OPERATING AND SERVICE MANUAL SUPPLEMENT

SUPPLEMENT FOR 10529A LOGIC COMPARATOR

Programmable Socket Card 10529-60014 Series 1424A

For use with Logic Comparator Operating and Service Manual 10529-90005.

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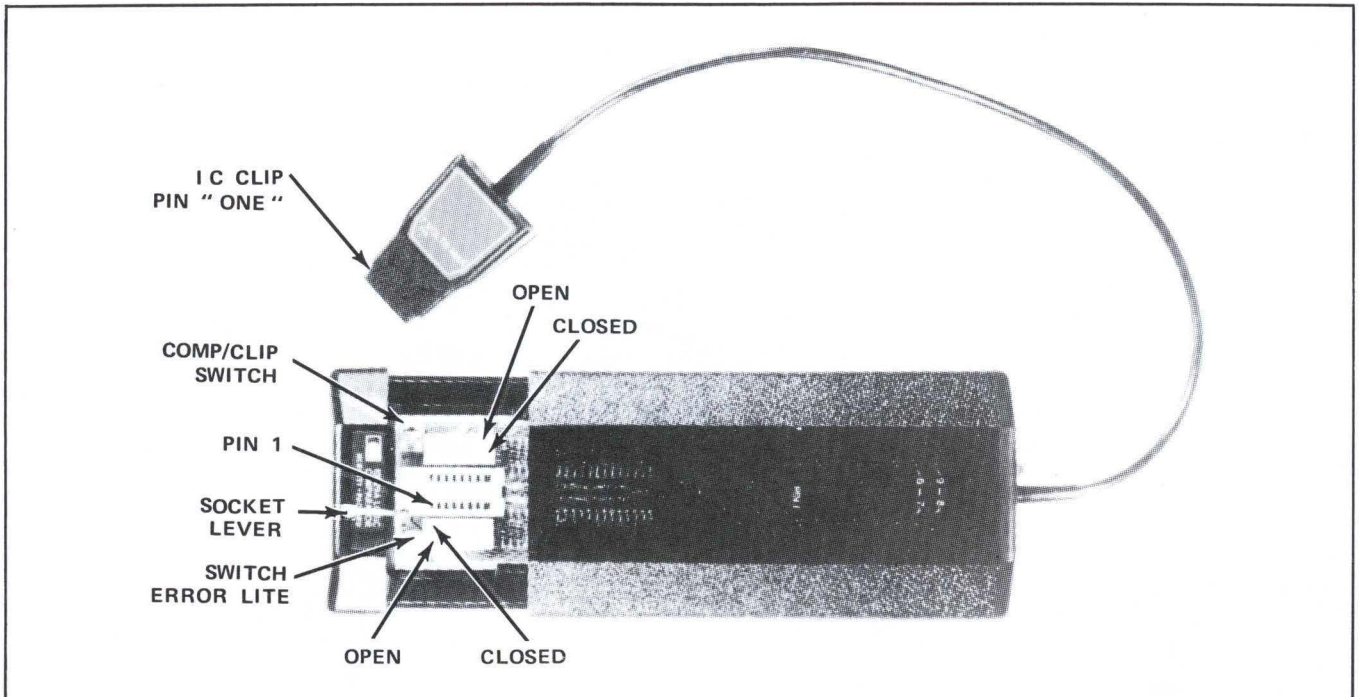
Figure 1. Socket Card



INTRODUCTION

This supplement covers specifications, operating instructions, theory, and service information for Programmable Socket Card 10529-60014. Use this supplement with the 10529A Operating and Service Manual (part number 10529-90005).

SPECIFICATIONS

The following specifications change when the socket card is used with the 10529A Logic Comparator. All other specifications are as listed in Table 1-1 of the 10529A manual.

Input Threshold:
1.8 volts nominal, TTL or DTL compatible.

Sensitivity:
Error Sensitivity: 300 nanoseconds, errors greater than this are detected and stretched to at least 0.1 seconds.

DESCRIPTION

The 10529-60014 Programmable Socket Card extends the usefulness of the 10529A Logic Comparator by allowing rapid test set-ups for seldom used IC's. The socket card also provides a Logic Clip function by displaying the status of each of the 14 or 16 pins of an IC under test.

Programming for a specific IC is easily accomplished. Two different methods are available. First the socket card included with the Comparator is inserted in the Comparator drawer. Outputs of the particular IC to be tested are selected via 16 miniature switches which tell the comparator which pins of the reference IC are to be allowed to respond freely. The reference IC is then inserted into the socket and locked into place. Any new IC may be set up in seconds. Alternatively, if specific IC types are to be tested repeatedly, the reference IC may be soldered into one of the reference cards provided with the Comparator. The reference card is programmed in minutes by opening the connections between the test and reference IC's outputs and solder bridging Vcc and ground. The socket card automatically seeks Vcc and ground. Ten blank

reference cards and the socket card are included with each Comparator.

The socket card also provides a Logic Clip function. In addition to the display of the instantaneous states of the 14 or 16 pins of the IC in the circuit via the Comparator's 16 LED's (one per pin), the Comparator-Clip also provides stretching on each pin. Thus intermittent highs and lows of 300 nanoseconds or longer may be detected. (See Logic Clip Operation.)

All operating power for the logic comparator is drawn from the circuit under test through the IC clip. No batteries or line power is used. The reference IC card has solderable connections to provide operating power to the comparator from the circuit being tested. The programmable socket card powers the logic comparator from the circuit under test by automatically locating Vcc and ground pins of the IC. Integrated circuits in the logic comparator are low-power TTL units to keep power consumption low.

Before the comparator is used to test an IC in operating equipment, one reference IC must be installed on a 10529-20005 reference IC card, or into the reference socket of the programmable socket card 10529-60014. The reference IC must be the same type as the IC to be tested, and a known good IC.

OPERATION

The following procedure describes how to use the Logic Comparator with the Programmable Socket Card.

Logic Comparator Operation

a. Pull drawer out of comparator case until drawer stops are reached - then put socket board in opening (see Figure 1 for correct position of socket card). Push drawer back into comparator case. Set the COMP/CLIP switch to the COMP position.

b. Check location of Pin 1 of the reference IC and match it to Pin 1 on the socket card (see Figure 1). The socket lever must be put in the vertical position while installing the IC in the socket. Put reference IC pins into the correct holes of the socket. To lock the

IC into the socket, push the socket lever into the horizontal position.

c. Identify the output pins of the reference IC. Set all output pin program switches to the open position (away from the socket). Place all other switches to the closed position (towards the socket).

d. The reference IC is now ready for use in the comparator.

e. Put the IC connector clip on the IC to be tested. Be sure to position the IC connector clip pin 1 index mark with pin 1 of the IC to be tested (see Figure 1).

f. The compartor "ON" light should illuminate.

g. If any of the 16 LED's light, the logic levels at that pin of the reference IC and the IC being tested are different. Since the reference IC is "known good" the fault is in the IC being tested.

Logic Clip Operation

The following is the procedure for using the Logic Comparator as a Logic Clip:

a. Pull drawer out of comparator case until drawer stops are reached - then put socket board in opening (see Figure 1 for correct position of socket card). Push drawer back into comparator case.

b. Set the COMP/CLIP switch to the CLIP position.

c. Set all program switches to the open position (away from the socket).

d. Put the connector clip on IC to be tested. Be sure to position the IC connector clip pin 1 index mark with pin 1 of the IC to be tested.

NOTE

If the SWITCH ERROR light on the Socket Card illuminates, check that all switches are set to the open position. The light ON indicates a short between Vcc and common through one of the switches.

e. The comparator "ON" LED should illuminate. The 16 LED's now display the "high" and "low" logic levels of the corresponding IC pins. An "ON" LED

represents a logic "high" while an "off" LED represents a logic "low". Positive pulses will be stretched and displayed as an "ON" LED for a minimum of 50 ms. Negative pulses will not be stretched. If a pin is pulsing, the corresponding LED will flash "ON" and "OFF" or appear as a static "High" depending on the frequency. These two conditions are differentiated in step "f".

f. With the COMP/CLIP switch set to the COMP position, all "low" logic levels will be displayed as "ON" LED's and all "high" logic levels will be displayed as "OFF" LED's. Negative pulses will be stretched and displayed as "ON" LED's for a minimum of 50 ms. Positive pulses will not be stretched. If a pin is pulsing, the corresponding LED will flash "ON" and "OFF" or appear as a static "low" depending on the frequency. These two conditions are differentiated in "e" above.

Failure Detection

The following procedure is useful in determining the nature of the failure detected by the comparator:

There are two general types of Logic Circuit failure: a static failure and a dynamic failure.

The static failure is the result of a node continuously held high or low. This is caused by an output gate failure or the failure of an input gate tied to the node. Other static failures occur when the node is loaded down by circuits that are not intended to draw current from that node. These faults are typically caused by problems such as a solder bridge or external wiring faults.

The dynamic failure is typified by a node with signal activity that does not follow some prescribed truth table. This type failure is normally identified by a deviation of IC operation from the truth table. Two other possibilities however must be considered before any IC's are replaced: the failure of an input gate on the node and the unwanted connection to the node.

Use the following procedure to determine the nature of the failure.

a. Use the comparator as explained above (see section Logic Comparator operation). Note all failed pin numbers.

b. Use the comparator with socket card as a Logic Clip and observe failed pin numbers of step a. All LED's that are off represent pins that are stuck low indicating a probable static type failure. All that are pulsing or flashing have pulse activity which may indicate a dynamic failure. All pins that are high may be high or have pulse activity.

To differentiate between the last two states, set the COMP/CLIP switch to COMP. All failed pins that are now pulsing have pulse activity (which may indicate a dynamic failure), while all others are high.

THEORY OF OPERATION

Programmable Socket Card.

Figure 2 is a schematic diagram of the socket card. The card provides the following functions:

1) Connects Vcc and common of the test IC with the corresponding Vcc and common pins of the Comparator.

2) Permits comparator operation in the Logic Clip mode as well as the normal comparator mode. The B input line with the highest voltage will be tied to the Vcc bus through its forward biased diode. The B input line with the lowest voltage will be tied to the Com Bus through its forward biased diode. S3 is used to select either Clip or Comparator mode of operation. In the Clip mode CR19-22 and CR40-51 are tied to the common bus through DS1. DS1 provides protection against operation where an S1 or S2 switch is closed, applying a positive voltage from the B line to the A line, forward biasing the diode. When S3 is in the Comparator mode, CR19-22 and CR40-51 are tied to the Vcc bus.

When S3 is in the Clip mode CR19-22 and CR40-51 are tied to the common bus through DS1. S1 1-8 and S2 1-8 provide a means of paralleling the Ref IC inputs with those of the IC under test. Open switches enable comparison of the Reference and test IC.

SERVICE INFORMATION

Table 1 lists replaceable parts for the Programmable Socket Card. A component locator and schematic diagram are shown in Figure 2.

Table 1. Replaceable Parts

Ref. Desig.	HP Part No.	Qty.	Description	Ref. Desig.	HP Part No.	Qty.	Description
DS 1	2140-0420	1	LAMP	S1S2	3101-1856	2	SW.-PROGRAM
For DS1	1200-0147	1	INS.-NYLON		1200-0542	1	SOCKET-TEST
S3	3101-1857	1	SW.-SLIDE	CR1-51	1910-0047	51	DIODE
					10529-20014	1	BD-BLANK

Part of Figure 2. 10529A Component Locator

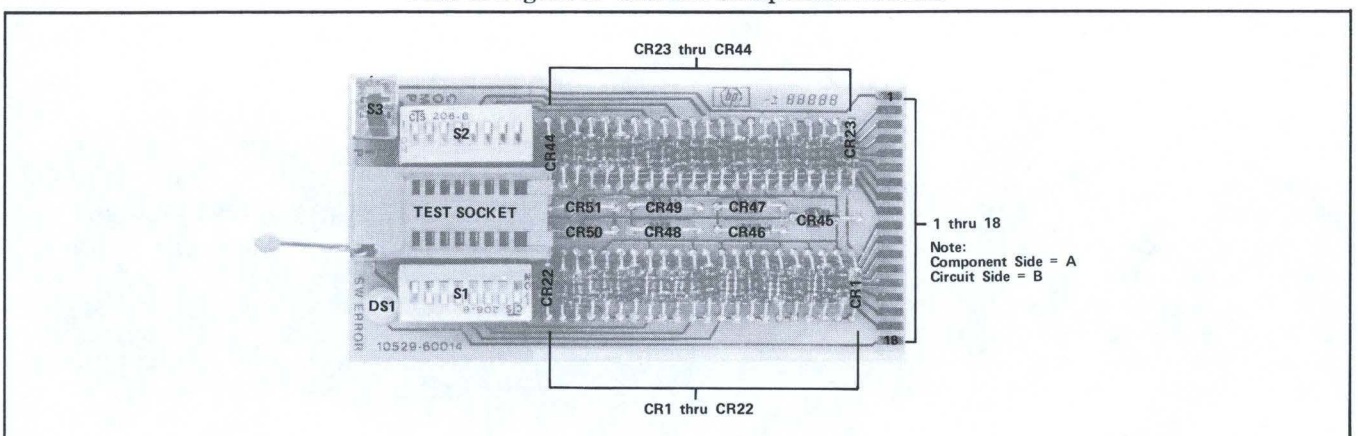
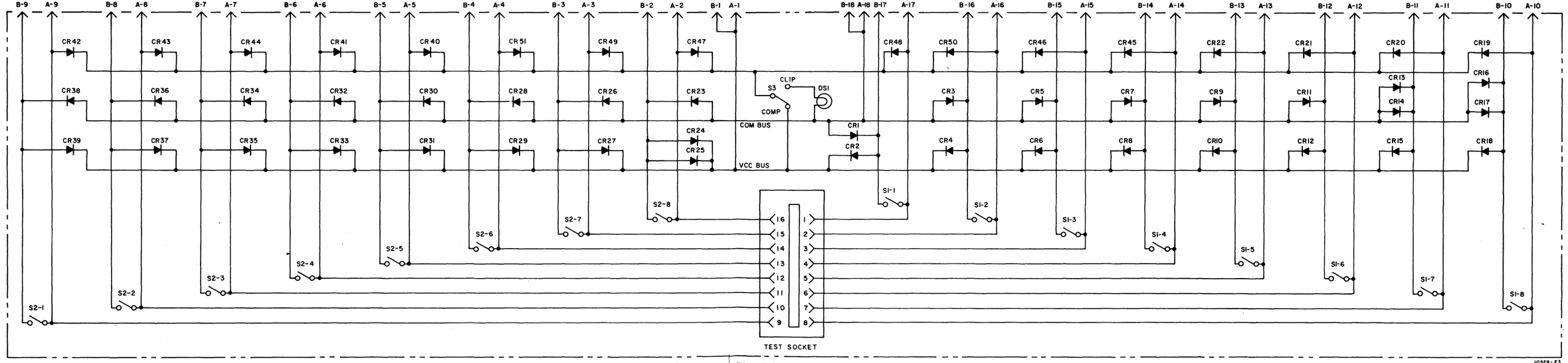


Figure 2. 10529A Component Locator and Schematic Diagram



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