

ChronoPHY™ AS22x10 Single-Port 10GBASE-T PHY

P/Ns: AS22010P, AS22010J, AS22510, AS22210

Description

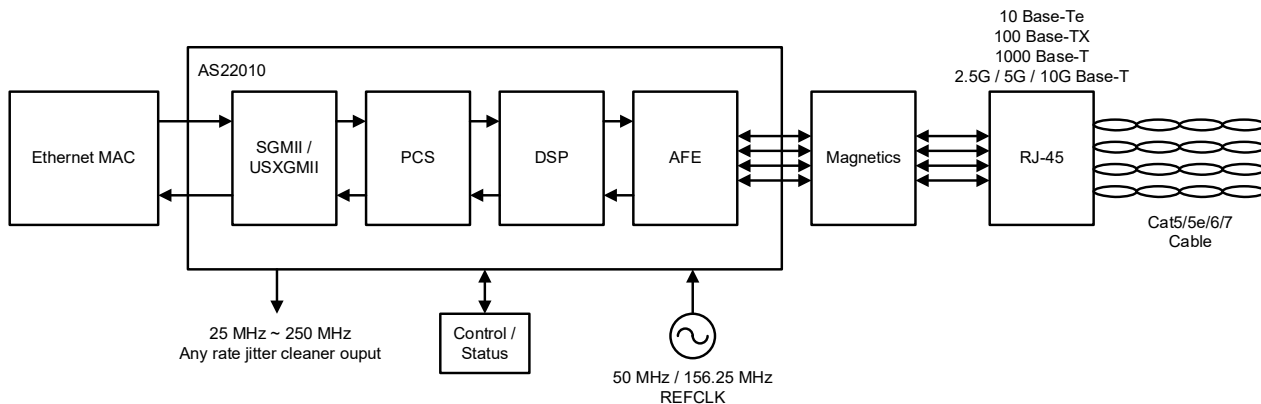
The AS22010 is a single-port, multi-rate Ethernet PHY fully compliant with IEEE 802.3an, 802.3bz, 802.3ab, and 802.3u, supporting 10GBASE-T, 5GBASE-T, 2.5GBASE-T, 1000BASE-T, 100BASE-TX, and 10BASE-Te operation over up to 100 meters of Cat6A twisted-pair cable.

The AS22010 delivers a compact, low-power 10GBASE-T solution optimized for system integrators who need robust multi-rate Ethernet connectivity without compromising on timing performance. Its flexible MAC interface set and industrial temperature range make it suitable for a broad range of deployments.

Featuring Aeonsemi's ChronoPHY™ technology, the AS22010J integrates a SyncE cleanup PLL with any-rate jitter-cleaned output (25 MHz to 250 MHz) on-chip — a capability competing 10GBASE-T PHYs deliver only in pass-through form. Combined with IEEE 1588v2 timestamping, the AS22010J enables G.8273.2 Class A–D timing performance and eliminates the need for an external jitter-cleaner, reducing BoM cost, board area, and design effort.

The device supports a flexible SerDes MAC interface set — XFI, 10GBASE-KR, USXGMII, 5000BASE-X, 2500BASE-X, 1000BASE-X, and SGMII — enabling seamless integration with switches, NICs, and SoC platforms. An on-chip cable analyzer, digital thermal sensor, and IEEE 802.3az Energy Efficient Ethernet support round out a feature set built for proactive diagnostics and power-conscious deployments.

Block Diagram



Key Features

| Features | Benefits |
|---|--|
| Multi-Rate IEEE 802.3 PHY <ul style="list-style-type: none"> 10GBASE-T / 5GBASE-T / 2.5GBASE-T / 1000BASE-T / 100BASE-TX / 10BASE-Te IEEE 802.3an, 802.3bz, 802.3ab, 802.3u compliant 100m reach on Cat6A in 10G mode Auto-Negotiation with Extended Next Page (XNP); Auto MDI/MDI-X, pair swap, polarity, skew correction | <ul style="list-style-type: none"> Broad interoperability across installed Cat5e/6/6A/7 copper infrastructure Simplifies deployment in mixed-rate networks Robust link reliability under varying channel conditions |
| Flexible Host Interface <ul style="list-style-type: none"> XFI / 10GBASE-KR, USXGMII 5000BASE-X, 2500BASE-X, 1000BASE-X, SGMII Intelligent Rate Adaptation Jumbo packet support | <ul style="list-style-type: none"> Seamless integration with Ethernet switches, NICs, and SoCs Reduces glue logic for heterogeneous system designs Fits a wide range of host platforms and management architectures |
| Integrated ChronoPHY™ Timing <ul style="list-style-type: none"> On-chip SyncE cleanup PLL with any-rate jitter-cleaned output (25–250 MHz, AS22010J) IEEE 1588v2 PTP G.8273.2 Class A–D compliant timing performance Low, deterministic latency variation | <ul style="list-style-type: none"> Removes external jitter cleaner, reducing BoM and board area Enables precise synchronization for 5G fronthaul and O-RAN Delivers telecom-grade timing in a single chip |
| Energy Efficiency & Diagnostics <ul style="list-style-type: none"> IEEE 802.3az Energy Efficient Ethernet (EEE) Wake-on-LAN magic packet detection On-chip cable analyzer: open/short detection with distance, attenuation, and isolation quality Industrial temperature range | <ul style="list-style-type: none"> Optimizes power across all supported data rates Simplifies field diagnostics and proactive link monitoring Reliable operation in harsh environments |
| Management Interfaces <ul style="list-style-type: none"> MDC/MDIO management interface (1.8V or 3.3V signaling) I²C-compatible management interface JTAG for debug and boundary scan | <ul style="list-style-type: none"> Flexible host management for switch, NIC, and embedded SoC platforms Standardized debug and production-test access |
| Thermal Management & Package <ul style="list-style-type: none"> Integrated on-chip digital thermal sensor 7.5 mm × 7.5 mm FC-BGA, 0.8 mm ball pitch (BGA81) | <ul style="list-style-type: none"> System-level thermal monitoring without external components Compact footprint for high-density line cards and access platforms |

Ordering Codes

| Part Number | Description | Package |
|-------------|--|--------------------|
| AS22010P | Single-Port 10G/5G/2.5G/1G/100M/10M Ethernet PHY | 7.5 × 7.5 mm BGA81 |
| AS22010J | AS22010P + integrated SyncE cleanup PLL with 25–250 MHz any-rate jitter-cleaned output | 7.5 × 7.5 mm BGA81 |
| AS22510P | Single-Port 5G/2.5G/1G/100M/10M Ethernet PHY | 7.5 × 7.5 mm BGA81 |
| AS22210P | Single-Port 2.5G/1G/100M/10M Ethernet PHY | 7.5 × 7.5 mm BGA81 |

Target Applications

- Wi-Fi 7/8 access points
- 5G fronthaul, O-RAN, and small cells
- 10G PON ONU and broadband access CPE (xPON, xDSL, DOCSIS)
- Enterprise / SMB switches, servers, NICs, and SFP+ modules