The TTY

COMS10012 Software Tools

The TTY

A famous old UNIX error message:

```
Not a typewriter.
```


Teletype

Teletype

Applications unlimited . . .

TELETYPE Model 28 Line

Chemical company "wires" distant payroll . . . Tool supplier has instantaneous access to centralized inventory of 15,000 items . . . Railroad keeps track of 50,000 freight cars.

These are just a few examples of the variety of "assignments" Teletype equipment is handling today—helping business to cut costs . . . improve service . . . and cope with the ever-growing paperwork and communication needs generated by rapid growth and decentralization.

Presented here are various machines in the Teletype Model 28 Line. "Model 28" stands for an entirely new concept in record communications equipment. These new machines operate at 100 words per minute, are smartly styled and quiet in operation. They are manufactured to Teletype's precision standards, for dependable day-in and day-out service. All-metal clutches and other design elements keep maintenance needs way down. A built-in switching and remote control unit, called the "stunt box," multiplies the flexibility of the equipment and provides an almost unlimited range of applications in communications.

If you'd like to know how Teletype equipment can cut costs and improve service for you—or if you already have Teletype equipment and would like to give it an added "assignment"—contact our application engineers today. Wire, phone, or write direct to Teletype Corporation, Dept. SP5, 5555 Touhy Avenue, Skokie, Illinois.
Phone: ORchard 6-1000. TWX: SKOK 3454.
(See coupon back page.)

Teletype Model 28 Automatic Send-Receive Set. A "complete station" in a compact console—with facilities for sending and receiving on message paper or sprocket-fed business forms . . . preparing punched tape . . . sending or receiving with tape . . . integrating tape and manual keyboarding . . . producing tape automatically, as a by-product of send-receive operations. Optional accessories customize unit to special needs.

Teletype Model 28 Receive-Only Page Printer. A message receiving unit (without keyboard). This is "terminal" equipment, for use where two-way communication is not necessary. No attendant is needed. Produces a printed record on plain paper or multipart business forms. Table models of this unit and the send-receive set at the right are also available.

Teletype Model 28 Send-Receive Page Printer. Message originating unit, for sending and receiving. Model 28 page units, including the Automatic Send-Receive Set, feature a built-in "stunt box" control system for automatic station selection and electrical control of remote equipment. Horizontal tabulation and form positioning arrangement available.

Teletype Model 28 Tape Punch. Receives incoming electrical signals, punches a 5-level "common language" tape, and prints the data right on the tape, for easy identification and handling. This unit is used for message relaying . . . for integrating data from several sources into a single tape . . . and for providing punched tape as a by-product of send-receive operations.

Teletype Model 28 Tape Reader. This is a sending unit. Reads punched tape and instantaneously transmits data to local or remote receiving equipment. As with all Teletype transmitting units, data may go to one destination or a number of destinations simultaneously—either nearby or thousands of miles away.

Teletype Model 28 Tape Reader—Multi-Contact. Unit is similar to tape reader at left. Besides reading punched tape for on-line transmission, twin-shaft reader-distributor design offers facilities for tape transmission to business machines and direct readout, from business machines, for on-line transmission.

TELETYPE CORPORATION

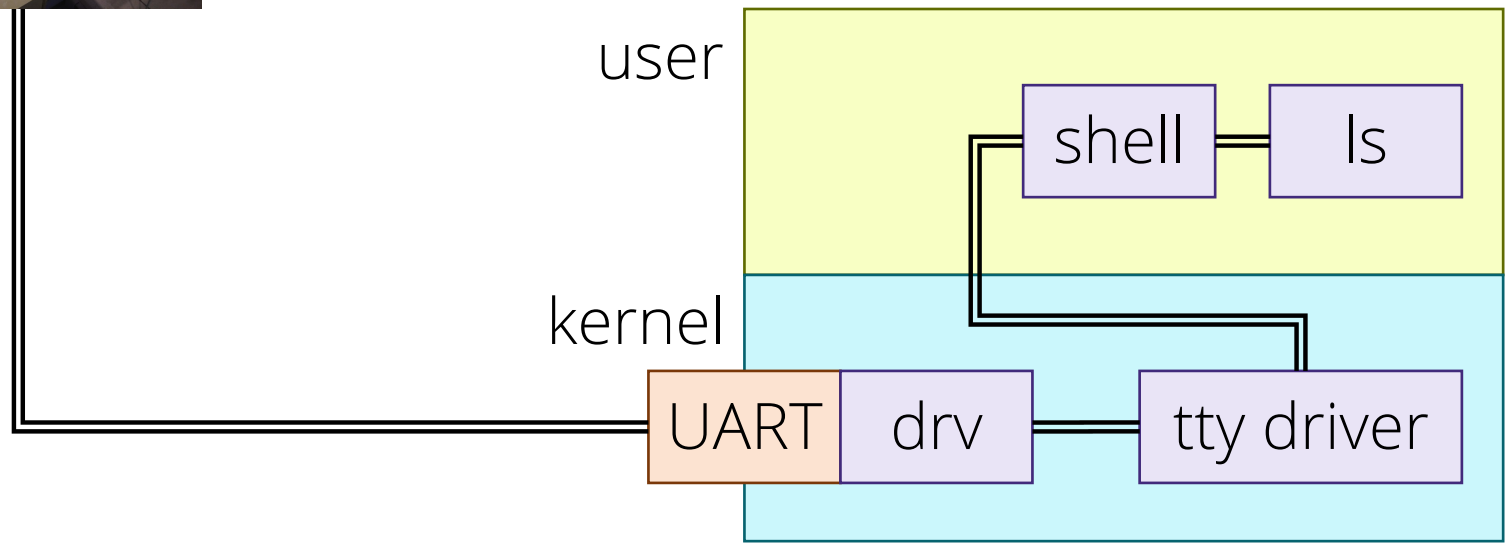
Mainframe

image from www.bosch.com/stories/ibm-mainframe-computer-history/

UNIX reminder

1. Everything is a file. A file is something you can read from and write to.
2. Readers and writers can be connected in a pipeline to accomplish larger tasks.
3. Programs and devices communicate using streams of ASCII text.

UNIX



Control Characters

XOFF

ASCII

USASCII code chart

Bits b_7 b_6 b_5 →	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b_4 b_3 b_2 b_1 ↓ Row ↓ Column →	0	1	2	3	4	5	6	7
0 0 0 0	0	NUL	DLE	SP	0	@	P	`	p
0 0 0 1	1	SOH	DC1	!	1	A	Q	a	q
0 0 1 0	2	STX	DC2	"	2	B	R	b	r
0 0 1 1	3	ETX	DC3	#	3	C	S	c	s
0 1 0 0	4	EOT	DC4	$	4	D	T	d	t
0 1 0 1	5	ENQ	NAK	%	5	E	U	e	u
0 1 1 0	6	ACK	SYN	&	6	F	V	f	v
0 1 1 1	7	BEL	ETB	'	7	G	W	g	w
1 0 0 0	8	BS	CAN	(	8	H	X	h	x
1 0 0 1	9	HT	EM	)	9	I	Y	i	y
1 0 1 0	10	LF	SUB	*	:	J	Z	j	z
1 0 1 1	11	VT	ESC	+	;	K	[	k	{
1 1 0 0	12	FF	FS	,	<	L	\	l	|
1 1 0 1	13	CR	GS	-	=	M	]	m	}
1 1 1 0	14	SO	RS	.	>	N	^	n	~
1 1 1 1	15	SI	US	/	?	O	_	o	DEL

ASCII again

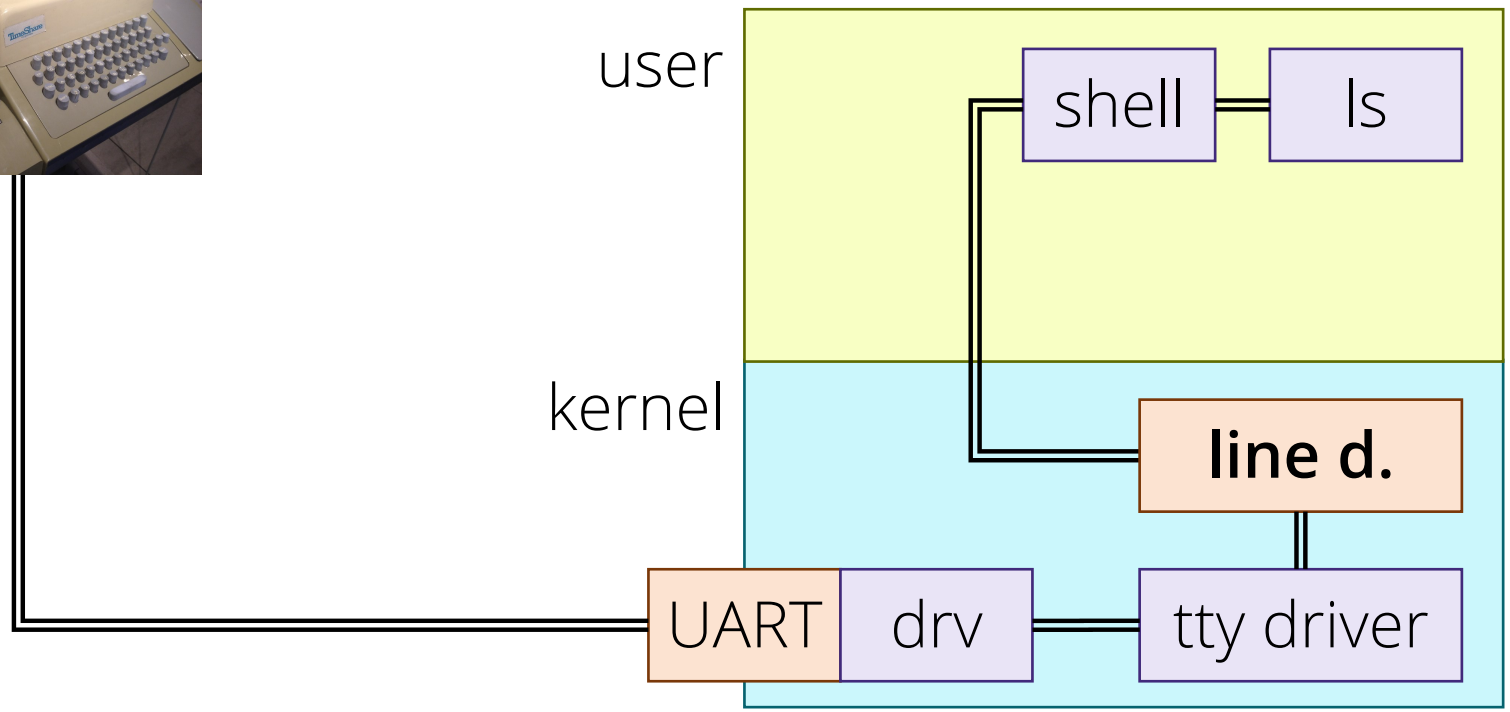

B E L L S Y S T E M
READER AUTO
KBD LOCAL
PRINTER LOCAL
READER LOCAL
PUNCH LOCAL
PUNCH ON
PAPER ADVANCE
LOCAL RETURN
INTRPT
TAB
RETURN
BACK SPACE
NULL
ESCAPE
SHIFT LOCK
NEW LINE
DELETE
CONTRL
SHIFT
CONTRL

ASCII again


DC1
Q
ETB
W
E
DC2
R
DC4
T
EM
Y
U
SOH
A
DC3
S
EOT
D
F
BELL
G
H
SUB
Z
CAN
X
ETX
C
SYN
V
STX
B
SO
N

Line Discipline

UNIX: line discipline



typo correction

`Type:` **`echo He[BACKSPACE]i[ENTER]`**

terminal prints: **`$ echo He#i`**

shell sees: **`echo Hi`**

and prints: `Hi`

TTY keyboard commands

^C	interrupt / cancel
^D	end of file (close terminal session)
^L	form feed (clear screen)
^M	carriage return (new line)
^Q	resume (after ^S)
^S	freeze terminal output
^U	kill line
^W	kill word

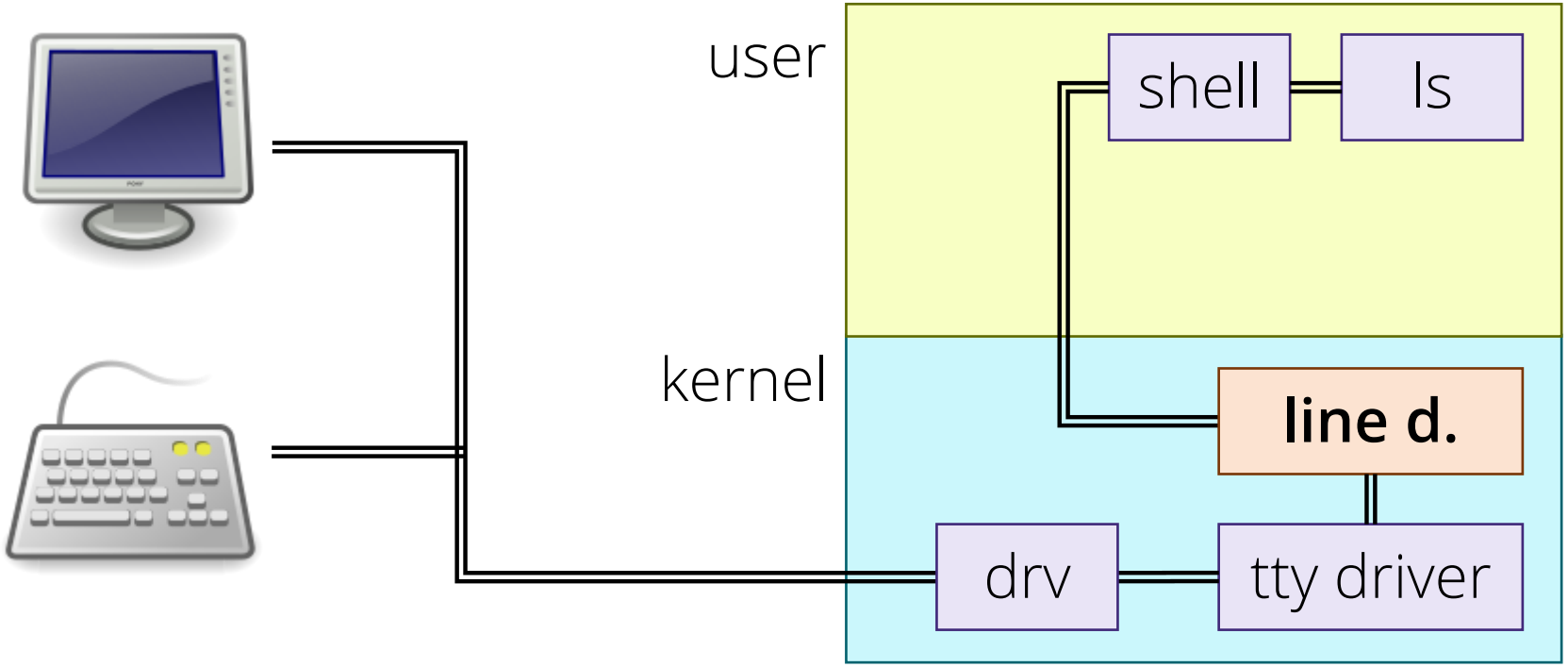
Virtual terminals

On a real/virtual UNIX/Linux machine,

Control+Alt+[F1 to F7] select a kernel-emulated virtual terminal (TTY).

This doesn't work over ssh, you have to be at the real "console" for this.

Virtual terminals



Note on buffering

Buffering can happen in two places:

1. In the kernel (set the tty to raw mode to turn this off, if needed) – see **`stty`** manual.

2. In the C library for fread/fwrite and friends (includes printf family) – you can turn this off with `stdbuf -o0 COMMAND` or **`-oL`** to buffer one line at a time.

To be continued in part 2 …