

**Table 7-16 (continued)**  
Keyboard connector signals

Pin	Signal	Description
13	GND	System common ground
14,18,16,20, 21,19,26,17	X0-X7	X-direction key-matrix connections
24	LSHFT'	Line from Shift key

### Connecting a keypad

There is a smaller connector wired in parallel with the keyboard connector in the original and the enhanced IIe. You can connect a ten-key numeric pad to the Apple IIe via this connector.

#### Extended keyboard IIe

The extended keyboard IIe has a numeric keypad built into the keyboard.

**Table 7-17**  
Keypad connector signals

Pin	Signal	Description
1,2,5,3,4,6	Y0-Y5	Y-direction key-matrix connections
7	n.c.	
9,11,10,8	X4-X7	X-direction key-matrix connections

### Cassette I/O

The two miniature phone jacks on the back of the Apple IIe are used to connect an audio cassette recorder for saving programs. The output signal to the cassette recorder comes from a pin on the IOU via resistor network R6 and R9, which attenuates the signal to a level appropriate for the recorder's microphone input. Input from the recorder is amplified and conditioned by a type 741 operational amplifier and sent to one of the inputs of the 74LS251 input multiplexer.

The signal specifications for cassette I/O are

- ☐ Input: 1 volt (nominal) from recorder earphone or monitor output. Input impedance is 12K ohms.
- ☐ Output: 25 millivolts to recorder microphone input. Output impedance is 100 ohms.