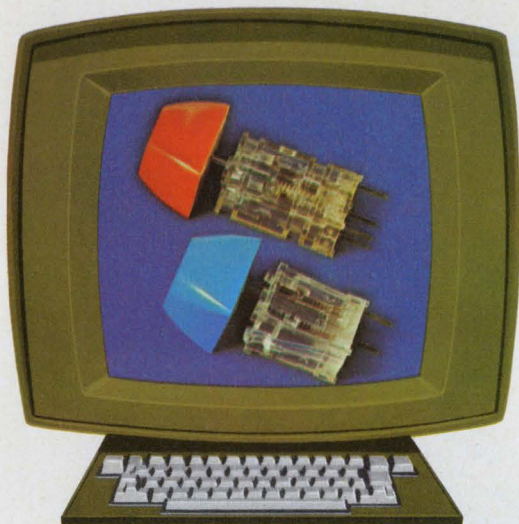


# Oak presents a short course in keyboard switch selection you can't afford to miss.

Our course could be called "Basic Economics in Keyboard Switch Design." It sums up more than 40 years of leadership in switch design and manufacture at Oak. Take a look at our course:



At the top: the Oak Series 400 Standard Keyboard Switch. It's what you're looking for if you want economy plus reliability. Millions are in use today in every kind of keyboard application.

And our Series 475 Compact Keyboard Switches (bottom) are about the shortest premium quality units you can buy. And, like the Series 400, they're ultra-reliable and economical.



We make so many types and sizes, you can specify Oak across the keyboard. Call on us for complete assemblies to your specifications or standard keypads. The most frequently used 10, 12 or 16 button arrays are stocked in quantity by Oak distributors.



Next subject: Oak Series 415 Low-Profile Keyboard Switches designed for calculators, security devices and data entry equipment. Note the streamlined silhouette. Select colors, custom caps and legends,  $\frac{1}{8}$ " or  $\frac{3}{16}$ ", single and double keys to fit your needs exactly.



We can say that because our automated manufacturing and test equipment ensures quality. And we design our keyboard switches with the operator feel, reliability, and economy it takes for such applications as data terminals, calculators, business machines, and more.

That's it. Just be sure to follow up on what you've learned. Write for Oak Keyboard Bulletins.

Class dismissed.

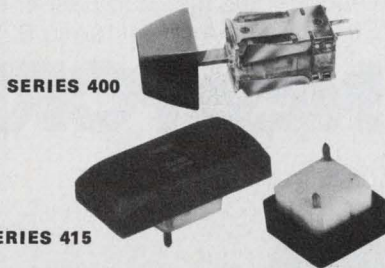
**OAK Industries Inc.**

**SWITCH DIVISION** / CRYSTAL LAKE, ILLINOIS 60014  
TELEPHONE: 815-459-5000 ■ TWX: 910-634-3353 ■ TELEX: 72-2447

Remove the Oak Keyboard Switch insert that follows for your files. If insert is missing, circle Information Retrieval No. 19 for a personal copy.



# Who to call for fast delivery on Oak Keyboard Switches



Oak Series 400 and Series 415 Keyboard Switches are available from a distributor near you. He'll supply your desired quantities and ship standard 10, 12 and 16-button keypads as well. It's the way to get Oak quality switches fast!

**DEMAMBRO ELECTRONICS**  
MASSACHUSETTS, Boston.....(617) 787-1200

**DRW**  
MASSACHUSETTS, Watertown....(617) 923-1900  
NEW YORK, Farmingdale.....(516) 249-2660

**EDMAR ELECTRONICS**  
ILLINOIS, DesPlaines.....(312) 298-8580

**FEDERATED PURCHASER**  
NEW JERSEY, Springfield.....(201) 376-8900

**GRAHAM ELECTRONICS**  
INDIANA, Indianapolis.....(317) 634-8486

**G. S. MARSHALL**  
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**INTERFACE ELECTRONICS**  
WASHINGTON, Seattle.....(206) 285-3500

**MILGRAY/WASHINGTON**  
MARYLAND, Hyattsville.....(301) 864-1111

**OHM/ELECTRONICS**  
ILLINOIS, Palatine.....(312) 359-5500

**RADAR ELECTRIC CO.**  
WASHINGTON, Seattle.....(206) 282-2511

**R. V. WEATHERFORD CO.**  
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CALIFORNIA, Palo Alto.....(415) 493-5373

**SCHOMBURG SALES**  
NEW YORK, Rochester.....(716) 244-0920

**SOLID STATE ELECTRONICS**  
TEXAS, Dallas.....(214) 352-2601

**OAK Industries Inc.**  
SWITCH DIVISION/CRYSTAL LAKE, ILLINOIS 60014

# Remote radar system raises harbor safety

A new high-resolution, remotely operated radar system, custom-designed for harbor surveillance, is giving mariners in San Francisco Bay added protection from collisions and groundings.

The shore-based, long-range system, called the Vessel Traffic System Radar, is reported to offer a number of improvements over the modified shipboard radars previously used for this work. It provides:

- Uniform illumination of the harbor.
- Antenna beamwidth that is less than half that of ship radars.
- A 50-ns pulse, permitting separation of targets as close together as 30 feet.
- A choice of antenna polarizations to match sea and weather conditions.

There are two radar sites in the San Francisco installation, which was developed under Coast Guard contract and built by the AIL Div. of Cutler-Hammer, Deer Park, N.Y. One, at a traffic center on Yerba Buena Island, covers the harbor; the other, 12 miles away at Point Bonita, covers the seaward approach to the harbor.

Both radars are identical, except for antenna polarization, and are operated unattended. They are controlled and monitored from a display-console setup on Yerba Buena Island. The Point Bonita installation provides video, bearing and triggering information to the consoles via a C-band microwave link while the radar is controlled via a uhf link.

The Point Bonita antenna is on a 60-foot tower, 330 feet above sea level, while the antenna on Yerba Buena is on a 90-foot tower, 415 feet above sea level. The seaward radar uses vertical polarization to match the long, rolling swells of the open waters, while the harbor

radar uses horizontal polarization to match the choppy swells of the confined area. Both antennas can be switched to circular polarization for maximum penetration of clutter during rain. Both antennas are 25 feet wide, have a beamwidth of 0.3 degree and rotate at 20 rpm.

The characteristics of the radar transmitters include:

- Frequency—9.3 to 9.5 GHz (spot).
- Output power—50 to 75 kW.
- Pulsewidth—50 or 200 ns.
- PRF—1000, 2500, 4000 PPS.

The receivers have these characteristics:

- Noise figure—7 dB maximum.
- Bandwidth—22 or 10 MHz.
- Response—logarithmic.

In the operations center there are five console positions, four of which are manned and can be switched to either of the two radars. The fifth console is currently unmanned and equipped with a movie camera, which photographs the pictures from the two radars. This permits later study of traffic patterns and possible legal protection in case of litigation arising from accidents.

Each console has a 16-inch round CRT that has 1000-line resolution and a selectable scale of 2, 4, 6, 8, or 16 nautical miles. Electronic cursors and leading lines may be added to the display to help establish traffic lanes and to ensure accurate determination of vessel headings and distances.

System dependability is assured by redundancy for the key elements, except for the antennas.

The system depends on the voluntary compliance of vessel captains with the advice supplied from the operations center. The radar operators can advise of the established traffic lanes and movement patterns but it is up to the captain to follow the advice. ■■