

APPLICATION NOTE NO. 26READING AND WRITING CHARACTERS IN MACHINE CODE

The Enterprise's operating system is called EXOS. EXOS is capable of executing a number of 'functions'. There are over 30 of these and Function 11 is capable of executing many sub-functions, therefore a short program instruction can execute a large number of routines. Just 4 of these functions will be described here as they are all connected. To access these functions from machine code the RST 30h instruction is used. Take, for example, Function 5 (Read character). First of all the number of the channel that is going to be read from must be loaded into the accumulator (A). Next the RST 30h instruction is executed followed by the data item '5'. On a Z80 assembler the code looks like this:-

```
LD A,105 ! Loads keyboard channel number into Accumulator.
RST 30h ! Calls the function specified by the next byte.
DEFB 5 ! The function number itself.
```

^{30h}
=> 48

This program will cause a character to be read from the keyboard and the ASCII code of it to be placed in register B. The accumulator will then contain the status. The program can only be entered and executed using a Z80 assembler (not from BASIC). If the need arises for this machine code to be incorporated in a BASIC program, it should be stored in a CODE statement like this:-

```
ALLOCATE 6
CODE FRED=HEX$("3E,69,F7,05,C9")
CALL USR(FRED,0)
```

Here are the 4 read/write functions:-

Function 5 (Read CHARACTER).

```
PARAMETER : A = Channel number.
RESULTS   : A = Status.
           : B = Character code.
```

Function 6 (Read BLOCK).

```
PARAMETERS : A = Channel numbers.
            : BC = Total bytes in block (0-65535).
            : DE = Buffer address.
RESULTS    : A = Status.
            : BC = Bytes left to read.
            : DE = Modified buffer address.
```

Function 7 (Write character).

```
PARAMETERS : A = Channel number.
            : B = Status code.
RESULTS    : A = Status.
```

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Function 8 (Write block).

PARAMETERS : A = Channel number.
BC = Total bytes in block (0-65535).
DE = Buffer address.

Default channels for the various devices are as follows:

COMMAND input and standard TEXT output - Channel 0
GRAPHICS input (LOOK, etc.) and output - Channel 101
Standard TEXT screen (initially 24x38) - Channel 102
SOUND out (open until explicitly closed) - Channel 103
PRINTER (default for the COPY command) - Channel 104
KEYBOARD operations (this is read only) - Channel 105
File based I/O tasks (default is TAPE:) - Channel 106
Local area NETWORK operations (NET:) - Channel 107

Additional channels can be opened to devices for greater flexibility.