

# ioPAC 5542 Series

*Rugged, compact RTU controllers*



- > Dedicated ARM CPUs for both the main system and I/O channels
- > Millisecond timestamp granularity on both digital input and analog input
- > Up to 250 Hz sampling rate per analog input channel
- > Prerecord feature for analog input data logging
- > Supports C/C++ or IEC 61131-3 programming languages
- > Compliant with EN 50121-4, UL/cUL Class 1 Division 2
- > Robust and compact design for harsh environments



## Overview

The ioPAC 5500 standalone controllers use an ARM9 industrial-grade CPU for the main system, with ARM Cortex™ M4 based CPUs used for I/O channels. The dual CPU architecture supports up to a 250 Hz per channel analog input sampling rate with millisecond timestamp granularity. The ioPAC 5500 supports C/C++ or IEC 61131-3 programming languages, rail-level surge and ESD protection, a -40 to

75°C (-30 to 75°C for HSPA models) operating temperature range, UL/cUL Class 1 Division 2 certifications, two 10/100 Mbps Ethernet ports with two MACs (Port Trunking ready), and two 3-in-1 serial ports. With Moxa's Active OPC Server and DA-Center, the ioPAC 5500 series provides a comprehensive solution for data acquisition and control applications in harsh environments.

### High Sampling Rate



High sampling rate AI

Moxa's ioPAC 5542 RTUs use an ARM9 industrial-grade CPU, and the dual CPU architecture supports up to a 2000 Hz analog input sampling rate (all channels), giving engineers the analog data precision they need to correctly analyze events, and then formulate the best response.

### Prerecorded Analog Input



Prerecording

The ioPAC 5542's prerecord function allows the RTU controller to continuously record analog input data before an event trigger point. The prerecording function is a major improvement over products that only start data logging after an event has occurred, which can lead to the loss of critical data due to the latency between the event and when the data logging actually begins.

## Specifications

### Computer

**Main CPU:** 32-bit ARM9 192 MHz CPU

**I/O CPU:** 32-bit ARM Cortex M4 80 MHz CPU

**OS:** Linux

**Clock:** Real-time clock with battery backup

#### Memory:

- SDRAM: 64 MB
- Flash: 32 MB
- SRAM: 256 KB (battery backup lasts for 1 week)
- microSD™ Slot: Up to 32 GB (SD 2.0 compatible)

**Note:** For units operating in extreme temperatures, industrial-grade, wide-temperature microSD cards are required.

### Cellular (for the ioPAC 5542-HSPA Series)

#### Network:

- Quad-band GSM/GPRS/EDGE 850/900/1800/1900 MHz
- Five-band UMTS/HSPA+ 800/850/AWS/1900/2100 MHz

#### Internet:

HSPA:

- Up to 5.76 Mbps upload speed
- Up to 14.4 Mbps download speed

UMTS: Up to 384 kbps upload/download speed

EDGE Class 12: Up to 237 kbps upload/download speed

GPRS Class 12: Up to 85.6 kbps upload/download speed

**SMS:** Point-to-Point Text/PDU mode

**SIM Control Voltage:** 3/1.8 V

#### Ethernet Interface

**LAN:** 2 x 10/100 Mbps, 2 MACs (IPs), RJ45

**Protection:** 1.5 kV magnetic isolation

#### Serial Interface

##### Interface:

- 2 RS-232/422/485 ports, software selectable (DB9 male)
- 1 RS-232 debug port (4-pin connector)

**Serial Line Protection:** 15 kV ESD for all signals

#### Serial Communication Parameters

**Parity:** None, Even, Odd

**Data Bits:** 7, 8

**Stop Bits:** 1, 2

**Flow Control:** RTS/CTS, XON/XOFF

**Baudrate:** 300 bps to 921.6 kbps

## Serial Signals

**RS-232:** Tx+, Rx+, DTR, DSR, RTS, CTS, DCD, GND, RI

**RS-422:** Tx+, Tx-, Rx+, Rx-, GND

**RS-485-4w:** Tx+, Tx-, Rx+, Rx-, GND

**RS-485-2w:** Data+, Data-, GND

## Inputs and Outputs

**Digital Inputs:** 8 channels

**Configurable DIOs:** 8 channels

**Analog Inputs:** 8 channels

**Isolation:** 3k VDC or 2k Vrms

## Digital Input

**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact

**I/O Mode:** DI Counter or Frequency

**Dry Contact:**

- On: short to GND
- Off: open

**Wet Contact:**

NPN (DI to GND):

- On: 0 to 3 VDC
- Off: 10 to 30 VDC

PNP (DI to GND):

- Off: 0 to 3 VDC
- On: 10 to 30 VDC

**Common Type:** 4 points per COM

**Counter Frequency:** 1 kHz

**Digital Filtering Time Interval:** Software selectable (by 0.5 ms)

## Digital Output

**Type:** Sink

**I/O Mode:** DO or PWM

**Pulse Output Frequency:** 1 kHz

**Over-Voltage Protection:** 45 VDC

**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)

**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)

**Current Rating:** 200 mA per channel

## Analog Input

**Type:** Differential Input

**Resolution:** 16 bits

**I/O Mode:** Voltage / Current

**Input Range:** 0 to 10 VDC, -10 to 10 VDC, 0 to 20 mA, 4 to 20 mA (wire off)

**Historical Data Buffering:** 60 KB per channel, 120-second data buffer at 250 Hz

**Accuracy:**

±0.1% FSR @ 25°C

±0.3% FSR @ -40 and 75°C

**Sampling Rate:**

- All channels: 2000 samples/sec
- Per channel: 250 samples/sec

**Input Impedance:** 2 mega-ohms (min.)

**Built-in Resistor for Current Input:** 120 ohms (min.)

## Software Characteristics

**Automation Languages:** C/C++ or IEC 61131-3

**Protocols:** Modbus TCP/RTU (master/slave), SNMP TCP/IP, UDP, DHCP, BOOTP, SNTP, SMTP

## Power Requirements

**Input Voltage:** 24 VDC (9 to 48 VDC)

**Input Current:**

- ioPAC 5542-HSPA series: 305 mA @ 24 VDC
- ioPAC 5542 series: 264 mA @ 24 VDC

## Physical Characteristics

**Housing:** Aluminum

**Dimensions:** 90.05 x 135 x 105.4 mm (3.55 x 5.32 x 4.15 in)

**Weight:**

- ioPAC 5542-HSPA Series: 1100 g (2.43 lb)
- ioPAC 5542 Series: 1000 g (2.20 lb)

**Mounting:** DIN rail (standard), wall (optional)

**Connector:** Spring-type terminal block

## Environmental Limits

**Operating Temperature:**

- ioPAC 5542 Series: -40 to 75°C (-40 to 176°F)
- ioPAC 5542-HSPA Series: -30 to 75°C (-22 to 176°F)

**Storage Temperature:** -40 to 85°C (-40 to 185°F)

**Ambient Relative Humidity:** 5 to 95% (non-condensing)

**Shock:** IEC 60068-2-27

**Vibration:** IEC 60068-2-6

**Altitude:** 2000 m

**Note:** Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

## Standards and Certifications

**Safety:** UL 508

**EMC:** EN 55032/24

**EMI:** FCC Part 15 Subpart B Class A, CISPR 32

**EMS:**

IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV

IEC 61000-4-3 RS: 80 MHz to 1000 MHz: 3 V/m

IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV

IEC 61000-4-5 Surge: Power: 2 kV (L-PE), 1 kV (L-L); Signal: 1 kV

IEC 61000-4-6 CS: 3 V

IEC 61000-4-8 PFME: 1 A/m

**Radio:** NCC

**Rail Traffic:** EN 50121-4

**Hazardous Location:** Class 1 Division 2

**Note:** Please check Moxa's website for the most up-to-date certification status.

## Warranty

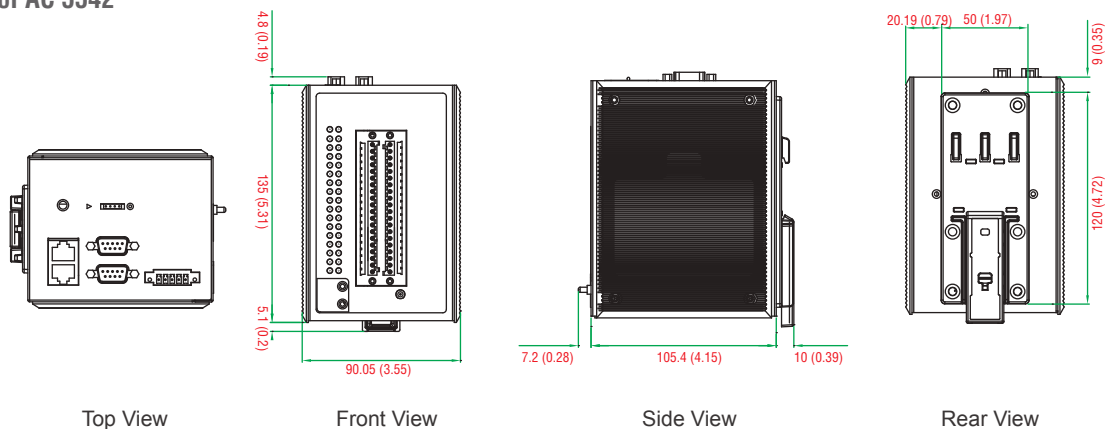
**Warranty Period:** 5 years

**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

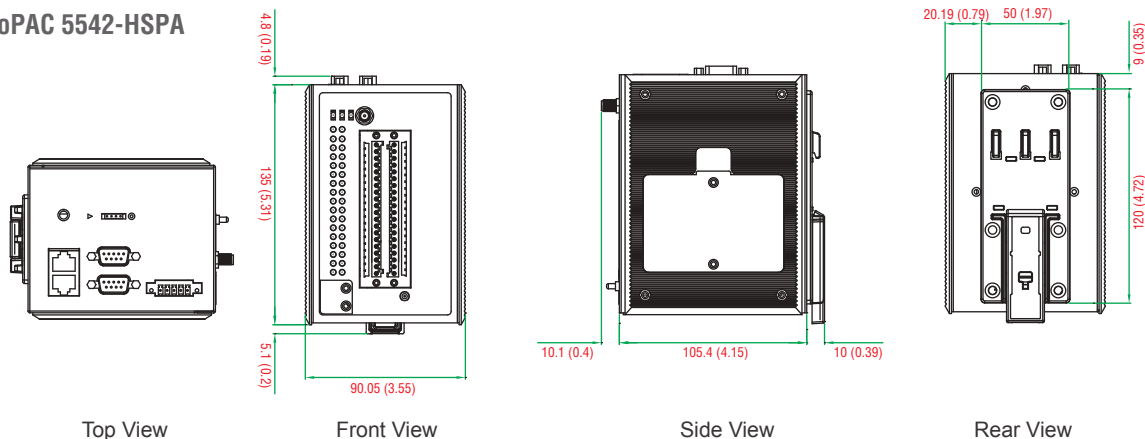
## Dimensions

### ioPAC 5542

Unit: mm (inch)



### ioPAC 5542-HSPA



## Ordering Information

### Available Models

**ioPAC 5542-C-T:** Rugged, compact, Ethernet, C/C++ programmable controller with 8 DIs, 8 DIOS, 8 AIs, -40 to 75°C operating temperature

**ioPAC 5542-IEC-T:** Rugged, compact, Ethernet, IEC 61131-3 programmable controller with 8 DIs, 8 DIOS, 8 AIs, -40 to 75°C operating temperature

**ioPAC 5542-HSPA-C-T:** Rugged, compact, HSPA, C/C++ programmable controller with 8 DIs, 8 DIOS, 8 AIs, -30 to 75°C operating temperature

**ioPAC 5542-HSPA-IEC-T:** Rugged, compact, HSPA, IEC 61131-3 programmable controller with 8 DIs, 8 DIOS, 8 AIs, -30 to 75°C operating temperature

### Optional Accessories (can be purchased separately)

**DK-DC50131:** DIN-rail mounting kit, 50 x 131 mm

**CBL-RJ458P-100:** 8-pin RJ45 CAT5 Ethernet cable, 100 cm

**CBL-F9DPF1x4-BK-100:** Serial console cable

**WK-51-01:** Wall-mounting kit, 2 plates with 6 screws

**ANT-WCDMA-AHSM-04-2.5m Black:** 3G cellular antenna

### Package Checklist

- ioPAC 5500 controller
- Serial cable: CBL-F9DPF1x4-BK-100
- Cellular 3G antenna: ANT-WCDMA-AHSM-04-2.5m black
- Documentation and software CD