

Serial Communications

FC–AL–3

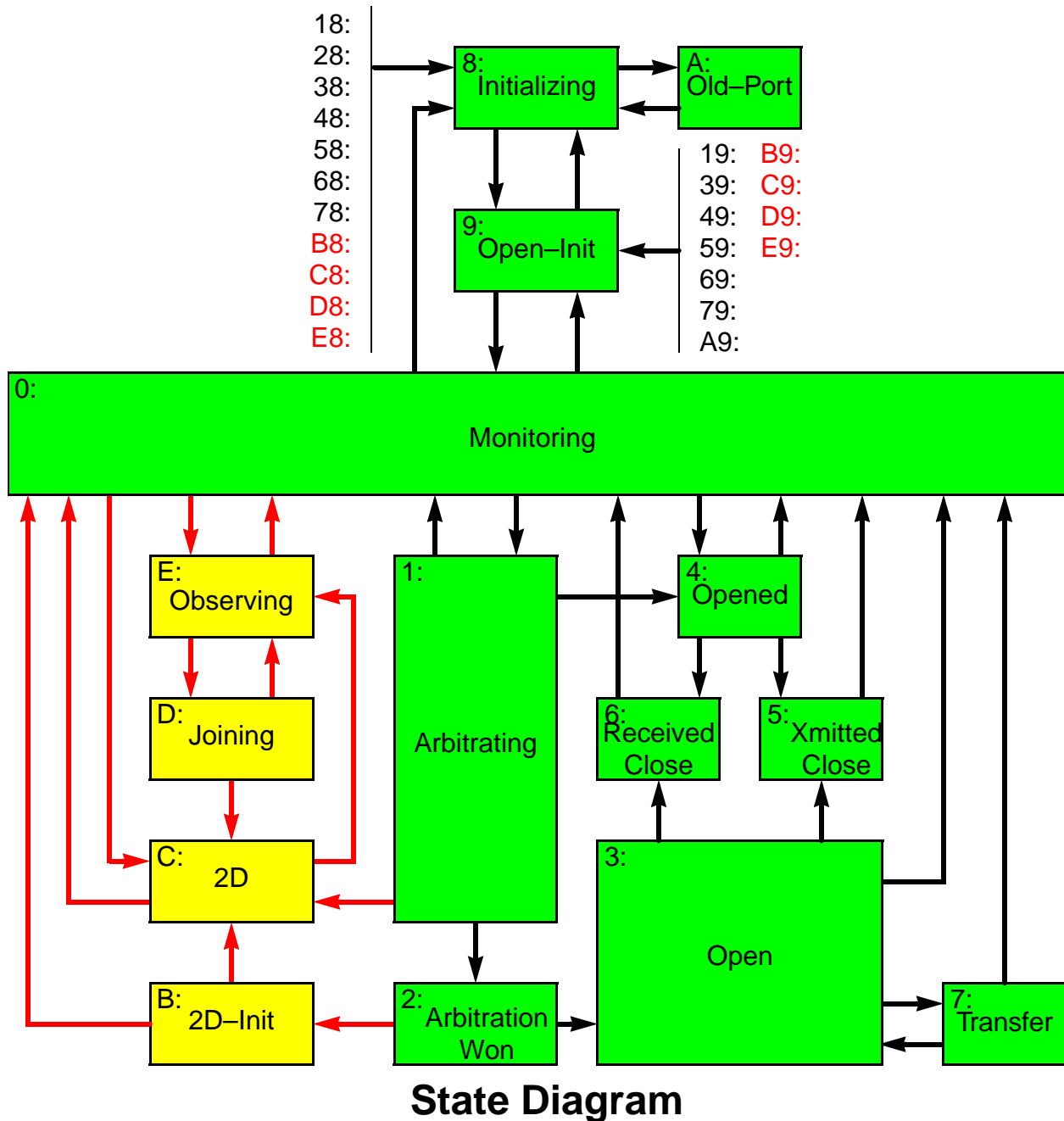
2D Loop Loop Identification

T11 9 Feb. 1998

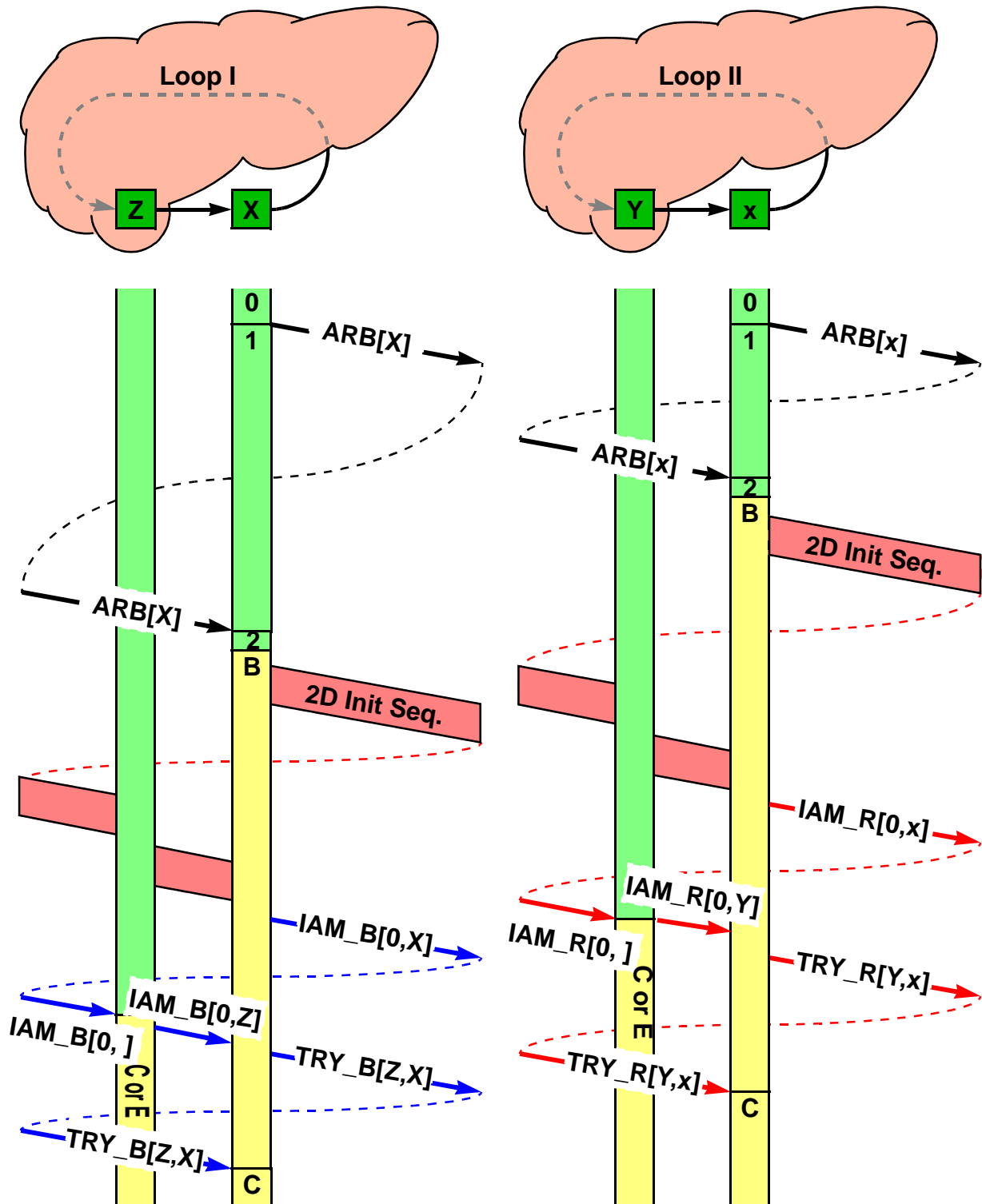
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FC-AL-3 – Loop Identification

2D Loop State Diagram



FC-AL-3 – Loop Identification



Successful 2D Loop Initialization Example

FC-AL-3 – Loop Identification

2D Loop Initialization

- ☯ Only dual ported entities may request entry to the 2D mode
 - The requesting dual ported entity shall, before it proceed to attempt to activate the 2D mode
 - ↪ Successfully complete FC-AL-2 loop initialization on both ports
 - ↪ Attempt Fabric Login on both loops
 - ✳ If a Fabric is present then the requesting entity shall not proceed before it successfully completes Fabric Login
 - ↪ Ensure both loops are on the same Fabric if both ports are on a Public Loop
 - ✳ If the Fabric Names are different, then operation in 2D mode shall not be requested
- ☯ The requesting entity shall Arbitrate on both loops
 - The requesting entity shall send the single frame '2D Initialization Sequence' when it wins Arbitration and enters the 2D-Init state on that port
 - ↪ Initialization shall proceed independently on the two loops
 - The requesting L_Port shall select an IAM_x[,X] Primitive Signal as its Fill Word, once the '2D Initialization Sequence' returns to the entity requesting 2D Loop operation
 - ↪ X = AL_PA of the sending L_Port
 - ↪ IAM_R[–,X] shall be used for the Red Loop
 - ✳ The loop with the lower valued addresses
 - ↪ IAM_B[–,X] shall be used for the Blue Loop
 - ✳ The loop with the higher valued addresses

FC–AL–3 – Loop Identification

2D Loop Initialization


- The requesting L_Port shall transmit FLT_x[FF,FF] Primitive Signals continuously until the port either receive a FLT_x[FF,FF] Primitive Signal or 5 ms have lapsed, if the requesting L_Port receive a FLT_x[X,X] Primitive Signal or if it continuously receives an IAM_x Primitive of the wrong colour
 - ⇒ The requesting L_Port shall return to the Monitoring state once it cease to transmit the FLT_x[FF,FF] Primitive Signal
 - ⇒ FLT_R shall be used for the Red Loop
 - ⇒ FLT_B shall be used for the Blue Loop
- The requesting L_Port shall transmit a TRY_x[Z,X] Primitive Signal once it receive a IAM_x Primitive Signal, valid for the loop
 - ⇒ X = AL_PA of the L_Port originating the TRY Primitive Signal
 - ⇒ Z = AL_PA of the originating L_Ports upstream neighbour
 - ⇒ TRY_R[Z,X] shall be used for the Red Loop
 - ⇒ TRY_B[Z,X] shall be used for the Blue Loop
- The requesting L_Port shall enter the 2D state, when it receives and discard the transmitted TRY_x[Z,X] Primitive Signal
 - ⇒ The requesting entity shall continue its attempts to establish 2D loop operation on the adjoining loop if this isn't already done
 - ⇒ Another dual ported entity may complete or have completed the transition to 2D Loop operation on the adjoining loop

FC–AL–3 – Loop Identification

2D Loop Initialization

Timeouts

- ☐ The entity attempting to establish a working 2D loop complex, shall, if it have not succeeded within LP_TOV, restore Arbitrated Loop operation

-  The LP_TOV starts from the time an L_Port on the requesting entity first wins arbitration

-  The L_Port shall transmit FLT_x[FF,FF] Primitive Signals to restore Arbitrated Loop operation


-  FLT_R shall be used for the Red Loop

-  FLT_B shall be used for the Blue Loop

-  Transmission of FLT_x[FF,FF] Primitive Signals shall cease when FLT_x[FF,FF] Primitive Signals are received by the originator or after 5 ms

2D compatible L_Ports shall promiscuously receive, validate and forward the single frame '2D Initialization Sequence'

- ☐ Both Participating and Non–Participating entities shall perform the described actions

-  Non–Participating L_Port on an operational 2D Loop partake in Primitive Signal processes, but are prohibited from extracting and originating Data Frames

FC–AL–3 – Loop Identification

2D Loop Initialization

- ❑ The '2D Initialization Sequence' shall only be forwarded if it is validated successfully
 - ↪ The 'LISM Master Port_Name for this loop' field shall match the receiving L_Ports value for this field
 - ↪ The 'This' Loop Fabric Address' field shall, for L_Port's having successfully completed Fabric Login, match the receiving L_Port's value for this field
 - ↪ The 'LISM Master Port_Name for the adjoining loop' field should, for dual ported entities, match the receiving L_Ports value
 - ↪ The 'Adjoining Loop Fabric Address' field shall, for dual ported entities, match the receiving L_Ports value, if that port have completed Fabric Login successfully
 - ↪ The L_Port shall transmit a FLT_R[AL_PA,AL_PA] Primitive Signal if the port elects to discard the single frame '2D Initialization Sequence'
 - ✳ Non-Participating L_Ports shall transmit a FLT_RF7,F7] Primitive Signal
- ❑ L_Ports shall delay forwarding the '2D Initialization Sequence' for at most 1 ms
- ❑ Participating L_Port shall enter the 2D state when they receive an IAM_x[–,X] Primitive Signal
 - ↪ If the L_Port have not received and validated the '2D Initialization Sequence' then it should insert a FLT_x[AL_PA,AL_PA] Primitive Signal, matching the colour of the received IAM
- ❑ A Non-Participating L_Port shall enter the Observing state when they receive an IAM_x[–,X] Primitive Signal and set its Fill Word to Idle

FC–AL–3 – Loop Identification

2D Loop Initialization

2D Initialization Sequence

0	SOFiL			Frame_Header
1	hex '22'	hex '000000'		
2	hex '00'	hex '000000'		
3	hex '01'	hex '380000'		
4	hex '00'	hex '00'	hex '0000'	
5	hex 'FFFF'		hex 'FFFF'	
6	hex '00000000'			Payload
7	hex '11100000'			
8	hex '00'	'This' Loop Fabric Address		
9	LISM Master Port_Name for this loop			
10				
11	hex '00'	Adjoining Loop Fabric Address		
12	LISM Master Port_Name for the adjoining loop			
13				
14	CRC			
15	EOFt			




- ☯ Frame Delimiters, as specified in FC–AL–2 for Loop Initialization
- ☯ Frame Header, as specified in FC–AL–2, for Loop Initialization by an FL_Port
- ☯ CRC field, as specified by FC–PH

FC–AL–3 – Loop Identification


2D Loop Initialization

2D Initialization Sequence fields

'This' Loop Fabric Address

-  The Loop Fabric Address for the loop on which the 2D Initialization Sequence is sent
 -  hex '000000' if both loops are Private and this loop's LISM Master Port_Name is the lower valued name
 -  hex '000100' if both loops are Private and this loop's LISM Master Port_Name is the higher valued name




LISM Master Port_Name for this loop

-  The Port_Name of the entity which won LISM mastership for the loop on which the 2D Initialization Sequence is sent

Adjoining Loop Fabric Address

-  The Loop Fabric Address for the companion loop

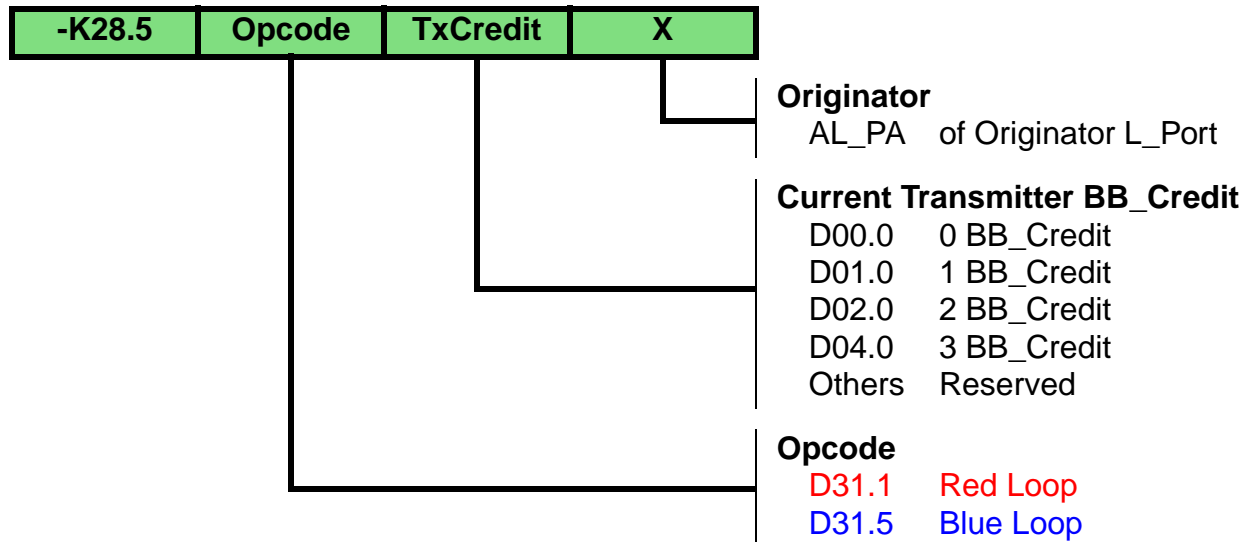
LISM Master Port_Name for the adjoining loop

-  The Port_Name of the entity which won LISM mastership for the companion loop
 -  hex '000000' if both loops are Private and the companion loop's LISM Master Port_Name is the lower valued name
 -  hex '000100' if both loops are Private and the companion loop's LISM Master Port_Name is the higher valued name

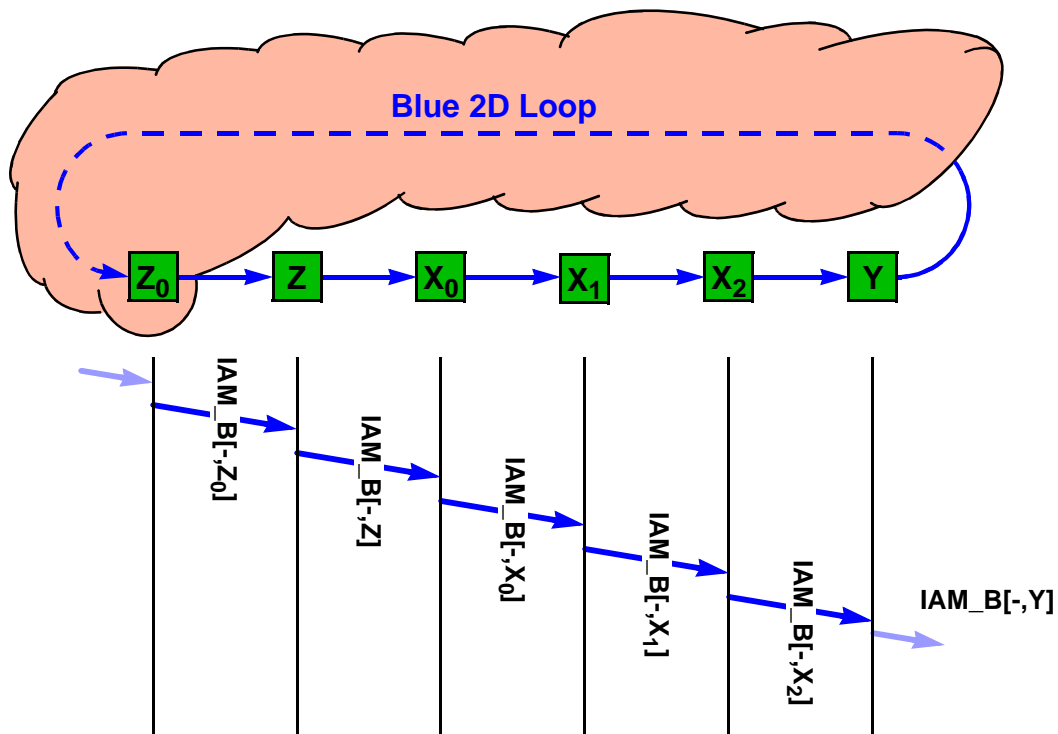
FC-AL-3 – Loop Identification

New Primitive Signals

IAM Primitive Signal



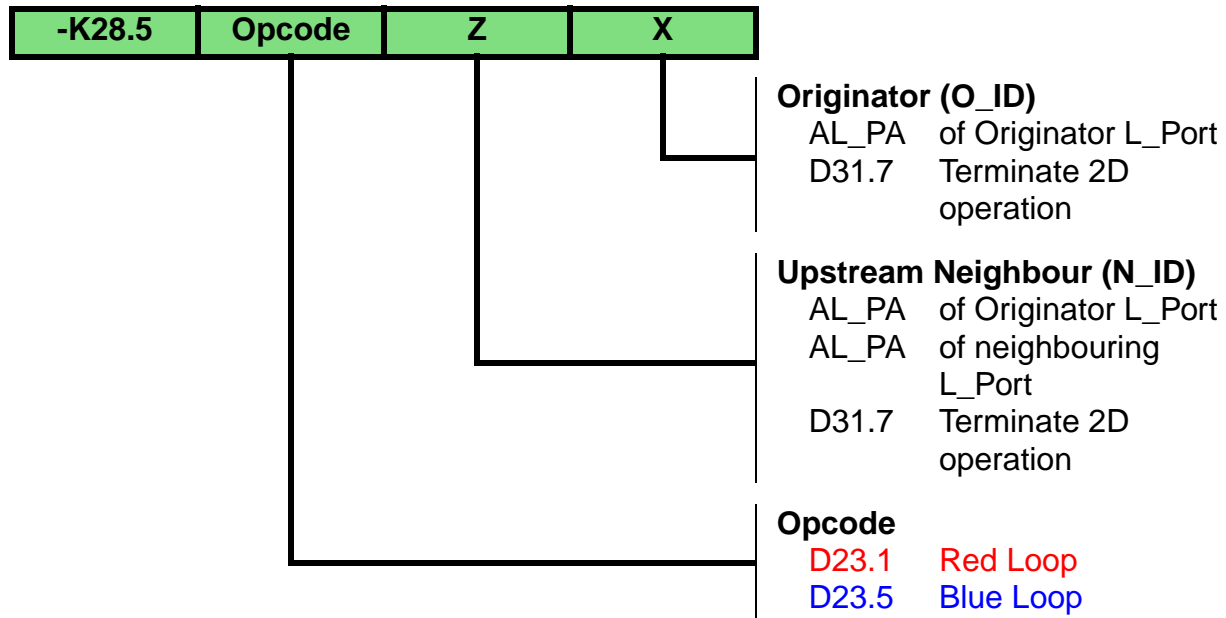
- ❑ Fill Word for Participating L_Ports
(traverses a single 'split' link only)






FC–AL–3 – Loop Identification

New Primitive Signals

Fault (FLT) Primitive Signal



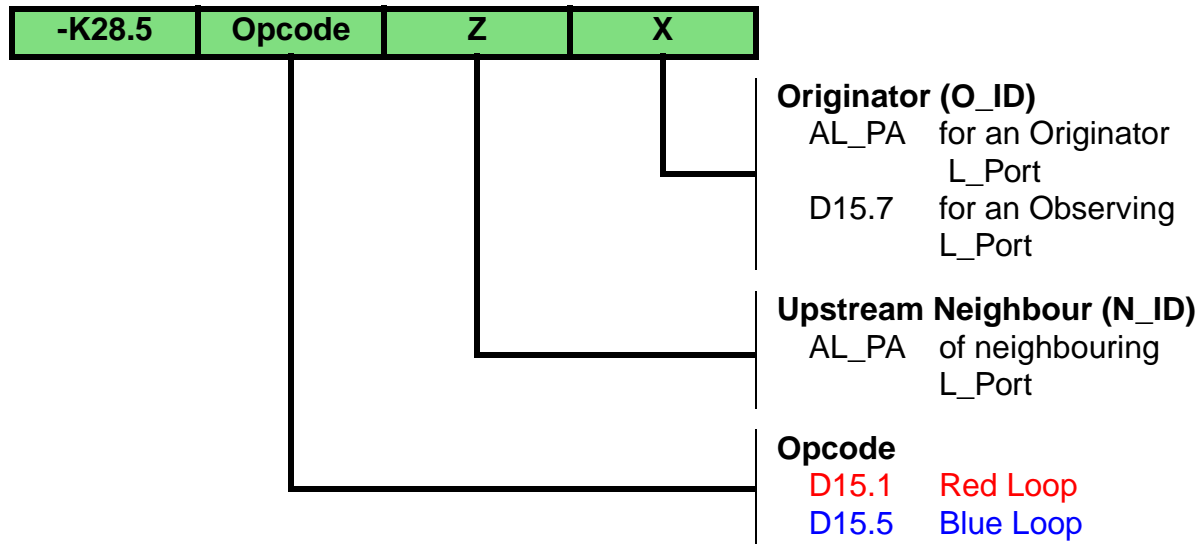
Announces error conditions on the loop (traverses the entire loop)

-  L_Ports shall insert a FLT_x[Z,X] every 8 to 10 ms in response to 'Loss of Signal' or 'Loss of Sync.' for more than R_T_TOV
 - * FLT_R[Z,X] shall be used for the red loop
 - * FLT_B[Z,X] shall be used for the blue loop
-  L_Ports shall insert a FLT_R[X,X] Primitive Signal to signify its rejection and discarding of the '2D Initialization Sequence'
-  L_Ports shall insert FLT_x[FF,FF] Primitive Signals to restore the Loop to Arbitrated Loop mode
 - * FLT_R[FF,FF] shall be used for the red loop, or if the colour of the loop is unknown
 - * FLT_B[FF,FF] shall be used for the blue loop

FC–AL–3 – Loop Identification

New Primitive Signals

TRY Primitive Signal



- Announces the originator's location on the loop (traverses the entire loop)
 - ↪ An L_Port shall insert its TRY_x[Z,X] Primitive Signal at the most once every 4 to 5 ms (Repetition limit)
 - * If one or more insertions are delayed by the repetition limit then a single TRY_x[Z,X] Primitive Signal shall be sent when the repetition timeout limit is satisfied
 - ↪ An L_Port shall insert its TRY_x[Z,X] Primitive Signal, in response to receipt of a TRY_x[Z,X] or FLT_x[Z,X] Primitive Signal originated by the upstream neighbour
 - * The insertion shall be delayed 40 to 50 μs for L_Ports in the Observing state
 - * The insertion shall be delayed 80 to 100 μs for L_Ports in the Joining or 2D state, subject to the 5 ms repetition limit
 - ↪ An L_Port in the 2D state shall insert its TRY_x[Z,X] Primitive Signal at least once every 16 to 20 ms
 - ↪ TRY_R[Z,X] shall be used on the red loop
 - ↪ TRY_B[Z,X] shall be used on the blue loop