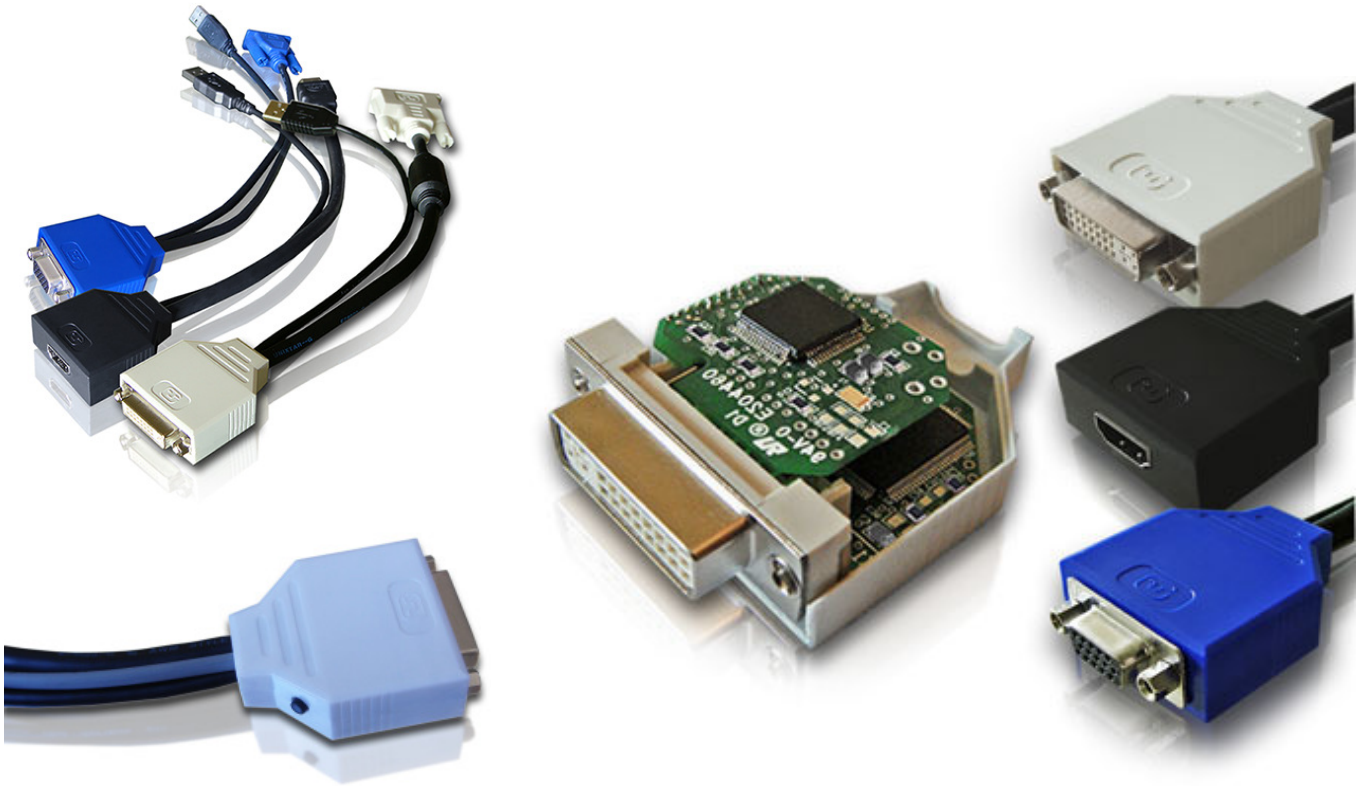
User's Guide

VideoGhost Pro
VideoGhost Max

DVI, HDMI, VGA



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Getting started

New to the *VideoGhost Pro/Max*?

⇒ Learn about the different modes first: section **Overview of configurations**
⇒ Then install your device: sections **Hardware installation** and **Device setup**
⇒ Finally, go to section **Virtual COM mode**, **Flash Drive mode**, or **Capture mode**, depending how you configured your device

Already familiar with the *VideoGhost Pro/Max* frame-grabber?

⇒ If you want to directly control your *VideoGhost Pro/Max* through Virtual COM (i.e. through the *VideoGhost Control* application), go to the **Virtual COM mode** section
⇒ If you want to use your *VideoGhost Pro/Max* as an independent frame-grabber similar to the standard *VideoGhost*, go to sections **Flash Drive mode** and **Capture mode**

Questions or problems?

⇒ Go through the **Troubleshooting** section.

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Introduction

About the product

The *VideoGhost Pro and VideoGhost Max* are intelligent **hardware frame-grabbers**, compatible with **DVI**, **HDMI**, and **VGA** signal sources such as **computers** and **laptops**. They feature a built-in **JPEG compressor**, and a huge **4 GB internal flash disk**. Frames captured from the DVI, HDMI, or VGA bus will be compressed and stored to the **built-in Flash Drive**. The *VideoGhost Pro/Max* has a USB interface, which may be operate either as a **USB Flash Drive**, or as a **USB Virtual COM port**. The Virtual COM interface allows accessing the *VideoGhost Pro/Max* by a set of commands, enabling full control from an external device, such as a PC. An additional **external push-button** is available, accelerating switching between modes and capturing images.

The *VideoGhost Max* also features a **true hardware COM** interface with a DB-9 connector. This interface enables access to the *VideoGhost's* resources and functions from external devices such as Programmable Logic Controllers, embedded systems, microcontrollers, or computers.

The *VideoGhost Pro* and *VideoGhost Max* are delivered a **PC application** named ***VideoGhost Control***, demonstrating how to access all the features through Virtual COM. The software is delivered with source code in C#.

Features

- Compatible with all **DVI**, **VGA**, and **HDMI** devices
- Supports resolutions up to **Full-HD (1920 x 1080)** and **WUXGA (1920 x 1200)**
- Works with **computers**, external **laptop monitors**, and other video sources
- No power supply necessary (power is drawn from the USB port)
- Built-in **JPEG encoder**
- **4 Gigabytes** of internal memory in all versions
- Built-in **time-stamping module** with battery (7 years lifetime guaranteed!)
- **USB Virtual COM** mode
- **USB Flash Drive** mode
- **Capture mode** with **JPEG timer**
- External **push button**
- On-demand image capture
- **Hardware COM** interface (*VideoGhost Max* only)
- PC-side software with source code
- Several color options available: white, black, gray, blue

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Requirements

- Compatible DVI / HDMI / VGA video signal source (no HDCP encryption)
- Standard resolution up to 1920 x 1200 and bandwidth up to 160MHz
- Computer with standard USB 1.1 or 2.0 port
- Operating system with USB Mass-Storage (MSD) and Virtual COM (CDC) support
- Optionally *MS Windows XP/Vista/7/8* (only for running *VideoGhost Control*)

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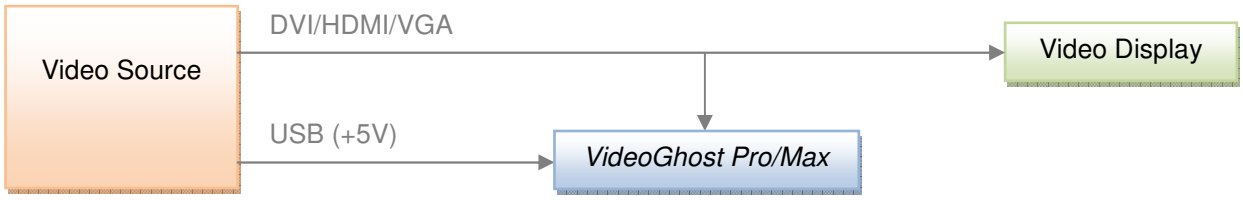
Overview of configurations

The *VideoGhost* Pro and *VideoGhost Max* can be used in a variety of hardware configurations, determined by the functionality and software configuration. Each configuration is associated with one of the three modes:

- **Capture mode** – the *VideoGhost Pro/Max* does not connect as a USB device, but may perform timer-triggered and push-button-triggered image captures
- **Virtual COM mode** – the *VideoGhost Pro/Max* connects as a USB Virtual COM device (typically used with *VideoGhost Control*), however may still capture images triggered by the timer, push-button, or COM command
- **Flash Drive mode** – the *VideoGhost Pro/Max* connects as a USB Flash Drive, and cannot capture images

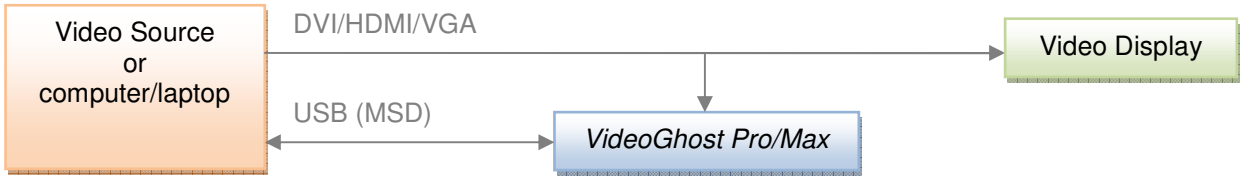
A list of configurations follows:

Configuration 1: Capture mode with JPEG timer



Description: The *VideoGhost Pro/Max* will capture a screenshot at a set interval, or after pressing the push-button, and store it as a JPEG file. The device will not enumerate as a USB device, but may draw power from USB. This mode of operation is identical as the standard *VideoGhost*, and is the default mode for the *VideoGhost* Pro.

Configuration 2: Flash-drive mode



Description: The *VideoGhost Pro/Max* will connect as a 2GB Flash-drive with stored JPEG files. USB will be used to power the device. This mode may be triggered by pressing the push

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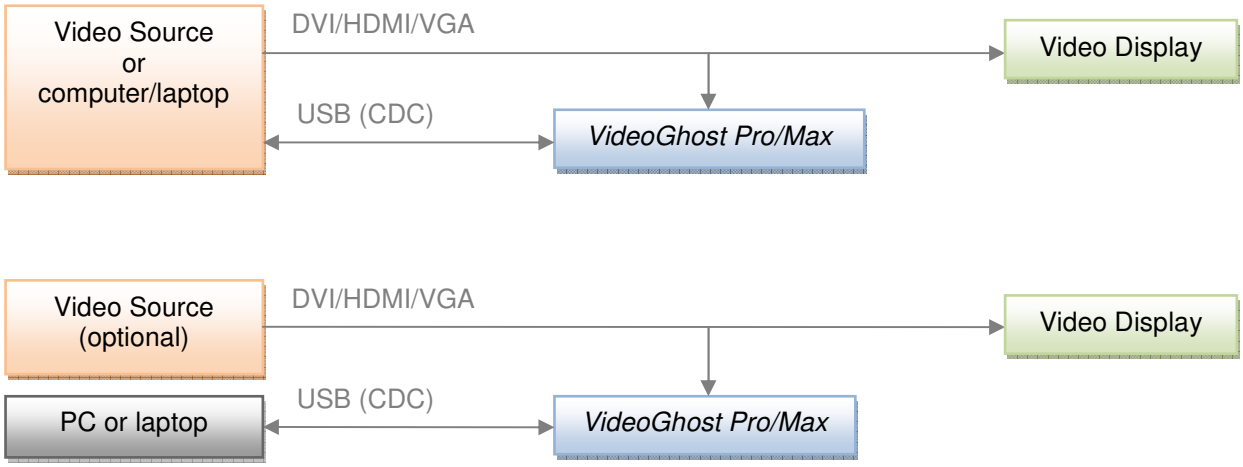
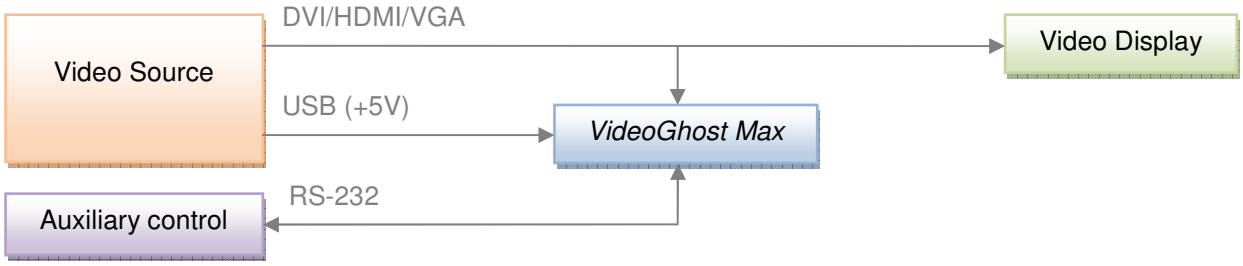
button for 3 seconds, or by sending a command through COM. Connecting the video source and receiver is not necessary.

Configuration 3: Virtual COM mode with on-demand capture and JPEG timer



Description: The *VideoGhost Pro/Max* will connect as a Virtual COM port, allowing full access through the PC application *VideoGhost Control* with on-demand capture. The JPEG capture timer may run in parallel. The push-button may be used to store a JPEG to the internal memory, or to transfer an image through Virtual COM. USB will be used to power the device. This mode may be set through the configuration file as the default mode of operation.

Configuration 4: Capture mode with auxiliary RS-232 control and JPEG timer



Description: The *VideoGhost Max* will capture a screenshot when triggered through the external RS-232 control, internal timer, or push-button, and store it as a JPEG file. The device will not enumerate as a USB device, but may draw power USB. This mode is only supported by the *VideoGhost Max*, and is its default mode of operation.

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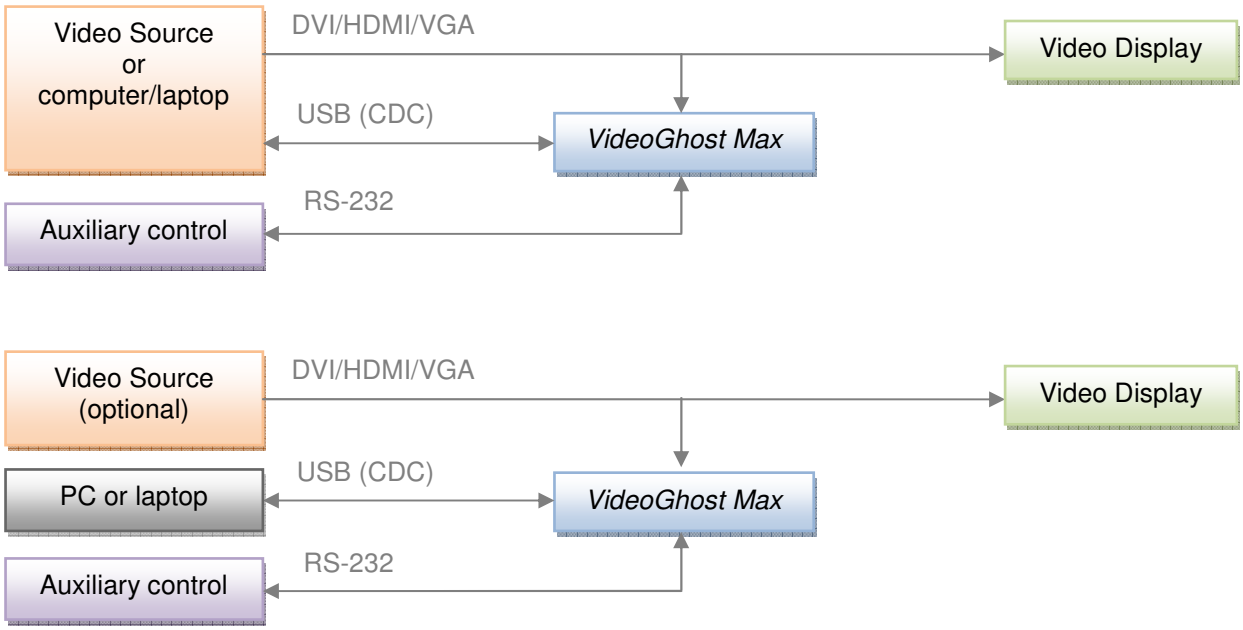
Configuration 5: Virtual COM mode with on-demand capture, auxiliary RS-232 control, and JPEG timer



Description: The *VideoGhost Max* will connect as a Virtual COM port, allowing full access through a PC application *VideoGhost Control* with on-demand capture. Additionally, an external RS-232 device may control the *VideoGhost*. USB will be used to power the device. The JPEG capture timer may run in parallel. The push-button may be used to store a JPEG to the internal memory, or to transfer an image through Virtual COM. This mode is only supported by the *VideoGhost Max*, and may be set through the configuration file as the default mode of operation.

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Hardware installation

Connecting the hardware is quick and easy, no software or drivers are required. First locate the source of the video signal, such as the output of the graphics card, or the TV output.

DVI version

HDMI version

VGA version

Connect the *VideoGhost Pro/Max* to the video source, and then connect the output device (TV or monitor) to the other end of the *VideoGhost Pro/Max*.

DVI version

HDMI version

VGA version

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Finally, connect the USB connector to a free USB port.

DVI version **HDMI version** **VGA version**

The USB port is used for powering the device, and for communication with the host in either Flash Drive mode or Virtual COM mode. If the device is in Capture mode (Configuration 1 or Configuration 4), then a +5V DC USB power supply may be used instead.

In case of the *VideoGhost Max*, an auxiliary RS-232 device may be connected to the DB-9 cable. Refer to section **COM commands** for instructions how to control the VideoGhost Max from an external device.

The *VideoGhost Pro/Max* is now ready to capture screenshots. **If this is the first time the device is being used, it will default to Configuration 1 (*VideoGhost Pro*) or Configuration 4 (*VideoGhost Max*), meaning it will not show up as a USB device.** Press the external push-button for 3 seconds to switch to Flash Drive mode, and configure the device through the file CONFIG.TXT (see section **Device setup**).

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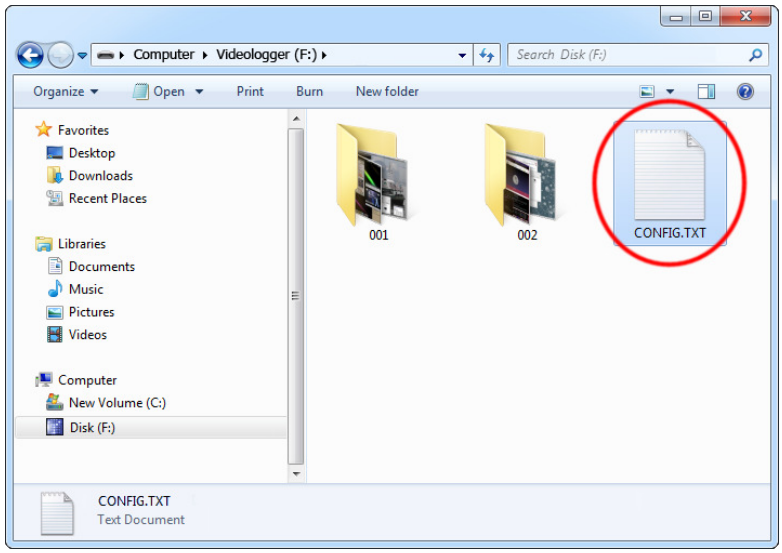
Device setup

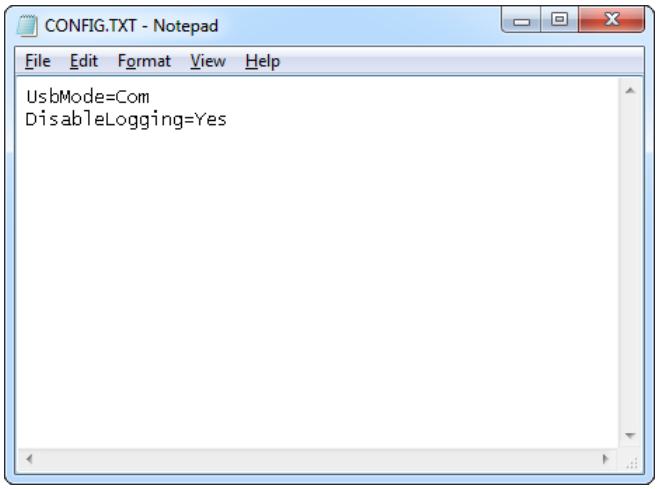
If your *VideoGhost Pro/Max* is already configured to operate in Virtual COM mode (Configurations 3 or 5), further configuration may be done using the PC application *VideoGhost Control*. Simply install *VideoGhost Control* and use it to connect and configure the device (see section **Virtual COM mode**).



If your *VideoGhost Pro/Max* is configured to operate in Capture mode (Configurations 1 or 4) or Flash Drive mode (Configuration 2), it may be configured through the file CONFIG.TXT, placed in the Flash Drive root folder. **This is the case for newly delivered devices**. First, press the external push-button for 3 seconds to switch to Flash Drive mode (Configuration 2). Then use any text editor to create or open the file CONFIG.TXT.

Put the following line in the file, if you want to use the *VideoGhost Pro/Max* in Virtual COM mode (Configurations 3 or 5):

```
UsbMode=Com
```



If you want to use the device in Flash Drive mode (Configuration 2) or simply capture images without using USB (Configurations 1 or 4), put the following line in CONFIG.TXT:

```
UsbMode=Flash
```

If you don't need the internal JPEG capture timer, continue editing CONFIG.TXT by placing the following line in it:

```
DisableLogging=Yes
```

If you want to use the internal JPEG capture timer in any of the modes, place the following lines in CONFIG.TXT and modify the values accordingly:

```
DisableLogging=No
Interval=300
Resize=50
Timestamping=Image
```

DisableLogging allows disabling JPEG logging. Allowed values are *Yes* (logging disabled) and *No* (logging enabled). Default value is *No*.

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Interval sets number of seconds between successive screenshots. Please note that compressing and saving an image takes several seconds (depending on the image size and quality), so this may become the limiting factor for low values of *Interval*. Default value is *300*.

Resize sets the resizing factor for storing screenshots. Allowed values are *No* (no resizing), *Auto* (automatic resizing factor based on image size), *75* (75%), *67* (67%), *50* (50%), *33* (33%), and *25* (25%). Default value is *No*.

Timestamping configures the built-in time- and date-stamping module. Allowed values are *Yes* (timestamping active, but limited to updating the modification time and date of JPEG files), *Image* (timestamps burned into JPEG image content), and *No* (timestamping disabled). Default is *Image*.

When finished editing CONFIG.TXT, save the file in the root folder of the Flash Drive, and safely remove the drive. The new configuration will be loaded on next power-up.

The configuration file CONFIG.TXT may contain several parameters, fully configuring how the *VideoGhost Pro/Max* operates. A full list of available parameters with descriptions is available below.

Basic parameter list

Parameter	Values	Example	Description
UsbMode	Flash (default) Com	UsbMode=Com	Mode of USB operation. *Flash* will force the device to connect as a Mass Storage device. *Com* will force the device to connect as a Virtual COM device.
Interval	Screenshot interval in seconds (default 300)	Interval=200	Number of seconds between successive screenshots.
Resize	No (default) Auto 75 67 50 33 25	Resize=50	Resizing factor for storing screenshots in percent. *Auto* will choose an optimal resizing factor based on the image size.
Timestamping	Yes Image (default) No	Timestamping=Yes	Time-stamping disable flag.
Quality	JPEG compression quality (default 7)	Quality=5	Quality factor for JPEG compression from 1 to 10.
DisableLogging	Yes No (default)	DisableLogging=Yes	Screenshot logging disable flag.

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Advanced parameter list (use only when you know what you're doing!)

Parameter	Values	Example	Description
Encryption	Yes No (default)	Encryption=No	Flash Drive encryption setting (caution: changing this value will re-format the Flash Drive).
Brightness	Brightness factor (default 0)	Brightness=50	The factor to add to the standard image brightness from 0 to 150
ForceWidth	Image width in pixels (defaults to resolution X)	ForceWidth=1024	If this parameter is present, it will force the width of the captured image regardless of the current resolution.
ForceHeight	Image height in pixels (defaults to resolution Y)	ForceWidth=768	If this parameter is present, it will force the height of the captured image regardless of the current resolution.
TopMargin	Top margin in pixels (default 0 or table value)	TopMargin=10	If this parameter is present, it will cut out the top part of the captured image. It is used primarily in the VGA version, for filtering out the useful part of the signal.
LeftMargin	Left margin in pixels (default 0 or table value)	LeftMargin=5	If this parameter is present, it will cut out the left part of the captured image. It is used primarily in the VGA version, for filtering out the useful part of the signal.
RightFrame	Right frame in pixels (default 0 or table value)	RightFrame=20	If this parameter is present, it will add a frame on the right side of the captured image. It is used primarily in the VGA version, for filtering out the useful part of the signal.
BottomFrame	Bottom frame in pixels (default 0 or table value)	BottomFrame=15	If this parameter is present, it will add a frame at the bottom of the captured image. It is used primarily in the VGA version, for filtering out the useful part of the signal.
ShiftX	Horizontal shift value (default 0 or table value)	ShiftX=-10	If this parameter is present, it will shift the image horizontally within the bounds given by LeftMargin and RightFrame. It is used primarily in the VGA version, for filtering out the useful part of the signal.
ShiftY	Vertical shift value (default 0 or table value)	ShiftY=-5	If this parameter is present, it will shift the image vertically within the bounds given by TopMargin and BottomFrame. It is used primarily in the VGA version, for filtering out the useful part of the signal.
EnableSerial	Yes (default) No	EnableSerial=No	Hardware COM enable flag. Available in *VideoGhost Max* only.
BaudRate	Baud rate value in bits per second (default 115200)	BaudRate=9600	Hardware COM interface baud rate in bits per second. The range is 300 to 115200. Available in the *VideoGhost Max* only.

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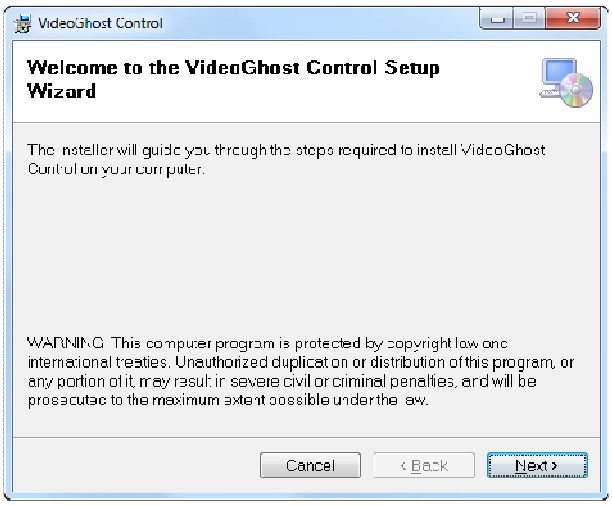
Virtual COM mode

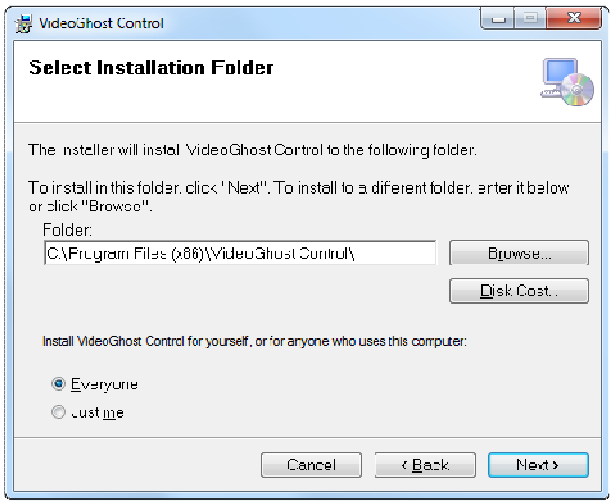
The primary purpose of Virtual COM mode (Configurations 3 or 5) is to perform on-demand image capture, access recorded JPEG images, and configure the device.

Before connecting the device, make sure you have installed the *VideoGhost Control* application, delivered with your device. The latest version is always available under the following URL: http://www.keydemon.com/download.html

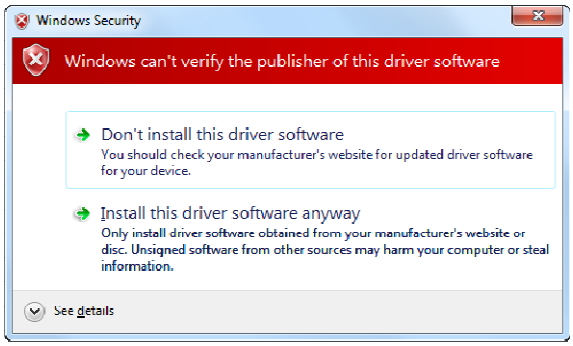
If you want to reconfigure your *VideoGhost Pro/Max* to Virtual COM mode (Configurations 3 or 5) from Capture Mode (Configurations 1 or 4) or Flash Drive Mode (Configuration 2), follow the procedure presented in section **Device setup**. This involves switching to Flash Drive mode (Configuration 2) by pressing the push-button for 3 seconds and placing the line *UsbMode=Com* in the configuration file CONFIG.TXT.

Installing *VideoGhost Control* is a straightforward process, simply follow the wizard's dialog windows.





Next, connect the *VideoGhost Pro/Max* to a USB port. When connected to a USB port, the *VideoGhost Pro/Max* will attempt to enumerate as a Virtual COM device (Communications Device Class). Most operating systems contain built-in drivers. Some operating systems, such as Windows XP/Vista/7/8, will require confirming the driver's publisher (select *Install the driver software anyway*).



If the operating system has any difficulties finding the correct INF file, select it manually from the *Driver* folder in the *VideoGhost Control* install folder. This is usually:

C:\Program Files\VideoGhost Control\Driver

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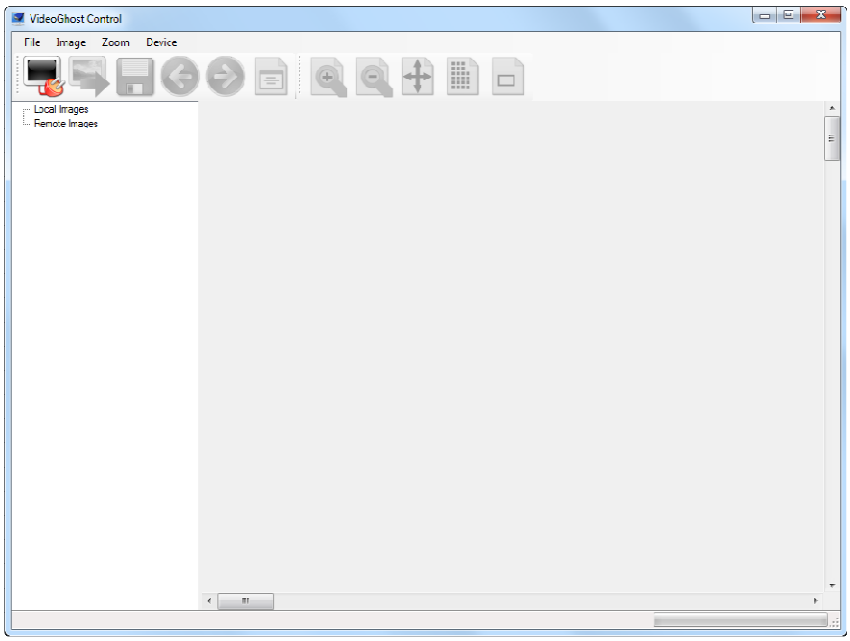
or

C:\Program Files (x86)\VideoGhost Control\Driver

After successfully installing the device driver, launch *VideoGhost Control*. Connect to the *VideoGhost Pro/Max* using the first icon in the toolbar. This will scan all COM ports, searching for a compatible *VideoGhost* device.



Once connected, the software will display a list of images in the list on the left panel. The panel has two sections:

- Local Images

  This section will contain a list of BMP images captured using *VideoGhost Control* (Snapshot feature). The images are stored on the computer's hard drive. The folder will default to *My Pictures\VideoGhost Control*, however can be configured in the application's options. Clicking on an image from the list will display the image in the right panel.

- Remote Images

  This section will contain a list of JPEG images archived on the *VideoGhost*'s internal Flash Drive. Clicking on an image from the list will initiate a file transfer from the device, and then the image will be displayed in the right panel.

One of the primary features of *VideoGhost Control* is taking a snapshot. This can be initialized using the *Device->Take a Snapshot* option, by clicking the second icon in the toolbar, or pressing CTRL+T. The device will capture an image from the DVI/HDMI/VGA interface, and transfer it through Virtual COM to *VideoGhost Control*. The image will then be immediately displayed, archived on the computer's hard drive, and listed in the *Local Images* section.

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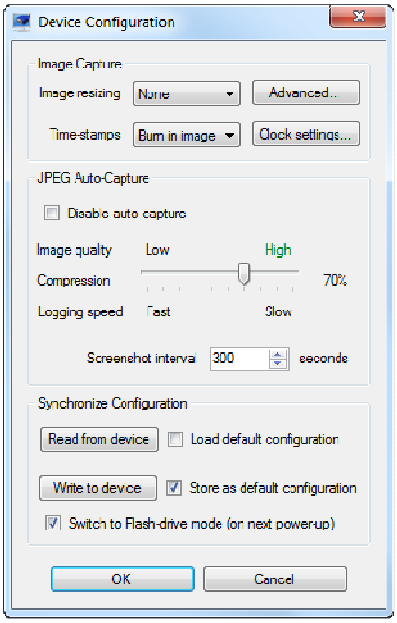
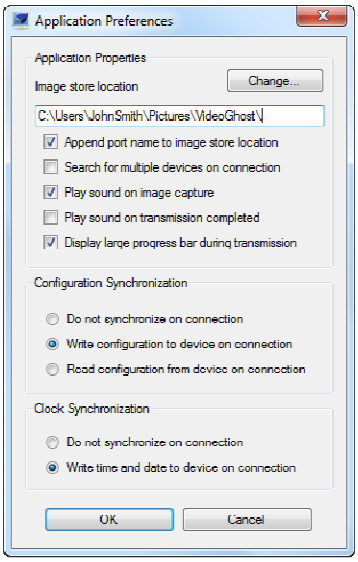
VideoGhost Control allows configuring the *VideoGhost Pro/Max* through the *Device Configuration* dialog window (*Device->Device Configuration…*). The device configuration can be written based on the selected options in the dialog window (*Write to Device*), or the dialog window may synchronized with the current device settings (*Read from Device*). If the *Load default configuration* option is checked, the default settings will be read from CONFIG.TXT instead of the current runtime settings. If the *Store as default configuration* option is checked, the transmitted settings will also be stored to CONFIG.TXT as default, loaded upon next power-up.



An important setting is *Switch to Flash-drive mode (on next power-up)*. This will set the UsbMode=Flash setting in CONFIG.TXT, thus switching to Capture mode (and Flash Drive mode). Upon next power-up, *VideoGhost Control* will not be able to connect to the device, unless configured back to Virtual COM mode.



VideoGhost Control also contains several application-level Device setup available from *File->Application Preferences…*

Finally, *VideoGhost Control* contains several image handling features, such as panning, zooming, deleting, copying, displaying properties, and several more. The application is relatively self-explanatory in this aspect.

Virtual COM mode is in fact a low-level communication interface, which is wrapped into a Graphical User Interface by *VideoGhost Control*. The application sends simple COM commands, which are interpreted by the *VideoGhost Pro/Max*. Any of these commands can be sent by any other application capable of communicating with a serial device, such as *Hyper-Terminal*. See section **COM commands** for a complete list of available commands.

An important feature in Virtual COM mode is the external push-button. This button has two functions:

- Short press – on-demand JPEG capture to Flash Drive. Compressing and storing the full image may take several seconds.
- Long press (> 3 seconds) – on-demand image transfer through Virtual COM. A receiver application, such as *VideoGhost Control*, must be connected to the device.

The internal JPEG timer is fully operational in Virtual COM mode, just as in Capture mode. The timer may be configured directly through the configuration file CONFIG.TXT in Flash

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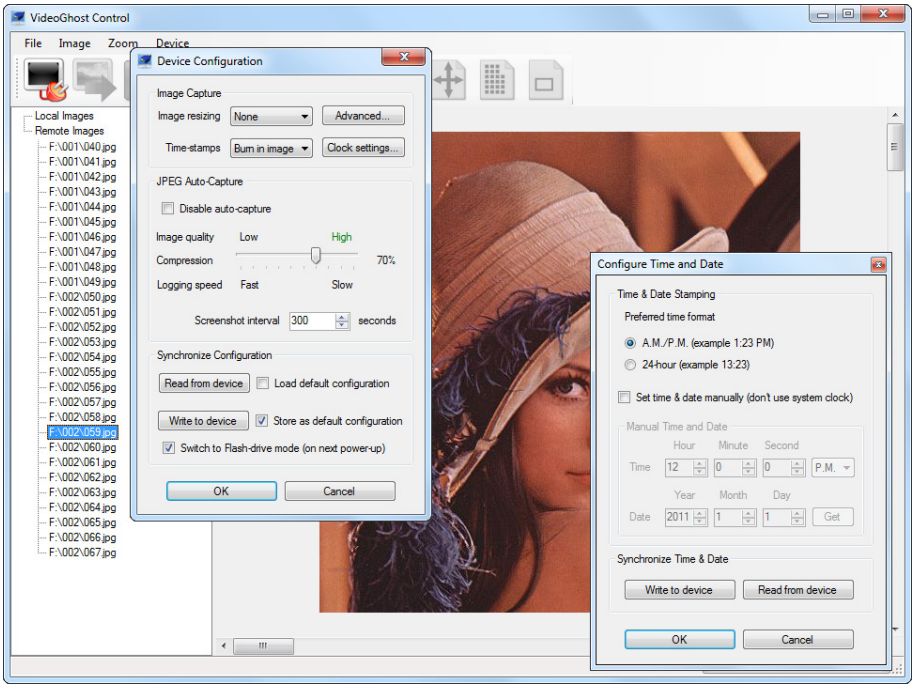
Drive mode (see section **Device setup** for more information), or indirectly using *VideoGhost Control*.



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Capture mode

Capture mode (Configurations 1 or 4) is a stand-alone mode that does not require a USB host. Its primary purpose is to let the *VideoGhost Pro/Max* run as an automated frame-grabber. A USB connection can be provided solely for the purpose of powering the device (but an external +5V DC power supply can be used as well).

Capture mode is the default mode after startup (Configurations 1, 2, or 4). The *VideoGhost Pro/Max* will not enumerate as a USB device, however it may capture images when triggered by the push button, or internal JPEG timer. The button has two functions:

If you want to reconfigure your *VideoGhost Pro/Max* from Virtual COM mode (Configurations 3 or 5) to Capture mode, simply use the configuration option in the *VideoGhost Control* application (*Device->Device Configuration…->Switch to Flash-drive mode (on next power-up)* and click *Write to Device*).

- Short press – on-demand JPEG capture to the internal memory. Compressing and storing the full image may take several seconds.
- Long press (> 3 seconds) – switch to Flash Drive mode (Configuration 2). A USB host with Mass Storage Device support must be connected.

The internal JPEG timer is responsible for periodic captures from the DVI/HDMI/VGA interface. The timer is configured through the configuration file CONFIG.TXT (see section **Device setup** for more information). Recorded images can later be viewed in Flash Drive mode (see section **Flash Drive mode** for more information).

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Flash Drive mode

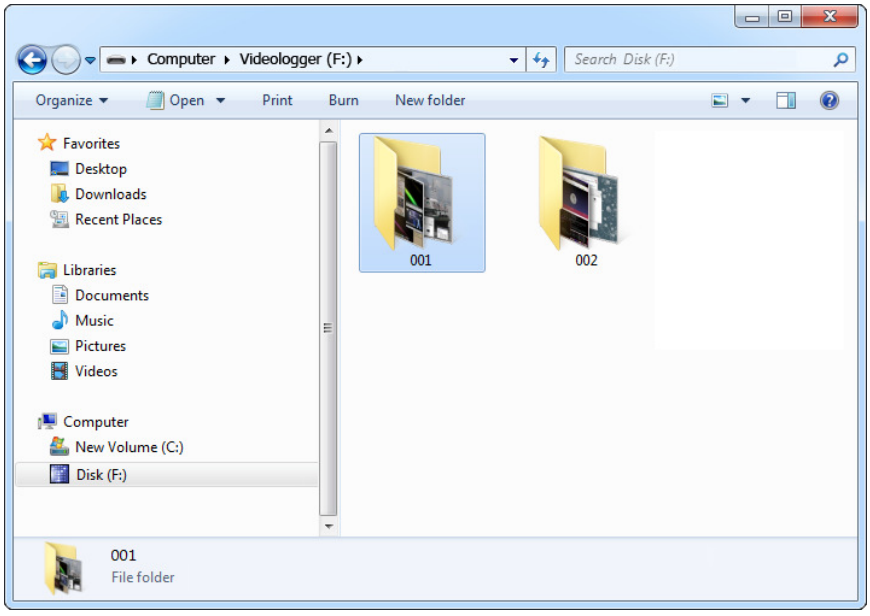
The primary purpose of Flash Drive mode is to access recorded JPEG images. Flash Drive mode can also be used to configure the *VideoGhost Pro/Max* in Configurations 1, 2, or 4 (see section **Device setup** for more information).

If your *VideoGhost Pro/Max* is configured to operate in Configurations 1, 2, or 4 (UsbMode=Flash), press the external push-button for 3 seconds to enable Flash Drive mode.

If you want to reconfigure your *VideoGhost Pro/Max* from Virtual COM mode (Modes 3 or 5) to Flash Drive mode, simply use the configuration option in the *VideoGhost Control* application (*Device->Device Configuration…->Switch to Flash-drive mode (on next power-up)* and click *Write to Device*). On the next startup, press the push-button for 3 seconds to switch to Flash Drive mode.

After a few seconds, the device will automatically get detected as a Mass Storage Device. The operating system will use the standard built-in mass storage driver (*MS Windows 7* in the following examples).

Note: During the first switch to Flash Drive mode, the operating system can ask for drivers. In such case choose automatic driver installation (usually default option).



The Flash Drive will contain the captured screenshots as JPEG files, grouped in folders named *001*, *002*, etc. Depending on the device configuration, the images may have burned-in time- and date-stamps. Use any image-viewing software to browse the JPEG files, such as the default *Windows Photo Viewer*.

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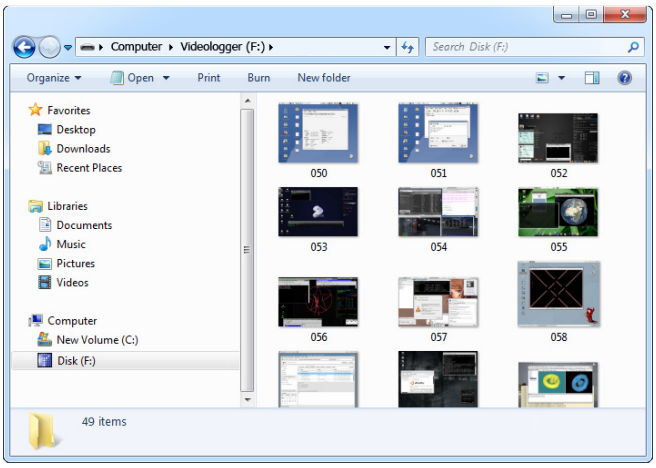

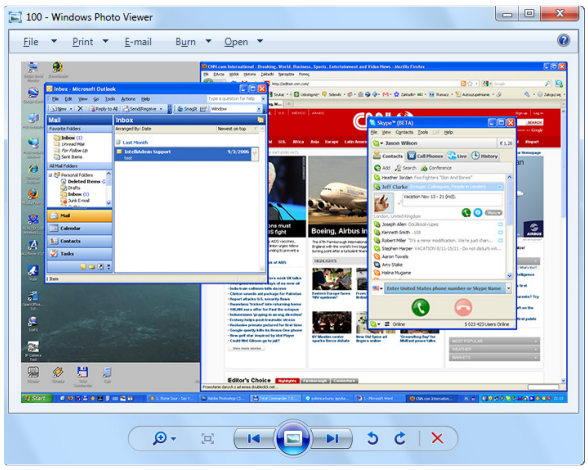

Switching back to capture mode can be achieved by pressing the external push-button for 3 seconds, or by a safe software removal of the flash disk. Use the systems standard disk removal procedure. For *MS Windows*, left-click on the *Safe Removal* icon in the system tray and select the appropriate drive. Then reconnect the *VideoGhost Pro/Max* to the USB port.

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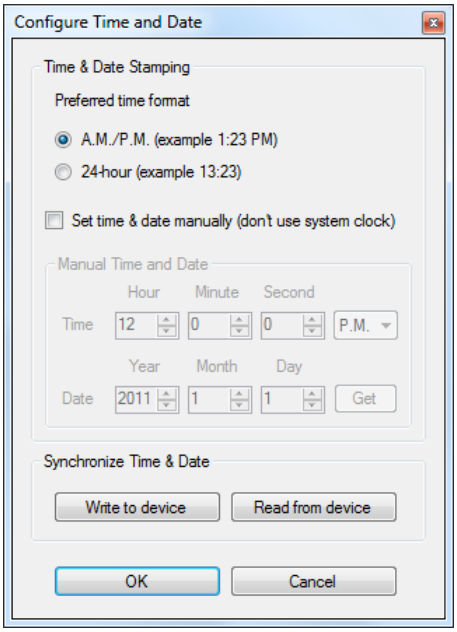
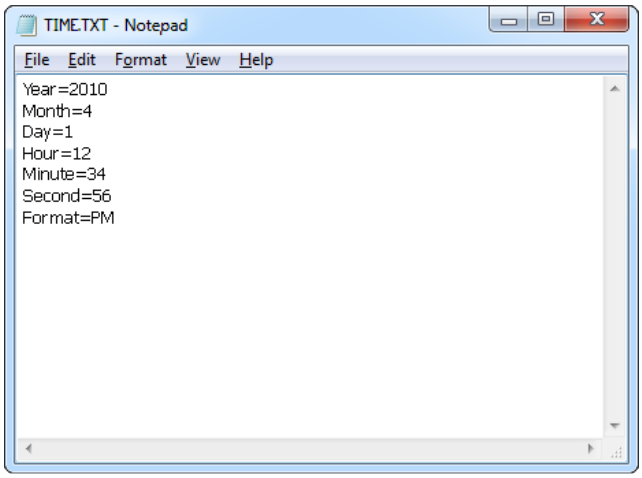
Clock configuration



It is necessary to configure the built-in clock module for getting correct date and time-stamps. The procedure is different for Virtual COM mode and Flash Drive mode. In Virtual COM mode, simply start *VideoGhost Control*, connect to the device, and select *Device->Device Configuration…->Clock Settings…* and write the correct time and date to the device. The settings will get stored to the internal real-time clock powered by an internal battery, meaning they will be preserved and updated even if the *VideoGhost Pro/Max* is not powered.

Alternatively, the internal clock may be configured in Flash Drive mode. If the *VideoGhost Pro/Max* is in Capture mode, switch to Flash Drive mode by pressing the external push button for at least 3 seconds. Then a text file named TIME.TXT should be prepared with the following format:

```
Year=2010
Month=4
Day=1
Hour=12
Minute=34
Second=56
Format=PM
```



The fields should contain the current time and date. The field *Format* allows distinguishing between A.M., P.M., and 24-hour time (use the value *AM*, *PM*, or *24*). After the file has been prepared, switch to Flash Drive mode and copy the file TIME.TXT to the root folder of the flash disk.

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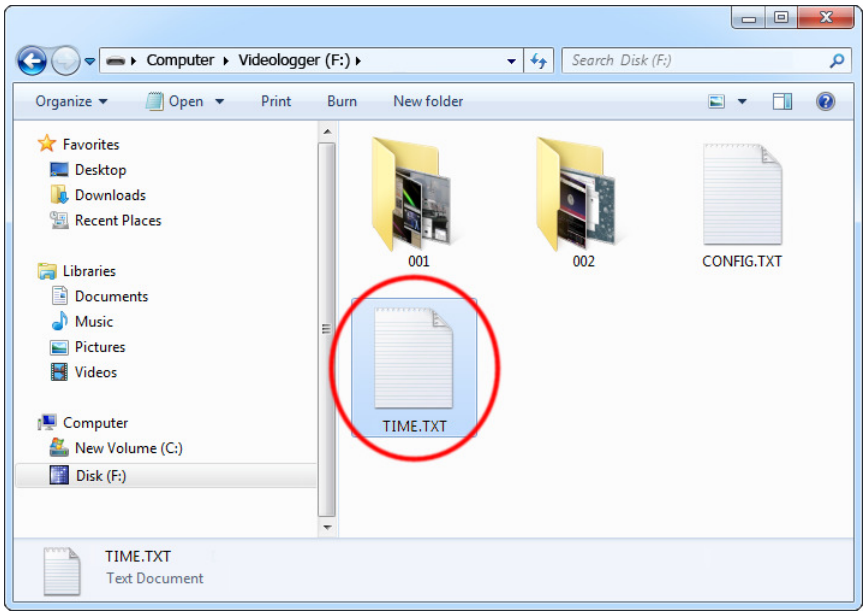

After copying the file, safely remove the Flash Drive. The new clock configuration will be loaded during the next power-up.

The clock configuration file must be named TIME.TXT and must be placed in the root folder. Variable and value strings are case insensitive, however they must match the options listed below.

- *Year* sets the clock year value. Valid range is from 2000 to 2099.
- *Month* sets the clock month value. Valid range is from 1 (January) to 12 (December).
- *Day* sets the clock day value. Valid range is from 1 to 31. If the specified day exceeds the maximum number of days in the specified month, the next valid day value will be chosen.
- *Hour* sets the clock hour value. Valid range is from 1 to 12 for 12-hour time (A.M./P.M.), and 0 to 23 for 24-hour time.
- *Minute* sets the clock minute value. Valid range is from 0 to 59.
- *Second* sets the clock second value. Valid range is from 0 to 59.
- *Format* sets the time format. Valid values are *AM*, *PM*, and *24*. If *AM* is chosen, the 12-hour format is selected and the specified hour is treated as before noon. If *PM* is chosen, the 12-hour format is selected and the specified hour is treated as after noon. If *24* is chosen, the 24-hour format is selected and the specified hour is treated as 24-hour format.

Sample TIME.TXT for 12-hour time:

```
Year=2010
Month=10
Day=25
Hour=5
Minute=51
Second=43
Format=PM
```

Sample TIME.TXT for 24-hour time:

```
Year=2010
Month=10
Day=25
Hour=17
Minute=51
Second=43
Format=24
```


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COM commands

The *VideoGhost Pro/Max* can be controlled through Virtual COM or hardware COM with a set of commands, offering the following functionality:

- capture and transfer an image on-demand from the DVI/HDMI/VGA interface
- capture and store an image on-demand from the DVI/HDMI/VGA interface
- read, write, and store the device configuration
- retrieve an archived JPEG image and JPEG image counter
- read and write time/date configuration
- retrieve device information (VID/PID)
- reset the device

If you want to use the *VideoGhost Max* with the hardware COM interface, configure the serial controller to the following parameters:

- 115200 bps
- 8 data bits
- no parity bit
- 1 stop bit
- no handshaking

Connect the serial device to the DB-9F connector on the *VideoGhost Max*.

The baud rate may be changed by the parameter *BaudRate* in CONFIG.TXT in Flash Drive mode, or through *VideoGhost Control* in Virtual COM mode.

Each command can be sent through the Virtual COM interface, or through the hardware COM interface in case of the *VideoGhost Max*. For using the hardware COM interface, connect a serial device to the cable with the DB-9F connector. The standard RS-232 pin-out should be used, with +/-12V logic levels. The transmission speed should be set to 115200 bps, 8 data bits, no parity bit, 1 stop bit, no handshaking. The baud rate may be reconfigured through the file CONFIG.TXT, or using *VideoGhost Control*. Other RS-232 parameters are fixed.

The *VideoGhost Pro/Max* will always respond using the same interface as was used to send the command. A command sent through Virtual COM will result in a response through Virtual COM. A command sent through hardware COM will result in a response through hardware COM. The only exception to this rule is the CAPTURE command, which always results in a response through the Virtual COM interface. This is due to the relatively low speed of the hardware COM interface, and time it would take to send an image as the response.

A full list of COM commands follows:

Command contents	Command length in bytes	Response contents	Response length in bytes	Description
CAPTURE	7	Captured image in BMP format (16-bit per pixel, format 5.6.5) followed by EOF character (1Ah)	54 (header size) + Image width x Image height x 2 + 1 (EOF)	Initializes a screen capture from the DVI/HDMI/VGA interface. The image is sent in the 16-bit BMP format (5.6.5), followed by a single EOF character. The response is always sent through the Virtual COM interface.
STORE	5	No response	0	Initializes a screen capture from the DVI/HDMI/VGA interface, and stores the image to the internal flash drive in the JPEG format. This operation can take several seconds, depending on the screen

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				resolution and contents.
GET VID	7	19AEh	2	Returns the USB VID word.
GET PID	7	2347h	2	Returns the USB PID word.
GET COUNT	9	JPEG image counter value in decimal format	Number of digits in JPEG counter	Every time a JPEG image is stored to the internal flash drive, the JPEG image counter value is increased. This value is useful for requesting images through Virtual COM just by supplying the image number.
GET CONFIG	10	Current configuration in text file format (one parameter per line) followed by EOF character (1Ah)	File size + 1 (EOF)	Returns the current device configuration in text file format identical to that of CONFIG.TXT. Each line contains a parameter-value pair separated by the equals sign. Line separator is CR/LF.
GET DEFAULT	11	Default configuration in text file format (one parameter per line) followed by EOF character (1Ah)	File size + 1 (EOF)	Returns the default device configuration from CONFIG.TXT in text file format. Each line contains a parameter-value pair separated by the equals sign. Line separator is CR/LF.
GET TIME	8	Current time and date in text file format (one parameter per line) followed by EOF character (1Ah)	File size + 1 (EOF)	Returns the current device time and date in text file format identical to that of TIME.TXT. Each line contains a parameter-value pair separated by the equals sign. Line separator is CR/LF.
GET PIC	8 + Image number digit count	Stored image in JPEG format followed by EOF character (1Ah)	File size + 1 (EOF)	Returns a stored JPEG file from the flash drive given by image number. The GET PIC command should be followed by a space and the image number in decimal format. The image number should not exceed the JPEG image counter available by using the GET COUNT command. Example: GET PIC 547
SET CONFIG	11 + File size digit count + File size	No response	0	Sets the current device configuration. The command should be proceeded by a space sign and the expected configuration file size in decimal format, and then by the configuration file. The configuration should be sent in text file format identical to that of CONFIG.TXT. Each line contains a parameter-value pair separated by the equals sign. Line separator is CR/LF. Example: SET CONFIG 23 Quality=5CRLFInterval=200
SET DEFAULT	12 + File size digit count + File size	No response	0	Sets the default device configuration by writing CONFIG.TXT. The command should be proceeded by a space sign and the expected configuration file size in decimal format, and then by the configuration file. The configuration should be sent in text file format identical to that of CONFIG.TXT. Each line contains a parameter-value pair separated by the equals sign. Line separator is CR/LF.

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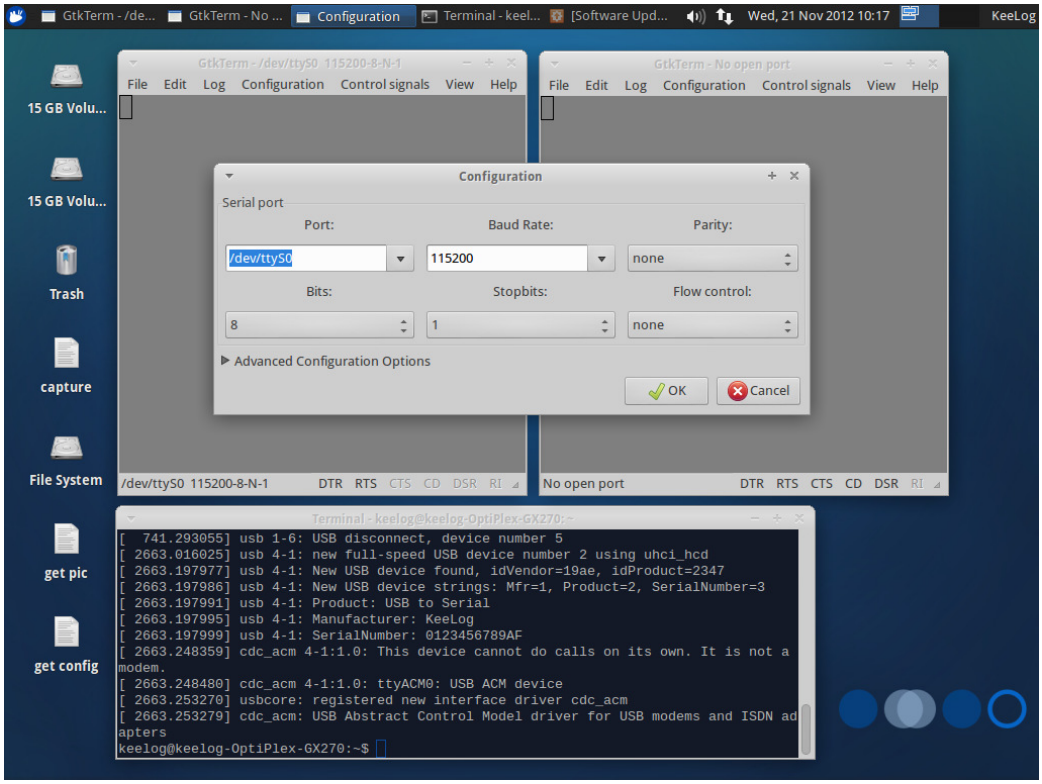
				Example: SET DEFAULT 24 UsbMode=ComCRLFInterval=50
SET TIME	9 + File size digit count + File size	No response	0	Sets the current device time. The command should be preceded by a space sign and the expected time configuration file size in decimal format, and then by the time configuration file. The time configuration should be sent in text file format identical to that of TIME.TXT. Each line contains a parameter-value pair separated by the equals sign. Line separator is CR/LF. Example: SET TIME 26 Hour=8CRLFMinute=4CRLFSecond=9
RESET	5	No response	0	Resets the device. This command is useful when reconfiguring the device mode from Virtual COM mode to Capture mode or Flash Drive mode using the SET DEFAULT command. The changes will take effect on the next power-up of the device.

The COM command interface is heavily used by *VideoGhost Control*, available for the Windows family of operating systems. However, COM commands can be sent by any RS-232 enabled device such as a microcontroller, embedded system, or computer running any serial terminal software. The examples below demonstrate using Ubuntu with the Virtual COM interface.



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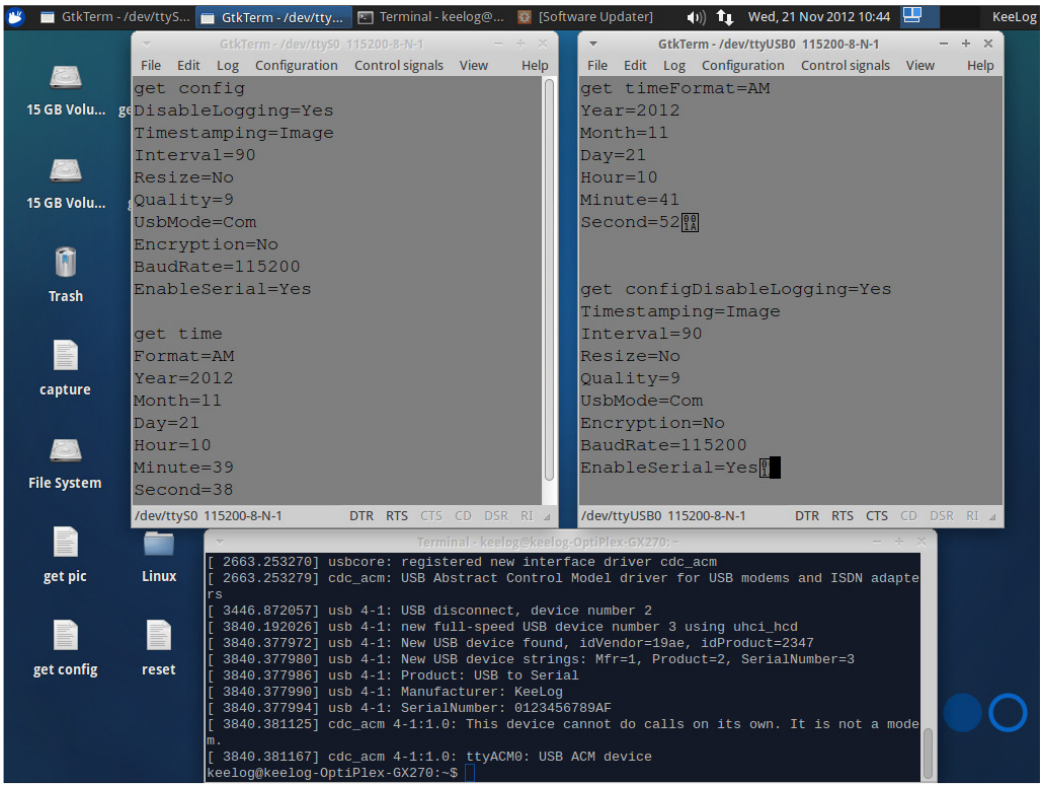

Notes on installing the *VideoGhost Pro/Max* in Virtual COM mode in Linux/Ubuntu:

1. Login with administrator rights and update the kernel:

```
# sudo apt-get install linux-image-generic linux-headers-generic
```

On 64 bits version install 32 bits libraries:

```
# sudo apt-get install ia32-libs
```

2. Unload the `usbserial` module if it is already running:

```
#sudo rmmod usbserial
```

3. Load the `usbserial` kernel module

```
#sudo modprobe usbserial vendor=0x19ae product=0x2347
```

4. Connect the board

5. Verify that the USB connection is established:

```
#lsusb
```

The *VideoGhost Pro/Max* should be visible as:

```
Bus 004 Device 002: ID 19ae:2347
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```


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```
Bus 002 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 003 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 004 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 005 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
```

6. Find out which USB connection is established:

```
#dmesg
```

This should show a result similar to that below:

```
[194.936026] usb 4-1: new full-speed USB device number 2 using
uhci_hcd
[195.117216] usb 4-1: New USB device found, idVendor=19ae,
idProduct=2347
[195.117224] usb 4-1: New USB device strings: Mfr=1, Product=2,
SerialNumber=3
[195.117230] usb 4-1: Product: USB to Serial
[195.117235] usb 4-1: Manufacturer: Keydemon
[195.117238] usb 4-1: SerialNumber: 0123456789AF
[195.244776] cdc_acm 4-1:1.0: This device cannot do calls on its own.
It is not a modem.
[195.244895] cdc_acm 4-1:1.0: ttyACM0: USB ACM device
[195.248266] usbcore: registered new interface driver cdc_acm
[195.248275] cdc_acm: USB Abstract Control Model driver for USB
modems and ISDN adapters
```

7. Create a symlink on `/dev/ttyACM0`:

```
# sudo ln -s /dev/ttyACM0 /dev/ttyUSB0
```

It is now possible to access `/dev/ttyUSB0` from any terminal application.

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Specifications

	VideoGhost Pro/Max DVI	VideoGhost Pro/Max HDMI	VideoGhost Pro/Max VGA
Power supply	4.5 V – 5.5 V DC	4.5 V – 5.5 V DC	4.5 V – 5.5 V DC
Max. power consumption	250 mA (1.3 W)	250 mA (1.3 W)	250 mA (1.3 W)
Memory capacity	4 GB	4 GB	4 GB
Data retention	100 years	100 years	100 years
Interface support	DVI-compatible video source, USB 1.1 or 2.0 with MSD/CDC support	HDMI-compatible video source, USB 1.1 or 2.0 with MSD/CDC support	VGA-compatible video source, USB 1.1 or 2.0 with MSD/CDC support
Max. video bandwidth	160 MHz	160 MHz	160 MHz
Max. video resolution	1920 x 1200	1920 x 1200	1920 x 1200[1]

Typical JPEG encoding time in seconds[2]:

Frame size	Quality = 3			Quality = 5			Quality = 7		
	50% Resize	Auto Resize	No Resize	50% Resize	Auto Resize	No Resize	50% Resize	Auto Resize	No Resize
640x480	1	1	1	1	1	1	1	1	2
800x600	2	3	3	2	3	3	2	3	3
1024x768	2	5	5	2	5	5	2	5	5
1280x720	3	5	5	3	5	5	3	5	5
1440x900	4	5	7	4	6	8	4	6	8
1280x1024	4	5	7	4	5	7	4	5	7
1680x1050	5	6	9	5	6	9	5	6	9
1600x1200	5	7	10	5	7	10	5	7	10
1920x1080	5	7	11	5	7	11	5	7	12

[1] Limited to standard resolution and refresh rate combinations.

[2] Encoding times may vary depending on image contents.

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The VGA version supports the most common resolution and refresh-rate combinations:

	50 Hz	56 Hz	60 Hz	70 Hz	72 Hz	75 Hz	85 Hz	100 Hz	120 Hz
640x480			X		X	X	X	X	
800x600		X	X		X	X	X	X	
1024x768			X	X		X	X	X	X
1152x864			X	X		X	X	X	
1280x720	X		X			X			
1280x768			X			X			
1280x800			X						
1280x960			X			X	X	X	
1280x1024			X			X	X	X	
1360x768			X			X	X		
1440x900			X			X			
1600x900			X			X	X		
1600x1200			X	X		X	X		
1680x1050			X	X		X			
1920x1080			X			X			
1920x1200			X			X			

All Keydemon products come with 1 year warranty against manufacturer defects. Defect products must be shipped by the customer. All warranty repairs and delivery to the customer will be paid by the manufacturer.

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Troubleshooting

The *VideoGhost Pro/Max* will **not** work in the following cases:

1. Internal laptop screens
2. Devices protected with HDCP, such as most Blu-ray players
3. No USB port for powering the device
4. Non-conformant DVI/HDMI/VGA interfaces

No video signal at the monitor or TV

Please check the following:

1. Is the *VideoGhost Pro/Max* connected firmly to the signal source, such as the graphics card?
2. Is the monitor/TV connected firmly to the *VideoGhost Pro/Max*?
3. Is the USB cable connected? If not, is the device powered from an alternate source?

The VideoGhost Pro/Max does not switch to Flash Drive mode

Please check the following:

1. Are pressing the external push-button for at least 3 seconds?
2. Does the operating system support removable USB flash disks?
3. Have you checked the drive list?
4. Have you tried on a different USB port?
5. Have you checked on a different computer?

The VideoGhost Pro/Max does show up as a Virtual COM device

Please check the following:

1. Have you configured the device to Virtual COM mode? Refer to the **Device setup** section for detailed instructions.
2. Does the operating system support Virtual COM devices (CDC support)?
3. Have you installed the INF drive file? Refer to the **Virtual COM mode** section for detailed instructions.
4. Have you tried on a different USB port?
5. Have you checked on a different computer?

VideoGhost Control cannot connect to the device ("Device not found!" error)

The *VideoGhost Pro/Max* has probably not enumerated properly as Virtual COM device.
Please check the following:

1. Have you configured the device to Virtual COM mode? Refer to the **Device setup** section for detailed instructions.
2. Does the operating system support Virtual COM devices (CDC support)?

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3. Have you installed the INF drive file? Refer to the **Virtual COM mode** section for detailed instructions.
4. Have you tried on a different USB port?
5. Have you checked on a different computer?

VideoGhost Control cannot capture or transfer images ("No data received on port" error)

First, check if the *VideoGhost Pro/Max* is still connected. Click the *Connect to device* icon in the toolbar to disconnect and reconnect. If the device has connection problems, refer to the previous questions and answers. If you are attempting to do an on-demand screen capture, the problem has most likely to do with the DVI/HDMI/VGA interface. Check if the video source and receiver is connected, and check different screen resolutions. If you are attempting to transfer an archived JPEG image, most likely the image has been deleted, or is corrupt. You can fix this by adjusting the JPEG image counter. Refer to the next question in such case.

VideoGhost Control displays an invalid list of JPEG files

VideoGhost Control displays a list of JPEG files based solely on the JPEG image counter (always from 001 to the current counter value). Most likely some archived JPEG files have been deleted, however *VideoGhost Control* does not know about this. This can be fixed by manually setting a new JPEG image counter value. To do this, switch to Flash Drive mode, and create a file named COUNTER.TXT in the Flash Drive root folder. Put the string Counter=N in the file, where N is the new image counter value. This value will be loaded on next power-up.

I can't find any screenshots after switching to Flash Drive mode

Please check the following:

1. Have you powered the device from the USB port while recording?
2. Have you checked in the subdirectories, such as *001*, *002*, etc.?
3. Did you properly configure the device through CONFIG.TXT?
4. Have you checked with a different screen resolution?

The screenshots show no contents, just noise

You are probably trying to acquire a HDCP-protected video signal, such as a Blu-ray or DVD player. The *VideoGhost Pro/Max* is not a device intended for breaking the HDCP copyright protection.

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Problems with time-stamps

Set the correct time by creating a clock configuration file TIME.TXT (Flash Drive mode), or by using *VideoGhost Control* (Virtual COM mode). Make sure you have not disabled time-stamping. Refer to the **Clock configuration** section for detailed instructions.

Screenshots are not logged as fast as I would like

Change the *Interval* parameter in CONFIG.TXT to a smaller number. If this doesn't help, it means that the JPEG compression time is the limiting factor. Reduce the image size by reducing the *Quality* parameter in CONFIG.TXT. Finally, change the *Resize* parameter to *50*, *33*, or *25*.

I've checked everything, nothing helps!

If you are still experiencing problems, please do the following:

1. Check if the problem appears with a different screen resolution.
2. Check if the problem appears on a different computer or video source.
3. Check if the problem appears using a different USB port.
4. Contact the dealer you have purchased the device from. Please supply all necessary information (hardware type, model and manufacturer, OS type and version, and a short description of the problem).

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You should not use this device to intercept data you are not authorized to possess, especially passwords, banking data, confidential correspondence etc. Most countries recognize this as a crime. Please consult a legal representative for logging requirements in your country.

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