

Commodore Plus/4

From C64-Wiki
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The **Plus/4** was a Commodore home computer sold from 1984 to 1986. It featured a compact plastic casing and a fully-fledged keyboard. The cursor keys and function keys were made of rubber. The Plus/4 was similar to the C16 and C116, and it belonged to the Commodore 264 series, which were all software compatible. The original price was about \$300.

Commodore produced about 827,000 units worldwide, with about 286,500 sold in Germany. It was also available with a modified Plus/4 logo (+4=) for the Canadian market and with additional Hungarian characters for the Hungarian market.

Compared to the VIC-20 and C64, the operating system of the Plus/4 had an advanced BASIC (version 3.5), which meant that the software for the Plus/4 was not compatible with the C64. Also incompatible were the peripheral devices, including the datasette 1531, disk drive 1551, and joysticks. However, a simple adapter was available for the datasette and joysticks.

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Built-in Software

The Plus/4 was one of the first home computers to feature integrated user software in ROM. This was one of the first office suites.

- Word processor: Start with **F1** + **RETURN** or SYS1525 (plus <RETURN>). In the Plus/4 software area you can change by using the key combination **C=** + **C** and the following input of **tw** (plus <RETURN>; shortcut for "to Word") in the command mode to get back to the word processor.
- Spreadsheet: Start with **F1** + **RETURN** or SYS1525 (plus <RETURN>), then press **C=** + **C** and enter **tc** (plus <RETURN>; shortcut for "to the Calculator") in command mode.
- Additional graphics option for the spreadsheet, i.e. creation of block- or scatter diagrams with data from the tables.
- Database: Start with **F1** + **RETURN** or SYS1525 (plus <RETURN>), then press **C=** + **C** and enter **tf** (plus <RETURN>; shortcut for "to File Manager") in the command mode.
Important: Before the first use of the database a special file for the database management must be created.

The built-in machine code monitor TEDMON is part of the BASIC V3.5. It can be called with SYS 0 or MONITOR.

Construction

Right side

- Reset button
- On/Off switch

Rear view

- Power connector (power; 4 pins, square) for the power supply unit. PSU basically compatible to C64, but uses different (square) connector.
- Serial bus resp. Serial Bus (IEEE-488, 6 pin, I/O) to connect a disk drive 1541/70/71/81 or printer MPS-801/802/803, VIC-1515/1525/1526
- Cassette connector (cassette port round Mini-DIN, 7-pins; E/A) to connect a cassette recorder (Datasette) 1531
- User Port (RS-232; 24-pins; I/O) used to connect expansions, not compatible with the user port of the C 64. The used MOS 6551 ACIA of the Plus/4 supports data transfer up to 19.200 baud in hardware. The MOS 6529 provides 8 port lines
- Memory expansion; (50 pins; I/O) to connect cartridges or the disk drive 1551
- Two control ports (Joy0 and Joy1, round mini-DIN, 8 pins, I) to connect a Joystick
- Audio-/Video (8 pins; O) to connect a monitor and/or a stereo

Left side

- TV connector, (HF modulator output; O) to connect a television (in the versions NTSC or PAL)

Mainboard

- CPU:** MOS 7501 or 8501 with 0.885/1.78MHz clock frequency (controlled by TED) - average approx. 1.1 MHz.
- Memory:** 64 KByte RAM, with 60671 bytes free usable for BASIC
- ROM:** 2×32 KByte in total, divided to:
 - CBM BASIC V3.5 (16 KByte) (\$8000-\$BFFF; 32768-49151)
 - KERNAL (14 KByte) (\$D800-\$FFF9; 55296-65529)
 - Character set (2 KByte) (\$D000-\$D7FF; 53248-55295)
 - ROM-Chip with integrated office software
- Graphics:** TED 8360
 - Display in text mode (either uppercase characters & block graphics or upper- & lowercase characters) 40 (rows) × 25 (columns) characters or in graphic mode 320×200 Pixel or 160×200 pixel. Also display graphics with 5 rows of text at 320*160 or 160×160 pixel, additional Shapes in BASIC
 - Colors: 121 (15 colors in 8 shades and black)
- Sound:** TED 8360 is used as well for sound generation and can create 2 independent voices with tones or sound effects covering 4 octaves (approx. 28 tones without intermediate tones).
- Keyboard:** 67 keys (QWERTY or QWERTZ), with multi-assignments, function key are already predefined.
- Others:**
 - Dimensions: 335mm × 202mm × 65mm (13.19in × 7.95in × 2.56in)
 - Weight: approx. 1 kg (2.20 lbs)
 - Power supply: 9 V AC and 5 V DC via power supply unit

Block diagram

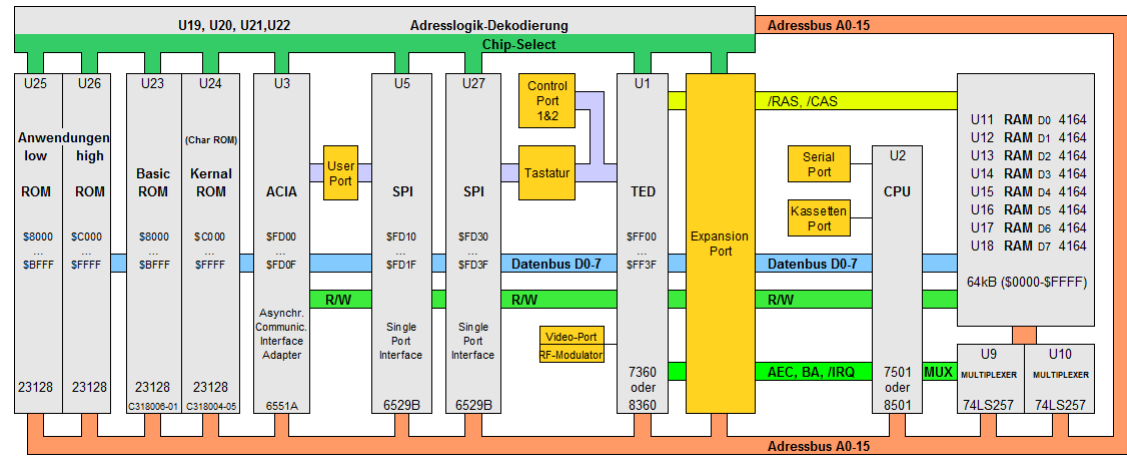
Commodore Plus/4



Type:	Home Computer
Producer:	Commodore
Price:	299 US\$
Released:	1984
Discontinued:	1986
Processor:	MOS 7501/8501 @ 0,885/1,76 MHz
Memory:	64 KByte, upgradeable
OS:	BASIC 3.5
Info:	Include office software part of the Commodore-264 series



Plus/4 box



ROM listing

RAM chip

Memory addresses		Description
Hexadecimal	Decimal	
\$0000-\$07FF	00000-02047	Zero page, system RAM
\$0800-\$0BFF	02048-03071	Color RAM
\$0C00-\$0FFF	03072-04095	Video RAM
\$1000-\$FD00	04096-64768	BASIC RAM begin (with active graphics this area will be moved up!)
\$1800-\$1BFF	06144-07167	Luminance (with active graphics)
\$1C00-\$1FFF	07168-08191	Color table (with active graphics)
\$2000-\$3FFF	08192-16383	Video ram for graphics (with active graphics)
\$4000-\$FD00	16384-64768	BASIC RAM begin (with active graphics)!
\$FD01-\$FFFF	64769-65535	free

ROM-Chip

Memory addresses		Description
Hexadecimal	Decimal	
\$8000-\$BFFF	32768-49151	BASIC V3.5
\$C000-\$CFFF	49152-53247	Free for BASIC extensions
\$D000-\$D7FF	53248-55295	Char set
\$D800-\$DBFF	55296-64511	KERNAL
\$FC00-\$FCFF	64512-64767	ROM banking routines
\$FD00-\$FEFF	64768-65279	I/O addresses
\$FF81-\$FFFF	65409-65529	KERNAL
\$FFFA-\$FFFB	65530-65531	NMI vector
\$FFFC-\$FFFD	65532-65533	RES vector
\$FFFE-\$FFFF	65534-65535	IRQ vector

Deviations color table and control characters

The commodore color table deviates on the TED beginning with the 9th color (brown):

Color	Key combination	Color value for POKE	In program: PRINT CHR\$(X)	Or by PRINT "control character" (in quotes!)
yellow-green	<C>+<3>	090	150	inverse graphic X
Pink	<C>+<4>	107	152	inverse ring
Blue-green	<C>+<5>	092	151	inverse clubs
Light blue	<C>+<6>	109	153	inverse vline right
Dark blue	<C>+<7>	046	154	inverse check
Light green	<C>+<8>	095	155	inverse clubs

Hint: There are some new control characters on a Plus/4:

PRINTCHR\$(027)	Escape key
PRINTCHR\$(130)	Text flashing on
PRINTCHR\$(131)	Text flashing off
PRINTCHR\$(140)	Help key

Function Keys

The Plus/4 function keys are usually:

- F1 SYS 1525: 3-PLUS-1 (starts the built-in 3-Plus-1-Office-Software)
- F2 DLOAD+CHR\$(34)
- F3 DIRECTORY+CHR\$(13) (the key RETURN is hit)
- SHIFT + F4 SCNCLR+CHR\$(13)
- SHIFT + F5 DSAVE+CHR\$(34)
- SHIFT + F6 RUN+CHR\$(13)
- SHIFT + F7 LIST+CHR\$(13)
- HELP or F8 HELP+CHR\$(13)

To overview or modify function keys can be accomplished through the BASIC-command KEY in direct mode or in programs. After a reset or a reboot are the standard function key configuration active.

Bundles and purchased parts package

In Germany the Plus/4 was available as single package and later it was sold in a bundle.

The purchased parts of a Plus/4 package are (1984):

- Computer (Plus/4)
- Power Supply
- Manual Commodore Plus/4 (ring binder)
- Manual 3+1 Software (ring binder)
- Aerial cable
- Commodore warranty card
- Commodore extra guarantee
- Interference free certificate
- Cardboard package
- Styrofoam shells top and bottom

In Germany the additional content of the bundle *Commodore Plus/4 Computer-Lernkurs BASIC-Programmiersprache* for approx. DM 250 was (1986):

- Datasette 1531
- BASIC-Tutorial book Lerne BASIC mit dem Commodore 116/16/Plus 4
- BASIC program cassette C116, C16, plus/4
- Manual Datasette 1531
- Commodore warranty card
- Cardboard package of the bundle
- Cardboard package of the 1531
- Datasette box with 2 styrofoam shells
- 2 Styrofoam shells for Plus/4

The additional purchased parts package of the bundle *Commodore Plus/4 Plus Pack" outside Germany* (Commodore Plus/4 Presentation Pack *or* Plus/4 Liquidation Package *is (1985) for £ 99.95 (Great Britain pounds)*):

- Cardboard package of the bundle
- Datasette 1531
- Joystick Commodore T1341
- 10 cassettes with software: Icicle Works, Harbour Attack, Fire Ant, Exorcist, Crazy Golf, Mayhem, Number Builder, Number Chaser, Space Sweep, Space Invaders and Treasure Island

The additional purchased parts package of the bundle *Commodore Plus/4 Das Komplett-Paket mit Floppy-Disk 1551* for approx. DM 500 is (1986/87):

- Cardboard package of the bundle
- Serial cable
- Commodore warranty card for the Floppy 1551
- Interference free certificate for the floppy 1551
- Styrofoam shells top and bottom for the floppy 1551

Links

W **Wikipedia: Commodore_Plus/4** (http://en.wikipedia.org/wiki/Commodore_Plus/4)

- Plus/4 related documents at CARLSEN ELECTRONICS (<http://personalpages.tds.net/~rcarlsen/cbm/plus4/>)
- Plus/4 World (<http://plus4world.powweb.com/>)
- Plus/4 and C16-Software at Eli's Software Encyclopedia (http://www.elisoftware.org/index.php?title=Category:Commodore_Plus-4_Software)

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