QS30-1 Nixie Tube Module

Hardware designed by Yan,Zeyuan   Version 2.0.0

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Caution

- ◇ Warning: SHOCK HAZARD! The module has high voltage in the circuits. Don't touch the circuit board or any components when the module is electrified.
- ◇ Warning: No designed for outdoor use. Only use it in a dry environment.
- ◇ Warning: This is NOT a toy. Keep out of reach of children.
- ◇ Note: To avoid damages, don't place this module on uneven place.

Introduction

This module is designed to work with nixie tube QS30-1/SZ-8. Combined with classic nixie tube, ceramic tube socket, gold-plated PCB, RGB background LED, QS30 module can be used for a variety of applications, to fulfill your requirements to display numbers with colorful effects. It is a compact design in a minimal footprint, packed with voltage boost circuit, display driver and user-friendly tube sockets. Multiple modules can be daisy-chained in sequence for more imaginative needs. This nixie tube module extends the power of Arduino, allowing users to easily integrate nixie tubes into their own Arduino projects, or any projects using similar open-source platforms. Users can focus on implementing their ideas with no need to worry about the power management or display driving. (More details can be found here http://www.nixieclock.org/?p=541)

Technical Specifications

ELECTRONIC SPECIFICATIONS

Specification	Symbol	Min	Typ	Max	Units
Input voltage	V_{IN}	4.8	5.0	5.5	Volts
Operating current (V_{IN} = 5V)	I_{IN}	---	200	---	mAmps
Minimum High-Level input voltage (V_{IN} = 5V)	V_{IH}	3.5	---	---	Volts
Maximum Low-Level input voltage (V_{IN} = 5V)	V_{IL}	---	---	1	Volts
Minimum High-Level output voltage (V_{IN} = 5V)	V_{OH}	4.9	---	---	Volts
Maximum Low-Level output voltage (V_{IN} = 5V)	V_{OL}	---	---	0.1	Volts
Maximum clock frequency (V_{IN} = 5V)	f	---	---	100	MHz

Note: The module may display random numbers if no controller is connected.

FEATURES

- Vintage nixie tube, model QS30-1/SZ-8/SW3-1 (made in China in 1961-1989)
- Open source library for Arduino
- Hassle-free voltage boost circuit integrated.
- Easily expandable
- Gold-plated PCB
- Ceramic tube socket
- RGB LED backlighting
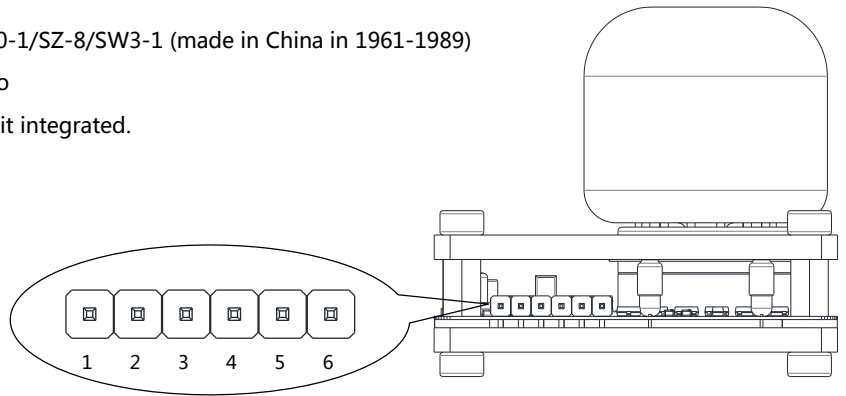
PIN ASSIGNMENT

Pin	Symbol	Description
1	5V DC	5V DC power in
2	GND	Ground
3	DIN (Pin side)/DOUT (Socket side)	Serial data input (Pin side)/Serial data output (Socket side)
4	OE	Output enable (active LOW), brightness control
5	STCP	Storage register clock input
6	SHCP	Shift register clock input

TYPICAL APPLICATION
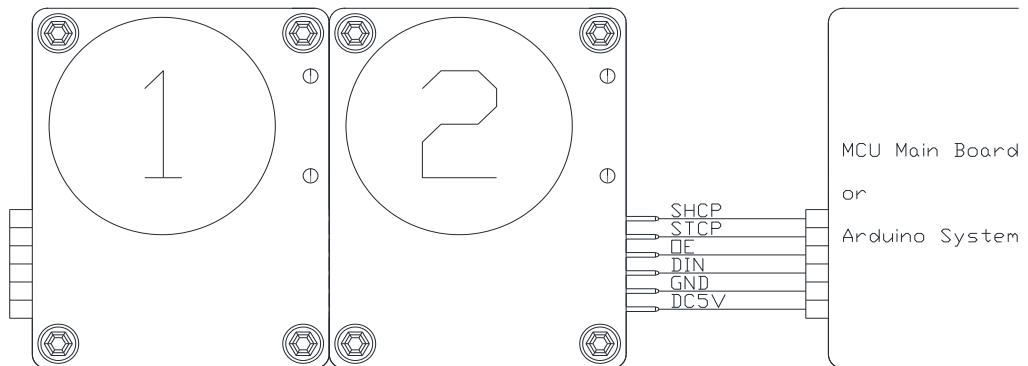
Module Outline (unit: mm)
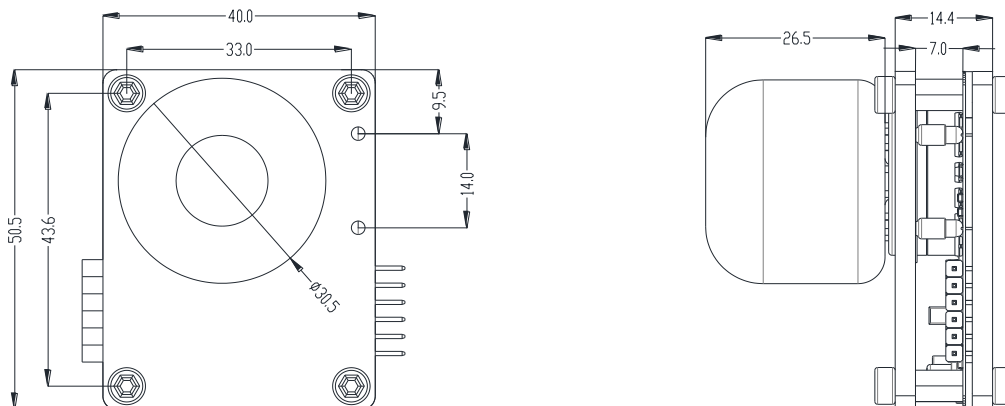
Function Table

Function	Bit 15 MSB	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0 LSB
■ LED OFF	1	1	1	X	X	X	X	X	X	X	X	X	X	X	X	X
□ LED white	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X
■ LED	0	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X
■ LED cyan	0	1	0	X	X	X	X	X	X	X	X	X	X	X	X	X
■ LED yellow	1	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X
■ LED blue	0	1	1	X	X	X	X	X	X	X	X	X	X	X	X	X
■ LED green	1	1	0	X	X	X	X	X	X	X	X	X	X	X	X	X
■ LED red	1	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X
[ ] Dots off	X	X	X	X	X	X	X	X	X	X	X	X	X	0	0	X
[.] Dot	X	X	X	X	X	X	X	X	X	X	X	X	X	0	1	X
['] Single	X	X	X	X	X	X	X	X	X	X	X	X	X	1	0	X
[:] Colon	X	X	X	X	X	X	X	X	X	X	X	X	X	1	1	X
[ ] Number Off	X	X	X	0	0	0	0	0	0	0	0	0	0	X	X	X
[0] Number 0	X	X	X	0	0	0	0	0	0	0	0	0	1	X	X	X
[9] Number 9	X	X	X	0	0	0	0	0	0	0	0	1	0	X	X	X
[8] Number 8	X	X	X	0	0	0	0	0	0	0	1	0	0	X	X	X
[7] Number 7	X	X	X	0	0	0	0	0	0	1	0	0	0	X	X	X
[6] Number 6	X	X	X	0	0	0	0	0	1	0	0	0	0	X	X	X
[5] Number 5	X	X	X	0	0	0	0	1	0	0	0	0	0	X	X	X
[4] Number 4	X	X	X	0	0	0	1	0	0	0	0	0	0	X	X	X
[3] Number 3	X	X	X	0	0	1	0	0	0	0	0	0	0	X	X	X
[2] Number 2	X	X	X	0	1	0	0	0	0	0	0	0	0	X	X	X
[1] Number 1	X	X	X	1	0	0	0	0	0	0	0	0	0	X	X	X

(1: high, 0: low, X: don't care)

Two pieces of 74HC595 ICs are connected in serial on each single module. Display can be easily controlled by feeding serial data to the 74HC595. The excess data will overflow to pin DOUT to the DIN pin of the next module, if one is present, which is utilized for expanding to multiple modules.

Note

Please use a good-quality power supply to ensure consistent display performance.

References:

- Datasheet of 74HC595
- Details for Nixie Module v2.0.0
- Free Arduino Library Download

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