Summary of Modifications

Instructions for the Editor

1. Clause 5.2.7.3
    - Add definitions for ARB(F1) and ARB(F7) in Table 8
2. Clause 5.3.7.2
    - Add definitions for ARB(F1) and ARB(F7) in Table 14
3. Clause 25
    - Add new clause defining Congestion Signals

*Changes are shown highlighted in yellow.

5.2.7.3 8B/10B Primitive Signals

A Primitive Signal is an Ordered Set designated by this standard to have special meaning. All FC_Ports shall at a minimum recognize R_RDY and Idle Primitive Signals. All Primitive Signals not recognized by the FC_Port shall be treated as Fill Words. When a single Ordered Set is detected possible Primitive Signals detected are listed in table 8.

To assure a sufficient number of Fill Words between frames, the originator of any Primitive Signal (except ARByx, ARB(val), MRK, SYNx, SYNy, and SYNz) shall precede and follow the Primitive Signal by a minimum of two Fill Words. Because Fill Words may be removed by intermediate transmitters, the number of Fill Words preceding or following a Primitive Signal at a receiver may be reduced to zero.

All Primitive Signals in 8b/10B have negative beginning running disparity.

Table 8 - 8B/10B Primitive Signals

Abbr.	Primitive Signal	Reference	Ordered Set
Idle	Idle	5.2.7.4	K28.5 – D21.4 – D21.5 – D21.5
R_RDY	Receiver_Ready	20.4	K28.5 – D21.4 – D10.2 – D10.2
VC_RDY	Virtual Circuit Ready	FC-SW-7	K28.5 – D21.7 – VC_ID – VC_ID
BB_SCs	buffer-to-buffer State Change (SOF)	20.4.9	K28.5 - D21.4 – D22.4 – D22.4
BB_SCr	buffer-to-buffer State Change (R_RDY)	20.4.9	K28.5 - D21.4 – D22.6 – D22.6
SYNx	Clock Synchronization Word X	24.4	K28.5 – D31.3 – CS_X1 – CS_X2
SYNy	Clock Synchronization Word Y	24.4	K28.5 – D31.5 – CS_Y1 – CS_Y2
SYNz	Clock Synchronization Word Z	24.4	K28.5 – D31.6 – CS_Z1 – CS_Z2
ARBff	Arbitrate	FC-AL-2 and 11.3.5	K28.5 - D20.4 - D31.7 - D31.7
ARByx	Arbitrate	FC-AL-2	K28.5 – D20.4 – y – x
ARB(val)	Arbitrate	FC-AL-2	K28.5 – D20.4 – val – val
ARB(F1)	Warning Congestion Signal	25	K28.5 – D20.4 – D17.7 – D17.7
ARB(F7)	Alarm Congestion Signal	25	K28.5 – D20.4 – D23.7 – D23.7
CLS	Close	FC-AL-2	K28.5 – D5.4 – D21.5 – D21.5
DHD	Dynamic Half-Duplex	FC-AL-2	K28.5 – D10.4 – D21.5 – D21.5
MRKtx	Mark	FC-AL-2	K28.5 – D31.2 – MK_TP – AL_PS
OPNyx	Open full-duplex	FC-AL-2	K28.5 – D17.4 – AL_PD – AL_PS
OPNyy	Open half-duplex	FC-AL-2	K28.5 – D17.4 – AL_PD – AL_PD
OPNyr	Open selective replicate	FC-AL-2	K28.5 – D17.4 – AL_PD – D31.7
OPNfr	Open broadcast replicate	FC-AL-2	K28.5 – D17.4 – D31.7 – D31.7
Idle2	Alternate Idle 2	FC-BaseT	K28.5 – D7.0 – D9.1 – D9.1

Idle3	Alternate Idle 3	FC-BaseT	K28.5 – D7.0 – D9.5 – D9.5

5.3.7.2 64B/66B Primitive Signals

A Primitive Signal is a Special Function for which each instance has meaning independent of neighboring Special Functions.

When the 64B/66B transmission code is used, the Fill Word (see 11.3.2) is either Idle or Low Power Idle, depending on whether Energy Efficient operation (see 10) is used. The Idle Primitive Signal shall be represented as a series of four Idle control codes.

Primitive Signal Special Functions other than the Idle Primitive Signal shall be represented by the combination of the Transmission Word type code (see table 10), an order code (see table 12), and three modifier bytes, as specified in table 14. If a valid order code associated with a series of modifier bytes that is not specified in table 14 is decoded, the order code together with its associated modifier bytes shall be processed as though an Idle Special Function had been decoded in the same position.

Table 14 - 64B/66B representation of Primitive Signal Special Functions

Abbr.	Primitive Signal	Reference	Ordered Code	Modifier Byte 1	Modifier Byte 2	Modifier Byte 3
R_RDY	Receiver_Ready	20.4	Fh	95h	4Ah	4Ah
VC_RDY	Virtual Circuit Ready	FC-SW-7	Fh	F5h	VC_ID	VC_ID
BB_SCs	buffer-to-buffer State Change (SOF)	20.4.9	Fh	95h	96h	96h
BB_SCr	buffer-to-buffer State Change (R_RDY)	20.4.9	Fh	95h	D6h	D6h
ARB(F1)	Warning Congestion Signal	25	Fh	94h	F1h	F1h
ARB(F7)	Alarm Congestion Signal	25	Fh	94h	F7h	F7h

All FC_Ports shall at a minimum recognize the R_RDY Primitive Signal and the Idle Primitive Signal.

To assure a sufficient number of Fill Words between frames, the originator of any Primitive Signal other than Idle shall precede and follow the Primitive Signal by a minimum of two Fill Words. Because Fill Words may be removed by intermediate transmitters, the number of Fill Words preceding or following a Primitive Signal at a receiver may be reduced to zero.

25 Congestion Signal

25.1 Overview

The Congestion Signal provides a method of indicating the presence of congestion conditions between two directly attached FC_Ports. A Congestion Signal may be sent by a first FC_Port to a second FC_Port to indicate the second FC_Port behavior is causing the first FC_Port to consume resources above defined thresholds.

Congestion Signals are primitive signals (see table 8 and table 14). A warning level of congestion is indicated by the Warning Congestion Signal (see 25.3.1). An alarm level of congestion is indicated by the Alarm Congestion Signal (see 25.3.2).

The ability of the FC_Port to transmit and/or receive Congestion Signals is indicated in the Congestion Detection Capability descriptor of the Exchange Diagnostic Capabilities ELS exchange (see FC-LS-5).

An FC_Port capable of supporting only one type of Congestion Signal value shall support the Warning Congestion Signal.

The threshold conditions necessary to activate transmission of a Congestion Signal are outside the scope of the standard.

25.2 Protocol

25.2.1 Warning Congestion Signal

If the transmission resources of an FC_Port are consumed above a warning threshold then that FC_Port may transmit a Warning Congestion Signal. The transmission of the Warning Congestion Signal shall continue at the negotiated frequency (see FC-LS-5) while consumption of transmission resources of an FC_Port are greater than or equal to a warning threshold. The transmission of the Warning Congestion Signal shall end if the consumption of the transmission resources of an FC_Port is less than a warning threshold or greater than or equal to the alarm threshold if the Alarm Congestion Signal is supported.

The transmit signal frequency of the Warning Congestion Signal is indicated during the Exchange Diagnostic Capabilities ELS exchange between the two ports of the link (see FC-LS-5).

25.2.2 Alarm Congestion Signal

If the transmission resources of an FC_Port are consumed above an alarm threshold then that FC_Port may transmit an Alarm Congestion Signal instead of the Warning Congestion Signal. The transmission of the Alarm Congestion Signal shall continue at the negotiated frequency (see FC-LS-5) while consumption of transmission resources of an FC_Port are greater than or equal to an alarm threshold. The transmission of the Alarm Congestion Signal shall end if the consumption of the transmission resources of an FC_Port is less than an alarm threshold. If the resource consumption is less than an alarm threshold, the Warning Congestion Signal may be transmitted until the resource consumption is less than a warning threshold.

The transmit signal frequency of the Alarm Congestion Signal is indicated during the Exchange Diagnostic Capabilities ELS exchange between the two ports of the link (see FC-LS-5).