

New T-H90 Motherboard for the H8* Computer

The T-H90 Motherboard is the basis of a system to upgrade the performance of the H8 computer to commercial standards. New hardware products can be produced for the H8 computer which take advantage of the additional signal lines defined on the expanded bus. Most important, the entire bus is electrically referenced to ground so that it may be passively terminated in order to eliminate line reflections which cause signal distortion.

The original versions of the H8 computer were supplied by the Heath Company with tin-plated motherboard connectors. These connectors are not reliable and sooner or later will cause difficult-to-isolate system problems. These tin connectors should be replaced with gold-plated connectors. The necessity for doing this is now very well established. This is more than reason enough to purchase a new motherboard.

The new Trionyx T-H90 motherboard is completely compatible with the H8 computer in every way and can be used simply as a replacement for the original motherboard. Use of the additional connectors and card locations provided on the T-H90 motherboard is optional. The extra connectors can be added to the motherboard at any time. The power supply parts can be easily removed from the original motherboard and installed on the T-H90. An extra +18 volt filter capacitor can be added, if desired, to increase the +18 volt current output.

Seven additional card slots have been added to the T-H90 motherboard. These have 50 pin connectors which combine signal lines from the original H8 bus with some of the new lines added to make up the T-H90 bus. These connectors are intended to interface the bus with various peripheral devices. Short cards with special connectors, similar to the Heath HA8-8 card, can be used to plug into these slots. The Heath HA8-8 (extended configuration) card, in fact, should be plugged into one of these slots just behind the CPU card.

The additional signal grounding provided on the T-H90 motherboard may be sufficient in itself to provide reliable system operation in many instances. In this case, nothing further need be done. However, the real advantage of the T-H90 motherboard lies in the availability of additional ground connections along the length of each connector for the boards which plug into the bus. Adding additional ground connections from the bus to each plug-in board will increase system reliability by a very large order. An adaptor kit is available to convert the original Heath boards to the full 90 pin bus on the T-H90 motherboard. Small wires are soldered to the Heath boards from pads on the connector adaptor board. Complete instructions are included with each adaptor kit.

Reflections can cause problems on any unterminated bus. If problems persist after each of the plug-in printed circuit boards are well grounded on the bus, a terminator card should be added to the last connection slot on the bus. Ideally, both ends of the bus should be terminated. A bus termination network has been included on the new Trionyx Z80 CPU board for the H8, which should be located at the front of the bus, immediately behind the front panel board.

Finally, the bus drivers on each card must have the capability of driving the terminated bus. If the bus drivers cannot drive a terminated bus, neither can they drive an unterminated bus. This point is very important. An unterminated bus presents an A-C load of the same impedance as the bus terminations. Inability to drive this load will result in distorted signals on the unterminated bus. It is also important that the bus receivers do not load the bus. Trionyx Electronics, Inc. will soon announce tiny bus driver and receiver modules for the original H8 cards which will plug into the sockets for the present integrated circuit bus drivers and receivers.

* H8 is a registered trademark of the Heath Company.

GROUND CONNECTOR KIT

for the

T-H90 MOTHERBOARD

Kit, GC-TH90 - - - \$10.00 each, postpaid

Each kit contains sufficient material to add ground connections to as many as 6 printed circuit boards:

- 12 - Individual Pin Connector Assemblies
(Insulated pin connectors with wires attached)
- 1 - 25 Pin Gold Connector Strip
(Cut single pins to install at motherboard ground locations)

Complete Instructions Included

The GC-TH90 Ground Connector Kit provides an extremely simple and very effective method of grounding the printed circuit boards which plug into the T-H90 motherboard for the H8* computer.

The Ground Connector Kit consists of pre-wired, insulated pin connectors which are soldered to ground points on the various printed circuit boards and individually plug on the ground pins provided on the motherboard auxiliary ("B") connectors. The wires on the pin connectors are cut to the proper length before soldering to the printed circuit boards.

The ground connectors will plug on either the "B" connector ground pins or individual ground pins installed in place of the "B" connectors on the motherboard. An average of two ground connectors will be used for each printed circuit board.

The GC-TH90 Ground Connector Kit is used in place of the T-H90 PC Board Connector Expansion Kits when the motherboard "B" connectors are used only to provide ground connections for the printed circuit boards. The Connector Expansion Kits are necessary to use the additional bus lines provided on the T-H90 motherboard.

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TRIONYX ELECTRONICS, INC.
P.O. Box 5131, Santa Ana, CA 92704

T-H90 MOTHERBOARD

Fully Assembled	-	-	-	-	-	-	\$250.00
Heath Equivalent, Assembled	-	-	-	-	-	-	175.00

The new T-H90 motherboard for the H8* computer is an exact replacement for the original Heath H8 motherboard.

No modifications whatever are required to use the Heath H8 printed circuit boards with the T-H90 motherboard.

The center-layer ground plane on the T-H90 motherboard provides significant improvement in the signal transmission characteristics of the bus, without the need for additional ground connections to the bus.

Additional ground connections to the bus can be made using either the T-H90 pc board connector expansion kits or the new GC-TH90 ground connector kit. The addition of ground wires or additional connectors to the printed circuit boards is completely optional.

The T-H90 motherboard can be used simply as a replacement for the Heath H8 motherboard, making use of the gold connectors and the center-layer ground plane.

The T-H90 motherboard also has many advanced features that can be implemented individually at any time to transform the H8 computer into a very advanced machine.

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TERMINATION CARD - T-H90 Motherboard

The termination card for the T-H90 motherboard for the H8 computer is designed to plug into both the "A" and "B" connector pairs at the last position (P10) on the bus. The termination card will electrically terminate all lines on the bus at this position. Prices for the termination card are as follows:

TC-TH90	Kit	\$29.00
TC-TH90	Assembled	39.00

Recent tests have shown that the center ground plane on the T-H90 motherboard, by itself, provides a significant improvement in the signal transmission characteristics of the bus. The termination card and the additional ground connections on the second ("B") connector will not be needed with the motherboard, in most cases.

The auxillary ("B") connectors need not be installed on the H8 printed circuit board modules until it is desired to use the additional bus signals on the T-H90 motherboard. Installing these connectors simply to use the additional T-H90 motherboard ground connections will, however, provide a increase in the margin of reliability already obtained with the ground plane.

The termination card for the T-H90 motherboard has been designed to not only electrically terminate the bus, but also to configure the bus on an individual basis between the three connector types ("A", "B" and "C"). The bus must be configured for some of the new product options which will soon become available for use with the motherboard. The termination card will be necessary to configure the bus when using these new boards.

The bus terminations, themselves, will be "split" type terminations chosen to match the characteristics of TTL drivers, while terminating the bus in its characteristic impedance. This type of termination is standard in the computer industry and is far superior to so-called "active" terminations, which are simple pull-up resistors, which do not properly terminate on the bus.

The TC-TH90 termination card is a dual-purpose bus termination and connector configuration card. The connector configuration options can be used without installing termination resistors on the card. The termination resistors will require heavy-duty drivers on the bus. This means that the "LS" type TTL bus drivers on each printed circuit board plugged into the bus will have to be replaced with "S" type TTL bus drivers.