Malcolm Bull
Training and Consultancy Publications

MB-Guide to

The spooler

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Introduction

The *MB-Guide to the spooler* is produced for those who need a quick introduction to the features of the spooler on the Pick operating system.

This *MB-Guide* contains:

* A general introduction to the spooler.

* A description of the individual commands which are available for use with the spooler.

* A *how-to* section describing how to achieve specific effects with the spooler.

The material will be of interest to operations personnel, to anyone working in a technical role, and to those who work in a systems support function. The end-user will also find the general concepts of use and interest.

The spooler is one area of the operating system which varies most widely between implementations. If you are using an implementation such as McDonnell Douglas Reality or Ultimate, you are advised to read this *MB-Guide* in conjunction with the reference literature for your particular system.

You may find the following titles in the *MB-Guide* beginner's guide series useful in conjunction with the present volume:

Creating and using Procs
File-save and file-restore
Files: monitoring and sizing
Operations and systems management

and you may also find the following *MB-Master* self-tuition courses of interest in conjunction with the material presented in this *MB-Guide*:

PICK1: Starting Pick
PICK2: Pick systems management

A suite of supporting software called MB-SPOOLER is available for use in conjunction with the material presented in this *MB-Guide*. This is a front-end processor allowing you to apply the fundamental operations involving the Pick spooler: display / change spooler assignments; display details of current jobs; change jobs to hold; edit / release / reroute / delete / kill jobs; start / stop printers; perform SP-TAPEOUT. All *MB-Software* includes a TCL stacker utility, and many individual routines are available directly from TCL. *MB-Software* is particularly valuable to users of native PC Pick which does not provide such utilities. Please write or call for a leaflet or to place an order.

This *MB-Guide* is not intended to present a complete description of the subject but merely to place it in context and give the reader enough information to use the facilities and to survive.

Best use can be made of this *MB-Guide* if it is read in conjunction with the reference literature which is provided for your system. You should amend your copy of this guide so that it accurately reflects the situation and the commands which are used on the implementation which you are using. By doing this, your *MB-Guide* will become a working document that you can use in your daily work.

I hope that you enjoy reading and using this *MB-Guide* and the others in the series, and welcome your comments.

What is the spooler?

The Pick operating system is a multi-user system and there may be several people using the same computer at the same time. Any - or all - of these users may ask for a printed report to be produced simply by issuing an Access sentence such as:

```
SORT STOCK BY PRICE DESCRIPTION TOTAL VALUE LPTR
```

with the LPTR modifier, or a TCL command such as:

```
COPY DICT STOCK * (P
```

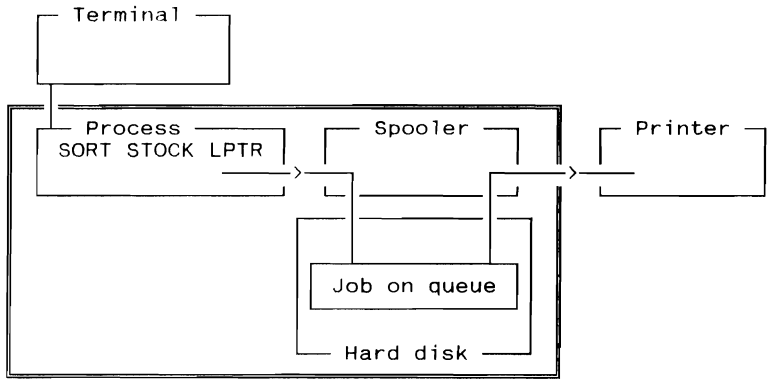
with the P option, or by executing a Basic program which uses the:

```
PRINTER ON
```

statement to print a report or produce some other sort of listing. If all the users were to ask for a report at the same time, there could be problems unless the operating system has some means of resolving the competition for the printer resources.

The *spooler* is a standard part of the Pick operating system and controls the production and output of all the reports and other output sent to the printer by the various users.

Whenever you perform a task which produces printed output, the spooler collects the output - line by line - as it is produced and stores this on a temporary disk file until the process finishes. When the process is complete your terminal is released and is then free to perform other tasks. In the meantime, the spooler takes care of the output, holding the various reports in a queue until the printer is free and your report can be printed. When the report has been output and no longer required, the temporary disk file is deleted.

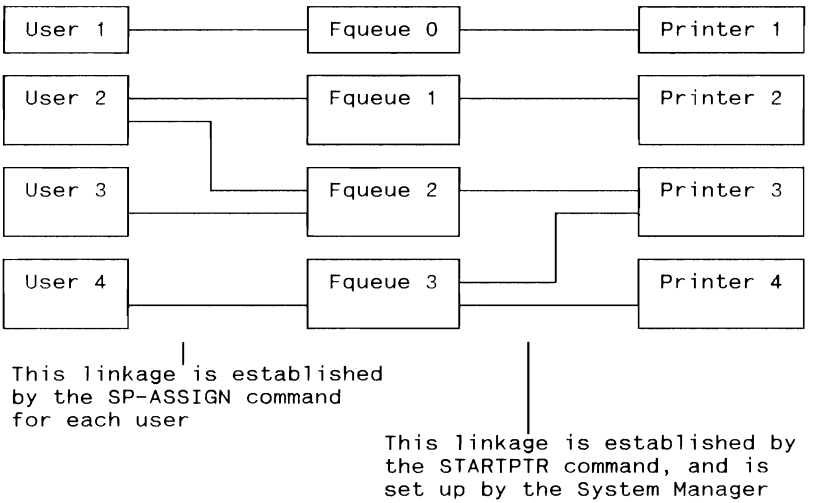


If there were no spooler, whenever you sent a report to the printer, you would have to wait until your entire job had finished and all the reports were completely printed before

your terminal would be released and you could continue with other work.

1.1 Users - form-queues - printers

The diagram below shows the linkage between the users and the printer(s) which are available on the system. The linkage consists of the *form-queues*. There may be any number of users, any number of form-queues and any number of printers. We have numbered the various boxes; on McDonnell Douglas systems, the form-queues have names, not numbers.



The first part of the linkage is that between the users and the form-queues:

* A user may send his/her print jobs to just one queue (user 1 is linked to form-queue 0 only). Unless they issue an SP-ASSIGN command to change this linkage, all users are connected to form-queue 0 (or the STANDARD queue on McDonnell Douglas systems).

* A user may be linked to several queues (User 2 is linked to form-queue 1 and form-queue 2).

* Several users may be linked to the same queue (user 2 and user 3 are both linked to form-queue 2).

* This association is set up by the SP-ASSIGN command which is issued by each user. We shall discuss this later.

The second part of the linkage is between the form-queues and the printers:

* A form-queue may be linked to just one printer (form-queue 0 is linked to printer 1 only).

* A form-queue may be linked to several printers (form-queue 3 is linked to Printer 3 and Printer 4).

* Several form-queues may be linked to the same printer (form-queue 2 and form-queue 3 are both linked to printer 3).

* This association, set up by STARTPTR commands issued by the System Manager, is said to be *system-wide* because the associations apply to the entire system.

1.2 Why do you need to use the spooler?

We have seen that the spooler - or some similar piece of software - is necessary to avoid the conflicting demands when several users are attempting to use the same printer (or printers) at the same time.

The spooler also handles the *de-spooling* of your reports after the process - the Access process, the TCL command or the Basic program which produced them - has terminated, controlling the reports as they are sent to the printer. This means that, once your report has been sent to the spooler, your terminal is free for you to carry on with some other work. Some operating systems tie up your terminal from the moment that you issue the request to produce a report right until the very last line has been printed.

1.3 When do you use the spooler?

If you only want:

* To print a single copy of your output,

* On the main printer,

* As soon as the printer is free,

then you do not need to concern yourself with the spooler. You can simply carry out the work which produces the reports and these will be collected by the spooler and printed when your turn comes in the queue.

However, the spooler is much more useful than this and there are simple facilities which allow you to change this state of affairs:

* You may assign your report(s) to the queue associated with any of the printers which are available on your system.

* It is possible for a single program to produce several different reports: a payroll program might produce pay cheques, pay slips, departmental returns, and so on. In such cases, the spooler will allow you to specify that each of the reports be directed to a different printer, or some of the reports be directed to one printer, and other reports to another.

* You may specify that a sequence of reports be collected

together and output as a single report.

* You may ask for your reports to be dumped to backing storage diskette/tape for storage and printing when required.

* You may ask that the first part of a report be printed first, allowing the operator to line up any special pre-printed stationery such as invoices or cheques.

* You may request the spooler to suppress the output.

* You may request the spooler to hold the report on the queue after the job is completed.

When a report is held on one of the spooler queues, you may:

* Inspect it - to check the results before printing.

* Delete it - the results may be wrong.

* Move it to another queue - from where it will be output to another printer.

* Change the number of copies - you can produce several copies of a report without repeating the request.

* Hold the report for printing overnight - it may be too large to print during the day.

* Hold the report until you have had a chance to load and line-up the stationery on to the printer - you may want to print on cheques or special stationery.

* Copy the report and save it as an item on a file - you may want to incorporate an output report into some other documentation or save it for later use.

For these reasons, it is worth thinking about what the spooler can do for you.

1.4 How do you use the spooler?

As we see in the table below, there are a number of standard utilities available to allow to you to control the spooler. Rather than have the users remember all these commands and type them in correctly, many implementations and application development tools offer some sort of *front-end* processor, such as a control menu, which allows the various tasks to be chosen and performed by selecting options from a series of menus. This is much simpler for the user, and the supporting software can then guide and prompt the user through the work more easily than would be the case if the user had to remember the format of each command individually and exactly.

For various reasons, these control menus differ according to the implementation which you are using. In this *MB-Guide*, we shall consider the general features of the operations and we shall look at the standard (and fundamental) facilities which are available on all implementations.

You may find it useful to read this present *MB-Guide* in conjunction with the reference literature for your system and add and/or amend the guide to record the features which are offered on the implementation which you will be using.

If you are content with *one copy as soon as possible on the main printer*, then you need not be aware of the spooler. Otherwise, you will express your requirements by means of a number of *spooler commands*. These are listed in the table below.

	Command	Usage
	LISTABS	Users - enquiry
*	LISTPEQS	Users - enquiry
	LISTPTR	Users - enquiry
*	SP-ASSIGN	Users
	SP-CLOSE	Users - special
*	SP-EDIT	Users
*	SP-KILL	Users
	SP-OPEN	Users - special
	SP-STATUS	Users - enquiry
	SP-TAPEOUT	Users - special
	STARTPTR	System Manager
	STARTSPOOLER	System Manager
	STOPPTR	System Manager

This table shows the standard spooler commands and where they are most frequently used, whether by the ordinary end-user, by the end-user on special occasions, by the end-user to enquire about the status of the spooler, or by the System Manager. Those marked with an asterisk are employed by the average end-user in the general day-to-day use of the spooler.

We look at the individual commands below.

1.5 Finding a TCL command

If you are using TCL commands and cannot remember what verbs are available or if you have forgotten the correct form of a particular verb, you can always use Access commands such as:

LIST ONLY MD = "[SAVE]"
to find out what items - including verbs - there are on your MD whose names contain the letters SAVE.

LIST ONLY MD = "SP-]"
to find out what entries there are which start with the letters SP-

LIST ONLY MD = "T-]"
to find out what T- verbs there are.

The spooler commands

In this section, we present the fundamental commands which are provided on generic versions of the Pick operating system.

We discuss each of the commands in turn, giving examples where appropriate. The *How to ... section* at the end of this *MB-Guide* looks at these same commands from the practical standpoint, seeing how to apply them to solve specific tasks.

In most operational environments, the use of the direct TCL commands for handling the spooler has been superseded by some form of front-end processor which makes the handling of the spooler much simpler and more natural to the non-technical end-user.

MALCOLM BULL TRAINING & CONSULTANCY SERVICES has written a simple front-end processor to allow users to perform most of the fundamental spooler operations by menu-selection. Interested readers may obtain a diskette with a copy of the MB-SPOOLER software by writing to us and enclosing a £10 handling fee (including VAT).

2.1 LISTABS

This command will display the spooler assignments for all ports on the system.

Typical output might look like this:

LINE £	STATUS	COPIES	FORM £
0	P	1	0
1	HS	1	0
2	P	2	1
3	S	0	0
4	S	0	0
5	S	0	0

This display shows:

+ the line (or port) number of the user.

+ the status of that line. This will will be a combination of:

  - C the output is closed and will be choked according to the printer speed.
  - H the output will be retained as a hold file.
  - I the output will be printed immediately and not intercepted by the spooler.
  - O the output is being kept open as a result of the SP-OPEN command or the SP-ASSIGN command with the O option.
  - P the output will be printed.
  - S the output will be suppressed.

T the output will be directed to disk/tape.

\+ the number of copies which will be produced.

\+ the form-queue to which the user is assigned.

This information is based upon the spooler assignments, as set by the SP-ASSIGN command.

In effect, the

LISTABS

command produces the same output as the

SP-ASSIGN ?

command but for all ports, whether they are in use or not.

2.2 LISTPEQS

This verb will display a list of the jobs which are currently held on the spooler queues.

Format

LISTPEQS {(options)}

The available options are:

A{-z} the first and last job-numbers to be output.

A output jobs for the current account only.

C output a count of the number of jobs and the space occupied. This is just the final line of the standard report.

E output the frame number at which each job is held.

F output the status of the jobs queued for output, ignoring any which are held on the queue.

L output the active and deleted jobs.

P directs the output the printer.

For each job, the report shows:

* £ = the job number.
* STAT = the status code for the job.
* LK = the number of the next following job.
* LN = the port (line) from which the job was submited.
* STATUSES = a set of status codes:

A = available.
C = closed.
G = align.
H = hold file. This job is (or was) a hold file.
I = immediate print (not being spooled).

L = locked.
N = not closed.
O = currently being output to the printer.
P = waiting for printer.
R = requested.
S = spooled.
T = output to tape.
X = aborted.

* CP = number of copies.
* FO = form queue to which the job is assigned.
* FRMS = the number of frames occupied.
* DATE = the date the job was submitted.
* TIME = the time the job was submitted.
* ACCT = the account by which the job was submitted.

2.3 LISTPTR

This command is used to display details of the printers which are currently recognised by the spooler.

For each printer on the system the report shows:

+ the type of printer (whether PARALLEL or SERIAL).
+ the printer number.
+ the output queue (or queues) associated with this printer.
+ the number of blank pages skipped before each report.
+ the port number (or the device number) to which the printer is connected.
+ the status (whether ACTIVE or INACTIVE).

Typical output might look like this:

```
PRINTER ASSIGNMENTS                                    09:30:59

PRINTER          OUTPUT QUEUES     PAGE  DEV OR     STATUS
TYPE   NUMBER                      SKIP  LINE £

PARALLEL   0     0                    0       0     INACTIVE
```

The B option, as in

```
LISTPTR B
```

will display details of all the printers, whether allocated or not.

2.4 SP-ASSIGN

As we mentioned above, you will normally produce a single copy of each report on the main printer, as soon as this is free; these pieces of information are known as your *spooler assignments*.

This command is used to change the user's spooler assignments. The new spooler assignments will completely reset the current assignments.

The general form of the SP-ASSIGN command is

SP-ASSIGN {options}

Any number of options may be specified, in any (sensible) combination and in any order. The most frequently-used options are:

n a number to indicate how many copies are to be produced.

? to display the spooler assignments. The format of the display is shown below.

H to hold the report on the queue.

S to suppress the output of the report immediately it is completed.

Fn to send the output to form-queue number **n**.

Less commonly encountered are:

C activate the choke function.

I to print the report immediately without spooling. When this option is active, the output will be printed as soon as the spooler has collected a full frame of data (typically, this will be 500 bytes).

This is useful in situations where the output document would require excessive disk space if it were to be held by the spooler in its entirety.

If another user sends a report to a printer which is handling such immediate output, this second user's report will be held until the first user's report has completed.

O leave files open so that all the reports will be output together. This is identical to the SP-OPEN command.

Rn assign a print file number for use in the Basic PRINT ON statement (and the RUNOFF PFILE command). Typically, the number **n** is in the range 0 to 254.

T output to disk/tape.

The options need not be enclosed in parentheses nor separated by commas.

Some examples:

SP-ASSIGN
with no options will cancel all previous assignments and reset them to the defaults (one copy on form-queue 0).

SP-ASSIGN ?

to display the current spooler assignments without changing them. All other forms of the SP-ASSIGN command will reset your spooler assignments.

Typical output might look like this:

LINE £	STATUS	COPIES	FORM £
0	P	1	0

The meaning of the various parts of this display are described when we discuss the LISTABS report. The LISTABS command produces a similar report showing the spooler assignments for all ports on the system.

SP-ASSIGN 3
to request that all subsequent output is to be sent to standard form-queue number 0, and that three copies are to be produced of all reports.

SP-ASSIGN F2 3
to request that all subsequent output is to be sent to form-queue number 2, and that three copies are to be produced of all reports.

SP-ASSIGN F2 3 ?
this is identical to the previous command, except that the new spooler assignments will be displayed, possibly to confirm the assignment.

SP-ASSIGN S
this will suppress the output of the report when it is complete. Since there is no H option to hold the report, it will simply pass through the spooler without any output being produced or held. This is an unusual situation which might be used when testing a process without any concern for the output produced.

SP-ASSIGN H
this will send a single copy of the report to the standard form-queue 0, and the report will be held on the form-queue for further processing later. See the SP-EDIT command below.

SP-ASSIGN H 5
this will send five copies of the report to the standard form-queue 0, and the report will be held on the form-queue for further processing later.

SP-ASSIGN HS
SP-ASSIGN H S
SP-ASSIGN S H
These forms are identical and will request that all output be **held** on the form-queue until you release it with the SP-EDIT verb. The S option will suppress the production of the output, as above.

SP-ASSIGN R3 F2
to assign the output from the Basic PRINT ON 3 statement (and the output from the RUNOFF PFILE 3 command) to form queue number 2.

SP-ASSIGN T
to send a report to the backing storage (floppy disk or magnetic tape) device. When required, the document can be printed from the disk/tape by means of the SP-TAPEOUT command.

2.5 SP-CLOSE

This command is used to close output which has been left open as a result of a previous SP-OPEN command or an SP-ASSIGN command with the O option. When a job has been closed, it will become eligible for editing/output.

2.6 SP-EDIT

This command is used to process a report which is held on one of the spooler's form-queues.

The general form of the command is

SP-EDIT {options}

and the available options are:

'xx' to process all reports for account xx. Note that the account name is enclosed in apostrophes. Unless this or the U options are specified, only reports from the current user will be made available.

a{-z} to edit reports a to z inclusive.

D to delete hold files. See also MD below.

Fa{-z} to edit all the reports on form-queues a to z inclusive.

H to suppress the production of a disk/tape label when sending output to backing storage (as instructed by the response to prompt 3 below).

L to display the first 500 bytes of each report.

MD to delete all hold files without any further user intervention or confirmation.

MS to spool all hold files without any further user intervention or confirmation.

O to allow the L option to process reports which are being output.

R to reset the output parameters for the report to those of the current spooler assignments.

T to direct the output to disk/tape. See also

SP-TAPEOUT

TW to direct the output to disk/tape and wait for device to be readied.

U to process all the available reports. Unless the U or *accountname* options are specified, only reports from the current user will be made available.

V to output a hold file to a data file (see also option 3 below).

When the SP-EDIT command is issued, for each report presented, the spooler will give you the opportunity to

DISPLAY a part of the report,
scan to start output at a specific STRING,
SPOOL (that is, output) the report, and/or
DELETE the report.

If a number of entries are edited at one time, they will be passed for processing in turn, one after another.

Processing requests are specified in response to the following prompts from the SP-EDIT processor:

1) DISPLAY?

In response to this prompt, the user may enter any one of:

Y to display the first few lines of the report. If you wish to view more of the report, you can use the T or TN options in response to the SPOOL? message.
N to pass on to the STRING option
S to pass on to the SPOOL option
D to pass on to the DELETE option
X to abandon the action
<RETURN> will skip to the next report.

2) STRING

This facility allows to you to start the output at a specific point in the report, as may be required if the printer had run out of paper and you want to reprint the last part of a report.

In response to this prompt, the user may enter either of:

<RETURN> to pass on to the SPOOL option, or

Xxxxxxx to search for the string 'xxxxxxx'.

3) SPOOL?

In response to this prompt, the user may enter any one of:

Y to output according to your current spooler assignments
N or <RETURN> to pass on to the DELETE option
T to output the report on the terminal

TN to output the report on the terminal, with no pause at the foot of each page
F to save the output as an item (or items) on a file. See below.

The T and TN option allow you to view the report before it is output.

If you ask to save the output as an item (or items) on a file, you will be further asked to enter the name of the file and the first item-id which is to be used. You should enter these in the form:

```
filename itemname
```

For example:

```
OLDREPORTS FRIDAY
```

When this command is issued, the report will be transferred in *RUNOFF format* to the OLDREPORTS file. The first page will be saved as item FRIDAY, the second page as item FRIDAY0001, the third page as item FRIDAY0002, and so on. The full report may be output when required by means of a command such as

```
RUNOFF OLDREPORTS FRIDAY
```

to output the entire report, or

```
RUNOFF OLDREPORTS FRIDAY004
```

to output the report starting at page 5. Some special characters, such as underlining and special graphics output, may be lost when diverting a report in this manner.

The file, OLDREPORTS in this instance, must exist, and any existing items with item-ids FRIDAY, FRIDAY0001 and so on, will be overwritten by the spooler output.

4) DELETE?

In response to this prompt, the user may enter

Y to delete the report from the queue.

Any other response will pass to the next entry.

If you ask for a report to be output (by entering a Y at response 3), then the report will cannot be deleted until the output is complete. In this case, you must use the SP-EDIT command again later to delete the report.

2.7 SP-KILL

This command will cancel the job which is currently printing by terminating any further output to the printer for that job, and when the printer buffer is empty, the report will terminate with the message

ABORT!

If the printer buffer is very large, this may take some time physically to terminate the report; if there are no other reports going to the printer, this problem can be overcome by switching the printer off and then on again, thereby *losing* the contents of the buffer.

Typically, this command will be used to terminate a report which has been sent for printing by mistake.

Its functions include:

* to terminate the report which is currently being output. If the report does not have hold status, then it will be lost.

* to convert a report which is about to be output to hold status, and

* to remove a printer from the spooler.

You must have SYS2 system privileges in order to kill reports other than those which you have sent from your own account.

The general form of the command is

SP-KILL {options}

and the available options are:

a{-z} to terminate the reports which are being sent to printers **a** to **z** inclusive.

A to terminate the reports from the current account only.

B to terminate the reports from all accounts.

Da{-z} to delete printers **a** to **z** inclusive.

DB to delete all printers.

Fa{-z} to convert to hold status all the reports **a** to **z** inclusive. When a report has been converted to hold status, it may then be processed by means of the SP-EDIT command.

N to suppress the printing of the ABORT! message when a report is killed.

O to convert to hold status the report which is currently being output.

Some examples:

SP-KILL
to terminate the report which is currently being printed for the current user, and a message

ABORT!

will be printed. If the current user's report is not being printed, then no action will be taken.

SP-KILL 2
to terminate the report which is being output on printer number 2.

SP-KILL F3
to convert report number 3 to hold status.

SP-KILL F3-6
to convert reports 3, 4, 5 and 6 to hold status.

SP-KILL F4O
to convert report number 4 - which is currently in the queue awaiting output - to hold status.

SP-KILL F3-6O
to convert reports 3, 4, 5 and 6 - which are currently in the queue awaiting output - to hold status.

SP-KILL D6
to delete printer number 6.

2.8 SP-OPEN

This command is used to instruct the spooler to leave a report open as it completes each output report. In this way, you can ensure that several reports are all printed as a single job, one after the other, without anyone else's work coming in between.

After this command has been issued, all subsequent reports sent to the spooler by that user will be collected together as a single output job.

The SP-ASSIGN command with the O option has the same effect.

When an SP-CLOSE command is issued, the collected reports will be closed and made available for editing/output as a single job.

2.9 SP-STATUS

This command is used to display details of all the devices which are currently controlled by the spooler.

The general form of the command is:

SP-STATUS {options}

The available options are:

a{-z} to display details of printers **a** to **z** inclusive.

B to display details of all printers, whether they are allocated or not.

Typical output may look like this:

```
THE SPOOLER IS INACTIVE.

PRINTER £ 0 IS PARALLEL, INACTIVE, AND ON LINE.
THE PRINTER IS DEFINED AS PARALLEL PRINTER £ 0.
ASSIGNED OUTPUT QUEUES: 0.
THE NUMBER OF INTER-JOB PAGES TO EJECT IS 0.
The SPOOLER is in an unambiguous state.
```

This report is a part of the display produced by the WHAT verb.

2.10 SP-TAPEOUT

This command is used to retrieve a report which has been dumped to disk/tape by means of the SP-ASSIGN command with the T option:

```
SP-ASSIGN T
```

or by means of the SP-EDIT command with the T option:

```
SP-EDIT T
```

and transfer the report back to the spooler, from where it can be edited and directed to a printer in the normal manner.

The general form of the command is:

```
SP-TAPEOUT {options}
```

and the available options are:

A to convert EBCDIC data to ASCII format.

U to convert all alphabetic data to upper-case.

2.11 STARTPTR

This command will only be used by the System Manager.

This command is used to define a printer, associate it with one or more form-queues and initialise it for use. The command is also used to restart a printer which has been stopped by means of the STOPPTR command.

The general form of the command is:

```
STARTPTR n,q,s,tp,A {(options}
```

where the various parameters are

n is the identifier for this printer. On generic Pick systems, this will be an integer in the range 0 to 19.

q is the form-queue number. On generic Pick systems,

this will be an integer in the range 0 to 125.

If the printer is to be associated with several form-queues (up to a maximum of three), then these will be separated by commas and enclosed in parentheses:

(1,3,7)

s is the number of pages which are to be skipped between output reports. For reasons of economy, this will typically be 0, but on generic Pick systems, this may be any integer in the range 0 to 9.

See also the S option below.

t identifies the type of printer and will be one of

P for a parallel printer, or

S for a serial printer.

p is the port number to which the printer is attached.

A indicates that the form alignment process is to be executed. This gives the operator an opportunity to align pre-printed stationery correctly before the output is produced.

Before each report is printed, the spooler displays the prompt

LINES?

and the operator will specify how many lines are to be output in order to check the alignment of the stationery. When the required lines have been printed, the spooler will ask

AGAIN(Y/T/N)

to allow the operator to enter one of:

Y to repeat the alignment process.

T to terminate the alignment process. This response will stop the printer.

N to abandon the alignment process and proceed with the regular output.

The available options include:

S to suppress the form-feed which is made at the start of each output report.

X{n} to indicate that the ASCII character 12 (hex 0C) is to be ignored as a form-feed character and the output process will itself control the pagination of the report by printing blank lines to effect the page

break.

The parameter **n** is the number of lines per page. If n is omitted, a value of 66 is assumed.

Some examples of the STARTPTR command:

STARTPTR 0,0,0,P0
to define the parallel printer on port 0 as printer 0, associate it with form-queue 0 and specify that no blank pages are to be skipped between output reports.

STARTPTR 1,2,0,S3
to define the serial printer on port 3 as printer 1, associate it with form-queue 2 and specify that no blank pages are to be skipped between output reports.

STARTPTR 2,(0,1,3),1,P4,A
to define the parallel printer on port 4 as printer 2, associate it with form-queues 0, 1 and 3, specify that a single blank page is to be skipped between output reports, and request the alignment process at the start of each output report.

STARTPTR 3,0,,,A
to reset the printer 3 for form-queue 0 and specify forms alignment.

STARTPTR 4
to restart printer 4 which has been stopped by a STOPPTR command or by the response T during the forms alignment process. The details of the printer remain unchanged.

2.12 STARTSPOOLER

The spooler is activated when the system is switched on and the coldstart procedure is carried out. The spooler then remains active all the time. If it has stopped for any abnormal reason, the :STARTSPOOLER or STARTSPOOLER verb will re-initialise the spooler and resume normal operation.

The general form of the command is:

```
STARTSPOOLER {options}
:STARTSPOOLER {options}
```

The available options include:

C to clear all reports, except hold files, from the spooler queues.

I to initialise and release all spooler pointers.

L to link the workspace for all inactive lines.

After the C or I options have been used, all lines must be reassigned and all the printers must be redefined.

Note that, on some implementations, the first character of this command is a colon.

2.13 STOPPTR

This command is used to stop a specific printer, or printers, when it has completed the current report.

The general form of the command is

STOPPTR {options}

and the available options are:

a{-z} to stop printers **a** to **z** inclusive.

B to stop all printers.

W to wait until all reports for the printer(s) have been output before stopping the printer(s).

A printer which has been stopped by means of the STOPPTR command can be restarted by means of the STARTPTR command.

3 Variations on the spooler

In this *MB-Guide*, we have considered the spooler which is encountered on generic Pick implementations, including R83, Open Architecture and Advanced Pick. However, as we have indicated, there are other implementations of the operating system and these have different spooler verbs and different ways in which the user can control the spooler.

Generally, these different interfaces with the spooler allow the ordinary user to control the spooler by means of menu selections, such as the:

SP-MENU

command of Ultimate, or the:

SP-STATUS

and:

SP-JOBS

menus of McDonnell Douglas Reality implementations, or by answering a series of questions asked by special front-end programs; these programs then go on to invoke the standard spooler verbs for the user.

In this final section, we take a brief look at the some of the other spooler commands which are encountered on systems such as the McDonnell Douglas Reality and Ultimate (Honeywell) implementations.

As always, you should consult the reference literature for your own system for the precise details of these commands.

SP-DELETE
: This command is used to delete a report (or reports) from the spooler queues.

SP-DELETELPTR
This command is used to delete a specific printer from the system.

SP-DEQ
This command is used to de-queue a specific spooler report and make it available as a hold file, and is similar to the standard command:

SP-KILL Fn

which we met earlier.

SP-DEVICE
This command is used to assign a form-queue to another printer.

SP-JOBS
On McDonnell Douglas implementations, this command displays details of the current spooler entries (similar to the standard LISTPEQS command) and also offers the user a menu from which to select other spooler actions. The SP-STATUS command can be used to process the form-queues, the devices and the general features of the spooler.

SP-LISTASSIGN
This command is used to display the spooler assignment parameters for all ports, and is similar to the standard LISTABS command.

SP-LISTLPTR
This command is used to display the control block details for all printers.

SP-LISTQ
This command is used to display a list of spooler entries, and is similar to the standard LISTPEQS command.

SP-MENU
This command is used to invoke a menu which allows the user to control the spooler interactively.

SP-MOVEQ
This command is used to move all the reports from one form-queue to another.

SP-PRIORITY
This command is used to change the priority of a specific report and put it at the head of its queue for output as soon as possible.

SP-RESUME
This command is used to resume the output of a form-queue or a printer which has been suspended by means of the SP-SUSPEND command.

SP-SKIP
This command is used to set number of pages to skip

between reports, and is similar to the corresponding option on the standard STARTPTR command.

SP-STARTLPTR
This command is used to restart a specific printer and is similar to the standard STARTPTR command.

SP-STATUS
On McDonnell Douglas implementations, this command displays details of the current form-queue assignments and also offers the user a menu from which to select other spooler actions. The SP-JOBS command can be used to process specific reports.

SP-STOPLPTR
This command is used to stop a specific printer and is similar to the standard STOPPTR command.

SP-SUSPEND
This command is used to interrupt the output of a specific form-queue or a specific printer. The output may be resumed by means of the SP-RESUME command.

SP-SWITCH
This command is used to move a specific report to another form-queue.

4 How to ...

In this section, we look at a number of specific questions which you and other users might ask, and we see how to answer these by means of the spooler.

How can I send my report to a specific printer?

Use the SP-STATUS command to display details of the printers which are available. Identify the printer which you want to use and make a note of the ASSIGNED OUTPUT QUEUES which are associated with that printer.

Then issue an SP-ASSIGN command of the form:

```
SP-ASSIGN Fq
```

to set your spooler assignments to send the output to form-queue *q* which is one of those associated with the printer which you wish to use.

I have sent a report to form-queue 0 and now I want it to go to form-queue 1. It is report number 2 on the LISTPEQS report. How can I do this?

You must first set your spooler assignments to form-queue 1:

```
SP-ASSIGN F1
```

and then edit the report with the command:

```
SP-EDIT R2
```

since 2 is the entry number of the report on the spooler queue. Then give the response:

Y to the DISPLAY? prompt,

<RETURN> to the STRING? prompt,

Y to the SPOOL? prompt.

When the report has printed successfully, delete the old report, as described below.

How can I produce several copies of a report without executing my program over and over again?

Issue the command:

```
SP-ASSIGN 5
```

before you invoke the process which produces the report(s).

Don't forget to reset your spooler assignments afterwards by the simple:

```
SP-ASSIGN
```

command.

How can I cancel a report which I have sent to the printer and will be printed in a few moments time?

If your report is actually printing at the moment, you can terminate it by issuing one of the commands:

```
SP-KILL
SP-KILL O
SP-KILL OFn
```

If your report is waiting to be printed, you can first convert it to a hold file by means of the command:

```
SP-KILL Fn
```

(where *n* is the entry number of the report) and then delete it as described below.

When I use the SP-EDIT and some of the other commands, I need to know the identity number of my report. How can I find the number which identifies a particular report on the spooler queues?

There are two ways:

1) Make a note of the entry number (shown as *n* in these examples) which is displayed as part of the message:

    ENTRY £n

    or:

    HOLD ENTRY £n

    when the report is originally sent to the spooler.

2) Issue the LISTPEQS command and then identify your report on the display.

How can I produce a report now, but print it later?

You must first specify that you wish to hold the report on the spooler and suppress the automatic output of the report. This is done by means of a command such as:

    SP-ASSIGN HS

You will then carry out the process which produces the report; this may be an Access sentence, a TCL command, a Basic program or some other process. Make a note of the report entry number (as described above).

When you are ready to print the report, you will issue the command:

    SP-ASSIGN

to reset your spooler assignments so that the spooler will once again print your reports, and then edit the held report by means of the command:

    SP-EDIT n

(where *n* is the entry number of the report). Then give the response:

    Y to the DISPLAY? prompt,

    <RETURN> to the STRING? prompt,

    Y to the SPOOL? prompt.

When the report has printed successfully, delete the old report, as described below.

> How can I produce a report and ask for it to be printed at, say, 10:30 at night?

Using the facilities of the standard spooler, you cannot specify a time when your report is to be output; any report may be produced either immediately upon completion or when you release it by means of the SP-EDIT command, as we saw in the answer to the last question.

It is perfectly feasible to write a Proc or a Basic program which will sleep until the required hour and then either execute the process which produces the report or invokes an SP-EDIT command to release the report in the manner we saw above.

> How can I delete an old report which is still held on the spooler queue?

Issue the command:

```
SP-EDIT n
```

(where *n* is the entry number of the report) and then delete the report by entering:

D in response to the DISPLAY? prompt, and

Y in response to the DELETE? prompt.

> I have a large report which I want to print immediately, rather than waiting until the entire process has completed. How can I achieve this?

Issue the command:

```
SP-ASSIGN I
```

to indicate that you want to print immediately. Each block of 500 bytes (or so) output will then be printed as soon as it is produced.

When you issue such a command, the printer will be effectively attached for your sole use. Any other user who sends a report to the printer will have to wait until your report has completed.

> How can I check what my spooler assignments are?

Issue the command:

```
SP-ASSIGN ?
```

and this will display your current spooler assignments.

How can I check what the spooler assignments of another user are?

Issue the command:

```
LISTABS
```

and this will display the current spooler assignments of all the users on the system.

How can I stop any of my reports from being printed until I am ready for them?

Before you start your work, issue the command:

```
SP-ASSIGN HS
```

and then release the jobs, one by one, as you are ready for them, as we saw in the answer to the question *How can I produce a report now, but print it later?*

How can I print the last part of a report again?

If the report is still a hold file on the spooler, then - as we shall see - it is a simple matter to reprint the report. If the report is no longer available a hold file, then you must produce a hold file version by first issuing the command:

```
SP-ASSIGN HS
```

and then producing the report again.

To reprint a hold file, you must first reset your spooler assignments to a suitable printer. The simplest means is by issuing a command such as:

```
SP-ASSIGN
```

Then, you must issue the command:

```
SP-EDIT n
```

to edit the hold file, then enter:

```
N   in response to the DISPLAY? prompt,
```

and in response to the STRING? prompt, you should enter a string of text which occurs in one of the lines on the page *before* that at which you wish to start reprinting (if the pages have page numbers, then it is fairly easy to use this as the string of text). Enter the string of text exactly as

it appears on that page. Then, enter:

    Y   in response to the SPOOL? prompt.

If you don't wish to print all of the remainder of the report, you may cancel the output by means of the SP-KILL command as soon as it has printed the page(s) which you require.

When the report has printed successfully, delete the old report, as described above.

I have a large number of reports held on the queue. Is there a quicker way to get them printed than SP-EDITing each one by one?

The command:

    SP-EDIT MS

will spool all your *held* jobs without any intervention from you.

I have a large number of reports held on the spooler queue. Is there a quicker way to delete them than just by SP-EDITing each one by one?

The command:

    SP-EDIT MD

will delete all your *held* jobs without any intervention from you.

I have sent some jobs to the spooler and they have an L in the status field. This seems to stop me using SP-EDIT. How can I edit these?

Issue the command:

    SP-EDIT L

and then just press <RETURN> as the editor submits each job to you. The L will then be removed.

You may also need to kill the jobs, using the Fn form, as described in the following answer.

I have a number of jobs on the spooler queue and they are all waiting to print, so I can't edit them. What can I do?

Issue a command such as:

```
SP-KILL F1-7
```

where 1 is the entry number of the *first* of your jobs and 7 is the entry number of the last job which you want to stop printing.

> I am writing a Basic program to print out several different reports. How can I print one report on one printer and another report on a different printer?

In your Basic program, you must first execute the PRINTER ON statement and then issue PRINT statements such as:

```
PRINT ON 1 your-output-line

PRINT ON 2 your-output-line
```

using the ON 1 to identify the output which is to be sent to one report, and the ON 2 to identify the other report, and so on. There may be up to 255 such reports in any one program.

Before you execute the program, you will associate these report numbers with specific form-queues (and hence with specific printers) by giving a series of SP-ASSIGN commands such as:

```
SP-ASSIGN R1 F3
SP-ASSIGN R2 F5
```

which will direct all the output from your PRINT ON 1 statements to form-queue 3, and all the output from your PRINT ON 2 statements to form-queue 5.

5 Glossary

This section describes some of the terms which are used in this *MB-Guide*. These and other definitions may also be found in the *MB-Guide to Computer Terms*.

Form-queue
: A queue of reports which are held by the spooler. Each queue may hold any number of reports [up to a maximum of 600 on generic Pick systems]. There may be just a single form-queue or there may be several form-queues defined at any time [up to 125 form-queues on generic Pick systems]. If there are several printers available on your system, each printer will normally be associated with a particular form-queue and you may assign your output to any of these queues - and thence to a particular printer. Each form-queue is identified by a number (or a name on McDonnell Douglas systems). The default assignment is form-queue 0 (called STANDARD on McDonnell Douglas).

Hold file
: A report which has been sent to the spooler when the user's spooler assignments include the H option, or when a normal output report has been the subject of an SP-KILL command. A hold report can be inspected, deleted, reprinted and redirected to another form-queue, as required.

Spooler job
: Colloquial term for any individual output element which has been sent to the spooler and which is identified as a unit on the spooler queues.

Spooler assignments
: The current specifications which the spooler uses to control each user's printed output. The assignments include details of the form-queue(s) to which the user's reports will be sent, how many copies of each report are to be produced, whether the output is to be suppressed or not, and whether the report is to be held on the form-queue after it has been completed. The assignments are set (and reset) by means of the SP-ASSIGN command.

I n d e x

MB-Guides

The booklets in the *MB-Guide* series cover a range of fundamental topics of interest to users and those responsible for running Pick systems.

Each *MB-Guide* deals with a specific aspect of the operating system and the booklets represent an economical introduction to the various topics and the whole series forms an integrated presentation of the subject matter.

The booklets are intended to be a working document and, for this reason, space is provided for the user's notes, and the reader is encouraged to amend the booklet so that it applies to his/her own system.

It is anticipated that the series of *MB-Guides* will be of special interest to new users, and it should prove useful for software houses and others who are responsible for the instruction of their clients and staff in the fundamental aspects of the Pick operating system.

Malcolm Bull

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