

# DB02

## NTSC/PAL Video Encoder and Black-Burst Generator

### User Manual

Revision 0.1  
6<sup>th</sup> October 2023

## Revisions

Date	Revisions	Version
06-10-2023	First draft	0.1

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## 1. Introduction

DB02 is a broadcast quality video encoder for NTSC-M and PAL standards.

DB02 accepts serial digital interface (SDI) video at either 525i or 625i standards and converts this to a broadcast quality NTSC or PAL output (respectively). In the absence of any SDI input the DB02 outputs a black and burst signal. NTSC or PAL output can be selected by a switch allowing the DB02 to be used as a black-burst generator.

The analogue video output is available as single-ended (coaxial) or differential (UTP).

DB02 requires 12VDC which is provided via the supplied AC-DC converter.

## 2. Quick start guide

Connect the DB02 to the supplied AC/DC adaptor. Fit the appropriate blades to the adaptor for your country. Blades are supplied for North America, Europe, UK, China and Australia. The adaptor accepts AC between 90 and 264VAC – the full specification is provided in Appendix A.

The connections to the DB02 are shown in Figure 1.

Connect the 12VDC jack from the adaptor to the +12VDC ‘Power in’ socket on the DB02. The ‘Power On’ LED should light up blue.



**Figure 1 DB02 Connections.**

Connect your SDI video input to the SDI In input (BNC). The DB02 accepts either 525i or 625i video. The SDI Lock LED will light if the SDI input is valid.

The encoded video is available as either differential (UTP) or single-ended (coaxial). Both outputs may be used at the same time if required. The output standard follows the SDI input – NTSC if 525i and PAL if 625i. The NTSC/PAL select switch has no effect when the SDI input is connected.

The positive video output is on pin 1 of the RJ-45 connector and the inverted video is on pin 2.

In the absence of an SDI input the DB02 can act as a black-burst generator. A stable clock is used to drive the encoder and the output standard is selected by the NTSC/PAL switch (down for NTSC, up for PAL).

### 3. DB02 Technical Details

A simplified block diagram of the DB02 is shown in Figure 2.

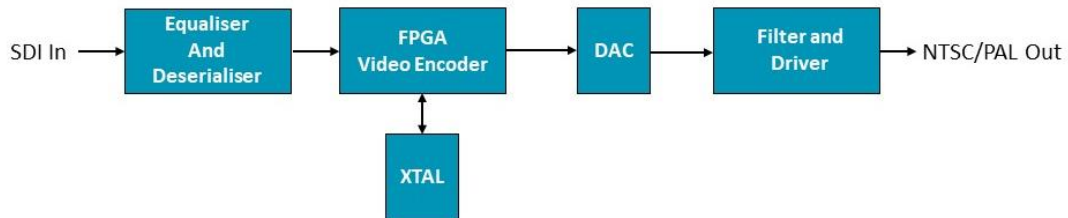


Figure 2 DB02 Block diagram.

The +12VDC from the AC/DC power adaptor is filtered and protected from over-range or reverse polarity inputs. The 12VDC input is then regulated to provide clean power supplies for the module.

The SDI input is equalized and de-serialised. The video encoder uses a variant of the SingMai PT8 IP core. The output from the IP core is 10-bit digital composite video. This is converted to analogue in a digital to analogue converter (DAC). The analogue video is then filtered to remove clock noise and reconstitute the video before being output as both differential and single-ended outputs. The single-ended output should be terminated in 75Ω and the differential output in 100Ω. The positive differential signal is on pin 1 of the RJ-45 connector and the negative signal on pin 2.

If there is no SDI input the encoder uses a crystal oscillator (XTAL) to generate a black and burst output.

## 4. Specification

Power:	+9-14V (+12VDC nominal) @ ~240mA (all outputs driven).
Dimensions:	120mm x 78mm x 27mm.
Video input:	SDI (SMPTE-259M). >15dB return loss.
Video output:	NTSC-M or PAL. 75Ω output impedance (coaxial), 100Ω output impedance (UTP).
Luma bandwidth:	5.75MHz ± 0.2dB.
Chroma bandwidth:	1.3MHz – 3.0dB.
Differential gain/phase:	<1%, <1°.
K-factor:	<1%.
Luma/chroma delay:	<10ns.
Operating temperature:	-10 – +40 degC.

## Appendix A: AC-DC adaptor

The specification for the supplied AC-DC adaptor is shown in Figures 3 and 4.

CUI Inc | SERIES: SM136 | DESCRIPTION: AC-DC POWER SUPPLY date 06/23/2022 | page 2 of 5

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**INPUT**

parameter	conditions/description	min	typ	max	units
voltage		90		264	Vac
frequency		47		63	Hz
current				1	A
inrush current	at 230 Vac, full load, 25°C, cold start			70	A
leakage current				0.25	mA
no load power consumption	at 115/230 Vac			0.075	W

**OUTPUT**

parameter	conditions/description	min	typ	max	units
regulation			±5		%
hold-up time	at full load	10			ms

**PROTECTIONS**

parameter	conditions/description	min	typ	max	units
over voltage protection	output shut down			180	%
over current protection	output shut down, auto recovery			170	%
short circuit protection	output shut down, auto recovery				

**SAFETY & COMPLIANCE**

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output at 10 mA for 1 minute		3,000		Vac
isolation resistance	input to output at 500 Vdc	10			MΩ
safety approvals	UL/cUL (60950-1, 62368-1), RCM, CCC, PSE, UKCA				
EMI/EMC	FCC Part 15B Class B, CE				
MTBF	as per Telcordia SR-332, 25°C	300,000			hours
RoHS	yes				

**ENVIRONMENTAL**

parameter	conditions/description	min	typ	max	units
operating temperature		0		40	°C
storage temperature		-20		80	°C
operating humidity	non-condensing	20		80	%
storage humidity	non-condensing	10		90	%

Figure 3 Power supply specification: electrical.

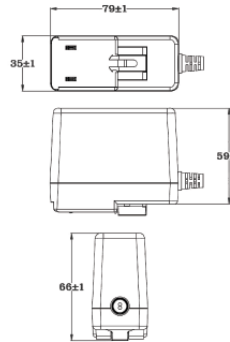


**MECHANICAL**

parameter	conditions/description	min	typ	max	units
dimensions	79 x 35 x 66				mm
inlet plug	interchangeable blades (North America, Europe, UK, Australia, China)				
ac blade clip type	pinch clip				
weight	without blades		160		g

**MECHANICAL DRAWING**

units: mm  
tolerance: ±1.0 mm



INTERCHANGEABLE BLADES					
BLADE DESIGNATOR	N	E	B	A	C
REGION	North America	Europe	UK	Australia	China
BLADE ACCESSORY	SMI-US-2	SMI-EU-2	SMI-UK-2	SMI-AU-2	SMI-CN-2
BLADE	US (N)	Europe (E)	UK (B)	Australia (A)	China (C)

**DC CORD**

units: mm

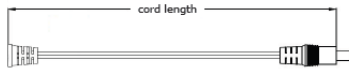


Table 1

MODEL NO.	CABLE	CORD LENGTH
SMI36-5	UL2468, 16 AWG	1,000 mm ±30
SMI36-9	UL2468, 18 AWG	1,500 mm ±30
SMI36-12	UL2468, 16 AWG	1,500 mm ±30
SMI36-15	UL2468, 18 AWG	1,500 mm ±30
SMI36-24	UL2468, 20 AWG	1,500 mm ±30
SMI36-48	UL2468, 22 AWG	1,500 mm ±30

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Figure 4 Power supply specification: mechanical.