

Start Frame Delimiter

The start frame delimiter field marks the start of the frame and must contain the pattern 10101011. The pattern is transmitted from left to right. The receive data valid signal from the PHY (RX_DV) may go active during the preamble but will be active prior to the start frame delimiter field. For transmission, this field is always automatically inserted by the GEMAC and should never appear in the packet data provided to the GEMAC. For reception, this field is always stripped from the packet data.

Destination Address

The destination address field is 6 bytes in length¹. The least significant bit of the destination address is used to determine if the address is an individual/unicast (0) or group/multicast (1) address. Multicast addresses are used to group logically related stations. The broadcast address (destination address field is all 1's) is a multicast address that addresses all stations on the LAN. The GEMAC supports transmission and reception of unicast, multicast and broadcast packets.

All properly formed receive packets are accepted regardless of destination address type or value.

Source Address

The source address field is 6 bytes in length². This field is transmitted with the least significant bit first.

Type/Length

The type/length field is 2 bytes in length. When used as a length field, the value in this field represents the number of bytes in the following data field. This value does not include any bytes that may have been inserted in the padding field following the data field. The value of this field determines if it should be interpreted as a length as defined by the IEEE 802.3 standard or a type field as defined by the Ethernet protocol.

The maximum length of a data field is 1,500 bytes for normal frames. Therefore, a value in this field that exceeds 1,500 (05DC hex) would indicate that a frame type rather than a length value is provided in this field. The IEEE 802.3 standard uses the value 1536 (0600 hex) or greater to signal a type field and that is what is used in the GEMAC design. Jumbo frames can have a data field as large as 8982 bytes.

For reception, if the field is a length field and jumbo frames are disabled, the GEMAC will compare the length against the actual data field length and will flag an error if they are different. If the field is a type field or jumbo frames are enabled, the GEMAC will ignore the value and pass it along with the packet data with no further processing. A type/length field value of 8100 hex indicates that the frame is a VLAN frame and a value of 8808 hex indicates a pause MAC control frame.

If the frame is a VLAN type frame, the GEMAC must accept 4 additional bytes which are provided with the received packet data (i.e., the maximum normal frame size is increased from 1518 bytes to 1522 bytes). No additional processing is performed by the GEMAC other than to accept the additional bytes.

The GEMAC does not perform any processing of the type/length field on transmissions. The data provided in the transmit packet is transmitted without any interpretation or validation.

This field is transmitted with the least significant bit first but with the high order byte first. This field is always provided in the packet data for transmissions and is always retained in the receive packet data.

1. The GEMAC design does not support 16-bit destination addresses as defined in the IEEE 802 standard
2. The GEMAC design does not support 16-bit source addresses as defined in the IEEE 802 standard

