VIC 20 / Commodore 64 Memory Map

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There are some differences between the 20 and 64 as indicated. Zero Page contents at power-up by Richard Evers.

Location			Contents				Description
Hex		Dec	VIC Hex	VIC Dec	C64 Hex	C64 Dec	
00	-02 00	0-2	0	4C	76	2F	47	USR Jump. 64: Chip directional reg.
	01		1	48	72	37	55	64: Chip I/O; memory & tape control
	02		2	D2	210	33	51	20: JMP $D248. 64: Unused
03	-04 03	3-4	3	AA	170	AA	170	Float-Fixed vector
	04		4	D1	209	B1	177	
05	-06 05	5-6	5	91	145	91	145	Fixed-Float vector
	06		6	D3	211	B3	179	
07	07	7	7	22	34	22	34	Search character
08	08	8	8	22	34	22	34	Scan-quotes flag
09	09	9	9	00	0	00	0	TAB column save
0A	0A	10	10	00	0	00	0	0 = LOAD, 1 = VERIFY
0B	0B	11	11	4C	76	4C	76	Input buffer pointer/# subscripts
0C	0C	12	12	00	0	00	0	Default DIM flag
0D	0D	13	13	00	0	00	0	Type: FF = string, 00 = numeric
0E	0E	14	14	00	0	00	0	Type: 80 = integer, 00 = floating pt
0F	0F	15	15	00	0	00	0	DATA scan/LIST quote/memory flag
10	10	16	16	00	0	00	0	Subscript/FNx flag
11	11	17	17	00	0	00	0	0 = INPUT;$40 = GET;$98 = READ
12	12	18	18	00	0	00	0	ATN sign/Comparison eval. flag
13	13	19	19	05	5	05	5	Current I/O prompt flag
14	-15 14	20-21	20	14	20	14	20	Integer value
	15		21	00	0	00	0	
16	16	22	22	19	25	19	25	**Pointer:** Temporary string stack
17	-18 17	23-24	23	16	22	16	22	Last temp string vector
	18		24	00	0	00	0	
19	-21 19	25-33	25	02	25	02	2	Stack for temporary strings
	1A		26	FE	254	FE	254	
	1B		27	1D	29	9F	159	
	1C		28	0	0	00	0	
	1D		29	00	0	00	0	
	1E		30	00	0	00	0	
	1F		31	00	0	1E	30	
	20		32	00	0	00	0	
	21		33	00	0	00	0	
22	-25 22	34-37	34	05	5	05	5	Utility pointer area
	23		35	10	16	08	8	
	24		36	F3	243	F3	243	
	25		37	01	1	01	1	
26	-2A 26	38-42	38	00	0	00	0	Product area for multiplication
	27		39	00	0	00	0	
	28		40	00	0	00	0	
	29		41	00	0	00	0	
	2A		42	00	0	00	0	
2B	-2C 2B	43-44	43	01	1	01	1	**Pointer:** Start of BASIC
	2C		44	10	16	08	8	
2D	-2E 2D	45-46	45	03	3	03	3	**Pointer:** Start of Variables
	2E		46	10	16	08	8	
2F	-30 2F	47-48	47	0A	10	0A	10	**Pointer:** Start of Arrays
	30		48	10	16	08	8	
31	-32 31	49-50	49	0A	10	0A	10	**Pointer:** End of Arrays
	32		50	10	16	08	8	
33	-34 33	51-52	51	00	0	00	0	**Pointer:** String Storage (moving down)
	34		52	1E	30	A0	160	
35	-36 35	53-54	53	00	0	00	0	**Pointer:** String Utility
	36		54	1E	30	A0	160	
37	-38 37	55-56	55	00	0	00	0	**Pointer:** Limit of Memory
	38		56	1E	30	A0	160	
39	-3A 39	57-58	57	00	0	00	0	Current BASIC line number
	3A		58	FF	255	FF	255	
3B	-3C 3B	59-60	59	00	0	00	0	Previous BASIC line number
	3C		60	00	0	00	0	
3D	-3E 3D	61-62	61	3D	61	00	0	**Pointer:** BASIC statement for CONT
	3E		62	00	0	00	0	
3F	-40 3F	63-64	63	00	0	00	0	Current DATA line number
	40		64	00	0	00	0	
41	-42 41	65-66	65	00	0	00	0	Current DATA address
	42		66	10	16	08	8	
43	-44 43	67-68	67	00	0	00	0	Input vector
	44		68	00	0	00	0	
45	-46 45	69-70	69	41	65	41	65	Current variable name
	46		70	00	0	00	0	
47	-48 47	71-72	71	05	5	05	5	Current variable address
	48		72	10	16	08	8	
49	-4A 49	73-74	73	05	5	05	5	Variable pointer for FOR/NEXT
	4A		74	10	16	08	8	
4B	-4C 4B	75-76	75	00	0	00	0	Y-save; op-save; BASIC pointer save
	4C		76	00	0	00	0	
4D	4D	77	77	00	0	00	0	Comparison symbol accumulator
4E	-53 4E	78-83	78	00	0	00	0	Misc. work area, pointers, etc.
	4F		79	00	0	00	0	
	50		80	00	0	00	0	
	51		81	00	0	00	0	

Location			Contents				Description
Hex		Dec	VIC Hex	VIC Dec	C64 Hex	C64 Dec	
	52		82	00	0	00	0	
	53		83	03	3	03	3	
54	-56 54	84-86	84	4C	76	4C	76	Jump vector for functions
	55		85	0D	13	0D	13	
	56		86	D8	216	B8	184	
57	-60 57	87-96	87	00	0	00	0	Misc. numeric work area
	58		88	0A	10	0A	10	
	59		89	1F	15	07	7	
	5A		90	03	3	03	3	
	5B		91	1F	15	07	7	
	5C		92	00	0	00	0	
	5D		93	00	0	00	0	
	5E		94	00	0	00	0	
	5F		95	03	3	03	3	
	60		96	10	16	08	8	
61	61	97	97	87	135	87	135	Accum#1: Exponent
62	-65 62	98-101	98	00	0	00	0	Accum#1: Mantissa
	63		99	00	0	00	0	
	64		100	00	0	00	0	
	65		101	65	101	65	101	
66	66	102	102	4C	76	4C	76	Accum#1: Sign
67	67	103	103	00	0	00	0	Series evaluation constant pointer
68	68	104	104	00	0	00	0	Accum#1 hi-order (overflow)
69	-6E 69	105-110	105	00	0	00	0	Accum#2: Exponent
	6A		106	00	0	00	0	Accum#2: Mantissa
	6B		107	00	0	00	0	
	6C		108	00	0	00	0	
	6D		109	00	0	00	0	
	6E		110	00	0	00	0	Accum#2: Sign
6F	6F	111	111	00	0	00	0	Sign comparison, Acc#1 vs #2
70	70	112	112	00	0	00	0	Accum#1 lo-order (rounding)
71	-72 71	113-114	113	01	1	01	1	Cassette buff len/Series pointer
	72		114	01	1	01	1	
73	-8A 73	115-138	115	E6	230	E6	230	CHRGET subroutine; get BASIC char
	74		116	7A	122	7A	122	;INC $7A
	75		117	D0	208	D0	208	;BNE $0079
	76		118	02	2	02	2	
	77		119	E6	230	E6	230	;INC $7B
	78		120	7B	123	7B	123	
	79		121	AD	173	AD	173	;LDA $022D 64: LDA $022C
	7A		122	2D	45	2C	44	
	7B		123	02	2	02	2	
	7C		124	C9	201	C9	201	;CMP #$3A
	7D		125	3A	58	3A	58	
	7E		126	B0	176	B0	176	;BCS $008A
	7F		127	0A	10	0A	10	
	80		128	C9	201	C9	201	;CMP #$20
	81		129	20	32	20	32	
	82		130	F0	240	F0	240	;BEQ $0073
	83		131	EF	239	EF	239	
	84		132	38	56	38	56	;SEC
	85		133	E9	233	E9	233	;SBC #$30
	86		134	30	48	30	48	
	87		135	38	56	38	56	;SEC
	88		136	E9	233	E9	233	;SBC #$D0
	89		137	D0	208	D0	208	
	8A		138	60	96	60	96	;RTS
7A	-7B 7A	122-123	122	2D	45	2C	44	BASIC pointer (within subrtn)
	7B		123	02	2	02	2	
8B	-8F 8B	139-143	139	80	128	80	128	RND seed value
	8C		140	4F	79	4F	79	
	8D		141	C7	199	C7	199	
	8E		142	52	82	52	82	
	8F		143	58	88	58	88	
90	90	144	144	00	0	00	0	Status word ST
91	91	145	145	FF	255	FF	255	Keyswitch PIA: STOP and RVS flags
92	92	146	146	00	0	00	0	Timing constant for tape
93	93	147	147	00	0	00	0	LOAD = 0, VERIFY = 1
94	94	148	148	55	85	55	85	Serial output: deferred char flag
95	95	149	149	FF	255	FF	255	Serial deferred character
96	96	150	150	00	0	00	0	Tape EOT received
97	97	151	151	10	16	00	0	Register save
98	98	152	152	01	1	01	1	How many open files
99	99	153	153	00	0	00	0	Input device, normally 0
9A	9A	154	154	08	8	08	8	Output CMD device, normally 3
9B	9B	155	155	00	0	00	0	Tape character parity
9C	9C	156	156	00	0	00	0	Byte-received flag
9D	9D	157	157	80	128	80	128	Direct = $80/RUN = 0 output control
9E	9E	158	158	00	0	00	0	Tp Pass 1 error log/char buffer
9F	9F	159	159	00	0	00	0	Tp Pass 2 err log corrected
A0	-A2 A0	160-162	160	00	0	00	0	Jiffy Clock HML
	A1		161	25	37	3B	59	

Location Hex	Location Dec	Contents VIC Hex	VIC Dec	C64 Hex	C64 Dec	Description
	A2	74	116	38	56	
A3	A3 163	55	85	55	85	Serial bit count/EOI flag
A4	A4 164	00	0	00	0	Cycle count
A5	A5 165	00	0	00	0	Countdown, tape write/bit count
A6	A6 166	00	0	00	0	Tape buffer pointers
A7	A7 167	00	0	00	0	Tp Wrt ldr count/Rd pass/inbit
A8	A8 168	00	0	00	0	Tp Wrt new byte/Rd error/inbit cnt
A9	A9 169	00	0	00	0	Wrt start bit/Rd bit err/stbit
AA	AA 170	00	0	00	0	Tp Scan;Cnt;Ld;End/byte assy
AB	AB 171	00	0	00	0	Wr lead length/Rd checksum/parity
AC-AD	AC 172-173	00	0	00	0	**Pointer:** tape bufr, scrolling
	AD 173	00	0	00	0	
AE-AF	AE 174-175	00	0	00	0	Tape end adds/End of program
	AF 175	00	0	00	0	
B0-B1	B0 176-177	00	0	00	0	Tape timing constants
	B1 177	00	0	00	0	
B2-B3	B2 178-179	3C	60	3C	60	**Pointer:** Start of Tape Buffer
	B3 179	03	3	03	3	
B4	B4 180	00	0	00	0	1 = Tp timer enabled; bit count
B5	B5 181	00	0	00	0	Tp EOT/RS232 next bit to send
B6	B6 182	00	0	00	0	Read character error/outbyte buf
B7	B7 183	11	17	10	16	# characters in file name
B8	B8 184	05	5	05	5	Current logical file
B9	B9 185	65	101	65	101	Current secndy address
BA	BA 186	08	8	08	8	Current device
BB-BC	BB 187-188	EF	239	F0	240	Pointer to file name
	BC 188	1D	29	9F	159	
BD	BD 189	00	0	00	0	Wr shift word/Rd input char
BE	BE 190	00	0	00	0	# blocks remaining to Wr/Rd
BF	BF 191	00	0	00	0	Serial word buffer
C0	C0 192	00	0	00	0	Tape motor interlock
C1-C2	C1 193-194	00	0	00	0	I/O start address
	C2 194	20	32	A0	160	
C3-C4	C3 195-196	6D	109	30	48	Kernal setup pointer
	C4 196	FD	253	FD	253	
C5	C5 197	40	64	40	64	Last key pressed
C6	C6 198	00	0	00	0	# chars in keybd buffer
C7	C7 199	00	0	00	0	Screen reverse flag
C8	C8 200	4A	74	49	73	End-of-line for input pointer
C9-CA	C9 201-202	01	04	4	03	Input cursor log (row, column)
	CA 202	4A	74	49	73	
CB	CB 203	203	40	64	40	64 Which key: 64 if no key
CC	CC 204	204	01	1	01	1 0 = flash cursor
CD	CD 205	205	0D	13	11	17 Cursor timing countdown
CE	CE 206	206	20	32	20	32 Character under cursor
CF	CF 207	207	00	0	00	0 Cursor in blink phase
D0	D0 208	208	00	0	00	0 Input from screen/from keyboard

Location Hex	Location Dec	Contents VIC Hex	VIC Dec	C64 Hex	C64 Dec	Description
D1-D2	D1 209-210	209	C6	198	40	64 Pointer to screen line
	D2	210	1E	30	05	5
D3	D3 211	211	00	0	00	0 Position of cursor on above line
D4	D4 212	212	00	0	00	0 0 = direct cursor, else programmed
D5	D5 213	213	15	21	27	39 Current screen line length
D6	D6 214	214	09	9	08	8 Row where cursor lives
D7	D7 215	215	0D	13	0D	13 Last inkey/checksum/buffer
D8	D8 216	216	00	0	00	0 # of INSERTS outstanding
D9-F0	D9 217-240	217	9E	158	84	132 Screen line link table
	DA	218	9E	158	84	132
	DB	219	9E	158	84	132
	DC	220	9E	158	84	132
	DD	221	9E	158	84	132
	DE	222	9E	158	84	132
	DF	223	1E	30	84	132
	E0	224	1E	30	05	5
	E1	225	1E	30	85	133
	E2	226	9E	158	85	133
	E3	227	9E	158	85	133
	E4	228	9E	158	85	133
	E5	229	9F	159	85	133
	E6	230	9F	159	86	134
	E7	231	9F	159	86	134
	E8	232	9F	159	86	134
	E9	233	9F	159	86	134
	EA	234	9F	159	86	134
	EB	235	9F	159	86	134
	EC	236	9F	159	86	134
	ED	237	9F	159	87	135
	EE	238	9F	159	87	135
	EF	239	9F	159	87	135
	F0	240	9F	159	87	135
F1	F1 241	241	FF	255	87	135 Dummy screen link
F2	F2 242	242	08	8	87	135 Screen row marker
F3-F4	F3 243-244	243	6E	110	F0	240 Screen colour pointer
	F4	244	96	150	D8	216
F5-F6	F5 245-246	245	5E	94	81	129 Keyboard pointer
	F6	246	EC	236	EB	235
F7-F8	F7 247-248	247	00	0	00	0 RS-232 Rcv pntr
	F8	248	00	0	00	0
F9-FA	F9 249-250	249	00	0	00	0 RS-232 Tx pntr
	FA	250	00	0	00	0
FB	FB 251	251	00	0	00	0 Not Known
FC	FC 252	252	00	0	00	0 Not Known
FD	FD 253	253	00	0	00	0 Not Known
FE	FE 254	254	00	0	00	0 Not Known
FF	FF 255	255	00	0	20	32 Start of Floating to ASCII Work Area

00FF-010A	256-266	Floating to ASCII work area
0100-013E	256-318	Tape error log
0100-01FF	256-511	Processor stack area
0200-0258	512-600	BASIC input buffer
0259-0262	601-610	Logical file table
0263-026C	611-620	Device number table
026D-0276	621-630	Sec address table
0277-0280	631-640	Keybd buffer
0281-0282	641-642	Start of BASIC Memory
0283-0284	643-644	Top of BASIC Memory
0285	645	Serial bus timeout flag
0286	646	Current colour code
0287	647	Colour under cursor
0288	648	Screen memory page
0289	649	Max size of keybd buffer
028A	650	Repeat all keys
028B	651	Repeat speed counter
028C	652	Repeat delay counter
028D	653	Keyboard Shift/Control flag
028E	654	Last shift pattern
028F-0290	655-656	Keyboard table setup pntr
0291	657	Keyboard shift mode
0292	658	0 = scroll enable
0293	659	RS-232 control reg
0294	660	RS-232 command reg

		* Commodore 64 only
0295-0296	661-662	Bit timing
0297	663	RS-232 status
0298	664	# bits to send
0299-029A	665-666	RS-232 speed/code
029B	667	RS232 receive pointer
029C	668	RS232 input pointer
029D	669	RS232 transmit pointer
029E	670	RS232 output pointer
029F-02A0	671-672	IRQ save during tape I/O
02A1	673	CIA 2 (NMI) Interrupt control *
02A2	674	CIA 1 Timer A control log *
02A3	675	CIA 1 Interrupt log *
02A4	676	CIA 1 Timer A enabled flag *
02A5	677	Screen row marker *
02C0-02FE	704-766	(Sprite 11) *
0300-0301	768-769	Error message link
0302-0303	770-771	BASIC warm start link
0304-0305	772-773	Crunch BASIC tokens link
0306-0307	774-775	Print tokens link
0308-0309	776-777	Start new BASIC code link
030A-030B	778-779	Get arithmetic element link
030C	780	SYS A-reg save *
030D	781	SYS X-reg save *
030E	782	SYS Y-reg save *

030F	783	SYS status reg save	*
0310-0312	784-785	USR function jump	64: (B248) *
0314-0315	788-789	Hardware interrupt vector	20: (EABF) 64: (EA31)
0316-0317	790-791	Break interrupt vector	20: (FED2) 64: (FE66)
0318-0319	792-793	NMI interrupt vector	20: (FEAD) 64: (FE47)
031A-031B	794-795	OPEN vector	20: (F40A) 64: (F34A)
031C-031D	796-797	CLOSE vector	20: (F34A) 64: (F291)
031E-031F	798-799	Set-input vector	20: (F20E) 64: (F20E)
0320-0321	800-801	Set-output vector	20: (F309) 64: (F250)
0322-0323	802-803	Restore I/O vector	20: (F3F3) 64: (F333)
0324-0325	804-805	INPUT vector	20: (F20E) 64: (F157)
0326-0327	806-807	Output vector	20: (F27A) 64: (F1CA)
0328-0329	808-809	Test-STOP vector	20: (F770) 64: (F6ED)
032A-032B	810-811	GET vector	20: (F1F5) 64: (F13E)
032C-032D	812-813	Abort I/O vector	20: (F3EF) 64: (F32F)
032E-032F	814-815	Warm start vector	64: (FE66) *
032E-032F	814-815	USR vector	20: (FED2)
0330-0331	816-817	LOAD link	20: (F549) 64: (F1A5)
0332-0333	818-819	SAVE link	20: (F685) 64: (F5ED)
033C-03FB	828-1019	Cassette buffer	
0340-037E	832-894	(Sprite 13)	*
0380-03BE	896-958	(Sprite 14)	*
03C0-03FE	960-1022	(Sprite 15)	*

		VIC 20
0400-0FFF	1024-4095	3K RAM expansion area
1000-1FFF	4096-8191	Normal BASIC memory
1E00-1FF9	7680-8185	Normal Screen memory
1000-11F9	4096-4601	Screen memory w/expansion
1200-	4608-	BASIC memory w/expansion
2000-7FFF	8192-32767	Memory expansion area
8000-8FFF	32768-36863	Character bit maps
9000-900F	36864-36879	Video Interface Chip
9110-912F	37136-37151	VIA Interface - NMI
9120-912F	37152-37167	VIA Interface - IRQ
9400-95FF	37888-38399	Alternate Colour Nybble area
9600-97FF	38400-38911	Main Colour Nybble area
A000-BFFF	40960-49151	Plug-in ROM area
C000-FFFF	49152-65535	ROM: BASIC and Operating System
FF8A-FFF5	65418-65525	Jump Table (Kernal)

		Commodore 64
0400-07F7	1024-2039	Screen memory (default)
07F8-07FF	2040-2047	Sprite Pointers (default)
0800-9FFF	2048-40959	BASIC RAM memory
8000-9FFF	32768-40959	Alternate: ROM plug-in area
A000-BFFF	40960-49151	ROM: BASIC
A000-BFFF	49060-49151	Alternate: RAM
C000-CFFF	49152-53247	RAM memory, including alternate
D000-D02E	53248-53294	Video Chip (6566)
D400-D41C	54272-54300	Sound Chip (6581 SID)
D800-DBFF	55296-56319	Color nybble memory
DC00-DC0F	56320-56335	Interface chip 1, IRQ (6526 CIA)
DD00-DD0F	56576-56591	Interface chip 2, NMI (6526 CIA)
D000-DFFF	53248-53294	Alternate: Character set
E000-FFFF	57344-65535	ROM: Operating System
E000-FFFF	57344-65535	Alternate: RAM