

Serial Communications

FC–AL–3

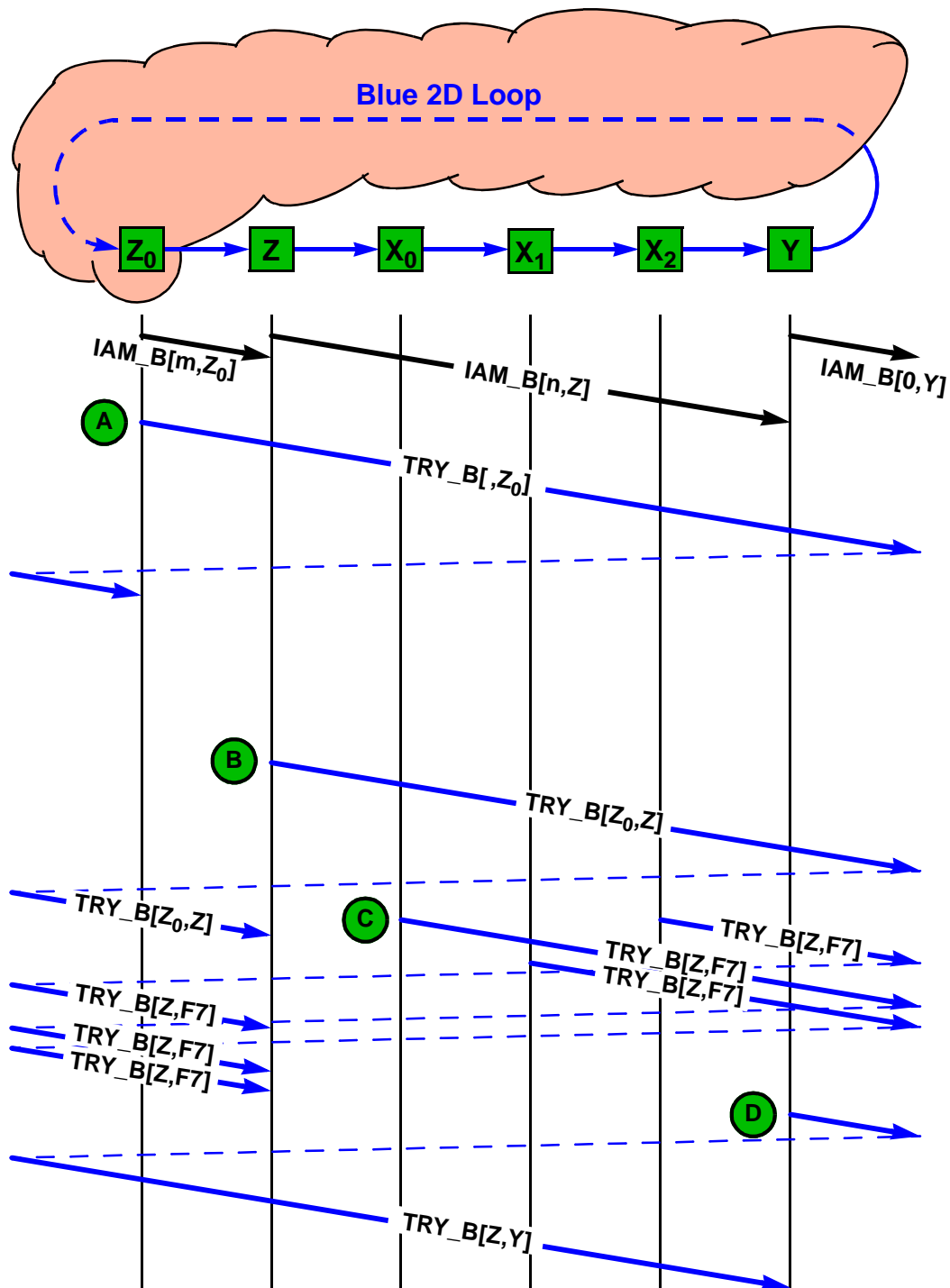
2D Loop Loop Initialization

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FC-AL-3 – Loop Initialization

2D Loop Operation Scenario #1



Normal TRY propagation on a 2D Loop







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2D Loop Operation Scenario #1

- ☯ The Participating L_Ports 'Z₀', 'Z' and 'Y' sends IAM_B[n,X] Primitive Signals as Fill Words
 - ↪ The IAM Primitive Signal identify the sending L_Port to its immediate downstream neighbour
 - ↪ IAM Primitive Signals are not passed through Participating L_Ports
- The Observing (Non-Participating) L_Ports 'X₀', 'X₁' and 'X₂' uses IDLE Primitive Signals as Fill Words
 - ↪ IAM Primitive Signals are passed through Observing L_Ports
 - ↪ IAM Primitive Signals may be removed for clock skew purposes
- ☯ **A** – L_Port 'Z₀' transmits a TRY_B[,Z₀] Primitive Signal
 - The TRY[,Z₀] Primitive Signal is extracted from the loop by L_Port 'Z₀', once it has traversed the loop

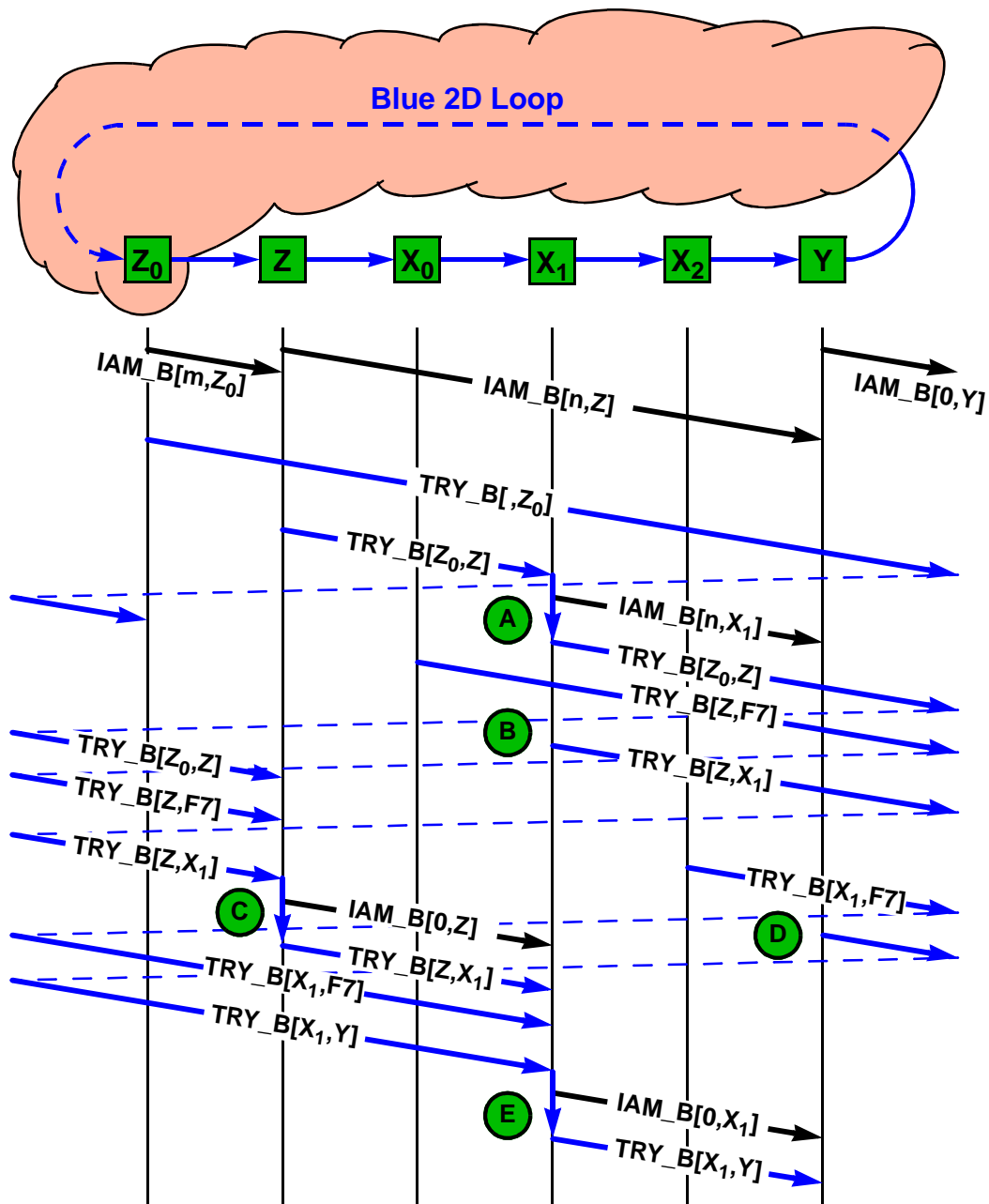
FC-AL-3 – Loop Initialization

2D Loop Operation Scenario #1

-  **B** – L_Port 'Z' transmits a TRY_B[Z₀,Z] Primitive Signal, announcing its position on the loop
-  Z₀ = AL_PA address of the L_Port upstream to the originating L_Port
 -  Z = AL_PA address of the originating L_Port
- ☐ L_Port 'Z' transmits the TRY_B[Z₀,Z] Primitive Signal after a delay of between 80 and 100 μs from the receipt of the TRY_B[,Z₀] Primitive Signal
-  All L_Ports are required to send a delayed TRY Primitive Signal, once a TRY Primitive Signal originated by its upstream neighbouring L_Port is received
- ☐ The TRY_B[Z₀,Z] Primitive Signal is extracted from the loop by L_Port 'Z', once it has traversed the loop
-  **C** – L_Port 'X₀', 'X₁' and 'X₂' each inserts, after a 40 to 50 μs delay, a TRY_B[Z,F7] Primitive Signal
- ☐ This identify the number and position of Observing L_Ports on the loop
 - ☐ The TRY_B[Z,F7] Primitive Signals are extracted from the loop by L_Port 'Z'
-  **D** – L_Port 'Y' inserts its TRY_B[Z,Y] Primitive signal, 80 to 100 μs, after the receipt of the TRY_B[Z₀,Z] Primitive Signal
- ☐ The TRY_B[Z,Y] Primitive Signal is extracted from the loop by L_Port 'Y', once it has traversed the loop

FC-AL-3 – Loop Initialization

Initialization Scenario #1 (Warm Start)



Joining an operating 2D Loop

FC-AL-3 – Loop Initialization

Initialization Scenario #1 (Warm Start)

- ☯ The Participating L_Ports 'Z₀', 'Z' and 'Y' sends IAM_B[n,X] Primitive Signals as Fill Words
 - The Observing L_Ports 'X₀', 'X₁' and 'X₂' uses IDLE Primitive Signals as Fill Words
- ☯ **A** – The Joining L_Port 'X₁' changes it its Fill Word to IAM_B[n,X₁] when it receives the TRY_B[Z₀,Z] Primitive Signal
 - ✚ The transmitter credit value 'n' is copied (inherited) from the received IAM_B[n,Z] Fill Word
 - L_Port 'X₁' precede the received TRY_B[Z₀,Z] with 12 IAM_B[n,X₁] Primitive Signals, when the TRY_B[Z₀,Z] is forwarded
- ☯ **B** – L_Port 'X₁' inserts a TRY_B[Z,X₁] Primitive Signal, announcing its position on the loop
 - L_Port 'X₁' inserts the TRY_B[Z,X₁] Primitive Signal between 80 and 100 μs after the receipt of the TRY_B[Z₀,Z] Primitive Signal
- ☯ **C** – The upstream L_Port 'Z' withhold forwarding the TRY_B[Z,X₁] Primitive Signal until it have reset its transmitter credit
 - The TRY_B[Z,X₁] Primitive Signal is preceded by 12 IAM_B[0,Z] Fill Words before it is forwarded

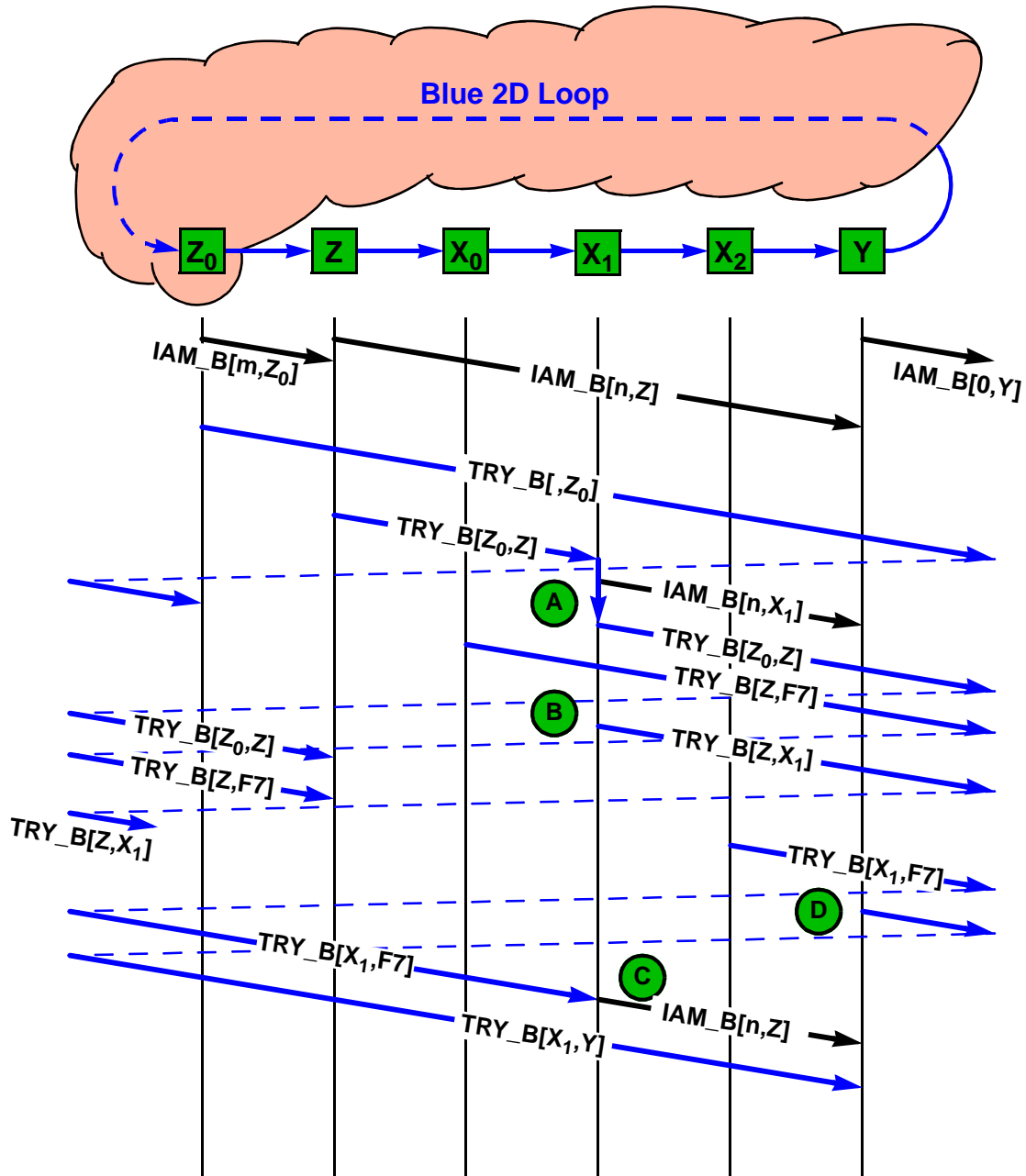
FC–AL–3 – Loop Initialization

Initialization Scenario #1 (Warm Start)

- ☯ **D** – L_Port ‘Y’ inserts a TRY_B[X₁,Y] Primitive Signal, announcing its ‘new’ position on the loop
 - L_Port ‘Y’ inserts the TRY_B[Z,X₁] Primitive Signal between 80 and 100 μs after the receipt of the TRY_B[Z,X₁] Primitive Signal
- ☯ **E** – The upstream L_Port ‘X₁’ withhold forwarding the TRY_B[X₁,Y] Primitive Signal until it have reset its transmitter credit
 - The TRY_B[X₁,Y] Primitive Signal is preceded by 12 IAM_B[0,X₁] Fill Words before it is forwarded

FC-AL-3 – Loop Initialization

Initialization Scenario #2 (Warm Start)



Joining failure on an operating 2D Loop

FC-AL-3 – Loop Initialization

Initialization Scenario #2 (Warm Start)

- ☯ The Participating L_Ports 'Z₀', 'Z' and 'Y' sends IAM_B[n,X] Primitive Signals as Fill Words
 - The Observing L_Ports 'X₀', 'X₁' and 'X₂' uses IDLE Primitive Signals as Fill Words
- ☯ **A** – The Joining L_Port 'X₁' changes it its Fill Word to IAM_B[n,X₁] when it receives the TRY_B[Z₀,Z] Primitive Signal
 - ✚ The transmitter credit value 'n' is copied (inherited) from the received IAM_B[n,Z] Fill Word
 - L_Port 'X₁' precede the received TRY_B[Z₀,Z] with 12 IAM_B[n,X₁] Primitive Signals, when the TRY_B[Z₀,Z] is forwarded
- ☯ **B** – L_Port 'X₁' inserts a TRY_B[Z,X₁] Primitive Signal, announcing its position on the loop
 - L_Port 'X₁' inserts the TRY_B[Z,X₁] Primitive Signal between 80 and 100 μs after the receipt of the TRY_B[Z₀,Z] Primitive Signal
 - The TRY_B[Z,X₁] Primitive Signal is blocked (discarded) or lost somewhere between L_Port 'Y' and L_port 'Z₀'

FC–AL–3 – Loop Initialization

Initialization Scenario #2 (Warm Start)

- ☯ **C** – L_Port 'X₁' discover that it failed to obtain an address on the operating 2D loop, when it receive the TRY_B[X₁,F7] Primitive Signal
 - The TRY_B[Z,X₁] Primitive Signal would have preceded the TRY_B[X₁,F7] Primitive Signal
 - L_Port 'X₁' starts forwarding the IAM_B[n,Z] Fill Word sent by L_Port 'Z', when it returns to the Observing state
- ☯ **D** – L_Port 'Y' inserts a TRY_B[X₁,Y] Primitive Signal, announcing its 'new' position on the loop
 - L_Port 'Y' inserts the TRY_B[Z,X₁] Primitive Signal between 80 and 100 μs after the receipt of the TRY_B[Z,X₁] Primitive Signal

FC-AL-3 – Loop Initialization

Rules – Summary

- ☯ L_Ports in the 2D state shall extract TRY_x[Z,X] Primitive Signal when
 - ❑ X = L_Port's AL_PA
 - ❑ Z = L_Port's AL_PA and X = 'F7' (\geq 'F0')
- ☯ A Joining L_Port shall claim an address (AL_PA) not observed in the preceding TRY Primitive Signal cycle
 - ❑ The interval between insertions of TRY_x[Z,F7] Primitive Signals
- ☯ A Joining L_Port shall insert 12 of its own IAM Primitive Signals before forwarding a TRY Primitive Signal from its upstream neighbour
- ☯ A Joining attempt have failed if
 - ❑ A FLT Primitive Signal is received
 - ❑ Loss of Sync or Loss of Signal is detected
 - ❑ A TRY_x[Z,X] Primitive Signal is received where Z = Joining L_Ports address
 - ❑ A TRY_x[Z,X] Primitive Signal is received where X = Upstream L_Ports address if the Joining L_Port have inserted its own TRY_x[Z,X] Primitive Signal
 - ❑ An L_Port which Joining attempts has failed shall return to the Observing state