Chandra X-ray Center

Modules for Scientific Analysis

The primary motivation for embedding an interpreter such as S–Lang into CIAO is to provide the user with the means to extend the software in ways that were not anticipated by the designers. Modules extend this capability to libraries by providing access to libraries via the scripting language. A module is a shared object that is dynamically linked into a S–Lang application during runtime via the import statement.

There are a number of S–Lang modules that are distributed with the CIAO software package and are essential to its operation. Other modules not distributed with CIAO, but can run from within it as well as standalone. A list of available modules is provided in the following table; there is an explanation of the different columns located at the end of the table.

Module	Description	Bundled with CIAO?	Depends On
caldb	The interface between the S–Lang interpreter and the CXC caldb library. The caldb library functions are used in CIAO in the acis_fef_lookup tool, which is written in S–lang.	Yes	CIAO
cfitsio	Generic FITS input/output functions.	Yes	CFITSIO
chips	The plotting package of CIAO which can be used to create plots from S–Lang. The S–Lang programming language can also be used to manipulate or create data for plotting.	Yes	CIAO
group	The interface between the S–Lang interpreter and the CXC group library, which bins histogram data based on various user–selected rules.	Yes	CIAO
GUIDE	GUIDE can be used to store and retrieve models and model parameters. One of it's more advanced applications is in identifying spectral lines to derive physical conditions and differential emission measures.	Yes	CIAO
histogram	Allows for the creation and manipulation of one– and two–dimensional histograms.	No	(none)
isis	ISIS is a fully programmable spectral analysis system designed to facilitate the interpretation and analysis of high resolution X–ray spectra. ISIS also supports analysis of CCD resolution spectra and a number of other applications.	Yes	CFITSIO, PGPLOT

paramio	The interface between the S–Lang interpreter and the CXC parameter library.	Yes	CIAO
pixlib	The interface between the S–Lang interpreter and the CXC pixlib library.	Yes	CIAO
pvm	PVM (Parallel Virtual Machine) is a software package which permits a heterogeneous collection computers connected by a network to be used as a single large parallel computer. The S–Lang pvm module provides a S–Lang interface to PVM.	No	PVM
region	The interface between the S–Lang interpreter and the CXC region library.	Yes	CIAO
Sherpa	_Sherpa_ provides a loadable module, which can be imported into other S–Lang applications at run–time (e.g., _ChIPS_, slsh). The module has many functions that provide access to datasets and invoke _Sherpa_ functions. See the documentation on sherpa–module for a list of _Sherpa_/S–Lang module functions.	Yes	CIAO
SLglade	Used in conjunction with SLgtk, it allows you to design your GUIs using Glade (a GTK+ user interface builder), save them in Glade's XML format, and then generate your S–Lang script's graphical interface directly from the XML at runtime.	No	Glade
SLgsl	The GNU Scientific Library, or GSL, is a well–written and well–supported C library that contains a vast number of numerical routines. The GSL module makes many of those functions available to any application that makes use of the S–Lang interpreter's ability to dynamically load interpreter modules.	No	GSL
SLgtk	Binds the GIMP Toolkit, also known as GTK, to the S–Lang scripting language. It provides an importable module which makes most of GTK and its constituent libraries callable directly from S–Lang scripts.	No	GTK
SLxpa	SLxpa binds the XPA library to the S–Lang language. The SLxpa package adds significant enhancements to the original bindings of the CIAO xpa module.	No	XPA
stackio	The interface between the S–Lang interpreter and the CXC stack library.	Yes	CIAO
varmm	The Varmm library (Variable, Math and Macro) provides a number of functions for reading data from files (both ASCII and FITS formats), and assigning them to variables. In addition to Varmm, there are many I/O functions within S–Lang itself which	Yes	CIAO

	can also be used.		
xpa	The interface between the S–Lang interpreter and the XPA library.	Yes	CIAO
xspec	An ISIS–specific module which provides an interface to all the xspec spectral models including additive and multiplicative models, convolution models, and table models. This interface is primarily intended to support using the ISIS fitting engine to fit data with xspec spectral models.	No	HEAsoft

Explanation of Table Columns

Module

The name of the module. It is linked to a help file or webpage which provides further information, when available.

Description

A brief description of the module.

Bundled with CIAO?

"Yes" if the module comes with the CIAO package; "No" if it needs to be downloaded separately. The *Module* column is linked to documentation that explain how to obtain the module.

Depends On

If the module depends on the CIAO installation, e.g. because it needs CIAO libraries, "CIAO" is noted in this column. Otherwise, any necessary external libraries are listed.

Explanation of Table Columns