

SYSTEM - A Basic Supervisor for Interdata 74

A control program known as "system" is provided to support running all IMP77 programs and many suitable HAL programs. System provides a minimal set of I/O facilities for the running programs and a loader to get them into the machine initially. The I/O facilities are accessed by means of SVC instructions. These are generated automatically by the IMP compiler, but HAL programs must explicitly arrange for this to happen (cf. Running Programs in the Interdata 74).

The facilities provided are described first and then the operational details of use.

The Loader

This will load only RELOCATABLE programs. These are generated automatically by the IMP compiler, and by default using the HAL assembler. The loader causes the processor to halt when it has completed. If it detects any error during loading it sets the status part of the PSW to 800F. The program may be entered (started) by depressing EXE. If a fault was detected, depressing EXE re-enters the loader.

Stream I/O Facilities

Readsymbol, printsymbol etc. are implemented as SVC's. These must be explicitly written into HAL programs. The necessary definitions are contained in a file called (pub).sysdef. The following description is in terms of the definitions given in .sysdef.

Stream I/O

Three input and three output streams are made available which are permanently associated with certain devices.

stream 0	-	the terminal
stream 1	-	the links to and from ISYS
stream 2	-	a.n. other link

The streams are selected by an instruction of the following form:-

SELIN <literal>
or
SELOUT <literal>

e.g.

SELIN 0
SELOUT 1

The system uses R1 in executing these SVC's. This means that the value of R1 on return from one of these SVC's is unpredictable.

On initial entry to a program, after loading, stream 0 is selected for input and output.

Two input instructions are provided:-

NEXTSYM
and
READSYM

As a result of executing these SVC's a symbol is placed in R1. (N.B. These are instructions - not functions or routines as in IMP!!)

The single output form is:-

PRINTSYM <symbol>

Examples are

PRINTSYM '&'
PRINTSYM R3
PRINTSYM FRED

In general, <symbol> must be something which can be the immediate operand of an SVC instruction i.e. a constant, the contents of a register, or the sum of two such things.

PRINTSYM also makes use of R1, whose value is therefore unpredictable following the instruction.

Stopping a Program

The form is:-

STOP

The processor stops in such a way that depressing EXE will cause it to restart from the beginning.

Further Useful Definitions

In addition to these SVC definitions, pub.sysdef defines values for useful literals viz:-

EOT - the symbol which terminates a text file from ISYS
NL - the symbol which represents newline
RT - the carriage return symbol
LF - the line feed symbol, for explicit teleprinter control.

Terminal Input and Output

At the point where it is trying to read or write a character, the '74 processor can detect if the Olivetti is unavailable (i.e. switched off or connected to ISYS). If it is unavailable then the processor waits for it to become available before continuing.

Keyboard input conventions are the same as those of ISYS i.e. can, del, si, so and dle have their usual significance.

Operational Details

Loading the System

The system is contained in the file (pub).system. The 50 sequence in the Interdata 74 loads system directly. The details are:-

1. Ensure the 50 sequence is present in the '74.
2. Start the '74 at location 50 (the wait light goes out and stays out).
3. Make sure the Olivetti is switched to ISIS.
4. Type the command:-
 * t .system / lk:b
5. The ISIS transfer should terminate and the '74 should halt.
 (Otherwise start again!!)

Loading Programs

The loader within the system may be started in one of 2 ways:-

either i) Start the '74 processor at location 60
or ii) Immediately after loading system, by depressing EXE.

The object file from ISIS is transferred to the '74 by a transfer command such as:-

* t obj / lk:b

The transfer should terminate normally.

The loader causes the processor to halt when it finishes. The PSW status part is set to 800F iff any errors are detected during loading. In which case abandon everything and start again.

Starting the Loaded Program

This is achieved in one of 2 ways

either i) Immediately after loading, by depressing EXE.
or ii) By starting the '74 processor at location 70.

As usual, IMP programs are guaranteed to be set up correctly to be started as above. But HAL programs must be explicitly coded to make use of this facility. The system enters a loaded program at its first location i.e. relocatable 0.

Frequently the loaded program will require to transfer data up and/or down the link to ISIS. These transfers are conveniently (not necessarily) initiated before the '74 program is started e.g.

```
* t obj / lk:b
389      { '74 program is loaded}
* t data1 / lk      { to '74 }
              { strike ESC if further transfer to be set up}
* t lk/result      { from '74}
Now switch the Olivetti to '74 and start the loaded program.
```

Examining Loaded Programs In Situ

This is only relevant to HAL programs, where the programmer has detailed knowledge of the instruction and data layout in memory. In order to relate relocatable addresses on a program listing to actual addresses in memory it is necessary to know precisely where it is loaded. The base address of the program area is contained in location 72. (N.B. this value is fixed at 46A, should your program overwrite it.)

WARNING

The system software resides in low memory addresses 0-469, it is in no way protected. Hence an errant program (HAL esp.) can corrupt it easily. The golden rule is:-

```
*****
*
* IF IN DOUBT RELOAD *
*
*****
```