

POINT TO POINT



ALS

IP/PDH/SDH Series



ALS Series provides Native IP and Native PDH and SDH connections; it is the ideal solution for a wide range of applications in access networks and backbone areas, covering any market segment ranging from cost-sensitive applications to advanced network implementations in which high capacities, complex protection schemes and excellent reliability are mandatory.

Its superior mix of Packet and TDM interfaces allows easy network evolution from pure TDM to pure IP.

A complete range of user interfaces (E1, Gigabit/Fast Ethernet and STM1) and a high degree of versatility allow very easy network planning and management.

ALS series includes nodal configuration for crowded stations where many different hops are converging; it allows a drastic reduction of equipment complexity both in terms of units counts and physical connections.

ALS is available in all frequency bands from 4 to 42 GHz in single or duplicated configuration, with Gbps radio capacity. XPIC functionality is available for high capacity cross-polar implementations.



siae microelettronica



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IP/PDH

IP/PDH/SDH Series

IP/PDH / SDH Series

MAIN FEATURES

- > Advanced Microwave Technology
- > Base-Band high circuit integration
- > Reduced power consumption
- > Excellent radio-electrical performance
- > Full software approach:
 - Modulation and radio capacity
 - Adaptive modulation
 - Alarm/performance monitoring
 - Fault analysis
 - Availability of O&M Tools (Loop activation, switch manual forcing, etc.)
- > Interchangeable modules
- > Easy configuration upgrade
- > Mixed TDM and Ethernet interfaces
- > Synchronous Ethernet support
- > Reduced OPEX (high reliability and fast restoration of replaceable Units)
- > Extended environmental compatibility
- > Extreme compactness and lightness
- > Optimized mechanical solutions
- > Complete compatibility and inter-operability with all SIAE MICROELETTRONICA's equipment
- > Integrated antennae up to 1.8 m

L2 SWITCH FUNCTIONALITIES

- > MAC Address switching, ageing and learning
- > VLAN / VLAN STACKING (IEEE 802.1q with QinQ)
- > Ethernet QoS (IEEE 802.1p)
- > Flow Control (IEEE 802.3x)
- > IP-V4 ToS / IP-V6 TC
- > Jumbo Frames
- > RMON Statistic
- > CIR
- > LLF (Link Loss Forwarding)
- > Link aggregation (IEEE 802.3ad)
- > ETH OAM (IEEE 802.1ag/ITU-T Y 1731)
- > MSTP (IEEE 802.1w)

NODAL CONFIGURATION

In a Nodal Station the cross-connection functionality can be distributed over a configuration of up to eight different IDUs, and each one can manage up to two different ODU's (depending on IDU type). Connections among IDUs are ring protected. Failing one IDU, no other IDU in the node is affected by loss of traffic.

Thanks to the IDU scalable approach and user friendly software management, it is possible to build up a nodal configuration through incremental expansions (from one up to twelve or sixteen different directions) with a reduced initial investment.

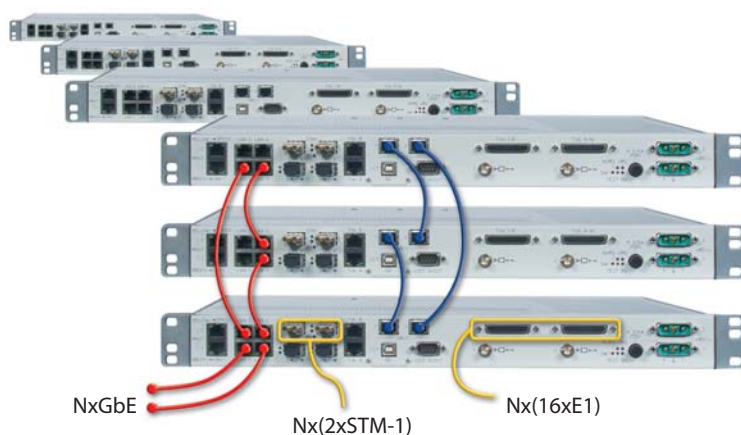
TYPICAL APPLICATIONS

The ALS series has been conceived and designed to cover a wide range of applications, such as:

- > 2G / 3G / LTE Cellular Network Infrastructure
- > 10/100/1000 Mbit/s Ethernet connections
- > WiMAX backhauling
- > Private data Networks (WANs, LANs, etc.)
- > Utility Networks (Railways, Pipelines, etc.)
- > Back-up transmission medium to Fibre Optic links
- > Spur Links for Backbones/Rings
- > Last Mile Fibre Extension
- > Leased Lines Replacement
- > SDH Radio Ring Deployment up to 4xSTM-1
- > High Capacity Broadband Access Networks

NETWORK MANAGEMENT

- > SNMP Agent protocol with "Full IP" or "OSI+IP" stack
- > Messages Routing: static, OSPF, IS-IS
- > Local Craft Terminal (LCT)/WEB LCT interface: USB (BType)
- > Network management System (NMS) interface:
 - Ethernet 10BASE-T
 - RS232 (only for modular versions)
 - EOC (PDH applications)
 - Out band and In-Band communication
 - DCC byte for STM-1 traffic (SDH applications)





OUTDOOR UNIT



Two ODU versions are available:
 AL for IP/PDH applications and AS for IP/PDH/SDH applications

- > Light weatherproof (IP65) box
- > Easy and quick deployment
- > Full software programmability of main RF parameters
- > Extended (Software) frequency agility
- > Configuration, capacity and modulation independent
- > Excellent short and long term frequency stability
- > Built-in ATPC functionality
- > RF Loop

INDOOR UNIT

Several IDU models are available to fit any application:

IP PDH SDH Medium & High Capacity

| IDU Model | IP - PDH Solutions AL / ALplus | IP - SDH Solutions ALS | IP - PDH - SDH Solutions ALplus2 / ALCplus2 / ALCplus2e |
|--|--|--|--|
| IDU 1RU (1 rack unit) - Compact Version | | | |
| Configuration | 1+0 / 1+1 | 1+0 / 1+1 / 2x(1+0) / XPIC | 1+0 / 1+1 / 2x(1+0) / XPIC |
| TDM Transmission Capacity | Up to 32xE1 | 1xSTM1 / 2xSTM1 / 63-126xE1* | Up to 164xE1 per radio direction |
| Ethernet Throughput Capacity | Up 100 Mbps | - | Up to 500 Mbps (per radio channel - 1 Gbps with XPIC) |
| Modulation | 4 to 32QAM | 32 and 128QAM | 4 to 256QAM with 8 ACM |
| Tributary interfaces | 16xE1 + 3xFE 32xE1 32xE1 + 3xFE | 2xSTM1 | (16+2)xE1 + 2xSTM1 (32+2)xE1 + 2xSTM1 TDM Cross Connection capability 2xGE Electrical + 2xGE Optical/Electrical Synchronous Ethernet Support |
| Maintenance Interfaces | 2x10BaseT + USB + RS232 + G704 (E1) | 2x10BaseT + USB + RS232 | 2x10BaseT + USB + G704 (E1) |
| IDU 1RU (1 rack unit) - Modular Version | | | |
| Configuration | 1+0 / 1+1 | 1+0 / 1+1 / 2x(1+0) | 1+0 / 1+1 / 2x(1+0) |
| TDM Transmission Capacity | Up to 32xE1 | 1xSTM1 / 2xSTM1 / 4xSTM1 | Up to 80xE1 (per radio channel) |
| Ethernet Throughput Capacity | Up 100 Mbps | 155 / 310 / 620 Mbps | Up to 400 Mbps (per radio channel) |
| Modulation | 4 to 32QAM | 32 and 128QAM | 4 to 256QAM with 8 ACM |
| Tributary interfaces | 32xE1 24xE1 + 4xFE | 2xSTM1 4xSTM1 8xE1 + 2xFE + 1xGE | 16xE1 + 2xSTM1 TDM Cross Connection capability 1xGE Electrical/Optical + 1xGE Electrical + 1xGE Optical |
| Maintenance Interfaces | 2x10BaseT + USB + RS232 + G704 (E1) | 2x10BaseT + USB + RS232 | 2x10BaseT + USB + RS232 + G704 (E1) |
| IDU - Nodal | | | |
| | Modular 2RU | Modular 2RU | Nx1RU |
| Configuration | 1+0 / 1+1 / 2x(1+1) Drop/Insert | 1+0 / 1+1 / 2x(1+0) / 2x(1+1) | Nx(1+0), Nx(1+1) Drop/Insert Nx2x(1+0), Drop/Insert |
| TDM Transmission Capacity | Up to 53xE1 | 1xSTM1 / 2xSTM1 / 4xSTM1 | Up to 164xE1 (per radio direction) |
| Ethernet Throughput Capacity | Up 100 Mbps | 145 / 290 / 580 Mbps | Up to 500 Mbps (per radio channel - 1 Gbps with XPIC) |
| Modulation | 4 to 32QAM | 32 and 128QAM | 4 to 256QAM with 8 ACM |
| Tributary interfaces | 53xE1 53xE1 + 4xFE 2xSTM1 + 16xE1 + Nodal Connection 2xSTM1 + 16xE1 + 1xFE + 1xGE + Nodal Connection | 2xSTM1 4xSTM1 8xE1 + 2xFE + 1xGE | Nx2xSTM1 Nx16xE1 Nx2xGE TDM Cross Connection capability Synchronous Ethernet Support |
| Maintenance Interfaces | 2x10BaseT + USB + RS232 + G704 (E1) | 2x10BaseT + USB + RS232 | 2x10BaseT + USB + G704 (E1) |



IDU 1RU
 up to 800 Mbps



IDU 1RU / NODAL
 up to Nx800 Mbps



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Technical Specifications (*)

| Frequency Band | 4 GHz | 6L/6U GHz | 7/8 GHz | 10/11 GHz | 13 GHz | 15 GHz | 18 GHz | 23 GHz | 25 GHz | 28 GHz | 32 GHz | 38 GHz | 42 GHz | |
|--|---|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------|-------------|-------|
| Frequency Range | 4.4-5.0 | 5.9-7.1 | 7.11-8.5 | 10.2-11.7 | 12.75-13.25 | 14.4-15.35 | 17.7-19.7 | 21.2-23.6 | 24.5-26.5 | 27.5-29.5 | 31.8-33.4 | 37-39.5 | 40.5-43.5 | |
| Channel Spacing | 4 QAM | 4 Mbits (3.5 MHz BW) to 100 Mbits (56 MHz) | | | | | | | | | | | | |
| | 8 QAM | 18 Mbits (7MHz BW) to 150 Mbits (56 MHz) | | | | | | | | | | | | |
| | 16 QAM | 8 Mbits (3.5 MHz BW) to 200 (56 MHz BW) | | | | | | | | | | | | |
| | 32 QAM | 30 Mbits (7 MHz BW) to 240 Mbits (56 MHz BW) | | | | | | | | | | | | |
| | 64 QAM | 38 Mbits (7MHz BW) to 290 Mbits (56 MHz BW) | | | | | | | | | | | | |
| | 128 QAM | 42 Mbits (7 MHz BW) to 340 Mbits (56 MHz BW) | | | | | | | | | | | | |
| | 256 QAM | 50 Mbits (7 MHz BW) to 500 Mbits (56 MHz BW) | | | | | | | | | | | | |
| Supported Configurations | Terminal applications | 1+0 / 1+1 MHSB / 1+1 SD / 1+1 FD / 2+0 / 2x(1+1) | | | | | | | | | | | | |
| | Nodal applications | Up to 8x(1+1) or up to 16x(1+0) | | | | | | | | | | | | |
| Modulation Schemes | 4 QAM / 8 QAM / 16 QAM / 32 QAM / 64 QAM / 128 QAM / 256 QAM | | | | | | | | | | | | | |
| Supported Capacities | 2xE1 / 4xE1 / 5xE1 / 8xE1 / 10xE1 / 16xE1 / 21xE1 / 32xE1 / 42xE1 / 53xE1 / 1xSTM1 / 80xE1 / 160xE1 / 2xSTM1 / 4xSTM1 | | | | | | | | | | | | | |
| Ethernet Throughput | Up to 1 Gbps per radio channel | | | | | | | | | | | | | |
| Output Power (dBm) at Point C** | | | | | | | | | | | | | | |
| AL ODU / AS ODU | 4 QAM | +29/- | -/+29 | +27/+29 | +25/+28 | +25/+28 | +25/+28 | +20/+23 | +20/+23 | +20/+22 | +19/+21 | +17/+20 | +17/+19 | -/+17 |
| | 8 QAM | - | -/+29 | -/+29 | -/+28 | -/+28 | -/+28 | -/+23 | -/+23 | -/+22 | -/+21 | -/+20 | -/+19 | -/+17 |
| | 16 QAM | +24/- | -/+26 | +22/+26 | +20/+25 | +20/+25 | +20/+25 | +15/+21 | +15/+21 | +15/+20 | +14/+19 | +13/+18 | +13/+17 | -/+15 |
| | 32 QAM | +23/- | -/+26 | +20/+26 | +20/+25 | +20/+25 | +20/+25 | +15/+21 | +15/+21 | +15/+20 | +14/+19 | +13/+18 | +13/+17 | -/+15 |
| | 64 QAM | - | -/+25 | -/+25 | -/+24 | -/+24 | -/+24 | -/+19 | -/+19 | -/+18 | -/+17 | -/+16 | -/+15 | -/+13 |
| | 128 QAM | - | -/+25 | -/+25 | -/+24 | -/+24 | -/+24 | -/+19 | -/+19 | -/+18 | -/+17 | -/+16 | -/+15 | -/+13 |
| | 256 QAM | - | -/+24 | -/+24 | -/+23 | -/+23 | -/+23 | -/+18 | -/+18 | -/+17 | -/+16 | -/+15 | -/+14 | -/+12 |
| | Receiver Sensitivity (dBm) at BER 10 ⁻⁶ at Point C (1+0 conf., 28 MHz BW, RF filter losses included) | | | | | | | | | | | | | |
| AL / ALplus, ALS, ALplus2 (see Indoor Unit Table) | 4 QAM | -85/- | -83/-89,5 | -83/-89,5 | -82,5/-89 | -82,5/-89 | -82,5/89 | -82/-88,5 | -82/-88,5 | -81,5/-88 | -81/-87,5 | -80/-86 | -80,5/-86,5 | -85,5 |
| | 8 QAM | - | -/-82,5 | -/-82,5 | -/-82 | -/-82 | -/-82 | -/-81,5 | -/-81,5 | -/-81 | -/-80,5 | -/-79 | -/-79,5 | -78,5 |
| | 16 QAM | -78/- | -76/-81 | -76/-81 | -75,5/-80,5 | -75,5/-80,5 | -75,5/-80,5 | -75/-80 | -75/-80 | -74,5/-79,5 | -74/-79 | -73/-77,5 | -73,5/-78 | -77 |
| | 32 QAM | -76/- | -74/-77,5 | -74/-77,5 | -73,5/-77 | -73,5/-77 | -73,5/-77 | -73/-76,5 | -73/-76,5 | -72,5/-76 | -72/-75,5 | -71/-74 | -71,5/-74,5 | -73,5 |
| | 64 QAM | - | -/-75,5 | -/-75,5 | -/-75 | -/-75 | -/-75 | -/-74,5 | -/-74,5 | -/-74 | -/-73,5 | -/-72 | -/-72,5 | -71,5 |
| | 128 QAM | - | -70,5/-73,5 | -70,5/-73,5 | -70/-73 | -70/-73 | -70/-73 | -69,5/-72,5 | -69,5/-72,5 | -69/-72 | -68,5/-71,5 | -67,5/-70 | -67,5/-70,5 | -69,5 |
| | 256 QAM | - | -/-70,5 | -/-70,5 | -/-70 | -/-70 | -/-70 | -/-69,5 | -/-69,5 | -/-69 | -/-68,5 | -/-67 | -/-67,5 | -66,5 |
| | Frequency Stability | ± 5 ppm | | | | | | | | | | | | |
| Frequency Agility | 250 KHz (software programmable), 125 KHz on request | | | | | | | | | | | | | |
| RTPC | Up to 20/30 in 1 dB steps | | | | | | | | | | | | | |
| ATPC | Up to 20/40 dB in 1 dB steps | | | | | | | | | | | | | |
| Management Interfaces | RS232C, USB, Ethernet 10 BASE-T (TMN) | | | | | | | | | | | | | |
| IDU/ODU Interconnection (per terminal) | 50 Ω Coaxial Cable per RT | | | | | | | | | | | | | |
| Dimensions (W x H x D) | 1RU Compact IDU | 480 x 45 x 212 (mm) | | | | | | | | | | | | |
| | 1RU Modular IDU | 480 x 45 x 270 (mm) | | | | | | | | | | | | |
| | 2RU Modular IDU | 480 x 90 x 270 (mm) | | | | | | | | | | | | |
| | AL ODU 1+0 | 254 x 254 x 114 (mm) | | | | | | | | | | | | |
| | AS ODU 1+0 | 254 x 254 x 154 (mm) | | | | | | | | | | | | |
| | Power Supply | -48 Vdc (-15%, +20%) | | | | | | | | | | | | |
| Overall Power Consumption (per Terminal) | 1+0 configuration | ALC-ALCplus | | | | ALS-C | | | | ALCplus2 | | | | |
| | 1+1 configuration | ≤ 34 W | | | | ≤ 42 W | | | | ≤ 60 W | | | | |
| | 1+1 configuration | ≤ 59 W | | | | ≤ 72 W | | | | ≤ 90 W | | | | |
| Environmental Performance ODU Weather Proofing Class | IDU Temperature Range | IP65 | | | | | | | | | | | | |
| | IDU Temperature Range | -5 °C to +50 °C | | | | | | | | | | | | |
| | ODU Temperature Range | -35 °C to +55 °C | | | | | | | | | | | | |
| Compliant with | ETSI EN 302 217 | | | | | | | | | | | | | |

(*) Typical values

(**) Nominal values according to ETSI