ELLIOTT 900

Volume 2: PROGRAMMING INFORMATION

Part   7: MAGNETIC TAPE ROUTINES

Section 8: QMROUT

CONTENTS

Chapter 1: INTRODUCTION

1.1 Function

QMROUT is a SIR coded subroutine used to put units of information (records) onto a magnetic tape file. Each call of QMROUT puts one record into a buffer area. When the buffer area is full, it is output as a block onto magnetic tape.

1.2 Form of Distribution

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

1.3 Method of Use

The program is assembled and entered as a SIR subroutine, a block of the user's program. QMWRITE and QMREAD must also be present in the assembled program.

1.4 Configuration

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

Chapter 2: FUNCTIONS

2.1 Record Structure

The routine may be used to write either fixed or variable length records. Location 23; of the file table must be set explicitly; either to a negative value if variable length records are to be written or to a positive integer giving the number of words in each fixed length record.

Records are defined in Volume 2.7.1., Chapter 2.6.

2.2 Initial Positioning

Before commencing to write records to a magnetic tape file the file must be opened for writing or updating and the tape must be positioned correctly. If a new file consisting entirely of records is to be written it is sufficient to use QMOPEN to open for writing. The tape will then be positioned correctly to write the first record. Otherwise blocks must be read or written until the point where new records are to be written. Normally a label block should be written before a new group of records, but this is not essential.

Before the first record is written (by entering QMROUT) location 5; of the file table must be set zero or negative by the user's program. This indicates to QMROUT that the buffer area does not contain any existing records. The file table must be set correctly, see 2.3 below.

2.3 Entry to Write One Record

An entry to QMROUT has the typical form:

11	QMR
8	QMROUT
0	FT
0	RECORD
8	ERROR

The link is stored in QMR and entry made to label QMROUT. (QMR and QMROUT are global labels in MTREC). The word following entry holds 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 QMROUT. The user must specify a buffer area for use by QMROUT by setting 1; and 2; of the file table.

The second word after entry must hold the address of the area (specified by the user) which holds the record to be written. (This must be distinct from the buffer area.)

If fixed-length records are to be written location 23; of the
file table must hold the number of words in the record.   If variable length
records are to be written the record length must be held in the A-register,
on entry to QMROUT, and 23; file table must be negative.   This value and the
record itself must not include the extra word holding the record length (of a
variable length record).   The extra word is added by QMROUT before writing
the record onto tape.

2.4   Exit

Normal exit is to the 4th. location after entry.   The A-, B-
and Q-registers are undefined.

2.5   Output of the Last Records

Before closing the file, or writing anything on tape other than
records of the same type, the user's program must ensure that all previous
records have been output.   In general, there will be a block in the buffer
area, partly filled with the last few records accepted by QMROUT.   These
records must be output by making a special entry to QMWRITE as follows:

        11   QMT   (Note QMT not QMR)

         8   QMREND

         0   FT   (File table address)

         8   ERROR   (Error Exit)

Note that in this case 2; of the file table will be altered.   (Also 5; file table
will be set negative,so that further records could be written immediately.)

The normal exit and error exit will be as specified for
QMWRITE (Volume 2.7.3), not as for QMROUT.   QMT and QMREND are
global labels, within QMREAD and QMROUT respectively.

2.6   Error Exit

If an error is detected when a block is written the routine
QMROUT exits to the third location after entry.   The A-register then holds
an error status value as specified for the error exit of QMWRITE (Volume 2.7.3).

If the A-register is zero the end of tape warning has been
detected.   In that case the next action should be to close the file for writing
(which writes an EOF label).

When the error exit is taken the record specified on entry to
QMROUT will not have been transferred to the buffer.   The buffer area will
be intact, and in the case of a recoverable error it may be possible to continue
the program by re-entering QMROUT with the same record specified again.

2.7   Undetected Errors

Fixed length records must not have zero in the first word of the record.   This error will cause QMRIN to ignore this record and all further records placed in the same block when the file is read.

Action is undefined if the record length is outside the range:

$2 \leq$ record length $\leq$ (buffer length - 2).

Chapter 3: METHOD USED

On entry to QMROUT a check is made to determine whether transfer of the current record will overfill the buffer area. If it will, the buffer is first output, using QMWRITE, and the address for the next record is reset to the address of the buffer +2. Then or otherwise the record is copied to the specified position in the buffer. Location 5; of the file table is set to hold the address at which the next record will be stored.

For variable length records +1 is added to the record length and this value is inserted as an extra word at the beginning of the record when it is copied.

Chapter 4: STORE USED

4.1 Store Occupied by Program

QMROUT occupies 105 words approximately

QMREAD and QMWRITE must also be in store.

4.2 Store Locations Affected

QMROUT alters the following locations 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; of the file table.

QMREND alters 2; of the file table.

Chapter 5: TIME TAKEN

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

Entries to QMROUT which do not cause an entry to QMWRITE take approximately

$$770 + 220 \, n \quad \text{microseconds,}$$

where n is the number of words in a record.