

DFPRO: Programmer-Tester for Domino bus

The address assigning to **Domino** bus modules can be executed at bench using a PC, equipped by BDTools, a DFRS module, a DFPW2 and some wirings.

This work become more difficult if the modules have been installed in the plant, because in this case two persons are required, one at the PC and another one going to push the programming button on the modules; in addition, the two operators have to communicate between them in order to synchronize the operation to be achieved for each module.

DFPRO avoids all these uncomfortable operations, being a battery powered portable instrument that does not require the use of a PC.

DFPRO can also perform several diagnostic functions on the **Domino** system (for instance the reading of the inputs, the forcing ON/OFF of the outputs, the detection of fault modules) and it can also operate, through the proper provided cable, as interface between the RS232 port of a PC and the **Domino** bus, emulating exactly the DFRS module.

The main characteristics of DFPRO are the following:

- ◆ Ergonomic housing
- ◆ Powered by a common 9V battery
- ◆ Internal circuit to step-up the battery voltage to a proper value for modules supplying
- ◆ Auto power off
- ◆ LCD display (with timed back-lighting), alphanumeric type with 20 characters x 4 lines
- ◆ 23-button keyboard
- ◆ The address assigning and checking can be performed both on a not-installed **Domino** module (thus not powered by DFPW2) and on an installed **Domino** module
- ◆ Measurement of the voltage level on the bus
- ◆ Diagnostic and configuration functions of some special modules (e.g. DFIR, DFDM, DFDI, etc.)
- ◆ Port for the RS232 connection to a PC: it can operate also as PC-field interface, exactly as DFRS module

The functions that can be performed by DFPRO are the following:

- ◆ Assigning and changing the address of modules
- ◆ Verifying the address assigned to modules
- ◆ Configuration of the parameters of special modules (e.g. DFIR, DFDM, etc.)
- ◆ Display the status or the value of input modules
- ◆ Display the status or the value of output modules
- ◆ Changing the outputs, both digital and dimmer types
- ◆ Getting the list of the modules installed in the plant
- ◆ Measuring the voltage level on the bus
- ◆ Request of the firmware version of the modules

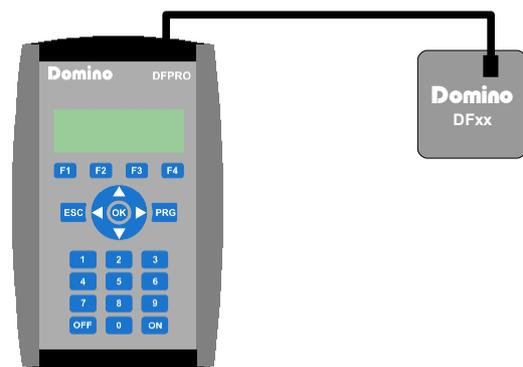
Together to **DFPRO**, it is provided the cable for the fast and easy link to 3-way connector available on the **Domino** modules and identified as PRG connector.

The cable for the connection between **DFPRO** and the RS232 port of the PC is also provided.



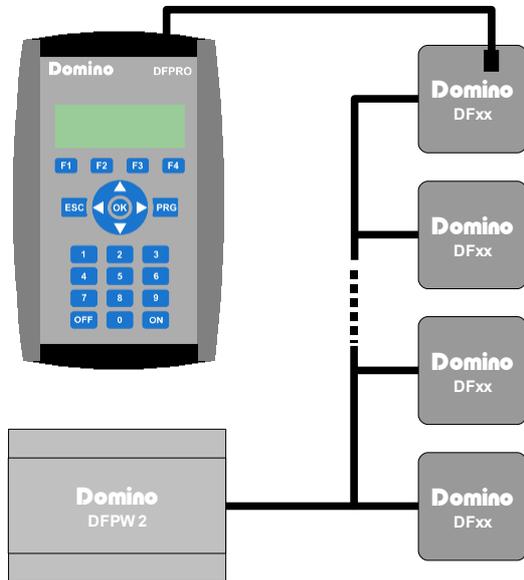
Allowed connections

DFPRO can be directly connected to PRG connector (if available) of a single **Domino** not supplied by the bus. This kind of connection is typically useful for assigning and checking of the module address before its installation in the plant.

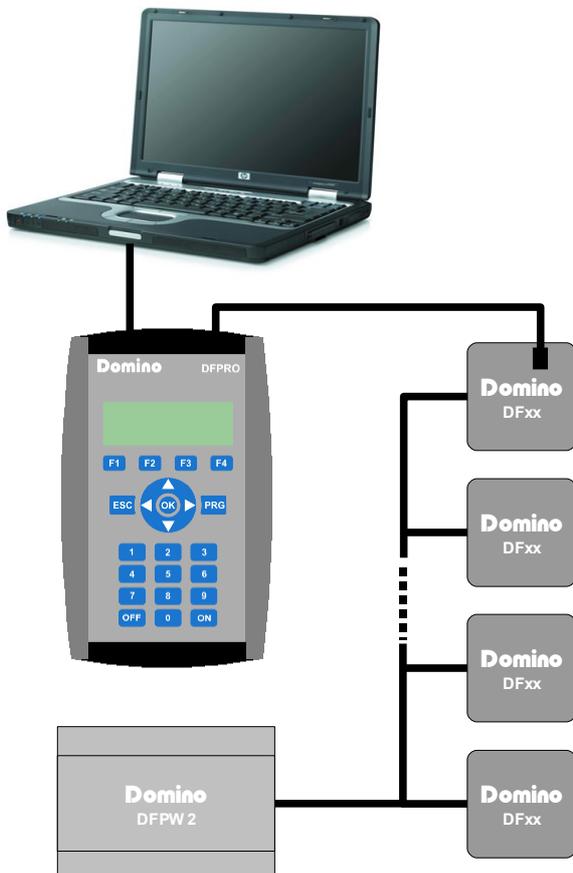


DFPRO

DFPRO can be directly linked to the PRG connector of a module inside a **Domino** bus system, supplied by one or more DFPW2; in this case, many diagnostic and configuration functions can be performed.



DFPRO can be finally be used as interface between a PC and the **Domino** bus (regardless of the activated menu). In this case DFPRO works in a way absolutely identical to the **Domino** DFRS interface.



Battery installation

Remove the cover on the rear side of **DFPRO** sliding it toward the outside.

Connect an alkaline 9V battery (shape 6LR61) to the proper clip, taking attention to the correct polarity. Insert the battery inside the holder and place again the cover sliding it toward the internal side, taking attention to arrange the battery wires in order to have a correct closing.

Auto power off

When **DFPRO** is not connected to a supplied bus, it automatically switches off after the timeout set during the setting up (see related paragraph); this timeout is calculated from the last pushing of any button on **DFPRO** keyboard.

If **DFPRO** is instead connected to a bus supplied by one or more DFPW2, then it will be kept always on.

Back lighting

If **DFPRO** is not connected to a supplied bus, then the back lighting remains on, from the last pushing of a button with back lighting on, for the time set during the setting up (see related paragraph).

If the back lighting switches off, it can be switched on again pushing the ON button. Take in account that the back lighting discharge quickly the battery, so it is recommended to use it only in case real necessity.

If **DFPRO** is instead connected to a bus supplied by one or more DFPW2, then the back lighting will be always on.

DFPRO

Use of the menus

The menus of **DFPRO**, allowing the execution of allowed functions, will be described in the following pages.

As general rule, the arrow keys  and  allow to scroll the options, while the key  confirms the currently selected option and displays the next menu.

The key  cancels an operation and/or causes the return to the previous menu.

Switching ON

To switch on **DFPRO** push the key . The display will show for 2 seconds a screen containing the firmware version (1.0 in this example).

```
*****
*   DOMINO DFPRO   *
*   VER. 1.0       *
*****
```

Low battery warning

When the battery level goes under a critical value, the following message will be displayed:

```
BATTERY LOW
Press OK
to continue
anyway
```

Push  to continue anyway, or replace the battery, or connect **DFPRO** to a supplied bus.

Short circuit on the bus warning

If a short circuit occurs on the bus connector of **DFPRO**, the following message will be displayed:

```
WARNING! SHORT
CIRCUIT ON BUS
PRESS ON AFTER
REMOVING SHORT
```

This message will be displayed also in overload conditions, for instance when connecting **DFPRO** to a bus not supplied by DFPW2.

Remove the short circuit or the overload and push  to continue.

Setting up of DFPRO

Pushing the key  while the screen shown in the "Switching ON" paragraph is displayed, the configuration menu will be entered; this is made by 2 screens. Select the parameter to be changed by the arrow keys  and .

```
> Language      English
   Baudrate     115200
   Contrast     055%
   Stand-by     060s
> Backlight     010s
```

Language is that which will be used in the several menus of **DFPRO**. Push  to change it. Options: Italian and English.

Baudrate is the RS232 serial communication speed when using **DFPRO** as interface between PC and field. Push  to change it. Options: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.

Contrast allows to adjust the sharpness of the display. Enter the desired value, made by 3 digits, by the numerical keys 0 to 9. Allowed values: 10÷100.

Stand-by and **Backlight** are the delay, from the last pushing of a key, after which **DFPRO** will be completely switched off or after which its back lighting will be switched off. Enter the desired value, made by 3 digits, by the numerical keys 0 to 9. To switch on again the back lighting push the key . Allowed values: 10÷255 for stand-by and 0÷255 for back lighting (0 means always OFF).
If **DFPRO** is connected to a powered bus, the back lighting will be always ON and the automatic power OFF will be disabled.

Push  to quit the configuration menu.

 When DFPRO is supplied by the internal battery and the selected menu requires long times (for instance "Verify Address" and "Show/Command"), the auto power off time will be increased up to 10 minutes in order to avoid interruption of running operations.

DFPRO

Main Menu

At power on, after the screen showing the version number, the main menu will be entered.

```
> Address Management
  Modules Configur.
  Tester
```

Choose the desired option and push **OK**.

Address Management allows assigning, editing and checking of the address of standard modules, or the identification number of special modules (DFCC, DFCL, DFCK, etc.)

Modules Configur. allows displaying and editing of the configuration parameters of some modules having this feature (e.g. DFIR, DFDM, DFDI, DFDV, etc.)

Tester allows to perform diagnostic functions like the displaying of inputs, the command of the outputs, the finding of installed modules, the voltage level on the bus.

Address Management

```
> Set Address
  Modify Address
  Verify Address
```

Set Address to assign the address of input and output modules or to assign the identification number of special modules (DFCC, DFCL).

```
> Input Module
  Output Module
  DFCC
  DFCL
```

Enter the desired address by the numerical keys, prepare the module to receive the address (e.g. press the button on the module) and push **PRG** on **DFPRO**.

```
Input Module
Address = 001
PRG to program
```

```
Output Module
Address = 001
PRG to program
```

```
DFCC
Address = 001
PRG to program
```

```
DFCL
Address = 001
PRG to program
```

Modify Address allows to change the address of input and output and special modules (DFCC, DFCL, DFCK). The symbols > and < on the right side mean that a next and a previous page is available; in this case the keys  and  scroll a page forward and a page backward respectively.

```
> Input Module
  Output Module
  DFCC
  DFCL >
> DFCK <
```

Enter the old and the new desired address, using the numerical keys, and then press PRG (it is not needed to prepare the module to receive the address).

```
Input Module
> Old Address = 001
  New Address = 001
  PRG to program
```

```
Output Module
> Old Address = 001
  New Address = 001
  PRG to program
```

```
DFCC
> Old Address = 001
  New Address = 001
  PRG to program
```

```
DFCL
> Old Address = 001
  New Address = 001
  PRG to program
```

```
DFCK
> Old Address = 001
  New Address = 001
  PRG to program
```

i In both previous cases, if the module is not connected, or if it is has not been prepared to receive the address, or if it is not compatible with that operation, then the following message will be displayed:

```
ERROR!
NO ACKNOWLEDGE
OR MODULE
NOT COMPATIBLE
```

DFPRO

 **Verify Address** allows to read or check the address assigned to the connected module. With this option, **DFPRO** starts to scan all input and output addresses, stopping as soon as a module with the current address has been found; the display shows the module type (Input or Output), its code, its firmware version and the found address.

```
Modulo di Ingresso
DF4I      v3.1
Indirizzo = 1
```

Pushing again the key , the scanning continues until the next module has been found (if any). To stop the scanning push the key .

```
> DFDV      000
  Minimum   = 005%
  Maximum   = 100%
  Ramp      = 002s >

> DFAI      000
  Input 1   0-5V
  Input 2   0-10V
  PRG to program
```

Modules Configuration

```
> DFIR
  DFDM
  DFDI
  DFDV >
<
> DFAI <
```

 Select the code of the module to be configured; a different screen will be shown depending on the selected module, as required by the specific parameters of that module. The symbols > and < on the right side mean that a next and a previous page is available; in this case the keys  and  scroll a page forward and a page backward respectively. Once entered the desired address (first parameter of each screen) by the numerical keys, push  to read the current configuration of the module. Enter the desired values or change the default options (e.g. the load type for DFDI) by the numerical keys and then push  to send the new settings to the module.

```
> DFIR      000
  Channels   = 011
  I^ Code    = 016
  PRG to program
```

```
> DFDV      000
  Minimum    = 005%
  Maximum    = 100%
  Ramp       = 002s >
```

```
> DFDI      001
  Minimum    = 005%
  Maximum    = 100%
  Ramp       = 002s >
```

```
> Load      Cap <
  OK to read
  PRG to program
```

Tester

The following functions have meaning only if **DFPRO** is connected to a powered bus.

```
> Show/Command
  Get Modules List
  Module List
  Bus Power Supply
```

 **Show/Command** allows to display the status or the value of input modules, or to send commands to output modules, or for displaying and writing the information related to special modules. The list of modules that can be controlled by **DFPRO** will be displayed, split on more pages. The following screens are only an example and they may change with the addition of new modules.

```
> DF4I
  DF8I
  DF4I/V
  DF8IL / BRIDGE8 >
```

```
> DFIR <
  DFGSM
  DFTR
  DFTE >
```

```
> DFAI <
  DFCT
  DFART >
```

```
> DF2R <
  DF4R / DF4RP
  DFTR
  DFTR/I >
```

```
> DFTR <
  DFDM
  DFDI
  DFDV >
```

```
> DFCT <
  DFCK
  DFCC
  DFCL >
```

DFPRO

★ Selecting a *digital input module*, **DFPRO** will show the chosen code, the address (which must be entered by the numerical keys), the firmware version and the current status of the 4 points of the module (.1 .2 .3 and .4). The status will be shown by symbol “-” if the point is not activated, or by the label “ON” if the point is activated.

```
DF4I 001 v3.1
.1 .2 .3 .4
- - - ON
```

★ Selecting an *analog input module* (DFTA, DFTE), **DFPRO** will show the chosen code, the address (which must be entered by the numerical keys), the firmware version and the current value read from the module.

```
DFTA 008 v3.0
.1
+21.8°C
```

★ Selecting an output module, **DFPRO** will show the chosen code, the address (which must be entered by the numerical keys), the firmware version and the current status or the value of the outputs.

The 4 function keys **F1 F2 F3 F4** perform the function shown by the related label on the last line of the display, as in the following examples.

➔ DF2R/DF4R/DF4RP: the status will be shown by the symbol “-” if the point is not activated, else by the label “ON”.

```
DF4R 001 v3.0
.1 .2 .3 .4
- - ON -
on on off on
```

➔ DFTP: the status will be shown by the symbol “-” if the point is not activated, else by the labels “OPEN” and “CLOS”.

```
DFTP 001 v5.0
.1 .2
OPEN -
stop clos open clos
```

➔ DFTR: as previous option, but in addition the free relay output (point 2) can be controlled.

```
DFTR 001 v5.0
.1 .2
open clos on
```

➔ DFDM-DFDI: the output level will be shown as %; in addition, 3 levels can be forced: 0%, 50% and 100%.

```
DFDI 001 v4.0
.1
15%
0% 50% 100%
```

➔ DFDV: as previous option, but in addition the free relay output (point 2) can be controlled.

```
DFDV 001 v4.4
.1 .2
20% -
0% 50% 100% on
```

★ Selecting a *special module* (DFCT, DFCK, DFCC, DFCL), the related information will be shown in a way similar to that described before. For instance, for DFCK:

```
DFCK 001
VE 23/03/07 10:30
+ - set
```

i In all the previous cases, if the entered address does not exist in the plant, **DFPRO** will show a message similar to the following:

```
DF4R 128
.1 .2 .3 .4
NO ACKNOWLEDGE
```

i In all the previous cases, if the type of the selected module does not match the type of the module effectively installed in the system with the selected address, **DFPRO** will show a message similar to the following:

```
DF4R 128
.1 .2 .3 .4
MOD. NOT COMPATIBLE
```

▶ Get Modules List allows to retrieve the list of the modules connected to the bus. Selecting this option, **DFPRO** begins to scan all input, output and special addresses; at the end of the scanning, the display will show, split on more pages, a list reporting the codes of found modules, the addresses and the firmware versions.

```
> DF4I 1 v3.1
DFTA 7 v3.4
DFTE 8 v3.4
DFBIL 33 v4.3 >
```

Selecting a module from the list and pushing the key **OK**, the selected module can be easily read/written.

To abort the scanning before its ending, push **ESC**.

▶ Module List shows the list that is the result of the last scanning, as described at the previous menu item (this list remains in the memory until **DFPRO** will be switched off).

Selecting this option, **DFPRO** shows, on more pages, a list reporting the codes of the modules, the addresses and the firmware versions.

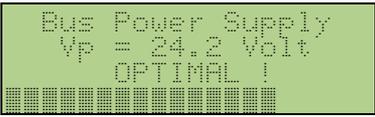
```
> DF4I 1 v3.1
DFTA 7 v3.4
DFTE 8 v3.4
DFBIL 33 v4.3 >
```

Selecting a module from the list and pushing the key **OK**, the selected module can be easily read/written as described for the menu item Show/Command.

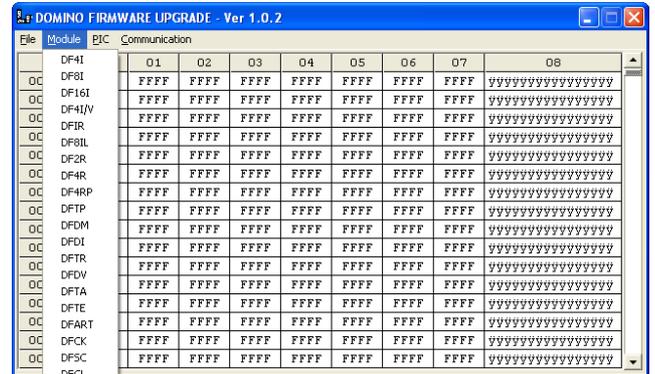
DFPRO

i When the address in Show/Command or Module List menu is related to a mixed module, then pushing of **OK** will toggles the displaying between input section and output section.

▶ Bus Power Supply measures the voltage level on the bus (Vp in Volts). A message will be also displayed to inform if the voltage level is insufficient, sufficient or optimal. A scroll bar will be also displayed on the last line to give a graphical representation of the voltage level.



Close the previous window and select Module; in the list that will appear select **DFPRO**:

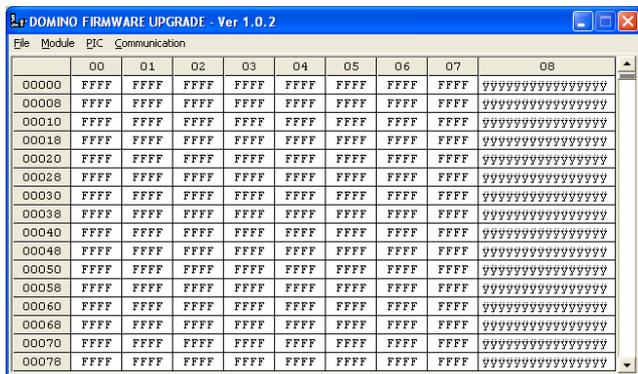
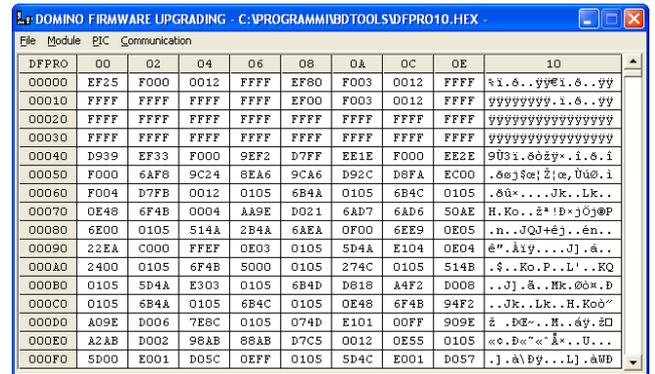


Firmware updating

The firmware of **DFPRO** can be easily updated to the last available version. To execute this procedure, the program named BDBoot is needed; this program is part of BDTools software package.

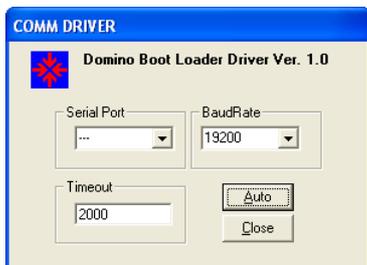
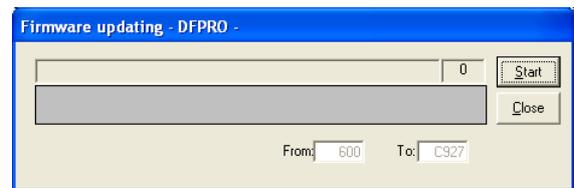
Connect the RS232 serial port of a PC to **DFPRO** using the provided cable. Launch the BDBoot program; the following window will appear:

Select then File and Open; choose in the window the file related to the firmware of **DFPRO** (e.g. DFPRO10.hex): The main window of the program will now contain the firmware to be sent to **DFPRO** (in a manner similar to the following figure):



At this point select Communication and then Program; the following window will be shown:

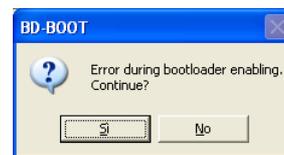
Open the communication between the PC and **DFPRO**; to do this, select Communication and then Enable. The following window will be shown:



Press the button Start and wait for the ending of the operation; during the firmware updating, the back lighting of **DFPRO** will blink and the display will show the message "Firmware Updating".

Select the serial port of the PC to which **DFPRO** has been connected and the baud rate, or press Auto button to perform the automatic search. When using an USB or Ethernet converter, it possible that the timeout must be increased writing the value (in milliseconds) in the related text box (the default is 2000 = 2seconds).

If the following message appears:



then **DFPRO** has not been found or that the connected **DFPRO** is already waiting for the new firmware. In this case answer Yes.

The BDBoot program, during the uploading of the new firmware, also executes its checking.

The information about the updating process or about possible errors will be shown in the same window Firmware Updating. The back lighting of **DFPRO**, during the firmware updating procedure, normally blinks and the display shows the message "Firmware Updating".

Technical characteristics

Power supply	- By 9Valkaline battery, shape 6LR61 - By Domino bus supplied by proper power supply mod. DFPW2
Display	LCD, alphanumeric, 20 characters x 4 lines, automatic timed back lighting with programmable timeout, adjustable contrast
Keyboard	23 keys
Protections	Over-current on the bus output
Serial interface	RS232, cable/adapter provided
Operating temperature	-5 ÷ +50 °C
Storage temperature	-20 ÷ +70 °C
Protection degree	IP20

Outline dimensions

