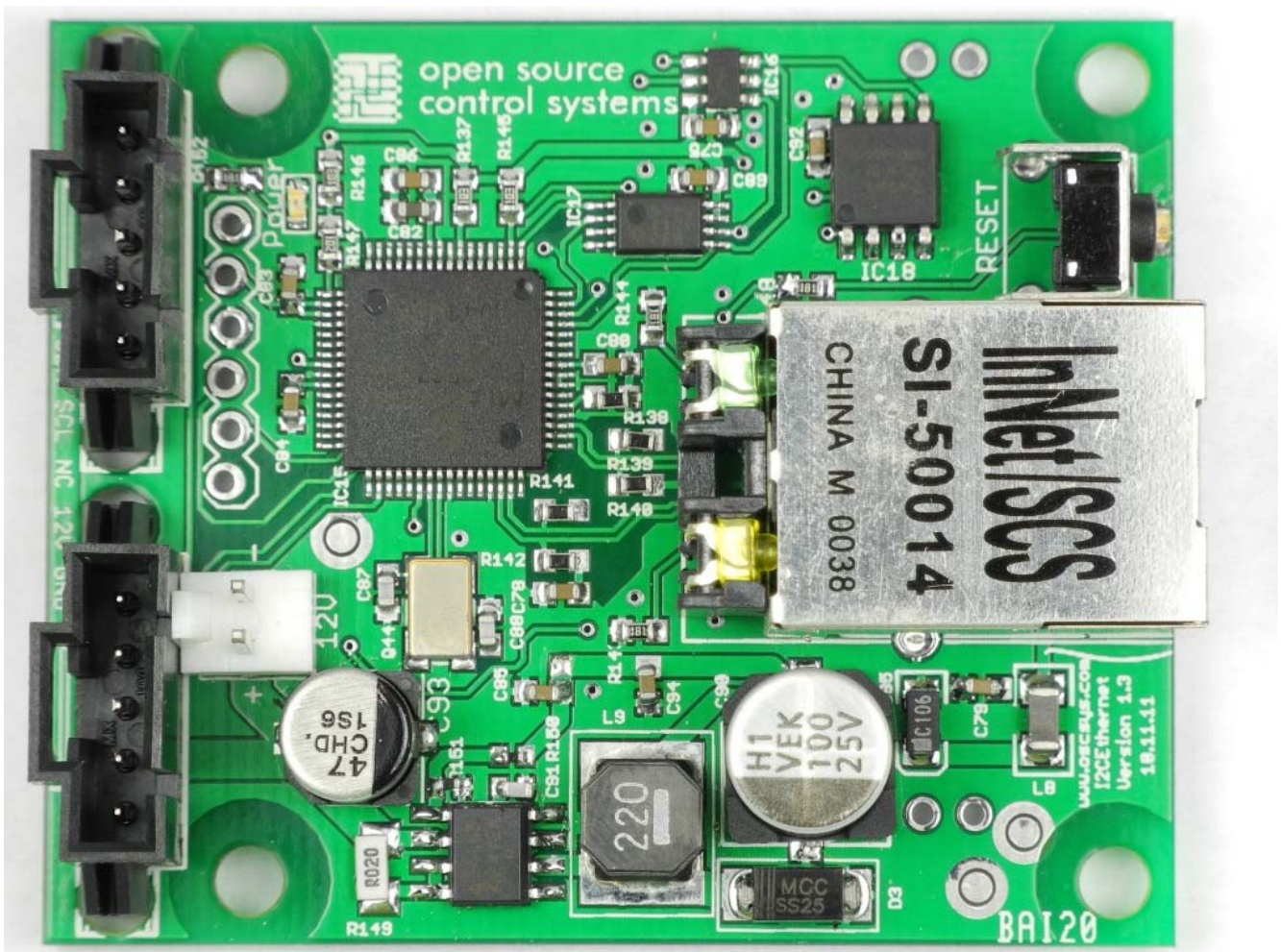




open source
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I2C Ethernet Module User Manual



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1 Overview

The I2C Ethernet Module was designed to add network connectivity to the BrewTroller and FermTroller control systems. The module connects to the I2C bus provided on BrewTroller 3.3 and newer system boards. It passes web requests to the BrewTroller and returns the BrewTroller's response back to the requestor.

The BTnic was designed to act as a web service for a web based user interface to be hosted on another server or system. The user interface itself is not hosted on the module.

For more information about the BrewTroller Project please visit <http://www.brewtroller.com>.

1.1 Safety Information

The BrewTroller and the I2C Ethernet Module are intended to be integrated into a brewing system by the purchaser. It is solely the purchaser's responsibility to assure that the system is configured in a manner consistent with applicable safety requirements. Open Source Control Systems, Inc. does not control how this board is integrated into the purchaser's system and cannot be responsible for guaranteeing the safety of your system.

The BrewTroller is not guaranteed to be fail-safe. The system into which the BrewTroller is installed should provide fail-safe protection and emergency stop capability.

The BrewTroller system contains circuitry that may be connected to dangerous voltages. Care must be taken that user cannot come in contact with these voltages. An enclosure that allows for modest ventilation, but prevents intrusion by operator's hands and foreign objects should be utilized with this board.

1.2 I2C Ethernet Features

- Microchip 18F67J60 8 Bit Processor with 128KB of flash
- 10Base-T PHY
- 2KBIT EEPROM with Globally Unique Node Address
- 256K Serial SRAM

1.3 Package Contents

- I2C Ethernet Module

1.4 Before You Proceed

Please review all safety and connection information before attempting to connect and power on your I2C Ethernet Module. Open Source Control Systems, Inc. is not responsible for damage caused to boards by improper connections. If you have any questions please do not hesitate to contact support. You can find phone numbers and contact forms on our website (<http://www.oscsys.com>).

2 Quick Start Guide

2.1 Connecting Power

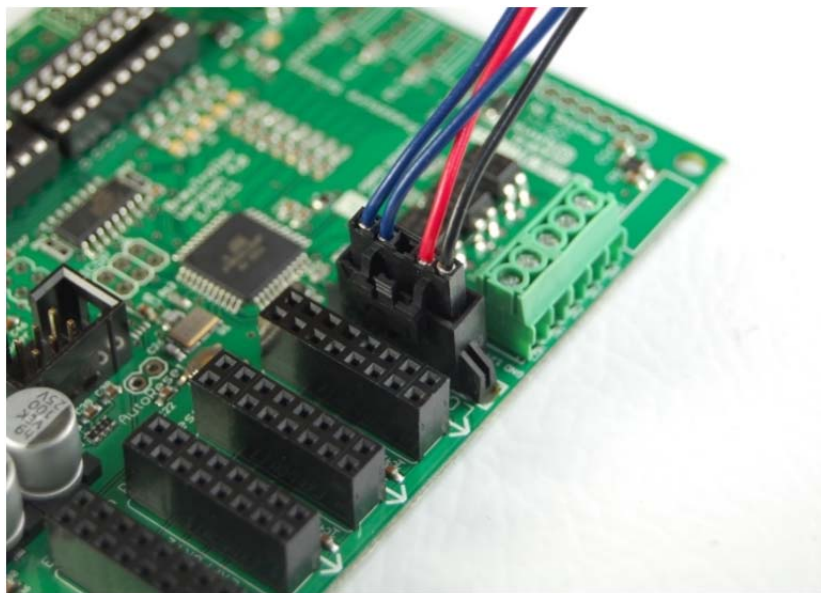
Power is supplied via the I2C Bus cable. Under special circumstances you may need to use the aux power input connector (X4).

WARNING: Do not connect power to X4 when applying power with the I2C port, damage can result.

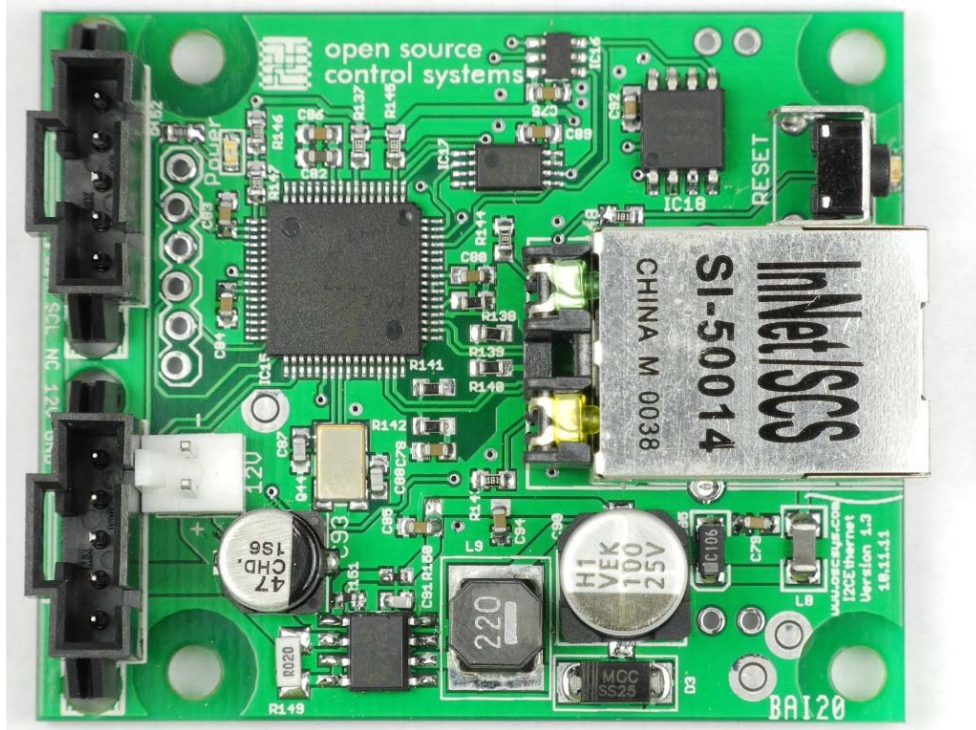
2.2 Connecting the I2C bus

Connections to the I2C Ethernet module are made via the two locking connectors onboard. This board can be installed between your BrewTroller and I2CLCD or to the I2C expansion port on the BrewTroller 3.3 boards.

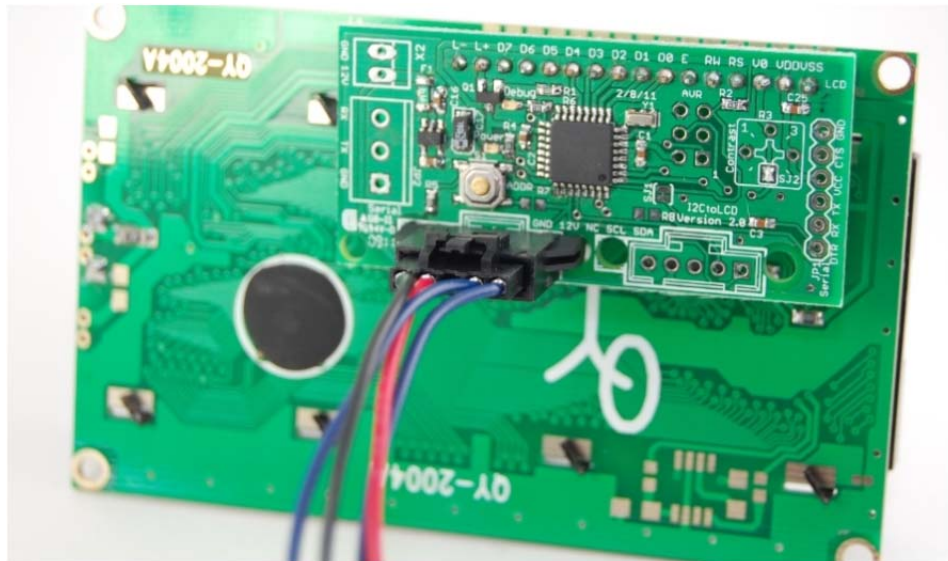
Refer to the following pictures for examples



I2C Connection on BrewTroller 4.0



I2C Connection on I2C Ethernet Module



I2C Connection on I2CLCD Module

2.3 Connecting Ethernet

Connections to the RJ-45 Ethernet Jack can be made using a standard Ethernet patch cable.

2.4 Debug LED Status

The Debug LED heartbeat indicates normal operation during normal operation. The Debug LED will toggle on/off approximately every 250ms. If the Debug LED is not flashing the firmware is not properly running. Remove power from the module and restart it. If the problem persists or recurs please contact OSCSYS Technical Support.

2.5 Restart

The reset jumper can be used to restart the module by momentarily connecting the reset pins. The jumper should remain disconnected during normal operation. When the jumper is connected the BTnic firmware will pause execution and will restart when the jumper is removed. The I2C module will execute a network bootloader process for approximately 4s before reloading the BTnic firmware.

2.6 Identifying the module's IP Address

The I2C Ethernet Module uses DHCP by default to obtain an IP address on network. A Windows utility is available to detect the module on your network and identifies its assigned address:

<http://brewtroller.googlecode.com/files/Microchip%20Ethernet%20Discoverer.exe>

2.7 Modifying Network Configuration

The I2C Ethernet Module's network configuration can be modified using a web utility hosted as part of the firmware. The network configuration is stored in the EEPROM on the module and loaded each time the module boots.

The following URL is used to access the network configuration page (Note: replace MODULE_ADDRESS with the current IP Address of the module):

http://MODULE_ADDRESS/protect/config.htm

The default authentication settings are:

Username: btnic

Password: btnic

2.8 Restoring Factory Defaults

The reset jumper is also used to restore the factory default settings. Use the following procedure to reset all settings:

Connect the Reset Jumper before applying power to the module or if the unit is already running momentarily connect, disconnect and then reconnect the jumper and leave the jumper connected.

The module will execute the 4s bootloader process.

The Debug LED will light constantly. The firmware will delay 4s and then clear the current EEPROM settings.

The Debug LED will turn off when the EEPROM has been cleared and the unit will remain halted until the Reset Jumper is removed.

2.9 Upgrading Firmware

The I2C Ethernet Module ships with a Network Bootloader that allows the firmware to be updated from another computer connected to the local network. (Note: The firmware will not allow a firmware upgrade from a remote subnet.)

During initial power up the bootloader uses a static IP Address of 192.168.97.60. You must configure a computer on the network with another address on that same network (192.168.97.61 is recommended).

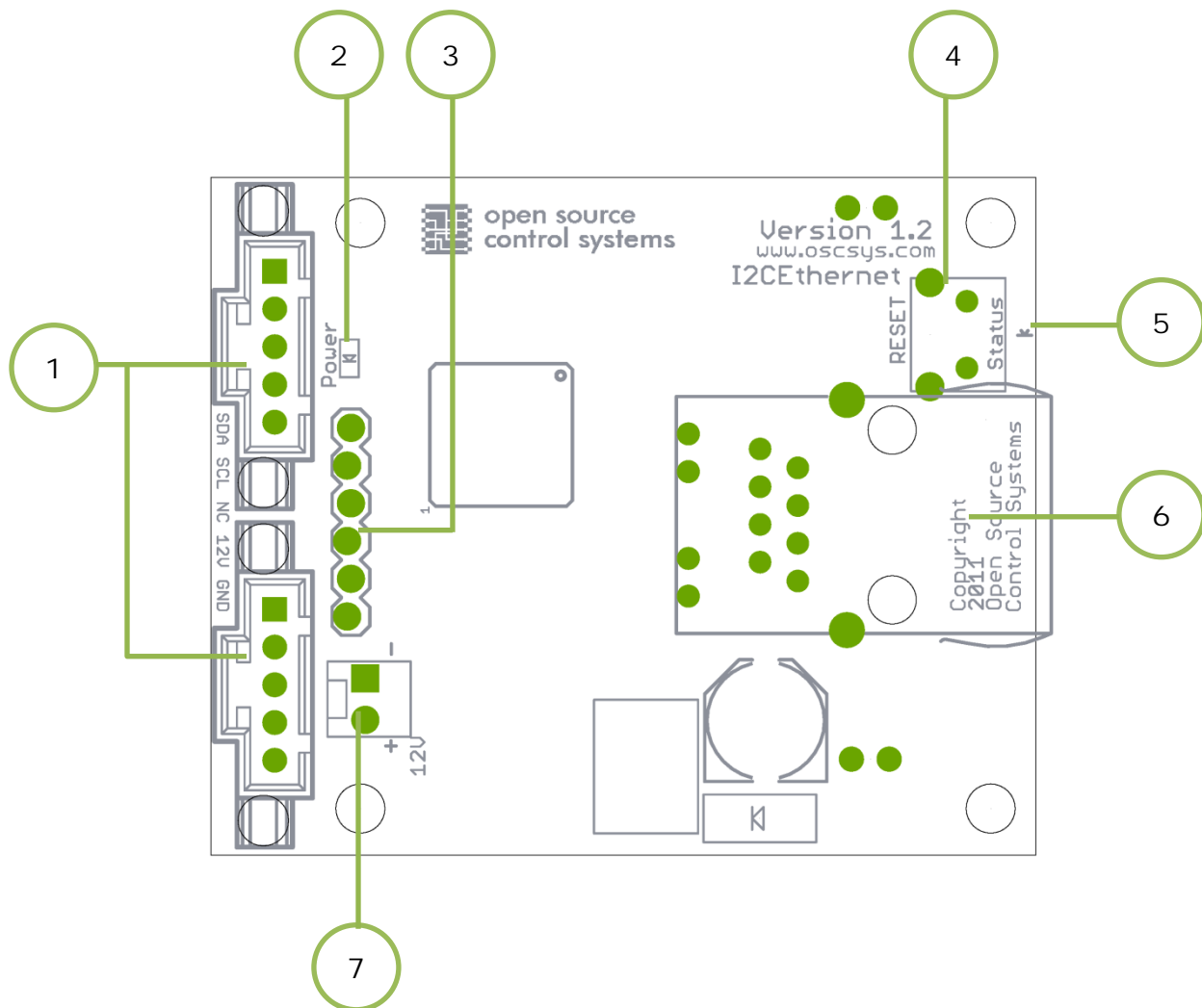
Obtain the latest I2C Ethernet Firmware .hex file from the BrewTroller website.

A TFTP utility is used to upload the firmware. The following shows the correct syntax to use for the TFTP command available in Windows:

tftp 192.168.97.60 PUT BTnicEmb.hex

3 I2C Ethernet Layout

3.1 Layout



1. I2C Input/Output Connectors
2. Power LED
3. In Circuit System Programmer (ICSP)
4. Reset Switch
5. Status LED
6. RJ-45 Ethernet Jack
7. Optional 12V Input

3.2 LED Indicators

3.2.1 Power

Indicates power is connected to board.

3.2.2 Status

When this LED is flashing the board is operating normally.

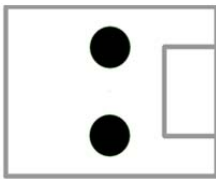
3.3 Jumpers

3.3.1 Reset

This jumper is used to reset the board back to defaults and for TFTP firmware updates.

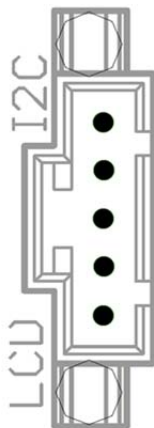
3.4 Connections

3.4.1 X4 – Aux Power



1. GND
2. 12VDC

3.4.2 I2C Communications Port



1. SDA
2. SCL
3. N/C
4. 12VDC
5. GND

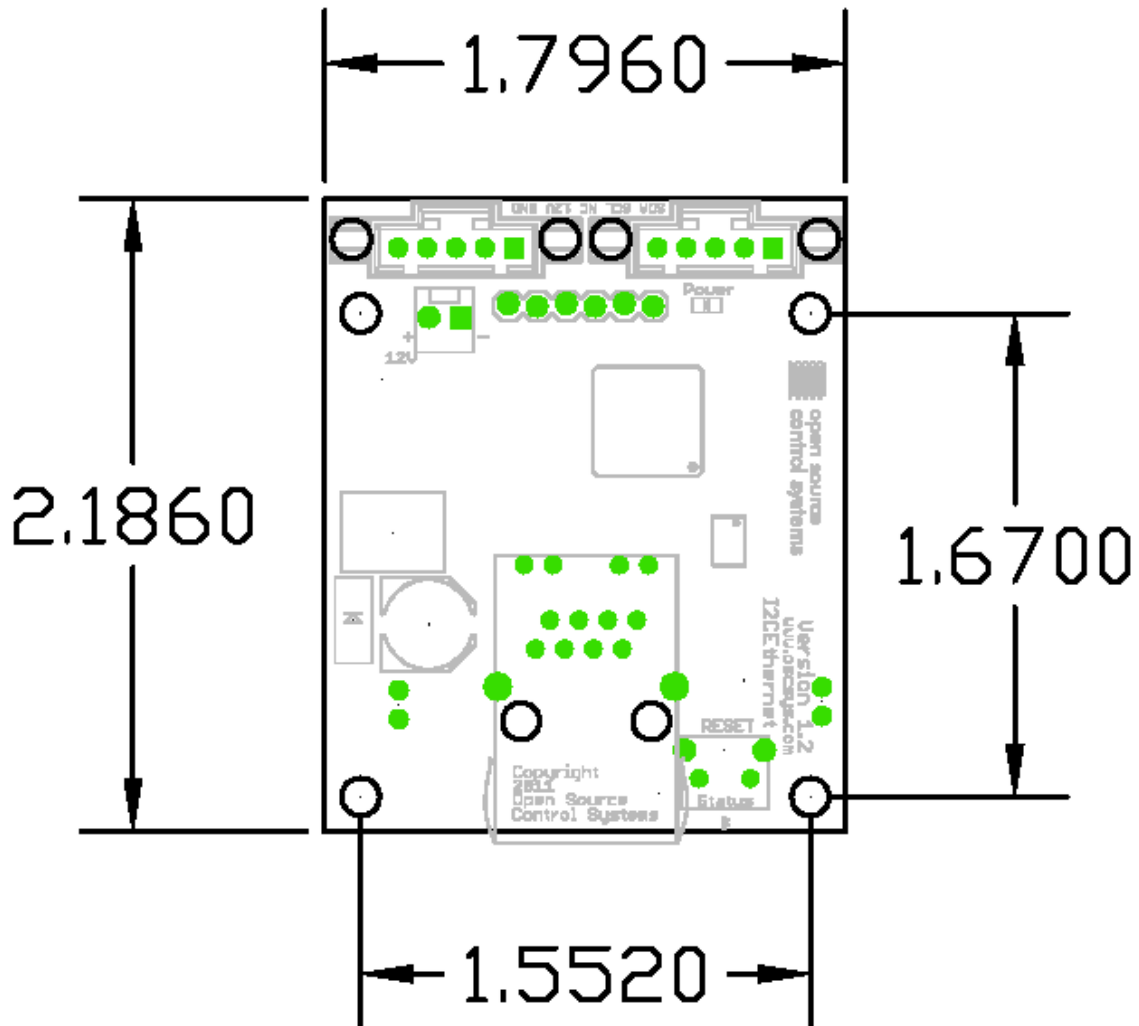
3.4.3 ICSP Header



1. MCLR
2. VCC
3. GND
4. PGD
5. PGC
6. N/C

4 Mechanical Specifications

4.1 Board Dimensions



5 Electrical and Environmental Specifications

Main Power Input	12VDC
Logic-Level Communication Ports	5VDC
Temperature	0° to +55° C
Relative Humidity	20% to 80% relative humidity, non-condensing

6 Appendix A – Warranty

Open Source Control Systems, Inc. (OSCSYS) warrants that this hardware product is in good working condition, according to its specifications at the time of shipment, for a period of 90 days from the date it was shipped from OSCSYS. Should the product, in OSCSYS's opinion, malfunction within the warranty period, OSCSYS will repair or replace the product without charge. Any replaced parts become the property of OSCSYS. This warranty does not apply to the software component of a product or to a product which has been damaged due to accident, misuse, abuse, improper installation, usage not in accordance with product specifications and instructions, natural or personal disaster or unauthorized alterations, repairs or modifications.

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- (a) from the use of the product;
- (b) from the loss of use of the product;
- (c) from the loss of revenue or profit resulting from the use of the product; or
- (d) as a result of any event, circumstance, action or abuse beyond the control of Open Source Control Systems, Inc.

whether such damages be direct, indirect, consequential, special or otherwise and whether such damages are incurred by the person to whom this warranty extends or a third party.