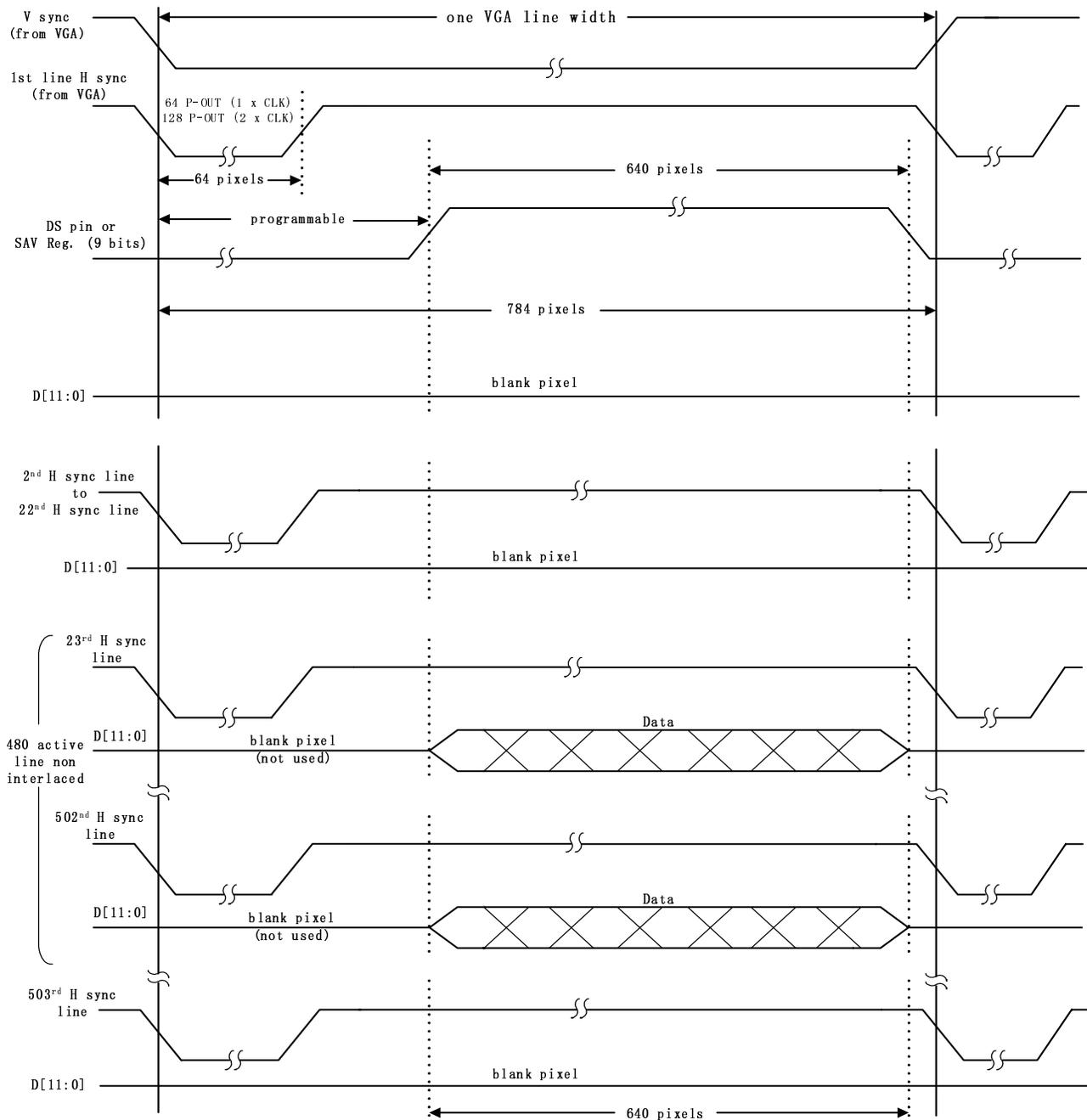
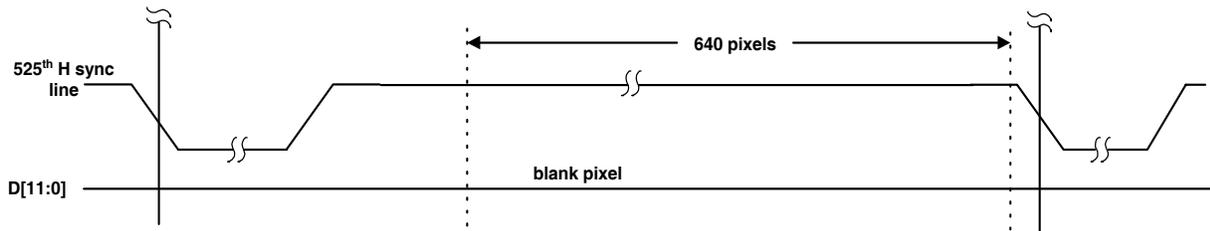


Input/Output Timing Diagram of CH70XX TV Encoders

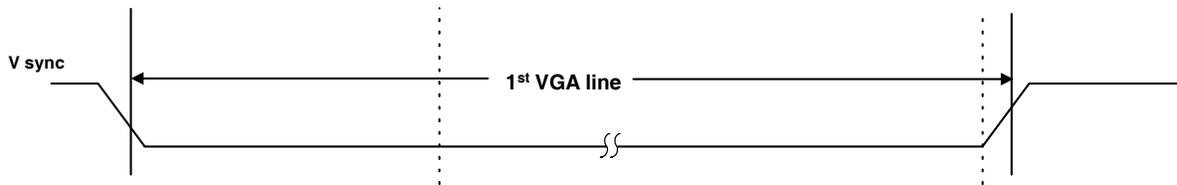
This Technical Bulletin shows a paradigm of CH70XX TV Encoder input/output timing diagram. The display mode 16: NTSC 640 x 480 with scale factor 1:1 is used as the example here.

Input Signal From VGA (1st Frame), Assume 1 x CLK / 2 x CLK of Pixel Clock.





Input signal from VGA (2nd frame)



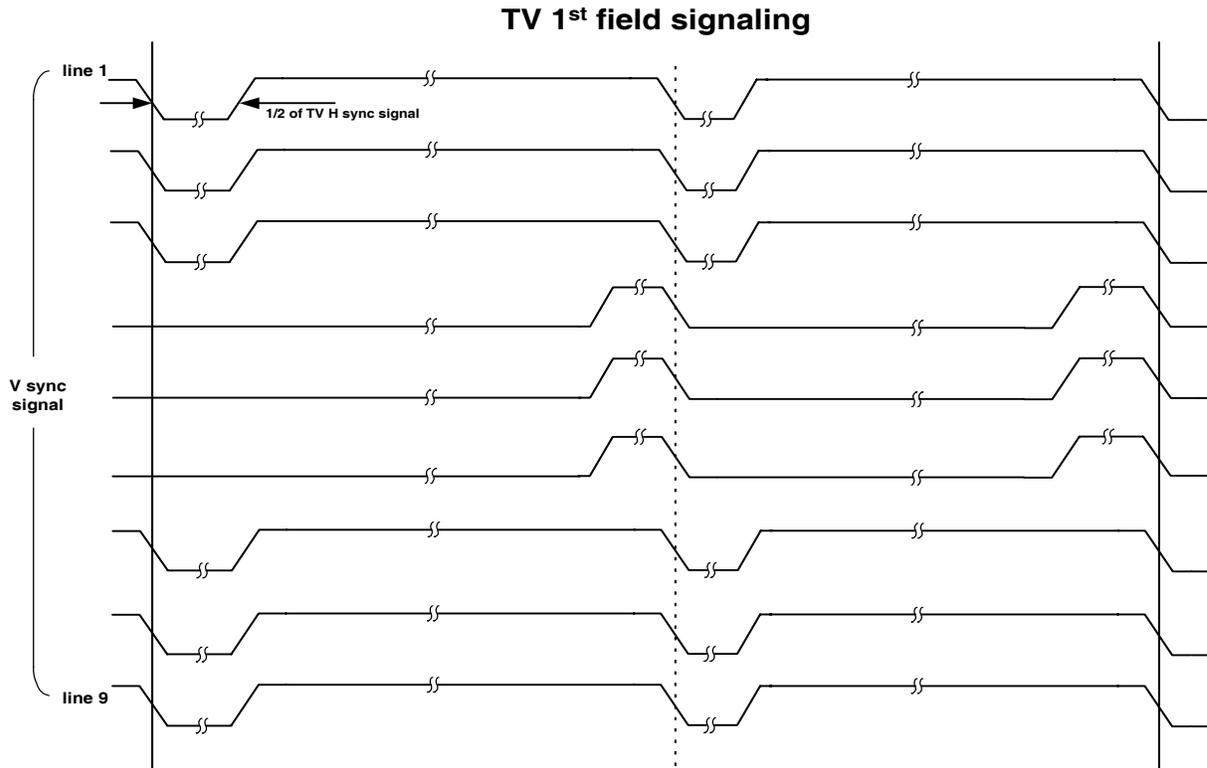
Other signal is repeated as shown in 1st frame.

Note: The display mode details and the relationship of XCLK and D[11:0], please refer to the CH70XX data sheet for detail.

The TV Encoder of CH70XX will take the 1st frame from VGA inputs, decimate 240 lines from 480 active lines and convert the signal to TV output format in the 1st field. The 2nd field of TV signal is converted from the 2nd VGA frame. The 1st field and the 2nd field together compose one TV frame.

TV-Output Format (NTSC, 59.94Hz, 525 lines)

The TV encoder of CH70XX will Synchronize with V sync and H sync from VGA to generate and insert 3 lines of pro-equalizing pulses, 3 lines of vertical sync pulses and 3 lines of post-equalizing pulses, (please refer CH70XX data sheet for detail).



Note: Please refer the data sheet, which is defined the H sync pulse width (Parameter B).

For this mode, the frequency is 24.671329MHz. The Horizontal frequency

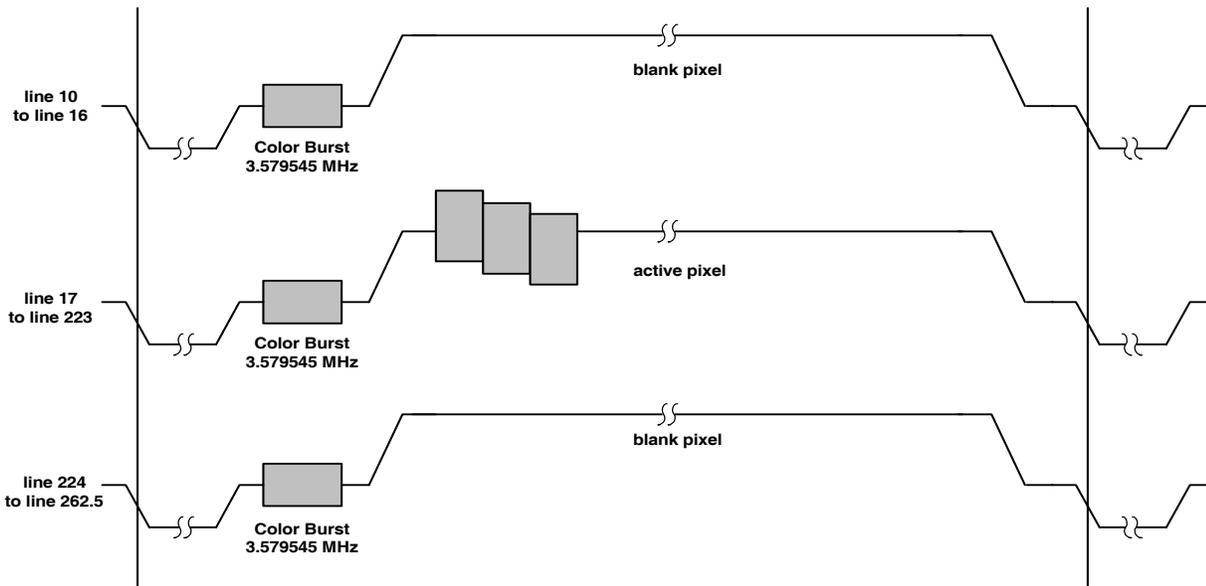
$$f_H = \frac{24.671329 \text{ MHz}}{784 \text{ pixels}} = 31.46853 \text{ KHz}$$

or 31.7777 祄 / VGA line

In order to meet the TV-output line frequency, which is

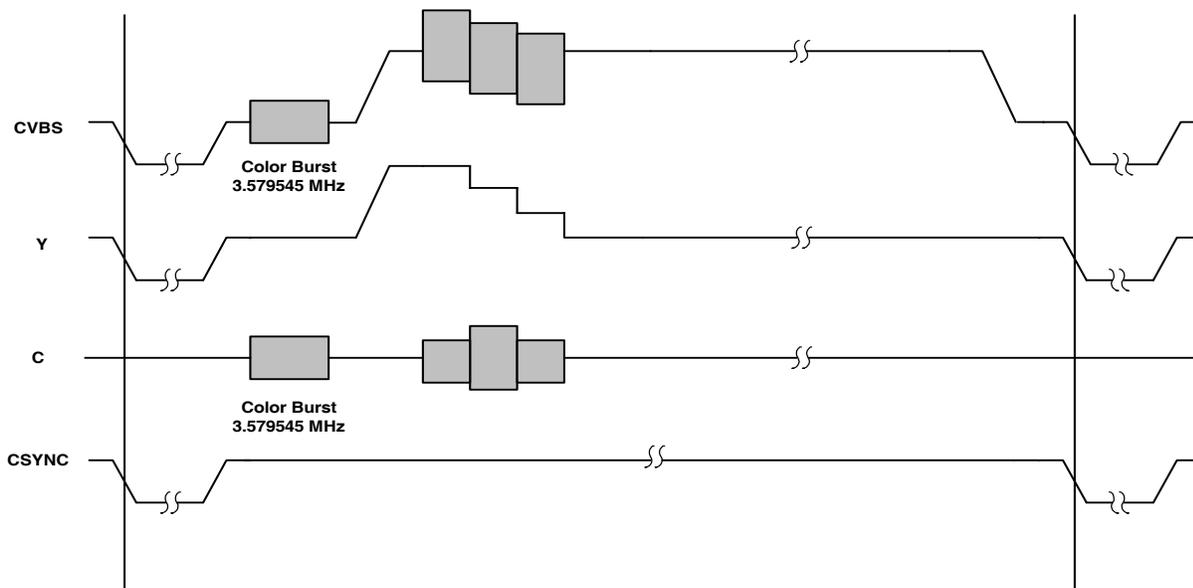
$$\frac{1}{59.94 \times \frac{525}{2}} = 63.5556 \text{ 祄 / TV line}$$

TV encoder for this mode will double each pixels (784 x 2) for each line and decimate 240 lines after some internal signal processing.



After VGA 1st frame has been processed, VGA 2nd frame is used to convert the TV 2nd field. The process is repeated as shown above, these two fields will be interlaced by TV.

If we look at the TV encoder output pins (CVBS, Y, C and CSYNC), we will have the following line signaling for each pin.



By the way, CSYNC is used in SCART mode which uses R, G and B signals most of the time.

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