Brown Deer Technology

STDCL 1.5 Fortran Quick Reference Card

STDCL provides a simplified interface to OpenCL designed in a style familiar to conventional UNIX/C programmers.

The STDCL interface provides support for default contexts, a dynamic CL program loader, memory management, kernel management, and asynchronous operations.

Default CL Contexts

type(C_PTR) ~ CLCONTEXT* **stddev**
type(C_PTR) ~ CLCONTEXT* **stdcpu**
type(C_PTR) ~ CLCONTEXT* **stdgpu**
type(C_PTR) ~ CLCONTEXT* **stdrpu**
type(C_PTR) ~ CLCONTEXT* **stdnpu**

Default context for [all|CPU|GPU|RPU|NPU] OpenCL supported devices.

Platform

integer(C_INT)
function **clgetndev**(*clcontext*)
  type(C_PTR) *clcontext*
Returns number of devices in context.

Dynamic CL Program Loader

type(C_PTR)
function **clopen**(*clcontext, filename, flags*)
  type(C_PTR) *clcontext*
  character(kind=C_CHAR) *filename*
  integer(C_INT) *flags*
  flags: CLLD_NOW, CLLD_NOBUILD
Build the OpenCL device program and return a handle to the program.

type(C_PTR)
function **clsopen**(*clcontext, srcstr, flags*)
  type(C_PTR) *clcontext*
  character(kind=C_CHAR) *srcstr*
  integer(C_INT) *flags*
  flags: CLLD_NOW, CLLD_NOBUILD
Build the OpenCL device program and return a handle to the program.

type(C_PTR) ~ cl_kernel
function **clsym**(*clcontext, handle, symbol, flags*)
  type(C_PTR) clcontext
  type(C_PTR) handle
  character(kind=C_CHAR) symbol
  integer(C_INT) flags
  flags: CLLD_NOW
Returns the kernel object identified by name from the compiled OpenCL device program.

integer(C_INT)
function **clclose**(*clcontext, handle*)
  type(C_PTR) *clcontext*
  type(C_PTR) *handle*
Close the OpenCL device program and release associated resources.

type(C_PTR)
function **clbuild**(*clcontext, handle, options, flag*)
  type(C_PTR) *clcontext*
  type(C_PTR) *handle*
  character(kind=C_CHAR) *options*
  integer(C_INT) *flags*
Build the OpenCL device program and return the handle to the program

Memory Management

type(C_PTR)
function **clmalloc**(*clcontext, size, flags*)
  type(C_PTR) *clcontext*
  integer(C_SIZE_T) *size*
  integer(C_INT) *flag*
  flags: CL_MEM_DETACHED
Allocate memory that can be shared across OpenCL devices.

type(C_PTR)
function **clmrealloc**(*clcontext, ptr, size, flags*)
  type(C_PTR) *clcontext*
  type(C_PTR) *ptr*
  integer(C_SIZE_T) *size*
  integer(C_INT) *flags*
  flags: CL_MEM_DETACHED
Re-allocate (re-size) memory that can be shared across OpenCL devices.

integer(C_INT)
function **clfree**(*ptr*)
  type(C_PTR) *ptr*
Free device-shareable memory allocated with clmalloc() or an equivalent call.

type(C_PTR) ~ cl_event
function **clmsync**(*clcontext, devnum, ptr, flags*)
  type(C_PTR) *clcontext*
  integer(C_INT) devnum
  type(C_PTR) *ptr*
  integer(C_INT) *flags*
  flags: CL_MEM_HOST | CL_MEM_DEVICE,
    CL_EVENT_WAIT | CL_EVENT_NOWAIT,
    CL_EVENT_NORELEASE
Synchronize memory on host or OpenCL device, performing a memory copy as necessary.

type(C_PTR) ~ cl_event
function **clmcopy**(*clcontext, devnum, src, dst, flags*)
  type(C_PTR) *clcontext*
  integer(C_INT) devnum
  Type(C_PTR) *src*
  Type(C_PTR) *dst*
  integer(C_INT) *flags*
  flags: CL_EVENT_WAIT | CL_EVENT_NOWAIT,
    CL_EVENT_NORELEASE
Copy memory on an OpenCL device.

integer(C_INT)
function **clmattach**(*clcontext, ptr*)
  type(C_PTR) *clcontext*
  type(C_PTR) *ptr*
Attach device-shareable memory to context.

integer(C_INT)
function **clmdetach**(*ptr*)
  type(C_PTR) *ptr*
Detach device-shareable memory from context.

integer(C_SIZE_T)
function **clsizeofmem**(*ptr*)
  type(C_PTR) *ptr*
Return the size of device-shareable memory allocated with clmalloc() or an equivalent call.

Kernel Management

type(clndrange_struct)
function **clndrange_init**[**1**|**2**|**3**] **d**(*gtoff0, gtsz0, ltsz0*
  [*,gtoff1, gtsz1, ltsz1,* [*,gtoff2, gtsz2, ltsz2*]])
  integer(C_INT) *gtoff0* [*,gtoff1* [*,gtoff2*]]
  integer(C_INT) *gtsz0* [*,gtsz1* [*,gtsz2*]]
  integer(C_INT) *ltsz0* [*,ltsz1* [*,ltsz2*]]
Initialize N-dimensional range.

integer(C_INT)
function **clarg_set**(*clcontext, krn, argnum, arg*)
  type(C_PTR) *clcontext*
  type(C_PTR) *krn*
  integer(C_INT) argnum
  Tn *arg*
Set intrinsic argument of kernel.

integer(C_INT)
function **clarg_set_global**(*clcontext, krn, argnum, ptr*)
  type(C_PTR) *clcontext*
  type(C_PTR) *krn*
  integer(C_INT) argnum
  type(C_PTR) *ptr*
Set pointer argument of kernel.

type(C_PTR) ~ cl_event
function **clfork**(*clcontext, devnum, krn, ndr_ptr, flags*)
  type(C_PTR) *clcontext*
  integer(C_INT) devnum
  type(C_PTR) *krn*
  type(C_PTR) *ndr_ptr* ~ C_LOC(clndrange_struct)
  integer(C_INT) *flags*
  flags: CL_EVENT_WAIT | CL_EVENT_NOWAIT,
    CL_EVENT_NORELEASE
Fork kernel for execution on OpenCL device.

Synchronization

type(C_PTR)
function **clflush**(*clcontext, devnum, flags*)
  type(C_PTR) *clcontext*
  integer(C_INT) devnum
  integer(C_INT) *flags*
  flags: CL_KERNEL_EVENT, CL_MEM_EVENT
    CL_ALL_EVENT, CL_EVENT_NORELEASE
Flush all enqueued operations (non-blocking).

type(C_PTR)
function **clwait**(*clcontext, devnum, flags*)
  type(C_PTR) *clcontext*
  integer(C_INT) devnum
  integer(C_INT) *flags*
  flags: CL_KERNEL_EVENT, CL_MEM_EVENT
    CL_ALL_EVENT, CL_EVENT_NORELEASE
Block on all enqueued operations.

Notation:
~ type indicates the opaque type for which the C_PTR is used as a proxy since Fortran does not support type aliasing.
[a | b | ...] indicates a choice between several alternatives and is not part of the syntax.