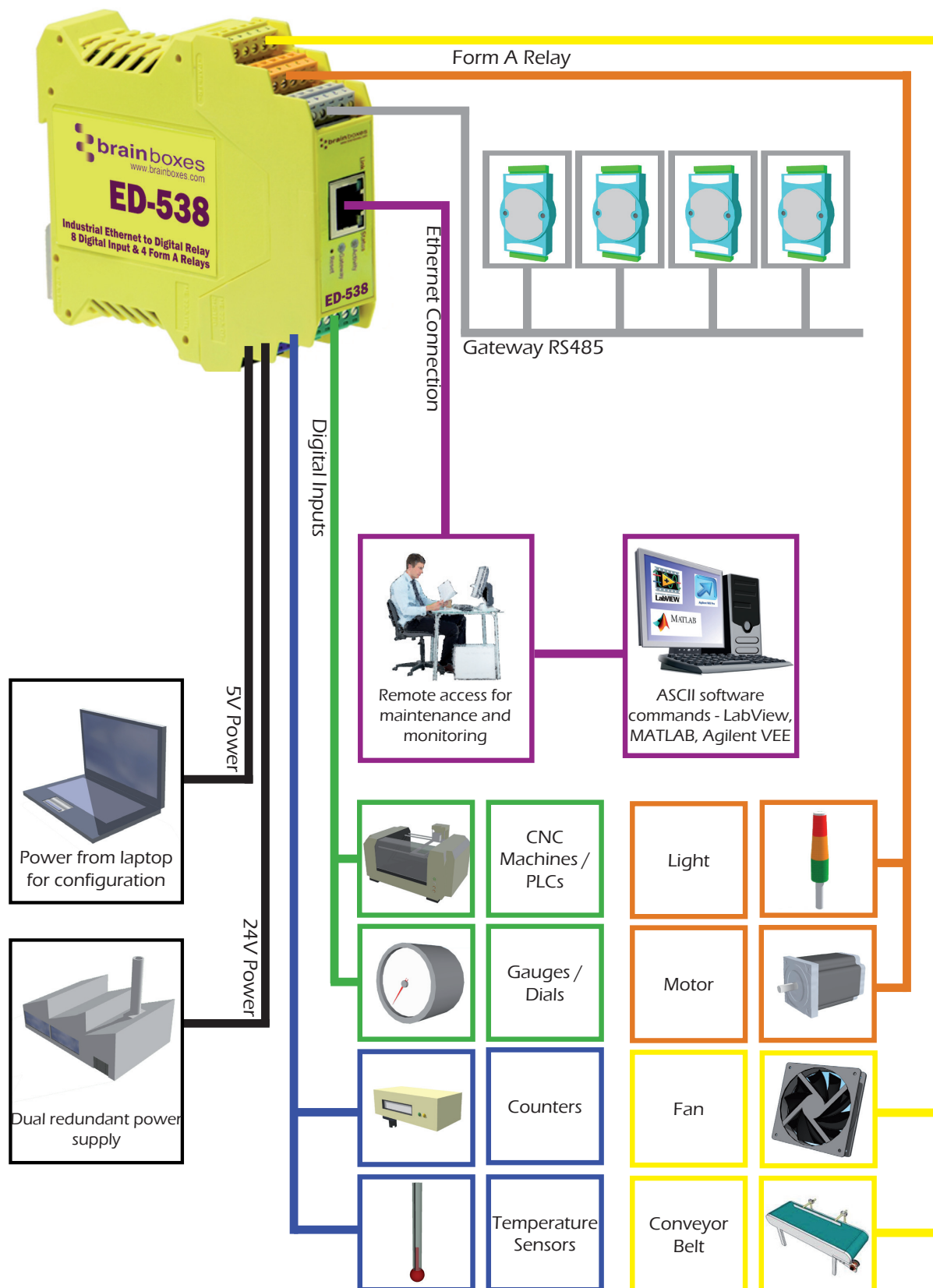## ED-538  ETHERNET TO Digital IO Relay

# ED-538

- 8 Digital Inputs and 4 Form A Relays
- Drives high current and high voltage loads
- Ideal for inductive, capacitive & resistive loads
- Factory floor process control and automation

- Network enable your NuDAM/ADAM modules
- -30ºC to +80ºC Temperature range
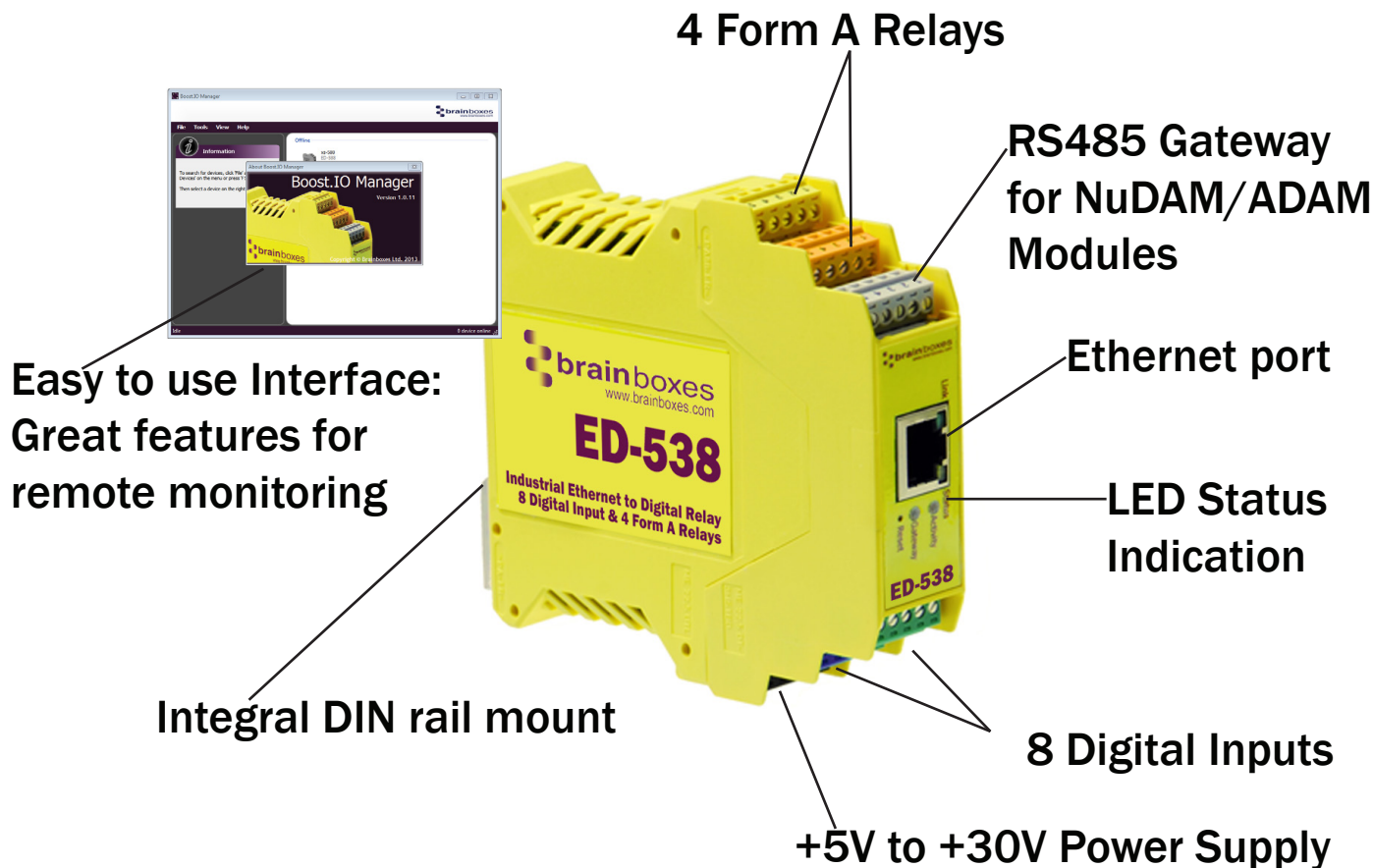- +5V to +30V DC Input Power

## Digital Channels

| Inputs | | |
|---|---|---|
| | Input Channels | 8 non-isolated input channels |
| | NPN/PNP | Jumper selectable pull up for NPN, active low, type sensors and pull down for PNP, active high, type sensors |
| | Logic Level 0: | 0V to +1V |
| | Logic Level 1: | +2.0V to +30V |
| | Latched Inputs: | Triggered by user programmable positive or negative edges, stays true until acknowledged |
| | Counter Inputs: | User programmable- counts positive or negative transitions 0-65335 |
| Relay Outputs | | |
| | Relay Type | 4 Form A (SPST: Single Pole Single Throw) - Normally Open When power is removed from the ED-538 the relay is Open |
| | Maximum Output Load Voltage | 60VDC |
| | Contact Rating | 5 A @ 30 VDC, 5 A @ 250VAC, 5 A @ 110 VAC |
| | Inductive Load | 2 A |
| | Resistive Load | 5 A |
| | Breakdown Voltage | 500 VAC |
| | Relay On/Off Time | 10 ms (Max) |
| | Initial Insulation Resistance | 1G min @ 500 VDC |
| | Expected Life | 100,000 times (Typical) |
| | Initial Contact Resistance | 30 milli-ohms (Max) |
| | Pulse Output | 0.3 Hz at rated load |

# Connect, Configure, Control

# Usage Model for ED-538



Form A Relay

Gateway RS485

Ethernet Connection

Digital Inputs

5V Power

24V Power

Power from laptop for configuration

Dual redundant power supply

Remote access for maintenance and monitoring

ASCII software commands - LabView, MATLAB, Agilent VEE

CNC Machines / PLCs

Gauges / Dials

Counters

Temperature Sensors

Light

Motor

Fan

Conveyor Belt

**4 Form A Relays**

**RS485 Gateway for NuDAM/ADAM Modules**

**Ethernet port**

**Easy to use Interface: Great features for remote monitoring**

**LED Status Indication**

**Integral DIN rail mount**

**8 Digital Inputs**

**+5V to +30V Power Supply**

### Ethernet to DIO Device Server:
The Ethernet to DIO device is implemented using a Windows COM port driver that is completely compatible with all popular PC packages such as LabView, MATLAB and Agilent VEE and support a range of popular APIs. Continue to get value from your existing development and process control system.

### Slim Shape:
Small foot print for when DIN rail space is a premium
Only 22.6mm wide

### Extended Temperature Range:
-30ºC to +80ºC operating range copes with changing temperatures for harsh environments.
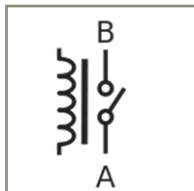Monitor CPU temperature via the web interface or programmatically using ASCII commands.

### Brainboxes' Easy Wire Feature:
Removable screw terminal blocks make installation easier and quicker
Colour coded blocks and ports prevents incorrect connection
Numbered Pins simplifies wiring and removes confusion

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### Grounding:
Correctly wired grounds help cut down on electromagnetic interference
5 pin terminals allow a ground on the 5th pin of each block
Functional earth connection to the DIN rail

### Relay:
A relay is an electrically operated switch used to control a circuit by a low-power signal giving complete electrical isolation between the control and the controlled circuits. Relays are often used where several circuits must be controlled by one signal.

### Gateway RS485 Serial Port:
Half duplex RS485 port allows connection and control of industry standard NuDAM, eDAM and ADAM modules modules using ASCII protocols.

### Wide Range Redundant Dual Power Input:
+5VDC to +30VDC accommodates variation in the +24VDC factory floor and allows alternative power sources. A second power supply can be fitted as a back-up to prevent down time should one power source fail.
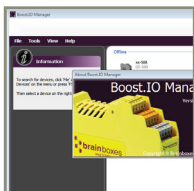
### Power from any USB Port:
Can use 5 Volt power from any computer USB port via optional accessory cable PW-650. Useful for configuring the device from a laptop in the field.

### Watchdog feature:
Allows independent known good states to be set for power up, comms link watchdog and hardware watchdog. Programmable time range allows full control.
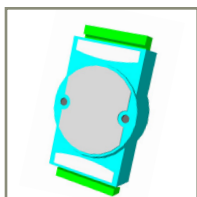
### Signed Drivers and Rigorous testing:
Our software allows hassle free installation, configuration and monitoring via our easy to use webpage. The software gives local COM ports that are backwards compatible enabling legacy applications and the device to work with a myriad of different 3rd party software.

### Lifetime Warranty and Support:
We can help with every aspect of your project, from getting you up and running to custom application.

## Familiar ASCII Command Protocol:

The ED range of devices uses the de facto industry standard ASCII command protocol implemented in the popular ADAM/NuDAM/EDAM modules.

Typical examples include:

| | |
|---|---|
| $01M | read the name of device address 01 |
| !01ED-588 | device 01 replies that its name is ED-588 |
| $01F | read firmware version number of device address 01 |
| !012.54 | firmware version of device 01 is 2.54 |
| @01 | read digital input output status of device 01 |
| >1A45 | device 01 digital input data= 1A (=00011010) digital output data = 45 (=01000101) |
| $012 | read configuration of device 01 |
| !01400500 | device 01 40=typecode, 05 =gateway RS485 port is at 4800 Baud, 00=No checksum |

The ED device's webpage has an interactive console where any command can be entered and it is immediately executed showing the device's response.

```
ASCII Command Console
> $01M
!01ED-588

> $01F
!012.55

> @01
>0000
```

## Software Development

**COM Port on Windows**

On a PC running the Microsoft Windows family of OS's the ED Boost.IO Manager provides a standard COM port interface so enabling thousands of proven legacy applications to work straight out of the box. COM port compatibility allows you to continue to get value from your existing application software investment. Moreover your engineers don't need to retrain to use the Brainboxes ED range of I/O devices.

**Industry Standard Packages**

The COM port based driver means that ED-xxx devices are completely compatible with all popular packages such as: LabView, MATLAB, Agilent VEE. You can continue to get value from your existing development and process control system. Hundreds of thousands program with these packages every day.

**Software Platforms**

The future is mobile, with data available everywhere on demand; Brainboxes has designed a software suite which allows you to design your new systems with mobile in mind with most popular platforms and development environments supported. With APIs and sample program code for: Microsoft .NET, C#, Visual Basic, C++, JavaScript, PHP, Java, Objective-C

**Devices Supported**

The ED sample codes running on Operating Systems such as Windows XP, Server 2008, Server 2012, Windows 7, Windows 8, and Linux based systems such as Android and Raspberry Pi allow you to run your applications on Servers, Desktops, Laptops, Tablets, Phones or low cost embedded devices, almost any device you wish.

**Configuration Options**

Windows Utility, Web Interface: Boost.IO driver provides familiar Serial COM port interface

**OS Compatibility**

Legacy COM porty drivers for: Microsoft Windows 10, 8 & 7 32 bit & 64 bit Editions / Windows Server 2008 32 bit & 64 bit Editions / Server 2012/ Windows Server 2008 & Windows Server 2000 / Windows Vista 32 bit & 64 bit Editions / Windows Server 2003 32 bit & 64 bit Editions. TCP and web browser interface for other OS's & Linux, e.g. Android, Raspberry Pi

## Browser Interface

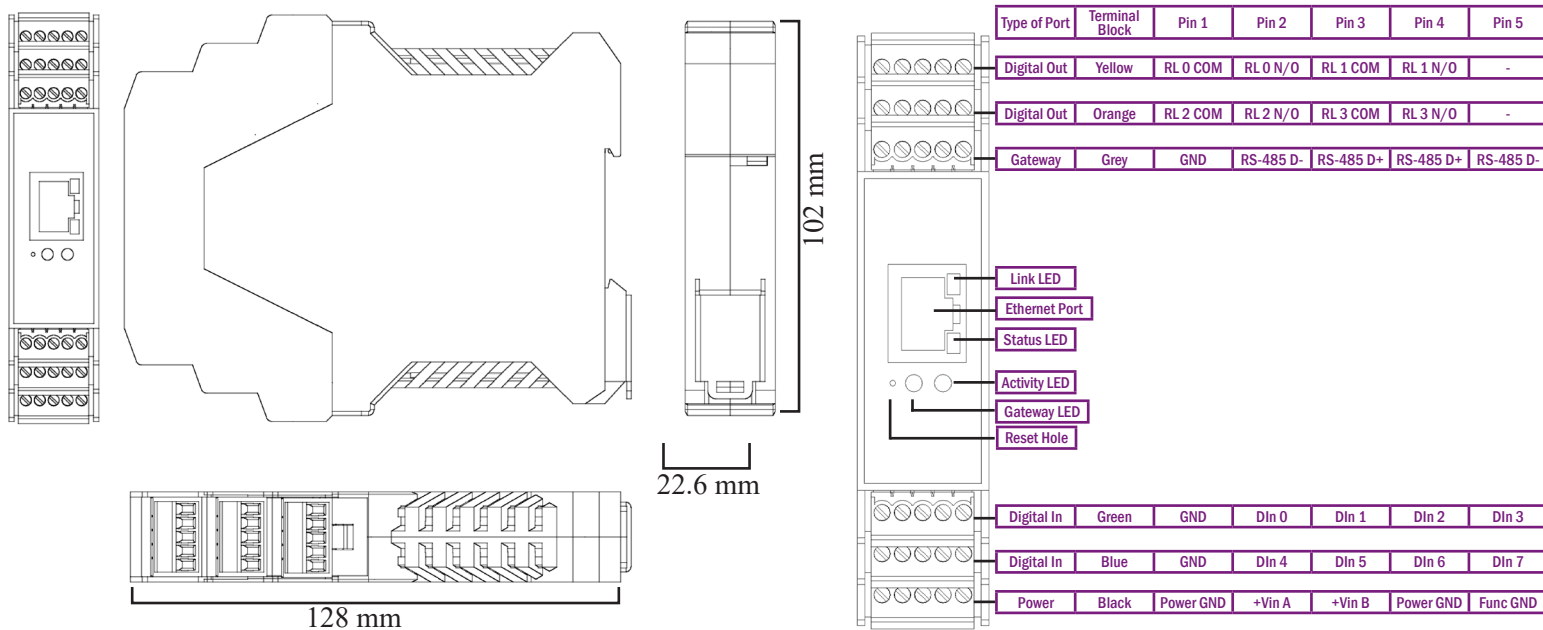| | |
|---|---|
| Webserver Interface | Configure IP address, monitor state of i/o lines, set the Watchdog Timers Output Reset Value, Set Power on digital output value |
| Programming Interface | No device driver needed, just open a TCP connection and send simple ASCII commands.<br>Software drivers give local COM Port interface for configuration |
| Utility Programs | Find device, configure IP address |

## Watchdog

| | |
|---|---|
| Power up | On power up all outputs go to user programmable power on known good state |
| Watchdog coms link | On loss of communications link all outputs go to a user programmable watchdog comms known good state. |
| Watchdog hardware timer | If the firmware does not refresh the watchdog timer within a predetermined interval then all outputs go to a user programmable watchdog hardware good state |
| Q-Stop function | When a user programmable input transitions to a preconfigured high or low state then all outputs go to a user programmable Q-Stop known good state |

## Ethernet

| | |
|---|---|
| Ethernet Port | 1 x RJ45 jack, 10/100Mhz autosensing, crossover auto sensing (Auto MDIX) |
| Protection | 1,500Volts magnetic isolation between I/O ports and network |
| Network Protocols | ICMP, IP, TCP, DHCP, Telnet, HTTP |
| Connection to Network | Ethernet 10BaseT / 100BaseTX |

## Housing

IP-20 rated non-conducting polyamide case with integrated DIN rail mount

102 mm

22.6 mm

128 mm

| Type of Port | Terminal Block | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
|---|---|---|---|---|---|---|
| Digital Out | Yellow | RL 0 COM | RL 0 N/O | RL 1 COM | RL 1 N/O | - |
| Digital Out | Orange | RL 2 COM | RL 2 N/O | RL 3 COM | RL 3 N/O | - |
| Gateway | Grey | GND | RS-485 D- | RS-485 D+ | RS-485 D+ | RS-485 D- |

Link LED
Ethernet Port
Status LED
Activity LED
Gateway LED
Reset Hole

| Digital In | Green | GND | DIn 0 | DIn 1 | DIn 2 | DIn 3 |
|---|---|---|---|---|---|---|
| Digital In | Blue | GND | DIn 4 | DIn 5 | DIn 6 | DIn 7 |
| Power | Black | Power GND | +Vin A | +Vin B | Power GND | Func GND |

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## Connectors

| | |
|---|---|
| **Screw Terminals** | 3.5mm pitch, #22 - #14, 0.5mm$^2$-2.5mm$^2$ pin power supply |
| **Wire Thickness** | 0.150 inch, 3.81mm, 20 pins, 12+8 screw terminals, #26 - #16 AWG, 0.14mm$^2$-1.3mm$^2$ |

## Power Supply

| | |
|---|---|
| **Power Consumption** | 2.5 Watt Max |
| **Power Supply input** | unregulated +5V to +30Volts DC, reverse polarity protection |
| **Isolation** | 1500VRMS Magnetic isolation from Ethernet |

## Environmental

| | |
|---|---|
| **Operating Temperature** | -30$^o$C to +80$^o$C, -22°F to +176°F |
| **Storage Temperature** | -40$^o$C to +85$^o$C, -40°F to +185°F |
| **Ambient Relative Humidity** | 5 to 95% (non-condensing) |

## LED Information

| | | |
|---|---|---|
| **Status LED** | Green | Device Ready |
| | Flashing Yellow | Changing Settings |
| | Flashing between Red & Green | Querying IP |
| | Flashing Green/Red | User performing Hard Reset |
| | Flashing between Green & Red/Yellow | IP address diagnostic |
| | Flashing between Green & Yellow | Initialization diagnostic |
| **Gateway** | Flashing Red | RS-485 Comms error |
| | Flashing Green | RS-485 |
| **Link LED** | Green light on | Network Link Established |
| | Flashing Green | Network Data RX/TX |
| **Activity** | Flashing Green | Output set / Input Read |
| | Flashing Red | Output overload |

## Approvals

| | |
|---|---|
| **Industry Approvals** | C-Tick, AEO (C-TPAT), WEEE, RoHS |
| **Microsoft Approvals** | Microsoft Certified Gold Partner |
| **Microsoft Signed Drivers** | Windows 10 32 bit & 64 bit Editions |
| | Windows 8 32 bit & 64 bit Editions |
| | Windows 7 32 bit & 64 bit Editions |
| | Windows Server 2008 32 bit & 64 bit Editions |
| | Windows Server 2008 & Windows 2000 |
| | Windows Vista 32 bit & 64 bit editions |

Gold
Microsoft Partner

## Packaging Information

| | |
|---|---|
| Packaging | Installation CD including manual, Microsoft signed drivers & utilities, Quick Start Guide |
| Device | Ethernet 8 DI + 4 Form A Relays |
| Packaged Weight | 0.215 kg, 0.47 pounds |
| Packaged Dims | 235(l) x 170(w) x 62(h) mm, 9.25(l) x 6.69(w) x 2.44(h) inches |
| GTIN Universal Code | 837324009828 |

## Product Support

| | |
|---|---|
| Warranty | Lifetime - online registration required<br>Please note this product contains relays; each have a typical lifespan of 100,000 operations. Relays are not covered by the Brainboxes Lifetime warranty beyond their typical lifespan. |
| Support | Lifetime Web, Email and Phone Support from fully qualified, friendly staff who work in and alongside the Product Development Team |

### Additional Information

| | |
|---|---|
| OEM option | Available for bulk buy OEM |
| Made In | Manufactured in the UK by Brainboxes Winner 2005 European Electronics Industry Awards 'Manufacturer of the Year' |
| Customisable | Brainboxes operate a 'Perfect Fit Custom Design' policy for volume users. More info: sales@brainboxes.com |

## Optional Accessory Items

### PW-600
**Global Power supply**

Power supply with connectors for UK, USA, EU and AUS mains socket. 'Tails' are suitable for connecting to screw terminal blocks

### PW-650
**5V from USB Power supply**

USB connector fits any standard USB port, such as on a laptop or desktop PC, providing 5V power to a prewired screw terminal block useful when you are configuring your ED device

### MK-588
**Accessory 6 Pack ED-5xx 5 Way 3.5mm Pitch Pluggable Blocks**

6 coloured PCB connectors. Individually numbered pins; 5 x 3.5mm pitch screw connections with tension sleeve.

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