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# IoT Data Acquisition System and Protocol Converters

## Scientech 6205DA


When talking about Internet of Things (IoT), Data acquisition (DAQ) and protocols are pivotal building blocks of IoT technology. A data acquisition device helps users to make machines smarter by gathering and analyzing real-time data. IoT protocols enable it to exchange data in an organized and significant manner. IoT protocols are languages that enable interaction between sensors, devices, gateways, servers, and user applications.

**Scientech 6205DA IoT Data Acquisition System and Protocol Converters** is a unique platform which allows users to explore architecture, working, and design applications of a data acquisition system and understand types of protocol converters like serial to Ethernet converter, serial to Wi-Fi converter, and serial to GPRS. This platform allows users to perform a wide range of experiments while learning intricate concepts in an interactive and simple manner.

## Features

- DAQ with 4 analog inputs, 8 pulse inputs, 8 digital inputs and 4 relay outputs.
- Serial to Ethernet, serial to Wi-Fi and serial to GPRS protocol converter modules.
- Ethernet, Wi-Fi and GPRS modem.
- Push to on switches, visual indicators, audio indicator and variable DC supplies.
- Embedded web server and application software.
- Cloud connectivity for bidirectional control.
- Arduino compatible.
- User reconfigurable and re-programmable hardware.
- Study of sensor and actuator interfacing.
- Cloud & server configuration.
- IoT gateway using Wi-Fi and Ethernet.
- PC based data logging.
- User friendly, self explanatory system.
- Experiments configurable through patch board.
- Online product tutorial.

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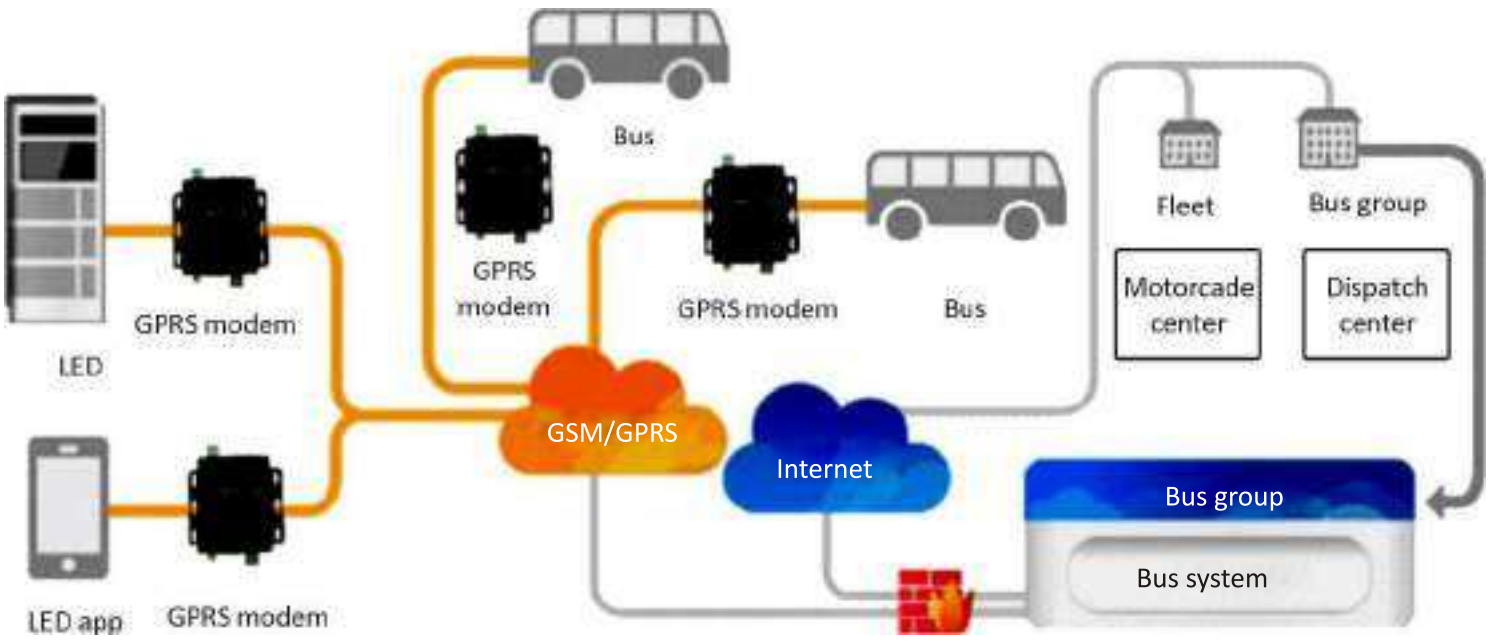
## Scope of Learning

- Introduction to IoT protocols and converters.
- Data acquisition and its applications.
- Installation and operating of Arduino IDE.
- GPIO control using Arduino programming.
- UART, RS485, Ethernet, Wi-Fi AP/Router and GSM communication.
- Interface Ethernet modem with DAQ controller.
- Interface GSM modem with DAQ controller.
- Interface Wi-Fi modem with DAQ controller.
- Understand and use RS232 to RS485 converter.
- Understand and use RS232 to Wi-Fi converter for cloud connectivity.
- Understand and use RS232 to GPRS converter for cloud connectivity.
- Program to send data through RS232 and RS485.
- Explore AT commands to configure GSM and Wi-Fi modem.
- Study network protocols like TCP, UDP, HTTP and MQTT.
- Study SMS using AT commands.
- Understand database and cloud configuration for IoT.
- Design and develop edge and cloud computing applications.

## Applications




A dedicated line

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## Technical Specifications

### Data acquisition system (DAQ)

| | |
|---|---|
| ADC resolution | : 10 bits |
| Digital inputs | : 8 nos. |
| Digital pulse inputs | : 8 nos. |
| Analog inputs | : 4 nos. |
| Digital outputs | : 4 nos. (relay output) |
| Flash memory | : 32KB |
| SRAM | : 2KB |
| Interface | : USB port |

### Modems:

**Ethernet modem**

- IEEE802.3af compliant
- Wiznet W5100 IC chip
- 10/100mb connection speed

**Wi-Fi modem**

- 802.11 b/g/n
- Wi-Fi direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Integrated low power 32-bit CPU can be used as application processor
- Access point and station modes

**GPRS modem**

- Quad-band 850/900/1800/1900 MHz
- GPRS multi-slot class 10/8
- GPRS mobile station class B
- Compliant to GSM phase 2/2+
- Class 4 (2 W @850/ 900 MHz)
- Class 1 (1 W @ 1800/1900MHz)
- Control via AT commands

### Protocol convertor:

**Serial to Ethernet convertor**

| | |
|---|---|
| Processor | : TI cortex-M0 |
| Ethernet port number | : 1 |
| Serial port number | : 1 |
| Interface standard | : RJ45 |
| Rate | : 10/100 Mbps |
| Network protocol | : IP, TCP, UDP, DHCP, DNS, HTTP |
| Buffer send | : 6KB |
| Buffer receive | : 4KB |
| Interface standard | : RS232: DB9 female port |

**Socket transparent**

| | |
|---|---|
| Transmission | : Supports TCP server, TCP client, UDP server, UDP client |
| HTTP client | : Supports HTTP protocol transmission |
| Configuration method | : AT command, webpage configuration |

**Serial to Wi-Fi convertor**

| | |
|---|---|
| Wi-Fi standard | : 802.11 b/g/n |
| Serial interface | : RS232/RS485 |
| Antenna interface | : External: SMA antenna |
| Wireless network | : AP, STA, AP+STA |
| Encryption type | : TKIP, AES , TKIP/AES |
| Network protocol | : IPV4, TCP/UDP |

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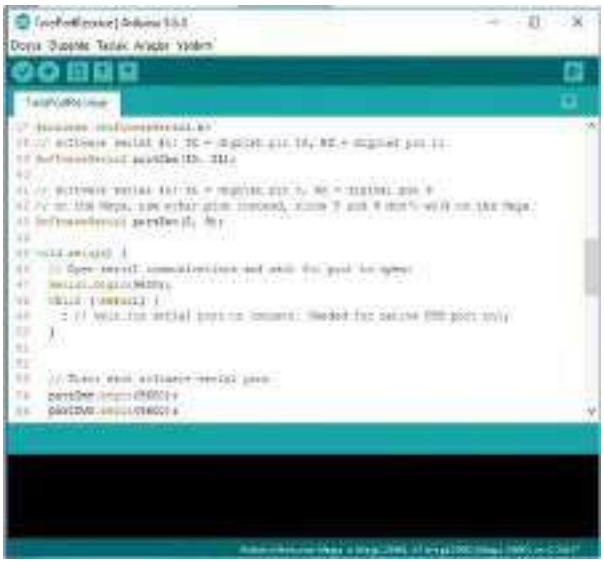
**Serial to GPRS convertor**

| | |
|---|---|
| Network standard | : GSM / GPRS |
| Rate | : 14.4Kbps ~ 57.6Kbps |
| Standard frequency range | : 850/900/1800/1900MHz |
| GPRS multi-slot class GPRS | : Class 10 |
| Network protocol | : TCP, UDP, DNS, HTTP |
| Serial port number | : 2 (1*RS232, 1*RS485, cannot work at the same time) |
| Interface standard | : RS232: DB9 cellular type, RS485: 2 wire (A+, B-) |
| Antenna interface | : 50Ω/SMA (female terminal) |
| SIM card supply | : 1.8V/3V |
| Configuration | : Using AT command |

**Note:** SIM card will have internet data pack activated and will be provided by the user.

Arduino IDE software



Software window of virtual serial port server

## Package contains

| | | Quantity |
|---|---|---|
| • Ethernet cable | : | 1 |
| • RS232 cable male to female | : | 1 |
| • RS232 cable female to female | : | 1 |
| • 4mm patch cord (blue) | : | 10 |
| • 4mm patch cord (yellow) | : | 10 |
| • 4mm patch cord (red) | : | 4 |
| • 4mm patch cord (black) | : | 4 |
| • Mains cord | : | 1 |
| • USB cable (A to B ) | : | 1 |

RS232 to Ethernet convert tester software window

Subject to change Version 1.0

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