

Creasol DomBus1

RS485 bus expander for Domoticz with 3 relays, 6 inputs and one 230Vac input



DomBus1 is designed to easily expand the number of I/Os of home automation systems using **Domoticz software** (on Raspberry or other hardware) minimizing the power consumption.

It can be supplied from 5 to 25Vdc, and power consumption is really low: at 12V, for example, 3mA in standby, 10mA with 1 relay ON, 17mA with 2 relays ON, 24mA with 3 relays ON.

One or multiple DomBus boards can be connected via RS485 bus, so using a 4-wires cable it's possible to implement a network of I/O and sensors where 2 wires are for data and 2 for power supply (from 5 to 24Vdc).

LEDs, connected on all inputs, outputs and bus, are enabled by pressing the **Prog** button and stay active for 60 seconds, then will be OFF until **Prog** button is pushed again.

Red LED between A and B terminal blocks indicates the serial bus transmission.

Relay outputs are configured for low power mode, consuming less than 30% of the power normally needed by relays, so they can be used for outputs that stay ON for long time (alarm/security signals, night lights, ...).

The switching mode power supply, LEDs-enable and low power relay outputs features, lead to a full control of inputs/outputs with an optimized power consumption.

Full instructions and domoticz plugin are available at www.creasol.it/CreasolDomBus1

Features and specifications

- Switching mode power supply unit, converting 7.5-25Vdc input voltage to 5V: standby current is 6mA @5Vdc, 3mA @12Vdc, 2mA @24Vdc.
- RS485, 115200bps half duplex (2 wires bus) with 32bit microcontroller
- 3 relay outputs (250V 5A switch capability with non-inductive load. In case of inductive load, switch current is lower).
- All 3 relays can be configured in low power mode: relay current consumption is reduced to 7mA @12V instead of 25mA @12V (normal relay current).
- 6 inputs, fully configurable, with internal pull-up to 5V.
- Optionally, it's possible to configure 2 or 3 "inputs" to be connected to 1 or 2 waterproof ultrasonic distance sensors.
- 1 230V AC input (with optocoupler), suitable to sense AC voltage: connect the two blue-wires to a device to check if it is powered or not (e.g. to avoid power disruption to heat pump or freezer).
- Optionally, it's possible to convert the AC input to a low-voltage solid state relay output (40V, AC or DC, 100mA), by adding an integrated circuit and configuring that port as output in Domoticz.
- Domoticz automatically recognize a new DomBus device attached to the RS485 bus, and automatically add the corresponding I/Os to the switches panel.
- Easy way to configure I/O using the switch description (for example it's possible to configure an output as normal or low power relay, normally open or closed, writing the configuration in Domoticz device description).

Installation

Using RS485 specific cables it's possible to get almost 1km linear bus with more devices attached. Alternatively, it's possible to use 2 twisted pairs of cheap Cat6 UTP or STP cable, one twisted pair for data (A and B) and one for 12-24V power supply. Be careful to connect all devices using a linear bus topology, to get the lowest reflection/noise, and connect 100-150 Ohm resistor on the two ends.

At Raspberry/PC side, it's possible to use a cheap USB-RS485 adapter, if a serial port with RS485 driver is not available.

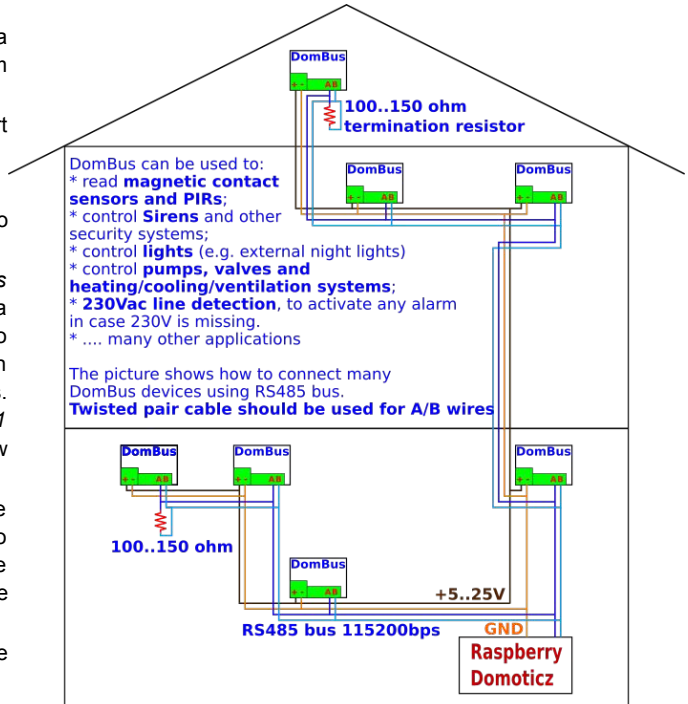
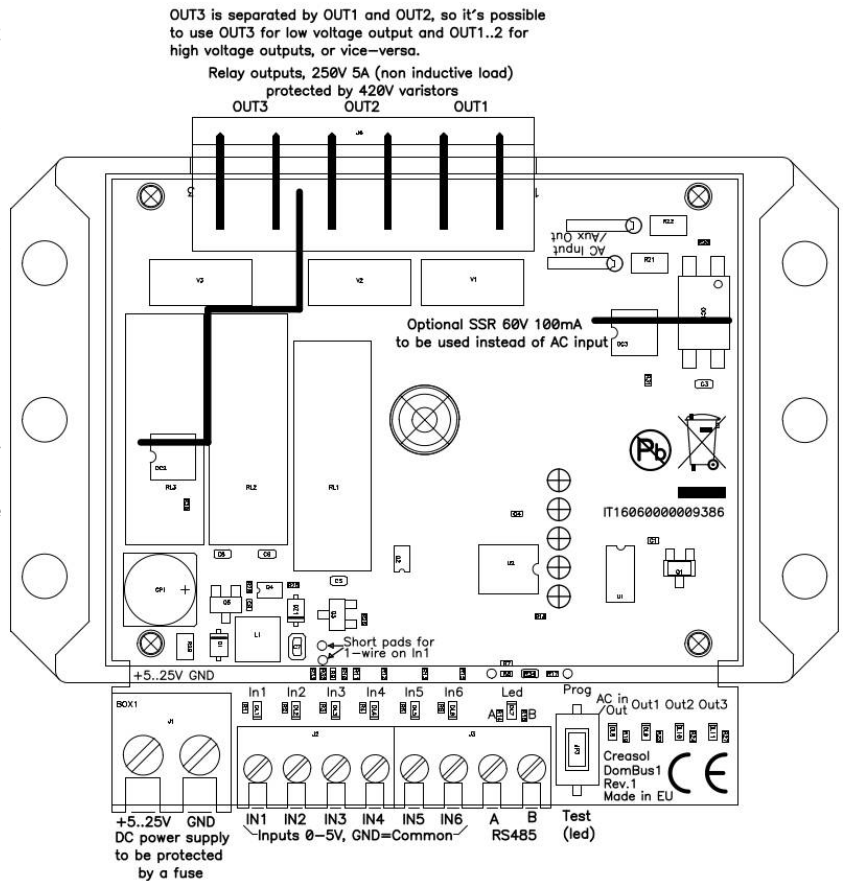
Configuration

Domoticz plugin can be found at www.creasol.it/CreasolDomBus1, where it's also possible to find detail instructions for device configuration.

After plugin installation and Domoticz restart, it's possible to add the *Creasol DomBus* hardware (Setup->Hardware) and connect the DomBus1 device to the RS485 bus: if a DomBus1 has the default address 0xff01, only one port will be automatically added to the Switches panel of Domoticz; in case the DomBus1 was already configured with another address, all ports will be added to the Switches panel in few seconds. In the first case, go to Switches panel, find the new device "*dombus - [Hff01] OUT1 Relay*", click on Edit and add in the description *,HWADDR=0x0001* to set the new address to 0001. Reload the Switches panel to get all ports of DomBus1 active.

Every I/O can be configured via the Domoticz switch description: for example a device type *IN_DIGITAL* normally is On when it's left unconnected, and Off when it's shorted to GND, but it's possible to invert this function specifying in the switch description the parameter *INVERTED*, separated by a comma (,): *IN_DIGITAL,INVERTED*. Please check the following sections *I/O parameters* and *DomBus1 I/O capabilities*.

I/O that are not used can be disabled in Domoticz *Setup -> Devices* clicking on the blue arrow of each useless device (I/O).



I/O parameters

Parameter name	Function
HWADDR=0xNNNN	This command set new address for the dombus device: reload the Switch panel to see the new devices associated with the new address of DomBus. NNNN is an hexadecimal number, from 0x0001 to 0xff00, so 65280 combinations are available. Keep note of address assigned to each dombus device, because in case of address conflict it's needed to switch off one of the conflicting device and program the remaining one to another address, or make a factory reset as explained below.
INVERTED	Used to invert the logic state of an input or output. Can be used in conjunction with OUT_DIGITAL, OUT_RELAY_LP, IN_DIGITAL. Normally, domoticz switch is On if input is at logic level high (open), and Off when it's shorted to ground. If INVERTED is specified, domoticz switch will be On when the corresponding input is shorted to ground, and vice versa.
OUT_DIGITAL	Output is managed as digital, On when it's active and Off when it's disabled.
OUT_RELAY_LP	Relay output managed in low power saving mode, to reduce relay coil current consumption at less than 30% of normal value.
IN_DIGITAL	Digital input, is On when the corresponding input is at high voltage level (open), and Off when the corresponding input is at GND (shorted).
DISTANCE	Set the current port as the echo output of ultrasonic distance meter: IN3 will be used to provide the trigger to the distance meter (see application schema). Setting a device as DISTANCE, it will be moved to the Utility panel of Domoticz.
A	For analog and distance sensors: used to compute the real value using the formula $REAL_VALUE=A * VALUE_FROM_DOMBUS + B$.
B	For analog and distance sensors: used to compute the real value using the formula $REAL_VALUE=A * VALUE_FROM_DOMBUS + B$.


DomBus1 I/O capabilities

Port#	Name	Capabilities	Default configuration	Description
1	OUT1 Relay	OUT_DIGITAL, OUT_RELAY_LP	OUT_RELAY_LP	Relay output, that can be managed as standard relay (OUT_DIGITAL) or low power relay (OUT_RELAY_LP)
2	OUT2 Relay	OUT_DIGITAL, OUT_RELAY_LP	OUT_RELAY_LP	Relay output, that can be managed as standard relay (OUT_DIGITAL) or low power relay (OUT_RELAY_LP)
3	OUT3 Relay	OUT_DIGITAL, OUT_RELAY_LP	OUT_RELAY_LP	Relay output, that can be managed as standard relay (OUT_DIGITAL) or low power relay (OUT_RELAY_LP)
4	IN1	IN_DIGITAL, IN_ANALOG, DISTANCE	IN_DIGITAL	Normally it works as digital input, 0-5V
5	IN2	IN_DIGITAL, IN_ANALOG, DISTANCE	IN_DIGITAL	Normally it works as digital input, 0-5V
6	IN3	IN_DIGITAL, IN_ANALOG	IN_DIGITAL	Normally it works as digital input, 0-5V
7	IN4	IN_DIGITAL, IN_ANALOG	IN_DIGITAL	Normally it works as digital input, 0-5V
8	IN5	IN_DIGITAL, IN_ANALOG	IN_DIGITAL	Normally it works as digital input, 0-5V
9	IN6	IN_DIGITAL, IN_ANALOG	IN_DIGITAL	Normally it works as digital input, 0-5V
10	IN AC/OUT SSR	IN_AC, OUT_DIGITAL	IN_AC INVERTED	230Vac line sensing, used to detect blackout or line voltage. DomBus1 board can be modified to replace the circuitry with a 60V 100mA SSR (current consumption less than 1mA), suitable for controlling a siren or other security device, heating system or another low voltage device.

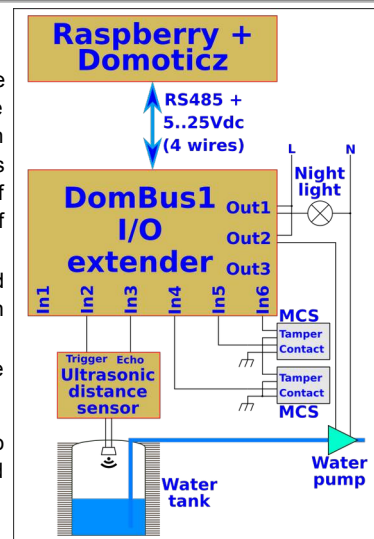
Application note: measures the level of a water tank, activates a valve for watering the garden, turns on/off the night light and read magnetic contact sensors of door+blind

The following schema shows how to connect a [waterproof ultrasonic distance sensor](#) to Creasol DomBus1 to measure the level of water tank, so the garden irrigation program on Domoticz can determine if there is enough water in the tank. DomBus1 returns the distance value in mm, and it's possible to program the device to get a linear transformation of this measure using the formula $VALUE=A*mm+B$. In this example, distance is measured in cm, the tank height is 200cm from the sensor, so to measure the level of water $A=-0.1$ and $B=200$, so when DomBus1 returns 1800mm of distance (from sensor, placed in the top of tank, to water level), $VALUE=-0.1*1800+200=-180+200=20$ cm (level of water from the bottom of tank).

These parameters can be easily set in the device description: enter Switches panel, locate and edit the IN2 switch, and write in the description $DISTANCE,A=-0.1,B=200$ and save: Domoticz automatically remove the device from the switch list and create a device in the Utility panel, showing the correct value compute with the parameter A and B indicated.

DomBus supports at max 2 distance devices, connected to IN1 and IN2; trigger to distance meters is sent using the IN3 port, that is reserved for this function and can be disabled on the Setup -> Devices (clickin on .

As the Creasol DomBus1 device has many inputs and outputs, in this application note the same DomBus is used also to activate the garden watering pump, activate the night lights, and control the magnetic contact sensors for a door and blind, as like as the MCS tamper.



Factory reset

To restore default parameters, remove power supply, push and hold the button *Prog* and supply the device: red led starts flashing; after 5 seconds it stops flashing and device restores the configuration to default settings.

This procedure can be useful when 2 DomBus devices have the same address and one of these cannot be disconnected or changed.

Safety information

The appliance must be disconnected from the power supply before carrying out any installation work. Electricity must be removed even for the external devices connected to the board (e.g. lights, pumps, electronic boards,... connected to the relay outputs).

Installation and maintenance must be carried out by a qualified technician, in compliance with the manufacturer's instructions and local safety regulations.

The electronic board must be installed into a well protected plastic enclosure, well protected by accidental contact with other metal objects.

Power supply must be protected by a fuse, as indicated in the application schema. External devices can be connected to the board only if they meet the specifications indicated in the *Features and specifications* section. The manufacture do not respond for improper use or connection of this device.

Disposal

The packing material is 100% recyclable and should be disposed in the appropriate recycle bins. The electronic board cannot be disposed as household waste, but must be disposed of correctly or returned to the seller when purchasing a new equivalent product. Heavy fines can be imposed by local laws for illegal disposal. By ensuring this product is disposed of correctly, you will help avoid potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.

Warranty

The warranty complies with statutory requirements, and covers only defect in material, workmanship or lack of conformity. Your local stockist should be contacted in connecting with any warranty-related matters.

CE Declaration of Conformity

This equipment meets the essential requirements of the European Directive 2014/53/EU. The Declaration of Conformity can be obtained from www.ce.creasol.it