## Using samtools C libraries with Rsamtools

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Modified: 21 March, 2011. Compiled: March 2, 2015

## **Contents**

1 Background 1
2 Use 1

This document is meant for package developers wanting to use the <u>samtools</u> C libraries provided by *Rsamtools*. The instructions here are based on the 'Writing R Extensions' manual associated with R-2.13; consult the current version of the manual for up-to-date instructions.

## 1 Background

Rsamtools arranges to install static versions of the libbam and libbcf libraries. The idea is that other packages can use these to implement C functionality that uses these libraries. This means that the samtools libraries are available in a consistent version to users across platforms, without requiring installation of additional software.

Rsamtools takes the following approach. On installation, Rsamtools contains a snapshot of the samtools library source code under src/samtools. Rsamtools makes static version(s) of the samtools libraries libbam.a and libbcf.a. These static libraries are specific to the operating system on which Rsamtools is being installed, are found under usrlib\${R\_ARCH} in the user library location specified by the mechanism (e.g., biocLite, install.packages) used to install Rsamtools. At the same time, Rsamtools copies headers required to use the library to the location include/samtools.

## 2 Use

To use these libraries, the third party package developer needs to (1) discover the appropriate header files when their package is built, and (2) locate the static library when their package is used.

To discover appropriate header files at package installation time, add

LinkingTo: Rsamtools

to the DESCRIPTION file, and reference the relevant include files as, for instance,

#include "samtools/bam.h"

The content of the include files can be found in the Rsamtools source (under src/samtools) or at their installed location.

Linking to the static libraries is accomplished by including the following code in src/Makevars.win on Windows:

or otherwise in src/Makevars:

This updates the environment variables \$PKG\_CPPFLAGS and \$PKG\_LIBS; if your Makefile modifies these also, be sure to use syntax like PKG\_LIBS+=-1....