Driver script

1. Location

The drivers will be located in **/etc/drivers**.

2. Description

User may upload new driver to our system and will be located in /etc/drivers. Therefore, we have to define some rules to be supported our PTZ manager. From ptzcommand file, we have a list of command set and the user have to define their values. Hence, PTZ manager will load all the command sets as well as their response format at the startup and will modify its content on the fly depends on the requested operation and camera ID. We will try this method to reduce using system or popen function to increase overall performance. But, we have to test this architecture for complicated commands such as one command in our system may need to send several commands to the camera, Click on image command for example. We list the variables must be defined by user in the following table in order to control the camera correctly.

3. Variable list

The following list is the variables must be defined by the user/driver script programmer.

Driver variables [defined by user]		
Name	Type	Description
var_name	String	Driver name
checksum		Specify the calculation method of checksum Please see the driver script example of this document.
var_GeneralGapTime	Integer (decimal)	(Unit: milliseconds) Delay time between successive commands, i.e. the second command will be hold at least this gap time after the first one.
var_PanGapTime	Integer (decimal)	(Unit: milliseconds) Specify the gap time of pan commands. Many pan command of PTZ camera are composed of one move command and one stop command. Adjusting the value will affect the resulting angle of pan command.

		If not specified, the system will use var_GeneralGapTime instead.
var_TiltGapTime	Integer (decimal)	(Unit: milliseconds) Specify the gap time of tilt commands. Many tilt command of PTZ camera are composed of one move command and one stop command. Adjusting the value will affect the resulting angle of tilt command. If not specified, the system will use var_GeneralGapTime instead.
var_ZoomGapTime	Integer (decimal)	(Unit: milliseconds) Specify the gap time of zoom commands. Many zoom command of PTZ camera are composed of one zoom command and one stop command. Adjusting the value will affect the result of zoom command. If not specified, the system will use var_GeneralGapTime instead.
var_FocusGapTime	Integer (decimal)	(Unit: milliseconds) Specify the gap time of focus commands. Many pan command of PTZ camera are composed of one focus command and one stop command. Adjusting the value will affect the result of focus command. If not specified, the system will use var_GeneralGapTime instead.
speedpan_min	Integer (heximal)	Specify the minimum pan speed value of this device.
speedpan_max	Integer (heximal)	Specify the maximum pan speed value of this device.
speedtilt_min	Integer (heximal)	Specify the minimum tilt speed value of this device
speedtilt_max	Integer (heximal)	Specify the maximum tilt speed value of this device.
speedzoom_min	Integer (heximal)	Specify the minimum zoom speed value of this device
speedzoom_max	Integer (heximal)	Specify the maximum zoom speed value of this device.
speedfocus_min	Integer (heximal)	Specify the minimum focus speed value of this device
speedfocus_max	Integer (heximal)	Specify the maximum focus speed value of this device.
presetid_min	Integer (heximal)	The minimum index of preset position index supported in this driver
presetid_max	Integer (heximal)	The maximum index of preset position index supported in this driver

[Note: The min. and max. speed values described above are used to perform the

responding speed mapping when user select -5~+5 speed setting in the web page.]

4. Command

Here is the command/variable list supported by video server.

Please note that maybe not all commands are fully supported by your external PTZ camera. Please refer to the manual of the PTZ camera for details.

- var_name
- checksum
- var_GeneralGapTime:
- var_PanGapTime
- var_TiltGapTime
- var_ZoomGapTime
- var_FocusGapTime
- speedpan_max
- speedpan_min
- speedtilt_max
- speedtilt_min
- speedzoom_max
- speedzoom_min
- speedfocus_max
- speedfocus_min
- presetid_max
- presetid_min
- initial: command to initialize camera (check manual of PTZ camera for details)
- set_speedpan: command to set the pan speed parameter to PTZ camera (check manual of PTZ camera for details)
- set_speedtilt: command to set the pan speed parameter to PTZ camera (check manual of PTZ camera for details)
- set_speedzoom: command to set the pan speed parameter to PTZ camera (check manual of PTZ camera for details)
- set_speedfocus: command to set the pan speed parameter to PTZ camera (check manual of PTZ camera for details)
- move_left: command to move left
- move_right: command to move right
- move_up: command to move up
- move_down: command to move down
- move_home: command to move to home position
- zoom_wide: command to zoom wide

- zoom_tele: command to zoom tele
- zoom_stop: command to stop zoom operation
- focus_far: command to focus far
- focus_near: command to focus near
- focus_auto: command to set auto focus
- focus_stop: command to stop focus operation
- iris_open: command to iris open
- iris_close: command to close iris
- iris_auto: command to set auto iris
- cam_preset: command to set current position as a preset point
- cam_clearpreset: command to clear specified preset position
- cam_goto: command to go to specified preset postion
- cam_stop: command to stop camera
- cam_reset: command to reset camera

A simple example of PTZ driver script (Pelco D protocol) is as below.

[Note]: Each command/variable begins with **export ${ptz}.**

```
#!/bin/sh
header="FF"
export ${ptz}var_name="pelcod"              # Driver name
export ${ptz}checksum="[b02]+.[b06]"    # Check sum method
export ${ptz}var_GeneralGapTime="500" # General gap time between commands
export ${ptz}var_PanGapTime=""             # pan gap time
export ${ptz}var_TiltGapTime=""            # tilt gap time
export ${ptz}var_ZoomGapTime=""          # zoom gap time
export ${ptz}var_FocusGapTime=""         # focus gap time
export ${ptz}speedpan_min="01"             # specify minimum speed value of pan
export ${ptz}speedpan_max="3F"           # specify maxmimum speed value of pan
export ${ptz}speedtilt_min="01"            # specify minimum speed value of tilt
export ${ptz}speedtilt_max="3F"            # specify maxmimum speed value of tilt
export ${ptz}speedzoom_min="01"          # specify minimum speed value of zoom
export ${ptz}speedzoom_max="03"        # specify maxmimum speed value of zoom
export ${ptz}speedfocus_min="01"           # specify minimum speed value of focus
export ${ptz}speedfocus_max="03"        # specify maxmimum speed value of focus
export ${ptz}presetid_min="01"             # specify minimum value of preset index
export ${ptz}presetid_max="14"           # specify maxmimum value of preset index

# ================== Command Set ========================
```

```
# Move Left command
command1="00"
command2="04"
data1="[speedpan]"    # The server will fill the responding speed value according to
                      # current speed settings
data2="00"
c1="$header[camid]$command1$command2$data1$data2"
command1="00"
command2="00"
data1="00"
data2="00"
c2="$header[camid]$command1$command2$data1$data2"
export ${ptz}move_left="$c1;$c2"    # This command is composed of 2 commands.
export ${ptz}move_left_motion=0
…
}
```

Please note that [camid] and [index] will be replaced by the actual value. For example, if the user uses CGI command that specifies the *cameraid* field and in this case the video server will use this value to replace [camid] to generate correct command to PTZ camera.

In other hand, while the commands are composed by multiple commands, please use ';' as the separator.For example, cam_goto="FF303100A4EF**;**FF30300063EF**;…**". These commands will be sent with a certain delay/gap time among the commands which is defined in var_GeneralGapTime variable.

The following table lists the operation supported in the driver script. By surveying several popular products in the market, most of them use ^ (XOR), + (sum) and % (modulo). We've added some operations for future uses.

[variable**]** → variable name, e.g. [camid]
[b01] → first byte, [b02] → second byte, [b0A], [b##] → nth byte of response message/command, [b##] means the last byte.
; → command separator, e.g. click_image="FF303100A4EF**;**FF30300063EF**…**"
+ → Add operation
- → subtract operation
% → modulo operation

^	→ XOR operation
&	→ AND operation
|	→ OR operation
>	→ Shift right operation
<	→ Shift left operation
.	→ Until to, e.g. checksum=[b02]+.[b##] means sum of the second byte until the last byte
(@X)	→ Get ASCII value for the characters in the brackets, e.g. (@0) → 30h
(X)	→ Get Ordinal value for the ASCII character in the brackets. (30) → 0

For example, we take the Canon VC-C4 camera – move left command format as the following figure.

● Format of Control Code

d0	d1	d2	d3	d4	d5	d6
Header	Device Num		Command		Parameter	End mark
FFh	30h	3Xh	00h	53h	32h	EFh

● Answer Format

d0	d1	d2	d3	d4	d5
Header	Device Num		Error Code		End mark
EFh	30h	3Xh	e0	e1	EFh

We assume camera ID is 1. Therefore, we should send the "0xFF 0x30 0x31 0x00 0x53 0x32 0xEF" to PTZ camera for moving to left. Next, we define the "move_left" which should be written by the user with the corresponding left command, i.e. move_left=" 0xFF 0x30 0x31 0x00 0x53 0x32 0xEF".