Cisco Catalyst 3850 StackWise-480 Cable Installation and Stacking Limits - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

The Cisco Catalyst 3850 Series represents a pivotal advancement in stackable access switching, integrating wired and wireless capabilities into a single, high-performance platform. Central to its high-availability architecture is the StackWise-480 technology, a dedicated stacking infrastructure designed to provide 480 Gbps of stack bandwidth and stateful switchover (SSO) resiliency. This document serves as a definitive engineering reference for the physical cable installation, topological constraints, and hardware stacking limits specific to the Catalyst 3850 platform. It delineates the precise boundaries of scale—including switch count, ASIC allocation, and cable management—to ensure deterministic behavior and carrier-grade reliability in enterprise campus deployments.



HARDWARE ARCHITECTURE & SILICON

The StackWise-480 architecture is built upon a specialized backplane interconnect that operates independently of the front-panel data ports. Each Catalyst 3850 switch chassis is equipped with dedicated StackWise ports that facilitate a full-duplex ring topology. The physical layer utilizes Cisco proprietary stacking cables available in specific lengths (0.5 m, 1 m, and 3 m) to accommodate various rack-mount and side-by-side configurations . The silicon-level implementation relies on a distributed forwarding model where each stack member contributes its own ASIC resources to the unified data plane. The system is managed by an elected Active switch, which synchronizes forwarding state and configuration to a Hot-Standby switch, ensuring sub-second convergence during hardware failures. The stack ring operates as a shared bus, and the integrity of the physical cabling directly dictates the

available bandwidth (full-ring vs. half-ring) and redundancy posture of the entire logical unit.

KEY FEATURES & ROUTING LOGIC

- **Deterministic Stacking Scale**: The Catalyst 3850 platform supports a maximum of nine switches in a single StackWise-480 data stack, providing a balance between port density and management simplicity .
- **ASIC-Based Capacity Constraints**: Specific high-density fiber and multi-gigabit models (e.g., WS-C3850-24XS, WS-C3850-12X48U) contain four ASIC chips each. Consequently, stacks containing these models are limited to a maximum of eight switches to ensure the aggregate ASIC count remains within the 32-chip architectural limit .
- **Cable Interconnect Topology**: Recommended cabling practices utilize a full-ring topology with redundant connections (Port 1 to Port 2, and Port 2 to Port 1 on adjacent switches). A half-ring or incomplete cabling scheme results in a loss of redundancy and a 50% reduction in available stack bandwidth .
- **StackPower Distinction**: While the data stack supports up to nine members, the separate StackPower (power-sharing) ring topology is restricted to a maximum of four switches in a ring configuration (or up to nine in a star topology with specific cabling) .
- **Excluded Models**: The WS-C3850-48XS, WS-C3850-48XS-S,

WS-C3850-48XS-E, WS-C3850-48XS-F-S, and WS-C3850-48XS-F-E models do not support StackWise-480 technology and cannot participate in a data stack .

COMPLIANCE & STANDARDS

The physical installation and operational limits of the StackWise-480 system adhere to strict Cisco manufacturing and safety standards. The stacking cables are keyed and color-coded to prevent misconnection, complying with IEC 61010-1 safety requirements for electrical connectivity. The stacking architecture supports IEEE 802.3ad Link Aggregation across stack members (Cross-Stack EtherChannel), ensuring compatibility with standard enterprise resiliency protocols. The system maintains compliance with NEBS Level 3 (where applicable) and RoHS directives, ensuring suitability for deployment in harsh environments and adherence to global environmental regulations.

TECHNICAL SPECIFICATIONS

The following table outlines the critical physical and logical parameters required for compliant StackWise-480 installation on the Catalyst 3850 platform.

Parameter	**Specification**

Supported Stack Members (Data Stack)	Up to 9 switches (Standard models); Up to 8 switches (Models with 4 ASICs per switch, e.g., 24XS/12X48U)
Stack Bandwidth	480 Gbps (Full Ring) / 240 Gbps (Half Ring)
Supported StackWise Cable Lengths	0.5 m (STACK-T1-50CM), 1 m (STACK-T1-1M), 3 m (STACK-T1-3M)
Cable Insertion Cycles	Maximum 200 connect/disconnect cycles per cable
Power Stacking (StackPower) Limit	Max 4 switches in Ring Topology; Max 9 switches in Star Topology
Unsupported Models (No StackWise-480)	WS-C3850-48XS, WS-C3850-48XS-S, WS-C3850-48XS-E, WS-C3850-48XS-F-S, WS-C3850-48XS-F-E
Stack Power Support on 48XS Models	Not supported
Connector Orientation	Cisco logo must be oriented topside during insertion

ORDERING SKU INFORMATION

To implement a compliant StackWise-480 topology, the following cable SKUs are available. Note that each switch requires two cables to form a full-ring topology (unless operating at the edge of a stack).

- **STACK-T1-50CM**: 0.5-meter StackWise-480 cable (typically included with switch; ideal for vertical rack stacking).
- **STACK-T1-1M**: 1-meter StackWise-480 cable (for adjacent rack configurations).
- **STACK-T1-3M**: 3-meter StackWise-480 cable (for side-by-side or cross-rack installations).

