Chapter News

MID-ATLANTIC CHAPTER in its Annual Awards dinner in June featured a presentation by John Morelli (left), Aerospace Consultant, on the successful first flight of the Space Shuttle. John Stapleton (right) is holding the chart. Thanks to Ames Giordano, Chapter Secretary, for this picture.

SAN DIEGO CHAPTER on May 26 enjoyed a presentation entitled "The Beginnings of SID San Diego." Featured speakers were Jim Redman and Eunice Love of Science Applications, Inc. Redman was one of the first SID members in Southern California, according to George Unangst, Chapter Officer who supplied this report. John Lipscombe, Chapter Chairman, presided at the meeting. On August 19, Dwain Keller presided over a 1981/82 Planning Meeting.

MINNEAPOLIS/ST PAUL CHAPTER consistently has imaginative SID programs. Because of that energetic cameraman, Central Area Director Vern Born, here is another photo from a recent chapter meeting. Gary White and Bob Schultz discuss Hewlett Packard computers and graphic displays.

LOS ANGELES CHAPTER on June 30 found both education and entertainment in a program entitled "Laser-Optical Videodiscs". An advanced communiction system including a new optical videodisc and player was demonstrated by Richard Allen of Discovision Associates, a joint venture of IBM and MCA, Inc. Thanks to Gordon Kramer, Program Chairman, the Los Angeles Chapter has had a succession of outstanding technical programs.

NOTE: See page 10 for the article of an outstanding SID/MAC panel discussion of the Eurodisplay 81 conference, to be held on October 6 at the Burroughs Building, New York City.

INFORMATION DISPLAY
SEPTEMBER/OCTOBER, 1981
SOCIETY FOR INFORMATION DISPLAY
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SEPTEMBER/OCTOBER, 1981

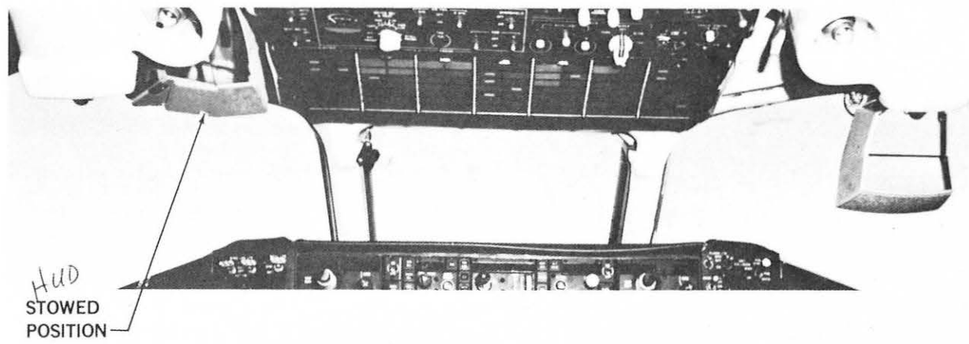
Compensated-Control HUD shown just to the right of the pilot's head is an advanced avionics display system designed to contribute notably to air safety. This is the cockpit of a DC-9 Super 80 built by Douglas Aircraft Company (DAC), Long Beach, CA, part of McDonnell Douglas Corporation.

While Head-Up Display (HUD) techniques have been used for approximately 25 years, the system shown here and described in an article beginning on page 3 has several unique features. A new concept developed at Douglas has shown that rate relative to a glidepath can be derived without having to use the velocity vector. A feedback-compensated control system, an adaptation of a principle used in autopilot design, makes this possible. Rate data are derived from aircraft motion measurements not subject to wind error, then combined with a fixed depression angle. This combined signal drives the HUD symbol that provides both glidepath and course guidance.

The pilot in this picture is Frederick W. Hamilton, engineering test pilot, DAC, with Porter Pierce as copilot. James R. Lowe, principal engineer, avionics, and Jack Henningfeld, editor of *DC Flight Approach*, supplied material for this cover story. Several SID members are involved in the design of Douglas cockpit displays, including Erwin A. Ulbrich, senior staff engineer, who served as SID president from 1976 to 1978.

FRONT COVER MATERIAL WELCOMED: Every month **Information Display** usually features one or more active members of SID and the products with which they are most closely associated. Please send a glossy print and appropriate captions so that you, too, can be on our front cover. Send your material to Ted Lucas, Editor, P.O. Box 852, Cedar Glen, CA 92321, or to our National Office Manager, June Friend, for Information Display, 654 North Sepulveda Blvd., Los Angeles, CA 90049. Next deadline for material from you is October 10 for the November issue. If you miss that, try for the December issue. NOTE: We also welcome feature articles on interesting projects.

HEAD-UP DISPLAY



- RETRACTABLE COMBINER GLASS
- VARIABLE INTENSITY DISPLAY
- APPROACH GUIDANCE (VISUAL AND ILS)
- TAKEOFF GUIDANCE
- GO-AROUND GUIDANCE

HUD CONTROL

"Heads-Up" Flying

When McDonnell Douglas set out to meet the airline industry's need for an advanced technology, quiet, fuel-efficient airplane for the 1980s, the needs of those who work in the cockpit were of primary concern. The DC-9 Super 80 offers an optional Head-Up Display (HUD) designed to assist the pilot during take-offs, approaches, landings, runway rollouts and go-arounds in all weather conditions.

The Advanced Super 80 HUD, the first available in U.S. commercial aviation, was designed by McDonnell Douglas in conjunction with Sundstrand Data Control, Inc. It uses an immersed optics technique in which computer-generated guidance information is projected through a transparent block.

Although positioned just a few inches in front of the pilot's eyes, the visual cues are focused at infinity so the pilot can absorb the information while looking out the windscreen. HUD systems being tested on Super 80s now flying, plus data obtained from prototype units installed in the McDonnell Douglas engineering development motion base simulator, are verifying design capabilities.

For the first time with a major avionics system, FAA certification of the DC-9 Super 80 HUD has been based on combined aircraft and flight simulation demonstration. Approximately 230 hours of simulator testing are required for HUD development and certification. The simulator validation program, which involves comparisons of aircraft versus simulator characteristics, has been completed and the simulator accepted by the FAA for approach and landing maneuvers. HUD approach demonstrations have been accomplished, and initial certification of the system as a monitor has been approved. Category II and III demonstrations will continue until FAA certification criteria for the autoland capability are satisfied.

Various HUD data clusters appear on the display depending upon whether the pilot needs advisory information for visual approaches, instrument runway approaches take off/go-around.

A single HUD computer provides computation for single or dual cockpit displays. The computer also monitors the HUD units approximately 16 times per second to verify information accuracy.

The unit may be tested by the crew during operation by pushing a self-test button and comparing the position

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of a fixed pattern with the display image to verify optical alignment.

More than half the firm orders received for the Super 80 include purchase of the optional HUD. Swissair has ordered HUD units in its 15 Super 80s, Austrian Airlines will have Head-UP Displays on board nine twin-jets, and PSA will be the first American carrier to be equipped with the HUD. Other purchasers are Inex Adria of Yugoslavia and Aeromexico. Polaris and GATX/MDFC Leasing Corporation will take delivery of DC-9 Super 80s with provisions for later HUD installation.

How The HUD Works

HUD symbology is designed so that primary control indicators are grouped for easy viewing around the aircraft symbol. Symbology consists of the following:

Aircraft Reference Symbol

The aircraft symbol, a circle with a horizontal line extending from the left and right sides, is a reference point line up on the touchdown position during visual approaches. If the aircraft symbol can be "flown" over the command dot during instrument landings, takeoffs and go-arounds, the actual aircraft is in position to execute these maneuvers properly.

Command Reference Symbol (Aim Dot)

The aim dot assists in providing the pilot with the same visual information during an ILS situation that would be available during VFR approach. The runway touchdown point is simulated by the aim dot. The aim dot also functions during go-around as well as during takeoff when it defines necessary pitch attitude.

Airspeed and Radio Altimeter/Barometric Altitude

These primary indicators are near the aircraft reference symbol, with the digital airspeed readout beneath the left wing of the symbol and the radio altitude or barometric altitude under the right. The selecting of radio or barometic altitude is accomplished by a switch on the HUD control panel.

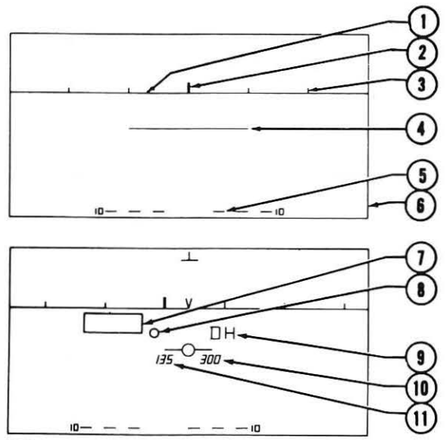
Airspeed Error Indicator

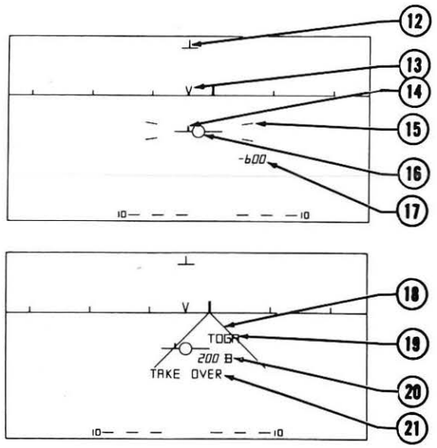
To indicate excessive or inadequate approach speed, a vertical line appears. It extends up for excess and down for too slow, from the left wing of the aircraft reference symbol.

Vertical Speed

Vertical speed is digitally displayed in 50-foot increments in the lower right-hand corner of the display.

HUD SYMBOLOGY





1. HORIZON LINE
2. COURSE REFERENCE
3. HEADING REFERENCE MARKERS (5-DEG INTERVAL)
4. NON-ILS APPROACH GUIDANCE SYMBOL (ABOVE 100 FT ONLY)
5. PITCH REFERENCE SCALE
6. INSTANTANEOUS FIELD OF VIEW
7. ILS RAW DATA WINDOW
8. COMMAND REFERENCE SYMBOL (COMMAND DOT)
9. DECISION HEIGHT ALERT
10. DIGITAL RADIO ALTITUDE
11. DIGITAL INDICATED AIRSPEED
12. ATTITUDE REFERENCE MARKER (PITCH ATTITUDE AND AIRCRAFT HEADING)
13. AIRCRAFT HEADING
14. SLOW/FAST INDICATOR
15. BANK ANGLE LIMIT MARKERS
16. AIRCRAFT GUIDANCE SYMBOL
17. DIGITAL VERTICAL SPEED
18. RUNWAY SIDELINES
19. TAKEOFF/GO-AROUND ANNUNCIATION
20. DIGITAL BAROMETRIC ALTITUDE
21. AUTOPILOT DISENGAGE WARNING

Horizon and Pitch Scale

The horizon line provides an artificial horizon to match earth horizon, with parallel lines above and below to provide pitch information. The horizon line has lateral reference marks at 5-degree intervals.

Category II Window

During ILS situations, a Category II box appears to represent permissible localizer and glideslope deviation. Below 100 feet radio altitude, the box is replaced by computer-generated runway sidelines representing an 150-foot-wide, 11,000-foot long runway.

Aircraft Heading (Lubber Line)

A "V" symbol appears on the display's horizon line to indicate aircraft heading.

Attitude Reference Symbol

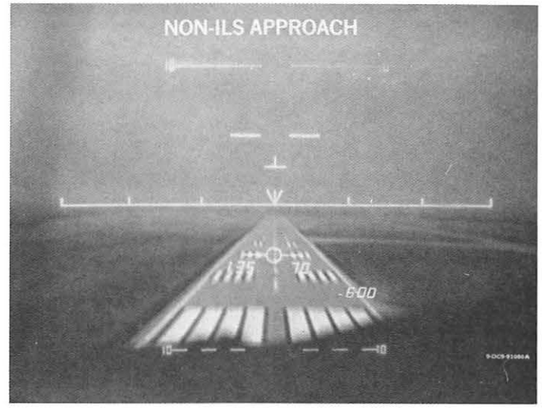
An inverted "T" demonstrates pitch attitude and aircraft heading.

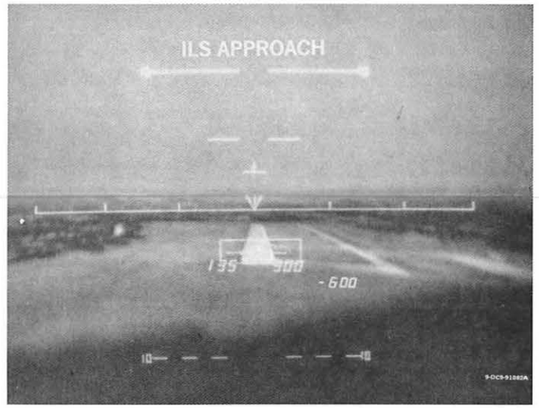
Roll Whiskers

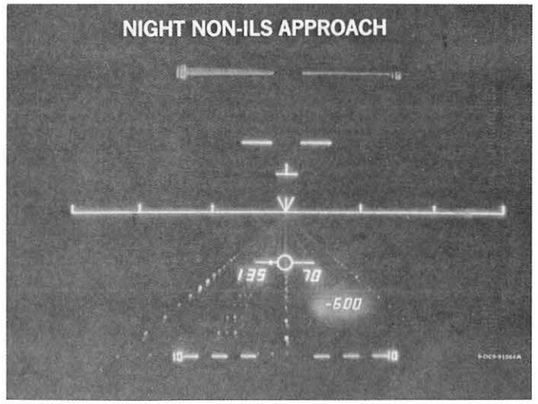
A pair of bank angle limit marks appears on each side of the aircraft symbol during the final 100 feet to runway when the roll angle is in excess of 6 degrees. Roll whiskers are at bank angles of 9 degrees.

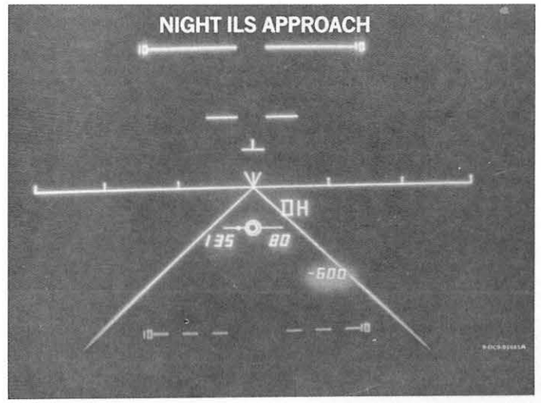
Message Symbols

Additional symbols also appear on the display to notify the pilot he has reached decision height (DH), that he is in takeoff or go-around mode (TOGA), or that the autopilot has disconnected (TAKEOVER).









GREETINGS TO NEW SID MEMBERS!

Each month you'll find a roster of new SID Members, listed by Chapters with the Chapters in alphabetical order. If your name — or a friend's — should have been listed and was inadvertently omitted, please let June Friend or your Editor know immediately. We'll make amends in the next issue. See the front cover for your choice of addresses to which to send vital data.

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SID CALENDAR
SEPTEMBER 1981 to JULY 1982

1981		
September	10	Sid 1982 International Symposium Program Committee, Palisades Institute, New York City
	11	SID/IEEE Biennial Conference Program Committee Meeting, Palisades Institute, New York City
	16-18	Eurodisplay 81 - The First European Display Research Conference, Munich, Germany
October	1	Proceedings, Volume 22, No. 3, 1981, Mailed
	20	Quarterly Chapter Rebates Mailed
December	1	Honors and Awards Nominations Deadline (Submit to I. Reingold, ERADCOM, DELET-B, Fort Monmouth, New Jersey 07703)
	7	Abstract Deadline for SID 1982 International Symposium (Submit to Leonard Klein, Palisades Institute, 201 Varick St. New York, NY. 10014)
	15	Nominations for National Officers and Regional Directors Due. (Submit to B. J. Lechner, Nominations Committee Chairman)
	15	Bylaws Recommendations Due
1982		
January	4	Proceedings, Volume 22, No. 4, 1981, Mailed
	20	Quarterly Chapter Rebates Mailed
	20-21	SID 1982 International Symposium Program Committee Meeting, Town & Country Hotel, San Diego
	22	National Board Meeting, Town & Country Hotel, San Diego, CA
February	15	National Ballot Mailed
March	5	Post-Deadline Papers for SID 1982 International Symposium
April	1	Proceedings, Volume 23, No. 1, 1982, Mailed
	12	National Ballot Return Deadline
	20	Quarterly Chapter Rebates Mailed
May	9	Executive Committee Meeting
	10	National Board Meeting, San Diego, CA.
	10-14	SID 1982 International Symposium, Town and Country Hotel, San Diego, CA.
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SID Mid-Atlantic Chapter on October 6 will present a panel discussion of Eurodisplay 81, the first European display conference. Attendees at Eurodisplay on the panel are the following SID panel members in alphabetical order: Frank Asterino, Dr. Ifay Chang, Allen Kmetz, and Dr. John van Raelte. Place: Burroughs Building, 39th St. and 3rd Ave., New York City.

Computer-Aided Drafting **at SCA&EGS is a team effort with (l. to r.) Delica Capull, Sam Ifverovich and John Clemsen at one of the firm's numerous Tektronix 4014 graphics terminals.**

Computerized Architectural Services Company: Success Story Written in Graphic Displays
By Ted Lucas

A Los Angeles company with an exceptionally long corporate name has already, in less than a year, proved highly successful by using computers and display terminals. Southern California Architecture and Engineering Computer Services Inc. (SCA&ECS) provides a technology specifically designed to aid architects, engineers, interior designers, and both civic and corporate planners, according to Duane P. Koenig, president.

"We save our clients both time and money," Koenig told your editor. "Their investment with us has an immediate tangible payoff. Thus our investment in 14 graphic terminals, two high speed plotters, and a 132-column fast line printer as peripherals for our VAX 11/780 computer has enabled us to provide an exceptionally useful service bureau.

"Our two major services include computer-aided drafting and also project cost control and general ledger accounting tailored for the specific needs of architects, engineers, designers of building interiors, and management engaged in planning. In this latter area of cost control and accounting, our firm works in conjunction with Data Processing Services, Inc. (DPS) which uses IBM general systems equipment."

Backed by Major Architectural Firm

There was no accident in the formation of SCA&ECS. Duane Koenig joined the noted architectural firm of Albert C. Martin and Associates seven years ago as director of administration. There he headed the development and implementation of computerized drafting, project cost control, and accounting.

Then in 1980 it was decided to set up a separate corporation so as to offer these services to other architectural and engineering organizations. Koenig was selected by Martin as president, and he has had a continuing major role in both management of the new company and in selling the capabilities to a variety of clients in Southern California.

As an indication of SCA&ECS success, Koenig told your editor recently: "We're operating two shifts a day. If I could hire more trained people, we'd go to three shifts."

Facilities Offered to Clients

In its two locations, one in downtown Los Angeles and the other in Irvine near the John Wayne Orange County Airport, SCA&ECS has an impressive array of equipment. Included are a VAX 11780 (DEC) computer and a total of 14 Tektronix graphic terminals. Also there are two Calcomp 2-pen drawing plotters, a DEC-132 column line printer, and two input tablets.

(Continued on page 14)

(Continued from page 12)

All this equipment is devoted primarily to computer-aided drafting.

As Koenig expresses it: computer-aided drafting permits drawings to be completed faster than manually prepared drawings, and produces finished drawings from rough sketches provided by the client at a cost competitive with in-house manual drafting.

The construction document phase represents about 60% of the total design fee. When computer-aided drafting is applied to the construction document phase it offers the client the greatest potential savings in the performance of the project.

Personnel selected as programmers and analysts by SCA&ECS are multi-talented: they must have either an architectural or structural engineering background, and then have acquired expertise in computer software and hardware.

Project Cost and Accounting Systems

Working with DPS, the firm previously mentioned having experienced programmers and analysts using IBM equipment, SCA&ECS has extended its services to architectural and engineering clients to include project management reporting and general accounting. The computerized project cost and accounting systems utilize an IBM System 38 with data base and time-sharing capabilities (2048K memory), several IBM CRT data entry terminals and a 132 column line printer. Since time and expense reporting is the most important function in a professional organization where the profitability is determined by the performance on specific projects, it is essential that this reporting be accurate and complete. To furnish such complete and accurate reporting, SCA&ECS has developed a management information system which relates directly to the needs of professional A&E firms. The system is said to be efficient, easily adapted or modified, and provides up-to-the-minute reporting for both management and production personnel.

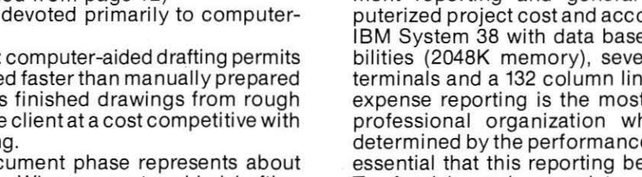
The system consists of one data base receiving all inputs on a weekly or monthly time schedule. The system is divided into two categories:

1. Project Management System reporting essential data weekly.
2. General Accounting System, the general ledger system necessary for efficient management of every A&E firm, providing checks and balances, cash flow and profit status.

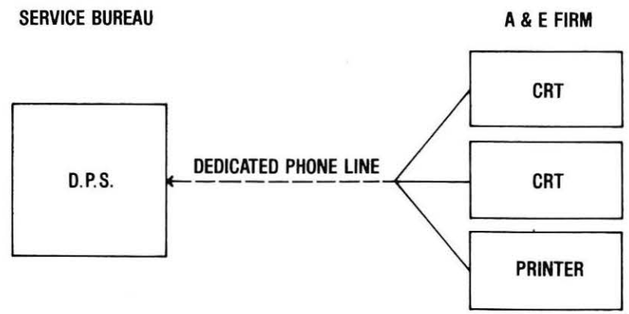
Computerized Project Cost Control & Accounting Options

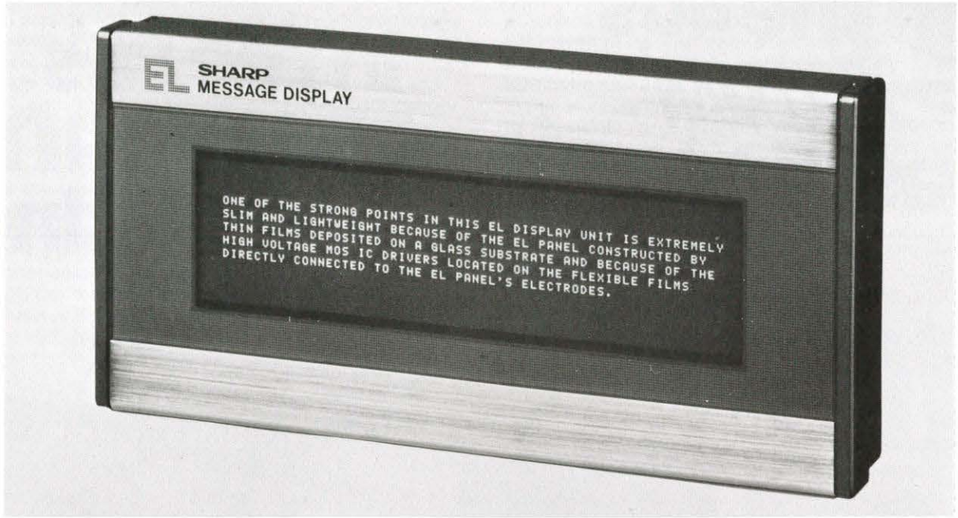
SCA&ECS

OPTION 1
COMPUTER SERVICE BUREAU



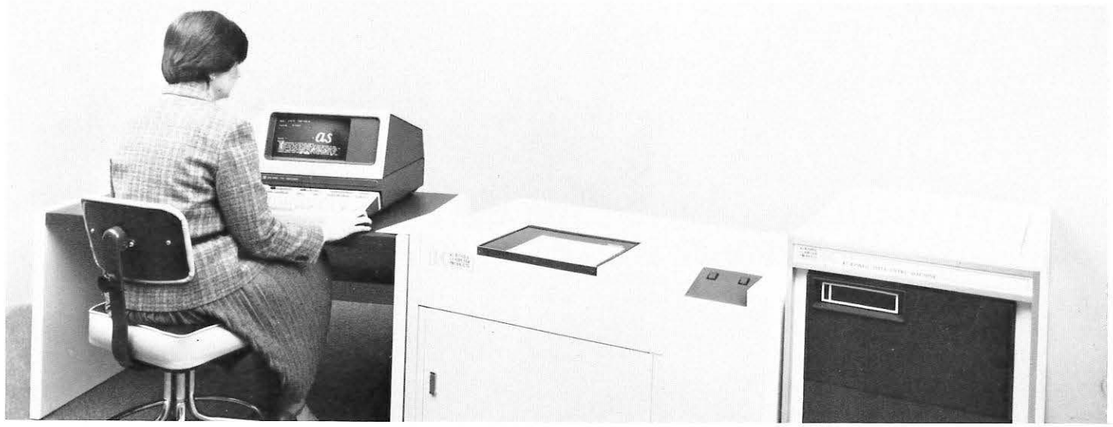
OPTION 2
TIME SHARE SYSTEM





Flat Panel El Display
Slim Lightweight

This small, solid state, flat panel EL display assembly provides 80 characters per line and up to 12 lines of alphanumeric information; or graphic portrayal on the 128 x 512 full field array. The display panel is 1.77″ x 7.1″ and dimensions of the entire assembly are 4.8″ x 10.1″ x 1.5″; weight is approximately 0.5 lbs. The 72.5 lpi resolution is a precise flicker free presentation of about 37 foot lamberts for light-on-dark or dark-on-light material. Its compact size offers OEMs a much smaller packaging than is currently possible with CRTs. Made by Sharp Corporation of Japan and distributed exclusively by Hycom, Inc., Irvine, Ca. this ED-7128 is a model of the 10,000 hour life production units expected in 1982.



Product shot: The Kurzweil Data Entry Machine (KDEM) now can scan and convert documents in virtually any typeface for computer or word processor use up to 25 times faster than a human keyboard operator—and triple its previous speeds. The new model of the KDEM includes a specially-designed processor, work station, terminal, disk drive, and optional document feed.

Machine Now Reads, Enters Information 25 Times Faster Than Human Keyboard Operators

Progress towards the computerized office has been given a boost by a machine which competes with the human eye and brain in reading capabilities. Kurzweil Computer Products, a Xerox company of Cambridge, MA, recently announced that the Kurzweil Data Entry Machine (KDEM) can now convert ordinary printed material to digital form on an average 10 to 15 and up to 25 times faster than a human operator typing at a keyboard.

This represents a 300% increase in speed for the KDEM, which was introduced two and a half years ago as the first system able to recognize and convert to digital signals all of the two hundred-plus typefaces and typefonts in common use. "This 'omni-font' recognition capability has been used to automate text and data entry for a wide range of business applications for customers in both the United States and overseas," says Raymond Kurzweil, president of Kurzweil Computer Products.

He cites corporations and data base bureaus which use the automataic unit to scan and enter govenment regulations and court decisions into computer files, and publishing houses which scan telephone directories to create mailing lists. Service bureaurs use the KDEM to convert company records such as manuals, specifications, and reports for computer or word processor use.

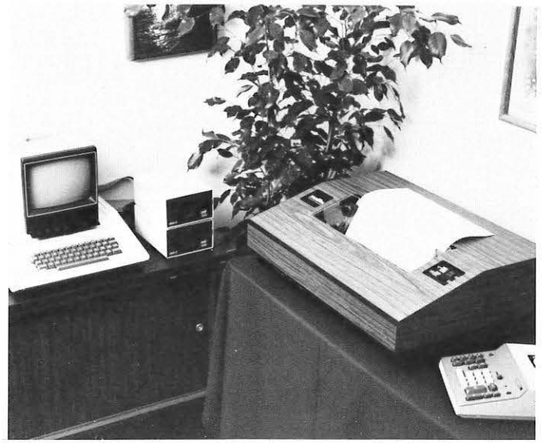
Typesetters also use the KDEM to create typeset copy directly from manuscripts, taking advantage of the machine's ability to automatically insert typographical instructions. Other applications include the automatic production of Braille books. "The KDEM's increased speed will not only improve text and data entry productivity but will help provide the economies necessary to justify new applications of computer power to information currently stored only on paper," says Kurzweil. "With the KDEM's automation of text and data entry, today's office has a cost-effective means of bridging the gap between information on paper and information stored in computers and word processors."

A new processor, designed by Kurzweil engineers, is responsible for the KDEM's increased recognition speeds. This processor, based on advanced emitter coupled logic (ECL) technology, is capable of executing six to seven million instructions per second, an instruction rate comparable to large mainframes. The KDEM now enters between 20 and 50 characters per second on the average, with top speeds up to 75 characters per second, depending on the original document's print quality and format. A human operator enters about three to five characters per second. In other words, the KDEM can scan and enter the typical page of a hardback book in 60 seconds or less—in contrast to a professional typesetter's seven to twelve minutes.

The KDEM also incorporates a 40,000 word dictionary. The KDEM checks any words with questionable characters against the dictionary, reducing the need for operator identification of characters by an estimated 80-90 per cent on typical documents.

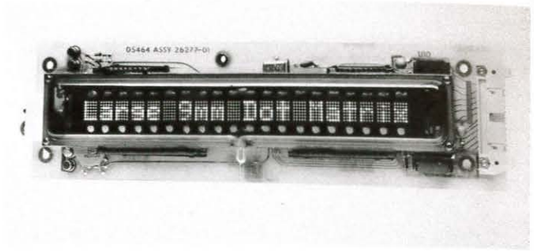
The new version of the KDEM offers a document feed and a redesigned workstation, which is expected to increase the unit's output by easing paper handling for the KDEM operator.

Terminal shot: The KDEM can "learn" to recognize almost any typeface accurately, including special characters and ligatures, or characteristic misprints including broken, filled-in, or connected letters. Characters which the KDEM does not immediately recognize with a high degree of certainty are displayed on the CRT screen; the operator instructs the KDEM as to the identity of the character. The KDEM then recognizes the character whenever it is scanned.



New Dot Matrix Printer: Malibu Electronics Corporation, Westlake Village, CA., recently introduced its Model 165 bidirectionaldot matrix printer with speeds of up to 165 characters per second in a 5 x 9 dot matrix. For document preparation requirements, the Model 165 features a word processing font that prints at 90 characters per second in a 10 x 9 dot matrix. This model comes in woodgrain and solid finishes and is being marketed both for commerical and personal computer applications.

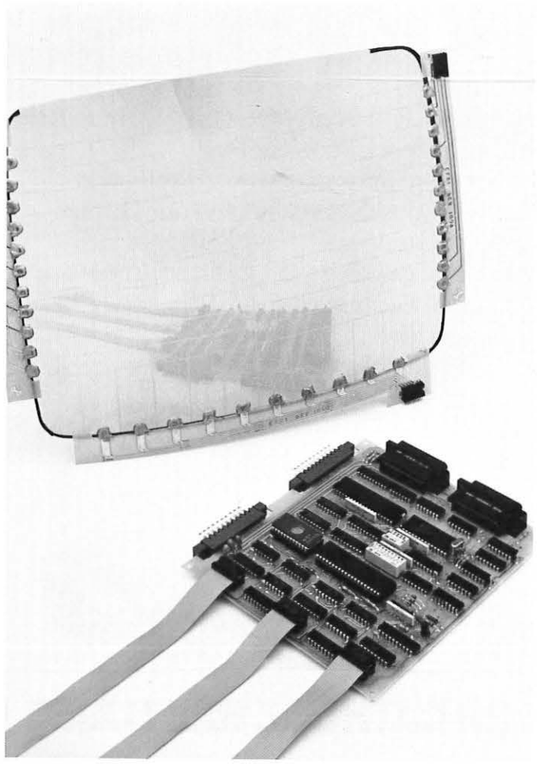
Lear Siegler's ADM 3A Dumb Terminal® video display is now capable of voice actuated data entry. This voice recognition unit was developed by Interstate Electronics, Inc. of Anaheim, California. The two companies recently signed a mutual development and marketing support agreement.



IEE Announces a Large Character Dot Matrix Vacuum Fluorescent Module

The Industrial Products Division of Industrial Electronic Engineers, Inc., (IEE), Van Nuys, CA., a leading manufacturer of displays in diverse technologies, has introduced a large 0.35 inch (9mm) dot matrix 20-character display module as an addition to the growing FLIP line of full electronics alphanumeric vacuum fluorescent display modules. Said to be engineered for easy reading at a distance and over a 150° viewing angle, this microprocessor-controlled module (Model 3600-14-020) boasts a full 96-character ASCII set plus European ECMA-7 overlay characters, bidirectional bus operation, support of ASCII control codes and operation from a single 5-volt source at 4090mA. The 5x7 dot matrix characters are a bright (175FL) blue-green color filterable to blue, green, aqua, or yellow.

Reflective DREXON™ data stripe reflecting image of coin-size semiconductor-diode laser. The DREXON™ data stripe can be used for laser encoding of information on debit/credit, ATM, and other cards. The stripe can store 1,200,000 bits of information in non-tamperable form, compared to only 1,700 bits of storage on a magnetic stripe of the same size, and several thousand bits of storage using semiconductor chip-in-the-card technology. This new card is a product of Drexler Technology Corporation, Mountain View, CA.



Interaction Systems, Inc. Provides Touch-Sensitive CRT add-on Kits

Interaction Systems, Inc., Newtonville, MA, recently announced TK-100 Series CRT add-on kits. These kits are said to provide the ability for the touch-sensitive feature to be incorporated into existing CRT terminals manufactured by other companies.

The touch-sensitive feature equips a CRT terminal with the capability of responding to the touch of the human finger on the data displayed on the CRT screen. The touch-sensitive feature also allows people who are not familiar with the use of data processing equipment to conduct an interactive dialog at a CRT terminal and to obtain information from online files without prior training.

The TK-100 Series Kits consist of a transparent touch-sensitive faceplate, an electronics touch control and interface board, interconnecting cables and mounting hardware. Standard kits are available for 12″ and 15″ CRT screen sizes (diagonal measurement).

The TK-100 Series touch-sensitive CRT add-on kits incorporate Interaction Systems' capacitance-sensitive touch detection technology. With the capacitance-sensitive technology, the touch-sensitive face-plate has no active or mechanical elements and is said to be maintenance-free. Continuous recalibration under microprocessor control compensates for changes in the operating environment and eliminates false touch senses.

For ease of integration to the touch-sensitive add-on kits into existing CRT terminals, the TK-100 Series provides ASCII serial and parallel interfaces, and switch-selectable baud rate, touch detection time and touch sense repeat rate. The Z80-based electronics interface to the touch-sensitive faceplate occupies 42 square inches of printed circuit board area and requires less than 500 ma at +5v (+12v at 200 ma for RS232).