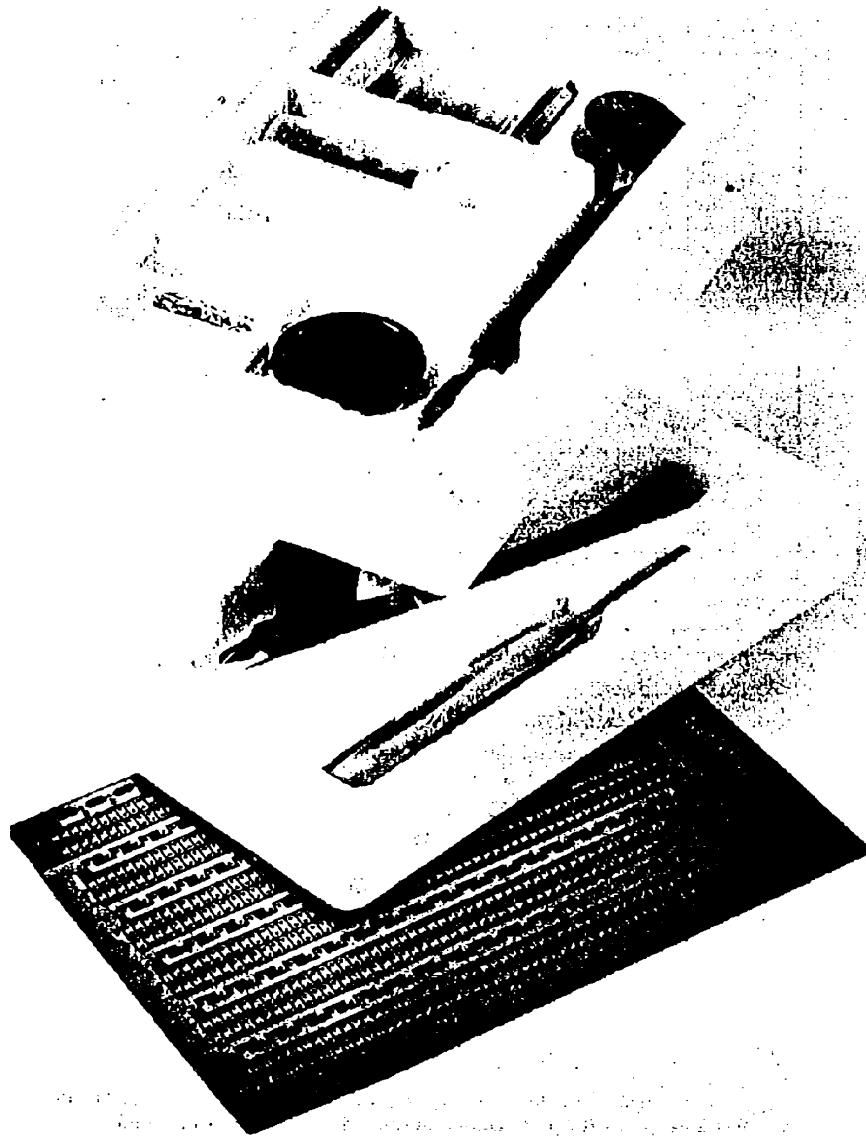




11/11/77

Verowire[®]
 prototyping kit
 instruction leaflet

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Verowire® is a new kind of wiring system which enables prototype circuits to be rapidly and reliably constructed. it allows high packing density to be achieved, irrespective of whether integrated circuits or discrete components or a mixture of both are employed. This kit contains sufficient materials and basic tools to enable you to assess the System's general application. in addition, a miniature soldering iron with tip temperature of 380°C to 400°C (Webber No. 8 bit) will be required, A suitable Iron, Order Code, 22-0176E is available as an optional extra. See page 11.

While the **Verowire** System can be used with a wide range of different types of board, we have introduced a range of Three-Plane High Density D.I.P. Boards, which will enable extremely high packing densities to be achieved. Brief details of these boards are shown on the facing page and full catalogue information is available on request.

it will be noticed that the board layout issuitable for use with discrete components and for D.I.L. devices with 2,54 mm. x 7,62 mm. or 15,24 mm. pitch leads.

In order to achieve maximum packing density whilst maintaining ease and tidiness of wiring, you should give consideration to the placement of components before fixing them in place. With current logic practice, it is wise to place logic integrated circuits such that speed critical leads are kept as short as possible and to group component elements which form functional blocks. It is also wise to produce a wiring schedule such that all common connections can be delenined before you commence wiring when this is not obvious from the wiring diagram.

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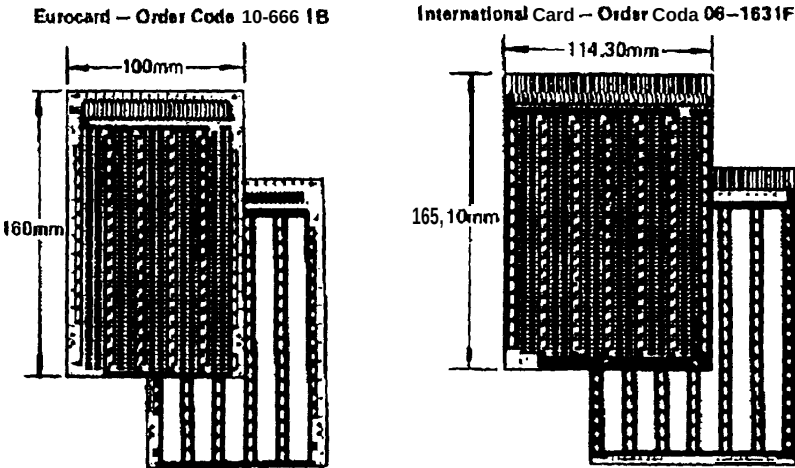
- Description of Hi& Density D.I.P. Boards
- Component Placing and Fixing (using the High Density Board)
- The Wire
- How to use the Verowire® Pen
- Tips and Recommendations
- List of Contents of Introductory Kit
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- Compatible Products

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Verowire® is a registered trade mark of Vero Electronics Limited

SECTION 1 – VERO THREE PLANE HIGH DENSITY BOARDS

These boards contain a double-sided copper pattern which has been specially designed for this system but they can also be used as general purpose breadboards employing integrated circuits or discrete components. The pattern consists of a ground plane (marked GND) which is directly under I.C. devices for screening and/or grounding purposes. The reverse (or wiring) side of the board contains a power rail (marked Vcc) and a secondary (unmarked) power rail. This second power rail could be used as secondary voltage line or for reference ground purposes.



Suitable for use with
64 Way Connector to DIN41612

43 + 43 Gold Plated Contacts
2,54 mm. pitch
Reference Key in Position 37

ORDER CODE	MAXIMUM NO. OF D.I.P.s		COMPATIBLE CONNECTOR
	14 WAYS	16 WAYS	
10-0581 B	30	30	Indirect (64 ways) Order Code: 39-3 704F
06-1831 F	36	36	Modular 43 + 43 way Order Code: 14-1000B
06-0128J*	36	36	Direct 22 + 22 way 3,96 pitch Order Code 15-0204L

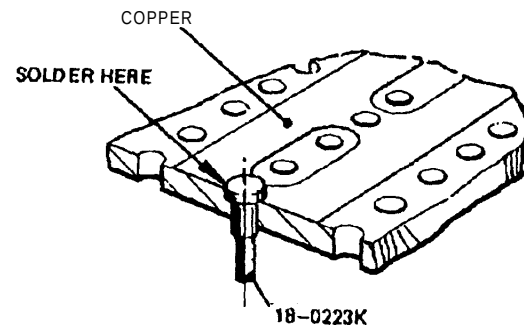
*Dimensions as 06-1 631 F, but with alternative plug-in tongue.

SECTION 2 - COMPONENT PLACEMENT AND FIXING

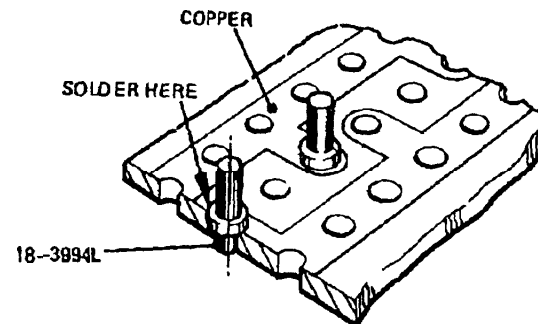
All components should be mounted on the ground (GND) side, i.e. the side with less copper. With practice and planning, it is possible to achieve high component density because the Verowire connection method is in effect a repairable multilayer wiring system. Wiring is "point to point", as in wire-wrapping, via the specially designed comb, which facilitates neat retention of the interconnection wire loom.

2.1. Connections to power planes

Ground plane connections - use Pin 18-0223K



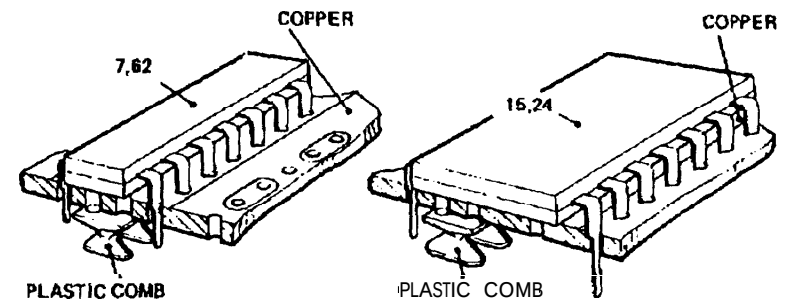
Voltage plane connections - use Pin 18-3994L



These pins should be fitted before any other components.

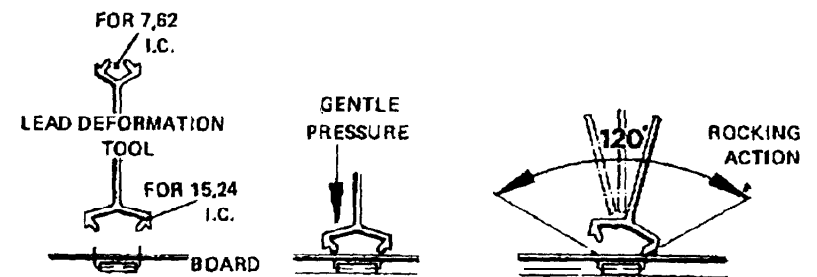
2.2. Dual-in-line integrated circuits

The board will accept 7.62 and 15.24 pitch devices in the following positions:-



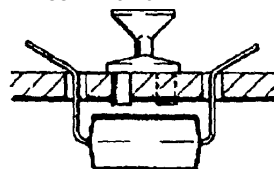
2.3. Lead deformation tool

After the I.C.s have been positioned in the board the assembly should be turned over on to a clean, flat surface. The I.C. leads are then bunt to 120° inclusive using the lead deformation tool, Order Code 79-1733B, as illustrated below. It will be noted that the lead deformation tool is designed to accommodate I.C.s with a pitch between leads 7.62 mm. or 15.24 mm. Because of the novel nature of the design, deformation will always be correct, since the tool has an internal built-in stop.



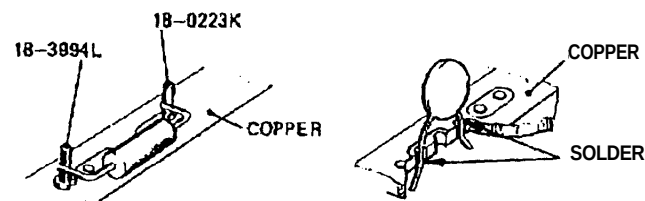
2.4. The wiring comb

Having attached the I.C.s and other discrete components, a number of plastic wiring combs, Order Code 79-1735C, should be fitted between the deformed leads of the integrated circuits. The combs would normally be fitted adjacent to each other, in between the deformed legs of the I.C.s, down the complete length or width of the board? The plastic comb has staggered projections which are a push fit into 1 mm. holes.



2.5. Discrete components

Components such as resistors and capacitors can be attached to the board by soldering them to terminal pins (see Section 2.1.) or alternatively the wire ends can be inserted through appropriate holes in the board and deformed to approximate the angle on the I.C.s. These ends are then cut to suitable lengths so that they can be wired utilising the wiring pen.



2.6. Attaching moulded D.I.P. sockets, etc.

D.I.P. Sockets with solder terminals can be attached in a similar manner to that described in Section 2.3. Although it is not always possible to form these leads as for I.C.s, it is still possible to apply Verowire techniques by omitting the wiring combs so that the wires lay horizontally across the board. To hold the sockets in position, two pins should be soldered to copper pads. The use of moulded sockets is recommended where fast replacement of I.C.s, transistors, etc., is required.

SECTION 3 — THE WIRE

Wire specification	
Diameter of Wire	— 0,15 mm
Insulation	— Self-fluxing Polyurethane*
Insulation thickness	— 0,005 mm
Proof Voltage	— 600V D.C.
Current rating	— 0,030 Amps
Resistance @ 20° C	— 0.8575 Ω /m
Length of wire/spool	— 40 m
Colours	— Pink, Green, Gold Violet

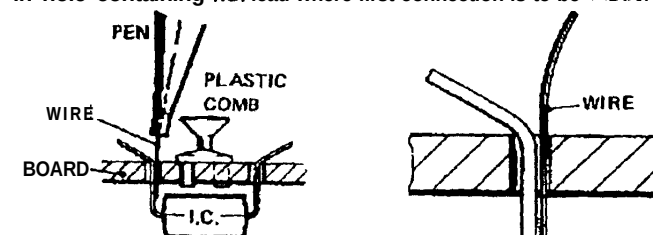
- * Warning: Polyurethane produces toxic fumes when in contact with molten solder.

SECTION 4 — USING THE VEROWIRE® PEN

The Verowire Pen, Order Code 79-1732G, comes to you complete with a spool of wire fitted. Note how the wire is threaded (see Section 5.3).

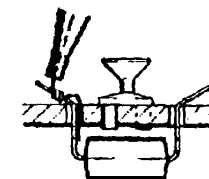
step 1

With approximately 3 mm, of wire protruding from the tip, insert wire in hole containing I.C. lead where first connection is to be made.



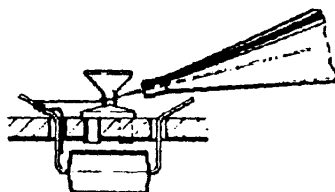
step 2

Wind at least two turns of wire around I.C. lead to make your first joint. Keep the Verowire pen tip as close to the I.C. lead as possible to ensure a tight wrap.



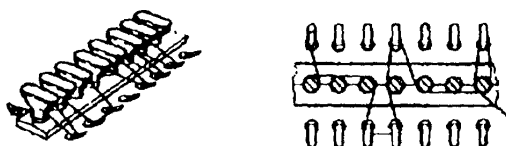
Step 3

Wind two turns around nearest peg on the wiring comb.



step 4

From now onwards you may proceed to route the wire to the appropriate pins of the components to be connected. Use the Wiring Comb as a means of holding and controlling the wire so ensuring a neat layout. Wherever possible, the wire is routed through a gap in the Comb adjacent to the component to be connected. Generally speaking, multiple turns are only required at the start and the end of a number of common interconnection points. However, where connections are being made to terminal pins or the wire ends of discrete components, at least two wraps are recommended.



Your finished board will then have its wiring looms laid neatly either side of the wiring comb. The fact that the wire is also wrapped around the pegs on the wiring comb obviates the need for loom tying.

To complete the joints, a miniature soldering iron with a tip temperature of 380°C to 400°C is required together with resin cored solder. Every point around which the wire has been wrapped should now be soldered. It will be found that reasonable application of the soldering iron and an appropriate quantity of solder will ensure that the polyurethane insulation on the wire melts and an effective solder joint is achieved between the wire, the component terminal and the pad on the board.

SECTION 5 -- TIPS AND RECOMMENDATIONS

6.1. Replacement of components

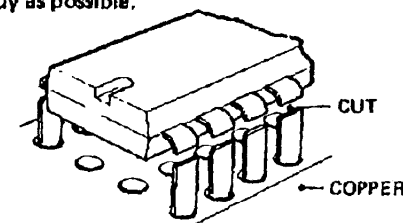
This can be done without disturbing wiring, using the following procedures: —

Step 1

Ensure all component leads are soldered to the copper pads on the wiring side of the board.

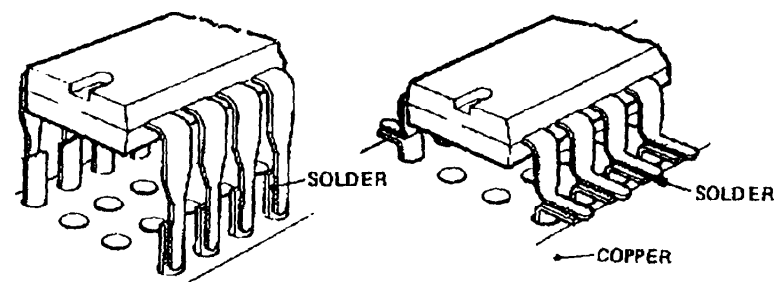
Step 2

Using a pair of side cutters, cut the component leads as near to the component body as possible.



Step 3

Remove the component body and place a new device in the correct position so that the new leads sit over the original leads.



If the height of the replaced component, as illustrated above, is an embarrassment, the original cut leads may be bent down to the surface of the board, enabling the new component, with leads deformed through 90° , to be soldered in position.

Step 4

Solder in place.

5.2. Changing wiring

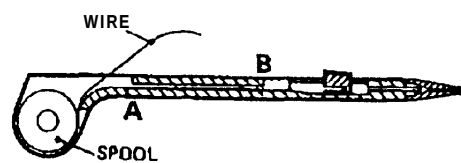
Cut the relevant wire(s) near to the termination(s) and remove, then re-wire as in Section 3.

5.3. Replacing the wire spool in pen

step 1

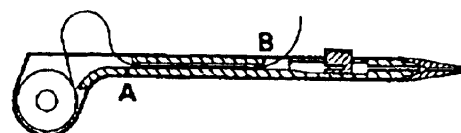
Remove empty spool in the following manner:-

Gently spread spool support flanges. Withdraw spool from retaining pins. Replace with a new reel in the same manner; making sure the wire lays as follows:-



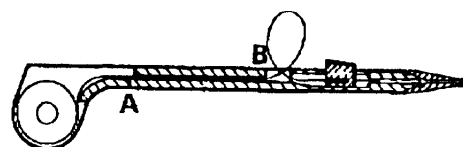
Step 2

Thread wire through hole at point 'A' to exit 'B'.



Step 3

Pass wire through slider/clamp and through the nozzle. If difficulty is experienced the clamp may be removed to assist threading by depressing tongue and sliding towards spool.



Step 4

Then pull the wire taut. The pen is now ready for use.



SECTION 6 - CONTENTS OF KIT

DESCRIPTION	QUANTITY IN KIT	ORDER CODE AS SEPARATE ITEM	UNIT OF SALE
Wiring Pen	1	79-1732G	1
Circuit Board			
interflational	1	08-1631F	1
Euro	1	10-0581B	1
U.S.A.	1	08-0128J	1
Spools of Wire (Pink)	2	79-1737D	
tone fitted to pen)			
(Green)	1	79-1235E	Pack of 4
(Gold)	1	79-1739E	
(Violet)	1	79-1740L	
Lead Form Tool	1	79-1733B	
Inspection Magnifier	1	79-1734H	1
Plastic Wiring Combs	20	79-1735C	100
Half Pin	100	18-0223K	1,000
Shouldered			
Terminal Pin	100	18-3994L	1,000
Pin Insertion Tool	1	22-0230H	1
Cutters	1	74-0477K	1

Recommended soldering temperature: 380°C to 400°C

SECTION 7 - SOLDERING IRON ORDER CODE 22-0176E

Vero now offer a soldering iron suitable for use with the Verowire System. A notable feature is its very low current leakage.

Wattage	~ 15 watts
Voltage	~ 230/240V 50Hzs
Leakage current	~ Less than 1µA (measured under working conditions)
Capacitance	~ 30pF (nominal)
Bit size	~ 2,3 mm

The iron is fitted with 1,8 metres of twin-core mains cable.

SECTION 8 - COMPATIBLE VERO PRODUCTS

Vero Electronics manufacture a complete range of Electronic Packaging Systems. For catalogue telephone Chandler's Ford (04215) 2956.