KV6O DG5 Emulator for the 2.0.3 PCB

3/13/2020

Bill of Materials - main board for all display options   https://www.mouser.com/ProjectManager/ProjectDetail.aspx?AccessID=56847333fc

Qty	Part Name	Schematic Part	Description	Part Number	Source	Notes
1	Atmel 328P	U1	Atmel Microcontroller	556-ATMEGA328P-PU	Mouser	Blank chip - will need to be programmed externally - see project @ kv6o.com
1	DG5-V2.0.3		DG5 Emulator for Arduino	DG5V203	KV6O	
1	Crystal	Y1	16Mhz, 10ppm crystal	815-ABL-16-B1U	Mouser	10 ppm perferred, 20 or 30ppm OK if 10 unavailable.
2	Xtal loading caps	C14. C16	22pF loading cap for Crystal	581-SR075A220JAA	Mouser	
1	LED1		LED - Basic Red 3mm	78-TLHK46Q1R2	Mouser	
1	Headers	LCD1, LCD2, FTDI	Break Away Headers - Straight, 36 position	649-68004-236	Mouser	
1	RCA Jacks	J1	Triple RCA Jack	490-RCJ-32265	Mouser	
1	PWR_JCK		DC Barrel Power Jack/Connector	163-179PH-EX	Mouser	
1	R8		Carbon Film Resistors - Through Hole 6.2ohms 0.05	291-6.2-RC	Mouser	
7	C6-C11 C15		Multilayer Ceramic Capacitors MLCC - Leaded 50volts 0.01uF 10% X7R	581-SR155C103KARTR1	Mouser	
8	C1-C5, C12-C13, C17		Multilayer Ceramic Capacitors MLCC - Leaded 50volts .1uF 20%	581-SR295E104MAA	Mouser	
4	Socket for IC1-IC3, IC5		IC & Component Sockets 16P DUAL WIPE DIPSKT	517-4816-3000-CP	Mouser	
1	Socket for IC4		IC & Component Sockets 14P DUAL WIPE DIPSKT	517-4814-3004-CP	Mouser	
1	Socket for U1		IC & Component Sockets 28P DIP SKT 300 CL LADDER	571-1-2199298-9	Mouser	
1	Protection Diode	D7	1N4001 - Rectifiers Vr/50V Io/1A T/R	863-1N4001G	Mouser	
1	IC6		7805 - Linear Voltage Regulators 5V 1A Postive	863-MC7805CTG	Mouser	
6	D1-D6		1N4148 - Diodes - General Purpose, Power, Switching 100V Io/200mA BULK	512-1N4148	Mouser	Mouser project orders 10, as 10 costs the same as 6
1	Reset Switch	S1	Tactile Switches 6.0X5.0MM 160G	612-TL1105A	Mouser	
1	IC5		74HC153 - Encoders, Decoders, Multiplexers & Demultiplexers Dual Line	595-SN74HC153N	Mouser	
3	R1-R2, R4		Carbon Film Resistors - Through Hole 1.0Kohms 0.05	299-1K-RC	Mouser	
1	R3		Carbon Film Resistors - Through Hole 100ohms 5%	299-100-RC	Mouser	Mouser project orders 10, as 10 costs less than 1. Can be replaced by jumper if 10M band shows jitter
1	R5		Carbon Film Resistors - Through Hole 10Kohms 5%	299-10K-RC	Mouser	Mouser project orders 10 as 10 costs less than 1.
1	IC4		74HC93 -Counter ICs Hi-Spd CMOS Logic 4-Bit Bnry Rpl Cntr	595-CD74HC93E	Mouser	
3	IC1-IC3		74HC4046 - Phase Locked Loops - PLL PLL w/ VCO	595-CD74HC4046AE	Mouser	
2	C18-C19		Aluminum Electrolytic Capacitors - Radial Leaded 25volts 47uF 6.3x5 20% 2.5LS	647-UMR1E470MDD	Mouser	
1	JP4		Future Jumper - not popluated			

Optional Bill of Materials

Qty	Part Name	Schematic Part	Description	Part Number	Source	Notes
1	AdaFruit USB to FTDI		Interface Development Tools FTDI Friend plus extras	485-284	Mouser	Needed to be able to program board using Arduino IDE. Bootloader needs to be loaded first

Additional Bill of Materials - LED version

Qty	Part Name	Schematic Part	Description	Part Number	Source	Notes
1	LED Jumper		Jumper Wire - 0.1", 4-pin, 4"	474-PRT-10364	Mouser	
1	LED Jumper		Jumper Wire - 0.1", 2-pin, 4"	474-PRT-10362	Mouser	Not stocked, for reference. For LED Power, you can hand wire.
1	LED Display		MAX7219 based 8-Digit LED Display 7 Segment		eBay/amazon	

Additional Bill of Materials - LCD version

Qty	Part Name	Schematic Part	Description	Part Number	Source	Notes
2	LCD Jumpers		Jumper Wire - 0.1", 6-pin, 4"	474-PRT-10366	Mouser	Sparkfun jumper
	LCD Display		Display Development Tools 16X2 CHARACTER BLUE LCD W/BACKLIGHT	992-LCD-16X2B	Mouser	Can be found on eBay - Look for HD44780 displays
1	Contrast trimmer	R7	Trimmer Resistors - Through Hole 10K 25% 6mm Single Turn	652-3306F-1-103	Mouser	
1	R8	R8	Display Backlight current limiting resistor - jumper is OK with above display			

Additional Bill of Materials - Nixie version

Qty	Part Name	Schematic Part	Description	Part Number	Source	Notes
6	IN12 Nixie w/board		IN12 SmartNixie (Sockets and tube)	1328ST	Taylor Electronics	https://www.shop-tes.com/smartnixie/display-module/
						There are other tube/socket choices as well
1	HV Supply		HVPS Vertical (High Voltage)	1363	Taylor Electronics	Or similar. See Taylor Electronics for options.