ADVANCED TECHNOLOGY GROUP (ATG)

DS8000 Host Adapter Configuration Guidelines
September 19, 2025

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DS8A00   DS8900F

History of Updates to this Document

1) Transparent Cloud Tiering Adapters section – Release 10.1 , which GA'd on 9/12/2025, introduced Long Reach TCT Adapters as an option for all 4 DS8A00 models (Rick Pekosh,IBM ATG on 9/19/2025)

Notes on the updated DS8000 Host Adapter Configuration Guidelines document

This version of the DS8000 Host Adapter Configuration Guidelines covers the DS8A00 G10 family & DS8900F family only. i.e., the two most recent generations. Details regarding the DS8900F family remain "as is" from the previous version of this document. All references to prior generations were removed.

If you seek information on prior DS8000 generations then you need to access the previous version of this document, dated March 14, 2023, which you can find in *Techdocs*.

DS8A00 G10 model general availability:

G10 Model	General Availability
DS8A10-A00	09/12/2025
DS8A10-A01	10/24/2024
DS8A50-A05	10/24/2024
DS8A80-A08	09/12/2025

DS8A00   DS8900F

Document Outline

Port Counts & Host Adapter Factory Installation Sequence

- ➢ DS8A00 G10 Family
- ➢ DS8900F Family

Host Adapter & Host Port Best Practices and Performance Guidance
(Note – applies the same for both DS8A00 G10 & DS8900F)

Host Adapters & zHyperLink Adapters
(installation sequence diagrams with Port IDs)

- ➢ DS8A00 G10 Family
- ➢ DS8900F Family

Transparent Cloud Tiering Adapters

- ➢ DS8A00 G10 Family
- ➢ DS8900F Family

DS8A00   DS8900F

DS8A00 G10 Models

**Port Counts &
Host Adapter
Factory Installation
Sequence**

DS8A00

DS8A50/DS8A80 Port Counts and Host Adapter Installation Sequence

DS8A50/DS8A80 (A05/A08/E05) – 32 Gb/sec host adapters

➢ Host adapters may be installed in the base frame and the expansion frame, if present

➢ For dual frame configurations, the adapters should be ordered with ½ of the adapters in each frame

➢ Do not configure a dual frame system with 16 or less Host Adapters

➢ If a frame has 2 HPFE pairs then for best performance, it should be configured with 9 or more Host Adapters so the components are spread over 2 I/O enclosure pairs. Otherwise consider larger drives and less HPFE pairs.

➢ Maximum port count is 128 – maximum adapter count is 32 (16 in base frame + 16 in expansion frame)

➢ Maximum ports per I/O enclosure is 16 ports – there can be up to 8 I/O enclosures (4 pairs)

➢ Installation order of adapters from the factory:
   • 32 Gb/sec 4-port Long Wave host adapters
   • 32 Gb/sec 4-port Short Wave host adapters

DS8A00

DS8A10 Port Counts and Host Adapter Installation Sequence

DS8A10 (A00 & A01) – 32 Gb/sec host adapters

➢ Host adapters may be installed in one or two I/O enclosure pairs in the base frame

➢ If the system has 2 HPFE pairs then for best performance, it should be configured with 9 or more Host Adapters so the components are spread over 2 I/O enclosure pairs. Otherwise consider larger drives and less HPFE pairs.

➢ Maximum port count is 64 – maximum adapter count is 16

➢ Maximum ports per I/O enclosure is 16 ports – there can be up to 4 I/O enclosures (2 pairs)

➢ Installation order of adapters from the factory:

- 32 Gb/sec 4-port Long Wave host adapters
- 32 Gb/sec 4-port Short Wave host adapters

DS8A00

DS8900F Models

**Port Counts &
Host Adapter
Factory Installation
Sequence**

DS8900F
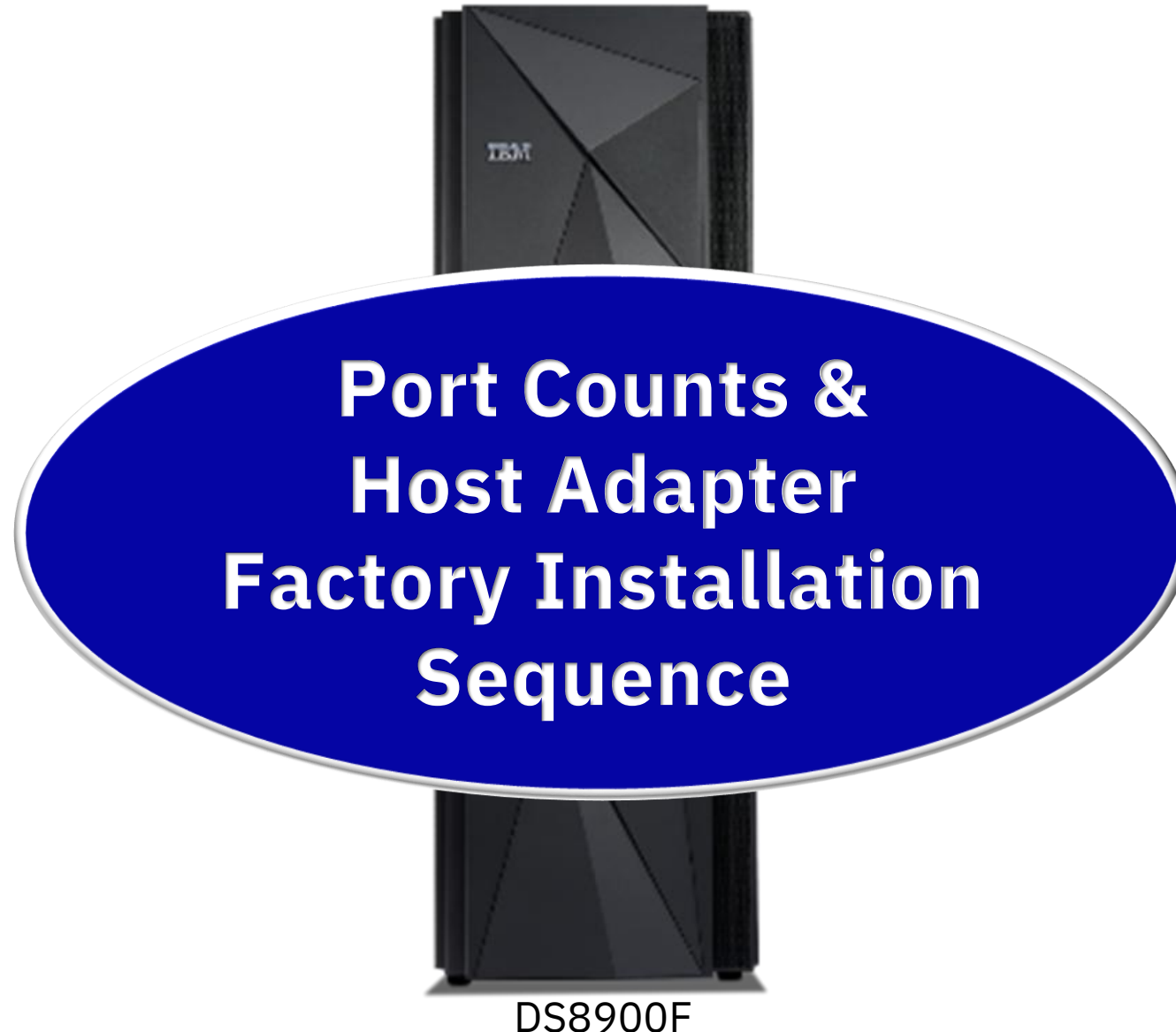
DS8950F/DS8980F Port Counts and HA Card Installation Sequence

DS8950F/DS8980F (996/998/E96) – 16 Gb/sec and 32 Gb/sec host adapters

➢ Host adapters may be installed in the base frame and the expansion frame, if present

➢ For dual frame configurations, the adapters should be ordered with ½ of the adapters in each frame

➢ DS8000 storage systems should be configured to avoid having only 1 I/O enclosure pair in a frame, either base or expansion

➢ Maximum port count is 128 – maximum adapter count is 32 (16 in base frame + 16 in expansion frame)

➢ Maximum ports per I/O enclosure is 16 ports – there can be up to 8 I/O enclosures (4 pairs)

➢ Installation order of adapters from the factory:
  • 32 Gb/sec 4-port Long Wave host adapters
  • 32 Gb/sec 4-port Short Wave host adapters
  • 16 Gb/sec 4-port Long Wave host adapters
  • 16 Gb/sec 4-port Short Wave host adapters

DS8900F

DS8910F Port Counts and Host Adapter Installation Sequence

DS8910F (994) – 16 Gb/sec and 32 Gb/sec host adapters

➢ Host adapters may be installed in one or two I/O enclosure pairs in the base frame

➢ Maximum port count is 64 – maximum adapter count is 16

➢ Maximum ports per I/O enclosure is 16 ports – there can be up to 4 I/O enclosures (2 pair)

➢ Installation order of adapters from the factory:

- 32 Gb/sec 4-port Long Wave host adapters
- 32 Gb/sec 4-port Short Wave host adapters
- 16 Gb/sec 4-port Long Wave host adapters
- 16 Gb/sec 4-port Short Wave host adapters

DS8900F

DS8910F Port Counts and Host Adapter Installation Sequence

DS8910F (993) – 16 Gb/sec and 32 Gb/sec host adapters

➢ Host adapters may be installed in the single I/O enclosure pair

➢ Maximum port count is 32 – maximum adapter count is 8

➢ Maximum ports per I/O enclosure is 16 ports – there can be up to 2 I/O enclosures (1 pair)

➢ Installation order of adapters from the factory:
- 32 Gb/sec 4-port Long Wave host adapters
- 32 Gb/sec 4-port Short Wave host adapters
- 16 Gb/sec 4-port Long Wave host adapters
- 16 Gb/sec 4-port Short Wave host adapters

➢ Note: Model 993 pictured here is for installation in a customer supplied rack. If installed in an IBM Z frame, the keyboard and display, and "HPFE Gen2 2" at the top of the picture cannot be included

Optional

HPFE Gen2 2

HPFE Gen2 1

DS8900F
(rackless)

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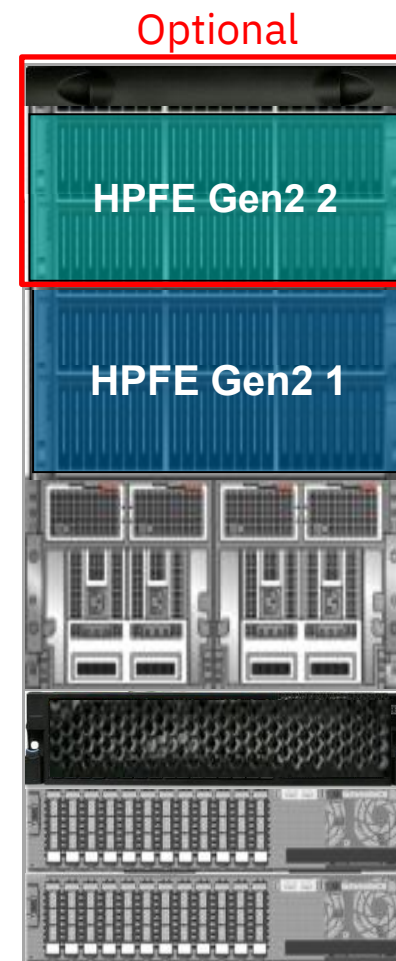
DS8A00 G10 & DS8900F Models

Host Adapter & Host Port Best Practices and Performance Guidance

DS8A00   DS8900F

Host Adapter Performance Considerations

➢ A single host adapter will not provide full line rate bandwidth with all ports active
  - **Customers should not plan to drive the Ports/Links/Host Adapters to their defined limits**

➢ Most of these recommendations will be needed in cases where the utilization is high
  - Running only 10 MB per second per port will never overload a host adapter

➢ If in doubt, get RMF, Spectrum Control, or Storage Insights performance data and use StorM modelling tool for recommended adapter counts

➢ Start planning for additional resources when you reach approximately 50% of the maximum values during some intervals (and not a single number for one day)

➢ Each DS8000 host port has an internal queue depth of 2,048 per port

Port & Host Adapter Utilization Guidelines

Utilizations	Amber Threshold	Red Threshold
Processor for I/O	60%	80%
Bus	70%	90%
Highest High Performance Flash Enclosure	60%	80%
Highest High Performance Flash Tier 0	60%	80%
Highest High Capacity Flash Tier 1	60%	80%
Highest High Capacity Flash Tier 2	60%	80%
Average FICON Adapter	50%	70%
Highest Host FICON Port	50%	70%
Average FCP Adapter	60%	80%
Highest Host FCP Port	60%	80%
Highest zHyperlink	60%	80%
Highest First Remote Mirror Target Port	60%	80%
Highest Second Remote MirrorTarget Port	60%	80%
Highest z/OS Global Mirror Link	60%	80%

The table to the left is produced and documented by the StorM modeling tool and the values represent IBM recommendations at the time that this document was published.

Best practice is to design a solution that keeps resource utilization below amber thresholds and maintain an existing solution that does not exceed the respective amber thresholds

These are the resource utilizations relevant to host adapters & ports

Port Assignment Best Practices

- ➤ Spreading a Host workload or PPRC workload over Host Adapters in 4 I/O enclosures (single frame) or 8 I/O enclosures (two frames) will result in workload being spread evenly over internal DS8000 resources

- ➤ Always have symmetric pathing by connection type (i.e., use the same number of paths on all host adapters used by each connection type). For z/OS, all path groups should be symmetric (i.e., uniform number of ports per HA) and spread path groups as widely as possible across all CKD host adapters

- ➤ Always have additional (redundant) resources in case of failure – best practices is to plan for host adapter, SAN network or even enclosure failure

- ➤ Size the number of host adapters needed based on expected aggregate maximum bandwidth and maximum IOPS (use Disk Magic, StorM, or other common sizing methods based on actual or expected workload

Note: These recommendations are from the DS8000 host adapter perspective are not intended to address SAN or FICON fabric considerations

Port Assignment Best Practices – continued

➢ Sharing different connection types (FCP and FICON) within an I/O enclosure and host adapter is encouraged

- Corollary: dedicating entire adapters for FICON vs PPRC is not encouraged, unless all 32 host adapters are being deployed, in which case you may benefit from dedicated adapters

➢ When utilizing multipathing, try to zone ports from different I/O enclosures to provide redundancy and balance (e.g., include ports from a host adapters in enclosure 0 and enclosure 1)

➢ Do not share a mainframe CHPID with tape and disk devices

- Keep large block and small block transfers isolated to different host adapter ports

Replication Port Best Practice – 1 of 2
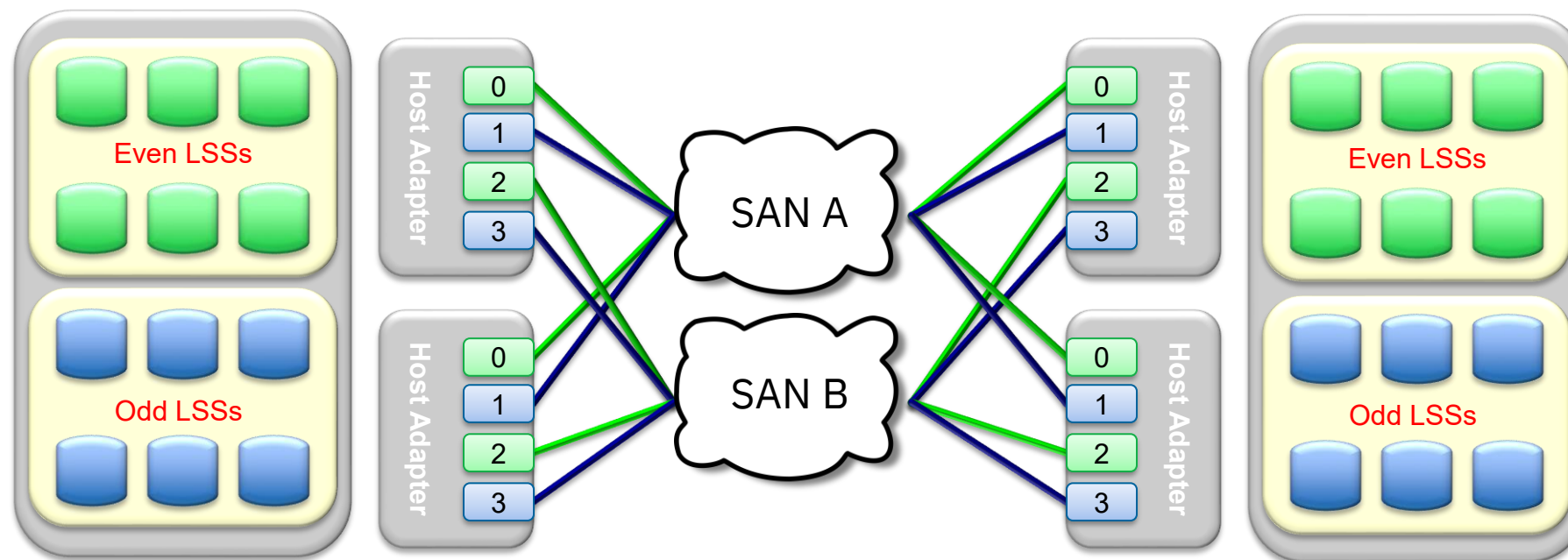
Replication – for best performance:

➤ Replication port pairs (primary to secondary) should be zoned 1:1

➤ With current DS8000 models, there is no need to separate host ports from replication ports on the same adapter since unlike the earlier adapters a single port cannot overload the total bandwidth or CPU of the host adapter

➤ Avoid using FCP ports for both host attachment and replication

➤ For async replication (Global Copy or Global Mirror), assign even and odd LSS/LCU to different ports

➤ Do not allow a Metro Mirror source port to also be a Global Copy or Global Mirror source port. Heavy preference will be given to the MM function, and the GC/GM function will be limited in its throughput capability

Replication Port Best Practice – 2 of 2

Metro Global Mirror example — Bi-directional Global Mirror example
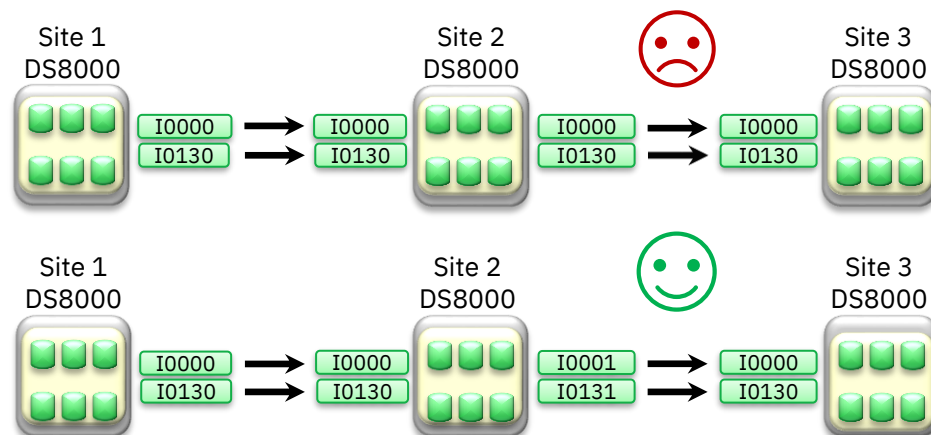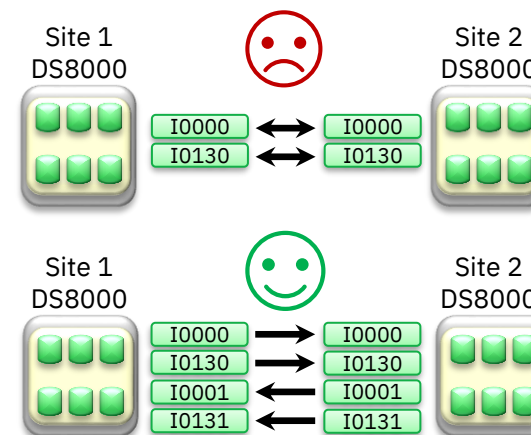
Replication – for best performance (continued):

➢ Avoid using an adapter port for both replication send and receive data, simultaneously

➢ In the MGM example above, the "poor configuration" uses the same port to receive MM traffic from Site 1 and to send data to Site 3

➢ In the GM example above, the "poor configuration" would be not ideal when Site 1 is actively sending GM data to Site 2, while Site 2 is also actively sending data to Site 1. In this case, it is recommended to move to separate send and receive ports. However, in a failover/failback configuration, where either Site 1 or Site 2 is active and sending GM data to its partner, this port configuration is not a problem – only one site is active at a time

Plug Order

For optimal performance

➢ Avoid using adjacent ports (if possible) on 32 Gb/sec Host Adapters (for 16 Gb/sec Host Adapters the plug order does not matter and could match the order of other adapters for consistency)

➢ Follow the following plug order sequence

	Plug Order 16 Gb/sec 4-port HA	Plug Order 32 Gb/sec 4-port HA
Port 0	1	1
Port 1	3	3
Port 2	2	2
Port 3	4	4

System z Plug Order - Example

For System Z

➢ Place each path in a path group in a different I/O bay

➢ Do not have two paths from the same path group sharing a host adapter

➢ This will balance the workload over the available host adapters

	Base Frame Only Port #	Base and Expansion Frame Port #
Path 1	I0230	I0230 (frame 1)
Path 2	I0300	I0300 (frame 1)
Path 3	I0030	I0030 (frame 1)
Path 4	I0100	I0100 (frame 1)
Path 5	I0200	I0630 (frame 2)
Path 6	I0330	I0700 (frame 2)
Path 7	I0000	I0430 (frame 2)
Path 8	I0130	I0500 (frame 2)

DS8A00 G10 Models

Host Adapters & zHyperLink Adapters

DS8A00

Notes on the DS8A00 G10 Models

G10 Model	General Availability	Max Frames (Racks)	Max Power 9+ Cores	Max System Memory	Min / Max Host Adapters	Min / Max 32 Gb/sec Ports	Min / Max zHyperLink Adapters
DS8A10-A00	2H2025	1	20	512 GB	2 / 16	8 / 64	0 / 4
DS8A10-A01	10/242024	1	20	512 GB	2 / 16	8 / 64	0 / 4
DS8A50-A05	10/242024	2	40	3.58 TB	2 / 32*	8 / 128*	0 / 10*
DS8A80-A08	2H2025	2	48	4.80 TB	2 / 32*	8 / 128*	0 / 12*

*Requires expansion frame to accommodate additional Host Adapters &/or zHyperLink Adapters. Installation order for additional adapters is dependent on the number of I/O Enclosure pairs. See slides covering 3 and 4 I/O Enclosure Pairs for reference.

Host Adapter slot placement within the I/O Enclosure Pairs for the DS8A00 G10 family differs from the DS8900F family. If you are planning to either replicate from/to a DS8900F to/from a DS8A00 via Metro Mirror, Global Mirror, or Global Copy or migrate from a DS8900F to a DS8A00 via Global Copy we advise that you ensure that the DS8900F has Release 9.4 microcode. R9.4 includes code that enables a DS8900F to address all host adapter ports on a DS8A00. Without R9.4 on the DS8900F certain ports on the DS8A00 cannot be used for replication nor migration.

DS8A10 Base Frame – I/O Enclosure & Enclosure Pair numbering

Enclosure Pair numbering indicates installation order

I/O Enclosure 1 "XI1"

I/O Enclosure 2 "XI2"

Enclosure Pair 2
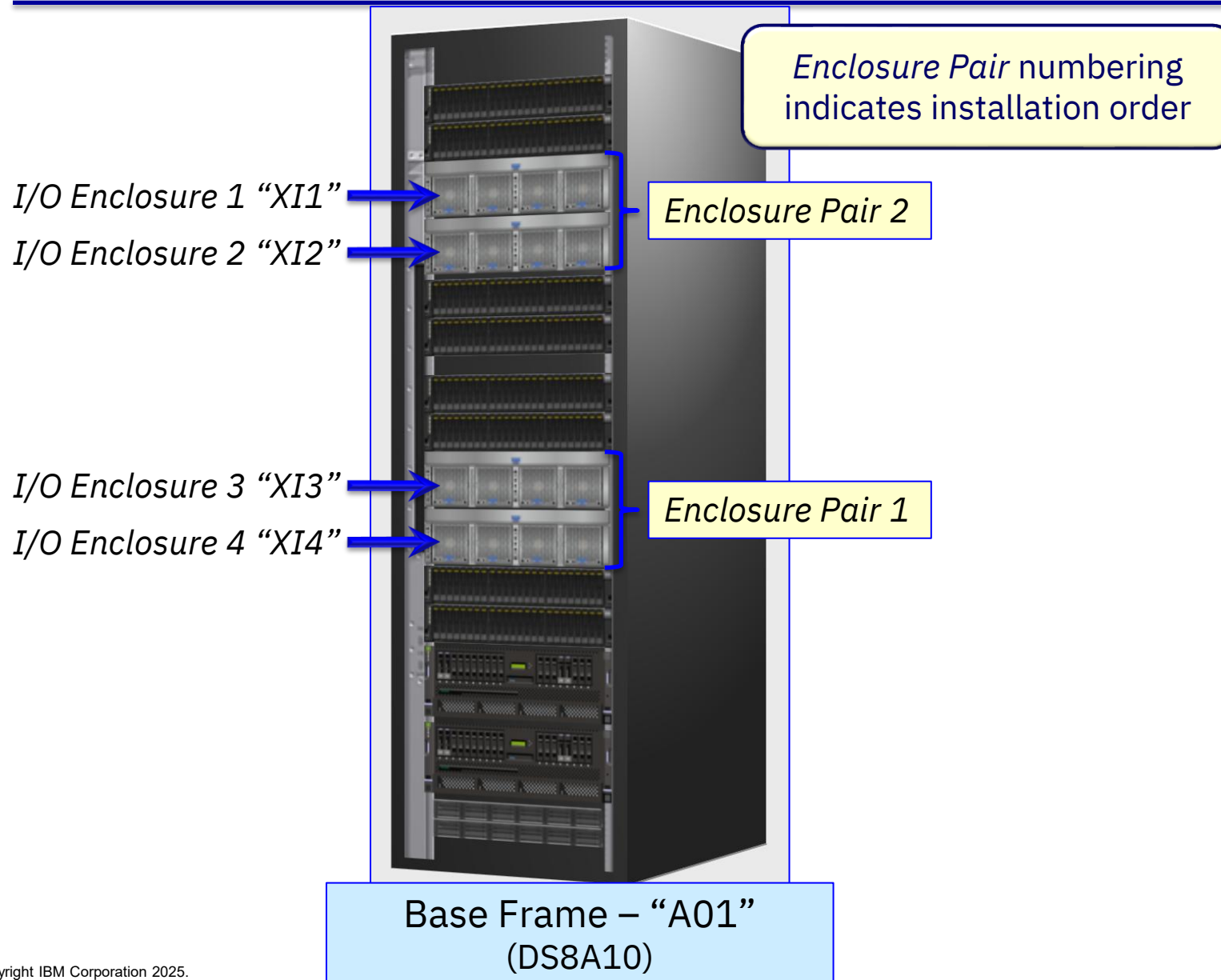
Note: The "A00" model, which requires a customer provided rack, will have the same layout and installation sequence. The "A00" is planned to become generally available in 2H2025.

I/O Enclosure 3 "XI3"

I/O Enclosure 4 "XI4"

Enclosure Pair 1

Base Frame – "A01"
(DS8A10)

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DS8A10 Host Adapter & zHyperLink Adapter Installation Order – Single Frame – 1 x I/O Enclosure Pair

Base Frame ("A00" & "A01")

I/O Enclosure Slot ID

I/O Enclosure 3 "XI3"

I/O Enclosure 4 "XI4"

Host Adapter Port ID ("SAID")
zHyperLink z/OS Interface ID

(zHyperLink Adapter Installation Order)
(Host Adapter Installation Order)

Maximum zHyperLink Adapters for "A00" with 1 x I/O Enclosure Pair is 4
Maximum zHyperLink Adapters for "A01" with 1 x I/O Enclosure Pair is 4

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DS8A10 Host Adapter & zHyperLink Adapter Installation Order – Single Frame – 2 x I/O Enclosure Pairs

Base Frame ("A00" & "A01")

I/O Enclosure 1 "XI1"

C1 Device Adapter				Device Adapter			**C2**
(3) C3 Host Adapter I0020 I0021 I0022 I0023				Host Adapter I0030 I0031 I0032 I0033			**C4 (7)**
Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)				Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)			
(11) C5 I0040 I0041 I0042 I0043				I0050 I0051 I0052 I0053 Host Adapter			**C6 (15)**
(4) C1 0080 zHyperLink Adapter	CEC & I/O Enclosure Attachment Ports	zHyperLink Adapter					**C2**

I/O Enclosure 2 "XI2"

C1 Device Adapter				Device Adapter			**C2**
(4) C3 Host Adapter I0120 I0121 I0122 I0123				Host Adapter I0130 I0131 I0132 I0133			**C4 (8)**
Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)				Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)			
C5 I0140 I0141 I0142 I0143				I0150 I0151 I0152 I0153 Host Adapter			**C6 (16)**
(2) C1 0180 zHyperLink Adapter	CEC & I/O Enclosure Attachment Ports	zHyperLink Adapter					**C2**

I/O Enclosure Slot ID

I/O Enclosure 3 "XI3"

C1 Device Adapter				Device Adapter			**C2**
(1) C3 Host Adapter I0220 I0221 I0222 I0223				Host Adapter I0230 I0231 I0232 I0233			**C4 (5)**
Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)				Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)			
(9) C5 I0240 I0241 I0242 I0243				I0250 I0251 I0252 I0253 Host Adapter			**C6 (13)**
(1) C1 0280 zHyperLink Adapter	CEC & I/O Enclosure Attachment Ports	zHyperLink Adapter					**C2**

I/O Enclosure 4 "XI4"

C1 Device Adapter				Device Adapter			**C2**
(2) C3 Host Adapter I0320 I0321 I0322 I0323				Host Adapter I0330 I0331 I0332 I0333			**C4 (6)**
Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)				Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)			
C5 I0340 I0341 I0342 I0343				I0350 I0351 I0352 I0353 Host Adapter			**C6 (14)**
(3) C1 0380 zHyperLink Adapter	CEC & I/O Enclosure Attachment Ports	zHyperLink Adapter					**C2**

(10)

Host Adapter Port ID ("SAID")
zHyperLink z/OS Interface ID

(zHyperLink Adapter Installation Order)
(Host Adapter Installation Order)

Maximum zHyperLink Adapters for "A00" with 2 x I/O Enclosure Pairs is 4
Maximum zHyperLink Adapters for "A01" with 2 x I/O Enclosure Pairs is 4

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DS8A50 & DS8A80 Base Frame & Expansion Frame – I/O Enclosure & Enclosure Pair numbering

Enclosure Pair numbering indicates installation order

I/O Enclosure 1 "XI1"
I/O Enclosure 2 "XI2"

Enclosure Pair 2

I/O Enclosure 3 "XI3"
I/O Enclosure 4 "XI4"

Enclosure Pair 1

I/O Enclosure 5 "XI1"
I/O Enclosure 6 "XI2"

Enclosure Pair 4

I/O Enclosure 7 "XI3"
I/O Enclosure 8 "XI4"

Enclosure Pair 3

Base Frame – "A05" & "A08"
(DS8A50 & DS8A80)

Expansion Frame – "E05"
(DS8A50 & DS8A80)

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DS8A50 & DS8A80 Host Adapter & zHyperLink Adapter Installation Order – Single Frame – 1 x I/O Enclosure Pair

Base Frame ("A05" & "A08 ")

I/O Enclosure Slot ID

	I/O Enclosure 3 "XI3"		I/O Enclosure 4 "XI4"	
C1	Device Adapter / Device Adapter	C2	C1 Device Adapter / Device Adapter	C2
(1) C3	Host Adapter — I0220 I0221 I0222 I0223 / I0230 I0231 I0232 I0233	C4 (3)	(2) C3 Host Adapter — I0320 I0321 I0322 I0323 / I0330 I0331 I0332 I0333	C4 (4)
	Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)		Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)	
(5) C5	I0240 I0241 I0242 I0243 / I0250 I0251 I0252 I0253 — Host Adapter	C6 (7)	(6) C5 I0340 I0341 I0342 I0343 / I0350 I0351 I0352 I0353 — Host Adapter	C6 (8)
(1) C1	0280 zHyperLink Adapter — CEC & I/O Enclosure Attachment Ports — 0281 zHyperLink Adapter	C2 (3)	(2) C1 0380 zHyperLink Adapter — CEC & I/O Enclosure Attachment Ports — 0381 zHyperLink Adapter	C2 (4)

(zHyperLink Adapter Installation Order)
(Host Adapter Installation Order)

Host Adapter Port ID ("SAID")
zHyperLink z/OS Interface ID

Maximum zHyperLink Adapters for "A05" with 1 x I/O Enclosure Pair is 4
Maximum zHyperLink Adapters for "A08" with 1 x I/O Enclosure Pair is 4

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DS8A50 & DS8A80 Host Adapter & zHyperLink Adapter Installation Order – Single Frame with 2 x I/O Enclosure Pairs

Base Frame ("A05" & "A08")

I/O Enclosure 1 "XI1"

C1	Device Adapter	Device Adapter	C2

Host Adapter — I0020 I0021 I0022 I0023 — Host Adapter — I0030 I0031 I0032 I0033 *(3)* C3 / C4 *(7)*

Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)   Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)

(11) C5 I0040 I0041 I0042 I0043 — I0050 I0051 I0052 I0053 C6 *(15)*
Host Adapter — Host Adapter

(4) C1 **0080** zHyperLink Adapter — CEC & I/O Enclosure Attachment Ports — **0081** zHyperLink Adapter — C2 *(8)*

I/O Enclosure 2 "XI2"

C1	Device Adapter	Device Adapter	C2

Host Adapter — I0120 I0121 I0122 I0123 — Host Adapter — I0130 I0131 I0132 I0133 *(4)* C3 / C4 *(8)*

Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)   Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)

(12) C5 I0140 I0141 I0142 I0143 — I0150 I0151 I0152 I0153 C6 *(16)*
Host Adapter — Host Adapter

(2) C1 **0180** zHyperLink Adapter — CEC & I/O Enclosure Attachment Ports — **0181** zHyperLink Adapter — C2 *(6)*

I/O Enclosure Slot ID

I/O Enclosure 3 "XI3"

C1	Device Adapter	Device Adapter	C2

Host Adapter — I0220 I0221 I0222 I0223 — Host Adapter — I0230 I0231 I0232 I0233 *(1)* C3 / C4 *(5)*

Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)   Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)

(9) C5 I0240 I0241 I0242 I0243 — I0250 I0251 I0252 I0253 C6 *(13)*
Host Adapter — Host Adapter

(1) C1 **0280** zHyperLink Adapter — CEC & I/O Enclosure Attachment Ports — **0281** zHyperLink Adapter — C2 *(5)*

I/O Enclosure 4 "XI4"

C1	Device Adapter	Device Adapter	C2

Host Adapter — I0320 I0321 I0322 I0323 — Host Adapter — I0330 I0331 I0332 I0333 *(2)* C3 / C4 *(6)*

Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)   Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)

(10) C5 I0340 I0341 I0342 I0343 — I0350 I0351 I0352 I0353 C6 *(14)*
Host Adapter — Host Adapter

C1 **0380** zHyperLink Adapter — CEC & I/O Enclosure Attachment Ports — **0381** zHyperLink Adapter — C2 *(7)*

Host Adapter Port ID ("SAID")
zHyperLink z/OS Interface ID

(zHyperLink Adapter Installation Order)
(Host Adapter Installation Order)

Maximum zHyperLink Adapters for "A05" with 2 x I/O Enclosure Pairs is 8
Maximum zHyperLink Adapters for "A08" with 2 x I/O Enclosure Pairs is 8

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DS8A50 & DS8A80 Host Adapter & zHyperLink Adapter Installation Order – Dual Frame – 3 x I/O Enclosure Pairs
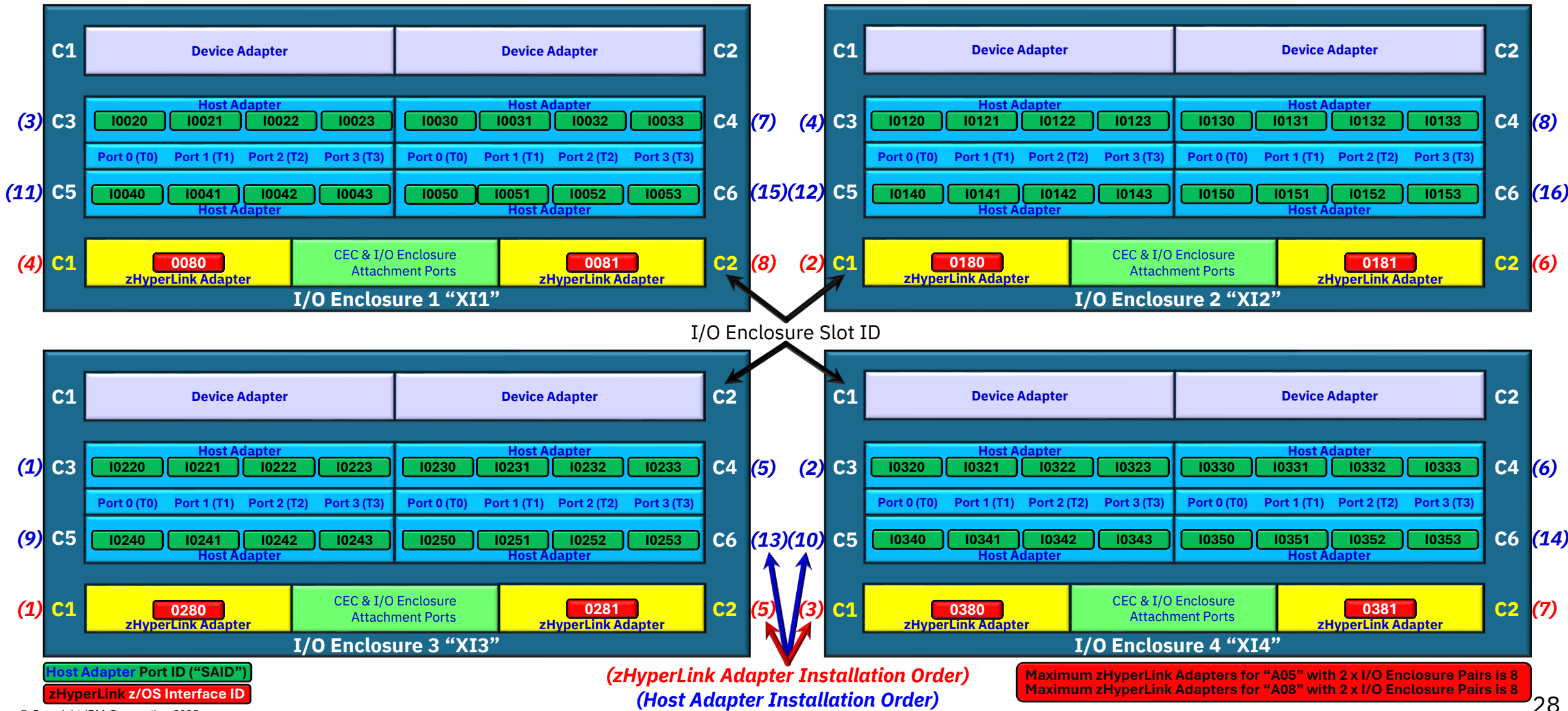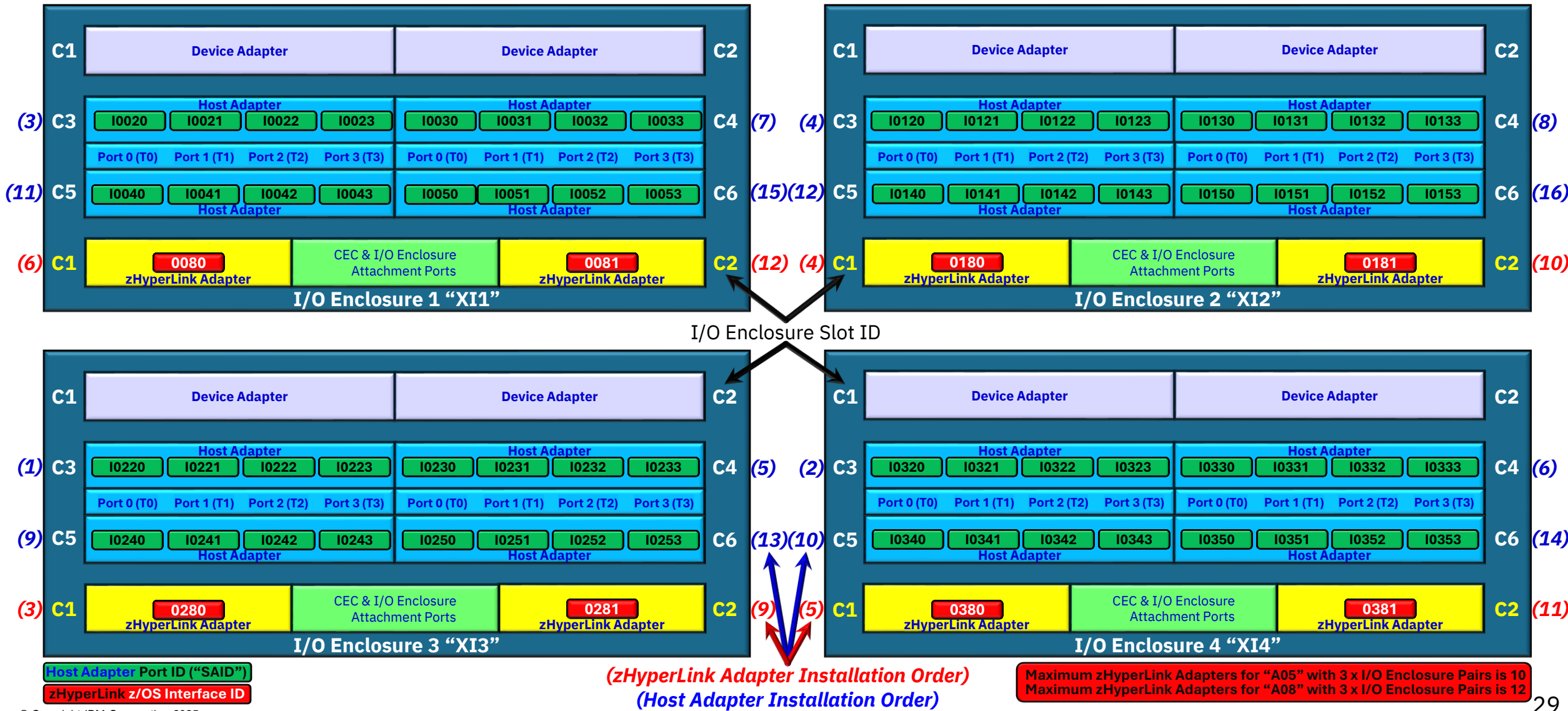
Base Frame ("A05" & "A08 ")

I/O Enclosure Slot ID

Host Adapter Port ID ("SAID")
zHyperLink z/OS Interface ID

(zHyperLink Adapter Installation Order)
(Host Adapter Installation Order)

Maximum zHyperLink Adapters for "A05" with 3 x I/O Enclosure Pairs is 10
Maximum zHyperLink Adapters for "A08" with 3 x I/O Enclosure Pairs is 12

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DS8A50 & DS8A80 Host Adapter & zHyperLink Adapter Installation Order – Dual Frame – 3 x I/O Enclosure Pairs

Expansion Frame ("E05")

I/O Enclosure Slot ID

I/O Enclosure 7 "XI3"

C1	Device Adapter	Device Adapter	C2

(1) C3 | Host Adapter — I0620 I0621 I0622 I0623 | Host Adapter — I0630 I0631 I0632 I0633 | C4 *(3)*

Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3) | Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)

(5) C5 | I0640 I0641 I0642 I0643 — Host Adapter | I0650 I0651 I0652 I0653 — Host Adapter | C6 *(7)*

(1) C1 | **0680** zHyperLink Adapter | CEC & I/O Enclosure Attachment Ports | **0681** zHyperLink Adapter | C2 *(7)*

I/O Enclosure 8 "XI4"

C1	Device Adapter	Device Adapter	C2

(2) C3 | Host Adapter — I0720 I0721 I0722 I0723 | Host Adapter — I0730 I0731 I0732 I0733 | C4 *(4)*

Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3) | Port 0 (T0) Port 1 (T1) Port 2 (T2) Port 3 (T3)

(6) C5 | I0740 I0741 I0742 I0743 — Host Adapter | I0750 I0751 I0752 I0753 — Host Adapter | C6 *(8)*

(2) C1 | **0780** zHyperLink Adapter | CEC & I/O Enclosure Attachment Ports | **0781** zHyperLink Adapter | C2 *(8)*

Host Adapter Port ID ("SAID")
zHyperLink z/OS Interface ID

(zHyperLink Adapter Installation Order)
(Host Adapter Installation Order)

Maximum zHyperLink Adapters for "A05" with 3 x I/O Enclosure Pairs is 10
Maximum zHyperLink Adapters for "A08" with 3 x I/O Enclosure Pairs is 12

30

DS8A50 & DS8A80 Host Adapter & zHyperLink Adapter Installation Order – Dual Frame – 4 x I/O Enclosure Pairs
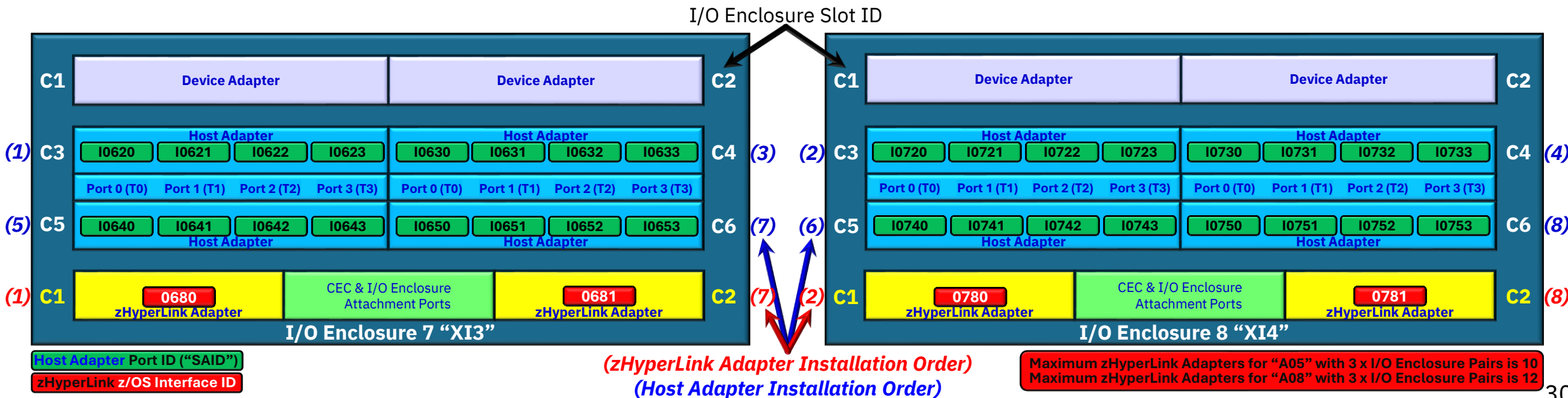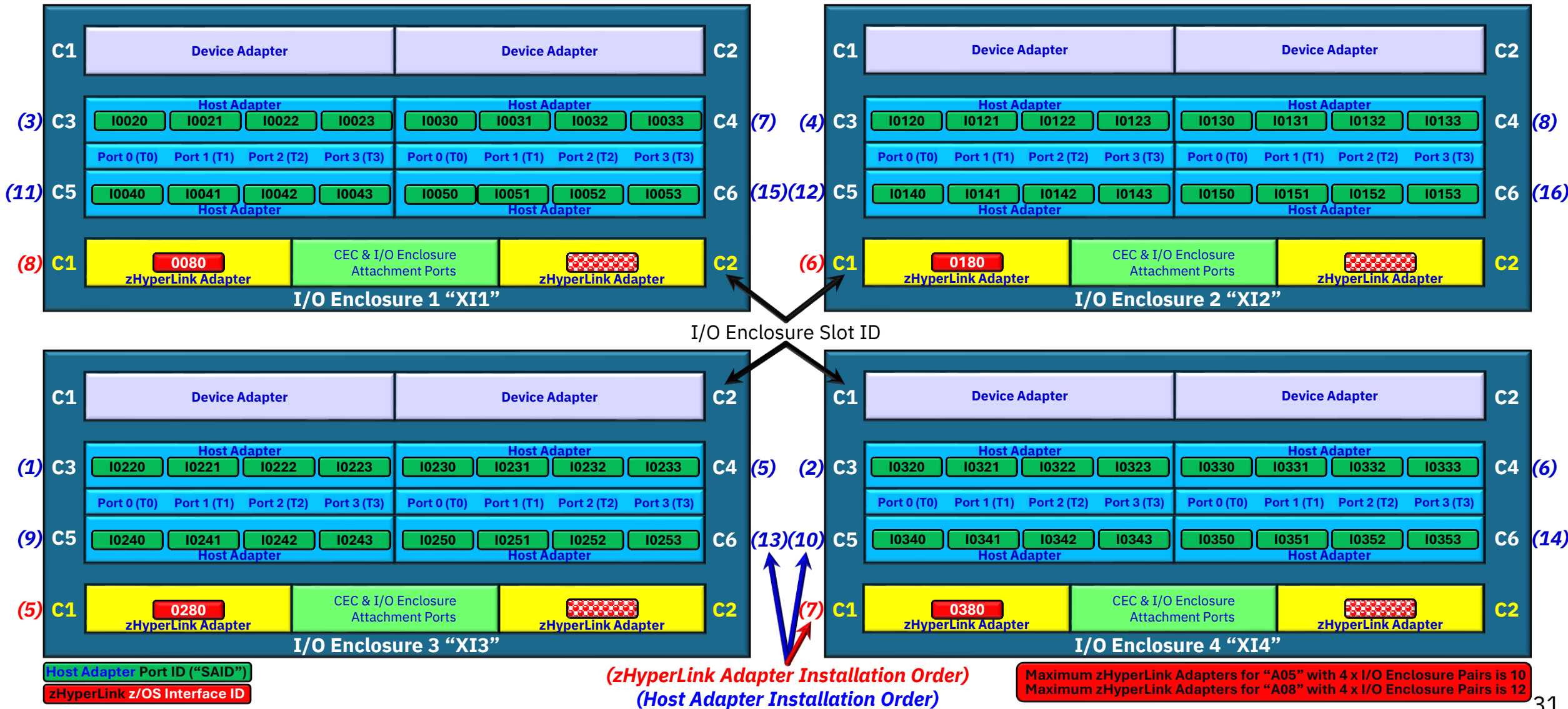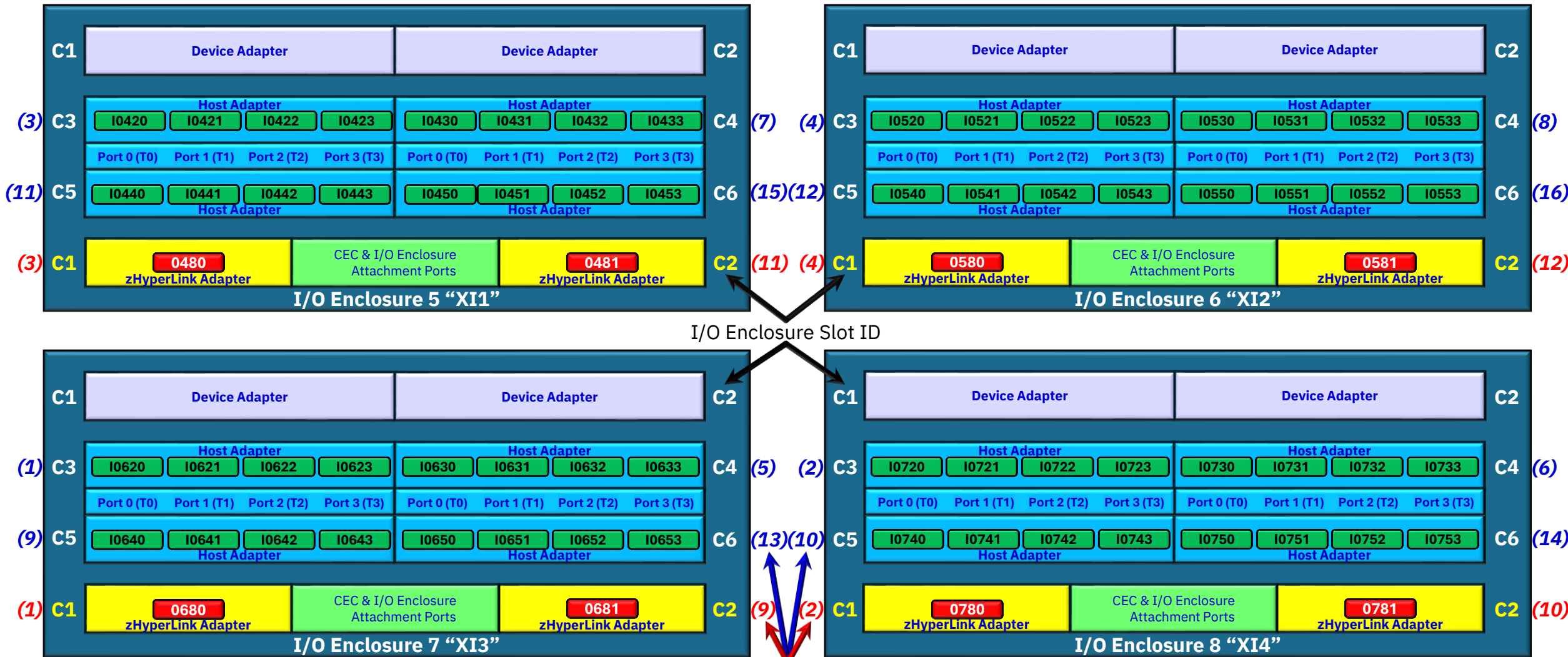
Base Frame ("A05" & "A08")

I/O Enclosure Slot ID

Host Adapter Port ID ("SAID")
zHyperLink z/OS Interface ID

(zHyperLink Adapter Installation Order)
(Host Adapter Installation Order)

Maximum zHyperLink Adapters for "A05" with 4 x I/O Enclosure Pairs is 10
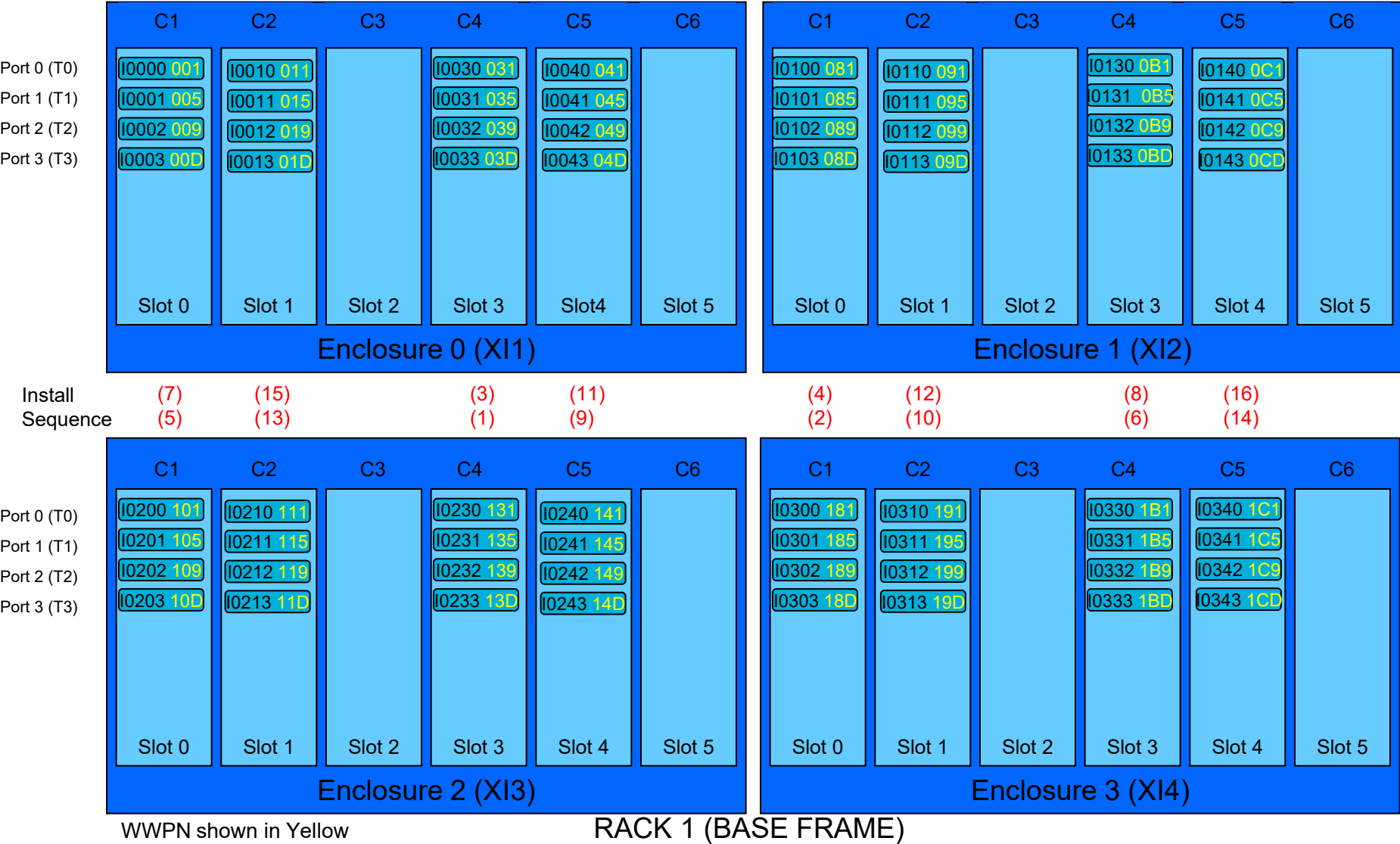Maximum zHyperLink Adapters for "A08" with 4 x I/O Enclosure Pairs is 12

31

DS8A50 & DS8A80 Host Adapter & zHyperLink Adapter Installation Order – Dual Frame – 4 x I/O Enclosure Pairs

Expansion Frame ("E05")

I/O Enclosure Slot ID

Host Adapter Port ID ("SAID")
zHyperLink z/OS Interface ID

(zHyperLink Adapter Installation Order)
(Host Adapter Installation Order)

Maximum zHyperLink Adapters for "A05" with 4 x I/O Enclosure Pairs is 10
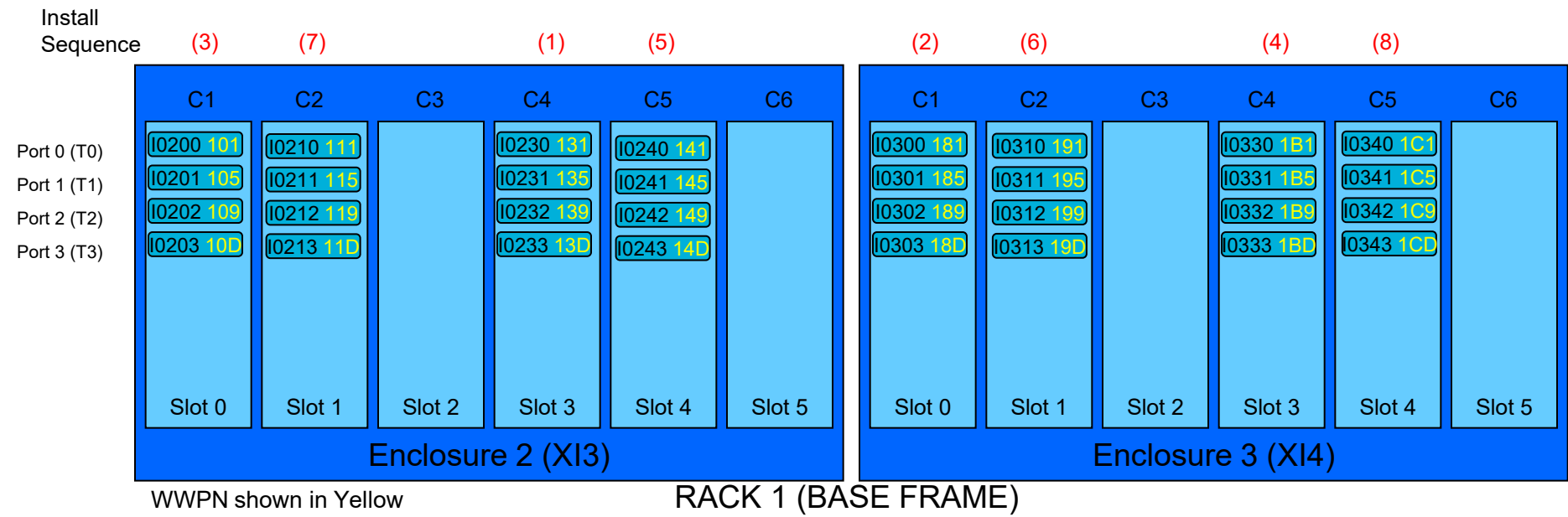Maximum zHyperLink Adapters for "A08" with 4 x I/O Enclosure Pairs is 12
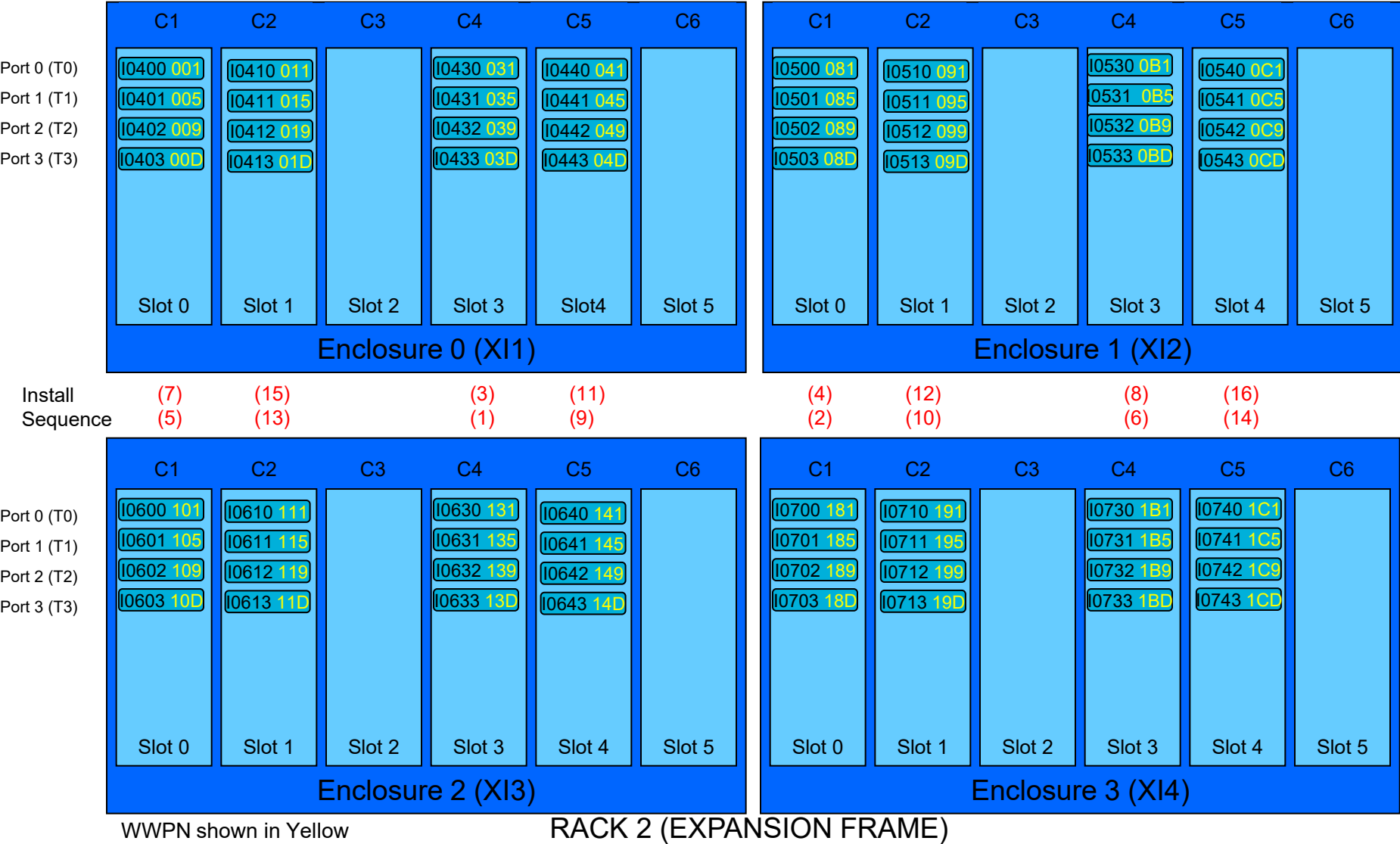
32

DS8900F Models

Host Adapters

DS8900F

33

DS8950F/DS8980F Model 996/998 Base Frame – 2 Enclosure Pairs Host I/O Port Assignments

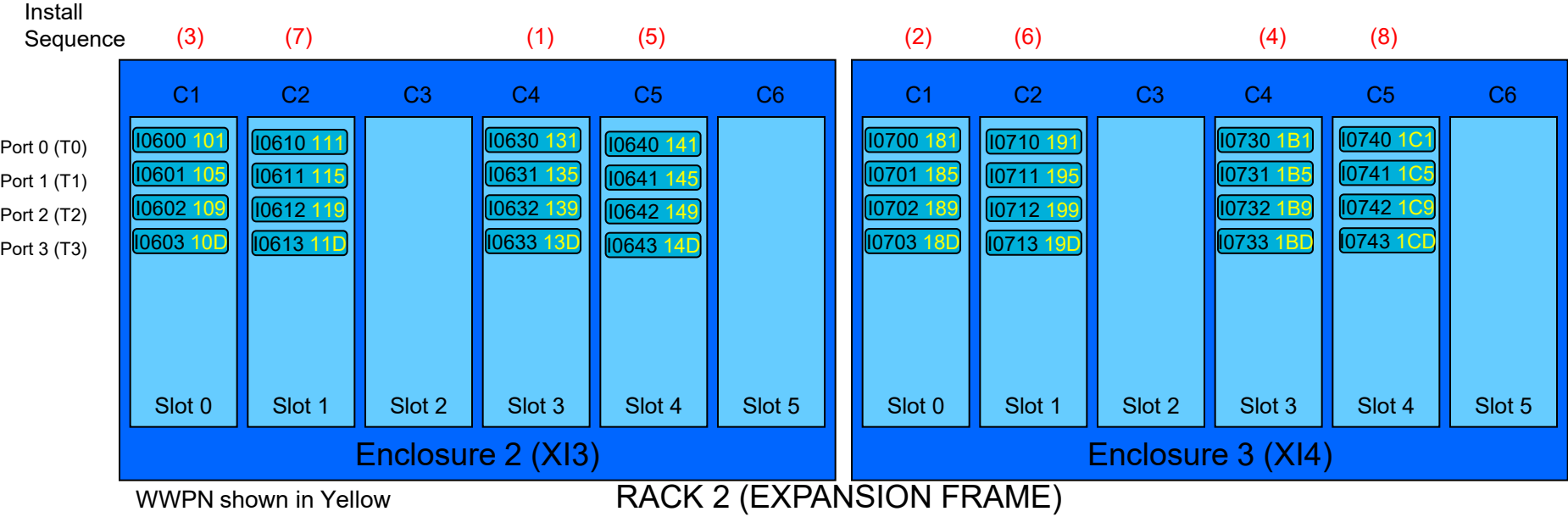### Enclosure 0 (XI1)

	C1	C2	C3	C4	C5	C6
Port 0 (T0)	I0000 001	I0010 011		I0030 031	I0040 041	
Port 1 (T1)	I0001 005	I0011 015		I0031 035	I0041 045	
Port 2 (T2)	I0002 009	I0012 019		I0032 039	I0042 049	
Port 3 (T3)	I0003 00D	I0013 01D		I0033 03D	I0043 04D	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot4	Slot 5

Enclosure 1 (XI2)

	C1	C2	C3	C4	C5	C6
Port 0 (T0)	I0100 081	I0110 091		I0130 0B1	I0140 0C1	
Port 1 (T1)	I0101 085	I0111 095		I0131 0B5	I0141 0C5	
Port 2 (T2)	I0102 089	I0112 099		I0132 0B9	I0142 0C9	
Port 3 (T3)	I0103 08D	I0113 09D		I0133 0BD	I0143 0CD	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5

Install Sequence

(7)	(15)		(3)	(11)		(4)	(12)		(8)	(16)
(5)	(13)		(1)	(9)		(2)	(10)		(6)	(14)

Enclosure 2 (XI3)

	C1	C2	C3	C4	C5	C6
Port 0 (T0)	I0200 101	I0210 111		I0230 131	I0240 141	
Port 1 (T1)	I0201 105	I0211 115		I0231 135	I0241 145	
Port 2 (T2)	I0202 109	I0212 119		I0232 139	I0242 149	
Port 3 (T3)	I0203 10D	I0213 11D		I0233 13D	I0243 14D	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5

Enclosure 3 (XI4)

	C1	C2	C3	C4	C5	C6
Port 0 (T0)	I0300 181	I0310 191		I0330 1B1	I0340 1C1	
Port 1 (T1)	I0301 185	I0311 195		I0331 1B5	I0341 1C5	
Port 2 (T2)	I0302 189	I0312 199		I0332 1B9	I0342 1C9	
Port 3 (T3)	I0303 18D	I0313 19D		I0333 1BD	I0343 1CD	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5

WWPN shown in Yellow

RACK 1 (BASE FRAME)

DS8950F/DS8980F Model 996/998 Base Frame – 1 Enclosure Pair Host I/O Port Assignments

Install Sequence

	(3)	(7)		(1)	(5)		(2)	(6)		(4)	(8)	
	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6
Port 0 (T0)	IO200 101	IO210 111		IO230 131	IO240 141		IO300 181	IO310 191		IO330 1B1	IO340 1C1	
Port 1 (T1)	IO201 105	IO211 115		IO231 135	IO241 145		IO301 185	IO311 195		IO331 1B5	IO341 1C5	
Port 2 (T2)	IO202 109	IO212 119		IO232 139	IO242 149		IO302 189	IO312 199		IO332 1B9	IO342 1C9	
Port 3 (T3)	IO203 10D	IO213 11D		IO233 13D	IO243 14D		IO303 18D	IO313 19D		IO333 1BD	IO343 1CD	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5

Enclosure 2 (XI3) Enclosure 3 (XI4)

WWPN shown in Yellow   RACK 1 (BASE FRAME)

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DS8950F/DS8980F Model E96 Expansion Frame – 2 Enclosure Pairs Host I/O Port Assignments

Enclosure 0 (XI1)

	C1 (Slot 0)	C2 (Slot 1)	C3 (Slot 2)	C4 (Slot 3)	C5 (Slot4)	C6 (Slot 5)
Port 0 (T0)	I0400 001	I0410 011		I0430 031	I0440 041	
Port 1 (T1)	I0401 005	I0411 015		I0431 035	I0441 045	
Port 2 (T2)	I0402 009	I0412 019		I0432 039	I0442 049	
Port 3 (T3)	I0403 00D	I0413 01D		I0433 03D	I0443 04D	

Enclosure 1 (XI2)

	C1 (Slot 0)	C2 (Slot 1)	C3 (Slot 2)	C4 (Slot 3)	C5 (Slot 4)	C6 (Slot 5)
Port 0 (T0)	I0500 081	I0510 091		I0530 0B1	I0540 0C1	
Port 1 (T1)	I0501 085	I0511 095		I0531 0B5	I0541 0C5	
Port 2 (T2)	I0502 089	I0512 099		I0532 0B9	I0542 0C9	
Port 3 (T3)	I0503 08D	I0513 09D		I0533 0BD	I0543 0CD	

Install Sequence: (7) (5) | (15) (13) | | (3) (1) | (11) (9) || (4) (2) | (12) (10) | | (8) (6) | (16) (14)

Enclosure 2 (XI3)

	C1 (Slot 0)	C2 (Slot 1)	C3 (Slot 2)	C4 (Slot 3)	C5 (Slot 4)	C6 (Slot 5)
Port 0 (T0)	I0600 101	I0610 111		I0630 131	I0640 141	
Port 1 (T1)	I0601 105	I0611 115		I0631 135	I0641 145	
Port 2 (T2)	I0602 109	I0612 119		I0632 139	I0642 149	
Port 3 (T3)	I0603 10D	I0613 11D		I0633 13D	I0643 14D	

Enclosure 3 (XI4)

	C1 (Slot 0)	C2 (Slot 1)	C3 (Slot 2)	C4 (Slot 3)	C5 (Slot 4)	C6 (Slot 5)
Port 0 (T0)	I0700 181	I0710 191		I0730 1B1	I0740 1C1	
Port 1 (T1)	I0701 185	I0711 195		I0731 1B5	I0741 1C5	
Port 2 (T2)	I0702 189	I0712 199		I0732 1B9	I0742 1C9	
Port 3 (T3)	I0703 18D	I0713 19D		I0733 1BD	I0743 1CD	

WWPN shown in Yellow

RACK 2 (EXPANSION FRAME)

DS8950F/DS8980F Model E96 Expansion Frame – 1 Enclosure Pair Host I/O Port Assignments

Install Sequence

(3) (7) (1) (5) (2) (6) (4) (8)

Enclosure 2 (XI3)

	C1	C2	C3	C4	C5	C6
Port 0 (T0)	IO600 101	IO610 111		IO630 131	IO640 141	
Port 1 (T1)	IO601 105	IO611 115		IO631 135	IO641 145	
Port 2 (T2)	IO602 109	IO612 119		IO632 139	IO642 149	
Port 3 (T3)	IO603 10D	IO613 11D		IO633 13D	IO643 14D	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5

Enclosure 3 (XI4)

	C1	C2	C3	C4	C5	C6
Port 0 (T0)	IO700 181	IO710 191		IO730 1B1	IO740 1C1	
Port 1 (T1)	IO701 185	IO711 195		IO731 1B5	IO741 1C5	
Port 2 (T2)	IO702 189	IO712 199		IO732 1B9	IO742 1C9	
Port 3 (T3)	IO703 18D	IO713 19D		IO733 1BD	IO743 1CD	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5

WWPN shown in Yellow

RACK 2 (EXPANSION FRAME)

DS8910F Model 994 – 2 Enclosure Pairs Host I/O Port Assignments

WWPN shown in Yellow

RACK 1 (BASE FRAME)
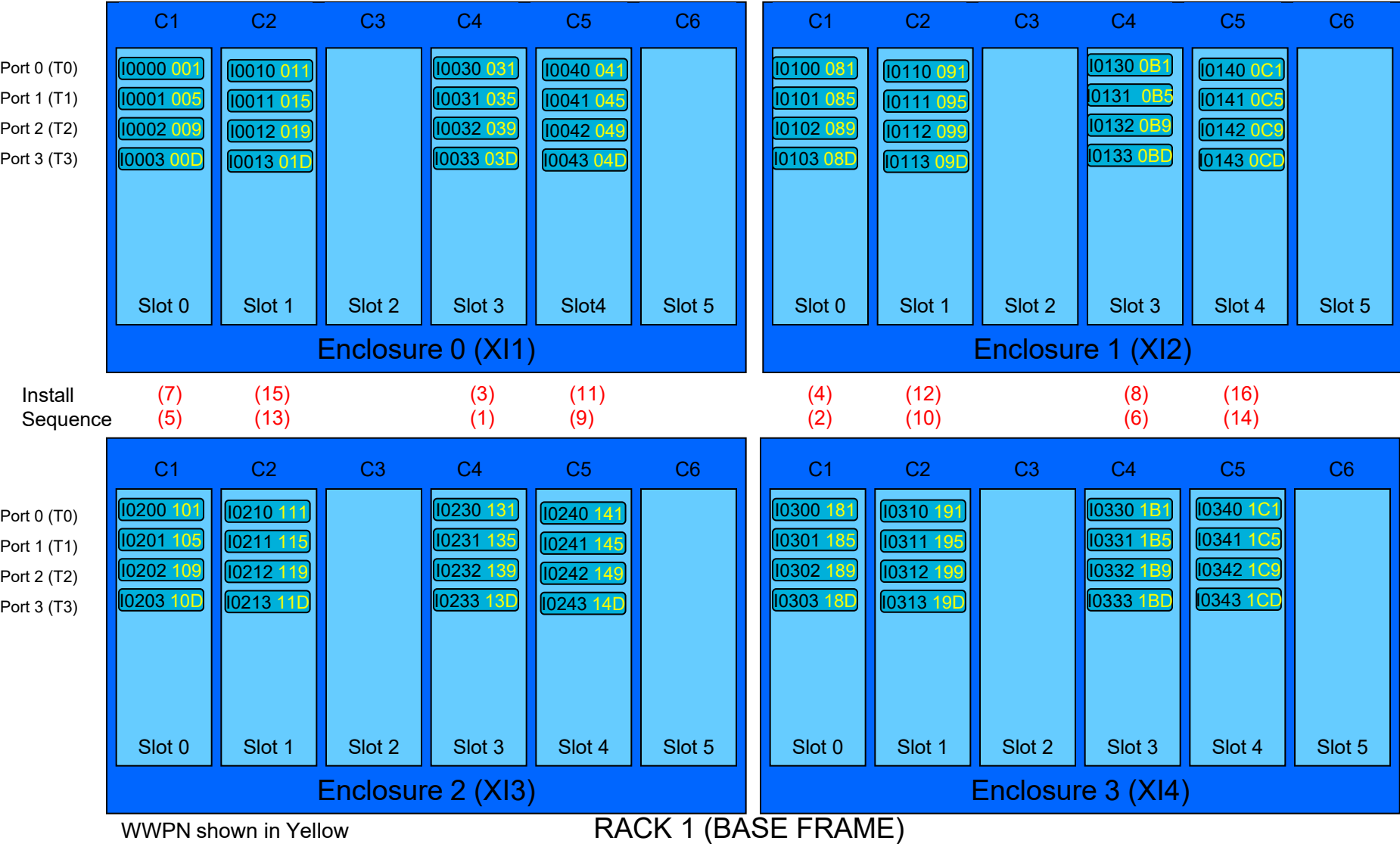
DS8910F Model 994 – 1 Enclosure Pair Host I/O Port Assignments

Install Sequence

| | (3) | (7) | | (1) | (5) | | (2) | (6) | | (4) | (8) | |

Enclosure 2 (XI3)

	C1	C2	C3	C4	C5	C6
Port 0 (T0)	IO200 101	IO210 111		IO230 131	IO240 141	
Port 1 (T1)	IO201 105	IO211 115		IO231 135	IO241 145	
Port 2 (T2)	IO202 109	IO212 119		IO232 139	IO242 149	
Port 3 (T3)	IO203 10D	IO213 11D		IO233 13D	IO243 14D	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5

Enclosure 3 (XI4)

	C1	C2	C3	C4	C5	C6
Port 0 (T0)	IO300 181	IO310 191		IO330 1B1	IO340 1C1	
Port 1 (T1)	IO301 185	IO311 195		IO331 1B5	IO341 1C5	
Port 2 (T2)	IO302 189	IO312 199		IO332 1B9	IO342 1C9	
Port 3 (T3)	IO303 18D	IO313 19D		IO333 1BD	IO343 1CD	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5

WWPN shown in Yellow

RACK 1 (BASE FRAME)

DS8910F Model 993 Host I/O Port Assignments

Install
Sequence

| | (3) | (7) | | (1) | (5) | | | (2) | (6) | | (4) | (8) | |

Enclosure 2 (XI3)

	C1	C2	C3	C4	C5	C6
Port 0 (T0)	IO200 101	IO210 111		IO230 131	IO240 141	
Port 1 (T1)	IO201 105	IO211 115		IO231 135	IO241 145	
Port 2 (T2)	IO202 109	IO212 119		IO232 139	IO242 149	
Port 3 (T3)	IO203 10D	IO213 11D		IO233 13D	IO243 14D	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5

Enclosure 3 (XI4)

	C1	C2	C3	C4	C5	C6
Port 0 (T0)	IO300 181	IO310 191		IO330 1B1	IO340 1C1	
Port 1 (T1)	IO301 185	IO311 195		IO331 1B5	IO341 1C5	
Port 2 (T2)	IO302 189	IO312 199		IO332 1B9	IO342 1C9	
Port 3 (T3)	IO303 18D	IO313 19D		IO333 1BD	IO343 1CD	
	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5

WWPN shown in Yellow

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DS8000 WWPN Determination*

- DS8000 WWNN is based on: 50:05:07:63:0z:FF:Cx:xx

- The z and x:xx values will be a unique combination for each machine and each Storage Facility Image (SFI).

- Each SFI has its own WWNN. The Storage Unit itself also has a unique WWNN.

- Use lssi to get the SFI WWNN (don't use lssu):

- DS8000 WWPN is a child of the SFI WWNN, based on 50:05:07:63:0z:YY:Yx:xx

- Take the z and x:xx value from the WWNN and use the YY:Y location derived from the port location as per the diagrams

- All DS8000 diagrams are from a REAR view of the machine.

- There are no differences for WWPN determination between DS8000 models

```
dscli> lssi IBM.2107-7503461

  Name ID              Storage Unit     Model WWNN            State   ESSNet
  ====================================================================
  -    IBM.2107-7503461 IBM.2107-7503460 922   5005076303FFC08F Online Enabled
```

- ```
  dscli> lsioport -dev IBM.2107-7503461

    ID    WWPN            State  Type             topo     portgrp
    ==========================================================
    I0000 500507630300008F Online Fibre Channel-SW SCSI-FCP 0
    I0001 5005076303004408F Online Fibre Channel-SW SCSI-FCP 0
    I0002 500507630300808F Online Fibre Channel-SW SCSI-FCP 0
    I0003 5005076303000C08F Online Fibre Channel-SW SCSI-FCP 0
  ```

For a complete discussion on IBM Storage WWPN determination, refer to Anthony Vanderwerdt's document on Techdocs. http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD105450

Rack-Enclosure-Card-Connector – DS8900F base & expansion frames

DS8900F Models

zHyperLink Adapters

DS8900F

43
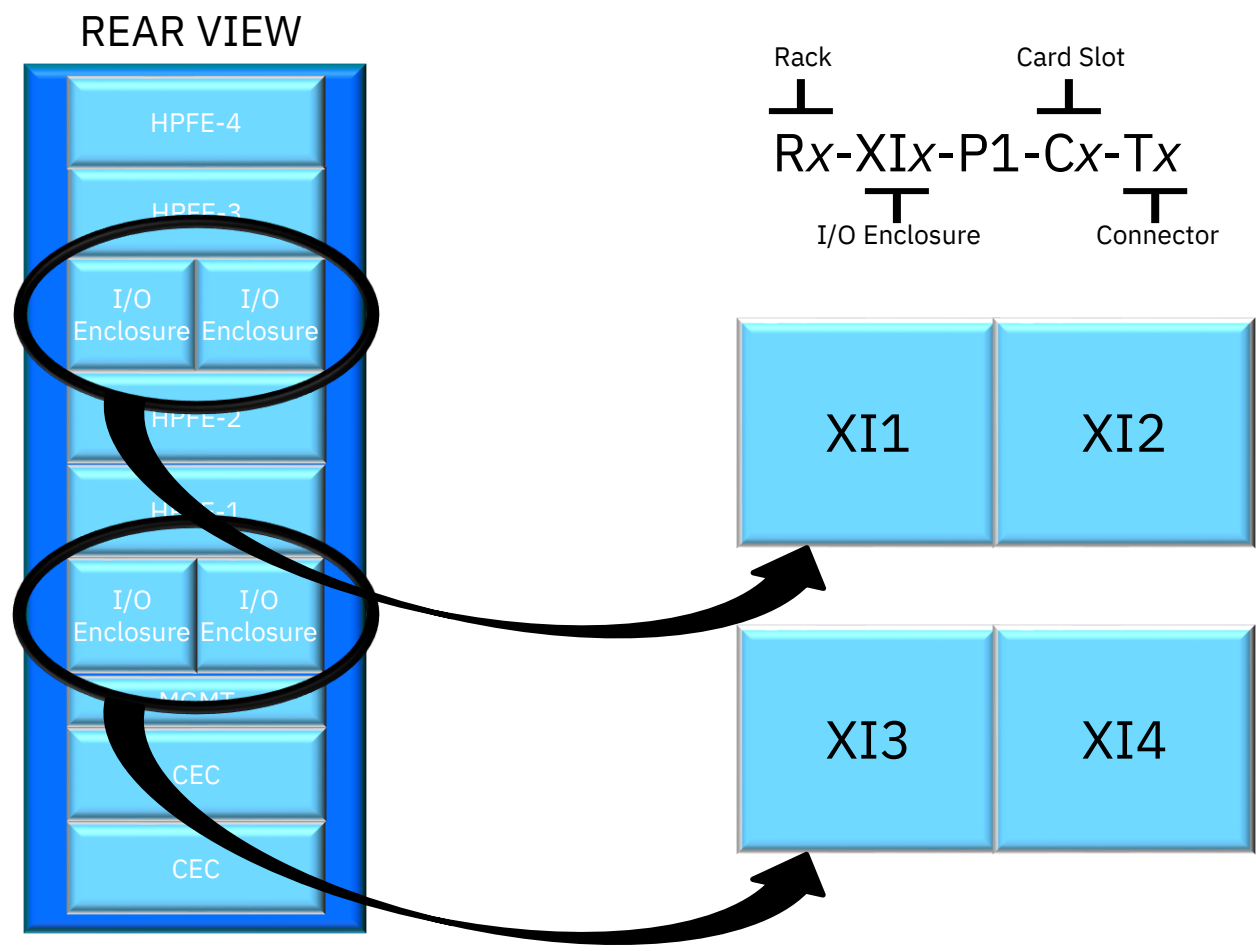
Maximum zHyperLink Connections – DS8900F Family

System/Model	Cores per CEC	zHyperLink Support	Maximum zHyperLink Connections (increments of 2)
DS8910F-993	8	Yes	4
DS8910F-994	8	Yes	4
DS8950F-996	10	Yes	6
DS8950F-996 DS8980F-998 DS89x0F-E96	20	Yes	8 per frame 12 total

- This table shows the maximum number of zHyperLink connections allowed based on DS8900F model and number of processor cores (per node). zHyperLink ports are always installed in increments of two.
- In a dual frame environment, it is preferred to utilize the first 4 plug-order locations in the expansion frame before utilizing ports in base frame.
- In a dual frame environment, if up to 8 ports are to be utilized, prefer the first 4 plug-order locations in the expansion frame, then use the first 4 plug-order locations in the base frame
- In a dual frame environment, if up to 12 ports are to be utilized, prefer the first 4 plug-order locations in the expansion frame, then use the first 4 plug-order locations in the base frame, then fill the remaining connections in the expansion frame.

Location of zHyperLink ports within the I/O Bay

The DS8900F I/O bay supports up to six external interfaces using a CXP connector type.

Base frame   Expansion frame

I/O Bay Enclosure

I/O Bay Enclosure

Card 1 – C1
Card 2 – C2
Card 3 – C3
Card 4 – C4
Card 5 – C5
Card 6 – C6

(Rear View)

FICON / FCP
FICON / FCP
RAID Adapter
FICON / FCP
FICON / FCP
RAID Adapter

Card 7 – C7

DS8900F internal PCIe Fabric

zHyperLink ports

HPFE

45
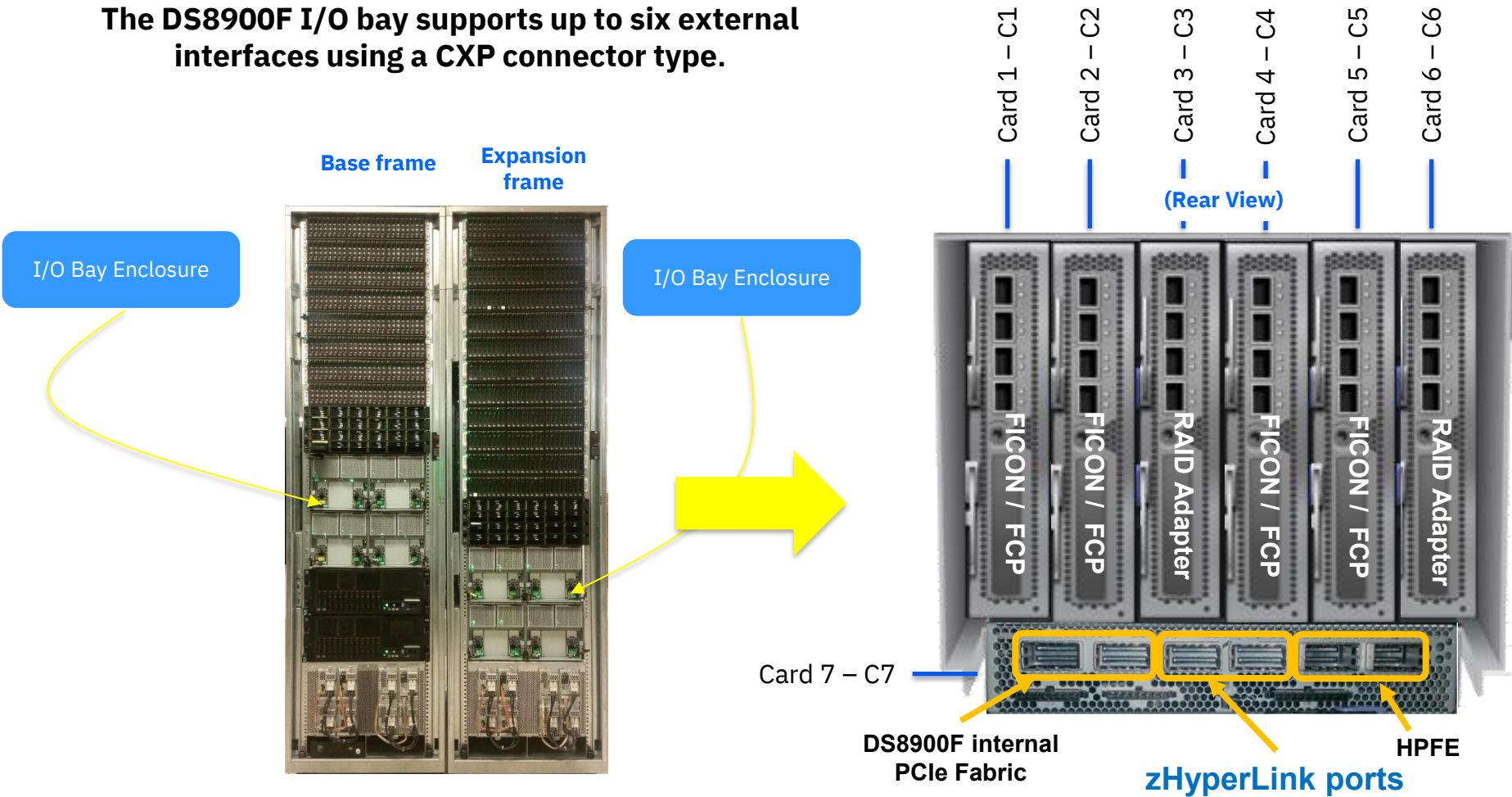
zHyperLink Plug Order DS8910F, DS8950F, or DS8980F Single Rack

Plug Order
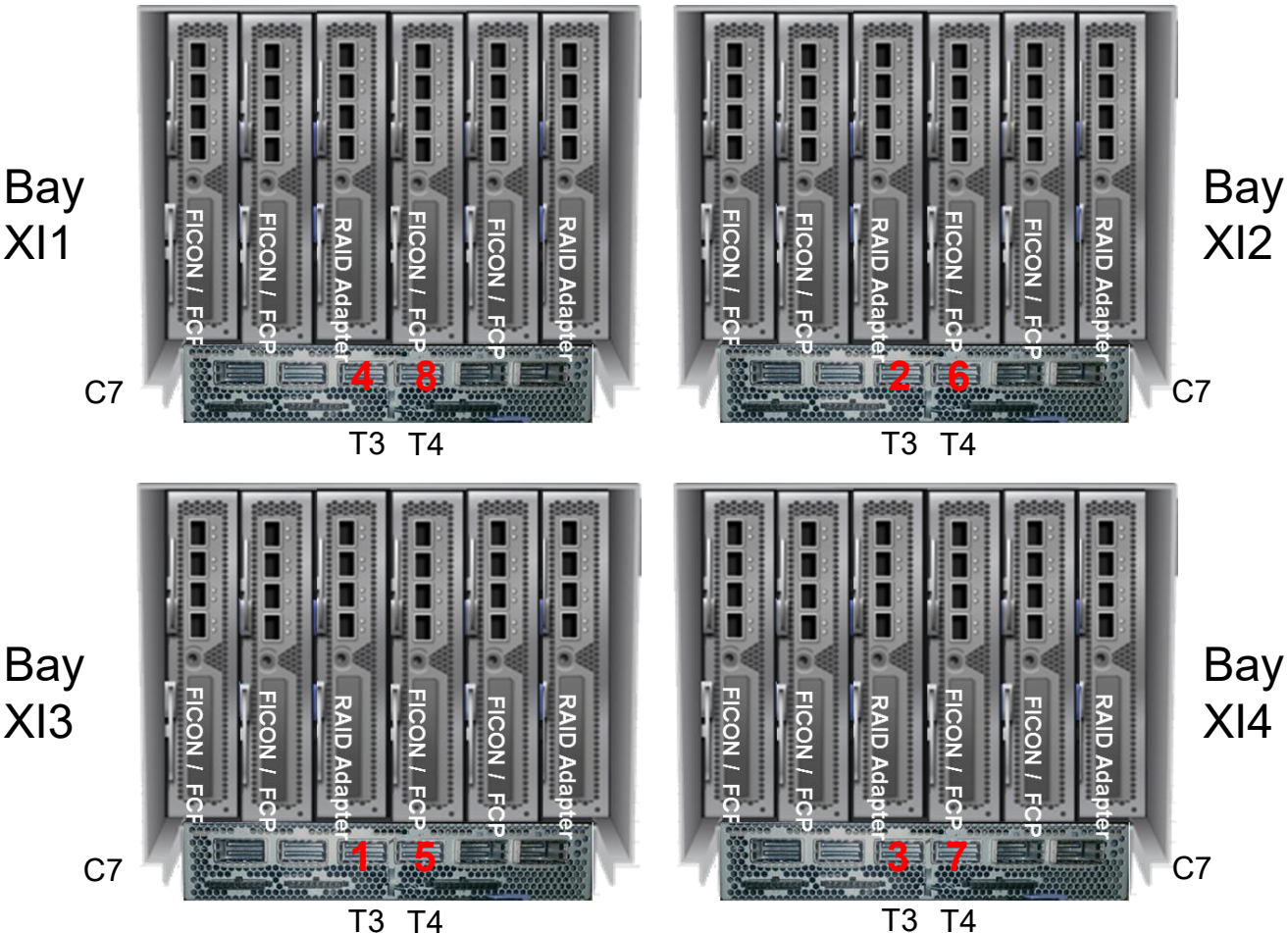
Bay XI1

C7

4 8

T3 T4

Bay XI2

2 6

C7

T3 T4

Bay XI3

C7

1 5

T3 T4

Bay XI4

3 7

C7

T3 T4

Note that these should be the order that zHyperLink adapters will be installed at the factory, but the adapters can be moved from install location to install location as needed.

zHyperLink Plug Order DS8910F or DS8950F Single Rack and Single I/O Enclosure Pair

- It is possible, though unlikely, to have a single I/O enclosure pair on a DS8980F
- It is possible, but a not recommended configuration, to have a single I/O enclosure pair in each rack of a dual rack DS8950F/DS8980F system. This possibility is not documented here as the configuration is highly discouraged

Plug Order
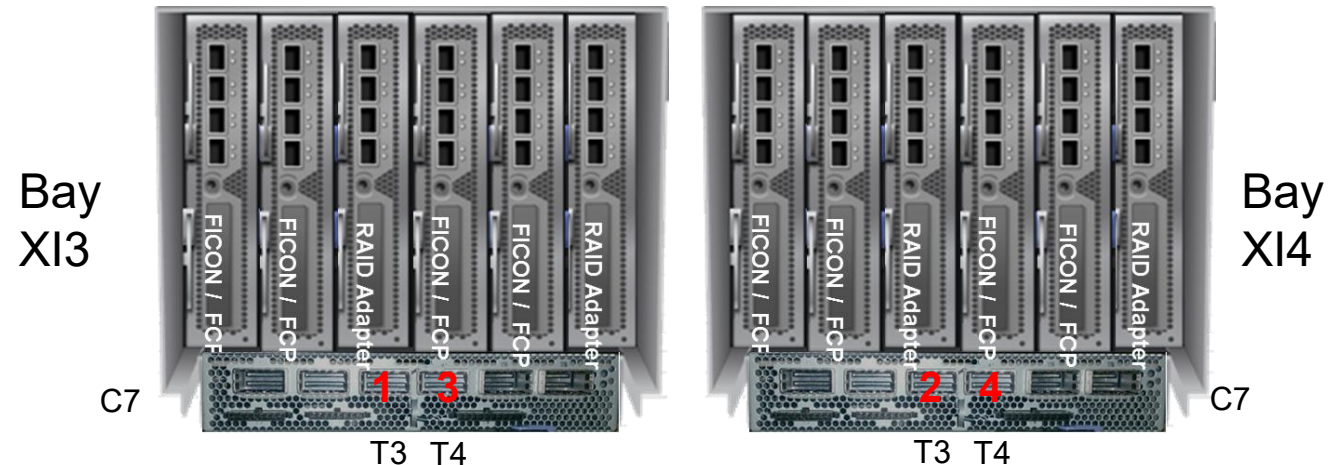
Bay XI3

Bay XI4

C7

C7

T3 T4

T3 T4

Note that these should be the order that zHyperLink adapters will be installed at the factory, but the adapters can be moved from install location to install location as needed.

zHyperLink Plug Order DS8950F or DS8980F Dual Rack

Plug Order

Expansion Frame
Rear View

Base Frame
Rear View
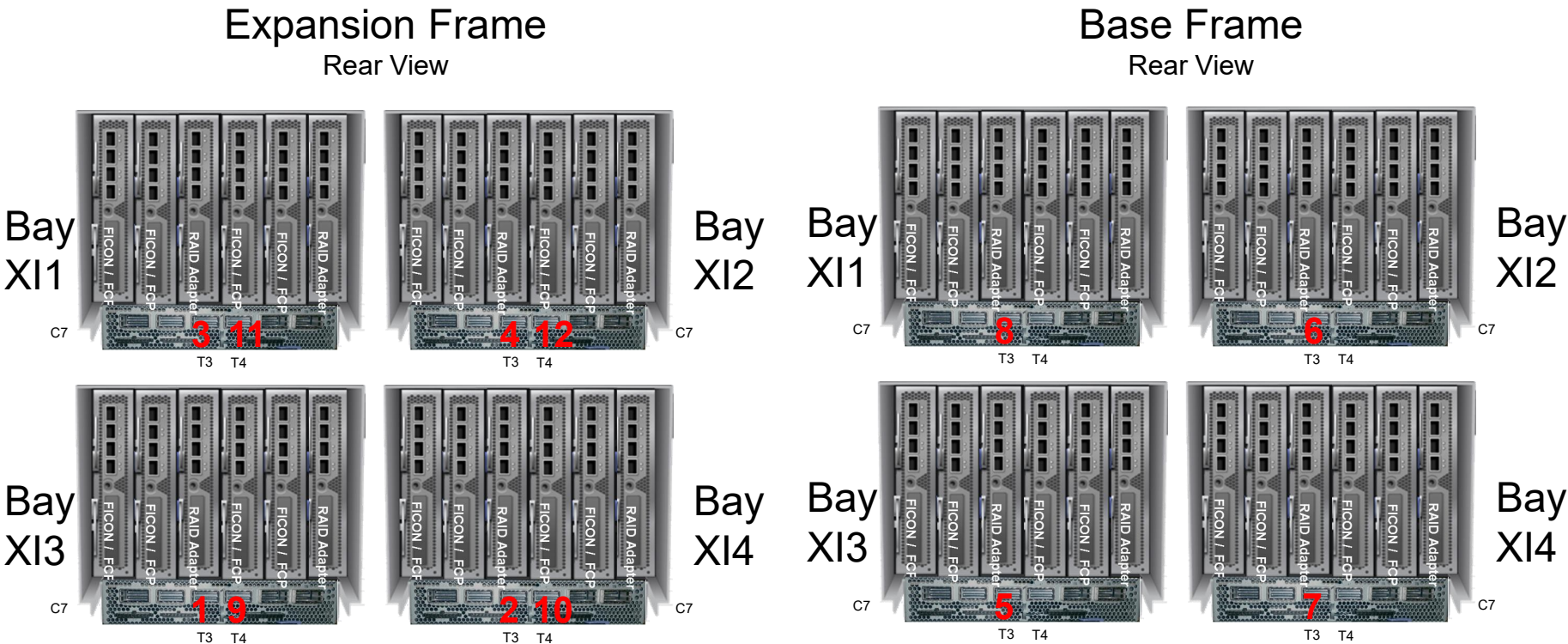
This view assumes that the expansion frame is installed to the right of the base frame, as viewed from the front, as is "usual", but not mandatory.

This is the factory install order if 8 zHyperLink adapters are ordered in the expansion frame and 4 adapters in the base frame. e-config does not enforce this, just insures a max of 8 per frame and 12 per storage system. If adapters are ordered in some other configuration, the adapters should be physically relocated to this install order at implementation time.

zHyperLink Plug Order DS8910F, DS8950F, or DS8980F (Rack 1 and Rack 2)

Plug Order
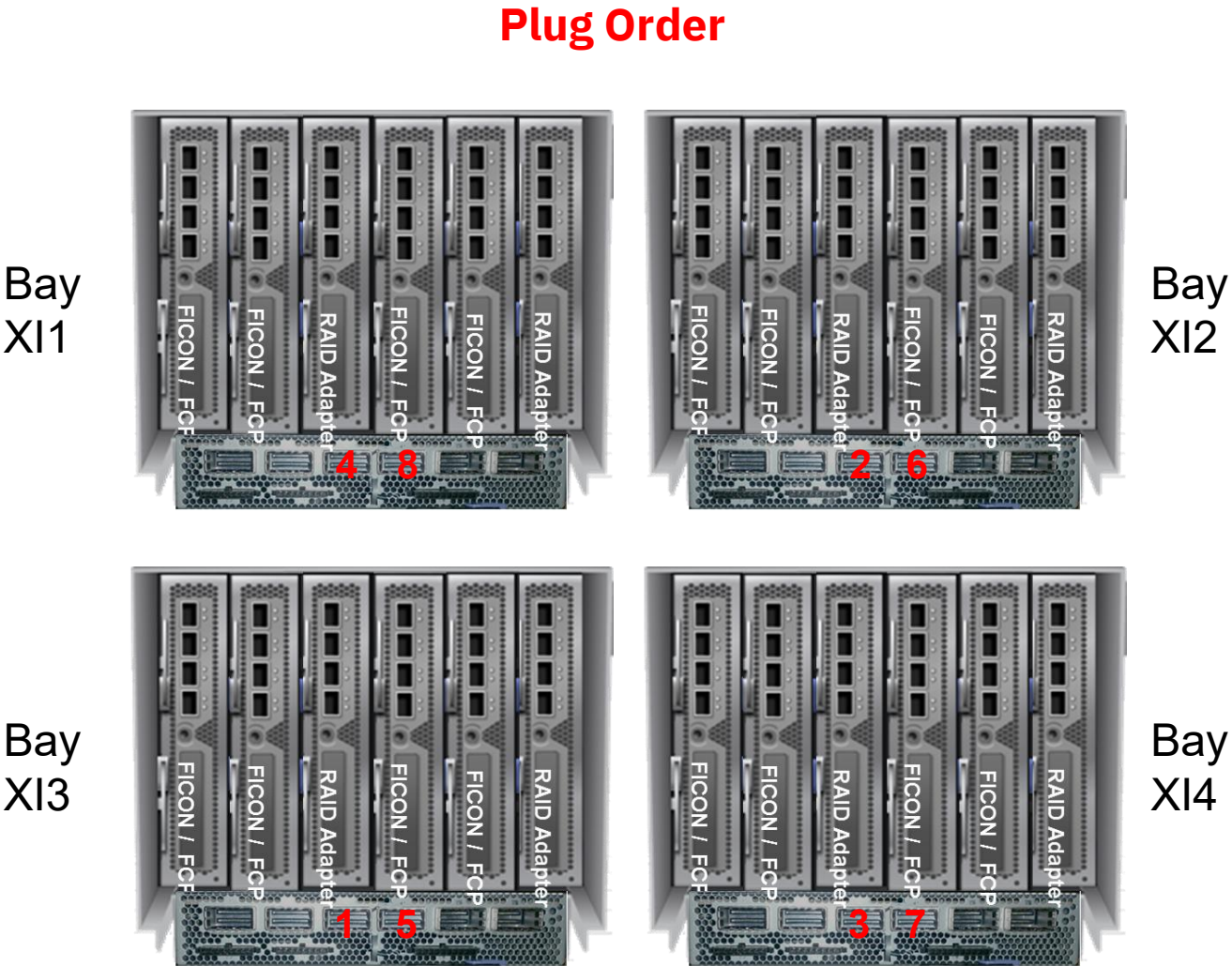
Note that these are not necessarily the order that zHyperLink adapters will be installed at the factory, but the adapters can be moved from install location to install location as needed.

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DS8A00 G10 Models

Transparent Cloud Tiering Adapters

DS8A00

DS8A10-A00 & DS8A10-A01 – Central Electronics Complex (Rear View) – Notes on TCT
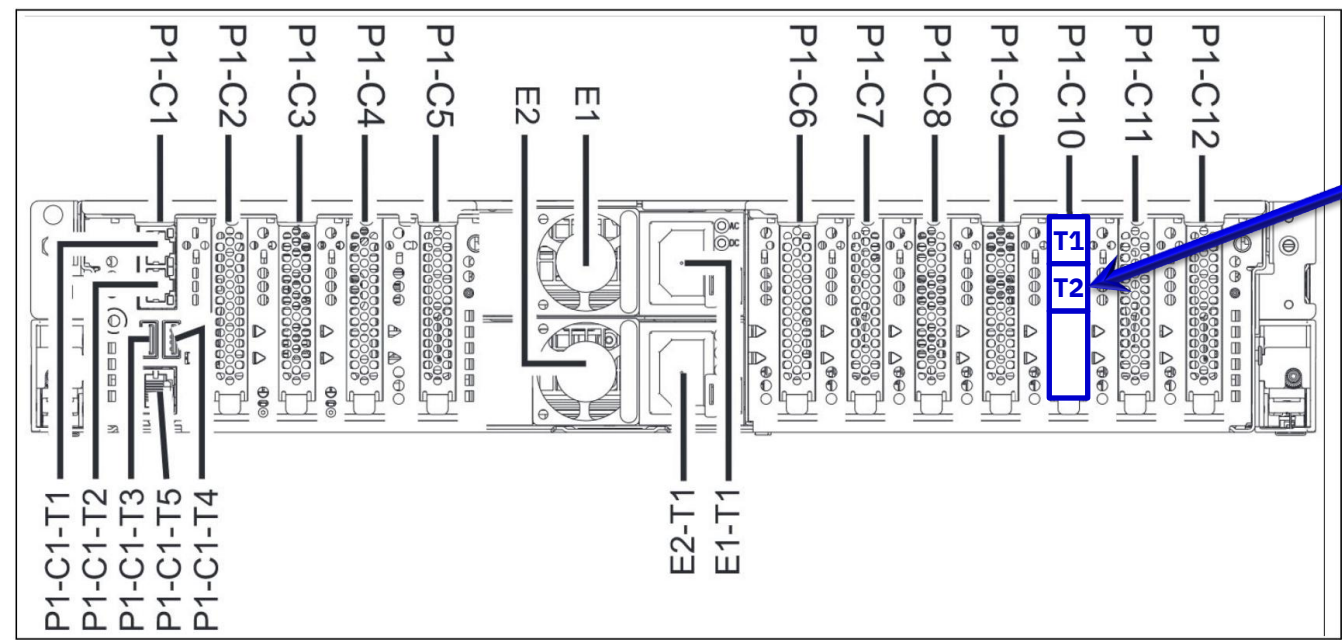
Image of 2U Power 9+ CEC for DS8A10 models A00 & A01
Optional TCT Adapter pair is installed in slot P1-C10 (i.e., one in each CEC)

CEC	DSCLI Port ID	Physical Port	Port Speed
0	I9891	P1-C10-T1	10 Gbps
0	I9892	P1-C10-T2	10 Gbps
1	I9B91	P1-C10-T1	10 Gbps
1	I9B92	P1-C10-T2	10 Gbps

Notes on TCT:
1) 2 port 10 Gbps TCT Adapter (only 1 port on an adapter is active; the other is standby)
2) 1 TCT Adapter per CEC (2 adapters per DSA800)
3) TCT Adapter options:
   - *AAH0 – TCT 10Gb/1Gb ethernet pair for 2U controllers_SR* (Short Reach optics)
   - *AAH1 – TCT 10Gb/1Gb ethernet pair for 2U controllers_LR* (Long Reach optics)
4) TCT requires function authorization licensing which is based on total raw CKD rank capacity
5) 1 Gbps not supported for TCT on the G10

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DS8A10-A00 & DS8A10-A01 – Central Electronics Complex (Rear View) – Location Codes
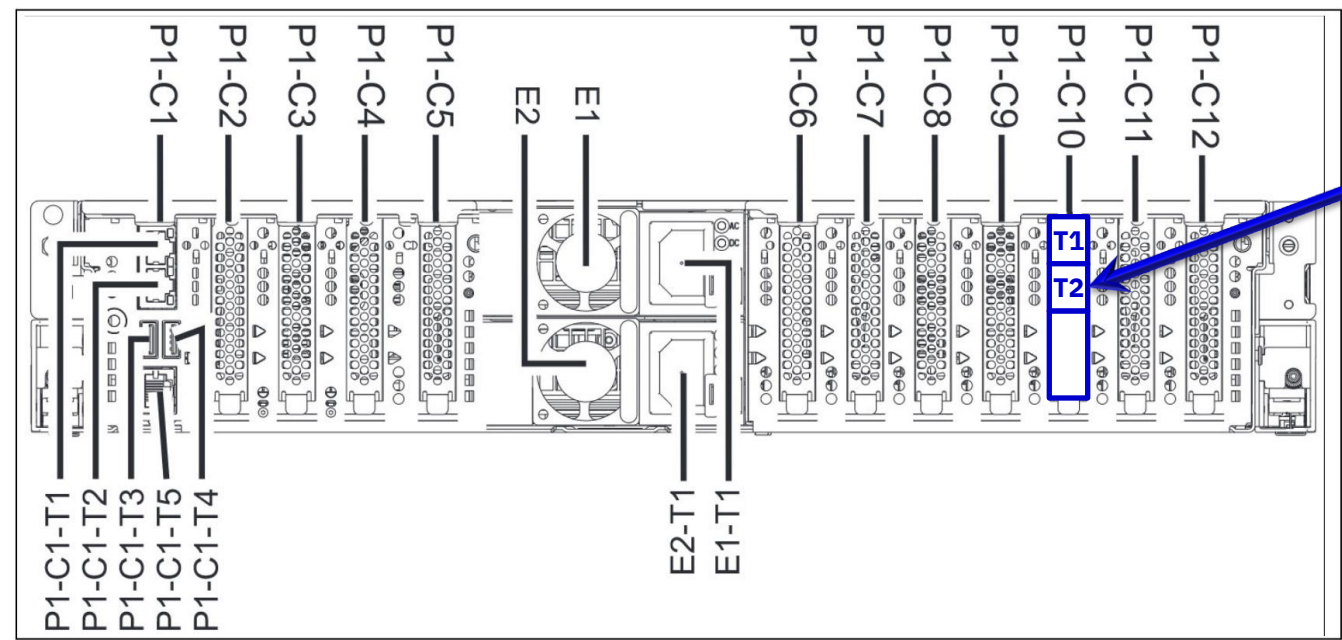
Connection	Description
P1-C1-T1 (HMC 1)	FSP Ethernet
P1-C1-T2 (HMC 2)	FSP Ethernet
P1-C6-T1	PCIe to I/O enclosures
P1-C8-T1	PCIe to I/O enclosures
P1-C9-T1	PCIe to I/O enclosures
P1-C10-T1, P1-C10-T2	Customer network (optional feature, if used)
P1-C11-T1, P1-C11-T2	LPAR Ethernet
P1-C12-T1	PCIe to I/O enclosures

Image of 2U Power 9+ CEC for DS8A10 models A00 & A01

Optional TCT Adapter pair is installed in slot P1-C10 (i.e., one in each CEC)

DS8A50-A05 & DS8A80-A08 – Central Electronics Complex (Rear View) – Notes on TCT
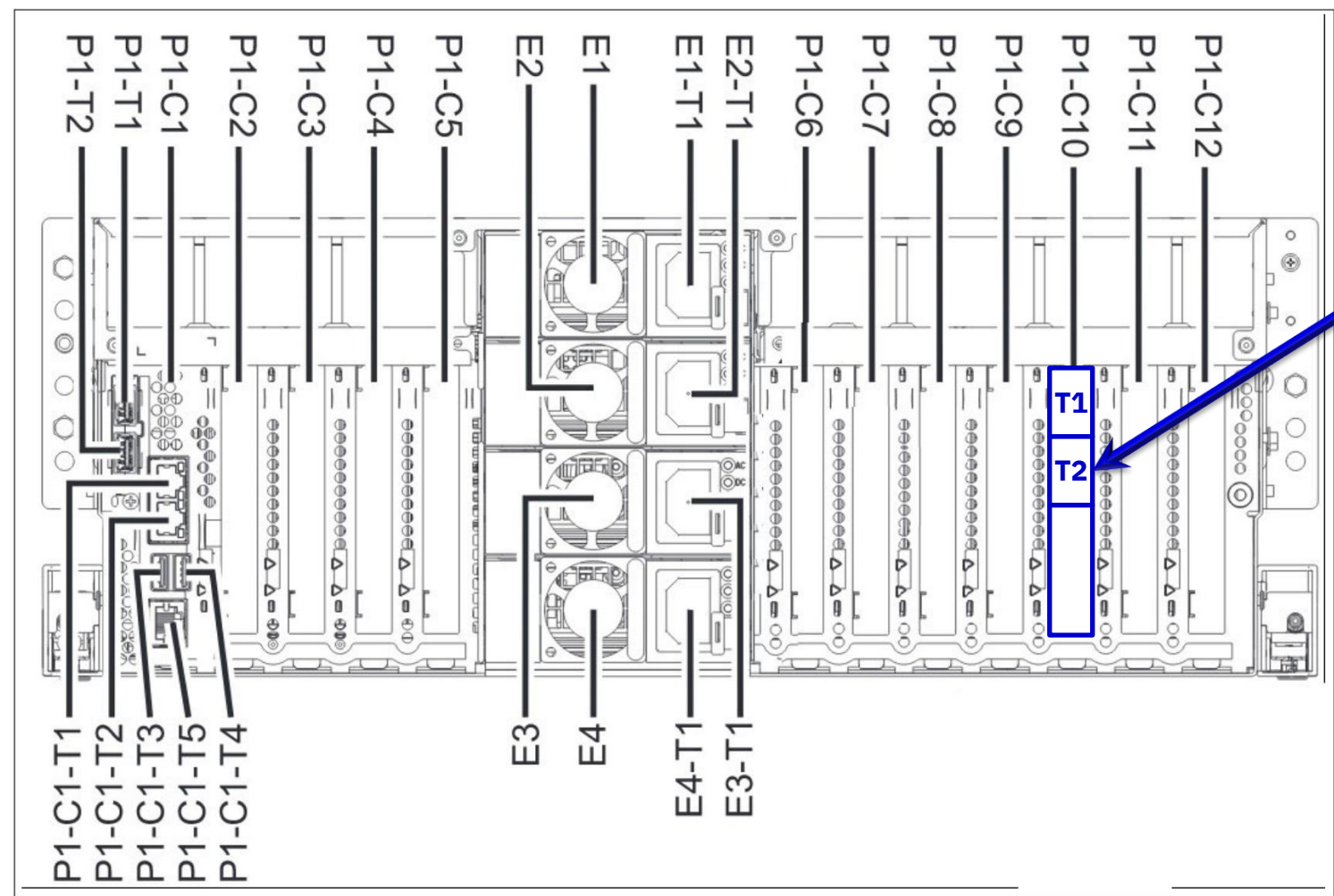
CEC	DSCLI Port ID	Physical Port	Port Speed
0	I9891	P1-C10-T1	10 Gbps
0	I9892	P1-C10-T2	10 Gbps
1	I9B91	P1-C10-T1	10 Gbps
1	I9B92	P1-C10-T2	10 Gbps

Notes on TCT:
1) 2 port 10 Gbps TCT Adapter (only 1 port on an adapter is active; the other is standby)
2) 1 TCT Adapter per CEC (2 adapters per DSA800)
3) TCT Adapter options:
   ➢ *AAJ0 – TCT 10Gb/1Gb ethernet pair for 4U controllers_SR* (Short Reach optics)
   ➢ *AAJ1 – TCT 10Gb/1Gb ethernet pair for 4U controllers_LR* (Long Reach optics)
4) TCT requires function authorization licensing which is based on total raw CKD rank capacity
5) 1 Gbps not supported for TCT on the G10

Image of 4U Power 9+ CEC for DS8A00 models A05 & A08

Optional TCT Adapter pair is installed in slot P1-C10 (i.e., one in each CEC)

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DS8A50-A05 & DS8A80-A08 – Central Electronics Complex (Rear View) – Location Codes

Connection	Description
P1-C1-T1 (HMC 1)	FSP Ethernet
P1-C1-T2 (HMC 2)	FSP Ethernet
P1-C2-T1	PCIe to I/O enclosures (if C2 present)
P1-C3-T1, P1-C3-T2	PCIe to I/O enclosures (if C3 present)
P1-C4-T1	PCIe to I/O enclosures (if C4 present)
P1-C6-T1	PCIe to I/O enclosures
P1-C8-T1	PCIe to I/O enclosures
P1-C9-T1	PCIe to I/O enclosures
P1-C10-T1, P1-C10-T2	Customer network (optional feature, if used)
P1-C11-T1, P1-C11-T2	LPAR Ethernet
P1-C12-T1	PCIe to I/O enclosures

Image of 4U Power 9+ CEC for DS8A00 models A05 & A08
Optional TCT Adapter pair is installed in slot P1-C10 (i.e., one in each CEC)

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DS8900F Models

Transparent Cloud Tiering Adapters

DS8900F

DS8950F Model 996 (4U POWER9 CPC) – Ethernet Adapters

See next page for description of adapters and ports used for these ethernet connections.

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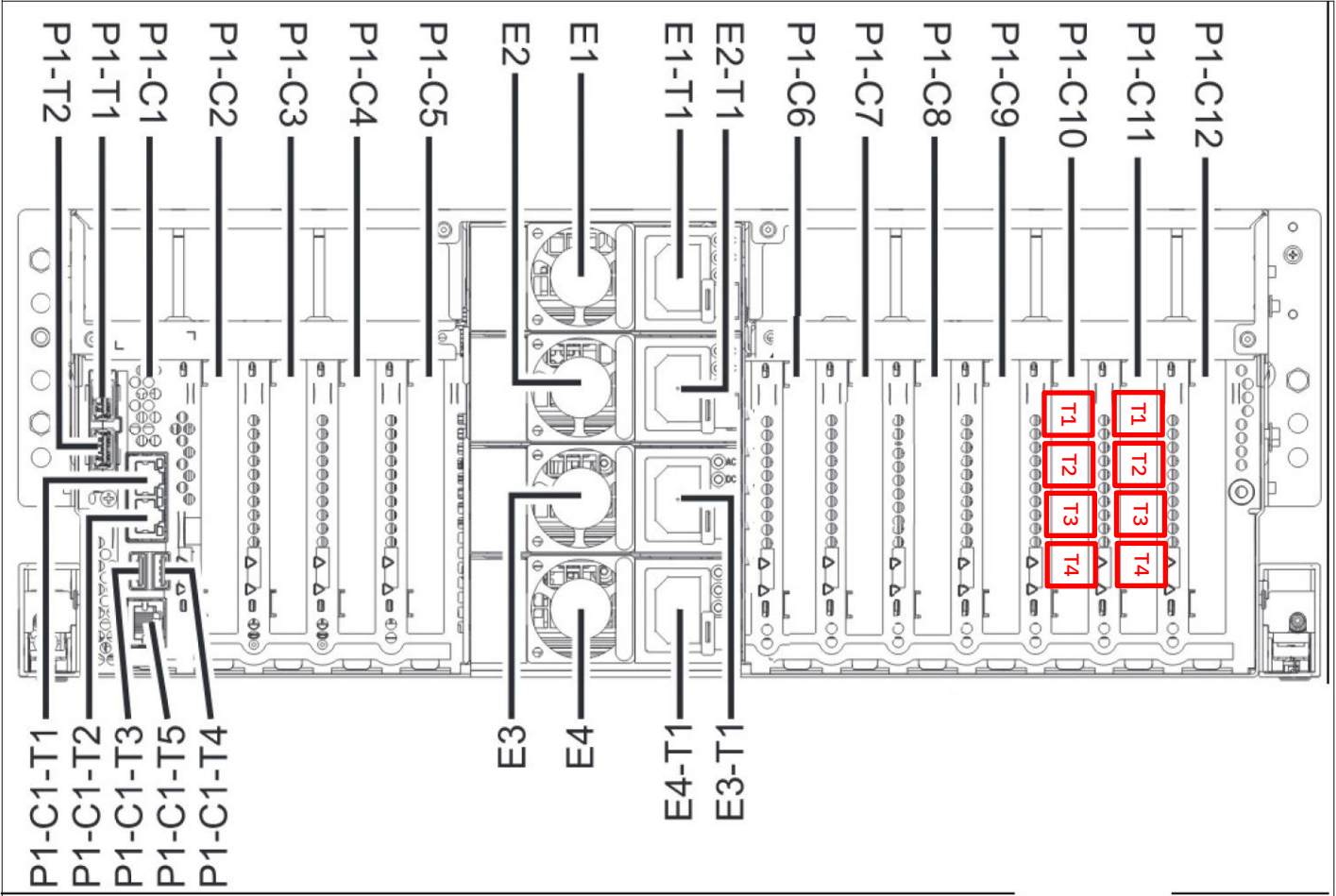
DS8950F/DS8980F Model 996/998 (4U POWER9 CPC) – Ethernet Adapters

- Ethernet Adapter P1-C11
  - 4 port (RJ45 copper) 1Gb ethernet adapter
  - Standard adapter shipped on all Model 996 CPCs
  - Ports T1 and T2 are cabled and used for internal communications
  - Ports T3 and T4 can optionally be used for TCT

- Ethernet Adapter P1-C10
  - 4 port ethernet adapter
  - Optional feature code 3603 for TCT
  - Ports T1 and T2 are optical SR 10Gb ports – Note: Short Reach optics
  - Ports T3 and T4 are RJ45 copper 1Gb ports

DS8950F/DS8980F Model 996/998 (4U POWER9 CEC) – DSCLI nomenclature

Model 996 or 998

CEC	DSCLI Port ID	Physical Port	Port Speed
0	I9893	P1-C10-T3	1Gbps
0	I9894	P1-C10-T4	1Gbps
0	I98A1	P1-C11-T1	10Gbps
0	I98A2	P1-C11-T2	10Gbps
0	I98A3	P1-C11-T3	1Gbps
0	I98A4	P1-C11-T4	1Gbps
1	I9B93	P1-C10-T3	1Gbps
1	I9B94	P1-C10-T4	1Gbps
1	I9BA1	P1-C11-T1	10Gbps
1	I9BA2	P1-C11-T2	10Gbps
1	I9BA3	P1-C11-T3	1Gbps
1	I9BA4	P1-C11-T4	1Gbps

CEC	DSCLI Port ID	Physical Port	Port Speed
0	I9891	P1-C10-T1	10Gbps
0	I9892	P1-C10-T2	10Gbps
1	I9B91	P1-C10-T1	10Gbps
1	I9B92	P1-C10-T2	10Gbps

Original 1 Gbit Ports (2 for redundancy)

New 10Gbit Ports (2 for redundancy)

New Additional 1Gbit Ports (2 for redundancy)

DS8910F Model 993 or 994 (2U Power9 CPC) – Ethernet Adapters

See next page for description of adapters and ports used for these ethernet connections.
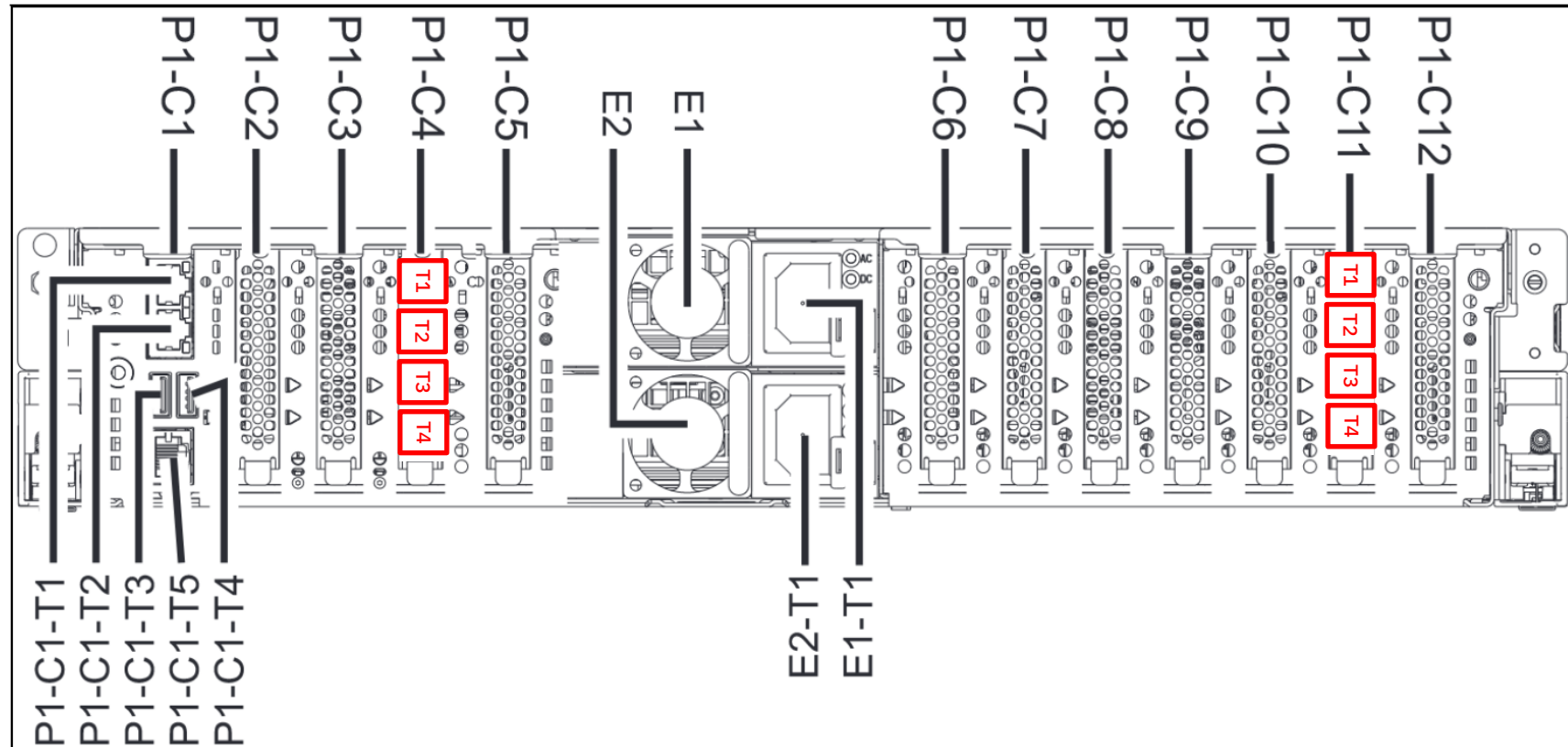
DS8910F Model 993 or 994 (2U Power9 CPC) – Ethernet Adapters

- Ethernet Adapter P1-C11
  - 4 port (RJ45 copper) 1Gb ethernet adapter
  - Standard adapter shipped on all Model 993/994 CPCs
  - Ports T1 and T2 are cabled and used for internal communications
  - Ports T3 and T4 can optionally be used for TCT

- Ethernet Adapter P1-C4
  - 4 port ethernet adapter
  - Optional feature code 3602 for TCT
  - Ports T1 and T2 are optical SR 10Gb ports – Note: Short Reach optics
  - Ports T3 and T4 are RJ45 copper 1Gb ports

DS8910F Model 993 or 994 (2U Power9 CPC) – DSCLI nomenclature

Models 993 and 994

CEC	DSCLI Port ID	Physical Port	Port Speed
0	I9893	P1-C10-T3	1Gbps
0	I9894	P1-C10-T4	1Gbps
0	I9831	P1-C4-T1	10Gbps
0	I9832	P1-C4-T2	10Gbps
0	I9833	P1-C4-T3	1Gbps
0	I9834	P1-C4-T4	1Gbps
1	I9B93	P1-C10-T3	1Gbps
1	I9B94	P1-C10-T4	1Gbps
1	I9B31	P1-C4-T1	10Gbps
1	I9B32	P1-C4-T2	10Gbps
1	I9B33	P1-C4-T3	1Gbps
1	I9B34	P1-C4-T4	1Gbps

Original 1 Gbit Ports (2 for redundancy)
New 10Gbit Ports (2 for redundancy)
New Additional 1Gbit Ports (2 for redundancy)

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