

- POINT, DRAW, WRITE, MAGNIFY ON TV MONITORS AND RECEIVERS
- USE IN BROADCASTING, TEACHING, COMPUTER-AIDED INSTRUCTION
- ANALOG AND DIGITAL OUTPUTS

The 4551 Light Pen Unit, when used in any 525/60 or 625/50 line TV system, produces a visible location indicator (cursor) on all TV displays in the system. The cursor may appear as a crosshair $\text{—} \text{+} \text{—}$, a rectangular box \square , or the crosshair may be enclosed by the box \square . Conventional video mixing techniques are used to insert the cursor into the TV display system. The cursor tracks the position of a pen as the user moves it across the screen of the TV display.

The cursor calls the attention of the TV audience to any point on the display. For example, news commentators will use the Light Pen Unit to call attention to areas on weather maps during weather broadcasting. Instructors on educational TV programs can use the Light Pen Unit to keep the attention of the audience concentrated on the appropriate point as material is discussed from sources such as blackboards, charts, books and drawings. Medical usage includes applications such as surgery which is being monitored by TV for lecturing purposes. The lecturing physician would use the Light Pen Unit to point to each anatomical area as it is discussed.

In any application where the Light Pen Unit is used, the user reduces distractions by removing himself and physical pointers from the display.

At any time the cursor's position is defined as a set of X-Y coordinates. Analog and digital signals corresponding to the X-Y coordinates are available at rear panel connectors. These signals may be fed into a data system for use in applications such as computer-aided instruction. For example, the computer would generate a display through appropriate software and ask a question of the student. The student points to an answer with the Light Pen Unit. Output signals from the Light Pen Unit would be used by the computer to validate the student's answer.

A pen connects to the Light Pen Unit through a modified BNC connector. Switches on the pen tip are used for controlling the cursor position and for writing on the display. One of these switches consists of a pair of rings (conducting surfaces) separated by a 5-mm gap (non-conducting surface). To illustrate how this functions, first assume that a stationary cursor is on the screen. To move the cursor the operator places the pen against the display area. The cursor will remain stationary until the user bridges the gap on the pen with his finger. When this is done the cursor moves to the pen's position. As long



as the gap is bridged and the pen is held against the display, the cursor tracks the pen movements. To stop the cursor movement, the operator simply lifts his finger.

Users who wish to write on the TV display may do so by using the Light Pen Unit with the Tektronix 4501 Scan Converter. These two devices are plug-to-plug compatible. The pen has a switch in its tip which activates the write function. When the user presses the pen tip against the display area, outputs from the Light Pen Unit are fed to the 4501. As the pen is moved to write or draw, its movements are converted to stored images in the 4501. The 4501 then displays the written image on the monitor or receiver. To the user the image appears as if it is written directly on the TV screen. To remove written data from the 4501, the user pushes Erase, a Light Pen Unit front panel control. This erases all stored data from the 4501 and readies it to store new data.

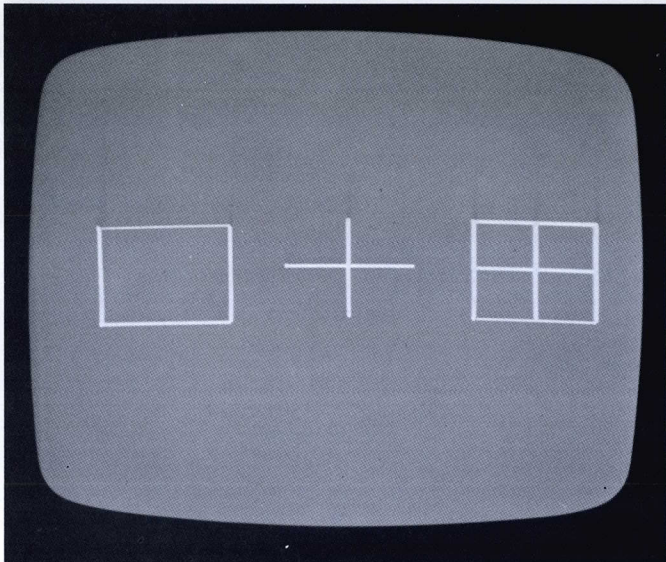
Application areas for the write capability would be the same as those previously described. News commentators, teachers, lecturers and students will find that writing material on TV screens is a convenient means of communicating with a large, scattered audience.

The Light Pen, when used with a scan converter such as the 4501, provides a convenient means to magnify displays. Data received from a source such as a computer is retained by the 4501 and converted to a display on the TV screens. To magnify, a cursor is placed over that portion of the display which is to be enlarged. With the Light Pen Unit operating in the MAG mode, the area enclosed by the cursor is magnified up to five times. In the MIXED mode, the area enclosed by the cursor is displayed alternately as a magnified and then a non-magnified area. The user views this as superimposed displays. The magnification ratio is variable by a front panel control on the Light Pen Unit.

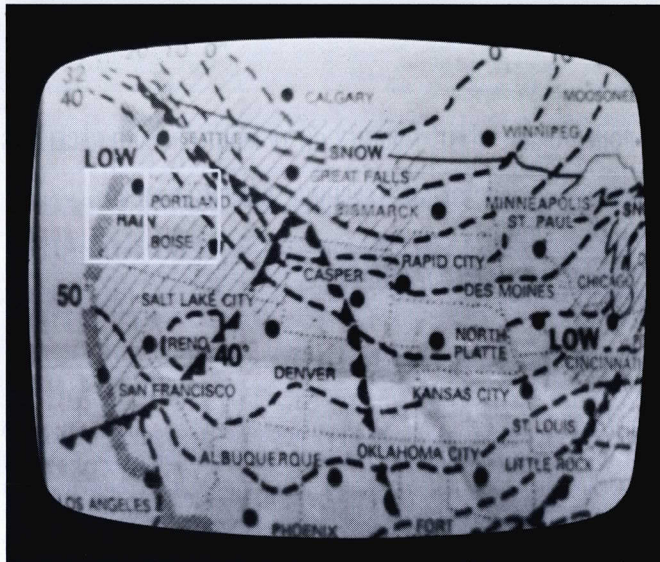
4551

Light Pen

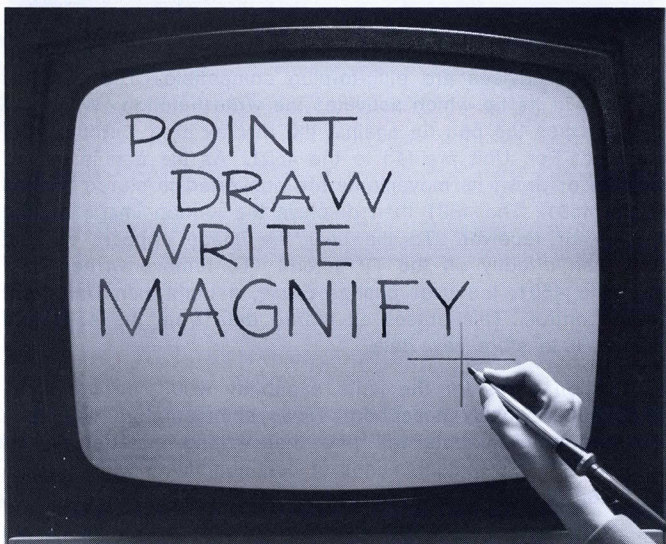
INFORMATION DISPLAY PRODUCTS



The above photos (multiple exposure) show the crosshair, box, and boxed crosshair cursor which the Light Pen Unit inserts into the TV display.



The boxed-crosshair cursor is being used in a broadcasting application to attract the viewers attention to the geographic area being discussed.



Artist conception of 4551 features.

LIGHT PEN CHARACTERISTICS

Output Signals—For analog applications the voltage output level varies from 0 to 5 V (nominal) as a function of the cursor position. Output current is 1 mA or less. The recommended load impedance should be at least 5 k Ω . In digital applications the vertical coordinates are provided by 9 parallel lines of binary information. The horizontal coordinates are also provided by 9 parallel lines of binary information. The lines are TTL compatible and each has a fan-out capability of 5 TTL loads.

OTHER CHARACTERISTICS

Power Source—Quick-change line voltage selector provides 4 ranges as follows: 90 V to 118 V, 104 V to 136 V, 180 V to 236 V, 208 V to 272 V. Line frequency range is 48 Hz to 440 Hz. Power requirement is approximately 20 Watts.

Dimensions and Weights—

Height	4 in	10.2 cm
Width	8 in	20.4 cm
Depth	16 in	40.7 cm
Net Weight	10 lb	4.5 kg

4551 LIGHT PEN UNIT **\$1800**
Includes instruction manual, 070-1149-00.

U.S. Sales Price FOB Beaverton, Oregon
Please refer to General Information page