

## GEMINI ROBOT KITS

## Vios Computer Assembly Instructions

## Parts List

DESCRIPTION	QTY	PART #
<u>Resistors</u>		
10 ohm (BRN-BLK-BRN-GOLD)	2	CCF2510 ohm
330 ohm (ORG-ORG-BRN-GOLD)	6	CCF255330 ohm
470 ohm (YEL-VIOLET-BRN-GOLD)	1	CCF25470 ohm
1K ohm (BRN-BLK-RED-GOLD)	10	CCF251K ohm
1.2K (BRN-RED-RED-GOLD)	2	CCF251.2K
2.7K (RED-VIOLET-RED-GOLD)	2	CCF252.7K
3.3K (ORG-ORG-RED-GOLD)	2	CCF253.3K
3.9K ((ORG-WHT-RED-GOLD)	1	CCF253.9K
6.8K (BLU-GRY-RED-GOLD)	12	CCF2568K
10M (BRN-BLK-BLU-GOLD)	1	CCF2510M
10K (BRN-BLK-ORG-GOLD)	20	CCF2510K
27K (RED-VIOLET-ORG-GOLD)	1	CCF2527K
47K (YEL-VIOLET-ORG-GOLD)	1	CCF2547K
150K (BRN-GRN-YEL-GOLD)	1	CCF25150K
100K (BRN-BLK-YEL-GOLD)	6	CCF25100K
10M ohm (BRN-BLK-BLU-GOLD)	1	CCF2510M
10K pot	2	91ER10K
100K pot	2	91ER100K
<u>Diodes</u>		
IN34A	3	IN34A
IN914A	3	IN914A
IN5231	2	IN5231
<u>Capacitors</u>		
.47 microfarad (474K)	1	CK05BX474K
.1 microfarad (104)	34	SR205E104M-AA
4.7 microfarad	1	TDL475M010S1A
47 pF (470K)	2	CK05BX470K
10 microfarad 16v Electrolytic	1	CRE10MF16v
.047 microfarad (473K)	4	CK05BX473K
.01 microfarad (103K)	5	CK05BX103K
220 microfarad 25v Electrolytic	2	CRE220MF25v
1 microfarad 25v Electrolytic	5	CRE1MF16v

100 microfarad 25v Electrolytic	1	CRE100MF25v
100 microfarad 16v Electrolytic	1	CAE100MF16v
100 microfarad 16v Electrolytic	4	CRE100MF16v
1000 microfarad 16v Electrolytic	1	CRE1000MF16v
1000 microfarad 25v Electrolytic	1	CRE1000MF25v
10 microfarad Electrolytic	2	CAE10MF16v
1000 microfarad 35v Electrolytic	1	CRE1000MF35v
100 microfarad 16v Electrolytic	1	CRE100MF16v

#### Transistors

PN2907	6	PN2907A
PN2222	9	PN2222A

#### Misc.

1M HZ Xtal	1	E100
4 position dip switch	1	BD04
MMB 4.8v battery	1	MMB4.8B
Jumper	1	925250-R
1/16" shrink tubing	4"	37N1166
1/2" shrink tubing	6"	37N409

#### Headers

2 pin single male	5	929834-01
3 pin single male	1	929834-01
4 pin single male	1	929834-01
8 pin single male	1	929834-01
10 pin single male	1	929834-01

#### Socket

40 pin socket	2	ICN-406-S5-T
28 pin socket	6	ICN-286-S5-T
24 pin socket	2	ICN-246-S5-T
16 pin socket	1	ICN-163-S3-T
14 pin socket	4	ICN-143-S3-T
8 pin socket	3	ICN-083-S3-T

#### ICs

ICL7660	1	ICL7660CPA
R65C02	1	R65C02P2
74HC138	1	74HC138
74HC04	1	74HC04
74HC00	1	74HC00

6264LP-12	2	6264LP-12
82C55	1	MSM82C55A-5RS
SSI-263	1	SSI263P
27C64	4	HN27C64G-20
AY-3-8913	1	AY-3-8913
LM 386	2	LM386N
ICL7641CCPD	2	ICL7641CCPD
Vios Circuit Board	1	Vios board

#### Assembling the Vios Board

##### 1. Insert and solder all sockets into their proper locations.

( ) U1 - 8 pin socket  
 ( ) U15 - 8 pin socket  
 ( ) U4 - 14 pin socket  
 ( ) U5 - 14 pin socket  
 ( ) U17 - 14 pin socket  
 ( ) U18 - 14 pin socket  
 ( ) U16 - 8 pin socket  
 ( ) U9 - 24 pin socket  
 ( ) U8 - 40 pin socket  
 ( ) U2 - 40 pin socket  
 ( ) U14 - 24 pin socket  
 ( ) U3 - 16 pin socket  
 ( ) U6 - 28 pin socket  
 ( ) U10 - 28 pin socket  
 ( ) U11 - 28 pin socket  
 ( ) U12 - 28 pin socket  
 ( ) U7 - 28 pin socket  
 ( ) U13 - 28 pin socket

##### 2. Insert and solder all resistors into their proper location.

( ) R68 - 6.8K (BLU-GRY-RED-GOLD)  
 ( ) R67 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R71 - 1K (BRN-BLK-RED-GOLD)  
 ( ) R70 - 6.8K (BLU-GRY-RED-GOLD)  
 ( ) R69 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R14 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R15 - 10M (BRN-BLK-BLU-GOLD)  
 ( ) R16 - 3.9K (ORG-WHT-RED-GOLD)  
 ( ) R47 - 100K (BRN-BLK-YEL-GOLD)  
 ( ) R48 - 1K (BRN-BLK-RED-GOLD)  
 ( ) R49 - 1K (BRN-BLK-RED-GOLD)  
 ( ) R51 - 1K (BRN-BLK-RED-GOLD)  
 ( ) R52 - 10K (BRN-BLK-ORG-GOLD)

( ) R53 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R54 - 27K (RED-VIOLET-ORG-GOLD)  
 ( ) R55 - 47K (YEL-VIOLET-ORG-GOLD)  
 ( ) R44 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R45 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R61 - 100K (BRN-BLK-YEL-GOLD)  
 ( ) R64 - 1K (BRN-BLK-RED-GOLD)  
 ( ) R63 - 100K (BRN-BLK-YEL-GOLD)  
 ( ) R62 - 1K (BRN-BLK-RED-GOLD)  
 ( ) R66 - 2.7K (RED-VIOLET-RED-GOLD)  
 ( ) R65 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R57 - 1K (BRN-BLK-RED-GOLD)  
 ( ) R58 - 100K (BRN-BLK-YEL-GOLD)  
 ( ) R56 - 100K (BRN-BLK-YEL-GOLD)  
 ( ) R59 - 1K (BRN-BLK-RED-GOLD)  
 ( ) R41 - 3.3K (ORG-ORG-RED-GOLD)  
 ( ) R38 - 3.3K (ORG-ORG-RED-GOLD)  
 ( ) R40 - 10 ohm (BRN-BLK-BLK-GOLD)  
 ( ) R43 - 10 ohm (BRN-BLK-BLK-GOLD)  
 ( ) R37 - 2.7K (RED-VIOLET-RED-GOLD)  
 ( ) R23 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R24 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R17 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R22 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R1 - 6.8K (BLU-GRY-RED-GOLD)  
 ( ) R2 - 6.8K (BLU-GRY-RED-GOLD)  
 ( ) R3 - 6.8K (BLU-GRY-RED-GOLD)  
 ( ) R5 - 330 ohm (ORG-ORG-BRN-GOLD)  
 ( ) R18 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R19 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R21 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R20 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R36 - 1K (BRN-BLK-RED-GOLD)  
 ( ) R25 - 10K (BRN-BLK-ORG-GOLD)  
 ( ) R26 - 6.3K (BLU-GRY-RED-GOLD)  
 ( ) R29 - 6.3K (BLU-GRY-RED-GOLD)  
 ( ) R27 - 330 ohm (ORG-ORG-BRN-GOLD)  
 ( ) R31 - 6.8K (BLU-GRY-RED-GOLD)  
 ( ) R7 - 470 ohm (YEL-VIOLET-BRN-GOLD)  
 ( ) R30 - 330 ohm (ORG-ORG-BRN-GOLD)  
 ( ) R28 - 6.8K (BLU-GRY-RED-GOLD)  
 ( ) R32 - 330 ohm (ORG-ORG-BRN-GOLD)  
 ( ) R34 - 330 ohm (ORG-ORG-BRN-GOLD)  
 ( ) R33 - 6.8K (BLU-GRY-RED-GOLD)  
 ( ) R35 - 6.8K (BLU-GRY-RED-GOLD)  
 ( ) R10 - 10K (BRN-BLK-ORG-GOLD)

- ( ) R11 - 1K (BRN-BLK-RED-GOLD)
- ( ) R12 - 100K (BRN-BLK-YEL-GOLD)
- ( ) R9 - 10K (BRN-BLK-GRN-GOLD)
- ( ) R13 - 100K (BRN-BLK-YEL-GOLD)
- ( ) R8 - 10K (BRN-BLK-ORG-GOLD)
- ( ) R4 - 6.8K (BLU-GRY-RED-GOLD)
- ( ) R6 - 330ohm(ORG-ORG-BRN-GOLD)

3. Insert and solder all diodes into their proper locations making sure the band is in the right position.

- ( ) CR8 - 1N914
- ( ) CR9 - 1N914
- ( ) CR4 - 1N914
- ( ) CR7 - 1N34A
- ( ) CR6 - 1N5231
- ( ) CR5 - 1N5231
- ( ) CR3 - 1N34A
- ( ) CR2 - 1N34A

4. Insert and solder all capacitors into their proper location.  
(Electrolytic is marked)

- ( ) C33 - 100 microfarad 16 v (Electrolytic)
- ( ) C9 - 47pF (470K)
- ( ) C8 - 4.7 microfarad or 475 or 3 colored, Blue 475 or yellow
- ( ) C10 - 47 pF (470K)
- ( ) C30 - .01 microfarad (103K)
- ( ) C31 - .01 microfarad (103K)
- ( ) C29 - .01 microfarad (103K)
- ( ) C32 - 1 microfarad 16v (Electrolytic)
- ( ) C27 - 1 microfarad 16v (Electrolytic)
- ( ) C25 - 1 microfarad 16v (Electrolytic)
- ( ) C26 - 1 microfarad 16v (Electrolytic)
- ( ) C22 - .047 microfarad (473K) (Note: we are not using an Electrolytic capacitor at this location)
- ( ) C23 - 1 microfarad 16v (Electrolytic)
- ( ) C1 - 1000 microfarad 16v (Electrolytic)
- ( ) C7 - 1000 microfarad 25v (Electrolytic)
- ( ) C13 - .047 microfarad (473K)
- ( ) C14 - .01 microfarad (103K)
- ( ) C15 - .047 microfarad (473K)
- ( ) C16 - 220 microfarad 25v (Electrolytic)
- ( ) C20 - 220 microfarad 25v (Electrolytic)
- ( ) C5 - 100 microfarad 16v (Electrolytic)
- ( ) C11 - 10 microfarad 16v (Electrolytic)
- ( ) C3 - .1 microfarad (104)

- ( ) C2 - .47 microfarad (474K)
- ( ) C12 - 100 microfarad 16v (Electrolytic)
- ( ) C6 - 100 microfarad 25v (Electrolytic)
- ( ) C17 - .1 microfarad (104)
- ( ) C19 - .047 microfarad (473K)
- ( ) C18 - .01 microfarad (103K)
- ( ) C21 - .1 microfarad (104)
- ( ) C34 - 1000 microfarad 35v (Electrolytic)
- ( ) C4 - 100 microfarad 16v (Electrolytic)

5. Insert and solder all potentiometers into their proper location.

- ( ) R50 - 100K pot (100K)
- ( ) R39 - 10K pot (10K)
- ( ) R42 - 10K pot (10K)
- ( ) R60 - 100K pot (100K)

6. Insert and solder all transistors into their proper locations.

- ( ) Q14 - PN2222
- ( ) Q15 - PN2222
- ( ) Q1 - PN2907
- ( ) Q3 - PN2222
- ( ) Q4 - PN2222
- ( ) Q6 - PN2907
- ( ) Q7 - PN2222
- ( ) Q9 - PN2222
- ( ) Q8 - PN2907
- ( ) Q10 - PN2907
- ( ) Q11 - PN2222
- ( ) Q12 - PN2907
- ( ) Q13 - PN2222
- ( ) Q5 - PN2222
- ( ) Q2 - PN2907

7. Cut or break headers to given size, then insert with small leads down and solder.

- ( ) J3 - 4 pin single male
- ( ) J6 - 8 pin single male
- ( ) JP4 - 3 pin single male
- ( ) JP1 - 2 pin single male
- ( ) JP2 - 2 pin single male
- ( ) JP1 - 10 pin single male
- ( ) JP3 - 2 pin single male
- ( ) J7 - 2 pin single male
- ( ) JP5 - 2 pin single male

8. Insert and solder the 1M HZ Xtal into its proper location.

( ) 1 M HZ Xtal - Y1

9. On the back of the circuit board you will solder a .1 microfarad cap (104) between pins 23 and 24 on U9.

10. Solder a 1.2K resistor in series to the negative lead of the 10 microfarad electrolytic cap. Fold in half and cover with shrink tubing. Do this for both 10 microfarad electrolytic caps. (These caps are the ones with the axial leads.) Install these on the back of the board at U15 and U16 with the positive lead going to pin 1 and the resistor lead going to pin 8.

11. Take the axial lead 100 microfarad 16v cap and cut a piece of 1/2" shrink tubing so that it covers the body of the cap and the leads are showing. Remember which lead is (+) and (-). Cut two pieces of the 1/16" shrink tubing so that it fits over the leads with only a tip of the lead showing.

Shrink with a hair dryer. On the back of the board solder the positive lead (+) to the base of Q10 and the negative lead (-) to pin 1 of J1. Push the cap up towards U11 and U12 with your finger. You want to make sure the cap does not get in the way when mounting.

12. At this point we recommend that you clean the board. You can use either alcohol and a scrub brush or purchase Flex Remover at your nearest electronics supply store.

13. Insert and solder the 4 position dip switch into its proper location. Note that SW1 should be at the bottom.

( ) SW1 - 4 position dip switch

14. Insert and solder the MMB 4.8 v battery into the proper location.

( ) B1 - MMB4.8v

15. Spot clean the back of the board where you have just soldered.

16. Cut a small piece of electrical tape and place over the leads to the battery on the back of the circuit board.

17. Insert the ICs into their proper locations. Make sure all the legs on the IC go into the sockets properly and do not bend underneath the IC. BE CAREFUL ABOUT STATIC.

( ) U15 - LM386  
( ) U16 - LM386  
( ) U1 - ICL7660  
( ) U4 - 74HC04  
( ) U5 - 74HC00  
( ) U17 - ICL7641  
( ) U18 - ICL7641  
( ) U9 - SSI-263  
( ) U8 - 82C55  
( ) U2 - R65C02P2  
( ) U14 - AY-3-8913  
( ) U3 - 74HC138  
( ) U6 - 6264RP-12  
( ) U10 - 27C64  
( ) U11 - 27C64  
( ) U12 - 27C64  
( ) U7 - 6264LP-12  
( ) U13 - 27C64

Only place the black jumper onto JP5 when in use or you will drain the battery.

The board is now complete.



