

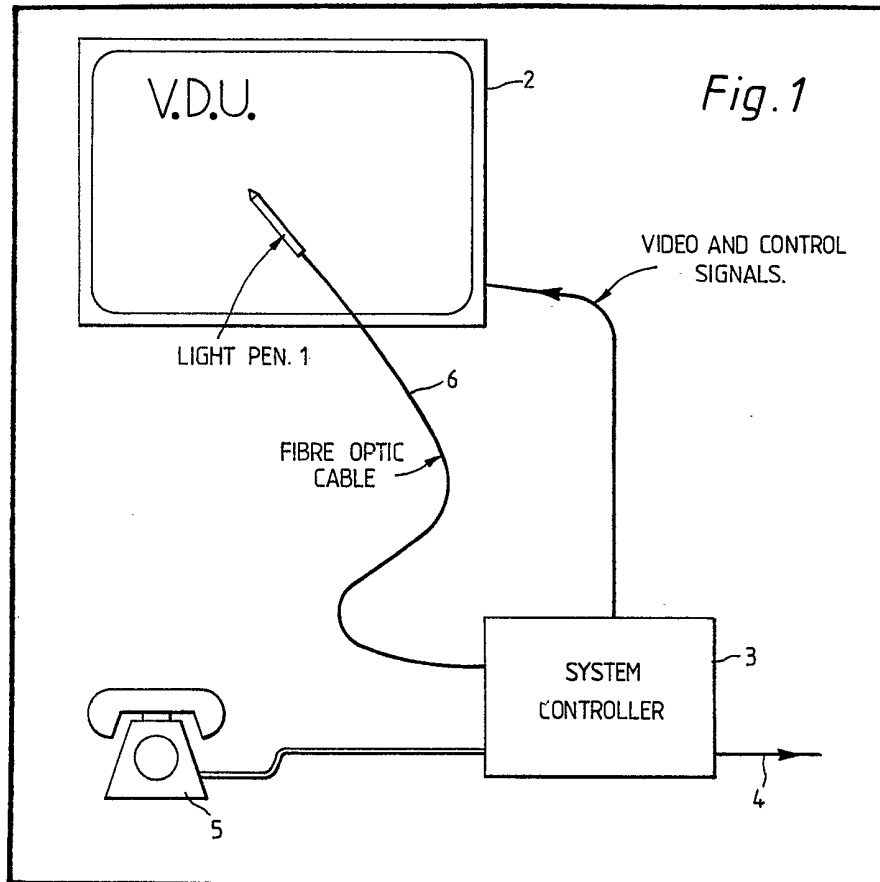
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(54) Light pen arrangements

(57) In or for an interactive visual display system comprising a raster scan visual display unit 2, a length of optical fibre 6 is used as a light pen,

the optical fibre having a sleeve at one end acting as the "pen" 1 and an electric circuit at the other end responsive to light signals picked up from the screen of the visual display unit. The system may employ a character recognition arrangement.



GB 2 102 944 A

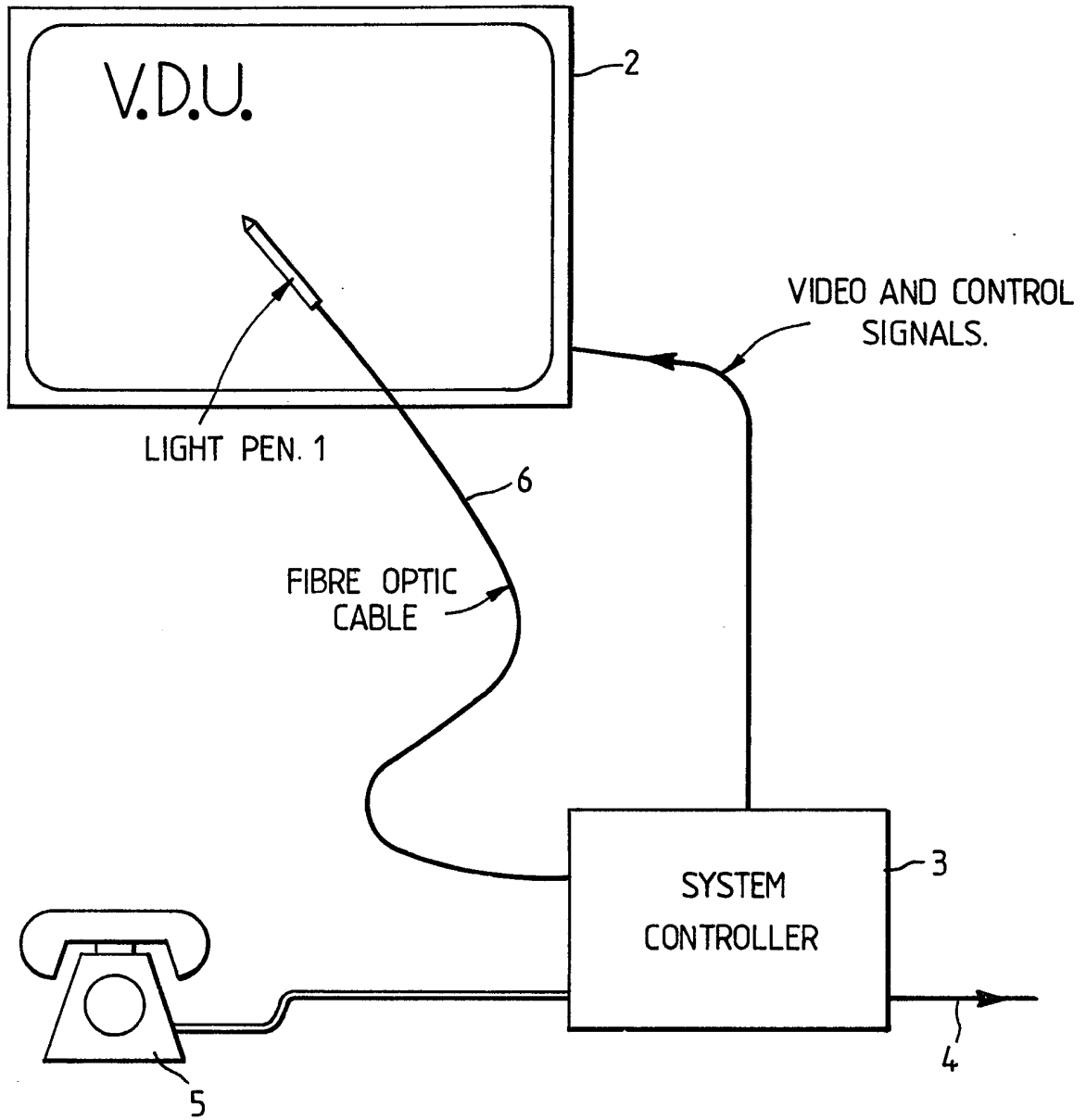
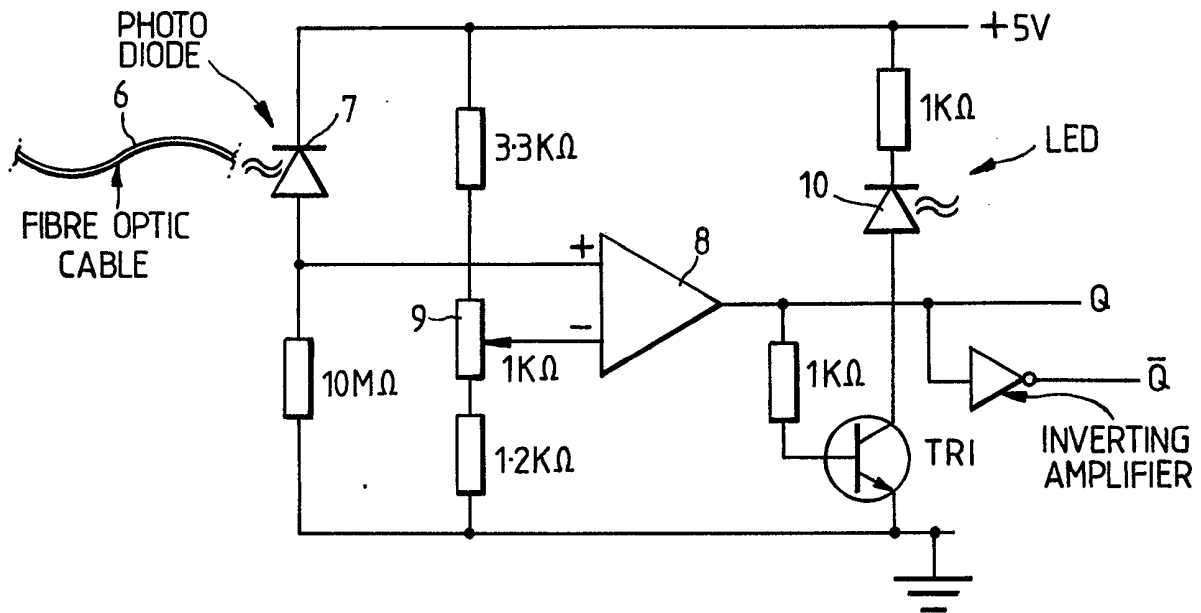


Fig. 1

*Fig.2*

SPECIFICATION

Light pen arrangements

The present invention relates to light pen arrangements.

5 Light pens may be used for example in arrangements for sketching directly onto visual display units, or onto the screen of domestic television receivers.

10 The screen of the display unit or television receiver may be considered as comprising an array of contiguous areas or picture elements in each of which may be displayed any one of a set of, say, one hundred and twenty eight different graphic characters. A sketch is made up by
15 sensing from successive light pen positions within a picture element which character of the set is to be displayed in that picture element.

20 With the sketch reduced to using only members of the graphic character set an assembled sketch may readily be transmitted at a low data rate, for example over a telephone network, to make possible applications such as 1) telephones for the deaf, transmitting text messages, 2) setting up and transmitting
25 engineering or electrical drawings or modifications, or 3) in domestic use for communicating line drawings or other sketches such as route maps.

30 According to one aspect of the present invention a light pen arrangement comprises a length of optical fibre, manually operable means at one end of said fibre to position the said end and electric circuit means at the other end of said fibre responsive to the level of light energy
35 transmitted by said fibre from said one end.

Preferably said manually operable means comprises a generally tubular sleeve surrounding said optical fibre.

40 According to another aspect of the present invention an interactive visual display arrangement comprises a raster scan visual display unit, a length of optical fibre, manually operable means at one end of said fibre to position said one end with respect to the display
45 screen of said visual display unit, and electric circuit means at the other end of said fibre responsive to the level of light energy transmitted by said fibre from said display screen to provide an indication of the position of said one end with
50 respect to said display screen.

Preferably said electric circuit means is responsive to provide said indication whenever the raster scan of said display screen passes said one end of said fibre.

55 A light pen arrangement in accordance with the present invention will now be described with reference to the accompanying drawings, of which:—

60 Figure 1 shows schematically an interactive terminal, and

Figure 2 shows diagrammatically a detector circuit for the terminal of Figure 1.

Referring first to Figure 1 the light pen 1 may be used in conjunction with a video display unit 2

65 to form an interactive terminal, for use with, say, a Prestel/Viewdata system. The pen 1 may be used to "draw" on the screen of the display unit 2 any one of a set of graphic characters in any of a matrix of areas on the screen, whereby a desired
70 picture may be built up on the screen.

The detector circuit shown in Figure 2 is used to provide a timing pulse indicating the position of the tip of the pen on the screen, as will be described, and the position indication is entered in
75 a memory field (not shown) in a system controller 3. As the tip of the pen 1 is moved over an area of the screen to describe one of the set of graphic characters the changing position indications are entered in the memory field, and a character
80 recognition arrangement (not shown) is utilised to determine which of the set of characters has been described by comparison with standard representations of these characters held in a read only memory (not shown). When the character
85 being drawn has been recognised it may be displayed on the respective area of the screen, in its standard form, or may be made available for transmission over a telephone link 4 associated with a telephone set 5.

90 The light pen 1 comprises a length of optical fibre 6, say one to three metres long, the free end of which is enclosed in a tubular protective sleeve by means of which this free end may be handled without damage. The other end of the fibre 6 is
95 coupled to a PIN photo diode 7 in an input circuit of an operational amplifier 8 the other input circuit of which is provided with a threshold voltage from a potential divider 9.

100 The amplifier 8 provides an output pulse each time the raster scan of the display unit 2 passes the free end of the optical fibre 6, and this output pulse is used to illuminate a light emitting diode 10 and to indicate to the system controller
105 circuits (not shown) where the free end of the fibre 6 is in relation to the raster scan timing.

For a standard visual display screen capable of displaying 32 rows each of 52 characters an optical fibre having an aperture of, say, 0.124 will be able to resolve individual dot elements of the
110 eight by eight dot matrix used to define a character, since the end of a fibre 6 of this aperture placed against the outer face of the screen will receive light only from an area of the phosphor on the reverse face equivalent to one
115 "dot".

The light emitting diode 10 provides an indication that the position of the light pen 1 is being detected, since it will then be illuminated each time the raster scan passes the tip of the pen
120 1. This may be used to set the background brightness of the display screen.

Claims

1. A light pen arrangement comprising a length of optical fibre, manually operable means at one
125 end of said fibre to position the said end and electric circuit means at the other end of said fibre responsive to the level of light energy transmitted by said fibre from said one end.

2. A light pen arrangement in accordance with Claim 1, wherein said manually operable means comprises a generally tubular sleeve surrounding said optical fibre.
- 5 3. An interactive visual display arrangement comprising a raster scan visual display unit, a length of optical fibre, manually operable means at one end of said fibre to position said one end with respect to the display screen of said visual display unit, and electric circuit means at the
- 10 display screen to provide an indication of the position of said one end with respect to said display screen.
- 15 4. An arrangement in accordance with Claim 3, wherein said manually operable means comprises a generally tubular sleeve surrounding said optical fibre.
- 20 5. An arrangement in accordance with Claim 3 or Claim 4, wherein said electric circuit means is responsive to provide said indication whenever the raster scan of said display screen passes said one end of said fibre.
- 25 6. A light pen arrangement substantially as hereinbefore described with reference to the accompanying drawings.