



monitored. If a “phantom trip” occurs due to a faulty *electronic* element, there will be no indication to identify the cause.

There usually are spare binary circuits (notice that some lamp windows are blank in Figure 2 below) that can be used as secondary annunciators alarms. Digital logic philosophy must be followed in wiring spare alarms. Thus, inverters may be needed to get the correct logic (to turn ON a light where a Logic “0” exists. Use **LIVD** card circuits in tandem with the **LINA** card. The **LINA** card below shows four spare locations that are available for “troubleshooting” use.



Fig. 2: LINA card with 4 unused lamps (Row 1, Slot R) on a typical Mark I panel

The *electronic* circuits shown on Sheet 34A of the turbine elementary drawings (See Figure 3 below) control the energization of two important relays: 4EC and its auxiliary 4ECX, shown on the lower right-hand side of this diagram.

***NOTE: At start-up, these two relays must energize and remain energized during all gas turbine operation. If the input logic changes due to a TRIP signal from any binary input, these relays will de-energize and the gas turbine will shut down immediately!***

Refer to your own **4EC** circuitry in your own electrical elementary diagram **Sheet 34A** for more specific applications. Your circuitry may vary from the simplified ones shown herein.

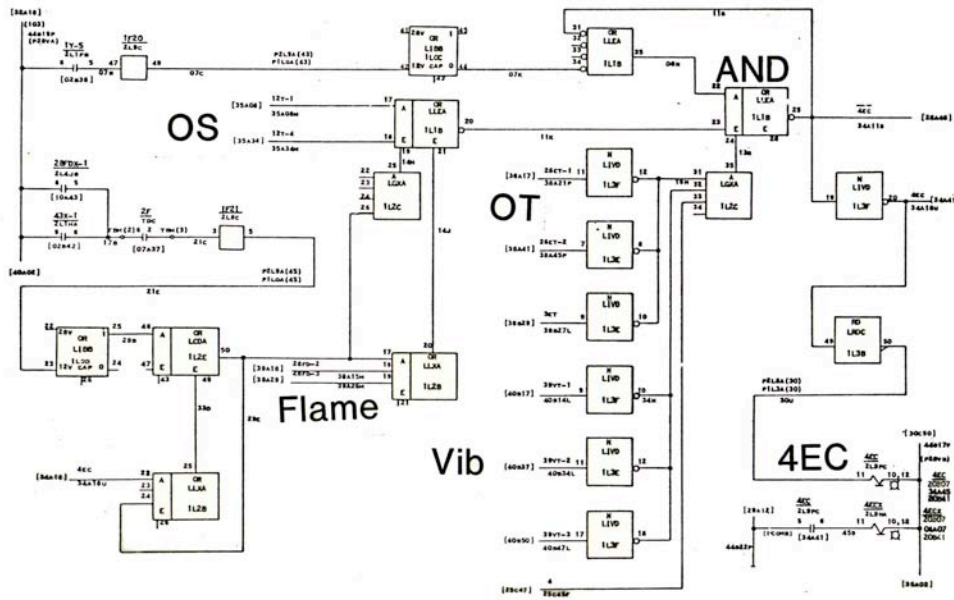


Figure 3: Simplified Master Electronic Protective Circuit for the 4EC and 4ECX relays

A set of normally open (N.O.) contacts of **4ECX** are located in the master protective circuit (a.k.a. the 4s Circuit shown on **Sheet 04A**) that must be **closed** (thus **4ECX** energized) for the turbine to continue to run. Refer to your own **Sheet 04A** and locate the N.O. contacts of **4ECX**.

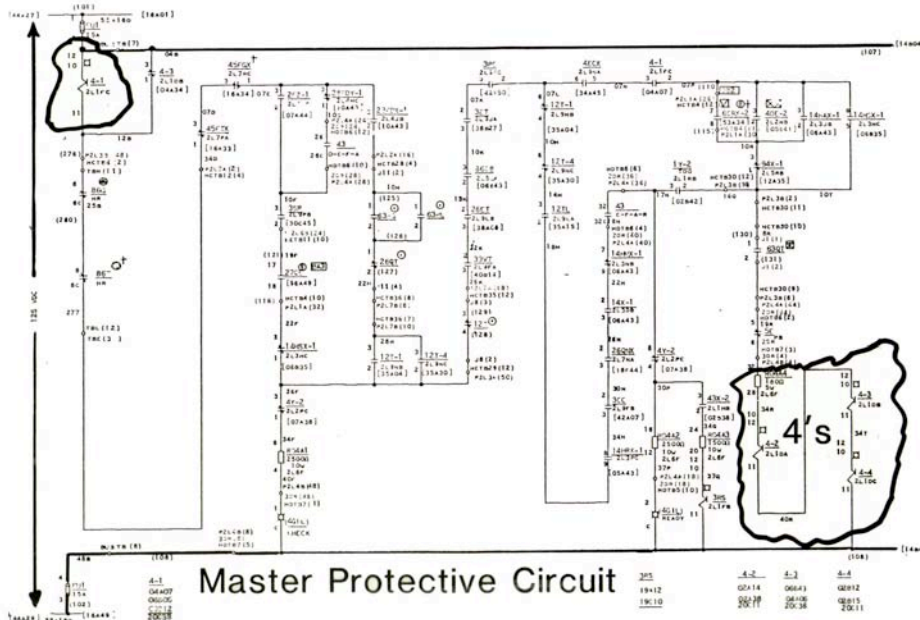


Figure 4: Simplified Electrical Master Protective Circuit the 4s Relays

A spare LINA card (shown in Figure 6) can be installed in a panel spare slot (See Figure 7).

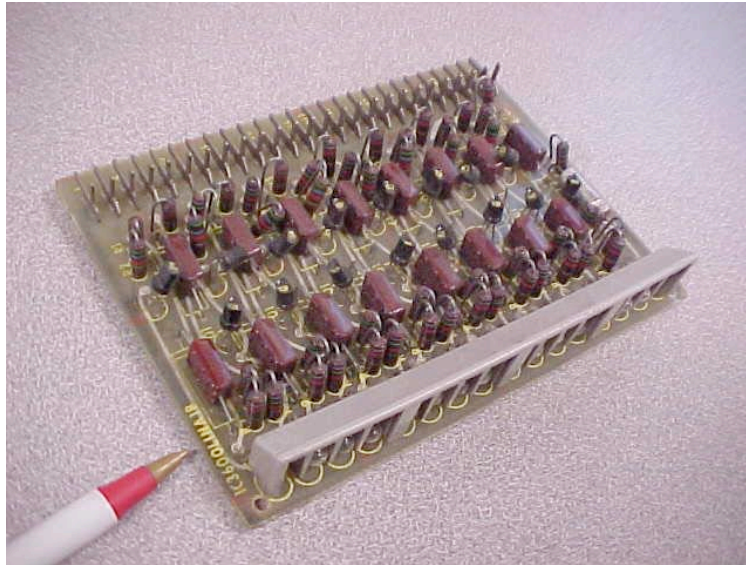


Figure 6: IC3600LINA Circuit Board with 16 Circuits

**Card Type: IC3600LINA**

	<b>Pin</b>	<b>Application</b>
1	1,51	Digital Common
2	27	Power: +12 volts DC
3	3, 7, 9, 11, 13, 17, 19, 21 31, 33, 37, 39, 41, 43, 47, 49	Sixteen available circuits for digital inputs on a new circuit board. Logic "1" lamp <b>ON</b> Logic "0" lamp <b>OFF</b>

**Caution:** Connect only one digital input per pin (one load) shown in line 3 of the chart above.



Fig. 7: Spare Locations for LINA cards in Row 0 (Slots F, G & H) on Speedtronic Panel

Contact Dave Lucier of **Pond And Lucier, LLC** if you have any questions regarding the use of LINA cards for troubleshooting, or if you need technical services on your GE gas turbines. Field

services from qualified controls engineers are available. Engineers can be dispatched to your site on short notice.