UCSD p-System™ Configuration

Texas Instruments Professional Computer

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UCSD p-System™* Configuration

The Texas Instruments Professional Computer p-System configuration package allows you to configure the p-System's real-number precision and serial communications support. The PSYS run-time disk is initially configured with four-word real numbers and serial communications support. The configuration package allows you to choose the following:

- The precision used in real-number arithmetic support
- 8087 Numerical Processor Unit (NPU) support
- Whether or not to include support for a serial communications port

The UCSD Pascal™* compiler supports real numbers that use either two or four words of memory to store the value. That is, there is an option at compile time that tells the compiler to allocate either two or four words of memory for each real number used in the program. To execute this program, you must configure the p-System to support the option that you selected at compile time. Whether two-word or four-word real numbers are used depends on the application. If you need more accuracy than two-word real numbers represent, then four-word real numbers must be used. Using four-word real numbers, however, imposes some execution speed penalty. Another option available is no real number support. You can use this option when the applications do not use real numbers. The advantage of not selecting real-number support is that the operating system requires less memory, thus leaving more memory available for applications.

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Another parameter in selecting which configuration you need is whether or not you have purchased the 8087 NPU option. The 8087 NPU performs real-number calculations and improves the peformance of those applications using real numbers.

The configuration package also allows you to configure the p-System's serial communications support. The PSYS run-time disk is initially configured with serial communications support. However, if you do not intend to use serial communications, you can configure the p-System without serial communications support. The advantage of eliminating serial communications support when you desire is that the operating system requires less memory (about 2K bytes less), thus leaving more memory available for applications.

The configuration utility creates the files NEW.INTERP, NEW.PASCAL, and (possibly) NEW.LIBRARY if four-word real-number support is selected. The NEW.LIBRARY contains all necessary system units with the addition of the TWOWORD unit, which allows four-word interpreters to use two-word real numbers.

The TWOWORD unit allows simultaneous use of both two- and four-word real numbers in the same program by defining a two-word real data type (real2) with a procedure (strl2), and a function (ldrl2) to deal with them. By utilizing this new data type, it is possible to have four-word real numbers to provide accuracy where it is needed and still minimize storage where accuracy is not required. Because the four-word real interpreter performs all operations, there will be no performance improvement by using two-word real numbers. The following example shows the interface section of the TWOWORD unit and a sample program using the unit.

```
unit TWO_WORD;
interface
type
  real2 = record a,b: integer end;

procedure strl2 (var X: real2; Y: real);
{
 Store a four-word real-number variable or expression Y
 to two-word variable X. An overflow or underflow on
 conversion will cause an execution error.
}
function ldrl2 (X: real2): real;
{
 Load and convert a two-word real number X into a
 four-word real number in the evaluation stack.
}

PROGRAM TEST_TWOWORD;
   USES Two_Word;
   Var
      i: integer;
      total, temp: real;
      table: array [0..10] of real2;
   Begin
      for i: = 0 to 10 do begin
        write ('Number?');
        readln (temp);
        STRL2 (table[i], temp)
      end;
      for i: = 0 to 10 do begin
        temp : = LDRL2(table[i]);
        total: = total * temp;
        writeln(total: 18: 2)
      end;
   End.
```

You must consider hardware requirements before performing the configuration. The following table describes the minimum system configurations to perform the configuration:

Total Size of RAM (K Bytes)	Number of Floppy Disk Drives
128	2
192	1
256	1

To begin, initialize the system using the system disk PSYS. Execute the utility PSYS:CONFIG.RAM to configure system memory for the interpreter (see the paragraph entitled RAM Configuration Utility in the *UCSD p-System Operating System Reference Manual*, TI part number 2232395-0001). Respond to the `Extended Code Pool Size` prompt with `32`. Quit the utility and reinitialize the system by pressing the `H` key.

If your system uses a Winchester disk as the system disk or has two flexible diskette drives, skip the following three paragraphs and resume with the paragraph regarding the configuration utility.

Prepare the system disk for the system initialization from random access memory (RAM). Depending upon the amount of memory of the system, the size of the RAM disk may be limited (see the paragraph on the RAM disk in the *UCSD p-System Operating System Reference Manual*). Therefore, the required system files needed in RAM may have to be repositioned in order to fit. The following listing is an example of how to arrange the files:

```
PSYS:
SYSTEM.PASCAL                126  11-Jul-83
SYSTEM.MISCINFO                1  11-Jul-83
SYSTEM.LIBRARY                35  11-Jul-83
```

To initialize from RAM, a file called RAM.INIT must be placed on the system disk. The RAM.INIT file signals the system to initialize from RAM. This file should be located immediately after the required system files. However, if there is not enough space after the system files to make a RAM.INIT file one block long, you must move files back on the disk to provide enough space to create the file. To move files back on the disk, use the extended directory listing command, E(xt-dir, of the filer to determine the starting block number to move. The following is an example of an extended directory listing:

```
PSYS:
SYSTEM.PASCAL      126  11-Jul-83    6  512  Datafile
SYSTEM.MISCINFO      1  11-Jul-83  132  226  Datafile
SYSTEM.LIBRARY      35  11-Jul-83  133  512  Datafile
SYSTEM.EDITOR       50  11-Jul-83  172  512  Codefile
```

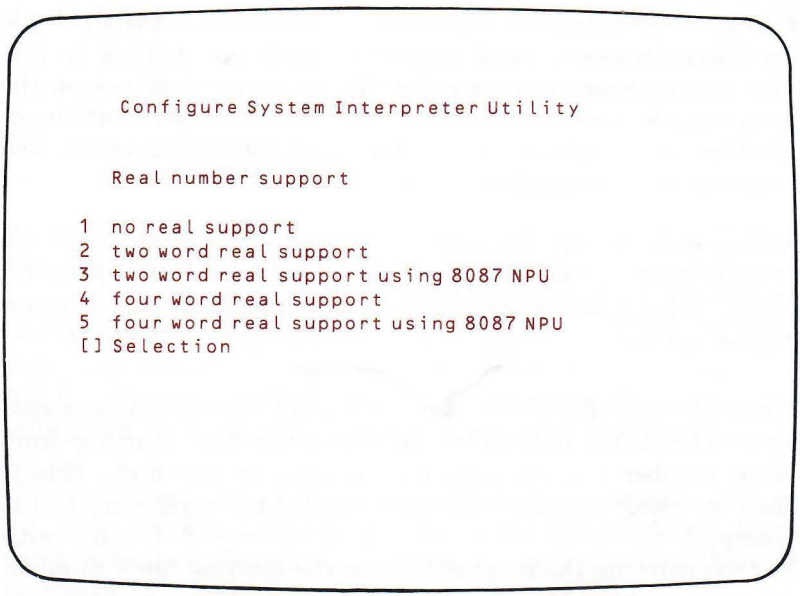
Using the example above, the RAM.INIT file should be placed after SYSTEM.LIBRARY. Therefore, the files starting from block number 172 must be moved back on the disk. This is done by using the filer's K(runch command, responding to the prompt `From end of disk, block nnn ? (Y/N)` with N, then entering the number 172 for the starting block number. After K(runching the disk, use the M(ake command of the system filer to create the file RAM.INIT.

After placing RAM.INIT on the PSYS disk, reinitialize the system using the ON/OFF power switch. The system will then load all files located above RAM.INIT into the RAM disk and initialize from RAM. After the system is initialized, remove the system disk PSYS and insert the CONFIG disk into the diskette drive.

NOTE

> Before reusing the configuration utility to configure a new interpreter, remove the old system files NEW.PASCAL, NEW.INTERP, and (possibly) NEW.LIBRARY from the CONFIG disk. Remove the file RAM.INIT from the PSYS disk to prevent the system from initializing from RAM.

To run the configuration utility, X(ecute the file CONFIG:CONFIG.INT and the following prompt appears:



Press the number of the type of real-number support that you want to configure (or press the space bar to quit the utility).

After you select real-number support, the following prompt appears:

```
Serial communications support (Y/N)? []
```

Press the Y key if you want serial communications support; otherwise, press the N key (or press the space bar to exit the utility).

The configuration utility creates the new system parts automatically. The configuration process takes five minutes or less to complete. When the main prompt line appears on the display unit, the configuration is complete. Using the T(ransfer command of the system filer, transfer the newly created files NEW.PASCAL and NEW.INTERP (and NEW.LIBRARY when you select either type of four-word real support) to your desired system disk. Use the C(hange command of the system filer to change the file names as follows:

NEW.PASCAL ——→ SYSTEM.PASCAL
NEW.INTERP ——→ SYSTEM.INTERP
NEW.LIBRARY ——→ SYSTEM.LIBRARY

The new system parameters are effective the next time you initialize the system from that system disk.

NOTE

The utilities provided on the PSYS run-time disk (CONFIG.RAM, CONFIG.PTR, CONFIG.REM) should be used only with interpreters configured with four-word real numbers without 8087 support.

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