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INSTITUTE OF OCEANOGRAPHIC SCIENCES

DP/D/22

DATA PROCESSING

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HASP WORKSTATION GUIDE

Version 2.0

DP/D/22

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CONTENTS

1. INTRODUCTION

The HASP protocol (Houston Automatic Spooling Priority) is supported on a number of different mainframe computers, the usual application being remote job entry (R.J.E.). It defines a communications protocol for passing data between two end points. Data is transferred in blocks, each block containing one or more records. The communications operates in a half duplex mode with an acknowledgement of the previous block required before the next block may be transmitted. A cyclic redundancy check (C.R.C.) character is appended to each block, which together with a block sequence number, provides a means of checking the validity of received data. If an error is detected in a received block, the protocol calls for re-transmission of the block. Devices of varying speeds are catered for in the protocol by means of logical switches (Function Control Sequence - FCS) which are passed to the data source to inhibit or enable transmission to an individual device or all devices. A data compression scheme is also included for the compression of identical characters into short control sequences, thus reducing transmission times.
Typical devices supported by this system are; card reader, line printer , paper tape reader and punch, magnetic tape, incremental plotter and an operator's console. These are supported under the standard protocol. Two additional terminals are supported for access to time sharing systems on host computers under the agreed extension of the protocol between SRC and NERC host computers.

This implementation does not support the full HASP protocol. The variations are:

- Multileaving is not supported. All the records within a block are assumed to be for the same device.

- Records cannot be continued across transmission blocks.

The I.O.S. HASP system is based on the S.R.C. Daresbury workstation hardware and software configuration. The software executes in a PDP 11 with all peripheral devices interfaced to the CAMAC standard.

The HASP application package executes in a multitasking environment, the executive functions being provided by a Daresbury developed package, MFT11. This provides task

initiation, scheduling by priority, buffer passing, resource control and timing facilities.

The original Daresbury version of the local HASP package provided R.J.E. to the IBM 370/165, two or three Time Sharing Option (T.S.O.) terminals and a 'local' facility to list punched cards.

Considerable hardware and software enhancements have been made by the addition of further peripherals, the generalisation of input and output peripheral tasks and the extension of local facilities.

The system now provides the following facilities:

- o R.J.E. to a number of host computer systems (not simultaneously).
- o Operator's console facilities for job control.
- o 2 or 3 Time sharing terminals on a number of host computer systems (again, not simultaneously).
- o Code conversion of input and output data streams.
- o Local media conversion.
- o Paper tape, magnetic tape, punched card input streams.
- o Paper tape, magnetic tape, lineprinter, terminal output streams.

The devices and facilities supported by the resident system may be determined by entering the VERSION command on the operator's console. The header text "I.O.S. HASP VERSION a/n.n dd/mm/yy" is displayed on the console. Appendix C defines the peripherals and facilities supported by a particular version.

Note that the terminals are logically connected via the workstation and are therefore only operable as time sharing terminals when the workstation is signed on to a host com-

puter system.

2. LOCAL OPERATIONS AND FACILITIES

2.1 HARDWARE OPERATIONS

Loading and Startup

The HASP software system load module can be provided in paper tape or punched card format. It consists of at least three tapes or card decks. There may be additional patch tapes or cards. The loading sequence is:

- o MFT11
- o HASP
- o DUMP
- o Patches

For loading procedures see DP/D/15. Note the difference between PDP11/05 (/10) and PDP11/04 operating procedures.

On the PDP11 console:

- o Set the ADDRESS/DATA switches down.
- o Depress and release the LOAD ADRS switch. ADDRESS/DATA lights should be off.
- o Depress and release the START switch. The RUN light should come, on also bit 0 of the ADDRESS/DATA lights. The header text should be displayed on the operator's console.
- o Turn the key clockwise from POWER to PANEL LOCK (90 deg.).

The header text "I.O.S. HASP VERSION a/n.n dd/mm/yy" is displayed on the console terminal following startup.

At this point, the system is idle and the user has the option of initiating:

- o Signon to a host computer system.
- o Local operations.

Restart

The system may be restarted manually by doing the following :

- o Follow the SHUTDOWN procedure if necessary. Enter the local command .RESTART. If that fails to restart the system, follow the manual procedure detailed below.

On the PDP11 console:

- o Set the ENABLE/HALT switch down.
- o Turn the key anticlockwise from PANEL LOCK to POWER (90 deg.).
- o Depress and release the START switch.
- o Set the ADDRESS/DATA switches down.
- o Depress and release the LOAD ADRS swith. ADDRESS/DATA lights should be off.
- o Depress and release the START switch. The RUN light should come on, also bit 0 of the ADDRESS/DATA lights. The header text should be displayed on the operator's console.
- o TUrn the key clockwise from POWER LOCK (90 deg.).

If the restart procedure fails, try again, or else follow the loading and startup procedure. If that, fails call User Support.

Shutdown

Do the following to shut down the system:

- o If the is signed on to a host computer , logoff any terminals and close down the communication line, as detailed in Section 3.
- o Wait for completion of any local operations.

- At this stage the system is idle and may be powered down or local operations or signon to a host computer system initiated.

Power_Up

- Follow the power up procedure for individual peripherals where necessary, as detailed in Appendix B.
- Switch on the CAMAC crate power supply and the fan tray above the CAMAC crate.
- On the PDP11 console, set the ENABLE/HALT switch down. Turn the key clockwise from OFF to POWER (90 deg).
- If a system load is required, follow the procedure detailed in LOADING AND STARTUP
- If a system load is not required, follow the procedure detailed in RESTART.

Power_Down

- Follow the SHUTDOWN procedure
- On the PDP11 console: Set the ENABLE/HALT switch down. Turn the key anticlockwise from PANEL LOCK or POWER to OFF.
- Follow the power down procedure for individual peripherals where necessary. (Appendix B).
- Switch off the CAMAC crate power supply and the fan tray above the CAMAC crate.

2.2 LOCAL COMMANDS

Local commands are those which setup local peripheral devices for input or output transfers. Typical of these are ; a card listing to the printer , a paper tape copy or a job submission to a host computer. These commands are preceded by a unique character in column one. For commands entered on the operator's console, this is the full stop (.). For other input devices, see table 2.1. All local devices are referenced by a two letter mnemonic, see table 2.1. The local commands can be grouped into three categories.

- o Data transfer/media conversion.
- o Data stream switching and reset.
- o Miscellaneous, such as system queries, peripheral setup.

Commands may be entered in lower or upper case. Various error and information messages may be displayed on the operator's console. These are listed in Appendix E.

Data Transfer

The general form of the command is :

.dvi(parameter string)>dvo(parameter string)

Where :-

dvi - is one of the valid input peripheral device names.

dvo - is one of the valid output peripheral device names

parameter string - is device dependent, (see section PARAMETER ENTRY) and must be enclosed in parentheses.

This command initiates a transfer of data, according to the parameters entered, between the two local peripheral devices. When the input stream is closed and the final record has been passed to the output device, the message 'dvi COPY ENDED' is displayed on the operator's console.

The transfer operation is terminated in a different manner for different devices. (see table 2.1).

Commands are not queued. Once a command has been accepted, further data transfer commands referencing either of the two devices will result in the message 'dv BUSY'. However, the devices may be referenced in a switch command. (see section DATA STREAM SWITCHING & RESET)

Two variations of the data transfer command are used to initiate job entry to a host computer or to setup a local device to receive job output from a host computer.

Remote job entry initiation

Command format:

.dvi(parameter string)>

The output device is assumed to be the host computer via the modem line driver. If the workstation is not signed on to a host computer, the message 'NOT SIGNED ON' is displayed on the operator's console and the command is ignored. The input device, dvi, is started immediately, assuming that the command is error free.

NOTE - If the communication line is not available temporarily, jobs can be written to a magnetic tape for submission to a host computer when communications are re-established.

Device setup for data retrieval

Command format:

.>dvo(parameter string)

In this case the input device is assumed to be the host computer. Again, if the workstation is not signed on, the message 'NOT SIGNED ON' is displayed and the setup command is ignored. The output device may not require to be setup in which case the message 'dv SETUP NOT SUPPORTED' is displayed. Following a successful setup, the data may be retrieved by entering the RJE command appropriate to the particular host computer system (Section 3). If the output device has not been setup prior to initiating the data retrieval, the message 'dvo SETUP REQUIRED' is displayed when the first buffer of data arrives. Further output is suspended until the user has setup the device for output.

NOTE - If signed on to a host computer system, disable the magnetic tape output stream before initiating any local magnetic tape transfers. If the magnetic tape stream is not disabled, any data waiting for output from the host computer will cause the magnetic tape stream to start up immediately the local transfer completes.

Examples of data transfer operations

- o Copy of punched cards to line printer number 1.

  .CR>P1

- o Copy of punched cards to paper tape punch with no code conversion. i.e. EBCDIC coded paper tape required.

  .CR>TP(C=C)

- o Listing of one ASCII coded paper tape on terminal 2.

  .TR(C=A)>T2

- o Submission of punched card job to host computer system, (Assuming the workstation is signed on).

  .CR>

- o Set up of tape punch to receive from host computer system. Data to be converted to ASCII. (Assuming the workstation is signed on)

  .>TP(C=A)

- o Setup of magnetic tape to receive from host computer system.(Assuming the workstation is signed on) Data not coded (i.e. binary or EBCDIC), record length to be 100 bytes, blocking factor of 4:

  .>MT(C=C,R=100,B=400,P=x)

  x - may be either: an integer, in which case the tape is rewound and the file is written at the logical end of tape; or the letter 'F', in which case the tape is moved forward from its current position and then the file is written at the logical end of tape.

- o Copy of paper tape data to magnetic tape. Paper tape code is ASCII and the mag. tape code is also to be ASCII, blocking factor of 5, on a record length of 80:

```
.TR(C=A)>MT(B=400,R=80,C=A,P=x)
```

x - Defined as in previous example.

Any records less than R in length will be padded with spaces in the code C. Any records > R will be truncated.

- o Copy of data on magnetic tape file number 4 to printer number 2. Code is EBCDIC, required record length is 80 bytes, suspected block length is 480 bytes:

```
.MT(R=80,C=C,P=4,B=480)>P2
```

If the block length does not match the physical block length on the tape, the message 'nnnnn BYTE BLOCK(S)' is displayed on the operator's console.

Data_Stream_Switching_and_Reset

Command format:

```
.dv1#dv2(parameter string)
```

The command causes the data stream directed to or from dv1 to be switched to or from dv2.

Only devices of the same type (i.e both input or both output) can be switched. If a data transfer is taking place when the switch command is entered, the switch takes effect when the current block is completed. Both of the devices referenced in the switch command will remain busy for as long as the switch is in effect or until the completion of the data transfer. Only one level of switch is permitted.

The switch may be reset at any time by using an abbreviated form of the command:

```
.dv1#
```

NOTE - 1. When a switch is made from an input device to a second input device, an implicit switch reset command takes effect on the first when end-of-stream is reached on the second. This applies to input devices only. Output device switches must be reset from the operator's console when no longer required.

2. When a switch is made from an output device to the magnetic tape, the transfer to the magnetic tape MUST be allowed to run to completion. On no account should the switch be reset prematurely as the file will not be closed.

Examples of data stream switching

- To submit a job to the S.R.C. IBM 370 with JCL on punched cards and data on paper tape (ASCII coded):

  Load the JCL cards in the card reader hopper, substituting for the data, a card punched with the appropriate switch command. Load the paper tape in the paper tape reader and initiate the transfer from the operator's console .

Operator's Console	Card Reader	Tape Reader
.CR>	//jcl	
	//	
	//G.SYSIN DD *	
	.CR#TR(C=A)	
		paper tape data
	/*	
	//	
	.END	

NOTE - The 'dot' command introducer in column 1 of a card is NOT a full stop but a multipunch character. (see Table 2.1)

- To submit a job as in the previous example but with EBCDIC coded data on file 9 of a magnetic tape in card images and with no blocking of records:

  Load the JCL cards as above with the appropriate switch card and initiate the transfer from the operator's console.

Operator's console	Card Reader	Magnetic Tape Unit
.CR>	//jcl	
	//	
	//G.SYSIN DD *	
	.CR#MT(C=C,R=80,B=80,P=9)	
		mag. tape data
	/*	
	//	
	.END	

NOTE - See note in previous example regarding 'dot' commands on cards.

Parameter Entry

The user must supply parameters for some peripheral device transfers and switch operations. A parameter is a single alphabetic character which has an associated argument. Each parameter defines a transfer feature, i.e. the data code required, record lengths, multivolume transfers etc. Parameters are entered in a string of one or more, each parameter and its argument separated from the next by a comma(,). The parameter is separated from its argument by an equals(=) and the parameter string is enclosed in parentheses. Parameters are not position dependent. The parameter string is decoded from left to right, the scan being terminated when the first error is detected. The various parameters and values are described in Table 2.2

If a device does not require any parameters, the message 'dv NO PARAMETERS' is displayed. This message may also be displayed if a parameter or the terminating parenthesis is omitted.

If a parameter argument is in error or if the equals (=) is omitted, the message 'dv PARM n IN ERROR' is displayed. Where, n is the n'th parameter in the parameter string associated with device dv.

Certain parameters are mandatory (see Table 2.2) e.g. for the paper tape reader, the possible parameters are C (data code) and M (multivolume transfer). C is the mandatory parameter.

If a mandatory parameter is omitted, the message 'dv PARM/S MISSING' is displayed. If a parameter string including the mandatory parameters is entered and the additional parameters are redundant in the context of the command, then the additional parameters are ignored.

Miscellaneous Commands

A list of miscellaneous local commands follows. They apply to the operator's console only, except where indicated. These commands, as are all local commands, are preceded by the local command character appropriate for the device issuing the command.

e.g. For the operator's console, this is the full stop (.). For the card reader, this is multipunch 205. (in column 1)

CLOSE — indicates the operator's intention to close down. It should be entered immediately before the the signoff sequence defined for the particular host computer system.

CR OK — restarts the card reader, if ready, following the detection of an error on a card or a card reader error.

END — closes the input stream of the calling device. Applies to the card reader stream only.

ERRORS — displays the number of line errors (in decimal) since loading the software and since starting the line. Only meaningful if signed on to a host computer.

GO — initiates the signon to a host computer system if not already signed on.

MT OK — restarts mag.tape operations following display of message:

WHERE'S THE TAPE THEN? or

TAPE WRITE LOCKED

MT STOP — Halts a mag.tape read operation. The mag. tape is backspaced to the beginning of the current file.

RESTART — Initiates a complete restart of the local system and should only be used when the communications line has been closed down (See Section RESTART) A 'secret' control character is included in this command.

SIGNON?	queries the signon status. Returns an appropriate message.
TP OK	restarts transfer of data to the tape punch following a punch hardware error e.g. tape tight, broken.
TR NEXT	initiates the transfer of the next volume in a multivolume file from the tape reader.
TR LAST	initiates the transfer of the last volume in a multivolume file from the tape reader.
VERSION?	displays the header text which includes the version type and release. (see appendix C.).

TABLE 2.1

LOCAL DEVICE FEATURES

DEVICE NAME	2 LETTER MNEMONIC	LOCAL COMMAND CHARACTER	TRANSFER TERMINATOR
Card Reader	CR	Multipunch 205	END
Line Printer 1	P1	-	-
Line Printer 2	P2	-	-
Operator's Console	T1	Full stop (.)	
Timesharing Terminal A	T2	ND	-
Timesharing Terminal B	T3	ND	-
Paper Tape Reader	TR	ND	end of tape or timeout
Paper Tape Punch	TP	-	-
Magnetic Tape unit	MT	ND	file mark or error
Drum Plotter	PL	ND	-

ND - Not Defined.

The terminal keyboards are not available as input devices in a local data transfer operation.

TABLE 2.2

PARAMETERS AND ARGUMENTS

PARAMETER	=	ARGUMENT	VALID DEVICES	COMMENTS
C	=	A	TR* TP* MT	Data code is ASCII For Paper Tape, parity is ignored on input and set to one on output.
C	=	C	TR* TP* MT	Data code is EBCDIC (ie copy data as is) also applies to BINARY
M	=	Y	TR	Multivolume transfer required. (Y-Yes)
M	=	N	TR	Single volume transfer required. (N-No)
R	=	n	MT	sets record length 'n'. Must be even and no greater than 160
B	=	n	MT	sets block length 'n'. Must be even, no greater than 2048 and a multiple of R.
P	=	U	MT*	Unload Magnetic tape.
P	=	S	MT*	Scratch Magnetic tape. writes logical end of tape at B.O.T.
P	=	F	MT*	Read/write forward from current position
P	=	n	MT*	Read file n, or write at logical end of tape.

* indicates a mandatory parameter for the specified peripheral.

TABLE 2.3

TIMESHARING TERMINAL FEATURES

FEATURE	AVAILABILITY
Type ahead	Limited
Password Blanking	Yes
Character delete	Yes - DELETE or RUBOUT Key
Line Delete	Control X or LINE DELETE
Logon sequence	Preceded by ESC

3. ACCESS TO HOST COMPUTER SYSTEMS

3.1 GENERAL

The workstation can be used to provide Remote Job Entry (RJE) to any mainframe computer system which supports standard HASP. The access can be over a 'private' 4 wire circuit or over a dial-up connection on the Public Switched Telephone Network.

The following sub-sections describe the facilities available and the general operating procedures for RJE access to the host computer systems used by the Institute of Oceanographic Sciences.

Two additional terminals are supported by the IOS HASP workstation for time-sharing access if a host supports the SRC extension of HASP for time-sharing terminals.

HASP Gateway at IOS Bidston

A HASP Gateway has been installed in a node at Bidston. This provides a number of ports into which a standard HASP workstation can be connected (either by private wire or dial-up). The gateway process performs the necessary conversion to and from Network HASP, thus allowing a traditional HASP station to communicate with any Network HASP service.

A restriction imposed on HASP workstations wishing to connect via the Gateway is that the transmit buffer size is restricted to a maximum of 255 bytes. If this is likely to cause any difficulty, please contact the Data Processing Group at IOS Bidston.

When the remote station signs on, the operator supplies the sign-on code (as required by the host computer) and also the network address of that host. The HASP Gateway opens the required network call and is then effectively transparent to the user until the call is closed.

The network call from the HASP Gateway to the Network is deemed to be 'secure', but the gateway process still has to provide error checking for the link to the HASP workstation itself.

Connection via the HASP Gateway

Certain conventions apply to the sign-on record for HASP workstation connections made via the HASP Gateway at Bidston.
The full sign-on record format is :-

```
             /*SIGNON    stationid[$password] netadd|mnemonic
card column  0           1
             1           6
```

For IOS type workstations, only the variable portion of the sign-on record is required. This is entered on the console, beginning in column one.
e.g.
after the message
** ENTER REMOTE IDENTIFICATION CODE **

```
             stationid[$password] netadd|mnemonic
console      0
column       1
```

The password is an optional feature and can be configured in by request. 'netadd' is the network address of the required host computer, or alternatively, a mnemonic for the required host may be entered.
The currently assigned values for 'netadd' and 'mnemonic' are given in Table 3.1

TABLE 3.1

NETWORK ADDRESSES/MNEMONICS

HOST NAME	NETWORK ADDRESS	MNEMONIC
IOS Bidston Honeywell 66	9111	BIHASP
SRC Daresbury IBM 370		DLHASP
SRC Rutherford IBM 360		RLHASP

3.2 IOS HONEYWELL 66

Introduction

The Honeywell 66 at Bidston does not understand HASP in any form. It, in fact, has its own protocols with very different concepts from those of HASP, or indeed the network.

The approach that has been taken is to create in a node at Bidston a HASP Adaptor process, which can translate between Network HASP and the Honeywell Remote Terminal Interface, or the Remote Batch Interface.

Unfortunately the concepts in these two protocols are so different that it has not been possible to make the Adaptor transparent - rather it is seen by the user as an intermediary.

When a HASP station signs on, it does so not to the Honeywell, but to the HASP Adaptor. Suppose output is required. The remote operator makes a request to the HASP Adaptor, which conducts the appropriate negotiations with the Honeywell. If successful, the Adaptor then negotiates with the HASP workstation for the appropriate output device. During output the data is translated from one protocol to the other.

Once the output stops (which can happen for several reasons) the appropriate connections have to be closed down in a tidy fashion and the various resources in the node recovered.

In addition to remote batch operations, the HASP Adaptor supports the use of the remote console for access to the Honeywell Time-Sharing System TSS.

HASP systems conforming to the SRC HASP extension for additional terminals can also use TSS from Terminals 2 and 3.

Sign-on and Sign-off

To sign-on :

Enter the command .GO

The following message should then appear :-

** ENTER REMOTE IDENTIFICATION CODE **

Enter the sign-on code and network address or mnemonic for the Honeywell 66. See Table 3.1 for current assignments. You may also need to enter a station password.
e.g. Taunton operations would enter :-
T$password BIHASP
The following messages should then appear :-

COMMUNICATION LINE ESTABLISHED BUT NOT STARTED YET
IOSNET-HA01I: HASP ADAPTOR ACCEPTS

Perhaps followed by a Broadcast message from the node operator.

If all the messages do not appear within 5 minutes, contact operations at Bidston.

To Sign-off :-

Wait until all active input and output devices have stopped. Alternatively, in an emergency, force close them with a !ZA command. (See Section on RJE commands).
Logoff any terminal users. The !DV command will display a list of all ACTIVE devices including terminals.
Enter the local command .CLOSE
Enter the RJE command !BYE
Wait for the message :-
COMMUNICATION LINE CLOSED DOWN
to appear. The workstation is then available for local operations or for sign-on to a host computer.

NOTE - if the local .CLOSE is not commanded, the workstation will ultimately attempt to sign-on again.

Job Submission

Jobs may be submitted from the workstation via any of the batch input devices. That is, the card reader or the paper tape reader. The magnetic tape deck can also be used as a batch input device instead of the paper tape reader. A description of the procedure for submitting jobs from the card reader follows. It applies equally to the tape reader.

All jobs for submission to the Honeywell 66 should be headed by
$ SNUMB
and
$ IDENT
cards and terminated by a

$ ENDJOB
card. The last card in a deck should also be followed by a .END card to close the card reader.
A large card deck should be sub-divided for loading in the input hopper of the card reader.

Having loaded a card deck in the reader, enter the command .CR> on the operator's console and press the RESET switch on the card reader.

As each section of the deck is read, remove it from the output stacker before loading the next section.

When the reader starts, the message

IOSNET-HA04I: CR id STARTING
should appear, closely followed by
IOSNET-HA04I: CR id ACTIVE

id will be the two character identifier of the reader as currently known to the HASP Adaptor. The first character is your station id, and the second defaults to 9 for the card reader and 8 for the tape reader. The Wormley card reader would have an id of W9.
The second letter may be changed by using the !ID command.
When the .END card has been read, the card reader should close down and the following messages should appear :-

LINE DISCONNECTED --DIS
IOSNET-HA04I: CR id CLOSING
IOSNET-HA04I: CR id CLOSED

Use the !ST command to examine the status of the submitted jobs in the Honeywell 66.

If GRTS detects an error in either the $ SNUMB or the $ IDENT card, the following messages will appear.

LINE TERMINATED -- S/I
IOSNET-HA04I: CR id FLUSHING

All input will be 'flushed' until the card reader is closed down. The normal CLOSING/CLOSED messages will then appear. The card reader can be closed prematurely by pressing STOP, loading a .END card in the reader and then pressing START. This will avoid the need to wait for all the deck to flush through.

Occasionally if the node is heavily loaded, the message
IOSNET-HA06E: NO CHANNEL FREE

may appear. Try again later when the node may be less busy.

Paper tape and magnetic tape data may be submitted with a job by using the data stream switch command. (See Section on Data Stream Switching and Reset)

Output Retrieval

Output from a job can be retrieved to any batch output device on your workstation either directly from the specific queue to the directed device or by effecting a local switch between two output devices.

The RJE command !RO is used to initiate the retrieval of output from the Honeywell 66.

e.g.
!RO P1 1234T
will cause the print output, if any, for job 1234T to be returned to printer1.
or, more generally,
!RO PL
will initiate the return of all output waiting for the Plotter.

When the command has been entered, the following messages should appear :-

IOSNET-HA04I: P1 id STARTING
IOSNET-HA04I: P1 id ACTIVE
The output should then start printing.

If the printer is in local use or if there is a paper jam during printing at any time, then the message

IOSNET-HA04I: P1 id WAIT DEV

will appear at intervals to remind you that the printer is being waited upon. If the printer does not become available and remains inactive for a finite time, GRTS will time-out and close it down. There may be some output buffered in the workstation. This must be allowed to print off before the printer can be declared CLOSED.

When the output of a job completes or if there is no output waiting from a requested job, the following messages will appear, assuming a printer is involved.

LINE TERMINATED -- ONA
IOSNET-HA04I: P1 id CLOSING
IOSNET-HA04I: P1 id CLOSED

Remember that job output can be requested by SNUMB so that long jobs or 'specials' can be left until lunch-times or some other more convenient period.

Some local devices, such as the magnetic tape deck and paper tape punch, will need to be setup for output. (See Section on Device Setup for Data Retrieval)

Directing Honeywell Output to a Remote Device

Output may be directed to an appropriate HASP remote device by one of several methods:

If the job was input from a remote batch reader (not necessarily a HASP station), the 2nd letter of the ID will be changed inside the Honeywell to 'A'. Thus a job entered at Barry through the Tape Reader (ID of Y8) will automatically be returned to the printer (ID of YA).

Jobs submitted from TSS may be directed to a remote printer by using the appropriate ID in the ROUT option.

Specific reports from a job may be sent to a device by specifying the ID on the SYSOUT card. The SYSOUT control card has the following effect:

$ SYSOUT xx
Send output on-line as a seperate report, regardless of the overall job destination.

$ SYSOUT xx,id
Send output to station id as a seperate report, regardless of the overall job destination. Not more than 3 different IDs may occur in a given job.

$ SYSOUT xx,ORG
Send output to the overall job destination

Mixed Media Output

In the early days a remote device could often produce printed and punched output. Job output containing both types of records was sent to the device which would know whether to print or punch it. Modern workstations require

output for different devices on different streams, or, in Honeywell terms, different IDs.

The problem only arises where non-printer output is generated. In such cases it is necessary to ensure that the main job output is sent to the printer and just the punch (or plotter etc) output goes to the device id. The second form of the $ SYSOUT control card is appropriate.

Note that the JPUNCH TSS command is not appropriate as both the printer report and punch output will be send to the specified ID.

RJE Commands

Device Names

The devices on a HASP workstation are known to the HASP Adaptor by the following mnemonics:

Device Name	Description
CO	Console
P1	Printer 1
P2	Printer 2
TP	Tape Punch
MT	Magnetic Tape Output
PL	Plotter
CR	Card Reader
TR	Tape Reader
T1	Terminal 1
T2	Terminal 2
T3	Terminal 3

Honeywell Remote IDs

All remote devices connected to the Honeywell 66 are known to it by a two character Remote Identifier, referred to as the ID.

As used in IOS, the following conventions apply:

The first character is alphabetic, and identifies the remote workstation. The following list illustrates this, but is not necessarily comprehensive:

First Character	Site
B	Bidston
D	Development
T	Taunton
W	Wormley
Y	Barry

The second character is alphanumeric and defines the particular stream or device within the workstation.

By default, the following associations exist:

2nd Character	Device Name	Description
0 (Zero)	C0	Console
9	CR	Card Reader
8	TR	Tape Reader
A	P1	Printer 1
B	P2	Printer 2
M	MT	Magnetic Tape
P	PL	Plotter
T	TP	Tape Punch
1	T1	Terminal 1
2	T2	Terminal 2
3	T3	Terminal 3

Note that not all workstations are necessarily equipped with all the devices shown. Additionally, some workstations have devices not on the above list.

The two character ID effectively forms a queue for output. The remote operator can associate a particular queue with a particular device as required. For example, Printer 1 is the main print stream used for normal printer output, and users at, say, Taunton would direct their output to TA.

Large print jobs would normally be directed to TB for Printer 2, thus preventing such jobs from unduly holding up the smaller ones.

If the station does not have a second printer, the operator can print jobs from the TB queue on Printer 1. Since the jobs are on seperate queues, proper control of the situation can be maintained.

Although remote terminals attached to a Hasp Workstation have a remote ID as described above (e.g. T1, T2, T3 for Taunton) the system itself uses yet another pseudo-random identifier, starting with a non-alphabetic character.

The remote console performs many functions. It may be helpful to describe them together:

1) Local Hasp commands

These are entirely local, and unknown to the HASP adaptor.

2) Time Sharing

For this purpose the console is known to the HASP Adaptor as device T1, and has a 2nd character remote ID of 1 e.g. for Wormley this would be W1. GRTS generates a seperate ID for use with JOUT etc.

3) HASP Adaptor Commands

Some of these commands can be dealt with entirely by the HASP Adaptor. For !ST and !AB comands, the HASP adaptor needs to query the Honeywell on behalf of the console operator. This it does by signing the console on as device CO with a 2nd character remote ID of 0 (Zero) e.g. at Wormley this would be W0.

When the first !ST or !AB command is made, the console will be signed on as required. Subsequent requests can then be performed straight forwardly. However if no !ST or !AB command if made for a period of 7 minutes, the connection is broken to conserve resources. In this case, a subsequent !ST or !AB command will cause the console to be signed on again. The console may be force-closed by the command !ZA CO in the normal way.

Remote Operator Commands

The HASP workstation operator has a number of commands to control the functioning of the station. These may be either local commands (apply to the workstation directly, and in the case of an IOS station all start with the character '.') or commands to the Hasp Adaptor (these all start with the character '!'). The Hasp Adaptor commands will now be described:

!MS<id1> <message> Send Message

This command is used to send a message to the operator of another HASP Workstation signed onto the Hasp Adaptor.

<id1> is the identifying letter of the station to which the message is to be sent e.g. if station W sends

!MSY Hello Barry

this will be displayed at station Y as:

W: Hello Barry

If <id1> is omitted, the message is sent to the Hasp Adaptor Operator at Bidston. Messages from the Hasp Adaptor Operator are printed at remote sites in the form:

: <message>

The Post Office wishes it to be known that where messages are sent along a route that involves Post Office lines rented to more than one organisation (e.g. NERC and SRC) and the message content is not related to the operation of the computers, this use is technically outside the scope of the licence under which the lines are provided.

!RO <dv> <sn> Request Output

This command Requests Output to device <dv>, possibly qualified by <sn>.

If <sn> is omitted, output starts at the beginning of the first job on the appropriate queue. All other jobs will follow in queue order.

If <sn> is a job sequence number (Snumb), a search is made for that job in the appropriate queue, and is output if found. Output stops after that particular job has finished.

If <sn> is the single letter C, output is resumed from any previously interrupted point - otherwise it behaves as when <sn> is omitted.

When output of a job has completed, its state becomes OUTPUT COMPLETED. In due course the space in the Honeywell will be released, but until that

time the output can be repeated by requesting it by Snumb, even though it does not appear in the queues as WAITING. No assumptions can be made as to how long output will remain available for re-use.

!FA <dv> File Abort

This command can be used to abort the current report being output to the specified device. Output jumps to the start of the next report, if any. The report that is aborted is the one being output from the HOneywell at the time the request is received. Because of the high degree of buffering in the network, this is not necessarily the one actually being output at the remote site at the time the cOmmand is issued.

!FB <dv> File Backspace

This command allows the output on the specified device to be repeated from the last check-point - a useful facility in the event of a paper-wreck on a printer.

!ZA <dv> Zap a device

To force close (Zap) a device.

This causeS immediate closure of the specified device.

As much as possible of any data 'in flight' will be flushed away.

If !ZA is applied to an output stream, the job currently being output at the Honeywell end will be returned to the queues and marked OUTPUT WAITING.

Note that if !ZA is applied to an output stream near the end of a job, and after the last bit has left the Honeywell 66, the last output may be lost but the job marked OUTPUT COMPLETE.

If !ZA is applied to an input stream, the job currently being submitted will not be run and all subsequent input will be flushed away until an End of File condition is sent from the device.

!AB <snumb> Abort Snumb

This command can be used to abort the specified job, if it is associated with the workstation. Jobs in the System scheduler (other than class .HOLD) cannot be aborted, and neither can jobs that have already completed.

!ST Status Request

This command can do one of several things, depending on its form:

!ST

This requests the status of all jobs associated with this station, either because they were submitted from it or because they have output for it.

!ST <id1>0

This request is similar to !ST, but the report is for jobs associated with some other station whose identifying letter was given.

!ST <id>

In this form only jobs associated with the specified <id> will be reported. For example, Taunton could find out which jobs are waiting for plotter output by using the request !ST TP .

!ST <snumb>

This form reports on the specified SNUMB only. Only jobs that are associated with the requesting station will be considered. Jobs in the system scheduler will be reported if there is a match on the first id character.

It is possible for the same SNUMB to be in use by more than one job. In this case only the first job located will be reported.

!DV Report Device Status

This is a request for listing of the state of all devices on the workstation not fully closed.

!ID <dv> <id2> Switch Device ID

This command is used to redefine the 2nd letter of the remote ID associated with the specified device, e.g:

!ID P1 B

given from station W indicates that future output for P1 is to come from the WB queue rather than the normal WA queue.

The !ID command can only be given when the device is fully closed.

!BYE Sign Off Workstation

This is a request to close down the workstation. It will only be accepted if all the individual devices, including terminals, on the station are already closed. Note that an IOS workstation will automatically try and reconnect itself if the operator has not first given it the .CLOSE command.

Messages

This section describes messages that may originate from the network and associated systems. Because of the many sources of messages it is not possible to provide here an exhaustive list. Where practical the source of a message is included, allowing it to be more readily identified.

IOSNEI-HG Hasp Gateway Messages

These messages all originate from the HASP Gateway task that connects standard HASP workstations to the network. The Gateway is transparent to the data traffic once the workstation has signed-on to a host computer. Therefore, these messages will only appear when the gateway connection to the network fails or cannot be made initially. Following the message number is a letter E (indicating an error message) or I (indicating an information message).

IOSNET-HG00I: CALL CLOSED BY HOST

The network call from the gateway has been closed from the network. It may occur as a result of:

* HASP workstation operator action taken to close down the workstation.
* Action taken by the host computer operators.

* An irrecoverable error in the network.

IOSNET-HG10E: INVALID SIGN-ON RECORD

The sign-on record control characters do not conform to the HASP standard. If this messsage appears, contact the central site.

IOSNET-HG20I: WAITING FOR HOST

The first attempt to open the Network HASP call to the Host has failed. The Gateway "idles" the HASP workstation line and attempts to open the call at intervals.

IOSNET-HG40E: INVALID DESTINATION ADDRESS

The destination address field portion of the sign-on record does not match in the gateway's list of valid addresses.

IOSNEI-HA Hasp Adaptor Messages

These messages all originate from the HASP Adaptor that connects HASP Workstations to the Honeywell 66. Following the message number is a letter E (indicating an error message) or I (indicating an information message).

IOSNET-HA01I: HASP ADAPTOR ACCEPTS

The signon record has been accepted by the HASP Adaptor and the station is now "signed on". This message may be followed by a broadcast message or a station specific message.

IOSNET-HA02I: COMMAND ACCEPTED

This is used to acknowledge certain operator commands for which there is no other obvious indication that they have been received.

IOSNET-HA03E: INVALID COMMAND

An operator command has been rejected.

Check for:

* Invalid command
* Command mis-spelt
* Arguments missing or incorrectly formatted or spaced
* Arguments contain 'odd' characters (only alphanumerics allowed)

IOSNET-HA04I: <dv> <id> <status>

This message reports the status of one or more workstation devices as known to the HASP Adaptor.

<dv> is the 2-letter device mnemonic e.g. CR, P1 etc.
<id> is the 2-letter remote ID used for communication with the Honeywell. The first will be the station letter; the second the device letter.
<status> is the reported status, and will be one of:

ACTIVE
The device is busy in the normal way.

BREAKING
A TSS user has signalled 'break', and the action is being carried out. The break request is passed to the Honeywell and any data 'in-flight' is flushed away. This includes commands typed ahead. When the Honeywell has acknowledged the action, the device returns to the ACTIVE state.

CLOSED
The device is logically closed, but a table used to control it (the Device Table) is allocated. Normally a transitory state. It is reported when a device closes down.

EOF
When an input device indicates end of input, it enters the EOF state until this fact has been successfully communicated to the Honeywell, when it reverts to CLOSING.

FLUSHING
The specified device is being 'crash-closed' i.e. any data 'in-flight' is being flushed (thrown away) and resources recovered as quickly as possible. If all resources are recovered, the device is closed. This is the normal response to a !ZA (zap) command, but can also occur if the HASP Adaptor is unable to obtain sufficient resources to handle a particular situation, or if a workstation breaks the HASP protocol.

CLOSING
The specified device is in the process of closing down normally. Data 'in-flight' is being allowed to pass through and resources in the HASP Adaptor are being recovered. When this process is complete the device should be CLOSED. An output device enters the CLOSING state when all eligible output has been received from the Honeywell. An input device enters the CLOSING state when the input device has indicated it has sent its last data (EOF condition) and that fact has been communicated to the Honeywell. A LINE TERMINATED -- DIS message should also be received from GRTS.

IDLE
: The specified device is waiting for output to arrive. At present the Honeywell 66 does not support this situation and closes such a device immediately. The state is thus transitory, and should not normally be seen.

STARTING
: A batch device is in the process of starting up. The logical connection with the Honeywell has been established, but the required input/output operation has not yet started.

WAIT DEV
: The HASP Adaptor wishes to send batch output but the workstation has not yet given it permission to send to the appropriate device. This message is only spontaneously issued if there is unusual delay in allocating the device - perhaps if the device is in use for some other purpose. This message will be repeated occasionally if the situation is not rectified.
This message will also be issued occasionally for an ACTIVE output device if there is an unusual hold-up, e.g. printer run out of paper etc.

IOSNET-HA05E: BAD RCB

A Record Control Byte received from the HASP station is unknown to the HASP Adaptor. Under rare circumstances this could be due to data corruption.

If it is reproducible it indicates an incompatibility between the remote station and the HASP Adaptor.

IOSNET-HA06E: NO CHANNEL FREE

There are defined limits to the number of logical channels between the HASP Adaptor and GRTS. This message is issued if a device cannot be started because all the channels are allocated. Seperate limits apply to batch and timesharing devices, but there is also an overall limit. If this error is encountered, try again when the system is less busy. An input device will enter the FLUSHING state until an EOF is received, so as to shut down the workstation device properly.

IOSNET-HA07E: REJECTED <dv> <id> <status>

The 2nd Remote ID letter of a device can only be changed if that device is closed. This message is used to reject a !ID command when the specified device is allocated within the

HASP Adaptor. The qualifying information indicates the present state, and is further described under message IOSNET-HA04I.

IOSNET-HA09E: CAN'T DO

The HASP Adaptor cannot obtain sufficient resources to perform a required function. If this arises as a direct response to a command, it may be retried later. It is possible for a device to reach a half opened/closed state and then encounter this difficulty. In this case an attempt will be made to close down properly, but things could be left in an awkward state. Please report any such incident.

IOSNET-HA11E: DATA LOST

Irrecoverable loss of data has been detected by the HASP Adaptor. This message should not normally occur except when establishing a connection via network HASP, when it can result from initial synchronisation problems.

IOSNET-HA12E: INVALID DEVICE

An operator command specified a device mnemonic either unknown to the HASP Adaptor or inappropriate for the desired action (output to a card reader etc).

IOSNET-HA13I: ALL CLOSED

The !DV command requests the state of all allocated devices. Only allocated ones are displayed. The above message is issued if all devices are closed, and there would otherwise be no response.

IOSNET-HA14E: CAN'T CONTACT GRTS

The HASP Adaptor is unable to perform the required action because it is unable to contact the Honeywell. If the required action was to start an input device, that device will be flushed, to obtain a tidy shutdown. The above message may be accompanied by a further explanation provided by the HASP Adapter Operator.

IOSNET-HA15E: NCALL IN EFFECT

Similar to IOSNET-HA14E, except that the HASP Adaptor is in contact with GRTS, but the Honeywell 66 operator has instructed it not to accept new remote calls. Exitsing calls

may be maintained.

IOSNET-HA16E:INPUT REJECTED

TSS input is being rejected, because the type-ahead capacity is exhausted.

IOSNET-HA17E: ALREADY CLOSED

This message rejects a commmand to close, backspace, or abort a device that is already CLOSED.

IOSNET-HA18E: STATION NOT SIGNED ON

Rejects a message requiring some other station to also be signed-on to the HASP Adaptor (notably the !MS command).

IOSNET-HA90I: STATION <id1> SIGNED ON

Message to the HASP Adaptor operator indicating that station <id1> has signed on.

IOSNET-HA91I: STATION <id1>SIGNED OFF

Message to the HASP Adaptor operator indicating that station <id1> has signed off.

IOSNET-HA92E: STATION <id1> ABORTED

Message to the HASP Adaptor operator indicating that station <id1> has been aborted - usually because of loss of contact. If contact is lost with a station that had not completely signed-on, the identifier <id1> will be omitted.

GRTS Messages

The GRTS software in the Honeywell front-end processor issues various messages to remote devices. They are described in the Honeywell Remote Terminal Supervisor manual (DD40), but the few normally encountered are explained here in the network context.

program name -

This message is sent to a terminal when it starts up. The user must reply with the name of the service program required. To connect to time-sharing, the reply must be TSS.

If an error is made at this stage, the terminal is liable to be left in a non-responsive state. The HASP workstation operator can rectify this by ZApping the appropriate terminal.

cp disconnects

This message is sent to a terminal to indicate that it is being disconnected on instructions from the central system. This is normal for a time-sharing user who has requested disconnection with a BYE or LOGOFF command. It can also happen on instructions from the central site operator or if the central system is in difficulties.

LINE TERMINATED -- <reason>

A batch device is being closed down for the reason indicated.

<reason> includes the following:

S/I - Missing SNUMB or IDENT card
The first two records of a batch input job must be SNUMB and IDENT records respectively. Note that extraneous information, such as stray characters on paper tape, can cause this error.

ONA - Output not available
No output (or no more output) of the appropriate type is available.

"ID - Duplicate ID
An attempt has been made to start up a batch device for which the two letter remote ID is already in use. A !DV command will list the devices on the station. If a duplicate is not present, some other station could be signed on with the same remote letter.

DUP - Duplicate SNUMBs
The job being submitted has the same SNUMB as one already in the system.

FILE BACKSPACED

This acknowledges a remote operator's request to backspace a file being output.

FILE ABORTED -- OP

This acknowledges a remote operator's request to abort a file being output.

LINE DISCONNECTED -- <reason>

A batch device is being closed down for the reason indicated.

<reason> includes the following:

CP - Central System Disconnects
The central system has terminated the connection - either by central operator request or because of major difficulties.

DIS - Received DIS control record
Disconnection is being made at the request of the remote system. This is the normal situation following receipt of an EOF status on a batch input stream.

Time Sharing System

Access to TSS is available from the Remote HASP console and also from terminals 2 and 3 of systems conforming to the SRC convention, such as the IOS HASP workstations.

To connect to time-sharing, send a null line by entering a carriage return. On IOS HASP stations it may be necessary to use the ESC key before the carriage return is effective.

The user should receive the prompt:

'program name -'

to which the reply is TSS

The normal logon sequence is then followed.

The use of TSS from a HASP workstation differs from a standard Honeywell terminal in the following ways:

Corrections for typing errors on the current line follow the conventions for the workstation, not the standard Honeywell ones. On IOS stations these are:

<del> or <rubout> key	delete last character entered
<cntl X> or <Delete Line>	delete entire current line

The input line length is limited to 80 characters in length.

The user may 'type ahead' if he wishes, i.e. if he is certain what the next entry will be, he can type it before the system has asked for it. Some care is needed with this technique since an error in processing a previous command could alter the inputs required. However, an experienced operator will find this a useful facility, particularly when entering many lines of similar data or text (e.g. in build mode). The HASP Adaptor controls the depth to which the user may type ahead, depending on the resources available. If it is not prepared to accept more, it locks the terminal keyboard until it can. If more input is sent despite this, it will be rejected.

Terminals attached via HASP cannot use the normal break key. Instead, any input line commencing !! will be taken as a break request. When a break request is received, the Honeywell 66 is informed and any output or input (typed ahead requests) in the HASP Adaptor are flushed away. Any output already dispatched to the HASP Workstation will be printed, so the effect is not always immediate.

On a normal Honeywell terminal, input is terminated by a carriage return, which places the print head or cursor over the start of the current line. The resulting output is prefixed by a line feed, which moves the paper up or the cursor down. On a HASP terminal, the linefeed is automatically provided as part of the carriage return action. To avoid double spacing, the appropriate line-feed on the front of the output is dropped by the HASP Adaptor. Certain clever programs (notably QED) may prompt only with a line feed. In this case there will be no visible evidence of the prompt. Under these circumstances the HASP Adaptor sounds the terminal bell instead.

When the system is expecting a password to be entered, the characters typed are not displayed. The cover-up masks used on Honeywell connected terminals are not seen.

When using TSS from the HASP Console, TSS input commencing with '!' (or for IOS stations also with '.') cannot be entered normally as it would be mistaken for a command. Such input is usually intended for the QED editor, and it should be noted that in this case a leading blank may be used to avoid confusion.

On a standard Honeywell terminal a session may be force terminated by the CNTL C code. This does not apply to HASP terminals. The remote HASP operator may force close one of his time-sharing terminals by using the !ZA command on the operators console.

3.3 SRC DARESBURY LABORATORY - IBM 370/165

Introduction

The Daresbury laboratory IBM 370/165 supports a subset of HASP. The I.O.S. HASP Workstation package is compatible with the Daresbury implementation of HASP. For further information on the Daresbury computing facilities, consult the appropriate section of the IOS Computer Users' Guide and the Daresbury Computer Users' Guide.

Sign-on and Sign-off

to signon:

Enter command .GO
Message ** ENTER REMOTE IDENTIFICATION CODE** displayed.
Enter the identifier by which your workstation is known to Daresbury, followed by a carriage return, and wait for the following messages to appear :

COMMUNICATION LINE ESTABLISHED BUT NOT STARTED YET
DNPL07I stationid LINE STARTED

The identifier for IOS Bidston is REMOTE00, stationid is IOS

If all the messages do not appear within five minutes, contact an operator.

NOTE -- You may need to enter additional information if your workstation is connected to a host computer via a Gateway. (See Section 3.1)

to signoff:

Enter stop commands for any active output devices and wait until they have stopped.(see Section on RJE COMMANDS)
Close any input streams.
Logoff any terminal users.
Enter the local command
.CLOSE
Enter the RJE command
$STOP LINE
wait for the message COMMUNICATION LINE CLOSED DOWN to appear.

The workstation is then available for local operations or for signon to a host computer system.

NOTE - if the local close down is not commanded, the workstation will ultimately attempt to signon on again.

Job Submission

Check the jobs to make sure each is terminated with an end of job (//) card and additionally, that the last job is followed by a .END card. Place the card deck in the input hopper of the reader. If the deck is greater than about 7 inches in thickness, divide the deck into smaller decks, no larger than 7 inches.

Enter the command .CR> on the operator's Console. Press the RESET switch on the card reader.

When the reader becomes ready, the jobs will be read in. When the deck has been successfully read remove the cards from the output stacker.

When each job has been successfully read, the messages:
DNPU20I stationid/RD1 JOB jobname SUBMITTED
followed by
DNPL73I jobname QUEUED

or

DNPL75I jobname NOT RUN - JCL ERROR

will appear. There will be a delay between the last card being read and a job being queued. If the delay seems excessive, check that the last card in the deck was an end of job (//) card followed by a .END card.

Paper tape and magnetic tape data may be submitted with a job by using the data stream switch command as detailed in Section DATA STREAM SWITCHING AND RESET.

Output Retrieval

Output from a job can be retrieved by issuing a start command to the appropriate device:

e.g. $S PRINTER1 or $S PRINTER2

to start the appropriate printer;

or $S PLOTTER

to initiate retrieval of plotter output to magnetic tape.

Remember, the local device may need to be setup (see Section Device setup for data retrieval).

The RESET command can be used to shuffle jobs on the output queue to allow them to be printed in any order.

Associated with each line printer, card punch, etc. attached to the 370 is one or more system output (SYSOUT) queues. A SYSOUT queue is also assigned to each remote device, and any output appearing in one of these queues will be processed by the corresponding device.

Two sorts of entries are made in output queues:

- messages generated by the system during scheduling of your job. The destination queue for these messages is defined in the MSGCLASS (message class) parameter on the job card. If MSGCLASS is not specified then the system assumes the class associated with the workstation from which the job was submitted.

- output produced by a job during execution. The destination queue is specified on a DD card using the SYSOUT parameter. The only exception is SYSOUT=A, which is interpreted as being the same class as MSGCLASS. This has the effect that, in the absence of any MSGCLASS parameter on the job card, all CLASS A SYSOUT will be routed to the site from which the job was submitted. Since all catalogued procedures specify SYSOUT=A, the default destination for output from most jobs is therefore the originating site.

If you want to route all of the output from a job to the printer at Daresbury you should specify MSGCLASS=R on the job card. Alternatively, you might run a FORTRAN job and want to receive all output at your workstation except for the output from the G step. In this case you should omit the MSGCLASS parameter from the job card and include:

```
//G.FT06F001 DD SYSOUT=R
```

in the deck.

Other combinations of MSGCLASS and SYSOUT can be used to route the output jobs submitted at Daresbury (or through TSO) to workstations via the queues listed below.

CLASS	STATION	DEVICE
I	IOS	PRINTER1/PRINTER2
J	IOS	TPUNCH
K	IOS	PLOTTER
L	LANC	PRINTER1
M	MANC	PRINTER1
S	SHEF	PRINTER1
F	GLAS	PRINTER1

For additional Q names, see the appropriate section of the I.O.S. Computer Users' Guide and the Daresbury Computer Users' Guide.

RJE Commands

Commands are available to allow you to control the devices attached to your workstation, to enquire about the status of jobs and job queues in the 370, to communicate with the central operator, and to hold, release, cancel and reset the output from jobs submitted from the workstation. All commands begin with the currency symbol, $, followed by the command name (or its abbreviation). Any additional information (job name, device name, etc) must be separated from the command name by a blank. The commands and their abbreviations are:

Command	Abbreviation	Description
$START	$S	activate device
$STOP	$P	stop device or line
$HALT	$Z	halt device
$MESSAGE	$M	send a message to 370 operator, another workstation or T.S.O. user.
$DISPLAY	$D	see full description
$HOLD	$H	hold a job
$RELEASE	$A	release a job
$CANCEL	$C	cancel a job
$RESET	$R	reset output for a job
$DELETE	$T	delete output

NOTE - Please read Section on Recommended operating procedures, and note the restrictions before using any of

these commands.

Device Names

The names which you use to refer to the devices on your workstation are:

PRINTER1	for line printer number 1
PRINTER2	for line printer number 2
READER1	for the card reader
READER2	for jobs submitted from magnetic tape
TPUNCH	for paper tape punch
PLOTTER	plotter output for magnetic tape unit
LINE	can be used to refer to all devices on the workstation.

These may not apply to all IOS type workstations as known to Daresbury.

Device States

The devices attached to your workstation may be in one of four states. The state of a device depends on the availability of input or output for it to process and also on commands which you may have issued to the system. The possible states are:

ACTIVE — The device is currently processing input or output and will continue to do so until the session is terminated or until there is no more input or output to process.

INACTIVE — The device currently has no input or output to process, but it will reactivate itself as data becomes available. An output device for which the automatic start option has not been selected will remain inactive until restarted by a $START command.

STOPPING — A $STOP command has been issued to the device, but all input/output for the current job is being completed before the device stops.

STOPPED — The device has been stopped by means of the $STOP ($P) or $HALT ($Z) command. A $START ($S) command must be issued to reactivate a STOPPED device.

You can determine the state of the devices on your workstation by issuing the $DISPLAY U ($D U) command.

Commands to RJE in the 370

Please read the Section on Recommended operating procedures, before using these commands.

A full description of each command and its operands follows:

$START devicename

The $START command is used to reactivate a device after it has been placed in the STOPPED state. A device is placed in the STOPPED state as a result of a line error, or a $STOP or $HALT command issued either locally or by the 370 operator.

e.g. $START PRINTER1
$S PUNCH

$STOP devicename

The $STOP command causes the specified device to stop at the end of the current job. A $START command must be issued before a STOPPED device will become ACTIVE again.

e.g. $STOP PUNCH
$P PRINTER1

$HALT devicename

The $HALT command causes the specified device to stop immediately. If it is an output device the The $HALT command causes the specified device to output for the current job is saved. If it is a reader the job being read is not run.

e.g. $HALT PUNCH
$Z READER1

$MESSAGE operands

You can use the $MESSAGE command to send a message to the 370 operators, another workstation or a T.S.O. user. The three forms of the command are:

- $MESSAGE message-text The message message-text will be sent to the 370 operators

- o $MESSAGE 'message text',U=uid(,L) The message text, which must be enclosed in single quotes, will be sent to the T.S.O. user, uid. The parantheses indicates an option which allows the message to be stored until the user logs on.

- o $MESSAGE 'message text',W=stationid(,L) The message text, which must be enclosed in single quotes will be sent to the work station stationid, with a similar option as above for logon.

e.g.
```
$MESSAGE ARE YOU THERE.....
$M No
$M 'HELLO FRED',U=UID,L
```

$DISPLAY operands

The $DISPLAY command is used to display the status of jobs and job queues in the 370, of devices on your workstation, and to find the date and time of day. The function performed by the $DISPLAY command is determined by the operands supplied. The possible operands and the corresponding information returned are:

T — the time of day and the date are to be displayed. The date is supplied in the format yy.ddd, where yy is the year (00-99) and ddd is the day of the year (000-366).

A — the system is to display the status of all jobs currently running in the 370.

U — the state of all devices attached to your workstation is to be displayed as they are known to the 370.

USER — the list of Time sharing users currently logged on

Q — a listing of the number of entries on each of the non empty input, hold and output queues is to be displayed. Also included in the display may be the input reader queue (RDRA) and the Time Sharing Option background reader queue (BRDR).

N — a listing of job names on the hold, input and output queues is to be displayed. Also included in the display may be the RDRA and BRDR queues.

Either Q or N may be followed by '=list', where 'list' is any combination of up to four of the following items:

specific input queue name (job class A-0)
SOUT (system output queues collectively)
HOLD (system hold queue)
BRDR (Background reader queue for TSO)

If the list includes more than one item, you must separate the specified items by commas and enclose them in parentheses. If no list value is specified, all 15 input queues, the hold queue and the output queues are assumed.

jobname

the current status of the specified job is to be displayed.

e.g. $DISPLAY T
$D T
$D Q
$D N=(A,D,BRDR)
$DISPLAY MYJOB

NOTE. The number of lines of output which can be produced by the $DISPLAY (or any other) command is limited to 20.

$HOLD jobname

the specified job will be placed on the HOLD queue. It will not be selected for execution until RELEASEd, either by operator command or under program control by another job.

e.g. $HOLD THISJOB
$H OTHERJOB

$RELEASE jobname

the specified job will be released, allowing it to be selected for execution.

e.g. $RELEASE THATJOB
$A HELDJOB

$CANCEL jobname,DUMP
or
$CANCEL jobname,SYSOUT=classname
or
$CANCEL jobname,ALL,DUMP

the first form of the command is used to cancel a job which is either executing or on the input or hold queue. 'DUMP' is optional, and if present will cause an abnormal termination dump to be produced if the job was executing when the command was issued. The second form allows system output of the specified class to be deleted from the output queue. Note the system messages for a job cannot be deleted from the output queue. The third form cancels a job whether in execution, the input queue or the output queue. As before 'Dump' is optional.

e.g. $CANCEL HISJOB
$C THEIRJOB,DUMP
$C OURJOB,SYSOUT=R

When a job is cancelled, it will still appear on the SOUT listing but the user will only receive a message saying that his job was cancelled.

$RESET jobname,type,destination,priority
or
$RESET jobname,type,priority

output of the specified type for job name will be rerouted to the requested destination and/or its priority will be adjusted according to the priority operand. Type should be either PRINT or PUNCH, destination should be either HERE (to route output to the workstation) or CENTRAL (to route the output to the 370), and priority if specified must be either LOW or HIGH. If destination is CENTRAL, then priority may not be specified. If neither destination nor priority is defined, a destination of CENTRAL is assumed. The second form of the command may be used to adjust the order of jobs queued for output at the workstation.

e.g. $RESET MYJOB,PRINT,HERE,HIGH
$R YOURJOB,PUNCH

NOTE: In general, the HOLD, RELEASE, CANCEL and RESET commands will be accepted only for jobs which have been submitted from the workstation. The only exception to this rule is that all output queued for devices on the workstation may be cancelled or reset in the usual way. Jobs submitted through TSO from a terminal attached to a workstation are not considered as having been submitted from the workstation.

$DELETE devicename

deletes output to device for the current step.

e.g. $DELETE PRINTER1
$T PUNCH

RJE Messages

DNPL07I stationid devicename STARTED

Explanation: devicename on workstation stationid has become active. If devicename is 'LINE' the workstation has successfully signed on.

DNPL08I stationid devicename ERROR

either a multileaving block associated with device on station stationid contains erroneous control data or repeated line errors have been encountered.
System action: all operations on the workstation are halted.
Response: If the trouble persists, notify user support.

DNPL09I stationid devicename CLOSED

Explanation: device on station has become INACTIVE or, if a $STOP or $HALT command has been issued for the device it has become STOPPED.

DNPL10I stationid devicename SYSTEM ERROR

Explanation: a system error has occurred associated with processing for the specified device.
System action: the system attempts to continue processing.
Response: note any relevant data and notify user support.

DNPL11I stationid devicename DELAY

Explanation: no data transfers to or from the specified device have taken place for 10 minutes although the device is marked ACTIVE.
System action: the system continues processing.
Response: If the device has become not ready, then ready it. If the device cannot be made ready then issue a $HALT command to place it in the STOPPED state. If the device is a card reader then close it with an end of stream

card (.END).

DNPL12I stationid devicename UNMATCHED OR INVALID RCB

Explanation: a multileaving block associated with devicename on stationid contains a record control byte which is invalid or for which a matching device cannot be found.

System action: the block is ignored and processing continues. All active input and output devices are halted. System operation may be degraded if critical control information was lost.

Response: If the system continues to process normally none; otherwise halt the line and signon again. Check with other users who may be logged on before closing down the line.

DNPL13I stationid devicename FLUSHING

Explanation: the workstation has transmitted data from a STOPPED device.

System action: the 370 ignores the data.

Response: issue a $START command for this device and then resubmit the data.

DNPL26I stationid devicename ABENDSsss/Uuuuu (L)

Explanation:

the processing program in the 370 for handling the specified device has abnormally terminated (ABENDED). The system completion code is sss and the user code is uuuu. If 'L' is present the ABEND occurred during initialisation or termination of the program.

System Action: all operations on the affected device are stopped.

Response: attempt to restart the device. If the trouble persists notify the central operator.

DNPL36I RJE IS STOPPING

Explanation: the central operator has issued a STOP RJE command.

System action: the system effectively issues a STOP command to all devices. All processing will stop at the end of the current job.

DNPL50A SYSTEM ERROR - REENTER COMMAND

Explanation: a system error has occurred during processing of a command entered at the workstation.
System action: the command is ignored.
Response: reenter the command.

DNPL51I COMMAND SYNTAX ERROR

Explanation: the format of a command entered at the workstation is invalid - e.g. no $ symbol, no blank after command name, missing comma, etc.
System action: the command is ignored.
Response: check the format of the command and reenter it correctly.

DNPL52I UNIDENTIFIED OPERATION FIELD

Explanation: the operation field (i.e. the field following the $) of a command could not be identified.
System action: the command is ignored.
Response: reenter the command correctly.

DNPL53I devicename status

Explanation: issued in response to a $D U command. Devicename has the specified status.

DNPL54I DEVICE NOT FOUND

Explanation: a $START, $STOP or $HALT command has been issued but the specified device cannot be found.
System action: the command is ignored.
Response: check the name of the device and reenter the command.

DNPL55I COMMAND NOT APPLICABLE TO LINE

Explanation: a $START or $HALT command has been issued for LINE. The only command which can validly be issued for the LINE is $STOP.
System action: the command is ignored.
Response: issue a $STOP command if this was intended. $HALT commands may be issued to individual devices if necessary.

DNPL56I LINE CLOSING DOWN

Explanation: issued in response to a $STOP LINE command when one or more devices are still active.
System action: the line will be closed down when all devices become INACTIVE or STOPPED.
Response: issue $HALT commands for the ACTIVE devices if required.

DNPL57I START REJECTED-LINE CLOSING DOWN

Explanation: a $START command has been issued, but the LINE is closing down as a result of a $STOP LINE command issued locally or by the 370 operator.
System action: the command is rejected.

DNPL58I START IGNORED - DEVICE ALREADY ACTIVE

Explanation: a $START command has been issued for a device which is already active.
System action: the command is ignored.

DNPL59I COMMAND ACCEPTED

Explanation: a command from the workstation has been accepted and is being processed.

DNPL60I COMMAND IGNORED - DEVICE INACTIVE

Explanation: a $HALT command has been issued for a device which is not ACTIVE.
System action: the command is ignored.

DNPL62I JOB NOT SUBMITTED LOCALLY

Explanation: a $CANCEL, $RESET, $HOLD or $RELEASE command has been entered, but the job in question was not submitted from the workstation (or was submitted from TSO).
System action: the command is ignored.
Response: use the corresponding TSO command if appropriate, otherwise a message can be sent to the central operators requesting that they issue the command on your behalf.

DNPL63I JOB NOT ON type QUEUE

Explanation: a $CANCEL, $HOLD or $RELEASE command has been issued but the job could not be found on the expected queue. E.g. A $RELEASE command was issued, but the job was not on the HOLD queue. type may be one of HOLD, INPUT or OUTPUT.
System action: the command is ignored.

DNPL64I STATION CANNOT HANDLE OUTPUT OF SPECIFIED TYPE

Explanation: a $RESET command has requested that output of a given type is to be routed to the workstation, but the station has no device able to process output of that type.
System action: the command is ignored.

DNPL65I INVALID DESTINATION/PRIORITY

Explanation: a $RESET command has been issued, but the destination specified is neither HERE nor CENTRAL, or the priority was incorrectly specified.
System action: the command is ignored.
Response: reenter the command correctly.

DNPL66I JOB NOT FOUND

Explanation: a $CANCEL or $RESET command has been issued but the job could not be found. N.B. A simple $CANCEL command will not search the output queues for the job.
System action: the command is ignored.

DNPL68I ERROR IN TYPE FIELD

Explanation: a $RESET command has been issued, but the field following jobname does not contain PRINT or PUNCH.
System action: the command is ignored.
Response: reenter the command correctly.

DNPL70I jobname STARTED

Explanation: job jobname (submitted from the workstation) has been selected for execution.

DNPL71I jobname ENDED

Explanation: execution of job jobname is complete.

DNPL72I OUTPUT WAITING FOR devicename

Explanation: output is available for devicename but the device is in the STOPPED state.
System action: the output is queued for processing.
Response: when convenient $START the device.

DNPL73I jobname QUEUED

Explanation: job name has been read into the 370 and is now queued for execution.

DNPL75I jobname NOT RUN - JCL ERROR

Explanation: specified job not run: JCL error.
Response: examine the output, correct the JCL and resubmit the job.

DNPL99I

Explanation: Communication has been established with Daresbury, but the 370 is not accessible.
System action: no RJE processing is possible.
Response: telephone the 370 operators to determine the reason and possible duration of the interruption.

DNPU20I stationid/RD1 JOB jobname SUBMITTED

Explanation: The job jobname has been submitted to the 370.

Timesharing Terminals

All of the facilities of timesharing are available on the three terminals attached to the workstation. However, there are a number of differences between the use of a directly coupled timesharing terminal, and terminals connected via the workstation. The workstation terminal features are summarised in Table 2.3

Under the telecommunications package, 'PARROT' in the IBM 370, each terminal has the following characteristics by default.

- Maximum of 18 lines of continuous output
- Prompt of three asterisks (***), following 18 lines of output
- Exclamation mark (!) or 1 as a pseudo 'break' character. This may be entered following ***, to 'break' a listing or at any other time if the keyboard is enabled.

The three asterisks (***) feature can be removed by the User Support Group at Daresbury if necessary. It need only be used on fast VDU ports.

A two minute wait period is setup for each keyboard when the first character of a line of text is typed. If the line is not completed by the end of this period and a message is waiting for display on the terminal, the line of text is ignored and the message is displayed.

Operator's console (special considerations)

The characters '.' and '$' in column 1 are used for local and R.J.E. commands respectively. Therefore if these characters are required as T.S.O. input on the operator's console, the T.S.O. command, 'PROFILE', should be used, to define a delete character.

e.g. PROFILE CHAR(") followed by
"$P LINE or ".CR>P2
would be entered to T.S.O. as
$P LINE or .CR>P2

Any input sent to T.S.O. when it is not expecting input, will result in the message INPUT REJECTED BY TSO being displayed.

Datasets may be printed at the workstation by adding the parameter SYS(sysoutclass) to the PRINT command

e.g. PRINT THIS.DATA SYS(I)

The OUTPUT command also has some useful features as applicable to the workstation:

e.g. OUTPUT MYJOB CLASS(T) NOPRINT(I)
would reset class T output for MYJOB onto the I queue for printing at the Bidston workstation.

Recommended Operating Procedures

This section defines the do's and don'ts of operating the work station when signed on to the S.R.C. I.B.M. 370 at Daresbury.

The local facilities available on the work station operate without any reference to the IBM 370. However, a data transfer operation can be initiated only if the required peripherals are 'free' i.e. not busy. Furthermore, they will be free, only if the most recent use of those peripherals terminated completely, regardless of whether it was a local operation or a remote one. If the operation was entirely a local one, it is a fairly simple matter to ensure that the devices are freed, i.e. both devices are freed when the input stream is closed. However, the procedure is somewhat more complicated when the peripheral is operating to or from the I.B.M. 370 and the transfer MUST be allowed to progress to a natural conclusion.

Detailed operating recommendations follow:

- $S devicename - where devicename is an input device. This command MUST NOT be used. The quiescent state of input devices is INACTIVE and they become ACTIVE automatically when a job is submitted. e.g. a job submitted via the card reader with the local command .CR> will cause the message DNPL07I stationid READER1 STARTED to be displayed. When the card reader stream is closed by the .END card, the message DNPL09I stationid READER1 CLOSED is displayed.

- $Z devicename - where devicename is an input device This command MUST NOT be used to stop an input device. The effect of this command is that the device is not completely closed, , regardless of the message which is displayed following this command.

- Paper tape punch output from different jobs in the IBM 370 is not identified. Therefore, enter a $STOP com-

mand immediately following a $START command on the paper tape punch. This will enable the output of several jobs to be received one at a time and therefore separated.

The STOPping of the PUNCH is particularly important when the punch has been switched to the magnetic tape. (see Section DATA STREAM SWITCHING AND RESET) As the end of stream also closes down the output device completely, the mag. tape task is able to close the current file. If the stream is not STOPped at the end of each job output, the output from several jobs will be written to the magnetic tape as one file.

- The above problem is not important when receiving plotter output on the magnetic tape. The Calcomp software in the 370 writes stop commands into the plotter output. (assuming that you follow the recommended procedures for plot jobs) The output of several plot jobs will therefore be physically separated when they are plotted on the Calcomp plotter.

3.4 SRC RUTHERFORD LABORATORY - 360/195

Introduction

The Rutherford Laboratory computer system supports a compatible subset of Hasp. Some of the operating procedures and facilities available to the remote user are described here. For more complete information on the computing facilities and the full range of commands available to the remote user, refer to the Rutherford CIGAR and ELECTRIC manuals.

Sign-on and Sign-off

to sign-on :

Enter the command .GO
The message ** ENTER REMOTE IDENTIFICATION CODE ** is displayed.
Enter the identifier by which your workstation is known to Rutherford, followed by carriage return, and wait for the following message to appear,

COMMUNICATION LINE ESTABLISHED BUT NOT STARTED YET

The identifier for IOS Bidston is REMOTE51, for SMBA Oban, REMOTE78

NOTE -- You may need to enter additional information if your workstation is connected to a host computer via a Gateway. (See Section 3.1)

to sign-off-:

Enter stop commands for any active output devices and wait until they have stopped. (see the Section on RJE commands).
Close any input streams.
Logoff any terminal users.
Enter the local command .CLOSE
Place a /*SIGNOFF card followed by a .END card in the card reader and enter the local command .CR> to submit the sign-off card to Rutherford. Wait for the message COMMUNICATION LINE CLOSED DOWN to appear.

The workstation is then available for local operations or for sign-on to a host computer system.

NOTE - if the local close down is not given, the workstation will ultimately attempt to sign-on again.

Job_Submission

Job submission follows the same general format as for Daresbury. The messages received from Rutherford are different of course. Refer to the Rutherford manuals for descriptions of the messages.

Two messages which can be mentioned are :

$*JOB nnnn ON RMrr.RD1 -- jobname 'jobparameter'

which declares that the job card at least, is valid, and that the job has been allocated a job number, nnnn. The job number may be required for some of the commands discussed later.

The message-:

$ RMrr.RD1 SKIPPING

will appear if the job card is missing or invalid.

Output_Retrieval

Output from a job can be retrieved by issuing a start command to the appropriate device :

e.g. $S RM78.PR1 or $S RM78.PU2

to start printer1 or punch2 on workstation REMOTE78. Remember that certain local devices may need to be setup for code translation or blocking factor etc. (see the Section - Device Setup for Data Retrieval)

Jobs producing large amounts of output can be printed at 'convenient' times by using the special forms facility. The job card should contain the forms code to direct the bulk output to the specified forms queue. The printer can be 'set' to retrieve the output from that queue when convenient. (see the CIGAR manual)

Print output of jobs submitted from the workstation is automatically returned to the workstation unless specifically routed elsewhere. To direct or route output to another site, insert the following card after the job card :

/*ROUTE PRINT REMOTEnn
or
/*ROUTE PUNCH REMOTEnn

NOTE - 2 spaces after ROUTE, 1 space after PRINT or PUNCH. Punched card output from a job will be punched at Rutherford unless you route it back to your workstation.

ROuting of output to a specific printer or punch in this manner is not possible. However, by using the special forms parameter, output can be queued for retrieval after a specific device has been assigned or 'set' to receive it. TO direct specific output from a job to a special forms queue, you must enter the forms code on the SYSOUT card associated with that stream.

Consider the situation where a plotter is attached to a workstation. For operational reasons it may be undesirable to leave it permanently on line. For example, similar pen and paper requirements of users jobs may be grouped or classified together. So all jobs producing plotter output could direct it to a special forms queue. (see the Rutherford CIGAR manual for details of coding the 'forms' parameter). The '$T' command, entered on the console, can then be used to set the appropriate device to retrieve the output from that forms queue.

e.g.
The following SYSOUT card will direct 'punched card' output to forms queue 900.

```
//FT07F001 DD SYSOUT=(B,,900)
```

When the job has run, the command

```
$T RM78.PU2,F=900
```

will set the second punch (physically, the magnetic tape unit on IOS type workstations) to receive output from forms queue 900.

The commands

```
.MT#PL                    (For IOS type workstations only)
$S RM78.PU2
```

should then be entered to start the 'secOnd punch'.

NOTE
The $T command should only be entered when the device is DRAINED.
On IOS type workstations, the supported plotter is configured as the third punch. The local switch command is therefore necessary to switch the output from the device which is configured as the second punch (the magnetic tape unit) to the plotter. This is only necessary if the devices configured for the workstation at Rutherford differs from the physical configuration.

RJE Commands

Commands are available to allow you to control the devices attached to your workstation, to enquire about the status of jobs, job queues and devices, to communicate with the central operators and other remote operators, to hold, release and cancel jobs, and to modify the status of attached devices.

The workstation console operates in 'HASP' mode by default. In this mode, all commands begin with a $ followed by the command and the necessary operands. The other commands are of the form '++c', where c is the command type. These appear in the Rutherford CIGAR manual.
The console can be switched from HASP mode to ONLINE mode and vice verce by entering :

+++ to switch to ONLINE mode
++- to switch to HASP mode.

When in online mode, the console behaves as an ordinary timesharing terminal.

A typical '++c' command is :
++H CHANGE JOB=nnnn,ID=yours,ACCT=youracct,PRI=10
which would change to 10, the priority of jobnumber 'nnnn', under id 'yours', account number 'youracct'.
Another example would be :
++H STATUS JOB=nnnn
which would display the status of jobnumber 'nnnn'.

A description of the HASP mode commands follows.

COMMAND	DEFINITION	OPERAND TYPES
$A	RELEASE	Specific jobs
$B	BACKSPACE	Printers
$C	CANCEL	Device functions or jobs
$D	DISPLAY	Lines, Remotes, Messages Jobs, Queues or Initiators
$E	RESTART	Device functions
$F	FORWARD SPACE	Printers
$H	HOLD	Specific jobs
$I	INTERRUPT	Printers
$N	REPEAT	Device function
$P	STOP	Device or job
$R	ROUTE OUTPUT	By Routing Group or Job
$S	START	Device
$T	SET	Device
$Z	HALT (Immediate)	Device

Device Names
The names which you use to refer to the devices attached to your workstation are :

RMnn.PR1	For line printer 1
RMnn.PR2	For line printer 2
RMnn.RD1	For card reader 1
RMnn.RD2	For magnetic tape unit (used as a second reader)
RMnn.PU1	For paper tape punch
RMnn.PU2	For magnetic tape unit

These may not apply to all IOS type workstations as known to Rutherford. 'nn' is the 'Remote Number' of your workstation.

Device States
The devices attached to your workstation can be in one of four states :

ACTIVE — The device is actively performing a function.

INACTIVE — The device is available to perform a function, however, no jobs are available for the device.

DRAINING — The device is actively performing a function, but upon completion will not begin a new activity.

DRAINED — The device is not performing a function and will not do so until the operator starts the device.

The commands and the operands available for each are listed below :

$D F
Display the number of jobs queued for output awaiting special forms.

$D I
Display classes and status of initiators.

$D job-list
Display information on specified job(s)

$D LNEnn
Display devices on HASP RJE line 'nn'

$D Mr,message
Display message at remote terminal 'r' if r=0, the message is displayed at the central

operator's console

$D N,queue

Display job information on queued jobs. 'queue' can be :
XEQ for jobs awaiting execution
XEQ,class for jobs awaiting execution in the specified class
PRT jobs waiting for print
PUN jobs waiting for punch
HOLD jobs waiting for any activity and in HOLD

$D Q,queue

Display number of jobs queued
'queue' is as for $D N

$D RMr

Display devices on remote 'r'

$A job-list

Release specified job(s) from the HOLD queue

$C job-list

Cancel specified job(s)

$H job-list

Place specified job(s) in HOLD state

$P job-list

Stop specified job(s) after current activity

$B device-list,pages
or
$B device-list,D

Backspace printer(s) number of pages or to beginning of Data set (D). Pages defaults to 1.

$C device-list

Cancel current activity on device(s)

$E device-list

Restart current activity on device(s)

$F device-list,pages
or
$F device-list,D

Forward space printer(s) number of pages or to end of Data set (D). Pages defaults to 1.

$I device-list

Interrupt current activity on specified device(s)

$N device-list

Repeat current activity on specified device(s)

$P device-list

Stop (Drain) specified device(s) at the end of current activity, if any.

$R type,for-id,to-id

Route output of jobs destined for the destination 'for-id' to the destination 'to-id'.
for-id can be Jnnnn or RMnn remote station number
to-id can be LOCAL implying all output is routed to RL, or RMnn to another remote station.
type can be ALL, PRT for print output or PUN for punch output.

$S device

Start the specified device

$Z device-list

Halt the specified device(s) immediately. This should not be used on input devices such as card readers.

$T device,C=1
or
$T device,F=R
or
$T device,F=n

Set the specified device to perform the requested function
C=1 applies to printers and implies that all the carriage control functions are to be reduced to single line spacing for the duration of the current job only.
F=R applies to printers and punches and sets the device to receive output on standard forms.
F=n applies to printers and punches and sets the device to receive output on special forms n. Where n is a one to four digit number.

job-list may be :

'jobname1,jobname2,...' - a list of jobs by jobname, each seperated by a comma, the whole list enclosed in single quotes.
or
Jmmmm,Jnnnn,... - a list of jobs by job number as allocated by the system when submitted, each seperated by commas.

device-list may be :

RMrr.dv1,RMrr.dv2.... -- a list of devices dv attached to your workstation RMrr, each separated by commas.

Job numbers are allocated by the system when jobs are submitted and are therefore unique within certain time constraints. Job numbers should therefore be used in preference to job names for any commands on a single job which may have the same name as others in the system.

APPENDIX A

CAMAC CRATE STATION ALLOCATION

Station Number	CAMAC Module	*Source	Type Number
1	Reserved		
2	Card reader	D	EC364
3	Paper tape punch	G	TP0801
4	Paper Tape Reader	G	TR0801
5	Synchronous Modem Driver	D	EC371 or EC422
6)	Tally line printer driver	D	EC366
7)	(Printer No. 1)		
8	Quad terminal driver Console (T1) & T2,T3	N	9086 or 9045
9	Interval timer	D) S)	EC384 1412
10	Output register (Plotter)	G	0D2403/2407
11	----------		
12)	Magnetic Tape Unit	N	SE8000/
13)			CS0042/IOS
14)	Tally line printer driver	D	EC366
15)	(Printer No. 2)		
16	----------		
17	----------		
18	PDP11 Multicrate Terminator	D) S)	EC374 1593
19)	PDP11 Single crate DMA	S	1543
20)	Controller		
21	Crate LAM grader	D) S)	EC370 1582
22	----------		
23)	PDP11 Multicrate Controller	D) S)	EC372 1534
24)			

* N - Nuclear Enterprises
G - GEC Elliott Automation
D - SRC Daresbury Laboratory.(some produced by Sension Ltd.)
S - Sension Ltd

APPENDIX B

PERIPHERAL OPTIONS/OPERATING PROCEDURES

This appendix lists the general features of the supported peripherals and defines operating procedures where necessary. The procedures cover aspects such as, overheating, the effect of mismatch of parameters, power up and down etc. The manufacturer's manuals should be consulted for definitive descriptions and operating procedures.

Line printer

The line printer supported by the workstation is a Tally Ltd 2000 series, optionally with upper and lower case character sets and overprint/underscore capability. The characters are formed in a 7x5 or a 9x5 dot matrix and the printer operates at a speeds of up to 200 lines a minute. The system is capable of supporting a total of two line printers.

The main on/off switch is located at the rear of the printer and there is a secondary on/off switch in the switch panel at the top right hand corner of the printer. Make sure the PRINT switch is up before switching the power on. If the printer is switched on with the PRINT switch down, serious damage could occur.

To feed paper, the PRINT switch must be in the raised position, and for operation to Daresbury, the 8 LPI switch should be down. Remember to return the PRINT switch to the down (on line) position after retrieving your output.

After loading fresh paper, press FORM FEED and align the paper folds halfway up the column marks on the perspex platen.

The paper control loop is an 8 track melinex loop of 132 holes length. There are 2 pages per loop defining a page as a maximum of 66 lines. VFU1 responds to the top of form and lags by 5 holes VFU8 which defines the top of the page.

Card reader

The card reader supported by the workstation is a Documation model M6001. Problems will occur with the standard version of this reader if an attempt is made to read cards which have been clipped by a verification process. A modification can be applied (Documation Option 02) which disables the dark check on column 81. This modification has been applied to the Bidston card reader (ser no. 7510138).

The main on/off switch is located on the rear of the reader. The other control switches on the rear should be set as follows:

SHUTDOWN - set to AUTO
MODE - set to REMOTE

The card reader may not begin to read a deck following the pressing of the RESET button and entry of the transfer command. This is because of the simultaneity of the two operations. Press the RESET button again to initiate the reading.

The card reader separates the cards in the leading 10 mms or so by blowing a jet of air on to the deck. If you attempt to load cards whilst the reader is operating, this riffling action will be impaired and could result in the misreading of cards or 'pick check' errors.

Similarly, if you attempt to remove cards from the stacker whilst the reader is operating, you could cause a jam or a 'stack check'.

The reader can be stopped in flight at any time by pressing the STOP button. This allows you to load more cards. To restart, simply press the RESET button.

Paper tape punch

The paper tape punch supported by the workstation is a Facit Model 4070 which runs at maximum of 150 characters a second. Power is applied by pressing the rocker switch POWER ON and depressing the rocker switch DC ON. The green light should then come on.

Before initiating a punch operation, press the FEED HOLES rocker switch for a few seconds to clear a possible sticking tape problem and to punch some blank leader tape.

The indicator light TAPE LOW is a warning. Tape operations are not inhibited until the ERROR light comes on. This indicates no tape, tape tight or broken tape.

When used with data code A (ASCII), a carriage return and line feed are appended to each record.

Paper tape reader

The paper tape reader supported by the workstation is a Lynwood Model ATR 2 with a buffer modification for CAMAC. Power is applied by pressing the button marked 0. The tape may be spaced forward by pressing the button marked <. The reader has a maximum operating speed of 500 characters a second.

The reader MUST be switched off after use to avoid cooking it.

When an operation involving the reader is initiated, the reader will timeout after a few seconds if it is not switched on or if it runs out of tape. However, the tape drive clutch will still be engaged. Wait until one of the following conditions is satisfied and then pass a standard finger through the light beam to disengage the clutch.

- TR WAITING - message displayed when engaged in a multivolume transfer.
- TR COPY ENDED - message displayed when tape copy operation completed.
- When tape reading stops and reverts to card reading in a switch operation.

When used with data code A (ASCII), the parity bit is ignored, a line feed must terminate each record. Nulls, carriage returns and deletes are ignored and the maximum length of blank tape is 1 metre.

When used with data code C (copy, binary or EBCDIC), every character is significant including null tape. Data is packed in 80 byte records.

Magnetic_tape_unit

The magnetic tape unit supported by the workstation is a 9 track 800 bpi SE Labs Model SE8000.

The main power on/off switch is located on the front of the magnetic tape deck. A diagram located inside the tape deck perspex cover shows the threading procedure. The rollers on the tape tension arms have flanges on their outer edges which can damage a tape if threaded incorrectly.

When the tape has been threaded with a few turns on the take up spool, close the cover, press the LOAD button once to take up the tension, then again to position the tape at BOT. Then press the ON LINE switch. When the LOAD button lights, the tape is physically positioned at BOT and is available for use. The WRITE ENABLED light indicates whether or not a write permit ring is fitted to the tape spool.

Once a tape has been mounted, and switched to ON LINE, the MT commands must be used for all operations, including UNLOAD (P=U). This ensures that the software is re-initialised correctly for each operation.

To dismount a tape, use the UNLOAD argument of the P parameter (P=U), wait for the ON LINE light to go out, then press REWIND and remove the tape when it rewinds off the take up spool.

The RESET button initialises the tape deck hardware and should only be used when the deck is powered up initially or in an emergency.

The maximum size of data block which can be written or read is 2048 bytes and tapes are assumed unlabelled for read and will not be labelled when written.

The writing of a file to tape takes place at the logical end of tape, this being defined by 2 consecutive file marks following the file mark terminating the last file.

A fresh tape MUST ALWAYS be initialised to have the logical end of tape positioned at BOT. This is achieved by using the SCRATCH argument of the P parameter (P=S).

If the R parameter does not match the physical record length, the following occurs:

Write operation where R > physical record length, the record length is truncated to R.

Where R < physical record length, the record is padded to R in the specified data code, C.

The final block is not padded and therefore may be shorter than the other blocks in the file.

Read operation - as the data records are not separated on the tape, the R parameter defines the record length.

Where the B parameter does not match the physical block length, the physical block length is displayed on the operator's console and is used by the software to unpack the data records for each occurence of a mismatch.

Modem

The modem or line driving device supported by this workstation must conform to the CCITT V24 or EIA RS232B standards to provide Binary Synchronous communications over a telephone circuit.
The workstation can be used for communicating with a host computer system via either a 4 wire private circuit (Tariff T line) or the 2 wire circuit of a dial-up connection over the Public Switched Telephone Network. In either case, the modems at both ends of the communications link must be compatible not only in signalling rate but also in modulation technique. The current system can support synchronous communications up to 4800 baud.

Terminals

Terminals, including the console, connected via the workstation should be set to full duplex, zero or no parity and the appropriate speed. There is no real advantage to using the terminals at a speed setting of greater than 2400 baud.

APPENDIX C

IMPLEMENTATION STATUS

The facilities and peripherals supported by a particular version of the local HASP system may be determined by entering the local command .VERSION on the operator's console. The header text 'I.O.S. HASP VERSION a/n.n dd/mm/yy' is then displayed. The letter 'a' denotes the peripherals supported, the digits 'n.n' the release, and 'dd/mm/yy' the date of release. There may be additional information concerning patch levels.

PERIPHERALS	A	B	C	D	Y	Z
Operator's Console	x	x	x	x	x	x
Paper Tape Reader	x	x	x	x	x	x
Paper Tape Punch	x	x	x	x	x	x
Line Printer One	x	x	x	x	x	x
Card Reader		x	x	x	x	x
Line Printer Two			x	x	x	x
Time Sharing Terminals				x	x	x
Magnetic Tape Unit					x	x
Incremental Drum Plotter						x

x - indicates support for that peripheral.

Version 1.0 is the first release and includes all the facilities for the specified peripherals in this handbook, with the following restrictions:

Terminal keyboards

These operate one line at a time, including the operator's console. Therefore, until a line of text has been digested completely, another line may not be entered. Where entries for a host computer system are concerned , this means that the line of text has to be transmitted to and acknowledgement received from the host computer before the next line can be entered.

A problem exists when communications with the host computer have been lost and the local system has not yet attempted to signon again. If a line of text intended for the host computer is entered in this in between period, that keyboard will 'lock up' and further lines of text cannot be entered. If that keyboard is on the console , then local operations cannot be initiated until the signon has been attempted or the system has been restarted.

Magnetic tape unit

The following is a list of MT operations which are invalid but do not cause an error message to be displayed on the operator's console.

```
.MT(parameterstring)>MT(parameterstring)
.MT#MT(parameterstring)
.MT#dvi(parameterstring)
.MT#dvo(parameterstring)
.MT(P=U,remainderofparameterstring)>DVO
.MT(P=S,remainderofparameterstring)>DVO
```

Card reader

The card reader task will not accept binary cards.

Version a/1.1

A list of modifications follows:

1. The transmit buffer size has been reduced to 255 bytes to allow the connection of the workstation to a packet switching network.

2. The sign-on procedure has been changed so that the operator may select the host computer system. (See Section 3). If the line is restarted automatically, the current sign-on code is re-used.

3. An additional command has been introduced to stop mag. tape read operations.

Version 2.0

1. Support introduced for NE9045/NE9086 quad terminal interfaces.

2. Support introduced for Benson Incremental Drum Plotter.

3. Overprint introduced for Tally line printer.

4. Bugs fixed on terminal backspacing.

5. Bugs fixed on printer carriage control.

APPENDIX D

HASP CONTROL DEFINITIONS

DEVICE	RCB	SRCB	FCS	STANDARD HASP NAME
CARD READER	93	80	0800	READER1
LINE-PRINTER 1	94	80	0800	PRINTER1
LINE-PRINTER 2	A4	80	0400	PRINTER2
CONSOLE KEYBOARD	92	80	0040	CONSOLE
CONSOLE SCREEN	91	80	0040	CONSOLE
TERMINAL 2 KEYBOARD	9E	81	0100	
TERMINAL 2 SCREEN	9D	81	0100	
TERMINAL 3 KEYBOARD	9E	82	0008	
TERMINAL 3 SCREEN	9D	82	0008	
PAPER TAPE PUNCH	95	80	0001	PUNCH1
MAGNETIC TAPE (READ)	A3	80	0400	READER2
MAGNETIC TAPE (WRITE)	A5	80	0002	PUNCH2
INCREMENTAL DRUM PLOTTER	B5	80	0004	PUNCH3

All values are in Hexadecimal.

When a device is acting for another device, i.e. where a stream switch has taken place, the acting device assumes the control values associated with the original device.

APPENDIX E

LOCAL ERROR AND INFORMATION MESSAGES

This appendix defines the conditions under which each locally generated message is displayed on the operator's console together with the system action and any required user action.

Variable portions of messages are indicated by lower case characters. Messages specific to a particular device or aspect of the workstation are grouped under a common heading.

Card Reader

CR ATTN - LAST SENT
card image

where card image shows the last card successfully read. This message can appear if:

The HOPPER CHECK indicator on the card reader is lit and the last card read was not an end of stream (.END) card.

CR ATTN - READER ERROR LAST READ
card image

where 'card image' is the card which was being read when the error ocurred or the last card read successfully. The status indicator on the card reader may indicate the error. Possible causes are, warped or damaged cards.

System action: the card reader enters a wait state.

User action: replace the card in the input hopper, press RESET, wait for the RESET switch to light green, then type;

```
.CR OK
```

to continue reading the deck. If the card reader error persists, repunch the relevant cards.

ILLEGAL CODE AT ? IN:
card image

The specified card has an invalid punched character. The character '?' indicates the

columns containing an invalid character.
System action: the card reader enters a wait state.
User action: Repunch the card, press RESET, wait for the RESET switch to light green, then type:

.CR OK

to continue reading the deck.

Line_Printer

Pn ERROR

the indicated line printer is not available for any of the following reasons:

- o the line printer is offline, i.e. both the PRINT & ON switches are not depressed.
- o the line printer has run out of paper, in which case the line printer will whistle at you.
- o the line printer has been switched off at the POWER switch on the back panel.

System action: no more lines can be printed until the fault is corrected
User action: correct the fault and the line printer should restart automatically.

Paper_Tape_Reader.

TR WAITING

displayed when the paper tape reader has timed out or run out of tape in a multivolume transfer operation.
System action: the tape reader enters a wait state.
User action: initiate the next or the last paper tape transfer with the command .TR NEXT or .TR LAST as appropriate.

Paper_Tape_Punch

TP ERROR

displayed if a tape punch error is detected e.g.

- o Tape tight
- o Tape broken
- o Tape punch not switched on
- o Tape punch to interface cable not connected.

System action: no more data is punched until the error has been corrected.
User action: correct the error & enter the command .TP OK. It may be necessary to restart the operation depending on the action taken to correct to the error.

TP SETUP REQUIRED

displayed when the PUNCH stream has been started for receipt of output from the host and not setup locally.
System action: the punch task enters a wait state.
User action: setup the punch as in Section on Device setup for data retrieval.

Communications_line

MODEM NOT READY

displayed following a signon attempt if the modem is not in a ready condition. e.g.

- o Modem not switched on
- o Modem to interface cable not connected
- o Remote modem not in a ready state or break in GPO line
- o On a dial-up connection, the DATA button must be pressed at all times after dialling through to the host computer.

System action:
- o if following a .GO command, the system waits for another signon.

- o if following an attempt by the system to signon automatically after a LINE ERROR or repeated MODEM TIMEOUT messages the system retries.

User action: correct the fault and attempt to signon again or call User Support.

LINE ERROR

displayed if 20 consecutive NAKS (negative acknowledgements) have been transmitted or received when attempting to transmit or receive the same block of data.

System action: the system attempts to signon to the host computer again.

User action: any jobs in transit when the error occured must be resubmitted. If the error repeats, notify User Support.

MODEM TIMEOUT

displayed when no response has been received from the host computer. If approximately 5 of these messages occur in succession, telephone the host computer site to determine the reason and possible duration of the interruption.

ATTEMPTING TO RE-ESTABLISH CONTACT WITH REMOTE COMPUTER

displayed after the message LINE ERROR and tenth consecutive display of the message MODEM TIMEOUT.

System action: the workstation attempts to signon again.

COMMUNICATIONS LINE ESTABLISHED BUT NOT STARTED YET

displayed when communications to the host computer site have been established. It does not imply communication to the mainframe.

COMMUNICATION LINE CLOSED DOWN

displayed when the communication line has been closed down following a .CLOSE, and the line has been 'dropped' by the host computer.

ddddd TRANSMIT ERRORS SINCE LINE STARTED
ddddd RECEIVE ERRORS SINCE LINE STARTED
ddddd TRANSMIT ERRORS SINCE WORKSTATION LOADED
ddddd RECEIVE ERRORS SINCE WORKSTATION LOADED

displayed in response to the .ERRORS? command. This message is only meaningful if the workstation is signed on to a host computer. Up to 20 transmit errors may be logged during a sign-on/off sequence.

DATA LOST

displayed when a block has been received with an invalid sequence number.

HASP TRYING TO SIGN ON

displayed approximately every 30 seconds while the workstation is attempting to signon to a host computer.

ENTER REMOTE IDENTIFICATION CODE

displayed following a .GO command to initiate sign on to a host computer.

System action: waits for entry of appropriate sign on code.
User action: enter valid sign on code (see section 3)

AUTO SIGN ON

displayed when the workstation is attempting to sign-on to a host computer following a line fault.
User action: Wait until the sign-on sequence is completed before initiating any operations on the host computer.

Magnetic Tape

WHERE'S THE TAPE THEN?

displayed when the mag. tape has not been mounted on the mag. tape deck or is offline.

User action: Mount the mag. tape and switch to on-line. Then enter the command .MT OK to restart the operation.

TAPE WRITE LOCKED

displayed if a mag. tape write operation has been commanded, but write enable ring is not fitted to the currently mounted mag. tape.
User action: Fit write enable ring then enter the command .MT OK to restart the operation.

REWIND ERROR

Displayed if the software was unable to rewind the currently mounted mag. tape.
User action: Rewind the tape manually and notify User Support if the trouble persists.

ERROR IN FINAL BLOCK

displayed if an error occurred whilst writing the final block. A preceding message contained the file number and number of blocks written. The most likely cause, is a hardware error.
User action: Re-run the job and notify User Support if the trouble persists.

FILE INCOMPLETE

displayed if an error occured whilst writing a block. A preceding message contained the file number and number of blocks written including the block in error. The most likely cause, is a hardware error.
User action: Re-run the job and notify User Support if the trouble persists.

TAPE FULL

displayed following a read/write attempt at the physical end of tape.
System action: if a write action, the file is closed.
User action: if a write operation, re-run the job to a fresh tape.

FILE NO. fffff WRITTEN
nnnnn BLOCK(S)

displayed when file number fffff (in decimal) has been written. May be accompanied by the message ERROR IN FINAL BLOCK.

System action: file is closed.

User action: re-run the job if necessary and notify User Support if final block error persists. Else note the file's attributes for future reference.

FILE MARK READ/WRITE ERROR

displayed when unable to read or write a file mark, either when opening or closing a file. Most likely a hardware error.

User action: notify User Support if the problem persists.

FILE NO. fffff READ
nnnnn BLOCK(S)

displayed when a read operation on file fffff has been completed.

MT READ ERROR

displayed when the mag. tape is unable to read the tape any further. This may occur when attempting to open a file for read or write or when reading a file.

User action: re-run the job and notify User Support if the trouble persists.

nnnnn BYTE BLOCK(S)

displayed when the physical block length does not match the block length specified in the command.

System action: the physical block length is used.

fffff FILES ON TAPE

displayed when a read of say the 10th file has been requested and there are less than 10 files on the tape. A read command may be used in this fashion to count the number of files on a tape. be used to count the number of files on the tape.

BAD TAPE

displayed when parity error occurs on writing.
System action: The operation is terminated. The mag.tape task will attempt to write the current block several times before issuing this message.
User action: If the problem persists after cleaning the tape deck head, call operations.

MT SETUP REQUIRED

displayed when output retrieval from a host computer has been initiated without setting up the mag. tape.
System action: the mag. tape task enters a wait state.
User action: setup the mag. tape as detailed in Section on Device setup for data retrieval.

Console command messages.

I.O.S. HASP VERSION a/n.n dd/mm/yy

displayed in response to the .VERSION? command. See Appendix C for details.

SIGNED ON TO MAINFRAME

displayed in response to a .SIGNON? query on the console or if an attempt is made to signon with the .GO command when the workstation is already signed on to a host computer.

NOT SIGNED ON

displayed in response to a .SIGNON? query on the console when the workstation is not signed on to a host computer or to any attempt to initiate a dialogue with a host computer, such as a terminal session.

ILLEGAL COMMAND

displayed when a command of invalid syntax is detected.

User action: Enter the correct command.

dv SETUP NOT SUPPORTED

Displayed when the output dv does not require to be set up prior to initiating transfers from the host computer.
User action: Initiate the output retrieval without attempting a local device setup.

dv NOT OUTPUT

displayed when the input device dv appears in a command string as an output device.
User action: enter the correct command string.

dv NOT INPUT

displayed when the output device dv appears in a command string as an input device.
User action: enter the correct command string.

dv BUSY

displayed when device dv has been referenced in a data transfer command but is currently explicitly or implicitly, because of a switch, engaged in a transfer operation.
User action: Wait until the device is free, then re-enter the command.

DV I/O CONFLICT

displayed when a switch command attempts to switch an input and an output device.
User action: Respecify the command string.

dv CURRENTLY SWITCHED

displayed when a switch command attempts to switch a data stream to or from device dv when it is currently switched.
User action: Respecify the command string.

dv?

displayed when an undefined device, dv, is referenced in a command string.

User action: respecify the command string.

dv NO PARAMETERS

displayed following command string entry when:

- o parameters have been entered when not required.
- o parameter string is incomplete either because an invalid parameter has been entered or because the string terminator has not been entered.

User action: Respecify the command.

dv PARM n IN ERROR

displayed when an error is detected in the nth parameter of the parameter string associated with device reference dv. Specifically:

- o Parameter/Argument separator (=) has not been entered.
- o Entered parameter argument is invalid

User action: Respecify the command.

dv PARM/S MISSING

displayed when an incomplete parameter string has been entered. i.e. the mandatory parameters have not been entered.

User action: respecify the command.

INVALID SWITCH

displayed when the device commanding the switch attempts to switch a data stream other than its own.

User action: respecify the command.