

Hive-S

The AIONYX Hive S is a very compact, highly modular device designed for a large variety of applications. It combines outstanding performance with low power consumption and an affordable price. Its FPGA-based architecture, featuring field-proven NetTimeLogic IP Cores, ensures exceptional modularity to meet diverse customer requirements, making it ideal for laboratory, testing and measurement applications.

With customizable configurations, the AIONYX Hive-S provides maximum flexibility and adaptability, featuring up to four extension slots for AIONYX PM Modules that can accommodate GNSS Receivers, Clock/RTC Modules, and a variety of Input/Output Modules.

Key Features

- **10/100BASE-T RJ45 Ethernet Interface:** Reliable network connectivity
- **Modular Design with Flexible Configurations:** Easily adaptable to various requirements
- **Four Extension Slots:** Designed for various AIONYX PM Modules
- **Fully FPGA-Based Architecture:** Ensures high performance and versatility
- **USB Powered or Power Jack (7-15V):** Provides flexible power options for diverse environments
- **Configuration and Monitoring:** Managed via UCM Tool or UART Commands
- **EEPROM for Configuration Storage:** Retains settings that are applied at boot-up
- **Fast Boot Time:** Starts up in less than 2 seconds
- **Low Power Consumption:** Consumes less than 2 W, enhancing energy efficiency

Example Configurations

Grandmaster Device

- High performance PTP Grandmaster and NTP Server
- GNSS Reference (Furuno, ComNav or u-blox)
- High-stability oscillator and low-power RTC with 10 MHz and PPS output
- 6x customizable GPIO pins (1.65 – 5.5V)



Time Bridge:

- PTP Slave/Master, NTP Client/Server, PPS Slave/Master, IRIG Slave/Master. etc.
- Conversion to different protocols or timing signals like PTP, NTP, IRIG, DCF, PPS, Frequencies etc.
- Fiber Optic Input and Output
- 4x SMA Inputs or Outputs for Frequencies or Pulses



Signal/Clock/Frequency Distribution or Measurements:

- 6x SMA Inputs/Outputs for distributing various signals, frequencies, and pulses.
- 8x GPIO on a PMOD connector
- Synchronized to PTP or NTP
- Distribution of the measured data via Ethernet



Specification

General

Dimension	120 x 105 x 55 mm (L x W x H)
Weight	500 g
Housing	Anodized Aluminum
Operating Temperature	0-50 °C
Humidity	10%-90% (no condensation)
Status/Alarms	3x RGB Status/Alarm LEDs

Power

USB	-500mA @ 5V USB (depending on the configuration)
Power Jack (optional)	7-15V (2.5mm coaxial) supply
Power Consumption	2-3 W

Management/Configuration

USB/UART	UCM (NetTimeLogic's Universal Configuration Manager)
UART	Command Line via UCM Protocol (ASCII based, allows to use a standard Terminal)
EEPROM	The configuration can be stored in a EEPROM which is loaded on boot-up.

Network Interface

Default	1x 10/100BASE-T RJ45
PTP Option	PTP Master or Slave
NTP Option	NTP Server or Client

Reference Input Options

GNSS	L1, Multi-Constellation (GPS, GLONASS, Beidou, Galileo)
PTP	Slave Device for following Profiles/Modes: Default Profile: Layer 2 (Ethernet) and Layer 3 (Ipv4, Ipv6) support Power Profile: C37.238-2011 and C37.238-2017 including VLAN support Utility Profile: including HSR and PRP tag handling IEEE802.1AS: including IEEE802.1CB tag handling ITU: G8275.1, G8275.1 and G8275.2: 4096 Nodes at 128 frames/s One Step and Two Step support Peer to Peer (P2P) and End to End (E2E) delay measurement
NTP	SNTP Client according to RFC 4330/5905 IPv4 and IPv6 Support for Unicast or Multicast NTP mode
IRIG	IRIG-B006/IRIG-G006 format (compatible with B004, B005, B006 and B007 IRIG-B Masters)
PPS	PPS Slave with Accuracy Encoding or embedded PPS
CLK	Reference Clock Input (100Hz - 10MHz)
DCF	DCF-77 Slave

Reference Output Options

GNSS	Generating NMEA Messages (RMC, ZDA) including NMEA UTC
PTP	Master Device for following Profiles/Modes: Default Profile: Layer 2 (Ethernet) and Layer 3 (Ipv4, Ipv6) support Power Profile: C37.238-2011 and C37.238-2017 including VLAN support Utility Profile: including HSR and PRP tag handling IEEE802.1AS: including IEEE802.1CB tag handling ITU: G8275.1, G8275.1 and G8275.2: One Step and Two Step support Peer to Peer (P2P) and End to End (E2E) delay measurement
NTP	Server according to RFC 4330/5905 (NTPv4) IPv4 and IPv6 Support for Unicast, Multicast or Broadcast NTP mode
IRIG	IRIG-B007 and IRIG-G006 format (compatible with B004, B005, B006 and B007 IRIG-B Slaves)
PPS	PPS Master with Accuracy Encoding or embedded PPS
CLK	Reference Clock Output (100Hz - 10MHz)
DCF	DCF-77 Master

Network Performance

PTP ITU	4096 Nodes at 128 frames/s
CSPTP	-100'000 requests/s
NTP	-100'000 requests/s

Typical Synchronization Accuracy

GNSS	+/- 50 ns
PTP	+/- 25 ns
NTP	+/- 500 ns
IRIG	+/- 50 ns
PPS	+/- 10 ns
CLK	+/- 10 ns
DCF	+/- 100 us

Typical Signal Accuracy

Timestamping	Signal Timestamping Resolution: 1 ns
Signal-/Frequency Generation	Signal-/Frequency Generation resolution: 1 ns Frequencies up to 10 MHz

Holdover

Holdover after 10h locked	< 10 us within 24h (with Clock/RTC module)
Holdover after 7d locked	< 1 us within 24h (with Clock/RTC module)

Extension Slot Options (4x)

GNSS Receiver	Furuno GT88, ComNav K801 or u-blox M9N
Clock/RTC	SiT5356 (100 ppb precision MEMS Super-TCXO) and RV-3028-C7 (extremely low-power (45nA) RTC)
Input/Outputs	Per slot following configurations are possible: 8x 3.3V IOs (PMOD Connector) 6x 1.65V-5.5V IOs with external Voltage (3.3V with internal Voltage) 2x 1.65V-5.5V SMA IOs with external Voltage (3.3V with internal Voltage) 1x Fiber Optical Input from DC up to 50MBd 1x Fiber Optical Output from DC up to 50MBd
Ethernet	10/100BASE-T RJ45 with PM ETH
DPLL	AD9544 with two SMA Outputs

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AIONYX Extension Slot Module Options



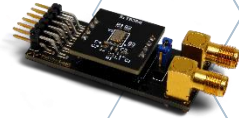
PM Furuno GT88



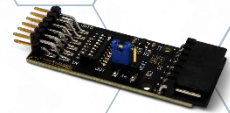
PM ComNav K801



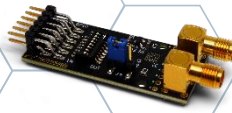
PM u-blox M9N



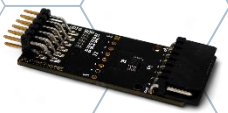
PM CLK RTC



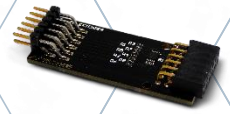
PM GPIO



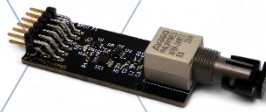
PM GPIO SMA



PM GPIO RAW



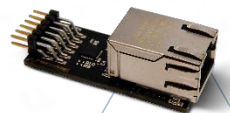
PM Extender



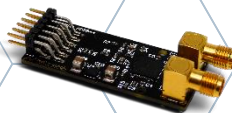
PM GPIO FI



PM GPIO FO



PM ETH



PM AD9544