OTTO SLACK

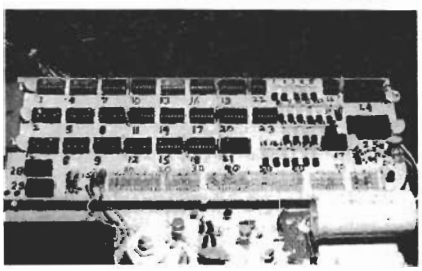
NIFTY WIRE-WRAP TRICKS

Here's a look at a few tricks to make wire-wrapped projects easier, faster and sturdier

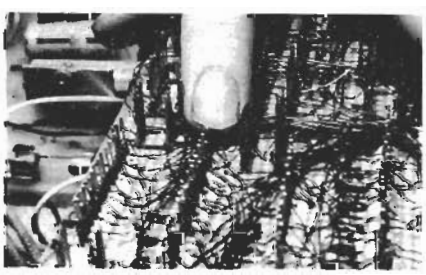
WIRE-WRAPPING IS THE WAY TO GO IF your next electronics construction project is not being assembled on a PC board. There are several variations on the wire-wrap theme and in the instruments used. ("Doc" Savage covered wire-wrap basics in his article "Wiring Systems For Projects" in the August 1979 issue.) I use both the Vector Electronics *Slit-N-Wrap* and the OK Machine and Tool Corporation's *Just Wrap* tools and wire for most projects. The ideas expressed and demonstrated here are based on those systems. However, even if you use other standard wire-wrap tools (such as Vero Electronics Wrap tool), you'll find that you're able to apply my ideas.

Add space for easier wiring.

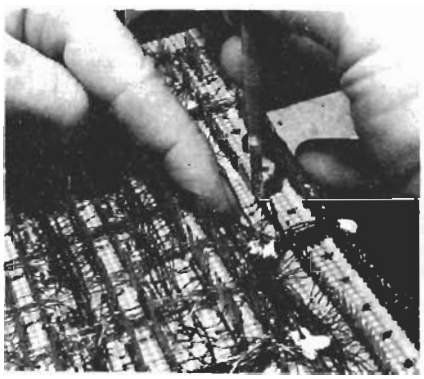
In wire-wrap layouts using normal spacing, Vector's *P183* forming and cutting tool is used to hold the loose end of the wire while the wire-wrap tool is anchoring the wire on the terminal post. The *P183*—supplied with the *P184* manual *Slit-N-Wrap* tool—has a sharp, metal



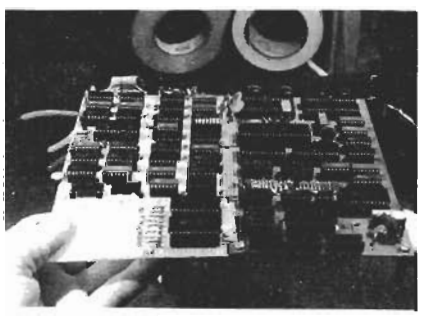
BOARD LAYOUT with "finger-distance" spacing between rows. Too much room at the ends of the IC's is wasted space. You don't need to manipulate the wire there and the 0.2-inch spacing provides enough room to cross over in-between rows. All wire in this series of photos is the older polyurethane-Nylon-coated wire. If you use the Tefzel insulated wire, you may find that you'll have to increase the end-to-end distance between the sockets because of its larger diameter.



MEASURING CORRECT DISTANCE between the rows. The "finger distance" is 0.8 inches on this board. You could also turn your finger to manipulate the wire. Too narrow a distance will slow you down and give you a sore finger.

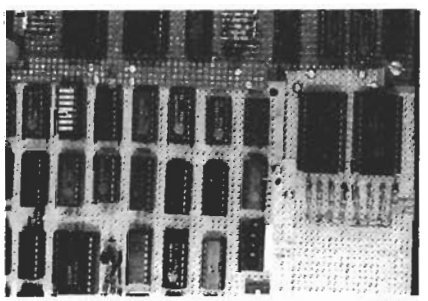


USING YOUR FINGER to hold the wire down while turning it onto the post with the tool. You never have to pick up or lay down your finger: Notice the hot-melt glue holding down the wire runs. If you have any wires that you're afraid will get snagged and broken, or skuffed on a post and shorted, hold them down in this manner.



DEMONSTRATION OF THE STRENGTH of a splice. It is nearly as strong as a single piece and it can be turned over and lifted in the same manner.

TWO PROJECTS ARE SPLICED TOGETHER, one being on the dark perf board and the other on the light. Both projects were wire-wrapped, but the "finger-distance" concept wasn't used here. The tools shown from left to right are Vector's *P160*-4T1 powered and the *P108* manual *Slit-N-Wrap* tools, the *P183* chisel knife and forming tool, a needle nose and diagonal pliers, and, finally, an O.K. Machine & Tool Co. hobby wrap tool.



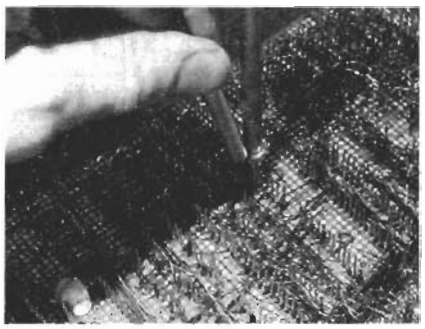
SPLICING TWO BOARDS together using strips of perf board. Use a No. 44 drill bit to drill the holes and 2-56 × ¾ screws and 2-56 nuts.

MANUFACTURERS of tools and materials

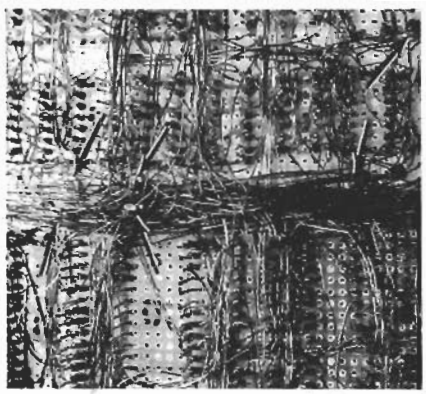
OK Machine & Tool Corp., 3455 Conner St., Bronx, NY 10475:
CIRCLE 148 ON FREE INFORMATION CARD
WSU-30—Wrap/unwrap tool, $6.95, plus materials, accessories, boards.
JWK-6—Just Wrap kit, $24.95.
R-JW—Just Wrap wire, 50-foot spool, $2.98.

Vector Electronics Co., Inc., 12460 Gladstone Ave., Sylmar, CA 91342:
CIRCLE 149 ON FREE INFORMATION CARD
P-183—Chisel knife and forming tool, $2.15.
P-180—Slit-N-Wrap tool, $25.00, plus materials, accessories, boards, kits.
P-160-4T1—Motorized handle, includes P-180 Slit-N-Wrap tool, $99.50.

Vero Electronics, Inc., 171 Bridge Rd., Hauppauge, NY 11787:
CIRCLE 150 ON FREE INFORMATION CARD
163-28300A—Combiwrap tool, $12.36, plus materials, accessories, boards, kits.

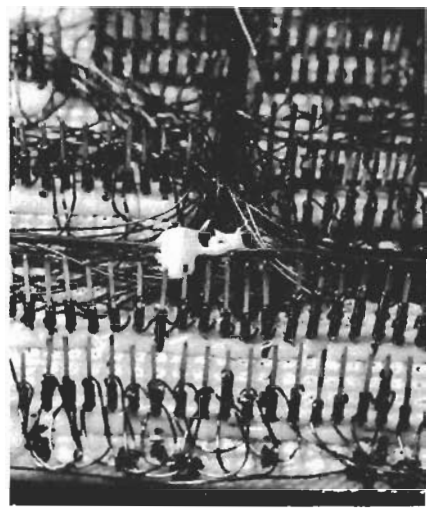


USING THE *P183* FORMING TOOL and *P180 Slit-N-Wrap* tool. This board layout is poor. Even if you must make your rows too narrow and have to use the forming tool, lay them out end-to-end. Extra room on the ends of the IC's is wasted space because the room isn't needed for your finger or the forming tool.

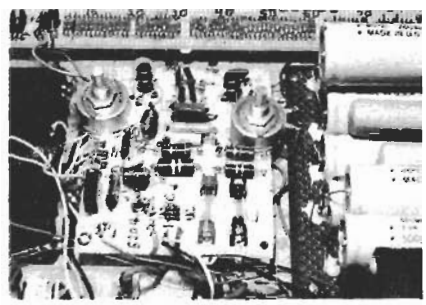


ARROWS POINT to the nuts on the bottom of board holding the splice together. Notice that there are no strips of perf board on the bottom. That makes it relatively easy to splice a board near a heavily wired area.

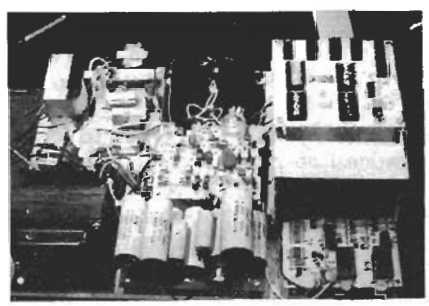
THE PENCIL POINTS to an area of wire-wrap pins that have bent over in their holes from handling. The posts themselves have not bent. Some of those posts will fall out of the holes when handled if the wire-wrapping hasn't been completed on them yet.



HOLDING WIRE-WRAP POSTS in place with hot-melt glue. A wire run is also held down with the glue. If you see a leaning post here, that's because it was either glued that way or the post is bent. These glued-down posts hold resistors and transistors.



MORE USES FOR THE HOT-MELT GLUE GUN. The two metal pots, the T0-220 regulator, the bridge rectifier and the bottom electrolytic capacitors are all held in place with hot-melt glue. The advantage of hot melt in these examples is that it is fast, strong, and the components are removable with heat.



THIS EPROM LOADER AND TESTER was built using the "finger-distance" concept and hot-melt glue to hold the wire-wrap and other posts in place. It has been running for a year. It is made almost exclusively with wire-wrap and perf board. The big exception to this is the PC board in the upper left-hand part of the photo. The device contains 32 IC's, including three hex readout chips plus the high-voltage power-supply board in the center, all wired with the wire-wrap technique. This project is ready to be mounted in an aluminum box with the perf board on the plywood frame mounted in a hole in the top.

chisel point on one end and a plastic piece similar to a blunt screwdriver or alignment tool on the other. It is the blunt end that is used to hold the wire and dress it against the board when necessary.

I find the forming tool cumbersome to use in some spots so I eliminate the need for it by spacing out the IC's, transistors, and other components on the perforated board. The IC's are placed end-to-end and spaced 0.2 inch apart in rows. The rows are spaced "finger distance" from each other. I usually space the rows 0.8 inch apart but it could be less depending on the size of your finger and the available room. Now, instead of using the forming tool you can use your finger to hold the wire in place. I find that my finger does a faster and better job. The only disadvantage in using that technique is the additional board space required for your layout.

Expanding a wire-wrap circuit

Sometimes a circuit change requires more space than is available on the perforated board. In other instances, two circuits must be tied together with a large number of connections. You can use a ribbon cable, but that is both expensive and unnecessary. A better solution is to butt-splice the two circuit boards together using strips of perforated board about one-half inch wide. I use 2-56 × 3/8 inch screws and 2-56 nuts.

You don't need splicing strips on the bottom side of the board; the assembly is strong enough without them. That makes it relatively easy to splice two boards in heavily wired areas.

Keeping terminal posts in place

A large, densely wired project requires a lot of handling before it is completed. The board flexes when handled by one edge; that flexing action can loosen the terminal posts. Some posts can loosen enough to bend over in the holes; and since most of the posts are installed before you start wiring, they can fall out if your wire-wrapping hasn't reached that point. To eliminate the problem, use a hot-melt glue gun and run a bead of glue down each side of each row of wire-wrap posts. (Adjacent rows of posts must be at least one-half inch apart so you can get the glue gun between them. Don't get glue on the tops of the posts! It is a very good insulator.) The end result is posts that are anchored in place and will take all the handling you have to give them while assembling a large wire-wrap project.

You can also use a dab of hot-melt glue to hold wires in place. Pots, and most other components, can also be anchored to the perforated board using hot-melt glue so they don't have to rely on circuit wiring for support. **R-E**