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
• -30°C to +80°C Temperature range
• +5V to +30V DC Input Power

Digital Channels

| Inputs | 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 |
| Relay On/Off Time | 10 ms (Max) |
| 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 |
| Maximum Output Load Voltage | 60VDC |
| 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 |
Usage Model for ED-538

ED-538 Ethernet 8 DI + 4 Relays
ED-538 Ethernet 8 DI + 4 Relays

4 Form A Relays

RS485 Gateway for NuDAM/ADAM Modules

Ethernet port

LED Status Indication

8 Digital Inputs

Integral DIN rail mount

+5V to +30V Power Supply

Easy to use Interface:
Great features for remote monitoring

Integral DIN rail mount

8 Digital Inputs

+5V to +30V Power Supply

Easy to use Interface:
Great features for remote monitoring

Extended Temperature Range:
-30°C to +80°C 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 prevent incorrect connection. Numbered Pins simplifies wiring and removes confusion.

+44(0) 151 220 2500  sales@brainboxes.com  www.brainboxes.com
ED-538 Ethernet 8 DI + 4 Relays

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:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$01M</td>
<td>read the name of device address 01</td>
</tr>
<tr>
<td>!01ED-S88</td>
<td>device 01 replies that its name is ED-S88</td>
</tr>
<tr>
<td>$01F</td>
<td>read firmware version number of device address 01</td>
</tr>
<tr>
<td>!012.54</td>
<td>firmware version of device 01 is 2.54</td>
</tr>
<tr>
<td>@01</td>
<td>read digital input output status of device 01</td>
</tr>
<tr>
<td>&gt;1A45</td>
<td>device 01 digital input data 1A (=00011010) digital output data = 45 (=01000101)</td>
</tr>
<tr>
<td>$012</td>
<td>read configuration of device 01</td>
</tr>
<tr>
<td>!01400500</td>
<td>device 01 40=typecode, 05=gateway RS485 port is at 4800 Baud, 00=No checksum</td>
</tr>
</tbody>
</table>

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.

---

**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**

**ED-538 Ethernet 8 DI + 4 Relays**

**Browser Interface**
Configure IP address, monitor state of I/O lines, set the Watchdog Timers Output Reset Value, Set Power on digital output value

**Webserver Interface**
No device driver needed, just open a TCP connection and send simple ASCII commands.
Software drivers give local COM Port interface for configuration

**Programming Interface**
Find device, configure IP address

**Utility Programs**
Configure IP address, monitor state of I/O lines, set the Watchdog Timers Output Reset Value, Set Power on digital output value

---

**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**
1,500 Volts 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

---

**Type of Port**

<table>
<thead>
<tr>
<th>Terminal Block</th>
<th>Pin 1</th>
<th>Pin 2</th>
<th>Pin 3</th>
<th>Pin 4</th>
<th>Pin 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Out</td>
<td>Yellow RL-0 COM RL-0 N/O RL-1 COM RL-1 N/O -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Out</td>
<td>Orange RL-2 COM RL-2 N/O RL-3 COM RL-3 N/O -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gateway</td>
<td>Grey  GND RS-485 D- RS-485 D+ RS-485 D+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Link LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gateway LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reset Hole</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet Port</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Webserver</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configuration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Black Power GND Vin A Vin B Power GND Func GND</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**102 mm**

**22.6 mm**

---

+44(0) 151 220 2500 sales@brainboxes.com www.brainboxes.com
ED-538 Ethernet 8 DI + 4 Relays

Connectors
- Screw Terminals: 3.5mm pitch, #22 - #14, 0.5mm²-2.5mm² pin power supply
- Wire Thickness: 0.150 inch, 3.81mm, 20 pins, 12+8 screw terminals, #26 - #16 AWG, 0.14mm²-1.3mm²

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°C to +80°C, -22°F to +176°F
- Storage Temperature: -40°C to +85°C, -40°F to +185°F
- Ambient Relative Humidity: 5 to 95% (non-condensing)

LED Information

<table>
<thead>
<tr>
<th>Status LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Device Ready</td>
</tr>
<tr>
<td>Flashing Yellow</td>
<td>Changing Settings</td>
</tr>
<tr>
<td>Flashing between Red &amp; Green</td>
<td>Querying IP</td>
</tr>
<tr>
<td>Flashing Green/Red</td>
<td>User performing Hard Reset</td>
</tr>
<tr>
<td>Flashing between Green &amp; Red/Yellow</td>
<td>IP address diagnostic</td>
</tr>
<tr>
<td>Flashing between Green &amp; Yellow</td>
<td>Initialization diagnostic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gateway</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashing Red</td>
<td>RS-485 Comms error</td>
</tr>
<tr>
<td>Flashing Green</td>
<td>RS-485</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green light on</td>
<td>Network Link Established</td>
</tr>
<tr>
<td>Flashing Green</td>
<td>Network Data RX/TX</td>
</tr>
</tbody>
</table>

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

+44(0) 151 220 2500 sales@brainboxes.com www.brainboxes.com
ED-538 Ethernet 8 DI + 4 Relays

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 Dms: 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
  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.

Trademarks and logos are the property of Brainboxes Ltd. All other trademarks are the property of their respective owners.