FERMINEWS

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SOMETHING UNUSUAL ABOUT THIS CIRCUIT BOARD

Many people have never seen a printed circuit board.

Others who have assembled Heathkits or looked inside a television set know that the majority of circuit boards are a foot square or smaller. But those who happen to stop at 27 Blackhawk in the Village will find a team of Research Services experts assembling a 12-foot long printed circuit board. That's right, 12 feet long.

Possibly the longest in the world, according to Ed Arko, who said he's not aware of any other group making boards that long. Technical specialist with Research Services and supervisor of the printed circuit laboratory and chamber (detector) construction, Arko is an enthusiastic man who takes considerable pride in the challenging and frequently demanding job he and the others on his staff are doing. When Arko and technicians Don Emery, Lupe Rodriguez, Vic Martinez and Maria Reyna get together, anything is possible--like a 12-foot long by 10-inch wide circuit board.

They are preparing 100 circuit boards for detectors that will be used in Experiment #537 and 80 boards for detectors in Experiment #516. And soon probably more for other experiments, said Arko. After scientists find that boards of this nature are technically possible, they also want them, he added.

The major advantages: it's more economical and easier to make a particle detector chamber with a few large circuit boards than with many small ones, and the accuracy of the circuit is considerably improved.

Research Services printed circuit facility has been slightly modified to handle the 12-foot long circuit boards--like cutting three-foot squares in the inside walls to accommodate one end of the board while the other end is being worked on and to move the boards easily from one

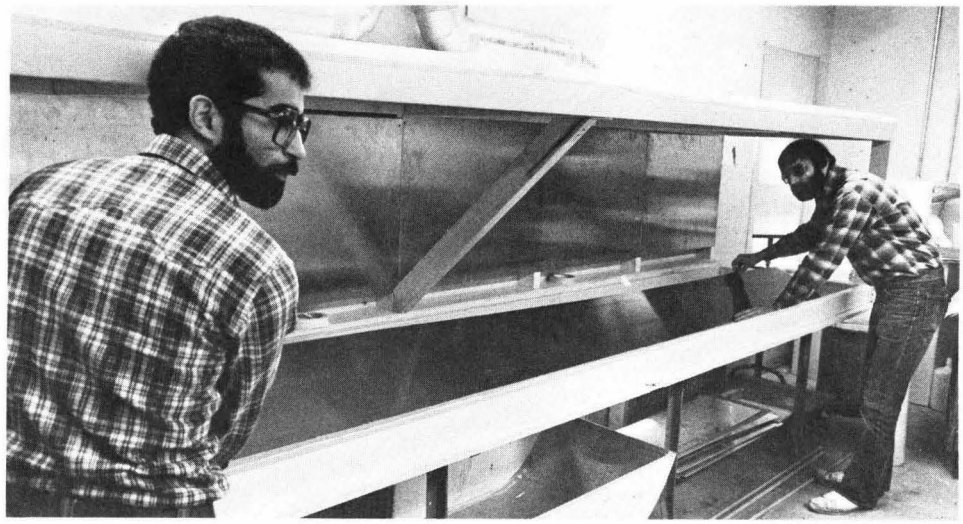
(Continued on Page 2)

MONDAY, MAY 28, IS MEMORIAL DAY. FERMILAB WILL OBSERVE THE HOLIDAY. SO REMEMBER.....

DEFENSIVE DRIVING IS EVERYONE'S RIGHT OF WAY

DRIVE THAT HOME OVER MEMORIAL DAY

...Maria Reyna (foreground) and Lupe Rodriguez prepare a 12-foot-long circuit board for exposure to black light...



...Vic Martinez (left), technician, and Don Emery, slip a circuit board into the developing and stripping tank. The two men designed the unit...

(Continued from Page 1)

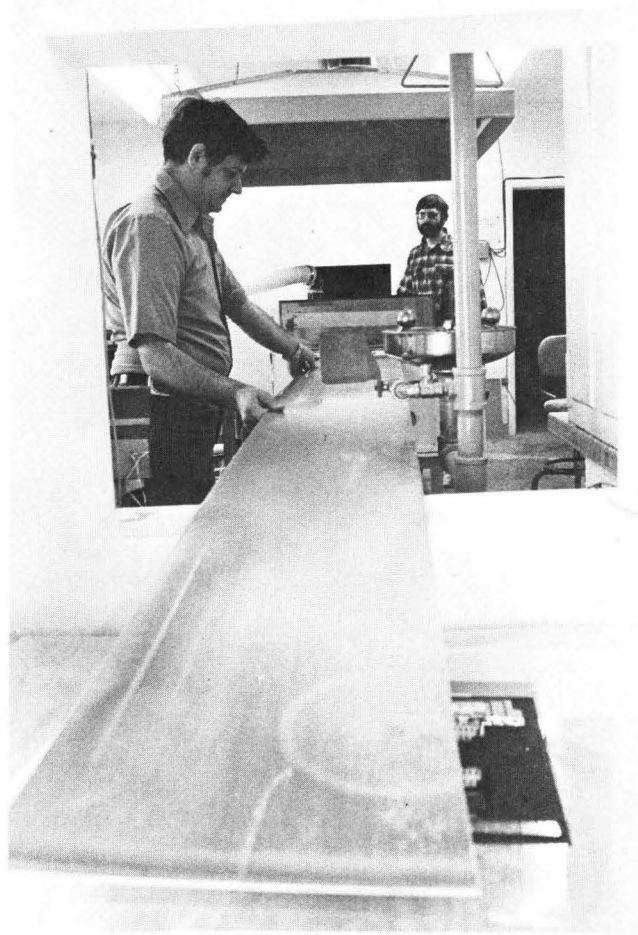
processing unit to another.

In a good week, one when everything goes well, the Research Services printed circuit team can produce 12 boards without interrupting their normal production, said Arko. The first step is bonding by heat and slight pressure photo-resist to a material called a G-10 base. Laminated to the base is a layer of copper. On top of the photo-resist goes a film that contains a precise drawing of the circuitry the physicists and engineers need.

The film, photo-resist and base with its copper laminate are then exposed to black light for about 60 seconds. This sets the circuit on the photo-resist. The sensitized board is placed in a developing tank of trisodium phosphate, then moved up to the etcher where ammonium persulphate etches off the copper that is not wanted. In the final stage, M-22 stripper takes off all of the photo-resist. What remains is the copper circuit on the G-10 base--the finished printed circuit board.

Of particular interest is the chamber in which the raw materials are exposed to the black light. Because of the enormous size of the board, special equipment had to be built. So Arko and his team constructed a four-foot model of the light chamber and checked it out. Based on their design, the Physics Department built the full size unit. (See photograph on Page 1.)

Arko and the others also build circuit boards in a variety of more normal sizes and with varying complexity. But it was probably those challenges that go beyond the normal that caused recent Chinese visitors to take careful photographs of the circuit board facility and to show their exceptional interest in its activities.



...Ed Arko (left) and Don Emery slide a sensitized circuit board through the etcher that removes unwanted copper...

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SUN RELUCTANT TO GIVE UP SECRETS

To many persons, the sun is a tidy ball of fire that warms the Earth and brings daylight: it's predictable and dominates the sky with its violent brightness.

But to a scientist like Dr. Robert H. Dicke, the sun is an enigma of unanswered questions that defy reason and sophisticated mathematics. In his talk on "What in the World is Going on in the Sun?" May 16 at a Fermilab physics colloquium, Dr. Dicke--Albert Einstein professor of science at Princeton University-- grappled with some of the solar mysteries that are more and more tantalizing the finest scientific minds in the world.

Even at the end of his 56-minute lecture, Dr. Dicke confessed he still had no great confidence in the model he had developed during his talk. He told his audience that much of what is known about the sun's processes comes from a study of its surface. Descriptions of the phenomena going on inside the sun are still only educated guesses.

At the opening of his lecture, he said solar physics is changing rapidly, and what he had to say that day was "current dogma." He built his talk around solar anomalies, meticulously explaining how his model helps explain them. Some of the anomalies he talked about include: 1--The neutrino problem (where are the energetic neutrinos?); 2--The regularity of the sun-spot cycle; and, 3--The 22-year solar cycle and its relation to Earth's weather.

Overall, Dr. Dicke developed correlations between observed events and cycles on Earth and what he believes is happening inside the sun, which he described as potpourri of phenomena constantly being stirred.

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THINK ENERGY CONSERVATION

"Waste not, watt not."
Wes Taft, Bonneville

"Insulation takes the heat off."
Dr. Joyce Rasdall
Western Kentucky Univ.

"Arrive alive at 55."
Bill Webster, Brookhaven

"Jack rabbit starts are for rabbits."
Earl Voss
DOE Headquarters

...Dr. Muris Osmanagic of Yugoslavia (left) is greeted by Drasko Jovanovic, associate head of the Research Division. Dr. Osmanagic, director of the Community of Interest for Scientific Work is touring this country visiting science facilities. The private organization he heads is an umbrella group for various industries, scientific bodies and universities at the state level. Dr. Osmanagic is a guest of the U. S. government under an international visitor program. He will be in this country through May 29...

AN EARLY MORNING JOG WITH LEON LEDERMAN

Dr. Leon Lederman, director designate of Fermilab, invites all runners to join him for a jog around the main ring June 1 beginning at 7 a.m.

Interested runners should join Lederman at that time in the Central Laboratory's east parking lot. Breakfast will be served to all those who make it--running or walking--around the ring. The event will be rescheduled only if it rains excessively.

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FERMILAB URGES SAFE DRIVING OVER MEMORIAL DAY WEEKEND

Fermilab has joined with the National Safety Council to urge safe, defensive driving over the Memorial Day weekend May 26-28.

A new campaign targets the message to motorists through internal publications, public service announcements and newspaper advertisements. The announcements and ads recommend drivers follow the two-second rule, a practical safety tip to maintain a safe following distance.

The two-second rule is easy to apply. When the car ahead passes a landmark, the driver in the following car begins to count "one thousand one, one thousand two." If his car passes the same landmark before the count of "two", he should drop back to increase the distance between his car and the one in front.

Fermilab is one of hundreds of institutions across the country that offers the eight-hour National Safety Council defensive driving course. For additional information, contact Marilyn F. Kasules, Fermilab Safety Section, Ext. 3607.

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BIRTHS

Eric Matthew, son of Randi F. and Sue Franck, was born 9:54 a.m. May 7 at Central DuPage Hospital. His father is a welder in the machine shop. Eric has a brother, Christopher Michael, 2-1/2.

A son, Christopher David, 6 pounds, 7 ounces, was born April 3 to David A. and Barbara Burkhart. He is the couple's first child. Burkhart works in Program Planning.

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DR. EDWIN LAND, POLAROID LEADER, TO GIVE COLLOQUIUM AT FERMILAB

Dr. Edwin H. Land, the gifted scientist who brought the world into a new era of photography, will speak at Fermilab May 30.

Chairman of the board, director of research and chief executive officer of Polaroid Corporation, Cambridge, Mass., Land will speak about the role of the retinex and his retinex theory of vision. Free and open to the public, his lecture-demonstration will be held at 4 p.m. in the Central Laboratory auditorium.

"The retinex is the name given to each of four independent systems," said Land. "Each system uses a liaison between the whole area of the retina, the pathway to the cortex and the cortex to generate what we call objects in the outer world.

"Each of the systems is rigorously independent of the others, although the band of wavelengths used by each one overlaps rather broadly the bands used by the others. The colors of the objects generated are determined by the comparison, presumably cortical, of the four different constructs produced by the four retinexes.

"Each of the retinexes associated with the left eye has a sister retinex associated with the right eye, and these pairs impose a geometric rigidity on the space created by the retinal-cortical system."

Dr. Land's creative leadership has brought him world fame and 14 honorary degrees from universities and colleges in this country alone; the latest being in 1973 from New York University. The first was from Tufts College in 1947. He holds fellowships and honorary memberships in more than 15 photography and science organizations; his list of awards takes up a full single-spaced typed page.

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FERMILAB INTERNATIONAL FILM SOCIETY PRESENTS

"MOTHER"

Friday, June 8 — 8pm — Central Laboratory Auditorium

In this 1926 Russian film, director Vsevolod I. Pudovkin focuses on the effect of the 1905 revolt on a Russian family, especially the mother. This film is regarded by critics as Pudovkin's greatest work.

PG — 73 Minutes — Adults $1.50 — Children 50¢

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