



<http://www.easycatshield.com/>

<http://www.bausano.net/>

Main features of revision 2

The generation of the *NetworkInfo.h* file has been added.

It can be used by the [Easy Master library](#). See chapter chapter ["3 - The NetworkInfo.h file"](#).

1 - The Easy Navigator

The Easy Navigator is a free software tool that allows you to analyze the functionality of the EasyCAT boards.

It uses the Ethernet interface of a Windows PC, and allows you to see which are the boards connected to the network, to set their PDO outputs and view their PDO inputs, through a simple and intuitive user interface.

1.1 - System requirement

The Easy Navigator works on any Windows PC, from XP onwards, 32 or 64 bits, equipped with a standard Ethernet interface 100BASE-TX.

It access the network using UDP sockets and therefore there is no need to install the WinPcap library, or equivalent.

1.2 - Installation

The Easy Navigator is a portable program, I.E. it doesn't require installation: just download the *EasyNavigator.zip* file from the [AB&T website](#) and unzip it somewhere on your hard disk.

A directory named *Easy_Navigator_Vx_y*, which contains the following files, will be created.

1- The *EasyNavigator_GUI.exe*, is the file you need launch to start the Easy Navigator.

2- The *ECAT.dll*, is the interface to the EtherCAT® network.

3- The *EasyNavigator_UserManual.pdf*, is the document that you are reading just now. It is accessible from the menu "Info → Help".

4- After running a scan, others two files, named *Network.txt* and *NetworkInfo.h*, will be created. *Network.txt* is used by the Easy Navigator and *NetworkInfo.h* can be used by the Easy Master as described in chapter ["3 - The NetworkInfo.h file"](#).

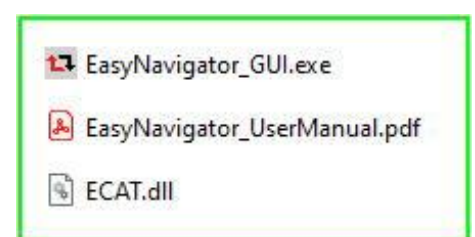


Fig-1 Files installed

2 - How to use the Easy Navigator

2.1 - Starting the Easy Navigator

When we start the Easy Navigator the window on the side will appear .

To proceed, be sure that the boards that you want to analyze are connected to the Ethernet interface of the PC and that they are correctly powered on.

It is not necessary to configure the Ethernet interface used, even if the PC has more than one: it will be automatically detected by simply clicking the "Scan" button.

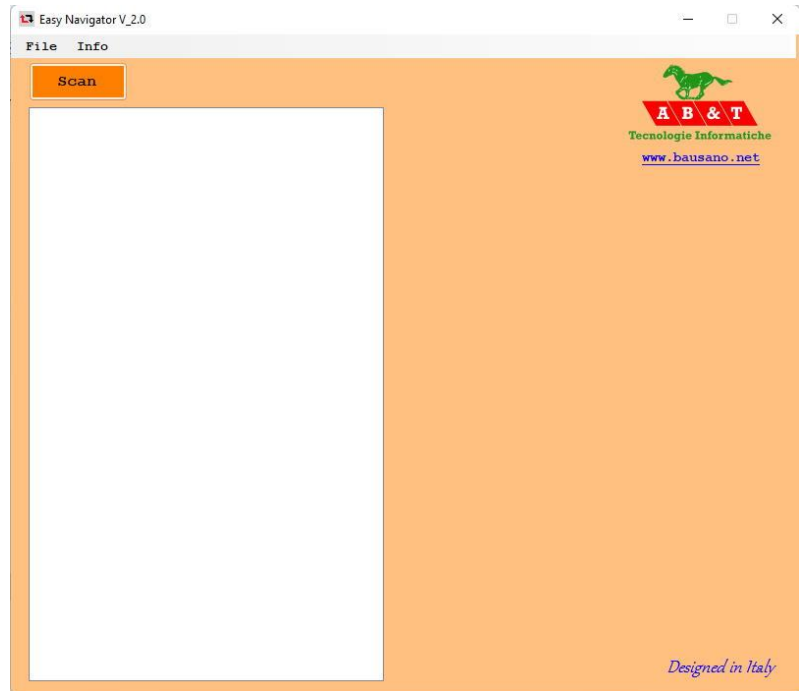


Fig-2 Initial window

2.2 - Scanning the network

When you click the "Scan" button the software will first look for the Ethernet interface that has same EtherCAT® slaves connected, and then it will read the configuration EEPROM that is present on each slave.

If only one slave is present this is almost immediate but on more complex networks it will take a few seconds.

Then the information acquired will be processed and displayed in a human readable format.

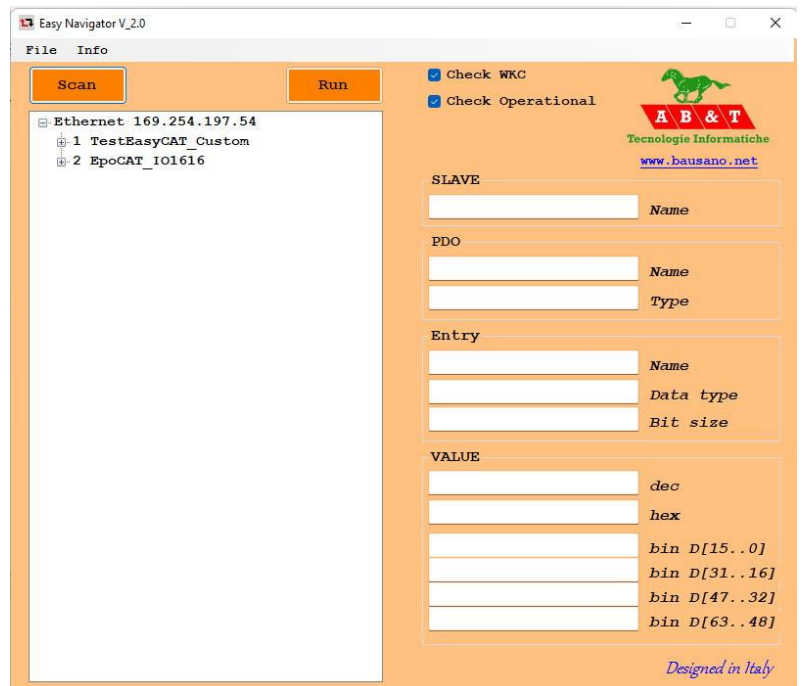


Fig-3 Network scanned

In this example we can see that the Ethernet interface with IP address 169.254.197.54 is used as EtherCAT® master and that two slaves are present: an EasyCAT that has been customized with the [Easy Configurator](#) and an EpoCAT IO1616.

2.3 - Analyzing the network

Now we can expand the network tree to see the slaves PDOs and their entries, as well as the data types and bit sizes.

To be recognizable at a glance the inputs are in blue and the outputs are in red.

At this time we cannot see or set the entries value yet, because the network sampling is not running.

To do so we need to click the "Run" button.

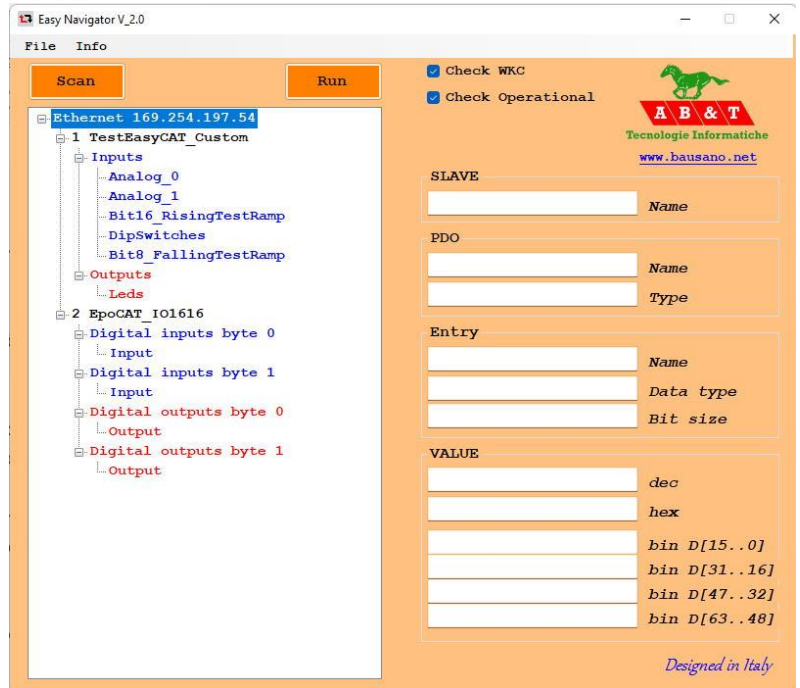


Fig-4 Network tree expanded

2.4 - Running the network and getting the inputs value

Clicking the "Run" button will start the network sampling, at a rate of about 10mS. This is visualized by the button "Stop" blinking green and orange.

Now, if we select an input PDO entry, its value will be display, and updated in real time, in the text boxes circled in green in the picture to the side.

For your convenience the value is displayed in decimal, hex and binary at the same time

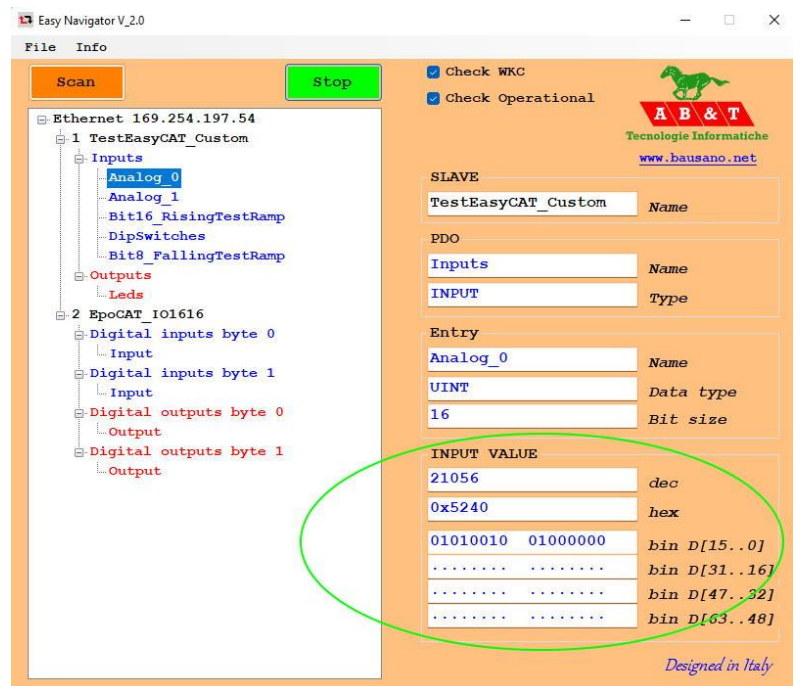


Fig-5 Value of the selected input entry

2.5 - Setting the outputs value

If we select an output entry, its current value will be displayed and we can edit it, if we want to change it.

We can assign the new value by editing the text box that we prefer, the decimal, the hex, or the binary and the others will be updated consequently.

By clicking on the "Write" button the changes will take effect and the new value will be sent to the slave.

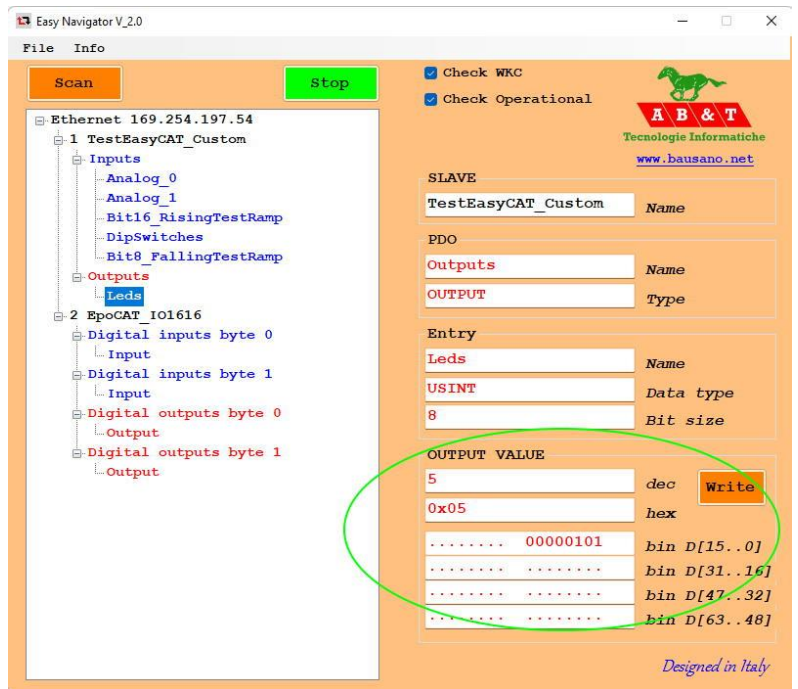


Fig-6 Value of the selected output entry

2.6 - Error checking

When the network sampling is running the software continuously checks that the working counter, returned by the slaves, is correct and that all the slaves are in Operational.

If an error is detected a message box pops up and the sampling is stopped.

Sometimes, for debugging purpose, it may be useful to disable these checks: this is possible through the two check boxes circled in the picture to the side.

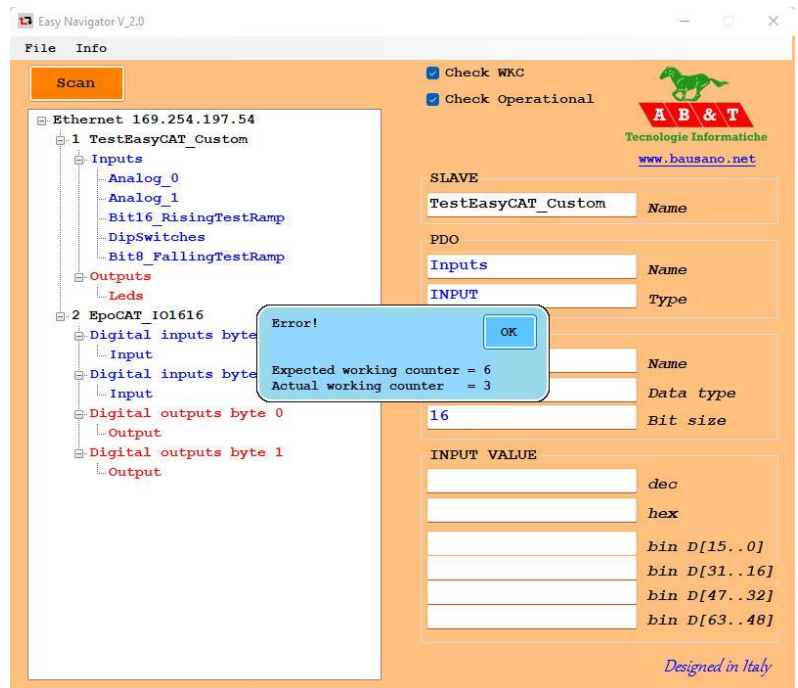


Fig-7 Error checking

3 - The NetworkInfo.h file

When we execute a network scan, a file named `NetworkInfo.h` will be created in the installation folder of the Easy Navigator.

This file, together with the [Easy Master library](#), can be used to create an EtherCAT® master that runs on an Arduino board. To do this the file `NetworkInfo.h` must be copied to the Easy Master Arduino project, next to the `.ino` file, using the menu selection:

File → *Copy NetworkInfo.h*

For info about how to create an EtherCAT® master that runs on an Arduino board please see the [Easy Master library user manual](#).

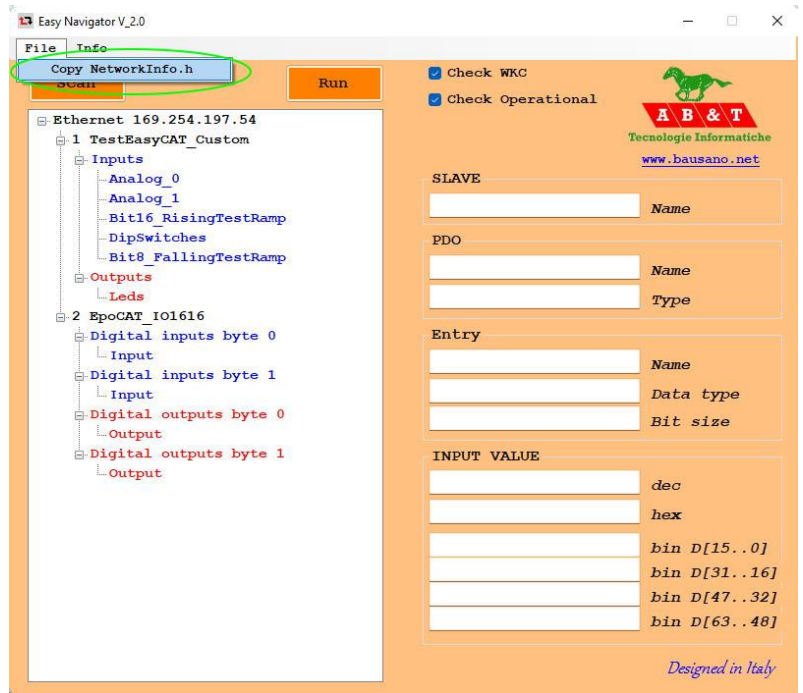


Fig-8 Copying the NetworkInfo.h file

----- Appendix -----

Useful links

AB&T website

<https://www.bausano.net/en/>

EasyCAT shield page on the AB&T website

<https://www.bausano.net/en/hardware/ethercat-e-arduino/easycat.html>

EasyCAT review on You Tube

https://www.youtube.com/watch?v=i_3PEEJ6QY8&t=7s

Easy Navigator tutorial video on You Tube

<https://www.youtube.com/watch?v=FJgTtstQuwQ>

Easy Navigator download

<https://www.bausano.net/images/arduino-easycat/EasyNavigator.zip>

Easy Master library download

<https://www.bausano.net/images/arduino-easycat/EasyMaster.zip>

Easy Master library user manual

https://www.bausano.net/images/arduino-easycat/Easy_Master_UserManual.pdf

Easy Configurator V 3.0 tutorial video on You Tube

<https://www.youtube.com/watch?v=JO5wMEIHAF4>

Easy Configurator V 4.0 update video on You Tube

<https://www.youtube.com/watch?v=ntqOJCtIuIq>

EtherCAT Technology Group ETG

<https://www.ethercat.org/default.htm>

EasyCAT shield page on the ETG website

<https://www.ethercat.org/en/products/791FFAA126AD43859920EA64384AD4FD.htm>

----- Document history -----

Rev 1.0 08/02/2022 First release.

Rev 2.0 28/04/2022 Added paragraph [3 - The NetworkInfo.h file](#) and minor corrections.