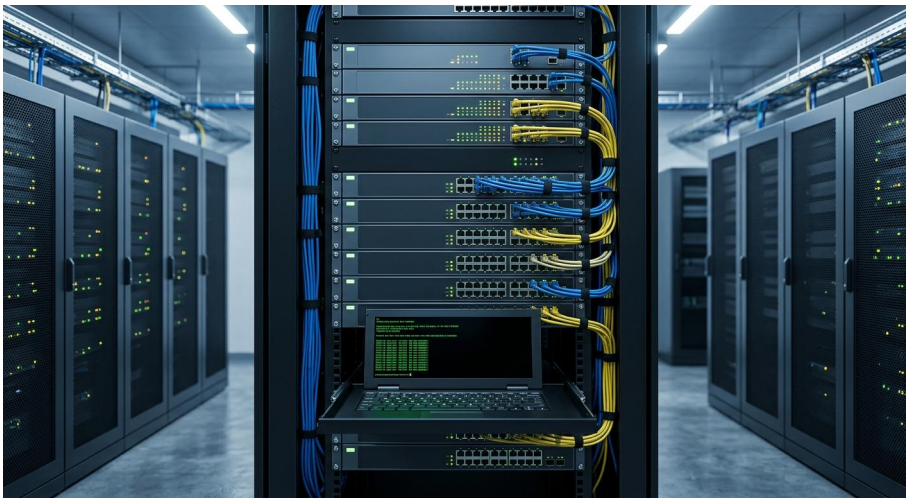
XPONSHOP Pre-Shipping Automated Test Bench Diagnostic Parameter Output Schema - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

The XPONSHOP Pre-Shipping Automated Test Bench Diagnostic Parameter Output Schema defines the authoritative, machine-readable diagnostic framework emitted by the XPONSHOP Automated Test Bench (ATB) platform during the pre-shipping validation of optical network terminal (ONT), optical line terminal (OLT), and associated passive optical network (PON) hardware. This schema standardizes the structure, naming, units, and pass/fail semantics of every diagnostic parameter captured during factory acceptance testing, ensuring deterministic interoperability between ATB test executors, manufacturing execution systems (MES), and cloud-based quality analytics pipelines. By enforcing a vendor-neutral, self-describing JSON payload, the schema eliminates ambiguous test logs and enables zero-touch integration with downstream provisioning, RMA disposition, and carrier acceptance workflows.



HARDWARE ARCHITECTURE & SILICON

The XPONSHOP ATB diagnostic output subsystem is architected around a modular test-execution controller that interfaces directly with the device-under-test (DUT) via GPIB, USB-TMC, Ethernet, and serial console channels. The schema is generated by the ATB Schema Engine, a lightweight C++/Python runtime that aggregates raw instrument telemetry into a normalized parameter tree. Each diagnostic run produces a single immutable JSON document whose root object contains schema version, test bench identifier, DUT metadata, timestamp, operator credentials, and an ordered array of parameter records. The silicon-level instrumentation layer supports optical power meters, BER testers, OTDR modules, temperature chambers, and programmable power supplies, all of whose measurements are mapped into the schema through a declarative parameter registry.

KEY FEATURES & ROUTING LOGIC

- Parameter Registry: A declarative YAML/JSON registry defines every diagnostic parameter with unique key, human-readable label, unit, data type, valid range, and pass/fail threshold.
- Deterministic Ordering: Parameters are emitted in a stable, schema-defined order to guarantee byte-level reproducibility across test runs.
- Hierarchical Grouping: Diagnostic results are grouped by subsystem (Optical, Electrical, Protocol, Thermal, Mechanical) for streamlined analytics.
- Verdict Semantics: Each parameter record carries a pass, fail, or inconclusive verdict with an associated severity level and failure code.
- Traceability: Every measurement is linked to the instrument serial number, calibration date, and test step identifier.
- Extensibility: Vendor-specific parameters can be added under a namespaced extension block without breaking schema validation.
- Versioning: Semantic versioning of the schema enables backward-compatible parsing and long-term archival.
- Security: Operator credentials and DUT serial numbers are handled per configurable redaction policies for privacy compliance.

COMPLIANCE & STANDARDS

The schema is designed to align with relevant industry frameworks including IEEE 802.3, ITU-T G.984/G.987/G.9807 series, MEF Carrier Ethernet specifications, and ISO 9001 manufacturing quality management principles. The output payload is valid JSON per RFC 8259 and supports optional JSON Schema draft-07 validation. Where applicable, diagnostic parameters reference Telcordia GR-468-CORE and GR-326-CORE reliability standards for optoelectronic component testing.

TECHNICAL SPECIFICATIONS

The schema defines a top-level object containing metadata, environment, DUT identity, test sequence, and parameter results. Each parameter record includes key, label, group, value, unit, nominal, lower limit, upper limit, verdict, severity, instrument, and timestamp. The schema supports scalar numeric, boolean, string, and enumerated values, as well as nested arrays for multi-channel measurements. Output encoding is UTF-8 JSON with optional gzip compression. Maximum document size is bounded by the ATB controller memory profile, typically 64 MB per DUT.

Parameter	**Specification**
Schema Format	UTF-8 JSON, RFC 8259 compliant, optional JSON Schema draft-07

	validation
Schema Versioning	Semantic versioning (MAJOR.MINOR.PATCH) with backward-compatible parsing
Parameter Record Fields	key, label, group, value, unit, nominal, lower_limit, upper_limit, verdict, severity, instrument_id, timestamp
Verdict Values	PASS, FAIL, INCONCLUSIVE with severity levels INFO, WARN, CRITICAL
Supported Data Types	Numeric scalar, boolean, string, enumerated, nested array for multi-channel
Output Encoding	UTF-8 JSON, optional gzip compression
Maximum Document Size	Typically 64 MB per DUT, bounded by ATB controller memory profile
Instrument Traceability	Instrument serial number, calibration date, test step identifier embedded per record
Security & Privacy	Configurable redaction policies for operator credentials and DUT serial numbers

Compliance Alignment	IEEE 802.3, ITU-T G.984/G.987/G.9807, MEF, ISO 9001, Telcordia GR-468-CORE, GR-326-CORE
Extension Mechanism	Namespaced vendor extension block without breaking base schema validation
Integration Interfaces	MES connector templates, cloud analytics pipeline hooks, RMA disposition APIs

ORDERING SKU INFORMATION

XPONSHOP-ATB-SCHEMA-BASE: Base schema definition and validator library for standard ONT/OLT pre-shipping test benches.

XPONSHOP-ATB-SCHEMA-PRO: Extended schema with vendor-specific namespaces, advanced analytics hooks, and MES connector templates.

XPONSHOP-ATB-SCHEMA-ENT: Enterprise license including schema versioning service, audit trail storage, and multi-site federation support.

XPONSHOP-ATB-SCHEMA-SDK: Software development kit for custom parameter registry authoring and schema extension.

