

# Instant Circuits

**E**very once in a while, something small happens that changes the course of events in our lives. For example, the simple "happening" of an apple falling on Sir Isaac Newton's head several centuries ago triggered the discovery of gravitational fields.

Although not quite in the same class, but equally important to anyone working with electronics, a product has been recently developed that is destined to play an important role in future developments. I'm referring to the various solderless, matrix terminal sockets now available for breadboarding electronic projects.

Depending on which manufacturer you talk to, the sockets may be referred to as "Super-Strips," "E1 Sockets," "QT Sockets," or "Klip-bloks." But regardless of what they are called, they all have one thing in common — convenience. In fact, after being introduced to their simplicity, you tend to ask yourself, "Now why didn't I think of that?"

With these sockets, a new circuit can be thrown together in a matter of minutes, making electronic projects that much more fun. Also, last minute changes may be incorporated into a new circuit merely by rearranging connections. This feature alone

will save you much anguish in working with stubborn circuits.

Most of the discussion here will center around AP's "Super-Strip," although each manufacturer has a complete line and assortment of terminal strips for you to choose from. A listing of some of the major manufacturers is contained in Table 1, and I suggest you send for a copy of their brochure before you decide to purchase one.

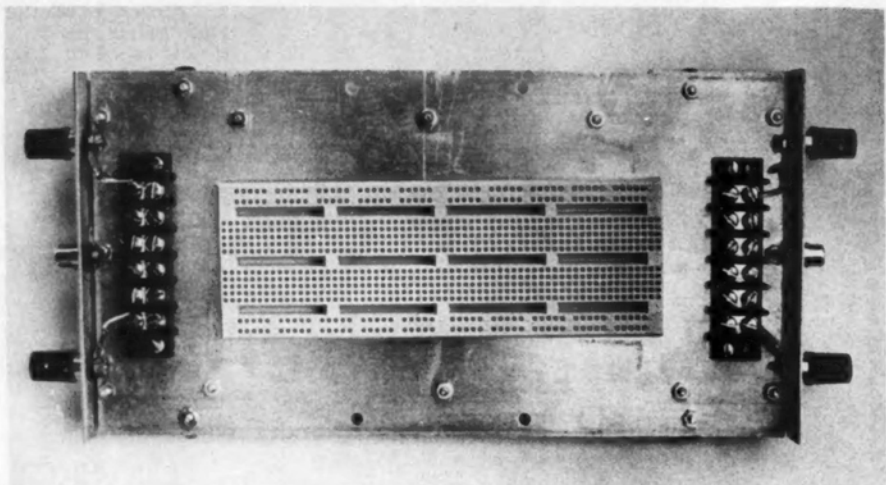
## Background

I was first introduced to breadboarding techniques through an article in 73 several years ago.<sup>1</sup> The solid state breadboard described was constructed and it has been a great aid to me in building electronic projects on short order.

The bus bars were installed in a manner similar to the original design, but I also incorporated additional features such as transistor and IC sockets, internally connected to individual bus circuits. This feature facilitated changing transistors and ICs, and also helped to avoid damaging the semiconductors while soldering other components to the bus.

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<sup>1</sup> Goodwin, G. W., "A Solid Solid State Breadboard," 73, November, 1972, p. 178.



*This particular distribution strip consists of 840 plug-in, solderless tie-points, which can accommodate a variety of circuit configurations.*

For the past few years, this arrangement has been adequate for my purposes and has been of great assistance. However, there is always room for improvement in everything, and breadboarding techniques are not excluded.

With the advent of new techniques, we now have available universal, solderless terminal blocks for quick circuit building and testing.

These terminal and distribution strips provide you with unlimited freedom in connecting components together to form a circuit. No special tools are required and any solid wire up to #20 AWG may be used for connections.

Terminal strips are also available in many different sizes and configurations to accommodate any circuit layout desired. The terminals accept all component leads between 0.015" and 0.032" in diameter.

As an example, 1/8 Watt resistors have lead diameters of 0.015", 1/4 Watt resistors have lead diameters of 0.025", and 1/2 Watt resistors, 0.032".

#### "Super-Strip"

My own experience with these products has been with the AP Products' "Super Strip." This particular socket is a combination distribution system with a universal

breadboarding matrix consisting of 840 solderless, plug-in tie-points which can accommodate a variety of components and circuit configurations.

The socket measures 2.25" by 6.50" and is currently selling for about \$18.00. While this price may seem high at first for an item so small, it is really a super bargain. Once you begin using one and realizing the advantages it has over all other breadboarding systems, I think you will agree that the sockets are worth their weight in gold.

My "Super-Strip" actually paid for itself in one month, considering the time it saved me and the cost savings of reusable components.

#### Applications

With regard to component locations on the terminal strip, all ICs are mounted in the center as shown in the photographs. In this manner, each IC lead is connected to one terminal of a 5-terminal strip, leaving 4 terminals for other components. The terminals along the edge are connected to form a bus for power supply connections.

I mounted my "Super-Strip" on a 5½" x 10½" aluminum plate with end panels for external connections. Each panel has two 5-way terminal posts along with a phono jack for input and output connections. As an

| TRADE NAME              | MANUFACTURER                  | ADDRESS                               |
|-------------------------|-------------------------------|---------------------------------------|
| Super-Strip             | AP Products, Inc.             | Box 110 Q, Painesville OH 44077       |
| EL Socket               | E & L Instruments, Inc.       | 61 First St., Derby CT 06418          |
| QT Socket               | Continental Specialties Corp. | 44 Kendall St., New Haven CT 06512    |
| KLIP-BLOK<br>KLIP-STRIP | Vector Electronics Co., Inc.  | 12460 Gladstone Ave., Sylmar CA 91342 |

*Table 1. Major manufacturers of solderless terminal strips.*

interface between these jacks and the "Super-Strip," I use a terminal block to allow changes without soldering.

There is usually enough room on the sides of the aluminum plate to mount large components such as coils, variable capacitors, pots and similar components. I sometimes add a strip of masking tape along each edge of the "Super-Strip" and label component leads to help keep track of connections.

Other arrangements are also possible. For example, the "Super-Strip" can be mounted to a plug-in type printed circuit board. It is then possible to plug this assembly into a master plug board for sophisticated circuits.

Another application is to mount the "Super-Strip" on a mini-box or chassis, and then put a power supply inside with power

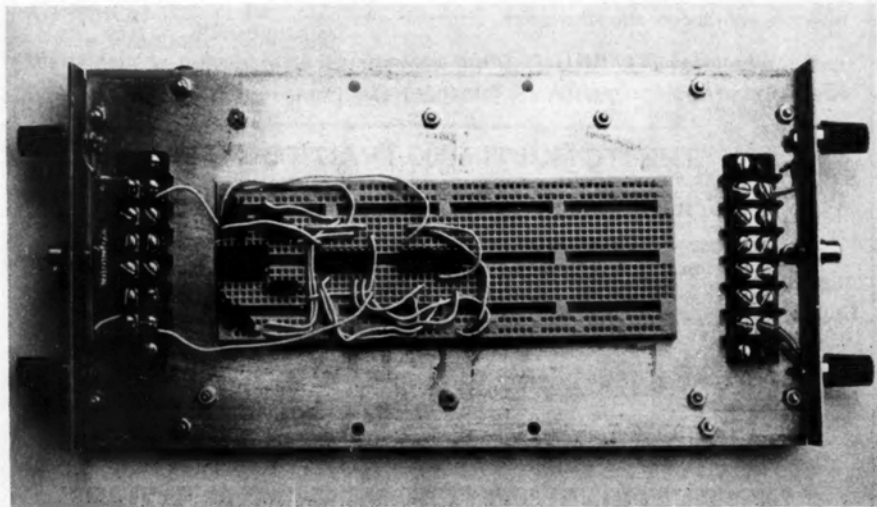
brought out through terminals. This provides a completely self-contained unit.

If you really want to get fancy, add a function generator or pulse generator for signal sources — all in one, neat package.

### Conclusion

Whether you are a serious experimenter or construct projects on rare occasions, one of the solderless terminal blocks described here can make your project more fun to build. Also, if you are not sure a new circuit will work or needs de-bugging, build it first on a "Super-Strip." Once the circuit is functioning properly, you can build it in more permanent form. This approach can save you both time and money and make life a lot easier.

... WB5DEP



*Components are generally mounted in the center, leaving at least four tie-points per device lead for interconnection to other components. Input and output terminals are shown on each end of the breadboard.*