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## 1 Overview

TermDriver2 is a USB to serial adapter with a built-in screen. All through traffic is displayed on the screen in real-time, together with line protocol information.

## 2 Features

- support for serial rates from 110 to 2M baud
- compact and bright 40x22 terminal display
- full set of ANSI control codes supported
- 32K receive buffer for robust reception even when the host PC is heavily loaded
- 3.3 V output at up to 300 mA

### 3 Installation

1. Connect a micro USB cable to the TermDriver 2
2. You should see the screen power up with the TermDriver logo and serial number
3. Confirm that the serial device is present on your host PC
4. Find the relevant port on your host PC
5. Connect the serial outputs to your target device
6. Use the TermDriver as a USB to serial adapter

### 4 ANSI escape codes

TermDriver2 implements the ANSI terminal **control codes**.

Code	Effect
ESC [ <i>n</i> A	Cursor up
ESC [ <i>n</i> B	Cursor down
ESC [ <i>n</i> C	Cursor forward
ESC [ <i>n</i> D	Cursor back
ESC [ <i>c</i> G	Moves the cursor to column <i>c</i>
ESC [ <i>r</i> ; <i>c</i> H	Moves the cursor to row <i>r</i> column <i>c</i>
ESC [ <i>n</i> J	Erase display
ESC [ <i>n</i> l	Erase display
ESC [ <i>n</i> m	Select graphic rendition
ESC [ 6n	Reports the cursor position (CPR) by transmitting ESC[ <i>n</i> ; <i>m</i> R, where <i>n</i> is the row and <i>m</i> is the column.

Select graphic rendition (SGR) sets display attributes. Supported sequences are:

Code	Effect
0	Normal: all attributes become turned off
8	Conceal
30..37	Set foreground color
38	Set foreground color. Next arguments are 5; <i>n</i> or 2; <i>r</i> ; <i>g</i> ; <i>b</i>
39	Default foreground color
40..47	Set background color
48	Set foreground color. Next arguments are 5; <i>n</i> or 2; <i>r</i> ; <i>g</i> ; <i>b</i>
49	Default background color

In addition the following sequences are specific to TermDriver:

Code	Effect
ESC [7 <i>n</i>	Reports the 6 digit hex id of the TermDriver
ESC [1413829197; <i>id</i> ;01	Reset to UF2 bootloader mode
ESC [1413829197; <i>id</i> ;11	Reboot

Where *id* is the 6 hex digit id of the TermDriver, as a decimal number.



For example if the TermDriver has id d68927, then *id* is 14059815, and the sequence to enter UF2 bootloader mode is:

ESC [ 1413829197;14059815;01



After entering UF2 mode, the TermDriver's firmware appears as a drive on the host PC named `RPI-RP2`. New firmware can be copied into the file, and when complete, the TermDriver will reboot and run the new firmware.

There is a Python program in `demos/reset_to_uf2.py` in the [TermDriver 2 repository](#) that uses these commands to put the TermDriver 2 into UF2 boot-loader mode.

## 5 Hardware



TermDriver2 has 6 output pins, on a standard 2.54 mm (0.1") female header.

Pin	Signal	Function	Notes
1	GND	power	Ground
2	RTS	output	Request to send
3	3.3V	power	Up to 300 mA available
4	TX	output	Data transmit
5	RX	input	Data receive
6	DTR	output	Data terminal ready, output

## 5.1 Standalone mode



In addition to working as a USB powered peripheral, TermDriver can run in standalone mode with no USB connection. In this mode 3.3 V power is supplied by the target circuit. Connect GND, 3.3V and RX to the target circuit.

When running in standalone mode, TermDriver's line configuration is 115200 8N1.

## 5.2 Internals

The onboard RP2040 microcontroller runs at 125 MHz, and has 2 Mbyte of program flash.

The display is a ST7789 controller with a 240x240 panel.

The RP2040 has these GPIO connections.

Signal	GPIO	
UART_TX_PIN	8	external pin 4
UART_RX_PIN	9	external pin 5
DTR_PIN	12	external pin 6
RTS_PIN	13	external pin 2
PIN_SCK	14	panel clock
PIN_MOSI	15	panel data
PIN_RES	11	panel reset
PIN_DC	10	panel command/data

## 6 Specifications

### 6.1 DC characteristics

	min	typ	max	units
RX				
low voltage	0		0.6	V
high voltage	2.7		3.3	V
Output signal current (TX, RTS, DTR)			4	mA
Output voltage		3.3		V
Output current		330		mA
Current consumption		25		mA

### 6.2 AC characteristics

	min	typ	max	units
UART speed	110		2M	bps
Startup time			100	ms

## 7 Troubleshooting

Screen is dark after connecting USB	Check USB cable and port Return for replacement
Screen is white after connecting USB	Return for replacement
Port does not appear on host	Check that the USB Cable is not "power only" Check USB cable and port Return for replacement

## 8 Support information

Technical and product support is available at [support@termdriver.com](mailto:support@termdriver.com)

TermDriver2 is built and maintained by [Excamera Labs](#).

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