

CatCam[®] Controller Datasheet - Revision 3.0

Check for updates on: www.mr-lee-catcam.de

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General safety advice

The CatCam controller chip or board is sensitive to static discharge. Never handle static sensitive devices without precautions.

The CatCam controller chip or board is not intended to be used in a medical, automotive or military environment.

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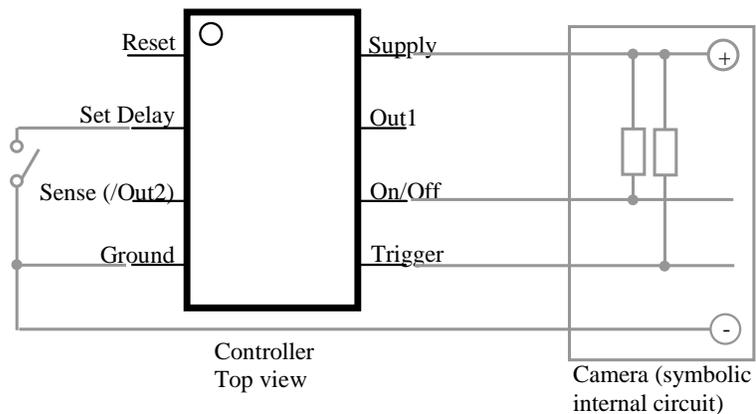
Features

The CatCam controller is intended to control a camera (basically any camera with electronic controls, but designed for VistaQuest Digital Keychain camera) for taking pictures or videos in an adjustable time frame of 1 second to 8 hours with an 1 second resolution. The focus is to save battery power. Therefore the camera is only activated for taking a picture. Two extra outputs are provided for advanced power saving management or external illumination/actions.

Also the controller design is optimized for power consumption and space. The CatCam controller comes in an 8 pin SOIC housing (5.1 x 5.1mm, 1.2mm pitch) that fits into most cameras. Only 2 external components are required for a save operation.

The controller is also available on a small PCB which contains all external components required.

Controller Chip Pinout

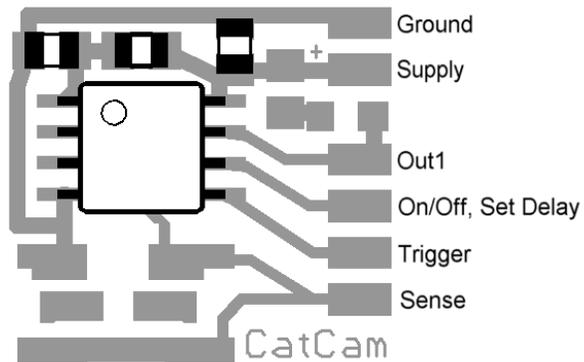


Controller Board Layout

Board rev. 3

On/Off and Set Delay are tied together. See pin description for details.

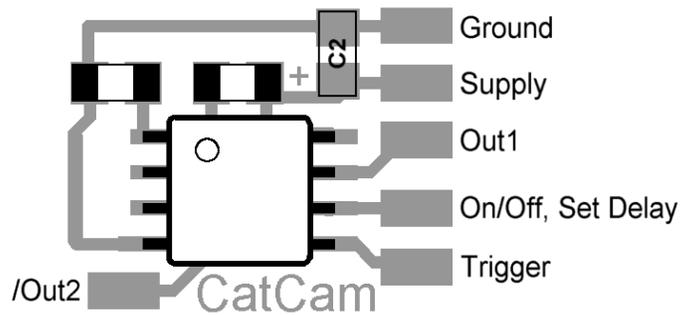
Sense replaces Out2 signal



Board rev. 2

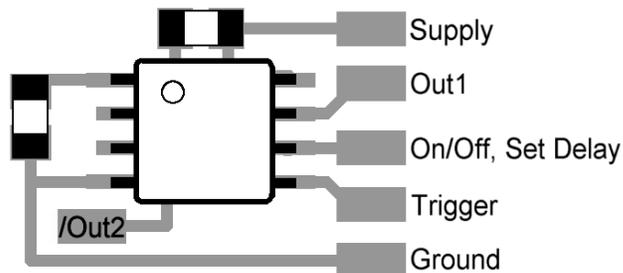
On/Off and Set Delay are tied together. See pin description for details.

C2 is an optional capacitor to stabilize supply voltage.



Board rev. 1

On/Off and Set Delay are tied together. See pin description for details.



Pin Description

Supply

Controllers supply pin. Voltage range: 1.8 to 5.5V. Connect this pin to the camera standby supply or to another battery supply (e.g. 3V Lithium cell).

Ground

Controllers ground reference. Connect this pin to camera ground or the negative potential of supply battery.

On/Off

This pin switches the camera on and off. It is a low active pin, this means it switch to ground potential to activate the function. Connect this pin to the pulled-up on/off switch of the camera.

Trigger

This pin triggers the camera to take a picture. It is a low active pin, this means it switch to ground potential to activate the function. Connect this pin to the pulled-up Shutter/Trigger switch of the camera.

Starting with rev2.0 a video recording mode was implemented. Instead of photos short video clips are recorded. The controller chip brings the camera in the video mode. To enable the video recording feature, the Trigger input has to be pulled to ground during Set Delay is pulled to ground. It is sufficient to pull the Trigger input only for a short time to ground; it does not have to stay low for the whole period. The video mode is disabled, if Trigger is not grounded during Set Delay.

Set Delay

This pin allows adjusting the time between the pictures. This pin is normally left open. You can change the default time (which is approx. 90 seconds) following this sequence:

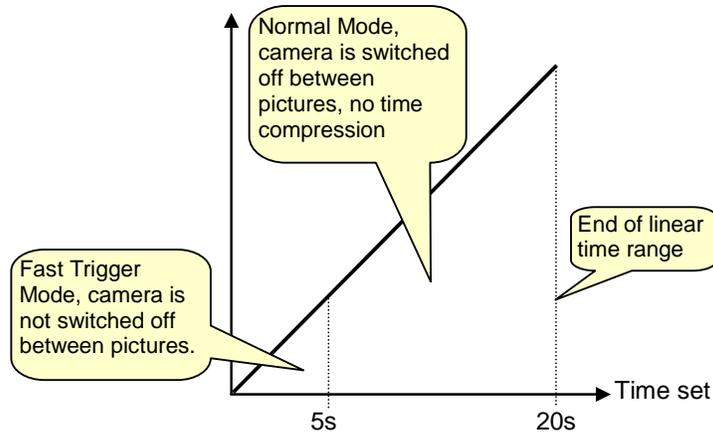
- Remove battery supply from camera or from controller
- Connect Set Delay pin to ground
- Connect battery supply so that the controller is supplied
- Remove the connection to Set Delay after the desired new delay time
- Remove battery supply
- The new delay time is written to the controller memory and used as the new default value.

Once the delay time is stored in the controller memory it will not get lost as long it is not reprogrammed with an other time.

The delay time between two picture shoots can not exceed the following range: 1 second ... 8 hours. If you try to adjust a time lower or higher this range then the minimum or maximum limit is used.

Please note that the delay time also depends from the camera. An offset of turn-on time, photo capture time, memory storage time and turn-off time has to be considered. Practical value is approx. 10s for the offset time.

Starting with rev1.7 a **Fast Trigger Mode** feature is implemented. If the delay time is set below 5 Seconds the camera is not switched off after taking one picture. This allows shorter interval times between pictures by reducing the offset time. The following image illustrates the different ranges:

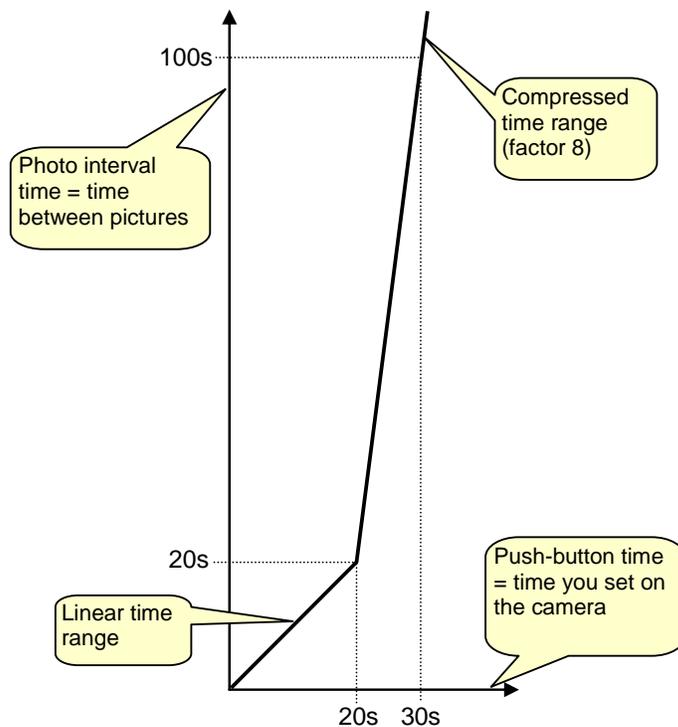


With firmware version 2.2 a **Time Compression** feature is implemented. This makes the adjustment of longer interval times more convenient.

Time compression means that if you want to set an interval time of e.g. 1 hour you don't need to wait for 1 hour. After the first 20 seconds the time compression is active and the time multiplied by 8. The first 20 seconds are not affected by the multiplication. Formula:

$$t_interval = [(t_set - 20s) \times 8] + 20s$$

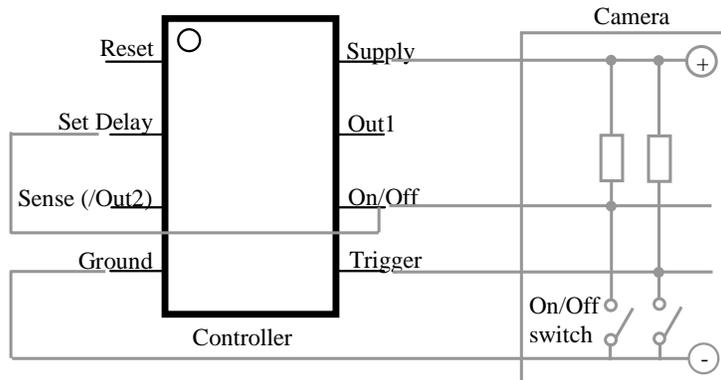
The following graph illustrates this behavior, but it is probably more practical for you to have a look to the table on the right which shows popular interval times and the time you need to adjust on the camera to get them.



Time you set	Interval time you get
5s	5s, Fast Trigger Mode
20s	20s
21s	30s
25s	1 minute
29s	1.5 minutes
33s	2 minutes
40s	3 minutes
55s	5 minutes
93s	10 minutes
130s	15 minutes
243s = ca. 4 minutes	30 minutes
468s = ca. 8 minutes	1 hour

An application hint for the VistaQuest camera for setting the delay time without any hardware additions: For this the On/Off switch of the camera is used. Pin Set Delay is connected to Pin On/Off,

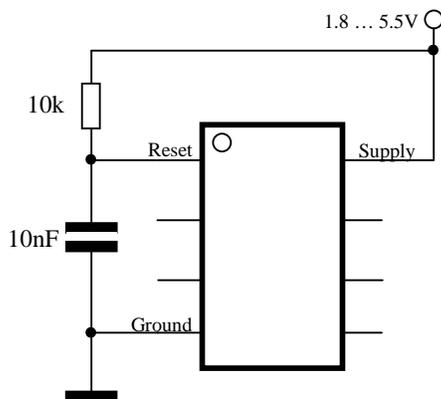
no additional wire is required. For setting the time, battery is removed from camera, On/Off button is pressed, battery is inserted while button is still pressed. Hold down button as long as the desired new time should be, do not care about camera display. After releasing button, remove battery and reinsert again. New time is now used.



Reset

Connect this pin to an RC circuit as shown below to ensure proper power-on-reset at any time. You can decide to not follow this recommendation; basically the controller will also work without power-on-reset circuit. But it was recently found that some instabilities of the CatCam controller are caused by missing RC elements.

Pulling Reset pin to ground will halt controller functions until the pin is released. In reset state all output pins will stay in tri-state.



Sense

This input signal is connected to a camera internal signal. When the camera is busy taking or saving a picture this signal gets active and reports the camera state to the controller. The benefits are a more efficient and reliable camera control. If this signal is not connected the controller will work in the default time controlled mode.

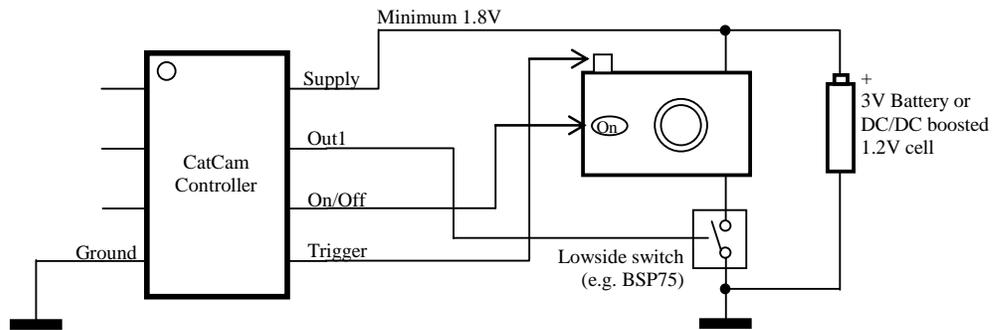
Out1 (and Out2)

These output pins are for advanced power saving functions or controlling external features like illumination. They are activated prior to camera control functions (On/Off and Trigger). Out1 turns from tri-state to logic high potential and Out2 from tri-state to logic low potential. One or both outputs can be used for powering the camera through a highside or lowside switch. In such a concept the controller can not be powered through the camera since during the wait phase the camera remains unpowered. All data stored in a volatile memory of the camera like SRAM will be lost. Therefore controller must be powered through a dedicated battery (eg. lithium coin battery) or through a system main battery (boosted using DC/DC converter or already higher voltage as 1.8V).

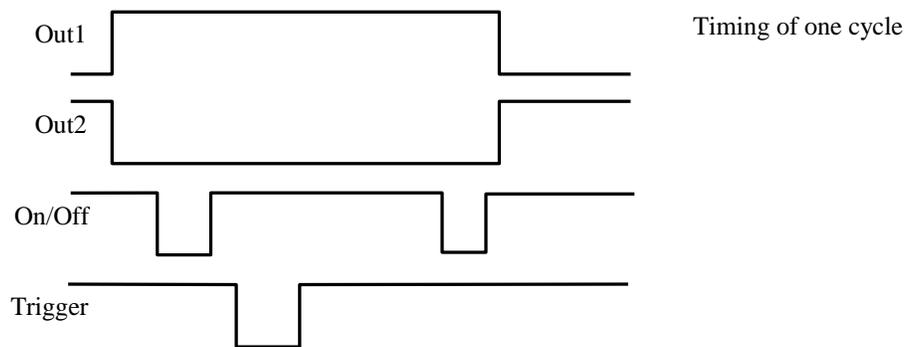
Out1 can supply 10mA, Out2 can sink 5mA (at a controller supply voltage of 3V).

Out2 signal was removed with revision 3 and replaced with Sense signal.

The following picture shows an example of an advanced power saving setup.



Timing Diagram



Revision history

3.0 vs. 2.2:

- new board layout to cover also Video CatCam (requires button and LED)
- Out2 signal replaced with Sense signal in order to support VistaQuest camera 1005 and 2005 model year 2009 and following.
- reduced standby current

2.2 vs. 1.7:

- Introduction of Video Recording Mode (introduced with firmware rev. 2.0, but required bug fix)
- Introduction of Time Compression for interval adjustment

1.7 vs. 1.6:

- Introduction of Fast Trigger Mode which allows taking pictures without switching the camera off and on after each picture.
- Added comments about external controls like illumination
- Added Controller Board pictures for rev 1 and 2 controller boards
- Added comment about halting controller functions by pulling Reset signal to ground
- Added comment about time between pictures

1.6 vs. 1.5:

- Control signals TRIGGER and ON/OFF changed from active high state to passive state for lower current draw and higher system stability
- Added comment about importance of power-on reset circuit

1.5 vs. 1.4:

- Introduction of Out1 and Out2 outputs for advanced power saving management.
- Optimized time range between pictures, now up to 8 hours instead of 110 seconds.

1.4:

- Initial public release.