

Ethernet Switch

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| Type | 10 Gigabit Carrier Ethernet CE 2.0 | 10 Gigabit Layer 3 | Gigabit Layer 3 | Gigabit | Gigabit | Gigabit | 10 Gigabit Carrier Ethernet CE 2.0 | Fast Ethernet DIN | Fast Ethernet DIN | Gigabit DIN | Gigabit POE DIN |
|---------------------------------|--|---|---|--|--|--|--|-------------------------------|-------------------------------|---|---|
| Total number of ports | 15 | 28 or 52 | 28 | 28 | 26 | 1+8 2+8x POE | 5 | 8 | 6 | 10 | 10 |
| 10 Gigabit Ethernet ports | 2x SFP+ | 4 | - | - | - | - | 2x SFP+ | - | - | - | - |
| Gigabit ports 10/100/1000BT | 8 + 1 | 4x combo up to 20x POE | 2x combo | 24x POE | 2x combo | 1x combo | 8 | - | - | - | - |
| Gigabit SFP ports | 4x SFP 2.5 / GbE / 100FX | 4x combo | 2 + 2x combo | 4 | 2x combo | 1x combo | 2x SFP 2.5 / GbE / 100FX | - | - | 2 | 2 |
| 10/100BT copper ports | - | up to 20 or 44 | 24 | - | 24 | 8 | - | 8 / 6 | 1 + 4x POE 30W | 8 | 8x POE 4x 30W + 4x 15W |
| 100FX optical ports | - | up to 20 or 44 | 24 | - | - | - | - | 0 / 2 | 1 | - | - |
| Protocols | VLAN 802.1q GVRP, GARP QoS 802.1p IGMP Snooping Flow ctl 802.3x 802.1x, Radius Port trunking Port mirroring NTP client - relay STP, RTSP, MSTP EVC, E-Lan/E-Tree G.8031 / 8032 OAM 802.3ah Y.1731 IP routing | IP routing RIP, OSPF, BGP VLAN 802.1q Q-in-Q GVRP QoS 802.1p IGMP Snooping 802.1X Port trunking LACP Port mirroring DHCP relay - server NTP client - relay STP, RSTP, MSTP | IP routing RIP, OSPF, BGP VLAN 802.1q Q-in-Q GVRP QoS 802.1p IGMP Snooping 802.1X Port trunking LACP Port mirroring DHCP relay - server NTP client - relay STP, RSTP, MSTP | VLAN 802.1q S-VLAN, C-VLAN Q-in-Q GVRP QoS 802.1p IGMP Snooping Flow ctl 802.3x Authentic 802.1x Port trunking LACP Port mirroring DHCP relay - server NTP client - relay STP, RTSP, MSTP 50ms Ring Protection | VLAN 802.1q S-VLAN, C-VLAN Q-in-Q GVRP QoS 802.1p IGMP Snooping Flow ctl 802.3x Authentic 802.1x Port trunking LACP Port mirroring DHCP relay - server NTP client - relay STP, RTSP, MSTP 50ms Ring Protection | VLAN 802.1q S-VLAN, C-VLAN Q-in-Q GVRP QoS 802.1p IGMP Snooping Flow ctl 802.3x Authentic 802.1x Port trunking LACP Port mirroring DHCP relay - server NTP client - relay STP, RTSP, MSTP 50ms Ring Protection | VLAN 802.1q GVRP, GARP QoS 802.1p IGMP Snooping Flow ctl 802.3x 802.1x, Radius Port trunking Port mirroring NTP client - relay STP, RTSP, MSTP EVC, E-Lan/E-Tree G.8031 / 8032 OAM 802.3ah Y.1731 IP routing | Transparent | Transparent | VLAN 802.1q GVRP QoS 802.1p IGMP Snooping 802.1X STP, RSTP, MSTP A.Ring 15 ms NTP, SNTP Port Trunking | VLAN 802.1q GVRP QoS 802.1p IGMP Snooping 802.1X STP, RSTP, MSTP A.Ring 15 ms NTP, SNTP Port Trunking |
| Management | Console telnet - ssh http, https snmp v1,v2,v3 | Console telnet - ssh snmp v1,v2,v3 | Console telnet, ssh snmp v1, v2, v3 | Console ftp telnet - ssh snmp v1,v2,v3 | Console ftp telnet - ssh snmp v1,v2,v3 | Console ftp telnet - ssh snmp v1,v2,v3 http | Console telnet - ssh http, https snmp v1,v2,v3 | Not manageable Alarm relay | Not manageable Alarm relay | Console telnet, ssh snmp v1, v2, v3 | Console telnet, ssh snmp v1, v2, v3 |
| Industrial temperature range | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industrial EMI | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Railway environment | - | - | - | - | - | - | Yes | opt. | - | opt. | opt. |
| Electric Substation environment | - | - | - | - | - | - | Yes | opt. | - | opt. | opt. |
| Power supply | 1x AC 1 or 2x 24-48 Vdc | 1 or 2x AC or 48 Vdc | 1x AC or 48Vdc | 1x AC or 48Vdc 1 or 2x AC or 48Vdc | 1x AC or 48Vdc | 1x AC or 48Vdc | 1 or 2x 24-48 Vdc | 12-48 Vdc | 48 Vdc | 12-48 Vdc | 12-48 Vdc |
| Format | 1U / compact | 1U / 19" | 1U / 19" | 1U / 19" | 1U / 19" | 1U / compact | DIN | DIN | DIN | DIN | DIN |
| Size WxDxH mm | 327x172x44 | 444x400x44 | 440x290x44 | 440x290x44 440x400x44 | 440x192x44 | 205x130x40 300x240x44 | 110x76x26 | 135x125x50 | 105x93x61 | 145x125x50 | 145x125x50 |



Ethernet Access and Extender Solutions

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| | FOCD-I | FiberWay-GE | CopperLan-Bis | SpeederLanBis-GE | CopperWay-Bis-GE | CopperWay-Bis-2TTX | SWM-8VDPW | VDDCOAX-4TPOE | VDP2-I-4TTX | CV200 |
|--------------------|---|---|--|---|---|---|---|---|---|--|
| |  |  |  |  |  |  |  |  |  |  |
| Type | Ethernet Media Converter | Ethernet Optical Switch | EFM SHDSL.Bis Bridge CPE | EFM SHDSL.Bis Aggregation bridge | EFP SHDSL.Bis & SFP Drop & Insert Bridge | EFP SHDSL.Bis Drop & Insert Bridge | VDSL2 Switch POL and POE | VDSL2 CPE POL and POE | VDSL2 bridge CPE | E1-T1 CSU-DSU Ethernet bridge |
| WAN interface | Copper or optical Ethernet | 2x SFP Gigabit Eth 2x SFP 100FX | 1/ 2 copper pairs | 1- 8 copper pairs 1x SFP Gigabit Eth | 2x SFP GbE 2x SFP 100FX 2x 2 copper pair 60 Mb | 2x 1 copper pair 30 Mb | 8x VDSL2 with POL | VDSL2 | VDSL2 | E1 - T1 |
| Ethernet interface | 100BT / 100FX 1,000BT / 1,000GX copper or optical POE PSE | 4x 10/100 BaseT POE PSE 4x SFP 100FX / GbE | 4x 10/100 BaseT 1x POE PSE | 4x 10/100/1000 BaseT 1x SFP Gigabit Eth | 4x 10/100 BaseT POE PSE 4x SFP 100FX / GbE | 2x 10/100 BaseT | 2x GbE | 4x 10/100 BaseT with POE | 4x 10/100 BaseT | 1x 10/100 BaseT |
| Other interfaces | - | 4x RS232/RS485 4+2x Digital in / out | 1x RS232 | - | 4x RS232/RS485 4+2x Digital in / out | 2x RS232/RS485 | Alarm relay | Alarm relay | Alarm relay | - |
| Max WAN throughput | 1 Gbps | 1,000 Mbps SFP | 22 Mbps | 120 Mbps SHDSL-Bis 1,000 Mbps SFP | 2x30 Mbps SHDSL.Bis 2x1,000 Mbps SFP | 2x15 Mbps SHDSL.Bis | 8x2x 100 Mbps | 2x 100 Mbps | 100 Mbps | 2 Mbps |
| WAN Protocol | Ethernet | Ethernet | 802.3ah, EFM | 802.3ah, EFM Point to Point mini-DSLAM Ethernet | 802.3ah, EFM | 802.3ah, EFM | G.993.2 G.994.1 | G.993.2 | G.993.2 | PPP - BCP HDLC |
| Link Aggregation | - | - | 802.3ah, PAF | 802.3ah, PAF | 802.3ah, PAF | 802.3ah, PAF | 802.3ad | - | - | - |
| Protocols | | 802.3X 802.1D VLAN 802.1q QoS, 802.1p, DSCP STP, RSTP 802.1X | 802.3X 802.1D VLAN 802.1q Q-in-Q 802.1ad QoS, 802.1p, DSCP STP, RSTP RIP DHCP, NAT, DNS | 802.3X 802.1D VLAN 802.1q QoS, 802.1p, DSCP STP, RSTP 802.1X | 802.3X 802.1D VLAN 802.1q QoS, 802.1p, DSCP STP, RSTP 802.1X | 802.3X 802.1D VLAN 802.1q QoS, 802.1p, DSCP STP, RSTP 802.1X | 802.3X 802.1D VLAN 802.1q QoS, 802.1p, DSCP IGMP Snooping DHCP | 802.3X 802.1D VLAN 802.1q QoS, 802.1p, DSCP | 802.3X 802.1D VLAN 802.1q QoS, 802.1p, DSCP | VLAN 802.1q Q-in-Q 802.1ad QoS, 802.1p 802.3X 802.1D Data compression |
| Management | Dip switches | CLI http, https ssh snmp v3 ftp Syslog USB | CLI http, https ssh snmp ftp Syslog | CLI http, https ssh snmp v3 ftp Syslog USB | CLI http, https ssh snmp v3 ftp Syslog USB | CLI http, https ssh snmp v3 ftp Syslog USB | CLI http telnet snmp v3 tftp | Dip switches | Dip Switches | VT100 menus AT and CLI Telnet snmp ftp |
| Power supply | 12 - 48 Vdc | 24 - 48 Vdc | AC / 5 Vdc adaptor 24/48 Vdc | 1x AC, 1 or 2x 48 Vdc | 24 - 48 Vdc | 12 - 24 Vdc | 110 - 230 Vac | POL & 48 Vdc | 2x 12-48 Vdc | AC / 5 Vdc adaptor |
| Format | Compact, DIN | Compact, DIN | Compact | Desktop or rackmount | Compact, DIN | Compact, DIN | 19" / 1U | Compact, DIN | Compact | Compact |
| Size - WxDxH mm | 106x90x35 | 260x160x35 | 170x120x41 | 287x175x41 | 260x160x35 | 155x164x35 | 404x274x44.5 | 135x106.5x62 | 170x121x35 | 146x144x31 |



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TDM over IP, E1/T1 and SONET/SDH Multiplexers

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| Type | TDM over IP 2x E1/T1 | TDM over IP 4x E&M Leased Line FXO / FXS | TDM over IP 1x RS530, V35, X21 | TDM over IP 16x E1 / T1 | TDM over IP 1x STM4 | 16x E1 Inverse Multiplexer | SONET/SDH ADM multiplexer | SONET/SDH and E1/T1 cross connect | E1/T1 DS-0 DACS | Carrier Ethernet MPLT-TP SDH / PDH | E1 or optical SFP multiplexer to 4x E&M |
|--|---|---|--|---|---|--|--|--|--|--|--|
| WAN interface | Ethernet 1x SFP GbE 2x 10/100BT | Ethernet 2x SFP GbE 4x 10/100BT | Ethernet 1x SFP GbE 2x 10/100BT | Ethernet 2x GbE Combo RJ45 & SFP | Ethernet 2x GbE Combo RJ45 & SFP | 16x E1 | STM-1/4/16 OC-3/12/48 | STM-1/4 OC-3/12 TDM over IP | E1 / T1 TDM over IP | 10GE CE & MPLS-TP | E1 or optical SFP |
| SONET / SDH Terminal | No | No | No | No | No | No | Yes | Yes | No | Yes | No |
| SONET / SDH multiplexer at DS-1 level | No | No | No | No | No | No | Yes | Yes | No | No | No |
| E1 / T1 channel bank and DS-0 multiplexer | No | No | No | No | No | No | No | Yes | Yes | No | Yes |
| Redundancy | 802.1q Trunking | No | No | PSU | PSU | PSU | PSU + CPU + WAN | PSU + CPU + WAN | PSU + CPU + WAN | PSU + WAN | No |
| Modularity | No | No | No | 2x Power supplies 4x slots for 4xE1/T1 | 2x Power supplies 4x slots for STM-1/4 and E1/T1 | No | 2xPSU + 2xCPU/WAN slots + 8x tributary slots | 2xPSU + 2xCPU-SDH + 12x Long Slots + 4x short slots | 2xPSU + 2xCPU + 12x Long Slots + 4x short slots | 2x PSU 4 slots for 10GE + SDH + PDH | No |
| WAN capacity | GbE | GbE | GbE | GbE | GbE | 16x E1 | 4x STM-16 OC-48 | 2x STM-4 OC-48 | 64 x E1 - T1 | 2x 10 GE | 1x E1 |
| Tributary cards and Features | 2x E1 / T1 Nx 64 kbps 2x 10/100BT 1x SFP GbE AAL1 over IP CES over IP SAT over IP up to 30 Bundles | 2 or 4x E&M voice Leased Line 2 or 4x FXO / FXS 1x RS232 1x E1 (opt) 4x 10/100BT 2x SFP GbE AAL1 over IP CES over IP SAT over IP up to 30 Bundles | 1x Serial port RS530 / V35 X21 / RS232 2x 10/100BT 1x SFP GbE AAL1 over IP SAT over IP HDLC over IP | 4x 4x E1/T1 2x Gigabit Ethernet SFP + RJ45 AAL1 over IP CES over IP SAT over IP up to 256 Bundles | up to 32x E1/T1 up to 4x STM-1 up to 1 STM-4 2x Gigabit Ethernet SFP + RJ45 3x 10/100/1000 RJ45 CES over IP SAT over IP up to 512 Bundles | Ethernet 2x 10/100/1000BT HDLC GFP / VCAT PPP/BCP 802.1q Provider Bridge | 16x E1/T1 32x E1/T1 63x E1/T1 3x E3/DS-3 1xGE / 8x10/100BT 2x 10/100/1000 plus 2x combo GE | Long slots : 4xE1 4xT1 8x ETH bridge - router TDM over IP, 2x ETH 5x RS232 sync - async 8x RS232 async 6x V35 - RS530 4x SHDSL 2 wires 2x SHDSL 2/4 wires 12/24x FXO 12/24x FXS 8xE&M Mini slots: 1x E1 1x T1 Optical fiber / 4x E1-T1 Ethernet bridge - router 3x RS232 async | Long slots : 4xE1 4xT1 8x ETH bridge - router TDM over IP, 2x ETH 5x RS232 sync - async 8x RS232 async 6x V35 - RS530 4x SHDSL 2 wires 2x SHDSL 2/4 wires 12/24x FXO 12/24x FXS 8xE&M Mini slots: 1x E1 1x T1 Optical fiber / 4x E1-T1 Ethernet bridge - router 3x RS232 async | 2x 10GE SFP+ 4x STM-1 32x E1/T1 8x GE 8x SFP GE / FX | 4x E&M 1x E1 1x SFP 1x Ethernet (mgt) |
| Format | Compact | DIN, compact | Compact | 1U / 19" | 1U / 19" | 1U / 19" | 6U / 19" | 5U / 19" | 5U / 19" | 1 U / 19" | Compact |
| Power supply | 1x AC adaptor or 48 Vdc | 48 Vdc or 12-24 Vdc | 1x AC adaptor or 48 Vdc | 1 or 2x AC and/or 48 Vdc | 1 or 2x AC and/or 48 Vdc | 2x AC or 2x 48 Vdc | 1 or 2x AC and/or 48 Vdc | 1 or 2x AC and/or 48 Vdc | 1 or 2x AC and/or 48 Vdc | 1 x AC or 1 or 2x 48 Vdc | AC or 48 Vdc |
| Size mm (WxDxH) | 170x120x41 | 220x140x44 | 170x120x41 | 438x226x44 | 438x226x44 | 432x200x44 | 433x280x264 | 434x220x225 | 434x220x225 | 438x225x44 | 433x280x264 |



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Rev. 03

SONET / SDH Terminal

Fiber Optic Media Converter, CSU-DSU, Modem

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| Type | E1/T1 optical modem | 4xE1/T1 optical multiplexer | RS530 optical modem | Ethernet Media Converter | E1/T1 SHDSL modem | E1/T1 and RS530 SHDSL modem | E1-T1 CSU-DSU Ethernet bridge | RS530 E1 / T1 CSU-DSU | RS232/RS485 over Ethernet / IP | Voice Freq. Modem |
|---------------------------|---|---|---|---|--|---|--|--|--|---|
| WAN interface | Optical | Optical | Optical | Copper or optical Ethernet | 1/2x copper pairs | 1/2x copper pairs | E1 - T1 | E1 / T1 | Ethernet copper or fiber | Leased Line and Dial-up |
| Terminal interface | E1 / T1 | 4x E1T1 2x Ethernet 10/100 | RS232/RS530/V35/X21 | 100BT / 100FX 1,000BT / 1,000GX 10GbE / 10GbE copper or optical | E1 / T1 | E1 / T1 RS232/RS530/V35/X21 | 1x 10/100 BaseT | RS232/RS530/V35/X21 | 2x RS232 / RS485 | RS232 - V35 - X21 |
| Other interfaces | Ethernet 10/100 | - | - | - | - | Ethernet 10/100 | - | - | 2+2x Digital in / out | - |
| Max WAN throughput | 2 Mbps | 100 Mbps | 8 Mbps | 10 GbE | 2 Mbps | 2 Mbps | 2 Mbps | 2 Mbps | 100 Mbps | 33.6 kbps |
| WAN Protocol | CMI | E13 / M13 CMI HDLC | CMI | Ethernet | G.991.2 | G.991.2 | PPP - BCP HDLC | G704 | Ethernet TCP / UDP | V21, V22, V32, V34 V27, V29, V33 Bell 202T |
| Protocols | | 802.3X 802.1D VLAN QoS, 802.1p, DSCP | | Ethernet | | | VLAN 802.1q Q-in-Q 802.1ad QoS, 802.1p 802.3X 802.1D Data compression | | IP / UDP / TCP Raw, bloc, modem Telnet, Rlogin, Rtelnet RFC 2217 / COM port | MNP4-5 V42-V42Bis |
| Management | VT100 menus AT and CLI Telnet snmp ftp Alarm relay | VT100 menus AT and CLI Telnet snmp ftp Alarm relay | VT100 menus AT and CLI Telnet snmp ftp Alarm relay | Dip switches FOCIR : http | VT100 menus AT and CLI Alarm relay | VT100 menus AT and CLI Telnet snmp ftp Alarm relay | VT100 menus AT and CLI Telnet snmp ftp | VT100 menus AT and CLI Alarm relay | VT100 menus AT and CLI http, https ftp snmp | VT100 menus AT and CLI Telnet snmp ftp Alarm relay |
| Power supply | AC or 48 Vdc | AC or 48 Vdc | AC or 48 Vdc | AC or 48Vdc adapter | AC / 5 Vdc adaptor or 48 Vdc or line feeding | AC or 48 Vdc | AC / 5 Vdc adaptor | AC or 48 Vdc | AC or 12/24/48 Vdc | AC / 5 Vdc adaptor or 48 Vdc or AC |
| Format | Desktop or rackmount | Desktop or rackmount | Desktop or rackmount | Compact or rackmount | Compact | Desktop or rackmount | Compact | Desktop or rackmount | Compact | Desktop or rackmount |
| Size mm (WxDxH) | 287x175x41 | 287x175x41 | 287x175x41 | 71x94x26 | 170x120x41 | 287x175x41 | 146x144x31 | 287x175x41 | 144x114x31 | 287x175x41 |

