

Nano Variac Controller Assembly BOM WG45Rev2A Issue 020724							
Designator	Comment	Description	Footprint	Quantity	From	Cost	Comments
Blank PCB		WG45Rev2		1			
C1, 2	22n	Film Capacitor	0.2" Pitch	2			50/63V
C3	150n	Capacitor	0.2" Pitch	1			50/63V
C4, 5	220n	Capacitor	0.2" Pitch	2			50/63V
C6, 8, 9, 12, 14, C18 - 24, 26	100n	Capacitor	0.2" Pitch	13			50/63V
C7, 11, 13	4u7	Capacitor Tant.	0.1/0.2" Pitch	3			From 6 - 35V ok
C10, 25	10n	Capacitor	0.2" Pitch	2			50/63V
C15	220u 63V	Capacitor	10D 5mm Pitch	1			Any value from100u up is OK
C16, 17	100u 16V	Capacitor	6.3D 2.5mm Pitch	2			Any value from47u up is OK
C27	470p	Capacitor	0.2" Pitch	1			50/63V
C28, 29	470n	Capacitor	0.2" Pitch	2			50/63V
D1 - 6, 10	1N4148	Diode	0.3" Pitch	7			
D7	16V 1W	Zener Diode	0.4" Pitch	1			
D8	5V6 1W	Zener Diode	0.4" Pitch	1			
D9	1N4004	Diode 1A	0.4" Pitch	1			
D11 (+5V Reg. Mod.)	8V2 0.5W	Zener Diode	10mm (0.4" pitch)	1			Fit on spare pads with KA78R05
J1	4 Pin PCB Socket	PCB V 5.08	0.2" Pitch	1	Element14	0.88/1	4176384
(J1)	4 Pin Pluggable	4 Pin Plug	0.2" Pitch	1	Element14	\$1.44/1	249364401
J2, J4	2 Pin PCB Socket	PCB V 5.08mm	0.2" Pitch	2	Element14	\$2.86/10	3770486
(J2, J4)	2 Pin Pluggable	2 Pin Plug		2	Element14	\$10.80/10	1787765
(J2, J4) Alternative	2 Pin Pluggable	2 Pin Plug		2	Digikey	7.35/10	102-6390-ND
J3	6 way Pin Header	Pin Strip 0.1" Pitch	HDR6	1			
J5	8 way Pin Header	Pin Strip 0.1" Pitch	HDR8	1			
J6	2 way Pin Header	Pin Strip 0.1" Pitch	HDR2	1			
J7, J8	3 way Pin Header	Pin Strip 0.1" Pitch	HDR3	2			
LD1	LED GREEN	3mm or 5mm LED	2P 0.1" pitch	1			
LD2	LED RED	3mm or 5mm LED	2P 0.1" pitch	1			
PS1	K78U12 (75-12V)	75V-12V DC/DC	3P 0.1" pitch	1	Element14	\$7.99	4254310
PS1 Alternate	LMW78_12-0.5R	75V-12V DC/DC	3P 0.1" pitch	1	Digikey	\$5.97	4254310
PS2 (See Altern.2)	LMO78_05-0.5	5V 0.5A Regulator	3P 0.1" Pitch	1	Digikey	\$2.74	3182-LMO78_05-0.5-ND
PS2 Alternative 1	12 - 5V 500mA	MINI360 DC/DC	3P 0.1" Pitch	1	Ali Express	\$1.20	MINI360 or MP1584
PS2 Alternative 2	KA78R05, 5V Reg.	Linear With Enable	4P 0.1" Pitch	1			***Recommended to avoid code corruption***
Q1, Q2, Q5	BS170 or equiv.	NCH 50V 0.2A	TO92/100/DGS	3	Element14	26c	1362623
Q3, 7	2N3904 or equiv.	NPN 50V 0.2A	TO92/100/EBC	2			
Q4	2N3906 or equiv.	PNP 50V 0.2A	TO92/100/EBC	1			
Q6	NCE6020AI	NCH 60V 20A	TO251V	1		68c/5	LCSC
Q6	WGP30N10V Alt.	NCH 100V 30A	TO220V	1		90c/5	LCSC
R1, 2	100K Vertical Fit	Res. 0.4 - 1W Axial	5.08mm (0.2" pitch)	2			Lead size > 0.68mm
R3, 13, 25, 41, 42, 45, 50	220R	0.25-0.4W Axial	10mm (0.4" Pitch)	7			
R4, 5, 10, 43, 46	10K	0.25-0.4W Axial	10mm (0.4" Pitch)	5			
R6	15K	0.25-0.4W Axial	10mm (0.4" Pitch)	1			
R7	120K	0.25-0.4W Axial	10mm (0.4" Pitch)	1			
R8	120K	0.25-0.4W Axial	10mm (0.4" Pitch)	1			
R9	9K1	0.25-0.4W Axial	10mm (0.4" Pitch)	1			
R11	Do Not Load	0.25-0.4W Axial	10mm (0.4" Pitch)	0			
R14	270R	0.25-0.4W Axial	10mm (0.4" Pitch)	1			
R15, 24, 26	1K	0.25-0.4W Axial	10mm (0.4" Pitch)	3			
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R16	100R	0.25-0.4W Axial	10mm (0.4" Pitch)	1			
R17	470R	0.25-0.4W Axial	10mm (0.4" Pitch)	1			
R18 - R22, R28 - R30	4K7	0.25-0.4W Axial	10mm (0.4" Pitch)	8			
R23	56K	0.25-0.4W Axial	10mm (0.4" Pitch)	1			
R27, 38, 39, 40, 48	2K2	0.25-0.4W Axial	10mm (0.4" Pitch)	5			
R34, 35, 36, 37 (*)	33R	0.25-0.4W Axial	10mm (0.4" Pitch)	4		Only Fit if U7,U8 not used and U6 = 74ACS86	
R44	220K	0.25-0.4W Axial	10mm (0.4" Pitch)	1			
R47	33K	0.25-0.4W Axial	10mm (0.4" Pitch)	1			
R52 (+5V Reg. Mod.)	1K	0.25-0.4W Axial	10mm (0.4" pitch)	1			Fit on spare pads with KA78R05
RV1. 3, 4	20K	1 Turn Trimpot	3306P or 3362P	1	Element14	3.85/5	108240 or 9354344
RV2	5K	1 Turn Trimpot	3306P or 3362P	1	Element14	3.70/5	108238 or 9354379
T1 (Transformer)	ZMPT107-1	2mA/2mA	TV31D	1		\$1.00	Ali Express
U1, U2, U5	MCP6002	Dual Op Amp	DIP8 x 0.3"	3	Element14	0.71	1292245
U3	NANO PCB	Nano Module	DIP30 x 0.6"	1	Ali Express	\$3.20	
U4	TLC555/ICM7555	Prog Timer	DIP8 x 0.3"	1	Element14	\$1.46	9663762
U6	74ACS86	Quad XOR Gate	DIP14 x 0.3"	1			Install R34 - R37 (4)
U6 Alternative (*)	74HC86	Quad XOR Gate	DIP14 x 0.3"	1			Install U7 & U8
U7, U8 (*)	TC4424	Dual Gate Driver	DIP8 x 0.3"	2	LCSC	\$5.80/10	Only fit if U6 is 74HC86
U7, U8 (*) Alternate	HX4424/HX4427	Dual Gate Driver	DIP8 x 0.3"	2	LCSC	0.31	Only fit if U6 is 74HC86
U9	+5V Rail Monitor	S-80838CNY-B2-U	TO92	1	Digikey	\$1.19 or 0.59c ea	or = SMD Part, cheaper & more fiddly to fit. APX803L20-42SA-7

Note a 10K linear pot will be required for VAC adjust, if accuracy is needed suggest 3/5/10T Panel POT

Suggest all ICs use machined pin IC sockets from digikey or Element 14 no Asian cheapies!! They fail!

LCD Assembly							
Blank PCB		WG44Rev2					
LCD	2004	Blue (or Green ?)	~ 98 x 60mm	1	Ali	\$4 +Del.	20 Character 4 line LCD
U1	NANO PCB KIT		30Pin Nano Module	1	Ali		
U2	+5V Rail Monitor	S-80838CNY-B2-U	TO92	1	Digikey	\$1.19 or 0.59c ea	or = SMD Part, cheaper & more fiddly to fit. APX803L20-42SA-7
R1	10 - 100K	single turn trimpot	3306P or similar	1	Digikey	~78c	
C1	100n		2.54mm (0.2")				Fit if any display issues
3P - 3P	2 x 3 pin females	wired connector	F - F, 3 x 0.1"		Ali		L=300mm, 10 for \$4.25
The 2 x 15 pin strip connectors supplied with the Nano kit will all be used for the assembly 6 + 6 + 3 & 6 + 4 + 3 + 2 = 30 pins							
Note J1 can be soldered vertically or horizontally.							