1.3 The Intercode 'Open File' Instruction

In this description, the programme identity number should be considered as consisting of five numeric characters, three specifying the suite number, two specifying the job within suite.

The file identity consists of one alpha and one numeric character (e.g. A7).

At the end of the Open File instruction for all media except magnetic tape input, register A contains:

      Q1 - Q4   Current run number (submitted by the operator) in numeric decimal)

      Q5 - Q10 Zero

After opening a magnetic tape input file, register A contains:

      Q1 - Q4   Current run number

      Q5   Zero

      Q6 - Q9   Number of run which wrote this file

      Q10   Numeric part of File Identity of file when output

In each case, register B is clear.

Standard Input Check

All input data is preceded by a 'File Heading' sentinel which includes a programme identity number and file identity (cf. Volume III Part 1 section 12).

The Open Input File subroutine will only allow a file to receive data which is headed by a sentinel having the same suite number and same alpha file identification.

When data is produced by the computer, the file heading sentinel is written by the 'Open Output File' instruction, and contains the programme identity number and file identity of the programme and file producing the data.

It follows that the only 'Brought Forward' that a file may receive is that produced by a file with the same alpha file identification, in the same suite. 'Run Data' should carry suitable heading sentinels.

1.3.1 <u>Magnetic Tape Output</u>

The subroutine performs the following tasks :

(i)   Tests the route

(ii) Checks that the tape may be overwritten

(iii) Writes a standard 'source' heading block

and on installations with high density assemblers :

(iv) Arranges for the tape to be written in the correct mode.

(i) <u>Test Route</u>

    1. <u>Route Closed</u>   ⎫
                     ⎬ As for write magnetic tape instructions
    2. <u>Route Engaged</u> ⎭

    3. <u>Doubtful Block</u>⎫
                     ⎬ no action taken
    4. <u>Warning of End</u>⎭

(ii) <u>Tape Check</u>

There are two types of check; the standard check is that the clerical spool number written into a standard heading block by the Sentinel Production Program (see Part 3 (2)) is currently in the 'released tapes index'. The released tapes index is periodically submitted by the operator, and specifies the spool numbers of up to 48 reels of tape (or 24 reels, an optional facility) which are available for output. When a released tape is written upon, the appropriate spool number is removed from the released tapes index, a log report is made recording the fact, and a card is punched containing information for the off-line magnetic tape library system (the production of this card can be suppresses if required). A card will not be punched on opening the Store Dump tape.

If the standard check fails a special check is carried out. This check is designed to allow magnetic tape to be used as a 'working area'. The tape will be accepted if it was last written as the same reel of the same file of the same program in the same run (and rerun); provided that a 'Close File' instruction has not been given for that file in the meantime. A 'Rewind' instruction does not prevent further use of a 'working' tape.

If the above checks fail, the route is unloaded and the operator instructed to load the correct tape.

(iii)   <u>Checks for Subsequent Reels</u>

Tapes for subsequent reels of the file also undergo the same checks described above.

The Master Programme writes a 'start of reel' sentinel block (see Part 3 (2)) after the standard heading blocks. This sentinel includes: the full identity (including run and rerun numbers) of the file which wrote the tape; and the reel number.

(iv)   <u>High/Low Density Mode</u>

On High Density installations all files are written in high density mode unless otherwise specified in the allocation data. On all tapes the sentinels and source block are written or remain written in low density mode. An indicator is placed in the source block denoting the mode of operation.

1.3.2 Magnetic Tape Input

The subroutine performs the following tasks:

(i)   Tests the route

(ii)   Tests the identity of the file

(iii)   Arranges for it to be read in the correct mode

(iv)   Prepares for the next 'Read' instruction

(i)   <u>Test Route</u>

As 'Open Magnetic Tape Output File'

(ii)   <u>Test File Identity</u>

When the file is opened for the first time during a run, or after it has been closed, the standard input file check is made, as described in the introduction to this section (1.3). If this check fails the route is unloaded and the operator informed so that the correct tape can be loaded.

A reel number check is also made, and in the event of failure the route is unloaded and options offered to:

(a)   Load correct tape and repeat checks

(b)   Reload tape and accept this reel number

(c)   Abandon   } These may or may not be included as Master
                      } Programme facilities, according to Users'
(d)   Defer options   } requirements.

<u>Note</u>:   The abandon option is unavailable when an overwrite allocate command has been given.

An exception to these checks is made for the 'standard programme' suite 060. Programmes with this suite number have no identity checks made when opening magnetic tape input files under the circumstances described above.

The standard check is seldom sufficient to ensure that the correct tape has been loaded and should be supplemented by programme checks (particularly run number) as required. If these checks fail the operator should be informed by use of the 'Type' facility and the file closed. (If the file is rewound, the next 'Open File' instruction will be treated as re-opening an accepted file and the new reel loaded by operator will be tested for conformity with the rejected reel as described below).

When a file is opened after a 'Rewind' instruction, (i.e. an accepted file is re-opened) the reel is checked against a complete record (programme identity, file identity, and run number) stored when the file was opened. The standard reel number check is made.

Checks on Subsequent Reels

Although the Master Programme check on the first reel of a file may be supplemented by programme, the Master Programme check on subsequent reels must be complete. Full details of the accepted reel (full programme and file identities, run number) are stored when the file is opened, subsequent reels being compared against the record. A reel number check (with options in the event of failure) is carried out as for the first reel. A log report is generated when an input reel is opened for the first time during the run of a programme.

(iii) High/Low Density Mode

If a high density tape is submitted on an installation not able to operate in high density mode the tape is rejected. Otherwise it is arranged that the tape will be read in the correct mode.

(iv) Preparation for Next Instruction

The Master Programme prepares for the next Input instruction by initiating a computer code 'Input one block' instruction to bring the first data block into the annexe.

1.3.3 <u>Punched Card Output</u>

      The subroutine performs the following tasks:

(i) Tests the route

(ii) Punches start of File Sentinel

(i) <u>Test Route</u>

      As Open Magnetic Tape Output File.

(ii) <u>Start of File Sentinel</u>

      The start of file sentinel includes programme and file identities specifying the source of the data (cf. Vol. III, Part 1, section 12).

1.3.4 Punched Card Input

        The subroutine performs the following tasks:

  (i) Tests the route

  (ii) Checks the identity of the file

 (iii) Prepares for the next Input Instruction

  (i) Test Route

     1.   Route Closed

     2.   Route Engaged   } As for 'Open Magnetic Tape Output File'

     3.   Doubtful Block

        If 'doubtful block' occurs during the 'open file' procedure, the route is set to MANUAL and a comment is typed telling the operator to align the cards at the start of the file. When the route has been set to COMPUTER, the file is re-opened.

     4.   Warning of End: No action taken.

  (ii) File Identity Check

        The standard file identity check is made as described in 1.3.

 (iii) Preparation for Next Instruction

        As for Magnetic Tape Input File.

1.3.5 Punched Paper Tape Output

        The subroutine performs the following tasks:

  (i) Tests the route

  (ii) Punches start of File Sentinel

  (i) Test Route

        As Open Magnetic Tape Output File.

  (ii) Start of File Sentinel

        The start of file sentinel includes programme and file identities specifying the source of the data.

        A similar sentinel is punched at the start of subsequent reels of the file.

1.3.6 Punched Paper Tape Input

The subroutine performs the following tasks:

(i)   Tests the route

(ii) Tests the identity of the file

(iii) Prepares for the next Input Instruction

(i)   Test Route

As for 'Open Punched Card Input File'.

(ii) Test File Identity

The standard file identity check is made as described in 1.3.
A reel number check is made and the reel is rejected unless the
start sentinel has reel number 1 or 10 (i.e. ten as one character).

(Checks on subsequent reels: The full programme and file
identities from the start of reel sentinel are checked against
those stored away from the start sentinel of the first reel. The
Master Programme maintains a reel number counter; the new reel must
check with this unless the reel number in the sentinel at the start
of the new reel is 10 indicating that the reel number check is not
required.   The reel number check is also suppressed if the serial
number counter is 10 indicating that the reel number check was not
required for the previous reel and that any reel number is acceptable.
The next reel must be either 10 or in sequence with the reel number
in the sentinel of the last tape accepted.

The reel number counter consists of $\overline{10}$ or two decimal digits,
resetting to 01 after 99).

(iii) Preparation for Next Instruction

As for Magnetic Tape Input.

1.3.7 Printer Output

The subroutine only tests the route (action as for magnetic tape
output). No further action is taken. This is a 'dummy' procedure
provided primarily for compatbility with other media. No additional
storage space is involved, only the Input/Output common preparatory and
end routines are used.

1.4 The Intercode Close File Instruction

1.4.1 Output Files

The route is tested to ensure that the programme's last block was
written correctly. An 'End of File' sentinel block is then written and
the route set to manual (magnetic tape reels are unloaded).

On magnetic tape, the 'End of File' sentinel is preceded by a standard end block (see Part 3 (2)) which may be read by programme - the End of File sentinels may not be read by programme.

If a program attempts to close file on a tape which has been rewound or has not been opened (i.e. attempting to overwrite start of file sentinels with end sentinels), the Master Program will abandon the Program with the appropriate comment.

No End of File information is output when a Printer file is closed.

Input Files

The Master Programme tests that the block in the annexe is the End of File sentinel. If it is not then a warning is typed. In either event the route is set to manual (magnetic tape routes unloaded) and the program continues.

Note: The typed warning is an optional facility in the Master Programme.

1.4.2 Open File Following Close File

After a magnetic tape file has been closed, it may be opened again for either Input or Output. If a magnetic tape file is opened for input after 'Close File', the same standard file identity check and reel number check are made as described in section 1.3 - the more extensive 're-open accepted file' check is only made after 'Rewind'.

If a magnetic tape file is to be opened as output following the Close File instruction, the spool number(s) must be in the released tapes list (and not have been cancelled by earlier use). The 'working tape' facility is cancelled by the Close File instruction.

1.5 Rewind File (Magnetic Tape only)

1.5.1   The action taken by the Master Programme differs from the 'Close File' procedure only in that:

(i) If the file is single reel, the reel is rewound to the 'load' position, (thereby being under computer control without the need for operator action), instead of being unloaded.

(ii) No test is made to determine if the input annexe contains an 'End of File' sentinel.

1.5.2 Open File Following Rewind

When a file has been rewound, it may be opened again for either Input or Output. If it is opened for input the extensive 're-open accepted file' check is carried out (not the less stringent standard check as after 'Close File').

If the file is opened as output after 'Rewind' the working tape check will be applied if the spool number is not currently in the released tapes list.

1.6 <u>Magnetic Tape Alignments</u>

1.6.1 In many programmes it is necessary to align magnetic tape files. There
are, in addition to the standard Rewind/Open File facility, two Inter-
code facilities available:

1. Run Back or Forward to Alignment Mark (Actions 46, 47).

2. Step Back or Forward (Actions 48, 49).

<u>Note</u>:   The Step Forward facility is optional in the Master Programme.

These are described below, their relative advantages being noted.

1.6.2 <u>Run to Alignment Mark - Intercode Actions 46, 47</u>

These instructions cause a search to be made for a block containing
a specified 'identifier' in a specified word, and at least four
consecutive alignment mark characters (control quartet 6, basic 15) in
any word other than the first two. The 'hardware' recognises the
alignment marks, the Master Programme performs the check on the identity.
(The identifier may itself contain the alignment mark characters or may
be in a separate word).

The identifiers must be in ascending order but need not be
consecutive.

The Intercode instruction specifies the identifier of the required
block and the Master Programme automatically checks the alignment.

The procedure is shown in fig. 1.

1.6.2.1 There are a few points to note with reference to this procedure:

(a) When running back, the first block to be scanned is block x and
when running forward it is block x + 2 where x is the last block
written or made available to the programme. Block x + 1 will only
be scanned after a change of direction has taken place (see (d)
below).

(b) Blocks containing identifier zero are ignored.

(c) The re-alignment facility is provided for multi-reel files. The
subsequent reels are always searched forward; the fact that
identifiers are in ascending order throughout the file, means
that it is not necessary when running back to align at the far
end of subsequent reels before continuing the search.

RUN BACK RUN ON FLOWCHART

RUN BACK CURRENT USE O/P

WRITE STANDARD END OF FILE INFORMATION INCLUDING FINIS BLOCK

RUN BACK CURRENT USE I/P AND RUN FORWARD

TEST IF DIRECTION OF SEARCH IS FORWARD

RUN TAPE BACK TO NEXT ALIGNMENT MARK

RUN TAPE FORWARD TO NEXT ALIGNMENT MARK

READ ONE BLOCK

TEST FOR START OF FILE

ABANDON PROG.

TEST IF DIRECTION HAS CHANGED 6 TIMES

OBTAIN NEXT REEL TO BE SEARCHED, ALIGN AT START SET DIRECTION FORWARD

TEST FOR END OF FILE

ARRANGE TO SEARCH IN OTHER DIRECTION

TEST FOR START OF REEL

TEST IF IDENTIFIER FOUND IS GREATER THAN THAT SPECIFIED

TEST FOR END OF REEL

TEST IF DIRECTION OF SEARCH IS FORWARD

TEST FOR REQUIRED IDENTIFIER IN SPECIFIED WORD

TEST IF IDENTIFIER FOUND IS NON ZERO AND LESS THAN THAT SPECIFIED

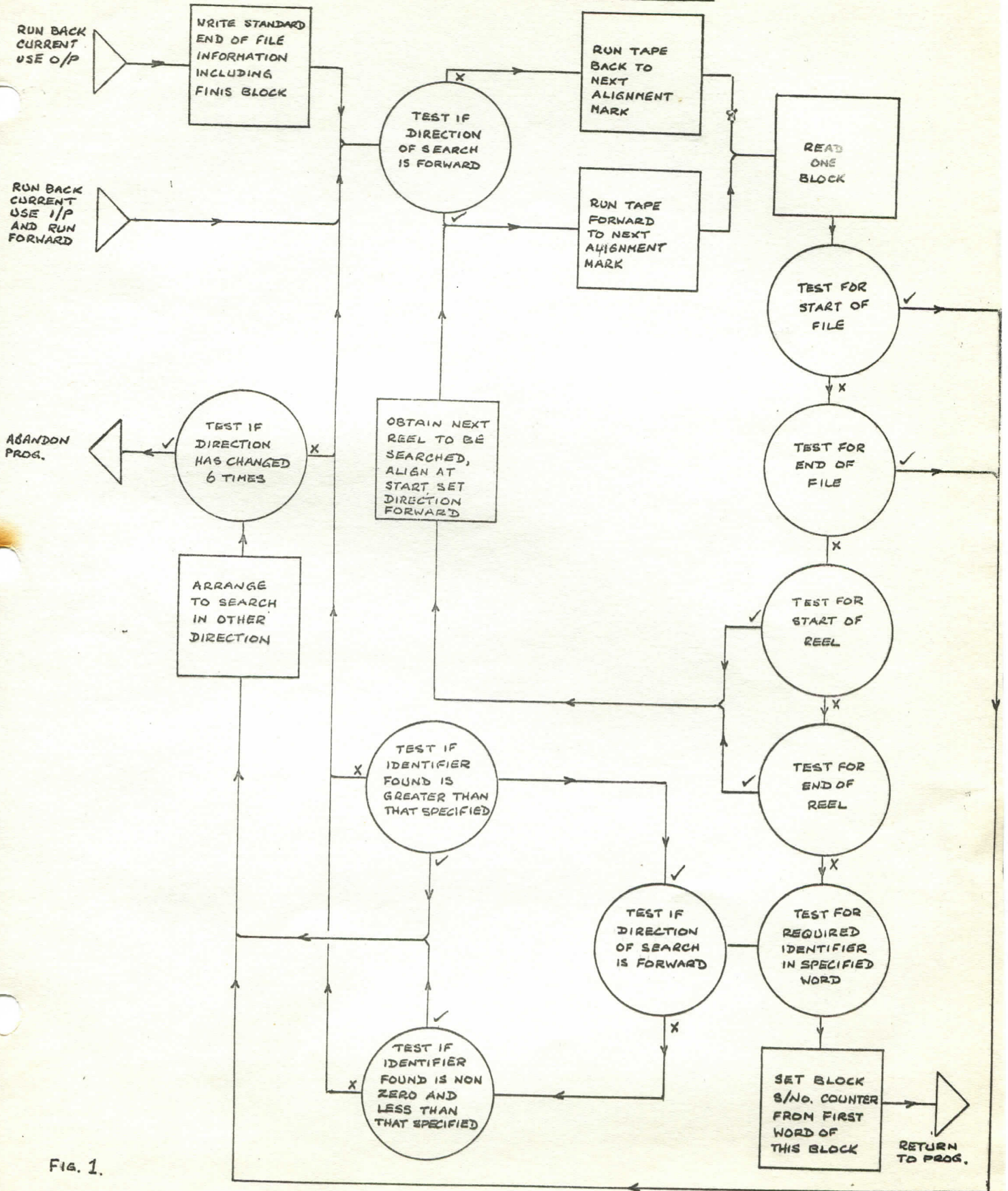SET BLOCK S/No. COUNTER FROM FIRST WORD OF THIS BLOCK

RETURN TO PROG.

Fig. 1.

(d) If the search fails the direction of search is changed (up to six times) and the search continued. This is to avoid errors caused by the magnetic tape system misreading or failing to recognise alignment marks. The number of changes of direction allowed may be varied as experience dictates. If the programmer is uncertain of the direction in which a specified alignment mark lies, a 'Run-Back' instruction should be given, and the Master Program will change the direction of search if required.

1.6.2.2 Alignment Marks

The identifier check is made on 5 numeric characters. For example, if the identifier is placed in the least significant end of the word containing the alignment mark characters, the specified identity must be quoted as :

$$\overline{15} \ \overline{15} \ \overline{15} \ \overline{15} \ n$$

where n is the required identity.

It is possible to use several independent sets of identifiers in the same file, the required set for any alignment being specified in the Intercode instruction by I (location of required identifier in block). In any block containing alignment mark characters, any word which is allocated to a set of identifiers MUST BE ZERO when not containing an identifier.

1.6.2.3 Alignment of Tape Following Instruction

The tape is aligned at the end of the process such that an Intercode read instruction will make available to the program the block containing the specified identity, or a write instruction overwrite the <u>following</u> block.

Intercode instructions 46, 47 may be used to change the 'function' of the file from Input to Output or vica versa except in the case of Run Forward, which may only be used when the file is currently being used for Input.

1.6.2.4 Time Taken by Alignment Instructions

The time taken by the magnetic tape alignment instructions is approximately t + n seconds, where t is the time (in seconds) required to traverse the tape without stopping, and n is the number of alignment mark blocks encountered in the search. This rule is applicable to the case where changes of direction take place, provided that the values assigned to t and n are adjusted as required. The case of multi-reel alignment is not covered by the formula. Time-sharing can take place only during the t seconds of the t + n.

If the 'Interruptible count 500 m.s. Routine' is incorporated in the Master Routine, time sharing can take place during the n seconds and it is also possible to have access to another tape deck on the same assembler.

1.6.3 Step Specified Number of Blocks - Intercode Actions 48, 49

These instructions cause the file to be aligned forward or back a specified number of blocks, due correction being made in the case of alignment across reels of a multi-reel file. Before stepping back on an output file, a 'FINIS' block and the End of File Sentinel blocks are written.

No additional information is required on the file, the block serial numbers used are automatically written by the Master Programme into the first word of every data block when the file is written.

These instructions may be used to change the 'function' of the file from Input to Output or vice versa, except in the case of step forward - which may only be used when the current function is Input.

The instruction 'step back zero blocks on an input file to be used for output' will be interpreted as a change of function which does not involve re-alignment of the file. In fact, a re-alignment of the tape will be required, as a promoted read instruction (of which the programmer is unaware) will have already taken place.

The time for the instruction will be approximately the time taken to read the number of blocks traversed (plus one second on step back). This excludes the time taken to deal with events such as doubtful block, and assumes that it is not necessary to change reels.

When alignment over multi-reel occurs, each subsequent reel in the 'step back' procedure must be aligned at the end before the alignment can continue.

1.6.4 Relative Merits of 'Step' and 'Run'

The advantage of the 'step' facility over the 'run' facility is that the file does not need to be specially set up. On the other hand, the 'run' facility may often be easier to programme, particularly when it is desirable to align at the start of a batch of data consisting of a variable number of blocks.

The time factors are such that running to mark traverses the tape faster than stepping forward or back, but each alignment mark not required imposes an overhead of 1 second. This overhead is equivalent to the time saved on 320 blocks (independent of block size). In other words, considering only the time factor, 'run to mark' should only be used for an alignment if the 'marked blocks' to be skipped occur on average at least 320 blocks apart.

Running back beyond one reel may however be more efficient than the above rule suggests due to the fact that subsequent reels need not be aligned at the end but can be directly searched from the start of the reel.

2. OVERFLOW ALARM

2.1 Conditions Producing Overflow

If at any time arithmetic is attempted which would produce a result too large to be held in the accumulator, an overflow alarm is given.

2.2 Procedure Following an Overflow

The action is completed, the contents of the Sequence Control Register are then placed in compartment 24 of division 0 and the instruction in compartment 25 is obeyed.

The Master Programme includes an instruction in compartment 25 which is a sequence change to a special subroutine.

2.3 Master Programme Action

A report is typed on the log providing the operator with the following information:

(a) The Programme Identity Number of the programme currently being obeyed.

(b) Contents of registers A and B.

(c) Contents of the sequence control register.

The programme causing overflow is closed, enabling the operator to take a Post-Mortem and Unload, or Unload directly. The programme is closed in such a way that the operator has no means of continuing with it.

Note: In the Master Program with shortened overflow routine, the contents of registers A, B, and C, are stored in location (Sp+30), (Sp+31), and (Sp+34) respectively: and the contents of compartment 24 are stored in location (Sp+45), when Sp is the start of the program switch. (If the master does not have FCC, the program switches start in locations 420, 468, 516, 564, 612, and 660 depending on the number of program switches in the Master. The program identity is found in location (Sp+39)).

If the programme causing overflow is being run under the Programme Trials Routines of the Master Programme, the programme is not closed but continues. The same information is typed.

If the Master Programme gives rise to overflow a special report is typed in the log and the post-mortem routines entered immediately. The Master Programme must be reloaded. However, if modification register 1 of modifier group 0 is set for the start of the programme control area the overflow routine deals with the overflow as if programme overflow had occurred, even though overflow may have occurred within the Master Programme.

Note: This facility is not available in the Utility Master Programme.

3.   LOCKOUT ALARM

3.1 Conditions Producing an Alarm

Lockout alarm is raised in connection with the store reservation system designed to ensure that no programme, other than the routines of the Master, can interfere with another. This system is optional and is not included on all machines. A four-bit tag is associated with every word of the store. The Master Programme allocates each programme a tag number (1-8) which is placed in the tag position of words forming the programme area and in the fifth quartet of all area modifiers used by the programme. The first 200 locations of the extra chapter are used by the Master Programme and have tag 14 (see section 9).

At the end of every annexe and input/output section, a special annexe limit word is placed having tag 15. Areas used by the Master Programme have tag 14. The Master Programme annexe areas are given tag 13 to prevent the Master Programme corrupting itself if the area modifier in 64 + R should be corrupted.

Whenever an attempt is made to use a route reserved for one programme to pass information to, or from, an area of the store reserved for another programme, the channel is closed. This happens when the fifth quartet of the area modifier is different from the tag in the annexe or input/output section, or when an annexe limit word is encountered by an assembler.

When a programme bearing a tag other than 14 (or 15) makes reference to an area of the store which does not have the same tag, a 'lockout' alarm occurs, unless the store area has tag 0.

3.2 Procedure Following the Alarm

The alarm halts the computer in the middle of the action, and an investigation may be carried out. If the Master Programme in use has the reduced facility, the operator should note the contents of compartment 1, sequence control register, order register, and key register. When this has been completed, a key is operated which causes a skip to the end of the action. The contents of the sequence control register are placed in compartment 16 of division 0 and the order in compartment 17 is obeyed. This is a sequence change to the Master Programme.

3.3 Master Programme Action

EITHER:

A report is typed on the log including the following information:

(a) Programme Identity Number of programme currently being obeyed.

(b) (Contents of compartment 16) -1. This gives the location of the instruction that caused lockout, except in the case of a sequence change instruction, when it gives the location before that addressed by the sequence change.

(c) Last location at which the programme was entered from the Priority Control routine. This is provided to reduce the search for a sequence change causing lockout.

(d) Contents of compartment 1. This gives the location of the last 8, 19, 20 - 22, 28 or 29 action obeyed.

The programme causing lockout is closed, enabling the operator to take a Post-Mortem and Unload, or Unload directly. The programme is closed in such a way that the operator has no means of continuing with it.

OR:

If the Master Programme causes lockout a special report is typed in the log. The operator should load the Independent Store Print programme on the appropriate route. This programme will then be entered immediately the machine is re-started. The Master Programme must be reloaded. However, if modification register 1 of modifier group 0 is set for the start of the programme control area (see section 7.2) the lockout routine deals with the lockout as if programme lockout had occurred, even though lockout may have occurred within the Master Programme.

(With the reduced Master Programme facility): The contents of compartment 16 are stored in location Sp + 34, the contents of compartment 0 in Sp + 40, and the contents of Sp + 44 (last entry to master) in Sp +41; where Sp is the start of the programme switch (see Note in section 2.3), and a report is typed in the log to specify which programme caused lockout.

4.   LOG ROUTINES

These routines control all communication from the Master Programme to the operator, by producing the log and providing for the presentation of options.

4.1   The Means of Communication

An electric typewriter provides the means of communication from the Master Programme to the operator.

The typewriter may be linked to either the General Purpose Output Assembler (together with paper tape, punched card or printer output) or the Paper Tape Output Assembler (together with paper tape output if required).

4.2   The Presentation of Options

When either a programme or a routine of the Master requires the operator to make a decision, options are offered.

The Log routines allow only one request for a decision to be offered to the operator at any one time, other requests being queued.

4.2.1   Master Programme Options

While a programme is running the Master Programme may require a decision by the operator. The procedure is standardised. The Log routines offer options by typing in the computer log:

(a)   A reference indicating that options are being offered and an alarm number specifying the cause of the alarm.

(b)   The identity number of the programme concerned.

(c)   Any further information required.

The Master Program alarm numbers consist of four digits indicating:

(Alarm type)   (Channel)   (Channel)   (Route)

A special warning light is lit on the operators' control desk whilst an answer to option is awaited.

4.2.2 Operational Program Options

A program may use the Intercode 'Offer Options' instruction to obtain a decision from the operator.

Information is displayed and entered in the log as for Master Program options, except that no 'further information' can be given.

Operational program alarm numbers consist of two digits.

4.2.3 Program Comment in Log

A facility is provided to enable the program to output up to 35 characters of information on the log (see section 5, action 154, Volume III).

It is essential that the information contains program identification to distinguish between comments when timesharing.

4.3 The Record of Activities

In addition to details of options offered, the following forms of comment are also typed:

(a) Warnings: These require operator action.

(b) Comments: These are for information and do not require operator action.

They provide a record for all magnetic tape usage, of the facilities used by a program and the course of any job.

4.4 Date and Time

The time in minutes is given as the first two characters of every log comment. The date and time (in hours and minutes) are included in the allocation comment when any program is loaded. As an additional optional facility, the time in hours and minutes may be typed with every twentieth block comment.

The date is fed to the Master Program when it is loaded and is stored in compartment 138 of division 0. The time is obtained from the counter in 156 which is updated by the hardware Saxby Clock (Volume 1 Section 10.4)

5.   OPERATOR INTERVENTION ROUTINES

The 'Operator Intervention' routines control all communications from the operator to the Master Program.

5.1   The Means of Communication

For all communications to the Master Program the operator stacks information into the Indicator Register, by setting a binary-decimal pattern on the indicator keys and pressing the Stack Indicators key, which places the selected pattern in the Indicator Register and sets a request for interruption.

The routines first determine whether the Master Program is able to deal with the operator intervention; (an operator's choice of options (see section 5.2) will always be dealt with). If not, it arranges to type a comment the next time the typewriter is used, informing the operator that his command has been ignored. Otherwise, the routines determine whether the pattern stacked was a command (see section 5.3) and take action accordingly.

5.2   Operator Commands

There are 12 indicator keys. Keys 9 - 12 are used to specify the type or 'Group' of communication; the remaining keys specify the communication within the group (referred to as the 'Function').

The groups are :-

0   Operator choice of options

1   Operator commands without control data (this group is optional)

2   Operator commands requiring control data

3   Store post-mortem commands (this group is optional)

4   Operator commands requiring control data

5   'Abandon Command' command

6   'Set Route Available' command

7   'Withdraw Route' command

The number of the route (relative to the card/paper tape input assembler) on which control data is being submitted is given in bits 5 to 8 of the pattern stacked for appropriate commands.

For those commands requiring control data a range check is made on the route number to ensure that it is a possible route for the given installation.

For installations with both paper tape and punched card input, the range is 0 to 6; for those with only paper tape input 0 to 3, and for those with only punched card input 4 to 6.

When interruption occurs as a consequence of operator intervention the Priority Control routines (see section 6) will pass control to the Operator Intervention Routines. These use the log routines to record the nature of the intervention, and then take action according to the pattern the operator has stacked.

5.3 The Operator's Choice of Options

If the pattern stacked is an operator's choice of options (Group 0 communication) the routines check that the choice made is in fact one of those offered. (Whenever options are offered, the set of 'legitimate' choices is specified to the Operator Intervention Routines and these routines make a check on the operator's choice of options).

If not, a log entry is made to this effect and the offer is still considered to stand.

Otherwise the selection is noted in the log, and control is passed to the selected part of the initiating program or routines of the Master.

There is a standard list of option numbers from which the answer to any Master Program option can be selected. This of course cannot apply in the case of program options, and the significance of the option numbers from which answers may be selected must therefore be specified in the program's operating instructions.

Choice of option number 10 enables the operator to defer his decision. Options are re-offered after 3 minutes. This applies to both Master Program and program options. For Master Program options only, choice of option number 1 causes the abandonment of the program on whose behalf options are being offered by the Master Program.

Note : Each of these options may or may not be provided in the Master Program, according to users' requirements.

A full list of Master Program options is given in Appendix B.

5.4 Acting on Operator's Commands

If the pattern stacked is of group 1, 2, 3, 4, 6 or 7, the Operator Intervention Routines pass control to the particular routines concerned.

The Operator Intervention Routines perform a range check on the patterns stacked for group number and function within group; they arrange to reject if the checks fail, and a report is typed in the log.

All commands received are recorded in the log, except those in group 3.

5.5   Master Routine Use of Indicators

If Indicators 1-7 are set, this means that the Master Routine
is in a non-interruptible mode. This occurs in such routines
as an overlay and allocation. Indicator 8 is used to denote
that an option is outstanding. Indicator 12 is set if a type-
writer alarm occurs and Indicator 13 is used to set the machine
interruptible.