

## MULTIPLE PERSONALITIES & DYNAMIC RECONFIGURATION

### Overview

New FPGA-based digital ComBlock modules are capable of **multiple personalities** and **dynamic reconfiguration**, whereby the FPGA can embody, on demand, one of multiple personalities stored in non-volatile flash memory.


Reconfiguration is ordered by a user over the selected communication link between user and ComBlock assembly: serial, LAN, PCMCIA, or USB, whichever is applicable.

Typical FPGA reconfiguration time is between 2 and 10 seconds, depending on the ComBlock, as listed in the specifications.

FPGA configuration data can be programmed into Flash memory one at a time, without affecting the other FPGA configurations already stored within the Flash memory.

Dynamic reconfiguration of the FPGA does not require any special VHDL programming. All ancillary tools are supplied with the ComBlock.

ComBlock modules supporting the dynamic

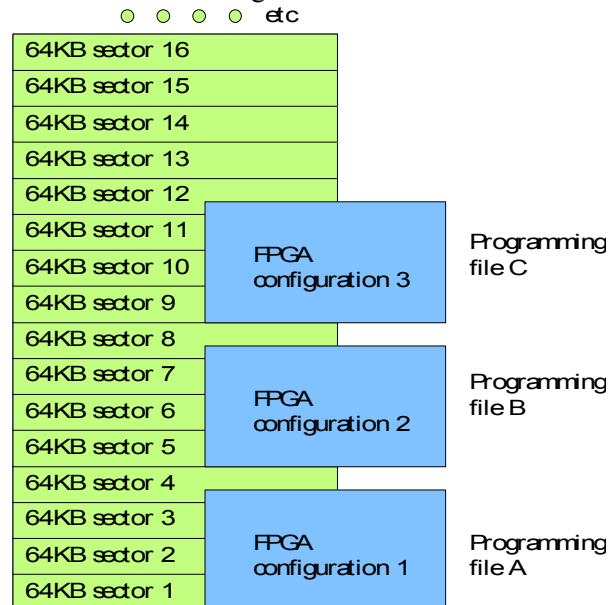
reconfiguration are identified with the  icon.

### Number of configurations vs Flash memory size

The number of FPGA configuration files and block ROMs is determined by the Flash memory size installed within a given ComBlock module. For example, the COM-1300 module is equipped with a 4MB flash capable of storing 16 XC3S400 FPGA configurations.

The basic rules for apportioning the flash memory are as follows:

- To avoid loss of adjacent data, each new data file to be programmed into the ComBlock flash memory must be aligned with a flash sector boundary (typical sector size is 64KB). Indeed, the flash memory writing protocol requires erasing a full sector prior to starting writing.
- A programming data file can comprise one FPGA configuration.



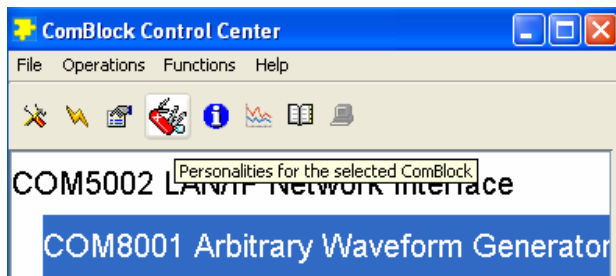
Flash Memory 4MB = 64 sectors \* 64 KB

ComBlock	Flash memory size	FPGA configuration file size (bits)	Maximum number of FPGA configurations
COM-1000	512KB	XC2S200 1,335,800	2
COM-8000	512KB	XC2S300E 1,875,648	2
COM-1100	512KB	XC2V1000 4,082,592	1
COM-1200	4MB	XC3S2000 7,673,024	4
COM-1300	4MB	XC3S400 1,699,136	16

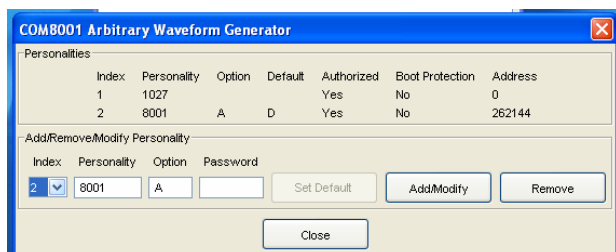
**Maximum number of FPGA configurations stored in Flash memory**

## Graphical User Interface User Manual

The simplest method to add/modify/delete personalities and to change the default personality is to use the ComBlock Control Center graphical user interface. Simply select the ComBlock of interest and open the personalities window by clicking on the Personalities icon (a Swiss army knife) as illustrated below:

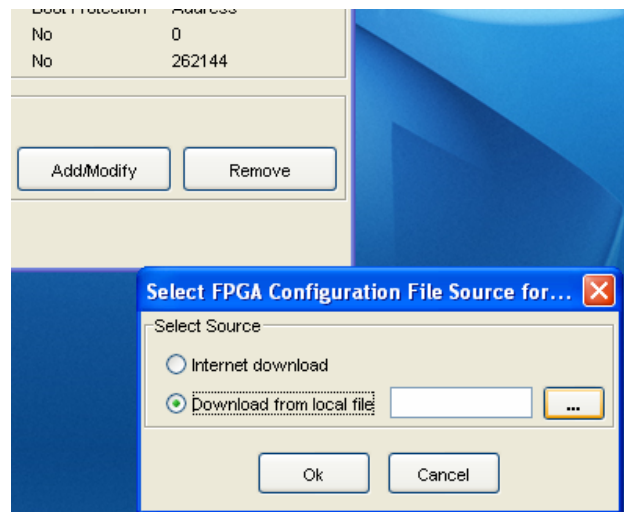


The personalities window opens and displays all configurations, options and authorization. The default configuration (identified with a 'D' in the Default column) is the one loaded at power up or reset into the FPGA.



The user has access to four fundamental operations:

- Modify a configuration.** A password (supplied by MSS/ComBlock) is generally required at the time of declaration. Once authorized, the user is prompted for the path to a FPGA configuration file which is then loaded into the ComBlock flash memory. This is the only operation for which a password/authorization is needed.
- Change the option** for a given configuration. The user is asked for the path to a FPGA configuration file (on the ComBlock CD or for download from the ComBlock web site over the Internet). Once the configuration file for the desired option is selected, the ComBlock flash memory is automatically programmed. The mapping of configuration files into flash memory is performed automatically. The start address displayed in the window is for information purposes only.
- Set the default configuration.**
- Load new firmware versions.** New firmware versions are typically released on the ComBlock web site.



Select the source for the FPGA configuration file.

## Programming Interface

This section is intended for designers who want to design their own graphical user interface. It can be skipped by ComBlock Control Center users.

All commands are described in the reference document

[www.comblock.com/download/M&C\\_reference.pdf](http://www.comblock.com/download/M&C_reference.pdf)

The key commands are discussed below:

**SMI:** The “Set Module Identification” command allows the user to declare the several FPGA configurations stored within a given ComBlock module. For example, @000SMI011027<enter> declares that configuration 01 is to be the FSK demodulator COM-1027. If no configuration number is entered, the declaration applies to the default configuration number selected by the SDC command. For example: @000SMI1027<enter>

**GMI:** The “Get Module Identification” command allows the user to inquire as to the several FPGA configurations stored within a given ComBlock module. @000GMI<enter> inquires about the current default configuration. @000GMI01<enter> inquires about FPGA configuration 01, even though 01 may not be the current default configuration.

**SDC:** The “Set Default Configuration” command selects the default FPGA configuration to be used at

power up or reset. This configuration is stored in non-volatile memory within the ComBlock. Usage: @000SDC01<enter> to select configuration 01. Configuration numbers start at 01 and are always two-digit long. To enact the change in default configuration, use the RST reset command.

**GDC:** Use the “Get Default Configuration” to read back the default configuration within a given ComBlock. Usage: @000GDC<enter>.

**SCA:** The “Set Configuration start Address” command selects the Flash memory start address for a given FPGA configuration. Usage: @000SCA010123456F<enter> states that the start address in the Flash memory for FPGA configuration 01 is 0x01 23 45 6F. The address is expressed in Bytes as a 32-bit hexadecimal number.

**GCA:** Read back the start address for a specific FPGA configuration file stored in flash memory. The configuration is identified by its two digit configuration number. Usage: @000GCA01<enter> to read the start address for configuration 01.

**RST:** The “Reset” command resets the module address to zero, reloads FPGAs as needed, reconfigure the FPGA with the default register values stored in non-volatile memory.