ICS Triplex T8310C

01 / The expanded communication path

ICS Triplex T8310C connects a Trusted Expander Chassis backplane to the triplicated Expander Bus. The conformally coated processor forwards I/O traffic and system control signals while supporting fault containment and an active/standby arrangement.

01 Controller-side interface

02 Triplicated expander path

03 T8310C processor

04 Expander chassis IMB

Place the processor on the correct side

The expander processor belongs in one of the two leftmost processor positions of a T8300 Expander Chassis. It receives traffic from the T8311 expander interface through the approved adapter and cable path, then forwards addressed messages to the local Inter-Module Bus. It is not the main application processor and must not be installed in an ordinary I/O position.

Maintain the three fault regions

Three primary fault-containment regions handle the triplicated communication paths, power supplies and control logic. Received traffic is resynchronized and voted before forwarding. A separate monitoring region supports non-critical display functions. Continued communication after one fault therefore does not mean that all physical paths remain healthy; error counters and slice status provide the necessary distinction.

Restore the complete redundancy state

Both active and standby units generate independent IMB power supplies, while the active processor provides synchronized IMB clocks and forwards system watchdog and power-fail signals. The chassis address and I/O connection-table entry remain part of the system configuration even though the module itself requires no local setup. A successful replacement must restore communication, diagnostics and the intended redundancy state.

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02 / Topology and power budgeting

Module function	Expander-side bus processor
Redundancy architecture	Hardware-implemented TMR, lock-step
Operating degradation	3–2–0
Primary fault-containment regions	3: A, B and C
Additional monitoring region	FCR D
Backplane supply range	20–32 V DC
Supply arrangement	Dual redundant nominal 24 V DC chassis feeds
Power, Series A/B	45 W
Power, Series C	20 W
Physical module positions	T8300 processor slots PL1 or PL2
Toolset slot numbers	13 or 14
Toolset chassis range	2–15
Expander Bus topology	Triplicated point-to-point
Copper link type	Unshielded twisted pair through approved TC-301 assembly

Plan power from the unit label

At the 20 V minimum supply, the rated 45 W and 20 W cases correspond to calculated power-over-voltage values of 2.25 A and 1 A respectively. These are illustrative steady power calculations, not inrush ratings. Add other chassis loads and follow the approved power design.

Topology and cable medium are different

The expander path uses triplicated point-to-point command and response links. The presence of twisted-pair cabling does not authorize an Ethernet switch, arbitrary patching arrangement or a longer unqualified run.

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03 / Addressing and diagnostic boundaries

Maximum copper distance	30 m using TC-301
Maximum optical distance	10 km using T8314 fiber TX/RX units
Expander Bus data rate	1.5 Gbit/s
IMB data rate	Up to 12.5 Mbit/s
IMB clock rate	12.5 million symbols/s
IMB data width	8 bits, bidirectional
Chassis identification	4-bit code
IMB power channels	3 independent diode-coupled supplies
Receive activity indication	Green
Transmit activity indication	Red; absent during standby
Operating temperature	0 to +60 °C
Storage temperature	−25 to +70 °C
Relative humidity	10–95%, non-condensing
Internal fusing	Not user serviceable

A successful message can conceal degradation

Voting improves availability but can allow a defective physical link to remain unnoticed if diagnostics are ignored. Link quality, frame/checksum errors and discrepancies belong in maintenance review alongside current I/O communication.

The processor is part of a larger chain

The controller-side interface, adapter, link, expander processor and destination I/O all contribute to the path. Diagnose each boundary separately so a chassis-address error or cable problem is not mistaken for a failed field module.

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04 / Recognizing degraded communication

Does the C suffix on T8310C establish which power rating applies?

No. It identifies conformal coating. Read the separate hardware-series marking: the power rating is 45 W for Series A/B and 20 W for Series C. Use the actual unit series when reviewing the chassis power and thermal budget.

Why can T8310C keep transferring data while one link reports errors?

The triplicated paths resynchronize and vote received data, allowing a single-path fault to be masked. Review error counts and slice status instead of treating continued I/O traffic as proof that every path is healthy.

Can T8310C be installed in a free ordinary I/O slot?

No. It belongs only in the two expander-processor positions, PL1 or PL2. Confirm the physical position before insertion; the toolset represents these positions as slots 13 and 14.

Does using UTP cable make T8310C compatible with an ordinary Ethernet switch?

No. UTP identifies the cable medium, not Ethernet protocol compatibility. Retain the approved triplicated Expander Bus connection through its designated adapter and cable assemblies.

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05 / Integration and reference selection

Additional I/O chassis

Extend controller access to the configured I/O modules on a Trusted Expander Chassis.

Copper chassis links

Use the approved TC-301 adapter and cable arrangement within the copper-distance limit.

Remote optical extension

Use compatible T8314 optical equipment and the corresponding TC-302/TC-303 connections for supported remote arrangements.

Redundant expansion service

Coordinate active and standby expander processors while monitoring individual link health and chassis supplies.

Technical scope

Rockwell Automation Trusted TMR Expander Processor, PD-T8310 Issue 15; Trusted TMR System Safety Manual, ICSTT-RM459K-EN-P. T8310C is the conformally coated T8310 expander processor. Bus and installation data describe the T8310 architecture. Power depends on the hardware series: the current IECEx ULD 17.0001X schedule distinguishes 45 W for Series A/B and 20 W for Series C. The C in T8310C identifies coating, not the hardware-series rating.

Other automation product references

Emerson KJ2005X1-BK1 12P4688X052 SE3007

Foxboro P0922YU FPS400-24

Honeywell FC-PSU-UNI2450U V1.0

Separate references; no replacement or compatibility is implied.