Vol. 2:   PROGRAMMING INFORMATION

Part 2:   PROGRAM DESCRIPTION

Section 1:   QCHECK SUBROUTINE

Contents

CHAPTER 1: INTRODUCTION

1.1 Purpose

QCHECK is used in the checking of programs by performing the following functions:

(i) Printing the contents of any number of locations in one of five formats.

(ii) Changing the contents of any number of locations by inputting the new contents in one of three formats.

(iii) Replacing the contents of any number of locations by zero.

(iv) Replacing the contents of up to twenty locations by dynamic stops while preserving the original contents for subsequent replacement.

(v) Jumping to any address in the current store module.

(vi) Causing the user program to run on level 4 so that it may be manually interrupted.

1.2 Form of Distribution

The program is distributed as a mnemonic tape for assembly by MASIR. This tape is terminated by %.

1.3 Method of Use

The operation required, and the locations to be operated upon are specified by a parameter tape (see 2.1 for further details) or by input from the on-line teleprinter.

CHAPTER 2: OPERATION

2.1   Parameter Tape

Punch the following items, each on a new line:

(i)   the first address to be operated on.

(ii)   the last address to be operated on.

(Omit this item if only one location is to be
operated on.)

Items (i) and (ii) are punched as signed positive integers
or in the form:

+m ↑ n

where n is the store module number and m is the address within this module.

(iii)   an operation code – see Chaper 3 for available
functions.

N.B. In the case of input functions, the function code
must not be terminated by a new line sequence.

Examples

(a)   To output the orders held in location 8 to 12
inclusive punch:

+8
+12
O

(b)   To output locations 8192 to 8200 punch:

+0↑1   +8192

+8↑1   or   +8200

O   O

2.2   Entry and Exit

Entry is at the first location, QCHECK

When   all locations have been operated on (with the

exception of functions X (trigger), D (drop level) and R (continue), the program returns to QCHECK. If the next significant character is <halt> the program enters a dynamic stop; otherwise it reads the next set of parameters.

2.3   Ignorable Characters

<carriage return> and <delete> are ignored everywhere. All characters except <halt> are ignored before the first <+>.

After the first address all characters are ignored, between <linefeed> and <+> or the first permissible operation code letter.

After the second address all characters are ignored between <linefeed> and the first permissible operation code letter.

N.B.   There is no error routine provided to detect a character which is not permissible, nor is there any error indicator given by QCHECK.

CHAPTER 3: FUNCTIONS AVAILABLE

3.1 Output

The contents of each store location are printed on a new line, preceded by the address of the location. The contents may be interpreted as:

		Operation Code
1)	an integer	I
2)	a pseudo - instruction	O
3)	an octal number *	L
4)	a fraction	F
5)	a binary number	B

*N.B.   When a group of zero words is included in the specified block of locations for octal output, &0 will be output for the first zero word and other zero words in the group will be skipped.

3.2 Input

The address of the location is printed on a new line and the new contents are read in as:

		Operation Code
1)	a signed integer	SI
2)	a pseudo instruction	SO
3)	an octal number	SL

For each format, the terminator is a <newline>. For item 3) fewer than six digits may be read, in which case the digits are right justified. For item 1) the integer must be preceded by a sign, either a <+> or <->

3.3 Zero   Operation Code Z

The locations specified on the parameter tape are zeroed. There is no output.

3.4 Dynamic Stops   Operation Code H

The location(s) specified on the parameter tape are

replaced by dynamic stops, the original contents being retained within QCHECK for restoration. There is no output. Normally only one location at a time is specified.

If an attempt is made to replace more than 20 instructions by dynamic stops, a two tone warble can be heard on the loud speaker. The program must then be re-entered at QCHECK.

3.5   Clear Dynamic Stops   Operation Code C

The location(s) specified on the parameter tape, the contents of which have been replaced by dynamic stops as in 3.4 is restored to its original condition.   Normally only one location at a time is specified. There is no output.

If a location specified had not originally been replaced by a dynamic stop, a two tone warble is heard on the loud speaker. The program must then be re-entered at QCHECK.

3.6   Trigger   Operation Code X

Control is transferred to the first address input. There is no output.

3.7   Drop Level and Continue   Operation Code D

Control is transferred to the first address input (normally only one location is specified) and the user program is run on level 4. The program may then be interrupted manually on level 1. This will cause control to be transferred to the program QCHECK. At this stage, the user may utilise any of the facilities of QCHECK previously described.

To return to the user program, the operation code R is typed without any addresses. This causes control to be transferred to the next instruction of the user program and the program continues to run on level 4.

CHAPTER 4: METHOD USED

4.1 Routines

On entry, the parameter tape is read and control is passed to one of the 14 format routines. Three sub-routines are used:

(i)   to print an address

(ii)   to print an integer

(iii)   to read a signed or an unsigned integer

In (iii) a space acts as a terminator so that pseudo instructions can be read in, and there is a separate exit to cater for input of B-modified instructions.

CHAPTER 5:   OPERATING INSTRUCTIONS

The program must be patched to a suitable location and assembled under MASIR; after loading and setting up the program to run, entry at the first location causes the parameter tape to be read in. Operation of QCHECK will be found more convenient if input and output are diverted to the on-line teleprinter if fitted.

CHAPTER 6: STORE TAKEN

The program occupies 614 consecutive locations. QCHECK runs at the speed of the output and input devices used.