

Instruction

Multiplier/Divider, 193W298A_G01

1.0 GENERAL

This instruction provides basic information regarding the subject card. Refer to the system elementary diagrams for information relating to the overall system operation.

2.0 DESCRIPTION

2.01 This card may be connected up for use as either a four quadrant multiplier or a four quadrant divider. The X input may be applied differentially with +10V max. between X1 and X2 or +3.3V max. between X3 and X4. The Y input must be reference to common with +10V max. at Y1 or +3.3V max. at Y3.

With a differential X input the maximum permissible input voltages with respect to common are X2 = +30V max. and X4 = +20V max.

2.02 Connected as a multiplier (tab 10 to tab 22) the general expression for the product is: Prod. = .1 [(X1-X2) + 3(X3-X4)] X [Y1 + 3(Y3)], where the X's and Y's represents the voltages to common at the respective input tabs as indicated on the functional block diagram. Normally only one of the input voltage ranges would be used and the X input would usually be referenced to common. The product expression is then simplified to:

Prod. = .1(X1) x (Y1), X2 (tab 27) must be connected to common, or Prod. = -.1(X2) x (Y1), where X1 must be connected to common.

2.03 When connected as a divider (tab 22 to tab 3) the general expression for the quotient is

$$\text{Quot.} = \frac{-10 [(Y1) + 3(Y3)]}{(X1 - X2) + 3(X3) - X4}$$

where -10 [(X1 - X2) + 3(X3 - X4)] 0

Again only one input range is normally used and the X input is usually referenced to common simplifying the above expression to

$$\text{Quot.} = \frac{-10 (Y1)}{(X1)}$$

Where X1 is neg. and the X2 tab connected to common.

If the X signal is positive it must be applied to the X2 tab with X1 connected to common and the expression becomes

$$\text{Quot.} = \frac{10 (Y1)}{(X2)}$$

3.0 ADJUSTMENTS

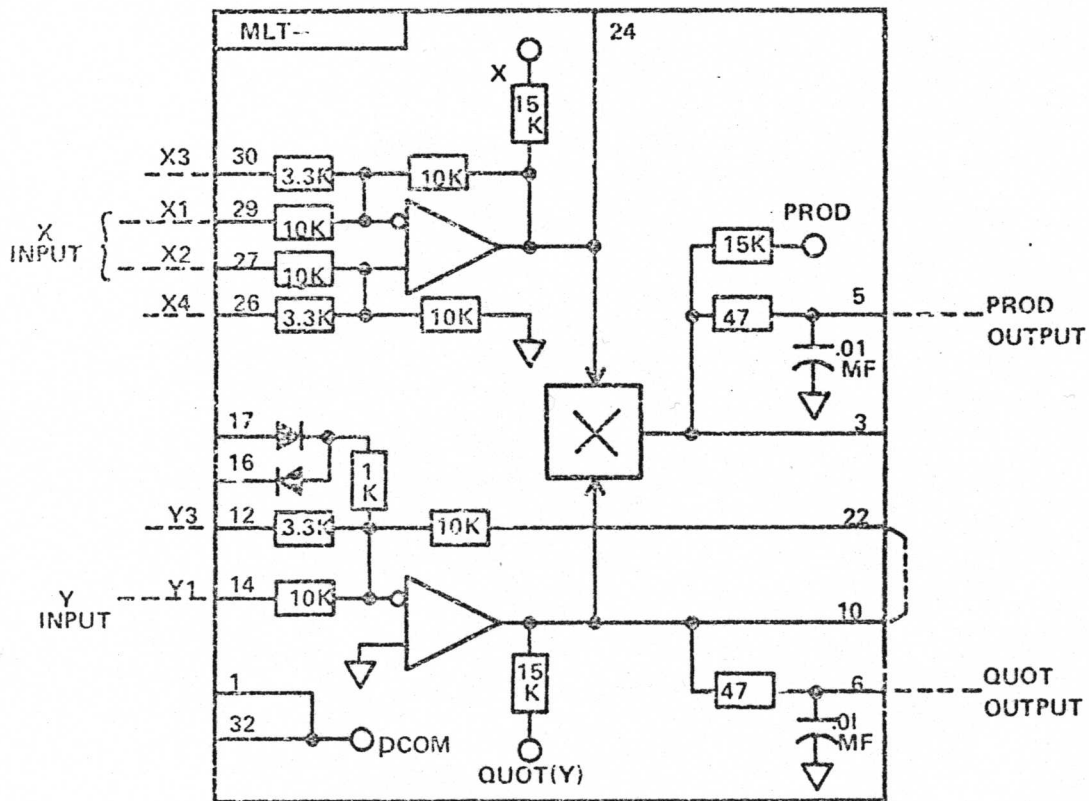
There are no adjustments on this card.

4.0 TROUBLESHOOTING

4.01 With the card connected as a multiplier check for the following performance:

- a) With $X1 = X2 = Y1 = 0$ (connected to common) the output voltage should be less than ± 0.02 volts.
- b) With $X1 = X2 = 0$ & $Y1 = +5V$ the output voltage should be less than $\pm 0.04V$.
- c) With $X2 = Y1 = 0$ and $X1 = +5V$ the output voltage should be less than $\pm 0.04V$.
- d) With $X2 = 0$, $X1 = +5V$ and $Y1 = +5V$ the output voltage should be $\pm 2.5V \pm 0.1V$.

FUNCTIONAL BLOCK DIAGRAM MULTIPLIER/DIVIDER



*) MULTIPLIER CONNECTION. JUMPER TAB 3 TO TAB 22
FOR DIVIDER CONNECTION.