3002 – Input selector for SPDIF digital audio TosLink (optical)

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Introduction

This BMM electronics DIY-kit contains a universal microcontroller operated input selector for TosLink SPDIF digital audio signals. It complies with digital audio formats IEC958 1989-03 and EIAJ CP-340 1987-9 standards with signal bit-rate 2 MHz (Fs=32 kHz), 2.8 MHz (Fs=44.1 kHz) or 3.1 MHz (Fs=48 kHz) and is compatible with any future standard up to Fs=192 kHz. It can be used with several digital audio equipment like CD, SACD, DVD, MD, computer ect. The input and output impedance for the circuit is 75 Ohm with a bandwidth from 100 kHz to 10 Mhz (no DC). Both Coax and TosLink outputs can be used simultaneously.

Power supply

Because of the built-in 5 volt voltage regulator the power supply to be used for this kit is not very critical. A simple 8V 1A transformer or an 8 to 10 volt DC wall-plug transformer will do nicely. Battery operation is possible but not recommended. The kit will only run for 15 minutes on a 9 volt NiMH rechargeable battery. The AC or DC voltage can be applied to the blue power supply terminals K1 regardless of polarity. The maximum power supply voltage must not exceed 10VAC or 12VDC.

Connecting the boards

Connect the main board and keyboard/display board with the supplied 3 and 10 pole cables. Plug one end of the 3 pole cable in K2 on the main board and the other end in K2 on the keyboard/display board. Plug one end of the 10 pole cable in K3 on the main board and the other end in K1 on the keyboard/display board.

Operation

When the power is turned on the LED for the previous selected input will light up after about 2 seconds and the input selector is ready to operate.

Two modes of operation are available, manual and automatic input selection.

Standard operation is set to manual. By pressing the "SKIP NEXT INPUT" SW1 button the selected input will advance by one. When the last input 8 is active and the SW1 button is pressed input one is selected. Every time the "SKIP NEXT INPUT" SW1 in pressed the selected input is stored in non-volatile memory. So when the supply voltage is removed the previous selected input is remembered and restored at power on.

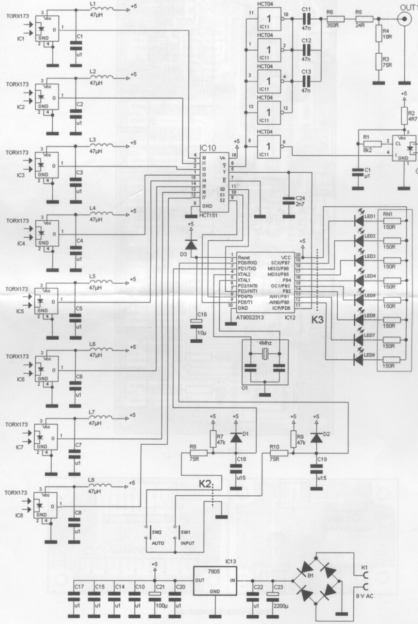
By pressing the "AUTO/MANUAL" SW2 button once the auto select mode is activated and inputs will be scanned one by one until a valid input signal is detected. While scanning the LED corresponding with the selected input will blink for one second and then advance to the next input. When a valid input signal is detected on the input the corresponding LED will blink to indicate that auto mode is active. When the input signal is "lost" after 1 second the next input is selected and so on. By pressing the "SKIP NEXT INPUT" SW1 or the "AUTO/MANUAL" SW2 once again the manual mode is restored and the selected input is stored in non-volatile memory.

Note that some CD and DVD players will output an SPDIF signal even when the disc has stopped playing. In this case the SPDIF signal is still valid for this device and the 3001 does not skip to the next input.

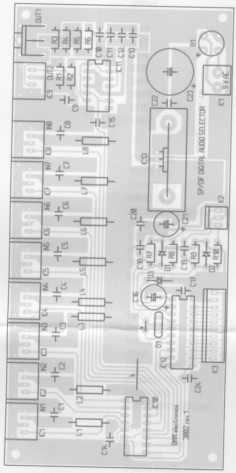
Specifications

SPDIF inputs	8x coaxial
COAX output	1x gold plated RCA
Vout	0.4Vpp .. 0.6Vpp, <0.05Vdc (75ohm)
Zout	75ohm +/-20% (100kHz .. 6Mhz)
Cable in/out	75ohm +/-5% (l<10m) or 75ohm +/-35% (l>10m)
TOSLINK output	1x optical
Bandwith	100kHz to 6Mhz
Datastreams	IEC60958 and IEC61937 (SPDIF)
Supported audio formats	PCM,MPEG2, AC3 and DTS
Supply voltage	8V AC 250mA
Dimensions base PCB	160 x 75mm
Dimensions control PCB	120 x 40mm

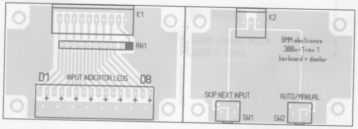
Schematic



Components layout



Main PCB



Keyboard/display board

Parts list

Resistors	Value	Quantity
R1	8K2	1
R2	4R7	1
R3,R8,R10	75R	3
R4	18R	1
R5	24R	1
R6	360R	1
R7,R9	47K	2
RN1	150R	1
Semiconductors		
IC1-IC8	TORX173	8
IC9	TOTX173	1
IC10	74HCT151	1
IC11	74HCT04	1
IC12	AT90S2313-B001	1
IC13	7805	1
IC8	TOTX173	1
B1	B40C1000	1
D1,D2,D3	1N4148	3
LED1-LED8	LED red 3mm	8
Capacitors		
C1-C8,C9,C10,C14,C15,C17,C20,C22	100nF	15
C24	2n2F	1
C18,C19	150nF	2
C11,C12,C13	47nF	3
C21	100uF/16V	1
C23	2200uF/16V	1
C16	10uF/35V	1
O1	CST4.00MGW osc	1
Mics.		
K1	2 pole screw terminal	1
K2	3 pole cable set	1
K3 (K1 on 300x)	10 pole cable set	1
SW1,SW2	Push button	2
8 way plastic LED holder		1
Heatsink	SK104-25	1
M3 x 10		1
OUT1	Gold plated RCA	1
PCB	3002 + 300x	1