CameraPro NET Module for Android

Manual
Version 1.0, 5th December 2013
Harald Meyer
office@tequnique.com

Contents

Introduction

CameraPro NET Module supports remote control of camera features over WiFi and Bluetooth turning your smartphone (or tablet) into a powerful camera controlled from web browsers, microelectronic boards (such as Arduino), and other Bluetooth and WiFi enabled devices.

Example use cases are:

- Entry control systems triggered by external sensors, like movement, temperature, or light sensors attached to an Arduino board.
- Trigger multiple CameraPro instances on different smartphones at almost the same time.
- Trigger image capture from a remote distance (for instance a group photo where the smartphone is 10 meters away).
- …

The NET Module is available as an In-App-Purchase item from Google Play in the CameraPro Settings. If you do not use Google Play then the full version of CameraPro including the NET Module can be purchased here: http://www.tequnique.com/camerapro#android

Note: The NET Module requires additional battery and processing power. Thus, the both Bluetooth and WiFi should be disabled in the CameraPro settings if not needed.

Hint: For optimal remote usage we recommend to turn on the CameraPro "mini preview" or to completely disable the preview of captured photos.

Bluetooth Mode

The following steps are necessary to control CameraPro over Bluetooth:

1. Each Bluetooth device has to be paired with the smartphone in the smartphone Bluetooth settings. This is only required once for each Bluetooth device.
   On Android new devices can be paired under Android "Settings" – "Bluetooth".
2. In the CameraPro Settings turn on "Bluetooth" and select the device from which commands will be received.

WiFi Mode

The following steps are necessary to control CameraPro over WiFi:

1. Connect the smartphone to a WiFi network. If the smartphone can act as a WiFi access point then this works as well.
2. Enable "WiFi" mode in the CameraPro Settings. Optionally the port number can be changed.
3. Note down the IP address displayed in the CameraPro Settings. This address is used to send commands.

Sending Commands

CameraPro can be controlled by sending integer+string style command/value pairs over Bluetooth or WiFi. The following table shows the supported commands. The corresponding values are described later in this document.

Command name	Command integer value
CAMERAPRO_COMMAND_OK	20
CAMERAPRO_COMMAND_FAILED	21
CAMERAPRO_CAMERA_CONTROL	23
CAMERAPRO_CAMERA_MODE	24
CAMERAPRO_GET_CAPTURED_IMAGE	25
CAMERAPRO_EFFECT_MODE	26
CAMERAPRO_EXPOSURE_COMPENSATION	27
CAMERAPRO_FLASH_MODE	29
CAMERAPRO_FOCUS_MODE	30
CAMERAPRO_FOCUS_POSITION_X	31
CAMERAPRO_FOCUS_POSITION_Y	32
CAMERAPRO_IMAGECONTROLS_BRIGHTNESS	33
CAMERAPRO_IMAGECONTROLS_CONTRAST	34
CAMERAPRO_IMAGECONTROLS_SATURATION	35
CAMERAPRO_IMAGECONTROLS_SHARPNESS	36
CAMERAPRO_ISO_VALUE	37
CAMERAPRO_SCENE_MODE	38
CAMERAPRO_RESOLUTION	39
CAMERAPRO_SWITCH_CAMERA	40
CAMERAPRO_WHITEBALANCE_MODE	41
CAMERAPRO_ZOOM	42
CAMERAPRO_ANTIBANDING_MODE	43
CAMERAPRO_METERING_MODE	44
CAMERAPRO_EXPOSURE_LOCK	45

Bluetooth Mode

In Bluetooth mode each command sent to CameraPro has the following structure:

Byte	Value	Description
0	0x06	Header
1	0x85	Header
2	0-255	Payload size
3	0-255	Command
4-x	char[]	The command stored in a null-terminated (\0) char buffer
x+1	0-255	CRC value by XOR over the payload bytes 3 to x.

CameraPro can send back status messages with the following format:

Byte	Value	Description

0	0x06	Header
1	0x85	Header
2	0-255	Payload size
3	0-255	Status / command
4	0-255	CRC value by XOR over the payload byte 3.

WiFi Mode

CameraPro is controlled by sending GET requests to the smartphone IP address:

http://<IP>:30000?k=command_value&v=value

 "command_value" is an integer from the commands table and "value" is a string representing the parameter.

For instance the following command triggers the image capturing button:

http://<IP>:30000?k=23&v=capture

Hint: Some smartphones disconnect the WiFi connection after some idle time. To prevent this, regular "CAMERAPRO_COMMAND_OK" commands with an arbitrary value can be send to CameraPro.

Parameters

This Section describes supported command/value pairs.

Note: The presented values are examples. Not all values are supported by all Android devices. The presented values are also only a subset of possible values which, again, differ between different Android devices.

Camera Control

Command: CAMERAPRO_CAMERA_CONTROL

Possible values (device dependent):

Value	Description
capture	Trigger capture button
focus	Focus
pause	Pause (video). **NOT IMPLEMENTED**

Camera Mode

Command: CAMERAPRO_CAMERA_MODE

Possible values (device dependent):

Value	Description

normal	Still images
video	Video
timelapse	Time-lapse
selftimer	Self-timer
bracketing	Bracketing
antishake	Anti-shake
burst	Burst

Captured preview image (WiFi only)

Command: CAMERAPRO_GET_CAPTURED_IMAGE

This command requests the captured image (only in WiFi mode) in jpeg format. If no preview image is available then an empty message is returned.

Antibanding Mode

Command: CAMERAPRO_ANTIBANDING_MODE

The same constant string values as in the Android API are used:

http://developer.android.com/reference/android/hardware/Camera.Parameters.html#ANTIBANDING_50HZ

Examples (device dependent):

Value	Description
50hz	50 Hz
60hz	60 Hz
auto	Auto
off	Off

Effect Mode

Command: CAMERAPRO_EFFECT_MODE

The same constant string values as in the Android API are used:

http://developer.android.com/reference/android/hardware/Camera.Parameters.html#EFFECT_AQUA

Examples (device dependent):

Value	Description
none	None
negative	Negative
mono	Monochrome
sepia	Sepia

Exposure Compensation

Command: CAMERAPRO_EXPOSURE_COMPENSATION

Possible values (device dependent):

Value	Description
-x to x	The **index** of the exposure compensation value where "0" is no exposure compensation adjustment, "-x" is the minimum adjustment, and "x" is the maximum adjustment.

Exposure Lock

Command: CAMERAPRO_EXPOSURE_LOCK

Possible values (device dependent):

Value	Description
0	Unlock exposure
1	Lock exposure

Flash Mode

Command: CAMERAPRO_FLASH_MODE

The same constant string values as in the Android API are used:

http://developer.android.com/reference/android/hardware/Camera.Parameters.html#FLASH_MODE_AUTO

Examples (device dependent):

Value	Description
off	Off
auto	Auto
on	On
red-eye	Red eye reduction
torch	Video light / torch mode

Focus Mode

Command: CAMERAPRO_FOCUS_MODE

The same constant string values as in the Android API are used:

http://developer.android.com/reference/android/hardware/Camera.Parameters.html#FOCUS_MODE_AUTO

Examples (device dependent):

Value	Description
fixed	Fixed
auto	Auto

macro	Macro
infinity	Infinity

Change focus rectangle position

Command: CAMERAPRO_FOCUS_POSITION_X

Command: CAMERAPRO_FOCUS_POSITION_Y

The focus rectangle position can be changed by sending two separate x/y commands where x and y hold the center position coordinates of the target focus rectangle position.

After setting the position, re-focusing has to be manually triggered using the Camera Control focus command.

Image Controls: Brightness, Contrast, Saturation, Sharpness

Command: CAMERAPRO_IMAGECONTROLS_BRIGHTNESS

Command: CAMERAPRO_IMAGECONTROLS_CONTRAST

Command: CAMERAPRO_IMAGECONTROLS_SATURATION

Command: CAMERAPRO_IMAGECONTROLS_SHARPNESS

Possible values (device dependent):

Value	Description
x	The adjustment value "x" of the image control setting. For most devices the valid range is between 0 and 10.

ISO Value

Command: CAMERAPRO_ISO_VALUE

Examples (device dependent):

Value	Description
auto	Auto
deblur	
100	ISO value of 100
200	ISO value of 200
400	ISO value of 400
800	ISO value of 800
1250	ISO value of 1250
movie	ISO value for video recording

Metering Mode

Command: CAMERAPRO_METERING_MODE

Examples (device dependent):

Value	Description

center	Center weighted
meter-center	Center weighted
average	Average
meter-average	Average
spot	Spot
meter-spot	Spot

Scene Mode

Command: CAMERAPRO_SCENE_MODE

The same constant string values as in the Android API are used:

http://developer.android.com/reference/android/hardware/Camera.Parameters.html#SCENE_MODE_ACTION

Examples (device dependent):

Value	Description
auto	Auto
hdr	HDR
sports	Sports

Resolution

Command: CAMERAPRO_RESOLUTION

Possible values (device dependent):

Value	Description
0-x	The index of the resolution, starting with 0 and ending with x = number of resolutions – 1. Changing resolution works only for still image modes and not for video recording.

Switch between front and back camera

Command: CAMERAPRO_SWITCH_CAMERA

Possible values (device dependent):

Value	Description
0	Back camera
1	Front camera

White balance Mode

Command: CAMERAPRO_WHITEBALANCE_MODE

The same constant string values as in the Android API are used:

http://developer.android.com/reference/android/hardware/Camera.Parameters.html#WHITE_BALANCE_AUTO

Examples (device dependent):

Value	Description
auto	Auto
daylight	Daylight
cloudy-daylight	Cloudy / daylight
incandescent	Tungsten/Incandescent
fluorescent	Fluorescent

Zoom Control

Command: CAMERAPRO_ZOOM

Possible values (device dependent):

Value	Description
1-x	The zoom **value** starting with 1. For instance 1.5, 2.0, 4.0, etc.