

mediaLib™ Installation Manual

Release 2.5



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Release Notes for mediaLib 2.5

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1.1 *What's New in mediaLib 2.5*

1.1.1 *Libraries Tuned with SSE2 for x86*

On Solaris x86, the following libraries have been tuned using the SSE2 instructions:

```
/usr/lib/libmllib/libmllib_sse2.so.2  
/usr/lib/libmllib/amd64/libmllib_sse2.so.2
```

1.1.2 *Changes in mediaLib Modules*

The following are 11 new functions in mediaLib 2.5:

```
mllib_ImageSetSubimageStruct()  
mllib_ImageResetSubimageStruct()  
mllib_VideoColorRGBint_to_BGRAint()  
mllib_VideoDCT8x8Quantize_S16_S16_B12()  
mllib_VideoDCT8x8Quantize_S16_S16_B12_NA()  
mllib_VideoDCT8x8Quantize_S16_U8()  
mllib_VideoDCT8x8Quantize_S16_U8_NA()  
mllib_VideoDeQuantizeIDCT8x8_S16_S16_B12()  
mllib_VideoDeQuantizeIDCT8x8_S16_S16_B12_NA()  
mllib_VideoDeQuantizeIDCT8x8_U8_S16()  
mllib_VideoDeQuantizeIDCT8x8_U8_S16_NA()
```

The following 4 video functions have been renamed from

```
mllib_VideoDCT8x8_S16_S16()  
mllib_VideoDCT8x8_S16_S16_NA()
```

```
mllib_VideoIDCT8x8_S16_S16()  
mllib_VideoIDCT8x8_S16_S16_NA()
```

to

```
mllib_VideoDCT8x8_S16_S16_B10()  
mllib_VideoDCT8x8_S16_S16_B10_NA()  
mllib_VideoIDCT8x8_S16_S16_B12()  
mllib_VideoIDCT8x8_S16_S16_B12_NA()
```

respectively, but the old names are kept as the aliases of the new ones for backward compatibility.

Please see `mllib_image_proto.h`, `mllib_video_proto.h` and the *mediaLib Reference Manual* for the calling sequences of these functions.

1.1.3 Major Bugs/RFEs Fixed

```
6397145 mllib_VideoQuantizeInit_S16() causes SIGFPE when FP_X_INV is  
      set  
6401721 mllib_ImageAve[_Inp] don't have rounding  
6403330 add a new function mllib_VideoColorRGBint_to_BGRAint() for  
      speeding up GNOME  
6408945 add new functions  
      mllib_VideoDCT8x8Quantize_[S16_U8|S16_S16_B12][_NA] for  
      better performance  
6431261 add new functions  
      mllib_VideoDeQuantizeIDCT8x8_[U8_S16|S16_S16_B12][_NA] for  
      better performance  
6509428 mediaLib compositing has off-by-one errors with sse2  
      architecture  
6529757 add a new function mllib_ImageSetSubimageStruct() for speeding  
      up GNOME  
6591899 GtkAda's testgtk got SIGFPE in mllib_ZoomBlendEdge()
```

1.1.4 Changes in mediaLib Examples

The following examples have been updated from using DGA only to using Xlib by default so they can display the results on both SPARC and x86 platforms.

```
example_g1  
example_g2  
example_i5  
example_i6
```

1.1.5 Change in Version Number

The version number has been changed from 2.4 to 2.5. The distribution file names have been changed accordingly.

mediaLib 2.5 is a minor release and therefore no changes have been made to the mediaLib 2.4 interfaces. In mediaLib 2.5, the shared objects (i.e., the shared libraries) still have an external version ".2" in their file name extensions, for example, libmLib.so.2. But they have an internal version name "SUNW_2.5" for the new symbols. Refer to Solaris *Linker and Libraries Guide* (Part No: 817-1984) for more information on Solaris library versioning.

1.1.6 Changes in Documentation

The *mediaLib Reference Manual* (Part No: 802-7800) has been updated for mediaLib 2.5.

1.2 System Requirements

You must have the following items in order to use mediaLib:

- OS - Solaris 8 or later (SPARC or x86)
- C/C++ Compiler - Sun Studio, or GCC

Note that the compiler requirement is only for developers. Also note that mediaLib 2.5 was built and tested with Sun Studio 12, and it is recommended that it be used with Sun Studio 12 which is available for free from the following URL:

<http://developers.sun.com/sunstudio/index.jsp>

It is recommended that Multi-threaded mediaLib be used on Solaris 9 or later for better support.

Disk space requirement for a full installation:

- For Solaris SPARC

| Location | Compressed Packages | After Installation |
|----------|---------------------|--------------------|
| /usr | 113 MB | 245 MB |
| /opt | 122 MB | 278 MB |

- For Solaris x86

| Location | Compressed Packages | After Installation |
|-----------------|----------------------------|---------------------------|
| /usr | 30 MB | 125 MB |
| /opt | 36 MB | 149 MB |

1.3 *mediaLib* Components

mediaLib 2.5 is comprised of eight packages on the Solaris SPARC platform or the Solaris x86 platform, including the following six platform-specific packages for Solaris SPARC or Solaris x86:

| | |
|------------------|--|
| SUNWmlib | mediaLib - Shared Libraries |
| SUNWmliba | mediaLib - Archive Libraries |
| SUNWmlibe | mediaLib - Examples |
| SUNWmlibh | mediaLib - Headers |
| SUNWmlibl | mediaLib - Library Links |
| SUNWmlibt | mediaLib - Multi-threaded Libraries |

and the following two common packages for both Solaris SPARC and Solaris x86:

| | |
|------------------|--|
| SUNWmlibd | mediaLib - Documentation |
| SUNWmlibk | mediaLib - Header and Example Links |

1.4 *mediaLib* Distributions

There are three types of distributions for mediaLib:

- *mediaLib on the Web*
- *mediaLib bundled with Solaris Express*
- *mediaLib bundled with Solaris 10*

Currently, the mediaLib released on the Web is version 2.5. The ones bundled with Solaris Express and Solaris 10 are version 2.4, but they will be updated to mediaLib 2.5 later on.

1.4.1 *mediaLib Packages*

The *mediaLib* packages can be categorized as follows:

| Platform | Package | In Solaris | On the Web |
|----------|-----------|------------|------------|
| common | SUNWmlibd | | yes |
| | SUNWmlibk | bundled | yes |
| i386 | SUNWmlib | bundled | yes |
| | SUNWmliba | | yes |
| | SUNWmlibe | bundled | yes |
| | SUNWmlibh | bundled | yes |
| | SUNWmlibl | bundled | yes |
| | SUNWmlibt | bundled | yes |
| sparc | SUNWmlib | bundled | yes |
| | SUNWmliba | | yes |
| | SUNWmlibe | bundled | yes |
| | SUNWmlibh | bundled | yes |
| | SUNWmlibl | bundled | yes |
| | SUNWmlibt | bundled | yes |

1.4.2 *mediaLib on the Web*

The following 14 compressed tar files correspond to the 14 packages listed in Section 1.4.1, *mediaLib Packages*, and are provided for downloading. Users can download and install just the packages they need. Use `gunzip` to decompress.

| | |
|--|------------------------------------|
| <code>common.SUNWmlibd.2.5.tar.gz</code> | SUNWmlibd (for both SPARC and x86) |
| <code>common.SUNWmlibk.2.5.tar.gz</code> | SUNWmlibk (for both SPARC and x86) |
| <code>i386.SUNWmlib.2.5.tar.gz</code> | SUNWmlib (for Solaris x86) |
| <code>i386.SUNWmliba.2.5.tar.gz</code> | SUNWmliba (for Solaris x86) |
| <code>i386.SUNWmlibe.2.5.tar.gz</code> | SUNWmlibe (for Solaris x86) |
| <code>i386.SUNWmlibh.2.5.tar.gz</code> | SUNWmlibh (for Solaris x86) |
| <code>i386.SUNWmlibl.2.5.tar.gz</code> | SUNWmlibl (for Solaris x86) |
| <code>i386.SUNWmlibt.2.5.tar.gz</code> | SUNWmlibt (for Solaris x86) |
| <code>sparc.SUNWmlib.2.5.tar.gz</code> | SUNWmlib (for Solaris SPARC) |
| <code>sparc.SUNWmliba.2.5.tar.gz</code> | SUNWmliba (for Solaris SPARC) |
| <code>sparc.SUNWmlibe.2.5.tar.gz</code> | SUNWmlibe (for Solaris SPARC) |

| | |
|---|-------------------------------|
| <code>sparc.SUNWmlibh.2.5.tar.gz</code> | SUNWmlibh (for Solaris SPARC) |
| <code>sparc.SUNWmlibl.2.5.tar.gz</code> | SUNWmlibl (for Solaris SPARC) |
| <code>sparc.SUNWmlibt.2.5.tar.gz</code> | SUNWmlibt (for Solaris SPARC) |

1.5 *mediaLib File Structure*

Each package of *mediaLib* consists of part of the structure shown below. The packages can be installed independently. The actual files which show up on your system depend on which packages you have installed.

After a full installation of *mediaLib* 2.5, the files are organized as follows:

1.5.1 *On Solaris SPARC*

```

/usr
|
+-- demo --- +-- mlib -----+-- README, Makefile
|                                     +-- algebra ----- *.c, *.h, Makefile.*
|                                     +-- graphics ----- *.c, *.h, Makefile.*
|                                     +-- image ----- *.c, *.h, Makefile.*
|                                     +-- signal ----- *.c, *.h, Makefile.*
|                                     +-- volume ----- *.c, *.h, Makefile.*
|                                     +-- util ----- *.c, *.h, sparc*/*.o
|
+-- include -+--- mlib.h
|           +-- mlib_algebra.h
|           +-- mlib_algebra_proto.h
|           +-- mlib_graphics.h
|           +-- mlib_graphics_drawset_proto.h
|           +-- mlib_graphics_proto.h
|           +-- mlib_image.h
|           +-- mlib_image_blend_proto.h
|           +-- mlib_image_get.h
|           +-- mlib_image_proto.h
|           +-- mlib_image_types.h
|           +-- mlib_signal.h
|           +-- mlib_signal_proto.h
|           +-- mlib_signal_types.h
|           +-- mlib_status.h
|           +-- mlib_sys.h
|           +-- mlib_sys_proto.h
|           +-- mlib_types.h
|           +-- mlib_video.h
|           +-- mlib_video_proto.h
|           +-- mlib_volume.h

```

```

|         +--- mlib_volume_proto.h
|         +--- mlib_volume_types.h
|
+--- lib  ---+--- libmlib.so -> ./libmlib.so.2
|         +--- libmlib.so.2
|         +--- libmlib_mt.so -> ./libmlib_mt.so.2
|         +--- libmlib_mt.so.2
|         |
+--- sparcv9 -----+--- libmlib.so -> ./libmlib.so.2
|                   +--- libmlib.so.2
|                   +--- libmlib_mt.so -> ./libmlib_mt.so.2
|                   +--- libmlib_mt.so.2
|
+--- cpu  +-+ sparcv8plus -----+ libmlib.so.2
|         +-+ sparcv8plus+vis +-+ libmlib.so.2
|         +-+ sparcv9+vis -----+ sparcv9 +-+ libmlib.so.2
|         +-+ sparcv9+vis2-----+ libmlib.so.2
|                                 +-+ sparcv9 +-+ libmlib.so.2

/opt/SUNWmlib
|
+--- doc  -+--- README
|         +--- mlib_guide.pdf      (user's guide)
|         +--- mlib_install.pdf    (release notes and installation guide)
|         +--- mlib_qr.pdf         (quick reference manual)
|         +--- mlib_ref.pdf        (reference manual)
|
+--- example -> ../../usr/demo/mlib
|
+--- include -+---- mlib.h -> ../../usr/include/mlib.h
|         +---- mlib_algebra.h ->
|         |   ../../usr/include/mlib_algebra.h
|         +---- mlib_algebra_proto.h ->
|         |   ../../usr/include/mlib_algebra_proto.h
|         +---- mlib_graphics.h ->
|         |   ../../usr/include/mlib_graphics.h
|         +---- mlib_graphics_drawset_proto.h ->
|         |   ../../usr/include/mlib_graphics_drawset_proto.h
|         +---- mlib_graphics_proto.h ->
|         |   ../../usr/include/mlib_graphics_proto.h
|         +---- mlib_image.h -> ../../usr/include/mlib_image.h
|         +---- mlib_image_blend_proto.h ->
|         |   ../../usr/include/mlib_image_blend_proto.h
|         +---- mlib_image_get.h ->

```

```

|         ../../usr/include/mlib_image_get.h
+--- mlib_image_proto.h ->
|         ../../usr/include/mlib_image_proto.h
+--- mlib_image_types.h ->
|         ../../usr/include/mlib_image_types.h
+--- mlib_signal.h -> ../../usr/include/mlib_signal.h
+--- mlib_signal_proto.h ->
|         ../../usr/include/mlib_signal_proto.h
+--- mlib_signal_types.h ->
|         ../../usr/include/mlib_signal_types.h
+--- mlib_status.h -> ../../usr/include/mlib_status.h
+--- mlib_sys.h -> ../../usr/include/mlib_sys.h
+--- mlib_sys_proto.h ->
|         ../../usr/include/mlib_sys_proto.h
+--- mlib_types.h -> ../../usr/include/mlib_types.h
+--- mlib_video.h -> ../../usr/include/mlib_video.h
+--- mlib_video_proto.h ->
|         ../../usr/include/mlib_video_proto.h
+--- mlib_volume.h -> ../../usr/include/mlib_volume.h
+--- mlib_volume_proto.h ->
|         ../../usr/include/mlib_volume_proto.h
+--- mlib_volume_types.h ->
|         ../../usr/include/mlib_volume_types.h

+--- lib -+--- libmlib.a -> ./sparcv8plus+vis/libmlib.a
+--- libmlib.so -> ./libmlib.so.2
+--- libmlib.so.2 -> ../../usr/lib/libmlib.so.2
+--- libmlib_algebra.so -> ./libmlib_algebra.so.2
+--- libmlib_algebra.so.2 -> ./libmlib.so.2
+--- libmlib_graphics.so -> ./libmlib_graphics.so.2
+--- libmlib_graphics.so.2 -> ./libmlib.so.2
+--- libmlib_image.so -> ./libmlib_image.so.2
+--- libmlib_image.so.2 -> ./libmlib.so.2
+--- libmlib_signal.so -> ./libmlib_signal.so.2
+--- libmlib_signal.so.2 -> ./libmlib.so.2
+--- libmlib_video.so -> ./libmlib_video.so.2
+--- libmlib_video.so.2 -> ./libmlib.so.2
+--- libmlib_volume.so -> ./libmlib_volume.so.2
+--- libmlib_volume.so.2 -> ./libmlib.so.2
|
+--- sparcv8 ----- +--- libmlib.a
|                   +--- libmlib.so -> ./libmlib.so.2
|                   +--- libmlib.so.2 ->
|                   |   ../../usr/lib/libmlib.so.2
|                   +--- libmlib_algebra.so ->
|                   |   ./libmlib_algebra.so.2
|                   +--- libmlib_algebra.so.2 ->
|                   |   ./libmlib.so.2

```

```

+--- libmllib_graphics.so ->
| ./libmllib_graphics.so.2
+--- libmllib_graphics.so.2 ->
| ./libmllib.so.2
+--- libmllib_image.so ->
| ./libmllib_image.so.2
+--- libmllib_image.so.2 ->
| ./libmllib.so.2
+--- libmllib_signal.so ->
| ./libmllib_signal.so.2
+--- libmllib_signal.so.2 ->
| ./libmllib.so.2
+--- libmllib_video.so ->
| ./libmllib_video.so.2
+--- libmllib_video.so.2 ->
| ./libmllib.so.2
+--- libmllib_volume.so ->
| ./libmllib_volume.so.2
+--- libmllib_volume.so.2 ->
| ./libmllib.so.2

+-- sparcv8plus ----- +--- libmllib.a
+--- libmllib.so -> ./libmllib.so.2
+--- libmllib.so.2 ->
    ../../../../usr/lib/cpu/sparcv8plus/libmllib.so.2
+--- libmllib_algebra.so ->
| ./libmllib_algebra.so.2
+--- libmllib_algebra.so.2 ->
| ./libmllib.so.2
+--- libmllib_graphics.so ->
| ./libmllib_graphics.so.2
+--- libmllib_graphics.so.2 ->
| ./libmllib.so.2
+--- libmllib_image.so ->
| ./libmllib_image.so.2
+--- libmllib_image.so.2 ->
| ./libmllib.so.2
+--- libmllib_signal.so ->
| ./libmllib_signal.so.2
+--- libmllib_signal.so.2 ->
| ./libmllib.so.2
+--- libmllib_video.so ->
| ./libmllib_video.so.2
+--- libmllib_video.so.2 ->
| ./libmllib.so.2
+--- libmllib_volume.so ->
| ./libmllib_volume.so.2
+--- libmllib_volume.so.2 ->

```

```

./libmllib.so.2
+-- sparcv8plus+vis -- +--- libmllib.a
+--- libmllib.so -> ./libmllib.so.2
+--- libmllib.so.2 ->
../../../../usr/lib/cpu/sparcv8plus+vis/libmllib.so.2
+--- libmllib_algebra.so ->
| ./libmllib_algebra.so.2
+--- libmllib_algebra.so.2 ->
| ./libmllib.so.2
+--- libmllib_graphics.so ->
| ./libmllib_graphics.so.2
+--- libmllib_graphics.so.2 ->
| ./libmllib.so.2
+--- libmllib_image.so ->
| ./libmllib_image.so.2
+--- libmllib_image.so.2 ->
| ./libmllib.so.2
+--- libmllib_signal.so ->
| ./libmllib_signal.so.2
+--- libmllib_signal.so.2 ->
| ./libmllib.so.2
+--- libmllib_video.so ->
| ./libmllib_video.so.2
+--- libmllib_video.so.2 ->
| ./libmllib.so.2
+--- libmllib_volume.so ->
| ./libmllib_volume.so.2
+--- libmllib_volume.so.2 ->
./libmllib.so.2
+-- sparcv8plus+vis2 - +--- libmllib.a
+--- libmllib.so -> ./libmllib.so.2
+--- libmllib.so.2 ->
../../../../usr/lib/cpu/sparcv9+vis2/libmllib.so.2
+--- libmllib_algebra.so ->
| ./libmllib_algebra.so.2
+--- libmllib_algebra.so.2 ->
| ./libmllib.so.2
+--- libmllib_graphics.so ->
| ./libmllib_graphics.so.2
+--- libmllib_graphics.so.2 ->
| ./libmllib.so.2
+--- libmllib_image.so ->
| ./libmllib_image.so.2
+--- libmllib_image.so.2 ->
| ./libmllib.so.2

```

```

+--- libmllib_signal.so ->
| ./libmllib_signal.so.2
+--- libmllib_signal.so.2 ->
| ./libmllib.so.2
+--- libmllib_video.so ->
| ./libmllib_video.so.2
+--- libmllib_video.so.2 ->
| ./libmllib.so.2
+--- libmllib_volume.so ->
| ./libmllib_volume.so.2
+--- libmllib_volume.so.2 ->
./libmllib.so.2

+--- sparcv9 ----- +--- libmllib.a
+--- libmllib.so -> ./libmllib.so.2
+--- libmllib.so.2 ->
./../../../../usr/lib/sparcv9/libmllib.so.2
+--- libmllib_algebra.so ->
| ./libmllib_algebra.so.2
+--- libmllib_algebra.so.2 ->
| ./libmllib.so.2
+--- libmllib_graphics.so ->
| ./libmllib_graphics.so.2
+--- libmllib_graphics.so.2 ->
| ./libmllib.so.2
+--- libmllib_image.so ->
| ./libmllib_image.so.2
+--- libmllib_image.so.2 ->
| ./libmllib.so.2
+--- libmllib_signal.so ->
| ./libmllib_signal.so.2
+--- libmllib_signal.so.2 ->
| ./libmllib.so.2
+--- libmllib_video.so ->
| ./libmllib_video.so.2
+--- libmllib_video.so.2 ->
| ./libmllib.so.2
+--- libmllib_volume.so ->
| ./libmllib_volume.so.2
+--- libmllib_volume.so.2 ->
./libmllib.so.2

+--- sparcv9+vis ----- +--- libmllib.a
+--- libmllib.so -> ./libmllib.so.2
+--- libmllib.so.2 ->
./../../../../usr/lib/cpu/sparcv9+vis/sparcv9/libmllib.so.2
+--- libmllib_algebra.so ->
| ./libmllib_algebra.so.2

```

```

+---- libmllib_algebra.so.2 ->
|  ./libmllib.so.2
+---- libmllib_graphics.so ->
|  ./libmllib_graphics.so.2
+---- libmllib_graphics.so.2 ->
|  ./libmllib.so.2
+---- libmllib_image.so ->
|  ./libmllib_image.so.2
+---- libmllib_image.so.2 ->
|  ./libmllib.so.2
+---- libmllib_signal.so ->
|  ./libmllib_signal.so.2
+---- libmllib_signal.so.2 ->
|  ./libmllib.so.2
+---- libmllib_video.so ->
|  ./libmllib_video.so.2
+---- libmllib_video.so.2 ->
|  ./libmllib.so.2
+---- libmllib_volume.so ->
|  ./libmllib_volume.so.2
+---- libmllib_volume.so.2 ->
|  ./libmllib.so.2

+-- sparcv9+vis2 ----- +---- libmllib.a
+---- libmllib.so -> ./libmllib.so.2
+---- libmllib.so.2 ->
./../../../../usr/lib/cpu/sparcv9+vis2/sparcv9/libmllib.so.2
+---- libmllib_algebra.so ->
|  ./libmllib_algebra.so.2
+---- libmllib_algebra.so.2 ->
|  ./libmllib.so.2
+---- libmllib_graphics.so ->
|  ./libmllib_graphics.so.2
+---- libmllib_graphics.so.2 ->
|  ./libmllib.so.2
+---- libmllib_image.so ->
|  ./libmllib_image.so.2
+---- libmllib_image.so.2 ->
|  ./libmllib.so.2
+---- libmllib_signal.so ->
|  ./libmllib_signal.so.2
+---- libmllib_signal.so.2 ->
|  ./libmllib.so.2
+---- libmllib_video.so ->
|  ./libmllib_video.so.2
+---- libmllib_video.so.2 ->
|  ./libmllib.so.2
+---- libmllib_volume.so ->

```

```

| ./libmllib_volume.so.2
+--- libmllib_volume.so.2 ->
    ./libmllib.so.2

```

1.5.2 On Solaris x86

```

/usr
|
+--- demo ---+--- mlib -----+--- README, Makefile
|
|         +--- algebra ----- *.c, *.h, Makefile.*
|         +--- graphics ----- *.c, *.h, Makefile.*
|         +--- image ----- *.c, *.h, Makefile.*
|         +--- signal ----- *.c, *.h, Makefile.*
|         +--- volume ----- *.c, *.h, Makefile.*
|         +--- util ----- *.c, *.h
|
+--- include -+--- mlib.h
|
|         +--- mlib_algebra.h
|         +--- mlib_algebra_proto.h
|         +--- mlib_graphics.h
|         +--- mlib_graphics_drawset_proto.h
|         +--- mlib_graphics_proto.h
|         +--- mlib_image.h
|         +--- mlib_image_blend_proto.h
|         +--- mlib_image_get.h
|         +--- mlib_image_proto.h
|         +--- mlib_image_types.h
|         +--- mlib_signal.h
|         +--- mlib_signal_proto.h
|         +--- mlib_signal_types.h
|         +--- mlib_status.h
|         +--- mlib_sys.h
|         +--- mlib_sys_proto.h
|         +--- mlib_types.h
|         +--- mlib_video.h
|         +--- mlib_video_proto.h
|         +--- mlib_volume.h
|         +--- mlib_volume_proto.h
|         +--- mlib_volume_types.h
|
+--- lib ---+--- libmllib.so -> ./libmllib.so.2
|
|         +--- libmllib.so.2
|         +--- libmllib_mt.so -> ./libmllib_mt.so.2
|         +--- libmllib_mt.so.2
|
|         +--- amd64 -----+--- libmllib.so -> libmllib.so.2
|         |
|         |         +--- libmllib.so.2
|         |
|         |         +--- libmllib_mt.so -> libmllib_mt.so.2

```

```

|                                     +-- libmllib_mt.so.2
|
+-- libmllib ----+-- libmllib_sse2.so.2
|                                     +-- amd64 ----+-- libmllib_sse2.so.2
/opt/SUNWmllib
|
+-- doc -+-- README
|
|   +-- mlib_guide.pdf      (user's guide)
|   +-- mlib_install.pdf   (release notes and installation guide)
|   +-- mlib_qr.pdf        (quick reference manual)
|   +-- mlib_ref.pdf       (reference manual)
|
+-- example -> ../../usr/demo/mlib
|
+-- include +---- mlib.h -> ../../../../usr/include/mlib.h
|
|   +---- mlib_algebra.h ->
|   |   ../../../../usr/include/mlib_algebra.h
|   +---- mlib_algebra_proto.h ->
|   |   ../../../../usr/include/mlib_algebra_proto.h
|   +---- mlib_graphics.h ->
|   |   ../../../../usr/include/mlib_graphics.h
|   +---- mlib_graphics_drawset_proto.h ->
|   |   ../../../../usr/include/mlib_graphics_drawset_proto.h
|   +---- mlib_graphics_proto.h ->
|   |   ../../../../usr/include/mlib_graphics_proto.h
|   +---- mlib_image.h -> ../../../../usr/include/mlib_image.h
|   +---- mlib_image_blend_proto.h ->
|   |   ../../../../usr/include/mlib_image_blend_proto.h
|   +---- mlib_image_get.h ->
|   |   ../../../../usr/include/mlib_image_get.h
|   +---- mlib_image_proto.h ->
|   |   ../../../../usr/include/mlib_image_proto.h
|   +---- mlib_image_types.h ->
|   |   ../../../../usr/include/mlib_image_types.h
|   +---- mlib_signal.h -> ../../../../usr/include/mlib_signal.h
|   +---- mlib_signal_proto.h ->
|   |   ../../../../usr/include/mlib_signal_proto.h
|   +---- mlib_signal_types.h ->
|   |   ../../../../usr/include/mlib_signal_types.h
|   +---- mlib_status.h -> ../../../../usr/include/mlib_status.h
|   +---- mlib_sys.h -> ../../../../usr/include/mlib_sys.h
|   +---- mlib_sys_proto.h ->
|   |   ../../../../usr/include/mlib_sys_proto.h
|   +---- mlib_types.h -> ../../../../usr/include/mlib_types.h
|   +---- mlib_video.h -> ../../../../usr/include/mlib_video.h
|   +---- mlib_video_proto.h ->
|   |   ../../../../usr/include/mlib_video_proto.h
|   +---- mlib_volume.h -> ../../../../usr/include/mlib_volume.h

```

```

|         +---- mlib_volume_proto.h ->
|         |         ../../usr/include/mlib_volume_proto.h
+---- mlib_volume_types.h ->
|         |         ../../usr/include/mlib_volume_types.h
+--- lib -+--- libmlib.a -> ./i386/libmlib.a
|         +--- libmlib.so -> ./libmlib.so.2
+--- libmlib.so.2 -> ../../usr/lib/libmlib.so.2
+--- libmlib_algebra.so -> ./libmlib_algebra.so.2
+--- libmlib_algebra.so.2 -> ./libmlib.so.2
+--- libmlib_graphics.so -> ./libmlib_graphics.so.2
+--- libmlib_graphics.so.2 -> ./libmlib.so.2
+--- libmlib_image.so -> ./libmlib_image.so.2
+--- libmlib_image.so.2 -> ./libmlib.so.2
+--- libmlib_signal.so -> ./libmlib_signal.so.2
+--- libmlib_signal.so.2 -> ./libmlib.so.2
+--- libmlib_video.so -> ./libmlib_video.so.2
+--- libmlib_video.so.2 -> ./libmlib.so.2
+--- libmlib_volume.so -> ./libmlib_volume.so.2
+--- libmlib_volume.so.2 -> ./libmlib.so.2
|
+--- i386 ----- +---- libmlib.a
|         +---- libmlib.so -> ./libmlib.so.2
|         +---- libmlib.so.2 ->
|         |         ../../usr/lib/libmlib.so.2
+---- libmlib_algebra.so ->
|         |         ./libmlib_algebra.so.2
+---- libmlib_algebra.so.2 ->
|         |         ./libmlib.so.2
+---- libmlib_graphics.so ->
|         |         ./libmlib_graphics.so.2
+---- libmlib_graphics.so.2 ->
|         |         ./libmlib.so.2
+---- libmlib_image.so ->
|         |         ./libmlib_image.so.2
+---- libmlib_image.so.2 ->
|         |         ./libmlib.so.2
+---- libmlib_signal.so ->
|         |         ./libmlib_signal.so.2
+---- libmlib_signal.so.2 ->
|         |         ./libmlib.so.2
+---- libmlib_video.so ->
|         |         ./libmlib_video.so.2
+---- libmlib_video.so.2 ->
|         |         ./libmlib.so.2
+---- libmlib_volume.so ->
|         |         ./libmlib_volume.so.2
+---- libmlib_volume.so.2 ->

```

```

./libmllib.so.2
+-- amd64 ----- +--- libmllib.a
                    +--- libmllib.so -> ./libmllib.so.2
                    +--- libmllib.so.2 ->
                        ../../../../usr/lib/amd64/libmllib.so.2
                    +--- libmllib_algebra.so ->
                        | ./libmllib_algebra.so.2
                    +--- libmllib_algebra.so.2 ->
                        | ./libmllib.so.2
                    +--- libmllib_graphics.so ->
                        | ./libmllib_graphics.so.2
                    +--- libmllib_graphics.so.2 ->
                        | ./libmllib.so.2
                    +--- libmllib_image.so ->
                        | ./libmllib_image.so.2
                    +--- libmllib_image.so.2 ->
                        | ./libmllib.so.2
                    +--- libmllib_signal.so ->
                        | ./libmllib_signal.so.2
                    +--- libmllib_signal.so.2 ->
                        | ./libmllib.so.2
                    +--- libmllib_video.so ->
                        | ./libmllib_video.so.2
                    +--- libmllib_video.so.2 ->
                        | ./libmllib.so.2
                    +--- libmllib_volume.so ->
                        | ./libmllib_volume.so.2
                    +--- libmllib_volume.so.2 ->
                        | ./libmllib.so.2
+-- sse2 ----- +--- libmllib.a
                    +--- libmllib.so -> ./libmllib.so.2
                    +--- libmllib.so.2 ->
                        ../../../../usr/lib/libmllib/libmllib_sse2.so.2
                    +--- libmllib_algebra.so ->
                        | ./libmllib_algebra.so.2
                    +--- libmllib_algebra.so.2 ->
                        | ./libmllib.so.2
                    +--- libmllib_graphics.so ->
                        | ./libmllib_graphics.so.2
                    +--- libmllib_graphics.so.2 ->
                        | ./libmllib.so.2
                    +--- libmllib_image.so ->
                        | ./libmllib_image.so.2
                    +--- libmllib_image.so.2 ->
                        | ./libmllib.so.2
                    +--- libmllib_signal.so ->

```

```

|                                     | ./libmllib_signal.so.2
|                                     +--- libmllib_signal.so.2 ->
|                                     | ./libmllib.so.2
|                                     +--- libmllib_video.so ->
|                                     | ./libmllib_video.so.2
|                                     +--- libmllib_video.so.2 ->
|                                     | ./libmllib.so.2
|                                     +--- libmllib_volume.so ->
|                                     | ./libmllib_volume.so.2
|                                     +--- libmllib_volume.so.2 ->
|                                     | ./libmllib.so.2
|                                     +--- libmllib.so.2
|
+-- i386+sse2 -> ./sse2
|
+-- amd64+sse2 ----- +--- libmllib.a

```

1.6 Tips on Using mediaLib 2.5 for Better Performance

1.6.1 Use MT mediaLib on systems with multiple processors or a processor with multiple cores

1.6.1.1 Introduction

Multi-threaded (MT) mediaLib is a software layer developed on top of mediaLib using OpenMP. When used with a large data set on multi-processor systems, MT mediaLib will partition data into subsets and process the subsets in parallel, thus greatly improving performance of applications that are using mediaLib. Because Solaris treats each core/strand on a CMT (chip multi-threading) CPU, such as UltraSPARC-IV and UltraSPARC-T1, as a separate logical processor, applications will also benefit from MT mediaLib even running on systems with a single UltraSPARC-IV or UltraSPARC-T1.

Note that MT mediaLib has the same API as mediaLib. There is no need to modify any source code to use MT mediaLib.

A subset of functions for algebra, image processing, signal processing, and video processing are implemented in MT mediaLib with this release.

MT mediaLib uses the following general scheme to determine whether to use multithreading and how many threads to use.

```

if (function is not capable of MT) {
    call mediaLib function in single thread
}
else if (data set is too small to benefit from MT) {
    call mediaLib function in single thread
}
else if (PARALLEL = 1) {
    call mediaLib function in single thread
}
else {
    if (PARALLEL is not set) or (PARALLEL <= 0) {
        NTHRS = number of online processors
    }
    else if (PARALLEL > number of online processors) {
        NTHRS = number of online processors
    }
    else {
        NTHRS = PARALLEL
    }
    if (data set is too small to benefit from NTHRS threads) {
        NTHRS = reduced according to size of data set
    }
    partition data into NTHRS subsets
    call mediaLib function from NTHRS threads to process
        each subset in separate thread
}

```

1.6.1.2 Using MT mediaLib

There are two ways to use MT mediaLib:

- a. pre-loading MT mediaLib during runtime
- b. linking with MT mediaLib directly

1.6.1.2.1 Pre-Loading MT mediaLib

You can pre-load MT mediaLib during runtime by setting the **LD_PRELOAD** environment variable, and then running your application as normal.

Bourne/Korn Shell:

```
LD_PRELOAD=libmllib_mt.so
export LD_PRELOAD
```

C Shell:

```
setenv LD_PRELOAD libmllib_mt.so
```

In this way, you can take advantage of MT mediaLib WITHOUT rebuilding your applications.

1.6.1.2.2 *Linking with MT mediaLib*

You can also rebuild your application by linking it with MT mediaLib.

```
cc [ flag ... ] file ... -lmlib_mt -lmlib [ library ... ]
```

In this way, MT mediaLib is always used whenever your application is started.

1.6.1.3 *Parallelization Control*

The parallelization of MT mediaLib is controlled, in part, with the **PARALLEL** environment variable. You can change its setting to adjust the degree of parallelization before starting your application.

Bourne/Korn Shell:

```
PARALLEL=NTHRS  
export PARALLEL
```

C Shell:

```
setenv PARALLEL NTHRS
```

where NTHRS is a positive integer.

Note that other factors also affect the degree of parallelization in MT mediaLib. See the introduction section for more information.

There are other environment variables that can be set to change OpenMP runtime behavior. See section 2.3 OpenMP Environment Variables in *Sun Studio 12: OpenMP API User's Guide* in following URL for more details.

<http://docs.sun.com/app/docs/doc/819-5270/aewcb?a=view>

1.6.1.4 *Recommended Patches*

It is recommended that one of the following patches or their later revisions be installed in order to use MT mediaLib.

On Solaris SPARC:

```
117557-04 SunOS 5.8: Microtasking libraries (libmtsk) patch  
117560-06 SunOS 5.9: Microtasking libraries (libmtsk) patch  
120753-05 SunOS 5.10: Microtasking libraries (libmtsk) patch
```

On Solaris x86:

```
117558-04 SunOS 5.8_x86: Microtasking libraries (libmtsk) patch
117559-06 SunOS 5.9_x86: Microtasking libraries (libmtsk) patch
120754-05 SunOS 5.10_x86: Microtasking libraries (libmtsk) patch
```

They are available from the SunSolve web site.

<http://sunsolve.sun.com/>

1.6.2 Use 8-byte or 16-byte Aligned Data Buffers

For some mediaLib functions, data buffers are required to be 8-byte aligned (i.e., to start from an 8-byte aligned address). For other functions, there is no requirement on data buffer alignment, but they usually run faster in the cases with aligned data buffers. Refer to *mediaLib Reference Manual* (Part No: 802-7800) for the alignment requirements, if any, for each mediaLib function.

Use `mlib_malloc()`, which is a wrapper of `memalign(3C)` with an alignment of 16, or `mlib_ImageCreate()` when possible.

1.6.3 Use the filter shared libraries at `/usr/lib/` to let the runtime linker pick the best platform-specific library

On UltraSPARC-based systems, there are VIS and VIS2 versions of the libraries which have better performance than the C versions. But you don't have to link your applications to the shared libraries at `/usr/lib/cpu/` directly. In fact, on UltraSPARC-based machines, the shared libraries `libmlib.so.2` at `/usr/lib/` and `/usr/lib/sparcv9/` are built as auxiliary filters for the platform-specific libraries under `/usr/lib/cpu/`. You just need to link your applications to `/usr/lib/libmlib.so`, or `/usr/lib/sparcv9/libmlib.so` in case of 64-bit, and let the runtime linker pick the best library for you. You can run `ldd(1)` on your executable to see which version of `libmlib.so.2` is actually used. For example, the 32-bit VIS2 version library is used in the following case:

```
% ldd /usr/demo/mlib/image/example_il
libmlib.so.2 => /usr/lib/libmlib.so.2
libc.so.1 => /lib/libc.so.1
libm.so.2 => /lib/libm.so.2
/usr/lib/cpu/sparcv9+vis2/libmlib.so.2
/platform/SUNW,SUN-Blade-2500/lib/libc_psr.so.1
```

On AMD64-based systems, there are SSE2 versions of libraries installed at `/usr/lib/libmllib/`. They were built as auxiliary filterees of the C version filter libraries. You can link your application to a filter library and let the runtime linker pick up the filter library. For example:

```
% ldd /usr/demo/mlib/image/example_il_x86
libmllib.so.2 => /usr/lib/libmllib.so.2
libc.so.1 => /lib/libc.so.1
libm.so.2 => /lib/libm.so.2
/usr/lib/libmllib/libmllib_sse2.so.2
```


Installation Guide for mediaLib 2.5 2

Note: The following steps are for installing mediaLib packages manually. Some of the mediaLib packages are bundled with Solaris 10 FCS and later releases, which means they either are preinstalled or can be installed by a Solaris installer. So if you have a system running Solaris 10 or later, please check the installed mediaLib packages as shown in step 3 before proceeding.

1. Download the compressed packages for mediaLib 2.5 from the Web at:
`http://www.sun.com/processors/vis/mlibfiles.html`
Assume they reside in the directory `/tmp/`.
2. Extract the files from each downloaded file. For example to extract files from `/tmp/sparc.SUNWmlib.2.5.tar.gz`, perform the following steps:

```
% cd /tmp
% gzip -cd sparc.SUNWmlib.2.5.tar.gz | tar -xvf -
```
3. Check if any older version of mediaLib packages are installed.

```
% pkginfo | grep SUNWmlib
% pkginfo -x SUNWmlib SUNWmlibe SUNWmlibh SUNWmlibk \
  SUNWmlibl SUNWmlibt
```
4. Become a superuser.

```
% su
password:
#
```
5. Remove the older version of mediaLib packages, if any. For example,

```
# pkgrm SUNWmlib SUNWmlibe SUNWmlibh SUNWmlibk SUNWmlibl \
  SUNWmlibt
```

6. Add the packages to your system.

You can install one or more of the packages that you need. For example, to install the packages `SUNWmlib` and `SUNWmlibh`, enter:

```
# pkgadd -d `pwd` SUNWmlib SUNWmlibh
```

and follow the instructions. By default, the packages `SUNWmlib`, `SUNWmlibt`, `SUNWmlibh` and `SUNWmlibe` are installed at `/usr` while the other packages are installed at `/opt`. See the man page of `pkgadd(1M)` for more information if you want to install the packages in other places.

7. Exit from superuser.

```
# exit  
%
```




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