Bill of Materials

Qty	Ref	Part
1	BT1	1.5V AA cell
1	B1	beeper (see text)
2	C1, C4	0.1 uF 50V ceramic
1	C2	1 uF ceramic
1	C3	.0033 uF ceramic
	D1	1N5819 x 4 (see text)
1	D2	diode bridge 1 amp or more
1	J1	3-pin header
1	P1	3-pin header mate
1	J2	LCD 3-pin header
1	P2	LCD 3-pin header mate
1	J3	9-pin header
1	P3	9-pin header mate
4	P4, J4, P5, J5	single pin (see text)
2	J7, J6	DB9F chassis mount connector
1	J8	chassis mount barrel connector
1	J9	2-pin header mate
1	M1	stepper motor
2	OP1, OP2	optointerruptor
1	Q1	PNP transistor (see text)
1	R1	767 (see text)
2	R2, R16	10K resistors typically 5% 1/4W

1	R3	1268 (see text)
2	R4, R5	1K 1%
5	R9, R11, R13, R20, R22	1K
2	R7, R6	5.11K 1%
1	R10	4.7K
1	R14	47K
3	R15, R21, R23	100K
1	R17	22K
2	R19, R18	0.5 ohm 1206 surfmount
1	SW1	SPST pushbutton
1	SW2	SPST pushbutton
1	SW3	SPDT slide switch
1	U1	MC1458 dual op amp
1	U2	LM324 quad op amp
1	U3	LM555 timer
1	U4	L297 ST Microelectronics
1	U5	L298 ST Microelectronics
1	U12	ARDUINO Pro
1	U13	LCD
1	VR1	25K trimpot
2	VR2, VR4	10K trimpot
1	VR3	943 nominal 1K pot w/knob
1	VR5	2K trimpot
1	VR6	500K trimpot