6 SPLITTER

Overview

The splitter prepares non-bootable-PROM-image files, which execute from DSP external memory. These files are usually associated with ADSP-21065L DSP systems, because those DSPs have limited internal memory. In most all instances, developers working with an ADSP-21xxx SHARC DSP should use the loader instead of the splitter — the exception is the case where a SHARC system must execute instructions from external memory. For more information, see the overview of the loader on page 4-1. When working within the VisualDSP++ environment, using the splitter to produce a PROM file is an output option for projects. This chapter contains the following information on the splitter:

- "Splitter Guide" on page 6-2

  This section contains procedures for using the splitter.

- "Splitter Command-Line Reference" on page 6-3

  This section contains reference information on the splitter commands and operations.

- "Splitter Glossary" on page 6-9

  This section contains a glossary of splitter related terms.

Splitter Guide

The splitter (`elfspl21k.exe`) processes your executable files, producing a non-bootable-PROM-image file. Splitter operations depend on a set of splitter options.

Splitter options let you control how the splitter processes your executable files, letting you select features such as memory type and file format among others.

Setting Splitter Options

When developing a DSP project, you may find it useful to modify the splitter's default option settings in the VisualDSP++ environment. For more information, see the *VisualDSP++ User's Guide for ADSP-21xxx DSPs*.

These options come from splitter command-line switches or (when used within the VisualDSP++ environment) come from **Split** settings accessed via the **Project Options** dialog box. These **Split** settings correspond to command-line switches.

For more information, see "Splitter Command-Line Reference" on page 6-3.

Splitter Command-Line Reference

The splitter (`elfspl21k.exe`) generates non-bootable PROM image files for ADSP-21xxx DSPs by processing executable files. The splitter's output is a set of PROM files with the file name extension `.S_#`, `.H_#`, or `.STK`. To make an PROM file, the splitter processes data from a executable file (`.DXE`).

You can load the results from the splitter into the VisualDSP++ debugger for simulation. Once you have fully debugged your program, use the splitter to generate a set of PROM files for your target system.

This section provides reference information on the splitter command line and splitting. A list of all switches and their descriptions appears in Table 6-2 on page 6-6.

When using the splitter within the VisualDSP++ environment, the Split settings correspond to splitter command-line switches. For more information Split options, see the *VisualDSP++ User's Guide for ADSP-21xxx DSPs*.

Use the following syntax for the splitter command line:

```
elfspl21k [-switch …] -pm &| -dm &| -s segment executable
```

where:

- `[-switch …]` — This is the name of one or more switches to be processed. The splitter has many optional switches. These select the operations and modes for the splitter.
- `-pm &| -dm &| -s segment` — The `&|` symbol between these three switch indicates AND-OR. Your splitter command line must include one or more of the `-pm`, `-dm`, and/or `-s` switches.

- `executable` — This is the name of the executable file (`.DXE`) to be processed for a single-processor boot-loadable file. A file name can include the drive, directory, file name and file extension; enclose long file names within straight-quotes, `"long file name"`.

The splitter command line is case sensitive. For example, the following two command lines:

```
elfspl21k -pm -o pm_stuff my_proj.dxe
elfspl21k -dm -o dm_stuff my_proj.dxe
```

run the splitter twice, once producing PROM files for program memory and again producing PROM files for data memory. The switches on these command lines are as follows:

`-pm -dm`

Selects program and data memory as sources in the executable for extraction and placement in the image. Because these are the only switches used for identifying the memory source, the source segments are any PM or DM ROM segments. Because no other contents-switches appear on these command lines, the format for the output defaults to Motorola S3 format, and the output PROM width defaults to 8-bits wide for all PROMs.

`-o pm_stuff -o dm_stuff`

Provides names for the output files, using differing names so that the output of the second run does not overwrite the output of the first run. The output names are `pm_stuff.s_#` and `dm_stuff.s_#`.

`my_proj.dxe`

Provides an executable file to process into a non-bootable PROM-image file.

Many splitter switches take a file name as an optional parameter. Table 6-1 on page 6-5 lists the type of files, names, and extensions that the splitter expects on files.

File searches are important in the splitter's process. The splitter supports relative and absolute directory names, default directories, and user-selected directories for file search paths. File searches occur as follows:

1. `Specified path` — If you include relative or absolute path information in a file name, the splitter only searches in that location for the file.
2. `Default directory` — If you do not include path information in the file name, the splitter searches for the file in the current working directory.

When you provide an input or output file name as a command-line parameter, use the following guidelines:

- Enclose long file names within straight-quotes, `"long file name"`.
- Append the appropriate file name extension to each file.

The splitter follows the conventions for file names in Table 6-1.

Table 6-1. File Name Extension Conventions

Extension	File Description
`.dxe`	Executable files and boot-kernel files
`.s_#`[1]	Splitter output file — Motorola S-record format
`.h_#`[2]	Splitter output file — Intel Hex-32 format
`.stk`[3]	Splitter output file — Byte-stacked format

[1] Motorola S Record files are given the extension .s_# , where # indicates the position (0=least significant, 1=next-to-least significant, etc.).

[2] Intel Hex-32 format files are given the extension .h_# , where # indicates the position (0=least significant, 1=next-to-least significant, etc.).

[3] Byte-stacked format produces one file, not a series. This file is has the .STK extension and is not intended for PROMs, but for host transfer of data.

A summary of the splitter's command line switches and their descriptions appears in Table 6-2. Note that these switches may be used in any order on the command line, except for the `executable` parameter which should end the line. Items shown in `[ ]` are optional. Items shown in *`italics`* are user-defined and are described with each switch in Table 6-2.

Table 6-2. Splitter Command-Line Switches

Switch	Description
`executable`	The *`executable`* parameter selects an executable file for processing into PROM files.
`-dm`	The `-dm` (include Data Memory) switch directs the splitter to extract segments from the executable that you have declared as Data Memory ROM. The `-dm` switch influences the operation of the `-ram` and `-norom` switches, adding Data Memory as their target.
`-f` *`format`*	The `-f` (PROM file format) switch directs the splitter to prepare a non-bootable-PROM-image file in the specified *`format`*. The available *`format`* selections are `h` (Intel Hex-32), `s1` (Motorola S1—exorciser format), `s2` (Motorola S2—exormacs format), `s3` (Motorola—32-bit format), and `b` (byte-stacked format). If the `-f` switch does not appear on the command line, the default format for the PROM file is `s3`. For information on the Motorola S-record, Intel Hex-32, and byte-stacked formats, see the file formats overview in "Build (Processed) Files" on page A-7.
`-o` *`image`*	The `-o` (output file) switch directs the splitter to use the `image` name for the splitter's output file(s). If not specified, the default name for the splitter's output is "*`executable`*`.ext`," where `ext` depends on the output format.
`-norom`	The `-norom` (no ROM in PROM) switch directs the splitter to ignore any ROM segments in the *`executable`* when extracting information for the output image. The `-dm` and `-pm` switches control selection of Data or Program memory for the `-norom` switch. The operation of the `-s` switch is not influenced by the `-norom` switch.

Table 6-2. Splitter Command-Line Switches (Cont'd)

Switch	Description
`-pm`	The `-pm` (include Program Memory) switch directs the splitter to extract segments from the executable that you have declared as Program Memory ROM. The `-pm` switch influences the operation of the `-ram` and `-norom` switches, adding Program Memory as their target.
`-r # [# ...]`	The `-r` (ROM widths) switch directs the splitter to create a number of PROM files. Specify the number of files and the width (in bits) of each file with the `#` parameters to the `-r` switch. The splitter can create PROM files for 8-, 16-, and 32-bit wide PROMs. The default width is 8-bits. Order the `#` parameters from most to least significant. The total of the `#` parameters must equal the bit width of the destination memory, which is either 48-bits for program or 40-bits for data. The following splitter command line: `elfspl21k -dm -r 16 16 8 myfile.dxe` directs the splitter to extract Data Memory ROM from the `myfile.dxe` executable, creating the following three output PROM files (totalling 40-bits wide): `myfile.s_0` 8-bits wide, contains bits 7-0 `myfile.s_1` 16-bits wide, contains bits 23-8 `myfile.s_2` 16-bits wide, contains bits 39-24
`-ram`	The `-ram` (include RAM in PROM) switch directs the splitter to extract any RAM segments in the *`executable`* when extracting information for the output image. The `-dm` and `-pm` switches control selection of Data or Program memory for the `-ram` switch. The operation of the `-s` switch is not influenced by the `-ram` switch.

Table 6-2. Splitter Command-Line Switches (Cont'd)

Switch	Description
`-s` *`segment`*	The `-s` (include memory segment) switch directs the splitter to extract the contents of the *`segment`* memory segments from the executable. The `-s` switch may appear on the command line as many times as needed, but each incidence of the `-s` switch may specify only one *`segment`*. The type of memory (RAM or ROM) that is extracted from the *`segment`* depends on the definition of the segment and is not influenced by the `-pm`, `-dm`, `-ram`, or `-norom` switches.
`-u` *`number`*	The `-u` (user flags) switch, which may only be used in combination with the `-f b` switch, directs the splitter to use the *`number`* in the user-flags field of a byte-stacked format file. If the -u switch does not appear on the command line, the default value for number is zero. If you prefix the *`number`* with a "0x," the splitter interprets the *`number`* as hexadecimal. Otherwise, the splitter interprets the *`number`* as decimal. For information on the byte-stacked format, see the file formats overview on page A-1.

Splitter Glossary

Splitter — The splitter refers to `elfspl21k` contained in the software release.

Non-bootable PROM image files — The output from the splitter consists of PROM files that cannot be used to boot-load a system. Use the loader to produce boot-loadable files. For more information, see the overview of the loader on page 4-1.