

How does flow control work in full-duplex

Autonegotiation

Auto-Negotiation provides a linked device with the capability to detect the abilities supported by the device at the other end of the link, determine common abilities, and configure for joint operation. Pause(flow control) capability negotiate during this time. and PAUSE frames shall only be sent by DTEs configured to the full duplex mode of operation.

Autonegotiation Pause capability

Bit A5 and Bit A6 of the Technology bit field indicates that the device has implemented both the optional MAC control sublayer and the PAUSE function. Please refer to **Table-1** for the encoding.

Table-1

PAUSE (A5)	ASM_DIR (A6)	Capability
0	0	No PAUSE
0	1	Asymmetric PAUSE toward link partner
1	0	Symmetric PAUSE
1	1	Both Symmetric PAUSE and Asymmetric PAUSE toward local device

The PAUSE bit indicates that the device is capable of providing the symmetric PAUSE functions. The ASM_DIR bit indicates that asymmetric PAUSE is supported. The value of the PAUSE bit when the ASM_DIR bit is set indicates the direction the PAUSE frames are supported for flow across the link. Asymmetric PAUSE configuration results in independent enabling of the PAUSE receive and PAUSE transmit functions.

Priority resolution function

Since a local device and a link partner may have multiple common abilities, a mechanism to resolve which mode to configure is necessary. Auto-Negotiation shall provide the Priority Resolution function that defines the hierarchy of supported technologies(**Table-2**).

Table-2

Local Device		Link Partner		Local Resolution	Link Partner Resolution
PAUSE	ASM_DIR	PAUSE	ASM_DIR		
0	0	—	—	Disable PAUSE Transmit and Receive	Disable PAUSE Transmit and Receive
0	1	0	—	Disable PAUSE Transmit and Receive	Disable PAUSE Transmit and Receive
0	1	1	0	Disable PAUSE Transmit and Receive	Disable PAUSE Transmit and Receive
0	1	1	1	Enable PAUSE transmit, Disable PAUSE receive	Enable PAUSE receive, Disable PAUSE transmit
1	0	0	—	Disable PAUSE Transmit and Receive	Disable PAUSE Transmit and Receive
1	0	1	—	Enable PAUSE Transmit and Receive	Enable PAUSE Transmit and Receive
1	1	0	0	Disable PAUSE Transmit and Receive	Disable PAUSE Transmit and Receive
1	1	0	1	Enable PAUSE receive, Disable PAUSE transmit	Enable PAUSE transmit, Disable PAUSE receive
1	1	1	—	Enable PAUSE Transmit and Receive	Enable PAUSE Transmit and Receive

In practice, we can often see a common misconfiguration to set NIC on force speed to full duplex. the NIC will not send auto-negotiation and result in flow control fail on link partner.