

# **DDCcontrol Documentation**

**Nicolas Boichat**

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## **Abstract**

Documentation for DDCcontrol version 0.4.

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## Table of Contents

1. About DDCcontrol .....	1
About DDCcontrol .....	1
DDC/CI .....	1
2. Install notes .....	2
Software Requirement .....	2
Download the sources .....	2
Compile and install .....	2
Configure <code>/dev/i2c-*</code> devices .....	2
Kernel configuration options .....	3
3. Usage .....	4
GTK+ GUI .....	4
Gnome panel applet .....	4
Command line tool .....	4
Usage example .....	4
A. Report problems and successes .....	6
B. Supported monitors .....	7
C. Supported graphics cards .....	9
ATI Radeon series .....	9
Direct PCI memory access support .....	9
<code>/dev/i2c-*</code> devices support .....	9
nVidia .....	10
Direct PCI memory access support .....	10
<code>/dev/i2c-*</code> devices support .....	10
Intel .....	11
i810/i815/i830/i845/i855/i865/i915/i945 with Integrated Graphics Controller .....	11
SiS .....	11
VIA .....	11
Matrox .....	12
G200/G400/G450/G550 series .....	12
D. Thanks .....	13
E. Documents for developers .....	14
Monitor database structure .....	14
Control list .....	14
Monitor Profiles .....	15
Profile file structure .....	16
F. GNU General Public License .....	18
Preamble .....	18
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION .....	19
How to Apply These Terms to Your New Programs .....	22

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# Chapter 1. About DDCcontrol

## About DDCcontrol

DDCcontrol is a tool used to control monitor parameters, like brightness and contrast, without using the OSD (On Screen Display) and the buttons in front of the monitor.

All the software provided by monitor manufacturers (NEC/Mitsubishi NaviSet and Samsung Magic-Tune) are closed-source and only runs on Windows. DDCcontrol is open-source and runs on Linux.

There is two versions of this tool, a command line version, and an user-friendly Gnome GUI.

## DDC/CI

DDC/CI is a protocol designed by VESA to configure monitor by software, using two wires on the VGA or DVI cables, which forms an I2C bus.

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# Chapter 2. Install notes

## Software Requirement

To compile and run DDCcontrol, you need to have these packages installed:

- libxml2 [<http://www.xmlsoft.org/>]
- pci-utils [<http://atrey.karlin.mff.cuni.cz/~mj/pciutils.shtml>]
- gtk+>=2.4 [<http://www.gtk.org/>]

In addition to the library packages, you also need the development packages, which are not usually installed. For example, on Debian, their names are `libxml2-dev`, `pciutils-dev` and `libgtk2.0-dev`. Others distributions probably have similar packages names.

### Note

You don't need `pci-utils` if you don't use direct PCI memory access, and you don't need `gtk+` if you don't plan to use the Gnome GUI. Usually, this is not the case, so you will need these packages.

## Download the sources

Go to the download section [[http://sourceforge.net/project/showfiles.php?group\\_id=117933](http://sourceforge.net/project/showfiles.php?group_id=117933)] of `ddccontrol` project's page and download the latest `ddccontrol` and `ddccontrol-db` source tarballs.

Then unpack these two archives with:

```
# tar xvfz ddccontrol-X.Y.tar.gz
# tar xvfz ddccontrol-db-YYYYMMDD.tar.gz
```

You should now have two directories, `ddccontrol` and `ddccontrol-db`.

## Compile and install

To compile and install the source tarballs, type:

```
# ./configure
# make
# su root
Password: <root password>
# make install
```

You need to do this in `ddccontrol` and `ddccontrol-db` directories.

If you set the `--prefix` parameter when configuring one package, you must set it to the same value when configuring the other.

## Configure `/dev/i2c-*` devices

### Note

`/dev/i2c-*` devices are only working with kernel 2.6 or greater.

If your graphics card is supported by `/dev/i2c-*` devices (see Appendix C, *Supported graphics cards*), you must load the `i2c-dev` module by typing, as root:

```
# modprobe i2c-dev
```

You must also load your graphics card framebuffer driver (for card-specific instructions see Appendix C, *Supported graphics cards*).

If you want to automatically load these modules when Linux starts, see your distribution's documentation.

On systems not using devfs, even after loading framebuffer and i2c-dev modules, the devices `/dev/i2c/*` or `/dev/i2c-*` does not exist. On Debian, these devices are created using this command :

```
# /sbin/MAKEDEV i2c
```

To allow standard (i.e. non-root) users to use DDCcontrol, you must change permissions on `/dev/i2c-*`. This is done by typing, as root:

```
# chmod a+rw /dev/i2c-*
```

## Kernel configuration options

If `i2c-dev` or your graphics card's framebuffer modules are not available with your kernel, you can build your own kernel with the following options turned on (with recommend to build them as modules):

- Devices drivers->I2C support.
- Devices drivers->I2C support->I2C device interface.
- Devices drivers->Graphics support->Framebuffer support.
- and a specific driver for your graphic card (see Appendix C, *Supported graphics cards*).

---

# Chapter 3. Usage

## GTK+ GUI

If GTK+>=2.4 is installed on your computer, the configure process will detect it, and build the GTK+ application.

The GTK+ GUI is designed to be user-friendly, so it should be easy to use it. To launch this GUI, simply type:

```
# gddcontrol
```

## Gnome panel applet

If Gnome>=2.10 is installed on your computer, the configure process will detect it, and build the Gnome panel applet.

The Gnome panel applet is useful to switch between different monitor profiles created with the GTK+ GUI. To add it to your Gnome Panel, simply right-click on the panel, choose “Add to Panel”, and select “Monitor Profile Switcher”.

## Command line tool

The command line tool is useful for debugging purpose, and to create automatic scripts.

### Note

We won't present everything you can do with ddcontrol, if you want more information, type:

```
# ddcontrol -h
```

## Usage example

This example explains how to list all available controls and then change the brightness parameter.

### List available controls

To list available controls, type:

```
# ddcontrol -p
```

This probes for available monitors, then takes the first probed monitor and lists controls supported by it. This should give you an output like this (this example uses a Samsung Syncmaster 173P and a nVidia GeForce FX 5700):

```
ddcontrol version 0.1
Copyright 2004 Oleg I. Vdovikin (oleg-at-cs.msu.su)
Copyright 2004 Nicolas Boichat (nicolas-at-boichat.ch)
This program comes with ABSOLUTELY NO WARRANTY.
You may redistribute copies of this program under the terms of the GNU General
Public License.

Device : pci:01:00.0-0
Error while reading write message answer: Bad message
Reading EDID 0x50 failed.
Device : pci:01:00.0-1
Device : pci:01:00.0-2
Detected monitors :
```



```

- Device : pci:01:00.0-1
  DDC/CI supported : Yes
  Monitor Name : Samsung SyncMaster 173P (DVI)
  Input type : Digital
  (Automatically selected)
- Device : pci:01:00.0-2
  DDC/CI supported : Yes
  Monitor Name : NEC Multisync 2080UX+
  Input type : Analog
Reading EDID and initializing DDC/CI at bus pci:01:00.0-1...
Device : pci:01:00.0-1

EDID readings:
  Plug and Play ID: SAM00E2 [Samsung SyncMaster 173P (DVI)]
  Input type: Digital

= Samsung SyncMaster 173P (DVI)
> Color settings
  > Brightness and Contrast
    > id=brightness, name=Brightness, address=0x10, delay=-1ms, type=0
      supported, value=55, maximum=100
    > id=contrast, name=Contrast, address=0x12, delay=-1ms, type=0
      supported, value=60, maximum=100
    > id=magicbright, name=Magic Bright Mode, address=0xdc, delay=-1ms, type=2
      Possible values:
        > id=text - name=Text, value=1
        > id=internet - name=Internet, value=2
        > id=entertain - name=Entertain, value=3
        > id=custom - name=Custom, value=4
      supported, value=4, maximum=4
  > Others
    > Restore defaults
      > id=defaults, name=Restore Factory Defaults, address=0x4, delay=-1ms, type=1
        Possible values:
          > id=default - name=Restore Factory Defaults, value=1
          supported, value=0, maximum=1
        > id=defaultluma, name=Restore Brightness and Contrast, address=0x5,
          delay=-1ms, type=1
          Possible values:
            > id=default - name=Restore Brightness and Contrast, value=1
            supported, value=0, maximum=1
          > id=settings, name=Settings, address=0xb0, delay=-1ms, type=1
            Possible values:
              > id=store - name=Save Current Settings, value=1
              > id=restorefactory - name=Restore Factory Settings, value=2
            supported, value=0, maximum=2
        > Input settings
          > id=inputsource, name=Input Source Select, address=0x60, delay=-1ms, type=2
            Possible values:
              > id=analog - name=Analog, value=1
              > id=digital - name=Digital, value=3
            supported, value=3, maximum=3
        > Power control
          > id=dpms, name=DPMS Control, address=0xd6, delay=-1ms, type=2
            Possible values:
              > id=on - name=On, value=1
              > id=standby - name=Standby, value=4
            supported, value=1, maximum=4

```

## Change the brightness

The lines concerning brightness in the available controls list are:

```

> id=brightness, name=Brightness, address=0x10, delay=-1ms, type=0
  supported, value=55, maximum=100

```

The important elements are address (here: 0x10), current value (55) and maximum value (100).

To change the brightness value to 70/100, type:

```
ddccontrol -p -r 0x10 -w 70
```

The last lines of the output should be:

```

Writing 0x10, 0x46(70)...
Control 0x10: +/70/100 [Brightness]

```

---

# Appendix A. Report problems and successes

If you have problems building or running DDCcontrol, if your monitor doesn't work with DDCcontrol, or if your graphics card is not listed in the Appendix C, *Supported graphics cards*, please write a message to [ddccontrol-users@lists.sourceforge.net](mailto:ddccontrol-users@lists.sourceforge.net) [<mailto:ddccontrol-users@lists.sourceforge.net>].

For more informations on ddccontrol mailing lists, see the sourceforge project page [[http://sourceforge.net/mail/?group\\_id=117933](http://sourceforge.net/mail/?group_id=117933)].

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# Appendix B. Supported monitors

The following monitors are supported by DDCcontrol:

## Dell

- Dell 1704FPT (DVI input)
- Dell 2005FPW
- Dell 2405FPW

## Fujitsu Siemens

- P17-2
- P19-2
- P20-2 (VGA and DVI inputs)

## Mitsubishi

- Diamond Plus 92
- Diamond Pro 2060u (VGA input B only)
- Diamond Pro 2070sb

## NEC

- Multisync 2080UX+ (VGA and DVI inputs)

## Samsung

- SyncMaster 171P (VGA input only)
- SyncMaster 173P (VGA and DVI inputs)
- SyncMaster 173P Plus
- SyncMaster 173T (VGA input only)
- SyncMaster 174T (at least DVI input)
- SyncMaster 193P (VGA and DVI inputs)
- SyncMaster 193P Plus (VGA and DVI inputs)

- SyncMaster 701T
- SyncMaster 710T
- SyncMaster 710TM
- SyncMaster 712N (at least VGA input)
- SyncMaster 730BF
- SyncMaster 760BF
- SyncMaster 910T
- SyncMaster 912N (at least VGA input)
- SyncMaster 920N (at least VGA input)
- SyncMaster 913V
- SyncMaster 930BF (at least VGA input)
- SyncMaster 960BF (VGA and DVI inputs)
- SyncMaster 970P (VGA and DVI inputs)
- SyncMaster 997MB

## SUN

- GDM-5410 (Sony OEM)

## Your monitor is not on this list?

If your monitor is not on this list, and so doesn't work with DDCcontrol, but you think that it supports the DDC/CI protocol, please run this command:

```
LANG= LC_ALL= ddccontrol -p -c -d
```

And send the output to one of the DDCcontrol mailing lists (see Appendix A, *Report problems and successes*).

---

# Appendix C. Supported graphics cards

## `/dev/i2c-*` versus PCI memory

To control a monitor, DDCcontrol must access to the I2C bus of the graphics card. There are two methods to do so: the first one uses `/dev/i2c-*` devices provided by kernel drivers (abbreviated by `dev` in tables), the second one reads and writes directly in the card PCI memory (abbreviated by `PCI` in the tables).

Depending on your hardware, one method or the other works, or even both.

## ATI Radeon series

### Direct PCI memory access support

Almost every ATI cards should work with direct PCI memory access, even if it has not been very extensively tested.

To use it, you have nothing special to do, everything is done by DDCcontrol.

### `/dev/i2c-*` devices support

ATI Radeon cards also work with `/dev/i2c-*` devices. To use `/dev/i2c-*` devices with ATI cards, you must load the `radeonfb` module by typing, as root:

```
# modprobe radeonfb
```

The kernel configuration options needed to enable Radeon framebuffer driver and I2C support are:

- Devices drivers->Graphics support->Framebuffer support->ATI Radeon display support.
- Devices drivers->Graphics support->Framebuffer support->ATI Radeon display support->DDC/I2C for ATI Radeon support.

#### **Warning**

The `radeonfb` kernel module may cause system instability (crashes or screen corruption) when used at the same time as used the ATI closed source drivers.

This is why we recommend that you use direct PCI memory access with ATI cards.

### ATI cards support table

These ATI cards have been reported to work, but others models should also work. If yours is not listed, please send a message to one of the DDCcontrol mailing lists (see Appendix A, *Report problems and successes*).

Name	Works	
	dev	PCI
Radeon 7000	Yes	???
Radeon 7500	Yes	???
Radeon 9200	Yes	Yes

Name	Works	
	dev	PCI
Radeon 9200 SE	???	Yes
Radeon 9500	Yes	???
Radeon 9550 SE	Yes	???
Radeon 9600 Pro	Yes	???
Radeon 9700	Yes	???
Radeon 9800 Pro	Yes	Yes

## nVidia

### Direct PCI memory access support

Almost every nVidia cards work with direct PCI memory access, and this method is compatible with the nVidia proprietary drivers.

To use it, you have nothing special to do, everything is done by DDCcontrol.

### /dev/i2c-\* devices support

#### Note

To use /dev/i2c-\* devices with nVidia cards, you must have a rather recent kernel (at least version 2.6.9).

Most nVidia cards, starting with TNT, but excluding the most recent GeForce FX series, work with /dev/i2c-\* devices. To use them, you must load the `rivafb` module by typing, as root:

```
# modprobe rivafb
```

The kernel configuration options needed to enable nVidia framebuffer and I2C support are:

- Devices drivers->Graphics support->Framebuffer support->nVidia Riva support.
- Devices drivers->Graphics support->Framebuffer support->nVidia Riva support->Enable DDC Support.

#### Warning

The `rivafb` kernel module is *not* compatible with the binary nVidia X drivers, which are the only drivers for nVidia cards to provide 3D acceleration.

This is why we recommend that you use direct PCI memory access with nVidia cards.

### nVidia cards support table

Most of these nVidia cards have been reported to work, but others models should also work. If yours is not listed, please send a message to one of the DDCcontrol mailing lists (see Appendix A, *Report problems and successes*).

Name	Works	
	dev	PCI
GeForce Ti 200	Yes	Yes
GeForce FX 5600	No	Yes

Name	Works	
	dev	PCI
GeForce FX 5700	No	Yes
GeForce FX 5700 LE	???	Yes
GeForce FX 5950 Ultra	???	Yes
GeForce 6200 TC	???	Yes
GeForce 6600	???	Yes
GeForce 6800 GT	???	Yes
nForce 2 IGP	No	No

## Intel

### i810/i815/i830/i845/i855/i865/i915/i945 with Integrated Graphics Controller

Intel integrated graphics controllers only work with direct PCI memory access, so you don't have to have any kernel module built or loaded.

#### Intel chipset support table

These Intel chipsets have been reported to work. If yours is not listed, please send a message to one of the DDCcontrol mailing lists (see Appendix A, *Report problems and successes*).

Name	Works	
	dev	PCI
Intel i915G (82915G)	No	Yes
Intel i865G (82865G)	No	Yes

## SiS

SiS graphics controllers only work with direct PCI memory access, so you don't have to have any kernel module built or loaded.

#### SiS chipset support table

These SiS chipsets have been reported to work. If yours is not listed, please send a message to one of the DDCcontrol mailing lists (see Appendix A, *Report problems and successes*).

Name	Works	
	dev	PCI
SiS [M]661xX/[M]741[GX]/[M]760 PCI/AGP VGA Adapter	No	Yes

## VIA

VIA graphics controllers only work with direct PCI memory access, so you don't have to have any kernel module built or loaded.

## VIA chipset support table

These VIA chipsets have been reported to work. If yours is not listed, please send a message to one of the DDCcontrol mailing lists (see Appendix A, *Report problems and successes*).

Name	Works	
	dev	PCI
VIA VT8623 [Apollo CLE266] integrated CastleRock graphics	No	Yes
VIA S3 Unichrome Pro VGA Adapter	No	Yes

## Matrox

### G200/G400/G450/G550 series

Matrox cards only work with `/dev/i2c-*` devices. To use them, you must load both `matroxfb` and `i2c-matroxfb` modules by typing, as root:

```
# modprobe matroxfb
# modprobe i2c-matroxfb
```

The kernel configuration options needed to enable Matrox framebuffer driver and I2C support are, at least:

- Devices drivers->Graphics support->Framebuffer support->Matrox acceleration.
- Devices drivers->Graphics support->Framebuffer support->Matrox acceleration->G100/G200/G400/G450/G550 support.
- Devices drivers->Graphics support->Framebuffer support->Matrox acceleration->Matrox I2C support.

### Matrox cards support table

These Matrox cards have been reported to work. If yours is not listed, please send a message to one of the DDCcontrol mailing lists (see Appendix A, *Report problems and successes*).

Name	Works	
	dev	PCI
Matrox G200 AGP	No	No
Matrox G450 AGP	Yes	No



---

# Appendix D. Thanks

Thanks to Oleg I. Vdovikin, for his work which was used as a basis for ddccontrol, and for his help when designing the XML database.

Thanks to Christian Schilling, for his nice additions to the Gnome GUI, and for the Gnome panel applet.

Thanks to William Hollingworth, of NEC/Mitsubishi, for his constant help and support to this project.

Thanks to Chernyavskyy Valentin, for testing Intel graphics chipset support.

Thanks to Johannes Deisenhofer, for providing a patch to add VIA and SiS graphics chipset support.

Thanks to all users that reported if DDCcontrol works on their hardware.

Thanks to various people on mailing-lists (X.org, fbdevel...), for their help, in particular Jon Smirl, on the X.org list, who guided me in the direction of using the kernel framebuffer driver.

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# Appendix E. Documents for developers

## Monitor database structure

The monitor database is written in XML, it can be found in the `db` directory of `ddccontrol-db` package.

This directory contains the following files:

- `options.xml`
- `monitor/%monitor_id%.xml`

## Control list

XML file: `options.xml`

control elements (e.g. "brightness") are contained in group elements (e.g. "color settings"). group and subgroup elements allow the GUI to separate the controls in different branches on the tree.

options attributes:

- `date`: indicates the release date of the current database (YYYYMMDD format).
- `dbversion`: indicates which version of database format is used (must be set to 3).

group attributes:

- `name`: full English group name.

subgroup attributes:

- `name`: full English subgroup name.
- `pattern`: name of the fullscreen pattern `gddccontrol` must display to help the user to adjust subgroup's controls (optional). For possible values, see `ddccontrol/src/gddccontrol/fspatterns.c`.

control attributes:

- `id`: abbreviated control name.
- `name`: full English control name.
- `address`: DDC/CI address (optional).
- `type`: one of these values:
  - "value": The control accepts values in a continuous range (e.g. brightness).

- "command": An action occurs when the value is set to something greater than "0" (e.g. degauss). If you don't define any `value` element in a command control, the default value "0x01" will be used.
- "list": The control accepts a list of values (e.g. OSD language).
- refresh (only for list and command controls): Set whether other controls must be refreshed after changing list value or running the command associated with the control (optional). Possible values:
  - "none": Do not refresh anything. (default)
  - "all": Refresh all controls.

value attributes:

- id: abbreviated value name.
- name: full English value name (it is not needed if there is only one value for command controls).
- value: DDC/CI control value (optional).

File format:

```
<?xml version="1.0"?>
<options date="%date%" dbversion="3">
  <group name="%groupname%">
    <subgroup name="%subgroupname%" pattern="%patternname%">
      <control id="%control_id%" type="value" name="%control_name%"
address="%hex_address%" />
      <!-- Command using the default 0x01 address -->
      <control id="%control_id%" type="command" name="%control_name%"
address="%hex_address%" />
      <control id="%control_id%" type="command" name="%control_name%"
address="%hex_address%">
        <value id="%value_id%" value="%hex_value%" />
      </control>
      <control id="%control_id%" type="list" name="%control_name%"
address="%hex_address%">
        <value id="%value_id%" name="%value_name%" value="%hex_value%" />
        <value...>
      </control>
      <control ...>
    </subgroup>
  </group>
  <group ...>
</options>
```

## Monitor Profiles

XML files: `monitor/%monitor_id%.xml`

### caps element

The caps attribute is optional. Its format is defined in ACCESS.bus specifications.

To add controls to caps, use the `add` attribute. To remove controls from caps, use the `remove` attribute.

Note `remove` is handled before `add`, so if you remove and add a same control, it will finally be in caps.

### controls element

---

List of controls supported by a monitor (optional if you have an `include` element).

`control` `id` attributes are defined in `options.xml`. If `control` type is "list" or "command" without default values, supported values must be defined.

`address` attribute for `control` elements and `value` attribute for `value` elements are optional if they are defined in the general options file.

The `init` attribute in `monitor` element define the type of the initialization: DDC/CI standard ("standard"), or Samsung ("samsung"). This attribute is optional, as long as the monitor profile includes another profile which defines this attribute.

You can set a `delay` attribute in `control` elements to set the time in milliseconds to wait after changing the value of this control. If you don't, a default value is used.

## include element

Includes another monitor, manufacturer or standard profile, specified by the `file` attribute.

### Note

Monitor profile are read sequentially. Control and init mode redefinitions are ignored, so define specific controls and init mode before including a generic profile. Caps are also treated sequentially, so if a control is not in CAPS at the time it is defined, it won't be supported by `ddccontrol`.

File format:

```
<?xml version="1.0"?>
<monitor name="%full_monitor_name%" init="[standard|samsung]">
  <caps add="%add_caps%" remove="%remove_caps%" />
  <controls>
    <!-- value -->
    <control id="%control_id%" address="%hex_address%" delay="%wait_time%" />
    <!-- command using a default 0x01 value-->
    <control id="%control_id%" address="%hex_address%" delay="%wait_time%" />
    <!-- command -->
    <control id="%control_id%" address="%hex_address%" delay="%wait_time%">
      <value id="activate" value="%hex_value%" />
    </control>
    <!-- list -->
    <control id="%control_id%" address="%hex_address%" delay="%wait_time%">
      <value id="%value_id%" value="%hex_value%" />
      <value...>
    </control>
    <control...>
  </controls>
  <!-- Including VESA generic profile is generally a good idea. -->
  <include file="VESA" />
</monitor>
```

If a monitor supports exactly the same controls as another one, you can define it as shown:

```
<?xml version="1.0"?>
<monitor name="%full_monitor_name%">
  <caps add="%add_caps%" remove="%remove_caps%" />
  <include file="%include_monitor_id%" />
</monitor>
```

## Profile file structure

Profile files are used to save the value of some controls.

profile attributes:

- `pnpid`: indicates the PNP id of the monitor that this profile applies to.
- `name`: profile name.

- `version`: indicates which version of profile format is used (must be set to 1).

control attributes:

- `address`: DDC/CI address of the control.
- `value`: DDC/CI control value.

File format:

```
<?xml version="1.0"?>
<profile pnpid="%pnp_id%" name="%profile_name%" version="1">
  <control address="%hex_address%" value="%control_value%"/>
  <control...>
</profile>
```

---

# Appendix F. GNU General Public License

Version 2, June 1991  
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Boston,  
MA  
02111-1307  
USA

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Version 2, June 1991

## Preamble

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