
Harlequin® RIP

Precision Screening Library

Technical Note Hqn 057

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GLOBAL GRAPHICS®
software

1 Introduction

The HPSLIB library translates Harlequin Precision Screening (HPS) screen cache files into 16-bit threshold files. The library includes machine specific security set with a key at the point of installation. The library is designed to allow applications outside the Harlequin RIP environment to use the Harlequin RIP generated HPS screen cache files. As well as the threshold file, the library also provides dimension, offset information and the number of tones the HPS screen contains.

2 Distribution

The version of HPSLIB included in the distribution is a single-threaded Win32 static library. A multi-threaded version of the library is available on request. In addition to the HPSLIB library, an example source file, compilation **.mak** file and batch file to run the **sec_key** executive and make the example source is included. A ReadMe file is included which contains information on the supplied files and provides details on how to build the demonstration source code. The example source code and make **.mak** file illustrate how to include and use HPSLIB within your code. This document also describes the errors that can be produced by HPSLIB and the means to recover from these errors. All errors produced from HPSLIB should be resolvable.

Please note that error handling has not been explicitly covered in the example code. Error handling requires some co-ordination with the implementation of HPSLIB.

The example source code does not resolve the error codes produced by the errors.

3 Translation function (get_screen)

The interface for reading the HPS screen cache files comes through a single function, `get_screen`. The information is passed into and returned from the function through the `screen_information` structure.

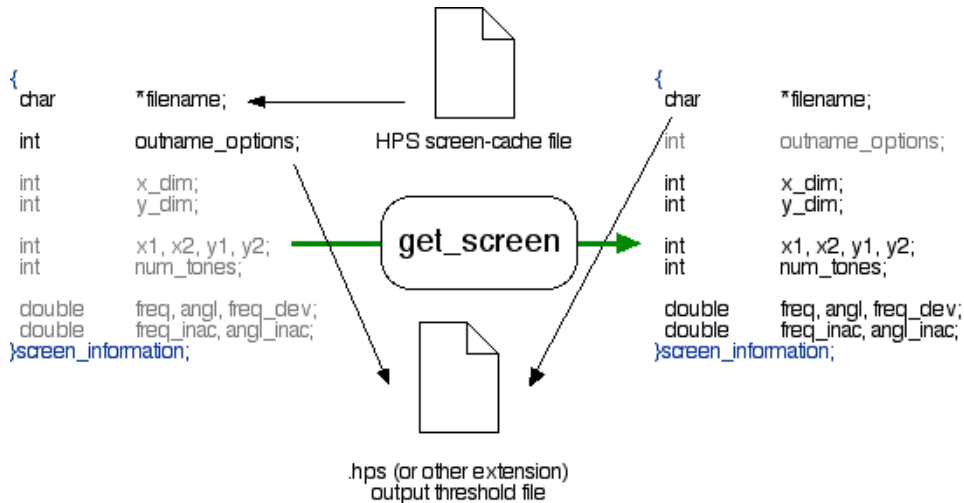


Figure 1 Internal relationships

`get_screen` requires `filename` and `outname_option` to be set. The default for `outname_option` is 0. `filename` should be a valid HPS screen-cache file. The file produced by the function will have `.hps` as its default suffix. This can be changed with `outname_options` (see below for more information). The output file produced is returned in the `filename` value.

The resultant threshold files can be read independently by Photoshop or other software applications. The size of the x and y dimension of the threshold is provided in the `x_dim` and `y_dim` information.

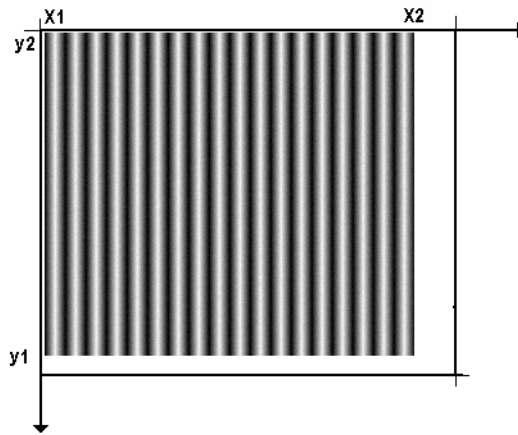


Figure 2 Zero rotated cell

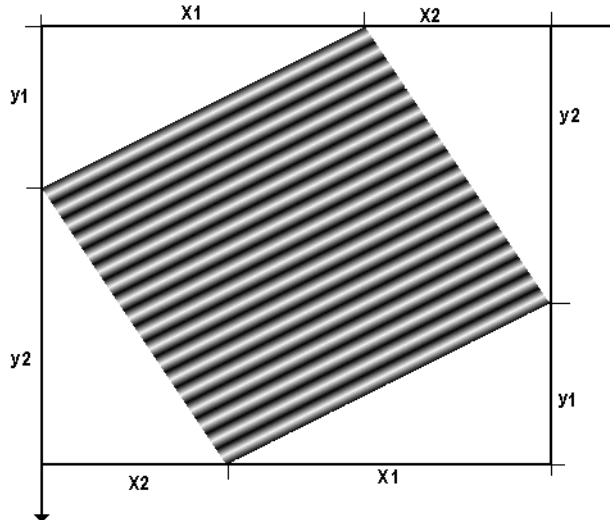


Figure 3 Rotation of the threshold

The values shown represent the rotation of the threshold. The rotation is always clockwise. The outer rectangle is the threshold array, and the inner array represents the active threshold that is applied with the offset shown in `x1`, `x2`, `y1` and `y2`. Note that in the case of an unrotated cell, `x1` and `y2` will be zero, while `x2` will be the width of the cell and `y1` the height¹.

Similarly for a 90-degree rotated cell, `x1` will be the width of the cell and `y2` the height, while `x2` and `y1` will be zero.

Values from the threshold that are part of the active HPS threshold have non-zero values. These range from 1 to the number of tones (`num_tones`) from the `screen_information` of `get_screen`. A zero value means the section of the threshold should be in a cell-replicated section. Cell-replication (the angular tiling of cells), must be done outside HPSLIB (although the example source code provided includes cell replication code).

In addition, five double precision values are given that correspond to the results provided by the Harlequin RIP monitor for frequency (`freq`), angle (`ang1`), deviated frequency (`freq_dev`), frequency inaccuracy (`freq_inac`) and angle inaccuracy (`ang1_inac`).

Note: The threshold file returns values relative to the number of tones, not true 16-bit thresholds. The conversion between the two is relatively trivial;

```
threshold_16_bit = (65535*threshold_file_value) / num_tones
```

HPSLIB should only be used to read HPS screen caches generated on the same type of machine (that is, Macintosh generated HPS screen caches cannot be read by a Win32 version of HPSLIB).

4 outname_options

The three character suffix and the method used for creating the output file name can be changed with the `outname_options` value. The first two bits of `outname_options` refer to whether the file suffix is appended or overwritten on the file name. The remaining bytes offset by these two bits, are the optional three characters for an alternative suffix.

¹ Versions up to and including 1.03 are in error. The coordinate systems used are not as drawn in Figure 3. For code to correct this error, see

The default file suffix is **.hps**. However if **.raw** was required, **outname_options** could be set to:

```
2 + ('r'<<2) + ('a'<<10) + ('w'<<18)-overwrite filename off
```

or

```
3 + ('r'<<2) + ('a'<<10) + ('w'<<18)-overwrite filename on
```

The file overwrite condition (the first bit set to 1), means if the fourth-last character of a file name is not a dot, the suffix is written to the end of a file. This condition requires that sufficient memory has been allocated to allow the output file name to be written. It is therefore not the default option.

Input files named	ABCDEF	ABCDEF.GH	ABCDEF.GHI
Overwrite set, output file names	ABCDEF.hps	ABCDEF.GH.hps	ABCDEF.hps
Overwrite not set, (default)	AB.hps	ABCDE.hps	ABCDEF.hps

Table 1 Input and output file names

5 Error codes

get_screen produces a number of results which have been included to handle almost all the errors that the function could encounter. The errors give some indication if they are critical or errors that can be resolved by the code outside the library. In almost all cases, the errors should be resolvable to produce non-fatal results.

The following are the defined error codes. Global Graphics reserves the right to change the actual error numbers associated with these however the defined error constants will not change. For example, when testing for “no screen information presented” to **get_screen**, check for a resultant **HPSLIB_NO_SCRINFO** not -7.

HPSLIB_OKAY

get_screen finished without problems. The threshold file and resultant **screen_information** data is ready for use.

HPSLIB_NO_FILE, HPSLIB_NOT_SCREEN_FILE, HPSLIB_NOT_HPS_FILE

This group relate to either no file being present or the wrong kind of file being present.

HPSLIB_NAME_TOO_SHORT

The library only accepts file names longer than four characters.

HPSLIB_SCREEN_VERSION

The screen file has the wrong version number. Please report this error (together with the associated screen file) to: harlequin-support@globalgraphics.com.

HPSLIB_FILE_TRUNC

The screen cache file has been truncated (that is, it is shorter than expected).

HPSLIB_FILE_ERROR

This error code results with the library's internal file handling. This error should be reported to harlequin-support@globalgraphics.com, preferably with supporting source code and the HPS file which produced this error. The internal file handling errors should in all reasonable cases should be handled by

HPSLIB_NO_FILE, HPSLIB_NOT_SCREEN_FILE, and HPSLIB_NOT_HPS_FILE.HPSLIB_MEMORY_ERROR

This error code results when an error has occurred with memory allocation. This could be resolved by freeing excess memory and attempting the `get_screen` call again.

HPSLIB_NO_SCRINFO, HPSLIB_SCRINFO_DAMAGED

If the screen information is damaged or not present these errors may occur. The no `screen_information` error is easily resolved, merely allocate a new `screen_information` structure with a valid HPS screen

file name. The **HPSLIB_SCRINFO_DAMAGED** error should be reported with source code and example HPS screen file to **harlequin-support@globalgraphics.com**.

HPSLIB_SECURITY_ERROR

This error is primarily caused by two conditions. The first condition is when the dongle has been tampered with in some way. This can be checked by running **sec_key**. The second condition, which is also solved by **sec_key**, is that the security key is invalid. See below for more information.

6 sec_key

The security for HPSLIB is provided by a unique verification key tied to the machine on which HPSLIB is run. **sec_key** should be used at installation time and then removed so it is not available for general use. **sec_key** can also be used as an interrogation tool, in the case of a security error. It will provide information relating to the dongle and associated security libraries being used correctly.

The **sec_key** executable is a passive executable—apart from its output text. It requires no input, it merely produces an output key file or explains any errors incurred. **sec_key** also tests the key produced, which allows for problems to be diagnosed before HPSLIB is used. Any errors that are reported through failure but are not identified should be reported to:

harlequin-support@globalgraphics.com.

7 hspilib corrections

In order to correct the error described Footnote 1, insert the following code snippet just after testing for the success of the call to **get_screen** within a conditional compilation directive.


```

{
    int R1 = scr_inf.x1,
        R2 = scr_inf.x2,
        R3 = scr_inf.y1,
        R4 = scr_inf.y2;

    scr_inf.x1 = R4;
    scr_inf.x2 = R1;
    scr_inf.y1 = R3;
    scr_inf.y2 = R2;
}

```

This will correct the error and produce the correct x1/x2/y1/y2 values for **hsplib** versions up to and including 1.03.

Change history

v 1.1	2006.08.30	Changes made to Figure 2 and accompanying text. Code added to correct error with previous versions.
v 1.0	2004.02.05	New Document



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