MaxRT eRTOS

Supported Network Interface Cards (NICs)

This document lists the NIC drivers provided for use with the MaxRT eRTOS Network. These drivers are intended to be loaded by the Network Link Layer (NL2). You can write custom drivers for NICs not included in this document.

If you have questions about NIC driver support, please contact IntervalZero Support.

Notes

- For improved performance, we recommend using MSI-X instead of MSI for interrupts.
- Enabling the RTSS Watchdog Timer may generate Watchdog Timeout exceptions when NIC drivers are loaded during NL2 startup.

Test Status

The drivers and supported NICs listed in this document are tested by IntervalZero. These drivers may support other untested NICs of the same family. Contact IntervalZero Support for more details.

RtndRtl Driver

Supported devices:

- RealTek PCIe Gigabit Ethernet Controller
  - Vendor ID: 0x10EC
  - Devices:
    - 8168/8111 B/C/CP/D/DP/E/F/G (Device ID: 0x8168)

- RealTek Gigabit Ethernet Network Card
  - Vendor ID: 0x10EC
  - Devices:
    - StarTech Gigabit Ethernet Network Card – Low Profile (Device ID: 0x8168)

Maximum packet size for specific hardware revisions:

Revision	Jumbo maximum packet size	Tested?
8110	1514	No
8168C/8111C, 8168CP/8111CP	6140	No
8168C-SPIN2/8111C-SPIN2	6140	Yes

Revision	Jumbo maximum packet size	Tested?
8168B/8111B, 8110S, 8169	7436	No
8168D/8168DP, 8168EP/8111EP	9212	No
8168G/8111G	9212	Yes
8168EVL/8111EVL, 8168H/8111H, 8168E/8111E, 8168F/8111F	9212	Yes

Real-time characteristics:

Operation	Deterministic?
Operations on Transmit Queues (RtndSubmitTxBuffer, RtndApplyTxBuffers, RtndExtractTxBuffer) **Note:** These functions are called by Rtnl2SubmitToPhysicalTxQueue and Rtnl2ExtractFromPhysicalTxQueue.	Yes
Operations on Receive Queues (RtndSubmitRxBuffer, RtndApplyRxBuffers, RtndExtractRxBuffer) **Note:** These functions are called by Rtnl2SubmitToPhysicalRxQueue and Rtnl2ExtractFromPhysicalRxQueue.	Yes

Operation	Deterministic?
Transmit interrupt to notification event	Yes
Receive interrupt to notification event	Yes

Memory usage:

Process	Memory usage?
Startup	• Use NL2 process external MSpace for per-interface management data. The exact amount of allocated memory depends on the number of buffers in each Queue. • Use contiguous memory for the ring of DMA descriptors and the frame data buffers of each Transmit/Receive Queue. The driver allocates one frame data buffer for each DMA descriptor in both the Transmit Queue and the Receive Queue.

Process	Memory usage?
Attach/Detach Transmit Queue (RtndAttachTxQueue, RtndDetachTxQueue) **Note:** These functions are called by RtnI2AcquirePhysicalTxQueue, RtnI2ReleasePhysicalTxQueue, RtnI2CreateLogicalTxQueue, and RtnI2DestroyLogicalTxQueue.	None
Attach/Detach Receive Queue (RtndAttachRxQueue, RtndDetachRxQueue) **Note:** These functions are called by RtnI2AcquirePhysicalRxQueue, RtnI2ReleasePhysicalRxQueue, RtnI2CreateLogicalRxQueue, and RtnI2DestroyLogicalRxQueue.	None

RtndIgc Driver

Supported devices:

- Intel® Ethernet Controller I225 Series
  - Vendor ID: 0x8086
  - Devices:
    - I225-LM (Device ID: 0x15F2)
    - I225-V (Device ID: 0x15F3)

> **Note:** The I225-LM controller has been tested with EtherCAT.

> **Note:** Intel recommends using I226.

- Intel® Ethernet Controller I226 Series
  - Vendor ID: 0x8086
  - Devices:
    - I226-V (Device ID: 0x125C)

Maximum packet size

All supported devices have a Jumbo maximum packet size of 9724.

Real-time characteristics:

Operation	Deterministic?
Operations on Transmit Queues (RtndSubmitTxBuffer, RtndApplyTxBuffers, RtndExtractTxBuffer) **Note:** These functions are called by Rtnl2SubmitToPhysicalTxQueue and Rtnl2ExtractFromPhysicalTxQueue.	Yes
Operations on Receive Queues (RtndSubmitRxBuffer, RtndApplyRxBuffers, RtndExtractRxBuffer) **Note:** These functions are called by Rtnl2SubmitToPhysicalRxQueue and Rtnl2ExtractFromPhysicalRxQueue.	Yes
Transmit interrupt to notification event	Yes
Receive interrupt to notification event	Yes

Memory usage:

Process	Memory usage?
Startup	• Use NL2 process external MSpace for per-interface management data. The amount of memory allocated depends on the interface's number of Transmit and Receive Queues and the number of buffers in each Queue. • Use contiguous memory for the ring of DMA descriptors and the frame data buffers of each Transmit/Receive Queue. The driver allocates one frame data buffer for each DMA descriptor in the Transmit Queue and the Receive Queue.
Attach/Detach Transmit Queue (RtndAttachTxQueue, RtndDetachTxQueue) **Note:** These functions are called by RtnI2AcquirePhysicalTxQueue, RtnI2ReleasePhysicalTxQueue, RtnI2CreateLogicalTxQueue, and RtnI2DestroyLogicalTxQueue.	None
Attach/Detach Receive Queue (RtndAttachRxQueue, RtndDetachRxQueue) **Note:** These functions are called by RtnI2AcquirePhysicalRxQueue, RtnI2ReleasePhysicalRxQueue, RtnI2CreateLogicalRxQueue, and RtnI2DestroyLogicalRxQueue.	None

Rtndlpch Driver

Supported devices:

- Intel® Ethernet Connection I219 Series
  - Vendor ID: 0x8086
  - Devices:
    - I219-LM (Device ID: 0x156F, 0x15B7)
    - I219-V (Device ID: 0x15BC, 0x0D55, 0x15B8)

- Intel® Ethernet Connection I218 Series
  - Vendor ID: 0x8086
  - Devices:
    - I218-V (Device ID: 0x15A1)

> **Note:** Intel has announced the expected discontinuation of the I218-V controller. Please contact Intel for more information on EOL timelines.

- Intel® Ethernet Connection I217 Series
  - Vendor ID: 0x8086
  - Devices:
    - I217-LM (Device ID: 0x153A)
    - I217-V (Device ID: 0x153B)

> **Note:** Intel has announced the expected discontinuation of the I217-LM and I217-V controllers. Please contact Intel for more information on EOL timelines.

- Intel® 82579 Gigabit Ethernet Controller
  - Vendor ID: 0x8086
  - Devices:
    - 82579LM (Device ID: 0x1502)
    - 82579V (Device ID: 0x1503)

> **Note:** Intel has announced the discontinuation of the 82579LM and 82579V controllers.

Maximum packet size

All supported devices have a Jumbo maximum packet size of 9212.

Real-time characteristics:

Operation	Deterministic?
Operations on Transmit Queues (RtndSubmitTxBuffer, RtndApplyTxBuffers, RtndExtractTxBuffer) **Note:** These functions are called by Rtnl2SubmitToPhysicalTxQueue and Rtnl2ExtractFromPhysicalTxQueue.	Yes
Operations on Receive Queues (RtndSubmitRxBuffer, RtndApplyRxBuffers, RtndExtractRxBuffer) **Note:** These functions are called by Rtnl2SubmitToPhysicalRxQueue and Rtnl2ExtractFromPhysicalRxQueue.	Yes
Transmit interrupt to notification event	Yes
Receive interrupt to notification event	Yes

Memory usage:

Process	Memory usage?
Startup	• Use NL2 process external MSpace for per-interface management data. The amount of memory allocated depends on the interface's number of Transmit and Receive Queues and the number of buffers in each Queue. • Use contiguous memory for the ring of DMA descriptors and the frame data buffers of each Transmit/Receive Queue. The driver allocates one frame data buffer for each DMA descriptor in the Transmit Queue and the Receive Queue.
Attach/Detach Transmit Queue (RtndAttachTxQueue, RtndDetachTxQueue) **Note:** These functions are called by RtnI2AcquirePhysicalTxQueue, RtnI2ReleasePhysicalTxQueue, RtnI2CreateLogicalTxQueue, and RtnI2DestroyLogicalTxQueue.	None
Attach/Detach Receive Queue (RtndAttachRxQueue, RtndDetachRxQueue) **Note:** These functions are called by RtnI2AcquirePhysicalRxQueue, RtnI2ReleasePhysicalRxQueue, RtnI2CreateLogicalRxQueue, and RtnI2DestroyLogicalRxQueue.	None

RtNall10gb Driver

Supported devices:

- Intel® Ethernet Controller X550
  - Vendor ID: 0x8086
  - Devices:
    - X550-AT2 (Device ID: 0x1563)

> **Note:** Intel has announced the expected discontinuation of the X550-AT2 controller. Please contact Intel for more information on EOL timelines.

Maximum packet size

All supported devices have a Jumbo maximum packet size of 15868.

Real-time characteristics:

Operation	Deterministic?
Operations on Transmit Queues (RtndSubmitTxBuffer, RtndApplyTxBuffers, RtndExtractTxBuffer) **Note:** These functions are called by Rtnl2SubmitToPhysicalTxQueue and Rtnl2ExtractFromPhysicalTxQueue.	Yes
Operations on Receive Queues (RtndSubmitRxBuffer, RtndApplyRxBuffers, RtndExtractRxBuffer) **Note:** These functions are called by Rtnl2SubmitToPhysicalRxQueue and Rtnl2ExtractFromPhysicalRxQueue.	Yes
Transmit interrupt to notification event	Yes
Receive interrupt to notification event	Yes

Memory usage:

Process	Memory usage?
Startup	• Use NL2 process external MSpace for per-interface management data. The amount of memory allocated depends on the interface's number of Transmit and Receive Queues and the number of buffers in each Queue. • Use contiguous memory for the ring of DMA descriptors and the frame data buffers of each Transmit/Receive Queue. The driver allocates one frame data buffer for each DMA descriptor in the Transmit Queue and the Receive Queue.
Attach/Detach Transmit Queue (RtndAttachTxQueue, RtndDetachTxQueue) **Note:** These functions are called by RtnI2AcquirePhysicalTxQueue, RtnI2ReleasePhysicalTxQueue, RtnI2CreateLogicalTxQueue, and RtnI2DestroyLogicalTxQueue.	None
Attach/Detach Receive Queue (RtndAttachRxQueue, RtndDetachRxQueue) **Note:** These functions are called by RtnI2AcquirePhysicalRxQueue, RtnI2ReleasePhysicalRxQueue, RtnI2CreateLogicalRxQueue, and RtnI2DestroyLogicalRxQueue.	None

RtndIgb Driver

Supported devices:

- Intel® Ethernet Controller I210 Series
  - Vendor ID: 0x8086
  - Devices:
    - I210 (Device ID: 0x1533)

> **Note:** This controller has been tested with EtherCAT.

- Intel® Ethernet Controller I211 Series
  - Vendor ID: 0x8086
  - Devices:
    - I211 (Device ID: 0x1539)

> **Note:** This controller has been tested with EtherCAT.

> **Note:** Intel has announced the discontinuation of the I211 controller.

- Intel® Ethernet Controller I350 Series
  - Vendor ID: 0x8086
  - Devices:
    - I350 (Device ID: 0x1521)

> **Note:** This controller has been tested with EtherCAT.

- Intel® 82576 Gigabit Ethernet Controller
  - Vendor ID: 0x8086
  - Devices:
    - 82576 (Device ID: 0x10C9)

> **Note:** Intel has announced the discontinuation of the 82576 controller.

- Intel® 82580 Gigabit Ethernet Controller
  - Vendor ID: 0x8086
  - Devices:
    - 82580 (Device ID: 0x150E)

> **Note:** Intel has announced the discontinuation of the 82580 controller.

Maximum packet size

All supported devices have a Jumbo maximum packet size of 9724.

Real-time characteristics:

Operation	Deterministic?
Operations on Transmit Queues (RtndSubmitTxBuffer, RtndApplyTxBuffers, RtndExtractTxBuffer) **Note:** These functions are called by RtnI2SubmitToPhysicalTxQueue and RtnI2ExtractFromPhysicalTxQueue.	Yes
Operations on Receive Queues (RtndSubmitRxBuffer, RtndApplyRxBuffers, RtndExtractRxBuffer) **Note:** These functions are called by RtnI2SubmitToPhysicalRxQueue and RtnI2ExtractFromPhysicalRxQueue.	Yes
Transmit interrupt to notification event	Yes
Receive interrupt to notification event	Yes

Memory usage:

Process	Memory usage?
Startup	• Use NL2 process external MSpace for per-interface management data. The amount of memory allocated depends on the interface's number of Transmit and Receive Queues and the number of buffers in each Queue. • Use contiguous memory for the ring of DMA descriptors and the frame data buffers of each Transmit/Receive Queue. The driver allocates one frame data buffer for each DMA descriptor in the Transmit Queue and the Receive Queue.
Attach/Detach Transmit Queue (RtndAttachTxQueue, RtndDetachTxQueue) **Note:** These functions are called by RtnI2AcquirePhysicalTxQueue, RtnI2ReleasePhysicalTxQueue, RtnI2CreateLogicalTxQueue, and RtnI2DestroyLogicalTxQueue.	None
Attach/Detach Receive Queue (RtndAttachRxQueue, RtndDetachRxQueue) **Note:** These functions are called by RtnI2AcquirePhysicalRxQueue, RtnI2ReleasePhysicalRxQueue, RtnI2CreateLogicalRxQueue, and RtnI2DestroyLogicalRxQueue.	None