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- Note 1) **BYT2=00**, the device under control will not return the 13-bytes command
BYT2=80, the device under control will not return the 13-bytes command after receiving commands and finished related operation
- 2) **BYT3=00**, switched to CVBS channel;
BYT3=03, switched to VGA channel;
BYT3=04, switched to DVI channel;
BYT3=05, switched to HDMI channel;
- 3) **BYT4~BYT11** have no practical meaning, set it as 0;
- * This command only works under switching state

2、PIP Mode (01)

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	01	XX	00	00	00	00	00	00	00	00	ChkSum

- Note 1) **BYT2=01**, the device under control will not return the 13-bytes command
BYT2=81, the device under control will not return the 13-bytes command after receiving commands and finished related operation
- 2) **BYT3=00**, close PIP/POP;
BYT3=01, enter PIP/POP Prep state;
- 3) **BYT4~BYT11** no practical meaning, set it as 0;
- * This command only works under the state of “cut switching” and PIP/POP Prep state

3、PIP channel switching(02)

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	02	XX	00	00	00	00	00	00	00	00	ChkSum

- Note 1) **BYT2=02**, the device under control will not return the 13-bytes command
BYT2=82, the device under control will not return the 13-bytes command after receiving commands and finished related operation
- 2) **BYT3=00**, PIP/POP channel is CVBS;
BYT3=03, PIP/POP channel is VGA;
BYT3=04, PIP/POP channel is DVI;
BYT3=05, PIP/POP channel is HDMI;
- 3) **BYT4~BYT11** have no practical meaning, set it as 0;
- * This command only works under PIP/POP Prep state or PIP/POP state

6、BYPASS(05)

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	05	XX	00	00	00	00	00	00	00	00	ChkSum

- Note 1) **BYT2=05**, the device under control will not return the 13-bytes command

BYT2=85, the device under control will not return the 13-bytes command after receiving commands and finished related operation

2) **BYT3=00**, close BYPASS;

BYT3=01, open BYPASS;

3) **BYT4~BYT11** have no practical meaning, set it as 0;

* This command only works under the state of “cut switching”.

8、FREEZE(07)

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	07	XX	00	00	00	00	00	00	00	00	ChkSum

Note 1) **BYT2=07**, the device under control will not return the 13-bytes command

BYT2=87, the device under control will not return the 13-bytes command after receiving commands and finished related operation

2) **BYT3=00**, close FREEZE;

BYT3=01, open FREEZE;

3) **BYT4~BYT11** have no practical meaning, set it as 0

* This command only works under the state of “cut switching”.

9、VGA-AUTO(08)

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	08	00	00	00	00	00	00	00	00	00	ChkSum

Note 1) **BYT2=08**, the device under control will not return the 13-bytes command

BYT2=88, the device under control will not return the 13-bytes command after receiving commands and finished related operation

2) **BYT3~BYT11** have no practical meaning, set it as 0;

* This command only works while switching and under the state of VGA channel.

10、Settings of output resolution (09)

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	09	XX	00	00	00	00	00	00	00	00	ChkSum

Note 1) **BYT2=09**, the device under control will not return the 13-bytes command

BYT2=89, the device under control will not return the 13-bytes command after receiving commands and finished related operation

2) **BYT3=00**, the output resolution set is 1024x768@60Hz;

BYT3=01, the output resolution set is 1024x768@75Hz;

BYT3=02, the output resolution set is 1280x1024@60Hz;

BYT3=03, the output resolution set is 1280x1024@75Hz;

BYT3=04, the output resolution set is 1600x1200@60Hz;

BYT3=05, the output resolution set is 1920x1080@50Hz;

BYT3=06, the output resolution set is 1920x1080@60Hz;

BYT3=07, the output resolution set is 1366x768@60Hz;
BYT3=08, the output resolution set is 1440x900@60Hz;
BYT3=09, the output resolution set is 2048x1152@60Hz;
BYT3=10, the output resolution set is 2560x816@60Hz;
BYT3=0A, the output resolution set is 2304x1152@60Hz;
BYT3=0B, the output resolution set is 1920x1200@60Hz;
BYT3=0C, the output resolution set is 1200x1600@60Hz;
BYT3=0D, the output resolution set is 1080x1920@60Hz;
BYT3=0E, the output resolution set is 1536x1536@60Hz;
BYT3=0F, the output resolution set is 1536x1536@60Hz;

3) **BYT4~BYT11** have no practical meaning, set it as 0;

*After the output resolution is set, please wait for 10s;

11、 Settings of output images' size and position (0A)

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	0A	00	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

Note 1) **BYT2=0A**, the device under control will not return the 13-bytes command

BYT2=8A, the device under control will not return the 13-bytes command after receiving commands and finished related operation

2) **BYT3** have no practical meaning, set it as 0;

3) **BYT4**, 8 high bits of output image's horizontal initial point;

4) **BYT5**, 8 low bits of output image's horizontal initial point;

5) **BYT6**, 8 high bits of output image's width;

6) **BYT7**, 8 low bits of output image's width;

7) **BYT8**, 8 high bits of output image's vertical initial point;

8) **BYT9**, 8 low bits of output image's vertical initial point;

9) **BYT10**, 8 high bits of output image's height;

10) **BYT11**, 8 low bits of output image's height;

* Limitation of the range of set parameters:

* vertical value of initial point +value of image's width<the maximum width of output resolution;

* horizontal value of initial point +value of image's height<the maximum height of output resolution;

12、 Settings for images' size and position of PIP Mode 1 (0B)

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	0B	00	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

Note 1) **BYT2=0B**, the device under control will not return the 13-bytes command

BYT2=8B, the device under control will not return the 13-bytes command after receiving commands and finished related operation

2) **BYT3=00**, settings of the images' size and position through the main channel;

BYT3=01, settings of the images' size and position through the subsidiary channel;

- 3) **BYT4**, 8 high bits of output image's horizontal initial point;
- 4) **BYT5**, 8 low bits of output image's horizontal initial point;
- 5) **BYT6**, 8 high bits of output image's width;
- 6) **BYT7**, 8 low bits of output image's width;
- 7) **BYT8**, 8 high bits of output image's vertical initial point;
- 8) **BYT9**, 8 low bits of output image's vertical initial point;
- 9) **BYT10**, 8 high bits of output image's height;
- 10) **BYT11**, 8 low bits of output image's height;
- * Limitation of the range of set parameters:
 *horizontal value of initial point +value of image's height<the maximum height of output resolution;
 * vertical value of initial point +value of image's width<the maximum width of output resolution;

13、 Settings for images' size and position of PIP Mode 2 (0C)

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	0C	00	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

- Note 1) **BYT2=0C**, the device under control will not return the 13-bytes command
BYT2=8C, the device under control will not return the 13-bytes command after receiving commands and finished related operation
- 2) **BYT3=00**, settings of the images ' size and position through the main channel;
 =01, settings of the images ' size and position through the subsidiary channel;
 - 3) **BYT4**, 8 high bits of output image's horizontal initial point;
 - 4) **BYT5**, 8 low bits of output image's horizontal initial point;
 - 5) **BYT6**, 8 high bits of output image's width;
 - 6) **BYT7**, 8 low bits of output image's width;
 - 7) **BYT8**, 8 high bits of output image's vertical initial point;
 - 8) **BYT9**, 8 low bits of output image's vertical initial point;
 - 9) **BYT10**, 8 high bits of output image's height;
 - 10) **BYT11**, 8 low bits of output image's height;
 - * Limitation of the range of set parameters:
 * horizontal value of initial point +value of image's height<the maximum height of output resolution;
 * vertical value of initial point +value of image's width<the maximum width of output resolution;

14、 Settings for images' size and position of PIP Mode 3 (0D)

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	0D	00	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

- Note 1) **BYT2=0D**, the device under control will not return the 13-bytes command
BYT2=8D, the device under control will not return the 13-bytes command after receiving commands and finished related operation
- 2) **BYT3=00**, settings of the images ' size and position through the main channel;

=01, settings of the images ' size and position through the subsidiary channel;

- 3) **BYT4**, 8 high bits of output image's horizontal initial point;
- 4) **BYT5**, 8 low bits of output image's horizontal initial point;
- 5) **BYT6**, 8 high bits of output image's width;
- 6) **BYT7**, 8 low bits of output image's width;
- 7) **BYT8**, 8 high bits of output image's vertical initial point;
- 8) **BYT9**, 8 low bits of output image's vertical initial point;
- 9) **BYT10**, 8 high bits of output image's height;
- 10) **BYT11**, 8 low bits of output image's height;

* Limitation of the range of set parameters:

* horizontal value of initial point +value of image's height<the maximum height of output resolution;

* vertical value of initial point +value of image's width<the maximum width of output resolution;

18、 Settings of brightness (11)

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	11	XX	00	00	00	00	00	00	00	00	ChkSum

Note 1) **BYT2**=11, the device under control will not return the 13-bytes command

BYT2=91, the device under control will not return the 13-bytes command after receiving commands and finished related operation

2) **BYT3**, image brightness value, ranged of 0~100/0~64, this depends on the brightness level set in the processor;

3) **BYT4**~**BYT11** have no practical meaning, set it as 0;

19、 Settings of color (12)

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7		BYT8	BYT9	BYT10	BYT11	BYT12
05	01	12	XX	00	00	00	00		00	00	00	00	ChkSum

Note 1) **BYT2**=12, the device under control will not return the 13-bytes command

BYT2=92, the device under control will not return the 13-bytes command after receiving commands and finished related operation

2) **BYT3**, images' color value, range of 0~100;

3) **BYT4**~**BYT11** have no practical meaning, set it as 0;

20、 Settings of definition (13)

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	11	XX	00	00	00	00	00	00	00	00	ChkSum

Note 1) **BYT2**=11, the device under control will not return the 13-bytes command

BYT2=91, the device under control will not return the 13-bytes command after receiving commands and finished related operation

0	1	2	3	4	5	6	7	8	9	0	1	
05	01	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

- A) **BYT3=00** indicates the current state is PIP/POP Mode 1;
BYT3=01 indicates the current state is PIP/POP Mode 2;
BYT3=02 indicates the current state is PIP/POP Mode 3;
- B) **BYT4** high bits of the main channel's horizontal initial point;
- C) **BYT5** low bits of the main channel's horizontal initial point;
- D) **BYT6** high bits of main channel's width;
- E) **BYT7** low bits of main channel's width;
- F) **BYT8** high bits of the main channel's vertical initial point;
- G) **BYT9** low bits of the main channel's vertical initial point;
- H) **BYT10** high bits of main channel's height;
- I) **BYT11** low bits of main channel's height;

BYT3=02, the controlled device will return 13 readable data to indicate sub parameter of PIP/POP;

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

- B) **BYT3=00** indicates the current state is PIP/POP Mode 1;
BYT3=01 indicates the current state is PIP/POP Mode 2;
BYT3=02 indicates the current state is PIP/POP Mode 3;
- B) **BYT4** high bits of the subsidiary channel's horizontal initial point;
- C) **BYT5** low bits of the subsidiary channel's horizontal initial point;
- D) **BYT6** high bits of subsidiary channel's width;
- E) **BYT7** low bits of subsidiary channel's width;
- F) **BYT8** high bits of the subsidiary channel's vertical initial point;
- G) **BYT9** low bits of the subsidiary channel's vertical initial point;
- H) **BYT10** high bits of subsidiary channel's height;
- I) **BYT11** low bits of subsidiary channel's height;

BYT3=03, the controlled device will return 13 readable data to show the output parameters;

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

- A) **BYT3=00**, the output resolution is 1024x768@60Hz;
BYT3=01, the output resolution is 1024x768@75Hz;
BYT3=02, the output resolution is 1280x1024@60Hz;
BYT3=03, the output resolution is 1280x1024@75Hz;
BYT3=04, the output resolution is 1600x1200@60Hz;
BYT3=05, the output resolution is 1920x1080@50Hz;
BYT3=06, the output resolution is 1920x1080@60Hz;
BYT3=07, the output resolution is 1366x768@60Hz;

- BYT3=08**, the output resolution is 1440x900@60Hz;
- BYT3=09**, the output resolution is 2048x1152@60Hz;
- BYT3=10**, the output resolution is 2560x816@60Hz;
- BYT3=0A**, the output resolution is 2304x1152@60Hz;
- BYT3=0B**, the output resolution is 1920x1200@60Hz;
- BYT3=0C**, the output resolution is 1200x1600@60Hz;
- BYT3=0D**, the output resolution is 1080x1920@60Hz;
- BYT3=0E**, the output resolution is 1536x1536@60Hz;
- BYT3=0F**, the output resolution is 1536x1536@60Hz;

- B) **BYT4** high bits of the main channel's horizontal initial point;
- C) **BYT5** low bits of the main channel's horizontal initial point;
- D) **BYT6** high bits of main channel's width;
- E) **BYT7** low bits of main channel's width;
- F) **BYT8** high bits of the main channel's vertical initial point;
- G) **BYT9** low bits of the main channel's vertical initial point;
- H) **BYT10** high bits of main channel's height;
- I) **BYT11** low bits of main channel's height;

BYT3=05, this controlled device will return 13 readable data to show other parameters;

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

- A) **BYT3** brightness;
- B) **BYT4** contrast ratio;
- C) **BYT5** saturation;
- D) **BYT6** definition;
- E) **BYT7** remained;
- F) **BYT8** indicates the brightness level, 0=0~64/1=0~100;
- G) **BYT9~BYT11** remained;

BYT3=07, this controlled device will return 13 readable data to show the main parameters of PIP/POP Mode 1;

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

- A) **BYT3=00**;
- B) **BYT4** high bits of the main channel's horizontal initial point;
- C) **BYT5** low bits of the main channel's horizontal initial point;
- D) **BYT6** high bits of main channel's width;
- E) **BYT7** low bits of main channel's width;
- F) **BYT8** high bits of the main channel's vertical initial point;
- G) **BYT9** low bits of the main channel's vertical initial point;

- H) **BYT10** high bits of main channel's height;
- I) **BYT11** low bits of main channel's height;

BYT3=08, this controlled device will return 13 readable data to show the subsidiary parameters of PIP/POP Mode 1;

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	ChkSu m

- A) **BYT3=00**;
- B) **BYT4** high bits of the subsidiary channel's horizontal initial point;
- C) **BYT5** low bits of the subsidiary channel's horizontal initial point;
- D) **BYT6** high bits of subsidiary channel's width;
- E) **BYT7** low bits of subsidiary channel's width;
- F) **BYT8** high bits of the subsidiary channel's vertical initial point;
- G) **BYT9** low bits of the subsidiary channel's vertical initial point;
- H) **BYT10** high bits of subsidiary channel's height;
- I) **BYT11** low bits of subsidiary channel's height;

BYT3=09, this controlled device will return 13 readable data to show the main parameters of PIP/POP Mode 2;

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	ChkSu m

- A) **BYT3=01**;
- B) **BYT4** high bits of the main channel's horizontal initial point;
- C) **BYT5** low bits of the main channel's horizontal initial point;
- D) **BYT6** high bits of main channel's width;
- E) **BYT7** low bits of main channel's width;
- F) **BYT8** high bits of the main channel's vertical initial point;
- G) **BYT9** low bits of the main channel's vertical initial point;
- H) **BYT10** high bits of main channel's height;
- I) **BYT11** low bits of main channel's height;

BYT3=0A, this controlled device will return 13 readable data to show the subsidiary parameters of PIP/POP Mode 2;

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	ChkSu m

- A) **BYT3=01**;
- B) **BYT4** high bits of the subsidiary channel's horizontal initial point;
- C) **BYT5** low bits of the subsidiary channel's horizontal initial point;
- D) **BYT6** high bits of subsidiary channel's width;

- E) **BYT7** low bits of subsidiary channel's width;
- F) **BYT8** high bits of the subsidiary channel's vertical initial point;
- G) **BYT9** low bits of the subsidiary channel's vertical initial point;
- H) **BYT10** high bits of subsidiary channel's height;
- I) **BYT11** low bits of subsidiary channel's height;

BYT3=0B, this controlled device will return 13 readable data to show the main parameters of PIP/POP Mode 3;

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

- A) **BYT3=02**;
- B) **BYT4** high bits of the main channel's horizontal initial point;
- C) **BYT5** low bits of the main channel's horizontal initial point;
- D) **BYT6** high bits of main channel's width;
- E) **BYT7** low bits of main channel's width;
- F) **BYT8** high bits of the main channel's vertical initial point;
- G) **BYT9** low bits of the main channel's vertical initial point;
- H) **BYT10** high bits of main channel's height;
- I) **BYT11** low bits of main channel's height;

BYT3=0C, this controlled device will return 13 readable data to show the subsidiary parameters of PIP/POP Mode 3;

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	ChkSum

- A) **BYT3=02**;
- B) **BYT4** high bits of the subsidiary channel's horizontal initial point;
- C) **BYT5** low bits of the subsidiary channel's horizontal initial point;
- D) **BYT6** high bits of subsidiary channel's width;
- E) **BYT7** low bits of subsidiary channel's width;
- F) **BYT8** high bits of the subsidiary channel's vertical initial point;
- G) **BYT9** low bits of the subsidiary channel's vertical initial point;
- H) **BYT10** high bits of subsidiary channel's height;
- I) **BYT11** low bits of subsidiary channel's height;

25、Set PIP/POP Mode(18)

BYT0	BYT1	BYT2	BYT3	BYT4	BYT5	BYT6	BYT7	BYT8	BYT9	BYT10	BYT11	BYT12
05	01	18	XX	00	00	00	00	00	00	00	00	ChkSum

Note 1) **BYT2=18**, the device under control will not return the 13-bytes command

BYT2=98, the device under control will not return the 13-bytes command after receiving

commands and finished related operation

- 2) **BYT3=00**, set it as PIP Mode 1;
BYT3=01, set it as PIP Mode 2;
BYT3=02, set it as PIP Mode 3;
- 3) **BYT4~BYT11** have no practical meaning, set it as 0;

26、Set seamless switching mode/fade in and fade out(19)

BYT 0	BYT 1	BYT 2	BYT 3	BYT 4	BYT 5	BYT 6	BYT 7	BYT 8	BYT 9	BYT1 0	BYT1 1	BYT12
05	01	19	XX	00	00	00	00	00	00	00	00	ChkSu m

Note 1) **BYT2=19**, the device under control will not return the 13-bytes command

BYT2=99, the device under control will not return the 13-bytes command after receiving commands and finished related operation

- 2) **BYT3=00**, seamless switching;
BYT3=01, fade in and fade out 0.5s;
BYT3=02, fade in and fade out 1.0s;
BYT3=03, fade in and fade out 1.5s;
- 3) **BYT4~BYT11** have no practical meaning, set it as 0;

4、Software design

- 1、 Firstly, configure COM port;
- 2、 Then select this device's number (by pressing Info button or setup button on the front panel);
- 3、 Test whether the communication via COM port is OK or not (execute a command about reading the state of this device and check whether it can be returned successfully or not) ;
- 3、 Then read the basic configuration and the current state;
- 4、 Periodically, it is enabled to read the basic configuration and the current state to estimate whether the device finishes carrying out the commands sent by software;
- 5、 In order to receive those instructions successfully and carry out those operations, some of those instructions are set with an "return" option, namely, the highest digit is set as 1. It is suggested to set for this option.