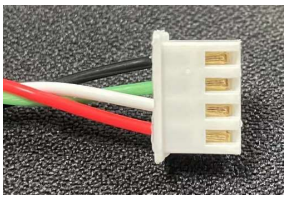
# Digital Tube Drive Communication Protocol

The digital tube driver board can configure parameters and control the display of 1 to 4-digit 7-segment common anode digital tubes by sending strings via a serial port. It features 8-level adjustable brightness. The display range for a single digital tube is 0-9, A-F. Values outside this range will not be displayed.



1
2
3
4

## Pin Description

| Label | Wire Color | Name | Function Description |
|---|---|---|---|
| 1 | Black | - | Power Supply Negative |
| 2 | Green | RX | Serial Port Receive (RXD), connect to controller TXD |
| 3 | White | TX | Serial Port Transmit (TXD), connect to controller RXD |
| 4 | Red | + | Power Supply Positive (5V DC) |

## Connection between Digital Tube Driver Board and External Controller

| External Controller | Digital Tube Driver Board |
|---|---|
| 5V | 5V |
| RXD | TXD |
| TXD | RXD |
| GND | GND |

## Serial Port Parameters

- Communication Interface: TTL
- Baud Rate: 115200 bps (default, adjustable)
- Data Bits: 8
- Stop Bits: 1
- Parity Bit: None

## Parameter Command Configuration Table

| Serial Command | Description | Default Value | Remarks | Corresponding Hexadecimal |
|---|---|---|---|---|
| !Bx\r\n | Configure serial communication baud rate | 0x07 | x is the set baud rate value | 21 42 x 0D 0A |
| !Lx\r\n | Configure digital tube display brightness | 0x08 | x is the display brightness level | 21 4C x 0D 0A |
| !Tx\r\n | Configure onboard indicator status | 0x02 | x is the display status | 21 54 x 0D 0A |
| !Sxxxx\r\n | Configure digital tube display command | None | xxxx is the digital tube display value | 21 53 x x x x 0D 0A |
| !R\r\n | Reset digital tube driver board | None | \ | 21 52 0D 0A |
| !C\r\n | Restore all initialization settings | None | \ | 21 43 0D 0A |

Parameters configured on the digital tube driver board will be saved. The configuration data remains effective after a power cycle.

## Baud Rate Table

| Baud Rate | Value (x) |
|---|---|
| 2400 | 0 |
| 4800 | 1 |
| 9600 | 2 |
| 14400 | 3 |
| 19200 | 4 |
| 38400 | 5 |
| 57600 | 6 |
| 115200 | 7 |
| 115200 | other |

Example:

Set serial port baud rate to 115200: !B7\r\n

Corresponding hexadecimal: 21 42 37 0D 0A

## Display Brightness Table

| Brightness Level | Value (x) |
|---|---|
| Brightness 1 | 1 |
| Brightness 2 | 2 |
| Brightness 3 | 3 |
| Brightness 4 | 4 |
| Brightness 5 | 5 |
| Brightness 6 | 6 |
| Brightness 7 | 7 |
| Brightness 8 | 8 |
| Maximum Brightness | other |

Example:

Set brightness to level 8: !L8\r\n

Corresponding hexadecimal: 21 4C 38 0D 0A

Onboard Indicator Status Configuration Command

!Tx\r\n

| Status | Value (x) |
|---|---|
| Constantly Off | 0 |
| Constantly On | 1 |
| Blinking | 2 |

Example:

Set indicator to off: !T0\r\n

Corresponding hexadecimal: 21 54 30 0D 0A

## Digital Tube Display Configuration Command

!Sxxxx\r\n

xxxx is the digital tube display content.

Example:

Display "AB12" on the digital tube: !SAB12\r\n

Corresponding hexadecimal: 21 53 41 42 31 32 0D 0A