

DFCKIII: scheduler module with integrated clock

The DFCKIII module allows the management of scheduled daily and weekly events, in the **Domino** bus system. By means of the CLOCK function (see the programming manual) it is possible to manage a virtually unlimited amount of outputs, each one having many turn on and turn off scheduled times; as an alternative, DFCKIII module can manage up to 15 different zones, with the advantages that each scheduled time can directly be changed from one or more DFTouch video-terminal (or other similar device).

For each zone it is possible to set 4 different activation time intervals (4 times for turn on and 4 times for turn off) for each of the 7 days of the week.

The main features of DFCKIII module are:

- internal clock with back-up battery and automatic change between daylight saving and standard time
- management of 15 different zones (outputs)
- daily and weekly programming for each zone
- possibility to enable/disable each scheduled time
- calculation of sunrise and sunset times
- calculation of sun position (azimuth/elevation)
- possibility to install more DFCKIII (with different addresses) in the same plant
- possibility to set a MASTER clock and some different SLAVES (these ones will be synchronized to MASTER)

A 2-way terminal block allows the connection of the module to the **Domino** bus; as for almost all module of the **Domino** family, the needed supply is derived from the bus.

Near to the bus terminal block, the module features a small pushbutton for the assignment of the address and a green LED that shows the operating status; the same green LED normally flashes every 2 seconds about to signal that the module is properly supplied and operating.

A small 3-way connector (PRG), under the cover of the bus terminal block, allows the connection of the optional tester/programmer.

DFCKIII module is housed in a standard DIN 2M box for rail mounting. The user interface can be easily realized by DFTouch (with special dedicate page) or by a generic video-terminal.

Note: this manual applies to DFCKIII with firmware version 2.0 or higher.

Address programming

DFCKIII module takes 1 input address made by 16 points (15 for the zones and 1 for sunrise/sunset). The assignment of the address module must be executed by DFPRO or using the proper specific tools (BDTools or DCPIDE); the address must be in the range 1 to 255.

Since more DFCKIII modules can be installed on the same bus, to identify which is the MASTER module and which are the SLAVE modules, it is necessary to assign an identification number (ID) by means of the configuration panel in BDTools (see the related paragraph).



The IDs must be in the range 1 to 8 with the following meaning:

- ID = 1 MASTER module
- ID = 2 ÷ 8 SLAVE module

Every clock circuit of a SLAVE module will be automatically synchronized to the MASTER module timing.

WARNING: it's important to define, in the case of more DFCKIII installed on the same bus, only one MASTER module (ID=1). If a DFPC controller has been installed on the bus, each DFCKIII must be configured as SLAVE module.

Wiring diagram

The following schematic diagram shows the connection to be made between DFCKIII module and the **Domino** bus.



DFCKIII

Operation

DFCKIII module has been developed to be used in association with a terminal (touch screen or other device) used as graphical interface of the clock module, thus allowing to show and set the date and time and to edit the scheduled times.

DFCKIII module, from the **Domino** bus point of view, is fully equivalent to a digital input module; each point of the module corresponds to a zone and must be identified with the usual notation **Ix.y**, where y is in the range 1 to 15.

Each point will be activated as function of the scheduled times (see the programming paragraph) and must be used in proper equations to execute the desired command on the outputs. The points of DFCKIII can be used as a usual input points of the system.

The operation of the module is very simple: the points related to the controlled zones will be activated according to the programmed scheduled times.

As said above, it is possible to install more DFCKIII modules on the same bus line. Only the MASTER module will send on the bus the date (1 time per minute) and the hour (6 times per minute), in order to keep synchronized the other modules and to allow the use of the CLOCK equation.

A change of the time on any DFCKIII module (regardless of the MASTER or SLAVE setting) will be automatically reported on all other modules.

If DFCK is installed on the bus, its CLOCK will be the MASTER in respect of the other DFCKIII modules, therefore all the DFCKIII modules must be set as SLAVE (thus with ID in the range 2 to 8).

Clock

The DFCKIII module has an internal clock with back-up battery that operates in the case of absence of supply to maintain the setting of date and time. The change between Greenwich mean time and the daylight saving time and vice versa is automatically managed by the module.

Programming

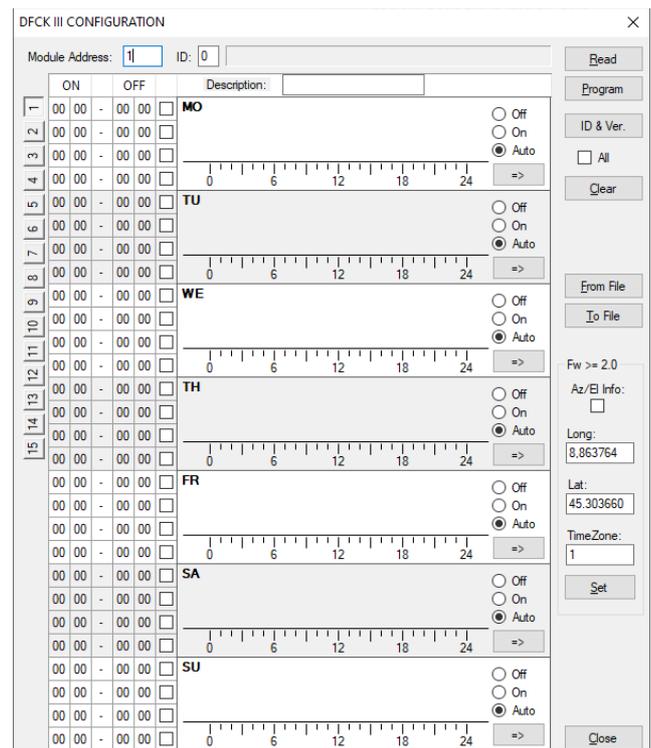
DFCKIII module behaves, in the **Domino** bus, as an input module, thus the 15 different possible zones will correspond to 15 inputs. In other words, these inputs will be seen as real input points to which it is possible to apply all the allowed programming functions. For example, to activate 4 outputs at the activation of 4 different zones of DFCKIII (in this example the first 4 zones), the equation to be loaded in the output module will be:

O1.1 = I1.1
O1.2 = I1.2
O1.3 = I1.3
O1.4 = I1.4

In this example, a DFCKIII module with input address 1 and an output module with address 1 have been used.

Setting up

To make operating the module, it is necessary to set the several parameters through the configuration panel in the program *BDTools version 8.3.0 or higher*. From the main menu of BDTools, select "Configuration", "Clocks" and then "DFCKIII"; the following window will appear.



On the top side of the window, the two following parameters have to be entered:

- **Module Address:** to unambiguously identify of selected DFCKIII
- **ID:** to identify if the module will be MASTER (ID equal to 1) or SLAVE (ID from 2 to 8). The ID is not the address; every DFCKIII in the same bus system will have different ID.

The configuration panel is divided in 15 TABs; each TAB has to be filled with the following information:

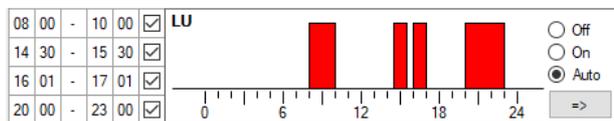
- **Description:** is the name assigned to the currently selected zone
- **Read:** to read the configuration of the selected zone of DFCKIII selected by the address field (regardless of the ID). With the option "All 15", all 15 zones will be read
- **Program:** to program the configuration of the selected zone of DFCKIII selected by the address field (regardless of the ID). With the option "All 15", all 15 zones will be programmed

DFCKIII

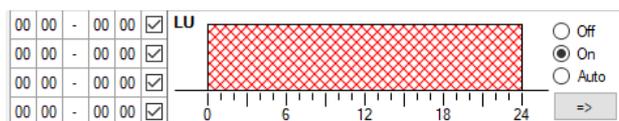
- **Clear:** to restore each parameter of the zone to the default settings (every time to 00:00, time intervals enabled and Auto mode). With the option "All 15", all 15 zones will be restored to the default values
- **From File:** load the configuration from a file saved before (extension .dck)
- **To File:** save in a file (extension .dck) the current configuration of all 15 zones
- **Close:** quit the configuration panel
- **Scheduled times:** allow the setting of the 4 different activation time intervals (es. 12:00-14:00) for each day of the week and for each one of the 15 zones managed by DFCKIII; each time interval can be disabled (the zone will not be activated during that time interval) removing the check from the checkbox near to the related clock range (00 00)
- **Off:** deactivate the zone for all 24 hours of the selected day
- **On:** activate the zone during all 24 hours of the selected day
- **AUTO:** the zone follows the programmed timetable
- **=>:** this button allows to copy the settings (OFF, ON, AUTO and clock intervals) from the current day to the next day

Note: in setting the time slots, midnight must be set as 00:00 if intended as the beginning of the new day and as 24:00 if intended as the end of the day.

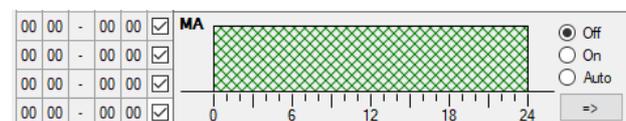
Example of settings: the next figure shows an example of 4 time intervals for Monday in Auto mode.



With the option ON, the interested day of week will be:



With the option OFF, the interested day of week will be:



Note: the scheduled times can be set with the resolution of 1 minute. The options ON and OFF have major priority in respect of the scheduled times. Therefore, these options will force the operation of the related zone.

Concerning the calculation of sunrise and sunset times and position of the sun (only for DFCKIII with firmware version 2.0 or higher), it is necessary to provide to DFCKIII the position in which you are located. For this purpose, the configuration window has a box where you can set longitude, latitude in degrees with decimals and Timezone:

After setting the desired values, press the Set button to transfer the information to DFCKIII.

Point 16 of the DFCKIII basic address will be active from sunrise to sunset and inactive from sunset to sunrise the next day.

If it is necessary to have information about the position of the sun, the "Az/El Info" option must be activated (see the previous figure); the activation of this option involves the addition of 2 input addresses to DFCKIII module (n+1 and n+2 if n is the base address) which will contain:

- address n+1: azimuth in degrees, without decimals (values from 0 to 360 degrees)
- address n+2: elevation in degrees, in two's complement format (from -90 to +90 degrees)

Before activating this option, make sure that the addresses n+1 and n+2 are free in the system.

Mapping

DFCKIII module can be displayed on the map of BDTools or DCPIde as in the following picture:

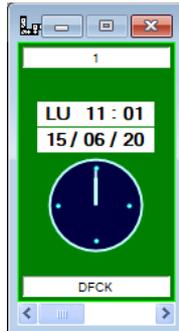


As for all **Domino** modules, the background of the module is in green color if the module is connected and properly working, otherwise the background is in red color.

The 15 points in the previous image show the input points of the 15 different zones of DFCKIII, while point 16 indicates day or night (it is activated between sunrise and sunset).

To set the current time in the DFCKIII module, insert a DFCK module in the maps of BDTools:

Also the clock setting of DFCKIII module can be displayed by BDTools as follows:



Note that the number, 1 in the figure above, is NOT the module address, but its identifier.

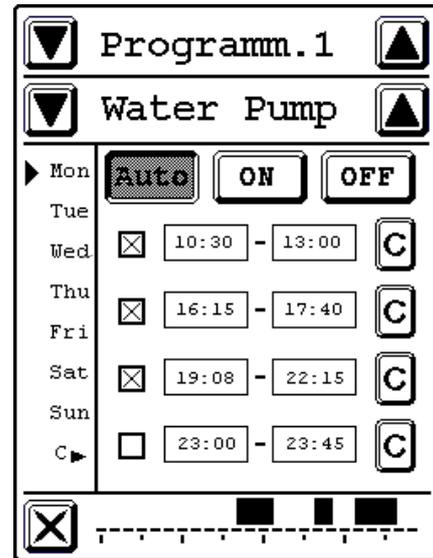
DFTouch as interface of DFCKIII module

The **Domino** DFTouch video-terminal provides a special page allowing to create, in a easy and quick way, the user interface to interact with one or more DFCKIII modules.

Each DFTouch can control up to 8 DFCKIII (and each one controlling up to 15 zones, thus up to 120 zones can be controlled); moreover, the DFCKIII themselves can be controlled from more DFTouch video-terminals, thus allowing a wide margin of choice in designing the installation.

The user's manual of DFTouch describes the proper instructions to set up these special pages; the configuration will be however reduced to the selection of the desired DFCKIII and the setting of few others parameters.

The following figure shows an example of page on DFTouch controlled by DFCKIII.



The page in the figure above is made by the following fields:

- **Programm. 1**: this is the name of current DFCKIII; it is possible to assign, by DFTouchTools any name with max length of 10 characters. The buttons ▲ and ▼ at the sides of the name allow to select the 8 possible DFCKIII modules.
- **Water Pump**: this field shows the name assigned to the current zone (see "Setting up"). For each DFCKIII module it is possible to set maximum of 15 different zones. The buttons ▲ and ▼ at the sides of the name allow to select the 15 possible zones.

It is important to set these fields correctly before to set the scheduled times.

On the left side of the page, the days of the week related to the current zone are shown; the arrow ► indicate the day of the week currently selected (each one of the 15 zones of DFCKIII allow to manage each days of the week). Touch the wanted day to change the selection.

The boxes - allow to enter the time intervals (max 4 ON and 4 OFF times for each day); after the selection of this field (touching the time to be modified) a numeric keyboard will appear (see the paragraph "Numeric keyboard"). The first column of times contains the ON clock, while the second one contains the OFF clock.

: enable/disable the related time interval.

: the zone follows the configured scheduled times,

ON : allows to keep ON the zone for all the 24 hours of the selected day.

OFF : allows to keep OFF the zone for all the 24 hours of the selected day

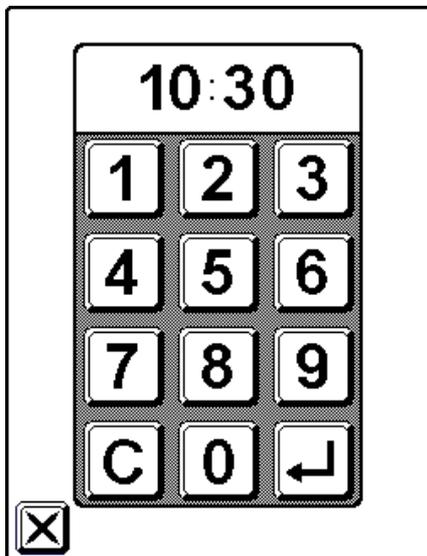
C : allows to cancel the related time interval.

 : this graphic represents, approximately, the activation period of the zone of the current day.

X : exit from the current page of DFTouch.

Numeric keyboard

This keyboard will appear when a time has to entered.



The first field **10:30** shows the time set by the numeric buttons from **0** to **9**.

The button **C** allow to clear the time entered by the numeric buttons.

The button  allows to confirm the entered time. The touch of this button will close the numeric keyboard.

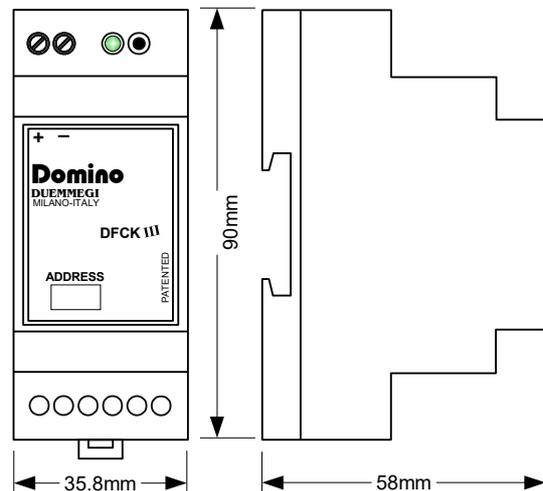
The button **X** allows to close the keyboard without confirmation of the entered time.

Technical features

Power supply (bus side)	By specific centralized power supply Mod. DFPW2
Amount of controlled zones	15
Amount of time interval for each day of the week	4
Internal battery	NiMH 3.6V 11mAh
Housing	Standard DIN 2M for DIN rail
Operating temperature	-5 ÷ +50 °C
Storage temperature	-20 ÷ +70 °C
Protection degree	IP20

Warning: DFCKIII module contains a NiMH rechargeable battery: remove this battery before to throw the device. The battery must be eliminated in a safe way according to current laws.

Outline dimensions



Correct disposal of this product



(Waste Electrical & Electronic Equipment)
(Applicable in the European Union and other European countries with separate collection systems). This marking on the product, accessories or literature indicates that the product should not be disposed of with other

household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable re-use of material resources. Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.

Installation and use restrictions

Standards and regulations

The design and the setting up of electrical systems must be performed according to the relevant standards, guidelines, specifications and regulations of the relevant country. The installation, configuration and programming of the devices must be carried out by trained personnel.

The installation and the wiring of the bus line and the related devices must be performed according to the recommendations of the manufacturers (reported on the specific data sheet of the product) and according to the applicable standards.

All the relevant safety regulations, e.g. accident prevention regulations, law on technical work equipment, must also be observed.

Safety instructions

Protect the unit against moisture, dirt and any kind of damage during transport, storage and operation. Do not operate the unit outside the specified technical data.

Never open the housing. If not otherwise specified, install in closed housing (e.g. distribution cabinet). Earth the unit at the terminals provided, if existing, for this purpose. Do not obstruct cooling of the units. Keep out of the reach of children.

Setting up

The physical address assignment and the setting of parameters (if any) must be performed by the specific softwares provided together the device or by the specific programmer. For the first installation of the device proceed according to the following guidelines:

- Check that any voltage supplying the plant has been removed
- Assign the address to module (if any)
- Install and wire the device according to the schematic diagrams on the specific data sheet of the product
- Only then switch on the 230Vac supplying the bus power supply and the other related circuits

Applied standards

This device complies with the essential requirements of the following directives:

- 2014/30/UE (EMC)
- 2014/35/UE (Low Voltage)
- 2011/65/UE (RoHS)

Note

Technical characteristics and this data sheet are subject to change without notice.