SX8750EVK User Guide
Evaluation Kit for SX8750 - Piezo Actuator drivers

GENERAL DESCRIPTION

SX8750 is a device to drive piezo actuators.
It operates from a 3V supply and generate 30V to drive an actuator.
No coil or capacitor is used to increase the voltage, minimizing the number of externals and the size of the solution.
The output is differential to drive the actuator with positive or negative voltage.
The key features are:

◆ 2.65 - 3.6 V supply, -16 V to +30 V differential output

◆ No coil, no external flying capacitor

◆ 2.4 - 4.8 V extended voltage mode

◆ I2C controlled 10-bit differential DAC

◆ Programmable max positive, max negative voltage and slew rate limitation.

The main applications for this product are:

◆ Capacitive actuator control

◆ Piezoelectric actuator control.

EVK content

The evaluation kit is composed of the following parts:

◆ The evaluation board

◆ A USB cable to connect the board to the PC

◆ A CDROM with the installation files and the user guide

MINIMAL CONFIGURATION

◆ PC with MS Windows 2000/XP
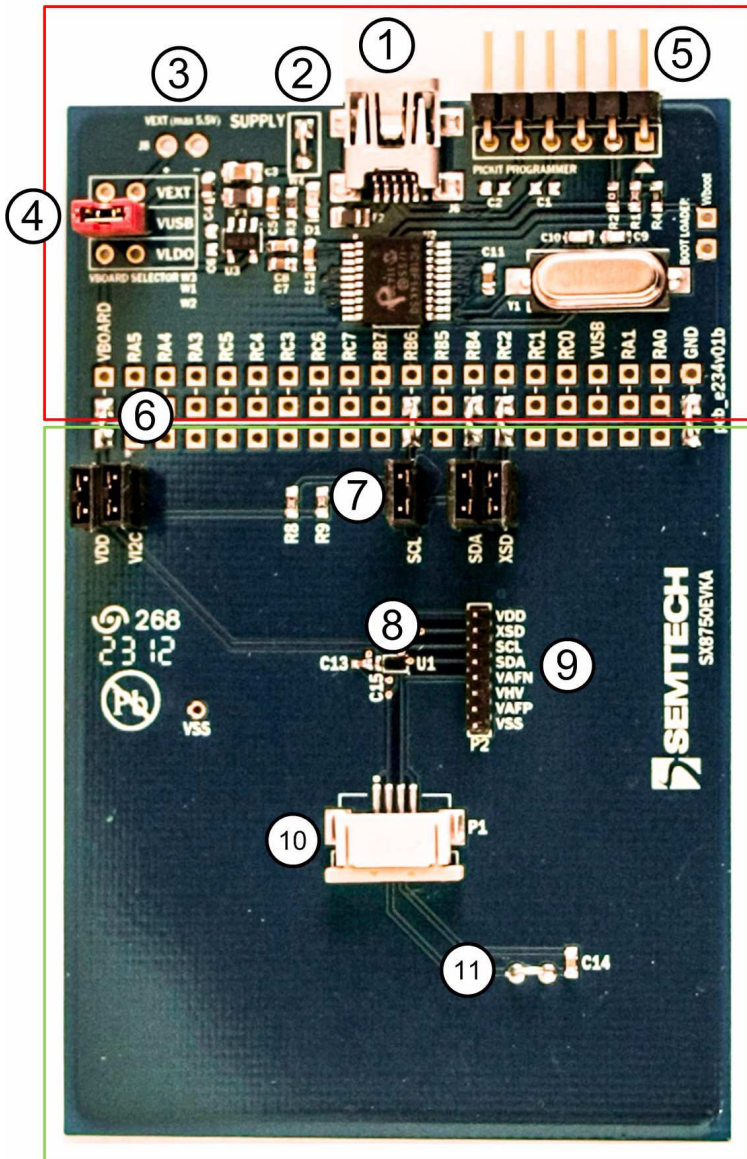
◆ USB interface

RECOMMENDED READING

◆ SX8750 Datasheet

Table of Contents

1. Evaluation board overview

The evaluation board is shown on Figure 1.

Figure 1.   SX8750EVK top view

The SX8750EVK is designed to evaluate the SX8750 behavior with the PoLight TLens or a 50nF capacitor load.

The board is made with two separate areas.

The Figure 1 shows the SX8750EVK top view. The separate areas are shown in the red and green squares.

The power and USB interface is located inside the red square.

The USB connector (1) connects the kit to the computer with the USB cable.

The wire (2) supplies the USB interface circuit.

A footprint for a connector (3) can be used to connect the board to an external power supply. The supply range is 2.4V-4.8V.

It is possible to power the board with three voltages. The external voltage (VEXT) coming from connector (3), the USB voltage (VUSB) or the 3.3V regulated voltage from the LDO (VLDO). The jumper (4) should be set to the desired location.

The wires on area (6) connect the USB interface to the main board shown in the green area.

The SX8750 device (8) is connected with its few externals.

By removing jumpers (7), it is possible to disconnect the SX8750 device to the supply, I2C communication and digital signals for direct control.

The DAC output and all the SX8750 pins are available on P2 connector (9).

The TLens can be connected on P1 connector (10). The default capacitor load wire connection (11) should be cut in that case.

2. Getting started

2.1. Software installation

Insert the CD into the CD-ROM drive of your computer. The installation should start automatically. If the installation does not start, launch the file "SX8750EvaluationKitSetup.exe"located at your CD ROM root directory.

If the Microsoft.NET Framework is not installed it will be installed automatically (An internet connection is required).

Choose the installation directory, when the installation is finished the GUI will launch.

Figure 2.   GUI Installation

2.2. Running the GUI

Connect the board to your USB port and launch the GUI. The GUI can be launch from Windows "Start Menu>Programs>SX8750EVK>SX8750EVK".

The GUI automatically detects the board.

3. GUI overview

The Graphic User Interface (GUI) is divided in 4 sections:

1. The menu and tool bar

2. The SX8750 controls

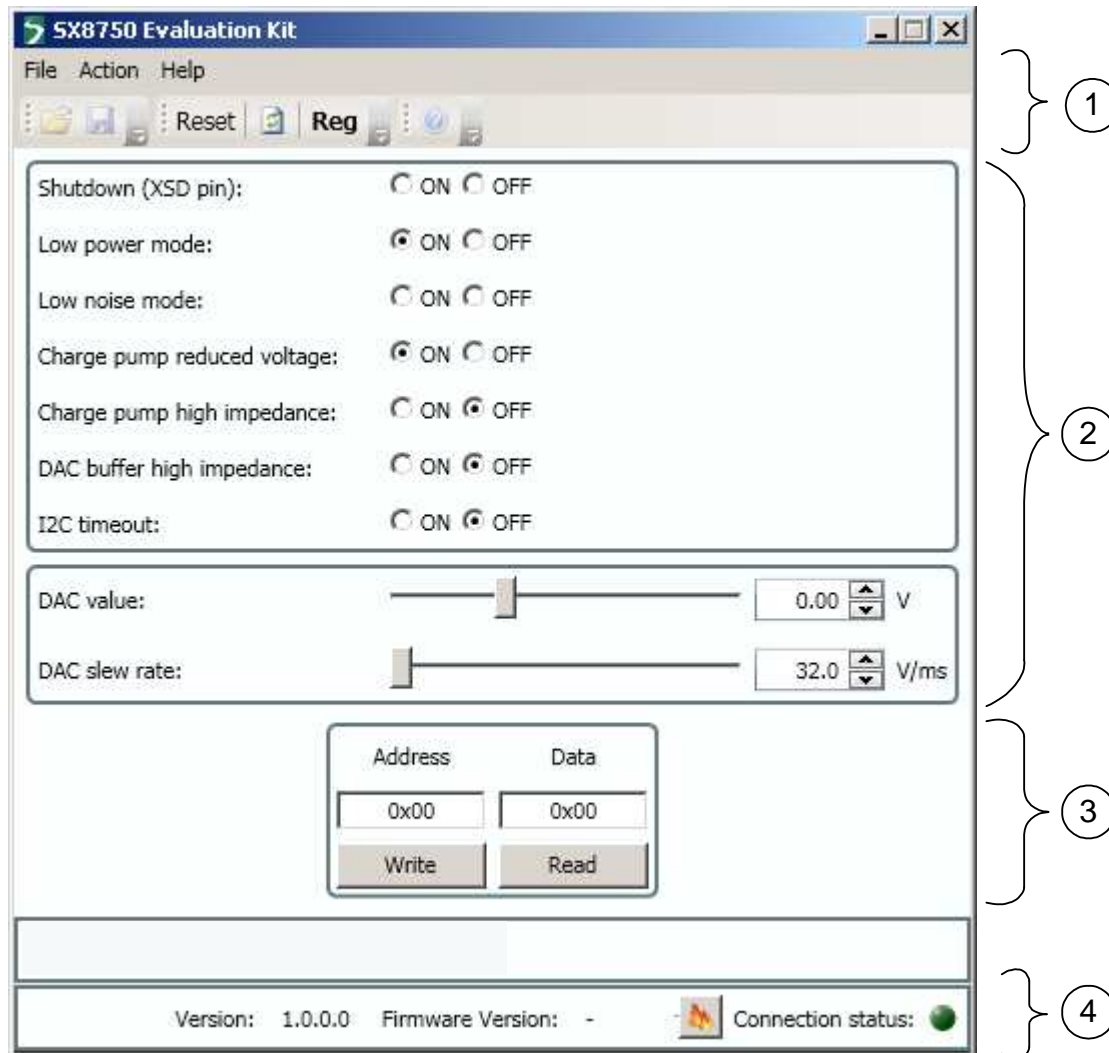3. The SX8750 registers access

4. The status bar

Figure 3.   GUI overview

3.1. Menu and toolbar

The File menu gives the user the possibility to save or open a configuration.

The Action menu suggests a list of actions to the user.

◆ The Reset button performs a general call reset to reset the SX8750.

◆ The Refresh button actualizes the register view and control after a manual register write.

◆ The Show Registers button displays a window with the SX8750 registers. This register view allows registers writing.

The Help menu is related to the user guide document.

The toolbar allows a direct access to the action triggered in the menu.

3.2. SX8750 controls

The radio button and slider controls setup in an convenient way the SX8750 device via I2C writing to registers. The various controls are describes in Table 1.

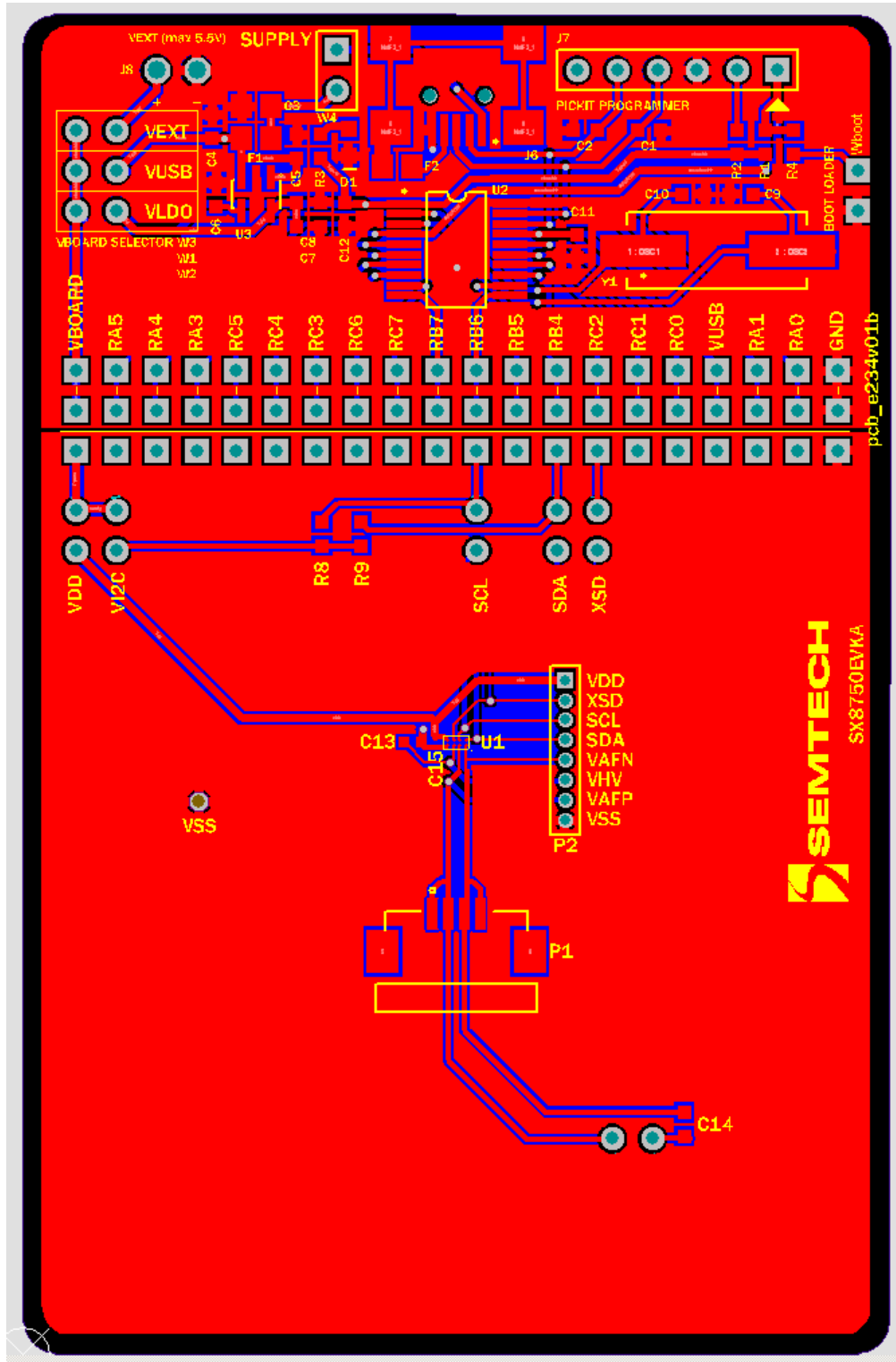| Controls	Description
Shutdown	Controls the XSD pin to set the SX8750 in shutdown mode. In the shutdown mode the communication is disabled, the charge pump and the DACs are disabled. Low speed clock is disabled.
Low power mode	In low power mode, the SX8750 listens the I2C and performs no other action. This control should be set to OFF to check the DAC behavior.
Low noise mode	Enable / disable the low noise mode.
Charge pump reduced voltage	Limit VHV and the DAC maximum output voltage.
Charge pump high impedance	The charge pump controls the VHV pin. Setting to ON disable the charge pump during the low noise mode.
DAC buffer high impedance	Setting to ON disable the DAC during the low noise mode.
I2C time-out	In case the I2C communication is stuck, enabling the I2C time-out allows to reset the I2C interface.
DAC value	Slider to select the DAC output voltage Positive voltage is output on VAFP with VAFN =0V. Negative voltage is output on VAFN with VAFP=0V.
DAC slew rate	Limit the DAC slew rate. The 32.0V/ms setting does not limit the slew rate.

Table 1   Control descriptions

3.3. SX8750 register access

This control enables the write of 8 bits data in the selected register.

The 8-bit address and data are in hexadecimal format, starting with the "0x" notation.

To update the controls, a refresh should be done.

3.4. Status bar

The status bar displays the GUI version and the EVK firmware version.

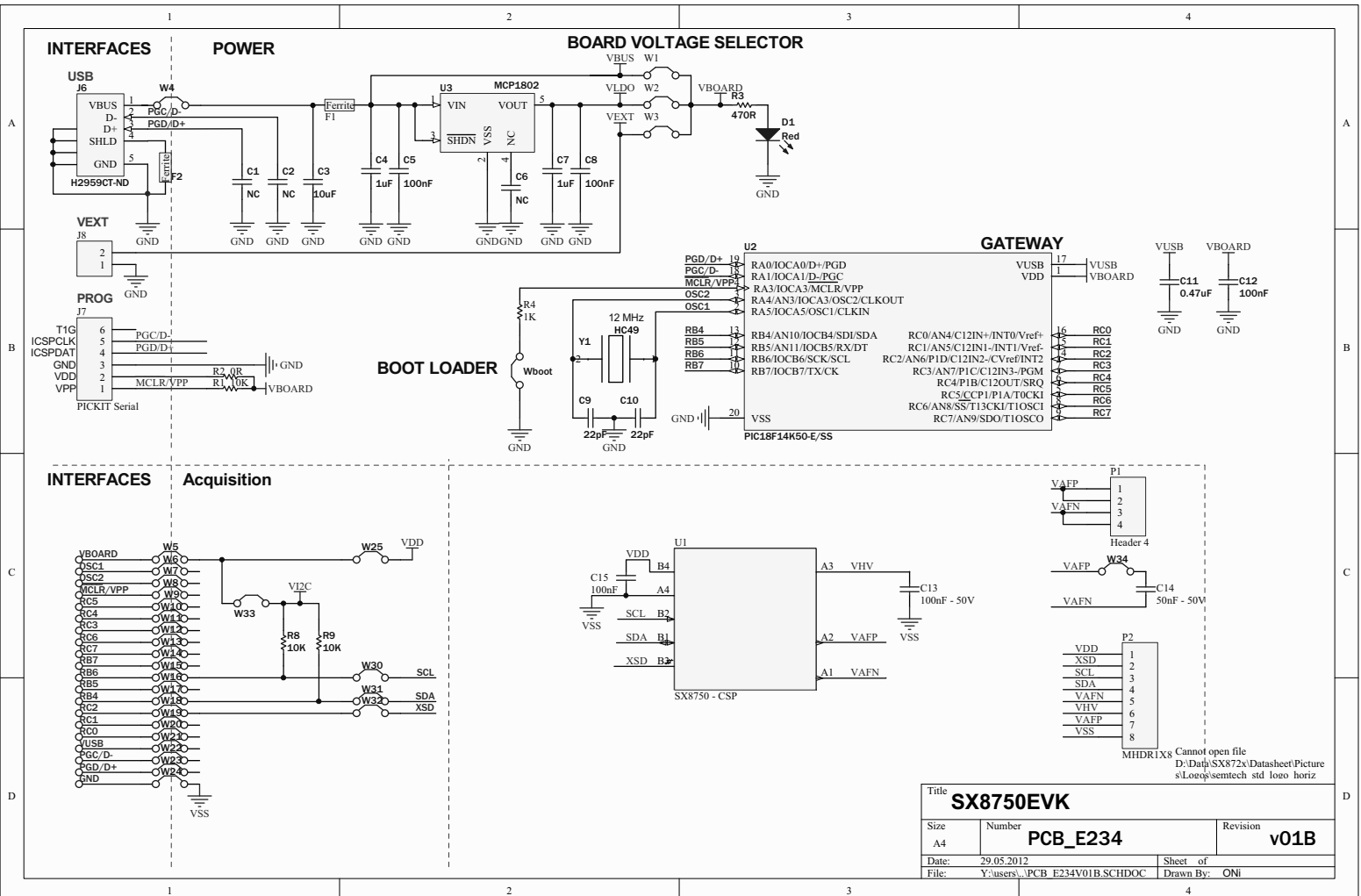When the EVK is connected, the connection status led is green.

4. Board overview

5. Board schematics

INTERFACES   **POWER**

BOARD VOLTAGE SELECTOR

USB
J6

VBUS	1
D-	
D+	
SHLD	4
GND	5

H2959CT-ND

W4
PGC/D-
PGD/D+

F2
Ferrite

Ferrite
F1

U3   MCP1802

VIN   VOUT
SHDN
VSS   NC

C1 NC   C2 NC   C3 10uF
C4 1uF   C5 100nF
C6 NC
C7 1uF   C8 100nF

GND GND GND   GND GND   GNDGND   GND GND

VBUS   W1
VLDO   W2
VEXT   W3

VBOARD   R3 470R
D1 Red

GND

VEXT
J8
2
1
GND

PROG
J7

T1G	6	PGC/D-
ICSPCLK	5	PGD/D+
ICSPDAT	4	
GND	3	
VDD	2	
VPP	1	MCLR/VPP

PICKIT Serial

R2 0R   GND
R1 10K   VBOARD

BOOT LOADER   Wboot

R4 1K

12 MHz
HC49
Y1

C9 22pF   C10 22pF
GND

GND

GATEWAY
U2

PGD/D+ 19   RA0/IOCA0/D+/PGD
PGC/D- 18   RA1/IOCA1/D-/PGC
MCLR/VPP 4   RA3/IOCA3/MCLR/VPP
OSC2 3   RA4/AN3/IOCA3/OSC2/CLKOUT
OSC1 2   RA5/IOCA5/OSC1/CLKIN

RB4 13   RB4/AN10/IOCB4/SDI/SDA
RB5 12   RB5/AN11/IOCB5/RX/DT
RB6 11   RB6/IOCB6/SCK/SCL
RB7 10   RB7/IOCB7/TX/CK

VUSB 17   VUSB
VDD 1   VBOARD

RC0/AN4/C12IN+/INT0/Vref+ 16   RC0
RC1/AN5/C12IN1-/INT1/Vref- 15   RC1
RC2/AN6/P1D/C12IN2-/CVref/INT2 14   RC2
RC3/AN7/P1C/C12IN3-/PGM 7   RC3
RC4/P1B/C12OUT/SRQ 6   RC4
RC5/CCP1/P1A/T0CKI 5   RC5
RC6/AN8/SS/T13CKI/T1OSCI   RC6
RC7/AN9/SDO/T1OSCO   RC7

GND 20   VSS

PIC18F14K50-E/SS

VUSB   VBOARD
C11 0.47uF   C12 100nF
GND   GND

INTERFACES   **Acquisition**

VBOARD   W5
OSC1   W6
OSC2   W7
MCLR/VPP   W8
RC5   W9
RC4   W10
RC3   W11
RC6   W12
RC7   W13
RB7   W14
RB6   W15
RB5   W16
RB4   W17
RC2   W18
RC1   W19
RC0   W20
USB   W21
PGC/D-   W22
PGD/D+   W23
GND   W24

W25   VDD

W33   VI2C

R8 10K   R9 10K

W30   SCL
W31   SDA
W32   XSD

VSS

U1

C15 100nF

VDD   B4
A4
SCL   B2
SDA   B1
XSD   B3

A3   VHV
A2   VAFP
A1   VAFN

C13 100nF - 50V
VSS

SX8750 - CSP

VSS

P1
VAFP   1
VAFN   2
3
4
Header 4

VAFP   W34   C14 50nF - 50V
VAFN

P2
VDD   1
XSD   2
SCL   3
SDA   4
VAFN   5
VHV   6
VAFP   7
VSS   8
MHDR1X8

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