ETH out - Ethernet output mailbox

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Table of Contents

The Ethernet output mailbox block allows sending up to 1024 bytes of data via Ethernet using the UDP/IP protocol (in SDK versions prior to 2025.2, the size limit was 32-bit). To receive data via Ethernet using the UDP/IP protocol, the Ethernet input mailbox should be used.

It supports two operating modes:

- **On-demand mode**: the user manually triggers the message transmissions.
- **Periodical mode**: the message is sent periodically, whether the data has been changed or not. The user can configure the transmission frequency.

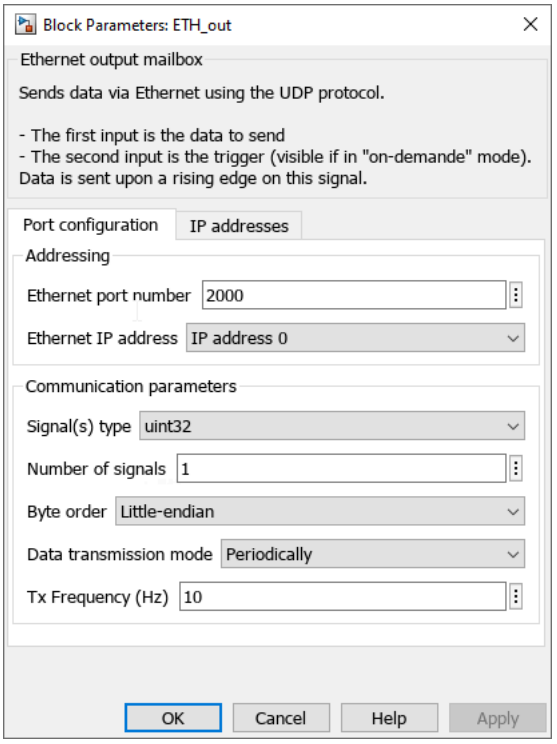
Simulink block

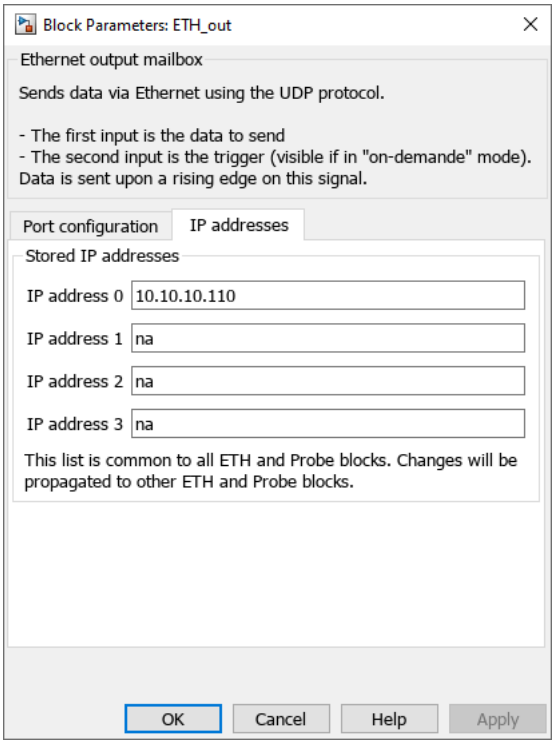
Signal specification

- The first input is the data to send. The accepted data type is specified by the `Signal coding format` parameter. This data can be provided as a vector, with its size defined by the `Number of signals` parameter. The maximum supported data size is 1024 bytes. (e.g. with `Signal coding format` set to uint32 and `Number of signals` set to 100, the data size will be 4 x 100 = 400 bytes)
- The second input is the *send data* signal. It is used to initiate a data transmission when the **on-demand** mode has been selected. Data is sent upon a rising edge on this signal.

Parameters

- `Ethernet port number`: sets the destination port to which the data will be sent.
- `Ethernet IP address` : selects the IP address to whom the data will be sent.
- `Signal coding format`: defines the data type accepted in the data input (int8, int16, int32, uint8, uint16, uint32, float32, or float64).
- `Number of signals`: specifies the vector size of the data to be sent.
- `Byte order` : defines the byte order in which the data will be sent. (little-endian or big-endian)
- `Tx frequency` : sets the data transmission frequency if the **periodical mode** has been selected.





PLECS block

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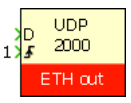

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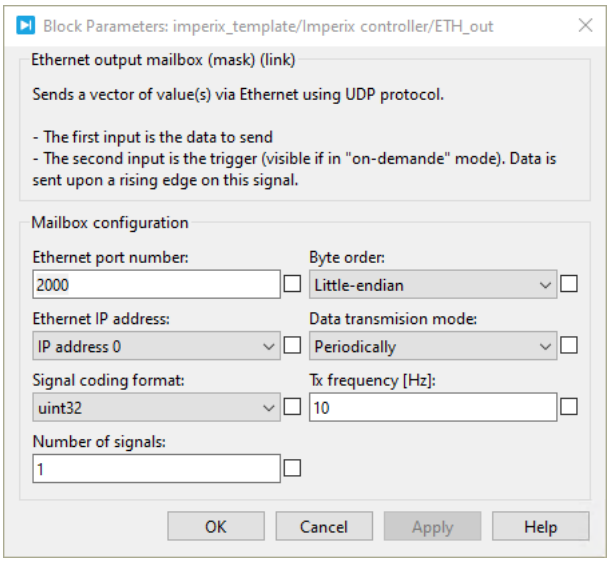

The Ethernet IP addresses can be configured in the Imperix Controllers' target window (*Coder → Coder option → Target*).

C++ functions

`Eth_ConfigureOutputMailbox` **— Configure an Ethernet output mailbox**

```
bool Eth_ConfigureOutputMailbox(unsigned int mailboxId, unsigned int port, const char* ipAddress, float maxTxFrequ
```

Configures an Ethernet UDP output mailbox.

It has to be called in `UserInit()`.

Parameters

- `mailboxId`: a unique id used to distinguish mailboxes from each other. This id must be unique throughout the code for all ETH and CAN input/output mailboxes.
- `port`: the destination UDP port number to which the data will be sent.
- `ipAddress`: the destination IP address to whom the data will be sent.
- `maxTxFrequency`: maximal frequency at which data can be sent. The frequency must be a multiple of the main interrupt frequency. If the requested frequency is not achievable, it will automatically be set to the closest valid frequency.
- `endianness`: defines the bytes order. BIG_ENDIAN (most significant byte first) or LITTLE_ENDIAN (least significant byte first)
- `msgLength`: size in bytes of the message, for best perfomance it is advised to keep it under 1024 bytes

Return value

- `bool`: returns false if too many output mailboxes were created or if the `port` was already assigned to another ETH output mailbox.

`Eth_Write` **— Write**

```
int Eth_Write(unsigned int mailboxId, void* data, size_t size);Code language: C++ (cpp)
```

```
int Eth_Write(unsigned int mailboxId, unsigned int dataLow);Code language: C++ (cpp)
```

```
int Eth_Write(unsigned int mailboxId, int dataLow);Code language: C++ (cpp)
```

```
int Eth_Write(unsigned int mailboxId, float dataLow);Code language: C++ (cpp)
```

These functions are used to send data on Ethernet using UDP.

They have to be called during the control interrupt.

Parameters

- `maildboxId`: a unique ID used to distinguish mailboxes from each other. This ID must be unique throughout the code for all ETH and CAN input/output mailboxes.
- `data`: data which will be sent.
- `size`: size in bytes of the data to copy, must match the size declared during mailbox creation

Return value

- `int`: returns 1 if the data has been loaded in the write buffer. Returns 0 otherwise.