CAMPUTERS LYNX
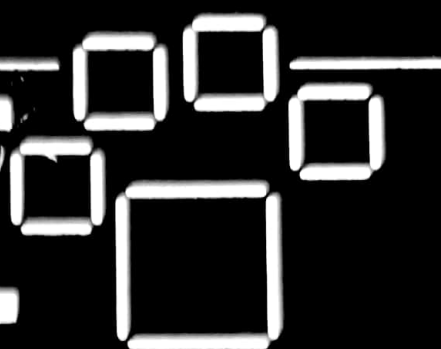
LYNX JOYSTICK INTERFACE

The Lynx Joystick Pack allows you to connect up to two joysticks by making use of the special Lynx Expansion Connector at the rear of the unit. Joysticks are easy to connect with this interface, and give your games an added dimension of control—provided of course that the programs have been written to take advantage of joystick controls, as many have.

The Lynx Joystick Pack is one of a set of Lynx Expansion Packs which use the 40-way connector at the rear of the computer to give direct access to internal Data, Address and Control lines right inside the machine. This is why the Expansion Connector is so useful.

Expansion Packs can be ganged together—one plugged into the back of another—to open up the use of joysticks, Centronics printer, disk drives and further peripherals still under development. However, since each level of expansion takes its power from the Lynx, the practical limit for the number of Packs without their own power supply is three.

A word of warning here: **the Lynx must be turned off before you plug or unplug a pack.** If you don't, you can crash the machine, or even worse, permanently damage some of the chips in the Lynx. Switching off the power supply before changing peripherals is standard practice with computers and you should always follow this rule.

Similar problems may occur if the connector isn't fully engaged, or if it 'walks off' during use because of vibration—though this is rare. Take care to plug the joysticks in fully and don't strain the cables. The Lynx is robustly designed, but not entirely resistant to over-excited players of our action games!

CONNECTION

Connection of the Lynx Joystick Pack is simplicity itself. With the power disconnected, plug the 40-way connector into the parallel expansion bus at the rear of the Lynx. The socket is marked 'INTERFACE' and there is a picture of it on page 1 and again on page 83 of the Lynx User Manual.

The pack provides two 9-pin 'D' connectors into which a maximum of two 'Discwasher PointMaster' joystick plugs may be attached. Other makes, if they can be used on the Atari, Vic20 and other home computers, should be suitable for the Lynx.

Apart from action games, the joystick interface has other uses: in general it provides you with 16 one-bit inputs which can be used for a variety of interesting digital control projects. The hobbyist might want to collect data from a piece of laboratory equipment, detect when a door is opened, when a robot arm is gripping something, or when a mobile 'mouse' bumps into the wall of a maze. If you are about to connect your own circuitry to a Lynx Expansion Pack, then take care not to exceed the input specification in terms of voltage and current. This technical information is given below.

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Joysticks are interfaced to the Lynx via two read only ports. Each port is connected to a standard 9-pin 'D' type connector—the pins of which are numbered. The corresponding pin assignments are shown below:

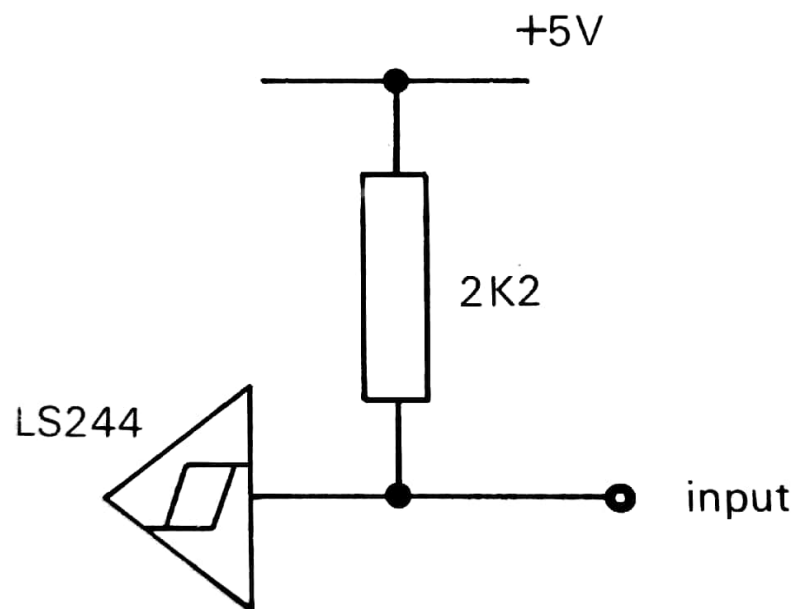| Pin	Bit
1	0
2	1
3	2
4	3
5	4
6	5
7	6
8	GND
9	7
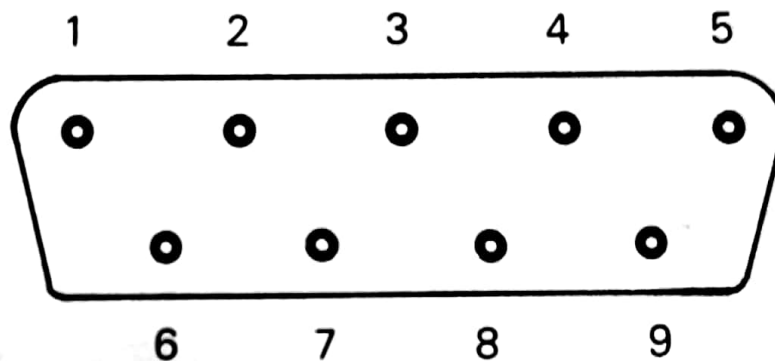
A switch-type joystick may be connected to one or both of these input ports. The ports themselves are read according to the following table:

DATA								I/O ADDRESS							
D7	D6	D5	D4	D3	D2	D1	D0	A7	A6	A5	A4	A3	A2	A1	A0
SPARE	SPARE	FIRE	SPARE	RIGHT	LEFT	DOWN	UP	★	1	1	1	1	0	1	0
SPARE	SPARE	FIRE	SPARE	RIGHT	LEFT	DOWN	UP	★	1	1	1	1	0	1	1

★The joystick is a read only port, but a 'write' operation to that port address will result in data being put on the bus.

The interface itself can read any 5 volt TTL (Transistor-Transistor Logic) compatible signal. A typical input circuit of one such input is given below:

+5V

2K2

LS244

input