

### Overview

ComBlocks are low-cost building blocks pre-programmed with essential communication processing functions which can be daisy-chained to form complex communication equipment.

Through a single serial, LAN, USB or CardBus interface, a user can monitor and control an entire assembly from the ComBlock Control Center, irrespective of the number of constituent modules.

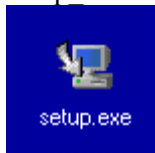
The ComBlock Control Center runs on any PC with Microsoft windows operating systems.

### Installation

The ComBlock Control Center software can be found on the CD shipped with any ComBlock module. The program name is "setup\_rev.exe".

Updates for this software can also be downloaded directly over the Internet from [www.comblock.com/download.html](http://www.comblock.com/download.html).

To install the software, simply double click on the setup\_rev.exe icon



and follow the instructions. In most cases, it is sufficient to answer "Next" to all questions.

### Operations

#### Step 1:

Start the Comblock Control Center from the desktop menu Start | Programs | ComBlock Control Center.

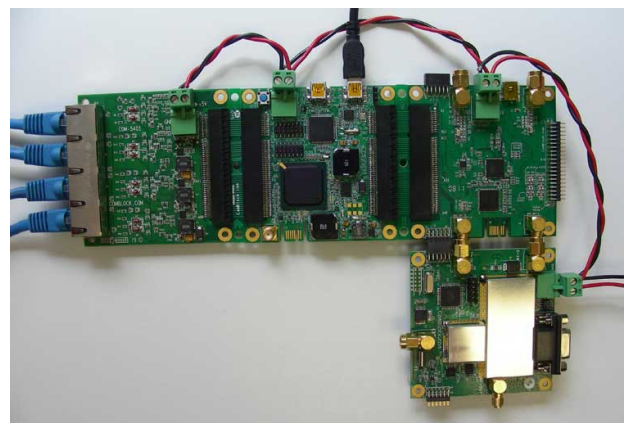


#### Step 2: Select a configuration link

An entire ComBlock assembly comprising several ComBlock modules can be monitored and controlled centrally over a single connection with a host computer. Connection types include:

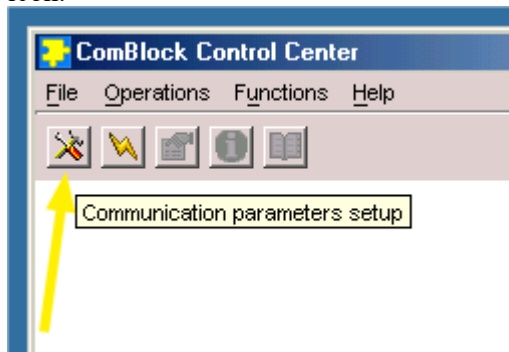
- USB
- TCP-IP/LAN,
- Asynchronous serial (DB9)
- PC Card (CardBus, PCMCIA).
- 0-3.3V asynchronous serial

Only one connection is required, even if multiple ComBlock modules are used since ComBlocks communicate with eachother.

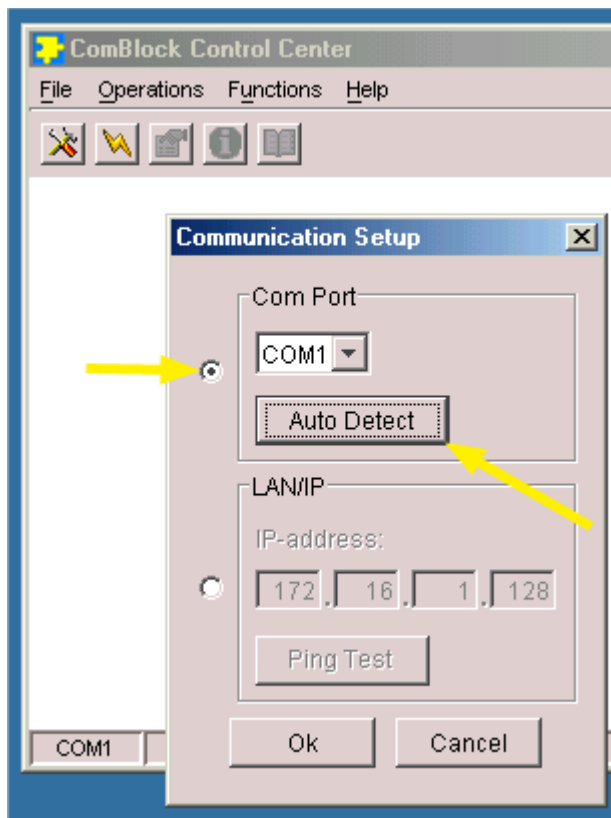


Power up the assembly. Wait for 5 seconds, to allow time for the ComBlocks to be properly configured.

In the ComBlock Control Center, start the communication setup by clicking on the left-most icon:



Select the serial Com Port method, and click on auto-detect.



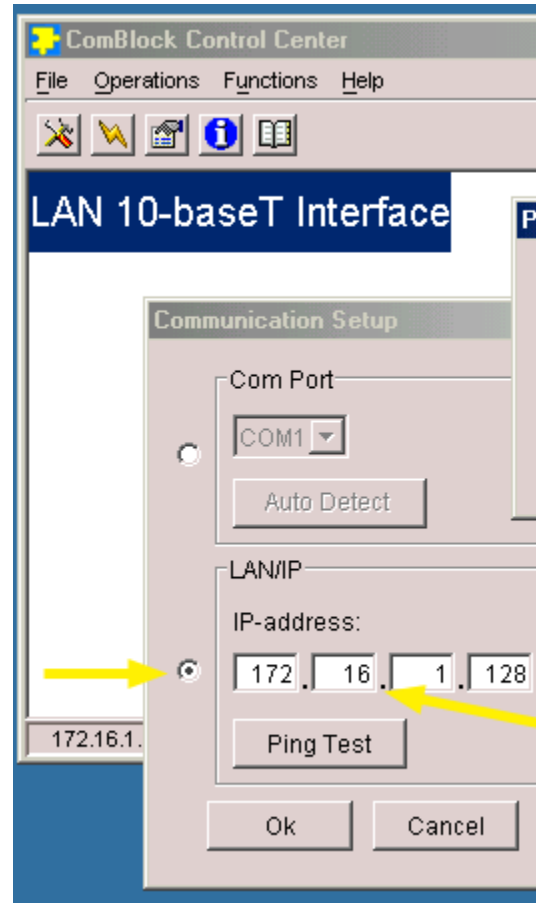
Upon receiving confirmation that the connection is established, click on OK to close the window and proceed to step 3.

The ComBlock Control Center is capable of detecting COM ports outside the traditional range of COM1 through COM4, for example when USB serial ports are used.

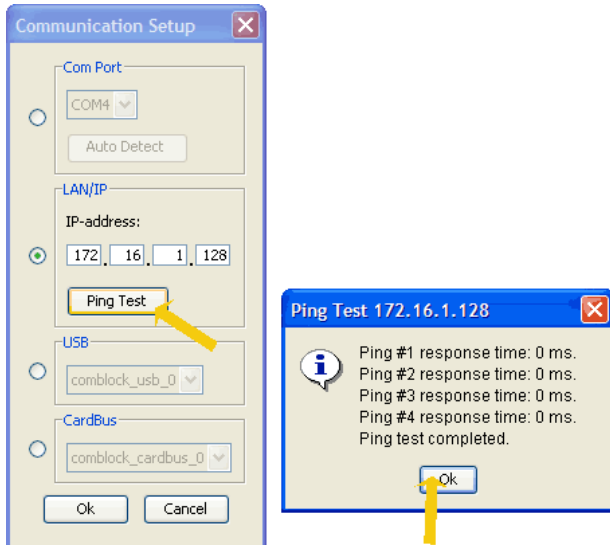
## Step 2B: Configure IP Link

As an alternative to the ubiquitous serial link, a LAN/TCP-IP connection is possible. A pre-requisite is that the COM-500x LAN/IP network interface module is part of the assembly to be remotely monitored and controlled.

In the ComBlock Control Center, start the communication setup by clicking on the left-most icon. Select the LAN Port method, enter the IP address.



To verify proper connection, 'ping' the destination IP address. Typical response time for local area network pings are 10 ms or less.



Upon receiving confirmation that the IP connection is established, click on OK to close the windows and proceed to step 3.

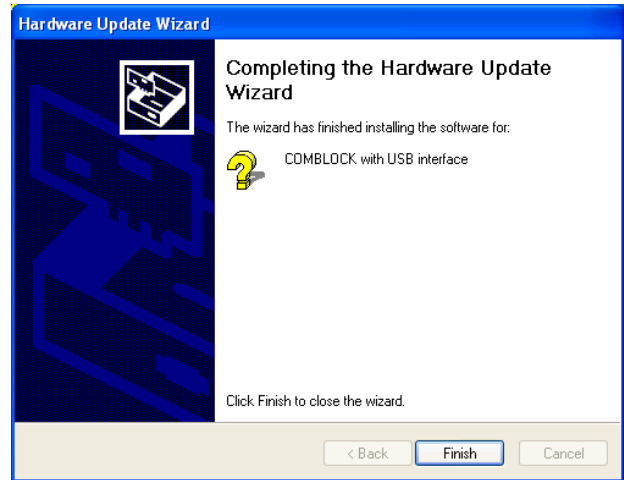
### Step 2C: USB 2.0 Driver Installation

ComBlocks are equipped primarily with high-speed USB 2.0 interface. A pre-requisite for using the USB 2.0 link is the installation of a driver prior to the first use. Windows “New hardware wizard” will automatically start upon connecting the USB cable between the host computer and a powered-up ComBlock assembly.



Follow the step-by-step instructions. The .inf and .sys driver files are located on the ComBlock CD within the \Windows Driver directory.

The last window for the New Hardware Wizard should appear, as shown below, for a successful installation.

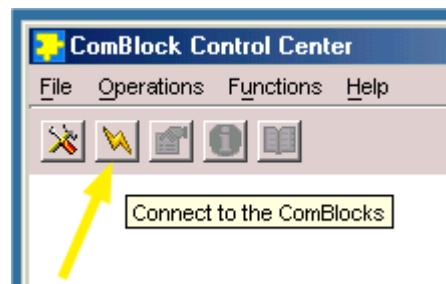


At this point, the driver for ComBlock has been successfully installed and next time the ComBlock is plugged in, the system automatically finds appropriate driver.

A detailed step-by-step driver installation procedure can be found at [comblock.com/download/USB20\\_UserManual.pdf](http://comblock.com/download/USB20_UserManual.pdf)

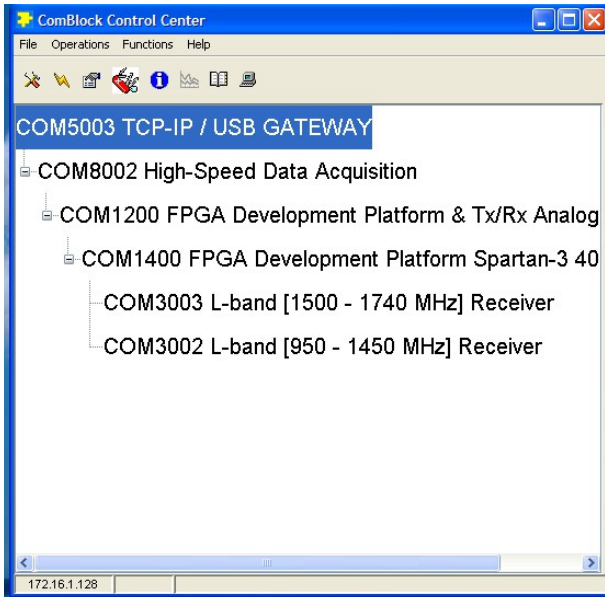
### Step 3: Connect

The ComBlock Control Center will now enumerate all the modules within an assembly. This takes a few seconds. To start the search, press the second icon from the left.



The enumeration step is mandatory. Configuration or monitoring attempts will fail if the enumeration was not performed. In particular, enumeration must be performed every time the ComBlock assembly is powered up, irrespective of whether the ComBlock Control Center stayed open or not.

Upon recognizing the modules and the manner in which they are connected to each other, the ComBlock Control Center will display the collected information in a tree structure.



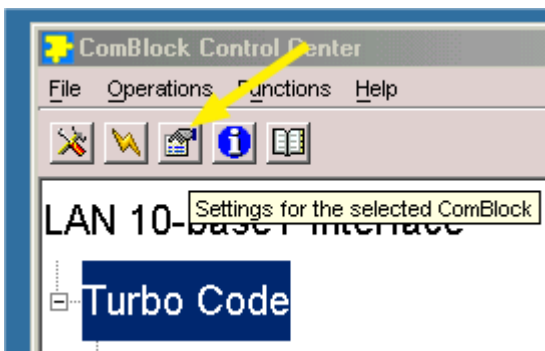
Select (highlight) the module to be configured or monitored and proceed to step 4.

If power to the ComBlock modules has been switched off and on, step 3 must be repeated before proceeding to step 4.

### Step 4: Read Module Configuration

Each ComBlock module stores its configuration in non-volatile memory. This information can be read back from the ComBlock Control Center by

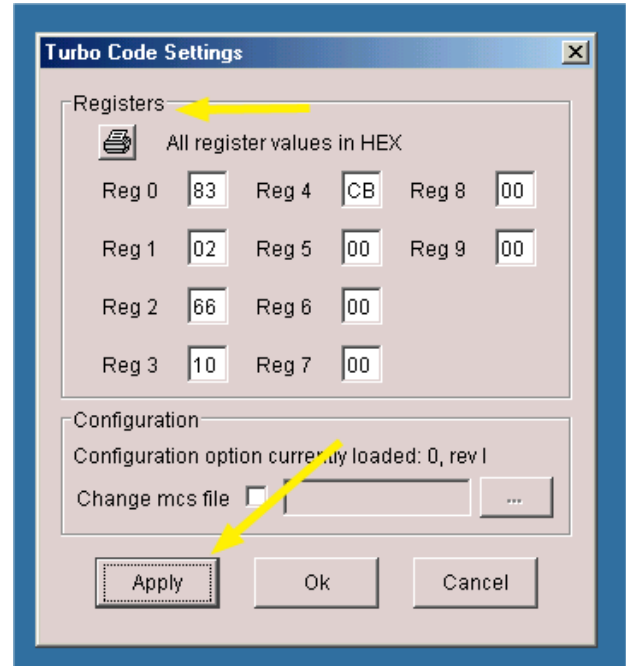
- (a) highlighting the module of interest
- (b) clicking on the third icon from the left.



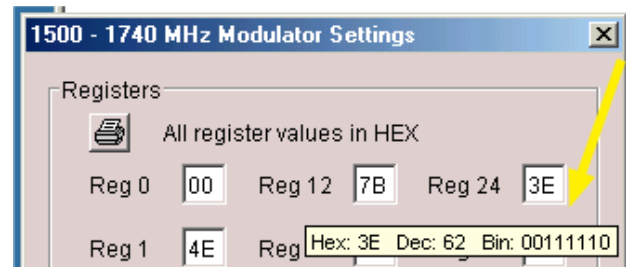
Many ComBlocks now offer two configuration windows: an advanced configuration method whereby configuration parameters are entered through generic 8-bit registers, and a user-friendly window specific to the ComBlock function.

### Step 5A: Configure Module (Advanced)

Each ComBlock module is configured through 8-bit registers. The registers definitions are described in the specifications. To change the register values, simply type the hexadecimal value in the window. Once all the new values are entered, press the “Apply” or “OK” button to load them into the ComBlock module. (“OK” closes the window, whereas “Apply” keeps it open after configuration).



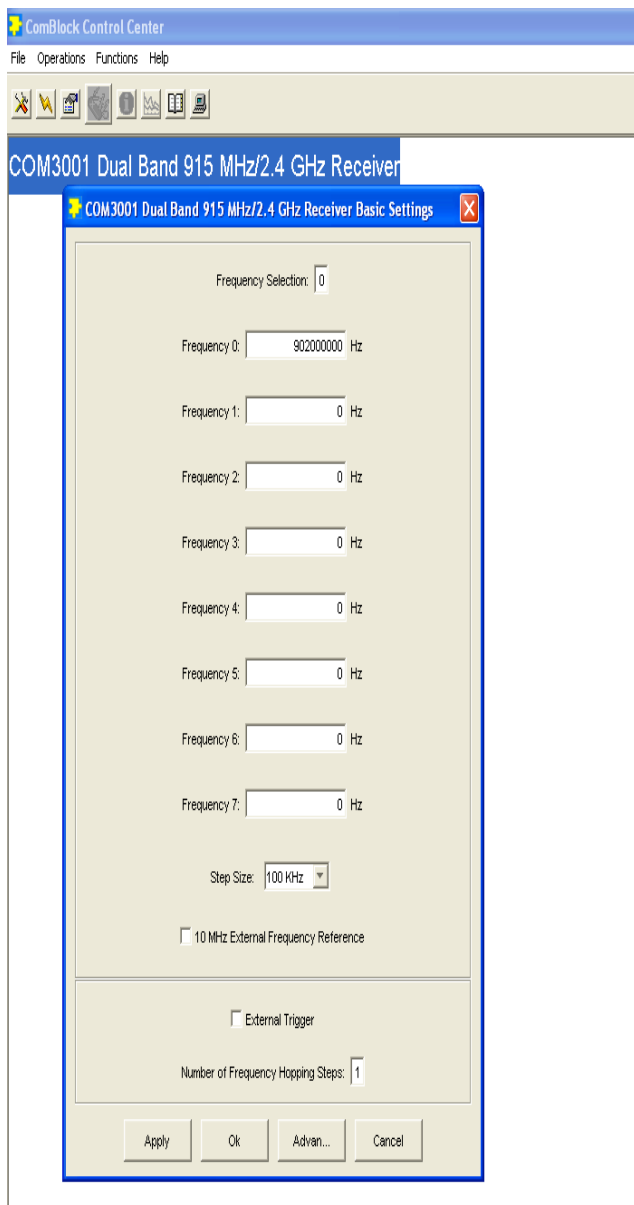
In order to help the user with conversion between binary, decimal and hexadecimal values, a tooltip automatically shows up when the cursor hovers over a register value.



### Step 5B: Configure Module (User-Friendly interface)

When available, a user-friendly application-specific configuration window will automatically pop-up upon clicking on the Settings button in Step 4. An

example of user-friendly configuration is illustrated below.

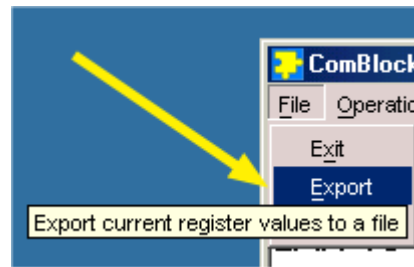


Please refer to the specific ComBlock specifications for operating instructions.

### Step 6: Import/Export Configurations

The entire configuration of a ComBlock assembly can be saved (exported) into a text file. The ‘import’ feature allows one to exactly replicate a particular ComBlock assembly configuration without entering register values.

The import/export feature is accessible under the ‘File’ menu.



The import/export feature is intended to ease the process of configuration management. It also facilitates the data entry process in large ComBlock assemblies. Finally, it also helps us in providing quality technical support, as the settings file include not only configuration register values, but also software versions, ComBlock serial numbers, etc. Settings file can be e-mailed to MSS when technical assistance is needed.

### Step 7: Load Software Updates

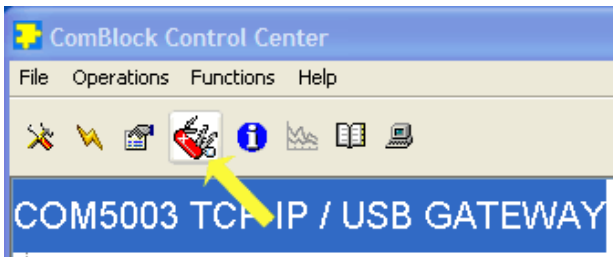
From time to time, ComBlock software updates are released. The updates are available for download on the ComBlock web site [www.comblock.com/download.html](http://www.comblock.com/download.html). A shortcut can be found under the Help section.



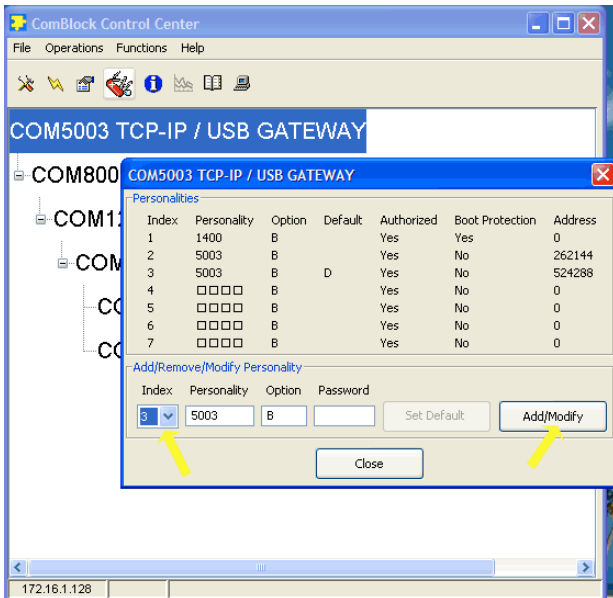
The ComBlock software can also be found on the CD shipped with any ComBlock module.

The ComBlock Control Center is capable of automatically checking the web for software updates. This ‘live update’ feature can be enabled or disabled by the user under the File | Preferences. If a newer software version is found for any module within the ComBlock assembly, the user will be asked to authorize/deny the update. No update will be performed without user authorization.

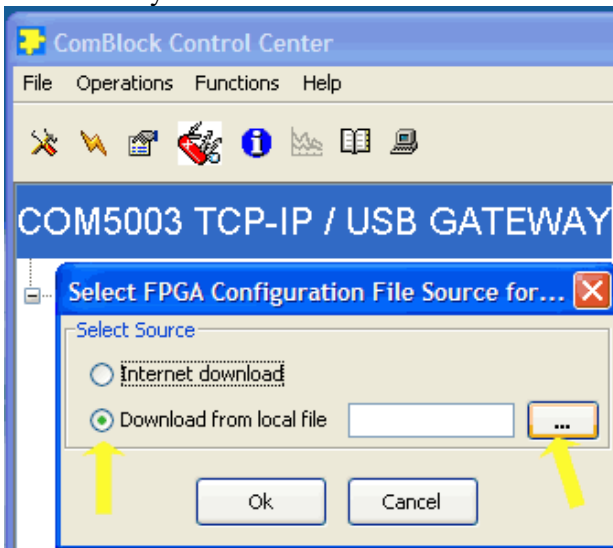
To manually update the software, highlight the ComBlock and click on the Swiss army knife button.



Most FPGA-based ComBlocks can store multiple personalities. The list of personalities stored within the ComBlock Flash memory will be shown upon clicking on the Swiss army knife button.



The default personality loaded at power up or after a reboot is identified by a 'D' in the Default column. Any unprotected personality can be updated while the Default personality is running. Select the personality index and click on the "Add/Modify" button.



The software configuration files are named with the .mcs extension. The mcs file can be downloaded via the Internet, from the ComBlock CD or any other local file.

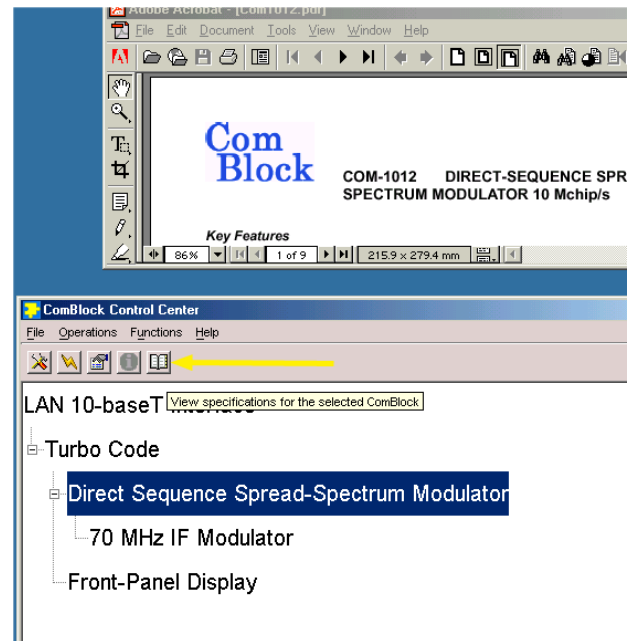
The option and revision for the software currently running within the FPGA are listed at the bottom of the advanced settings window.

### Step 8: Check Online Documentation

The ComBlock documentation can be found on the CD shipped with any ComBlock module. While the CD is in the CD drive, the user can access context-specific documentation by

- highlighting the module of interest in the main window
- pressing the "documentation" button (7<sup>th</sup> button from the left)

This will open the .pdf documentation.



### Step 9: Visualize internal FPGA signals using ComScope

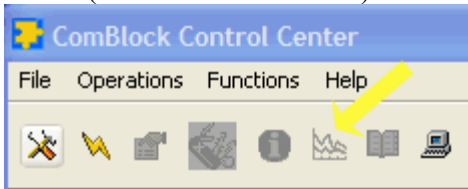
Many new FPGA-based digital ComBlock modules are equipped with the ComScope data capture capability to help users visualize otherwise hidden digital signals.

Internal digital signals, whether binary or digital representation of analog signals, can be stored in real-time within the internal memory, then exported



to a host computer for plotting, storage and further processing.

To activate the ComScope, click on the graph button (6<sup>th</sup> button from the left).

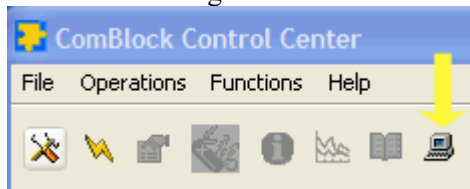


Detailed ComScope operating instructions are available at [comblock.com/download/comscope.pdf](http://comblock.com/download/comscope.pdf)

## Step 10: Terminal Emulator

Monitoring and Control (M&C) messages are exchanged transparently between the ComBlock Control Center and a ComBlock assembly using simple short textual messages. For most users, these messages are invisible and can remain as such. However, for users wishing to develop custom applications or custom GUI, ComBlock designers have made it possible

- a) to monitor the M&C messages while the ComBlock Control Center operates: click on the terminal button (8<sup>th</sup> button from the left). This opens a terminal emulator window on the right half.

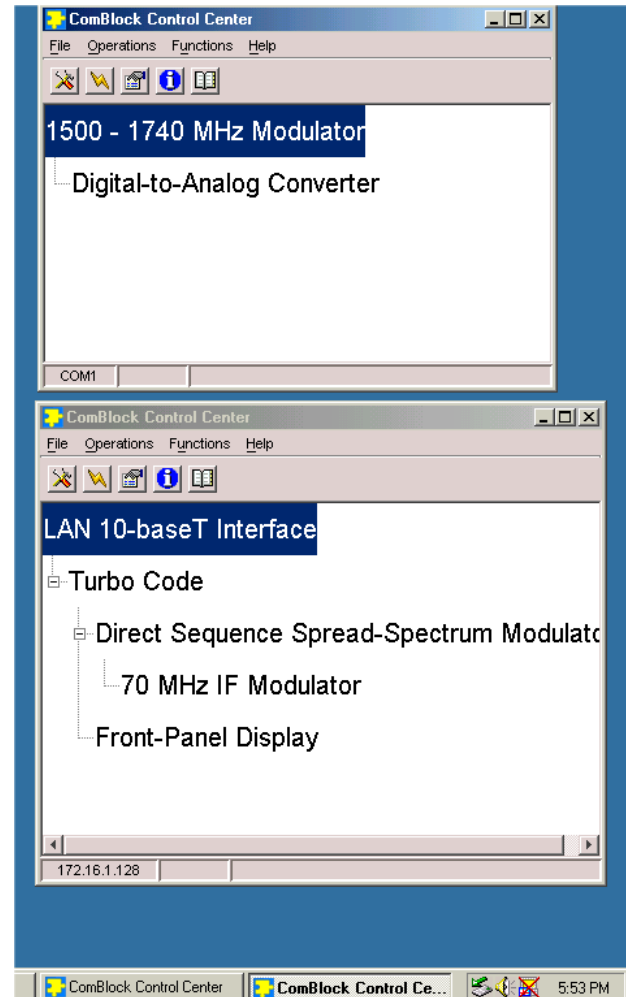


- b) to type in messages in the command line at the bottom of the terminal emulator window.

The messages syntax is described in the ComBlock API specifications document: [comblock.com/download/M&C\\_reference.pdf](http://comblock.com/download/M&C_reference.pdf).

## Multiple ComBlock Assemblies

It is possible to monitor and control multiple ComBlock assemblies from the same host computer.



## Troubleshooting

*Symptom: COM port autodetect failed.*

- Make sure that the ComBlocks have been powered up for at least 7 seconds.
- Verify that the serial cable is properly connected.
- Make sure that the COM port on the PC is not owned by another application such as dial-up modem.

*Symptom: “We just downloaded a new mcs configuration file. Afterwards, we keep receiving flash programming errors.”*

- In all likelihood, the new FPGA configuration file conflicts with the Flash memory read/write/data signals and prevents new FPGA configuration files from being downloaded. The solution is to use a short wire to keep the ‘INIT’ test point to ground for 10 seconds while the ComBlock powers up. Then use the ComBlock control center to load a new .mcs file without switching the power off the ComBlock.

*Symptom: “The multi-board ComBlock assembly works fine but the power supply shows a fluctuating power consumption.”*

- High power consumption and/or power consumption fluctuations are signs of output pin conflicts between FPGAs: i.e. two FPGA output pins driving one against another. This is easily resolved by ensuring consistency between the I/O configuration. Users developing custom VHDL code should be aware that the place and route tools may pick arbitrary output pins for output signals not specifically assigned to a pin in the .ucf constraint file.

## Contact Information

Technical assistance is available by sending an E-mail to [info@comblock.com](mailto:info@comblock.com). The easiest way is to export the relevant ComBlock assembly configuration and e-mail the settings (.stn) file. Please also include a description of all relevant symptoms and information on how to contact you.

MSS • 845-N Quince Orchard Boulevard•  
Gaithersburg, Maryland 20878-1676 • U.S.A.  
Telephone: (240) 631-1111  
Facsimile: (240) 631-1676  
E-mail: [info@comblock.com](mailto:info@comblock.com)