

FPGA Boot Camp \$20 FPGA kit with full user IO, some assembly required: soldering & breadboard wiring

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| 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 | Q | vendor | mfg | comments |
|---------------------------------|-------|---|---|--------------------|-------------------------|----------------|-------|-----------------|----------|-----------|-------|-------|--------|--------|--------------|----------|----------|---|---------------|-----------|--------------------------------------|
| Seeed Tang Nano-9K | no | https://www.seeedstudio.com/Tang-Nano-9K-FPGA-board-Go | https://www.cnx-software.com/ | FPGA board | GW1N-9 | \$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-modul | | 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 | 1 | \$6.99 | 1.25 | 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 |
| 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://tinkerssupply.com/products/10-cm-40-pin-solderless-jumper-wires-male-to-m | | (40) m/m jumpers | 10 CM 40 Pin Solderless | \$2.49 | 1 | \$2.49 | 0.62 | 4.0 | | | | | | | | | tinkerssupply | | 10 per kit? |
| HOOK-UP 22AWG SOLID - 10 X 25FT | yes | https://www.adafruit.com/product/3174 | | 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 | | 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

Gowin IDE has low level placement tools, supports VHDL, Verilog and constraint files, wonder about P&R quality

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

Required parts \$19.51

DIP switch only item with high volume price break

FPGA board has DRAM, Flash & SD socket