

Chapter 4 Using entrants outside the filestore

MAGNETIC TAPES

Magnetic tapes are of two kinds, insecure and secure tapes. Insecure tapes are those tapes not known to the Librarian. They may be sub-divided into standard tapes (that is those having a standard 1900 Series header label) and non-standard tapes. Note that virgin tapes are considered as non-standard tapes.

A standard insecure tape may be made secure (by means of a NEW command) provided that its serial number does not duplicate the serial number of an already secure tape. Tapes with duplicate serial numbers and non-standard tapes can only be used if the Librarian is given prior notice by means of a REDON command.

Secure tapes are tapes that are known to the Librarian. They may be sub-divided into owned tapes, pool tapes and worktapes.

The main ways in which the category of a tape can be changed are illustrated in the figure on page 71.

Ownership of magnetic tapes

Owned magnetic tapes are entered in directories in the filestore in the same way as filestore files, and they can be referred to by relative or absolute names. The owner of a tape, like the owner of a file, is the user associated with the lowest superior directory that is not a pseudo user's directory. The owner of a tape has rights with regard to the tape that correspond exactly to the rights listed on page 46.1 (for a full list of ownership rights, see *Ownership of entrants*, page 175). Thus:

- 1 A user may cause an entry for a magnetic tape to be set up in a directory only if the tape will then belong to him by virtue of his position in the filestore hierarchy
- 2 A user may only change the traps of tapes that belong to him
- 3 A user may cause an entry for a magnetic tape to be erased from a directory only if the tape belongs to him
- 4 A user has to pay rent on all the tapes that belong to him

Acquiring magnetic tapes

If a user wants to bring specific insecure tapes under his ownership, he must issue a NEW command. If, on the other hand, he wishes to acquire a tape from the pool for his permanent private use, he can do so by issuing a GET or GETONLINE command or an unanticipated open mode #400 PERI. If he only requires a tape temporarily, he may issue a GET or GETONLINE command to acquire a named worktape from the pool or he can connect an unnamed work tape directly to his program by means of an ONLINE command or an open mode #600 PERI.

Pool tapes will normally be used as a source of high quality tapes for permanent ownership, while worktapes will be for intermittent temporary use.

ACQUIRING INSECURE TAPES

Any number of insecure tapes can be brought under a user's ownership by a NEW command provided that his magnetic tape budget permits. Each tape is referred to by serial number and tape name. (The latter is optional but when it is omitted the user cannot refer to the tape solely by name on the first occasion on which it is used.)

The tape's characteristic can optionally be declared in the NEW command by use of the PROPERTY qualifier (see also *Properties and magnetic tapes*, below, and the NEW command)

GEORGE checks that the specified tapes are not already entered in :SYSTEM.SERIAL, the librarian's index file. Provided that they are not, GEORGE enters the serial numbers in :SYSTEM.SERIAL, and in the user's directory. The name of the user is written in each entry in :SYSTEM.SERIAL to indicate that the tapes are entered in the directory associated with this user name. The tapes are not loaded by the NEW command, so the contents of the tape header labels are not initially known to GEORGE. When such an owned tape is first loaded after an ONLINE command or an open mode PERI instruction, the name, generation number, reel sequence number and retention period are copied into the directory entry from the header label of the tape, unless the details were given in the NEW command in which case these details are checked against those from the header label.

PROPERTIES AND MAGNETIC TAPES

Many installations have magnetic tape decks operating at different speeds and recording with different methods (7 track, 9 track phase encoded and 9 track NRZI). Usually when a job requests a tape it does not matter how the tape was recorded or how fast a deck it is loaded on, but there are cases where these factors could be important. For example, if a tape is to be used at another installation which only has 7 track decks, then it is obviously necessary for the job setting up the tape to be able to request a 7 track tape; or if a large file is to be sorted using worktapes to hold the intermediate sorted strings of records, it would be advantageous to be able to request fast decks for the tapes.

A number of special properties are used by the system to cater for the above situations. They are as follows:

<i>Property name</i>	<i>Meaning</i>
TRACK7	7 track tape (or deck)
PE	9 track phase encoded tape (or deck)
NRZI	9 track NRZI tape (or deck)
TRACK9	9 track tape (or deck)
MODE <i>n</i>	tape (or deck) in recording mode <i>n</i>
NONS	nonstandard tape
FAST	fast deck
SLOW	slow deck

It is not necessary to issue PROPERTY commands defining these property names, nor is it necessary to attribute them, as GEORGE is able to discern from internal information which property names are relevant to which device.

ENTRANT PROPERTIES AND PERIPHERAL PROPERTIES

A further difference between magnetic tape properties and basic peripheral properties is that the former can be subdivided into entrant properties and peripheral properties. An examination of the list of MT properties given above will reveal that many of them could refer either to a magnetic tape or to a magnetic tape deck. For example, TRACK7 could be either the property of a 7 track tape deck or the property of a tape that was last written to when loaded on a 7 track deck. The subdivision into *entrant properties* and *peripheral properties* reflects this dual role: entrant properties are the properties of tapes, peripheral properties are the properties of decks.

The entrant properties are: TRACK7, PE, NRZI, TRACK9, MODE *n* and NONS.

The peripheral properties are: TRACK7, PE, NRZI, TRACK9, MODE *n*, FAST and SLOW.

Entrant properties can be specified as qualifiers to commands such as NEW, GET and GETONLINE. Peripheral properties can be specified as parameters to commands such as ONLINE, GETONLINE and TRANSPORTS in the same way as property parameters can be included in LISTFILES for basic output peripherals. For description of the basic output peripherals, see *The property system*, page 84.

TAPE CHARACTERISTICS

Data on a tape can be recorded by one of three methods: 7 track, 9 track phase encoded, and 9 track NRZI. This recording method is called the *tape characteristic*, (although it applies to the deck as well) and the possible characteristics correspond to the entrant and peripheral properties TRACK7, PE and NRZI.

Note:

TRACK9 is also regarded as a tape characteristic although it may seem to be redundant, since PE and NRZI cover all cases of 9 track tapes. However, many installations will only have one type of 9 track deck and may prefer for convenience to use only TRACK7 and TRACK9 as tape characteristics. TRACK9 will be interpreted as any 9 track tape or deck (as appropriate) unless the installation standard tape characteristic (see page 72) is PE or NRZI, in which case TRACK9 will be interpreted as the standard tape characteristic.

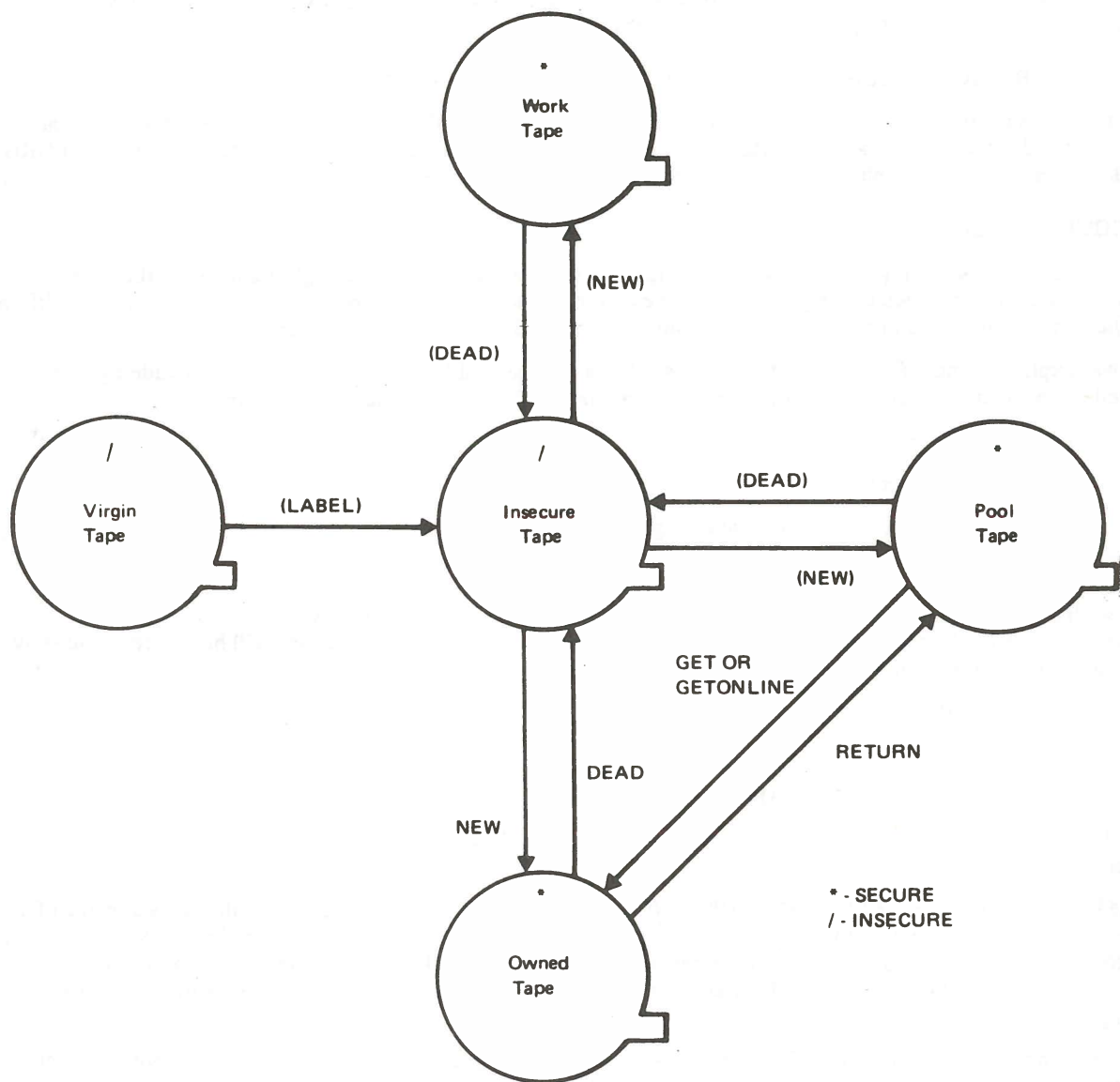


Figure 2: Magnetic tape category conversion

STANDARD TAPE CHARACTERISTICS

The librarian remembers tape characteristics of secure tapes. The tape characteristic is stored when the tape is NEWed (see page 69) if the appropriate entrant property is specified or, failing that, when the tape is first loaded as a secure tape. The characteristic is then used by GEORGE when the operator is given a list of possible decks on which to load the tape.

If when a tape has to be loaded its characteristic is not known to GEORGE, either because it is an insecure tape that has been ONLINED without a property parameter or because it is a secure tape whose characteristic is not yet known to GEORGE, the tape will be assumed to have the installation standard tape characteristic. The installation standard is set by the manager when GEORGE is set up.

If no installation standard tape characteristic is specified, jobs which issue GET or ONLINE commands without property parameters will be given tapes of any type available.

TRANSFERRING INSECURE TAPES TO THE POOL OR WORKTAPES STORE

This process is carried out by the NEW command issued in OPERATOR context. Tapes are described by serial number and a code to indicate the category in which they are to be placed. If a tape is to be a pool tape, GEORGE will request that the tape be loaded so that POOLVTAPE may be written in the header label.

ACQUIRING POOL TAPES

The GET command brings a single pool tape under the ownership of the user and gives a name to the tape. The name that is specified as the parameter of the command has the same format as a file name except that different details may be included in the general local name, and the qualifier *MT must be given.

It was explained under *Referring to files*, page 46.2, that the general local name of a file may include a generation number and a language code. The details that may be specified for a magnetic tape name are:

- 1 A generation number
- 2 A reel sequence number
- 3 A retention period (although this will be ignored by GEORGE)

The formats of these details are given in the table *Entrant details* on page 166.

As with file creation, except when the user possesses the ALLACC or INFACC privilege (see *Ownership of entrants*, page 175), the name specified in a GET command must be such that the tape will belong to the user by virtue of its position in the filestore hierarchy, for example:

```
GET MYTAPE(5/100,1000) (*MT)
```

or

```
GET :LONDON.MYTAPE(S50) (*MT)
```

In the second case :LONDON must be the name of the user or a pseudo user's directory that belongs to the user.

The local name of an owned tape (MYTAPE, in the examples above) must not coincide with the local name of a file entered in the same directory. It is, however, possible to have two or more tapes entered in the same directory, with the same local names or even the same general local names (MYFILE (5/100,1000)). In this case, when referring subsequently to the tapes, the user must include a tape serial number if he wishes to identify a tape uniquely.

To implement a GET command, GEORGE looks to see if a pool tape is loaded and available; if there is not one, it outputs a request for one. The serial number of the pool tape found is entered in the directory implied by the command together with the local name and details given in the command. In addition, the name of the user associated with this directory is entered in the appropriate record in :SYSTEM.SERIAL to indicate that the tape is no longer in the pool. The local name and details given in the command are written in a new header label. The tape is then unloaded. If details are omitted in the command, the default values assumed are:

generation number	0
reel sequence number	0
retention period	4095

The significance of the details is standard (see the ICL 1900 Series *Magnetic Tape* manual), but users should note that GEORGE never checks the retention period of a tape.

If a tape with a particular tape characteristic is required, then the *PR magnetic tape properties* qualifier should be specified to the magnetic tape description parameter (see also *Properties and magnetic tapes*, page 70, and the GET command).

The user may also request a pool tape by means of a GETONLINE command or an unanticipated open mode #400 PERI which brings the tape under the permanent ownership of the user (as with the GET command) and also connects the tape to the user's program.

As with GET (above), if a tape with a particular tape characteristic is required, the *PR magnetic tape properties* qualifier should be specified to the magnetic tape description parameter in the GETONLINE command. In the case of an unanticipated open mode #400 PERI a tape with the tape characteristic specified in bits 10,16,17 of X will be obtained and if possible the deck will be switched to the appropriate packing density (see also Chapter 14, Extracodes and program events)

ACQUIRING WORKTAPES

There are two different methods of acquiring worktapes, and the one chosen will depend on whether the user wishes to pass the tape between programs within the job. If he does wish to pass the tape between programs, the worktape must be named, and must therefore be acquired by means of a GET (or GETONLINE) command specifying a *worktape name*, that is a local name preceded by an exclamation mark. This *worktape name* is quite independent of the name in the tape's header label; its only significance is to identify the tape so that it may be ONLINED to subsequent programs within the job. Note that the same worktape name may be used more than once, so that there may be a current tape named !SELOTAPE, for example, and several other tapes also named !SELOTAPE. The current tape is the one most recently acquired, and when it is returned to the worktape store the next most recently acquired tape with the name !SELOTAPE becomes the current tape of that name. Only the current tape may be referred to in commands.

If the user does not wish to pass a tape between programs within a job he can obtain a worktape by means of an unanticipated mode #600 PERI or the equivalent ONLINE command. A tape obtained this way can be converted to a named worktape by use of the RENAME command to give it a worktape name. If a tape with a particular tape characteristic is required this may be indicated by specifying a *PR magnetic tape description* qualifier to the magnetic tape description parameter of the ONLINE command. If it is required that the tape be loaded on a deck with a particular property, this should be specified by means of a *PR peripheral property name* parameter. If the unanticipated open mode #600 PERI is used the tape characteristic may be specified in bits 10, 16, 17 of X (see also Chapter 14, Extracodes and program events).

Details of worktapes are held in a temporary directory which GEORGE sets up under the user's proper directory.

Referring to magnetic tapes

A magnetic tape may be referred to in one of four ways:

- 1 By serial number enclosed in parentheses, for example:
(1234)
- 2 By name, optionally including details, for example:
:HEADOFFICE.MAGTAPE(1/100)
- 3 By serial number and name, separated by a comma and enclosed in parentheses, for example:
(1234, :HEADOFFICE.MAGTAPE(1))
- 4 Named worktapes may be referred to by a worktape name which cannot include details, for example:
!SORTEDINPUT

A user may not use the same local name for both a magnetic tape and a file.

The retention period of a tape is never checked by a command. The generation number and reel sequence number are checked if specified.

INSECURE MAGNETIC TAPE DESCRIPTIONS

These may be divided into standard and non-standard tapes:

- 1 Standard tapes (that is tapes with a standard 1900 Series header label).

These tapes may be used in one of two ways:

- (a) If the serial number of a tape is a duplicate of the serial number of a secure tape or of a loaded insecure tape, then the new tape must be classed as a Xenotape. In this case an X must be appended to the tape serial number given in the tape description and the tape must be introduced to the librarian by means of a REDON command before the tape is loaded. Note that a Xenotape may not duplicate the serial number and name of a secure tape.
- (b) If there is no possibility of serial number duplication the tape may be used as a standard insecure tape. In this case the best way to reference the tape is by its serial number as this is a known unique factor. An attempted access by name alone to an insecure tape cannot guarantee that the correct tape will be loaded.

2 Non-standard tapes.

These must be introduced to the Librarian by a REDON command which will check that the tape does not have a header label which corresponds to a secure tape. For non-standard tapes the reference for the tape should be the name which it has been given in the REDON command.

OWNED MAGNETIC TAPE DESCRIPTIONS

The user may refer to an owned tape by its serial number, a name (relative or absolute) or a combination of the two.

A tape that has been brought directly under user ownership by a NEW command without specifying the name, cannot be referred to solely by name until it has been loaded and the name in the header label has been written to the directory entry.

If the user wishes to refer to a tape with the same local name as another tape in the same directory, he must give the tape serial number and/or include distinguishing details in the general local name of the tape. If the general local name is exactly the same as that of another tape in the same directory, he can identify the tape uniquely only by including the serial number in the magnetic tape description. If the tape is not identified uniquely, any of the tapes in the directory which satisfy the description given will be used.

User traps of owned magnetic tapes

The TRAPGO, TRAPSTOP and TRAPCHECK commands apply to owned magnetic tapes in the same way as to files (see *File security*, Chapter 3). When issuing one of these commands the user must always include the tape's name in its description, unless the tape is entered in the job's current directory; in this case he may refer to the tape by its serial number alone.

INITIAL USER TRAPS

When a tape is initially recorded in a user's directory by a NEW command, a user trap is set granting the owner of the tape READ access to it. When a tape is initially requested by a GET or GETONLINE command or an unanticipated open mode #400 PERI, a WRITE trap is also set. These traps are changed only when TRAPGO or TRAPSTOP commands are issued.

Connecting magnetic tapes to user programs

A magnetic tape, whether secure or insecure, can be connected to a user program by a command (ONLINE or GETONLINE) or alternatively, if standard and not a Xenotape, by an open mode PERI instruction. All open mode PERIs can be simulated by commands apart from mode #500. The table under ONLINE in Chapter 11 lists the various open modes and their command equivalents. If an ONLINE or GETONLINE command is issued, the open mode PERI for that device (if included) is ignored, but the standard replies are given.

LOADING PROCEDURE

Opening a specified tape for reading or writing

The tape may be identified by serial number, name or both. In an ONLINE command the peripheral name may be qualified by READ or WRITE and MODE *nm*, for example:

```
ONLINE *MT0 (READ) ,MYTAPE (5/100)
ONLINE *MT1 (WRITE) ,(1234,MYTAPE)
ONLINE *MT0 (READ, MODE 36), (1234,MYTAPE)
```

If READ is specified, the absence of a write permit ring will be tested, and if WRITE is specified, the presence of a write permit ring will be tested. If neither READ nor WRITE is specified, no write permit check is made, unless the tape is an owned tape and the user requesting to use the tape has a trap giving him READ access only; in this case

the absence of a write permit ring is tested.

If MODE is included, the required tape will only be accepted if it is loaded on a deck which is in (or can be switched to) the specified mode.

GEORGE assumes initially that the tape is an owned tape. If a name is given, it treats this name as a relative or absolute filestore name and attempts to find an entry for the tape in the directory specified or implied in the magnetic tape name. If no name is given, it searches :SYSTEM.SERIAL for the tape of the specified serial number. If the tape is an owned tape, its entry in :SYSTEM.SERIAL will contain the user name associated with the directory in which the tape is entered, so the directory entry can be traced in this way. Provided that there is a directory entry for the tape and the specified magnetic tape description corresponds to this entry, GEORGE checks the user traps to ensure that the user is allowed to access the tape in the required way. If this check fails and the tape is being opened by an ONLINE command, the standard trap failure error is reported. If the tape is being opened by an unanticipated open mode PERI, no error message is given. Instead, the following action is taken:

- 1 If additive mode #34000 is being used, bit zero of the reply word is set to one and the program continues without the tape.
- 2 If additive mode #34000 is not being used, a program event of the category FAILED is generated, with the message ONLINE *peripheral name* FAIL.

These are the standard actions that result from failures.

If a serial number is given and it is found that this is the serial number of a pool or work tape, the standard action for failures is taken.

If every check is passed satisfactorily or it is established that the tape is unknown to the librarian, a *request description* is established. This is the description of the tape that will be output to the operator if the tape is not already loaded. It normally consists of the tape serial number of an owned tape or of an insecure tape. In the latter case, if a tape serial number has not been specified by the user, the local name of the tape is given in the request description.

Locating the tape

To establish whether the tape is loaded or not, GEORGE examines a file called :SYSTEM.DOCUMENT. This file contains a list of all the tapes that are currently loaded. If the tape is already correctly loaded and available, it is allocated to the program. If it is not correctly loaded or is not available, the message:

WAITING FOR MT *magnetic tape description*

is sent to the monitoring file system (COMMENT category). If it is necessary for the tape to be loaded or reloaded, an appropriate request is output to the operator. The job then waits until a tape is loaded before searching :SYSTEM.DOCUMENT again.

When a tape with a standard 1900 Series header label that satisfies the request is correctly loaded, further checks are carried out.

If the tape is known to the librarian, the name and details in the header label are checked against the general local name in the directory entry. If this check fails it is assumed that the disparity has occurred through action either outside GEORGE or in the period between the dumper being used and a break in the system. The action taken is to hold the tape at *Query* status until the confusion has been remedied.

If the operator cannot comply with a system request at any stage, he may issue a CANTDO command and the standard action for failures will be taken.

Provided that the required tape is correctly loaded and passes all the checks described, it is allocated to the program.

Opening a work tape

- 1 A named worktape can be opened by an ONLINE command of the form:

ONLINE *magnetic tape peripheral name* (WRITE), *worktape name*

The WRITE qualifier is optional and will always be assumed if it is omitted, unless READ is specified. The current tape with the specified worktape name is opened. If the tape is not already loaded, a request giving the tape serial number will be output to the operator's console asking for the tape to be loaded and a message explaining the delay will be sent to the monitoring file system as described under *Loading procedure*, page 74. If the operator replies to this request with CANTDO then the standard action for failure is taken.

When a tape must be acquired as well as ONLINEd, the GETONLINE command may be used

- 2 A worktape can be opened by an open mode #600 PERI or by an ONLINE command of the form:

ONLINE *magnetic tape peripheral name* (WRITE). PR *peripheral property name*

If (WRITE) is omitted, it will always be assumed, unless READ is specified.

A worktape is allocated to the job. If no such tape is loaded and available, the operator is requested to load any worktape with a write permit ring and the message:

WAITING FOR A WORKTAPE

is sent to the monitoring file system (COMMENT category).

If there are no worktapes available or the operator cannot comply with the request for some other reason, he may issue a CANTDO command and the standard action for failures will be taken.

When a suitable tape is correctly loaded, it is allocated to the program and the user becomes the temporary owner.

Releasing magnetic tapes from user programs

Magnetic tape decks can be released from user programs in one of three ways:

- 1 By a close mode PERI instruction
- 2 By the deletion of the program
- 3 By a RELEASE command

Returning owned magnetic tapes

PERMANENTLY OWNED TAPES

A permanently owned tape can be returned to the pool only by the owner of the tape (but see *Ownership of entrants*, page 175). The operation is performed by the RETURN command. The tape can be referred to by serial number, name or both, qualified by *MT; for example:

RETURN (1234) (*MT)

RETURN :LONDON.MYTAPE(*MT)

RETURN (1234,:LONDON.MYTAPE) (*MT)

The directory entry for the tape is deleted and the entry in :SYSTEM.SERIAL is updated to indicate that the tape is no longer owned.

The RETURN command makes a tape available to any other user as a pool tape. If a user wishes to remove a tape from the system completely, he should issue a DEAD command. This command deletes any reference to the tape from the system.

WORKTAPES

- 1 A named worktape can be returned to the worktape store either by the termination of the job or by a RETURN command
- 2 An unnamed worktape can be returned to the worktape store in one of four ways:
 - (a) By the termination of the job
 - (b) By the deletion of the program
 - (c) By a close mode #1007 PERI
 - (d) By a RELEASE command

If a close mode #1000 PERI is obeyed

- 1 The worktape will not be returned to the worktape store on deletion of the program.
- 2 A RELEASE command cannot be given unless the tape is ONLINEd again.

Query status

If, when an owned tape is loaded, it is found that the name, reel number or generation number on the tape's header label does not match the details held in the directory entry, it is assumed that this was caused either by events that occurred outside GEORGE or by events that occurred in the period between a dump and a system break. GEORGE will take the following action: if the name on the header label is POOLTAPE, and the tape does not belong to :DUMPER, the tape will be returned to the pool; otherwise the tape will be put into *query status* until the problem has been remedied by issuing either a RENAMEDIR command or a NEW command (see below).

When a tape is put in query status, the following message is output on the operator's console, indicating the states of the tape header label, the file :SYSTEM.SERIAL and the directory:

```
MT tsn IS IN QUERY STATUS: HDDR = name(rsn,fgn), SYSTEM.SERIAL = username, DIRECTORY
= name(rsn,fgn)
```

Once put in query status, a tape cannot be used until it has been removed from query status. There are two basic ways to remove a tape from query status, depending on whether or not the owner of the information held on the tape is the same as the owner specified in :SYSTEM.SERIAL. The following table describes them:

<i>Owner of information</i>	<i>Owner specified in :SYSTEM.SERIAL</i>	<i>Action to be taken</i>
:A	:A	:A should issue a RENAMEDIR command to alter the directory entry to agree with the tape header label.
:A	:B	:B should issue a RETURN command thus keeping the tape in query status. :A should then issue a NEW command, specifying the name, rsn and fgn on the tape header label. (Note: This is a special use of the NEW command.)

However, note that if a REDON command is not used when loading a xenotape, the tape may be put into query status. If this occurs, the query status can be removed simply by reloading the secure tape. GEORGE will then again compare the name, reel number and generation number on the tape's header label with the entry in the directory and, on finding that they now match, will remove the query status.

Loading programs held on magnetic tape

A program on magnetic tape can be loaded by the FIND system macro. This macro loads a subject program and makes a specified magnetic tape ONLINE to this program. The subject program searches the tape until it finds the required program. It then reads the program into core.

Since FIND uses a normal ONLINE command, programs can be loaded from both insecure and owned magnetic tapes. The procedure for loading tapes is as described under *Loading procedure*, page 74.

Inputting magnetic tape data to the filestore

Subfiles on a magnetic tape can be copied into card files in the filestore by means of the COPYIN or FILEIN system macros. The converse operation is performed by the COPYOUT system macro. In both cases the magnetic tape may be either insecure or owned.

Magnetic tape environment

When GEORGE is loaded, the mode setting of all switchable decks will be set as follows:

- 1 For machines below 1904 except 1903T:
 - 1971/2 Mode #34
 - 1973 Mode #44
- 2 For machines 1904 and above plus 1903T:
 - 1971/2/3 Mode #24

The initial mode setting can be altered by the DEFMODE restore time macro (see Appendix 1 of the manual *GEORGE 3 and 4 Operation Management*) or during running by the MODE command (see Chapter 12 of this manual).

Temporary removal of tapes

Magnetic tapes may be temporarily removed from the system by means of the TAPEWRONG command. The tape is made unavailable as soon as the present user releases it and cannot subsequently be used until a TAPERIGHT command for this tape has been issued. (Note that the execution of this command contrasts with commands such as RETURN which do not act until all extant requests for the tape have been satisfied). The TAPEWRONG command is also available to the operator to allow the temporary removal of damaged tapes.

It should be noted that the user cannot TAPERIGHT a tape that has been TAPEWRONGed by the operator, and vice versa.

EXOFILES

The exofile facilities have been developed to maintain the user interface so that programs designed to run in an Executive environment may be run under GEORGE without modification.

The following sections describe the use of exofiles that conform to ICL's Unified Direct Access Standards (U.D.A.S.) and these sections should be read in conjunction with the ICL 1900 Series manual *Direct Access*. The main feature of U.D.A.S. is the principle that all conforming direct access devices (E.D.S., F.D.S., E.D.S. (30), Twin-E.D.S.) are essentially identical and may only be distinguished by serial number. (Note: Twin-E.D.S. is not applicable to GEORGE 3 and 4.) The peripheral name for any U.D.A.S. device is simply *DAnumber, but to save users altering job descriptions written before Mark 6 the peripheral names *EDn *FDn will be accepted as meaning *DAn. It should be noted, however, that if an existing job description uses *EDn and *FDn with identical values of n it must be changed.

Similarly, the peripheral type number for a U.D.A.S. device is 6, but type 13 is also accepted, although identical channel numbers will cause an error.

Note: All relevant error messages and system requests are placed together at the end of this chapter and referred to in the text by codes.

The creation of exofiles

Exofiles may be created dynamically by the user with a PERI mode #1200. Alternatively, the data file allocator (#XPJC) may be used.

Commands applicable to exofiles

The only commands at present applicable to the control of exofiles are the ONLINE, RELEASE and REDON commands.

The ONLINE command can be used to replace or override an open mode PERI order for modes #100, #200, #300, #400 and #600.

The RELEASE command closes a file and releases the channel to which it was connected.

The REDON command is used to warn GEORGE that a non-standard cartridge is to be loaded (cf. *Non-standard tapes*, page 74).

Connecting exofiles to user programs

Exofiles may be connected to user programs by means of ONLINE commands, open mode PERIs, or both.

[A current restriction prevents the use of the ONLINE command for mode #1200 and additive modes.]

THE ONLINE COMMAND

The command must be issued in CORE IMAGE context and has the format:

ONLINE *peripheral name*, *exofile description*

The *peripheral name* is given in the form *DAnumber where *number* is the channel number (0-63) to be used by the program for PERI orders. (As stated previously *DA may be replaced by *ED or *FD without changing the meaning.)

The *peripheral name* may be qualified by one of the following mode indicators.

Mode indicator	Corresponding mode
OVERLAY	#100
READ or no qualifier	#200
WRITE	#300
OFFSET	#400
SCRATCH	#600

The *exofile description* has one of two formats depending on the mode in use:

- 1 Modes #100, #200, #300 and #400

The format is:

(*serial number, exofile name*)

The serial number is given in octal. The exofile name has the format of a general local name and may be qualified by a generation number and/or a retention period. (See table *Entrant details*, page 166.) If the generation number is absent or negative, the 'latest generation on-line' will be assumed. A generation number of 4096 means 'any file of this filename'.

The retention period is only relevant in WRITE mode (#300) when it represents the new retention period to be put on the file; in any other mode it will be ignored. If no retention period is specified in WRITE mode, the retention period is not updated. The generation number is not altered unless the REVGEN qualifier is used.

- 2 Mode #600

The format is:

(*blocks, bucket size, serial number₁, serial number₂, . . . serial number_n*)

where *blocks* will be the number of blocks required (rounded up to a multiple of 8)

bucket size will be 1, 2, 4 or 8

serial number which is optional, indicates the units on which an attempt may be made to open the file. (In the order in which the attempt is to be made.) It may be written in decimal or octal and in the latter case must be preceded by a '#' sign.

Additional qualifiers to the exofile description

- 1 GIVE (all modes) This has the effect that an ALLOT instruction at any time following the ONLINE command will cause a positive reply, and a subsequent open mode PERI will be illegal
- 2 MAYBE (scratch mode only) A subsequent open mode #600 PERI will only be allowed to succeed if:
 - (a) The bucket size is the same as that given in the ONLINE command
 - (b) The file ONLINEd is at least as large as that requested by the PERI
- 3 REVGEN*number*, where *number* is in the range 0 to 4095. Provided WRITE mode is specified the file will be given a revised generation number of *number*.

The effect of the ONLINE command

Assuming the command to be successful, the specified file is opened and the job continues with the next command. If an ONLINE command is given for a channel that is already open, the previous file will be closed and the ONLINE command allowed to proceed.

Although the file is open once the ONLINE command has been obeyed, an ALLOT instruction will not indicate, this fact unless a GIVE qualifier is used; if a GIVE qualifier is used then an open mode PERI instruction cannot be given for the file.

Possible errors, exceptions and other incidents

If a specified storage unit is not on-line, or is in use by an S-trusted program, a message (M16 or M15) is sent to the monitoring file and the job is set waiting. The user may break-in at this point, in which case the command is

abandoned. If the operator CANTDO's a LOAD STORAGE UNIT request, message M2 is output and a command error occurs (or, in the case of SCRATCH mode, another storage unit may be used). Otherwise, message M17 is output and the job is restarted when the storage unit becomes available.

If, on opening a permanent file, the integrity code check fails, the job is set waiting, with message M12. The user may break-in. The job is restarted, with message M13, when the file becomes available.

The following messages may be output indicating certain incidents during the open file operation:

M1, M4, M18, M19, M20, OM1, OM2, OM10

If the file cannot be ONLINED, one of the following command errors occurs:

C1 to C7, C12, C15

CONNECTION BY PERI INSTRUCTION

The interpretation of an open mode PERI instruction depends on whether a successful ONLINE command has been issued for the channel in question, that is, whether the PERI is anticipated or not. The open mode PERI, if present, must be the first PERI to the channel.

Anticipated open mode PERI

1 Modes #100, #200, #300 and #400

The instruction is treated as if it has successfully opened the file which was ONLINED, provided that the access mode was not SCRATCH, and a GIVE qualifier was not used. The PERI control area is over-written with the file details including mode and file name and a 'successful' reply set.

2 Mode #600

The instruction is only allowed if the access mode of the ONLINE command was SCRATCH, and the GIVE qualifier was not used. The instruction is then treated as successful provided that the provisions of a MAYBE qualifier (described above) are met. The control area is then updated to conform to the actual file obtained.

Unanticipated open mode PERI

The implementation of unanticipated open mode PERIs is basically the same under GEORGE as in an Executive environment, except that most failures produce a program event in the FAILED category.

Possible errors, exceptions and other incidents

If the PERI is illegal, the program is failed with the appropriate illegal message, one of:

I1, I3, I4, I5, I7

If a specified storage unit is not online or is in use by an S-trusted program (and additive mode #4000 is not in use) the action described for the ONLINE command is taken, except that if the user breaks in, the PERI is abandoned and the program is stepped back to the point immediately before the PERI, and if the storage unit is not available message M6 is output and the program is failed.

If the integrity code check fails the action described for the ONLINE command is taken.

The following messages may be output as appropriate:

M1, M3-M11, M14, M18, M19, OM1, OM2, OM10

If the PERI is unsuccessful standard replies are set (except for failure of integrity code check, see above) where appropriate and the program is restarted. If a transfer failure or backing store corruption occurs, or a storage unit is not available, the program is failed and the message:

ONLINE *DAn FAIL

is output.

FILE MODES (OTHER THAN OPEN)

The following modes are available with, at present, no command equivalent.

1 Extend/Contract (#500 and #1500)

2 Rename (#700)

- 3 Read File Specification (#1100)
- 4 Describe File Area (#1400)
- 5 Close (#1000)
- 6 Close and Delete (#1300)
- 7 Create and open a file (#1200)

These modes are all implemented in standard fashion.

Possible errors, exceptions and other incidents

The action is the same as that described for unanticipated open PERI above, with the following exceptions:

- 1 Failure of integrity code check does not apply
- 2 An additional message, OM3, may be output

Additives applicable to file modes

The following additive modes are recognised by GEORGE 3:

- | | |
|-------|--|
| #2000 | Forces use of the unit specified in word 1 of the control area and suspends program until required unit is on-line |
| #4000 | Inhibits all suspensions and messages caused by a unit being off-line |
| #6000 | Forces use of unit as for #2000 except that if the unit is off-line no suspensions or messages occur. |

Data transfers

All PERI transfer modes (#0, #1, #2, #3 and #7) are legal under GEORGE 3 and the first four are implemented as standard. Mode #7, the 'move heads' order, is acceptable but has null effect.

POSSIBLE ERRORS, EXCEPTIONS AND OTHER INCIDENTS

If the PERI is illegal, one of the following illegals is generated:

I2, I4, I6, I7

If the required storage unit is not on-line, the action described for unanticipated open PERI is taken.

One or more of the following messages may be output, as appropriate:

M1, OM4-OM9

If the PERI is unsuccessful, standard replies are set in all cases. If an irrecoverable transfer fail occurs (and mode #20000 is absent) or a storage unit is not available the program is failed; otherwise the program is restarted.

ADDITIVES TO TRANSFER MODES

The following additive modes are recognized by GEORGE:

- | | |
|--------|---|
| #40 | Suppression of check read |
| #20000 | Suppression of error halts |
| #30000 | Suppression of error halts and repeats. If this additive mode is specified no reference will be made to the flaw area or flaw index. This means that the setting of the Flaw Action Indicator for the file will be ignored. |

Releasing exofiles from user programs

Exofiles can be released from user programs, and therefore closed, in one of three ways:

- 1 By a close mode PERI (#1000 or #1300).
- 2 By the deletion of the program.
- 3 By a RELEASE command.

Trusted program facilities

ICL standard software which is Q or S trusted will run in a normal manner under GEORGE using exofiles. In order to make use of trusted facilities the user must have the TRUSTED privilege (see page 156).

Note:

A storage unit with a system control area open for writing to an S-trusted program cannot be accessed by any other program.

Error messages and system requests

COMMAND ERRORS

- C1 ILLEGAL NAME *file name*
- C2 FILE *file name* IS PROTECTED
- C3 FILE *file name* NOT FOUND
- C5 FILE *file name* IS LOCKED OUT
- C6 FILE *file name* IS IN USE BY GEORGE
- C7 FILE *file name* IS NOT TO BE WRITTEN TO
- C8 REDON HAS BEEN OBEYED FOR UNIT *geographical number*
- C9 A STANDARD SU IS LOADED ON UNIT *geographical number*
- C10 NON-STANDARD SU *serial number* IS NOT AVAILABLE
- C11 SERIAL NUMBER *serial number* IS ALREADY ON LINE
- C12 SCRATCH FILE CANNOT BE OPENED
- C13 NOT ALLOWED TO USE UNIT *geographical number*
- C14 FILE *file name* CANNOT BE CREATED
- C15 FILE *file name* IS ALREADY OPEN TO YOUR PROGRAM

MONITORING FILE MESSAGES

- M1 STORAGE UNIT *serial number* INOPERABLE
- M2 STORAGE UNIT *serial number* NOT AVAILABLE
- M3 STORAGE UNIT *serial number* NOT ONLINE
- M4 SCAFILE CORRUPT ON STORAGE UNIT *serial number*
- M5 FILE NAME ALREADY EXISTS ON SU *serial number*
- M6 FILE *file name* NOT FOUND
- M7 FILE *file name* NOT CREATED
- M8 FILE *file name* IS PROTECTED
- M9 FILE *file name* IS LOCKED OUT
- M10 FILE *file name* IS IN USE BY GEORGE
- M11 FILE *file name* IS NOT TO BE WRITTEN TO
- M12 WAITING FOR FILE *file name* TO BE CLOSED
- M13 FILE *file name* NOW AVAILABLE
- M14 STORAGE UNIT *serial number* IS LOCKED OUT
- M15 WAITING FOR TRUSTED PROGRAM TO RELEASE STORAGE UNIT *serial number*
- M16 WAITING FOR STORAGE UNIT *serial number* TO BE PUT ONLINE
- M17 STORAGE UNIT *serial number* NOW AVAILABLE
- M18 NOT ENOUGH SPACE ON STORAGE UNIT *serial number*

- M19 SYSTEM CONTROL AREA FULL ON STORAGE UNIT *serial number*
M20 FILE *file name* IS ALREADY OPEN TO YOUR PROGRAM

MESSAGES TO OPERATOR'S CONSOLE (INCLUDING SYSTEM DEMANDS)

- O1 PLEASE PUT STORAGE UNIT *serial number* ONLINE
O2 UNIT *geographical number* FAILED
O3 UNIT *geographical number*: *n*TH STORAGE UNIT FAILED
O4 UNIT *geographical number*: STORAGE UNIT FAILED.
O5 UNIT *geographical number*: DUPLICATE SERIAL NUMBER *serial number*
O6 UNIT *geographical number* IN USE BY GEORGE
O7 PLEASE PUT NON-STANDARD SU *serial number* ON UNIT *geographical number*

Notes:

- 1 O1 and O7 are system requests
- 2 O2 to O4 indicate that the storage unit concerned is non-standard: a REDON command may be issued for it

MESSAGES TO OPERATOR'S CONSOLE AND MONITORING FILE

- OM1 CHECKSUM FAIL ON SU *serial number* BLOCK *block number*
OM2 STORAGE UNIT *serial number* SCA *block number* FAILED
OM3 STORAGE UNIT *serial number* CORRUPT: *file name* HAS TWO FILE INDEX ENTRIES
OM4 STORAGE UNIT *serial number* BLOCK *block number* FLAW
OM5 STORAGE UNIT *serial number* FLAW BLOCK *block number* FAIL
OM6 STORAGE UNIT *serial number* FLAW AREA FULL
OM7 STORAGE UNIT *serial number* BLOCK *block number* NOT ERASED
OM8 STORAGE UNIT *serial number* NO FLAW ENTRY FOR BLOCK *block number*
OM9 STORAGE UNIT *serial number* BLOCK *block number* FAIL
OM10 UNALLOCATED AREA (BLOCK *block number*) ON STORAGE UNIT *serial number* IS LOST

Notes:

- 1 OM1, OM2, OM3, OM10 indicate serious corruptions of system control information
- 2 OM3 may occur when deleting a file (PERI mode #1300); it indicates that the system control information for a file other than the one being deleted is seriously corrupted
- 3 OM10 indicates that, due to a failure on another storage unit, the file area cell for the unallocated file area starting at the specified block number is missing; the storage unit is otherwise uncorrupted
- 4 The block number in message OM 9 is the block number of the first block of the transfer; it may not be the number of the failing block.

MONITORING FILE MESSAGES (ILLEGAL CATEGORY)

- 11 ILLEGAL : INVALID CONTROL AREA
12 ILLEGAL : COUNT OUT OF RANGE
13 ILLEGAL : INVALID CONTROL AREA WORD *number*
14 ILLEGAL : MODE IN ERROR
15 ILLEGAL : MODES INCOMPATIBLE
16 ILLEGAL : BUFFER OUT OF RESERVATIONS
17 ILLEGAL : CONTROL AREA OUT OF RESERVATIONS

