer command.

\$T	printer	<pre> ,C={ 1 {carriage} ,F={AUTOM} {form} ,T=standard train ,U=nonstandard train ,S={Y} {N} ,Q=classes ,O={forms overlay name } * {NONE} ,B={Y} * {N} ,X1= ,X2= } character arrangement table names * ,X3= ,X4= ,Y={copy modification name } * {NONE} ,M={Y} * {N} </pre>
-----	---------	--

*Note: These operands are valid only for 3800 printers and are rejected for other devices.

printer - PRTn, where n is the device number.

C=1 - Space the printer one line after each print line; i.e., single space the printer ignoring problem program carriage control.

C=carriage - a 1- to 4-alphanumeric character string specifying the 3211 or 3800 forms control buffer identification or 1403 carriage tape identification.

F=AUTOM - set the printer to output jobs under HASP AUTOMATIC forms assignment.

F=form - a 1- to 4-alphanumeric character string specifying the form which the operator has loaded into the device.

T=standard train - The 1- to 4-character train or chain identification used to print output that has not specified a unique UCS train image as well as output that specified the designated image (AN, HN, PN, QN, RN, etc.).

U=nonstandard train - the 1- to 4-character train or chain identification that can be used to print only output that specifies the designated image.

- S=Y** - set the printer to provide HASP separator pages between data sets of different jobs.
- S=N** - set the printer not to provide HASP separators and (in case of a non-console remote work station) not to provide operator messages on the printer.
- Q=classes** - one or more alphameric characters representing all SYSOUT classes the device is eligible to process (maximum number of classes is specified at the installation).
- O=forms overlay name** - a 1- to 4-alphameric character string specifying the forms overlay currently inserted in the 3800.
- O=NONE** - indicates that no forms overlay is in the 3800.
- B=Y** - set the 3800 to process job output that specifies BURST=Y.
- B=N** - set the 3800 to process output that specifies BURST=N.
- Xn=character arrangement table names** - 1- to 4-alphameric character strings specifying the 1st through nth character arrangement table. This is the character arrangement table for the job separator pages and any data set currently requesting setup.
- Y=copy modification name** - a 1- to 4-alphameric character string specifying the copy modification module for the separator pages or any data set requesting setup.
- Y=NONE** - set the 3800 to nullify the copy modification for the separator pages or any data set requesting setup.
- M=Y** - set the 3800 to mark the end separator pages (if specified) using the Mark Form channel command. This is the only way to mark the separator perforations, since the 3800 does not print on the perforations between pages. The Mark Form command causes three end separator pages to be printed (or five, for the two shortest forms lengths).
- M=N** - set the 3800 so that job separator pages are not marked.

A console response of OK indicates that the settings requested have been made.

The specified printer will be set to handle the carriage control (C=), forms (F=), and train/chain (T=/U=), as specified. If the specified printer has the UCS feature installed, the UCS buffer will be loaded with the print train/chain image prior to the printing of each job.

The effect of C=1 will be negated by entry of a successful \$S command directed to the printer. Multiple settings directed to the same device, using the same command entry, are permitted. The specification C=V should be used in conjunction with the \$TF command (discussed later in this section). Whenever an FCB image (other than standard) is specified for a 1403 Printer, a setup message will be displayed, allowing the operator to mount the appropriate carriage control tape.

The specification F=AUTOM will cause the printer to print the normal batch stream jobs, using optimal work selection. However, a job requesting special forms (in a data set to be printed with the rest of the job) will cause a special forms mount before printing the data set. Note that F=form and F=AUTOM may be specified in a single set command in order to override a requested setup but leave the device in automatic mode.

The T= operand indicates to the printer that the designated train can be used to print either output specifying a unique UCS train image or output requiring the designated image. The U= operand restricts the printer to output that requires the image.

The setting of forms, train/chain, or carriage is valid only when the appropriate device is not being used. It is recommended that the operator enter "\$P device name" and wait for it to enter the DRAINED status. When HASP has issued a forms load and is waiting for the operator to enter \$S for the device, the device may be considered inactive for the purpose of setting train/chain or carriage for local printers.

Train/chain settings directed to remote printers or directed to local printers without UCS will be ignored.

The (T=/U=) operand is defined only for local printers. The remote CPU work station operator must load UCS buffers via means other than the HASP central system. The (C=carriage) operand is defined only for local printers. The remote CPU work station operator must load the carriage buffers via means other than the HASP central system.

Examples:

1.	user	-	\$T PRT1,C=1
	system	-	OK
2.	user	-	\$T PRT1,F=1234,T=PN
	system	-	OK
3.	user	-	\$T PRT2,F=AUTOM,T=HN
	system	-	OK

In example 1, the operator discovers that the problem program is skipping to carriage tape channels, which violate the installation procedures. The entry of \$T PRT1,C=1 causes the printer to single space after each line printed to the end of the data set.

In example 2, the operator requires that the printer print all jobs queued for forms 1234. The printer has been loaded with a PN train to be used with the forms 1234.

In example 3, the operator desires to use the printer to print the normal batch output using automatic forms selection and the HN print train.

Setting The 3211 Printer FCB Images

The 3211 printer carriage control tape, Forms Control Buffer (FCB), is internally set by HASP. The installation system programmer will create several FCB images at HASP generation time and will indicate to the programmer which images are available. The programmer can then control the 3211 FCB image through cards submitted within his job. This control extends to the data set level and is automatic (no operator intervention), except when:

1. The requested image is not in the system.
2. The variable FCB image is requested.

For either of these exceptions, the operator will receive a setup message, allowing him to alter the programmer request.

To override an image ID supplied by the programmer but not available from the current HASP System, the following console command is supplied:

```
$T printer, C=xxxx
```

where xxxx is an installation-defined image ID.

If the variable FCB image is requested, a setup message will be displayed, allowing time for the operator to supply the variable image using the \$TF command.

HASP resets the FCB image for each new data set processed. If an image is not explicitly specified, the HASPGEN default is used. To set the FCB image, the header page and, for example, HASP log are treated as separate data sets.

\$T	F... {6} [,P=n {8} [,c=list ,I=index]
-----	--

- 6 - indicator for six lines/inch (default if six or eight omitted)
- 8 - indicator for eight lines/inch

P=n - number of lines per page (may be specified only once per command). Acceptable numeric values for n range from 2 to 180 (default settings P=66 for six line/inch and P=88 for eight lines/inch).

c=list - specifications for one or more printer carriage control channels. The "c" specification may take values 1 through 12, rep-

representing the channel number. List items identify the line(s) to which a corresponding printer skip command is to position the page. List items are separated by commas. No two list items within the command can designate the same line number. Acceptable values for list items range from 2 to 180.

I=index - print alignment index indicating that the printer should offset the printing of data sets using the FCB image by the value specified. Acceptable values for index range from 1 to 31. If omitted, data sets will be printed starting with print position 1 for each line of output.

The console response is OK, indicating that the requested settings have been made.

The FCB image used for setting carriage control via \$T printer,C=V is reset and created in accordance with the operands of the command. If the last character of the first operand is not "8", the image is set for six lines/inch. If the P=n operand is omitted, a default of 66 lines/page is assumed for six lines/inch forms and 88 lines/page is assumed for eight lines/inch forms.

For each channel "c=list" specified, the carriage channel is set so that a "skip to channel" command addressed to the printer will cause the page to be positioned at the line indicated in the list items (see 3211 component description manuals for hardware details). If invalid parameters are specified, the image is reset and six or eight lines per inch null parameters are assumed. Carriage channel 1 is always set for line 1, representing the first print line on the page. This setting must not appear as a list item for channel 1.

Starting at the bottom of the page for as many lines as possible, channels which are omitted from the specifications are assigned automatically.

For this command, the operand limit, normally specified for HASP commands, does not apply. List items are not inspected to ensure specified lines are within the P=n specification (or the default, if P is not specified). This command is defined only when selected by the installation at HASPGEN time.

\$TF requires console authority for both device and system commands. The null FCB image settings are as follows:

<u>6 lines/inch</u>		<u>8 lines/inch</u>	
<u>line</u>	<u>channel</u>	<u>line</u>	<u>channel</u>
1	1	1	1
.	.	.	.
.	.	.	.
56	2	78	2
57	3	79	3
58	4	80	4
59	5	81	5
60	6	82	6
61	7	83	7
62	8	84	8
63	10	85	10
64	11	86	11
65	9	87	9
66	12	88	12

Note that it may be convenient to enter this command via card rather than from the console.

- Examples:
1. user - \$T FCB
system - OK
 2. user - \$T FCB8,P=40,2=20,4=10,30
system - OK

In example 1, the user desires the default six lines/inch carriage control image of channel 1 at line 1 with 66 lines/page.

In example 2, the user desires eight lines/inch with 40 lines/page. Channel 2 is to allow skipping to line 20, while channel 4 is to allow skipping to line 10 and 30 on the page.

Starting A Printer

To start a printer, use the \$S printer command.

\$S	printer
-----	---------

printer - PRtn, where n is the device number

The devices listed will be placed in the ACTIVE or INACTIVE status. If the device is INACTIVE, an attempt to select and process a job will be made. Each device started will be placed in OS offline status to prevent inadvertent OS allocation of an active device.

Examples: 1. user - \$S PRT1,PRT2
 system - OK

2. user - \$S RDR1,PRT1,PUN1
 system - OK

Restarting A Printer

To restart a printer, use the \$E printer command.

\$E	printer
-----	---------

printer - PRTn, where n is the device number

The current activity on the designated device(s) will be terminated. The job will be returned to the appropriate print or punch queue, in order of priority, and will be made eligible for selection, to resume processing at the beginning of the unit of work.

A console response of OK indicates that the specified device will be restarted.

Example: user - \$E PRT1,PRT2
 system - OK

Repeating A Printer

To repeat current activity on a printer, use the \$N printer command.

\$N	printer
-----	---------

printer - PRTn, where n is the device number

Current activity on the designated printer device(s) will be repeated. This operation will not terminate the activity in process but will place the work back on the output queue and make it available for selection, to resume processing at the beginning of the unit of work.

A console response of OK indicates that the specified printer device will be repeated.

Example: user - \$N PRT1
 system - OK

Interrupting A Printer

To interrupt current activity on a printer, use the \$I printer command.

\$I	printer
-----	---------

printer = PRTn, where n is the device number

Current activity on the designated printer(s) will be checkpointed and terminated. The work will be returned to the output queue and made available for selection. Any printer selecting the job for output will resume printing the job, after backspacing one page, where a page is defined as:

1. The entire data set, if the programmer supplied the lines per page parameter as 0.
2. The last page eject (skip to any channel) supplied by the programmer, if that page eject was not further back than the value of the lines per page parameter.
3. The last page eject (skip to channel 1) supplied by HASP when the programmer did not supply any page ejects.

A console response of OK indicates that the specified printer(s) will be interrupted.

Example: user - \$I PRT1
system - OK

Backspacing A Printer

To backspace a printer, use the \$B printer command.

\$B	printer [,pages] Dx...
-----	-----------------------------

printer - PRTn, where n is the device number

pages - the number of pages (up to 9999) to backspace (optional for the last device of the list, mandatory for the other devices)

Dx... - backspace to beginning of data set

The designated printer will, if ACTIVE, backspace the designated number of pages in the current data set and resume printing. If the beginning of the data set is encountered during the backspace process, the printer will resume printing at the beginning of the data set. If the number of

pages is not specified for the last in the list, a count of one will be assumed. The \$I printer command, described previously, defines a page.

A console response of OK indicates that the specified printer(s) will be backspaced.

Examples: 1. user - \$B PRT1,10
 system - OK
 2. user - \$B PRT1
 system - OK
 3. user - \$B PRT1,5,PRT2
 system - OK

In example 1, printer 1 is to be backspaced ten pages. In example 2, printer 1 is to be backspaced one page. In example 3, printer 1 is to be backspaced five pages (the count for printer 1 must be specified), and printer 2 is to be backspaced one page.

For a 3800 printer, when copy groups are specified, "pages" means pages within the data set, and not physical pages of printout.

Forward-Spacing A Printer

To forward-space a printer, use the \$F printer command.

\$F	printer	[,pages] [,Dx...]
-----	---------	----------------------

printer - PRTn, where n is the device number

pages - the number of pages (up to 9999) to forward-space
(optional for last device of list, mandatory for
the other devices)

Dx... - forward space to end of data set

The designated printer will, if ACTIVE, skip forward the designated number of pages and resume printing. If the end of the data set is encountered during the forward-space, printing will resume on the next data set if present. If the number of pages is not specified for the last device in the list, a count of one will be assumed. The \$I printer command, described previously, defines a page.

A console response of OK indicates that the specified printer(s) will be forward-spaced.

Examples: 1. user - \$F PRT1,999
 system - OK
 2. user - \$F PRT1,DS
 system - OK

For a 3800, when copy groups are specified, "pages" means pages of the data set rather than physical pages of printout.

Cancelling A Printer

To cancel current activity on a printer, use the \$C printer command.

\$C	printer
-----	---------

printer - PRTn, where n is the device number

The current activity on the designated devices will be terminated and the remainder of the unit of work will be discarded. The highest priority job eligible for output on the device will be selected, and printing will resume for the new job.

An OK response at the console indicates that activity on the specified device has been cancelled.

Example: user - \$C PRT1,PRT2,PUN1
system - OK

Halting A Printer

To halt a printer, use the \$Z printer command.

\$Z	printer
-----	---------

printer - PRTn, where n is the device number

The specified device(s) will be halted after the current scheduled operations complete. The effects of the \$Z command may be negated by the \$S command.

An OK response at the console indicates that the device(s) have been set to halt operations.

Example: user - \$Z PRT1,PRT2
system - OK

Stopping (Draining) A Printer

To stop (drain) a printer, use the \$P printer command.

\$P	printer
-----	---------

printer - PRTn, where n is the device number

The specified device(s) will be prevented from starting any new activity. If a device is INACTIVE, the device will be immediately stopped (DRAINED). If a device is ACTIVE, the device status will be DRAINING and will revert to the DRAINED status, upon completion of the current activity.

An OK response at the console indicates that the device(s) is in the DRAINED status or has been placed in the DRAINING status.

Example: user - \$P PRT1,PRT2
system - OK

If all operands of the command are entered correctly, the (device) DRAINED message will be displayed as a direct response to the command for specified devices that immediately enter or are in the DRAINED status. Thereafter, the (device) DRAINED informational message will be issued whenever ACTIVE devices enter the DRAINED status.

PUNCHES

HASP supports several punch devices for output of problem program SYSOUT data sets. Via local attachment to the central CPU, the following punch devices are supported:

1. IBM 2540 Punch
2. IBM 2520 Punch
3. IBM 3525 Punch*

*HASP does not use the 3525 Card Print feature.

The format for standard local punch output for each job stream is as follows:

1. HASP punch ID card - in pocket 2
2. Data sets created by the job - in pocket 2
3. Blank card - in pocket 1 (also will contain error cards).

Each job's punch output will be preceded by an identification card containing the programmer room number and internal job number. To make the card easy to identify, it has an 11-punch and 12-punch punched in all 80 columns. To make the room number and job number easy to read, each digit is extended over ten columns. Alphabetic characters are converted to digits as follows:

<u>Alphabetic Characters</u>	<u>Numeric Punch</u>
A or J	1
B, K, or S	2
C, L, or T	3
D, M, or U	4
E, N, or V	5
F, O, or W	6
G, P, or X	7
H, Q, or Y	8
I, R, or Z	9

All job punching for local devices is accomplished through OS facilities. OS will attempt to recover from punch errors and provide appropriate error messages to the operator. In the case of permanent errors, error cards are dropped in pocket 1 and punching continues starting with the record in error. The appropriate hardware SRL should be consulted for correct operator procedures in response to indicator lights and sense bits displayed when the punch stops and requires intervention.

Setting A Punch

To set a punch, use the \$T punch command.

\$T	punch <table style="display: inline-table; vertical-align: middle; border-left: 1px dashed black; border-right: 1px dashed black; border-bottom: 1px dashed black;"> <tr> <td style="padding: 2px 5px;">,F=</td> <td style="padding: 2px 5px;">{ AUTOM }</td> </tr> <tr> <td style="padding: 2px 5px;"></td> <td style="padding: 2px 5px;">n</td> </tr> <tr> <td style="padding: 2px 5px;">,S=</td> <td style="padding: 2px 5px;">{ Yx... }</td> </tr> <tr> <td style="padding: 2px 5px;"></td> <td style="padding: 2px 5px;">Nx...</td> </tr> <tr> <td style="padding: 2px 5px;">,Q=</td> <td style="padding: 2px 5px;">classes</td> </tr> </table>	,F=	{ AUTOM }		n	,S=	{ Yx... }		Nx...	,Q=	classes
,F=	{ AUTOM }										
	n										
,S=	{ Yx... }										
	Nx...										
,Q=	classes										

punch - PUNn, where n is the device number

F=AUTOM - set the punch to output jobs using automatic mode work selection

F=n - one to four alphanumeric characters specifying the forms that the operator has loaded into the device for controlled mode operation

S=Yx... - set the punch to provide HASP punch ID cards between data sets of different jobs

S=Nx... - set the punch not to provide HASP punch ID cards

Q=classes- one or more alphanumeric characters representing all SYSOUT classes the device is eligible to process. The maximum number of classes is specified by the installation.

A console response of OK indicates that the settings requested have been made.

The specified punch will be set to handle the forms (F=) specified for controlled mode operation. Multiple settings directed to the same device (using the same command entry) are permitted.

The setting of forms is valid only when the appropriate device is not being used. It is recommended that the operator enter \$P (device name) and wait for the device to enter the DRAINED status.

Example: user - \$T PUN1,F=4732
system - OK

In this example, the operator wants to punch only those data sets in the system that have specified forms type "4732".

Starting A Punch

To start a punch, use the \$S punch command.

\$S	punch
-----	-------

punch - PUNn, where n is the device number

The devices listed will be placed in the ACTIVE or INACTIVE status. If the device is INACTIVE, an attempt to select and process a job will be made. Each device started will be placed into the OS offline status to prevent inadvertent OS allocation of an active device.

Examples: 1. user - \$S PUN1,PUN2
system - OK
2. user - \$S RDR1,PUN1,PRT2
system - OK

Restarting A Punch

To restart a punch, use the \$E punch command.

\$E	punch
-----	-------

punch - PUNn, where n is the device number

The current activity on the designated device(s) will be terminated. The job will be returned to the Job Output Table in order of priority and will be made eligible for selection to resume processing at the beginning of the unit of work.

A console response of OK indicates that the specified device(s) will be restarted.

Example: user - \$E PUN1
system - OK

Repeating A Punch

To repeat current activity on a punch, use the \$N punch command.

\$N	punch
-----	-------

punch - PUNn, where n is the device number

The current activity on the designated punch device(s) will be repeated. This operation will not terminate the activity in process but will place the job back in the Job Output Table and will make it available for other devices to resume processing at the beginning of the unit of work.

A console response of OK indicates that the specified punch device(s) will be repeated, if they are eligible.

Example: user - \$N PUN1
system - OK

Backspacing A Punch

A \$B punch command will restart the current activity.

\$B	punch
-----	-------

punch - PUNn, where n is the device number

See \$E for information on restarting the function.

Forward-Spacing A Punch

A \$F punch command will restart the current activity.

\$F	punch
-----	-------

punch - PUNn, where n is the device number

See \$E for information on restarting the function.

Interrupting A Punch

A \$I punch command will restart the current activity.

\$I	punch
-----	-------

punch - PUNn, where n is the device number

See \$E for information on restarting the function.

Halting A Punch

To halt a punch device, use the \$Z punch command.

\$Z	punch
-----	-------

punch - PUNn, where n is the device number

The specified device(s) will be halted after the current scheduled operations complete. The effect of the \$Z command may be negated by the \$S command.

An OK response at the console indicates that the device(s) have been set to halt operations.

Example: user - \$Z PUN1,PUN2,RDR1
system - OK

Cancelling A Punch

To cancel current activity on a punch, use the \$C punch command.

\$C	punch
-----	-------

punch - PUNn, where n is the device number

An OK response at the console indicates that activity on the specified device(s) has been cancelled.

The current activity on the designated device(s) will be terminated, and the remainder of the unit of work will be discarded. The highest priority job eligible for output on the device will be selected and punching will resume for the new job.

Example: user - \$C PUN1
system - OK

Stopping (Draining) A Punch

To stop (drain) a punch, use the \$P punch command.

\$P	punch
-----	-------

punch - PUNn, where n is the device number

The specified device(s) will be prevented from starting any new activity. If a device is INACTIVE, it will be immediately stopped (DRAINED). If a device is ACTIVE, the device status will be DRAINING, and the device will revert to the DRAINED status at completion of the current activity.

If all operands of the command are entered correctly, the (device) DRAINED message will be displayed as a direct response to the command for specified devices that immediately enter or are in the DRAINED status. Thereafter, the (device) DRAINED information message will be issued whenever ACTIVE devices enter the DRAINED status.

Example: user - \$P PUN1,PUN2
system - OK

OS INTERFACES

Each printer and punch on the system is assigned a HASP name at HASP initialization time; responses to the \$DU command display the HASP printer and punch device names, along with the corresponding hardware addresses.

There are two ways to cause HASP to begin using a HASP printer or punch device:

1. Enter the \$S device command when the device is halted or drained.
2. Ready the printer or punch device prior to replying to the HASP initialization WTOR. (This is equivalent to entering a \$S device.)

If OS has allocated the device for other functions when HASP is initialized, there will be no attempt to use the device for job output, unless a \$S device command is entered. To prevent inadvertent OS allocation of the printer or punch to other jobs, HASP simulates an OS vary offline command, prior to its initial use of the device and when each \$S device command is entered for the printer or punch.

The operator should align printer forms and set printer FCB images, nonstandard UCB images, and nonstandard forms via the \$T command, before HASP begins job processing on printer devices.

Because of the length of its execution cycle, HASP does not prevent OS allocation of the printer or punch to other jobs within the system. The operator can start OS writers to a HASP printer or punch device or can enter jobs that require direct output. The operator should observe the following precautionary rules, when other jobs are to use HASP printer or punch devices:

1. Enter a HASP \$P command for the device and allow the device to become DRAINED, before varying the devices online or replying to the OS allocation requests. This may be supplemented by the \$I printer or \$E device command, to ensure rapid termination of the current job activity.
2. Ensure that the job has finished with the device and will not attempt to output more data, before a \$S command for the device is entered.

CONTROLLING DEVICES

OS CONSOLE SUPPORT

HASP utilizes standard OS facilities for displaying information on the OS-controlled consoles and accepts HASP commands from OS by monitoring the console inputs. All devices supported by OS continue to be supported when HASP is running in the system.

Controlling Console Message Output

While controlling devices and jobs, HASP originates messages to be displayed on one or more OS consoles. Depending on the system, it is possible for a large volume of messages to be displayed on the console devices. A large message volume not only makes it difficult for an operator handling a part of the operator work load to quickly identify messages intended for his use but tends to tie up the system waiting on the speed of the slowest device. HASP utilizes OS Multiple Console support and provides to OS message group routing codes for each HASP originated message (see OS Operator's Guide). Figure 6 lists all HASP originated messages with the appropriate HASP logical console classifications. The equivalent OS routing codes are as follows:

- LOG - master console information
- ERROR - system error maintenance
- UR - unit record pool
- TP - teleprocessing control
- TAPE - tape library, disk library, tape pool, direct-access pool
- MAIN - master console action, master console information.

Each HASP message will also have an associated level of importance:

- 1 - nonessential messages
- 3 - normal messages
- 5 - messages requiring action (delayed)
- 7 - essential messages
- 8 - messages requiring action (immediate).

By appropriate setting of the output routings of the console device, the operator is able to select only the OS messages, as well as HASP messages, desired. The operator should refer to the OS Operator's Guide for correct use of the OS "VARY unit, CONSOLE" command. The HASP "\$T

CON" command may be used to eliminate HASP messages of low importance levels by routing categories. Level 8 messages and responses to commands entered via OS consoles may not be eliminated under normal console operating conditions.

Controlling Command Entry

In a system running with many consoles, some consoles may be physically available to unauthorized personnel. OS provides a facility by which each console is given authorization to enter selected groups of commands. HASP will, when accepting a command from OS, examine the entry console authorization and reject unauthorized entry as an invalid command or invalid operand, as appropriate. The OS command authority groups and the HASP equivalents are as follows:

<u>OS Group</u>	<u>HASP</u>
0 INFO	Display Only
1 SYS	Job Control
2 IO	Device Control
3 CONS	System

The OS "VARY unit, CONSOLE, AUTH" command may be used for control of the command entry authorization of the consoles.

MESSAGE	LEVEL
"ERROR" CONSOLE MESSAGES	
ALL AVAILABLE FUNCTIONS COMPLETE	7
DISASTROUS ERROR - COLD START SYSTEM ASAP	7
DISASTROUS ERROR DURING CHECKPOINT - RESTART ASAP	7
I/O ERROR ON device uuu,cc,ssss,iiii,bbcchhr	7
I/O ERROR ON LINE n uuu,cc,ssss,iirr,xyee	7
"UR" CONSOLE MESSAGES	
JOB j SETUP -- prt device -- F=ffff -- C=cccc -- T=tttt	8
JOB j SETUP -- pun device -- F=ffff	8
JOB j - PRINTER n STPT=rrzzzzzz C=cccc X=xxxx-xxxx-xxxx-xxxx Y=yyyy	8
JOB j SETUP -- 3800 prt device -- F=ffff -- O=oooo -- B=b -- C=cccc	8
PAPER JAM -- APPROX PAGES=xxxx - PRINTER n	8
ALL AVAILABLE FUNCTIONS COMPLETE	7
SPOOL VOLUMES ARE FULL	7
JOB j ON device -- job name programmer name	5
device BACKSPACED	3
device command (excluding remote console devices)	3
device DELETED	3
device FWD-SPACED	3
device REPEATED	3
device RESTARTED	3
device SKIPPING FOR JOB CARD	3
device SUSPENDED	3
JOB j HELD	3
device IDLE - CLASS=classes	1
device IS DRAINED	1
JOB j -- INVALID /*JOBPARM CARD	1
JOB j -- INVALID /*OUTPUT CARD	1
JOB j -- ILLEGAL /*ROUTE CARD	1
JOB j -- ILLEGAL JOB CARD	1
JOB j DELETED	1
JOB j {PRINTING} ON device	1
{PUNCHING}	
JOB j PURGED	1
"TP" CONSOLE MESSAGES	
ALL AVAILABLE FUNCTIONS COMPLETE	7
I/O ERROR ON device uuu,cc,ssss,iiii,bbcchhr	7
I/O ERROR ON LINE n uuu,cc,ssss,iirr,xyee	7
r, message from operator (at remote r)	7
device command	3
LINE n -- INVALID PASSWORD	3
LINE n -- INVALID SIGNON	3
REMOTE r DISCONNECTED	3
REMOTE r STARTED ON LINE n	3
device IS DRAINED	1

Figure 6. HASP Message Classifications (Sheet 1 of 2)

MESSAGE	LEVEL
"TAPE" CONSOLE MESSAGES	
ALL AVAILABLE FUNCTIONS COMPLETE	7
device message	5
JOB j	
JOB j HELD FOR THE FOLLOWING VOLUMES --	5
"MAIN" CONSOLE MESSAGES	
ALL AVAILABLE FUNCTIONS COMPLETE	7
(Command responses for commands entered from HASP local readers)	7
JOB j BUFFER ROLL UNSUCCESSFUL -- VERIFY NUMBER OF BUFFERS	7
JOB j TERMINATED	7
SPOOL VOLUMES ARE FULL	7
JOB j USES TOO MANY /*OUTPUT CONTROL CARDS	7
INIT i IDLE - CLASS = classes	5
JOB j DUPLICATE JOBNAME - JOB DELAYED	5
JOB j ESTIMATED OUTPUT RECORDS EXCEEDED BY xxxxx	5
JOB j ESTIMATED TIME EXCEEDED BY xx MINUTES	5
JOB j HELD FOR THE FOLLOWING VOLUMES--	5
JOB j -- jobname -- BEGINNING EXEC - INIT i - CLASS c	3
JOB j AWAITING HASP ALLOCATION	3
JOB j HELD	3
JOB j END EXECUTION	1
"REMOTE" CONSOLE MESSAGES	
JOB j SETUP -- prt device -- F=ffff -- C=cccc -- T=tttt	
JOB j SETUP -- pun device -- F=ffff	
JOB j ON device--job name programmer name	
device SKIPPING FOR JOB CARD	
r, message from operator (at remote r)	

"LOG" CONSOLE MESSAGES

(All messages listed above routed to any other console)

Figure 6. HASP Message Classifications (Sheet 2 of 2)

Redirection Of Command Responses

Normally, responses to HASP commands entered at an OS console are directed to the normal message area (area Z) on the console of entry. Each line of the response will be time tagged with the HASP time stamp. With the exception of the \$DM (display message) operator command, responses to HASP commands may be redirected to "out-of-line areas" (areas A through O) of the console of entry or to another OS console. The operator causes this redirection by appending to the end of his command one of the following additional operands:

<u>Operand</u>	<u>Meaning</u>
,L=cca	Direct response to console "cc", area "a"
,L=cc	Direct response to console "cc", area Z
,L=a	Direct response to default console, area "a"

where cc is the 1- or 2-digit OS console number, as displayed by the OS display consoles command, and a is the area id (A through O or Z).

If the operand is acceptable for redirection of responses, it will be removed from the command text, and if an out-of-line area has been specified, the edited text of the command (up to 34 characters, including time stamp) is displayed at the response console along with the normal responses to the command (without time stamp).

If the responses are directed to area Z of a console, only responses (with time stamp) are displayed at that console, as though the command had been entered from that console. If the operand is not acceptable for redirection purposes, it remains appended to the command and depending on the command will be acted upon as an invalid entry or will be ignored.

Examples:

1. user - \$DA,L=2
at console 2 - (time stamp) + JOB 4 EXECUTING A PRIO 9
(time stamp) + JOB 1 ON PRINTER1 PRIO 4
2. user - \$DA,L=2A
at console 2 - (time stamp) + \$DA (OS display control
information)
JOB 4 EXECUTING A PRIO 9
JOB 1 ON PRINTER1 PRIO 4

Automatic Redirection Of Display Command Responses

Although responses to HASP commands may be redirected by appending the L=cca operand to the command, the operator of multiple display units (only one with a keyboard) may require that certain command responses be automatically displayed on a console other than the one into which the command was entered. In such a case, he can enter the \$TM (set message routing) command, specifying the console and area (cca) of the response console along with the operand identifiers of the various display command responses desired at that cca location.

For example, if the operator at console 1 enters:

\$TM2A,AQ

he instructs HASP that every time a \$DA, \$DQ, or \$DN (\$DN assumed if \$DQ specified) command from console 1 is entered, the response is to be displayed at console 2, area A. This specification for console 1 does not affect entries of \$DA, \$DQ, or \$DN from any other console in the system, including console 2.

The operator may always override the automatic setting for a prior display command by entering the L=cca operand. In this instance, the entry of L=cc will override both console and area, while L=a overrides only the area allowing the automatic console response routing to take place.

Setting Message Routing

To set message routing, use the \$TM command.

\$T	M[ccal[,operand IDs][,L=cca]
-----	------------------------------

cc - indicates the console that will display responses of commands entered at the console that entered this \$T command. If the cc operand is omitted, the console that entered this command is assumed.

a - indicates the console area (A through O or Z) to which the responses are to be directed. If omitted, area Z is assumed.

operand IDs - character string listing the first operand of each display command group as follows:

<u>Character</u>	<u>Commands</u>
A	\$DA
F	\$DF
I	\$DI
J	\$DJ,\$D'jobname'
L	\$DLINEn,\$DRMTr,\$DRMT
O	\$DO
Q	\$DQ,\$DN
S	\$DS
U	\$DU,\$DD

If no characters are specified, no changes in routing are made.

L=cca - if valid, specifies the console and area that will receive the response to this \$T command as well as the console whose responses are to be automatically redirected in accordance with the operand character string given.

The designated console (response console) will be set in accordance with the cca portion of the first operand and the character string given. Changes are made beginning with the first character in the string up to the end of the string or until an invalid character is encountered. If no invalid characters are specified, all settings for the console are displayed.

Note that this command requires system authority and must be entered from an OS console.

The console response to this command is:

CON cc A=cca F=cca I=cca J=cca L=cca O=cca Q=cca S=cca U=cca

Examples: 1. user - \$TM2A,A
 system - CON1 A=2A F=1Z I=1Z J=1Z L=1Z O=1Z Q=1Z S=1Z
 U=1Z

2. user - \$TM2B,FQ
 system - CON1 A=2A F=2B I=1Z J=1Z L=1Z O=1Z Q=2B S=1Z
 U=1Z

Displaying Operator Requests

To display operator requests, use the \$DO command.

\$D	O
-----	---

HASP messages that have been previously displayed on OS consoles with the characteristic "*" action flag and have not been acted on by the operator are redisplayed as responses to this command.

Each message that has not been acted on by the operator ties up resources in the system until the operator performs the required function. Depending on the installation options, a large number of requests that have not been acted on may result in the system stopping all useful work. When remote operators fail to respond to device forms and carriage tape mounting requests, the central operator can drain (\$P RMr.PRn or \$P RMr.PUn) the device and restart (\$E RMr.PRn or \$E RMr.PUn) the function to clear the pending action without causing the output to be printed or punched on invalid forms or carriage tape.

Console responses to this command are:

1. Previously displayed action message - one response for each outstanding operator request
2. NO OPERATOR REQUESTS - no outstanding operator requests were found.

```
Example:  user   -   $DO
          system -   JOB 5 SETUP -- PRINTER2 -- F=RRRR --
          C=6LPI -- T=PN
```

Setting Level Of Message Output For Logical Classes

To set the level of message output for logical classes, use the \$TCON command.

\$T	CON,level,class [,class,...]
-----	------------------------------

CON - indicates that HASP is to set the level of message output for the logical console classes passed to OS consoles.

level - a number, 0-15, which specifies the highest operator message level to be eliminated (for the designated logical console classes specified in the succeeding operands). A value of 0 will allow all HASP messages for the designated logical console classes to be displayed on the OS console(s) assigned to display the message classes. A value of 15 will eliminate all HASP messages (except level 8 or above) of the specified classes. The following list indicates the general levels of messages displayed by the HASP System:

- 1 - non-essential messages
- 3 - normal messages
- 5 - messages requiring operator action (delayed)
- 7 - essential messages
- 8 - message requiring operator action (immediate)

class - the logical console classes of the messages given to OS for display purposes. Specify as follows:

- LOG - log console messages
- ERROR - error messages
- UR - unit record messages
- TP - HASP RJE line messages
- TAPE - tape console messages
- MAIN - main operator console messages

Responses to HASP commands will always be displayed at the console of entry regardless of logical console classes or level settings, unless redirected to another console by the operator.

The display level of the logical console classes will be set, as specified. Each logical console class is set independently from the others, starting with the first listed (operand 3). If an error is detected in the list, the operands preceding the operand in error will be acted upon, and the operand in error (and all succeeding operands) will be ignored.

Note that responses to commands entered at local reader devices will be directed to LOG and MAIN consoles at level 7.

An OK response at the console indicates that the logical console classes have been set to the display level specified.

```
Example:  user   -   $T CON,4,MAIN,LOG
          system -   OK
```

STARTING, STOPPING, AND RESTARTING HASP RJE LINES

Starting A Line

To start an RJE line, use the \$S line command.

\$S	line{password}
-----	----------------

line - HASP Remote Job Entry line device

password - 0- to 8-character security password required for remote work station SIGNON

The specified line(s) will be started unless allocated by OS to another activity or unless the designated adapter is offline. The optional password will be set for the line and will be used to reject unauthorized terminals attempting to use the line without permission from the central installation. If the line is ACTIVE, the command has the effect of setting a new password to be used for future terminal SIGNON.

A response of OK indicates that the specified line(s) will be started; a response of (device name) IN USE indicates that the line listed is assigned by OS. A response of (device name) INVALID OPERAND indicates that the device (if name is spelled correctly) has not been assigned a hardware address.

```
Examples:  1.  user   -   $S LNE1,LNE2
            system -   OK

           2.  user   -   $S LNE1,XZQ,LNE2,XZZ
            system -   OK
```

Stopping (Draining) A Line

To stop an RJE line, use the \$P line command.

\$P	line
-----	------

line - HASP Remote Job Entry line device

The specified line(s) will be prevented from starting any new activity. If a line is INACTIVE it will be immediately stopped (DRAINED). If a line is ACTIVE, its status will be DRAINING, and it will revert to the DRAINED status at completion of the current activity.

If all operands of the command are entered correctly, the (device) DRAINED message will be displayed (along with OK) as a direct response to the command for specified devices that immediately enter or are in the DRAINED status. Thereafter, the (device) DRAINED information message will be issued whenever ACTIVE devices enter the DRAINED status.

A \$P, issued to a line that is communicating with a remote, places the line in the DRAINING status. When communications are disconnected, the line will enter the DRAINED status. To force the line to enter the DRAINED status, the \$P line command should be followed by a \$E line command.

Example: user - \$P LNE1,LNE2
system - OK

Note: After communications are disconnected, the line is DRAINED and any communication on the line will be disregarded by HASP. The modem is left enabled, and is conditioned to receive any incoming calls. In the case of draining the line using \$P followed by a \$E, the modem is also left enabled.

Restarting A Line

To restart an RJE line, use the \$E line command.

\$E	line
-----	------

line - HASP Remote Job Entry line device

Current activity on the line(s) will be terminated. The HASP System will, upon completion of the current line I/O, abort all activities on the line. The line will enter the DRAINED status if the previous operator command referencing the line was a \$P line command. The line will remain ACTIVE if the previous operator command referencing the line was a \$S line command.

A console response of OK indicates that the line(s) will be restarted.

Example: user - \$E LNE2
system - OK

REMOTE WORK STATIONS

The HASP System, while running in conjunction with OS/VS2, operates many peripheral devices simultaneously with normal job execution, to perform the functions normally associated with offline support computers. The function of HASP has been extended to operate, via several classes of telephone lines, peripheral devices located at a distance from the central computer complex.

Through the HASP Remote Job Entry feature, a user, located perhaps thousands of miles from a particular System/370 installation, can use the capabilities of that installation, as if in the local computer room. The unit record devices at a remote station are logically operated by HASP as if they were local readers, printers, and punches, so that HASP can simultaneously operate all local unit record devices, read jobs from several remote readers into the queue of jobs awaiting processing and print and punch the results of processing at the remote site.

Appendixes B through J give details on operating the particular remote workstations supported by HASP:

1. 1130
2. System/360 BSC
3. Model 20 BSC and 2922
4. 2780
5. 2770
6. System/3
7. 3780

Procedures common to all remote work stations will be given here.

Certain control cards recognized by HASP can be introduced from the remote terminal site as follows:

1. /*MESSAGE
2. /*ROUTE
3. /*PRIORITY
4. /*COMMAND
5. /*SETUP
6. /*JOBPARM
7. /*OUTPUT

These control cards were described previously under System Input.

Two other control cards generally introduced at remote terminal sites are the /*SIGNON and /*SIGNOFF cards described in the following paragraphs.

1	16	25
/*SIGNON	REMOTEn	Password

For CPU remotes, this card is optional and appears at the end of the HASP/RTP program deck. It is used to override the remote identification number, normally assigned to the HASP/RTP program deck. For non-CPU remotes this card must be transmitted alone as part of the initial connection process. For dial lines, the /*SIGNON card can contain a password which, if correct, allows the remote terminal access to the HASP System for remote job stream processing. The value "n" must match the remote identification number, assigned to the remote station by central computer personnel. The password must match that assigned to the line by the central computer operator, when the communication line is started.

1
/*SIGNOFF

This card informs the central system that the remote terminal operator will terminate a remote job stream processing session. At the completion of the current print and/or punch streams, HASP will disconnect the terminal from the system and will prepare the line for other remote stations to sign on.

Displaying Messages At Remote Terminals

To display a message at a remote, use the \$DM command.

\$D	M r-rr,message
-----	----------------

r-rr - range of remote terminals (all remote terminals from r through rr are to receive the message) or single remote number (the remote specified by r is to receive the message).

message - text of the message to be displayed at the designated remote terminals. If the message is enclosed by apostrophes, it will be made upper case and will be transmitted, along with the apostrophes, to the remote terminals indicated; otherwise, the text will be made upper case, and blanks will be removed.

A remote specification of zero indicates that the message is to be displayed at the central operator's console. If a range of remote terminals is specified by a remote terminal operator, only the last remote specified will receive the message.

The message will be transmitted to the indicated remote terminal, if the terminal is capable of receiving the message.

An OK response at the console indicates that the message has been queued for transmission to eligible remote terminals.

Examples: 1. user - \$D M4, Jobs remaining after 5PM
will be purged
at remote - 0,JOBSREMAININGAFTER5PMWILLBEPURGED

2. user - \$D M4,'Jobs remaining after 5PM
will be purged'
at remote - 0,'JOBS REMAINING AFTER 5PM WILL
BE PURGED'

The zero at the beginning of the message indicates that the message originated at the central site. If the message originated from a remote, it would reflect the remote number.

Routing Job(s) Output

To route job output, use the \$R command.

\$R	type,for-id,to-id
-----	-------------------

- type - ALL; all normal output for the specified job(s) is to be routed. (If the for-id specifies a job, all special routed data sets will be included.)
- PRT; normal print output for the specified job(s) is to be routed
 - PUN; normal punch output for the specified job(s) is to be routed
- for-id - JOBj; the designated output for job j is to be routed
- LOCAL; the output designated for all jobs currently in the system and for LOCAL devices is to be routed
 - RMx...r; the output designated for all jobs currently in the system and for remote r, is to be routed
- to-id - LOCAL; job(s) are to be routed to local devices
- device; job(s) are to be routed to this device
 - RMx..r; job(s) are to be routed to remote r

A job can be routed to a remote that does not exist. In an unmodified HASP System, device routing has no meaning and will be equivalent to specifying LOCAL or RMTr, as appropriate. RMT0 is equivalent to specifying LOCAL.

The routing of print and punch data sets for the job specified, or for all jobs currently in the system and routed for the output device group specified by the second operand, will be altered to the routing specified by the third operand. If the first and second operands are ALL and JOBj, respectively, all special routed data sets will be converted to normal print or punch data sets, and will be routed with the normal job output.

A response of OK at the console indicates that the job output specified has been routed. If the job requested is not in the system, JOB NOT FOUND is displayed.

```
Examples: 1. user   - $R ALL, J4, RMT6
           system - OK

           2. user   - $R PUN, RM3, LOCAL
           system - OK
```

Display Special Routed Output

To display special routed output, use the \$DS command.

\$D	S	[,Jx...j-jj	[,r-rr]]
			[,r-rr	[,Jx...j-jj]	

For each job within the specified job range the output queue is searched for work elements that have been routed by the programmer independent of the job. If special routed output is found and is within the routing range, the job number and normal output routings for the job are displayed along with the routing of each special work element found in the queue for the job. If no job is within the specified job range, a JOB(S) NOT FOUND message is displayed. If no job range is specified J1-9999 is assumed. If multiple job ranges are given, each must contain the J identification character. Only the last job range specified will be honored. If the routing range is omitted, the routing of the console of entry is assumed (0 for local, 1 for route 1, etc.) If multiple route ranges are specified, only the last range will be honored. The response NO SPECIAL ROUTED OUTPUT FOUND indicates that none of the jobs found had special routed output currently queued for output. (Special routed data sets may appear on the queue after the \$DS response for jobs known to be queued for output or actively being output on HASP devices.) The format of the information displayed is as follows:

JOB j (print route, punch route) = route1, route2,...routen


```

Example:  user   -   $DS, J1-4,0-9
          system -   JOB   1 ( 1, 0) = 4, 6, 8, 4
          JOB   2 ( 3, 0) = 6, 0, 1, 4, 3
          JOB   4 ( 0, 0) = 1, 2, 7

```

Note that Job 3 was not found or had no special routed output queued.

MONITORING DEVICES

Displaying Direct-Access Devices

To display the device addresses and volume serials of all online direct-access storage devices, use the \$DD command.

\$D	Dx...
-----	-------

A response of "aaa serial," for each device found, will be displayed at the console.

```

Examples:  1.  user   -   $D DISKS
            system  -   190 IPLRES
            -        191 LNKRES
            -        192 NO ID
            -        193 SPOOL1

            2.  user   -   $DD
            system  -   190 IPLRES
            -        191 LNKRES
            -        193 SPOOL1

```

Displaying Devices On RJE Line

To display the status and hardware device address assignment of a line, use the \$DL command.

\$D	line
-----	------

line - HASP RJE line

The status of the specified line, along with the hardware device address assignment, will be displayed. If no address is assigned, the address will be filled with "****". If the line is ACTIVE and is associated with a HASP remote work station, the HASP status of each device on the remote terminal will be displayed.

Remote console devices will not be displayed.

Responses to the \$D command include:

1. LINE aaa status - status of the specified line
2. RMr.devn aaa status - one response for each device associated with the line (aaa is the address of the line)
3. LINE_n NOT FOUND - HASP has no record of the line specified

Examples:

1. user - \$D LINE1
 system - LINE1 031 ACTIVE
 - RM3.RD1 031 INACTIVE
 - RM3.PR1 031 ACTIVE
 - RM3.PU1 031 DRAINED
2. user - \$DLINE2
 system - LINE2 032 DRAINED

Displaying Remotes

To display status of remote work stations, use the \$DR command.

\$D	Rx... [r]
-----	-----------

r - number of the remote. If r is omitted, all remotes will be assumed.

If the designated remote is currently associated with a HASP RJE line, the HASP status of the line and devices attached to the remote will be displayed. If the remote is not associated with a line, only the HASP status of the devices attached to the remote will be displayed. If the remote number is not specified in the command, the HASP status of all remote devices will be displayed. (Attached lines will be excluded.)

Console responses to this command include:

1. LINE_n aaa status - status of the associated line
2. RMr.devn aaa status - status of each device on the remote (aaa is the address of the line)

```

Examples: 1. user - $D RM3
           system - LINE 1 031 ACTIVE
                - RM3.RD1 031 INACTIVE
                - RM3.PR1 031 ACTIVE
                - RM3.PU1 031 DRAINED

           2. user - $D RMTS
           system - RM1.RD1 *** DRAINED
                - RM1.PR1 *** DRAINED
                - RM1.PU1 *** DRAINED
                - RM2.RD1 021 DRAINED
                - RM2.PR1 021 ACTIVE
                - RM2.PU1 021 INACTIVE
                - RM3.RD1 031 ACTIVE
                - RM3.PR1 031 ACTIVE
                - RM3.PU1 031 INACTIVE

```

Displaying Units

To display the status of all HASP-controlled, non-direct access devices, use the \$DU command.

\$D	Ux...
-----	-------

The status of all HASP-controlled, non-direct access devices attached to the local system will be displayed, along with the corresponding hardware address of the device.

A response of "device aaa status," for each HASP device, will be displayed.

```

Example: user - $D UNITS
           system - READER 1 00C INACTIVE
                - PRINTER1 00F ACTIVE
                - PRINTER2 00F DRAINED
                - PUNCH1 00D INACTIVE

```

CONTROLLING JOBS

CONTROLLING THE JOB QUEUE

Jobs being processed or awaiting processing by a HASP phase are represented in a queue. The queue is maintained in priority order, at all times. Various operator commands affect the entire job queue.

Holding All Jobs

To hold all jobs currently in the system, use the \$HA command.

\$H	Ax...
-----	-------

All jobs currently in the system will be placed in HOLD status, and further processing will be prevented. Any new jobs entering the system subsequent to the \$HA command will not be held. The \$A ALL command may be used to negate the effect of the \$HA command, or the \$A JOB command may be used to negate the effects for specific jobs.

An OK response at the console indicates that all jobs currently in the system have been placed in the HOLD status.

Examples:

1. user - \$H ALL
system - OK
2. user - \$H A
system - OK

Releasing All Jobs

To release all jobs in the system, use a \$AA command.

\$A	Ax...
-----	-------

Any jobs in the system, held by the \$HA command, will be released, and processing will be allowed.

A response of OK indicates that one or more jobs have been released. A response of QUEUE NOT HELD means no jobs have been released.

- Examples:
1. user - \$A ALL
 system - OK
 2. user - \$A A
 system - OK
 3. user - \$A A
 system - QUEUE NOT HELD

Displaying Active Jobs

To display job information for each active job in the system, use the \$DA command.

\$D	Ax...
-----	-------

Possible console responses are:

1. Job information messages.
2. NO ACTIVE JOBS - NO active jobs were found.
3. LIST INCOMPLETE - The last job listed was removed from the HASP job queue, while all HASP WTO buffers were in use.

The LIST INCOMPLETE response should be extremely rare, when sufficient WTO buffers have been generated to handle the message traffic.

- Examples:
1. user - \$D A
 system - JOB 3 ASSEMBLY EXECUTING
 A PRIO 5
 2. user - \$D ACTIVE
 system - JOB 20 LISTALL ON PRINTER 2
 PRIO 6

Displaying Output Work Queued On Forms, UCS, FCB, Forms Overlay, or BURST Characteristics

To display the number of jobs queued for output, use the \$DF command.

\$D	F	[,r-rr ,Jx...j-jj ,Hx ,Ax]
-----	---	---------------------------------------

r-rr - route code range; will display work for the lowest routing (r) first, then for the next higher routing, and so forth until the highest routing (rr) has been displayed; an r value of zero indicates the central system; an r value of 1 or greater (not to exceed 99) indicates remote terminal(s) selected for display; if r and rr are the same, value rr may be omitted; if the entire routing code is omitted or set to zero, the default routing at the console of entry is assumed.

Jx...j-jj - job number range desired; will display work for jobs between the job range indicated; the j value must be less than or equal to the jj value; if j and jj are the same value, jj may be omitted; if the job number range is omitted, all jobs are eligible.

Hx... - will display only work for jobs in the HOLD status; if omitted and the AX... parameter is omitted, only work for released jobs will be displayed.

Ax... - will display work for jobs in the HOLD and released status; if omitted and the Hx... parameter is omitted, only work for released jobs will be displayed.

Note that any or all of the routing, job, H or A parameters may be specified in any order; however, since H and A parameters are mutually exclusive, the last specification will override the previous. If more than one job range is specified, each should have the Jx... identification. The last specification will override any previous specifications. If more than one route code range is specified, the last specification will override any previous specifications.

Starting with the first route code and continuing for all specified route codes, each unique forms, FCB, UCS, forms overlay, and BURST combination is summarized for the SYSOUT classes that have work queued for output for the combination. Each unit of work represents one or more data sets capable of being selected for output by a device with specified setup (see \$T command). If the number of work elements is greater than 99, the count will be displayed as "***".

Possible console responses are:

1. OUT r F=form C=carriage T=train O=forms overlay name B=Y or N CLS c1=nn1[,...ci=nni] - one response for each route code r, form, carriage, train, forms overlay, and burst combination with summary of queued work listed for each class, as appropriate.
2. NO OUTPUT QUEUED - no work was found in the output forms queue for the specified route code through job range with the appropriate status.

Example: user - \$DF
system - OUT 0 F=STD. C=6 T=PN O= B=Y CLS A=10,B=4
OUT 0 F=3PRT C=6 T=HN O=GROK B=N CLS A=3,J=12

Note: Forms overlay and burst information is not included if eNUM3800=0 at HASPGEN.

Displaying Job Information On Queued Jobs

To display job information on all jobs queued for execution, print, and punch, use the \$DN command.

\$D	Nx...	[, {r-rr} [,queue]	[,queue]
-----	-------	--------------------	----------

- r-rr - route code range; 0 indicates local; 1-99 indicates remote terminal(s) selected for display.
- queue - XEQ; only jobs waiting for execution are to be displayed in order by class (A, B, C, etc.)
 - XEQ class; only jobs waiting for execution in the designated class are to be displayed
 - OUT; only jobs waiting for output are to be displayed in order by route code (0, 1, 2, etc.)
 - HOLD; only jobs waiting for any activity and in HOLD status are to be displayed

If routing and/or queue type restrictions are not specified, job information will be displayed for: all jobs queued for execution (XEQ) and output (OUT); all jobs destined for output at local; and all remote terminal printer-punch unit record groups. If the routing restriction is specified in operand 2, only the jobs with output destined to the designated terminals will be displayed. If the queue type is specified in operand 2 or 3, only jobs in the selected queue, with the appropriate routings, will be displayed.

Note that \$DN displays the routing of the job but does not display the destination of a data set as set by the 'DEST' parameter of the /*OUTPUT control card.

In addition to job information, the percentage of SPOOL disk utilization will be displayed, following the search for queued jobs.

Possible console responses are:

1. Job information message - one for each job in the designated queues; if the job has unlike print and punch routings, the message will be issued for each routing.
2. xx PERCENT SPOOL UTILIZATION - The last response.
3. LIST INCOMPLETE - The last job listed, prior to this message, was removed from the HASP job queue, while all HASP WTO buffers were in use.

```

Examples: 1. user - $D N,4,OUT
            system - JOB 6 PRINTJOB AWAITING OUT 4 4 PRIO 6
                   JOB 8 ASSEMBLY AWAITING OUT 4 4 PRIO 5
                   25 PERCENT SPOOL UTILIZATION

2. user - $D N,0-2,XEQ
   system - JOB 3 UNIQUE AWAITING EXEC A PRIO 9
            DUPLICATE
            JOB 6 JOHNSJB AWAITING EXEC A PRIO 9
            JOB 2 BILLSJB AWAITING EXEC A PRIO 8
            30 PERCENT SPOOL UTILIZATION
  
```

In example 1, the operator has requested information only on jobs with output to remote 4 and waiting for output. In example 2, the operator has requested information on jobs waiting for execution with output to local, remote 1, or remote 2 devices.

Displaying Number Of Jobs Queued

To display the number of jobs queued, use the \$DQ command.

\$D	Qx... [, {r-rr} {,queue}] [,queue
-----	---

- r-rr - route code range; 0 indicates local; 1 or greater (not to exceed 99) indicates remote terminal(s) selected for display.
- queue - XEQ; only jobs waiting for execution are to be counted and summarized in order of class (A, B, C, etc.)
 - XEQ class; only jobs waiting for execution in the designated class are to be counted and summarized
 - OUT; only jobs waiting for output are to be counted and summarized in order by route code (0, 1, 2, etc.)
 - HOLD; only jobs (active or queued) and in HOLD status are to be displayed

If routing and/or queue type restrictions are not specified, the number of jobs queued for execution (XEQ) and output (OUT); the number of jobs destined for output at local; and all remote terminal printer-punch unit record groups will be displayed. If the routing restriction is specified in operand 2, only the count of jobs with output destined to the designated terminals will be displayed. If the queue type is specified in operand 2 or 3, only the count of jobs in the selected queue, with the appropriate routings, will be displayed. Note that a job queued for output with unlike print and punch routings will be counted for each routing.

Note that \$DQ displays the routing of the job but does not display the destination of a data set as set by the 'DEST' parameter of the /*OUTPUT control card.

In addition to displaying number of jobs queued, the percentage of SPOOL disk utilization will be displayed, following the search for queued jobs.

Possible console responses are;

1. nn queue type; number of jobs in designated queue type - one line for each queue type
2. xx PERCENT SPOOL UTILIZATION - the last response.

Examples:

1.	user	-	\$D Q,4,OUT
	system	-	2 OUT 4
			25 PERCENT SPOOL UTILIZATION
2.	user	-	\$D Q,0-2,XEQ A
	system	-	3 XEQ A
			30 PERCENT SPOOL UTILIZATION
3.	user	-	\$D Q,OUT
	system	-	2 OUT 0
			2 OUT 1
			1 OUT 3
			35 PERCENT SPOOL UTILIZATION

In example 1, the operator has requested that the number of jobs with output to remote 4 and waiting for output be displayed. In example 2, the operator has requested that the number of jobs, waiting for execution class A with output to local, remote 1, or remote 2 devices, be displayed. In example 3, the operator has requested that the number of jobs waiting for output be displayed. The response shows two jobs waiting for local, two jobs waiting for remote 1 (route code 1), and one job waiting for remote 3 (route code 3).

CONTROLLING SPECIFIC JOBS

One or more specific jobs can be controlled via a job list command. The following format is used for entry of job list commands:

```
$verb Jz...j1-jj1,j2-jj2,....,jm-jjm
```

Each operand requests action on a range of job numbers; i.e., if "1-300" were specified for an operand, action would be attempted on jobs 1, 2, 3, ..., 300. If a single job is desired, the "-jj" may be omitted or may be entered with a value equal to the first value of the range. If the second value of the range is not greater than the first, only the job corresponding to the second value will be controlled.

The maximum of five (5) range groups may be entered; any entries beyond operand five will be ignored.

Releasing Specified Job(s)

To release specific job(s), use the \$A job list command:

\$A	job list
-----	----------

Specified jobs will be released from the HOLD status if held by \$H ALL, \$H JOB, JCL parameter TYPRUN=HOLD, setup control card, or a reader instructed to hold jobs.

Possible responses are:

1. JOBj RELEASED - one response for each job released
2. JOB(S) NOT FOUND - none of the specified job(s) were found
3. JOBj NOT HELD - one response for each job indicated but not in the hold status.

Examples:

1.	user	-	\$A JOB 3
	system	-	JOB 3 RELEASED
2.	user	-	\$A JOBS 4-6
	system	-	JOB 4 RELEASED
			JOB 6 NOT HELD

In example 2, job 5 was not found.

Cancelling Specified Job(s)

To cancel specific job(s), use the \$C job list command.

\$C	job list
-----	----------

If the specified job(s) is being read into the system or is awaiting execution, it's JCL will be queued for print prior to purging. If the specified job(s) is in execution, the job's partial output will be queued for print and/or punch when execution is terminated by OS. Jobs awaiting output will have all active functions terminated and all inactive functions cancelled prior to purge.

Possible console responses are:

1. Job information response - one response for each job cancelled
2. JOB(S) NOT FOUND - none of the specified jobs were found.

Example:

user	-	\$C JOB 7
system	-	JOB 7 YOURJOB AWAITING OUT 0 0 PRIO 7 PURGE

Displaying Job Information On Specified Job(s)

To display information on specified job(s), use the \$D job list command.

\$D	job list
-----	----------

If the \$D job list command is entered from a remote terminal, only those jobs belonging to the remote will be displayed.

Possible console responses are:

1. Job information response - one response for each specified job found in the system
2. JOB(S) NOT FOUND - none of the specified jobs were found.

Examples: user - \$D JOBS 1-10
system - JOB 2 YOURJOB EXECUTING A PRIO 13
JOB 3 YOURJOB AWAITING EXEC A PRIO 13 DUPLICATE
JOB 6 ANOTHER ON PRINTER1 PRIO 12
JOB 7 JOHNSJB AWAITING OUT 0 0 PRIO 12 HOLD

In example 1, jobs 1, 4, 5, 8, 9, and 10 were not found.

Restarting Specified Job(s) In Execution

To restart execution of specified job(s), use the \$E job list command.

\$E	job list
-----	----------

Each specific job, found in the system and currently in OS execution, will have its HASP execution controller flagged to restart the job. Upon completion of OS execution (normal or abnormal), HASP execution will place the job back on the HASP execution queue.

This command requires job and system command authority and is not available to HASP remote operators.

Possible console responses are:

1. Job information response - one response for each specified job in execution, which has been flagged for reexecution
2. JOBj NOT RESTARTABLE - one response for each specified job found in the system, which cannot currently be restarted

3. JOB(S) NOT FOUND - none of the specified jobs were found.

- Examples:
1. user - \$E J6
system - JOB 6 ANY EXECUTING A PRIO 8
 2. user - \$E J3
system - JOB 3 MYJOB EXECUTING A PRIO 6
user - C MYJOB
OS - accepted message

In example 1, the operator requires that job 6 run to completion before requeueing for execution. In example 2, the operator aborts current execution of job 3 and requeues it for execution.

Holdng Specified Job(s)

To place specific job(s) in the HOLD status, use the \$H job list command.

\$H	job list
-----	----------

Each specified job found in the system will be placed in the HOLD status.

Possible console responses are:

1. Job information response - one response for each job held
2. JOB(S) NOT FOUND - none of the specified jobs were found.

Example: user - \$H J4
system - JOB 4 YOURJOB AWAITING OUT 0 0 PRIO 4 HOLD

Stopping Specified Job(s)

To stop specific job(s) after current activity, use the \$P job list command.

\$P	job list
-----	----------

Effects of this command are the same as for \$C job list, except any active functions are allowed to complete normally prior to purging.

Possible console responses are:

1. Job information response - one response for each job, which will be stopped
2. JOB(S) NOT FOUND - none of the specified jobs were found.

Example: user - \$P J7
 system - JOB 7 JOHNSJB PRINTER2 PRIO 4 PURGE

CONTROLLING A SPECIFIC JOB BY OS JOBNAME

Releasing A Job

To release a job specified by OS jobname, use the \$A 'jobname' command.

\$A	'jobname'
-----	-----------

'jobname' - the OS job name, appearing on the user's JOB card, enclosed by apostrophes. The name may be upper or lower case alphameric characters but must not contain blanks.

The HASP job queue is searched for the single job with the specified job name, and the action of the \$A job list command is performed. If the job is not found, or if more than one job with the specified name is encountered, no action is taken, and an appropriate diagnostic is displayed.

Possible responses at the console are:

1. JOBj RELEASED - the job specified has been released
2. jobname NOT FOUND - the job named is not in the system
3. JOBj NOT HELD - the specified job was not in the hold status
4. MULTIPLE JOBS WITH jobname - more than one job with the specified name is in the system; messages compatible with \$D 'jobname' will follow.

Examples: user - \$A'MYJOB'
 system - JOB 4 RELEASED

Cancelling A Job

To cancel a job, specified by OS job name, use the \$C 'jobname' command.

\$C	'jobname'
-----	-----------

'jobname' - the OS job name, appearing on the user's JOB card, enclosed by apostrophes. The name may be upper or lower case alphameric characters but must not contain blanks.

The HASP job queue is searched for the single job with the specified job name, and the action of the \$C job list command is performed. If the job is not found, or if more than one job with the specified name is encountered, no action is taken, and an appropriate diagnostic is displayed.

Possible console responses are:

1. Job information response - response listing the current status of the job after command action
2. jobname NOT FOUND - the job named is not in the system
3. MULTIPLE JOBS WITH jobname - more than one job with the specified name is in the system; messages compatible with \$D'jobname' will follow.

Example: user - \$C'YOURJOB'
system - JOB 82 YOURJOB AWAITING OUT 0 0 Prio 7 PURGE

Displaying Job Information

To display information on a job specified by OS job name, use the \$D 'jobname' command.

\$D	'jobname'
-----	-----------

'jobname' - the OS job name, appearing on the users JOB card, enclosed by apostrophes. The name may be upper or lower case alphameric characters but must not contain blanks.

Possible console responses are:

1. Job information response - one response for each job in the system with the OS job name specified.
2. LIST INCOMPLETE - the last job listed was removed from the HASP job queue while all HASP WTO buffers were in use.

3. jobname NOT FOUND - the named job was not found.

```
Example:  user   -  $D'MYJOB'
          system -  JOB 4 MYJOB ON PRINTER 1 PRIO 13
                               JOB 5 MYJOB AWAITING OUT 0 0 PRIO 13
                               JOB 6 MYJOB EXECUTING A PRIO 13
                               JOB 7 MYJOB AWAITING EXEC A PRIO 13 DUPLICATE
```

Restarting A Job

To restart execution of a job specified by OS job name, use the \$E 'jobname' command.

\$E	'jobname'
-----	-----------

'jobname' - the OS job name, appearing on the user's JOB card, enclosed by apostrophes. The name may be upper or lower case alphameric characters but must not contain blanks.

The HASP job queue is searched for the single job with the specified job name, and the action of the \$E job list command is performed. If the job is not found, or if more than one job with the specified name is encountered, no action is taken, and an appropriate diagnostic is displayed.

This command requires job and system command authority and is not available to HASP remote operators.

Possible responses at the console include:

1. Job information response - response listing the current status of the job (the job's execution controller has been flagged to restart the job)
2. JOBj NOT RESTARTABLE - the specified job is not currently in execution
3. jobname NOT FOUND - the job named is not in the system
4. MULTIPLE JOBS WITH jobname - more than one job with the specified name is in the system; messages compatible with \$D'jobname' will follow.

```
Examples: 1. user   - $E 'ANY'
           system - JOB 6 ANY EXECUTING A PRIO 8

           2. user   - $E 'MYJOB'
           system - JOB 3 MYJOB EXECUTING A PRIO 6
           user   - C MYJOB
           OS     - accepted messages
```

In example 1, the operator desires to let job "ANY" run to completion before requeueing for execution. In example 2, the operator desires to abort current execution of job "MYJOB" and requeue for execution.

Holding A Job

To hold a job specified by OS job name, use the \$H 'jobname' command.

\$H	'jobname'
-----	-----------

'jobname' - the OS job name, appearing on the user's JOB card, enclosed by apostrophes. The name may be upper or lower case alphameric characters but must not contain blanks.

The HASP job queue is searched for the single job with the specified job name, and the action of the \$H job list command is performed. If the job is not found, or if more than one job with the specified name is encountered, no action is taken and an appropriate diagnostic is displayed.

Possible console responses are:

1. Job information response - response listing the current status of the job after command action
2. jobname NOT FOUND - the job named is not in the system
3. MULTIPLE JOBS WITH jobname - more than one job with the specified name is in the system; messages compatible with \$D'jobname' will follow.

Example: user - \$H 'ANYJOB'
system - JOB 302 ANYJOB AWAITING EXEC A PRIO 4 HOLD

Stopping A Job

To stop a job specified by OS job name, use the \$P 'jobname' command.

\$P	'jobname'
-----	-----------

'jobname' = the OS job name, appearing on the user's JOB card, enclosed by apostrophes. The name may be upper or lower case alphameric characters but must not contain blanks.

The HASP job queue is searched for the single job with the specified job name, and the action of the \$P job list command is performed. If the job is not found, or if more than one job with the specified name is encountered, no action is taken and an appropriate diagnostic is displayed.

Console responses to this command include:

1. Job information response - the job specified has been stopped
2. jobname NOT FOUND - the job named is not in the system
3. MULTIPLE JOBS WITH jobname - more than one job with the specified name is in the system; messages compatible with \$D'jobname' will follow.

Example: user - \$P 'UNIQUE'
 system - JOB 31 UNIQUE ON PRINTER 2 PRIO 6 PURGE

SETTING JOB CLASS, PRIORITY, OR NUMBER

Setting Job Class Or Priority

To set the priority or class of a specific job, use the \$T command.

\$T	Jx...j,	$\left(\begin{array}{l} p=\text{priority} \\ p=+\text{priority} \\ p=-\text{priority} \\ C=\text{class} \end{array} \right)$
-----	---------	---

Jx...j - job

p=priority - a numeric value, 0 through 15 indicating the HASP queueing priority desired for the specified job.

p=+priority - a numeric value to be added to the present HASP queueing priority of the specified job.

p=-priority - a numeric value to be subtracted from the present HASP queueing priority of the specified job.

C=class - a single character (A,B,C-Z,0,1-9), representing the new execution class of the specified job. (Lower case characters will be made upper case.)

If the priority operand is specified, the job's priority will be adjusted as indicated; however, if the resulting priority is outside the

range 0-15, the final priority is adjusted to 0 or 15 as appropriate. If the class operand is specified, the specified job's execution class will be set to the indicated class. No action will be taken on a job that is currently active.

If a job's class is execution batching (one of the classes specified by HASPGEN parameter %XBATCHC) it should not be changed to a nonbatching class. Similarly, a nonbatching class should not be changed to a batching class. Such actions will cause the job to execute incorrectly.

A job information response is received for the job being set. If the job is not in the system, JOB NOT FOUND is displayed.

```
Examples: 1. user   -   $TJ4,P=14
           system  -   JOB4 ANYJOB AWAITING EXEC
                       A PRIO 14

           2. user   -   $TJ6,C=Z
           system  -   JOB 6 YOURS AWAITING EXEC Z
                       PRIO 3
```

Setting HASP Internal Job Number

To set the HASP internal job number, use the \$T command.

\$T	Jx...n
-----	--------

jx...n - job base number for automatic job number assignments

The new base number will be set, causing the next job number assignment to be "JOB n," or the first number beyond n that is not currently held by a job. If the job is not in the system, JOB NOT FOUND will be displayed.

```
Examples: 1. user   -   $TJ1
           system  -   OK

           2. user   -   $TJOB100
           system  -   OK
```

In example 1, assume that jobs 1, 3, and 4 are currently in the system, when the input service processors read the next job. An attempt to assign the value of "1" to the new job will fail; however, the job will be assigned the value of "2". Subsequent jobs will be assigned the values of 5, 6, 7, and so forth. If, however, the jobs 1, 3, and 4 are not in the system, new jobs entering the system will receive job numbers 1, 2, 3, 4, and so forth.

APPENDIX A

HASP MESSAGES AND CODES

The following sections list messages, originated by HASP, that are not direct responses to HASP operator commands.

HASP INITIALIZATION

All HASP initialization messages are displayed by OS WTO or WTOR requests and are listed as follows:

CORRECT THE ABOVE PROBLEMS AND RESTART HASP

Explanation: This message follows one or more messages, which describe why HASP direct-access initialization could not complete normally.

System Action: The HASP job will terminate.

Operator Response: Self-explanatory.

ENTER HASP REQUESTS

Explanation: HASP is ready for job processing and is waiting for requests (see initialization WTOR).

System Action: The HASP System will not process jobs until a \$S command is entered.

Operator Response: Perform necessary preparatory functions and enter \$S command, if job processing is required, or \$P HASP if HASP is to be withdrawn.

EXTENT ERROR ON SPOOLx

Explanation: The operator did a HASP warm start. HASP has found that the first extent of data set SYS1.HASPACE on SPOOLx is different than before the warm start, due to: mounting the wrong SPOOLx volume, starting a different HASP system, or scratching and reallocating STS1.HASPACE.

System Action: After attempting to verify the remaining required SPOOL volumes, the HASP job terminates.

GETMAIN ERROR - PRINTERn NOT OPERATIONAL

Explanation: HASP was unable to obtain storage for the DC7E or MDR buffer for a 3800 printer. The named printer is drained and cannot be \$STARTED (\$S).

System Action: HASP will attempt to process jobs.

Operator Response: Probable user error. Stop HASP. Ensure that the REGION parameter is sufficient for the generated HASP.

HASP module ATTACH ERROR - code

Explanation: HASP has attempted to attach a subtask, which is required for running the system. The module name indicates the ECBDIC name of the subtask entry module, and "code" is the OS completion code returned. If the system is allowed to continue processing, the results will be unpredictable but will cause general malfunction as follows:

1. Module HASPWTR - Upon completion of OS execution, jobs will remain on the OS job queue, and HASP will not become aware of the user job termination.
2. Module HASPWTO - HASP WTO message facility will be inactive, eventually causing HASP to become interlocked when it attempts to use the OS console interface.
3. Module HASPACCT - HASP SMF interface facility will be inactive, eventually causing HASP to become interlocked when it attempts to write SMF records.
4. Module HASPSTPT - HASP SETPRT interface facility. HASP will be unable to use SETPRT to set up work on the 3800 and any attempt to use SETPRT will cause the printer PCE to be core interlocked, and the piece of work being processed to be unavailable to any other printer.

System Action: HASP will attempt to process jobs.

Operator Responses: Probable user error. Stop HASP, refer to the OS messages and completion codes manual, and correct the problem as indicated.

INVALID UNIT RECORD DEVICE CONTROL TABLES

Explanation: An inconsistency has been detected in the HASP control section HASPINIT. Unit record device control tables have been improperly generated.

System Action: The HASP job will terminate.

System Programmer Response: Check the assembly of HASPINIT for improperly applied modifications, and ensure that the correct HASP overlay data set corresponds to the current HASP resident module. Reassemble HASPINIT, recreate the HASP overlay data set, and LINKEDIT the HASP module, as required.

JOB nnnn - BAD {JCT} - ERRORS MAY OCCUR {IOT}

Explanation: The operator has warm started HASP. A direct-access allocation map for the job was discovered to be in error.

System Action: The control block's allocation map is altered to preserve system integrity and the control block is rewritten. The job may experience premature end on input data sets (JCT) or output data sets (IOT).

JOB j - END EXECUTION

Explanation: The operator has warm started HASP. The job in execution when the system stopped was queued by HASP initialization for warm start.

System Action: HASP has determined that it cannot offer the choice of rerunning or outputting the job, so it queues the job for output. It is possible that not all of the job's data sets (including the system message and HASP Job Log data sets) will print to completion; some may not print at all.

JOB j - WAS EXECUTING id SHOULD HASP RERUN JOB j (jobname)?

Explanation: The operator has warm started HASP. When the system stopped, the job was in the HASP execution phase.

System Action: If the operator reply is YES, HASP requeues the job for execution in normal priority order. If the reply is NO, HASP queues the job for output at its same priority. In the former case, all output for the previous execution is lost. In the latter case, all of the job's data sets (including the system message and HASP Job Log data sets) may not print to completion; some may not print at all.

Operator Response: Reply YES or NO to the second message.

JOB j WAS IN OUTPUT

Explanation: The operator has warm started HASP. When the system stopped, the job was being processed preparatory to printing and punching.

System Action: The job is requeued for the output process.

JOB j WAS ON READER

Explanation: The operator has warm started HASP. When the system stopped, the job was in the process of reading.

System Action: The job is purged.

Operator Response: Resubmit the job.

JOB j WAS PRINTING/PUNCHING

Explanation: The indicated job was printing or punching when the last HASP checkpoint was taken (prior to this warm start).

System Action: The job will be requeued, and the output function will be continued later when print/punch devices are available.

Operator Response: The operator may use the following console commands:

1. \$H - hold job - to prevent output from occurring until a \$A (release) is entered.
2. \$C - cancel job - to remove the job from the output queue and pass it to purge.

If neither of these commands is used, the job can be controlled normally when it is started on a device.

MAXIMUM OF n SPOOL VOLUMES (S) EXCEEDED

Explanation: More direct-access SPOOL volumes have been found online than HASP can handle.

System Action: The HASP job will terminate.

Operator Response: Probable user error. Check the volume labels of all direct-access volumes and remove all but n volumes. Restart HASP.

MAXIMUM OF n device type EXCEEDED

Explanation: More reader, printer, punch, or console devices are physically online to the CPU than HASP supports.

System Action: The first n devices of the specified type will be used by HASP; additional devices of the specified type will be ignored.

System Programmer Action: Check the OS generation to ensure that the hardware devices correctly reflect the system configuration and that additional pseudo devices, generated in OS for HASP, do not address a hardware device or control unit on the system. Check also that the UCBs used by HASP are the lowest sequential addresses for a given device type.

MOUNT volume ON A yyyy

Explanation: The operator warm started HASP. Not all SPOOL volumes are mounted, which were mounted prior to the warm start. In the message, x completes the SPOOL volume serial number, and yyyy is the device type, on which the volume had been mounted.

System Action: After attempting to verify the remaining required SPOOL volumes, the HASP job will terminate.

Operator Response: Probable user error. Mount the required volume(s) on the required devices and warm start (or cold start) HASP.

OBTAIN FAILED ON volume WITH CC nn

Explanation: The operator warm, cold, or format started HASP. HASP used the OBTAIN supervisor service to get information about data set SYS1.HASPACE on the SPOOL volume, but OBTAIN did not work as expected. OBTAIN returned condition code nn to indicate the problem:

1. nn=4 - the volume was not mounted. This error should not occur.
2. nn=8 - SYS1.HASPACE was not allocated on the volume.
3. nn=12 - A permanent input/output error was found during OBTAIN processing.

System Action: After attempting to verify the remaining SPOOL volumes, the HASP job will terminate.

Operator Response: Probable user error. If nn = 8, allocate a data set named SYS1.HASPACE on the SPOOL volume and warm start HASP. If nn = 12, use the IBM utility program IEHDASDR or IBCDASDI to reinitialize the SPOOLx volume, and then follow the procedure for nn = .8.

OLAYLIB DOES NOT MATCH RESIDENT HASP

Explanation: The procedure (normally named HASP) in SYS1.PROCLIB, used to start HASP, referenced a load module (from SYS1.LINKLIB, JOBLIB, or STEPLIB), which was not created from output of the HASPOBLD execution that created the referenced OLAYLIB.

System Action: The HASP job will terminate.

Operator Response: Probable user error. Verify that the correct start command and direct-access volumes are being used. Restart HASP. If unsuccessful, notify system programmer.

System Programmer Response: Verify that the HASP procedure (or equivalent) is correctly installed in SYS1.PROCLIB and that data sets referenced are cataloged and mounted, etc. If difficulty persists, redo the install HASP program actions (sample job HASPHASP) as described in the HASP System Programmer's Guide.

OPERATOR MESSAGE SPACE NOT AVAILABLE

Explanation: HASP has attempted to reserve tracks from the primary SPOOL volume for remote operator message queuing and has found that:

1. The first extent of SYS1.HASPACE was not large enough for the requested number of SPOOL records.
2. During HASP warm start, the SPOOL volume was found incompatible with the loaded copy of HASP.

System Action: The HASP job will terminate.

Operator Response: During HASP warm start, match the primary SPOOL volume with the HASP load module used during the cold start. During cold start, consult the system programmer.

System Programmer Response: Ensure that HASPGEN parameter %SPOLMSG has been correctly applied to the system, and check the extents of SYS1.HASPACE on the primary SPOOL volume for requested space.

OVERLAY REPPING ERROR

Explanation: The REP card intended for the resident CSECT may be mispunched, or the REP card intended for the overlay CSECT cannot be processed, because no space exists to save it. HASPGEN parameter %OREPSIZ was not set large enough to hold the amount of overlay REP information currently being processed, or %OREPSIZ was set to zero, which eliminates the capability of applying REP cards to overlay CSECTS.

System Action: The HASP job will terminate.

Operator Response: Probable user error. Verify that REP cards are those intended for the HASP System that was started. Restart HASP, and attempt to use correct REP cards. If unsuccessful, notify system programmer.

System Programmer Response: Verify that REP cards are punched correctly, according to the format described in the HASP Logic manual, and/or re-HASPGEN, with parameter %OREPSIZ set larger, to reserve more space for overlay REPs.

PERM I/O ERR ON volume WHILE FORMATTING

Explanation: HASP was unable to finish formatting the first extent of SYS1.HASPACE on the SPOOL volume, because a hardware error occurred or because the SPOOL volume is not properly initialized.

System Action: After attempting to process the remaining SPOOL volumes, the HASP job will terminate.

Operator Response: If the message was caused by a hardware malfunction, have it corrected. If not, the SPOOL volume may need to be reinitialized. Reinitialize it using IBM utility IEHDASDR or IBCDASDI.

PERM I/O ERR READING HASP CKPT

Explanation: The operator did a HASP warm start. HASP was unable to read the checkpoint record on the primary SPOOL volume, because the wrong volume was mounted, a different HASP System was started, or the checkpoint record had been destroyed.

System Action: The HASP job will terminate.

Operator Responses: Probable user error. Mount the correct primary SPOOL volume and warm start HASP, using a HASP System compatible with the old HASP checkpoint. If this fails, cold start HASP.

PERM I/O ERR WRITING HASP CKPT

Explanation: HASP failed to format-write correctly the HASP checkpoint record on the primary SPOOL volume, because of a hardware malfunction or because the variables used to generate HASP created a checkpoint record too long to be written on the type of device, on which the volume is mounted.

System Action: The HASP job will terminate.

Operator Response: If the message was caused by a hardware malfunction, have it corrected. If the message was caused by an oversize checkpoint record, and if the installation has devices that can support longer records, prepare a primary SPOOL volume for one of these devices. Otherwise, it is necessary to do another HASPGEN, specifying parameters that will create a smaller checkpoint record.

PREVIOUSLY-MOUNTED VOL volume IS UNFORMATTED

Explanation: The operator warm started HASP. The length of the first record of the last track of the first extent on SYS1.HASPACE on SPOOLx is incorrect, due to overwriting, starting a different HASP System, or mounting the wrong SPOOL volume.

System Action: After attempting to verify the remaining required SPOOL volumes, the HASP job will terminate.

Operator Response: Probable user error. If the wrong SPOOLx volume was mounted, mount the correct volume and warm start HASP. Otherwise, cold start HASP; any SPOOL volumes that are not correctly formatted will automatically be reformatted during a HASP cold start.

SPOOL VOLUMES HAVE DUPLICATE LABELS

Explanation: Multiple direct-access volumes have been found with identical labels.

System Action: The HASP job will terminate.

Operator Response: Probable user error. Check the volume labels of all direct-access volumes on the system and remove the required volumes. Restart HASP.

volume IS BEING FORMATTED

Explanation: The operator warm, cold or format started HASP. An unformatted SPOOL volume is now being formatted.

System Action: HASP will format unformatted new SPOOL volumes on a warm start, all unformatted SPOOL volumes on a cold start, and all SPOOL volumes on a format start.

volume IS NOT MOUNTED

Explanation: The operator warm, cold, or format started HASP, and HASP could not find a direct-access UCB, with volume serial of the primary SPOOL volume. The SPOOL volume is required to be mounted and online when HASP is started.

System Action: The HASP job will terminate.

Operator Response: Probable user error. Make sure the primary SPOOL volume is mounted, ready, and online. Then restart HASP.

n BUFFERS AVAILABLE

Explanation: HASP has not been able to allocate enough dynamic storage to build the minimum number of buffers required to run the system as specified by the HASPGEN parameter &MINBUF.

System Action: An attempt will be made to run with the available buffers.

Operator Response: Probable user error. Take one of the following actions, depending on the installation procedure:

1. Stop enough HASP functions to allow running with less than &MINBUF buffers.
2. Stop the HASP System, change the HASP region size, and restart HASP.

nn \$ SPECIFY HASP OPTIONS -- HASP-id, VERSION x.x

Explanation: HASP has been given control and is requesting instructions from the operator.

System Action: Wait for reply.

Operator Response: Read the section Starting The HASP Job, and enter the desired options using the OS reply format.

nn \$SYNTAX ERROR -- RESPECIFY OPTIONS

Explanation: HASP does not recognize one or more of the initialization options entered by the operator.

System Action: Reset to default responses and wait for reply.

Operator Response: Probable user error. Read the section Starting The HASP Job, and carefully enter the desired options.

HASP SYSTEM CATASTROPHIC ERROR CODES

All HASP System catastrophic errors are so extremely serious in nature that HASP is unable to continue processing. The message will be displayed on local consoles using an OS WTO, and HASP will go into a single instruction loop.

A storage dump should be taken by stand-alone utility and saved for later analysis. A careful check of the HASP generation process will ensure that: HASP modules are assembled properly (modifications are correctly entered, and no errors occurred during assembly), the overlay library has been properly created, the linkage editor created a correct HASP resident module, and the HASP execution JCL corresponds to the data sets designated by the generation JCL. If any doubt exists that the HASPGEN process is other than perfect, a new complete HASPGEN should be undertaken.

A01

Explanation: HASP detected more channel end indications for a device than expected. Only one channel end indication should be received from IOS for each input/output operation that HASP has initiated.

System Action: Continuous loop.

Operator Response: Take a stand-alone dump, and notify the system programmer.

B01

Explanation: Probable user error. Either an attempt has been made to return an invalid HASP buffer to the buffer pool, or the free buffer chain has been destroyed.

System Action: Continuous loop.

Operator Response: Take a stand-alone dump, and notify the system programmer.

E01

Explanation: The total number of channel end indications from IOS has exceeded the total number of input/output operations initiated by HASP (i.e., the total number of outstanding input/output operations has become negative).

System Action: Continuous loop.

Operator Response: Probable user error. Take a stand-alone dump, and notify the system programmer.

R01

Explanation: The Checkpoint Processor discovered that some track groups are both free and allocated.

System Action: Continuous loop.

Operator Response: Take a stand-alone dump, and notify the system programmer.

M01

Explanation: HASP has detected more channel end indications for an FJE line than expected. Only one channel end indication should be received from IOS for each Input/Output operation initiated by HASP.

System Action: Continuous loop.

Operator Response: Take a stand-alone dump, and notify the system programmer.

M02

Explanation: An attempt has been made to initiate an input/output operation on an RJE line, before the previous operation has completed.

System Action: Continuous loop.

Operator Response: Take a stand-alone dump, and notify the system programmer.

001

Explanation: A HASP processor, already logically executing under overlay control, has issued another call (\$LINK or \$LOAD) to Overlay Service, without exiting from overlay control (\$RETURN and \$DELETE). A test for this condition is performed, only if the HASPGEN parameter &DEBUG is set to YES.

System Action: Continuous loop.

Operator Response: Take stand-alone dump, and notify the system programmer.

System Programmer Response: Probable user error. Check any local modifications to HASP for the errors described above. Consult the IBM Customer Engineer, if the problem remains undetermined.

V01

Explanation: The Purge Processor has discovered that some track groups to be freed were already free.

System Action: Continuous loop.

Operator Response: Take a stand-alone dump, and notify the system programmer.

X03

Explanation: The Execution Processor routine XTERMIN8 (deallocates DDBs) discovered that a nonexistent UCB entry in the DDB is to be deallocated.

System Action: Continuous loop.

Operator Response: Take a stand-alone dump, and notify the system programmer.

X04

Explanation: The Execution Processor DDB Service routine (XDDBCONT), which maintains the DDB frequency table, was unable to match the action DDB with the frequency table entry.

System Action: Continuous loop.

Operator Response: Take a stand-alone dump, and notify the system programmer.

H01

Explanation: A HASP control Service Program function (that was not generated) was requested by a HASP processor.

System Action: Continuous loop.

Operator Response: Take a stand-alone dump, and notify the system programmer.

System Programmer Response: Probable user error. Validate HASPGEN parameters for consistency, across all modules. Verify local modification dependency on HASPGEN parameters.

ABND

Explanation: The HASP abnormal exit (STAE) routine has been entered, indicating that the HASP System has been abnormally terminated. The OS code, indicating the reason for the ABEND, may be found in the HASP TCB completion code field.

System Action: Continuous loop.

Operator Response: Take a stand-alone dump, and notify the system programmer.

HASP JOB PROCESSING MESSAGES

Messages displayed during HASP job processing reflect conditions, which range from informational to serious errors and are listed as follows:

ALL AVAILABLE FUNCTIONS COMPLETE

Explanation: All HASP job processors have become dormant, and no HASP RJE lines are active.

device BACKSPACED

Explanation: Output processing on the indicated printer is being backspaced.

System Action: The requested number of pages are backspaced and processing continues. If the beginning of the data set is encountered while backspacing, processing continues at the beginning of the data set.

device command

Explanation: The displayed command has been entered from the device indicated.

System Action: The command is passed to the command processor for further action.

device DELETED

Explanation: Output processing on the indicated device has been deleted.

System Action: The job being processed on the indicated device will be queued for the next processing phase. Output processing will be terminated.

device FWD-SPACED

Explanation: Output processing on the indicated printer is being forward-spaced.

System Action: The requested number of pages are skipped without printing and processing continues. If the end of the data set is encountered while skipping, processing continues with the beginning of the next data set.

device IDLE - CLASS = classes

Explanation: The indicated device found no work in the queue(s) specified by "classes."

System Action: The specified device remains idle until work becomes available.

Operator Action: If the device is in operator-controlled mode, the operator may use the set (\$T) command to:

1. Alter setup to match work in the listed classes.
2. Alter the current class list.
3. Switch to automatic mode.

If the device is in automatic mode, the set (\$T) command may be used to alter the class list.

device IS DRAINED

Explanation: The operator has entered a \$P device command, directed to the named device, and the device has entered the DRAINED status.

{device}
{JOB j } message

Explanation: The Input Service Processor has detected a /*MESSAGE control card in the input stream.

System Action: None.

Operator Response: Observe the message and take any appropriate action.

device REPEATED

Explanation: Output processing on the indicated device has been repeated.

System Action: The job being processed on the indicated device will be requeued. Output processing will continue.

device RESTARTED

Explanation: Output processing on the indicated device has been restarted.

System Action: The job being processed on the indicated device will be requeued. Output processing for the job will be terminated.

device SKIPPING FOR JOB CARD

Explanation: The Input Service Processor is now scanning the input stream for a JOB card.

System Action: The Input Service Processor will continue to read the input stream, until a JOB card is encountered or until an end-of-data condition is recognized.

device SUSPENDED

Explanation: Output processing on the indicated printer is being interrupted.

System Action: The job being processed on the indicated printer will be requeued, so that when it is processed again, printing will begin one page before the current point or at the beginning of the data set (whichever is less). Output processing will be terminated.

DISASTROUS ERROR - COLD START SYSTEM AS:

Explanation: A critical I/O error has occurred on the SYS1.HASPACE data set. A corresponding I/O error message will accompany this message, giving details of the error.

System Action: HASP will continue processing jobs, using unaffected facilities.

Operator Response: Prevent new jobs from entering the system, prepare all jobs in the HASP execution queue for resubmission (when HASP is restarted), allow HASP to complete all current jobs in execution and all output activity (depleting the output queues), and stop HASP. The cause of the error should be determined before cold starting HASP.

DISASTROUS ERROR DURING CHECKPOINT - RESTART ASAP

Explanation: An I/O error has occurred while attempting to write checkpoint information, preventing any possibility of performing a future HASP warm start. An associated I/O error message will accompany this message.

System Action: HASP will discontinue the checkpointing of critical information on direct-access devices.

Operator Response: Prevent new jobs from entering the system, prepare all jobs in the HASP execution queue for resubmission (when HASP is restarted), allow HASP to complete all current jobs in execution and all output activity (depleting the output queues), and stop HASP. The cause of the error should be determined before cold starting HASP.

HASPWTR - PERM I/O ERR OS JOBQ

Explanation: The subtask HASPWTR, which retrieves OS System Messages for HASP before the end of job execution, has received a permanent error indication, while attempting I/O on the data set SYS1.SYSJOBQE, after all standard OS direct-access error recovery actions have been attempted.

System Action: If the operation is a write, processing continues but later attempts to read the record may fail or read incorrect information. If the operation is a read, HASPWTR does not use the incorrect information. Processing of the single job, whole SYSOUT MSGCLASS, or requeue action is terminated (depending on when the I/O error occurred), and other processing continues.

Operator Response: Use the \$P command to prevent any new functions from starting. When all current functions have completed (except perhaps one or more jobs, which may not finish execution if HASPWTR has stopped processing a MSGCLASS), re-IPL the system, cold start OS (this reformats SYS1.SYSJOBQE, by writing every record on it), and if no errors are indicated, warm start HASP to continue processing. If unsuccessful, notify the system programmer.

System Programmer Response: The direct-access volume, containing SYS1.SYSJOBQE, should be analyzed with an appropriate utility and/or the direct-access device should be changed to localize possible machine malfunction. The IBM customer engineer should be notified, if difficulties persist.

I/O ERROR ON device uuu,cc,ssss,iiii,bbcchhr

Explanation: An input/output error has occurred on the indicated HASP device where:

device = HASP device name, or volume serial if direct access
uuu = hardware address
cc = CCW op code used at the time of error
ssss = CSW status code
iiii = sense information
bb = bin as appropriate
cc = cylinder as appropriate
hh = head as appropriate
r = record as appropriate

Associated error messages may be displayed as a result of the error. For direct access, the following could be causes of the error:

1. The channel, control unit, or device is malfunctioning. This may be determined by moving the volume (if movable) to a new drive, control unit, or channel and by restarting HASP.
2. The recording surface is bad, possibly indicated by the nature of the error and the distribution of the bbcchhr information. (A reinitialization with assignment of alternate tracks, followed by HASP format start may be desirable).
3. The data set SYS1.HASPACE may have been overwritten by improper data set assignment and protection procedures. This may be indicated by wrong length record indicators. (A HASP format start is required.)

System Action: HASP will continue job processing and will submit additional error messages, indicating the severity of the error to the system.

Operator Response: Determine the cause of the error, and take appropriate action.

I/O ERROR ON LINE n uuu,cc,ssss,iirr,xyee

Explanation: An error has been detected on the indicated HASP RJE line, or on a device attached to that line, where:

n = HASP RJE line number
uuu = line adapter address
cc = CCW op code used at the time of error; see Figure 9
ssss = CSW status code if no Block Sequence

Check
 = 0000 - indicator for normal channel end,
 with a Block Sequence Check at the
 central CPU
 = FFFF - indicator for normal channel end,
 with a Block Sequence Check at the
 remote site
 ii = sense information, if ssss=0E00; see
 Figure 7
 = last character received, if ssss=0C00
 and xy=94 or B4
 rr = remote device first response character;
 see Figure 8
 x = HASP CCW internal sequence
 identification; see Figure 10
 y = HASP CCW internal sequence command type;
 see Figure 11
 ee = expected response

Notes:

1. This message may also occur as an informational message, when maintenance personnel have set HASP internal flags to log all channel ends on the line device.
2. The appropriate IBM Component Description System Reference Library manual describes the status and sense information in detail.
3. Parameters in the following I/O ERROR ON LINEN messages are defined in Figures 7-11.

System Action: HASP will, for most line errors, attempt to recover and continue processing, using the line.

Operator Response: The console log should be saved for maintenance personnel (even if recovery is successful). Additional responses depend on the nature of the problem. The following discussions indicate typical errors and appropriate responses.

Specific Messages and Explanations: For terminals that employ the USASCII transmission code, the following substitutions should be made in response fields:

<u>Response</u>	<u>EBCDIC</u>	<u>USASCII</u>
EOT	37	04
NAK	3D	15
ACK1	61	31
ACK0	70	30

In the following messages, conventions observed are:

I/O ERROR ON LINEn uuu,02,0C00,003D, $\left. \begin{matrix} 94 \\ A5 \\ A6 \\ B4 \end{matrix} \right\} **$

Explanation: A NAK has been received from the remote terminal indicating an error was detected at the terminal.

System Action: Normal error recovery procedures are invoked.

I/O ERROR ON LINEn uuu,02,0C00,0061, $\left. \begin{matrix} A5 \\ A6 \end{matrix} \right\} 70$

I/O ERROR ON LINEn uuu,02,0C00,0070, $\left. \begin{matrix} A5 \\ A6 \end{matrix} \right\} 61$

Explanation: HASP has received an incorrect acknowledgement from a 2770, 2780, or 3780 terminal. This may indicate that an output device (printer or punch) at the remote terminal has become not ready. It may also indicate that an output block has been lost.

System Action: The last block is retransmitted.

Operator Action: The remote terminal operator should check (to any extent possible) for missing or duplicate output and should request a backspace or restart, if the output looks questionable.

I/O ERROR ON LINEn uuu,02,0C00,00rr,84**

Explanation: Invalid data has been received from a 2770, 2780, or 3780. Parameter "rr" indicates the first significant byte received.

System Action: Normal error recovery procedures are invoked.

I/O ERROR ON LINEn uuu,02,0C00,ii $\left. \begin{matrix} 01 \\ 02 \end{matrix} \right\}, \left. \begin{matrix} 94 \\ B4 \end{matrix} \right\} **$

Explanation: An invalid termination character was received from a MULTI-LEAVING terminal. Parameter "ii" indicates the termination character received.

System Action: Normal error recovery procedures are invoked.

I/O ERROR ON LINEu uuu,02,0D00,0037,84**

Explanation: The card reader on a 2770, 2780, or 3780 has become not ready. This may be caused by a card feed error or by the failure of the remote operator to activate the END-OF-FILE switch or button.

System Action: The system waits for the reader to be made ready and transmission to continue.

Operator Action: The remote terminal operator should correct the problem and ready the card reader (ensuring that the END-OF-FILE switch or button is activated).

I/O ERROR ON LINEu uuu,02,0D00,0037, {94} **
| {B4}
{C4}

Explanation: HASP has received an unexpected EOT.

System Action: Normal error recovery procedures are invoked.

I/O ERROR ON LINEu uuu,**,0E00,ii**,****

Explanation: A Unit Check on the Communications Adapter has been detected by HASP. For more detailed information concerning the exact nature of the error, IBM 2701 Data Adapter Unit Component Description (GA22-6864) and/or the System/360 Component Description-2703 Transmission Control (GA27-2703) should be consulted. Table 7 explains the sense bits.

I/O ERROR ON LINEu uuu,02,FFFF,00rr, {94} ee
{B4}

Explanation: A block sequence error has been detected by a MULTI-LEAVING terminal, indicating that one or more transmission blocks have been lost. Parameter "rr" indicates the count that was received at the remote terminal, and parameter "ee" indicates the count that was expected.

System Action: Any job printing on the terminal will be interrupted, and any job punching on the terminal will be restarted.

Operator Action: This represents a very serious error. Control records may have been lost, which could cause partial loss of terminal function. The line should be drained (\$P) and restarted (\$S) as soon as practical.

I/O ERROR ON LINEu uuu,cc,ssss,ii**,****

Explanation: An unusual channel end condition on the Communications Adapter has been detected by HASP. For more detailed information concerning the exact nature of the error, the appropriate hardware component description manuals should be consulted.

System Action: The line is automatically restarted.

<u>ii</u>	<u>Meaning</u>
80	Command Reject--"Abortive Disconnect" option of the 2701/2703 has been selected, and the remote terminal has disconnected without signing off.
40	Intervention Required--Remote terminal has disconnected without signing off, and abortive disconnect is not selected.
20	Bus Out Check--Hardware error.
10	Equipment Check--Hardware error.
08	Data Check--Line error or hardware error.
04	Overrun--Hardware error or deficiency.
02	Lost Data--Synchronization error.
01	Timeout--Expected terminal response not received by HASP.

Figure 7. HASP RJE Typical Sense Information On 2701

<u>rr</u>	<u>Sequence</u>	<u>Comments</u>
01	SOH-STX-data-ETB	Nontransparent data transfer
02	DLE-STX-data-DLE-ETB	Transparent data transfer
2D	SOH-ENQ	Initial sequence (prior to sign on)
3D	NAK	Remote did not receive last transmission correctly
70	DLE-ACK0	Last transmission received correctly, but remote has no data to transmit

Note: The display of control sequences has meaning only when (sss=0C00).

Figure 8. HASP BSC MULTI-LEAVING Data Stream Control Sequences

<u>cc</u>	<u>command</u>
01	WRITE
02	READ
03	NOP
08	TRANSFER IN CHANNEL
23	SET MODE
27	ENABLE
2F	DISABLE

Figure 9. Command Codes Utilized By HASP RJE

<u>x</u>	<u>Sequence Identification</u>
8	BSC hardware remote read sequence
9	BSC CPU MULTI-LEAVING remote write-read sequence
A	BSC hardware remote write sequence
B	BSC CPU MULTI-LEAVING remote write-read sequence
C	BSC prepare sequence

Figure 10. HASP RJE CCW Internal Sequence Identifiers

<u>y</u>	<u>Command Type</u>
0	Disable
1	Set Mode
2	Enable
3	Test Synch
4	Read Text
5	Read Response (normal)
6	Read Response (to ENQ)
7	Prepare
8	Write Text
9	Write Response
A	Send Inquiry (write ENQ)
B	Send EOT

Figure 11. HASP RJE CCW Internal Sequence Command Types

INIT i IDLE-CLASS=c...

Explanation: INIT "i" is idle, because the Execution Processor discovered that no jobs of the class(es) identified by "c..." were available in the HASP job queue.

System Action: The Execution Processor will activate the INIT, when jobs of the class(es) become available.

JOB DELETED BY HASP OR CANCELLED BY OPERATOR BEFORE EXECUTION

Explanation: The job was either deleted by the Input Service Processor of HASP or cancelled by an operator, before OS execution processing.

System Action: The JCL is printed, and the job is purged.

Note: This message appears only in the printed output stream for the job.

JOB j -- ILLEGAL JOB CARD

Explanation: The JOB card for the indicated job was found to be invalid, by the Input Service Processor.

System Action: Input Service Processing is terminated for this job.

Programmer Response: Correct the JOB card, and resubmit the job.

System Programmer Response: A different value for &RJOBPOT could be specified to allow the illegal JOB card to be ignored.

JOB j -- ILLEGAL /*ROUTE CARD

Explanation: The Input Service Processor has encountered an invalid /*ROUTE control card.

System Action: Input service processing for the job is terminated.

Programmer Response: Correct the /*ROUTE card and resubmit the job.

JOB j -- jobname -- BEGINNING EXEC - INIT i - CLASS c

Explanation: Job j, named "jobname", is beginning the execution phase in the INIT "i" as a class c job.

JOB j AWAITING HASP ALLOCATION

Explanation: Insufficient HASP resources are available to process the specified job (j). The Execution Processor is unable to find an available DDB to service the indicated job's I/O request.

System Action: Processing of the specified job will continue, when a DDB becomes available. Note: If insufficient DDBs have been defined for the system, a permanent lockout condition can occur.

Operator Response: If a single job is being processed by HASP, a permanent lockout (caused by insufficient DDBs) has occurred. Notify the system programmer.

If multiple jobs are being processed under control of HASP, DDBs can be made available if: OS can terminate a job that did not cause the condition, and sufficient DDBs can be made available to process all requests. If this cannot be done, a permanent lockout will occur.

System Programmer Response: Frequent occurrence of this message indicates insufficient resources (DDBs) for proper system performance. See the HASP System Programmer's Guide for guidelines on DDB definition.

JOB j BUFFER ROLL UNSUCCESSFUL ... VERIFY NUMBER OF BUFFERS

Explanation: An insufficient number of HASP buffers is available to process the specified job.

The Execution Processor BUFFER GET/ROLL routine was unable to find a DDB with a HASP buffer eligible for the buffer roll process.

System Action: Processing of the specified job will continue, when a buffer becomes available from another HASP processor.

Operator Response: Notify system programmer.

System Programmer Response: If this message appears frequently, the number of buffers defined for HASP is insufficient for proper performance.

Note: This message is eligible for output only if the HASPGEN variable &DEBUG was selected at HASPGEN time.

JOB j DELETED

Explanation: The Input Service Processor has deleted the indicated job.

System Action: The job is routed to the print phase for appropriate action; then the job is purged.

JOB j DUPLICATE JOBNAME - JOB DELAYED

Explanation: The specified job was delayed for execution, because a job of the same name was already executing.

System Action: The indicated job will be executed, when the job with the same name terminates execution.

JOB j END EXECUTION

Explanation: The specified job has completed execution processing.

System Action: The specified job is queued for action by the Output Processor or is requeued for the Execution Processor if the \$E job command has been previously entered for the job.

JOB j ESTIMATED {LINES}
{CARDS} EXCEEDED BY xxxxx

Explanation: The indicated job has exceeded its estimated number of lines/cards by xxxxx lines/cards.

System Action: Action taken by the system is dependent on HASPGEN parameter \$OUTPOPT. Either the job will be cancelled (with or without a dump), or no further action will be taken.

JOB j ESTIMATED TIME EXCEEDED BY xx MINUTES

Explanation: The indicated job has exceeded its estimated real time in the HASP Execution Phase by xx minutes.

System Action: The action taken by the system is dependent on HASPGEN parameter \$TIMEOPT. Either the job will be cancelled (with or without a dump), or no further action will be taken.

JOB j HELD

Explanation: The indicated job has been placed in **HASP HOLD** status for one of the following reasons:

1. The JOB card specified "TYPRUN=HOLD".
2. The device from which the job was read was set to hold all jobs.

System Action: None.

Operator Response: The reason the job was placed in **HASP HOLD** status should be determined, and the job should be released, when appropriate, for further processing.

JOB j HELD FOR THE FOLLOWING VOLUMES --

text

Explanation: The job indicated has been placed in **HASP HOLD** status, pending availability of the volumes indicated by "text".

System Action: The job is placed in **HASP HOLD** status, and input processing continues.

Operator Response: Ensure that the requested volumes are available to be mounted, and release the job.

JOB j IS PURGED

Explanation: HASP has completely finished processing the designated job, and all HASP facilities belonging to the job are made available for reuse.

JOB j ON device -- jobname programmername

Explanation: A JOB card has been detected in the input stream from the indicated device, and the associated job has been assigned a HASP job number of "j". The jobname and programmername displayed are the job name and programmer name from the JOB card.

System Action: The previous job (if any) is queued for the execution phase, and input service processing is initiated for the new job.

JOB j - PRINTERn - STPT=rrzzzzzz C=cccc X=xxxx-xxxx-xxxx-xxxx Y=yyyy

Explanation: HASP has encountered an error while setting up the designated printer. The SETPRT reason (rr) and return (zzzzzz) codes are provided, as are the requested FCB name (cccc), character arrangement tables (xxxx), and copy modification module name (yyyy). If the word HASP appears as the return code, then HASP encountered an error outside SETPRT.

System Action: Output processing on the printer is suspended until the requested operator response is received.

Operator Response: Look for obvious errors in the FCB name, the character arrangement tables, and the copy modification module name requested by the job. Look for obvious errors in the FCB, character arrangement tables, or copy modification specification. If you find none, ensure that there is a forms overlay frame in the printer if one has been requested. Override any specifications in error using the set (\$T) command. Consult the "Data Management" chapter of OS/VS2 SVS Independent Component: IBM 3800 Printing Subsystem System Information, GC26-3858, for the meaning of the SETPRT return and reason codes.

When the parameter in error has been overridden using \$T PRT, or the problem has been otherwise corrected, restart the 3800 using the start (\$S) command. The current activity can be suspended using the restart (\$E), interrupt (\$I), or cancel (\$C) commands.

JOB j {PRINTING}
{PUNCHING} ON device

Explanation: The indicated job is now being processed by the Output Service Processor.

JOB j prt device {FCB }
{UCSB} IMAGE xxxx NOT FOUND

Explanation: The indicated job has requested that the print device FCB or UCSB be loaded with image xxxx. A search of all images has shown that image xxxx does not exist in the HASP image library.

System Action: If an FCB image was not found, a device setup message is issued and processing of the indicated job is halted. If a UCSB image was not found, job processing continues and the UCSB load for this data set is suppressed.

Operator/User Action: The operator should notify the user of an invalid image xxxx so that the job can be altered to avoid the request or should notify the system programmer so that the image can be added to the HASP image library. At the first opportunity the operator should use the set (\$T) command to correct the FCB/UCSB image request.

JOB j SETUP -- prt device -- F=ffff -- C=cccc -- T=tttt

Explanation: The indicated job requires that the setup of the printer device indicated be altered to forms = ffff, carriage control = cccc, and print train = tttt.

System Action: Output processing is halted on the specified device until an appropriate operator response is received.

Operator Action: The operator should verify that the requested setup has been completed and should enter a start (\$S) command for the indicated device. If the operator wishes to override any or all of the setup specifications, he may do so with a set (\$T) command followed by a start (\$S) command. Current activity may be suspended by the restart (\$E), interrupt (\$I), and cancel (\$C) commands. In this event all intervening set (\$T) commands will be ignored, and the device setup will be that prior to the setup message.

JOB j SETUP -- 3800 prt device -- F=ffff -- O=oooo -- B=b -- C=cccc

Explanation: The indicated job requires that the indicated printer be altered to the indicated forms = ffff, forms overlay = oooo, Burster threading = Y or N, and FCB = cccc.

System Action: Output processing on the printer is halted until the required operator response is received.

Operator Response: Verify that the required setup has been performed and enter a start (\$S) command to the device. If you wish to override any or all of the setup specifications, do so using the \$T command. Current activity can be suspended using the restart (\$E), interrupt (\$I), or cancel (\$C) commands.

JOB j SETUP -- pun device -- F=ffff

Explanation: The indicated job requires that the setup of the punch device indicated be altered to forms = ffff.

System Action: Output processing is halted on the specified device until an appropriate operator response is received.

Operator Action: The operator should verify that the requested setup has been completed and should enter a start (\$S) command for the indicated device. If the operator wishes to override any or all of the setup specifications, he may do so with a set (\$T) command followed by a start (\$S) command. Current activity may be suspended by the restart (\$E), interrupt (\$I), and cancel (\$C) commands. In this event all intervening set (\$T) commands will be ignored, and the device setup will be that prior to the setup message.

JOB j TERMINATED

Explanation: A permanent I/O error was encountered, while reading input from a SPOOL volume for the specified job. The nature of the error was displayed by a previous I/O ERROR ... message.

System Action: The indicated job is cancelled, automatically.

Operator Response: Notify system programmer.

JOB j USES TOO MANY /*OUTPUT CONTROL CARDS

Explanation: The number of /*OUTPUT control cards in the job exceeds the installation limit.

System Action: Processing continues as if the excess /*OUTPUT control cards had not been included in the job.

User Response: Change the job so that it requires fewer /*OUTPUT control cards. This may be done by breaking the job into smaller jobs or by using alternate means (e.g., SYSOUT classing) to achieve the desired output control.

LINE n -- INVALID PASSWORD

Explanation: A remote attempted to sign on the specified line, with an invalid password.

System Action: The attempted sign on is not allowed, and the line is left in an INACTIVE status.

Operator Action: The remote operator should determine the valid password and correct the sign on to reflect this information.

LINE n -- INVALID SIGNON

Explanation: A remote attempted to sign on the specified line with an invalid sign on card. A sign on card may be invalid, if:

1. The remote name is spelled incorrectly.
2. The remote specified has not been generated.
3. The remote specified is attached to another line.
4. The remote name does not begin in column 16.

System Action: The attempted sign on is not allowed, and the line is left in an INACTIVE status.

Operator Action: The remote operator should verify the spelling of the remote. If the remote is attached to another line, steps should be taken to correct this conflict in remote assignments.

System Programmer Action: If the required remote has not been generated another HASPGEN will be required to correct this situation.

PAPER JAM -- APPROX PAGES=xxxx - PRINTERn

Explanation: A paper jam has occurred on the 3800 printer designated by PRINTERn. The number of pages specified by xxxx is the approximate number of logical pages of output lost.

System Action: The printer is placed in a stopped state and will resume printing when a start (\$S) command is received.

Operator Response: Clear the paper jam in the 3800 printer. The printer can be backspaced using the backspace (\$B) command. Issue the start (\$S) command to resume printing. The current activity can be suspended using the restart (\$E), interrupt (\$I), or cancel (\$C) commands.

r, message from operator

Explanation: The operator at a central console (r=0) or at a remote terminal, identified by the value r, has entered the displayed message, via the \$DM (display message) command.

SPOOL VOLUMES ARE FULL

Explanation: A request for HASP direct-access space allocation cannot be processed. All available space has been allocated to HASP functions.

System Action: The system suspends HASP processing and users of HASP services that require direct-access space until an output function completes and the associated direct-access space becomes available.

Operator Response: Determine which jobs are awaiting output (\$DN command) and then initiate output processing for those jobs. If no output is queued, cancel jobs that are awaiting execution or are in execution.

UNREADABLE OVERLAY--REBUILD OLAYLIB AND WARM START

Explanation: The HASP Overlay Service routines have received a permanent error indication, while attempting to read from the data set whose ddname is OLAYLIB, after all standard OS direct-access error recovery actions have been performed.

System Action: The HASP Processor, which requested the overlay module, is placed in a permanent \$WAIT state. Other processors continue to function.

Operator Response: Notify the system programmer. Enter \$P to prevent the starting of new functions.

System Programmer Response: Reinstall HASP as described in the HASP System Programmer's Guide. Ask the operator to warm start HASP to continue processing.

APPENDIX B

1130
OPERATOR'S GUIDE

The following sections contain detailed instructions for operating an 1130, equipped with a Binary Synchronous Communication Adapter, as a HASP MULTI-LEAVING remote work station. Control cards that can be entered from the 1130 and instructions for entering these cards are described previously under System Input in this manual.

REMOTE TERMINAL PROCESSOR

A special program has been written for the 1130 and can be considered a logical extension of the HASP System. This program, referred to as HASP/RTP1130, performs the following functions:

1. Input
 - a. Reads from the attached card reader(s).
 - b. Recognizes operator requests, and reads from the attached console.
 - c. Identifies, compresses, and blocks card images and commands for transmission to HASP.
 - d. Queues blocked records for transmission to HASP.
2. Output
 - a. Dequeues blocked records received from HASP.
 - b. Identifies the device required for output of the records.
 - c. Deblocks and decompresses output records, queueing the images for printing, punching, or typing.
 - d. Prints, punches, and types the output records, as required.
 - e. Sets status flags, indicating backlog conditions on the output devices.
3. Communications
 - a. Establishes and maintains synchronization with HASP.
 - b. Dequeues blocked input records and transmits them to HASP (upon request from HASP).
 - c. Provides backlog status flags, indicating the terminal's ability to receive the various output streams from HASP.

- d. Receives output from HASP and queues the blocked records for processing.

HASP/RTP1130 may read, print, and punch data concurrently, depending on the options selected by the installation and the capabilities of the unit record devices.

Due to the use of blocking and character compression to minimize line transmission time, the speed at which the 1130 unit record devices will operate is dependent on the data being transmitted and the number of concurrent functions. Certain job mixes, because of their data characteristics, will enable HASP/RTP1130 to operate the unit record devices at near full speed. Other job mixes may cause the devices to operate in short bursts because of contention on the communication line.

OPERATING PROCEDURES

The following subsections provide information sufficient for initiating and operating the HASP/RTP1130 program during the remote job stream processing session.

INITIATION OF A REMOTE JOB STREAM PROCESSING SESSION

The initiation of a remote job stream processing session involves initial program loading of the HASP/RTP1130 program deck, establishment of the communication lines, and exchange of initial control information between HASP and the HASP/RTP1130 program. The initial control sequence ends with the passing of the sign on remote identification information.

Initial Program Load (IPL)

The following steps should be taken to IPL the 1130:

1. Ready the RTP1130 deck in the primary card reader (do not place Jobs behind RTP1130 deck). If two card readers exist, be sure the second is not ready.
2. Ready all printers.
3. Set the STR/BSC switch to BSC.
4. Set the line speed control to the appropriate value e.g., 1200, 2000, 2400, etc.
5. Verify that the rotary CPU control switch is set to the "RUN" position.
6. Press IMM STOP, RESET, and PROGRAM LOAD on the 1130 console.
7. After the last card has been read, the card reader will go out of ready. Ready the card reader (press START on the reader until it goes ready) and press START on the 1130 console. The last card should be the end card of the RTP1130 deck or a /*SIGNON card or a REP card. All unidentified cards are ignored.
8. Establish the communication line.
9. Processing should then begin in the full MULTI-LEAVING mode.

Establishment Of Communication Line

The procedures for establishing communications with HASP are as follows:

1. Ready the data set. This will involve different actions, based on the type of data set; for nonswitched lines when the BSC RDY indicator is on no action is required. Certain nonswitched lines will require that the data set DATA button be pressed. To ready a dial line data set, perform the following:
 - a. Press the TALK button and lift the receiver on the data set.
 - b. Dial the assigned number for remote terminal.
 - c. If the HASP line is available, the central system will answer with a high pitched tone. Press DATA and hang up immediately (the data set is ready).
 - d. If the HASP line is in use, a busy signal will be received. Hang up and try again later, or dial an alternate communications line number.
 - e. If the call is not answered, the central HASP operator has not given the necessary command to authorize use of that communication line.
2. When the data set is ready, the BSC RDY indicator will be on. When requested, RTP1130 will begin the initial control sequence. The REC and TSM lights will alternate during normal operation.
3. When the initial sequence is complete, control information is transmitted to HASP and "handshaking" with REC and TSM alternating will continue. In addition, the message:

COMMUNICATION LINE ESTABLISHED

is printed on the console typewriter.

Note that the message DATA SET NOT READY is printed after the execution of step 7 in the IPL procedure if that condition exists.

REMOTE JOB STREAM PROCESSING

During remote job stream processing the operator is concerned with operating the unit record devices, while submitting jobs and controlling the output via commands to the central system.

Input Processing

Job submission can be initiated at any time, depending on the capabilities of the card reader/punch attached to the 1130.

The 2501 Reader allows the cards to be placed in the hopper as desired. The reader will stop after reading the last card in the hopper and the message INTERVENTION REQUIRED ON 2501 will be printed on the console printer. The operator may press START on the reader to terminate the job stream or may load more cards in the hopper, press START and

continue the job stream. The intervention message is typed whenever the 2501 goes from a ready condition to a not ready condition.

The input reader to HASP/RTP1130 is considered always "hot" that is, it is continually testing the reader and attempting to read cards.

Output Processing

The printing and punching of job output is handled automatically by the HASP/RTP1130 system, except as controlled by the remote terminal operator or central system operator via commands to HASP.

Input Processing On The 1442 Reader/Punch

The function of the 1442 Reader/Punch is defined via operator action at the Keyboard/Console. Initially, the 1442 R/P is considered to be a card reader. When punch data is transmitted to the 1130, a message is printed:

```
PUNCH PROCESSOR WAITING FOR 1442
```

The operator may then define the 1442 as a punch by entering the command:

```
.DPUNCH (or .DP)
```

This specification is necessary for each job that transmits punch data to the terminal.

Once defined as a reader by issuing the command:

```
.DREADER (or .DR)
```

The 1442 retains the assignment, until a .DPUNCH is given. As a reader, the 1442 operates in the same manner as the 2501 Card Reader.

Note that during input processing on the 1442 R/P:

1. The .DPUNCH and .DREADER Commands will result in no action if the opposite function is active at the time issued.
2. Defining the 1442 R/P as a reader with blank cards for punching ready in the hopper will result in a SKIPPING FOR JOB CARD message from HASP as the blank cards are read and transmitted.
3. Defining the 1442 R/P as a punch with input cards in the hopper and punch data available from HASP will result in the destruction of data in the input cards.

Output Processing On The 1442 Punch

A system with the 1442 defined as a punch-only device requires no operator action other than blank cards and a ready condition.

TERMINATING A SESSION

To terminate remote processing, the remote terminal operator should send a /*SIGNOFF card through the card reader input stream. This card tells HASP not to initiate the sending of any more job output and to release the communication line (if DIAL) when the current print and punch streams are finished. The RDY light on the data set will go out, and an SCA Log Message Code 3 will be released periodically. The operator should check to see if printing and punching of output streams have successfully terminated and will press STOP on the CPU. To start a new session, the operator must perform the steps prescribed for the initialization of a remote job stream processing session.

COMMAND PROCESSING

Central system commands, as well as local commands, may be entered at the operator's console. Any message entered at the keyboard, which is not recognized as a local command, will be transmitted to HASP for action. Although all commands transmitted to HASP may be listed on the central system operator consoles, only those designated previously in Figure 3 as being available to the remote user will be acted upon.

Entering Commands

The operator should perform the following steps when entering commands:

1. Press the INT REQ button which is located to the right of the console typewriter keyboard.
2. When the K.B. Select indicator comes on, type in the command, and press EOF.
3. If a typing error is noticed before pressing EOF, press ERASE FIELD key, and repeat step 1.

Note that the BACKSPACE key is processed in the same manner as the ERASE FIELD key.

Local Commands

The following list indicates local commands that can be entered at the operator's console:

COMMAND

MEANING/COMMENTS

.DR	Defines the dual 1442 Reader/Punch as a reader. This definition remains in effect, until a .DP command is entered and accepted.
.DP	Defines the dual 1442 Reader/Punch as a punch. This definition remains in effect for one job only. The function next assigned is dependent on the entering of another .DP or .DR.

Commands must start in the first available type position and are identified by a period. No blanks are allowed in the body of a command. Acceptance of a console command is signalled by the message:

OK!

Rejection is signalled by the message:

WHAT?

ERROR PROCEDURES

The following sections indicate some of the more common error conditions that may arise and the necessary steps for recovery from the error.

COMMUNICATIONS ADAPTER ERRORS

Due to the design of the synchronization technique for HASP remote terminals, no errors are expected during a processing session. The occurrence, therefore, of any error condition is an unusual condition resulting from either system or communication facility malfunction or operational conditions. In general, the display of error messages is only informational, since the terminal processor will automatically initiate the appropriate recovery action.

The following is a list of error messages that may be displayed on the console printer.

<u>MESSAGE*</u>	<u>MEANING</u>	<u>ACTION TAKEN</u>
FFRREEEO	Block Sequence Check - a transmission block was duplicated or lost; RR=received block number; EE=expected block number.	If duplicate, the received block will be ignored. If the block is lost, HASP will be signalled to restart the job.
02DDDD00	Abnormal read complete. Number of bytes requested have been read, but no end sequence was detected.	HASP will be requested to retransmit the record.
03DDDD00	Received timeout while attempting to synchronize an initial sequence.	HASP will be requested to retransmit the record.
04DDDD00	Received timeout while reading data.	HASP will be requested to retransmit the record.
05DDDD00	BCC compare error after normal read complete condition.	HASP will be requested to retransmit the record.
06DDDD00	Data overrun error. Program unable to read data before next character is received from transmission line.	HASP will be requested to retransmit the record.
07DDDD00	Data set not ready. Discovered at interrupt time.	RTP1130 waits for data set to become ready and then resumes operation on the line.
08DDDD00	Error on initial read. First character not SOH, DLE, ENQ, or NAK...or... SOH-STX, DLE-STX, DLE-ACK0 pair not found.	HASP will be requested to retransmit the record.
09DDDD00	NAK received.	Last data record will be retransmitted to HASP.
0BDDDD00	Single DLE found in transparent data.	HASP will be requested to retransmit the record.
0CDDDD00	ENQ received after initial sign on Sequence.	HASP will be requested to retransmit the record.
0DDDD00	No pad character following NAK.	HASP will be requested to retransmit the record.

*DDDD=Last SCA Device Status Word received.

REMOTE TERMINAL RESTART

In the event of an untimely interruption of the remote terminal operation (such as a machine, program, communications, or environmental failure), the remote terminal operator should notify appropriate maintenance personnel of the malfunction. He should also save material that may be of use in determining the source of the failure and, with the aid of the central system operator, should prepare for restarting the terminal as follows:

1. Notify the central system operator of the failure and, if necessary, request his assistance in preparing for restart.
2. Determine the current job being transmitted to HASP. (The central system operator has a record of the current job being submitted to HASP.) The job stream, starting with the current job, must be submitted to HASP after restart.
3. Determine the loss of data on the output devices, and inform the central operator to backspace or restart the printer or punch, as necessary. (The central system's line should be made available for a subsequent session with the remote station or other stations within the system).
4. When the remote terminal is available, perform the steps required for initiating a remote job processing session.

LOAD PROCESS UNUSUAL CONDITIONS

The first eight cards of the 1130 remote terminal deck comprise a bootstrap loader (RTPBOOT), which loads the main loader (RTPLOAD) into upper 1130 storage. RTPLOAD then loads the main terminal deck (RTP1130), processes REP cards (if any), processes the /*SIGNON card (if included).

Figures 12 and 13 describe the unusual conditions that may occur in conjunction with RTPBOOT and RTPLOAD.

Condition Indication	Condition Description	Operator Action
System wait at location '0010.' AC displays value 'FFF3.'	The last REP card read contained a format error.	Loading is terminated permanently. Note that a card is in error, and notify system programmer or lead operator.
System wait at location '0010.' AC displays value 'FFF2.'	RTPLOAD-computed sum (checksum) of columns 1-72 of last RTP1130 card read does not match value in columns 73-74, previously computed.	Loading may be resumed by pressing start on 1130 console. Unpredictable results may occur. Best action is to note card in error and notify system programmer or lead operator.
System wait at location '0010.' AC displays value 'FFF1.'	This is not an error. The last card has been read by the 2501 or 1442, and operation action is required.	To commence RTP1130 processing, press start on card reader, until ready; then press start on 1130 console.

Figure 12. RTPLOAD Unusual Conditions

Condition Indication	Condition Description	Operator Action
System loop at location 'AA' with IAR displayed at location 'AB.'	RTPBOOT-computed sum (checksum) of columns 1-72 of last card read does not match value in columns 73-74, previously computed during RTPLOAD generation.	Loading of RTPLOAD is permanently terminated. Note card being processed, and contact system programmer or lead operator about problem.
System loop at location 'AE' with IAR displaying location 'AF.' AC contains card code value of column in error. XR2 contains 2s complement of card column number in error.	RTPBOOT detected illegal EBCDIC punch in RTPLOAD card just read, or the last four cards of RTPBOOT contain an illegal EBCDIC punch.	Loading of RTPLOAD is permanently terminated. Note card being processed, and contact system programmer or lead operator about problem.

Figure 13. RTPBOOT Unusual Conditions

MESSAGE SUMMARY

Messages that are printed on the console typewriter originate at the central HASP System or are generated by RTP1130, in conjunction with the terminal operation. Messages from HASP may be identified by the \$ character prefix and by the fact that they are printed in red if the red/black typewriter ribbon is installed.

Local messages (typed in black) are listed in Figure 14 along with a more detailed explanation of each message.

Message	Explanation/Action
INTERVENTION REQUIRED ON xxxx	Where xxxx=1442, 2501, 1403, or 1132. Message indicates that the device has gone from a "ready" to "not ready" condition, usually because the device was manually stopped or because the device requires operator action, e.g., cards or paper. The device should be serviced as required and made ready to continue operation.
PUNCH PROCESSOR WAITING FOR 1442	Issued whenever punch data is received for a system equipped with a combination 1442 read/punch. If the 1442 is defined as a reader, it must complete the read function before it can be defined as a punch. If the 1442 is defined as a punch, no further action (other than providing blank cards and making the device ready) is necessary.

Figure 14. 1130 Local Messages (Sheet 1 of 2)

Message	Explanation/Action
DATA SET NOT READY	<p>Issued when the communications adapter signals the work station program that the attached telephone data set is in a not ready condition. The program will not attempt to use the Communication Adapter until a "ready" condition is detected. All other functions (card input, typewriter, etc.) will continue until they require the service of the adapter. If the data set was made not ready by manual intervention, operation may be resumed by making it ready. <u>Caution:</u> The central HASP System may print error messages that could cause the operator to restart the communications line. In this event, the work station program must be reloaded.</p>
SCA LOG xxxxxx00	<p>Indicates an unusual condition associated with the SCA (Synchronous Communication Adapter).</p>
COMMUNICATION LINE ESTABLISHED	<p>Issued when the work station program is initialized and when communications have been established with the central HASP System.</p>
WHAT?	<p>Response to any local command not recognized by the work station program.</p>
OK!	<p>Response to any local command recognized by the work station program.</p>

Figure 14. 1130 Local Messages (Sheet 2 of 2)

APPENDIX C

SYSTEM/360
OPERATOR'S GUIDE

The following sections contain detailed instructions for operating any model of System/360 (that is equipped with binary synchronous communication facilities) as a HASP MULTI-LEAVING, remote work station. Control cards that can be entered from System/360 and instructions for entering these cards are described previously under System Input in this manual.

REMOTE TERMINAL PROCESSOR

A special program, written for the remote System/360, can be considered a logical extension of the HASP System. This program, referred to as HASP/RMT360, performs the following functions:

1. Input
 - a. Reads from the attached card readers.
 - b. Recognizes operator requests, and reads from the attached console.
 - c. Identifies, compresses, and blocks card images and commands for transmission to HASP.
 - d. Queues blocked records for transmission to HASP.
2. Output
 - a. Dequeues blocked records received from HASP.
 - b. Identifies the device required for output of the records.
 - c. Deblocks and decompresses output records, queueing the images for printing, punching, or typing.
 - d. Prints, punches, and types the output records, as required.
 - e. Sets status flags, indicating backlog conditions on the output devices.
3. Communications
 - a. Establishes and maintains synchronization with HASP.
 - b. Dequeues blocked input records and transmits them to HASP, upon request.
 - c. Provides backlog status flags, indicating the terminal's ability to receive various output streams from HASP.

- d. Receives output from HASP and queues the blocked records for processing.

HASP/RMT360 may read print and punch data concurrently, depending on the options selected by the installation and the capabilities of the unit record devices.

Due to the use of blocking and character compression to minimize line transmission time, the speed at which the remote terminal unit record devices will operate is dependent on the data being transmitted and the number of concurrent functions. Certain job mixes, because of their data characteristics, will enable HASP/RMT360 to operate the unit record devices at full rated speed. Other job mixes may cause the devices to operate in short bursts because of contention on the communication line.

OPERATING PROCEDURES

The following subsections provide information sufficient for initiating and operating the HASP/RMT360 program during the remote job stream processing session.

INITIATION OF A REMOTE JOB STREAM PROCESSING SESSION

The initiation of a remote job stream processing session involves initial program loading of the HASP/RMT360 program deck, establishment of the communication lines, and exchange of initial control information between HASP and the HASP/RMT360 program. The initial control sequence ends with the passing of the sign on remote identification information.

Initial Program Load (IPL)

The following steps should be taken to IPL the HASP/RMT360:

1. If power is off press POWER ON.
2. Ready the HASP/RMT360 deck in reader 1 (designated by central system personnel) and press START and EOF on the reader. (The last card of the deck should be a blank or /*SIGNON card, as directed by the installation.)
3. Ready printers, punches, and the console.
4. Set the LOAD UNIT rotary switches to the device address of reader 1.
5. Disable the interval timer, if present.
6. Set the MODE (RATE) and DIAGNOSTIC (FLT) switches to process.
7. Set CHECK CONTROL to STOP.
8. Press SYSTEM RESET and LOAD.
9. All cards of the HASP/RMT360 deck should be read by the reader.
10. HASP/RMT360 will print the /*SIGNON card, if present, followed by a HASP environmental recording error printout (if the contents of core remain unchanged since the last running of the program).
11. The remote terminal is now ready to communicate with HASP. HASP/RMT360 will wait while communications are established with HASP.

Establishment Of Communication Line

The procedures for establishing communications with HASP are as follows:

1. Ready the data set. This will involve different actions, based on the type of data set. Readying nonswitched lines will only require that the data set DATA button be pressed (if present). To ready a dial line data set, perform the following:
 - a. Press the TALK button, and lift the receiver on the data set.
 - b. Dial the assigned number for the remote terminal.
 - c. If the HASP line is available, the central system will answer with a high pitched tone. Press DATA and hang up immediately (the data set is ready).
 - d. If the HASP line is in use, a busy signal will be received. Hang up, and try again later, or dial an alternate communication line number.
 - e. If the call is not answered, the central HASP operator has not given the necessary command to authorize use of that communication line.
2. When the data set is made ready for HASP, HASP/RMT360 will wait to request a transmission. When requested, HASP/RMT360 will begin the initial control sequence.
3. When the initial sequence is complete, the sign on is transmitted to HASP. HASP/RMT360 will "handshake" with HASP until processing of job streams actually begins.

REMOTE JOB STREAM PROCESSING

During remote job stream processing the operator is concerned with operating the unit record devices, while submitting jobs and controlling the output via commands to the central system.

Output Processing

The printing and punching of job output is handled automatically by the HASP - HASP/RMT360 system, except as controlled by the remote terminal operator or central system operator, via commands to HASP.

Input Processing

With the exception of 2520 and 1442 dual reader/punch devices, job submission can be initiated at any time from any card reader supported by the HASP/RMT360 program. (All readers may be running concurrently.) Place the cards in the input hopper, and press reader START. When all of a job stream has been loaded into the hopper, press reader EOF to.

allow the reading of the last cards to signal the program that the end of stream has been read.

HASP/RMT360 input readers are considered always "hot"; that is, the program is continually testing each reader and attempting to read cards. When any card reader is loaded, HASP/RMT360 will read and transmit the cards to HASP.

Operating A Dual Reader/Punch

Devices with single card paths for read and punch functions are considered dual reader/punches, if they are supported for both functions. The following are supported dual devices:

1. 1442 Reader/Punch
2. 2520 Reader/Punch

Dual devices have four basic status conditions that affect the operator:

1. Neutral - reader empty from normal program execution.
2. Input - reading normal job stream.
3. Output - punching normal output from HASP.
4. Output error recovery - attempting to recover from punch errors.

At IPL time, the dual device will be in neutral status and may be treated as any reader device, since the operator is at liberty to submit multiple job streams at any time. Any blank cards mixed in the input stream will be submitted to HASP as job input. When HASP/RMT360 recognizes the end-of-file (EOF) the dual device will revert to the neutral status.

When the dual device is in neutral, the operator may choose to ready the device with blank cards, placing the device in the output status. If HASP has output waiting, HASP/RMT360 will respond immediately by punching the blank cards. However, after all punching is finished, or if there is a pause due to low line speeds, the operator may not run the remaining cards out of the device and ready it with job stream cards. The procedure for interrupting the output mode is as follows:

1. Press STOP on the device.
2. Remove the cards from the hopper. (Do not nonprocess run the cards out of the card path.)
3. Place the job stream cards in the hopper, and press reader START.
4. If the punch is busy, the device will continue punching until the job stream is encountered; then, the device will enter the input status. (It is not necessary that all blank cards be removed from the hopper.)

5. If the punch is momentarily idle, the operator can cause the device to pass one card through by pressing reader STOP and then START. If several blank cards are in the hopper in front of the job stream, the operation must be repeated for each blank card.

The dual device is in error recovery status when a punch error occurs. HASP/RMT360 will attempt to repunch the record in error into the following card. If HASP/RMT360 encounters a nonblank card, a read error will occur (see Unit Record Error Procedures). The operator should nonprocess run out the job stream cards, place one or more blank cards in front of the job stream, and ready the device.

Command Processing

Any message entered into the 1052 Operator's Console via the keyboard will be transmitted to HASP for action. Although all commands transmitted to HASP may be listed on the central system operator consoles, only those available to the remote user will be read and acted upon.

The operator should perform the following steps when entering commands:

1. Press the REQUEST button on the right side of the keyboard. The ATTN indicator (indicator above the keyboard on the 1052) will glow momentarily.
2. When the PROCD indicator comes on, type in the command and press EOB (numerical 5 key pressed while ALTN CODING key is depressed).
3. If a typing error is noticed prior to pressing EOB, press CANCEL (numerical 0 key pressed while ALTN CODING key is depressed) and repeat step 2.
4. If (after receiving a proceed indicator) no command is to be entered, press EOB.

TERMINATING A SESSION

To terminate remote processing, the remote terminal operator should enter a /*SIGNOFF card, which prevents HASP from initiating any more job output and releases the communication line (if DIAL) when the current print and punch streams are finished. The DATA light on the data set will go out and BSCA will enter a check condition. For nonswitched lines, HASP will make the line available and wait for an initial sequence request from the HASP/RMT360 program. HASP/RMT360 will log UNIT CHECK on the console message device. The operator should determine whether printing and punching of output streams have successfully terminated and should press STOP on the CPU. To start a new session, the operator must perform the steps described previously for initialization of a remote job stream processing session.

ERROR PROCEDURES

The following sections indicate some common error conditions and the necessary steps for recovery from the errors.

COMMUNICATION ADAPTER ERRORS

Due to the design of the synchronization technique for HASP remote terminals, no errors are expected during a processing session. The unusual occurrence, therefore, of any error condition results from either system or communication facility malfunction or from operational conditions. In general, the display of error messages is only informational, because the terminal processor will automatically initiate the appropriate recovery action. A statistical summary of all errors is maintained in the HASP Environmental Recording Table, and a historical report is produced each time HASP/RMT360 is loaded (unless storage has been cleared). Additionally, the occurrence of any error will cause a descriptive message to be displayed immediately on the console typewriter. Figure 15 indicates each possible communication error, its meaning, and the recovery action taken.

UNIT RECORD ERROR PROCEDURES

Many unit record device errors that may occur during processing allow HASP/RMT360 to continue processing without operator intervention. Some errors (such as, DATA check on the reader and single pocket punch devices, FEED check, END OF FORM, etc.) require operator assistance before use of the device can be continued. In any event all errors occurring on unit record devices will be logged in the HASP Environmental Recording Error Printout Table and will be displayed immediately on the 1052 operator's console.

When the error message is printed the operator should perform the following:

1. Determine which device is in error (see Figure 16).
2. Note the device status (if HASP/RMT360 continues to use the device, the error message is informative in nature).
3. Correct the error in accordance with procedures prescribed for the device.
4. Ready the device to resume operation.

<u>Error</u>	<u>Description</u>	<u>Recovery Action</u>
01RREE00	Block sequence check- a transmission block was duplicated or lost; RR = received block number, EE = expected block number.	If duplicate, the received block will be ignored. If lost block, HASP will be signaled to restart the job.
02000000	Negative reply received - a transmission block was not correctly received by HASP.	The bad record will be retransmitted.
03RRRR00	Unknown response received - an unrecognizable control character was received from HASP; RRRR = first two characters received (if RRRR is correct sequence, ending sequence was bad).	HASP will be requested to retransmit the record.
04000000	Unit exception - indicates receipt of an "EOT" character from HASP (EOT is not utilized in MULTI-LEAVING).	HASP will be requested to retransmit the record.

Figure 15. Communication Adapter Error Messages (Sheet 1 of 2)

<u>Error</u>	<u>Description</u>	<u>Recovery Action</u>
05SS0000	Unit check - a check condition has occurred in the communication adapter; SS = sense byte indicating type of check. Sense information byte: 80 = Command reject 40 = Intervention required 20 = Bus out check 10 = Equipment check 08 = Data check 04 = Overrun 02 = Lost data 01 = Time out	The failing operation will be retried. If write operation in process at time of error, the write will be reissued; otherwise, HASP will be requested to retransmit.
06CC0000	Unusual end - an unusual end condition has occurred in the channel or control unit interface; cc=CSW byte 5.	The failing operation will be retried.
07000000	SIO failure - a Start I/O instruction was rejected by the Synchronous Data Adapter.	The Start I/O will be retried.

Figure 15. Communication Adapter Error Messages (Sheet 2 of 2)

<u>Message</u>	<u>Description</u>	<u>Program Action</u>
05SS0AAA	<p>Unit check - device within address "AAA" has unit check error described by sense byte "SS" and/or indicator lights on the device console.</p> <p>Example sense byte settings:</p> <p>40 = Intervention required 10 = Equipment check 08 = Data check - card read, card punched, or line printed incorrectly 01 = Carriage control tape channel 9 encountered on printer</p>	<p>Wait for operator. Treat as data check. Depending on device: ignore, retry, or wait for operator. Ignore.</p>
06CC0AAA	<p>Unusual end - previous I/O come to an unusual end. IBM customer engineer should be consulted; CC = CSW byte 5; AAA = device address.</p>	<p>Treat as data check.</p>

Note: Printing on a line that has a carriage control tape channel 9 or 12 punch will appear as errors and will be logged as errors. The installation should place these punches in line positions that will not contain print information and will not eliminate the punches from the carriage tape.

Figure 16. HASP/RMT360 Unit Record Error Messages

REMOTE TERMINAL RESTART

In the event of an untimely interruption of the remote terminal operation (such as a machine, program, communications, or environmental failure), the remote terminal operator should notify appropriate maintenance personnel of the malfunction and save material that can be used to determine the source of the failure. With the aid of the central system operator, the remote operator should also prepare to restart the terminal as follows:

1. Notify the central operator of the failure and, if necessary request his assistance in preparing for restart.

2. Determine, from the central operator's record, which job currently being transmitted to HASP. The job stream, starting with the current job, must be submitted to HASP after restart.
3. Determine the loss of data on the output devices and inform the central operator to backspace or restart the printer or punch, as necessary. (The central system's line should be made available for a subsequent session with the remote station or other stations within the system).
4. When the remote terminal is available, perform steps to initiate a remote job processing session.

APPENDIX D

**BSC MODEL 20 and 2922
OPERATOR'S GUIDE**

The following section contains detailed instructions for operating System 360/20, equipped with a Binary Synchronous Communication Adapter, and the 2922 as HASP MULTI-LEAVING, remote work stations. Although the section refers to System 360/20 features and devices, it also applies to the 2922. For the 2922, referenced reader and printer devices are the 2501 Card Reader and the 1403 Printer, respectively.

Control cards that can be entered from the Model 20 and 2922 and instructions for entering these cards are described previously under System Input in this manual.

REMOTE TERMINAL PROCESSOR

A special program, written for the Model 20, can be considered a logical extension of the HASP System. This program (HASP/RMTM20) performs the following functions:

1. Input
 - a. Reads from the attached card reader.
 - b. Recognizes operator requests and reads from the attached console.
 - c. Identifies, compresses, and blocks card images and commands for transmission to HASP.
 - d. Queues blocked records for transmission to HASP.
2. Output
 - a. Dequeues blocked records received from HASP.
 - b. Identifies the device required for output of the records.
 - c. Deblocks and decompresses output records, queuing the images for printing, punching, or typing.
 - d. Prints, punches, and types the output records as required.
 - e. Sets status flags indicating backlog conditions on the output devices.
3. Communications
 - a. Establishes and maintains synchronization with HASP.

- b. Dequeues blocked input records and transmits them to HASP upon request.
- c. Provides backlog status flags, indicating the terminal's ability to receive various output streams from HASP.
- d. Receives output from HASP and queues the blocked records for processing.

HASP/RMTM20 may read print and punch data concurrently, depending on the options selected by the installations and the capabilities of the unit record devices.

Because of blocking and character compression to minimize line transmission time, the speed at which the Model 20 unit record devices will operate is dependent on the data being transmitted and the number of concurrent functions. Certain job mixes, because of their data characteristics, will enable HASP/RMTM20 to operate the unit record devices at full rated speed. Other job mixes may require that devices operate in short bursts because of contention on the communication line.

OPERATING PROCEDURES

The following subsections provide information sufficient for initiating and operating the HASP/RMTM20 program during the remote job stream processing session.

INITIATION OF A REMOTE JOB STREAM PROCESSING SESSION

The initiation of a remote job stream processing session involves the initial program loading of the HASP/RMTM20 program deck, the establishment of the communication lines, and the exchange of initial control information between HASP and the HASP/RMTM20 program. The initial control sequence ends with the sign on remote identification information.

Initial Program Load (IPL)

The following steps should be taken to IPL the HASP/RMTM20.

1. If power is off, press POWER ON.
2. Ready the HASP/RMTM20 deck in the supported card reader. (The last card of the deck should be a blank or /*SIGNON card, as directed by the installation).
3. Ready the printer, punch, and console (as required).
4. Set time sharing key down.
5. Set the address/register data switches to one of the following:
 - 1F00 - 8K storage
 - 2F00 - 12K storage
 - 3F00 - 16K storage
6. Set the mode switch to PROCESS.
7. Press LOAD.
8. All cards of the HASP/RMTM20 deck should be read, except the last card. Press reader START to read the last card.
9. The IPL is complete when the last card is read. HASP/RMTM20 will print the /*SIGNON card (if the last card) followed by a HASP environmental recording error printout (if the contents of core remain unchanged since the last running of the program).
10. The BSCA indicator lights should show periodic transmit and receive activity.

11. The remote terminal is now ready to communicate with HASP.

Establishment Of Communication Line

The procedures for establishing communications with HASP are as follows:

1. Ready the data set. This will involve different actions, based on the type of data set. Readyng nonswitched lines will only require that the data set DATA button be pressed (if present). To ready a dial line data set, perform the following:
 - a. Press the TALK button and lift the receiver on the data set.
 - b. Dial the assigned number for the remote terminal.
 - c. If the HASP line is available, the central system will answer with a high pitched tone. Press DATA and replace the hand set in its cradle (the data set is ready).
 - d. If the HASP line is in use, a busy signal will be received. Hang up and try again later, or dial an alternate communication line number.
 - e. If the call is not answered, the central HASP operator has not given the necessary command to authorize use of that communication line.
2. When the data set is made ready, the BSCA DATA SET READY and BUSY indicators will be on and TRANSMIT MODE and RECEIVE MODE will be alternating (RECEIVE MODE may appear to be continuous).
3. When HASP responds to Model 20 transmission, the sign on is transmitted to HASP, and CARD I/O for the card reader will come on to indicate that the sign on is complete. HASP/RMTM20 will "handshake" with HASP until processing of job streams actually begins (indicated by BUSY on with alternating RECEIVE MODE and TRANSMIT MODE indicators).

REMOTE JOB STREAM PROCESSING

During remote job stream processing, the operator is concerned with operating the unit record devices, while submitting jobs and controlling the output via commands to the central system.

Output Processing

The printing and punching of job output is handled automatically by the HASP - HASP/RMTM20 system, except as controlled by the remote terminal operator or central system operator via commands to HASP.

Input Processing

Job submission can be initiated at any time, depending on the capabilities of the card reader/punch combination attached to the Model 20. There is no restriction on when the operator can submit a job stream with the following reader/punch combinations:

1. 2501 Reader - 2560 Punch (secondary feed)
2. 2501 Reader - 1442 Punch
3. 2501 Reader - 2520 Punch
4. 2560 Reader (primary feed) - 1442 Punch
5. 2520 Reader - 1442 Punch

The operator places the cards in the hopper. The reader will stop just before reading the last card of each job stream. The operator should put more cards in the reader or press START on the reader, allowing the last card to indicate the end of the job stream.

The input reader to HASP/RMTM20 is always considered "hot"; that is, the program is continually testing the reader and attempting to read cards. During this time the appropriate CARD I/O indicator on the CPU console will be on (see Unit Record Error Procedures). This condition is not an error but indicates that HASP/RMTM20 is ready to send the next job stream.

Operating A Dual Reader/Punch

Devices with single card paths for read and punch functions are considered dual reader/punch devices. When using these devices as dual devices, the operator must concern himself with the status of the device. The following are supported dual devices:

1. 2520 Reader/Punch
2. 2560 MFCM (Read - primary feed)
(Punch - secondary feed)

Notice that these devices are not considered dual devices when used in combinations listed previously under Input Processing.

Operating The Dual 2520

The 2520 has four basic status conditions that affect the operator:

1. Neutral - reader empty from normal program execution.
2. Input - reading normal job stream.
3. Output - punching normal output from HASP.
4. Output error recovery - attempting to recover from punch errors.

At IPL time the 2520 will be in neutral status and may be treated as any reader device; the operator is at liberty to submit multiple job streams at any time. Any blank cards mixed in the input stream will be submitted to HASP as job input. When HASP/RMTM20 recognizes an end-of-file (EOF), the 2520 will revert to the neutral status.

When the 2520 is in neutral, the operator may choose to ready the device with blank cards (which places it in the output status). If HASP has output waiting, HASP/RMTM20 will respond immediately by punching the blank cards. However, after all punching is finished or if there is a pause due to low line speeds, the operator may not run the remaining cards out of the 2520 and ready it with job stream cards. The procedure for interrupting the output mode is as follows:

1. Press STOP on the 2520.
2. Remove the cards from the hopper. (Do not NPRO the cards out of the card path.)
3. Place the job stream cards in the hopper and press reader START.
4. If the punch is busy, the device will continue punching until the job stream is encountered; then, the 2520 will enter the input status. (It is not necessary to remove all blank cards from the hopper.)
5. If the punch is momentarily idle, it will be waiting for local commands from the console (if installed). The operator can cause the 2520 to pass one card through by typing on the console ".SR1" (start reader 1). If several blank cards are in the hopper prior to the job stream, this command must be entered for each blank card. For configurations without consoles, the operator can simulate the .SR1 command by setting data dial 2 to numerical value 2 and moving data dial 1 one position in either direction. Do not move dial 1 twice. Upon completion of the skip function, set data dial 2 out of position 2.

The 2520 is in error recovery status when a punch error occurs. HASP/RMTM20 will attempt to repunch the record in error. If HASP/RMTM20 encounters a nonblank card, a read error will occur (see Unit Record Error Procedures). The operator should nonprocess run the job stream cards, place one or more blank cards in front of the job stream and ready the 2520.

Operating The Dual 2560 MFCM

The 2560 has two basic status conditions:

1. Input - submitting jobs using primary feed and hopper.
2. Output - punching data from HASP using secondary feed.

Blank cards, for punching, should always be in the 2560 secondary feed hopper during normal processing. During idle periods, and periodically while punching, HASP/RMTM20 will test the primary feed for job stream

cards. If job stream cards are encountered the HASP/RMTM20 will suspend the output status and will submit the job stream to HASP. The operator should always press STOP on the dual 2560 prior to loading the job stream in the primary feed hopper. (The feed mechanism cycles when HASP/RMTM20 is testing for job stream cards.)

Command Processing

Central system commands, as well as local commands, may be entered at the 2152 operator's console. Any message entered at the 2152 keyboard and not recognized as a local command will be transmitted to HASP for action. Although all commands transmitted to HASP may be listed on the central system operator console, only those designated as available to the remote user will be acted upon.

Local commands that are available to the HASP/RMTM20 operator signal the status of the unit record devices. Figure 17 contains a list, with meanings, of all available local commands.

The operator should perform the following steps when entering commands:

1. Press the REQ button which is located to the right of the console typewriter keyboard. The request indicator (indicator marked "R" at the right of the REQ button) will glow momentarily.
2. When the proceed indicator comes on (indicator marked "P" below the request indicator), type in the command and press EOT.
3. If a typing error is noticed prior to pressing EOT, press CAN (cancel) and repeat step 2.
4. If, after receiving a proceed indicator, no command is to be entered, type "." and press EOT. This will be recognized as an illegal local command and will be ignored.

<u>Command</u>	<u>Meaning/Comments</u>
.SR1	Start reader 1. This command tells HASP/RMTM20 that the operator has corrected a data check condition and has made the card reader ready to continue reading the input job stream (the first card is a corrected version of the card in error). This command is also used to terminate the output status of a dual 2520 card reader/punch.
.SU1	Start punch 1. This command tells HASP/RMTM20 that the operator has removed the incorrectly punched card from the punch stacker (1442) and the punch is ready.

Figure 17. Local Commands

Commands begin in the first available type position and are identified by a period (.). Except for the use of upper or lower case alphabetic characters, the commands must appear exactly as listed. No blanks are allowed.

TERMINATING A SESSION

To terminate remote processing, the remote terminal operator should transmit a /*SIGNOFF card, indicating that HASP should not initiate any additional job output and should release the communication line (if DIAL) when the current print and punch streams are finished. The DATA light on the data set will go out, and BSCA will enter a check condition. For nonswitched lines, HASP will make the line available and will wait for an initial sequence request from the HASP/RMTM20 program. Versions of HASP/RMTM20 that support console messages will log UNIT CHECK on the console. The operator should check to see if printing and punching of output streams have successfully terminated and should press STOP on the CPU. To start a new session, the operator must perform the steps described previously for the initialization of a remote job stream processing session.

ERROR PROCEDURES

The following sections indicate some common error conditions and necessary steps for recovery from the errors.

COMMUNICATION ADAPTER ERRORS

Due to the design of the synchronization technique for HASP remote terminals, no errors are expected during a processing session. The unusual occurrence, therefore, of any error condition results from either system or communication facility malfunction or from operational conditions. In general, the display of error messages is only informational, since the terminal processor will automatically initiate the appropriate recovery action. A statistical summary of all errors is maintained in the HASP Environmental Recording Table, and a historical report is produced, each time the HASP/RMTM20 is loaded (unless storage has been cleared). Additionally, if an operator message device has been designated (console or printer), any error will cause a descriptive message to be displayed immediately. Figure 18 indicates each possible communication error, its meaning, and the recovery action taken.

UNIT RECORD ERROR PROCEDURES

As a result of unit record device errors that inhibit I/O, HASP/RMTM20 will continuously test the device, while performing other functions that can continue. The operator is notified of device error by the CPU indicator panel as follows:

1. Card I/O 1 - 2501 Card Reader
2. Card I/O 2 - 2520 Reader/Punch or 2560 MFCM
3. Card I/O 3 - 1442 Card Punch
4. Printer - 1403 or 2203 Printer

Indicators on the device control panel will indicate the nature of the problem. The operator should correct the error, according to procedures prescribed for the device, and should ready the device. HASP/RMTM20 will automatically resume use of the device.

Unit record errors that occur during I/O will result in various program action, appropriate to the operator message facilities available for informing the operator and the nature of the error encountered. Figure 3.2.1 indicates the program action taken for each device supported by the system. When notified of the error via the 2152 Console, the operator should:

1. Note the address code in the error message (see Figure 19).

<u>Device-Function</u>	<u>Action With Console</u>	<u>Action Without Console</u>
2501, 2520, 2560 - read	<ol style="list-style-type: none"> 1. Type error message (note 1). 2. Wait for .SR1 command. 3. Read. 	<ol style="list-style-type: none"> 1. STOP with device address in ESTR register (note 2). 2. Reread when CPU started.
1442 - punch	<ol style="list-style-type: none"> 1. Type error message (note 1). 2. Wait for .SU1 command. 3. Repunch record in error. 	<ol style="list-style-type: none"> 1. STOP with device address in ESTR register (note 2). 2. When CPU started, repunch record in error.
2520, 2560 - punch	<ol style="list-style-type: none"> 1. Select out card in error. 2. Repunch record in error. 	<ol style="list-style-type: none"> 1. Select out card in error. 2. Repunch record in error.
2203, 1403 - print	Ignore error.	Ignore error.
2152 - write	<ol style="list-style-type: none"> 1. Ignore first error. 2. Wait on next attempt to use device (note 3). 	NA
2152 - read	<ol style="list-style-type: none"> 1. Initiate reread. 2. Wait on next attempt to use device (note 3). 	NA

Notes:

1. Error message will be of the form: 0500000a UNIT CHECK, where a is the device address of the unit in error.
2. Device addresses correspond to the CPU panel CARD I/O indicator numbers.
3. Console error indicator is cleared by pressing OFF LINE, then ON LINE.

Figure 19. HASP/RMTM20 Action On Unit Record I/O Execution Errors

Without the 2152, the program will stop the CPU, with the address of the device in the ESTR register. The operator should (without delay):

1. Note the address of the device in the ESTR register.
2. Press STOP on the indicated device.
3. Press START on the CPU to allow continuation of other functions.
4. Correct the error for "data check."
5. Ready the device for program retry of I/O.

REMOTE TERMINAL RESTART

In the event of an untimely interruption of the remote terminal operation (such as a machine, program, communications, or environmental failure), the remote terminal operator should notify appropriate maintenance personnel of the malfunction, save material, that may be of use in determining the source of the failure, and (with the aid of the central system operator) prepare for restarting the terminal as follows:

1. Notify the central system operator of the failure and, if necessary, request his assistance in preparing for restart.
2. Determine the current job being transmitted to HASP. (The central system operator has a record of the job currently being submitted to HASP.) The job stream (starting with the current job) must be resubmitted to HASP after restart.
3. Determine the loss of data on the output devices and inform the central operator to backspace or restart the printer or punch, as necessary. (The central system's line should be made available for a subsequent session with the remote station or with other stations within the system).
4. When the remote terminal is available, perform the steps required to initiate a remote job processing session.

APPENDIX E

**2780
OPERATOR'S GUIDE**

The IBM 2780 Data Transmission Terminal can connect to a System/370, using HASP to transmit jobs for execution and to receive the printed and punched output from those jobs. The 2780 is an I/O device, controlled much like any other I/O device (when connected to the central computer via telephone lines and an IBM 2701 Data Adapter Unit or an IBM 2703 Transmission Control Unit).

The 2780 consists of at most one printer and one reader/punch. The maximum speeds are 400 cards per minute for the reader, 355 cards per minute for the punch (if only column 1 of each card is punched), and 240 lines per minute for the printer. However, the actual speeds of these devices depend heavily on the speed of the telephone line and on the number of trailing blanks to be printed per line or to be punched per card.

Special features of the 2780, EBCDIC Transparency and Auto Turnaround, are of concern to the operator.

For System/370, EBCDIC is the character and punched-card code normally used. This code allows a card column to be punched in any of 256 different ways. Certain of these punch combinations represent control characters to which the 2780 will respond if it is not in Transparency mode. However, some 370 programs (for example, all assemblers and compilers) punch cards using the complete set of 256 punch combinations. To read these cards into a 2780, the terminal must have the Transparency feature, and the operator must set the mode selection knob to TSM TRSP. As a rule of thumb, always use this setting, rather than the TSM setting, if the 2780 has the EBCDIC Transparency feature.

If the 2780 has the Auto Turnaround feature, a back-lighted pushbutton turns this feature on and off. Auto Turnaround switches the reader/punch automatically from a reader to a punch, while reading in a job; this happens when the reader reads a blank card. Therefore, the operator must be careful when using this feature, that no blank cards are imbedded in the job. The advantage of Auto Turnaround is that no operator intervention is required to start punching the output from a job.

The remaining sections of this appendix discuss normal operating procedures for reading, printing, and punching jobs; the sign-on procedure; error recovery and operational hints. Control cards that can be entered from the 2780 and instructions for entering these cards are described previously under System Input in this manual.

OPERATING PROCEDURES

This section discusses procedures for transmitting jobs to the central computer and for receiving their printed and punched output. Throughout this manual, it is assumed that the 2780 has a reader/punch and a printer (that is, it is a 2780, Model 2). Refer to Establishment of Communication Line for the sign-on procedure.

At any given time, a signed-on 2780 is either reading a job, printing a job, punching a job, or waiting for work. Often, after an operator has read a job (through the 2780), he will disconnect (sign off) the 2780 to save telephone line charges and sign on at a later time to receive his output. There will be printed output for every job submitted; there will be punched output only if the job requires it.

Thus, the normal cycle of a job submitted from the 2780 is: reading the job (transmitting it to the central computer), waiting for it to execute, receiving its printed output, and possibly receiving its punched output.

In the following descriptions, certain time estimates (in seconds) are given. These estimates are based on the default value of a certain variable in the HASP System. The particular installation may have changed this default; if so, the time estimates will be greater or less than specified.

The power-on reset operation is referred to frequently throughout this appendix. Contrary to its name, a power-on reset does not involve the 2780 power on-off switch (on the right side of the 2780); this switch is turned on only once during 2780 operations.

To accomplish a power-on reset, turn the mode selection knob from its current position to any other position; this resets the 2780. If the knob is already in the desired position, turn it to some other position and then back to its current position.

For example, turning the knob from REC to TSM (or from OFFLINE to TSM or from TSM to OFFLINE and back to TSM) is sufficient to do a power-on reset.

Caution: Do not attempt a power-on reset while the printer is printing or while cards are being read or punched.

INITIATING PROCESSING

The following section contains sufficient information to allow the initiation of a remote job stream processing session.

Transmission To The Central Computer

The operator can transmit jobs to the central computer at one of three times:

1. Immediately after sign on.
2. In the pause (a few seconds) after the 2780 has finished printing or punching output from a previous job.
3. When the 2780 is signed on and waiting for work.

The operator cannot interrupt punching of job output to begin transmitting a job. He must not attempt a power-on reset while a job is being printed or punched. The 2780 will not transmit or receive jobs unless it is correctly signed on.

To read a job, the operator should take the following steps:

1. If a job is punching, wait till no cards have been punched for a period of a few seconds.
 - a. Do a power-on reset, leaving the knob at TSM TRSP (or TSM).
 - b. Remove the blank cards from the hopper and the punched cards from the stacker.
 - c. Press NPRO to run the two blank cards out of the feed mechanism.
2. Load the cards to be read into the card hopper. Jobs may be stacked on top of each other.
3. If a job is printing, wait until no lines have been printed for a period of 5 to 10 seconds. Then attempt a power-on reset, leaving the knob at TSM TRSP (or TSM).
4. Turn the mode-selection knob to TSM TRSP (or TSM).
5. Push the END OF FILE button and the START button so the END OF FILE and READY lights come on. Cards should start reading within about 15 seconds.

If cards do not start reading, or if the reader stops before the last card has been read, see Error Recovery When Transmitting. The reader will normally read 2 to 7 cards, pause a bit to transmit them to the central computer, and then read 2 to 7 more.

If the printer is readied during transmission (see Reception From The Central Computer), it will be able to receive after transmission is finished without further intervention.

If a job is printing and the selection knob is in either of the TSM positions, the reader can be readied as in step 5. When the job's printing is finished, card reading and transmission should begin without further intervention.

It may be possible to interrupt printing only to begin transmitting. See Error Recovery When Receiving for details.

Reception From The Central Computer

After a job has completed reading, HASP queues it for execution at the central computer. As the job executes, it may produce printed and punched output. HASP saves these outputs and at the end of the job queues them for processing, usually at the terminal from which the job was read. If the 2780 has been turned off or otherwise disconnected from the computer the sign-on procedure must be followed before output from the job can be received.

When HASP finds that any output device is ready on the 2780, it inspects that remote terminal's output queues in the order punch first, then print. Thus, if the operator is expecting the printer to start, HASP may actually be trying to punch. In this case, the printers READY light and the TERM ADDR light would be on. HASP must be allowed to punch, before it will start printing.

To receive a job's printed output (assuming the 2780 is correctly signed on), the operator should perform the following steps:

1. Make sure the mode-selection knob is at one of the positions: TSM TRSP, TSM, or REC. Do not put the knob in the PRINT position.
2. Press START on the printer.

If the terminal's punch queue is empty and its print queue is not empty, printing should start within about 15 seconds. If the TERM ADDR light comes on when the printer is ready, HASP has found a job to punch, and the operator must ready the punch.

If the printer will not become ready, see Error Recovery When Receiving. Normally the printer should print from 2 to 7 lines, pause a bit to receive more print lines, and print 2 to 7 more lines.

To receive a job's punched output (assuming the 2780 is signed on correctly), The operator should perform the following steps:

1. Make sure the mode-selection knob is set to REC. Do not use the PUNCH setting.
2. Use the NPRO button to clear the card feed.
3. Put blank cards in the card hopper.
4. Press START on the reader/punch, and hold it in until the READY light comes on.

Punching should start within 15 seconds, if there is anything to punch. Possible problems are discussed under Error Recovery When Receiving.

The audible alarm will sound at the end of each job's printed or punched output and will turn off if HASP sends more output or if transmission starts.

ESTABLISHMENT OF COMMUNICATION LINE

Before the 2780 terminal can transmit jobs to or receive printed or punched output from the central computer, the computer must establish a path of communication to the terminal, and must recognize it as a 2780 terminal (rather than, for example, a System 360, Model 20, being used as a terminal). Depending on how the 2780 is connected to the central computer, the operator may or may not have to use a special sign-on control card (/ *SIGNON).

If the terminal is permanently connected to the central computer (probably through private lines leased from the telephone company) the remote operator informs the central operator, who will issue the HASP command:

`$S LNEm`

(where mm is a 1- or 2-digit decimal number). Either the remote operator or the central operator will know the proper line number to use, depending on the installation. When the central operator has given this command and the 2780 mainline switch is turned on, the remote operator may begin to read a job, or to print or punch the output from a previous job.

However, if the 2780 is connected by ordinary switched telephone lines to the central computer, the remote operator can dial a telephone number to establish communications. The remote operator will have a sign-on card and a telephone number to call. He should carefully perform the following steps:

1. Turn on the 2780 mainline switch (it is on the right side).
2. Push the NPRO button on the card reader. Hold it in for a few seconds to make sure the card feed mechanism is clear.
3. Place the sign-on card and the card weight in the card hopper.
4. Turn the mode-selection knob to TSM TRSP (or TSM).
5. Dial the telephone number. (The TALK button on the data phone must be depressed.)
6. Listen for the normal sound of ringing followed by the normal sound of answering. A high-pitched tone of about six seconds duration, will be followed immediately by a short bleep.
7. When the bleep sounds, push the DATA button on the telephone and watch for the DATA SET READY light on the card reader. (Hang up the telephone handset.)

8. When the DATA SET READY light comes on, press the END OF FILE button and the START button, so that the END OF FILE light and the READY light come on. The reader should now read the sign-on card.

The 2780 is now signed on, and reading, printing, or punching may be started.

If the telephone is not answered, the central operator has not issued the command:

`$S LNEm`

or has issued it for the wrong line. He should issue the proper command, and then redial if necessary. If a busy signal is received, the line is of course busy. The operator should redial in a few minutes or try an alternate number, if available.

If the sign-on card is not read, run out the sign-on card, place it in the reader again, attempt a power-on reset, and repeat step 8.

ERROR RECOVERY

A wide variety of problems can occur when operating almost any type of machine, including the 2780. Most problems occur rarely, and many of these problems are not documented here. See the SRL IBM 2780 Data Transmission Terminal - Component Description, form A27-3005 for a more complete description of such problems and for information on how to load paper in the printer, how to fix a card jam, etc.

Most problems encountered will result in lights appearing on the reader/punch or printer control panels. Some of these lights are not error lights: DATA SET READY, the two READY lights, END OF FILE, I/O BFR FULL, CTR 1, CTR 2, CTR 4, and usually LINE. Other lights provide clues to the difficulty and will be discussed in the following two subsections. The first subsection describes errors in transmitting jobs to the central computer; the second subsection describes errors in receiving printed or punched output.

ERROR RECOVERY WHEN TRANSMITTING

TERM ADDR - This light may come on while the operator is readying the card reader. If cards can not be read, the READY light is on, and the TERM ADDR light is on, the operator should follow these steps carefully:

1. Remove the cards from the hopper, and press NPRO to run out the two cards in the feed.
2. Put these two cards in front of the cards removed from the hopper, and place the cards back in the hopper.
3. Attempt a power-on reset.
4. Wait for the TERM ADDR light to come on again. This may take as long as about 10 seconds.
5. Attempt another power-on reset, push END OF FILE, and push START (so the END OF FILE and READY lights come on).
6. Cards should begin reading within 15 seconds. If they don't, and the TERM ADDR light comes on again, repeat the above steps.

If the above steps continue to fail, the operator may have interrupted printing or punching to read a job before the printing or punching of a previous job had completed. He should attempt to ready the printer and punch.

DATA CHECK; DATA CHECK and EQUIP CHECK; DATA CHECK, EQUIP CHECK and PARITY CHECK - The reader could not read a card correctly. The operator should proceed as follows:

1. Remove cards from hopper (not stacker).

2. Push NPRO. Two cards will run out into the stacker. The first of these cards is the bad one.
3. Correct the bad card.
4. Put both cards back in the hopper, followed by the cards removed from the hopper.
5. Push END OF FILE and START so the END OF FILE and READY lights come on.

OVERRUN; PARITY CHECK; PARITY CHECK and EQUIP CHECK; RECORD and LINE - To correct errors when these lights are on, the operator should determine how many cards have been read but not yet transmitted. To make this determination, he should add up the CTR lights. For example, if CTR1 and CTR2 are on, 3 cards have been read but not yet transmitted.

Without removing all the cards from the stacker, the operator should:

1. Remove cards from the hopper.
2. Press NPRO to run out the 2 cards from the feed mechanism.
3. Remove from the stacker the last $n+2$ card, where n is the number of cards read but not yet transmitted.
4. Put these cards back in the hopper, followed by the cards removed from the hopper. Attempt a power-on reset.
5. Press END OF FILE and START so the END OF FILE and READY lights come on.

EQUIP CHECK - A mechanical error has occurred. The operator should use the procedure for DATA CHECK, but it should not be necessary to correct a card.

LINE - The operator should wait a few moments to see if the reader will start reading by itself. If the alarm comes on (in 15 to 45 seconds, depending on 2780 wiring options) and cards are in the stacker, a block of data will be sent twice. In such a case, the operator should (1) ask the central operator to cancel the partially read job and (2) Begin transmission again with the JOB card of the partially read job.

HOPR - No card was fed. The operator should check the edges of the cards at the bottom of the hopper, and repair them if necessary. Then he should put them back, and press END OF FILE and START so the END OF FILE and READY lights come on.

For other combinations of error lights, the operator should consult the 2780 manual. Most other errors involve misfeeds or jams.

ERROR RECOVERY WHEN RECEIVING

Some errors the remote operator may encounter while receiving are self-explanatory, such as END OF FORM (need another box of paper) or FORM CHECK (paper jammed).

In the case of an OVER RUN and INCP error, the operator may have specified the wrong remote number on the sign-on card, and HRJE is attempting to use features the 2780 doesn't have. The remote operator must sign on again, using a correct remote number. If the remote operator uses the same, incorrect number when reading in a job, he should ask the central computer operator to reroute the job output. In any case, the remote operator may have received output that is not his; if so, he must inform the central computer operator.

Other error indicators are described in the following paragraphs.

TERM ADDR - When this indicator is on, the operator should:

1. Push STOP and CHECK RESET on the reader/punch.
2. Make the output device ready.

EQUIP CHECK - The punch has mechanically malfunctioned. The operator should run out and throw away the cards in the feed mechanism, and make the punch ready again.

SYNC CHECK - The printer has erroneously printed a line. When the indicator is on, the operator should:

1. Push STOP.
2. Push RESET (on the printer).
3. Push the START button on the printer. A duplicate print line will be output.

PARITY CHECK - If the printer was printing, the operator should attempt a power-on reset and push the START button on the printer. Some duplicate print lines may be output.

If the punch was punching, he should:

1. Remove cards from hopper (not stacker).
2. Press NPRO to run out the two cards in the feed mechanism.
3. Throw away the N+K last cards stacked. N is the number represented by the CTR lights; for example, if CTR 1 and CTR 2 are lit, N is 3, and if all CTR lights are off, N is 0. K is:
 - a. 2, if all CTR lights are off and the I/O BFR FULL light is on
 - b. 1, if some or all CTR lights are on and the I/O BFR FULL light is on.
 - c. 2, if the I/O BFR FULL light is off.

4. Reload blank cards in the hopper, and make the punch ready.

Most other errors are jams or misfeeds. The 2780 manual gives instructions on how to fix these problems.

Depending on the central HASP System installed, actions during printer only error recovery may be somewhat different than described previously. If this altered mode of printer operation is applicable, when the remote operator makes the printer ready after any of the previous printer stops the job that was printing will be suspended, a message and terminal separator line(s) will be printed, and the job will be requeued in the print queue for the terminal. The operator can force this suspend action himself by pressing STOP while printing and by readying the printer.

Actions after the printer suspend depend on the state of the terminal and the output queues. The operator may start transmission or wait for more output. Print jobs of higher priority than the suspended job (or any punch jobs) will be received before the suspended job. When the suspended job resumes printing, it will do so at approximately one page prior to the page of interruption.

OPERATIONAL HINTS

Operator commands, output device control, and special forms processing have been discussed previously in this manual. However, certain properties of terminals like the 2780 require more explanation of these two topics.

Certain commands that control output devices (\$B, \$C, \$E, \$F, \$I, \$N, \$Z) actually refer to a job currently processing on that device, which is to be backspaced, restarted, etc. When the operator submits commands from the 2780, no output devices are active; therefore, these commands have no effect, even after a print job is suspended. The suspend function is equivalent to \$I, which includes the function of \$B. To use the other commands, the remote operator must ask the central operator to enter them.

The \$S, \$P, and \$T device commands are effective when submitted from the 2780 terminal. Furthermore, the \$C command is effective when referring to a job rather than a device. The \$H, \$A, and \$R commands may also be used effectively.

Special forms for printed or punched output can effectively be controlled from the 2780 terminal without central operator assistance, if all jobs submitted from (or routed to) the terminal follow certain conventions in requesting special forms. Programmers should be required not to use special forms requests for SYSOUT=A data sets, if the demand setup option was generated. Otherwise, any valid print class is acceptable. Special print forms for an entire job may be requested in the HASP accounting field of the JOB card. Violation of the SYSOUT=A rule will require central operator assistance to enter a \$S command when the terminal is in receive mode.

Assuming these conventions, the operator should periodically submit the \$DF command to determine if special forms jobs are queued for output at the terminal. If so, he should select the type of forms (from those queued) to be processed first on each output device, mount those forms, enter a "\$T device, f=forms#" command for each device, and wait for printing and/or punching to occur. When jobs stop processing on a device, the operator should resubmit the \$DF command and change to new forms if indicated. The set parameter F=AUTOM or automatic printer mode should never be used; the F=form# or operator-controlled mode should be used instead.

The operator can use the \$P and \$S device commands, prior to and after the \$T command, to prevent HASP from attempting to send an output job, while he is changing forms.

APPENDIX F

**2770
OPERATOR'S GUIDE**

The IBM 2770 Data Communication System can connect to a System/370, using HASP to transmit jobs for execution and to receive the printed and punched output from those jobs. The 2770 is an input/output device, controlled by HASP like any other input/output device (when connected to the central computer via telephone lines and an IBM 2701 Data Adapter Unit or an IBM 2703 Transmission Control Unit).

The 2770 system may have a wide variety of I/O devices attached. However, when operating the 2770 with HASP, the operator will be concerned only with the standard keyboard and, if attached, the card reader, printer, and card punch. These devices (mechanical features, speeds, etc.) are described in the SRL System Components: IBM 2770 Data Communication System, form A27-3013. Actual speeds at which these devices will operate, when communicating with HASP, depend on the type of telephone line used and the amount of information in each line or card to be transmitted or received (as well as the devices' mechanical speeds, given in the SRL).

Certain special features of the 2770 are of concern to the 2770 operator. One of these features is EBCDIC Transparency. For System/370, EBCDIC is the character and punched-card code normally used. This code allows a column of a punched card to be punched in any of 256 different ways. Certain punch combinations correspond to control characters to which the 2770 will respond if it is not in Transparency mode. However, some 370 programs (for example, all assemblers and compilers) punch cards using the complete set of 256 punch combinations (for example, object decks). To read these cards into a 2770 or receive such cards from the central computer for punching at the 2770, the Transparency feature must be present.

The Buffer Expansion or Additional Buffer Expansion features affect device performance and the amount of information that can be sent to HASP in a single transmission from the keyboard.

The Keyboard Correction feature, if present, facilitates error correction in keyed data before transmission to HASP.

Subsections of this appendix discuss switch setup; communications establishment; normal operating procedures for reading, printing, and punching jobs; error recovery; and operational hints. Control cards that can be entered from the 2770 and instructions for entering those cards are described previously in this manual under System Input.

SWITCH SETUP

During all 2770 operations with HASP, certain console switches should be set as follows:

1. JOB SELECT - VARIABLE SELECT
2. INPUT KEYBOARD, 2 (card reader) - both up
3. OUTPUT PRINTER, 2 (card punch) - both up
4. DIRECT DATA OUTPUT PRINTER - up
5. TERM MODE - LINE
6. SELECTION REQD - up
7. ANSWER - MANUAL
8. MONITOR PRINT - as desired by installation, normally down
9. Any of above which refer to devices not on the 2770 - down
10. All other VARIABLE SELECT switches - down.

During installation, the 2770 may have been provided with the equivalent of all the above switch settings at one of the five job positions on the JOB SELECT switch. If so, simply set to that position and ignore all VARIABLE SELECT switches. When power is on, console lights will show the settings that are in effect.

The 2770 card reader may be attached to the INPUT 3 position rather than to INPUT 2. Simply set the INPUT 3 switch, instead of INPUT 2, up.

The TRANSPCY switch should be set down, except when used for transmitting EBCDIC card decks that use all 256 possible punch combinations.

ESTABLISHMENT OF COMMUNICATIONS

Before the 2770 terminal can transmit jobs to or receive printed or punched output from the central computer, the computer must establish a path of communication to the terminal and must recognize it as a 2770 terminal (rather than, for example, a System/360, Model 20, being used as a terminal). Depending on how the 2770 is connected to the central computer, the remote operator may or may not have to use a special sign-on control card.

If the terminal is permanently connected to the central computer (probably through private lines leased from the telephone company) the remote operator must inform the central operator, who will issue the HASP command:

```
$S LNEM
```

(where mm is a 1- or 2-digit decimal number). Either the remote operator or the central operator will know the line number to use, depending on the installation. Once the central operator has given this command and the 2770 POWER ON switch is turned on, the remote operator may begin to read a job, or to print or punch the output from a previous job.

However, if the 2770 is connected by ordinary switched telephone lines to the central computer, the remote operator should dial a telephone number to establish communications. He will have a sign-on card and a telephone number to call. To establish communication, the following steps should be taken:

1. Turn on the 2770 POWER ON switch.
2. Push the STOP button, then the NPRO button, on the card reader. Hold the NPRO button in for a few seconds to make sure the card feed mechanism is clear.
3. Place the sign-on card and the card weight in the card hopper.
4. Dial the telephone number. (The TALK button on the data phone must be depressed.)
5. Listen for the normal sound of ringing, followed by the normal sound of answering. A highpitched tone of about six seconds duration will be followed immediately by a short bleep.
6. At the sound of the bleep, push the DATA button on the telephone. The DATA SET READY light on the console should come on. (Hang up the telephone handset now.)
7. Press TERM RESET on the console, turn the card reader EOF switch on, and push the card reader START button to run the sign-on card into the card feed.

8. Press the START button on the console; the BID light should come on. Momentarily, the card reader should read the sign-on card and move it into the stacker.

The 2770 is now signed on, and the operator may begin reading, printing, or punching.

If the telephone is not answered, the central operator has not issued the command:

```
$S LNEm
```

or has issued it for the wrong line. He should issue the proper command, and the remote operator should redial, if necessary. If instead of ringing, a busy signal is received, the line is, of course, busy. The remote operator should redial in a few minutes or try an alternate number, if available.

If the sign-on card will not read, the remote operator should run out the sign-on card, place it in the reader again, and repeat steps 7 and 8.

If the attempt to establish communications is still unsuccessful, the central computer operator should verify that the remote operator has the correct sign-on card and telephone number and that the line has been started correctly.

OPERATING PROCEDURES

The next two sections discuss procedures for transmitting jobs to the central computer and for receiving printed and punched output. The 2770 will not transmit or receive jobs unless the remote operator has correctly signed on.

At any given time, a signed-on 2770 is either reading a job, printing a job, punching a job, or waiting for work. Often, after an operator has read a job through the 2770, he will disconnect (sign off) the 2770 to save telephone line charges and sign on at a later time to receive his output. There will be printed output for every job submitted; there will be punched output only if the job requires it.

Thus, the normal cycle of a job submitted from the 2770 is: reading the job (transmitting it to the central computer), waiting for it to execute, receiving its printed output, and possibly receiving its punched output.

In the following descriptions, certain time estimates in seconds are given. These are based on the default value of a certain variable in the HASP System. A particular installation may have changed this default; if so, time estimates will be greater or less than specified.

TRANSMISSION TO THE CENTRAL COMPUTER

The 2770 can transmit jobs to the central computer only if signed on and not busy printing or punching. However, the remote operator can make it ready to transmit, any time it is signed on. Punching can not be interrupted to transmit a job. TERM RESET must not be pressed, while a job is being printed or punched. If it is pressed accidentally, a line restart (described later in this appendix) must be attempted.

To transmit job(s), the operator should take the following steps:

1. Push the card reader STOP button, and then press the NPRO button to clear the feed.
2. Place one or more jobs in the hopper of the card reader. Jobs may be stacked.
3. Push card reader START to run cards into the feed. The INPUT 2 light on the console should stop blinking and should come on steady, indicating that the card reader is ready. Turn on the reader EOF switch if all the cards to be transmitted fit in the hopper.
4. Turn on the console TRANSPCY switch, if required by the cards to be transmitted. (See previous discussion.)

5. Press the START button on the console; the BID light should come on.
6. If the 2770 is printing or punching, it will continue, until the end of the current job. Then, or when START is pressed (if the terminal is idle), the 2770 will ask permission to transmit. When the central computer answers affirmatively (within 15 seconds), the BID light should go out and cards should begin reading into the stacker.

If the operator adds more cards, he must be sure to turn on the reader EOF switch, when all cards to be transmitted are in the hopper. If the hopper becomes empty in the middle of a job's input, the remote operator must not have the EOF switch on.

STACKER UNLOAD, on the card reader, halts reading temporarily to facilitate removing cards from the stacker or adding more cards to the hopper. The operator can push reader START to continue or can wait for the reader to automatically continue in 30 seconds.

The keyboard can be used to transmit short jobs or control cards alone, or it can be used to transmit typed cards stacked prior to other cards read from the card reader in a single transmission.

To use the keyboard, the operator should:

1. Wait until the current job, if any, is finished printing or punching.
2. Turn off the TRANSPCY switch.
3. Press TERM RESET on the console and KEY REQ on the keyboard. The console PROCEED light should come on.
4. Type in one or more lines as if they were cards of 80 or less columns. Use the END CARD key to end each card.
5. Press the ENTER key to transmit what was typed. The PROCEED light should go out and the BID light should come on and then go out when transmission is complete.

The keyboard transmits letters in lower case unless the upshift key is depressed. The upshift key transmits letters as they would be transmitted if keypunched on cards.

Keyed information should appear on the printer as it is typed. If mistakes are made, the procedure must be repeated from step 3, and everything must be retyped. The SRL (page 2772-24) describes a better correction procedure if the Keyboard Correction feature is present.

The operator may use the keyboard, instead of the card reader, to transmit the sign-on card in the procedure described previously.

To transmit the keyed cards in front of those read from the card reader, the operator must follow steps 1 through 4 and then, instead of step 5, must follow the previously described procedure for the card reader.

Keyed information is always transmitted in nontransparency, therefore, cards following keyed information must also be transmitted in nontransparency.

The maximum number of cards that can be transmitted from the keyboard in a single transmission is two, without the Buffer Expansion feature. With the feature, a variable number of cards (up to the capacity of two 256-character buffers) can be transmitted. The Additional Buffer Expansion feature provides two 512-character buffers. In either case, when the limit is reached, the keyboard locks after the END CARD key is pressed. The operator must then cause transmission with ENTER, or START (if transmitting from the card reader after keying as described above).

It may be possible to interrupt printing only to begin transmitting as described later under Error Recovery When Receiving.

RECEPTION FROM THE CENTRAL COMPUTER

After a job has completed reading, HASP queues it for execution at the central computer. As the job executes, it may produce printed and punched output. HASP saves these outputs and, at the end of the job, queues them for processing (usually on the terminal at which the job was read). The operator may have turned off the 2770 or otherwise disconnected it from the computer; if so, he must follow the sign-on procedure before he can receive output from the job.

When HASP finds that any output device on the 2770 is ready, it inspects that remote terminal's output queues in the order punch first, then print. Thus, if the operator is expecting the printer to start, HASP may actually be trying to punch.

The 2770 will receive either printed or punched output from the central computer (if HASP has output to send, if the terminal is not transmitting, and if the output devices are ready). The operator should always have the printer and punch ready, even when transmitting, so the 2770 can automatically begin receiving when transmission is finished.

The printer is ready if it is loaded with forms, if it has a correct carriage tape, if the carriage is engaged, if the type bar properly installed (2203 only), if the cover is closed, and if the printer START has been pressed (2203 only). In the case of a 2203 printer, the INHIBIT IRS switch should be off when operating with HASP.

To ready the card punch, the operator must turn the power on, place blank cards in the hopper, set the punch keyboard switch to KEY PCH, place a card with Ds punched in columns 2-80 on the program drum and lower the star wheels, press the FEED key twice and the RELEASE key once, and then set the switch to AUTO PCH. The AUTO light should come on and the CHECK light on the card punch should go out. See the SRL (pages 545-11, 12, 18) for more details.

Blinking OUTPUT PRINTER or OUTPUT 2 lights on the console indicate that these devices are not ready. After making the devices ready, it may be necessary for the operator to press CHECK RESET and START on the console to make the lights stop blinking and the devices ready to receive.

Printed and punched output jobs will be separated by separator pages or cards, respectively; the separator pages and cards are described previously under System Output.

ERROR RECOVERY

A wide variety of problems can occur when operating almost any type of machine, including the 2770. Some problems occur only rarely and are not documented here. See the SRL System Components: IBM 2770 Data Communication System, Form A27-3013, for a description of any problems encountered which are not discussed in this guide: the SRL also describes how to load paper in the printer, how to fix a card jam, etc.

In general, there are three levels of error recovery that the operator may have to perform, depending on the severity of the error. They are:

1. Fix the difficulty (I/O device not ready, check condition, etc.) and continue. See the following two subsections for the most common examples.
2. Restart the job when the possibility of incorrect or lost data exists; this requires the assistance of the central computer operator. Job restart procedures for both transmitting and receiving are described in the following two subsections.
3. Restart the line when job restart is unsuccessful or any time it is necessary to press TERM RESET to clear a check condition during printing or punching. The operator should tell the central computer operator to issue the HASP command:

\$E LNEm

and then reestablish communications as previously described. Incomplete input or output jobs are handled as described for job restart in the following two subsections.

If line restart fails to establish successful operation, the 2770 operator probably has a hardware and/or software problem, which should be analyzed by the installation's systems personnel and IBM Customer Engineers.

Most problems encountered will result in lights appearing on the 2770 console or the I/O devices themselves. Some of these lights are not error lights: DATA SET READY, CARRIER OFF, DATA IN BUFFER, LINE MODE, PROCEED, BID, SELN REQD, TRNSPCY, MANUAL ANSWER, and any of the I/O device lights when on steady. Any I/O device light that is blinking indicates that the device is not ready. Other lights provide clues to the difficulty and will be discussed in the following two subsections.

ERROR RECOVERY WHEN TRANSMITTING

If job restart is required while transmitting, the OS job that is only partially read into the 2770 must be reread from the beginning. The 2770 operator should ask the central computer operator to issue the HASP command:

\$C RMnn.RD1

to delete the partially read job. He should then press TERM RESET, load the hopper beginning with the JOB card of the incompletely read job, and push reader START and console START.

Any card reader trouble while transmitting is indicated by a blinking INPUT 2 or INPUT 3 light. The following lights on the card reader may further indicate the type of trouble. Operator action for each light is also indicated.

FEED CHECK - The bottom card in the hopper failed to feed. Remove hopper cards. Push NPRO. Repair bottom hopper card, if necessary, and make sure the feed throat is clear. Reload cards. Push reader START and console START.

ATTENTION - Full stacker, empty hopper with EOF off, and cover open are possible causes. Correct, and push reader START and console START.

READ CHECK or **VALIDITY CHECK** - Last card was read incorrectly due to invalid or off punching or read station jam. The last card in the stacker (if no jam) and the following card (run out by NPRO after hopper cards are removed) must be re read. After appropriate correction, place these two cards at the front of the cards in the hopper, and push reader START and console START. If a jam is so severe that the order of cards or the last card read is not clear, attempt a job restart.

HASP retries all transmission line errors automatically until transmission is successful; however, certain console lights may indicate necessary action by the operator as follows.

TERMINAL ADDRESS - HASP is trying to send output while the operator is trying to start an input function. Continue input procedure (e.g., typing) until the BID light is on. Then, press CHECK RESET, and wait for input to begin. Press CHECK RESET if TERMINAL ADDRESS comes on again. If the operator is not able to initiate the input function, he may have interrupted an incomplete output function. He should make his output devices ready to accept the output and wait until the end of the next output job to again attempt transmission.

BID ENTRY - HASP has failed to respond to the 2770 within 15 to 45 seconds (depends on 2770 wiring option). If any cards are in the stacker, a duplicate block of data will probably be sent. The job restart procedure given previously should be followed.

INPUT CHECK, BUFFER CHECK, TRNSPCY CHECK - With these serious errors the operator should always attempt a job restart. He should make sure that he has turned on the TRNSPCY switch if the job contains OS object decks or other cards requiring transparent transmission.

RECORD CHECK or **LINE CHECK** - These lights may come on while HASP is attempting retransmissions for line errors and will go out if recovery is successful. If the lights stay on and transmission does not proceed, the operator should attempt a job restart.

ERROR RECOVERY WHEN RECEIVING

If job restart is required while receiving, the operator can cause HASP to begin printing or punching the current, partially completed job from its beginning. The 2770 operator should ask the central computer operator to issue the HASP command:

\$E RMn.PR1 or \$E RMn.PU1

to cause the restart. The 2770 operator should also ready his output devices, press CHECK RESET in the normal manner, and discard the partially completed output beginning with the last previous separator page or separator card. For printing only he may ask the central operator to issue the HASP command:

\$B RMn.PR1

instead. Only the few duplicated pages should be discarded in this case. TERM RESET should not be pressed when doing a job restart while receiving. If TERM RESET is required to clear a check condition, a line restart is required.

Output device trouble is indicated by blinking OUTPUT PRINTER or OUTPUT 2 lights and lights on devices as follows:

CARRIAGE CHECK (2213), FORM CHECK (2203), END OF FORM (2203), CARRIAGE INTERLOCK (2203) - The printer carriage, forms, or carriage tape are not ready or jammed. Correct the condition, press RESET (2203), console CHECK RESET, START (2203), and console START.

PRINT CHECK (2213), other CHK lights (2203) - The printer had a parity error or other hardware malfunction. See the SRL to interpret CHK lights. Press RESET (2203), console CHECK RESET, START (2203), and console START. Failure to recover indicates hardware trouble.

After any of the above printer recoveries, duplicate lines may be printed because HASP's recovery programming is designed to prevent loss of data at all costs. For most applications, these duplicate lines are obvious and may simply be crossed out or ignored. For more sensitive applications, the operator can use the backspace procedure described previously, which will make it easier to discard duplicate output at page or document boundaries.

CHECK light or any "card punch not ready" condition - Hopper empty, stacker full, or jams are possible causes. Set the keyboard switch to KEY PCH. Remove all cards from the stacker or eject station just below the stacker, if any. Discard all removed cards after the last one with a column 81 punch. Clear the entire card feed path. With blank cards in the hopper, press the FEED key twice and the RELEASE key once; then, set the switch to AUTO PCH. Press console CHECK RESET and START. The first card through the feed after recovery will be blank and should be discarded.

As with printing, there is a high probability of duplicate output following the punch error recovery described above. If duplicate punched output occurs, a whole 2770 internal buffer full of cards will

be duplicated. The first full buffer punched after recovery consists of the cards coming into the stacker up to and including the first one with a column 81 punch. These cards (may be as few as one) should be compared with the same number of cards from the bottom of those removed from the stacker. If each card is an exact duplicate, the operator should discard the second group. If the application is such that a duplicated group of cards could occur as part of the intended punched output, a job restart should be attempted, and all of the partially completed job's punched output should be discarded.

Certain console lights may require operator attention while receiving, as follows.

TERMINAL ADDRESS - HASP is trying to send output but the 2770 is not ready. Make sure the switch setup is correct, ready all output devices, and press console CHECK RESET.

OVERRUN - This usually indicates that features on the 2770 were not specified correctly at the central computer or that the operator has signed-on using the wrong remote number. The operator may have submitted jobs previously using this wrong number; if so, these jobs will need to be rerouted to the correct number. He may also have received output that is not his. He should ask the central operator to help him correct his confusion and should attempt a line restart, so he can sign-on using the correct number.

BUFFER CHECK - This serious hardware error will always require a line restart.

LINE CHECK - HASP is attempting retransmissions. If they are successful, the light will go out. If the light stays on and printing or punching does not continue within a short time, the operator should attempt a job restart.

Depending on the central HASP System at the installation, actions during printer only recovery may be somewhat different than described previously. If this altered mode of printer operation is applicable to the 2770, when the operator makes the printer ready after any of the above stops, the job that was printing will be suspended, a message and terminal separator line(s) will be printed, and the job will be requeued in the print queue for the terminal. The operator can cause this suspend action himself by pressing STOP on the 2213 or CARRIAGE STOP on the 2203 while printing and then by readying the printer.

With a 2203, the operator may press the STOP key to make minor carriage adjustments without causing a suspend, if he readies the printer within 34 seconds or periodically presses STOP, CARRIAGE SPACE, or CARRIAGE RESTORE to extend the 34 seconds period.

Actions after the printer suspend depend on the state of the terminal and the output queues. The operator may start transmission as described previously or he may wait for more output. Print jobs of higher priority than the suspended job, or any punch jobs, will be received before the suspended job. When the suspended job resumes printing, it will do so at approximately 1 page prior to the page of interruption.

OPERATIONAL HINTS

Operator commands, output device control, and special forms processing have been discussed previously in this manual. However, certain properties of terminals like the 2770 require more explanation of these two topics.

Certain commands that control output devices (\$B, \$C, \$E, \$F, \$I, \$N, \$Z) actually refer to a job currently in active processing on the device that is to be backspaced, restarted, etc. When the operator submits commands from the 2770, no output devices are active; therefore, these commands have no effect. This is true even after the operator suspends a print job as previously described. The suspend is functionally equivalent to \$I, which includes the function of \$B. To use the other commands, the operator must ask the central operator to enter them.

The \$S, \$P, and \$T device commands are effective when submitted from the 2770 terminal. Furthermore, the \$C command is effective when referring to a job rather than a device. The \$H, \$A, and \$R commands may also be used effectively.

Special forms for printed or punched output can effectively be controlled from the 2770 terminal without central operator assistance, if all jobs submitted from (or routed to) the terminal follow certain conventions in requesting special forms. Programmers should be required not to use special forms requests for SYSOUT=A data sets, if the demand setup option was generated. Otherwise, any valid print class is acceptable. Special print forms for an entire job may be requested in the HASP accounting field of the JOB card. Violation of the SYSOUT=A rule will require central operator assistance to enter a \$S command when the terminal is in receive mode.

Assuming the above conventions, the operator should periodically submit the \$DF command to determine if special forms jobs are queued for output at the terminal. If so, the operator should select the type of forms (from those queued) that he desires to process first on each output device, mount those forms, enter a command "\$Tdevice,F=forms#" for each device, and wait for printing and/or punching to occur. When jobs stop processing on a device, the operator should resubmit the \$DF and change to a new forms, if indicated. The set parameter F=AUTOM or automatic printer mode should never be used; the F=form# or operator-controlled mode should be used instead. The operator may want to use the \$P and \$S device commands, prior to and after the \$T command, to prevent HASP from attempting to send an output job while he is changing forms.

APPENDIX G

**SYSTEM/3
OPERATOR'S GUIDE**

The HASP System/3 Remote Terminal Processor program is a member of the family of HASP MULTI-LEAVING terminal programs. It is a stand-alone, self-loading, customized program that enables any System/3 with at least a Binary Synchronous Communications Adapter, a 5424 Multi-Function Card Unit, and a 5203 Printer to be used as a HASP MULTI-LEAVING terminal.

The following subsections contain operating procedures, error recovery procedures, and specifications for certain optional HASP Remote Job Entry and HASP System/3 control cards. Since each System/3 Remote Terminal Processor is custom-generated, not all of the features described here may be in a particular System/3 Remote Terminal Processor.

REMOTE TERMINAL PROCESSOR

The HASP System/3 Remote Terminal Processor supports most devices that can be attached to the System/3. Certain devices must be present:

1. A 5424 Multi-Function Card Unit, or a 1442 Card Reader-Punch
2. A 5203 Printer, with any features, or a 1403 Printer
3. A Binary Synchronous Communication Adapter with EBCDIC code and point-to-point network attachment.

The following devices need not be present but will be supported if they are present and specified at the time of generation of the System/3 program:

1. A 5471 Printer-Keyboard, as an operator's input/output console
2. A 5475 Data Entry Keyboard, as an operator's input console
3. A 1442 Card Reader-Punch, as an 80-column card reader/punch.

OPERATING PROCEDURES

This subsection describes normal operating procedures for the System/3 as a Remote Job Entry terminal. Operation generally consists of:

1. Loading the Remote Terminal Processor program
2. Signing on
3. Operating the various System/3 devices to send jobs and receive their output
4. Signing off.

Although this program does not operate under the IBM System/3 Card System, refer to the IBM System/3 Card System Operator's Guide (Order Number GC21-7513) for extended information on some phases of operation.

INITIATION OF A REMOTE JOB STREAM PROCESSING SESSION

To start a Remote Job Entry session, the operator should: load the HASP Remote Terminal Processor (HASP/RTPSYS3) program deck, establish a connection between System/3 and the central computer, and sign on.

The HASP/RTPSYS3 program deck is either a deck of 96-column cards or a deck of 80-column cards.

To load the 96-column load deck:

1. Put the deck in the rightmost card hopper of the MFCU.
2. Hit START on the MFCU.
3. Hit PROGRAM LOAD on the System/3. (For disk systems, the program load selection knob must point to MFCU.)
4. Hit START on the printer.

To load the 80-column load deck:

1. Raise the CE Controls cover on the System/3.
2. With the CE Mode Selector at PROCESS, hit SYSTEM RESET.
3. Turn the CE Mode Selector to ALTER STOR.
4. Set the data knobs to C2, and hit START once.
5. Set the data knobs to 01, and hit START once.
6. Set the data knobs to 00, and hit START once.

7. Set the data knobs to 00, and hit START once.
8. Set the data knobs to 31, and hit START once.
9. Set the data knobs to 54, and hit START once.
10. Set the data knobs to 00, and hit START once.
11. Set the data knobs to 03, and hit START once.
12. Set the data knobs to F3, and hit START once.
13. Set the data knobs to 51, and hit START once.
14. Set the data knobs to 01, and hit START once.
15. Set the data knobs to F1, and hit START once.
16. Set the data knobs to 52, and hit START once.
17. Turn the CE Mode Selector to PROCESS.
18. Hit SYSTEM RESET.
19. Close the CE Controls cover.
20. Put the 80-column load deck in the 1442.
21. Hit START on the 1442, the printer, and the System/3.
Cards should begin reading.
22. When the 1442 ready light goes out, again push START on the 1442.

Midway through the program deck, the reader will stop reading and the printer will start printing the HASP Environmental Recording and Editing Program (HEREP), a standard feature of RTPSYS3. The information printed is the content of certain error counters; these counters contain a record of the unit checks that occurred during the last remote terminal session. If the counters are destroyed, one line will be printed:

HEREP COUNTERS HAVE BEEN ALTERED.

In any case, program loading will automatically resume after printing is complete.

Program loading has completed satisfactorily if, when cards stop reading, the console indicator DT TERM READY is on and the hopper is empty (or the first card in the hopper is not EOR or /*SIGNON; jobs or blank cards may be stacked behind the program deck). If DDT TERM READY is not on, the last card of the program deck was not EOR or /*SIGNON, or a card read error occurred. To correct a card read error, follow the procedure under halt code F3 in the IBM System/3 Card System Operator's Guide, make the hopper ready, and depress the START key (on dual-programming systems, the PROGRAM LEVEL ONE HALT RESET key) if halt code F3 is displayed.

IF DT TERM READY is lit and the hopper contains an EOR or /*SIGNON card, the operator should remove the cards from the primary hopper and push STOP and then NPRO on the reader. The card that was stacked when he pushes NPRO is either an EOR or a /*SIGNON card. He should reload the program deck, making sure that it ends with either the correct /*SIGNON card or a single EOR card.

Step 2 of initiating a remote session is establishing a connection between System/3 and the central computer. The operator at the central computer should already have issued the HASP command \$START LNEEn, where LNEEn is the communication line to which the System/3 is permanently connected (point-to-point nonswitched) or corresponds to the telephone number he will dial (point-to-point switched).

If the communication line is nonswitched, the operator should make sure that any controls on the line's data set are in the DATA position. The System/3 will automatically establish communication with the central computer.

If the communication line is switched, the operator should pick up the data set's telephone handset and depress the data set's TALK button. He then dials the telephone number he has been given and listens for the ring. When the ring is answered (automatically by the central computer) he will hear a high-pitched tone, followed by silence. He then depresses the data set's DATA key and hangs up the handset. The System/3 will initiate communications with HASP and will automatically send it the /*SIGNON card. As the /*SIGNON card is being sent, the message:

COMMUNICATION ESTABLISHED

will print on the 5471 Printer-Keyboard and on the 5203 Printer (if the 5203 is ready).

If the System/3 has the Auto-Call feature and the /*SIGNON card (or the default /*SIGNON card, if not overridden) specifies a telephone number, the operator must leave the data set in AUTO. The System/3 will automatically dial the required telephone number. When the number answers, the System/3 will automatically sign on.

If the call is not answered, or if the System/3 halts with halt code CA (call aborted) while trying to auto-call, the trouble is most likely that the operator dialed or specified on the /*SIGNON card an incorrect telephone number, or that the central operator did not start the correct line.

An auto-call halt CA can occur if the called number is busy. In that case, the operator should depress the console START (or PROGRAM LEVEL ONE HALT RESET) key to redial or should redial manually.

REMOTE JOB STREAM PROCESSING

During remote job stream processing, the operator is concerned with operating the unit record devices to submit jobs to the central computer

and receive their printed and punched output. Each job goes through four phases - reading, execution, printing, and punching.

Reading

The operator places into a card hopper (either 5424 or 1442 card reader) a stack of one or more jobs and makes the card hopper ready. The system reads the first card, finds it to be nonblank, and requests from HASP permission to start sending a job stream. When the system receives permission from HASP, it continues reading cards and sending them to HASP.

If the operator is reading from the 5424, he may use either card hopper to read. The last card of his stack of jobs must be a /*EOF card (the characters /*EOF punched into columns 1-5); this card instructs the system to send to HASP an end-of-job-stream indicator and to make the card hopper dormant.

If the operator is reading from the 1442, he ends the job stream by pressing START when the hopper is empty. No special considerations apply to preparing or reading 80-column cards.

Each job submitted to HASP should be in the format of standard OS JCL. That is, it should consist of one JOB card followed by one or more EXEC and DD cards, and possibly by input stream data sets.

Execution

When HASP receives the last card of a job from System/3, it queues the job for OS execution. In due time, OS completes the job, and HASP queues its printed output for transmission back to the remote terminal. (However, the \$ROUTE operator command or the /*ROUTE control card may be used to change the destination of printed or punched output, or both.) The execution process happens automatically, and the operator is not normally concerned with it.

Printing

The operator need only press START on the printer to allow print to occur; once a job has completed execution, printing starts automatically. The normal JCL specification for printed output is SYSOUT=A.

Some print data sets may require special forms; the programmer specified a 1- to 4-digit forms number on his DD card (e.g., SYSOUT=(A,,1234) is the specification for forms type 1234). When special forms are to be mounted, the operator will receive the message:

```
JOB j  SETUP--prt device--F=ffff--C=cccc--T=tttt
```

either on the 5203 or on the 5471. He should mount the forms and type the command:

\$S RMnn.PR1

where nn is the same as in the SETUP message, or he should put into an available hopper the two cards:

```
/*$S RMnn.PR1
/*EOF
```

When a job's printed output is complete, HASP queues that job's punched output (if any) for processing. Though a job may not have punched output, it will always have printed output.

Punching

The operator must load an available hopper with blank cards and make it ready. Once a job has completed execution, punching starts automatically. The normal specification for punched output is SYSOUT=B.

Some punch data sets may require special forms; the programmer specified a 1- to 4-digit card forms number on his DD card (e.g., SYSOUT=(B,,9876) is the specification for forms type 9876). When special cards are to be loaded, the operator will receive the message:

```
JOB j  SETUP--pun device--F=ffff
```

either on the 5203 or on the 5471. He should run out the card path, load cards of the type indicated, and type the command:

\$S RMnn.PUn

where nn and n are the same as in the SETUP message, or he should put into an available hopper the two cards:

```
/*$S RMnn.PUn
/*EOF
```

Notes On The 5424

1. Either hopper of the 5424 can be used as a reader or a punch. When a previously dormant 5424 hopper reads a nonblank card, it becomes a reader. It remains a reader until it reads a /*EOF card; then it goes dormant with the /*EOF card in the wait station.
2. When a previously-dormant 5424 hopper reads a blank card, it becomes a punch. It remains a punch until it has completed punching all jobs queued for it. If no jobs are queued for it, the operator can make the hopper dormant by removing the blank cards from it.
3. The 5424 can read cards much faster than it can punch cards; therefore, to increase card throughput, the system performs card reading preferentially over card punching. When using both hoppers, one as a reader and one as a punch, punching will tend to proceed intermittently.

4. Though the 5424 has two hoppers, it has only one card path. For error recovery reasons, the system ensures the card path is empty before switching hoppers. Therefore, if the operator is using both hoppers as readers, or both as punches, the system will tend to process cards from one or the other of the hoppers, rather than dividing its time evenly between them.
5. Each blank card to be punched is read before it is punched, to make sure it is blank. A card that is not blank is stacked in the read stacker for the hopper from which it came.
6. Stacker selection is as follows:

<u>Condition</u>	<u>Stacker</u>
Reading from primary	1
Punching from primary	2
Punching from secondary	3
Reading from secondary	4

7. When preparing 96-column cards for the job stream, either as JCL or as data, the operator should avoid punching column 81, since the system makes special use of this column. In any case, the system only transmits the contents of columns 1-80; columns 82-96 are completely ignored. If the RMTGEN parameter &S30BJDK was set to 1, the system inspects column 81. If that column contains the character "1", the system assumes that the card contains a hexadecimal image of the first 40 bytes of an 80-column card. It reads the next card, checks for a "2" in column 81, combines the cards into an 80-column card image, and transmits the card image. No checks are made for validity of hexadecimal characters. If a "2"-card does not follow a "1"-card, the "1"-card is lost.
8. Programmers should be aware of certain punching restrictions on the 5424. For all systems, if column 1 is X'6A' (12-11 punch on an 80-column card) the system recognizes a HASP job separator card, extracts the job number to punch a System/3 job separator card, and ignores the rest of the card. If during RMTGEN the value of &S30BJDK was specified as 1, then the system recognizes a card image of an OS object deck and punches two 96-column cards with a hexadecimal representation of the card; see Note 7 above. If, during RMTGEN, the value &S396COL was specified as 1 and if column 73 is X'80' (12-0-1-8 punch on an 80-column card), the system recognizes the left 48 columns (if column 80 is odd) or the right 48 columns (if column 80 is even) of a 96-column card; in this way all 96 columns of a System/3 card can be punched. This feature is used to create the System/3 Remote Terminal Processor program deck, which is punched in System/3 load mode.

Notes On The 1442

1. When a previously-dormant 1442 reads a nonblank card, it becomes a reader. It remains a reader until the operator presses the START button after the hopper becomes empty (or until it reads a /*EOF card); then it goes dormant. If it became dormant because the

operator pressed the START button with no cards in the hopper, it also runs out the cards in its feed path.

2. When a previously-dormant 1442 reads a blank card, it becomes a punch. It remains a punch until it has completed punching all jobs queued for it. Only after all queued jobs have been punched can the operator safely remove cards from the 1442 hopper; with the hopper empty and no more punching to do, the 1442 goes dormant. The operator should press the NPRO button to stack (into the right stacker) the two blank cards remaining in the card feed path.
3. All cards processed by the system are stacked into the left stacker.

Notes On The 5203

1. At program load time, the system checks indicators of the 5203 to determine which print chain is mounted. If the indicators show a 48 character-set chain, the system assumes character arrangement LC; otherwise, it assumes character arrangement PN.
2. At program load time, the system sets the number of print lines per page to 66 (this may be different for each installation). For dual-carriage printers, the system uses only the left carriage; the operator must not press the RIGHT CARRIAGE RESTORE key.
3. At program load time, the system sets line numbers for programmed page skipping. These line numbers are provided to simulate the carriage tape control normally encountered in OS. A skip to carriage channel 1 will result in a page eject; a skip to channel 12 will stop 5 lines from the bottom of the page; and a skip to any other channel will result in no paper movement. Carriage tape channels may, however, be defined differently for each installation.

TERMINATION OF A REMOTE JOB STREAM PROCESSING SESSION

When the operator is finished using the System/3 as a Remote Job Entry terminal, he should put into an available hopper the two cards:

```
/*SIGNOFF  
/*EOF
```

and press START on the card reader.

The /*SIGNOFF card tells HASP to disconnect the communication line after it has finished sending the current print and punch streams to the System/3 and after it has finished receiving the current job from the System/3. That is, HASP disconnects when all currently-operating functions are complete. If the operator signs off before HASP has started printing or punching some or all of his jobs, HASP will save the output for transmission to his terminal the next time he signs on with the same remote terminal identification.

Alternatively, either the remote operator or the central operator can tell HASP to route the printed or punched output of any or all jobs to

the central site. See the description of /*ROUTE control card previously in this manual.

When HASP finally disconnects the communication line, the System/3 Communication Adapter will get a time-out error every three seconds for about 20 seconds; then the DATA light on the data set telephone will go out. The System/3 may continue printing and punching for a short time. When the System/3 is dormant, the operator should push the STOP button on the console to stop the customer meter from running. The current RJE session is now ended.

COMMAND PROCESSING

If the System/3 includes a 5475 Data Entry Keyboard or a 5471 Printer-Keyboard, the operator uses the keyboard to enter commands. Otherwise, he punches commands on cards and enters them through a reader, exactly as if they were jobs.

The only commands valid from a remote terminal are certain HASP commands described previously.

Entering Commands From The 5471

To type a command to HASP, press the REQ key. If the system can immediately allow the operator to type a command, the PROCEED light will go on; otherwise, the REQUEST PENDING light will go on. The operator can press the REQ key while he is typing a command, while the system is typing a message to him, or while the console is dormant.

When the PROCEED light comes on the operator can start typing his command. If he makes a mistake, he should press the CANCEL key and start typing again.

When the operator is finished typing, he should press either the END key or the RETURN key; their functions are identical. His command will be transmitted to HASP, where it will be executed (if valid) and repeated along with his remote terminal number on the central operator's console.

If the operator types a command of 120 characters, the system will automatically perform the END key function when he types the 120th character.

The 5471 will not type messages if the end-of-forms switch is on. When the 5471 runs out of forms, the operator should reload forms, hit the REQ key, and then hit the END key. The 5471 will resume typing if there are messages to be typed.

Entering Commands From The 5475

To type a command to HASP, the operator can merely start typing on the 5475 Data Entry Keyboard. The keyboard is always alive. After he has typed the first character, the column indicator will become active and display "02," the position of the character he will be typing next. If

he makes a mistake, he should depress the FLD ERASE key; the column indicator will display "01" and he can start typing again.

When he is finished typing, the operator should depress the REL key to transmit the command to HASP. When the column indicators go dark, he may begin typing another command. If he types a command of 120 characters, the system will automatically perform the REL key function when he has typed the 120th character.

Entering Commands From Cards

To send a command to HASP from a card reader, the operator should first punch the command on a card. Starting in column 1, he must punch a slash, an asterisk, and then the command. Since all HASP commands start with a dollar sign, columns 1-3 will read "/*\$". Then the operator should put one or more command cards, followed by a /*EOF card, into an available card hopper and push START. His commands will be transmitted to HASP, where they will be executed (if valid) and will be repeated along with his remote terminal number and reader number on the central operator's console.

SYSTEM/3 LOCAL COMMAND PROCESSING

If the System/3 Remote Terminal Processor program includes the local command facility, the operator can read commands to be executed locally by the System/3. The operator should place a card containing the command into any dormant card hopper and hit START. He should not use a /*EOF card.

For each command, the command name starts in column 1 and is followed by the operand field.

Command completion is indicated by one of the following messages, printed in the same place as error messages:

1. CODE0000 - Command completed satisfactorily
2. CODE0001 - Syntax error in command
3. CODE0002 - Operand value error in command.

A /*CARRIAGE command defines printer carriage information. The operand field has the format:

[L=forms-length] [,chan=line-no] [,chan=line-no...]

where:

- forms-length = the number of print lines on a page of forms (must not be greater than 112)
- chan = the carriage-channel number (must be between 1 and 12)
- line-no = the line number at which forms skipping will stop for the indicated carriage channel (must not

be greater than forms-length).

Note that:

1. The /*CARRIAGE command is effective immediately when read in.
2. Specification of the L= operand destroys all previous carriage channel settings.

ERROR RECOVERY PROCEDURES

Two general classes of errors are defined in the System/3 Remote Terminal Processor: communication errors and unit record errors. For either type of error, the system generates an 8-character error message. If the system has a 5471 console, error messages will be typed on it as errors occur. If the system does not have a 5471 console, error messages may or may not be printed on the 5203 printer, depending on how the Remote Terminal Processor program was generated. The format of all error messages is:

ttxxxxuu

where tt is the message type, xxxx is additional error information, and uu is the device on which the error occurred. The correspondence between uu and device is as follows:

<u>Device</u>	<u>uu</u>
BSCA	00
1442	05
5203	0E
5424	0F

COMMUNICATION ADAPTER ERRORS

The communication technique used by HASP prevents BSCA errors during a processing session. Therefore, any BSCA error that occurs while the operator is signed on is an unusual condition, resulting from system or communication facility malfunction or operational conditions. For all BSCA errors, the BSCA processor within the System/3 Remote Terminal Processor will automatically take corrective action; therefore, the operator should regard all BSCA error messages as only informational messages.

The following BSCA messages can be produced:

1. 01RREE00 - A block sequence check occurred. A transmission block was duplicated or lost. RR is the received block number, and EE is the expected block number. Both RR and EE will range from X'80' to X'8F.'

Duplicate transmission blocks will be ignored. Lost transmission blocks will cause automatic job restart.

2. 02000000 - The System/3 received a negative acknowledgement (NAK) from HASP.

The transmission block that was negatively acknowledged will be retransmitted.

3. 03RRRR00 - The transmission block received by the System/3 had an unrecognizable starting or ending sequence. The starting sequence is RRRR; if it is correct, the ending sequence is in error.

The System/3 will send a NAK to HASP, which will then retransmit the block.

4. 05SSSS00 - The System/3 BSCA has a unit check. The BSCA status indicators are SSSS.

The appropriate action will automatically be taken to continue or restore communication. Two of the most common examples of BSCA unit check are 05800000-timeout error, and 05840000-timeout with abortive disconnect. These errors can occur normally, as explained previously.

UNIT RECORD ERROR PROCEDURES

Unit record error messages are provided for errors on the 1442 Card Reader/Punch (an RPQ device), the 5424 Multi-Function Card Unit, and the 5203 Printer.

5424 MFCU

The only MFCU error message is 05SSSS0F, where SSSS represents the MFCU status indicators. In all cases, operator intervention is required. The operator should check the MFCU control panel to determine the card hopper to which the error message applies. PRI means the rightmost (primary) hopper; SEC means the leftmost (secondary) hopper. The system will attempt to perform its previous operation again when the operator has cleared the error condition: if it was reading when an error occurred, it will try to read the same card again; if it was punching, it will try to punch again. Therefore, if the hopper was punching, the operator should throw away the last card punched; if the hopper was reading, he should place the last card read in the hopper again, so the system can reread it. First, however, he must lift the cards out of the indicated hopper and press the NPRO key to clear the error condition.

5203 Printer

The only 5203 error message is 05SSSS0E, where SSSS represents the 5203 status indicators. If any error light is on at the 5203 control panel, the operator must correct the condition and press printer START. The system will automatically retry printing when an incrementer failure or print check occurred.

1442 Card Reader/Punch

The only 1442 error message is 05SSSS05, where SSSS represents the status indicators. The system recovers from 1442 errors the same way it recovers from MFCU errors. The operator should perform the action

indicated by the 1442 error lights; then, throw away the last punched card or place the last read card back in the hopper and press START.

REMOTE TERMINAL RESTART

In the event of an untimely interruption of the remote terminal operation such as a machine, program, communications, or environmental failure, the operator should notify appropriate maintenance personnel of the malfunction, save material which may be of use in determining the source of the failure, and with the aid of the central computer operator prepare for restarting the terminal as follows:

1. Notify the central computer operator of the failure and, if necessary, request his assistance in preparing for restart.
2. Determine the current job being transmitted to HASP. (The central operator has a record of the current job being submitted to HASP.) The job stream starting with the current job must be submitted to HASP after restart.
3. Determine the loss of data on the output devices and inform the central operator to backspace or restart the printer or punch as necessary. (The central computer's line should be made available for a subsequent session with the remote station or other stations within the system.)
4. When the remote terminal is available, perform the steps required for initiating a remote job processing session.

SYSTEM CONTROL CARDS

The operator may use the same HASP control cards in submitting his job from a HASP remote terminal that he would use for local job submission. These cards, the /*PRIORITY, /*ROUTE, /*MESSAGE, /*OUTPUT, /*JOBPARM, and /*SETUP control cards, offer a greater degree of control over jobs submitted to HASP. These cards are described previously in this manual under System Input.

By contrast, certain other control cards are fundamental to the operation of the System/3 Remote Terminal Processor: the /*EOF and EOR cards.

/*EOF

The /*EOF control card consists of the characters "/*EOF" punched in columns 1-5. This control card must be the last card read by an MFCU hopper when the hopper is reading, whether jobs, commands, or just a /*SIGNOFF card is being read. This card may optionally be used on the 1442, but the recommended 1442 procedure is as stated previously.

EOR

The EOR control card consists of the characters "EOR" in card columns 2-4. It is used instead of the /*SIGNON card when the default /*SIGNON card, assembled into the HASP/RTPSYS3 deck, is not to be overridden.

THE STARTER SYSTEM

The System/3 Remote Terminal Processor Starter System is a deck of 96-column cards distributed as a part of the HASP System. The operator should use the starter system to punch (at the System/3) the punched output of the RMTGEN process.

To use the starter system deck, the operator must add two cards at the end of the deck. The first card describes the size of the HASP MULTI-LEAVING buffers and is in exactly the same format as for the HASPGEN parameter &MLBFSIZ=. For example, if the correct size was 400 bytes, the operator would punch "&MLBFSIZ=400" starting in column 1.

The second card to be added is a /*SIGNON card. This card is punched as described previously in this manual.

The starter system deck will work on any System/3 that supports HASP MULTI-LEAVING Remote Job Entry. The deck it punches will be the customized System/3 Remote Terminal Processor, as defined by the installation's system programmer. The starter system does not include support for the 5475, 5471, or 1442.

APPENDIX H

**3780
OPERATOR'S GUIDE**

The IBM 3780 Data Communications Terminal can connect to a System/370, using HASP to transmit jobs to the 370 for execution and to receive the printed output from those jobs. The 3780 is not a computer but rather an input/output device. HASP controls it like any other input/output device, when connected to the central computer via telephone lines and an IBM 2701 Data Adapter or an IBM 2703 Transmission Control Unit.

The 3780 terminal contains a standard card reader, printer, associated control circuitry, and an operator control console. These devices (mechanical features, speeds, etc.) are described in the SRL IBM 3780 Data Communications Terminal, form GA27-3063. Actual speeds at which these devices will operate when communicating with HASP depend on the type of telephone line used, on the amount of information in each card or line to be transmitted or received, and on the devices' mechanical speeds given in the SRL.

The remaining sections of this manual discuss switch setup, communications establishment, normal operating procedures for reading and printing jobs, error recovery, and operational hints. Control cards that can be entered from the 3780 and instructions for entering these cards are described previously in this manual under System Input.

SWITCH SETUP

During all 3780 operations with HASP, certain console switches should be set as follows:

1. TERM MODE - LINE
2. SPACE COMPRESS/EXPAND - on
3. OFFLINE TEST - off
4. AUTO RESTART - off
5. ANSWER - MANUAL
6. INQUIRY MODE - off.

When power is on, console lights will show some of the settings that are in effect.

The TRANSPCY switch should be set in the OFF position, except when the operator is transmitting EBCDIC card decks that use all 256 possible punch combinations (for example, object decks).

ESTABLISHMENT OF COMMUNICATIONS

Before the 3780 terminal can transmit jobs to or receive printed output from the central computer, the computer must establish a path of communication to the terminal and must recognize it as a 3780 terminal (rather than, for example, a System/360 Model 20 being used as a terminal). Depending on how the 3780 is connected to the central computer, the operator may or may not have to use a special control card, called a sign-on card.

If the terminal is permanently connected to the central computer (probably through private lines leased from the telephone company), the operator must inform the central operator, who will then issue the HASP command:

```
$S LNEm
```

(where m is a 1- or 2- digit decimal number). Either the remote operator or the central operator will know the proper line number to use, depending on the installation. Once the operator has given this command and the 3780 POWER ON key is pressed; the operator can begin to read a job or print output from a previous job.

However, if the 3780 is connected to the central computer by ordinary switched telephone lines, a telephone number is dialed to establish communications. The operator will have a sign-on card and a telephone number to call. He should carefully perform the following steps:

1. Press the 3780 POWER ON key (located on the card reader).
2. Press the STOP key then the NPRO key on the card reader. Hold the NPRO key in for a few seconds to make sure the card feed mechanism is clear.
3. Place the sign-on card and the card weight in the card hopper.
4. Dial the telephone number. (The TALK button on the dataphone must be depressed.)
5. Listen for the normal sound of ringing, followed by the normal sound of answering. A high-pitched tone of about six seconds' duration, followed by a short bleep, will be audible.
6. At the bleep, press the DATA button on the telephone. The DATA SET READY light on the console should come on. (Hang up the telephone handset now.)
7. Press TERM RESET on the console, turn the card reader EOF switch on, and press the card reader START key to run the sign-on card into the card feed.

8. Press the START key on the console; the BID light should come on. Momentarily, the card reader should read the sign-on card and move it into the stacker.

The 3780 is now signed on, and reading or printing can begin.

If the telephone is not answered, the central operator has not issued the command:

```
$S LNEM
```

or has issued it for the wrong line. The remote operator should ask him to issue the proper command and should then redial, if necessary. If, instead of ringing, a busy signal is received, the line is, of course, busy. The operator should call again in a few minutes or try an alternate number, if available.

If the sign-on card will not read, the operator should run out the sign-on card, place it in the reader again and repeat steps 7 and 8.

If still unsuccessful, the operator should call the central computer operator to verify the correct sign-on card and telephone number and to verify that he has started the line correctly.

OPERATING PROCEDURES

The next two sections discuss procedures for transmitting jobs to the central computer and for receiving their printed output. The 3780 will not transmit or receive jobs unless the operator has correctly signed on.

At any given time, a signed-on 3780 is either reading a job, printing a job, or waiting for work. Thus, the normal cycle of a job submitted from the 3780 is: reading the job (transmitting it to the central computer), waiting for it to execute, and receiving its printed output. Often, after an operator has read a job through the 3780, he will disconnect (sign-off) the 3780 to save telephone line charges and sign-on at a later time to receive his output.

Since the 3780 does not have a card punch, the central HASP System will normally route any punched output produced by jobs submitted from a 3780 to the central computer card punch or another remote. If punched output is routed to the 3780, it will be printed on the printer.

TRANSMISSION TO THE CENTRAL COMPUTER

The 3780 can transmit jobs to the central computer only if signed on and not busy printing. However, the operator can make it ready to transmit whenever it is signed on. He must not press TERM RESET while a job is being printed. If he accidentally does, a line restart is required.

To transmit job(s), the operator should take the following steps:

1. Press the card reader STOP key and then the NPRO key to clear the feed.
2. Place one or more jobs in the card read hopper. Jobs may be stacked.
3. Press card reader START to run cards into the feed. The reader light on the console should stop blinking and come on steady indicating that the card reader is ready. Turn on the reader EOF switch if all the cards to be transmitted fit in the hopper.
4. Turn on the console TRANSPCY switch if required by the cards to be transmitted (for example, object decks).
5. Press the START key on the console; the BID light should come on.
6. If the 3780 is printing, it will continue until the end of the current job. Then, or as soon as START is pressed if the 3780 is idle, the 3780 will ask permission to transmit. When the central computer answers affirmatively (within 15 seconds), the BID light should go out and cards should begin reading into the stacker.

If the operator adds more cards, he should be sure to turn on the reader EOF switch when all cards to be transmitted are in the hopper. If he allows the hopper to become empty in the middle of a job's input, he must not have the EOF switch on.

The operator may press STOP on the card reader to halt reading temporarily to facilitate removing cards from the stacker or adding more to the hopper. If he presses reader START within 30 seconds, transmission will continue without a reader error condition.

It may be possible to interrupt printing to begin transmitting as described later under Error Recovery When Receiving.

RECEPTION FROM THE CENTRAL COMPUTER

After a job has completed reading, HASP queues it for execution at the central computer. As the job executes, it may produce printed and punched output. HASP saves these outputs and at the end of the job queues them for processing (usually at the terminal from which the job was read). The operator may have turned off the 3780 or otherwise disconnected it from the computer; if so, he must follow the sign-on procedure before he can receive output from the job.

HASP usually queues punched output (if any) at the central computer if the job was submitted from a 3780.

The 3780 will receive printed output from the central computer if HASP has output to send, the terminal is not transmitting, and the printer is ready. The operator should always have the printer ready, even when transmitting, so that the 3780 can automatically begin receiving when transmission is finished.

The printer is ready if it is loaded with forms, if it has a correct carriage tape, if the carriage is engaged, if the type bar is properly installed, if the cover is closed, and if the printer START key has been pressed.

The printer INHIBIT IRS switch should always be off when operating with HASP.

A blinking PRINTER light on the console indicates that the printer is not ready. Even after making it ready, it may be necessary to press CHECK RESET and START on the console to make the light stop blinking.

Printed output jobs will be separated by separator pages, which are described previously under System Output.

ERROR RECOVERY

A wide variety of problems can occur when operating almost any type of machine, including the 3780. Some problems occur only rarely and are not documented here. See the SRL IBM 3780 Data Communications Terminal, Form GA27-3063, for a description of any problems encountered which are not discussed in this guide. This SRL also describes how to load paper in the printer, how to fix a card jam, etc.

In general, there are three levels of error recovery that the operator may have to perform, depending on the severity of the error. They are:

1. Fix the difficulty (an I/O device that is not ready, check condition, etc.) and continue. See the following two subsections for the most common examples.
2. Job restart, done when the possibility of incorrect or lost data exists and requires the assistance of the central computer operator. Job restart procedures for both transmitting and receiving are described in the following two subsections.
3. Line restart, done usually when job restart is unsuccessful or any time it is necessary to press TERM RESET to clear a check condition during printing. The operator should tell the central computer operator to issue the HASP command:

\$E LNEm

then reestablish communications as previously described. Incomplete input or output jobs are handled as described for job restart in the following two subsections.

If even line restart fails to establish successful operation, the operator probably has a hardware and/or software problem that should be analyzed by the installation's systems personnel and IBM Customer Engineers.

Most problems encountered will result in lights appearing on the 3780 console or the I/O devices themselves. Some of these lights are not error lights: DATA SET READY, CARRIER OFF, DATA IN BUFFER, LINE MODE, OPERATE, BID, TRNSPCY, MANUAL ANSWER, and any of the I/O device lights blinking to indicate that the device is not ready. Other lights provide clues to the difficulty and will be discussed in the following two subsections.

ERROR RECOVERY WHEN TRANSMITTING

If job restart is required while transmitting, the OS job, which is only partially read into the 3780, must be reread from the beginning. The 3780 operator should ask the central computer operator to issue the HASP command:

\$C RMnn.RD1

to delete the partially read job. He should then press TERM RESET, load the hopper beginning with the JOB card of the incompletely read job, press reader START, and press console START.

Any card reader trouble while transmitting is indicated by a blinking READER light. The following lights on the card reader may further indicate the type of trouble. Operator action is indicated for each condition.

FEED CHECK - The bottom card in the hopper failed to feed. Remove hopper cards. Press NPRO. Repair bottom hopper card if necessary, and make sure the feed throat is clear. Reload cards. Press reader START and console START.

ATTENTION - Full stacker, empty hopper with EOF off, and cover open are possible causes. Correct, and press reader START and console START.

READ CHECK - Last card was incorrectly read due to invalid or off punching or read station jam. Last card in stacker (if no jam) and following card (run out by NPRO after hopper cards are removed) should be reread. After appropriate correction, place these two cards at the front of the cards in the hopper, and press reader START and console START. If a jam is so severe that the order of cards or the last card read is not clear, attempt a job restart.

HASP retries all transmission line errors automatically until transmission is successful; however, certain console lights may indicate necessary action as follows.

TERMINAL ADDRESS - HASP is trying to send output while the operator is trying to start an input function. The operator should continue input procedure until he has turned on the BID light. Then, he should press CHECK RESET and wait for input to begin. If TERMINAL ADDRESS comes on again, he should press CHECK RESET. If the operator is not able to initiate the input function, he may have interrupted an incomplete output function. He should make his printer ready to accept the output and wait until the next output job ends before again attempting transmission, or try to cause a printer suspend as described later.

BID RETRY - HASP has failed to respond to the 3780 within 15 to 45 seconds (depends on 3780 wiring option). If any cards are in the stacker, a duplicate block of data will probably be sent. Follow the job restart procedure given previously.

INPUT CHECK, BUFFER CHECK, TRNSPCY CHECK - With these serious errors the operator should always do a job restart. He should make sure that he has turned on the TRNSPCY switch if the job contains OS object decks or other cards requiring transparent transmission.

RECORD CHECK or LINE CHECK - These lights may come on while HASP is attempting retransmissions for line errors and will go out if recovery is successful. If the lights stay on and transmission does not proceed, the operator should attempt a job restart.

ERROR RECOVERY WHEN RECEIVING

If job restart is required while receiving, the operator should cause HASP to begin printing the current partially completed job from its beginning. He should ask the central computer operator to issue the HASP command:

\$E RMn.PR1

to cause the restart. He should also make his printer ready, press CHECK RESET, and discard the partially completed output beginning with the last previous separator page. He may ask the central operator to issue the HASP ~~command~~:

\$B RMn.PR1

instead. Only the few duplicated pages should be discarded in this case. The operator must not press TERM RESET when attempting a job restart while receiving. If TERM RESET is required to clear a check condition, a line restart is required.

Output device trouble is indicated by a blinking PRINTER light and lights on the printer as follows.

FORM CHECK, END OF FORM, CARRIAGE INTERLOCK - The printer carriage, forms, or carriage tape are not ready or are jammed. Correct the condition, and press printer RESET, console CHECK RESET, printer START, and console START.

Other printer CHK lights - The printer had a parity error or other hardware malfunction. The SRL can be used to interpret CHK lights. The operator should press RESET, console CHECK RESET, START, and console START. Failure to recover indicates hardware trouble.

After any of the above printer recoveries, duplicate lines may be printed because HASP's recovery programming is designed to prevent loss of data at all costs. For most applications, these duplicate lines are obvious and may simply be crossed out or ignored. For more sensitive applications, the operator may use the backspace procedure (described previously) to discard duplicate output at page or document boundaries.

Certain console lights may require operator attention while receiving, as follows.

TERMINAL ADDRESS - HASP is trying to send output but the 3780 is not ready. Make sure the switch setup is correct, ready the printer, and press console CHECK RESET.

OVERRUN - This usually indicates that the operator has signed on using the wrong remote number. He may have submitted jobs previously using this wrong number; these jobs will need to be rerouted to the correct number. He may have received output which is not his. He should ask the central operator to help him correct this confusion and attempt a line restart so he can sign on using the correct number.

BUFFER CHECK - This serious hardware error will always require that the operator attempt a line restart.

LINE CHECK - HASP is attempting retransmissions. If they are successful, the light will go out. If the light stays on and printing does not continue within a short time, the operator should attempt a job restart.

Depending on an option chosen for the central HASP System at the particular installation, actions during printer error recovery may be somewhat different than described previously. If this altered mode of printer operation is applicable to the 3780, when the operator makes the printer ready after any of the above stops the job that was printing will be suspended, a message and terminal separator line(s) will be printed, and the job will be requeued in the print queue for the terminal. The operator may cause this suspend action himself by pressing CARRIAGE STOP while printing and then readying the printer. He may press the printer STOP key to make minor carriage adjustments without causing a suspend, if he readies the printer within 34 seconds or periodically presses STOP, CARRIAGE SPACE, or CARRIAGE RESTORE to extend the 34 second period.

Actions after the printer suspend depend on the state of the terminal and the output queue. The operator may start transmission as described previously, or he may wait for more output. Print jobs of higher priority than the suspended job will be received before the suspended job. When the suspended job resumes printing, it will do so at approximately 1 page prior to the page of interruption.

OPERATIONAL HINTS

Operator commands, output device control, and special forms processing have been discussed previously in this manual. However, certain properties of terminals like the 3780 require more explanation of these two topics.

Certain commands that control output devices (\$B, \$C, \$E, \$F, \$I, \$N, \$Z) actually refer to a job currently in active processing on the device that is to be backspaced, restarted, etc. When the operator submits commands from the 3780, the printer is not active; therefore these commands have no effect, even after he suspends a print job as previously described. The suspend is functionally equivalent to \$I, which includes the function of \$B. To use the other commands, the 3780 operator must ask the central operator to enter them.

The \$S, \$P, and \$T device commands are effective when submitted from the terminal. Furthermore, the \$C command is effective when referring to a job rather than a device. The \$H, \$A, and \$R commands may also be used effectively.

Special forms for printer output can effectively be controlled from the terminal without central operator assistance, if all jobs submitted from (or routed to) the terminal follow certain conventions in requesting special forms. Programmers should be required not to use special forms requests for SYSOUT=A data sets, if the demand setup option was generated. Otherwise, any valid print class is acceptable. Special print forms for an entire job may be requested in the HASP accounting field of the JOB card. Violation of the SYSOUT=A rule will require central operator assistance to enter a \$S command when the terminal is in receive mode.

Assuming these conventions, the operator should periodically submit the \$DF command to determine if special forms jobs are queued for output on the terminal. If so, he should select the type of forms (from those queued) he desires to process first on his printer, mount that forms, enter a command "\$T RMn.PR1,F=forms#", and wait for printing to occur. When jobs stop processing on the printer, he should resubmit the \$DF and change to a new forms if indicated. The set parameter F=AUTOM or automatic printer mode should never be used; the F=form# or operator-controlled mode should be used instead. The operator may want to use the \$P and \$S device commands, prior to and after the \$T command, to prevent HASP from attempting to send an output job while he is changing forms.

Index

Aborting The System 21
Accounting Field (Of JOB Card) 26-27,30,40,182,196,226
ACTIVE Device Status 33,39,44
Auto-Call Feature 202
Automatic Output Mode 45
Automatic Starting Reader Feature 34
Auto Turnaround (2780) 172

Backspacing A Printer Command (\$B printer) 55-56
Backspacing A Punch Command (\$B punch) 61-62
Binary Synchronous Communication Adapter (BSCA) 132,152,159,161,162,
166,210
Bootstrap Loader (RTPBOOT) 11,13
Buffer Expansion Feature 54,60
| BURST Keyword (for 3800) 31,45,49-50.1,83,84,129

Cancelling A Job Command (\$C job list) 91-92
Cancelling A Printer Command (\$C printer) 57
Cancelling A Punch Command (\$C punch) 63
Cancelling A Reader Command (\$C reader) 36-37
Cancelling Specified Job(s) Command (\$C 'jobname') 88
Carriage Control 12,49-52,128,156
| Character Arrangement Table Specification
for a 3800 31,49-50.1,127
CHARS Keyword (for 3800) 31,49
Checkpoint Record 105
Classifying Messages 65,67-68
Cold Start 102,103,104,105,106,114,115
Command Authority 34,35,37,89,93
Command Authority Groups (OS) 66
COMMAND Card 32
Command Codes (RJE) 122
Command Processing At Remotes 137,152,165,207-708
Model 20 165
System/3 207-208
System/360 152
1130 137
Command Responses 15-17,68,69-70
Automatic Redirection of 69-70
Error Responses 16-17
(device name) IN USE 73
(device name) INVALID OPERAND 73
HASP NOT DORMANT 24
JOBj NOT HELD 88,91
JOBj NOT RESTARTABLE 89,93
jobname NOT FOUND 91,92,93,94,95
JOB(S) NOT FOUND 78,88,89,90,91
LINEn NOT FOUND 80
LIST INCOMPLETE 83,85
MULTIPLE JOBS WITH jobname 91,92,93,94,95

NO ACTIVE JOBS 83
NO OPERATOR REQUESTS 71
NO OUTPUT QUEUED 84
Job Information Responses 15-16
aaa serial 79
CON cc A=cca F=cca I=cca J=cca L=cca O=cca Q=cca
S=cca U=cca 71
device aaa status 81
INIT i (DRAINING) 42
 (DRAINED)
 (ACTIVE)
 (INACTIVE)
JOBj (print route,punch route)=route1,route2,...routen 78
JOBj RELEASED 88,91
LINE aaa serial 80
nn queue type; (number of jobs in designated queue type) 87
OUT n F=form C=carriage T=train CLS C1=nn1{,...ci=nni} 84
RMr.devn aaa status 80
xx PERCENT SPOOL UTILIZATION 85,87
OK Response 13,15,23,24,36,37,38,39,40,41,42,49,50,52,53,54,55,56,
57,58,60,61,62,63,73,74,77,78,82,83,96,138,145
Redirection Of 69
Commands
\$AA (Release All Jobs) 6,8,10,11,83-84,182,196,226
\$A job list (Release Specified Jobs) 8,10,11,87-88,91,101,182,196,
226
\$A 'jobname' (Release Job) 8,10,11,92,182,196,226
\$B printer (Backspace Printer) 8,9,11,14,44,55-56,182,194,196,224,
226
\$B punch (Backspace Punch) 11,14,61-62,182,196,226
\$C job list (Cancel Specified Jobs) 6,8,11,14,43,88,90,102,226
\$C 'jobname' (Cancel Job) 8,11,14,43,91-92,101,226
\$C printer (Cancel Printer) 8,9,11,14,44,57,128,182,196,226
\$C punch (Cancel Punch) 8,11,14,44,63,128,182,196,226
\$C reader (Cancel Reader) 8,11,14,34,36-37,193,222
\$DA (Display Active Jobs) 8,10,11,69,70,83
\$DD (Display Direct-Access Devices) 8,9,12,70,79
\$DF (Display Number Of Jobs Queued Awaiting
Different Output Setup 8,11,43,70,83-84,182,196,226
\$DI (Display Initiator) 8,9,12,41-42,70
\$D job list (Display Job Information On Specified Jobs) 6,8,9,10,11,
70,89
\$D 'jobname' (Display Job Information) 6,8,10,11,70,92,93,94,95
\$D line (Display Devices On RJE Lines) 8,11,70,79-80
\$DN (Display Job Information On Queued Jobs) 8,11,70,85-86
\$DO (Display Operator Request) 8,12,71-72
\$DQ (Display Number Of Jobs Queued) 8,9,11,70,86-87
\$DM (Display Message At Remote) 8,12,69,70,76-77,130
\$DR (Display Remotes) 8,9,12,80-81
\$DS (Display Special Routed Output) 8,12,47,70,78-79
\$DU (Display Units) 8,9,12,34,35,64,70,81
\$E job list (Restart Specified Jobs) 8,11,14,89-90,126
\$E 'jobname' (Restart Job) 8,11,14,93-94,126
\$E line (Restart RJE Line) 8,10,11,14,74,192,222
\$E printer (Restart Printer) 8,11,14,44,46,54,64,71,128,182,194,196,
224,226
\$E punch (Restart Punch) 8,11,14,44,61,62,64,71,128,182,194,196,226
\$F printer (Forward-Space Printer) 8,11,14,44,56,182,196,226
\$F punch (Forward-Space Punch) 11,14,62,182,196,226

\$HA (Hold All Jobs) 8,9,11,82,87,182,196,226
\$H job list (Holding Specified Jobs) 8,9,11,88,90,101,182,196,226
\$H 'jobname' (Hold Job) 8,11,94,182,196,226
\$I printer (Interrupt Printer) 8,11,14,44,46,54-55,56,64,128,182,
196,226
\$I punch (Interrupt Punch) 14,44,62,128,182,196,226
\$N printer (Repeat Printer) 8,10,12,14,44,46,54,182,196,226
\$N punch (Repeat Punch) 8,12,14,44,61,182,196,226
\$PHASP (Remove HASP) 8,12,14,24,98
\$PI (Stop or Drain Initiator) 8,9,12,14,24,40,42
\$P job list (Stopping Specified Jobs) 8,9,11,14,43,90-91
\$P 'jobname' (Stop Job) 8,11,14,94-95
\$P printer (Stop or Drain Printer) 8,9,14,44,50.2,57-58,60,64,71,
113,182,196,226
\$P punch (Stop or Drain Punch) 8,12,14,44,50.2,60,63,64,71,113,182,
196,226
\$P reader (Stop or Drain Reader) 8,12,14,34,35,38-39,113,182,196,226
\$P (Stop) 8,12,14,23,115,130
\$R (Route) 6,8,10,12,46,47,77-78,182,196,226
\$SI (Start Initiator) 8,12,14,40,182,196,226
\$S line (Start RJE Line) 8,10,12,14,73-74,118,120,176,177,182,186,
196,218,219,226
\$S printer (Start Printer) 8,12,14,44,50.2,53-54,57,63,128,182,196,
204,226
\$S punch (Start Punch) 8,12,14,44,60,62,64,128,182,196,204,226
\$S reader (Start Reader) 8,12,14,34,35,36,37,38,182,196,226
\$S (Start) 8,10,12,14,22-23,25,98
\$TF (Set FCB Images) 12,14,50.1,51-53,64
\$TI (Set Initiator Class) 8,9,12,14,41
\$T job list (Set Job Class Or Priority) 14,95-96
\$T job (Set Internal Job Number) 8,14,16,39-40,96
\$TM (Set Message Routing) 8,12,14,69,70
\$T printer (Set Printer) 8,10,12,14,44,45,50-51,84,113,128,182,
196,226
\$T punch (Set Punch) 8,12,14,44,45,58-59,83,113,128,182,196,226
\$T reader (Set Reader) 8,12,34,35,37-38,44,45,182,196,226
\$Z printer (Halt Printer) 8,10,12,14,44,57,182,196,226
\$Z punch (Halt Punch) 8,12,14,44,62,182,196,226
\$Z reader (Halt Reader) 8,12,14,34,38,196,226
Device List 11-14,17
Format Conventions 5-15
Job List 87-91
Summary List Of 11-12
Syntax 16-17
Verbs 8-10
Considerations for the IBM 3800 Printing Subsystem 49
Console Authority 53
Console Message Output 65-66
Console Support
See OS Console Support
Control Cards
/*COMMAND 32,75
/*EOF 203,204,205,206,208,213
/*JOBPARM 29-30,67,75,213
/*MESSAGE 29,75,113,213
/*OUTPUT 30-31,67,68,75,129,213
/*PRIORITY 28,40,75,213
/*ROUTE 28-29,46,67,75,124,203,207,213

/*SETUP 29,75,213
/*SIGNOFF 76,137,152,166,206,213
/*SIGNON 134,141,149,161,176,201,202,214
EOR 201,213
Controlling A Specific Job By OS Jobname 91-95
 Cancelling 91-92
 Displaying Job Information On 92-93
 Holding 94
 Releasing 91
 Restarting 93
 Stopping 94-95
Controlling Devices 45,65-81
 Automatic Printer/Punch Control 45
 Monitoring Devices 79-81
 Operator-Controlled Printer/Punch 45
 OS Console Support 65-73
 Remote Work Stations 74-79
 Starting And Restarting HASP RJE Lines 73-74
Controlling Jobs 82-96
 Controlling A Specific Job By OS Jobname 91-95
 Controlling Specific Jobs 87-91
 Controlling The Job Queue 82-87
 Setting Job Class, Priority, Or Number 95-96
Controlling Specific Jobs 87-91
 Cancelling 88
 Displaying Job Information On 89
 Holding 90
 Releasing 87-88
 Restarting 89-90
 Stopping 90-91
Controlling The Job Queue 82-87
 Displaying Active Jobs 83
 Displaying Job Information On Queued Jobs 84-86
 Displaying Number Of Jobs Queued 86-87
 Displaying Number of Jobs Queued Awaiting
 Different Output Setup 83-84
 Holding All Jobs 82
 Releasing All Jobs 82-83
COPIES Keyword 31
Copy Modification Specification for a 3800 31,49-50.1,127
COPYG Keyword (Copy Groups for 3800) 31,49,56

Device List Commands 11-14,17
Device Name 16,29
Device Status 33,44-45
Displaying Active Jobs Command (\$DA) 83
Displaying An Initiator Command (\$DI) 41-42
Displaying Devices On RJE Lines Command (\$DL) 79-80
Displaying Direct-Access Devices Command (\$DD) 79
Displaying Job Information Command (\$D 'jobname') 92-93
Displaying Job Information On Queued Jobs Command (\$DN) 85-86
Displaying Job Information On Specified Job(s) Command (\$D job list) 89
Displaying Messages At Remote Terminals Command (\$DM) 76-77
Displaying Number Of Jobs Queued Command (\$DQ) 86-87
Displaying Number of Jobs Queued
 Awaiting Different Output Setup Command (\$DF) 83-84
Displaying Operator Requests Command (\$DO) 71
Displaying Remotes Command (\$DR) 80-81
Displaying Units Command (\$DU) 81
Displaying Special Routed Output Command (\$DS) 78-79

DRAINED Device Status 33,39,45
DRAINING Device Status 33,39,45
Draining (Stopping) An Initiator Command (\$PI) 42
Draining (Stopping) A Line Command (\$P line) 74
Draining (Stopping) A Printer Command (\$P printer) 57-58
Draining (Stopping) A Punch Command (\$P punch) 62
Draining (Stopping) A Reader Command (\$P reader) 38-39

EBCDIC Transparency 172,184
2770 184
2780 172

Error Codes, Catastrophic 108-111
Error Messages 108-111,139-140
At Remotes 139-140,153-156,167-168,210-211
System 139-140,153-156,167-168,210-211
Model 20 167-168
Communication Adapter Errors 168
Unit Record Errors 169
System/3 210-211
Communication Adapter Errors 210-211
Unit Record Errors 211
System/360 153-156
Communication Adapter Errors 154-155
Unit Record Errors 156
1130 139-140
Error Procedures 35-36,139-145,153-157,167,210-212
At Remotes
Model 20 167
System/3 210-212
System/360 153-157
1130 139-145
2770 192-195
2780 177-181
3780 222-225
For Local Readers 35-36
Error Responses 16-17
Establishing Communication Line With HASP
For Model 20 162
For System/3 202
For System/360 150
For 2770 186-187
For 2780 176-177
For 3780 218-219
Execution Batch Scheduling Feature 24,42

| FLASH Keyword (for 3800) 31,45,49
Format Conventions 5-15
Format Start 106,116
Forms Control Buffer (FCB) 12,31,45,50-53,64,83-84
| Forms Overlay Specification for a 3800 31,50-50.1,83,84,129
Forward-Spacing A Printer Command (\$F printer) 56
Forward-Spacing A Punch Command (\$F punch) 62

Halting A Printer Command (\$Z printer) 57
Halting A Punch Command (\$Z punch) 62
Halting A Reader Command (\$Z reader) 38
HASP, Introduction To 18
Holding A Job Command (\$H job list) 94
Holding All Jobs Command (\$HA) 82
Holding Specified Job(s) Command (\$H 'jobname') 90

INACTIVE Device Status 33,39,45
Initialization Options 22,107
Initiators 39-42
 Displaying 41-42
 Setting Classes For 41
 Starting 40-41
 Stopping (Draining) 42
Input Job Streams 26-27
Internal Job Number (Setting) 96
Internal Reader 14,33,35,36,37,39
Interrupting A Printer Command (\$I printer) 54-55
Interrupting A Punch Command (\$I punch) 62
IPL 20,22,134,135,149,151,161-162,164,200-201
 Model 20 161-162
 System/3 200-201
 System/360 149
 1130 134

JOB Card 16,26-28,29,30,32,36,39,40,43,67,68,91,92,93-94,114,124,127,
136,179,182,192,196,203,223,226
Job Class 11,16,39,40,47,48
Job Execution Priority 95-96
Job Information Response 15,16
Job Log 17,18,27,30,100
Job Output Table (JOT) 61
JOBPARM Card 29-30
Job Priority (Setting) 95-96
Job Processing At Remotes 134-136,150-151,162-163,175-176,190-191,
202-203,221
 Model 20 162-163
 System/3 202-203
 System/360 150-151
 1130 134-136
 2770 190-191
 2780 175-176
 3780 221

Keyboard Correction Feature 54,59

Line Security Password 73
Loader (RTPLOAD) 11,12
Local Card Readers 34-35

Local Reader Interface 33
Logical Console Class 72-73

MESSAGE Card 29
Message Level 72
Messages And Codes (System) 97-130
 Catastrophic Error Codes 108-111
 Initialization 98-107
 Job Processing 112-130
Messages (At Remotes) 140, 144-145, 154-156, 168-169, 208, 210-212
 Model 20 168-169
 System/3 208, 210-212
 System/360 154-156
 1130 140, 144-145
Model 20 Work Station 28-40
 Error Procedures 37-40
 Operating Procedures 31-36
 Initiation 31-32
 Job Stream Processing 32-35
 Termination 36
 Remote Terminal Processor 29-30
MODIFY Keyword (for 3800) 31, 49
MODTRC Keyword (for 3800) 31
Monitoring Devices 79-81
 Displaying Devices On RJE Lines 79-80
 Displaying Direct-Access Devices 79
 Displaying Remotes 80-81
 Displaying Units 81
MULTI-LEAVING Work Stations 46, 118, 119, 120, 141-226
Multiple Console Support (OS) 65

OK Response 13, 15, 23, 24, 36, 37, 38, 39, 40, 41, 42, 50.1, 50.2, 52-58, 60-63,
73, 74, 77, 78, 82, 83, 96, 138, 145
Operands 13, 17, 21, 38, 58, 63, 69, 72, 74, 78
Operator-Controlled Output Mode 43, 182, 196
OS Console Support 65-73
 Automatic Redirection Of Display Command Responses 69-70
 Controlling Command Entry 66
 Controlling Console Message Output 65-66
 Displaying Operator Requests 71-72
 Multiple 65
 Redirection Of Command Responses 69
 Setting Level Of Message Output For Logical Classes 72-73
 Setting Message Routing 70-71
OS Interfaces 63-64
OS Routing Codes 65
OS "VARY unit, CONSOLE, AUTH" Command 66
OUTPUT Card 30-32
Output Queue 19, 43, 54, 55, 78, 101
Output Routing 46

Printers 47-58
 Backspacing 55-56

Cancelling 57
Controlling Printers, Commands For 44
Forward-Spacing 56
Halting 57
Interrupting 54-55
Repeating 54
Restarting 54
Setting 50-51
Setting 3211 FCB Images 51-53
Starting 53-54
Stopping (Draining) 57-58
Print Format 47
Print Train 51,128
PRIORITY Card 28
Punches 58-63
 Backspacing 61-62
 Cancelling 63
 Forward-Spacing 62
 Halting 62
 Interrupting 62
 Repeating 61
 Restarting 60-61
 Starting 60
 Setting 59-60
 Stopping (Draining) 63
Punch Format 59

Queued Job Information 84-85

Readers 33-39
 Cancelling 36-37
 Controlling Readers 33-35
 Commands For 34
 HASP Internal Reader 35
 Local Card Readers 34-35
 Error Procedures 35-36
 Halting 38
 Setting 37-38
 Starting 36
 Stopping (Draining) 38-39
Receiving From Central Computer (At Remotes)
 2770 193-195
 2780 179-181
 3780 223-225
Releasing A Job Command (\$A job list) 91
Releasing All Jobs Command (\$AA) 82-83
Releasing Specified Job(s) Command (\$A 'jobname') 87-88
Remote Job Entry (RJE) Feature 12,46,72,73,74,75,79,80,109,112,116,
 121,122,123,198,200,206,207,214
Remote Terminal Processor 132,147-148,159-160,198-199,200,205,208,
 210,213,214
 Model 20 (HASP/RMTM20) 159-160
 System/3 (HASP/RTPSYS3) 198-199,200,201,205,208,210,213,214
 System/360 (HASP/RMT360) 147-148
 1130 (HASP/RTP1130) 132,134,135,140,142,144

Remote Terminal Restart 141,156-157,170,212
Remote Work Stations 75-79,131-226
 Command Processing At
 Model 20 165
 System/3 207-209
 System/360 152
 1130 137-138
 Displaying Messages At 76-77
 Display Special Routed Output 78-79
 Error Procedures At
 Model 20 167-170
 System/3 210-212
 System/360 153-157
 1130 139-143
 2770 192-195
 2780 178-181
 3780 222-225
 Initiation Of Remote Job Stream Processing
 Model 20 161-162
 System/3 200-202
 System/360 149-150
 1130 134-135
 2780 173-176
 Job Stream Processing
 Model 20 162-166
 System/3 202-206
 System/360 150-152
 1130 135-137
 2770 188-191
 2780 173-175
 Routing Job(s) Output 77-78
 Terminating Processing At
 Model 20 166
 System/3 206-207
 System/360 152
 1130 137
Remove HASP Command (\$PHASP) 24
REP Cards 22,104,134,141,142
Repeating A Printer Command (\$N printer) 54
Repeating A Punch Command (\$N punch) 61
Responses, Standard 15-17
Restarting A Job Command (\$E job list) 93-94
Restarting An RJE Line Command (\$E line) 74
Restarting A Printer Command (\$E printer) 54
Restarting A Punch Command (\$E punch) 60-61
Restarting Specified Job(s) In Execution Command (\$E 'jobname') 89-90
Restarting The System 24-25
RJE CCW Internal Sequence 123
 Command Types 123
 Identifiers 123
RJE MULTI-LEAVING Data Stream Control Sequences 122
RJE Typical Sense Information 121
RMTM20 200
RMT360 188
ROUTE Card 28-29
Routing 46-47,77-78
Routing Codes (OS) 15,46,65
Routing Job Output Command (\$R) 77-78
RTPSYS3 198-199
RTP1130 132-133,134

Separator Page Format 47-48
Setting A Printer Command (\$T printer) 50-51
Setting A Punch Command (\$T punch) 59-60
Setting A Reader Command (\$T reader) 37-38
Setting HASP Internal Job Number Command (\$T) 96
Setting Initiator Classes Command (\$TI) 41
Setting Job Class Or Priority Command (\$T) 95-96
Setting Level Of Message Output For Logical Classes Command (\$TCON)
65-66,72-73
Setting Message Routing Command (\$TM) 70-71
Setting 3211 Printer FCB Images Command (\$TF) 51-53
SETUP Card 29
SIGNOFF Card 76
SIGNON Card 76
SPOOL Utilization 86,87
Start Command (\$S) 23
Starter System (System/3) 83
Starting An Initiator Command (\$SI) 40
Starting An RJE Line Command (\$S line) 73
Starting A Printer Command (\$S printer) 53-54
Starting A Punch Command (\$S punch) 60
Starting A Reader Command (\$S reader) 36
Starting The HASP Job 20-22
Starting The System 20-21
 Initialization Options 22
 Preparation For 20
 Starting The HASP Job 20-21
Status Conditions 33,39,44-45,151,163,164
Stop Command (\$P) 23
Stopping A Job Command (\$P job list) 94-95
Stopping (Draining) An Initiator Command (\$PI) 42
Stopping (Draining) A Line Command (\$P line) 73-74,118,120
Stopping (Draining) A Printer Command (\$P printer) 57-58
Stopping (Draining) A Punch Command (\$P punch) 63
Stopping (Draining) A Reader Command (\$P reader) 38-39
Stopping HASP 24
Stopping Specified Job(s) Command (\$P 'jobname') 90
Stopping The System 23-24
 Removing HASP From The System 24
 Stopping All HASP Processing 23
Syntax, Command 16-17
SYSOUT Classes 43,49,84
System Input 26-42
 Initiators 39-42
 Input Job Stream 26-32
 Input Readers 33-39
System Output 43-64
 Commands 47-63
 OS Interfaces 63-64
 Printers 47-58
 Punches 58-63
 Work Selection By Devices In Automatic Mode 45
 Work Selection By Devices In Operator-Controlled Mode 45
 Work Selection By Remote Devices 45-47
System/3 Work Station 197-214
 Error Recovery Procedures 210-212
 Operating Procedures 200-209
 Command Processing 207-208
 Initiation 200-202

Job Stream Processing 202-206
Local Command Processing 208-209
Remote Terminal Processor 199
System Control Cards 213
The Starter System 214
System/360 Work Station 146-157
Error Procedures 153-157
Operating Procedures 149-152
Initiation 149-150
Job Stream Processing 150-152
Termination 152
Remote Terminal Processor 147-148

Transmitting From Remotes

2770 188-190
2780 174-175
3780 220-221

Verbs, Command 8-10

Warm Start 20, 24, 98, 100, 101, 102, 103, 104, 105, 106, 115, 130
HASP 24, 98, 100, 101, 102, 103, 104, 105, 106, 115, 130
OS 20
Work Selection 45-47
By Remotes 45-47
In Automatic Mode 45
In Operator-Controlled Mode 45
WTOR Reply, Abbreviated 17

1052 Operator's Console 152, 153
1130 Work Station 76, 131-145
Error Procedures 139-143
Messages 144-145
Operating Procedures 134-138
Command Processing 137-138
Initiation 134
Job Stream Processing 135-136
Termination 137
Remote Terminal Processor 132-133
1403 Printer 47, 49, 50.1, 144, 159, 167, 169, 199
1442 Reader/Punch 136, 138, 144, 150, 151, 163, 166, 167, 169, 199, 201, 203,
205-206, 210, 211, 212, 213, 124
2501 Reader/Punch 33, 135, 136, 142, 144, 159, 163, 167, 169
2520 Reader/Punch 58, 150, 151, 163, 164, 166, 167, 169
2560 MFCM 163, 164, 165, 167, 169
2701 Data Adapter Unit 120, 121, 172, 184, 216
2703 Transmission Control Unit 172, 184, 216
2770 Work Station 75, 118, 119, 120, 183-196
Error Recovery 192-195
When Receiving 193-195
When Transmitting 192-195
Establishment Of Communications 186-187
Operating Procedures 188-191
Operational Hints 196

Switch Setup 185
2780 Work Station 75, 118, 119, 120, 171-182
Error Recovery 177-181
 When Receiving 179-181
 When Transmitting 177-179
Operating Procedures 173-177
 Establishment Of Communication Line 176-177
 Initiation 173-175
Operational Hints 182
2922 Remote Work Station
 See Model 20 Work Station
3780 Work Station 75, 118, 119, 120, 215-226
Error Recovery 222-225
 When Receiving 223-225
 When Transmitting 222-223
Establishment Of Communication 218-219
Operating Procedures 220-221
Operational Hints 225
Switch Setup 217
3800 Printing Subsystem
 Considerations for 49
 OUTPUT Card Keywords 31
 Setting 50-50.1, 129
 Supported by HASP 47
 Work Selection in Automatic Mode 45
5203 Printer 198, 199, 202, 203, 204, 206, 210, 211
5424 MFCU 199, 203, 204, 205, 210, 211
5471 Printer-Keyboard 199, 202, 203, 207, 210, 214
5475 Data Entry Keyboard 199, 207, 214

GC27-6993-0

Your views about this publication may help improve its usefulness; this form will be sent to the author's department for appropriate action. Using this form to request system assistance or additional publications will delay response, however. For more direct handling of such requests, please contact your IBM representative or the IBM Branch Office serving your locality.

How did you use this publication?

- | | |
|--|---|
| <input type="checkbox"/> As an introduction | <input type="checkbox"/> As a text (student) |
| <input type="checkbox"/> As a reference manual | <input type="checkbox"/> As a text (instructor) |
| <input type="checkbox"/> For another purpose (explain) _____ | |

Please comment on the general usefulness of the book; suggest additions, deletions, and clarifications; list specific errors and omissions (give page numbers):

Cut or Fold Along Line

What is your occupation? _____

Number of latest Technical Newsletter (if any) concerning this publication: _____

Please include your name and address in the space below if you wish a reply.

Thank you for your cooperation. No postage stamp necessary if mailed in the U.S.A. (Elsewhere, an IBM office or representative will be happy to forward your comments.)

Your comments, please . . .

This manual is part of a library that serves as a reference source for systems analysts, programmers, and operators of IBM systems. Your comments on the other side of this form will be carefully reviewed by the persons responsible for writing and publishing this material. All comments and suggestions become the property of IBM.

Cut or Fold Along Line

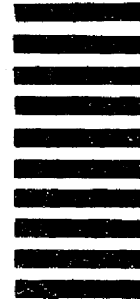
Fold

Fold

First Class
Permit 40
Armonk
New York

Business Reply Mail

No postage stamp necessary if mailed in the U.S.A.



Postage will be paid by:

International Business Machines Corporation
Department 63T
Neighborhood Road
Kingston, New York 12401

Fold

Fold

OS/VS2 HASP II Version 4 Operator's Guide Printed in U.S.A. GC27-6993-0





International Business Machines Corporation
Data Processing Division
1133 Westchester Avenue White Plains, N.Y. 10604

IBM World Trade Americas/Far East Corporation
Town of Mount Pleasant, Route 9, North Tarrytown, N.Y., U.S.A. 10591

IBM World Trade Europe/Middle East/Africa Corporation
360 Hamilton Avenue, White Plains, N.Y., U.S.A. 10601