



INSTRUCTIONS

PRELIMINARY GEK-24964

MACHINE TOOL CARD

193X552AAGO1, GO2, GO3

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to General Electric Company.

GENERAL  ELECTRIC

INSTRUCTION

GENERAL

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

DESCRIPTION

1. This card employs an Up-To-Speed Circuit and a Signal Level Detector Circuit.
2. Three card versions are available:

The **GO1** version provides an up-to-speed function and three separate signal level detector functions. All four functions have relay contact output with two form-C contact pairs per relay.

The **GO2** version provides the up-to-speed function and one signal level detector function. Each of these functions have relay contact output with two form-C contact pairs per relay.

The **GO3** version provides the up-to-speed function and three signal level detector functions. This group does not contain any relays, but instead provides a 5 volt or 20 volt logic level output for each of the four functions.

The **Up-to-Speed Circuit** provides relay operation (GO1 and GO2 cards) or logic level output (GO3 card version) with LED indication at a percentage of set speed.

The up-to-date speed function is configured and scaled for use with Valutrol* Drives having:

1. $\pm 10V$ SFB signal at top speed
2. SABS signal of -7.73 volts at top speed
3. SR signal in the 4 to 20 volt range at top speed with polarity opposite to the SFB signal polarity.

Normally the SRH signal on the MCC card in the drive is jumpered to common. In drive systems with SR less than 9 volts at top speed, the SRH signal on the MCC card may be applied to tab 30X. In this mode, the balance potentiometer (P1) is inoperative and reference scale adjustments on the MCC card do not affect the up-to speed function.

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The **Signal Level Detector (SLD) Circuit** provides relay operation (GO1 and GO2 card versions) or logic level output (GO3 card) with LED indication when the input voltage exceeds a preset positive and/or negative value.

1. The signal level detector functions may be used with reference signals of 0.1 to 9.8 volt, which are reasonably free of ripple as described in the Signal Level Detector Circuit section.
2. A switch is supplied with each SLD function to provide operation from positive, negative, or non-polarized reference.

OPERATION

Up-to-Speed Circuit

1. SFB (10.0V @ top speed) is applied to tab 28X.
2. Connect SABS to tab 9.
3. SR is applied to tab 29X with the following switch settings.

	SWA				
SR	(1)	(2)	(3)	(4)	(5)
4-13 volts	ON	OFF	OFF	see note 1	see note 2
13-20 volts	OFF	ON	OFF	see note 1	see note 2

NOTE 1

For GO3, a logic level is available at output tab 12X. With SWA (4) OFF the high level is 20 volts open circuit with an impedance of 10K. If SWA(4) is ON, the high level is 5 volts open circuit with an impedance of 2.5K. The logic level is high when off speed. The voltage on 12X is less than 0.1 volt when up-to-speed.

NOTE 2

Normal sensitivity is achieved with SWA(5) OFF. To reduce the sensitivity, change SWA(5) to ON. This has most effect at lower speed. If SRH is used instead of SR, connect SRH to tab 30X and set the switch as follows:

(1)	(2)	(3)	(4)	(5)
OFF	OFF	ON	see note 1 above	see note 2 above

In this mode the balance potentiometer is inoperative.

For proper operation, the voltage on TP1 must be adjusted to less than 0.1 volt with the BAL potentiometer. This must be done after the reference scale potentiometer is properly adjusted on the MCC and should be done at top speed.

For GO1, GO2, the relay contacts on tabs 18X, 16X, 17X and 14X, 12X, 13X may be connected as required in the system. **Note that the relay MTA is picked up when off speed.**

LED A will indicate off-speed.

SIGNAL LEVEL DETECTOR CIRCUIT

1. Connect the signals being detected to the REFB, REFC, or REFD inputs (tab 13, 12 or 11). Only channel B is available on GO2 cards.
2. The switches should be set for the desired mode of operation for each respective channel.

	SWB			SWC			SWD		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Positive REF	OFF	ON	*	OFF	ON	*	OFF	*	ON
Negative REF	OFF	OFF	*	OFF	OFF	*	OFF	*	OFF
Non-Polarized	ON	OFF	*	ON	OFF	*	ON	*	OFF

* Connect the relay contacts on GO1, GO2 cards as required in the system. On GO3 cards, logic levels outputs are available on tab 19, 24X and 27. With SWB(3), SWC(3) and SWD(2) OFF, the logic level is 20V open circuit through 10K. With the respective switch for any output closed, the logic relay level is 5 volt open circuit through 2.5K.

The operating points may be set by measuring the voltages on TP2, TP3, TP4 respectively for the three channels MTB, MTC and MTD (GO2 does not have channels MTC and MTD) when the references are at the desired level.

For operation: set pots level B, level C, and level D to get ± 10.0 volts at TP2, 3 and 4 respectively when REFB, REFC and REFD are at the level where operation is desired. The first stage is inverting so the test point voltage will be opposite in polarity from the reference. The nominal range for operation possible is 0.1 to 10.0 volts.

Actual operation may be slightly off this point due to resistor tolerances, especially for non-polarized or positive operation which requires the operation of second amplifier. Setting for 0.1 to 9.8 volts is possible in the worst case.

The reference input impedance is 49.5K with a nominal time constant of 5.75ms.

To avoid chattering, it is essential that the peak-to-peak ripple voltage measured at TP2, TP3 or TP4 be less than the hysteresis voltage band at the pick-up level. The hysteresis band is approximately 11% in width and signals after the internal filters must be clean enough to prevent chattering.

OPERATING CONDITIONS

This card is capable of operating within the performance described under Description and Operation sections while exposed to the following conditions:

DC supply: $\pm 20 \pm 0.1$ volts.

1. Power supply requirements:

GO1	+60MA	-200MA
GO2	+40MA	-120MA
GO3	+60MA	-75MA

RELAY CONTACT CHARACTERISTICS

1. The relays are sealed.

2. High Current Level:

Make & break at 0.25 amps resistive load at 115V AC
or 0.85 amps at 24V DC.

Pilot duty: 0.15 amps at 115V AC

Low Current Level: 100 microamps @100MV

TROUBLESHOOTING

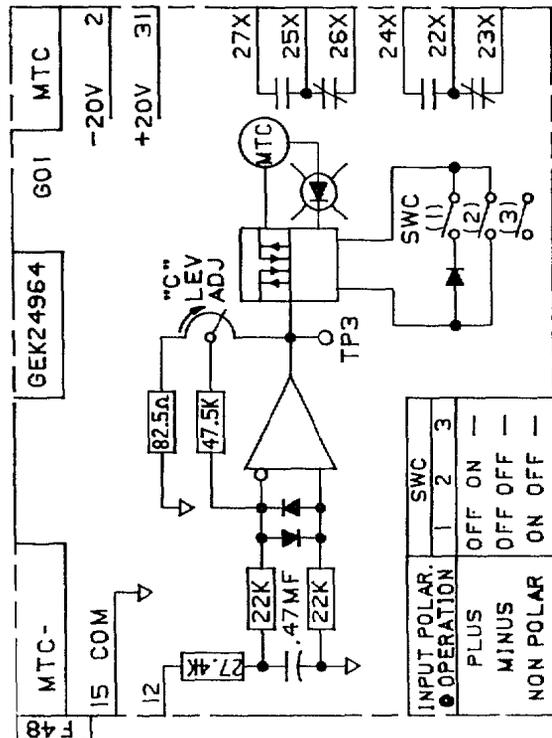
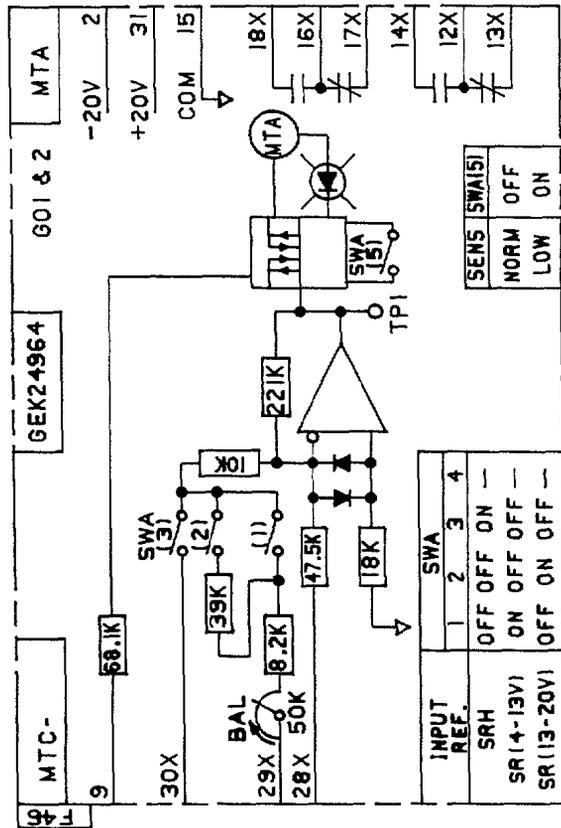
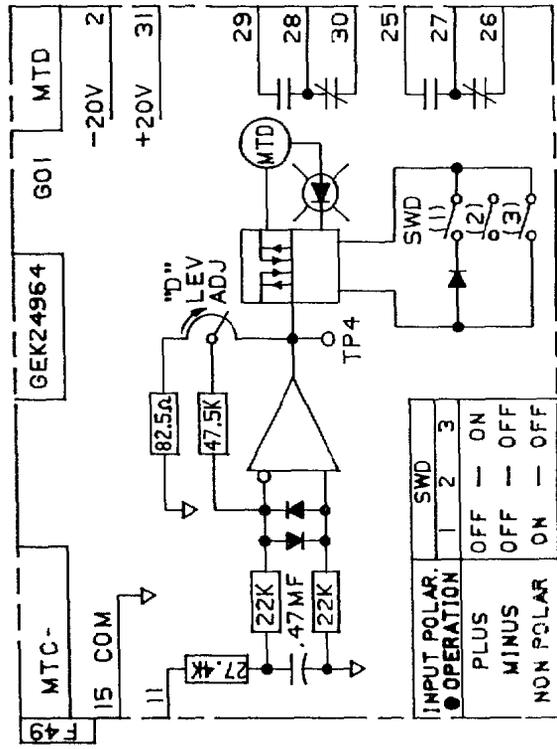
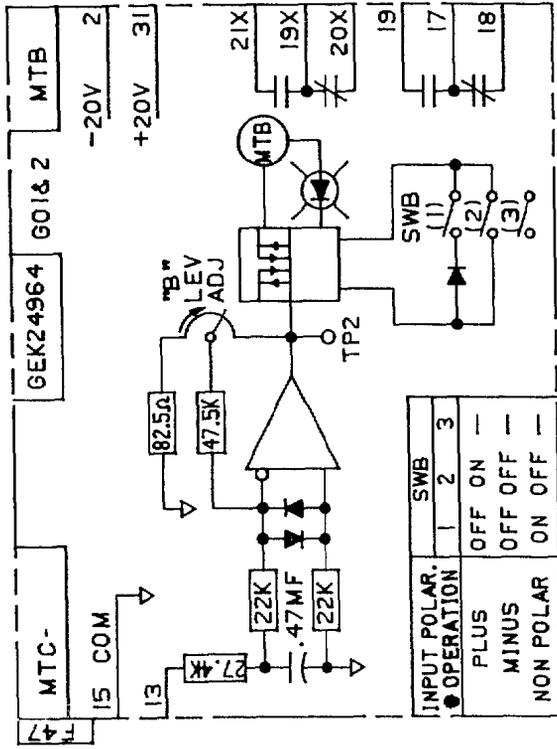
Check for:

- a) Proper input connections.
- b) Proper polarity setting as described in Operation Section.
- c) Proper adjustments as described in Operation Section.

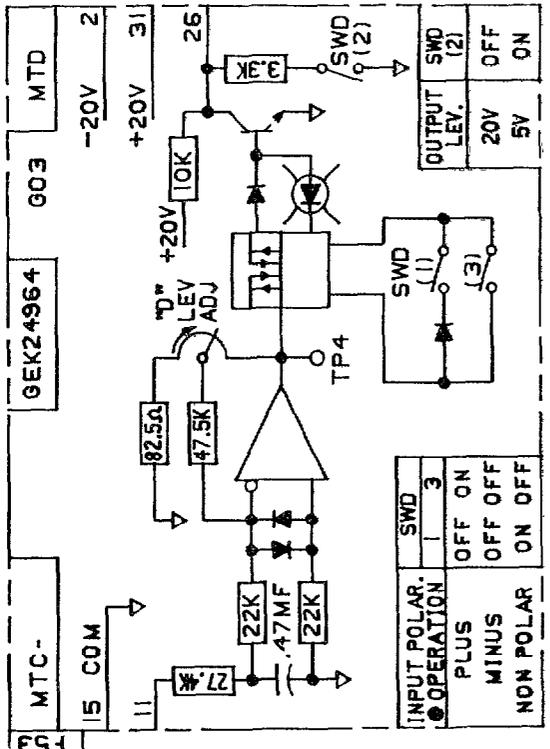
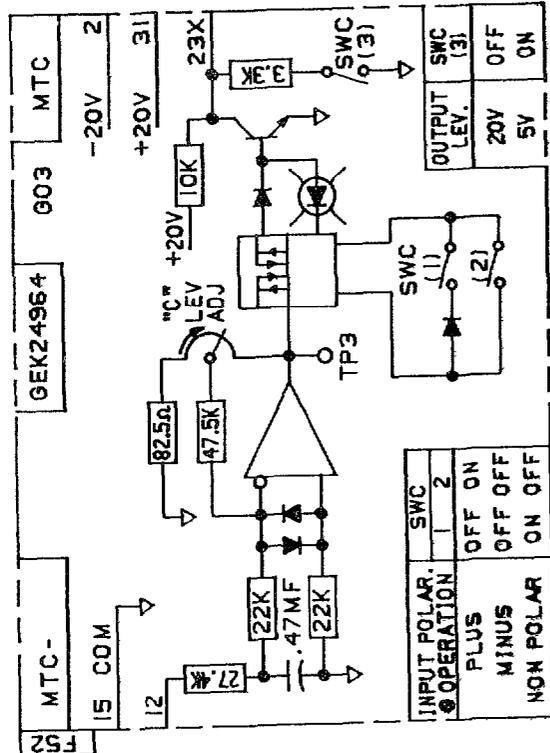
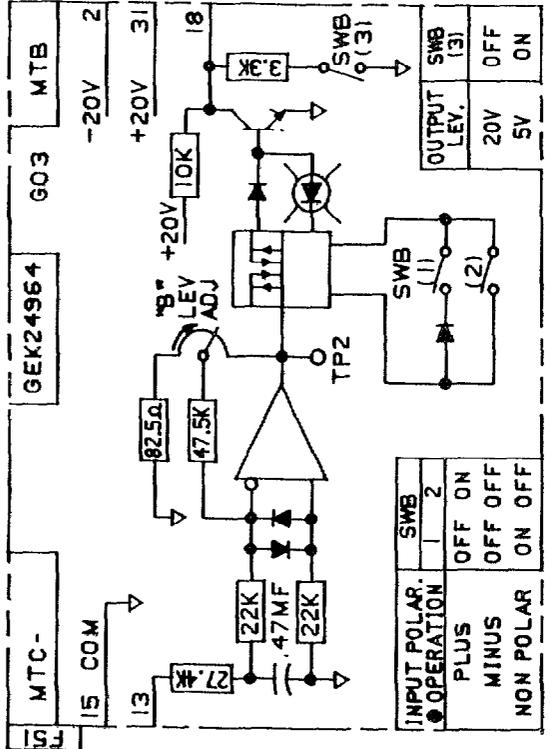
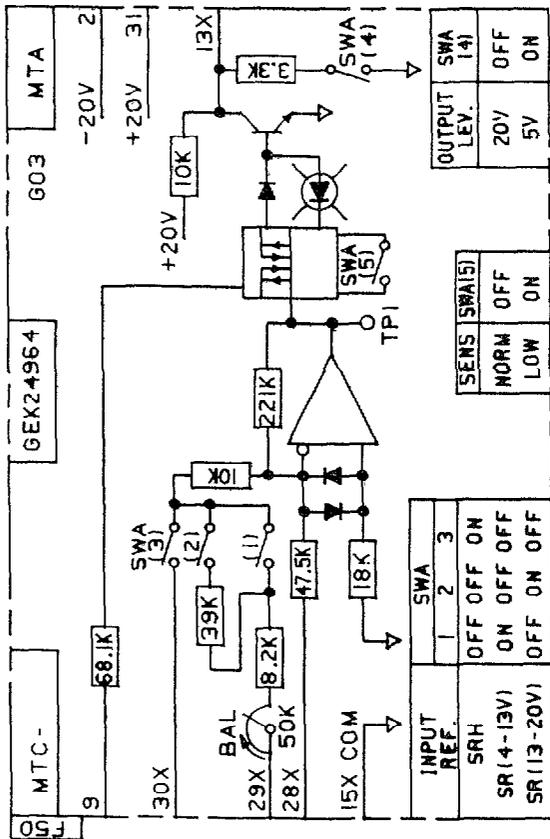
Check for actual operation of the relay interlocks on the GO1 and GO2 card versions.

If card failures are experienced, check for:

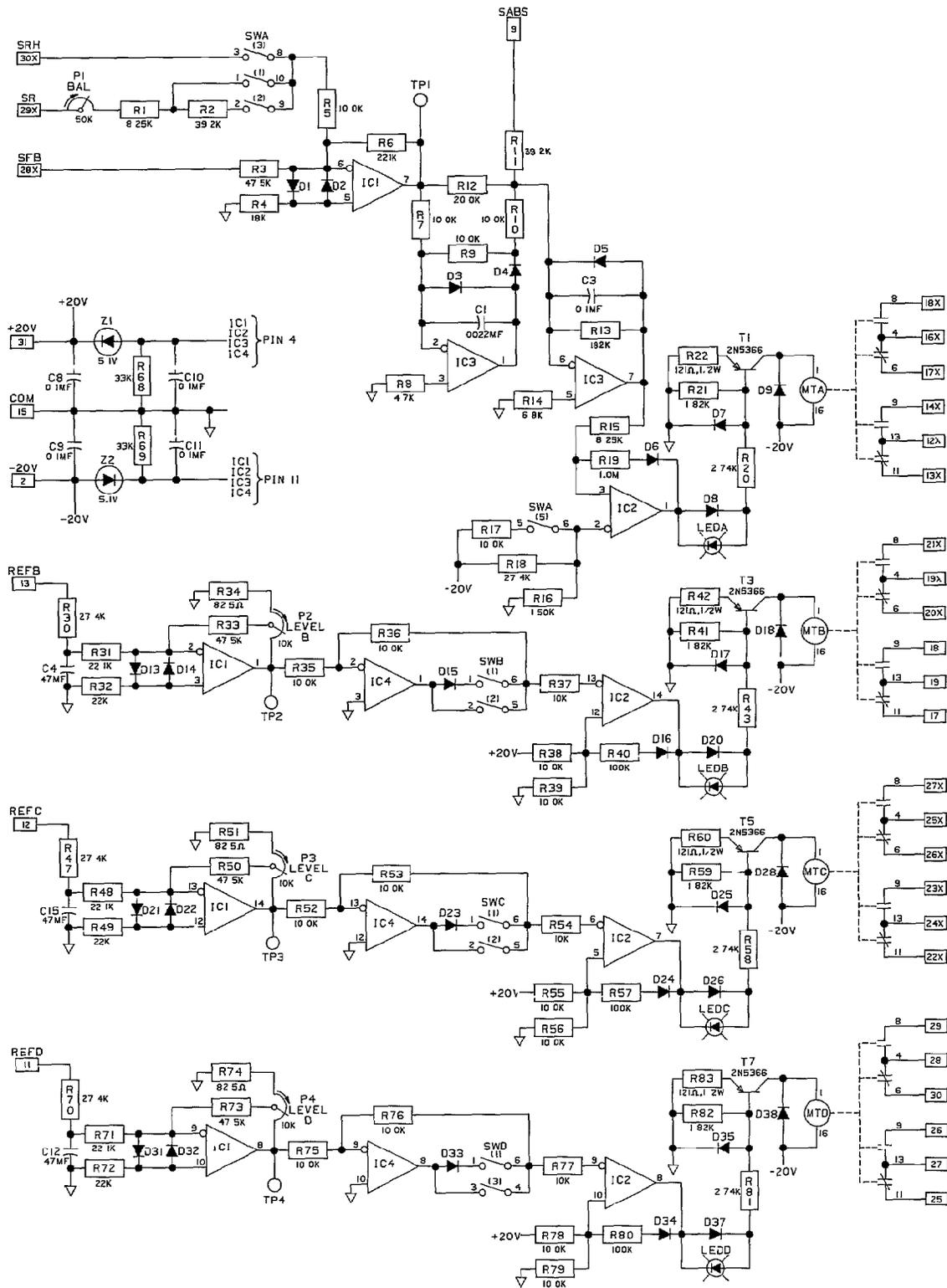
- a) Excessive voltage (above $\pm 40V$) at tabs 11, 12 and 13.
- b) Excessive relay interlock load.
- c) Excessive voltage transients on relay interlock wires. If an interlock is used in another relay coil circuit, the coil should be suppressed. Long wire runs to the relay interlocks should be avoided.
- d) Excessive ripple on the incoming reference signals as described in Operation Section.



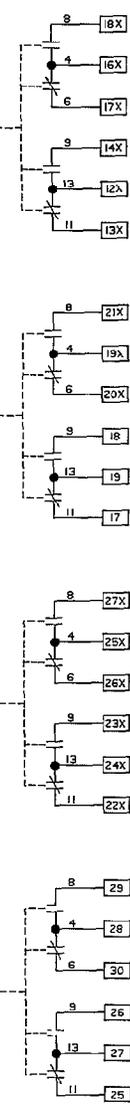
FUNCTIONAL BLOCK DIAGRAMS
GO1 and GO2

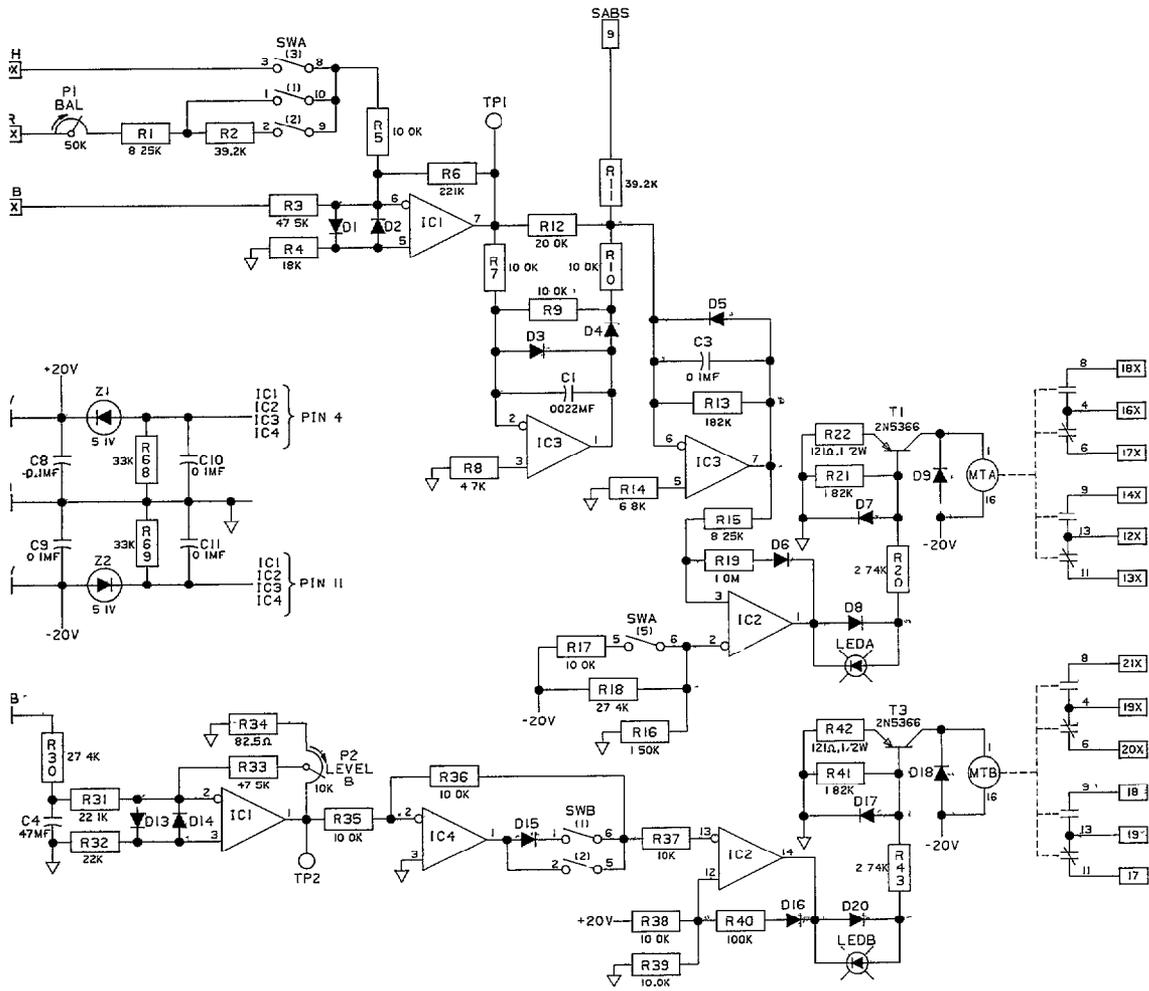


FUNCTIONAL BLOCK DIAGRAMS
GO3

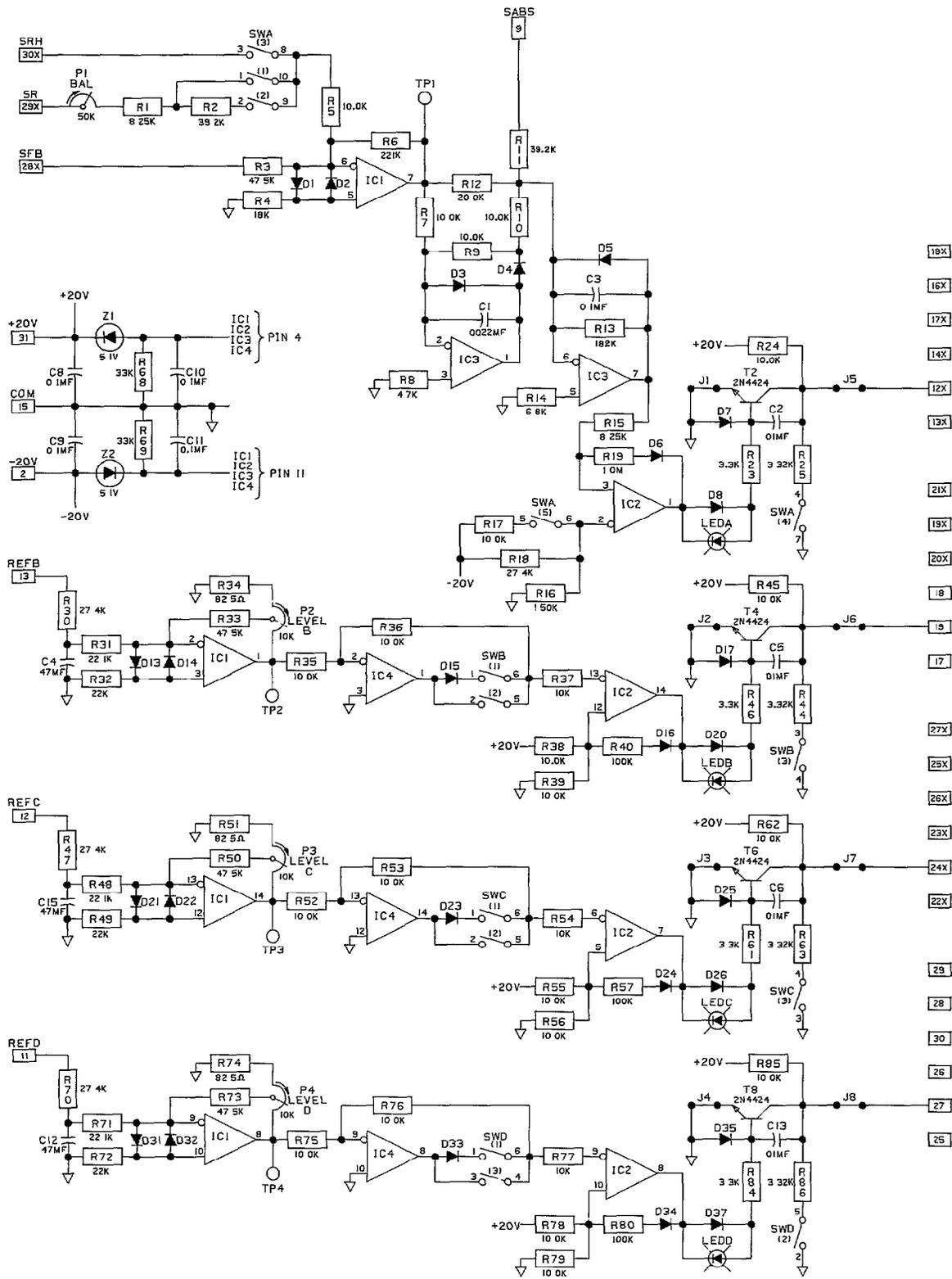


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MACHINE TOOL CARD





36C754427AA
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