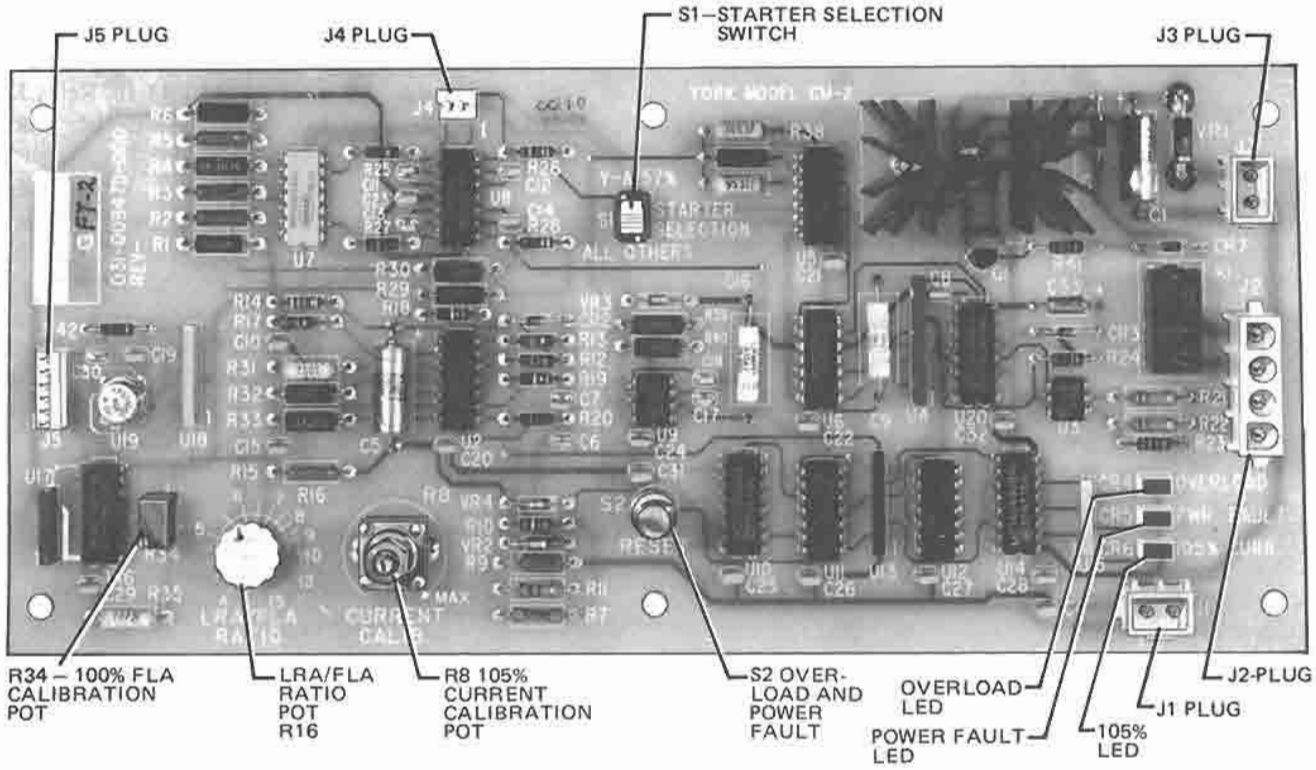
SECTION 3F
CM-2 CURRENT MODULE
FOR ELECTRO-MECHANICAL STARTER APPLICATIONS ONLY
(Ref. Fig. 39 & 40)



24244

FIG. 39 – CM-2 CURRENT MODULE

If the MicroComputer Control Center is used with an electro-mechanical starter, a CM-2 module is required. It is mounted on the hinged door inside the Control Center. This module provides compressor motor current **OVERLOAD** and **POWER FAULT** protection. Also, the 100% FLA motor current signal is calibrated on this board and multiplexed to the Micro Board for use in current limit control and display purposes.

External to the CM-2, three CT's provide 30 motor current signal to a diode bridge. The bridge rectifies the signal and applies it to two parallel variable resistors. The resistors are adjusted to provide a 1VDC (.90-1.05VDC) signal to the CM-2 (J1-1/2) when the compressor motor is conducting 100% FLA. On the CM-2 module, this signal is applied to a power fault detector circuit. When the motor current decreases to 15% FLA the power fault detector initiates a 1 second pulse from the monopulse circuit and simultaneously illuminates the "Power Fault" LED. The LED remains illuminated until manually reset. The 1 second pulse de-energizes K1 relay for 1 second. After 1 second, K1 relay again energizes. This causes a momentary interruption of the "Motor Controller Circuit" located between TB5-53, TB3-16 and Digital Input Board J2-1 and initiates a chiller shutdown. MON XX:XX AM POWER FAULT AUTOSTART is displayed on the keypad display. At the completion of "System Coastdown" the chiller will automatically restart. The power fault detector is inhibited for 75 seconds after the 120VAC start signal 24 is received.

The motor current signal input at J1-2 and J1-1 is also buffered and applied to the 100% FLA calibration potentiometer (R34). The wiper of the POT provides an analog voltage to the multiplexer (MUX). This voltage represents the compressor motor current. The POT is calibrated to provide 4VDC @ 100% FLA. When the Micro Board addresses MUX Channel No. 0, 0VDC is output from the MUX to the Micro Board. This tells the Micro Board that this is an electro-mechanical starter application and the Micro Board skips over MUX Channel 1 thru 6 and addresses MUX Channel No. 7. The motor current analog signal is then output to the micro board where this value is used to determine when "Current Limit" control is to be initiated. Also this value can be displayed as "% FLA" upon operator request.

The buffered motor current signal is also applied to the motor current "Overload" circuits. When the motor current reaches 105% FLA the 105% FLA LED illuminates

and the 50 second timer is started. When 50 seconds have elapsed, if the current is still at 105% FLA, the timer output causes the latching circuit to latch and illuminate the "OVERLOAD" LED. Simultaneously, K1 relay is de-energized. This opens the "Motor Controller" circuit between Micro Control Center TB5-53, TB3-16 and Digital Input Board J2-1 which initiates a chiller shutdown. MON XX:XX AM MOTOR CONTROLLER—EXT RESET is displayed on the keypad display. The "OVERLOAD" LED remains illuminated and K1 relay remains de-energized until the **RESET** pushbutton is pressed.

The remaining overload circuits (245% FLA, 290% FLA, 360% FLA) receive the buffered motor current signal from the **LRA/FLA RATIO** potentiometer. The setting of this POT is determined by $\frac{\text{LRA}}{\text{FLA}}$ = SETTING. If switch S1 is in **ALL OTHERS** (across the line starter) position, when the motor current remains at 245% FLA, 290% FLA, or 360% FLA for 40 seconds, 20 seconds or 10 seconds respectively, the chiller shuts down on "OVERLOAD" as described above. If switch S1 is in the YΔ/57% (YΔ = open/close transition starter; 57% = auto-transformer starter) the 245% FLA detection circuit is disabled.

CM-2 MODULE - INPUTS AND OUTPUTS

J1-1/2—3Ø motor current input. Calibrated by external variable resistors to be 1VDC @ 100% FLA (.90—1.05VDC).

J2-1/2—Dry closure relay (K1) contacts interfaced to the "Motor Controller" circuit TB5-53 to Relay Output Board TB3-16 and digital input board TB3-16. Relay K1 is normally energized causing contacts to be closed. When CM-2 module initiates a **POWER FAULT** shutdown, contacts open for 1 second and then close. When CM-2 module initiates an **OVERLOAD** shutdown, contacts open and remain open until manually reset with S2 **RESET** pushbutton.

J2-3/4—120VAC start signal input from TB5-24. Signal is used to inhibit power fault detection circuit for the first 75 seconds of chiller run time.

J3-1—30VDC Return (GND.)

J3-2— + 30VDC unregulated from power supply board.

J5-1—2^2 address bit from Micro Board. + 15VDC in active state. Otherwise 0VDC.

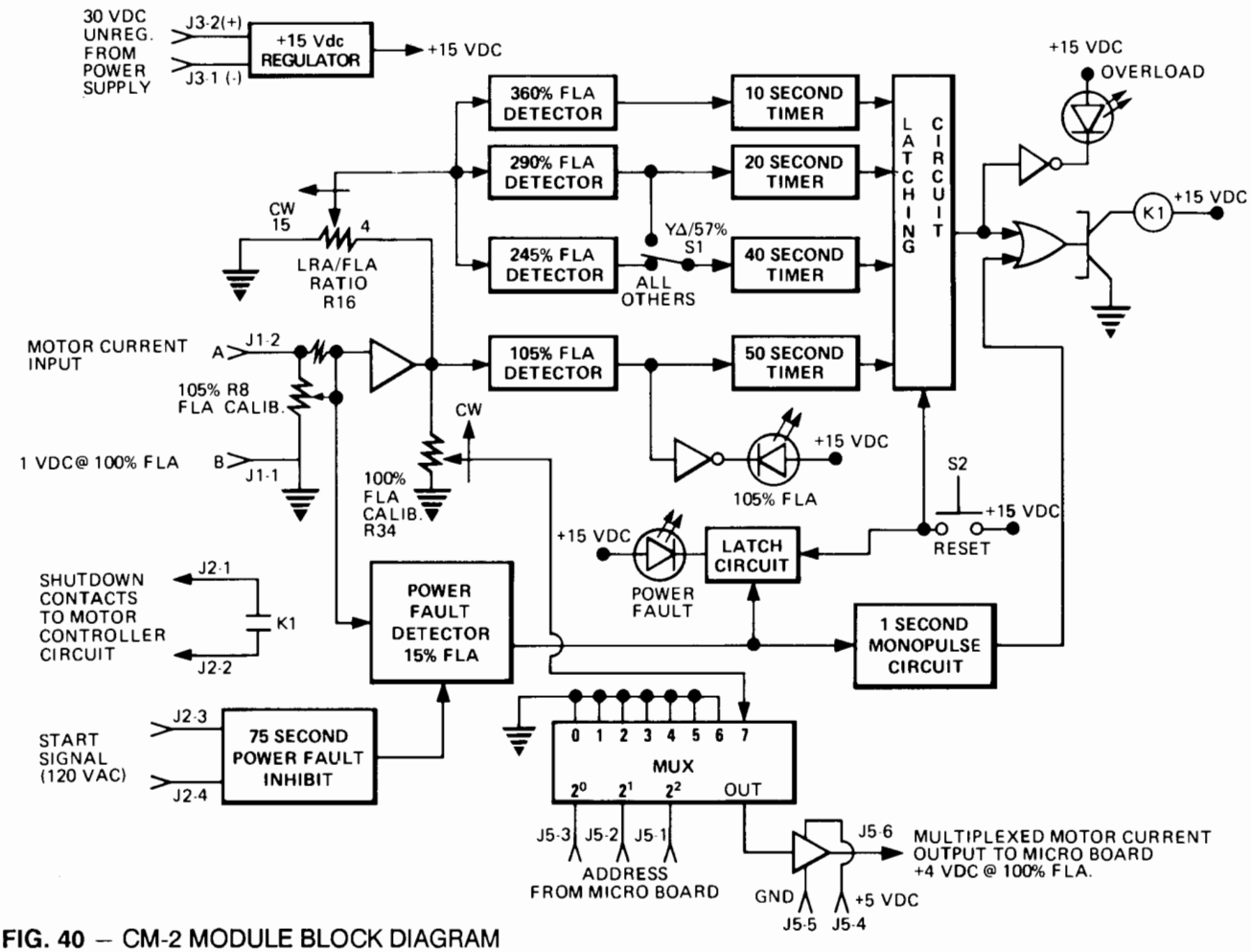


FIG. 40 – CM-2 MODULE BLOCK DIAGRAM

J5-2—2^1 address bit from Micro Board. +15VDC in active state. Otherwise 0VDC.

J5-3—2^0 address bit from Micro Board. +15VDC in active state. Otherwise 0VDC.

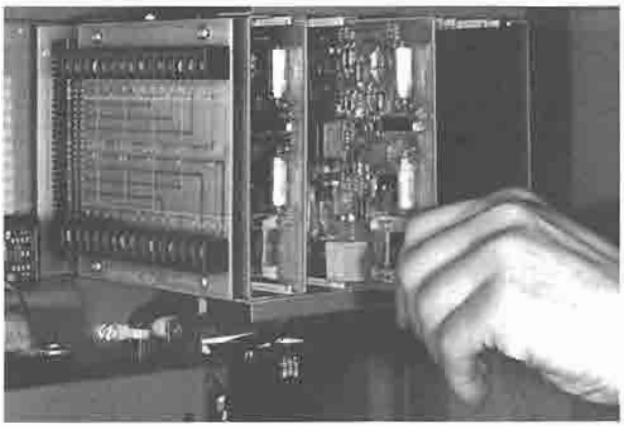
J5-4— +5VDC from Micro Board.

J5-5— +5VDC Return (GND.) from Micro Board.

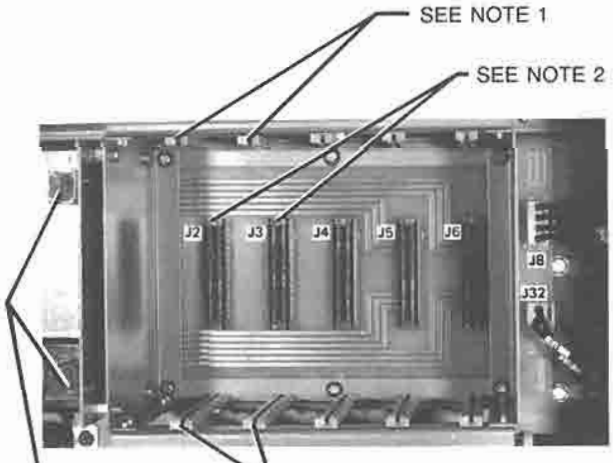
J5-6—Multiplexed 0-5VDC output of MUX to Micro Board.

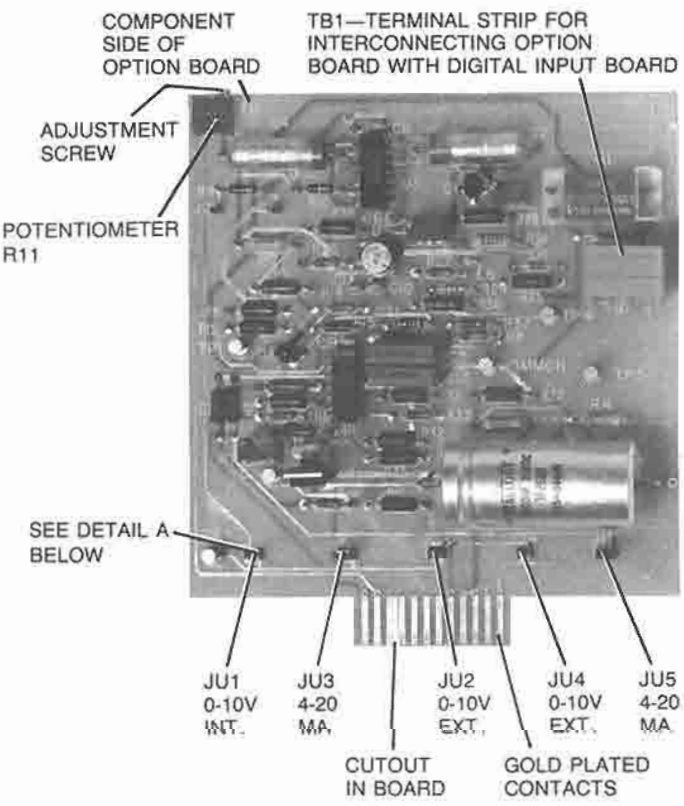
ADDRESS	OUTPUT
000	0VDC (GND)
001	Not Used
010	Not Used
011	Not Used
100	Not Used
101	Not Used
110	Not Used
111	0-5VDC motor current analog signal calibrated on CM-2 module to be +4VDC @ 100% FLA

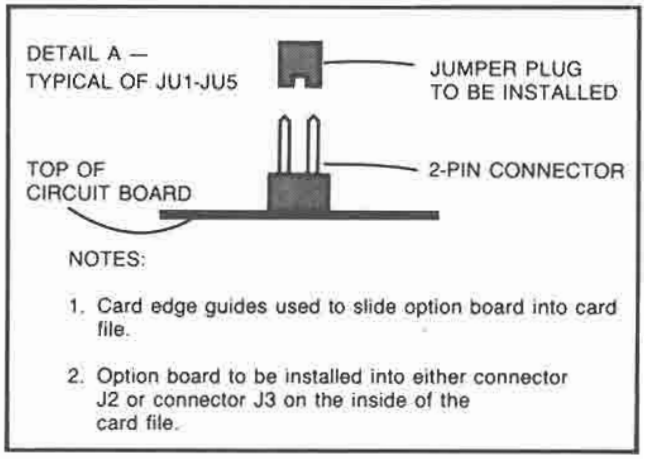
SECTION 3G
REMOTE CURRENT LIMIT/LCWT SETPOINT BOARD
(Ref. Fig. 41 & 43)



BOARD CARD FILE







22647 22646 22681

FIG. 41 — CARD FILE AND BOARDS