ELLIOTT 900

Volume 2: PROGRAMMING INFORMATION

Part 7: MAGNETIC TAPE ROUTINES

Section 7: QMRIN

CONTENTS

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Chapter 1: INTRODUCTION

1.1 Function

QMRIN is a SIR coded subroutine used to fetch units of information (records) from a magnetic tape file. A block of data holding one or more records is read from magnetic tape into a buffer area. Each call of QMRIN extracts one record, the next in sequence, from the buffer area.

1.2 Form of Distribution

The routine is distributed in SIR mnemonic form, part of the MTREC tape, which contains QMRIN and QMROUT.

1.3 Method of Use

The program is assembled and entered as a SIR subroutine, a block of the users program. QMREAD must also be in store.

1.4 Configuration

The minimum configuration for running this program is a basic 903 processor with magnetic tape controller and at least one magnetic tape handler.

Chapter 2: FUNCTIONS

2.1 Record Structure

The routine may read either fixed or variable length records. Location 23; of the file table must be set either negative if variable length records are to be read, or to a positive integer giving the number of words per fixed-length record. Location 23; may be set implicitly by reading down the header block (into file table locations 8; to 35;) or explicitly by the user.

Records are defined in Volume 2.7.1, Chapter 2.6.

2.2 Initial Positioning

Before commencing to read records from a magnetic tape file the file must be opened for reading and the tape must be positioned so that the first record to be read is at the beginning of the block that will next be read when QMREAD is entered. If the records follow the header block it is sufficient to open the file for reading using QMOPEN.

Before the first record is input 5; of the file table must be set zero or negative. This indicates to QMRIN that a new block must be read from tape. The file table must be set up correctly, as described in 2.3 below.

2.3 Entry

An entry has the typical form:

```
11  QMR
 8  QMRIN
 0  FT
 0  RECORD
 8  ERROR
```

The link is stored in QMR and entry made to label QMRIN . (These are global labels in MTREC.) The word following entry contains the address of the file table. Words 0; 1; 2; 5; and 23; of the file table must be set correctly, or not disturbed since the previous entry to QMRIN. Words 1; and 2; of the file table specify a buffer area which must be allocated by the user.

The second word after entry must hold the address of the area (specified by the user), into which QMRIN will store the next record. This must be distinct from the buffer area.

The area specified by the record address, and the buffer area specified on the file table, must be large enough to hold the largest record and block respectively, which are possible on the file being read.

2.4 Exit

Normal exit is to the fourth location after entry. The A-register will hold the number of words in the record. The record will be stored in consecutive words, starting at the given address. This copy of the record will not include the record length, (given in the first word of each variable length record written by QMROUT on a magnetic tape file). Similarly the number of words given in A will not include this extra word.

2.5 Errors

If an error or special condition is detected QMRIN exits to the third location after entry. If the A-register is zero a label block has been read (see 2.7 below). Otherwise the A-register holds a status word as given on the error exit from QMREAD (see Section 2.7.2).

2.6 Undetected Errors

Fixed-length records must not have zero in the first word. Any such records are ignored by QMRIN, and the next block is read. Action is undefined if record length is outside the range:

$$2 \leq \text{record length} \leq (\text{buffer length} - 2)$$

If QMRIN reads a block from tape which does not contain a record structure and is not a label block, the error is not detected.

2.7 Action on Detecting a Label Block

If a label block is read (successfully) QMRIN exits to the third location after exit with the A-register zero. This is not an error, unless the user's program treats it as such. The contents of the label block will be held in the specified buffer area.

Chapter 3: METHOD USED

QMREAD is used to read the next block along the tape, and the first record is picked up, from the buffer, and copied into the area specified by the user. Location 5; of the file table is then set to hold the address of the next record. Subsequent entries to QMRIN pick up the following records until all records in the block have been processed. Location 5; of the file table is then set negative so that the next entry to QMRIN causes another entry to QMREAD. If 5; file table contains a (positive) record address but the record as read from tape has its first word zero, then subsequent entry to QMRIN will also cause another entry to QMREAD.

Chapter 4: STORE USED

4.1 Store Occupied by Program

QMRIN occupies approximately 70 locations.

9 locations within QMROUT are also used.

QMREAD must also be in store.

4.2 Store Locations Affected

QMRIN alters the following outside its own area:-

QMT

4; and 5; of the file table.

Workspace used internally by the magnetic tape software. The buffer area specified by the user in 1; and 2; file table. The area specified in the second location after the entry.

Chapter 5: TIME TAKEN

When a block is read by QMREAD, the time taken is governed by the magnetic tape transfer and start/stop times. The value given below may be added if this is significant.

Entries to QMRIN which do not cause tape to be read take approximately:

$$870 + 220\,n \text{ microseconds}$$

where n is the number of words in a record.