Ethernet Switch

# Hyperion - 402

*Manageable Industrial Switch
ideal for providing transmission
in surveillance applications*

**Solid**     **Easy to operate**     **Safe**     **Robust**

# Hyperion-402

## Industrial L2+ managed Ethernet switch with 4x 1/2.5/10G SFP/SFP+ and 8/16/24/32 10M/100M/1G RJ45 PoE÷High PoE IEEE 802.3bt ports or 100/1000M SFP slots

- ✓ A family of industrial switches featuring 4x 1/2.5/10G SFP/SFP+ slots and 8/16/24/32 10M/100M/1G RJ45 ports or 100M/1G SFP slots
- ✓ Additional NMI UTP RJ45 10/100Mbit/s management port
- ✓ ITU-T G.8032 compliant ring operation with < 20ms reconfiguration, up to 64 rings simultaneously
- ✓ Support for STP, RSTP and MSTP protocols.
- ✓ IEEE802.1x authentication, Radius, Tacacs+ - AAA
- ✓ Support for PROFINET Conformance Class A protocol
- ✓ In the HYPERION-402.2 version, the following IEEE1588 v.2 (PTPv.2)-based precision time synchronization profiles are hardware-supported: 1588 default, G.8265.1 and G.8275.1
- ✓ NTP protocol in server/client mode and SNTP
- ✓ Switch designed in accordance with the requirements of IEC61850-3, IEEE1613 standards for substations,
- ✓ As standard, secondary surge protection in UTP modules on ports RJ-45 for transmission path, ITU-T K.44 4kV 10/700us
- ✓ IPv4, IPv6, Web, telnet, SSH and local CLI (RS232) management, SNMP v1/v2c/v3,
- ✓ SNMPv3, HTTPS, SSH access security,
- ✓ DDMI - SFP insert monitoring function
- ✓ Save Energy with Energy Efficient Ethernet (EEE) Technology,
- ✓ Reflectometer test for used pairs in UTP cable,
- ✓ Ethernet OAM support (Link OAM and Service OAM),
- ✓ Operating temperature: -40 to +85°C when conditions are met,
- ✓ Rugged 19" 1U metal enclosure,
- ✓ Redundant power supply 75 - 240VAC, 80 - 350VDC or 36 - 60VDC.
- ✓ Load Balance function with power redundancy

### Optional features

- ✓ L3 routing support - static routing,
- ✓ **PoE ÷ High PoE** (IEEE 802.3bt) support up to 90W per UTP port (500W max on all ports), **PoE Watchdog**.

### Optional features under the license

- ✓ Extension in **IEEE 1588-2008v.2 (PTPv2)** with **Power Profile**; synchronization for real-time power applications in accordance with **IEEE C37.238-2011, C37.238-2017; IEC61850-9-3**,
- ✓ **Synchronous Ethernet G.8261** ( available on optical ports only 402.2 )

# Features of Hyperion-402

### Solid

Hyperion-402 switch is designed to cope with operation in extreme environmental conditions. The device is equipped with a durable IP-30 rated enclosure, and is designed in accordance with the requirements of IEC61850-3, IEEE1613 standards. Above that, the device is suitable for operation in temperatures from -40°C to +85°C under appropriate conditions.
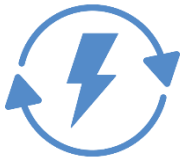
### Energy efficient

Using IEEE 802.3az-compliant Energy Efficient Ethernet technology, the Hyperion-402 can significantly reduce power consumption by optimizing the operation of interfaces based on port traffic load, and allows an electrical port to go to sleep if the connected device is not generating traffic.

### Easy to use

BitStream's devices and software are designed to be as user-friendly as possible for network administrators and installers. From the very first moment you will make the configuration in an intuitive way, despite having a lot of functionality. The incorporation of an HTTPS server, SSH server allows you to securely configure the device's parameters via a standard web browser or command line, and thanks to the incorporation of the SNMPv.3 agent, monitoring from the level of any management platforms equipped with the SNMP protocol.

### Precise

In its versatility, the Hyperion-402 supports the IEEE 1588v.2 PTP protocol with profiles: default 1588, G.8265.1 and G.8275.1. With an additional license, it can be expanded to include Power Profiles in BC or TC mode, which will support precise time synchronization for applications in the power industry with high synchronization requirements , and with a SYNCE license to enable Synchronous Ethernet, G.8261 which will provide precise frequency-based synchronization of internal device clocks. The built-in NTP server can also provide time synchronization taken from PTP or other external sources.

### Sure

Hyperion-402 series switches can be retrofitted with two independent power supplies. The redundant power supply function guarantees stable and continuous operation in case of failure of one of the power sources. The two power supply modules used in the device, provide operation with power redundancy supported by the Load Balance function.

### Strong

The switches can provide up to 500W of power to external devices using technology that complies with IEEE802.3af, IEEE802.3at, IEEE802.3bt standards, and each port can operate at up to 90W, plus the switch will keep an eye on the status of your devices for you thanks to the WatchDog PoE function.

## Supported transmission standards

- ✓ IEEE 802.3 10Base-T Ethernet
- ✓ IEEE 802.3u 100Base-TX Fast Ethernet
- ✓ IEEE 802.3u 100Base-FX Fast Ethernet Fiber
- ✓ IEEE 802.3ab 1000Base-T
- ✓ IEEE 802.3z Gigabit Fiber
- ✓ IEEE 802.3x Flow Control and Back-pressure
- ✓ IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- ✓ IEEE 802.1p Class of Service (CoS)
- ✓ IEEE 802.1Q VLAN
- ✓ IEEE 802.1ad QinQ
- ✓ IEEE 802.1D- Spanning Tree Protocol (STP)
- ✓ IEEE 802.1D-2004 Rapid Spanning Tree Protocol (RSTP).
- ✓ IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
- ✓ IEEE 802.3ad Link Aggregation Protocol (LACP)
- ✓ IEEE 802.1x Port Based Network Access Protocol
- ✓ IEEE 802.3az EEE
- ✓ IEEE 802.3af/at type 1/2 and PoE+ up to 3 0W per port, maximum on all ports 500W
- ✓ IEEE 802.3bt High PoE up to 90W per port, 500W maximum on all ports
- ✓ ITU K.44 - built-in secondary overvoltage protection on RJ-45 for transmission path, 4kV, 10/700us compliant: Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents - Basic Recommendation

## Supported protocols:

- ✓ IPv4, IPv6, ARP, ICMP, TCP, UDP, DNS
- ✓ IGMP v1,v2,v3, MLD v1, v2, GMRP, GVRP,
- ✓ SNMP v1/v2c/v3,
- ✓ DHCP client/server,
- ✓ NTP client/server, SNTP,
- ✓ IEEE1588 PTP v2 (only available in 402.2),
- ✓ Synchronous Ethernet (only available in 402.2)
- ✓ HTTP, HTTPS, Telnet, SSH v2, Syslog,
- ✓ EtherNet/IP, SNMP Inform, RMON, LLDP, LLDP-MED .
- ✓ MIB-II, Ethernet-Like MIB
- ✓ IEEE 802.1x Port Based Network Access Protocol, EAP, TACACS+, RADIUS, NAS

V2.09

## Supported standards, recommendations and directives EMC, safety*

| | | |
|---|---|---|
| **PN-EN 55035:2017-09** | Electromagnetic compatibility of multimedia devices | Resilience requirements. |
| **PN-EN 55032:2015-09** | Electromagnetic compatibility (EMC) | Emission requirements. |
| **PN-EN IEC 62368-1:2020-11** | Information technology equipment | Safety - Part 1: Basic Requirements |
| **PN-EN 60825-1:2014-11** | Safety of laser equipment Part 1: Equipment classification and requirements. | |
| **EMC 2014/30/EU** | EMC Electromagnetic Compatibility Directive. | |
| **LVD 2014/35/EU** | LVD Low Voltage Directive. | |
| **IEC 61000-4-2** | Electromagnetic compatibility (EMC) | Part 4-2: Test and measurement methods - Test of resistance to electrostatic discharge |
| **IEC 61000-4-3** | Electromagnetic compatibility (EMC) | *Part 4-3: Test and measurement methods - RF radiated electromagnetic field immunity test* |
| **IEC 61000-4-4** | Electromagnetic compatibility (EMC) | Part 4-4: Test of resistance to a series of fast electrical transients |
| **IEC 61000-4-5** | Electromagnetic compatibility (EMC) | Part 4-5: Test and measurement methods -- Impact resistance testing |
| **IEC 61000-4-6** | Electromagnetic compatibility (EMC) | Part 4-6: Test and measurement methods -- Testing for immunity to conducted disturbances induced by radio frequency fields |
| **IEC 61000-4-8** | Electromagnetic compatibility (EMC) | Part 4-8: Testing for immunity to mains frequency magnetic fields |
| **IEC 61000-4-11** | Electromagnetic compatibility (EMC) | Part 4-11: Tests for resistance to voltage drops, short interruptions and voltage changes |
| **IEC 61000-4-12** | Electromagnetic compatibility (EMC) | Part 4-12: Test and measurement methods -- Test of resistance to damped sinusoidal waveforms |
| **IEC 61000-4-29** | Electromagnetic compatibility (EMC) | Part 4-29: Testing for immunity to voltage dips, short interruptions and voltage changes at the DC power connection |

* - The scope and list of supported standards may change as the device evolves.

## Ethernet Interfaces

- ✓ Ethernet Connectors: 4 x 1G/2.5G/10G SFP+, 8/16/24/32 x 10/100/1000 M RJ45 ports or 100M/1000M SFP slots (100Mbps speed on Optical Interface only works with optical SFP inserts) and 4 x 1G/2.5G/10Gbps SFP/SFP+ slots
- ✓ Unblocked matrix : 160Gbps
- ✓ Forwarding: 108-84 Mpps depending on the number of ports
- ✓ QoS: Support for 8 physical queues, Weighted Round Robin algorithm and Strict Priority queuing. Priority settings based on: 802.1p PCP priorities, DSCP/ToS, port-based priority settings, TCP/UDP port number-based priority configuration capabilities
- ✓ VLANS: 4094 VLAN entries, 802.1Q, 802.1QinQ, private VLANs, VLAN translation.
- ✓ Flow Control: Flow Control - controls sent and received packets to prevent buffer overflow, i.e. data loss
- ✓ Storm protection: filtering for incoming traffic of Broadcast, Multicast, Unknown DA or all packets, outgoing traffic filtering for packets of all types, bandwidth limiting
- ✓ Security: HTTP/HTTPS, SSL/SSH, IEEE 802.1x Port Based Network Access Protocol, EAP, TACACS+; RADIUS authentication, authorization and accounting functions - AAA
- ✓ IGMP snooping: V1/V2/V3, IGMP Filtering/Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- ✓ Syslog - cooperation with the syslog server,

- ✓ Port Mirroring: Monitoring traffic on selected ports
- ✓ IEEE 802.3az: Energy Efficient Ethernet, reduced power consumption, 4 modes
- ✓ Port Trunk: IEEE 802.3ad LACP or static aggregation
- ✓ RMON, MIB II, Port mirroring, DNS , IEEE802.1ab LLDP, LLDP-MED
- ✓ MAC address table: up to 32k entries
- ✓ Optional L3 - static routing
- ✓ Network redundancy
  - ITU-T G.8032 Ethernet Ring (ERPS)
  - IEEE 802.1d - Spanning Tree (STP)
  - IEEE 802.1w - Rapid Spanning Tree Protocol (RSTP)
  - IEEE 802.1s - Multiple Spanning Tree Protocol (MSTP)
- ✓ UTP module reflectometer test: Each RJ45 port can perform a reflectometer test of all pairs for twisted-pair cable, that is, diagnostics of short circuits or breaks in pairs and the total length of the cable to the next active device
- ✓ ITU K.44 - built-in secondary, 4kV, 10/700us overvoltage protection in TRX.1 modules on RJ-45 ports for the transmission path in accordance with the requirements: Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents - Basic Recommendation

## Network synchronization

- ✓ The device is equipped with a TCXO on-board generator
- ✓ NTP protocol in server/client mode and SNTP
- ✓ IEEE 1588-2008 v2 PTP -. The following IEEE1588 v.2 based Precision Time Synchronization (PTPv.2) profiles are available in 402.2 hardware supported: 1588 default, G.8265.1 and G.8275.1 in the following modes:
  - Transparent clock (TC): peer to peer, end to end with one step, two step;
    - Time error typically 50ns
  - Boundary clock (BC);
    - Time error for BC (Boundary clock) typically < 200ns
    - Time error for BC (Boundary clock) with SyncE typically <100ns
  - Slave
- ✓ Optional synchronization with Power Profile IEEEC37.238-2011, IEEEC37.238-2017 and Power Utility Profile IEC/IEEE 61850-9-3,
- ✓ In version 402.2 licensed support Synchronous Ethernet, G.8261 on optical ports

## MTBF

- ✓ Time: 451000 hrs.
- ✓ Standard: Telecordia , SR-332

## Management

- ✓ SNMP v1/2c/3
- ✓ HTTP/HTTPS protocol - via web browser
- ✓ SSH v2, TELNET
- ✓ Local CLI console (RS-232) - RJ45 connector
- ✓ "Privilege level" - Privilege level configuration - read/write, configurable not dependent for multiple users

## Power supply

- ✓ DC power supply 36-60V, 80-350V
- ✓ AC 75-240V power supply
- ✓ Optional two power supplies - redundant, AC+AC or DC+DC only power supply
- ✓ Power supply redundancy supported by Load Balance function

- ✓ 80-350V DC/75-240V AC power supply does not support PoE
- ✓ Screw connectors for AC and DC power supply
- ✓ Total power consumption (without PoE ports) - <50W

## PoE power supply

- ✓ Compatible with IEEE802.3af, IEEE802.3at, IEEE802.3bt standards
- ✓ Power available per port up to 90W
- ✓ For 55VDC power supply, the maximum total PoE power is 500W.

## Physical characteristics

- ✓ 19" 1U enclosure
- ✓ Dimensions [440x325x43] mm
- ✓ Metal housing IP-30
- ✓ Weight approximately 3.68kg

## Environmental requirements for operation

- ✓ Operating temperature: -40°C to +85°C at an airflow of 0.4 m/s
- ✓ Operating temperature: -40°C to +70°C with a minimum airflow of 0.0 m/s.
- ✓ Operating time at a maximum temperature of +85°C is up to 16 hours
- ✓ Standard ambient humidity during operation: 0 to 95 percent (non-condensing),
- ✓ Location type: class C according to EN 60870-2-2 - sheltered locations
- ✓ Degree of protection according to IP-30

## Mechanical drawing

View - side



355mm

44mm

View - from above



450mm

355mm
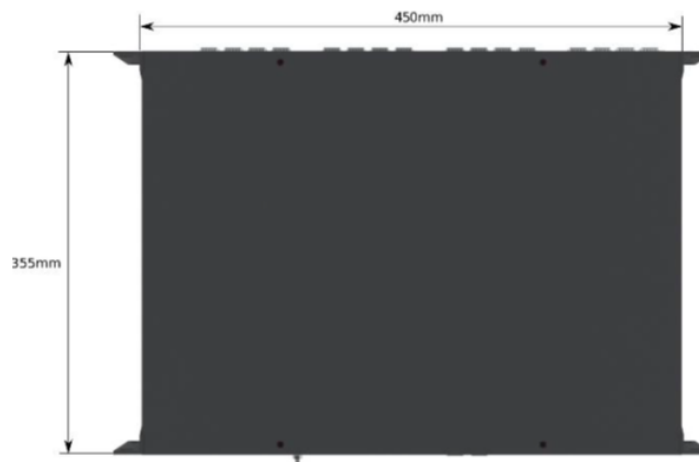
## HYPERION-402(.X)-Y-(L)-(Z)-K-U

| Hyperion -402 | (.X) | Y | (L) | (Z) | K | U |
|---|---|---|---|---|---|---|
| **Standard** | - | | | | | |
| Dedicated version for power substations | 2 | | | | | |
| **Available versions** | | | | | | |
| 32x RJ45 (10M/100M/1G) + 4x SFP/ SFP+ (1G/2.5G/10G) | | 1 | | | | |
| 24x RJ45 (10M/100M/1G) + 8x SFP (100M/1G) + 4x SFP/ SFP+ (1G/2.5G/10G) | | 2 | | | | |
| 16x RJ45 (10M/100M/1G) + 16x SFP (100M/1G) + 4x SFP/ SFP+ (1G/2.5G/10G) | | 3 | | | | |
| 8x RJ45 (10M/100M/1G) + 24x SFP (100M/1G)  + 4x SFP/ SFP+ (1G/2.5G/10G) | | 4 | | | | |
| 32x SFP (100M/1G) + 4x SFP/ SFP+ (/1G/2.5G/10G). | | 5[2] | | | | |
| 8x RJ45 (10M/100M/1G) + 16x SFP(100M/1G) + 4x SFP/ SFP+ (1G/2.5G/10G) | | 7 | | | | |
| **Routing functionalities (optional)** | | | | | | |
| Standard | | | - | | | |
| Static routing | | | L3 | | | |
| **Power over Ethernet (PoE) (optional)** | | | | | | |
| No PoE | | | | - | | |
| 8x HIGH PoE (802.3bt) PSE up to 90W per port | | | | S8P2b[3] | | |
| 16x HIGH PoE (802.3bt) PSE up to 90W per port | | | | S16P2b | | |
| 24x HIGH PoE (802.3bt) PSE up to 90W per port | | | | S24P2b | | |
| 32x HIGH PoE (802.3bt) PSE up to 90W per port | | | | S32P2b | | |
| **Additional features** | | | | | | |
| Option for version with 32x SFP slots | | | | | - | |
| Standard built-in secondary ITU K.44 overvoltage protection for transmission path, 4kV 10/700µs in modules on RJ-45 ports | | | | | K | |
| **Power supply** | | | | | | |
| Power supply 36-60VDC, for PoE in the range of 46-57VDC | | | | | | 7[1] |
| Power supply 80-350V DC, 75-240VAC | | | | | | C[2] |
| Redundant 36-60VDC, for PoE in the range of 46-57VDC | | | | | | 77p[1] |
| Redundant 80-350V DC, 75-240VAC | | | | | | CCp[2] |

Legend:

1 - For version with PoE, the maximum power available on all RJ45 ports is 500W

2 - Option only available for device without PoE

3 - Option available only for version 402-4 and 402-7

## Additional accessories

| Designation | Transmission speed | Wavelength | Fiber optic type | Distance | Insert type | Connector type | Operating temperature | Comments |
|---|---|---|---|---|---|---|---|---|
| BTPP-85192-SRC | 10 Gb/s | 850 nm | MM | 300 m | SFP+ | LC | 0~70° C | --- |
| BTPP-31192-LRC | 10 Gb/s | 1310 nm | SM | 10 km | SFP+ | LC | 0~70° C | --- |
| BTPP-31192-L2C | 10 Gb/s | 1310 nm | SM | 20 km | SFP+ | LC | 0~70° C | --- |
| BTPP-55192-ERC | 10 Gb/s | 1550 nm | SM | 40 km | SFP+ | LC | 0~70° C | --- |
| BTPP-55192-ZRC | 10 Gb/s | 1550 nm | SM | 80 km | SFP+ | LC | 0~70° C | --- |
| | | | | | | | | |
| BTP-8524-S5TD | 1.25 Gb/s | 850 nm | MM | 550 m | SFP | LC | -40~85° C | 100Mb support |
| BTP-3124-L2TD | 1.25 Gb/s | 1310 nm | MM/SM | 2/20 km | SFP | LC | -40~85° C | 100Mb support |
| BTP-3124-L4TD | 1.25 Gb/s | 1310 nm | SM | 40 km | SFP | LC | -40~85° C | 100Mb support |
| BTP-5524-L8TD | 1.25 Gb/s | 1550 nm | SM | 80 km | SFP | LC | -40~85° C | 100Mb support |
| BTP-5524-12TD | 1.25 Gb/s | 1550 nm | SM | 120 km | SFP | LC | -40~85° C | 100Mb support |
| | | | | | | | | |
| BTE-GB-P1RT | 10/100/1000 Mb/s | 100m (UTP-5) | --- | | Copper SFP | RJ-45 | -40~85° C | |
| BTE-GB-P3RT | 1000 Mb/s | 100m (UTP-5) | --- | --- | Copper SFP | RJ-45 | -40~85° C | --- |

## List of proposed power supplies for BITSTREAM devices

| Designation of the power supply | Output voltage range | Nominal output power | Number of ports with PoE (15W) | Number of ports with PoE+ (30W) | Number of ports with PoE++ (60W) | Number of ports with PoE++ (90W) | Operating temperature C-standard T-industrial | Comments |
|---|---|---|---|---|---|---|---|---|
| | DC | W | | | | | | |
| ZAS-48V56-60-R-T | 48 - 56 V | 60 | 3 | 1 | 0 | 0 | -20°C ~ +70°C | PoE support |
| ZAS-48V55-120-R-T | 48 - 55 V | 120 | 6 | 3 | 1 | 1 | -20°C ~ +70°C | PoE support |
| ZAS-48V55-240-R-T | 47 - 56 V | 240 | 13 | 6 | 3 | 2 | -20°C ~ +70°C | PoE support |
| ZAS-48V55-480-R-T | 47 - 56 V | 480 | 30 | 14 | 7 | 4 | -20°C ~ +70°C | PoE support |
| ZAS-48V55-960-R-T | 48 - 55 V | 960 | 60 | 30 | 15 | 8 | -20°C ~ +70°C | PoE support |

Legend of designations: W - plug-in; S - standalone; R - for DIN rail.

## Hyperion switch expansion license kit- 402

1. **SYNCE LICENSE - Synchronous Ethernet G.8261 -** license to add Synchronous Ethernet G.8261 functionality (Timing and synchronization aspects in packet networks) on optical ports , providing precise synchronization of internal clocks of devices using frequency, among other applications in the energy industry.

2. **PTP SYNCHRONIZATION LICENSE WITH POWER PROFILE -** License to extend in the IEEE1588 PTPv2 protocol with POWER PROFILE - IEEEC37.238-2011, IEEEC37.238-2017 and IEC61850-9-3 for precise time synchronization among other applications in the power industry.

   **NOTE: Licenses only available in 402.2 version.**

# Bitstream S.A.

Mełgiewska St. 7/9
20-209 Lublin, Poland
Vat: 946-250-85-88
Tel. +48 81 743 86 43
Fax +48 442 02 98
info@bitstream.pl
www.bitstream.pl/en