Appendix A

CMMD Function Summary: C Syntax

A.1 Point-to-Point Functions

A.1.1 Cooperative Message Passing

int **CMMD_send_block(**int *dest_node,* int *tag,* void **buffer,* int *buffer_desc***)**
int **CMMD_send_block_v(**int *dest_node,* int *tag,* void **buffer,* int *elem_len,*
int *stride,* int *elem_count***)**

int **CMMD_receive_block(**int *source_node,* int *tag,* void **buffer,*
int *buffer_desc***)**
int **CMMD_receive_block_v(**int *source,* int *tag,* void **buffer,* int *elem_len,*
int *stride,* int *elem_count***)**

int **CMMD_send_and_receive(**int *source,* int *source_tag,* void **inbuffer,*
int *inbuf_desc,* int *destination,* int *dest_tag,* void **outbuffer,*
int *outbuf_desc***)**
int **CMMD_send_and_receive_v(**int *source,* int *source_tag,* void **inbuffer,*
int *in_elem_len,* int *in_stride,* int *in_elem_count,* int *destination,*
int *dest_tag,* void **outbuffer,* int *out_elem_len,* int *out_stride,*
int *out_elem_count***)**

int **CMMD_swap(**int *partner,* void **inbuffer,* int *inbuf_desc,* void **outbuffer,*
int *outbuf_desc***)**
int **CMMD_swap_v(**int *partner,* void **inbuffer,* int *in_elem_len,* int *in_stride,*
int *in_elem_count,* void **outbuffer,* int *out_elem_len,*
int *out_stride,* int *out_elem_count***)**

A.1.2 Asynchronous Message Passing

CMMD_mcb **CMMD_send_async(**int *dest_node,* int *tag,* void **buffer,*
int *buffer_desc,* void *(*handler)(*CMMD_mcb **mcb,*
void *handler_arg**)**
void **handler_arg***)**

CMMD_mcb **CMMD_receive_async(**int *source_node,* int *tag,* void **buffer,*
int *buffer_desc,* void *(*handler)(*CMMD_mcb **mcb,*
void **handler_arg***)**
void **handler_arg***)**

int **CMMD_send_noblock(**int *dest_node,* int *tag,* void **buffer,*
int *buffer_desc***)**

A.2 Cooperative and Asynchronous Auxiliary Functions

A.2.1 Processor Information Functions

int **CMMD_self_address(**void**)**
int **CMMD_partition_size(**void**)**

A.2.2 Cooperative Message-Passing Information

int **CMMD_msg_pending(**int *node,* int *tag***)**
int **CMMD_bytes_received(**void**)**
int **CMMD_bytes_sent(**void**)**
int **CMMD_msg_sender(**void**)**
int **CMMD_msg_tag(**void**)**

A.2.3 Asynchronous Message-Passing Information

CMMD_mcb **CMMD_mcb_pending(**int *node,* int *tag***)**
int **CMMD_msg_done(**CMMD_mcb *mcb***)**
int **CMMD_all_msgs_done(**void**)**

int **CMMD_all_sends_done(**void**)**
int **CMMD_all_receives_done(**void**)**

int **CMMD_mcb_node(**CMMD_mcb *mcb***)**
int **CMMD_mcb_source(**CMMD_mcb *mcb***)**
int **CMMD_mcb_dest(**CMMD_mcb *mcb***)**
int **CMMD_mcb_tag(**CMMD_mcb *mcb***)**
int **CMMD_mcb_bytes(**CMMD_mcb *mcb***)**
void ***CMMD_mcb_buffer(**CMMD_mcb *mcb***)**
void **CMMD_msg_wait(**CMMD_mcb *mcb***)**
void **CMMD_all_msgs_wait()**
void **CMMD_free_mcb(**CMMD_mcb *mcb***)**

A.3 Virtual Channels

int **CMMD_open_send_channel(**int *dest_node,* int *tag,* void **buffer,* int *buffer_desc***)**
int **CMMD_open_receive_channel(**int *source_node,* int *tag,* void **buffer,* int *buffer_desc***)**

int **CMMD_send_channel_status(**int *scd***)**
int **CMMD_receive_channel_status(**int *rcd***)**

int **CMMD_is_channel_writable(**int *scd***)**
int **CMMD_is_channel_readable(**int *rcd***)**

int **CMMD_write_channel(**int *scd***)**
int **CMMD_reset_channel(**int *rcd***)**

int **CMMD_close_send_channel(**int *scd***)**
int **CMMD_close_receive_channel(**int *rcd***)**

int **CMMD_all_channels_free(**void**)**
void **CMMD_all_channels_free_wait(**void**)**

A.4 Global Functions

A.4.1 Broadcast

void **CMMD_bc_to_nodes(**void **buffer,* int *buffer_desc***)**
void **CMMD_receive_bc_from_node(**void **buffer,* int *buffer_desc***)**

A.4.2 Reduce, Scan, and Concatenate

<type1> **CMMD_reduce_***<type2>* **(***<type2> value***,**
CMMD_combiner_t *combiner***)**

void **CMMD_reduce_v(**void **dest,* void **source,*
CMMD_combiner_t *combiner,*
int *stride,* int *elem_count***)**

<type1> **CMMD_scan_***<type2>* **(***<type2> value,*
CMMD_combiner_t *combiner,*
CMMD_scan_direction_t *direction,*
CMMD_segment_mode_t *smode,* int *sbit,*
CMMD_scan_inclusion_t *inclusion***)**

void **CMMD_scan_v(**void **dest,* void **source,*
CMMD_combiner_t *combiner,*
CMMD_scan_direction_t *direction,*
CMMD_segment_mode_t *smode,* int *sbit,*
CMMD_scan_inclusion_t *inclusion,*
int *stride,* int *elem_count***)**

void **CMMD_concat_with_nodes(**void **element,* void **buffer,*
int *elem_length***)**

Note: *Type1* always equals *type2*, except for *_float* routines, which return **double** values.

A.4.3 Global Synchronization

void **CMMD_sync_with_nodes(**void**)**

A.4.4 Asychronous Global OR

int **CMMD_set_global_or(**int *value***)**
int **CMMD_get_global_or()**

A.5 Interrupts and Polling

int **CMMD_enable_interrupts(**void**)**
int **CMMD_disable_interrupts(**void**)**
int **CMMD_interrupt_status(**void**)**
int **CMMD_inside_interrupt_handler(**void**)**
void **CMMD_poll(**void**)**

A.6 CMAML (Active Message) Functions

A.6.1 Active Messages — Requests, Replies, and RPCs

void **CMAML_request**
void **CMAML_reply**
void **CMAML_rpc**
(int *dest_node***,** void **(****handler***)(),**
int *data1,* int *data2,* int *data3,* int *data4***)**

void **CMAML_request_tohost**
void **CMAML_reply_tohost**
void **CMAML_rpc_tohost**
(void **(****handler***)(),**
int *data1*, int *data2*, int *data3*, int *data4***)**

A.6.2 CMAML Array Transfer Operators

int **CMAML_scopy** **(**int *dest_node,* int *dest_rportno***,**
int *dest_align,* int *dest_offset***,**
int *source_addr***,** int *nbytes***,**

```
                    void (*rport_handler)(),
                    void *rport_handler_arg)

int CMAML_pcopy (int dest_node, int dest_rportno,
                    int dest_align, int dest_offset,
                    int source_addr, int nbytes,
                    void (*rport_handler)(),
                    void *rport_handler_arg)

int CMAML_allocate_rport(void)
int CMAML_allocate_this_rport(int rport)
int CMAML_free_rport(int rport)
int CMAML_number_of_rports(void)
int CMAML_number_of_free_rports(void)

void *CMAML_get_rport_addr(int rport)
void CMAML_set_rport_addr(int rport, void *value)

int CMAML_get_rport_allocated(int rport)
int CMAML_get_rport_byte_counter(int rport)
void CMAML_set_rport_byte_counter(int rport, int value)

int CMAML_get_rport_total_nbytes(int rport)
void CMAML_set_rport_total_nbytes(int rport, int value)

void *CMAML_get_rport_handler(int rport)
void CMAML_set_rport_handler(int rport, void *value)

void *CMAML_get_rport_handler_arg2(int rport)
void CMAML_set_rport_handler_arg2(int rport, void *value)
```

A.6.3 Interrupts

```
int CMAML_enable_interrupts(void)
int CMAML_disable_interrupts(void)
int CMAML_interrupt_status(void)
int CMAML_inside_interrupt_handler(void)
```

A.6.4 Polling

void **CMAML_poll(**void**)**
void **CMAML_request_poll(**void**)**
void **CMAML_reply_poll(**void**)**
void **CMAML_poll_while_lt(**volatile int **flag*, int *value***)**
void **CMAMML_wait(**volatile int **flag*, int *value***)**
void **CMAML_poll_wait(**volatile int **flag*, int *value***)**

A.6.5 Register State Saving Functions

void **CMAML_save_ctrlregs(**double **dp_cr_spillarea***)**
void **CMAML_restore_ctrlregs(**double **dr_cr_spillarea***)**
void **CMAML_save_dataregs(**double **dp_dr_spillarea***)**
void **CMAML_restore_dataregs(**double **dp_dr_spillarea***)**
void **CMAML_save_fpuregs(**double **iu_fp_spillarea***)**
void **CMAML_restore_fpuregs(**double **iu_fp_spillarea***)**

A.7 I/O Functions

int **CMMD_set_open_mode(**CMMD_file_mode_t *io_mode***)**
CMMD_file_mode_t **CMMD_get_open_mode(**void**)**

int **CMMD_global_open**(char **path,* int *flags,* int *mode*)
int **CMMD_global_creat**(char **path,* int *mode*)
FILE ***CMMD_global_fopen**(const char **path, *mode*)

int **CMMD_set_io_mode(**int *fd,* CMMD_file_mode_t *io_mode***)**
int **CMMD_fset_io_mode(**FILE **stream,* CMMD_file_mode_t *io_mode***)**
CMMD_file_mode_t **CMMD_get_io_mode(**int *fd***)**
CMMD_file_mode_t **CMMD_fget_io_mode(**FILE **stream***)**

int **CMMD_global_socket**(int *domain,* int *type,* int *protocol*)

double **dseek(**int *fd,* double *offset,* int *whence***)**
double **dtell(**int *fd***)**
double **dlength(**int *fd***)**
int **dftruncate(**int *fd,* double *length***)**

int **CMMD_physical_blocking**(int *fd*)
int **CMMD_physical_write(**int *fd,* void **buffer,* int *length***)**
int **CMMD_physical_read(**int *fd,* void **buffer,* int *length***)**

A.8 Error Handling

int **CMMD_get_errno(**void**)**
void **CMMD_error(**const char **format, args ...***)**

A.9 Timing Functions

int **CMMD_node_timer_clear(**int *timer***)**
int **CMMD_node_timer_start(**int *timer***)**
int **CMMD_node_timer_stop(**int *timer***)**
double **CMMD_node_timer_elapsed(**int *timer***)**
double **CMMD_node_timer_busy(**int *timer***)**
double **CMMD_node_timer_idle(**int *timer***)**

A.10 Changing Defaults

CMMD_matching_function_t **CMMD_set_msg_matching_fcn**
(CMMD_matching_function_t **(*matcher)**
(int *req_node***,** int *req_tag***,** int *req_length***,**
int *send_node***,** int *send_tag***,** int *send_length***)**
int **CMMD_reset_partition_size(**int *new_size***)**
void **CMMD_enable_safety(**void**)**
void **(CMMD_disable_safety(**void**)**

A.11 Host/Node Environment Functions

void **CMMD_enable(**void**)**
void **CMMD_enable_host(**void**)**

int **CMMD_host_node(**void**)**

void **CMMD_sync_host_with_nodes(**void**)**
void **CMMD_sync_with_host(**void**)**

void **CMMD_bc_from_host(**void **buffer*, int *buffer_desc***)**
void **CMMD_receive_bc_from_host(**void **buffer*, int *buffer_desc***)**

void **CMMD_bc_from_host_v(**void **vector*, int *elem_bytes*,
int *stride*, int *elem_count***)**

void **CMMD_receive_bc_from_host_v(**void **vector*, int *elem_bytes*,
int *stride*, int *elem_count***)**

void **CMMD_distrib_to_nodes(**void **buffer*, int *elem_length***)**
void **CMMD_receive_element_from_host(**void **buffer*, int *length***)**

void **CMMD_gather_from_nodes(**void **buffer*, int *elem_length***)**
void **CMMD_concat_elements_to_host(**void **element*t,
int *elem_length***)**

int **CMMD_reduce_from_nodes_int(**int *value*,
CMMD_combiner_t *combiner***)**
uint **CMMD_reduce_from_nodes_uint(**uint *value*,
CMMD_combiner_t *combiner***)**
double **CMMD_reduce_from_nodes_float(**float *value*,
CMMD_combiner_t *combiner***)**
double **CMMD_reduce_from_nodes_double(**double *value*,
CMMD_combiner_t *combiner***)**

int **CMMD_reduce_to_host_int(**int *value*,
CMMD_combiner_t *combiner***)**
uint **CMMD_reduce_to_host_uint(**unsigned *value*,
CMMD_combiner_*t combiner***)**
double **CMMD_reduce_to_host_float(**float *value*,
CMMD_combiner_t *combiner***)**
double **CMMD_reduce_to_host_double(**double *value*,
CMMD_combiner_t *combiner***)**

void **CMMD_reduce_from_nodes_v(**void **dest*, void **source*,
CMMD_combiner_t *combiner*,
int *stride_bytes*, int *elem_count***)**

void **CMMD_reduce_to_host_v(**void **dest*, void **source*,
CMMD_combiner_t *combiner*,
int *stride_bytes*, int *elem_count***)**

void **CMMD_service_loop(**void**)**
void **CMMD_global_suspend_servers(**void**)**
int **CMMD_poll_for_services(**void**)**