Bus buffer, strobe generator and NI6533 adapter board

Gerhard Hendl, Florian Schreck and Todd Meyrath

This board provides several functions: it is an adapter between the NI6533 cable and the 50 pin header of the bus system, it can generate a strobe signal and it can have input lines for the NI6533 external clock and trigger. It can also be used just as a signal refreshing board within the 50 pin bus cable. It is possible to add zener diodes between the bus signal lines and ground to improve the signal quality. The remaining normally unused 7 bits of the NI6533 are available on a independent connecter. Those bits can for example be used in conjunction with an address decoder chip to put the strobe signal to the bus only if a certain bit pattern appears on these higher seven bits. In that way it is possible to use more than 256 different addresses. Or these bits can be used as additional digital outputs.

This board was designed by Gerhard Hendl of the institute for quantumoptics and quantuminformation of the Austrian academy of sciences at Innsbruck (gerhard.hendl at oeaw.ac.at).

P1
Header 8X2

P2
Header 25X2

P3
Header 8X2

P4
Header 3

P5
Header 25X2

P6
Header 8X2

P7
Header 2

P8
Header 2

P9
Header 2

P10
Header 25X2

P11
Header 8X2

J1
3-174682-7

U1 M74HCT541B1R
U2 M74HCT541B1R
U3 M74HCT541B1R
U4 M74HCT541B1R
U5 M74HCT541B1R

U6A M74HC123AB1R
U6B M74HC123AB1R
U7A M74HC123AB1R
U7B M74HC123AB1R

U8 L7805AB-V

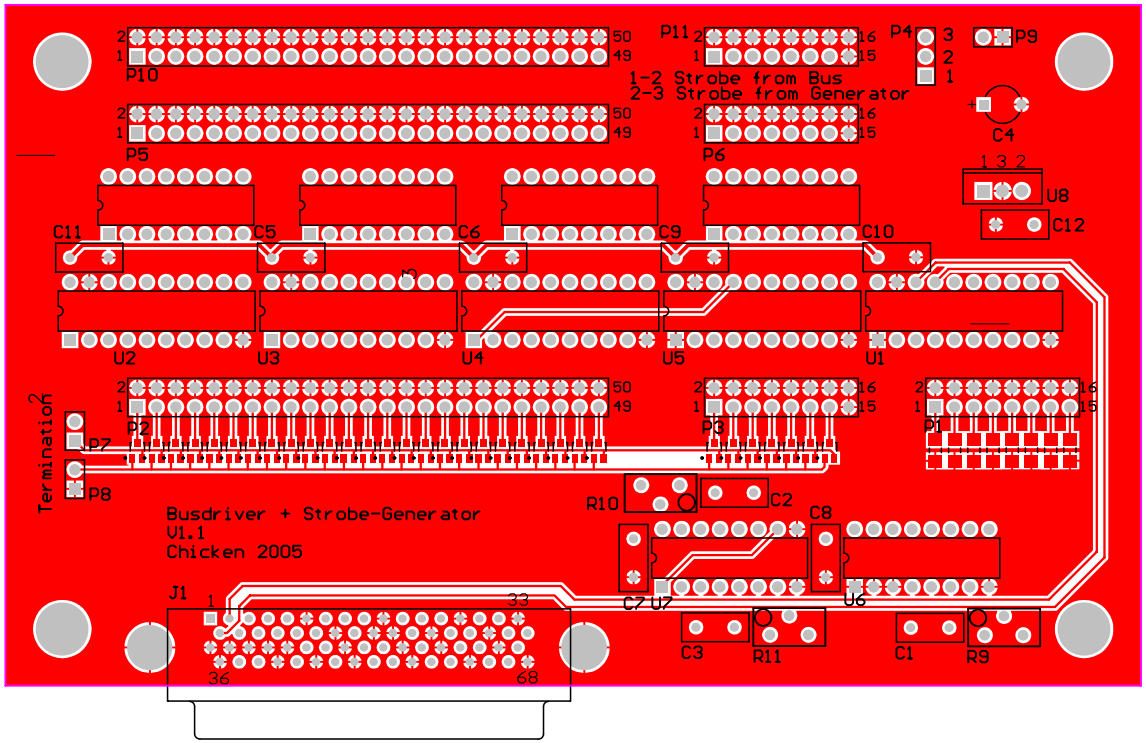
R1 Res2
R2 Res2
R3 Res2
R4 Res2
R5 Res2
R6 Res2
R7 Res2
R8 Res2
R9 RPot 2k
R10 RPot 2k
R11 RPot 2k

R15A Res Pack2
R15B Res Pack2
R15C Res Pack2
R15D Res Pack2

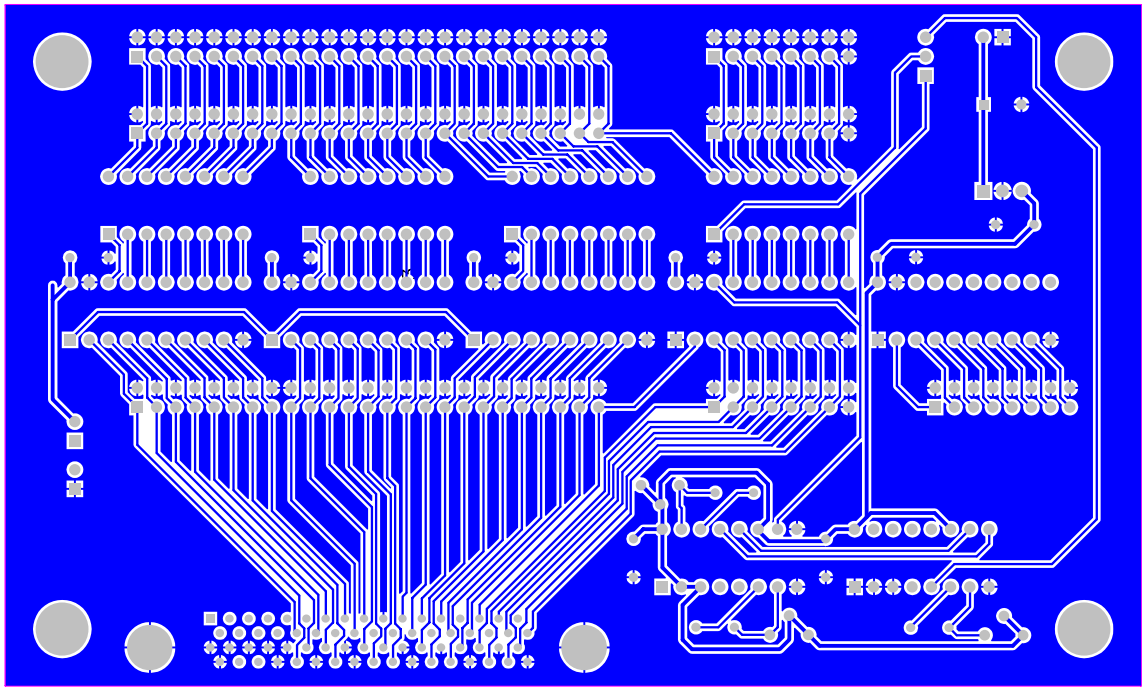
C1 Cap 100pF
C2 Cap 470pF
C3 Cap 470pF
C4 Cap Pol1 220uF
C5 Cap 0.1uF
C6 Cap 0.1uF
C7 Cap 0.1uF
C8 Cap 0.1uF
C9 Cap 0.1uF
C10 Cap 0.1uF
C11 Cap 0.1uF
C12 Cap 0.1uF

D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16 D17 D18 D19 D20 D21 D22 D23 D24
1PS70SB14
D25 D26 D27 D28 D29 D30 D31 D32
1PS70SB14

Title	Adapterkarte 68-50polig mit Strobegenerator	
Size A3	Number	Revision
Date: 12.08.2005	Sheet of	
File: E:\projekte\..\Strobe 68-50 V3.SchDoc	Drawn By:	



Altium Limited 12a Rodborough Rd Frenchs Forest NSW 2086	ENGINEER:	TITLE: Adapterkarte 68-50 polig mit Strobegenerator Top Layer	
	PCB DESIGNER:		
	DATE: 15.07.2005	PART NO.:	REV:
	FILE NAME: Strobe 68-50 V3GNDplane.PcbDoc	DWG NO:	SCALE:



Altium Limited 12a Rodborough Rd Frenchs Forest NSW 2086	ENGINEER:	TITLE: Adapterkarte 68-50 polig mit Strobegenerator Bottom Layer	
	PCB DESIGNER:		
	DATE: 15.07.2005	PART NO.:	REV:
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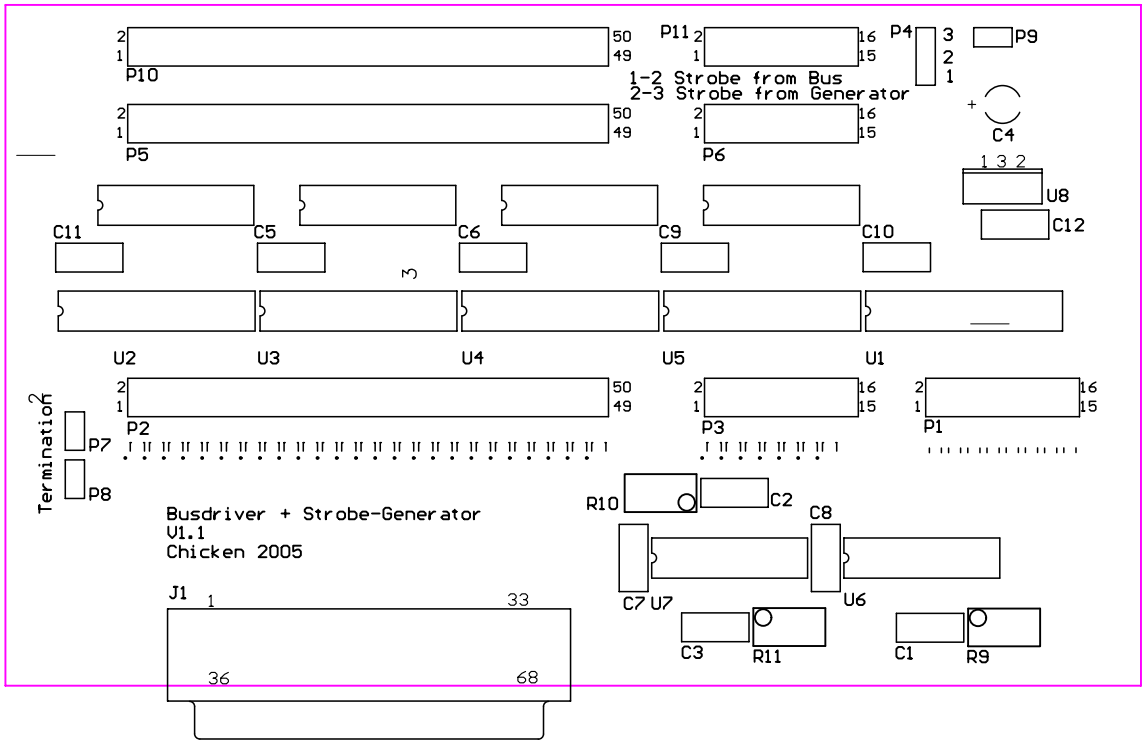
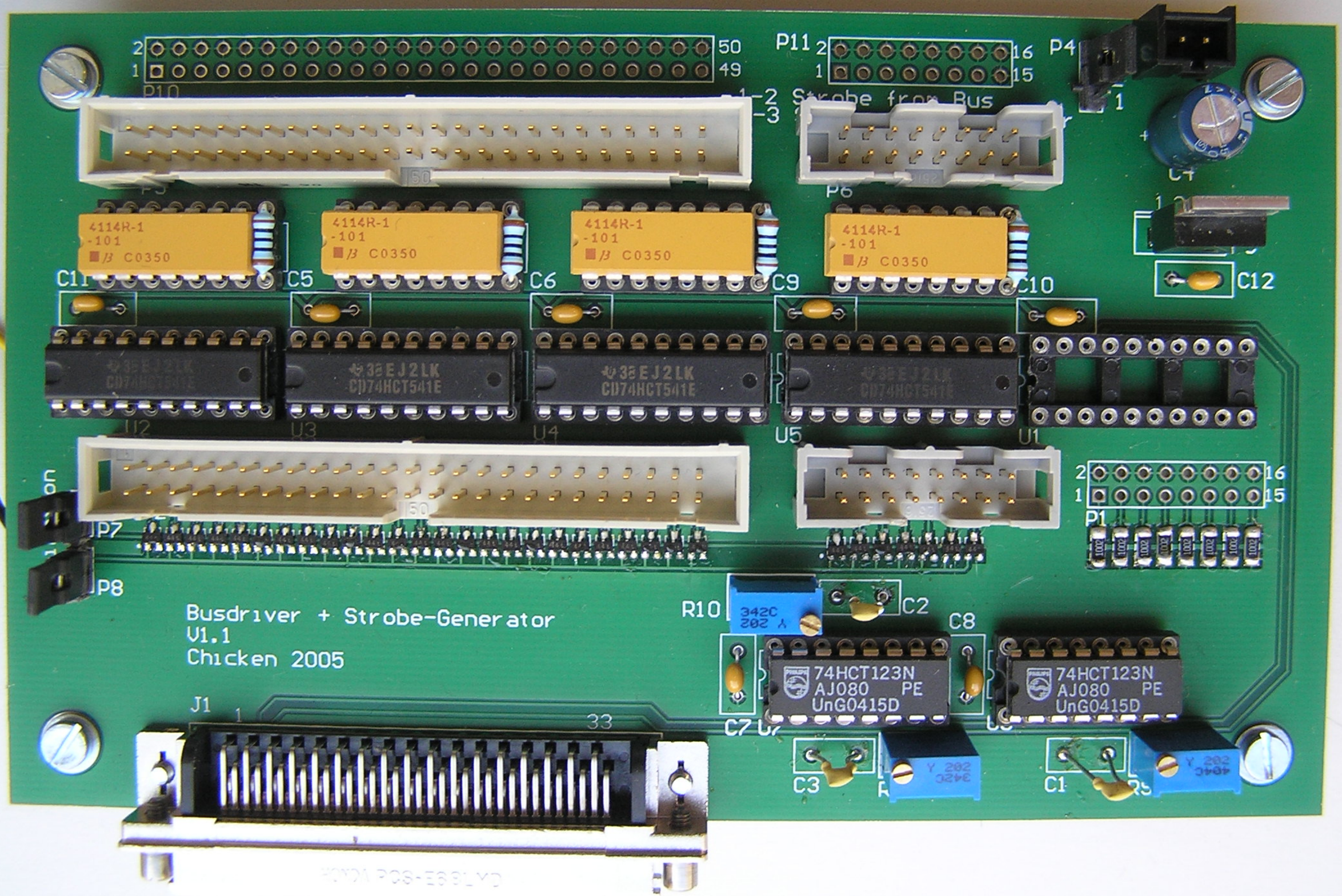


Altium Limited 12a Rodborough Rd Frenchs Forest NSW 2086	ENGINEER:	TITLE: Adapterkarte 68-50 polig mit Strobegenerator Top Silkscreen Overlay	
	PCB DESIGNER:		
	DATE: 15.07.2005	PART NO.:	REV:
	FILE NAME: Strobe 68-50 V3GNDplane.PcbDoc	DWG NO:	SCALE:

Designator	Description	Value	LibRef	Footprint
C1	Capacitor	100pF	Cap	RAD-0.2
C2	Capacitor	470pF	Cap	RAD-0.2
C3	Capacitor	470pF	Cap	RAD-0.2
C4	Polarized Capacitor (Radial)	220uF	Cap Pol1	CAPPR5-5x5
C5	Capacitor	0.1uF	Cap	RAD-0.2
C6	Capacitor	0.1uF	Cap	RAD-0.2
C7	Capacitor	0.1uF	Cap	RAD-0.2
C8	Capacitor	0.1uF	Cap	RAD-0.2
C9	Capacitor	0.1uF	Cap	RAD-0.2
C10	Capacitor	0.1uF	Cap	RAD-0.2
C11	Capacitor	0.1uF	Cap	RAD-0.2
C12	Capacitor	0.1uF	Cap	RAD-0.2
D1	Schottky Barrier Double Diode		1PS70SB14	SOT323
D2	Schottky Barrier Double Diode		1PS70SB14	SOT323
D3	Schottky Barrier Double Diode		1PS70SB14	SOT323
D4	Schottky Barrier Double Diode		1PS70SB14	SOT323
D5	Schottky Barrier Double Diode		1PS70SB14	SOT323
D6	Schottky Barrier Double Diode		1PS70SB14	SOT323
D7	Schottky Barrier Double Diode		1PS70SB14	SOT323
D8	Schottky Barrier Double Diode		1PS70SB14	SOT323
D9	Schottky Barrier Double Diode		1PS70SB14	SOT323
D10	Schottky Barrier Double Diode		1PS70SB14	SOT323
D11	Schottky Barrier Double Diode		1PS70SB14	SOT323
D12	Schottky Barrier Double Diode		1PS70SB14	SOT323
D13	Schottky Barrier Double Diode		1PS70SB14	SOT323
D14	Schottky Barrier Double Diode		1PS70SB14	SOT323
D15	Schottky Barrier Double Diode		1PS70SB14	SOT323
D16	Schottky Barrier Double Diode		1PS70SB14	SOT323
D17	Schottky Barrier Double Diode		1PS70SB14	SOT323
D18	Schottky Barrier Double Diode		1PS70SB14	SOT323
D19	Schottky Barrier Double Diode		1PS70SB14	SOT323
D20	Schottky Barrier Double Diode		1PS70SB14	SOT323
D21	Schottky Barrier Double Diode		1PS70SB14	SOT323
D22	Schottky Barrier Double Diode		1PS70SB14	SOT323
D23	Schottky Barrier Double Diode		1PS70SB14	SOT323
D24	Schottky Barrier Double Diode		1PS70SB14	SOT323
D25	Schottky Barrier Double Diode		1PS70SB14	SOT323
D26	Schottky Barrier Double Diode		1PS70SB14	SOT323
D27	Schottky Barrier Double Diode		1PS70SB14	SOT323
D28	Schottky Barrier Double Diode		1PS70SB14	SOT323
D29	Schottky Barrier Double Diode		1PS70SB14	SOT323
D30	Schottky Barrier Double Diode		1PS70SB14	SOT323
D31	Schottky Barrier Double Diode		1PS70SB14	SOT323
D32	Schottky Barrier Double Diode		1PS70SB14	SOT323
J1	Plug Assembly, Horizontal with Kink		3-174682-7	3-174682-7
P1	Header, 8-Pin, Dual row		Header 8X2	HDR2X8
P2	Header, 25-Pin, Dual row		Header 25X2	HDR2X25
P3	Header, 8-Pin, Dual row		Header 8X2	HDR2X8
P4	Header, 3-Pin		Header 3	HDR1X3
P5	Header, 25-Pin, Dual row		Header 25X2	HDR2X25
P6	Header, 8-Pin, Dual row		Header 8X2	HDR2X8
P7	Header, 2-Pin		Header 2	HDR1X2
P8	Header, 2-Pin		Header 2	HDR1X2
P9	Header, 2-Pin		Header 2	HDR1X2

P10	Header, 25-Pin, Dual row		Header 25X2	HDR2X25
P11	Header, 8-Pin, Dual row		Header 8X2	HDR2X8
R1	Resistor	10K	Res2	cr3216-1206
R2	Resistor	10K	Res2	cr3216-1206
R3	Resistor	10K	Res2	cr3216-1206
R4	Resistor	10K	Res2	cr3216-1206
R5	Resistor	10K	Res2	cr3216-1206
R6	Resistor	10K	Res2	cr3216-1206
R7	Resistor	10K	Res2	cr3216-1206
R8	Resistor	10K	Res2	cr3216-1206
R9	Potentiometer	2k	RPot	rpot3
R10	Potentiometer	2k	RPot	rpot3
R11	Potentiometer	2k	RPot	rpot3
R12	Isolated Resistor Network - Parts	1K	Res Pack2	DIP-16
R13	Isolated Resistor Network - Parts	1K	Res Pack2	DIP-16
R14	Isolated Resistor Network - Parts	1K	Res Pack2	DIP-16
R15	Isolated Resistor Network - Parts	1K	Res Pack2	DIP-16
U1	Octal Bus Buffer with 3 State Outputs		M74HCT541B1R	DIP20
U2	Octal Bus Buffer with 3 State Outputs		M74HCT541B1R	DIP20
U3	Octal Bus Buffer with 3 State Outputs		M74HCT541B1R	DIP20
U4	Octal Bus Buffer with 3 State Outputs		M74HCT541B1R	DIP20
U5	Octal Bus Buffer with 3 State Outputs		M74HCT541B1R	DIP20
U6	Dual Retriggerable Monostable Multivibrator		M74HC123AB1R	DIP16
U7	Dual Retriggerable Monostable Multivibrator		M74HC123AB1R	DIP16
U8	Precision 1A Regulator		L7805AB-V	TO220ABN


P10
P11
P4
P3
P6
P7
P8
P1
J1
U2
U3
U4
U5
U1
C11
C5
C6
C9
C10
C12
C7
C8
C3
C1
R10
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UnG0415D
Busdriver + Strobe-Generator
V1.1
Chicken 2005