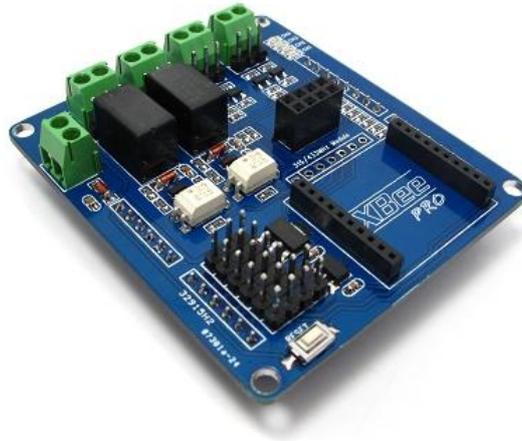**ITead Studio**
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# IS shield V1.1

## -Multi-channel Relay/Switch shield

## Overview



IS Shied is a Multi-channel relay/switch shield. It includes 2 channels of mechanical relay and 2 channels MOS switch with internal power supply. IS shield provides an easy way for applications of voltage controlling from low to high.

## Features

- 2 mechanical relays with photo-coupled circuit
- 2 MOS switch with internal power supply
- Xbee, nRF24l02, RF315/433M module wireless interface
- Arduino AD pins 3 PINs interface breakout for Sensor module (Electronic Brick)
- Equipped with screw holes for easy installation
- Light weigh
- Small form factor
- Native Arduino/Iteaduino compatibility

# Specifications

| PCB size | 67.3mm X 59.1mm X 1.6mm |
|---|---|
| Indicators | PWR, status LED |
| Power supply | 9~20V, compatible with Arduino |
| Communication Protocol | XBee, nRF24L01+,UART, IIC, 315/433 RF module |
| RoSH | Yes |

# Electrical Characteristics

| Specification | Min | Type | Max | Unit |
|---|---|---|---|---|
| Power Voltage（Vlogic） | 4.5 | 5 | 5.5 | VDC |
| Power Voltage（Vsupply） | 9 | - | 20 | VDC |
| Input Voltage VH： | 4.5 | 5 | 5.5 | V |
| Input Voltage VL： | -0.3 | 0 | 0.5 | V |
| Current Consumption | - | - | 400 | mA |

*IS shield just can work with Extenal Power supply or with the Arduino that using Extenal Powe supply, and it cannot work with Arduino which using USB 5V power supply.
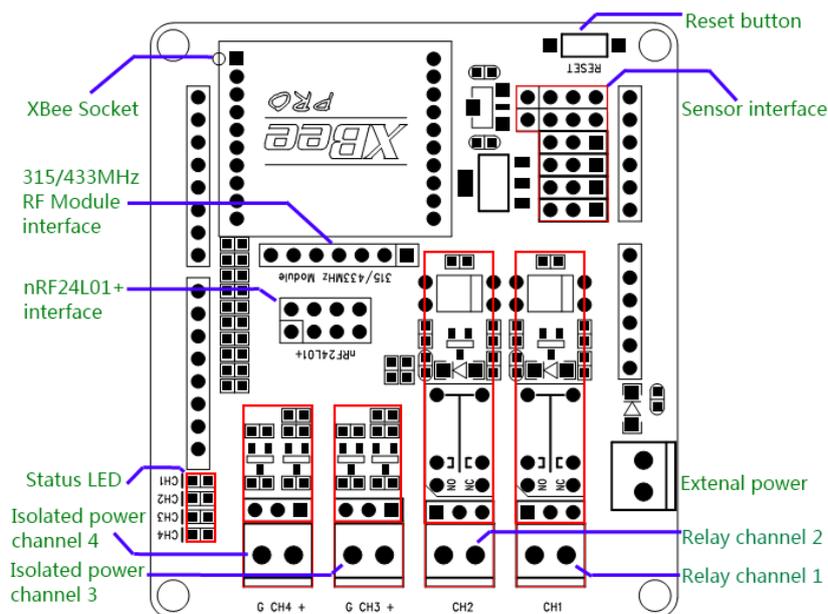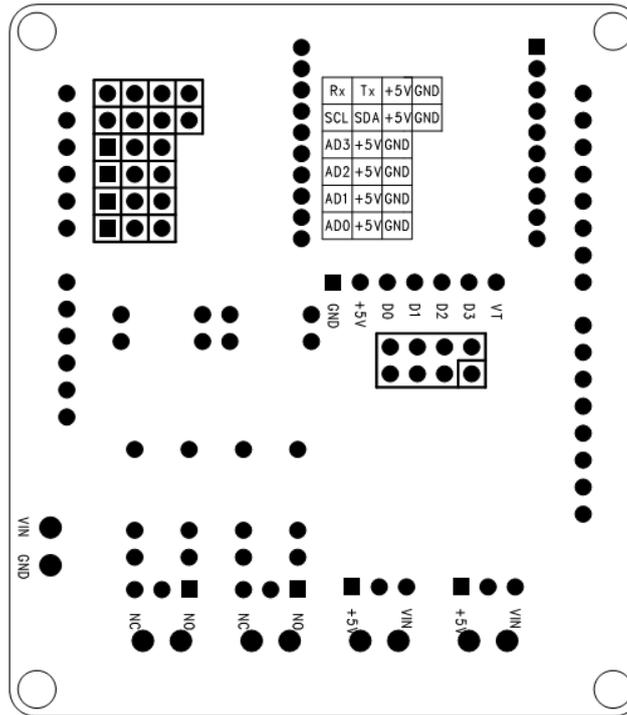
# Hardware



Figure 1 Top Map

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Figure 2 Bottom Map

| Interface | Pin | Description |
|---|---|---|
| UART | 1 | Ground |
| | 2 | 5V supply |
| | 3 | Tx |
| | 4 | Rx |
| AD0/1/2 | 1 | AD0/1/2 |
| | 2 | 5V supply |
| | 3 | Ground |
| IIC | 1 | Ground |
| | 2 | 5V supply |
| | 3 | Data wire of IIC |
| | 4 | Clock wire of IIC |
| nRF24L01+ Socket | 1 | GND |
| | 2 | VCC33 |
| | 3 | CE（Chip Enable） |
| | 4 | SPI_CS |
| | 5 | SPI_SCK |
| | 6 | SPI_MOSI |
| | 7 | SPI_MISO |
| | 8 | nRF24L01+ IRQ Output |
| XBee Socket | 1 | VCC33 |
| | 2 | Dout |
| | 3 | Din |
| | 10 | GNF |

| | 4,5,6,7,8,9,11, 12,13,14,15,16 ,17,18,19,20 | No Connect |
|---|---|---|
| 315/433MHz RF module socket | 1 | GND |
| | 2 | VCC |
| | 3 | D0 |
| | 4 | D1 |
| | 5 | D2 |
| | 6 | D3 |
| | 7 | VT |

Arduino Socket defination

| Pin | Description |
|---|---|
| D0 | XBee_Dout/UART_Rx |
| D1 | XBee_Din/UART_Tx |
| D2 | nRF24L01+_IRQ |
| D3 | VT |
| D4 | Channel 1 Enable（High active） |
| D5 | Channel 2 Enable（High active） |
| D6 | Channel 3 Enable（High active） |
| D7 | Channel 4 Enable（High active） |
| D8 | No connect |
| D9 | nRF24L01+_CE |
| D10 | nRF24L01+_CS |
| D11 | nRF24L01+_MO |
| D12 | nRF24L01+_MI |
| D13 | nRF24L01+_SCK |
| A0 | AD0 |
| A1 | AD1 |
| A2 | AD2 |
| A3 | AD3 |
| A4 | IIC_SCL |
| A5 | IIC_SDA |

# Installation

**Relay**

Is shield can control two relay at the same time.

Every channel can be set for Normal Open (NO)/Normal Connect (NC) by J6/J7 when this channel is active as the figure 3.
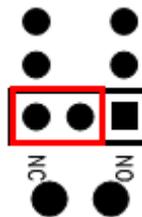
Figure 3

**MOS Switch**

Is shield can control two MOS Switch at the same time.

The output voltage of every channel of MOS Switch can be set for +5V/VIN by J8/J24, and every channel can supply 1A current max. The jumper setting is as figure 4.
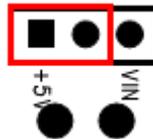
Figure 4

Note: The current of MOS Switch channel depend on the power supply of IS Shield.

# Revision History

| Rev. | Description | Release date |
|------|-------------|--------------|
| v1.0 | Initial version | 2011-5-12 |
| | | |
| | | |