

# How to use a serial terminal

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The serial terminal is an essential tool in a developer's life, just like the multimeter and the scope are essential to a hardware electronics engineer.

With a serial terminal one can send data from an embedded system to a computer in a simple way (only two wires). This is mainly used for log and debug purposes.

Here is how to use some of the most famous serial terminals.





### I. IDENTIFY THE DEVICE FOR THE SERIAL COMMUNICATION

Before using a serial terminal, we must find out the name of the connected device.

### I.1. Linux users

Start a Linux shell:	Ctrl+Alt+T
First, before plugging in the device:	ls /dev
After having plugged the device in:	ls /dev

dboudier:~\$ ls /d	ev																		
acpi_thermal_rel	cuse	fuse	i2c-11	loop0	loop21	loop8	nvidiactl	ptmx	snapshot	tty12	tty25	tty38	tty50	tty63	ttyS16	ttyS29	usb	vcsa	vfio
adsp	disk	gpiochip0	i2c-2	loop1	loop22	loop9	nvidia-modeset	ptp0	snd	tty13	tty26	tty39	tty51	tty7	ttyS17	ttyS3	userio	vcsal	vga_arbiter
ashmem	dma_heap	hidraw0	i2c-3	loop10	loop23	loop-control	nvidia-uvm	pts	stderr	tty14	tty27	tty4	tty52	tty8	ttyS18	ttyS30	v4l	vcsa2	vhci
autofs	dri	hidraw1	i2c-4	loop11	loop24	mapper	nvidia-uvm-tools	random	stdin	tty15	tty28	tty40	tty53	tty9	ttyS19	ttyS31	vboxdrv	vcsa3	vhost-net
block	drm_dp_aux0	hidraw2	i2c-5	loop12	loop25	mcelog	nvme0	rfkill	stdout	tty16	tty29	tty41	tty54	ttyACM0	ttyS2	ttyS4	vboxdrvu	vcsa4	vhost-vsock
bsg	drm_dp_aux1	hidraw3	i2c-6	loop13	loop26	mediaθ	nvme0n1	rtc	stlinkv2-1_	tty17	tty3	tty42	tty55	ttyprintk	ttyS20	ttyS5	vboxnetctl	vcsa5	video0
btrfs-control	drm_dp_aux2	hidraw4	i2c-7	loop14	loop27	mei0	nvme0n1p1	rtc0	stlinkv2-1_0	tty18	tty30	tty43	tty56	ttyS0	ttyS21	ttyS6	vboxusb	vcsa6	video1
bus	drm_dp_aux3	hidraw5	i2c-8	loop15	loop28	mem	nvme0n1p2	sda	stlinkv2-1_1	tty19	tty31	tty44	tty57	ttyS1	ttyS22	ttyS7	VCS	vcsu	wmi
cec0	dsp	hpet	i2c-9	loop16	loop29	mixer	nvme0n1p3	sdal	stlinkv2-1_3	tty2	tty32	tty45	tty58	ttyS10	ttyS23	ttyS8	vcs1	vcsu1	zero
char	ecryptfs	hugepages	initctl	loop17	loop3	mqueue	nvme0n1p4	sdb	tty	tty20	tty33	tty46	tty59	ttyS11	ttyS24	ttyS9	vcs2	vcsu2	zfs
console	fb0	hwrng	input	loop18	loop4	net	nvram	serial	tty0	tty21	tty34	tty47	tty6	ttyS12	ttyS25	udmabuf	vcs3	vcsu3	
core	fd	12c-0	kmsg	loop19	loop5	ng0n1	port	sg0	tty1	tty22	tty35	tty48	tty60	ttyS13	ttyS26	uhid	vcs4	vcsu4	
cpu	freefall	i2c-1	kvm	loop2	loop6	null	ppp	sg1	tty10	tty23	tty36	tty49	tty61	ttyS14	ttyS27	uinput	vcs5	vcsu5	
cpu_dma_latency	full	i2c-10	log	loop20	loop7	nvidia0	psaux	shm	tty11	tty24	tty37	tty5	tty62	ttyS15	ttyS28	urandom	VCS6	vcsu6	

The device name should appear on the second display, but not on the first one. The full device name is usually dev/ttyACM0 or /dev/ttyUSB0.

### I.2. Windows users

Open the Gestionnaire de périphériques / Device Manager.

Observe the devices in Ports (COM & LPT).

Unplug and plug the device to make sure of its name.

🗄 Device Manager -	_	Х
File Action View Help		
> 側 Mice and other pointing devices		^
> 🛄 Monitors		
> 🚍 Network adapters		
🗸 🛱 Ports (COM & LPT)		
Gommunications Port (COM1)		
Communications Port (COM2)		
> 📇 Print queues		- 14
>  Processors		
> 📱 Software devices		
> 🕡 Sound, video and game controllers		
> 🍇 Storage controllers		
> 🏣 System devices		
> 🏺 Universal Serial Bus controllers		
		~



## II. TERA TERM (WINDOWS)

### Launch Tera Term

At Tera Term's startup, select the device's com port.

### Serial communication parameters

 $\texttt{Setup} \rightarrow \texttt{Serial port}...$ 

Tera Term: Serial port setup and connection									
Port:	СОМ1 ~	New cetting							
Speed:	9600 ~	New setting							
Data:	8 bit $\sim$	Cancel							
Parity:	none 🗸								
Stop bits:	1 bit $\sim$	Help							
Flow control:	none ~								
Transm 0	it delay msec/char 0	msec/line							

### If you observe line feed or carriage return problems

 $\texttt{Setup} \rightarrow \texttt{Terminal}...$ 

Change the parameters Receive and Transmit to CR+LF or Auto.

Tera Term: Terminal setup	×
Terminal size	New-line Receive: CR ~ Transmit: CR ~ Cancel
Terminal ID: VT100 ~	Local echo
Answerback:	Auto switch (VT<->TEK)
Coding (receive) UTF-8 ~	Coding (transmit) UTF-8 ~



# III. PUTTY (WINDOWS / UNIX)

### Launch PuTTY

In the window, click on Serial (1), then fill in the COM port name (2).

DO NOT CLICK ON	"Open"
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Category:  Category:	🕵 PuTTY Configuration	×
□       Session         □       Logging         □       Terminal         □       Keyboard         □       Bell         □       Features         □       Window         □       Appearance         □       Behaviour         □       Translation         □       Selection         □       Colours         □       Connection type:         □       Saved Sessions         □       Default Settings         □       Load         □       Save         □       Serial         □       Telnet         □       Rlogin         □       SUPDUP	Category:	
Save Proxy SSH Serial Telnet Rlogin SUPDUP Close window on exit: Always O Never O Only on clean exit	Session     Logging     Terminal     Keyboard     Bell     Features     Window     Appearance     Behaviour     Translation     Selection     Colours     Connection     Data	Basic options for your PuTTY session Specify the destination you want to connect to Serial line COM1 2 9600 Connection type: SSH Serial Other: Telnet Load, save or deserved a stored session Saved Sessions Default Settings Load
	Bata → Proxy → SSH → Serial → Telnet → Rlogin → SUPDUP	Save Delete Close window on exit: Always O Never O Only on clean exit

### Serial communication parameters

Click on Connection  $\rightarrow$  Serial (3)

Fill in the communication parameters and click on Open.

### If you observe line feed or carriage return problems

Right-click on the PuTTY's title bar

 $\rightarrow$  Change Settings...  $\rightarrow$  Terminal  $\rightarrow$  Implicit LF in every CR  $\rightarrow$  Apply

The serial communication parameters are accessible through this menu: Right-click on the title bar  $\rightarrow$  Change Settings...  $\rightarrow$  Connection  $\rightarrow$  Serial



# IV. GTKTERM (LINUX)

### Install GTKTerm

From a Linux terminal (Ctrl+Alt+T), with the root privileges: sudo apt-get install gtkterm

### Launch GTKTerm

From a Linux terminal:gtktermFrom the graphical interface:Applications  $\rightarrow$  gtkterm

### Serial communication parameters

The device name must have been determined first.

Configuration  $\rightarrow$  Port

Fill in the device name (Port) and the communication parameters (*Baudrate, Parity, Bits, Stopits, Flow control*). Advanced parameters will not be set.

				GTKTerm - /dev/t	tyACM	10 11	5200-8-N-1		- 0	8														
File	Edit	Log	Configuration	Control signals	View	Help																		
			Port Main windo	Shift+0 w	Ctrl+S																			
			Local echo						Configur	ation		8												
			CR LF auto Timestamp Macros				Serial port Port:		Baud R	Rate:	Pa	rity:												
			Load config	uration			/dev/ttyACM0	•	115200	•	none	•												
	Save configuration			ation															Bits:		Stopb	oits:	Flow	control:
			Delete conf	iguration			8	*	1	Ŧ	none	•												
			·				Advanced Configu	ration Opti	ons															
											OK	Cancel												
/de	v/ttyA	CM0 1	15200-8-N-1				DT	R RTS C	TS CD DSR	RI														

### If you observe line feed or carriage return problems

Configuration  $\rightarrow$  CR LF auto (Carriage Return + Line Feed = '\r' + '\n').



# V. MINICOM (CONSOLE LINUX)

### Install minicom

From a Linux terminal (Ctrl+Alt+T), with the root privileges: sudo apt-get install minicom

### Launch minicom

The device name must have been identified first: /dev/tty\_\_\_\_. From a Linux terminal: minicom -D /dev/tty\_\_\_\_

### Accessing the menus

Press Ctrl+'A', then release all keys, then press 'Z'.

The user interface only uses the keyboard (no mouse).

<b>F</b>	dboudier@dboudier-Precision-3541:~ Q = _		
Welco+		+	
	Minicom Command Summary	!	
00110	Second and be called by STDL A show	!	
Compi	Commands can be called by CIRL-A <key></key>	!	
Port	Nois Exactions Other Exactions	!	
	Main Functions Other Functions	!	
Press   	Dialing directoryD run script (Go)G   Clear ScreenC Send filesS Receive filesR   cOnfigure MinicomO comm ParametersP Add linefeedA   Suspend minicomJ Capture on/offL HangupH   eXit and resetX send breakF initialize ModemM   Quit with no reset.Q Terminal settings.T run KermitK   Cursor key modeI lineWrap on/offW local Echo on/offE   Help screenZ Paste fileY Add Carriage RetU		
	Select function or press Enter for none.	ļ	
TRL-A	.7 for help   115200 8N1   NOR   Minicom 2.7.1   VT102   Offline   -	tvac	мо

#### Serial communication parameters

Press Ctrl+'A', then release, then press '0' (cOnfigure Minicom).

Serial port setup  $\rightarrow$  Press the keys according to the parameters to set.

'Enter' to quit, then 'Exit'.

#### If you observe line feed or carriage return problems

Press Ctrl+'A', release, then 'A' (Add linefeed) or 'U' (Add Carriage Return).