Instructions for Installing Software On the MC-PCA Board Utilizing the 21-LB-217A MicroController

INSTRUCTIONS FOR INSTALLING SOFTWARE ON THE MC-PCA BOARD UTILIZING THE 21-LB-217A MICROCONTROLLER

Great care should be taken when changing the microcomputer software. Follow all of the instructions on this page step-by-step.

1) Turn off the main power and verify that no lights are operating on the MC-PCA computer board.

2) Refer to Figure 1 for the location of the microcontroller chip (socket U7) and EPROM chip (socket U18) on the MC-PCA board.

> NOTE
>
> Depending upon the application, software may be programmed on the microcontroller chip, the EPROM chip, or both. This instruction provides information for changing both chips.

3) Using a small, thin-bladed screwdriver, install all software chips provided. Place the tip of the screwdriver between the microcontroller chip (loaded at U7) / EPROM (loaded at U18) and its socket (NOT between the socket and the board). Gently pry the existing microcontroller chip (loaded at U7) / EPROM (loaded at U18) out of the socket. Do this very slowly, taking care not to bend the last leads to come out of the socket. If they become bent, straighten them slowly and carefully with needle-nose pliers.

4) Now place the new microcontroller chip (U7) and/or EPROM (U18) lightly (do not plug it in yet) into the socket and check to see that all pins are aligned with

their corresponding holes in the socket. The notch on the chip should be positioned towards the top of the board. See Figure 1.

NOTE

A microcontroller chip is a 40-pin device. If one has been supplied, it should be plugged into the 40-pin microcontroller socket (U7).

An EPROM may be either a 28 or 32 pin device. If an EPROM has been supplied, it should be inserted in the socket labeled "ROM". If MCE has supplied you with a *28-pin* EPROM, *it should be placed in the lower part of the socket (U18).* The top two pin slots on each side of the socket should remain visible (a total of 4 pin slots should remain unused near the notch on the socket). If an EPROM has been supplied, the following criteria should be observed:

JP10=A (28 pin = 512 EPROM)

It is important not to plug the chips in backwards (make sure notch is oriented toward top of board).

Now push the new chip firmly into the socket, making sure that none of the pins get bent during the insertion. Inspect the chip and make sure that no pins are bent outward or under the chip.

5) If the MC-PCA-0A Board contains a 21-LB-217A microcontroller loaded at U7, then

verify that JP1 is set to position B, otherwise set to position A.

6) Turn on the system. The COMPUTER ON light should be on and it should not be blinking.

7) If the MC-PCA computer board does not look like it is working, the new chip may not be installed properly. Repeat steps 1 through 5.

8) If a new PTHC Programming Record has been provided with your software upgrade package, it is necessary to continue with steps 9-14.

Warning: **The steps (9-14) will clear all the programmed information, therefore do not repeat these steps unless a fully completed PTHC Programming Record is available.**

9) Place the controller on Relay Panel Inspection.

10) Flip the F1, F3, F5 and F7 dip switches UP and Flip the F2, F4, F6 and F8 dip switches DOWN. The display will read: WARNING: STANDARD DEFAULTS MODE CONTACT MCE BEFORE PROCEEDING.

11) Simultaneously press N, S, + and - keys of the MC-PCA board.

12) The computer will erase all the memory contents and show PARAMETERS HAVE BEEN DEFAULTED.

13) Flip all the dip switches down except the F1 switch and the computer is ready to be reprogrammed based on the programming information recorded earlier or use the new programming record provided.

14) Flip all the dip switches down except the F1 switch. The computer is ready to be reprogrammed based on the new programming record provided.

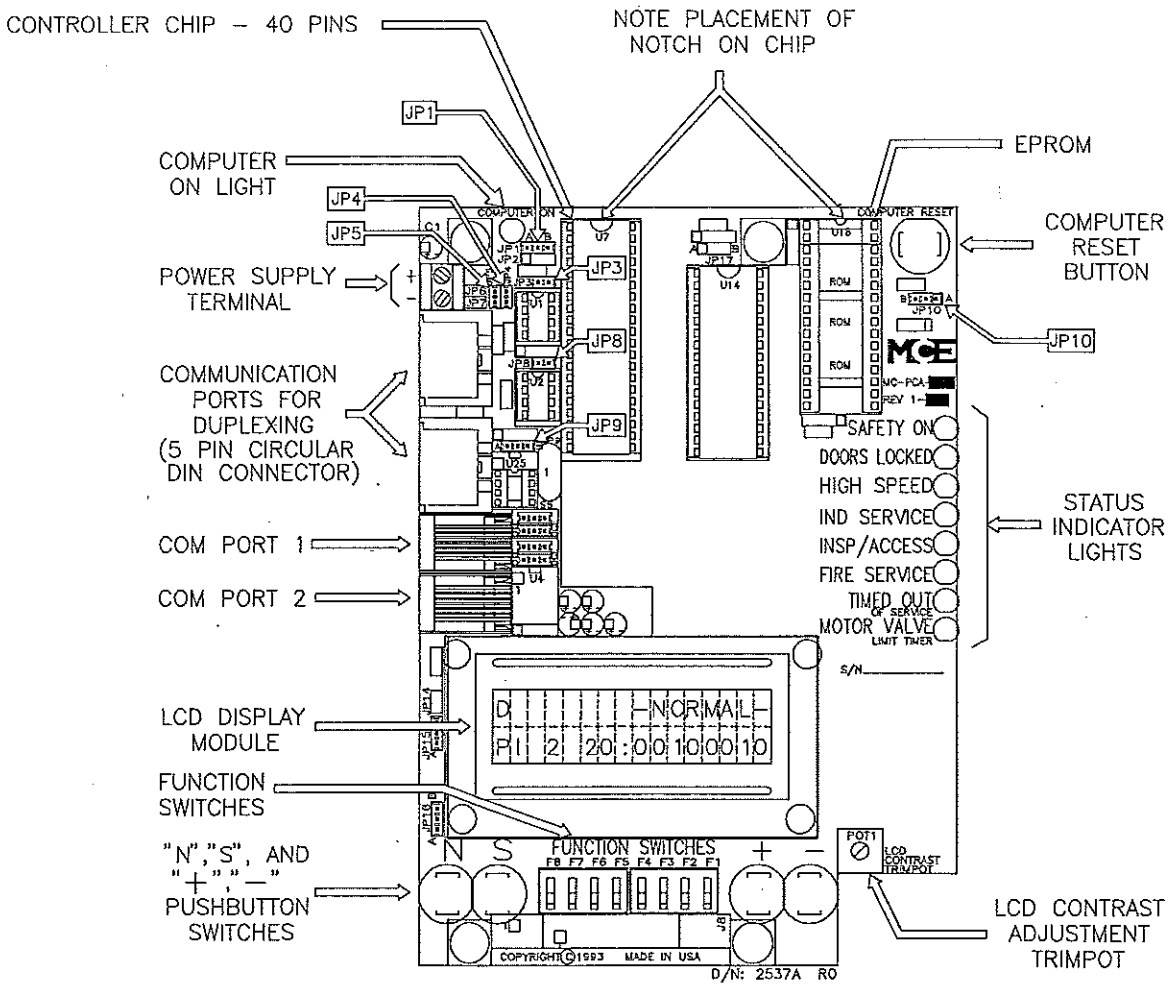


Figure 1 - MC-PCA board

APPENDIX C
ELEVATOR SECURITY INFORMATION AND OPERATION

Building name: _____

Building location: _____

Security activation: Key switch or Time clock

Mon:	from _____	to ____
Tue:	from _____	to ____
Wed:	from _____	to ____
Thu:	from _____	to ____
Fri:	from _____	to ____
Sat:	from _____	to ____
Sun:	from _____	to ____

Instructions: To gain access to secured floors, follow the steps below while in the elevator car. The steps may be taken while the car is moving or standing still. Requests for a car from a hallway or corridor are answered without restriction.

1. While in the car, press the button for the desired floor. If the destination floor is secured, the button for that floor will flash on/off.

   If the button for that floor stays solidly illuminated, that floor is unsecured.

2. While the destination floor button is flashing, enter the security code for that floor within 10 seconds. Enter the security code by pressing the corresponding buttons on the panel.

   If the code was entered correctly and within the required time limit, the car will immediately go to that floor. If the code was not entered within the 10-second time limit or was entered incorrectly, the destination floor button light will turn off after 10 seconds and the entire sequence must be repeated.

   If a mistake is made while entering the security code, simply wait until the destination floor button light stops flashing and then start the entire sequence again.

APPENDIX A
ORIGINAL PROGRAMMED VALUES AND THE RECORD OF CHANGES

OPTIONS	MCE VALUES	NEW VALUES
BASIC FEATURES		
Simplex or Duplex?	___ Simplex ___ Duplex	___ Simplex ___ Duplex
Operation:	___ Sel. Coll. ___ Single Button ___ Single Auto PB	___ Sel. Coll. ___ Single Button ___ Single Auto PB
Top Landing Served (Car A)?		
Car Doors are Walk-Thru (Car A)?	_____ Yes _____ No	_____ Yes _____ No
Car Serves Frnt/Flr (Car A)?	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Car Serves Rear/Flr (Car A)?	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Top Landing Served (Car B)?		
Car Doors are Walk-Thru (Car B)?	_____ Yes _____ No	_____ Yes _____ No
Car Serves Frnt/Flr (Car B)?	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Car Serves Rear/Flr (Car B)?	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Parking Floor		
Secondary Park Floor		
Lobby Floor		
Car Identifier	Set first car to A, next car to B	Set first car to A, next car to B
Number of IOX Boards:	_____ Valid range is 0-4.	_____ Valid range is 0-4.
Number of I4O Boards:	_____ Valid range is 0-3.	_____ Valid range is 0-3.
FIRE SERVICE		
Fire Service Operation?	_____ Yes _____ No	_____ Yes _____ No
Fire Phase 1 Main Floor		
Fire Phase 1 Alt. Floor		
Fire Service Code		
Fire Phase 1, 2nd Alt Landing		
Bypass Stop Sw. on Phase 1?	_____ Yes _____ No	_____ Yes _____ No
Honeywell Fire Operation?	_____ Yes _____ No	_____ Yes _____ No
NYC Fire Phase 2 w/ ANSI 89?	_____ Yes _____ No	_____ Yes _____ No
White Plains, NY Fire Code?	_____ Yes _____ No	_____ Yes _____ No
DOOR OPERATION		
Nudging?	_____ Yes _____ No	_____ Yes _____ No
Stuck Photo Eye Protection?	_____ Yes _____ No	_____ Yes _____ No
Sequential Door Oper.(F/R)?	_____ Yes _____ No	_____ Yes _____ No
Car Call Cancels Door Time?	_____ Yes _____ No	_____ Yes _____ No
Nudging During Fire Phase 1?	_____ Yes _____ No	_____ Yes _____ No
Retiring Cam Option?	_____ Yes _____ No	_____ Yes _____ No
Pre-Opening?	_____ Yes _____ No	_____ Yes _____ No
Mechanical Safety Edge?	_____ Yes _____ No	_____ Yes _____ No
Nudging Output/Buzzer Only?	_____ Yes _____ No	_____ Yes _____ No
D.C.B. Cancels Door Time?	_____ Yes _____ No	_____ Yes _____ No
Leave Door Open on PTI/ESS?	_____ Yes _____ No	_____ Yes _____ No
Nudging During Fire Phase 2?	_____ Yes _____ No	_____ Yes _____ No
Dir. Preference Until DLK?	_____ Yes _____ No	_____ Yes _____ No
Fully Manual Doors?	_____ Yes _____ No	_____ Yes _____ No
Cont. D.C.B. to Close Doors?	_____ Yes _____ No	_____ Yes _____ No
Cont. D.C.B. for Fire Phase 1?	_____ Yes _____ No	_____ Yes _____ No
Moment. D.O.B. door opening? Moment D.O.B. for: Moment D.O.B. for:	_____ No ____Front ____Rear ____Both Calls ____Hall Calls ____Car Calls ____All Calls	_____ No ____Front ____Rear ____Both Calls ____Hall Calls ____Car Calls ____All Calls

OPTIONS	MCE VALUES	NEW VALUES
DOOR OPERATION (CONT)		
Doors to open if parked?	___None ___ Front ___ Rear ___ Both	___None ___ Front ___ Rear ___ Both
Doors to Open on Main Fire?	___ Front ___ Rear ___ Both	___ Front ___ Rear ___ Both
Doors to Open on Alt. Fire?	___ Front ___ Rear ___ Both	___ Front ___ Rear ___ Both
Leave Doors Open on CTL	_____ Yes _____ No	_____ Yes _____ No
Limited Door Re-Open Option	_____ Yes _____ No	_____ Yes _____ No
Reduce HOT with Photo Eye	_____ Yes _____ No	_____ Yes _____ No
Leave Doors Open on EPI	_____ Yes _____ No	_____ Yes _____ No
Doors to open if No demand?	___None ___ Front ___ Rear ___ Both	___None ___ Front ___ Rear ___ Both
Const. Press Op. Bypass PHE?	_____ Yes _____ No	_____ Yes _____ No
TIMER		
Short Door Timer	_____ seconds	_____ seconds
Car Call Door Timer	_____ seconds	_____ seconds
Hall Call Door Timer	_____ seconds	_____ seconds
Lobby Call Door Timer	_____ seconds	_____ seconds
Nudging Timer	_____ seconds	_____ seconds
Time Out of Service Timer	_____ seconds	_____ seconds
Motor Limit Timer	_____ minutes	_____ minutes
Valve Limit Timer	_____ minutes	_____ minutes
Door Hold Input Timer	_____ seconds	_____ seconds
Parking Delay Timer	_____ minutes	_____ minutes
Fan/Light Output Timer	_____ minutes	_____ minutes
Hospital Emerg. Timer	_____ minutes	_____ minutes
Door Open Protection Timer	_____ seconds	_____ seconds
CTL Door Open Timer	_____ seconds	_____ seconds
GONGS/LANTERNS		
Mounted in hall or car?	_____ hall _____ car	_____ hall _____ car
Double strike on Down?	_____ Yes _____ No	_____ Yes _____ No
PFG Enable Button?	_____ Yes _____ No	_____ Yes _____ No
Egress Floor Arrival Gong?	_____ No Main Egress Floor = _____	_____ No Main Egress Floor = _____
SPARE INPUTS		
SP1 used for:		
SP2 used for:		
SP3 used for:		
SP4 used for:		
SP5 used for:		
SP6 used for:		
SP7 used for:		
SP8 used for:		
SP9 used for:		
SP10 used for:		
SP11 used for:		
SP12 used for:		
SP13 used for:		
SP14 used for:		
SP15 used for:		
SP16 used for:		
SP17 used for:		
SP18 used for:		
SP19 used for:		
SP20 used for:		
SP21 used for:		
SP22 used for:		
SP23 used for:		
SP24 used for:		
SP25 used for:		
SP26 used for:		
SP27 used for:		
SP28 used for:		
SP29 used for:		
SP30 used for:		
SP31 used for:		

OPTIONS	MCE VALUES	NEW VALUES
SPARE INPUTS (CONT)		
SP32 used for:		
SP33 used for:		
SP34 used for:		
SP35 used for:		
SP36 used for:		
SP37 used for:		
SP38 used for:		
SP39 used for:		
SP40 used for:		
SP41 used for:		
SP42 used for:		
SP43 used for:		
SP44 used for:		
SP45 used for:		
SP46 used for:		
SP47 used for:		
SP48 used for:		
SP49 used for:		
SPARE OUTPUTS		
OUT1 used for:		
OUT2 used for:		
OUT3 used for:		
OUT4 used for:		
OUT5 used for:		
OUT6 used for:		
OUT7 used for:		
OUT8 used for:		
OUT9 used for:		
OUT10 used for:		
OUT11 used for:		
OUT12 used for:		
OUT13 used for:		
OUT14 used for:		
OUT15 used for:		
OUT16 used for:		
OUT17 used for:		
OUT18 used for:		
OUT19 used for:		
OUT20 used for:		
OUT21 used for:		
OUT22 used for:		
OUT23 used for:		
OUT24 used for:		
OUT25 used for:		
OUT26 used for:		
OUT27 used for:		
OUT28 used for:		
OUT29 used for:		
OUT30 used for:		
OUT31 used for:		
OUT32 used for:		
EXTRA FEATURES		
PI Output Type:	____ 1 wire ____ Binary	____ 1 wire ____ Binary
Floor Encoding Inputs?	____ Yes ____ No	____ Yes ____ No
Encode All Floors?	____ Yes ____ No	____ Yes ____ No
Emergency Power Operation?	____ No Emergency Power Return Floor = ____	____ No Emergency Power Return Floor = ____
Light Load Weighing?	____ No Light Load Car Call Limit = ____	____ No Light Load Car Call Limit = ____
Photo Eye Anti-Nuisance?	____ No Consec Stops w/o PHE Limit = ____	____ No Consec Stops w/o PHE Limit = ____
Peripheral Device?	____ Yes ____ No	____ Yes ____ No

OPTIONS	MCE VALUES	NEW VALUES
	EXTRA FEATURES (CONT.)	
PA COM 1 Media:	_____ None _____ Serial Cable _____ Line Driver _____ Modem	_____ None _____ Serial Cable _____ Line Driver _____ Modem
PA COM 1 Device:	Personal Computer: ____ CMS ____ Graphic Display CRT - No Keyboard: Color CRT: ____ Yes ____ No CRT and Keyboard: Color CRT: ____ Yes ____No	Personal Computer: ____ CMS ____ Graphic Display CRT - No Keyboard: Color CRT: ____ Yes ____ No CRT and Keyboard: Color CRT: ____ Yes ____No
PA COM 2 Media:	_____ None _____ Serial Cable _____ Line Driver _____ Modem	_____ None _____ Serial Cable _____ Line Driver _____ Modem
PA COM 2 Device:	Personal Computer: ____ CMS ____ Graphic Display CRT - No Keyboard: Color CRT: ____ Yes ____ No CRT and Keyboard: Color CRT: ____ Yes ____No	Personal Computer: ____ CMS ____ Graphic Display CRT - No Keyboard: Color CRT: ____ Yes ____ No CRT and Keyboard: Color CRT: ____ Yes ____No
PA COM 3 Media:	_____ None _____ Serial Cable _____ Line Driver _____ Modem	_____ None _____ Serial Cable _____ Line Driver _____ Modem
PA COM 3 Device:	Personal Computer: ____ CMS ____ Graphic Display CRT - No Keyboard: Color CRT: ____ Yes ____ No CRT and Keyboard: Color CRT: ____ Yes ____No	Personal Computer: ____ CMS ____ Graphic Display CRT - No Keyboard: Color CRT: ____ Yes ____ No CRT and Keyboard: Color CRT: ____ Yes ____No
PA COM 4 Media:	_____ None _____ Serial Cable _____ Line Driver _____ Modem	_____ None _____ Serial Cable _____ Line Driver _____ Modem
PA COM 4 Device:	Personal Computer: ____ CMS ____ Graphic Display CRT - No Keyboard: Color CRT: ____ Yes ____ No CRT and Keyboard: Color CRT: ____ Yes ____No	Personal Computer: ____ CMS ____ Graphic Display CRT - No Keyboard: Color CRT: ____ Yes ____ No CRT and Keyboard: Color CRT: ____ Yes ____No
Automatic Floor Stop Option?	_____ No Floor # for Car to Stop at:_____	_____ No Floor # for Car to Stop at:_____
CC Cancel w/Dir. Reversal?	_____ Yes _____ No	_____ Yes _____ No
Cancel Car Calls Behind Car?	_____ Yes _____ No	_____ Yes _____ No
CE Electronics Interface?	_____ Yes _____ No	_____ Yes _____ No
Massachusetts EMS Service?	_____No EMS Service Floor #:_____	_____No EMS Service Floor #:_____
Master Software Key	___ Activated ___ Deactivated ___ Enabled	___ Activated ___ Deactivated ___ Enabled
PI Turned off if No Demand?	_____ Yes _____ No	_____ Yes _____ No
Hospital Emerg. Operation (Car A)	_____ Yes _____ No	_____ Yes _____ No
Set Hospital Calls (Car A)?	_____ Yes _____ No	_____ Yes _____ No
Hospital Calls Frnt/Flr (Car A)?	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Hospital Calls Rear/Flr (Car A)?	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Hospital Emerg. Operation (Car B)	_____ Yes _____ No	_____ Yes _____ No
Set Hospital Calls (Car B)?	_____ Yes _____ No	_____ Yes _____ No
Hospital Calls Frnt/Flr (Car B)?	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Hospital Calls Rear/Flr (Car B)?	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Fire Bypasses Hospital?	_____ Yes _____ No	_____ Yes _____ No
High Seed Delay After Run?	_____ Yes _____ No	_____ Yes _____ No
Single Speed A.C. Option?	_____ Yes _____ No	_____ Yes _____ No
Sabbath Operation?	_____ Yes _____ No	_____ Yes _____ No
UP Front Call?	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
UP Rear Call?	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DOWN Front Call?	2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
DOWN Rear Call?	2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Leveling Sensors	___Enabled ____ Disabled	___ Enabled ____Disabled
KCE	___Enabled ____ Disabled	___ Enabled ____Disabled

APPENDIX B
NOMENCLATURE

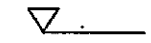
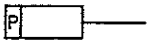
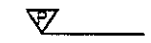
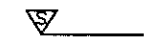
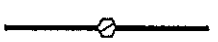
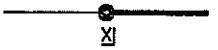
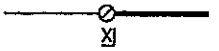
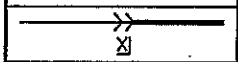
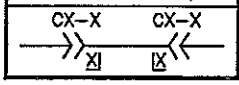
MCE Motion Control Engineering, Inc.	NOMENCLATURE		
F:\DOCS\Nmcltr1Shipping.frm	Effective Date: 11/27/00	Approved By: Engineering Manager	Page 1 of 2

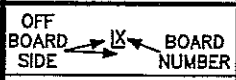
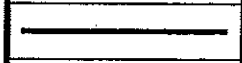
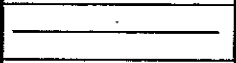
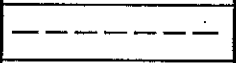
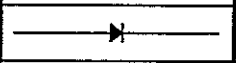
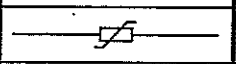
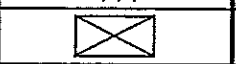
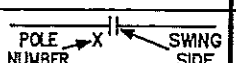
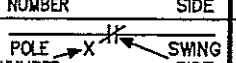
#	PC BOARD	DESCRIPTION
1	HC-RB4	Traction Controller Main Relay Board
1	HC-RBH	Hydraulic Controller Main Relay Board
2	HC-CI/O	Non Programmable Controller Call I/O Board
2	HC-CI/O-E	Programmable Controller Call I/O Expander Board
3	HC-PI/O	Non Programmable Controller Power I/O Board (Car A) ①
3	HC-PCI/O	Programmable Controller Power And Call I/O Board
4	HC-PI/O	Non Programmable Controller Power I/O Board (Car B) ①
6	HC-TAB	Traction Adapter Board
7	HC-RDRB	Rear Door Relay Board
8	HC-RD	Rear Door Logic Board (Car A) ①
9	HC-RD	Rear Door Logic Board (Car B)
10	HC-DB-MOD	Front G.A.L. MOD Door Interface Board
11	HC-DB-MOD-R	Rear G.A.L. MOD Door Interface Board
12	HC-DPS	Door Power Supply Board
13	HC-PIX	Position Indicator Expander Board (Car A) ①
14	HC-PIX	Position Indicator Expander Board (Car B)
15	HC-SRT	Suicide Relay Timing Board
16	HC-SCR	SCR Interface Board
17	HC-EQ	Earthquake Board
18	HC-IOX	I/O(8 Input / 8 Output) Expander Board (Car A) ①
19	HC-IOX	I/O(8 Input / 8 Output) Expander Board (Car B)
20	HC-IOX	Additional I/O(8 Input / 8 Output) Expander Board (Car A) ①
21	HC-IOX	Additional I/O(8 Input / 8 Output) Expander Board (Car B)
26	HC-DYNA	Dynalift Interface Board
27	MC-ACFR	AC Feedback Relay Board
28	IMC-GIO	General Turbo DF I/O Board
29	IMC-RB	Turbo DF Relay Board
30	HC-DB-MOM/H	Front G.A.L. MOM/MOH Door Interface Board
31	HC-DB-MOM/H-R	Rear G.A.L. MOM/MOH Door Interface Board
32	HC-OA	Output Adapter Board
33	IMC-RI	M/G Relay Interface Board
34	IMC-PRI	M/G Power Relay Interface Board
35	IMC-DIO	Digital I/O Board
36	IMC-DAS	Data Acquisition Board
37	HC-I4O	I/O(16 Input /4 Output) Expander Board (Car A) ①
38	HC-I4O	I/O(16 Input /4 Output) Expander Board (Car B)
39	HC-I4O	Additional I/O(16 Input / 4 Output) Expander Board (Car A) ①
40	HC-I4O	Additional I/O(16 Input /4 Output) Expander Board (Car B)
41	SCR-RI	SCR/AC Relay Interface Board
42	SCR-PRI	SCR/AC Power Relay Interface Board
43	HC-LB	Lock Bypass Board
44	HC-GB	Gong Board
45	HC-GB	Additional Gong Board
46	HC-SIB	Selectable Input Buffer Board (Car A) ①
47	HC-SIB	Selectable Input Buffer Board (Car B)
48	HC-RT	Relay Tester Board
49	IMC-ACIB	AC Baldor Interface Board
50	HC-DPS-MOM/H	Front G.A.L. MOM/MOH Door Interface and Power Supply Board
51	HC-ACI	AC Drive Interface Board
52	HC-ACIF	AC Flux Vector Interface Board
53	HC-DPS-MOM/H-R	Rear G.A.L. MOM/MOH Interface and Power Supply Board

#	PC BOARD	DESCRIPTION
54	IMC-MBX	IMC Enhanced Motherboard
55	SCR-RIX	SCR Relay Interface Extension Board
56	HC-HBF	A.S.M.E. Front Door Lock Bypass Board
57	HC-HBFR	A.S.M.E Front and Rear Door Lock Bypass Board
58	IMC-ACIM	AC MagneTek Interface Board
59	HC-TACH-MG	Tach Adjust Board for VVMC-MG Controller
60	HC-TACH-SCR	Tach Adjust Board for VVMC-SCR Controller

① Individual group cars use board numbers for car A only

SCHEMATIC SYMBOLS

SYMBOL	DESCRIPTION
	BUS LOCATED ON PC BOARD
	BUS LOCATED OFF PC BOARD
	MICROCOMPUTER OUTPUT OR CALL CIRCUIT
	MICROCOMPUTER INPUT
	PATTERN GENERATOR OUTPUT
	PATTERN GENERATOR INPUT
	PATTERN GENERATOR SAFETY INPUT
	POWER TERMINAL
	PANEL MOUNT TERMINAL
	EYELET ON PC BOARD
	SCREW TERMINAL ON PC BOARD
	IDC CONNECTOR ON PC BOARD
	RIBBON CABLE CONNECTOR

SYMBOL	DESCRIPTION
	BOARD DESIGNATOR
	SOLDER CONNECTION ON REAR OF PC BOARD
	WIRING INSIDE CONTROL CABINET
	TRACE ON PC BOARD
	CUSTOMER WIRING INTO CONTROL CABINET
	ALL UNMARKED DIODES ARE 2.5 AMP 1000 VOLT
	VOLTAGE SPIKE SUPPRESSOR
	DOT BY RESISTOR INDICATES TOP OR LEFT SIDE AS MOUNTED
	BOX INDICATES UNUSED ITEM
	RELAY COIL
	NORMALLY OPEN (N.O.) RELAY CONTACT
	NORMALLY CLOSED (N.C.) RELAY CONTACT
N/C	NO CONNECTION

WIRE SYMBOLS

SYMBOL	DESCRIPTION
	#X AWG THHN WIRE 90° C
	#X AWG PVC WIRE 105° C
	#X AWG PTL WIRE 125° C
	#X AWG TEFLON WIRE 200° C

UNLESS NOTED, ALL WIRES ARE #18 AWG PVC, WITH EXCEPTION TO THE PC BOARD WIRING, WHICH IS DETERMINED BY ENGINEERING.

WIRE GAUGES

SYMBOL	SIZE
03	3/0 AWG
02	2/0 AWG
0	0 AWG
1	1 AWG
2	2 AWG
4	4 AWG
6	6 AWG
8	8 AWG
10	10 AWG
12	12 AWG
14	14 AWG
16	16 AWG
18	18 AWG

MCE Motion Control Engineering, Inc.	NOMENCLATURE	
	Approved By: Engineering Manager	
F:\DOCS\NMCLR2.DWG	Effective Date: 10/16/96	Page 2