MANUAL (EN)

MANUEL (FR)

HANDLEIDING (NL)

Interactive Whiteboard

MARKER

1 General

This manual is based on a Vmarker IR-sensor USB with firmware version 7.7 and VmarkerUtility software version 2.2. When using a different firmware or VmarkerUtility, it is possible that the explanation does not match the situation.

You can e-mail any suggestions for improving this manual to: ludwig@vmarker.org.

EN

2 Vmarker IR-sensor USB

2.1 General

2.1.1 Front-side of the Vmarker sensor

You can recognize the front-side by the IR-filter: the dark-red nearly black shiny surface with three coloured LED's. Behind this filter the IR-sensors are positioned. You have to point this side in the direction of the projected image.

The most important sensor is positioned in the middle behind the IR-filter.
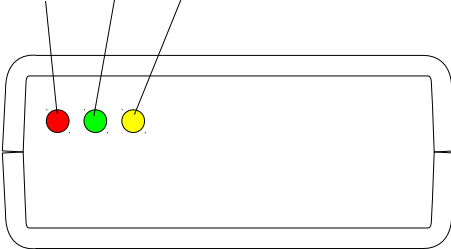
Pay attention that you do not damage this filter: scratches on the IR-filter can disturb the proper functioning of the Vmarker sensor. You can clean the IR-filter with a dry lint-free cloth.

The 3 colored LED's on the front indicate the status of the Vmarker sensor.

The red LED, indicates the state of the USB-connection.

The green LED, indicates the state of the calibration.

In normal operation mode the yellow LED indicates the sensing of an IR-dot. When the Vmarker sensor is in calibration mode, the yellow LED indicates which corner has to be identified.

The following table summarizes the possible states of the LEDs and the meaning.

RED LED	GREEN LED	YELLOW LED	
off	X	X	No connection to the computer or computer is switched off.
blinking	X	X	Connected to the computer, but USB is not yet configured.
on	-	-	Connected to the computer, USB is running.
on	off	X	The mouse-function of the Vmarker sensor is disabled.
on	blinking	off	The Vmarker sensor is in calibration mode.
on	blinking	1x blinking	The Vmarker sensor is in calibration mode, the first corner, top-left of the projected image must be identified with an IR pen.
on	blinking	2x blinking	The Vmarker sensor is in calibration mode, the second corner, top-right has to be identified.
on	blinking	3x blinking	The Vmarker sensor is in calibration mode, the third corner, bottom-right has to be identified.
on	blinking	4x blinking	The Vmarker sensor is in calibration mode, the fourth corner, bottom-left has to be identified.
on	on	off	The mouse-function of the Vmarker sensor is enabled.
on	on	on	The Vmarker sensor is operational, and detects an IR-dot
blinking	blinking	blinking	The Vmarker sensor is in firmware update modus.

2.1.2 The back-side of the Vmarker sensor

On the back-side of the Vmarker sensor is an USB port type B.

USB
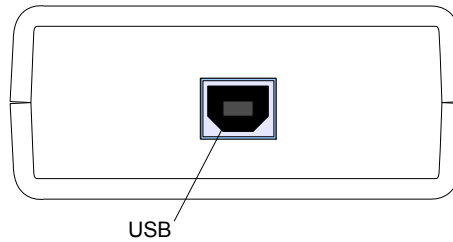
With a standard USB A-B cable you can connect the Vmarker sensor with a standard USB port on you computer. Note that the maximum length of 5m must not be exceeded.

If you want to use longer cable, you have to use an USB active extension cable.

2.1.3 The bottom-side of the Vmarker sensor

The bottom of the Vmarker sensor has a threaded hole. The common thread is 1 / 4 "BSW this is used for camera mounts.

1/4" BSW
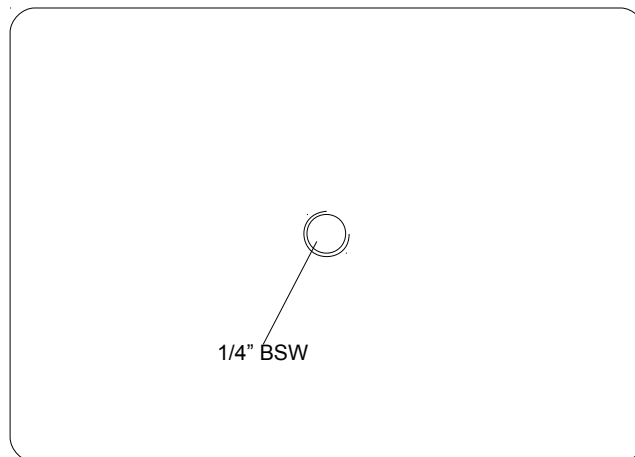
2.2 Arrangement of the Vmarker sensor

> ⚠️ATTENTION: make use of the correct tools and follow the appropriate safety guidelines when installing the Vmarker sensor to the ceiling.

The arrangement of the Vmarker sensor depends on the position of the projected image. Nevertheless we want to give you some recommendations.

Most projectors, have an aspect ratio of 4:3. Given the accessibility of the screen for an average person, with such projector the effective image should not be larger than 1.6meter wide and 1.2 meters high. (With 16:9 this is 2.13 meter by 1.2 meter)

B=image width

H= image heigth

EFFECTIVE
IMAGE 4:3

Whiteboard or other white surface
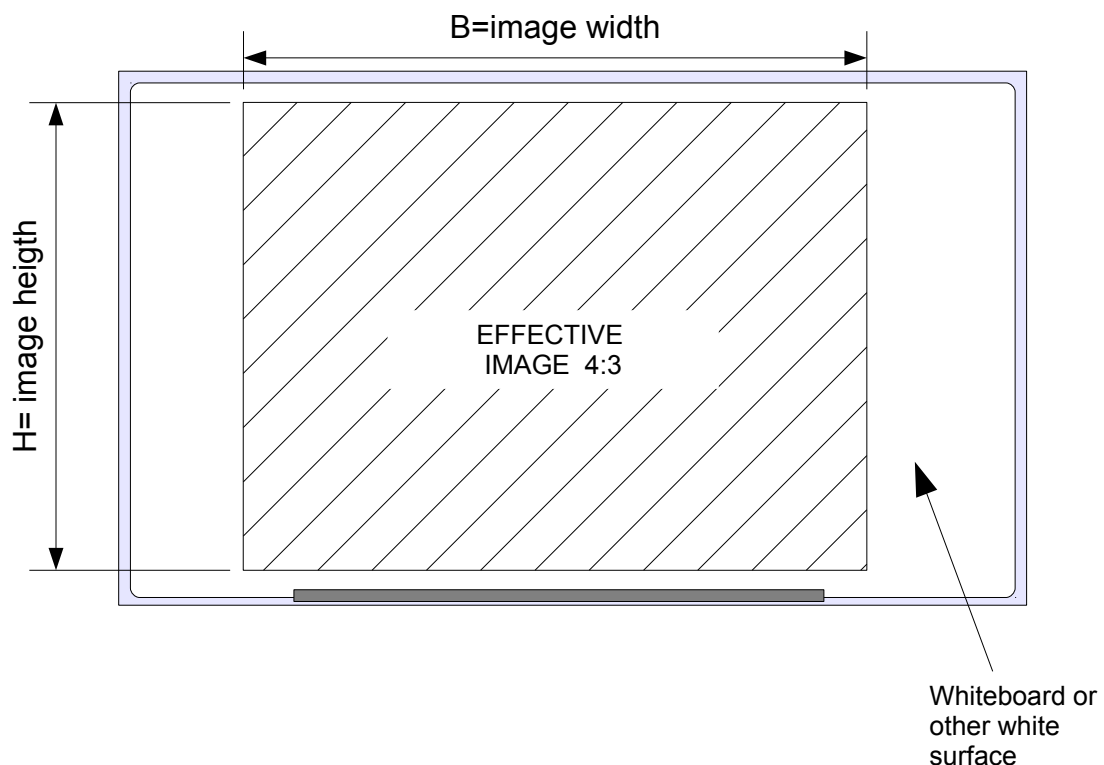
The optimal distance (A) from the Vmarker sensor to the image is approximately equal to the width (B) of the image. With a spare of 10 to 20cm the setup will be easier.

⚠️ Attention also read 2.2.5.About the projection surface and 2.2.6.Environment You will find some important information that affects the setup of the Vmarker sensor.

2.2.1 Setup of the Vmarker sensor when using a ceiling mount

You get the best results with the Vmarker sensor by mounting the Vmarker sensor to the ceiling like the projector itself. In most cases the Vmarker sensor will be positioned between the projection screen and the projector, just outside the projector beam. This depends on the type of projector.

The shortest distance (A) between the projection screen and the Vmarker sensor has to be larger then the width of the projected image (B). A bit more, 10 a 20cm makes setting up easier.

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A >= B(image width) + 20cm

White Board or
other white
surface
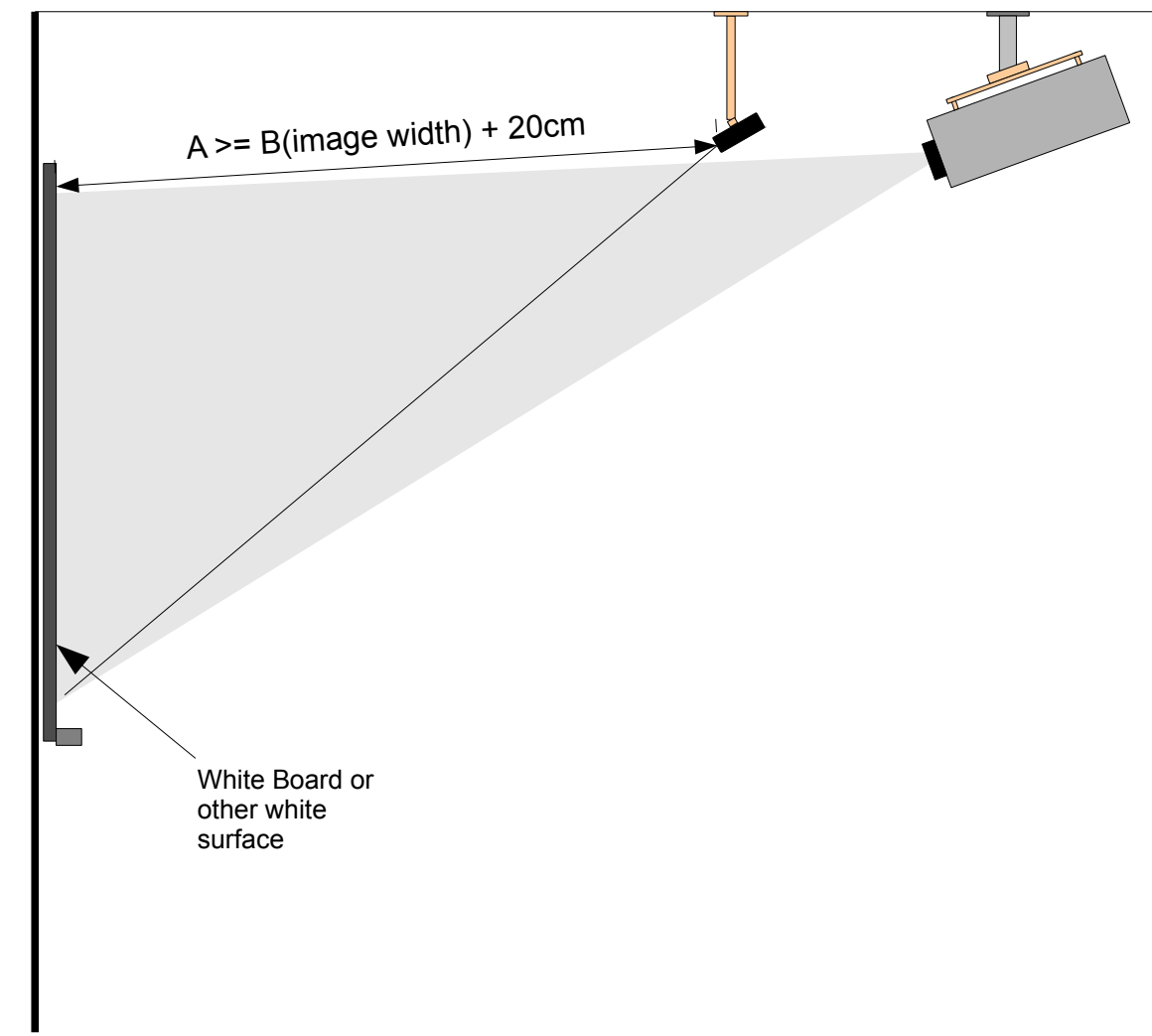
These values are guidelines for the optimal conditions, the settings of the Vmarker sensor are optimized for this setup.

In the '**Sensor status**' window of the VmarkerUtility you can observe the coordinates of the IR-pen. When you move the IR-pen over the projected screen you should always get values for X, Y and SIZE. If this is not the case you have to re-align the Vmarker sensor. Particular the corners of the image are important to be able to calibrate the Vmarker sensor.

With help of the Sensor alignment -function in VmarkerUtility you can easily align the Vmarker sensor in most circumstances.

2.2.2 Setup of the Vmarker sensor using a tripod

The guidelines for the Vmarker sensor setup with a tripod are similar to the ceiling mount. You just have to adapt to the situation, mostly the tripod is standing on a table.

The choice of the location of the Vmarker sensor is important to be able to use the IR-pen more comfortably. Important is that the Vmarker sensor is able to 'see' the IR-LED while writing.
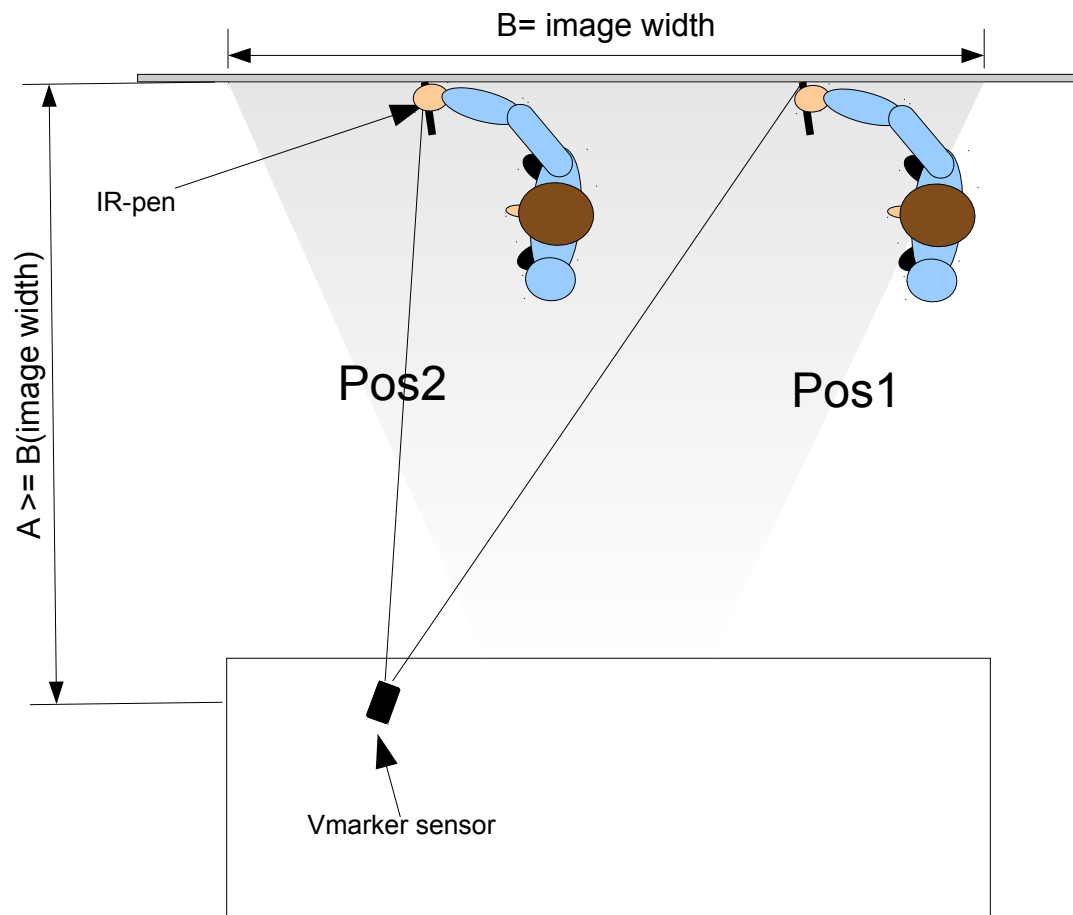
In stead of placing the sensor in the middle of the projected image, you can move the sensor either to the left or to the right side of the center. The left side if you are right handed, the right side if you are left-handed.

2.2.3 Setup of the Vmarker sensor using a special suction cup

It is also possible to stick it to the projector using a special suction cup. This is very easy, but not every projector is suited.

The projector has to have a smooth surface where you can stick the suction cup on. Also the projection distance of the projector is more important, a short-throw projector is not suited.

A >= B(image width) + 20cm

Vmarker sensor on suction cup

White Board or other white surface

EN
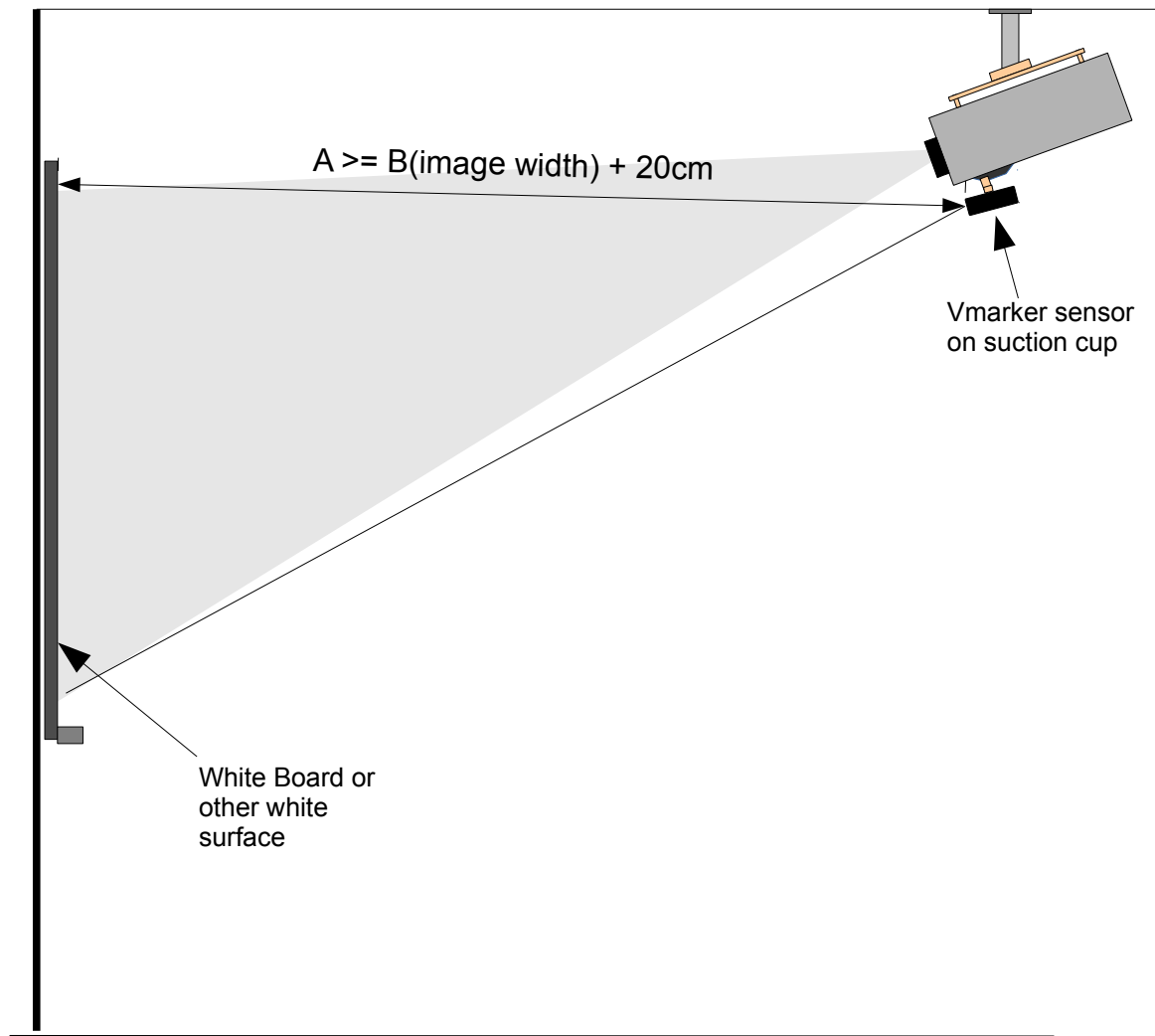
Like in the other configurations the distance(A) between the projection screen and the Vmarker sensor has to be larger then the width of the projected image (B). A bit more, 10 a 20cm makes setting up easier. In this arrangement this means the projector is also at this distance.

2.2.4   Setup of the Vmarker sensor in a "rear projection" configuration

With rear-projection, the projector is positioned behind the screen. The projected image is visible through the screen. In such an arrangement the Vmarker sensor can also be positioned behind the screen.
This is because the IR light from the IR pen, like the light from the projection, also shines through the screen.
The disadvantage of such an arrangement is that you need extra space behind the screen. This may be reduced by using mirrors, etc.

2.2.5   Other setups

Basically, the Vmarker sensor works almost from any angle. You have to ensure that the image of the computer is within range of the Vmarker sensor.

The use of extreme angle is possible but is strongly depending on the projection surface that is used. Also the angle of the IR-pen to the surface will have a greater influence.

In such case one can change a few settings of the Vmarker sensor to optimize to this situation. It is even possible to adjust the lens of the optics.

When using extreme angles also take into account that the accuracy will be reduced. Ideally, you should use the entire range of the sensor that has a ratio of 4:3. If you place the Vmarker sensor at an extreme angle, you obviously can not maintain the ratio of 4:3. You can see this with the VmarkerUtility.

2.2.6   About the projection surface

It is possible to use the Vmarker sensor on many different projection surfaces. Every surface that reflects the IR-light of the IR-pen can be used. But of course some are better then other.

Contrary to what one would expect, highly reflective surfaces are not the best choice. A matte white surface is basically better than a glossy white surface. The reflection on a glossy surface is very high and the angle of the IR pen to the surface is more important. A wrong angle of the IR-pen is missed by the Vmarker sensor. Therefore, a more matte surface, in which case the reflection is diffuse, is better. The angle of the pen to the plane becomes less important.

One of the best surfaces to use for your IWB would be a wall, simply painted in white.

2.2.7   Environment

The Vmarker sensor responds to infrared light. Avoid any other source of infra-red light in the range of the Vmarker sensor. The largest source of infra-red light is the sun. Direct sunlight or reflection of sunlight directly into the Vmarker sensor or on the projected image, will affect correct functioning of the Vmarker sensor. It is even possible that the mouse-cursor moves seemingly randomly.
Other sources of far infra-red light in their spectrum can also be disruptive. In such case, much depends on the situation.

2.3 How to connect the Vmarker sensor

After you've setup the Vmarker sensor, connect the Vmarker with the included USB cable to an available USB port on your computer. The computer will initialize the USB-communication. During this time the red LED on the front of the Vmarker sensor will blink.

The first time you connect a Vmarker sensor to the computer it may take a while before the computer selected the necessary drivers. This all happens automatically, the operating system itself will choose the appropriate standard drivers, so you do not need to install these.

When the USB-communication is initialized the red LED will be lit continuously.

Be sure to use an USB 2.0 active extension-cable when extending the USB-cable. The maximum length of a normal USB-cable is 5 meters.

2.4 Calibration of the Vmarker sensor

The Vmarker sensor has to know the exact position of the projected image to be able to control the mouse pointer of the computer with the IR-pen. So the sensor has to be calibrated.

There are two possible methods to invoke the calibration:

 – With help of the VmarkerUtility, a program that will help you calibrate the Vmarker sensor indicating which point to calibrate. **This is the preferred method.**

 – stand-alone calibration with the Vmarker sensor, without the use of software: you can follow the calibration process with the LED's. *(This has to be enabled, by default it is not enabled.)*

In both cases the calibration is stored in the Vmarker sensor itself.

2.4.1 Stand-alone calibration

To be able to calibrate the Vmarker sensor without software the option 'Stand-alone calibration' has to be enabled. **By default this option is disabled.**

You can invoke calibration-mode by shining with an IR-pen to the front of the Vmarker sensor from up-close.

The Vmarker sensor will switch into calibration-mode when the sensor recognizes a large IR-dot, the green LED will blink rapidly.

The yellow LED will indicate which corner to identify with the IR-pen.

The flashing rhythm of the yellow LED corresponds to the point that has to be identified.
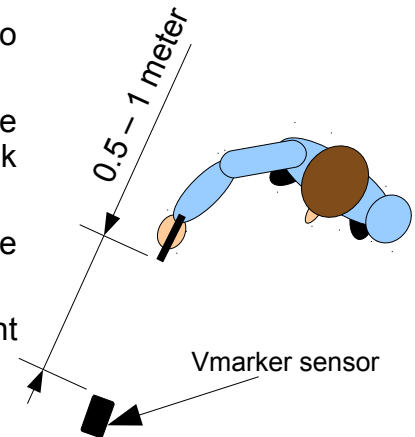
For the first point the yellow LED will flash normal. You have to identify the first point by pointing the first corner, the upper-left. You achieve this by pointing for about 1 second with the IR-LED of the IR-pen as accurately as possible to the upper-left corner of the projected image while pressing the switch of the IR-pen. When you release the IR-pen and the Vmarker sensor has 'seen' the IR-dot, the first point is calibrated
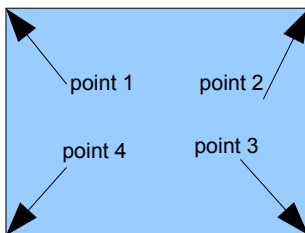
The yellow LED now blinks twice. When the yellow LED blinks 2x, the second point has to be identified, this is the upper-right corner of the screen. This is done the same way by pointing the IR-pen to the right top corner of the image. Again if this point is calibrated, the yellow LED will flash three times.

When the yellow LED flashes 3x the third point has to be identified, which is the lower right corner. Again, you have to point the IR pen to this corner.

When the yellow LED flashes 4x, the fourth and final point has to be identified, the lower left corner. When also this point is calibrated, the green LED will light continuously and the Vmarker sensor is calibrated.

2.4.2 Interruption of the calibration process

You can interrupt a calibration and reuse the old calibration by interrupting the USB connection.

3 VmarkerUtility software

3.1 General

The VmarkerUtility is not needed to be able to use the Vmarker IWB solution.

The VmarkerUtility can be used to help choose the best position to set up the Vmarker sensor, to change some settings and to calibrate the sensor. After using the program you can close this. Eventually you have to save the settings to the Vmarker sensor after you changed something.

3.2 VmarkerUtility: installation

3.2.1 Windows

You can download the windows version of the program from the website at: http://www.vmarker.org/VmarkerUtilityWin.zip

When you have downloaded the program, unzip the files in a folder. Then run the program by double click *VmarkerUtility*.

The program will not install, it runs directly. So removing the folder with the program, removes the program completely.

3.2.2 Linux

You can download the linux version of the program from the website at: http://www.vmarker.org/VmarkerUtilityLinux.zip

When you have downloaded the program, unzip the files in a folder.

The first time you want to run the VmarkerUtility you will have to install some UdevRules to ensure the VmarkerUtility has access to the Vmarker sensor. This can be done by executing: *installUdevRules.sh* in a terminal window.

After this you can run the VmarkerUtility by executing *startUtility.sh*.

The program will not install, it runs directly. So removing the folder with the program, removes the program completely.

3.2.3 Mac os

You can download the mac version

http://www.vmarker.org/VmarkerUtilityMac.dmg

The package will install the VmarkerUtility application on your mac system.

This is tested on Mac OS X version 10.9.

3.3 VmarkerUtility general

The application-window is divided in two parts: on the right-hand side the visualisation of the calibration information. On the left there are several tabs containing extra info and functions to be able to manage the Vmarker sensor.
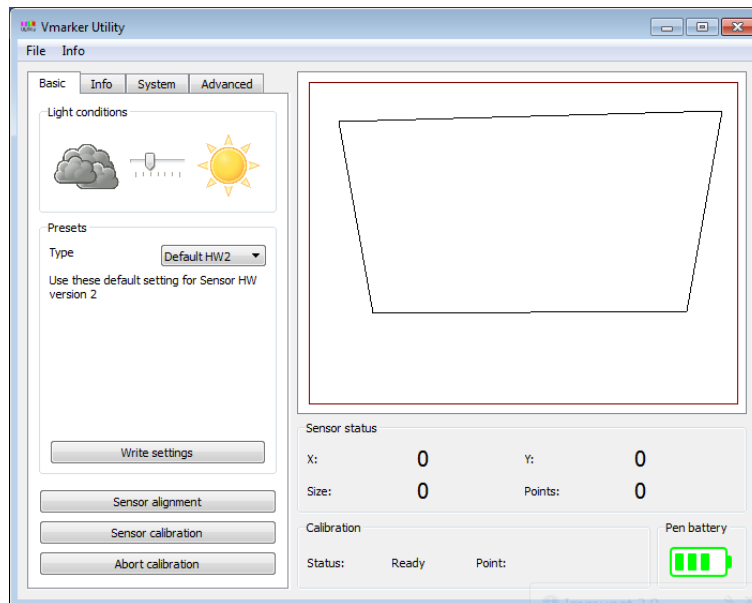
3.3.1 Menu

3.3.1.1 File

With **File:language** it is possible to change the language. For the moment there are 4 languages available:English, French, Italian and Dutch.

A language can be added by adding a json file with the translation in the directory lang of the application and add the language to the menu in the lang.json file.

File:Close; closes the VmarkerUtility application.

3.3.1.2 Info

Info:Help opens this manual. The manual (pdf) will be downloaded from the internet.

Info:Support opens the support page (http://www.vmarker.org/support) from the website in the default browser.

Info:Web opens the default browser and shows you the website: http://www.vmarker.org.

Info:Registration opens an online registration form where you can register the attached sensor. You have to fill in an valid e-mail to register the product. You can fill in some extra question to help us improve the product, but this is not obliged.

Info:about

This opens the version information of the VmarkerUtility, when connected to the internet you will get information when there is a new version available.

3.3.2 Sensor window

On the right-hand side of the application window the calibration data of the Vmarker sensor is shown as a quadrilateral-window.

In the section *Sensor status* you can read the **X** and **Y** position of the first detected IR-point. **Size** shows the size of the detected IR-dot.

And points shows how many IR-dots are detected.

The value of X varies between 0 and 1024[1]. The value of Y varies between 0 and 768. And the value of Size varies between 1 and 1024.

When you have positioned the Vmarker sensor on a tripod. The Vmarker label is visible on top, then the upper-left corner of the projected image is closest to X=0 and Y=768.

When you have positioned the Vmarker sensor to the ceiling, the Vmarker label is upside-down and visible at the bottom, then the upper-left corner of the projected image is closest to X=1024 and Y=0[1].

When detecting an IR-dot generated by the IR-pen the Size value will be between 10 and 100. The best performance you get when the size is around 30 +/- 10. The size depends on the distance of the Vmarker sensor to the projected image.

In the section *Calibration* you can see the status of calibration.

When in calibration-mode the **Point** value indicates which point to calibrate.

Under *Pen Battery* the battery condition of the Vmarker pen is indicated.

3.4 VmarkerUtility: Basic-tab

On the Basic tab you can find all you need for daily usage.

3.4.1 Light conditions

With the slider: 'Light conditions' it is possible to adapt the sensor to the Light conditions. If you operate in a darker environment, it is possible you have to increase the sensitivity of the sensor by moving the slider to the left.

If you operate the sensor in a bright environment where you get interference it is possible to decrease the sensitivity of the sensor by moving the slider to the right.

3.4.2 Preset

In the Preset section you can select some predefined settings to write to the Vmarker sensor.

The Default preset, restores the most important settings of the Vmarker sensor to factory-defaults.

The Mac preset, adjusts the Vmarker sensor so it can be used with a mac.

To activate a preset you will have to select the desired preset in the pull down and press the button: Write settings.

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1   For the Vmarker IR-sensor USB HW version 1.0 this is reversed.

3.4.3 Sensor alignment

Pressing the 'Sensor alignment' button will bring up the Sensor alignment screen. This window fills the screen completely.

First you have to choose the Vmarker sensor arrangement. By default the orientation on a tripod is selected. If the Vmarker sensor is mounted up-side-down choose the corresponding drawing.
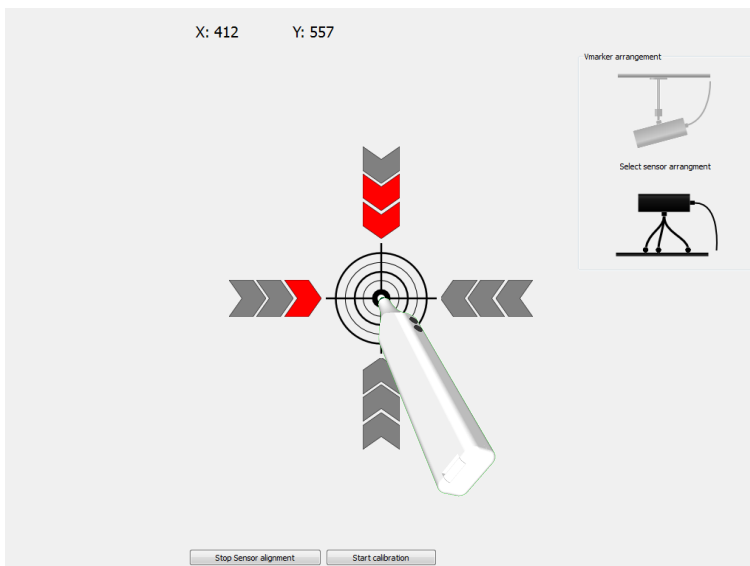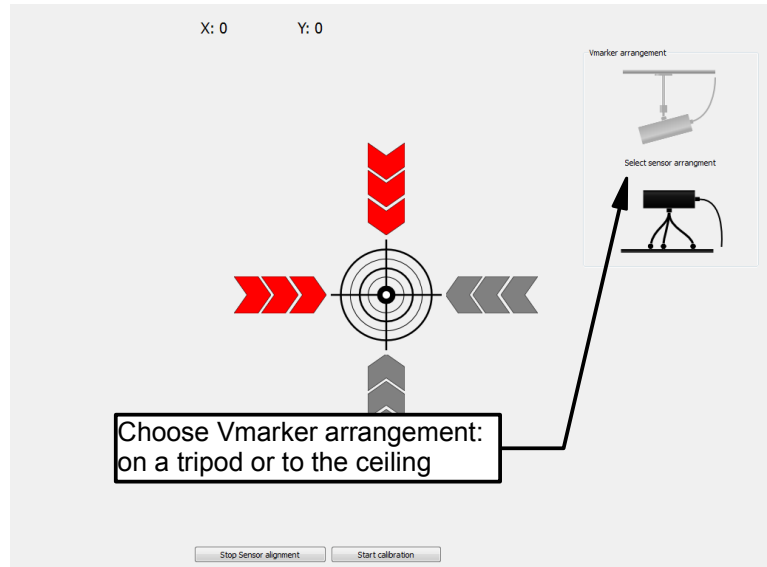
When the appropriate arrangement is chosen. You have to point the center-mark with an IR-pen. When you press the tip or the button of the IR-pen, the arrows at the center-mark will change color in according to the deviation of the Vmarker sensor.

You will have to turn the Vmarker sensor in the direction of the red arrows. The number of arrows corresponds with the magnitude of the deviation.

After you have turned the Vmarker sensor you will have to point the center-mark again. Again you can check the deviation When the deviation is within limits the corresponding arrows will color green.

The middle of the sensor is now aligned to the middle of the screen.
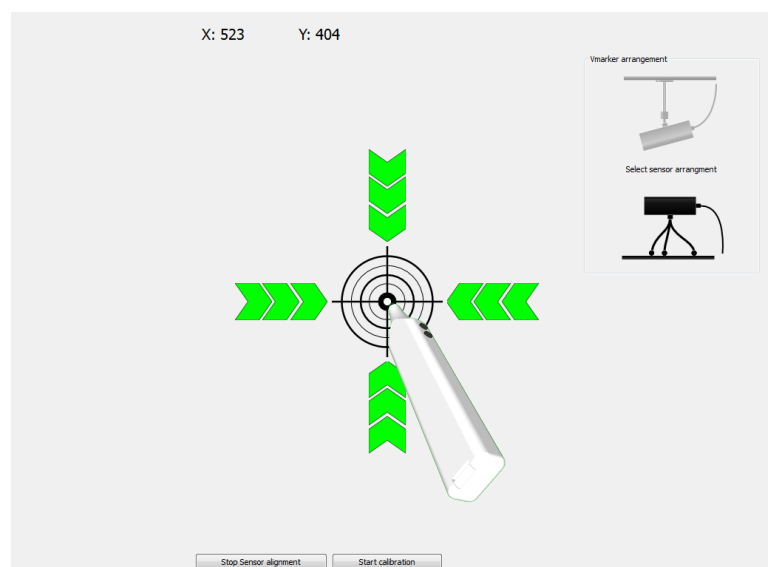
The correct alignment of the Vmarker sensor is no garantuee to be able to calibrate the Vmarker sensor. To ensure calibration of the Vmarker sensor is possible, all four corners of the projected image have to be within range of the Vmarker sensor. It is possible to check this by pointing an IR-pen at the corners of the projection and to check the coordinates.

If one of the corners is not visible you can turn the Vmarker sensor so the corner becomes visible. When it is not possible to turn the Vmarker sensor to get all corners within range, the distance of the Vmarker sensor to the image has to be increased.

If the Vmarker sensor is placed out of center, like suggested in 2.2.2, it is possible the alignment tool will not help you to find the best arrangement of the Vmarker sensor. You always can check the coordinates to see if the complete projection is whitin range of the Vmarker sensor.

3.4.4 Sensor calibration

You can press start the Sensor calibration from the sensor aligment screen or from the Basic tab of the application.

Like with the sensor alignment a special Sensor calibration screen is shown. This screen overlay's the computer screen completely, making it easy to calibrate the Vmarker sensor correctly.

The red-arrow indicates which point to calibrate.

Point the IR-pen to the point of this arrow and press the tip or the button for about 1 second. If the Vmarker sensor has captured the point. The arrow will color green and the next corner will have a red arrow.
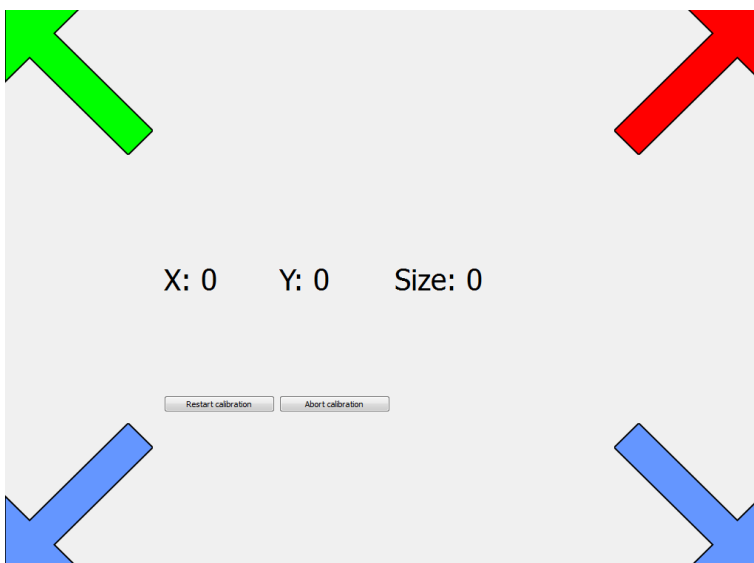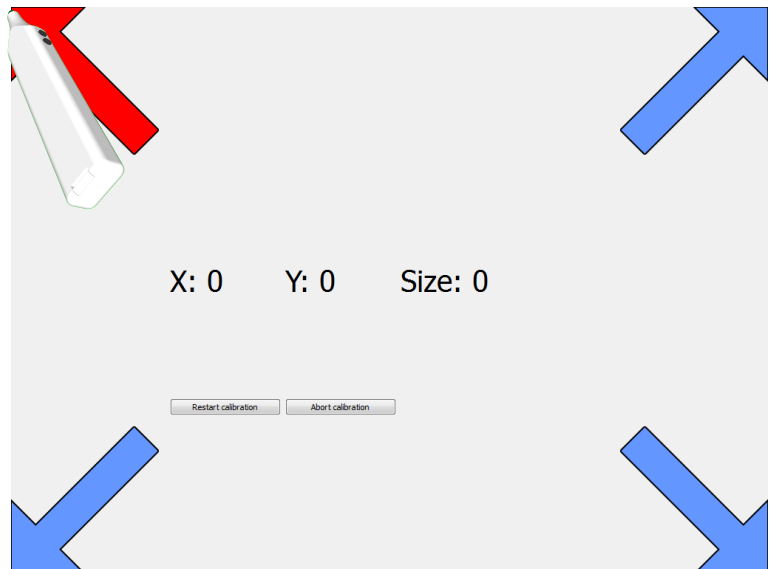

This has to be repeated for the four corners until all arrows are green.

When all four corners are calibrated, all arrows are coloured green and shortly after the application will return to the basic tab.

During the calibration process it is possible to restart the calibration to start from the beginning by pressing 'Restart calibration'.

Only when the calibration process is completed the new calibration data will be written to the Vmarker sensor.

X: 0   Y: 0   Size: 0

[Restart calibration]   [Abort calibration]

In Sensor status a quadrilateral-window will appear depending on the position of the Vmarker sensor.
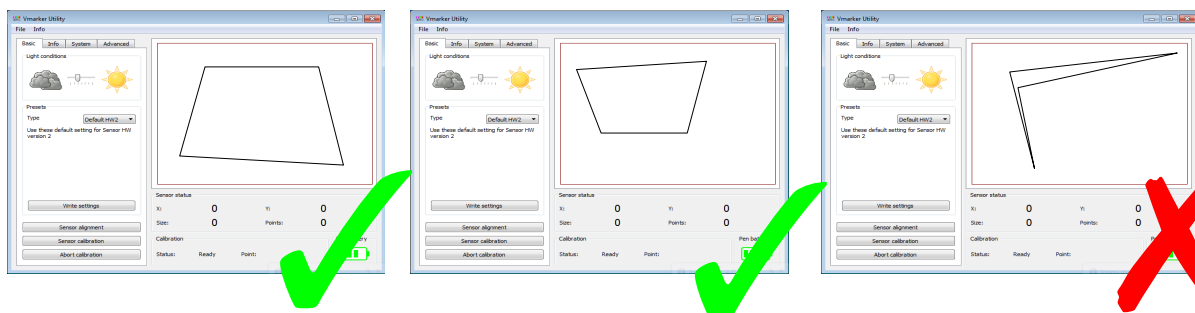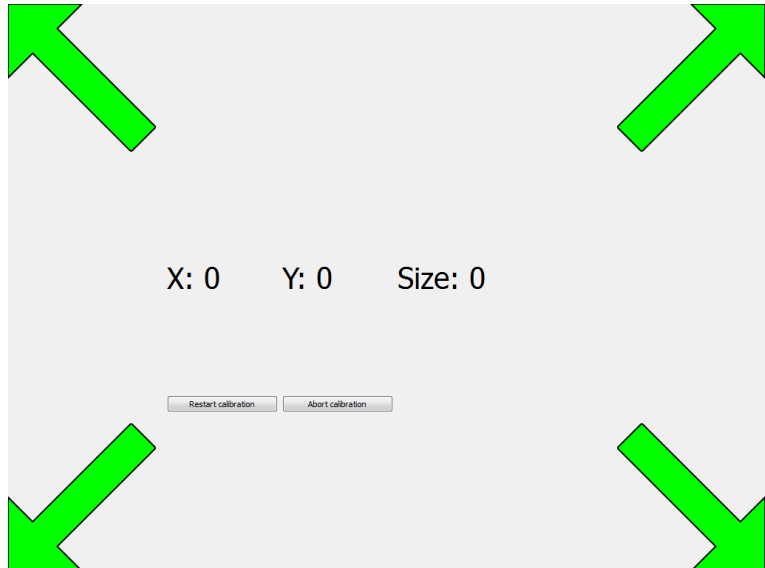
Above you can see different examples; the first, most left, could be the result after calibration of a Vmarker sensor placed on a table. The second could be a ceiling mounted Vmarker sensor, somewhat further away, but acceptable.

With the third sensor there is something wrong with the calibration. The sensor obviously has to be recalibrated. Check if the sensor is configured correctly, check for interfering IR-sources?

The calibration data is persistently stored in the Vmarker sensor itself. So even when the Vmarker sensor is disconnected and has no power, the calibration information is kept. Only when the position of the Vmarker sensor towards the projected image is changed a recalibration is required.

Even when you connect a different computer to the Vmarker sensor and the projector a calibration is not required, given the size, aspect ratio and position of the projected image stays the same.
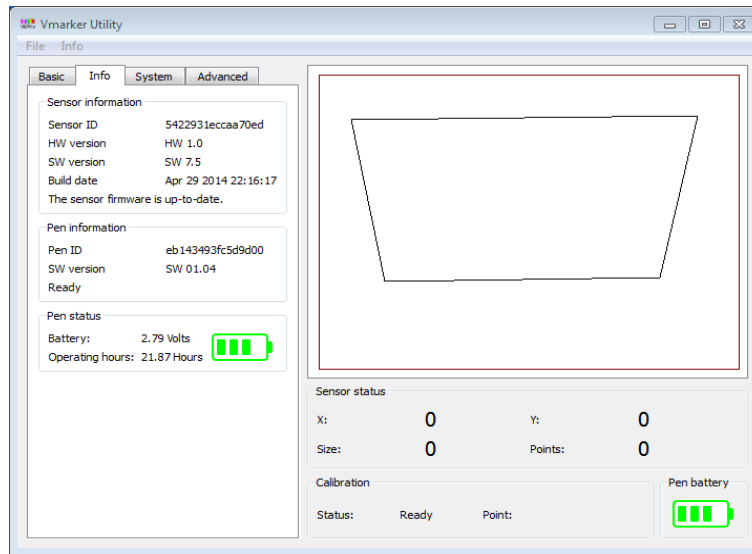
3.4.5 Abort calibration

With Abort calibration it is possible to abort the calibration process.

The previous calibration data will stay active.

3.5 VmarkerUtility: Info-tab

On the Info-tab extra information about Vmarker IR-sensor USB and Vmarker pen is shown.

3.5.1 Sensor information

In the section 'Sensor information' :

Sensor ID: the unique ID of the sensor.

HW version: the hardware version of the Vmarker IR-Sensor USB. HW 2.0 is the most current version. Version 1.0 can detect up to 4 IR-dots simultaneously, version 2.0 can detect up to 8 IR-dots simultaneously.

SW version: the firmware version of the Vmarker sensor. Check this before you deside to upgrade the firmware of the Vmarker sensor. The latest firmware version is available from the website.

Build date: The date of the firmware.

If connected to the internet you get information about the firmware version, for example: '*The sensor firmware is up-to-date.*'

3.5.2 Pen information

This information is only available for the Vmarker pen. Press left and right button of the Vmarker pen simultaneously until it shows ready, to get extra information.

Pen ID: the unique ID of the Vmarker pen.

SW version: the software version of the Vmarker pen.

3.5.3 Pen status

When using a Vmarker pen, additional information about the battery is available.

Battery: show the voltage available from the batteries. If the voltage is 2.0 volts or lower, the batteries have to be replaced.

Operating hours: The time the Vmarker pen is switched on with the current batteries. When batteries are exchanged the counter is automatically set to 0.

3.6 VmarkerUtility: System-tab

With the settings on the System-tab it is possible to change the behaviour of the Vmarker Interactive whiteboard.
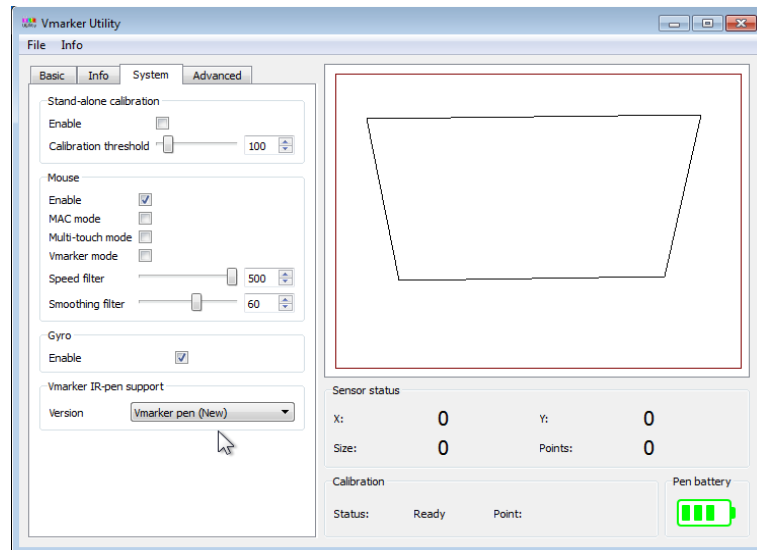
3.6.1 Stand-alone calibration

In this section it is possible to configure the Stand-alone calibration.

Enable: When checked it is possible to invoke calibration by holding an IR-pen from up close to the Vmarker sensor creating a large IR-dot.

Calibration threshold : determines the size of the IR-dot required to invoke the calibration-mode.

3.6.2 Mouse

In the section 'Mouse' there are several settings which influence the behaviour of the Vmarker Interactive Whiteboard:

Enable: This disables the mouse function all together by unchecking this check-box. When unchecked, the Vmarker sensor will ignore IR-dots on the projection surface. However when IR-dots are detected the coordinates are shown. You can disable the mouse when you want to test and optimise some settings without actually control the computer with the IR-pen.

MAC mode: This option has to be checked when using the Vmarker Interactive Whiteboard solution on a MAC computer running Mac-OS. This setting activates a correction to the calculation of coordinates so the position of the pen is synchronised to the mouse-pointer position.

Multi-touch mode: With Multi-touch mode checked it is possible to use multiple pens simultaneously, given the software and the OS support this. Currently only Windows 7 and higher support multi touch. A few example applications supporting multi-touch: ms-paint, ms surface-college...

Vmarker mode: When Vmarker mode is checked only IR-pens by Vmarker will be recognised, any other IR-source will be ignored. This makes it possible to suppress unwanted actions from interfering IR-sources. **To be able to use non-Vmarker IR-pens, this option has to be unchecked.**

Speed filter: With the speed filter it is possible to limit the drawing speed. Drawing speed exceeding the value will be ignored. The highest value gives the highest speed. The default value is 300.

Smoothing filter: With the smoothing filter it is possible to smooth out the drawing movement. Smoothing will delay drawing. The highest value gives the smoothest result but also the biggest delay. The default value is 60.

3.6.3 Gyro

Enable: When unchecked, cursor movement from a distance by moving the Vmarker pen is disabled. When enabled it is possible to move the cursor from a distance, also read: 4.1.3.2.How to use the Vmarker pen from a distance

3.6.4 Vmarker IR Pen support

Version: In the select list of this option it is possible to select which type of Vmarker IR-pen is used. Because the IR-data send by the new Vmarker pen differs from the IR-data send by the Vmarker IR-pen Touch series, the type of Vmarker IR-pen has to be selected. This also means it is not possible to use the two types of Vmarker IR-pens together.

3.7 VmarkerUtility: Advanced-tab

In the Advanced-tab it is possible to change the sensitivity of the Vmarker sensor.
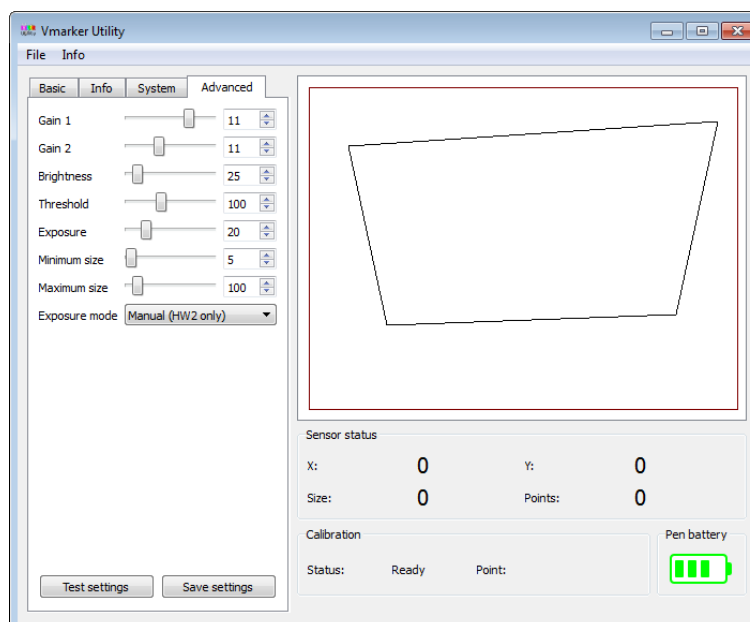
Gain 1: With the gain settings you can amplify the sensor-image. 'The greater the values, the more it will see'. The standard value is 11 (for sensor HW 1 it is 15).

Gain 2: Like Gain 1 with this settings you can amplify the sensor-image. 'The greater the values, the more it will see'. Normally this value is 11 (for sensor HW 1 it is 31).

Threshold: With this setting you can adjust the threshold-level of the sensor. When you have a weak IR-dot you should decrease the value and thus lowering the threshold level to be valid. When you have a good and clear IR-dot increase this value, to filter out other IR-sources.

Standard the value is 100.

Exposure: With this setting you can adjust the exposure parameter. Lowering the value makes the sensor more sensitive. You can make the sensor less sensitive by increasing the value. The standard value is 20 (for the sensor HW 1 it is 1).

Minimum size: With Minimum size you set the minimum size of dot recognition, IR-dots smaller then this setting will be ignored. 5 is the recommended setting. You can slide this value closer to the size of your IR-pen to filter out other IR-sources.

Maximum size: With Maximum size you set the maximum size of dot recognition, IR-dots bigger then this setting will be ignored. 100 is the standard setting. You can slide this value closer to the size of your IR-pen to filter out other IR-sources.

Exposure mode: For the sensor HW 2 you can change the exposure mode. By default this is set to Manual. This gives the best result when lighting conditions in the classroom are not ideal and can change a lot. If the lighting conditions in the classroom are stable, it is easier to set the exposure mode to semi automatic.

Beware these settings all influence each-other, it can be difficult to find an optimal combination. Before changing these values write down the initial values. After optimizing these values you should recalibrate the Vmarker with these settings as it also influences positioning.

Don't forget to save the settings. The settings will be written to the Vmarker sensor.

4 Vmarker pen

To get the most out of the Vmarker Interactive Whiteboard solution, a special IR-pens is developed. The Vmarker pen has extra logic embedded making it possible to have extra functionality.

4.1 General information

The Vmarker pen requires 2 AAA batteries. It is possible to use rechargeable batteries.

4.2 How to place the batteries

The Vmarker pen holds 2 AAA batteries. Place the batteries as indicated inside the battery compartment.
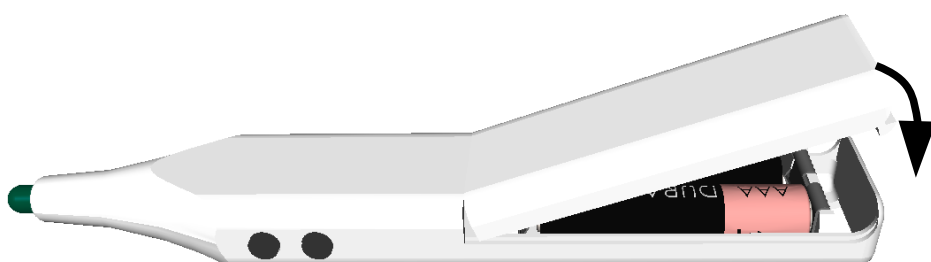
And close the battery compartment like shown in the picture.

4.3 Vmarker pen: operation

The new Vmarker pen has a power switch, 2 **double action push buttons** on the side, and a **double action** tip.

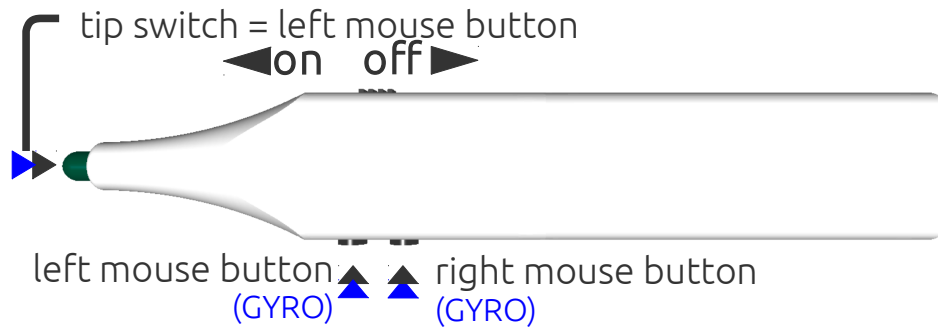The Vmarker pen is switched on by sliding the power switch to the tip of the pen. By sliding the switch to the back, the pen is switched off.

tip switch = left mouse button
◄on   off►

left mouse button (GYRO)   right mouse button (GYRO)

The tip and the push-buttons have two positions when pushing them. If you press the button/tip until the first resistance, you activate the primary action. If you press beyond that first resistance the secondary action is activated.

The primary action and the secondary action of the tip is a left-mouse-click.

The push-buttons on the side of the IR-pen act like the left and right mouse button.

The push-button closest to the tip corresponds with the left mouse button, so the primary action of this button is the left-mouse-click.
The secondary action of this button activates the GYRO. Rotation of the Vmarker pen will be translated in to movement of the mouse-cursor while holding the left mouse button.

The second push-button corresponds with the right mouse button, so the primary action of this button is the same like a right-mouse-click, mostly releasing this button will show the 'Right-click menu'.
The secondary action of this button activates the GYRO. Rotation of the Vmarker pen will be translated in to movement of the mouse-cursor, there is no action accompanied with this movement.

4.3.1 How to use the Vmarker pen on the whiteboard surface

To be able to interact with the projected computers screen on the whiteboard accurately it is important to calibrate the Vmarker sensor.

Use of the Vmarker pen on the whiteboard surface is very easy. You can interact with the computer by touching the whiteboard surface with the tip of the Vmarker pen. You will see the mouse cursor jumping to the tip of the Vmarker pen and a left-click action will be executed on that location.

You can do the same with use of the buttons on the side of the Vmarker pen. In case you use the buttons you do not have to touch the surface.

When you want to perform a left-click just press the push-button most near to the tip. Push until to the first resistance to have the primary action.
The mouse-cursor will jump to the tip of the Vmarker pen and a lef-click action will be executed at that location.
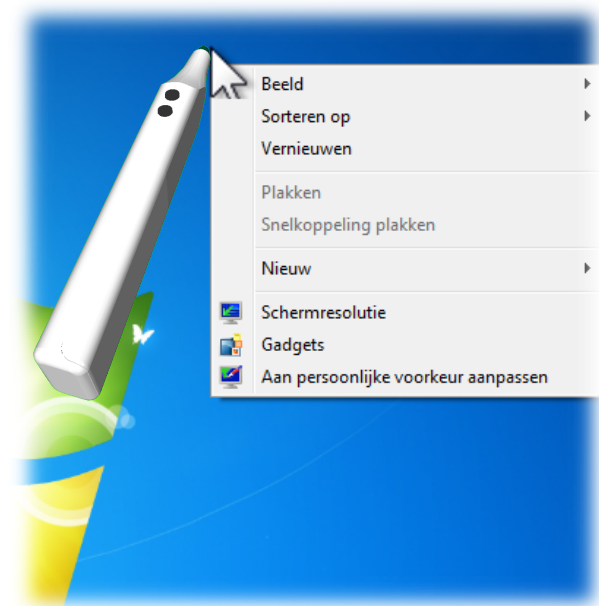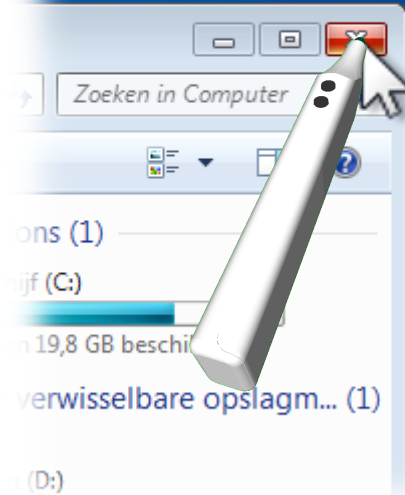

When you press the second button (until the first resistance to have the primary action), the mouse-cursor will jump to the tip of the Vmarker pen. Releasing the button will show the right-click-menu just like with the right-mouse-button.

Of course it is possible to move the pen over the surface while holding the buttons, to drag and drop or to draw a line...

4.3.2 How to use the Vmarker pen from a distance

It is possible to use the Vmarker pen from a distance, not in the direct line-of-sight of the Vmarker sensor. When using the primary action the corresponding left or right click will be generated at the location the mouse cursor is a that moment.

When you press the buttons beyond the first resistance to have the secondary action. The gyro is activated. The mouse cursor on the screen will 'follow' the movement of the Vmarker pen.
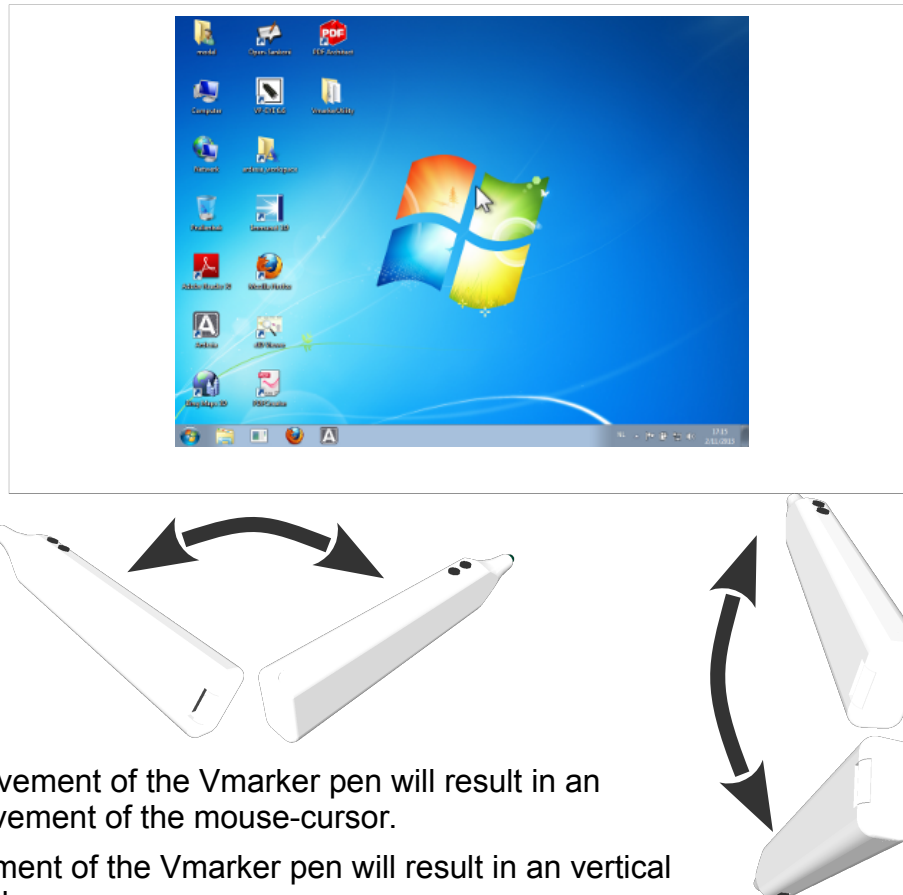
Horizontal movement of the Vmarker pen will result in an horizontal movement of the mouse-cursor.

Vertical movement of the Vmarker pen will result in an vertical movement of the mouse-cursor.

The 'left-mouse-button' of the Vmarker pen will also generate the left-click together with the movement. When using the 'right-mouse-button' of the Vmarker pen, the mouse-cursor will be moved without extra action.

So you move the mouse-cursor to the position you want by pressing the 'right-mouse-button beyond the first resistance and moving the Vmarker pen.

When the mouse-cursor is in position release the button and press the 'left-mouse-button' to have a left-mouse-click.

5 Overview Vmarker functionality

	Vmarker setting: - mouse enabled - gyro enabled	on projectionsurface *cursors is aligned to position of IR-pen on projected screen*						from a distance *IR-pen is not visible for Vmarker sensor*			
		tip left mouse click	left mouse click	right mouse click	scroll-wheel	mouse hoover	cursor movement	left mouse click	right mouse click	scroll-wheel	cursor movement
Basic IR-pen	normal		✓				✓				
	Multi-touch mode[1]		✓				✓				
	vmarker mode enabled										
Vmarker IR-pen Touch (version 1)	normal		✓	✓	✓		✓	✓	✓	✓	
	Multi-touch mode[1]		✓				✓	✓	✓	✓	
Vmarker IR-pen Touch	normal		✓	✓	✓	✓[2]	✓	✓	✓	✓	
	Multi-touch mode[1]		✓			✓[2]	✓	✓	✓	✓	
Vmarker IR-pen Touch+	normal		✓	✓	✓	✓[2]	✓	✓	✓	✓	✓[2]
	Multi-touch mode[1]		✓			✓[2]	✓	✓	✓	✓	✓[2]
Vmarker pen	normal	✓	✓	✓			✓	✓	✓		✓
	Multi-touch mode[1]	✓	✓				✓	✓	✓		✓

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1 Only supported Windows Vista, Windows 7 and Windows 8.
2 Vmarker IR-pen Touch and Touch+: proximity sensor **enabled**

6 Trouble shooting

6.1 No connection with the computer

6.1.1 The red LED of the Vmarker sensor is not lit

Possible causes are:

- The computer is off

- The USB cable is not plugged into the computer or Vmarker, check the connections

- The USB cable is defective, try an other USB-cable

- The used USB extension-cable is defective, test the Vmarker sensor without the extension cable

- The USB-port from the computer is defective, test with another USB-port, or another computer

6.1.2 The red LED of the Vmarker sensor keeps blinking

Normally the red LED will be lit continuously, the first time you connect the Vmarker its possible it takes longer. After some time the LED has to be lit continuously.

Possible causes when it keeps blinking are:

- The computer hasn't installed the correct driver yet. Although the Vmarker uses the standard driver it is possible the OS tries to download an updated driver from the internet. Depending on the speed of the internet-connection this may take a while. At the end the standard driver will be installed.

- The computer is not fully booted, wait until the computer is started, or restart the computer if necessary.

- The computer has some problems with the USB-communication, a conflict with a driver, USB is not properly installed. Test the Vmarker sensor with a different computer to exclude a defect of the Vmarker sensor itself.

- The OS does not support a USB-mouse. The Vmarker IR-sensor USB is tested on Windows XP, Windows 7, Windows Vista, Linux Ubuntu 32 and 64bit and Mac OS X,... Please report other working or failing OS-es to us.

- The USB-cable is defective, test the Vmarker sensor with an other USB-cable.

- The used USB extension cable is defective or is not properly installed. Test the Vmarker sensor without extension-cable.

6.2 The calibration process of the Vmarker sensor fails

When the calibration of the Vmarker sensor fails, or is very hard to complete successfully, there may be several reasons:

6.2.1 The Vmarker sensor still has old firmware

De Vmarker sensor continuously is being improved. Also the calibration process is possibly improved in a later firmware version. You can download the latest firmware version of the Vmarker sensor from the website: http://www.vmarker.org.

6.2.2 A particular corner is not accepted and gives problems

Possible causes are:

- Be sure there is nothing between the IR-LED of the IR-pen and the Vmarker sensor,

- Not all corners of the projected image are within the range of the Vmarker sensor, you can check this with use of the VmarkerUtility software.

- The angle of the IR-pen to the projection surface is not good, try to adjust the angle of the IR-pen to the surface. This can be a problem when a high gloss projection surface is used.

- The IR-dot is larger then 100, increase the distance of the Vmarker sensor towards the projected image. (You can check size with the VmarkerUtility software.)

- The IR-pen is not working properly see also 6.5

- You can make the sensor more sensitive by moving the slider to the left.

6.2.3 The calibration process seems to skip points

When calibrating, points are skipped. Or the Vmarker sensor seams to calibrate it self without using the IR-pen. This causes the calibration to fail.

Possible causes are:

- Besure you only press the button or the tip of the IR-pen only to mark the corner.

- The Vmarker IR-pen Touch(+) is in sensor-mode. To calibrate the IR-sensor, the proximity sensor of the Vmarker IR-pen Touch(+) has to be disabled.

- There is an other IR-source in the range of the Vmarker sensor, see 6.4

- The Vmarker sensor still has old firmware, see 6.2.1

- You can make the sensor less sensitive by moving the slider to the right.

6.3 The Vmarker sensor does not response to the IR-pen

The Vmarker sensor does not or not always response to the IR-pen. If you do not find a cause you can use the VmarkerUtility program to check the proper function of the IR-pen. The 'Sensor status' let you view the coordinates and the size of the IR-dot:

Possible causes are:

- The Vmarker sensor is not connected, the red LED is off or blinks, see 6.1

- The IR-pen does not work properly, see 6.5

- The mouse function of the Vmarker sensor is switched off. The Vmarker sensor USB has a setting to enable/disable the mouse function. This can be manipulated with the VmarkerUtility software.

- The Vmarker sensor is not yet calibrated or is in calibration mode. The green LED is blinking. Calibrate the Vmarker sensor first.

- The size of the IR-dot is outside the minimum and maximum value. If you doe not seen any value in the 'Sensor status'-section, you can decrease the value of the 'Minimum size', possibly the IR-dot is smaller then the minimum size in which case you do not see any values.
  When you do see values in 'Sensor status' you can check if the size of the IR-dot is smaller then the maximum value. If not you can change this setting.

- The Vmarker is not sensitive enough for this situation. You can adjust Light conditions by moving the slider to the left. If you move to far (threshold value to low) the other IR-sources can cause interference.

6.4 The Vmarker sensor interacts without using an IR-pen

Of course the Vmarker sensor should only react on the IR-pen. If the Vmarker sensor interacts without using an IR-pen, there probably is an other IR-source in the range of the Vmarker sensor. Be sure to remove every other possible IR-source out of the range of the Vmarker sensor. Possible causes are:

- There is sunlight on the projected image. Be sure there is no sunlight on the projected image, also not by reflection through a window of an other building..

- There is sunlight on the Vmarker sensor itself. Be sure there is not sunlight shining on the Vmarker sensor, also not by reflection..

- There is sunlight on objects that are visible in the range of the Vmarker sensor. Be sure there is no sunlight on objects in the range of the Vmarker sensor, or remove these objects.

- There is an other IR-source in the range of the Vmarker sensor, some lighting have a large part of infrared light in its spectrum. Switch of these light sources.

- The blinds preventing sunlight to shine on the projected image are insufficient. If you have to darken a window to prevent sunlight shining on the projected image be sure it is sufficient. Some blinds are not good enough. Not all windows have to be darkened, only the windows preventing the sun to shine on the projected image. Don't forget about the reflection of sunlight.

- The Vmarker is to sensitive for this situation. You can adjust Light conditions by moving the slider to the right. If you move to far (threshold value to high) the Vmarker sensor will not recognize the IR-pen itself.

6.5 The IR-pen does not function properly

The Vmarker sensor does not react to the IR-pen. It is possible the IR-pen does not function properly. Check if the Vmarker works with an other IR-pen if you have one. You can also check if the IR-LED of the IR-pen functions. You can check this with a digital camera, from your cellphone for example. Look with the camera to the IR-LED, if you activate the IR-LED you should see this clearly on the camera image.

Possible causes are:

- The IR-pen is switched off.

- The batteries are wrongly placed, check the polarity of the batteries.

- The batteries are empty, replace the batteries.

- The angle of the IR-pen to the projection surface is not good, try to adjust the angle of the IR-pen to the surface.

- Be sure there is nothing between the IR-LED of the IR-pen and the Vmarker sensor

7 Specifications

7.1 Vmarker IR-sensor USB (HW Version 1.0 until 1-7-2012)

- CPU: ARM Cortex M3 72Mhz, 20kB RAM, 128kB flash
- IR-sensor 940nm, dot-recognition up to 4 dots
- IR-receiver 38kHz, 940nm
- 3 LEDs indication
- Connection: USB 2.0 (USB-B port, 5V <125mA)

With firmware 7.5:
- output 1024x1024 @200 fps
- left click, right click
- scroll-button
- multi touch support 4 points
- USB: absolute HID, relative HID and control HID

7.2 Vmarker IR-sensor USB (HW Version 2.0 build after 1-7-2012)

- CPU: ARM Cortex M3 72Mhz, 20kB RAM & 128kB flash
- IR-sensor 940nm, can recognize up to 8 dots
- IR-receiver 38kHz 940nm
- 3 LEDs indication
- Connection: USB 2.0 (USB-B port, 5V <125mA)

With firmware 7.5:
- output 1024x1024 @200 fps
- left click, right click
- scroll-button
- multi touch support 4 points
- USB: absolute HID, relative HID and control HID

7.3 Vmarker IR-pen Touch (version 1)

- CPU: ATMEL ATTINY861 8Mhz, 8kB flash, 512 Bytes RAM, 512 Bytes EEPROM
- 3 Touch area's; left-mouse-button, right-mouse-button and scroll-function
- IR-LED 940nm (constant current)
- red LED indication
- Power: 2 x AA batteries(rechargeable)
- On/off switch

7.4 Vmarker IR-pen Touch

- CPU: PIC 18F25K22 8Mhz, 32kB flash, 1 kB RAM & 512 Bytes EEPROM
- 4 touch area's; left-mouse-button, right-mouse-button, scroll-function & one to switch on the IR-pen / change mode
- IR-LED 940nm (constant current)
- build-in proximity sensor
- green LED indicates the operation-mode
- Two red LED's indicating use of IR-LED
- Power: 2 x AA batteries(rechargeable)
- Auto power off

7.5 Vmarker IR-pen Touch+

- CPU: PIC 18F25K22 8Mhz, 32kB flash, 1 kB RAM & 512 Bytes EEPROM
- 4 touch area's; left-mouse-button, right-mouse-button, scroll-function & one to switch on the IR-pen / change mode
- IR-LED 940nm (constant current)
- build-in proximity sensor
- 3-axis GYRO sensor
- green LED indicates the operation-mode.
- Two red LED's indicating use of IR-LED
- Power: 2 x AA batteries(rechargeable)
- Auto power off.

7.6 Vmarker pen

- CPU: STM32F100 24Mhz, 64kB flash & 4 kB RAM
- Build in 3-axis acceleration-sensor, 3-axis magneto-sensor and a 3-axis Gyro
- 3 double action micro-switches. 2 on the side, 1 in the tip
- IR-LED (current controlled)
- Power: 2 x AAA-batteries(rechargeable)
- On/off switch

8 Safety instructions

8.1 GENERAL

This product is NOT a toy. Only to be used under adult supervision.

This product is meant to be used in an Interactive White Board Setup. Please read the manual completely before using this product.

You can download the operations manual from the website: http://www.vmarker.org.

8.2 MAINTENANCE:

Clean only with a dry cloth. Do not use cleaning solvents or abrasives.

8.3 BATTERY PRECAUTIONS

⚠WARNING:

Leakage of battery fluid can cause personal injury as well as damage to your Vmarker IR-pen. If battery leakage occurs, thoroughly wash the affected skin and clothes. Keep battery fluid away from your eyes and mouth. Leaking batteries may make popping sounds.

To avoid battery leakage:

- Do not mix used and new batteries (replace all batteries at the same time).
- Do not mix battery types and do not mix different brands of batteries.
- Do not leave batteries in the IR-pen for long periods of non-use.
- Do not recharge alkaline or non-rechargeable batteries.
- Do not put the batteries in backwards. Make sure that the positive (+) and negative (-) ends are facing in the correct directions. Insert the negative end first. When removing batteries, remove the positive end first.
- Do not use damaged, deformed or leaking batteries.
- Do not expose batteries to heat or dispose of batteries in a fire.

8.4 DISPOSAL

⚠ATTENTION:

At the end of this product's life, please do not dispose this product in your general household waste. Instead, please dispose the product separately in accordance with your local recycling laws and regulations.

Batteries have to be removed from the Vmarker IR-pen Touch™ before disposing the unit.

Discarding batteries in your general household waste can be harmful to the environment. When disposing the batteries, follow appropriate local guidelines and regulations.