FPGA Boot Camp $20 FPGA kit with full user IO, some assembly required: soldering & breadboard wiring   **Jim Brakefield** 2022

item	avail	web link	2nd web link	need	part #	high vol price	quant	min quant price	kit cost	# per kit	dx mm	dy mm	IO	K LUTs	Mb block RAM	MB D-RAM	MB flash	SD	vendor	mfg	comments
Seeed Tang Nano-9K	no	https://www.seeedstudio.com/Tang-Nano-9k-FPGA-board-Go	https://www.cnx-software	FPGA board	Tang Nano-9K	$14.90	1	$14.90	**14.90**	1.0	25.4	60.0	36	8.6	0.48	8.0		8.0	Y	Seeed	gowinsemi	2PB, 6LED, HDMI & LCD conn, 27MHz os
8 7-seg, 8 PB, 8 LED	yes	https://handsontec.com/index.php/product/tm1638-7-segment-display-keypadled-modu		User IO	TM1638 7-Segment Dis	$2.90	1	$2.90	**2.90**	1.0	50.8	76.2	5 pins							HandsOn Tech		all user IO except slide switches
16 PCS 400 Pin Solderless Board	yes	https://www.amazon.com/MCIGICM-Breadboard-Solderless-Prototype-Protoboard/dp/B		Breadboard	MCIGICM Breadboard 4	$19.99	16	$6.99	**0.08**	16.0	102.6	152.4								amazon	MCIGICM	connectable
12 position DIP switch	yes	https://www.mouser.com/ProductDetail/CUI-Devices/DS01C-254-L-09BE?qs=wnTfsH77X		**~10 slide switches**	490-DS01C-254-L-09BE	$1,148.66	2508	$0.88	**0.46**	1.0	10.2	30.5								mouser	CUI	bend out the pins for 2 sets of five
Seeed Tang Nano-9K	yes	https://www.aliexpress.us/item/3256803695567088.html?spm=a2g0o.ppclist.product.64		FPGA board	Tang Nano-9K	$20.64	1	$20.64	**20.64**	1.0	25.4	60.0	36	8.6	0.48	8.0		8.0	Y	Aliexpres	gowinsemi	**free shipping,** several prices
Seeed Tang Nano-9K	yes	https://www.pcbway.com/project/gifts_detail/Sipeed_Tang_Nano_9K_FPGA_kits_with_1		FPGA board	Tang Nano-9K	$22.99	1	$20.64	**22.99**	1.0	25.4	60.0	36	8.6	0.48	8.0		8.0	Y	pcbway	gowinsemi	has small LCD screen
iceFUN FPGA Board	yes	https://www.robotshop.com/en/icefun-fpga-board.html			iCE40			$31.46			22.9	66.0	45	7.7	0.13							includes PIC16 & 4x8 LED array
pico-ice		https://github.com/tinyvision-ai-inc/pico-ice	https://tinyvision.ai/		iCE40UP5K						22.9	50.8	80	5.3	0.12	8.0	4.0				RP2040 & iCE, 4 column IO, RGB LED
8 7-seg, 16 PB	yes	https://handsontec.com/index.php/product/tm1638/						$4.60													used in appliances
rotary dip switch	yes	https://www.digikey.com/en/products/detail/cts-electrocomponents/220ADC16/474385		HEX rotary switch	CT3070-ND	$5,755.75	5000	$2.28	1.15	1.0									digikey	ctscorp	has knob, also surface mount
5 position DIP switch	yes	https://www.mouser.com/ProductDetail/CUI-Devices/DS01C-254-L-09BE?qs=wnTfsH77X		5X slide switch	490-DS01C-254-L-05BE	$902.88	2508	$0.68	0.72	0.5									mouser	CUI	two per kit
12 position DIP switch	yes	https://www.digikey.com/en/products/detail/cts-electrocomponents/210-12MS/250378		~10 slide switches	CT21012MS-ND	$2,747.45	5000	$1.06	0.55	1.0									digikey	ctscorp	knockout legs for 2 sets of five
Breadboard Jumper Cables Kit	yes	https://www.amazon.com/Elegoo-EL-CP-004-Multicolored-Breadboard-arduino/dp/B01E		120 jumpers	Elegoo-EL-CP-004	$6.98	1	$6.98	1.40	5.0									amazon	ELEGOO	8X M/M, M/F, F/F per kit?
make-male Jumper Cables	yes	https://tinkererssupply.com/products/10-cm-40-pin-solderless-jumper-wires-male-to-ma		(40) m/m jumpers	10 CM 40 Pin Solderless	$2.49	1	$2.49	0.62	4.0									tinkersupply		10 per kit?
HOOK-UP 22AWG SOLID - 10 X 25F	yes	https://www.adafruit.com/product/3174	digikey	breadboarding	3174	$2,396.00	100	$29.95	2.00	12.0									adafruit		100 sets cut into 2' lengths
HOOK-UP 22AWG SOLID - 6 X 25FT	yes	https://www.adafruit.com/product/1311	digikey	breadboarding	1311	$1,276.00	100	$15.95	1.60	8.0									adafruit		100 sets cut into 3' lengths
narrow FPGA boards		https://shop.trenz-electronic.de/en/Products/Trenz-Electronic/																				
cheap FPGA boards		https://www.joelw.id.au/FPGA/CheapFPGADevelopmentBoards																				

DIP switch mounted on breadboard spanning plugboard ground bus and rows connected to FPGA IOs   Required parts   **$18.34**   DIP switch only item with high volume price break

Gowin IDE has low level placement tools, supports VHDL, Verilog and constraint files, wonder about P&R quality   FPGA board has DRAM, Flash & SD socket

Seeed Tang Nano-9K includes unsoldered pins, USB cable & case; has 27MHz oscillator