

Lego Computer Features

Philips 89C51RD+ processor with 64K flash ROM plus 1K RAM with 12MHz crystal. (Optional to 33MHz)

In System Programmable (ISP) via a phone line and *winisp.exe* from Philips

On board regulator produces +5V for computer. Motors may be driven by the unregulated supply.

Operates from eight 1.2 volt rechargeable AA batteries at 80 ma idle.

Input/Output

- 14 pin ribbon connector for 2x16 character LCD display

- 8 channel x 8 bit A to D converter at 40 µsec

- Drives up to 4 motors via 1-amp H-Drivers

- 1 memory mapped output port (74HCT374 latch)

- 1 programmable I/O port (port 1 from CPU)

- 1 piezzo buzzer which is jumper optional

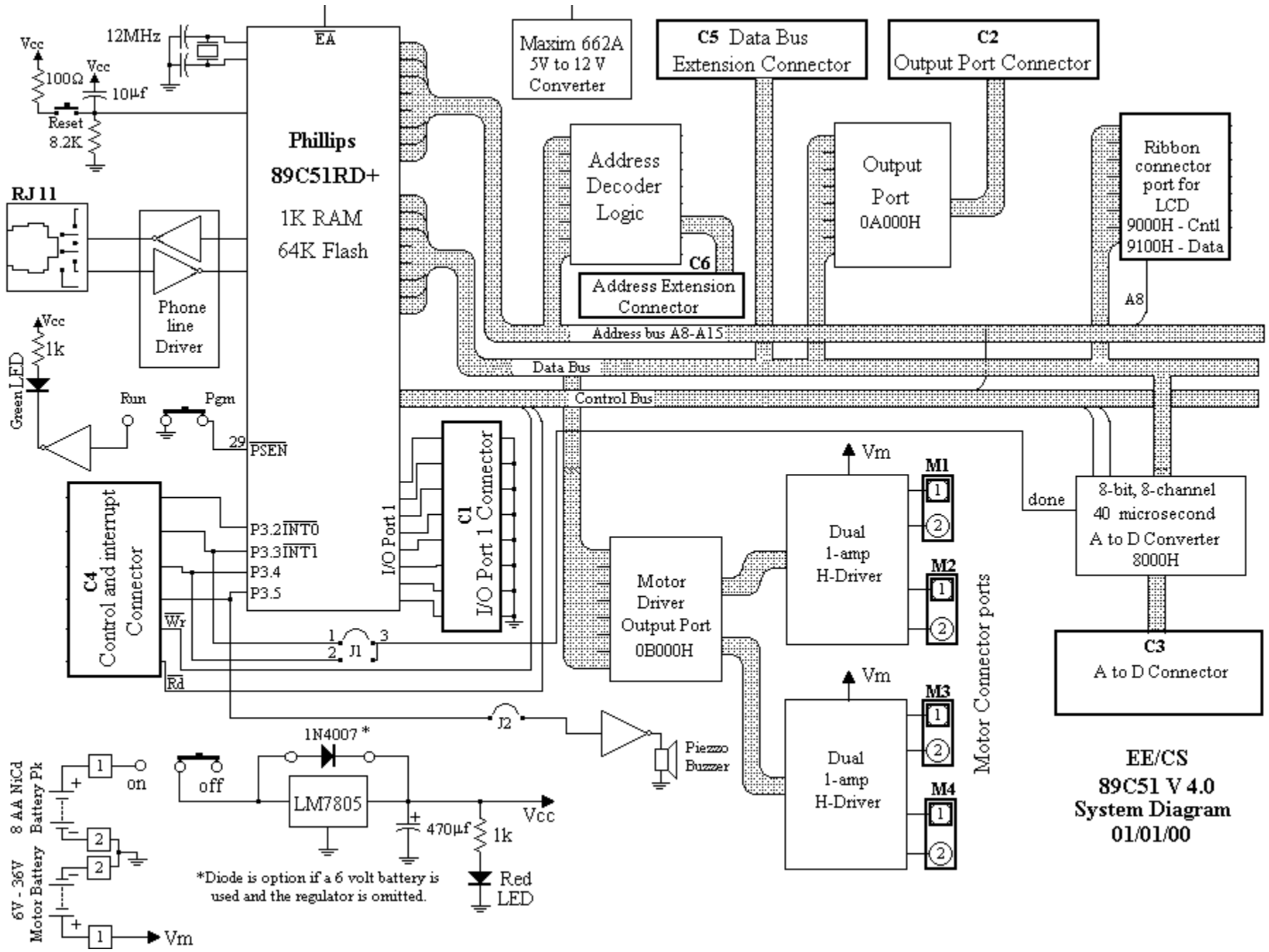
- 2 external interrupt sources

- connectors to extend data and address bus for off board I/O addition

- Support for up to 5 PWM ports (on board timer array)

Size is 3" x 5" x 1.5" at about 300grams with full battery pack.

LED on/off and program mode indicators.



**Lego Version 4
Parts List**

Item	Component	Vendor	Unit Cost	Total
1	U1 Philips 89C51RD+ IN CPU	Questlink or Avnet Electronics	10.00	10.00
2	U2 74HCT138 3:8 Decoder	JameCo 44927 74HCT138 3 to 8 Decoder	0.29	0.29
3	U3, U5 74HCT374 8 bit latch	JameCo 45073 74HCT374 Octal edge triggered D-type flip flop	0.29	0.54
4	U4 1 x 16 LCD display	Marlin Jones 8944-OP 16x1 LCD PCI display	7.95	7.95
5	U6, U7 SN754410 H Driver	Avnet Electronics 754410 NE ACT Quad half H-Driver	2.83	5.66
6	U8 ADC0848 8 bit 8 ch A/D Conv	DigiKey ADC0848CCN-ND 8-bit A/D converter w/Mux options	6.76	6.76
7	U9 Maxim 662A 5v to 12v dc-dc converter	DigiKey MAX662ACPA-ND 12 volt supply for flash memory	4.80	4.80
8	U10 Maxim MAX202 RS-232 interface	DigiKey MAX202CPE-ND Dual RS232 tranceiver with .1µf capacitors	3.31	3.31
9	U11 LM7805 5 volt regulator	DigiKey NJM7805FA-ND +5v 1A positive regulator	0.50	0.50
10	U12 74HCT04 Hex inverter	JameCo 44898 74HCT04 Hex inverter buffer	0.19	0.19
11	U13 74HCT02 Quad NOR	JameCo 44880 74HCT02 Quad 2 input NOR gates	0.19	0.19
12	Red LED	DigiKey 67-1131-ND Lumex Red LED	0.54	0.54
13	Green LED	DigiKey 67-1130-ND Lumex Green LED	0.54	0.54
14	Piezzo Buzzer	DigiKey P9957-ND Piezoelectric buzzer	1.80	1.80
15	Reset switch (tactile PB)	JameCo 149948 KT11P4CM SPST off (on) tactile switch	0.19	0.19
16	ON/OFF slider switch	JameCo 109170 SW153 SPDT on-on Slide Switch	0.29	0.29
17	12.000 MHz crystal	DigiKey CTX058-ND 12.000000MHz Microprocessor crystal HC 49 Case	0.80	0.80
18	Resistors (1/4 watt) 100Ω, 8.2K, 10K, 47K, 1K	DigiKey (Value)QBK-ND	0.01	0.05
19	Capacitor 27pf ceramic disk x 2	DigiKey PCC270CCT-ND 27pf ceramic chip capacitors	0.11	0.22
20	Capacitor 10µf Tantalum x 3	JameCo 87038 10µf SMT Tantalum 16 Volt Capacitor	0.19	0.57
21	Capacitor 470 µf	JameCo 158203 R470B16 470µf Alum. Electrolytic Capacitor	0.15	0.15
22	Capacitor 0.1µf decoupling x 11	JameCo 87388 .1µf Ceramic Chip capacitors	0.12	1.32
23	Capacitor 0.22µf capacitor x 2	JameCo 87396 .22µf Ceramic Chip	0.12	0.24
24	M1, M2, M3, M4, and Power Connector	JameCo 152346 Two terminal Vertical Terminal blocks	0.35	1.75
25	C1, C2 Dual row header pins	JameCo 139563 923680R double row male headers w/80 contacts (Breakable)	0.69	0.69

Item	Component	Vendor	Unit Cost	Total
26	C3 Single row header pins	JameCo 109516 923808R .1" Straight mail headers 8 contacts (Breakable)	0.10	0.10
27	Battery holders x 2	JameCo 105857 Plastic 4-AA cell battery holders	0.69	1.38
28	1.2 volt at 500 maH NiCd Batteries x 8	DigiKey P116-ND	1.94	15.52
29	Nylon screws x 8	Hosfelt 28-124 4-40 x 3/8" Pan head nylon screws	0.025	.02
30	1" Nylon Spacers x 4	Hosfelt 28-147 Tapped Hex 1" spacers	0.20	0.80
31	RJ-11 Jack	DigiKey A9043-ND 6-6 Modular jack	0.69	0.69
32	14 Pin I.C. solder socket x 2	DigiKey A9314-ND 14 pin I.C. socket w/tin-lead plating	0.05	0.10
33	16 Pin I.C. solder socket x 3	DigiKey A9316-ND 16 pin I.C. socket w/tin-lead plating	0.06	0.12
34	20 Pin I.C. solder socket x 2	DigiKey A9320-ND 20 pin I.C. socket w/tin-lead plating	0.07	0.14
35	24 Pin I.C. solder socket (thin)	Combination of 16 pin and 8 pin	0.12	0.12
36	40 Pin I.C. solder socket	DigiKey A9340-ND 40 pin I.C. socket w/tin-lead plating	.30	.30
37	3"x 5" Printed Circuit Board	Express PCB	12.90 ¹	12.90
			Total	\$81.53

¹Ten boards costs \$204 which included a \$75 set up fee.