

User's Manual

for

BT601Pro SDI Mod. Kit

Pixel Magic Systems Ltd.
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1. Warning:

It is assumed that you have already fully understood the pin assignments of the MPEG decoder in your DVD player / set-top box and have the skill to do the modification. Pixel Magic Systems Ltd. is not responsible for any damage caused during the modification.

2. Introduction:

The BT601Pro SDI Mod. Kit converts the standard parallel BT601/BT656 digital video signal generated by the MPEG decoders of DVD players or set-top boxes to SDI (Serial Digital Interface) signal for video signal transmission in order to avoid unnecessary digital-to-analog and analog-to-digital conversions which will cause video quality loss. SDI can keep video signal digital, from the source to the video processor / scaler then to the digital displays, i.e. the highest video picture quality.

2. Features:

- Standard compliant SDI output, compatible with major SDI capture devices
- Supports major DVD players and set-top boxes with ITU BT601/BT656 video output
- Provides 1 SDI output
- One BNC connector is pre-installed for easy installation
- Provides fully digital output directly from a MPEG decoder to SDI capture card/video processor
- Status LED turns on when 27MHz clock signal is detected
- Color ribbon cable are included to facilitate the installation

3. System Requirements:

- The video signal from the MPEG decoder must be ITU BT601 compliant (8-bit video data with embedded sync + 27MHz video clock).
- DC 5V (usually provided by the DVD player or the set-top box) is required to power the kit.

4. Specifications:

-Dimensions (H x W x D): 1.5cm x 5cm x 4cm, 1.5cm x 7cm x 4cm including the BNC connectors

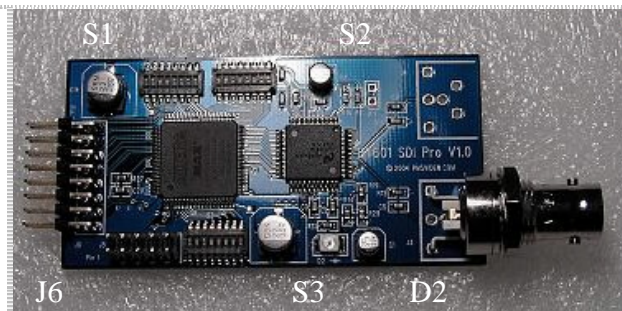
-Power consumption: 0.3W

-One Serial Digital Interface (SDI) Output

-One BT601/BT656 Input LED Indicator

-Table 1, PIN assignments:

- LED (D2) lights up when 27MHz clock signal is detected.



- D0 & D1 are for 10-bits SDI applications, they are not used for DVD/set top box SDI modification.
- 8bits (D2-D9).
 - D2 is the less significant bit.
 - D9 is the most significant bit.
- Clock
- Ground
- VSYNC/Field-id
- HSYNC
- +5V
- GND

(Twisted clock and ground cable may lower the noise of the clock signal)

Pin-color relationship
D0 – brown
D1 – red
D2 – orange
D3 – yellow
D4 – green
D5 – blue
D6 – purple
D7 – grey
D8 – white
D9 – Black
CLK – Brown
GND – Red
HSync – Orange
VSync/F – Yellow
GND – Green
+5V – Blue

6. Installation:

1. Connect all D2-D9 pins to the appropriate MPEG decoder output pins of your DVD player or set-top box. The D0 and D1 pins are not used because the digital video output of the MPEG decoders in the DVD players and set-top boxes is 8-bit data only.
2. Connect the 5 volt and ground to the appropriate location on the circuit board of the DVD player or set-top box.

7. Configuration

There are three 8-bit DIP switches to configure the BT601Pro SDI mod kit.

Table 2-1: S1 definition

1	2	3	4	5	6	7	8
HPOLARITY	HOFFSET10	HOFFSET9	HOFFSET8	BT601 Mode	VPOLARITY	HDiff1	HDiff0

Table 2-2: S2 definition

1	2	3	4	5	6	7	8
VOFFSET7	VOFFSET6	VOFFSET5	VOFFSET4	VOFFSET3	VOFFSET2	VOFFSET1	VOFFSET0

Table 2-3: S3 definition

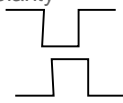
1	2	3	4	5	6	7	8
HOFFSET7	HOFFSET6	HOFFSET5	HOFFSET4	HOFFSET3	HOFFSET2	HOFFSET1	HOFFSET0

For S1/S2/S3 switches, ON=0, OFF=1

HPOLARITY: H-sync polarity

0(ON): negative polarity

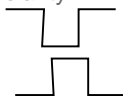
1(OFF): positive polarity



VPOLARITY: V-sync/F polarity

0(ON): negative polarity

1(OFF): positive polarity



BT601 MODE:

0(ON): the input signal is BT601 format; SAV/EAV will be inserted

1(OFF): pass-through mode, input signal is BT656 format (embedded sync)

HOFFSET:H-Sync offset, unit: clock cycle, total 11 bits (1 pixel=2 clock cycles)

Standard value: 862 (862 is the magic number which is corresponding to the standard position of H-sync based on ITU BT.601, the firmware of the BT601-Pro will automatically detect PAL or NTSC video format)

If H-Sync is N cycles ahead of the standard value, please set

HOFFSET= 862 - N, where N <= 862

If H-Sync is N cycles behind of the standard value, please set

HOFFSET= 862 + N, where N<=851

If the color of the picture is wrong (swapped Cr and Cb) or pink (swapped Y and Cr/Cb), please increase or decrease the HOFFSET value by M, where M=1, 2 or 3.

VOFFSET:V-sync/Field-id offset, unit: line, total: 8 bits

Standard value : 128 (128 is the magic number which is corresponding to the standard position of V-sync based on ITU BT.601, the firmware of the BT601-Pro will automatically detect PAL or NTSC video format)

If V-sync/Field-id is N lines ahead of the standard value, please set
VOFFSET= 128 – N, where N <= 128

If V-sync/Field-id is N lines behind of the standard value, please set
VOFFSET= 128 + N, where N <= 127

For most of the MPEG2 decoders, HOFFSET for NTSC is the same as HOFFSET for PAL. Some MPEG2 decoders (e.g. the one used in Denon 3910), the HOFFSET for NTSC is different from HOFFSET for PAL so we offer a parameter called HDiff to adjust the difference. In these cases, HOFFSET is an offset value for NTSC mode. For PAL mode, its offset value is the sum of HOFFSET and HDiff values. HDiff refers to the horizontal offset difference between NTSC and PAL and it is set with a value of 0 (setting 'ON' for both pin) as default so that the system will display image correctly both in NTSC and PAL mode. These settings aim at correcting the image color problem due to the color differences between PAL and NTSC color.

Default values:

+>**HPOLARITY: negative (ON)

VPOLARITY: negative (ON)

BT601 Mode: ON (input is BT601 signal)

HOFFSET: 862

VOFFSET: 128

HDiff: 0 (HOFFSET for NTSC = HOFFSET for PAL)

	1	2	3	4	5	6	7	8
S1	ON	ON	OFF	OFF	ON	ON	ON	ON
S2	OFF	ON	ON	ON	ON	ON	ON	ON
S3	ON	OFF	ON	OFF	OFF	OFF	OFF	ON

8. Finish:

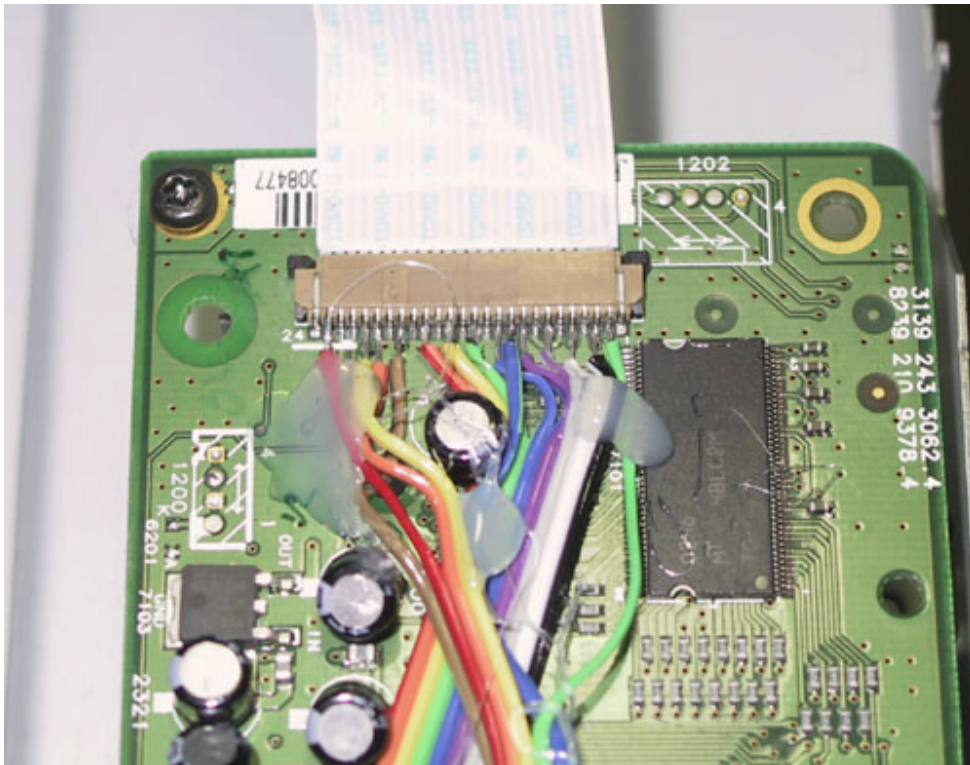
1. After the modification, power up the DVD player or set-top box and the LED (D2) on the kit should light up indicating that it is receiving a 27MHz clock signal from the MPEG decoder of the DVD - player or set-top box.
2. Connect BNC cables from the SDI output of this Mod. Kit to your SDI capture device.

Example: An SDI Mod. Kit installed on a Philips 963SA DVD player is shown in the following picture.



Example 1: the pin assignment of Philips 963SA's MPEG2 decoder (from left to right):

24 (Gnd) 21 (Field-id) 20 (H-sync) 18 (Clk) 16 (D2) 14 (D3) 12 (D4) 10 (D5) 9 (+5V) 8 (D6) 6 (D7) 4 (D8) 2 (D9) 1 (Gnd)



Settings of BT601Pro SDI Mod. Kit for Philips 963SA DVD player

	1	2	3	4	5	6	7	8
S1	ON	ON	OFF	OFF	ON	ON	ON	ON
S2	OFF	ON	ON	ON	ON	ON	ON	ON
S3	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF

Example 2: Settings of BT601Pro SDI Mod. Kit for Denon 3910 DVD player

	1	2	3	4	5	6	7	8
S1	ON	ON	OFF	OFF	ON	ON	OFF	OFF

S2	OFF	ON	ON	ON	ON	ON	ON	ON
S3	ON	OFF	ON	OFF	OFF	OFF	OFF	ON