

BEASTY

An introduction to Microrobotics

Just five years ago the chances are that you couldn't imagine having your own home computer. Well now you have one – and very soon you will be welcoming a robot into your home. This is because robotics and automation are currently the most exciting fields in computing, but until recently the hardware has been wildly expensive. What's happened to change things? The Beasty has landed!

Very simply attached (plugs supplied) to 1, 2, 3 or 4 servos – the Beasty performs its magic to lift, twist, open, close, pull and generally manipulate objects under computer control. A whole range of economical servos built to incredible standards of precision and reliability are listed overleaf. All of them can work with the Beasty.

The Beasty is supplied with software on tape to put you in control: it can be driven directly from the keyboard – or, for real robotics power, from your own BASIC or machine code programs.

All this means that the Beasty is the best introduction there is to robotics for educational, hobbyist and research users. Be prepared for the robotics revolution!



'The Beasty' by Microrobotics
available from

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BEASTY

Your introduction to Microrobotics

What is a Servo?

A servo is a precision geared motor with a feedback mechanism to give positional information. The Servo rotates an output arm through 100° and allows you to twist, turn, push, pull, lift, lower, open, close almost anything.

The standard servo is a FP-S128, which develops 3.5Kg/cm torque with 100° range. There is also a range of servos available for almost any application.



the Beasty with the FP-S128

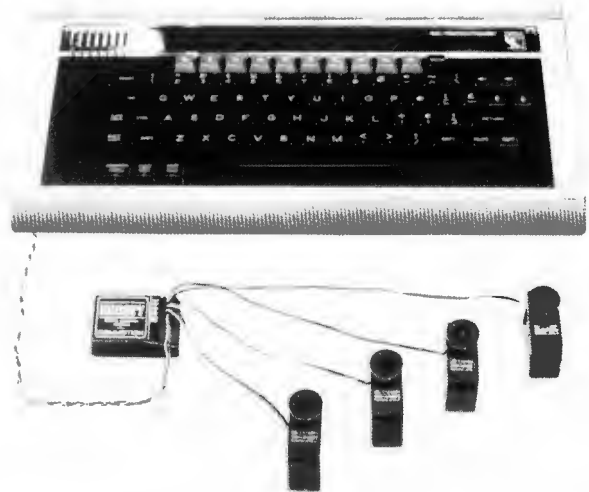
How Many Servos Do I Need?

You can start with **just one** and buy more as you need them. A Beasty can run up to four servos. All you have to do is decide on your movement requirements and select the number of servos you need.

Which Micro Do I Need?

The Beasty is designed for a BBC Model B microcomputer, (though a 32K Model A with a user port upgrade will suffice) fitted with OS Version 1.0 or above. Most of the Futaba range of servos can be driven from the 5v 1.25A DC auxiliary power output from the BBC microcomputer, though the more powerful ones may require an external power supply.

What is the "Beasty"?



the Beasty connected

The Beasty is the interface which connects directly into the BBC microcomputer and enables the computer to accurately control up to four servos. The Beasty comes complete with all connection cables, a demonstration program and comprehensive instructions.

What About the Software?

The Beasty is supplied with a demonstration program on tape which allows sophisticated control of up to four servos directly from the keyboard. For those who wish to program the servos, the machine code driver occupies less than 256 bytes of relocatable code (so it can be stored at any location in RAM). From BASIC, instructions are of the form:

X% = Channelnum: Y% = Newvalue: CALL Driver

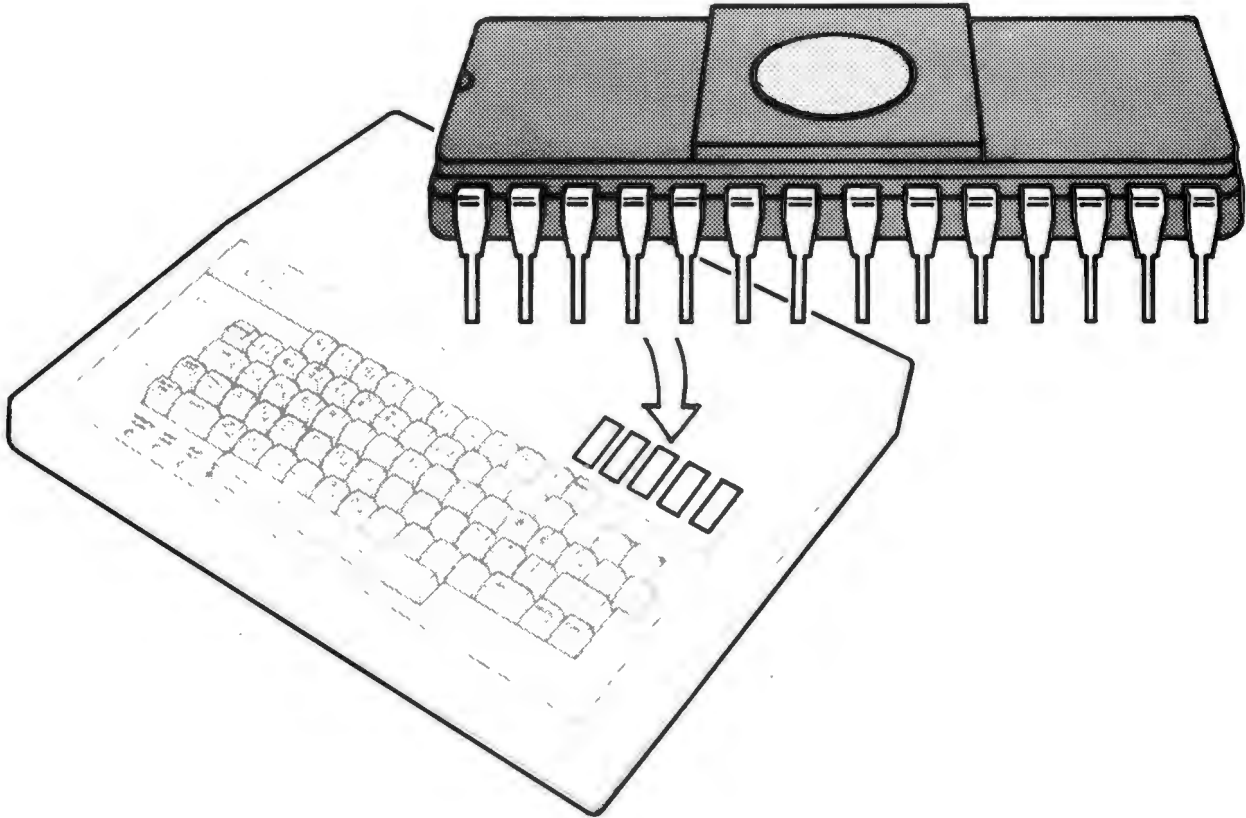
From Assembler, it's equally straightforward:

```
LDX 4           ; Servo number 4, for example
LDY NEWVAL%    ; Newval% is the new position.
                ; (between 0-255)
JSR DRIVER     ; Call Driver routine
```

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The Control ROM for the BBC Micro



The SJ Research Control ROM provides users with a simple method of controlling or monitoring external devices with the BBC microcomputer. Using this ROM, which simply plugs into a spare socket on the main computer board, even inexperienced users are able to control devices such as robots, laboratory equipment, electronic instruments and an unlimited range of similar systems.

The 8 K Control ROM provides:

- Control programs which are easier to write, simpler to understand and less prone to bugs.
- Simple commands available to any language which supports file handling (BASIC, BCPL, Pascal, LISP, etc.).
- Software which will work equally well on second processors, including the Z80 second processor. With the appropriate ROM version, identical software will also run on the Acorn Electron - a significant advantage over traditional Input/Output commands.
- Flexibility in defining which bit or bits are affected. Output bits can be left unchanged, set high or low, toggled or defined by the user. Data returned can also be any combination of the input bits.
- Direct access to the memory space on the BBC micro, either as whole bytes, or in individual bits.
- Transparent access to the 16 megabyte address space of the 1MHz bus, supporting both the Acorn standard and Control Universal's BEEB-EX expansion system.
- A number of additional facilities such as a terminal emulator. This transforms the BBC computer into a cheap RS423 terminal which can communicate with other computers.
- Additional channels for interfacing specialised I/O devices. The list of these dedicated channels will be added to - at present it includes Control Universal's Analog Interface Cards.

Channels available with the Control ROM

The Control ROM treats I/O as a filing system, with the same interface as the disk filing system. To access I/O files, the user first types '*IO'. All filing system commands will now be passed to the Control ROM.

Up to 32 channels can be opened at any one time. These may be any of the following types:

MEM	Main memory of the BBC computer
BUS	One-megahertz Bus address space of the BBC computer

USERPORT	A special channel for the User Port which automatically takes care of the 'housekeeping', including defining the data direction.
BIT0 to BIT7	Special single bit channels to address individual bits of the User Port.
PB, PA, etc.	23 special channels to allow direct access to all the facilities of the User 6522 or other 6522's at specified addresses.
CU-DAC8, CU-DAC12	Interface to Control Universal's Analog Card.

An Example of using the Control ROM

Suppose you need to read and write to a specific bit on the User Port without affecting the other bits. With the Control ROM, you can simply open a channel to the appropriate bit. This automatically takes care of setting the port to an input or output. Compare this with the equivalent BASIC procedure and function.

Without The Control ROM

To set up the channel:

```
DEFFN Light
?&FE62((?&FE62) AND &FD) OR 2
((?&FE60)DIV2) MOD 2

DEFPROC Light (State%)
?&FE&0((?&FE60) AND &FD) OR 2
?&FE62((?&FE62) AND &FD)
ENDPROC
```

Now you can write to it:

```
PROC Light (On): PROC Light (Off)
```

Or read from it:

```
State=FN Light
```

With The Control ROM

```
Light=OPENIN "BIT1"
```

```
BPUT# Light, On: BPUT# Light, Off
```

```
State=BGET# Light
```

And this was just a simple example! The difference is even greater with more complicated tasks.

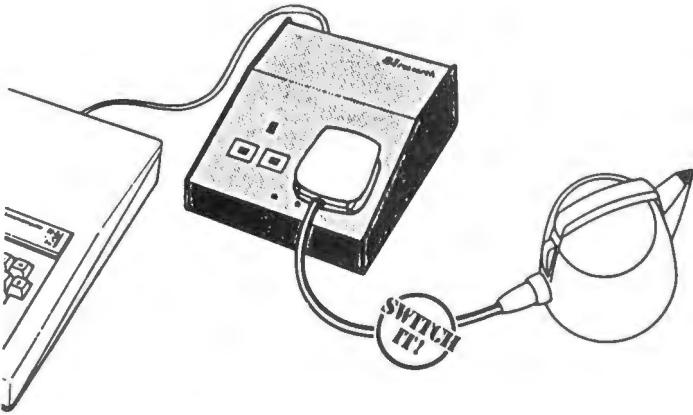
The Control ROM is the answer to your control programming problems. With comprehensive documentation it costs just £39.00+£1.00 p&p + VAT (total: £46.00).

Phone for further details.

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Control the mains from your micro!



SJ's R2 Gives you:

- Safe, low-cost control of two 13A mains outlets
- Independent switching of each channel - from BASIC
- Compact, heavy-duty metal case with a 2m control lead
- Choice of connectors for BBC, Sinclair and other popular makes
- A ready to go unit with full instructions and demonstration programs!

Lots of applications!

As an aid to home security, you can use the R2 with your micro to turn lights on and off while you're away - perhaps in a random sequence or for preset times. Plug a photocell into your micro and have automatic lighting when it gets dark.

Instrument control is another cost-effective R2 application. In a laboratory setting, for example, it can switch equipment in a preset order. Or the micro can power apparatus depending on the value of pressure transducers or temperature sensors.

Control your heating system: with input from a thermostat, arrange for the heating to suit your exact requirements around the clock.

Printers and other computer peripherals often have a motor or cooling fan which makes a noise all the time. Use the R2 unit to switch the device on only when required.

There's no need to stop here - the applications are limitless. Why not have a remote coffee maker so that any user on a network can start it without having to go to the kitchen until the coffee is ready?

Easy to use!

Controlling the R2 is simplicity itself. Just output a binary '1' to the User Port output and the mains device connected to that line will turn on. For example, on a BBC model B, just type:

```
?&FE62=&FF
```

which sets the user ports to be outputs; then type

```
?&FE60=1
```

which will turn on the R2's left hand socket. A binary '2' will switch on the right hand socket - a '3' will switch on both sockets.

With an SJ Research Control ROM (ask for our separate leaflet), it's even easier. Set up the two channels by typing:

```
Socket1=OPENOUT"BIT0"
```

```
Socket2=OPENOUT"BIT1"
```

Turn on the socket by typing: `BPUT#Socket1,1`

To turn it off, type: `BPUT#Socket1,0`

For other micros, the program will be slightly different. Clear instructions for your computer will be supplied with the adaptor.

Technical Specification

Case dimensions: 160 x 150 x 60mm

Front panel with 2 x standard 13A sockets with indicator LEDs.

Capable of controlling 3.5kW

Can be controlled by any electronic circuit with a minimum input voltage of 3V at 300microA.

Adaptors are available for all popular micros:
- just contact us at the address below.

Price

for BBC model B:

R2 with two 13 Amp sockets, indicator LEDs,
control connection (standard stereo jack)
and instruction manual:

Code Price

R2 £29.95

Please add postage and packing cost to all orders
(All prices include VAT)

£ 1.50

Phone for further details

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RETAIL PRICE LIST

<u>QTY</u>	<u>SERVO MODULES</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
_____	P-BM1 "BEASTY" Module (Includes all connection cables, software and instructions)	49.95	_____
	<u>SERVOS</u>		
_____	P-S128 STANDARD SERVO	13.00	_____
_____	P-S129 Waterproof Servo	21.00	_____
_____	P-S120 Micro Servo	24.50	_____
_____	P-S132 Micro High Speed Servo	25.00	_____
_____	P-S111 Linear Servo	27.50	_____
_____	P-S130 Mini Waterproof Servo	29.00	_____
_____	P-S130G 180° Movement Servo	29.00	_____
_____	P-S125 High Torque Servo	35.00	_____
_____	P-S130S Coreless Motor Servo	37.50	_____
_____	P-S131S Coreless Motor High Torque Servo	37.50	_____
_____	P-S131SH Coreless Motor High Speed Servo	37.50	_____
_____	P-S114 High Power Servo	61.00	_____
_____	P-S110 Winch Servo	70.00	_____
	<u>ACCESSORIES</u>		
_____	P-AT2161 Servo Extension Lead (1.5m)	4.00	_____
	<u>NEW ITEMS</u>		
_____	P-CRSJ The Control ROM	44.85	_____
_____	P-CR2 Mains Controller (for BBC Model B)	29.95	_____
	To: COMMOTION Ltd. 241 GREEN STREET, ENFIELD. EN3 7SJ Tel. 01-804 1378	TOTAL	£ _____
		POSTAGE & PACKING	£ 1.25
		GRAND TOTAL	£ _____

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or please debit my Credit Card Access Barclay Card (tick box)

CARD ACCOUNT No. _____

Signature _____

Mr /Mrs /Miss _____

Address _____

Post Code _____ Telephone No. _____

All prices include V.A.T. Prices apply to U.K. only.

Please allow 28 days for delivery. Delivery subject to availability.

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