

OCT608 Dynapic and Dynasim 8 coded Interface-Print with parallel and serial output

1 Introduction

The printed circuit board OCT608 is an interface to convert up to 8 Dynapic and Dynasim signals to logic levels. If more than 8 signals have to be processed, then several OCT608's can be connected together.

With some other elements mounted on the PCB, such as a 3V-batteryholder, one 16 coded switch, 9 LEDs and a buzzer, the OCT608 can be used as demoboard and as simple Dynapic and Dynasim tester.

2 Applications

The OCT608 is especially designed for applications such as a:

- demonstration tool for Dynapic and Dynasim keyboards.
- simple tester for Dynapic and Dynasim keyboards.
- Dynapic and Dynasim interface for feasibility studies and/or small quantities.

3 Description

The OCT608 contains mainly the following elements: one IC's DYSI-97PS, a 3V-batteryholder, 9 LEDs, a buzzer, a 16 coded switch and a DIP-socket to output the signals.

With one OCT608 up to 8 signals of a Dynapic or Dynasim keyboard can be converted to logic levels. If more than 8 signals have to be converted, then several OCT608's can be connected together. The keyboard connectors have 8 signal inputs and on each edge one pin connected to the common of the keyboard. In addition there are 2 pins "JP1, P1 + P2 in 12 poles connector" to connect a shield protection to 0V.

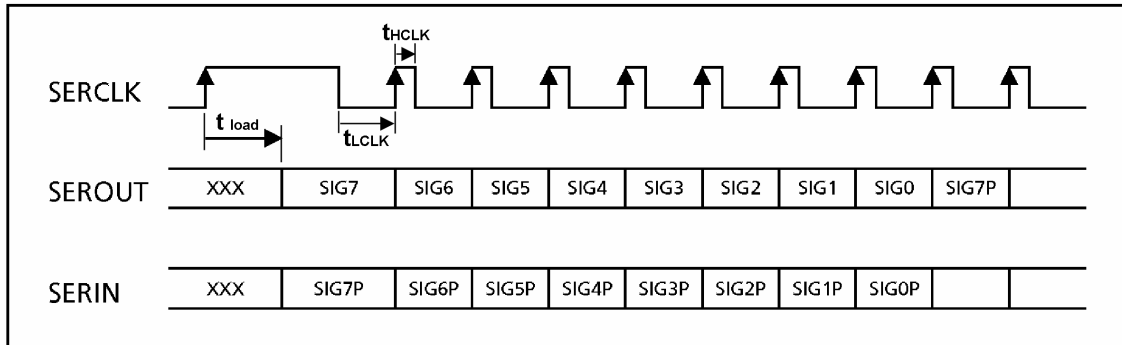
The 16 coded switch S2 offers 16 possible threshold's levels of DYSI-97PS according to table 1. Switch S1.2 switches on/off the battery power supply and switch S1.1 switches on/off the long duration state.

1 LED is on when the power is on (S1.2), the other 8 LEDs are on when the corresponding inputs and outputs are on.

Features:

- The output signals are active as long as a key is pressed (max. 25 seconds), or if TLIM is active, only a pulse is produced.
- The debounce circuit is realized inside the IC's DYSI-97.
- The following output signals (active "0") are accessible:
 - a) 8 outputs with 1 enable input
 - b) 1 serial output (and input)
 - c) 1 output (buzzer), which is active whenever a key is active.
- The 8 output signals can be read out in parallel (active "0"), when the signal „ENABLE“ is active ("0"). The signal „ENABLE“ is activated by default by means of a resistor. Several OCT608 can be connected in parallel, by connecting the related outputs together and activating the signals „ENABLE“ one by one.

- The output signals can also be read out serially. The output shift register is loaded by activating (set to "1") „SERCLK“ for a minimum time $t_{load} = 2\text{ms}$. After this time the output shift register is loaded and the first bit can be read out on the output „SEROUT“. Then the other data are shifted out to „SEROUT“ on every positive edge of the „SERCLK“. Several OCT608 can be connected together serially by connecting the „SEROUT“ of the previous OCT608 to the „SERIN“ of the next one.



- More detailed information on datasheet DYSI-97PS/PSK/S, item 4.4.
- The output signal „ACTIV“ is active ("0"), if at least one of the input signals Dynapic or Dynasim is active.
- A debouncing circuit filters out frequencies higher than approximately 30Hz. However, certain frequencies like $f=586\text{Hz} \pm 10\%$ and multiples of this frequency, may pose problems due to the sampling technique used in this circuit.
- The threshold for the Dynapic and Dynasim input signals is given by the amount of electrical charge, that the current sinks dissipate in average during the time of approx. 36ms. This threshold can be set by means of the coded switch S2.

Table 1: Setting the threshold for a specific actuation force

Position coded switch	Input threshold	Force for Dynapic metallic 0.5mm	Force for Dynasim PC 0.5mm
0	36pC		
1	60pC		
2	96pC		
3	156pC		
4	250pC		0.15 N
5	420pC		0.21 N
6	660pC		0.33 N
7	1,1nC	0.11 N	0.55 N
8	1.7nC	0.17 N	0.85 N
9	2.9nC	0.29 N	1,5 N
A	4.6nC	0.46 N	2.3 N
B	7,4nC	0.74 N	
C	12nC	1.2 N	
D	20nC	2.0 N	
E	32nC	3.2 N	
F	52nC	5.2 N	

All values are based on an oscillator frequency of 75kHz and a power supply of 3V.

Description of the Pins

VDD	Positive supply voltage of the ASIC.
VSS	Negative supply voltage of the ASIC.
INP0..INP7	Inputs to be connected to the external Dynapic and Dynasim switches. Unused inputs should be connected to VSS.
GUARD	Output and input connected to the threshold voltage may serve as guard ring voltage. The threshold voltage is set to approx. 1.7 V by connecting it to the LED9.
TLIM	Selection of the maximum time that the signal can be on when a switch is pressed. TLIM = "1" => t=24s. TLIM = "0" => t=0.2s.
SERIN	Serial input of the shift register. When multiple OCT608 are connected together this input can be connected to the SEROUT of the previous OCT608.
SEROUT	Serial output of the shift register, active "0". SEROUT = "0" => the corresponding switch has been pressed.
SERCLK	Shift register clock. The shift register is first loaded and then the data are shifted on a positive edge of this input.
ENOUT	Enable for the parallel outputs. On the OCT608 this input is activated by connecting a 10kOhm resistor to VSS.
OUT0...OUT7	Parallel output of the switch data, active "0". OUT = "0" => the corresponding switch has been pressed.
ACTIV	This open drain output is always active when at least one key is pressed.

4 Technical Data

All signals are CMOS compatible.

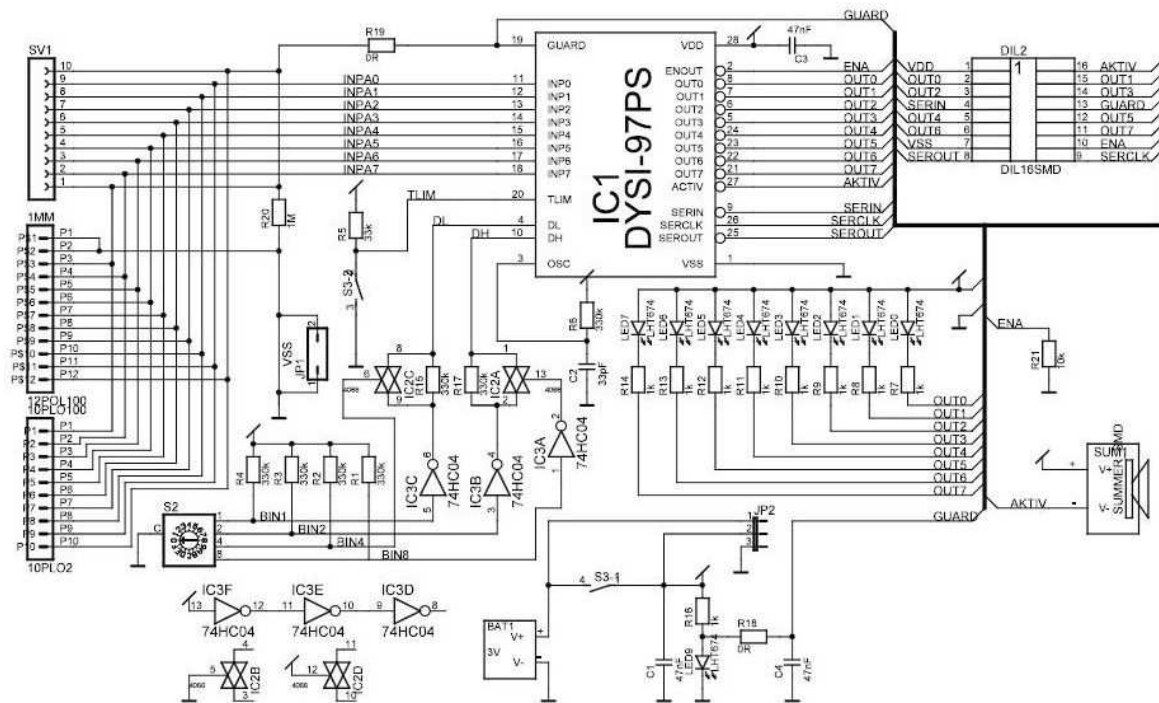
Operating Ratings

	Symbol	Min.	Typ.	Max.	Unit	Remarks
Supply Voltage	V_{DD}	2.7	3	6	V	
Quiescent device current	I_i		2	5	mA	$V_{DD} = 3V$
Operating temperature	T_A	-40	25	+50	°C	

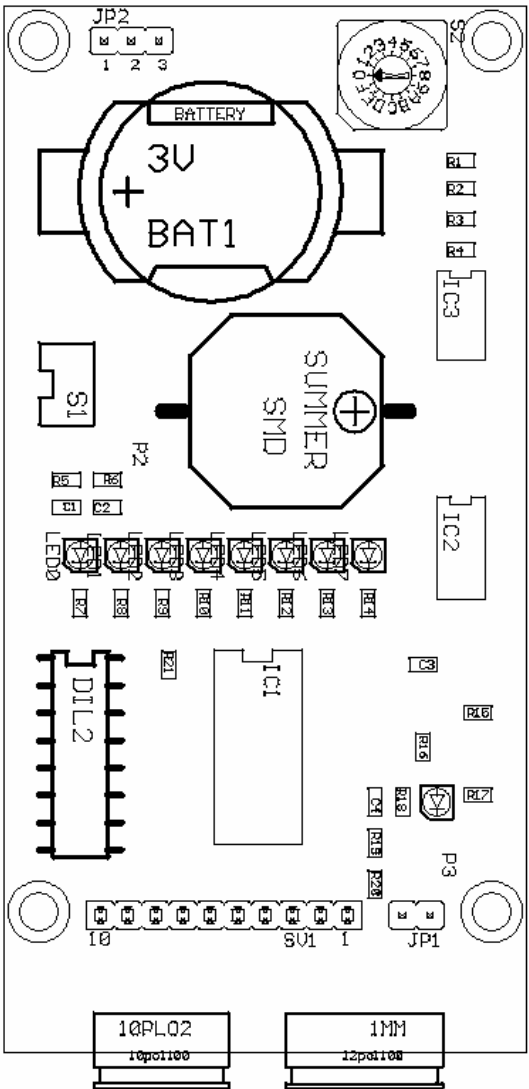
The input leakage currents rise with rising temperature, therefore the maximum signal duration of 25s is not guaranteed at temperatures higher than 50°C.

See also datasheet DYSI-97PS/PSK/S.

5 Schematic



6 Layout OCT608



7 Layout Evaluationskit

