TABLE 5.2 Error Status Messages and Response Chart

| MESSAGE	MEANING	PROBABLE CAUSE	NEEDED RESPONSE
CNP FAIL	Redundancy CNP fault	The main power contactors that provide power to the controller have not dropped out in their intended manner.	Inspect the main power contactors to ensure that they are working as intended. Ensure that there is power on the CNP Input when the car is not in motion.
DCL/DLK	Doors Open (DCL = 1) and Locked (DLK = 1)	A problem with DCL and/or DLK circuitry or wiring.	Inspect the Door Closed Limit and the Door Lock circuitry and wiring. When this error is generated, the car is not allowed to run.
DCLR/DLK	Rear Doors Open (DCLR = 1) and Locked (DLK = 1)	A problem with DCLR and/or DLK circuitry or wiring.	Inspect the Door Closed Limit Rear and the Door Lock circuitry and wiring. When this error is generated, the car is not allowed to run.
DLK FAIL	Door Lock Failure	A failure to lock the doors is detected. This failure condition exists when the doors have closed (DCLC = 1 or DCL = 0) a demand exists for the car to move (DCP=1),but the doors are not locked (DLK = 0) within 60 seconds.	If the Retiring Cam option is set, verify the Retiring Cam relay is activated (DCP=1, DCL=0 or DCLC=1) and the doors lock (DLK=1). If no Retiring Cam is used, verify the door lock circuitry contacts are closed to provide power to the door lock input (DLK=1). When a predetermined number of sequential failures is detected, default set to four, the car will shutdown. The failure will be reset once the doors are locked (DLK=1), if the car is placed on Inspection, or the Computer Reset Button is pressed.
DOL FAIL	Door Open Limit failure	The door open limit switch has failed open.	Ensure that the car gate is open, there is no power on the DOL input and no power is present on the DLS or GS inputs.
DOLRFAIL	Rear Door Open Limit failure	The rear door open limit switch has failed open.	Ensure that the rear car gate is open, there is no power on the DOLR input and no power is present on the DLSR or GSR inputs.
DOL/DLK	A critical failure has caused both the Door Open Limit and Door Lock inputs to both be active at the same time.(DOL=0 & DLK=1)	A problem with DOL and/or DLK circuitry or wiring.	Inspect the Door Open Limit and the Door Lock circuitry and wiring. When this error is generated, the car will shutdown with the doors open and will not answer any calls. The only way to reset this error condition is to put the car on Inspection operation.
DOLR/DLK	The Door Open Limit Rear and the Door Lock inputs are both active, DOLR=0 and DLK=1.	A problem with DOLR and/or DLK circuitry or wiring.	Inspect the Door Open Limit Rear and the Door Lock circuitry and wiring. When this error is generated, the car will shutdown with the doors open and will not answer any calls. The only way to reset this error condition is to put the car on Inspection operation.
DRVE FLT	Drive fault has occurred	The drive fault input (DFI) has been activated, indicating that a drive fault has occurred.	Check the contact wired to the DFI input (this contact should originate from the drive system). Refer to the installation/user manual associated with the specific drive for troubleshooting suggestions.
DZ FAULT	The door zone sensor input appears to have failed in the active state. The controller computer detected that one of the DZ inputs (front or rear) did not transition to the low state during the last elevator run.	Probable cause may be: 1. A faulty door zone sensor or associated circuitry (within the landing system assembly); 2. Faulty wiring from the landing system to the controller; 3. Faulty computer input circuit (main relay board or HC-PCIO board).	Check operation of the door zone sensors and associated wiring (place car on inspection, move car away from the floor, noting the transitions in the door zone signal(s) coming from the landing system). Verify that the computer diagnostic display of DZ (or DZ rear) matches the state of the sensor signals at the main relay board (or rear door relay board).
EMRG PWR	Emergency Power	The car is on Emergency Power operation (EPI is low).	Ensure that the Emergency Power operation option is set correctly. If emergency power is not required, set this option to NO and ensure that the EPI input is not programmed. If it is required, set this option to the floor that the car should return to on Emergency Power and program the EPI input
EMS SVCE	Massachusetts Emergency Medical Service	Either the EMSH or the EMSC input has been activated.	Ensure that the MASSACHUSETTS EMS SERVICE option is set correctly. If not required, set this option to no and ensure that the EMSH and EMSC inputs are not programmed as spare inputs. If it is required, set this option to the floor that the car should return to when the EMSH input is activated.
ESS FUNC	Elevator shutdown function	The ESS input has been activated.	Go into Program mode and see if any of the inputs are programmed as ESS. Then, check to see if that particular input is activated.
EXMLT	MLT shutdown with External Motor Limit Timer (EXMLT)	The EXMLT spare input is active.	Check the External Motor Limit Timer and the associated circuitry. Check the voltage at the EXMLT input. Verify that the wiring is correct. Check the MLT / VLT Data Trap to verify that EXMLT is active.
FIRE I A	The elevator is in Fire Service Phase 1 - The car is returning to an alternate fire return landing.	The FRS input is low, the FRA input is high or FRAON is active.	Inspect the fire sensors (especially the main floor sensor) and the Fire Phase I switch wiring. For some fire codes including ANSI, the Fire Phase I switch must be turned to the BYPASS position and then back to OFF to clear the fire service status once activated.
FIRE II	The elevator is in Phase 2 of Fire Service.	The FCS controller input is ON.	Inspect the phase 2 switch and wiring. In some cases, to exit Fire Service Phase 2, the car must be at the fire floor at which Fire Phase 2 was activated, the doors must be fully open, and the phase 2 switch must be off (the FCOFF input must be activated) to get out of phase 2.
FIRE I M	The elevator is in Fire Service Phase 1 - The car is returning to the main fire return landing.	The FRS input is low or the FRON or FRON2 inputs are high.	Inspect the fire sensors and the Fire Phase I switch wiring. For some fire codes including ANSI, the Fire Phase I switch must be turned to the BYPASS position and then back to OFF to clear the fire service status once activated.

TABLE 5.2   Error Status Messages and Response Chart

MESSAGE	MEANING	PROBABLE CAUSE	NEEDED RESPONSE
HC BUS	The Hall Call Bus is disconnected.	A problem in the wiring or fuses. There is no power to the Hall Call circuits on the HC-CIO and HC-PCIO board(s).	Check the Hall Call Bus fuse. Check the wires that go to the Hall Call Power inputs on the HC-PCIO & HC-CIO board(s) in the controller.
HEAVY LD	Heavy Load	The HLI input has been activated.	Go into Program mode and see if any spare inputs are programmed as an HLI input. Then, check to see if that particular input is activated.
HEO PH.2	The car is on Hospital Emergency Operation Phase 2.	The car has answered a hospital emergency call or the in car hospital emergency key switch has been activated (HOSP is high).	Ensure that the hospital emergency operation option is set correctly. Then check to see if any spare inputs are programmed as HOSP and if it is activated.
HEO PH.1	The car is on Hospital Emergency Operation Phase 1.	A hospital emergency momentary call switch is activated at any floor.	Ensure that the hospital emergency operation option is set correctly. If hospital emergency operation is not required, set This option to no. If it is required, set the floors eligible to answer a hospital call to yes.
HOISTWAY	Hoistway safety device activated	One of the hoistway safety devices has activated, opening the safety circuit (e.g., pit stop switch, car and cwt buffers switches, up/down final limit switches).	Check all hoistway safety devices. Refer to controller wiring prints for applicable devices.
IND SVCE	The car is on Independent Service.	The independent switch inside the car has been turned on, or the TEST/NORMAL switch on the Relay board is in the TEST position.	Check the Independent Service switch inside the car. Inspect the TEST/NORMAL switch on the Relay board on the controller.
INSPECT.	The car is on Inspection.	The Inspection computer input (IN) is deactivated.	Check all of the inspection switches and associated wiring.
LEVEL DN	The Level Down computer input is ON.	Comes ON normally when the car is just above a floor. If the car is level with the floor and a message appears, it is usually the result of a switch or sensor problem.	Inspect the LD switch or sensor on the landing system and the placement of the landing system vane or magnet for that floor.
LEVEL UP	The Level Up computer input is ON.	Comes ON normally when the car is just below a floor. If the car is level with the floor and a message appears, it is usually the result of a switch or sensor problem.	Inspect the LU switch or sensor on the landing system and the placement of the landing system vane or magnet for that floor.
LEV FAIL	Redundancy leveling fault	One or both of the LU and LD sensors have failed closed.	Ensure that the power is not present on both the LU and LD inputs.
LFLT OFF	One of the leveling sensor inputs (LU or LD) appears to have failed (in the inactive state). The controller computer did not detect the appropriate leveling signal (LU or LD) during the last approach to the floor.	Probable causes may be: 1. A faulty leveling sensor or associated circuitry (within the landing system assembly); 2. Faulty wiring from the landing system to the controller; 3. Faulty computer input circuit (main relay board or HC-PCIO board).	Check operation of the leveling sensors and associated wiring (place car on inspection, move above and below a landing, noting the transitions in the leveling signal(s) coming from the landing system). Verify that the computer diagnostic display of LU and LD matches the state of the sensor signals at the main relay board.
LFLT ON	One of the leveling sensor inputs (LU or LD) appears to have failed (in the active state). The controller computer detected that both the LU and LD inputs are active simultaneously.	Probable causes may be: 1. A faulty leveling sensor or associated circuitry (within the landing system assembly); 2. Faulty wiring from the landing system to the controller; 3. Faulty computer input circuit (main relay board or HC-PCIO board).	Check operation of the leveling sensors and associated wiring (place car on inspection, move above and below a landing, noting the transitions in the leveling signal(s) coming from the landing system). Verify that the computer diagnostic display of LU and LD matches the state of the sensor signals at the main relay board. Check also the operation of any contacts that may be placed at the "low side" (the "1-bus" side) of the LU and LD relay coils (e.g., H, INT). Check that such contacts close properly when appropriate.
LIGHT LD	Light Load	The Light Load Weighing input is activated.	Ensure that Light Load Weighing is required. If not, set the Light Load Weighing option to NO and ensure that the LLI input is not programmed. If Light Load Weighing is required, ensure that the Light Load Car Call Limit is set to the correct number of stops.
-LOBBY-	Car to Lobby function	The CTL input has been activated.	Go into Program mode and see if any spare inputs are programmed as CTL. Then, check to see if that particular input is activated.
LOW OIL	MLT shutdown with LOS	The car was unable to move at the expected speed due to insufficient oil.	Check the MLT/VLT Data Trap (Addr 495H bit 8). Ensure that there is sufficient oil in the reservoir. Check the Low Oil switch and LOS input.
LSR FAIL	Redundancy LSR fault	Either the DZ, LU or LD has failed closed.	Ensure that on any run between floors, the LSR input goes low at least once. If the DZ sensor has failed closed, power will be present continuously on the LSR input. If either the LU or LD sensor has failed closed, power will be present constantly on their respective inputs and this can also cause this error. This condition can be cleared by pressing the Redundancy Reset button.
MLT*	Motor Limit Timer elapsed	The Starter Overload or the Thermal Overload has tripped, or there is a mechanical problem that prevents or slows the motion of the car.	To clear the condition, the car must be put on inspection, then back into normal operation, or the RESET button must be pressed. Immediately check the Starter & Thermal Overloads and all circuitry associated with the motor.

TABLE 5.2   Error Status Messages and Response Chart

MESSAGE	MEANING	PROBABLE CAUSE	NEEDED RESPONSE
NORMAL	Normal mode of operation.	The elevator and controller are operating normally.	None
OVERLOAD	Overload car status	The car appears to be overloaded, as indicated by the load weigher input OVL.	Check the OVL input. If power is present on the OVL input, the load weigher contact associated with this input is closed. This contact being closed indicates to the elevator computer that the car is overloaded.
PWR TRAN	Power transfer	The PTI input has been activated.	Go into Program mode and see if any of the inputs are programmed as PTI. Then, check to see if that particular input is activated.
PASS REQ	The Passcode Request Option has been activated. *	The Passcode Request Option has been activated from the System Mode Menu.	* The system can be run on inspection operation only. The passcode must be entered correctly in the System Mode Menu in order to deactivate this option which will allow the controller to run normally (see Section 5.6.2).
RDLSFAIL	Rear Door Lock Relay failure	One or both of the rear door lock contact relays has failed closed.	Ensure that with the rear hoistway doors open, there is no power present on the RDLSR input. If power is present, one of the rear door lock relays has failed in the closed or picked position.
RGS FAIL	Redundancy RGS fault	The car gate switch relay has failed closed.	Ensure that with the car gate open, there is no power present on the RGS input. If power is present, the car gate switch relay has failed closed.
RGSRFAIL	Redundancy RGSR fault	The rear car gate switch relay has failed closed.	Ensure that with the rear car gate open, there is no power on the RGSR input. If power is present, the rear car gate switch relay has failed closed.
SABBATH	The elevator is in the Sabbath operation.	The spare input SAB has been activated.	Check spare input bit address for SAB. Verify that the spare input address matches the SAB flag. Check voltage level at IOX Board.
·SAFETY·	Safety Circuit is open.	The Car Operating Panel emergency stop switch has been pulled, or another contact switch in the safety circuit is in the open position.	Check the C.O.P. stop switch. Check the other switches and contacts in the safety string. Check safety string wiring against the MCE wiring diagrams.
SECURITY	Car expects Security code	MCE Security has been initiated.	Enter floor passcode in the C.O.P. within 10 seconds. See Section 5.6.1 for instructions on how to program or change security passcodes.
SYNC FNC	Synchronization Function	The SYNCI input has been activated	Ensure that the synchronization function is required. This function is used on PHC controllers used on jobs with two jacks or telescopic jacks. If the SYNCI is programmed and has been activated, the SYNC function will be performed as soon as all demand is serviced. Ensure that the circuit connected to SYNCI input is not activating the input inappropriately.
TESTMODE	The elevator is in Test Mode operation.	The spare input TEST has been activated.	Check the TEST/NORM switch on the Relay Board. Check voltage level at IOX Board.
TIME OUT	Timed out of service	The T.O.S. timer has expired.	See Section 5.4.5.6.
UDF FAIL	Redundancy UDF Fault	A failure in the up and down direction relays has been detected.	Check to see if the UDF input is active without the computer's generation of the UPDO or DNDO outputs. (This is not required.)
USD/DSD	Both the USD and the DSD inputs are active.	Usually indicates a problem with the up slow down or the down slow down switch.	Inspect both switches and associated wiring. The down slow down switch should be closed, unless the car is at the bottom; then it should be open. The up slow down switch should be closed, unless the car is at the top; then it should be open.
VLT	Valve Limit Timer elapsed.	A problem with the valve or valve solenoids.	Inspect the valves & valve solenoids and associated wiring.
VISCOS	The controller is executing the Viscosity Control Function.	The VCI (Viscosity Control Input) is ON. The computer is periodically running the motor to warm the oil in the system.	Check the device that is wired to the input (usually an oil temperature sensor).

5.3.6.3 ELEVATOR POSITION - The underlined section in this display shows the current elevator position relative to the bottom. The number 1 denotes the lowest landing in the elevator system.
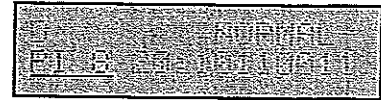

5.3.6.4 COMPUTER INTERNAL MEMORY - The underlined section in this display shows the computer's internal memory address (2 digits) and the data (8 digits) at that address. The colon character (:) separates the address from the data. The address is changed by first pressing the **N** pushbutton, then the + and – pushbuttons.

Each of the 8 data digits (flags) corresponds to a particular elevator signal or condition. There are 8 pieces of information about the elevator at each memory address. Each data digit is either 1 or 0. 1 indicates the signal or condition is *ON* and 0 indicates it is off.

The Computer Internal Memory Chart (Table 5.3) indicates the meaning of these data digits at different addresses.

For example, the internal memory display might look like this:
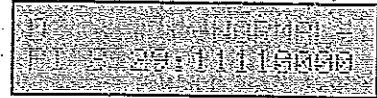
The address on the display is 29; the data at that address is 11110000. To figure out what this means, simply match up the data digits with row 29 of the Computer Internal Memory Chart:

Display Data: 1   1   1   1   0   0   0   0
Row 29:   DNDO   LD   DPD   DDP   UPDO   LU   UPD   UDP

Notice that the DNDO, LD, DPD and DDP signals are *ON* and the UPDO, LU, UPD and UDP signals are *OFF*.

TABLE 5.3   *Computer Internal Memory Chart*

					FLAGS AND VARIABLES			
ADD	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
10:	DOLMR	PHER	DZR	DOLR	DBCR	DOBR	GEUR	GEDR
11:	TFAR	DCR	UCR	CCR	NDSR	FDCR	DHOR	DOIR
12:	DCFR	DCPR	DOFR	LOTR	GHTR	HCTR	CCTR	SDTR
13:	DOCR	SER	DCLCR	CSBR	DCCR	NUDGR	NDGBPSR	DSHTR
20:	DOLM	PHE	DZ	DOL	DBC	DOB	GEU	GED
21:	TFA	DC	UC	CC	NDS	FDC	DHO	DOI
22:	DCF	DCP	DOF	LOT	GHT	HCT	CCT	SDT
23:	DOC	SE	DCLC	CSB	DCC	NUDG	NDGBPS	DSHT
24:	VCI	FRA	FCS	FRS	DNS	UPS	STD/R0	STU/R1
25:	SCE	FCCC	FCHLD	HLI	VCA	EXMLT	FWI	PIC
26:	LFP	UFP	NYDS	CCH	DIN	DPR	GTDE	GTUE
27:	HD	FCOFF	DHLD	IND	IN	DLKS	MLTP	MLTDO
28:	LLW	DLK	DDF	SUD	ISR	INCF	REAR	LLI
29:	DNDO	LD	DPD	DDP	UPDO	LU	UPD	UDP
2A:	DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
2B:	TOS	MLT	VLT	SST	H	HSEL	DSH	RUN
2C:	DZP	STC	SAF	HCR	HCDX	CCD	ISV	ISRT
2D:	TEMPB	UFQ	DZORDZ	FCSM	FRM	FRSS	FRAS	FRC
2E:	SD	SDA	DSD	BFD	SU	SUA	USD	TFD
2F:	FRBYP	FRON	HYD1_TRC0	ECC	CD	ECRN	EPR	PFG
30:	R4	R2	R3	FREE	DEADZ	DHLDI	PH1	NDGF
31:	CTLDOT	CTLF	CTL	ALV	EPSTP	AUTO	EPRUN	EPI
33:	API	SAB	TEST	DHENDR	DHEND	CTST	HOSPH2	HOSP
38:	HML	SLV	CCC	CNFG	DLI	DLW	LWCE	HLW
42:	COMMUNICATION TIME-OUT ERROR COUNT							
43:	COMMUNICATION CHECKSUM ERROR COUNT							

5.3.7 TROUBLESHOOTING USING THE COMPUTER'S INTERNAL MEMORY

Examining the computer memory (as in the example above) is a useful step in troubleshooting elevator problems. It is possible to find out if the controller is receiving input signals correctly and if it is sending out the proper output signals. It is also possible to look up each of the computer output and input signals shown in the Job Prints.

The following example illustrates how to use Tables 5.3 and 5.4 to check a signal in the computer internal memory.

Example problem: the photo eye will not cause the doors to reopen.

Step 1: Look at Table 5.4. Find the abbreviation or mnemonic for Photo Eye input. Table 5.4 shows that the mnemonic for Photo Eye input is PHE.

Step 2: Look for PHE on Table 5.4. Table 5.4 gives an Address (Addr) and Position for each signal. This will show where to look for the signal on Table 5.3 and on the computer display.

Table 5.4 shows that the Address of PHE is 20 and the Position is 7.

Step 3: Notice on Table 5.3 that PHE is indeed in Position 7 on row 20.

Step 4: Now that the Address and Position have been determined, look up the PHE signal on the computer. First, change the address on the display to address 20 (see Sections 5.3.2 and 5.3.3 for an explanation). Then, look at data bit number 7 (from the right), which is underlined in the following display:

This digit represents the computer's interpretation of the PHE signal. If the digit is 1, the computer thinks that the PHE signal is *ON*. If the digit is 0 (as shown above), the computer thinks that the PHE signal is *OFF*.

This information can be used to find the source of the problem. The diagnostic display will show that the PHE input is *ON* when an obstruction is present which should interrupt the photo eye beam. If this is the case, checking the voltage present on the PHE terminal will show if the problem is inside or outside the controller.

TABLE 5.4   *Alphabetized Flags/Variables and Their Locations*

FLAG	Definition	Addr	Position	FLAG	Definition	Addr	Position
ALV	Other car alive output	31	5	FRS	Fire phase 1 input	24	5
API	Alternate Parking Input	33	8	FRSS	Fire phase 1 flag	2D	3
AUTO	Emergency power auto output	31	3	FWI	Fire warning indicator output	25	2
BFD	Bottom floor demand flag	2E	5	GED	Gong enable down output	20	1
CC	Car call flag	21	5	GEDR	Gong enable down output (rear)	10	1
CCA	Car call above flag	2A	1	GEU	Gong enable up output	20	2
CCB	Car call below flag	2A	5	GEUR	Gong enable up output (rear)	10	2
CCC	Car call cancel input	38	6	GHT	Gong hold timer flag	22	4
CCD	Car call disconnect flag	2C	3	GHTR	Gong hold timer flag (rear)	12	4
CCH	Car call hold	26	5	GTDE	Gong timer down enable	26	2
CCR	Car call flag (rear)	11	5	GTUE	Gong timer up enable	26	1
CCT	Car call-time flag	22	2	H	High speed output	2B	4
CCTR	Car call time flag (rear)	12	2	HCDX	Hall call disconnect flag	2C	4

FLAG	Definition	Addr	Position	FLAG	Definition	Addr	Position
CD	Car done flag	2F	4	HCR	Hall call reject flag	2C	5
CNFG	Configuration error flag	38	5	HCT	Hall call door time flag	22	3
CSB	Car stop switch bypass	23	5	HCTR	Hall call door time flag (rear)	12	3
CSBR	Car stop switch bypass (rear)	13	5	HD	High speed delay flag	27	8
CTL	Car to lobby input	31	6	HLI	Heavy load input	25	5
CTLDOT	Car to lobby door open timer	31	8	HLW	Heavy load weigher flag	38	1
CTLF	Car to lobby function	31	7	HML	Home landing input	38	8
CTST	Capture for test input	33	3	HOSP	In car hospital emergency input flag	33	1
DBC	Door close button input	20	4	HOSPH2	Hospital emergency phase 2 flag	33	2
DBCR	Door close button (rear)	10	4	HSEL	Hospital service select flag	2B	3
DC	Down call flag	21	7	HYD1-TR0	Hydro/Traction flag	2F	6
DCA	Down call above flag	2A	3	IN	Inspection or access input	27	4
DCB	Down call below flag	2A	7	INCF	Independent service car call cancel flag	28	3
DCC	Door close complete flag	23	4	IND	Independent service input	27	5
DCCR	Door close complete flag (rear)	13	4	ISR	In service and ready	28	4
DCF	Door close function output LIMIT	22	8	ISRT	In service truly flag	2C	1
DCFR	Door close function output (rear)	12	8	ISV	In service flag	2C	2
DCLC	Door close contact input	23	6	LD	Level down input	29	7
DCLCR	Door close contact input (rear)	13	6	LFP	Lower parking floor flag	26	8
DCP	Door close power output	22	7	LLI	Light load input	28	1
DCPR	Door close power output (rear)	12	7	LLW	Light load weighing function input flag	28	8
DCR	Down call flag (rear)	11	7	LOT	Lobby door time	22	5
DHENDR	Door hold end rear	33	5	LOTR	Lobby door time (rear)	12	5
DDF	Double ding function flag	28	6	LU	Level up input	29	3
DDP	Down direction preference flag	29	5	LWCE	Load weighing change enable flag	38	2
DEADZ	Dead zone flag	30	4	MLT	Motor limit timer flag	2B	7
DHEND	Door hold end	33	4	MLTDO	Motor limit timer door open	27	1
DHLD	Door hold input flag	27	6	MLTP	Motor limit timer pilot flag	27	2
DHLDI	Normal door hold input flag	30	3	NDGBPS	Nudging bypass flag	23	2
DHO	Door hold open flag	21	2	NDGBPSR	Nudging bypass flag (rear)	13	2
DHOR	Door hold open flag (rear)	11	2	NDGF	Nudging function flag	30	1
DIN	Door open inactive	26	4	NDS	Hall door timer non-shorten	21	4
DLI	Dispatch Load input	38	4	NDSR	Hall door timer non-shorten (rear)	11	4
DLK	Door lock input	28	7	NUDG	Nudging output	23	3
DLKS	Door lock store bit	27	3	NUDGR	Nudging output (rear)	13	3
DLW	Dispatch load weighing function	38	3	NYDS	New York door shortening flag	26	6
DMD	Demand down flag	2A	8	PFG	Passing floor gong output	2F	1
DMU	Demand up flag	2A	4	PH1	Phase 1 return complete flag	30	2
DNDO	Down direction output	29	8	PHE	Photo eye input	20	7
DNS	Down direction sense input	24	4	PHER	Photo eye input (rear)	10	7
DOB	Door open button input	20	3	PIC	PI correction flag	25	1
DOBR	Door open button input (rear)	10	3	R2	Absolute floor encoding #2	30	7
DOC	Door open command	23	8	R3	Absolute floor encoding #3	30	6
DOCR	Door open command (rear)	13	8	R4	Absolute floor encoding #4	30	8
DOF	Door open function output	22	6	REAR	Rear door flag	28	2
DOFR	Door open function output (rear)	12	6	RUN	Run flag	2B	1
DOI	Door open intent flag	21	1	SAB	Sabbath input	33	7
DOIR	Door open intent flag (rear)	11	1	SAF	Safety string input	2C	6
DOL	Door open limit input	20	5	SCE	Stepping correction enable	25	8
DOLM	Door open limit memory flag	20	8	SD	Supervisory down flag	2E	8
DOLMR	Door open limit memory flag (rear)	10	8	SDA	Down direction arrow	2E	7
DOLR	Door open limit (rear)	10	5	SDT	Short door time flag	22	1
DPD	Down previous direction	29	6	SDTR	Short door time flag (rear)	12	1

FLAG	Definition	Addr	Position	FLAG	Definition	Addr	Position
DPR	Door protection timer flag	26	3	SE	Safety edge input	23	7
DSD	Down slow down input	2E	6	SER	Safety edge input (rear)	13	7
DSH	Door shortening flag	2B	2	SLV	Stable slave flag	38	7
DSHT	Door shortening flag	23	1	SST	Soft stop timer flag	2B	5
DSHTR	Door shortening flag (rear)	13	1	STC	Stepping complete flag	2C	7
DZ	Door zone input	20	6	STD/R0	Step down input/absolute floor encoding #0	24	2
DZORDZ	Front or rear door zone input	2D	6	STU/R1	Step up input/absolute floor encoding #1	24	1
DZP	Door zone previous	2C	8	SU	Supervisory up flag	2E	4
DZR	Door zone input (rear)	10	6	SUA	Up direction arrow	2E	3
ECC	Excess car calls flag	2F	5	TEMPB	Temporary bit	2D	8
ECRN	Emergency car run flag	2F	3	TEST	Test switch input	33	6
EPI	Emergency power input flag	31	1	TFA	Timing function active	21	8
EPR	Emergency power return	2F	2	TFAR	Timing function active (rear)	11	8
EPRUN	Emergency power run input	31	2	TFD	Top floor demand flag	2E	1
EPSTP	Emergency power stop input	31	4	TOS	Timed out of service flag	2B	8
EXMLT	External Motor Limit Timer	25	3	UC	Up call flag	21	6
FCCC	Fire phase 2 car call cancel	25	7	UCA	Up call above flag	2A	2
FCHLD	Fire phase 2 hold	25	6	UCB	Up call below flag	2A	6
FCOFF	Fire phase 2 off	27	7	UCR	Up call flag (rear)	11	6
FCS	Fire phase 2 input	24	6	UDP	Up direction preference	29	1
FCSM	Fire service phase 2 input memory	2D	5	UFP	Upper parking floor flag	26	7
FDC	Door fully closed phase 2	21	3	UFQ	Up first qualifier flag	2D	7
FDCR	Door fully closed phase 2 (rear)	11	3	UPD	Up previous direction	29	2
FRA	Alternate Fire service phase 1 input	24	7	UPDO	Up direction output	29	4
FRAS	Alternate fire flag	2D	2	UPS	Up direction sense input	24	3
FRBYP	Fire phase 1 bypass input flag	2F	8	USD	Up slow down input	2E	2
FRC	Fire phase 2 flag	2D	1	VCA	Viscosity active	25	4
FREE	No demand and in service	30	5	VCI	Viscosity input	24	8
FRM	Fire service phase 1 flag	2D	4	VLT	Valve limit timer	2B	6
FRON	Fire phase 1 on input flag	2F	7				

5.3.8 TROUBLESHOOTING SPECIFIC PROBLEMS

This section will describe how to solve some specific problems by using the computer panel.

5.3.8.1 PROBLEM: THE BFD/TFD ERROR MESSAGE IS FLASHING ON THE DISPLAY -

As shown in Table 5.2, the message means that there is either a Bottom Floor Demand or a Top Floor Demand. The controller is trying to establish the position of the car by sending it to either the bottom or top floor.

> **NOTE:** If the controller has the Absolute Floor Encoding feature, then the controller can establish the position of the car as soon as the car reaches any door zone. The car does not have to travel to a terminal landing to establish the position of the car.

It is normal for the BFD/TFD message to appear on the display right after power up, after the car is taken off Inspection, or after the COMPUTER RESET button is pressed. However, in all of these cases, the BFD/TFD message should be cleared quickly and then it should not be seen again as the car runs on Normal service.

If the BFD/TFD message is flashing for no apparent reason, take the following steps:

The first step in troubleshooting is to decide which of the following scenarios applies:

Scenario A: The car is stuck at the bottom floor with the BFD/TFD error message flashing constantly.

-OR-

Scenario B: The car runs normally until it reaches the top floor, then the BFD/TFD error message flashes and the car goes to the bottom floor. When it reaches the bottom, the message is cleared and the car functions normally until it again reaches the top floor.

-OR-

Scenario C: The car runs normally until it reaches the bottom floor. Then the BFD/TFD error message flashes and the car goes to the top. After it gets there, the message is cleared and the car runs normally until it again reaches the bottom floor.

WHAT TO DO FOR SCENARIO A:

A Bottom Floor Demand should be cleared when all of the following conditions are met:

1. The car is at the bottom and the Down Slow Down (DSD) input to the controller is *OFF*.

2. The Door Zone (DZ) input to the controller is *ON*.

3. The Door Lock (DLK) input to the controller is *ON*.

Look up the DSD, DZ and DLK signals in the computer memory (see Section 5.3.7 for an explanation). When the car is at the bottom floor with the doors locked, the correct values for these signals in the computer memory are as follows:

```
DSD     =     0 (OFF)
DZ      =     1 (ON)
DLK     =     1 (ON)
```

If there is a different value for any of the 3 signals, check the wiring associated with that particular signal.

For example, if the DSD signal is equal to 1 (ON) in the computer memory, inspect the DSD input wiring, including the Down Slow Down limit switch. The Down Slow Down switch contacts should be open when the car is at the bottom.

WHAT TO DO FOR SCENARIO B: In this situation, the USD input is usually the problem. Look at the USD signal in the computer memory (Address 2E, Position 2). USD should be *ON* except when the car is at the top; then it should be *OFF*. If the signal is not following this rule, then inspect the wiring associated with the USD input, including the Up Slow Down limit switch. The Up Slow Down switch contacts should be open when the car is at the top.

WHAT TO DO FOR SCENARIO C: In this situation, the DSD input is usually the problem. Look at the DSD signal in the computer memory (Address 2E, Position 6). DSD should be *ON* except when the car is at the bottom; then it should be *OFF*. If the signal is not following this rule, then inspect the wiring associated with the DSD input, including the Down Slow Down limit switch. The Down Slow Down switch contacts should be open when the car is at the bottom.

5.3.8.2 PROBLEMS WITH CALLS - See Section 6.3, for Call Logic and Troubleshooting of call circuits.

5.3.8.3 PROBLEMS WITH DOORS - See Section 6.2, which explains how to use computer memory to solve door problems.

5.4 PROGRAM MODE

This section will explain how to use Program mode. Enter Program mode by moving the **F1** switch on the computer board to the up position. Program mode can be used to program the controller to meet the requirements of the elevator such as, the selection of stops and fire floors, or changing timer values and selecting options such as nudging. The PHC controller has already been programmed at MCE. Usually, the controller does not have to be programmed during the initial installation. Program mode can be used later to modify the elevator operation.

FUNCTION SWITCHES

F8 F7 F6 F5   F4 F3 F2 F1
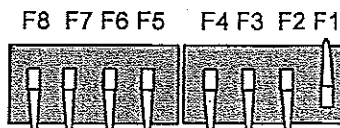
Program mode

Refer to the Programming Record in the Job Prints for a list of the options and values programmed into the controller at MCE. If you choose, you may copy these values into the space provided in Appendix A.

 NOTE: If any changes are made using Program mode, record them in writing for future reference (use Appendix A).

5.4.1 GENERAL DESCRIPTION OF PROGRAM MODE

The car must be on Inspection before Program mode can be used. Messages will appear on the computer board display. Use the **N** and **S** pushbuttons below the display to find and select options and to change values. The next several subsections describe in detail how to use Program mode.

5.4.1.1 VIEWING MENUS ON THE LCD DISPLAY - All of the programmable options and features are divided into menus. The following is a list of all of the menus:

- Basic Features Menu
- Fire Service Menu
- Door Operation Menu
- Timer Menu

- Gongs/Lanterns Menu
- Spare Inputs Menu
- Spare Outputs Menu
- Extra Features Menu

For each menu, there is a Menu Message on the display. To look at these Menu Messages, enter Program mode by moving the **F1** switch to the up position. The Start Message will appear:

PROGRAM MODE
PRESS N TO BEGIN

Press the **N** pushbutton, and release it.
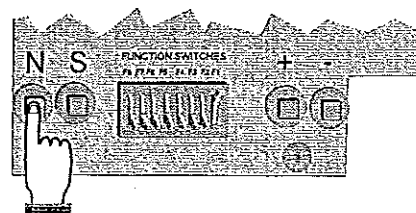
The first Menu Message will appear:

```
* BASIC FEATURES *
       MENU
```

Press the **N** pushbutton again, the next Menu message will appear:

```
* FIRE SERVICE *
```

Hold down the **N** pushbutton, each Menu Message will appear, one at a time. Finally, the Start Message will appear again.

5.4.1.2 VIEWING OPTIONS WITHIN A MENU - The options can be viewed inside a particular menu by pressing the **S** pushbutton when the Menu Message appears on the display. For example, to look at the options in the Door Operation Menu, first press the **N** pushbutton until the Door Operation Menu Message appears:

```
* DOOR OPERATION *
       MENU
```

Press the **S** pushbutton. The following display will appear:

```
NUDGING? YES
```

To view the next option, press the **N** pushbutton. Hold down the **N** pushbutton to scroll through the options. Eventually the Menu Message will reappear, or to return directly to the Menu Message while the options are displayed, press the **N** and '+' pushbuttons at the same time. Press the **S** pushbutton to see the options for that same menu again, or press the **N** pushbutton to go on to the next menu.

5.4.1.3 CHANGING A VALUE - For each option that appears, the value can be changed by pressing the **S** pushbutton. While in the Timer, Spare Inputs and Spare Outputs menus, pressing and holding the **S** pushbutton for five seconds causes the display to scroll through the values at a faster rate. Also, in those same menus, pressing the **S** and '-' pushbuttons at the same time will cause the display to scroll backwards and pressing the **S** and '+' pushbuttons at the same will reset the option to NOT USED. To return directly to the Menu Message while the values or options are displayed, press the **N** and '+' pushbuttons at the same time.

Going back to the previous example in which the Nudging option was on the display:

```
NUDGING? YES
```

Pressing the **S** pushbutton to changes Nudging to NO:

```
NUDGING? NO
```

5.4.1.4 SAVING THE NEW VALUES - Whenever options or values are changed in Program mode, this information must be saved in the computer's memory. When the changes are complete, press the **N** pushbutton until the following message appears:

```
SAVE CHANGES *
N=NO    S=YES
```

Press the **S** pushbutton to save the changes and the following display will appear:

```
SAVE COMPLETE
N= CONTINUE
```

Now press the **N** pushbutton, and the Start Message will appear again. When programming is complete, move the **F1** switch back to the down position.

> **NOTE:** If the values have not been saved, they will be lost when *F1* is switched back to *OFF* (down) position. *Make sure* to keep an account of saved changes on the record provided in Appendix A.

5.4.1.5 RESTORING ORIGINAL VALUES - When using Program mode, if some values have been changed, but then you decide to go back to the old values, exit Program mode without saving the changes. Move the *F1* switch back to the down position and the original values will be restored.

5.4.1.6 STEP-BY-STEP EXAMPLE - Table 5.5 is a step-by-step example of using Program mode. In this example, the Fire Phase 1 Alternate floor will be changed. Similar steps can be taken to change any option.

TABLE 5.5   Using the Program Mode

Example: Changing Fire Phase 1 Alternate floor from 1 to 3		
STEPS TO TAKE	DISPLAY MENUS AND SUB-MENUS	SECTION OF MANUAL
Put car on Inspection	D -INSPECT- PI 8 20:1011000	
Flip *F1* switch *Up*	PROGRAM MODE PRESS N TO BEGIN	
Press *N* button for Next	*BASIC FEATURES* * MENU *	5.4.2
Press *N* button for Next	* FIRE SERVICE * * MENU *	5.4.3
Press *S* button for Select	FIRE SERVICE OPERATION? YES	5.4.3.1
Press *N* button for Next	FIRE PHASE 1 MAIN FLOOR = 1	5.4.3.2
Press *N* button for Next	FIRE PHASE 1 ALT. FLOOR = 2	5.4.3.3
Press *S* button to select next available value. If you press *S* too many times, continue to press it until the desired value appears again.	FIRE SVCE. CODE ALT. FLOOR = 3	5.4.3.3
Press *N* button for Next	FIRE SVCE. CODE XXXX	5.4.3.4
Press *N* button for Next	BYPASS STOP SW. ON PHASE 1? YES	5.4.3.5
Press *N* button to scroll through any remaining Fire Service sub-menus.		
Press *N* button for Next	* FIRE SERVICE * * MENU *	
Press *N* button for Next	*DOOR OPERATION* * MENU *	5.4.4
Press *N* button for Next	* TIMER * * MENU *	5.4.5
Press *N* button for Next	*GONGS/LANTERNS* * MENU *	5.4.6
Press *N* button for Next	* SPARE INPUTS * * MENU *	5.4.7
Press *N* button for Next	* SPARE OUTPUTS* * MENU *	5.4.8
Press *N* button for Next	*EXTRA FEATURES* * MENU *	5.4.9
Press *N* button for Next	* SAVE CHANGES?* * N=NO S=YES *	
Press *S* button to Save	SAVE COMPLETE: N= CONTINUE	
Press *N* button for Next	PROGRAM MODE PRESS N TO BEGIN	
Flip *F1* switch *Down* and take car off of Inspection	*The new options are stored and are now in effect.*	

5.4.2 BASIC FEATURE MENU OPTIONS

5.4.2.1 SIMPLEX OR DUPLEX? - The controller has been programmed at the factory for either simplex or duplex capability.

If the controller has simplex capability, it can only operate a single car as a simplex. The Simplex/Duplex option message will not appear on the display.

If the controller has duplex capability, then it can operate a single car as a simplex, or it can be connected to a second PHC controller and the 2 controllers can operate 2 cars as a duplex.

Both PHC controllers must have duplex capability for this arrangement to work. Also, the Simplex/Duplex option on each controller must be set to duplex.

5.4.2.2 OPERATION (DISPATCHING OPERATION) - For simplex operation, there are 3 dispatching operations to choose from: Selective Collective, Single Button Collective, or Single Automatic Pushbutton. Each operation is described below.

> **Selective Collective** - Choose this operation if there is an UP and DOWN button at each landing station except for the top floor (DOWN button only) and bottom floor (UP button only) and any number of calls can be registered at one time.

> **Single Button Collective** - Choose this operation if there is only 1 call button at each landing station and any number of calls can be registered at one time.

> **Single Automatic Pushbutton** - Choose this operation if there is only 1 call button at each landing station and only 1 call can be registered and/or serviced at a time.

> **NOTE:** If either Single Button Collective or Single Automatic Pushbutton operation is selected, then one of the spare output terminals should be used for an INDFRC output. This output is used to cut out the hall calls during Fire Service and Independent Service (see Section 5.4.8 for more details). Refer to the Job Prints for information on using the INDFRC output to cut out hall calls.

For duplex operation, the dispatching scheme is always Selective Collective. Therefore, the Operation option message will not appear on the display if the duplex option has been selected.

5.4.2.3 TOP LANDING SERVED? (simplex) / TOP LANDING FOR THIS CAR? (duplex) - Set this option to the highest floor served by this car.

5.4.2.4 CAR DOORS ARE WALK-THRU? (simplex) / THIS CARS DOORS WALK-THRU? (duplex) - Set this option to *YES* if independent (walk-through) doors are served by this car.

5.4.2.5 CAR SERVES FRNT/FLR 1? (simplex) /THIS CAR SERVES FRNT/FLR 1? (duplex) - Setting this option to YES indicates that this car is eligible to serve a front opening at this floor. This option will continue to be asked until the top landing is reached. Press the '+' pushbutton to scroll through the available landings. Press the N pushbutton for the next option.

5.4.2.6 CAR SERVES REAR/FLR 1? (simplex) / THIS CAR SERVES REAR/FLR 1? (duplex) - Setting this option to YES indicates that this car is eligible to serve a rear opening

at this floor. This option will not be displayed if option 5.4.2.4 is set to *NO*. This option inquiry will continue until the top landing is reached. Press the '+' pushbutton to scroll through the available landings. Press the N pushbutton for the next option.

For a duplex, option inquiries for 5.4.2.4 through 5.4.2.6 must be answered for both cars. Each message will ask what the *other* car's top landing is, if it serves rear floors, etc. Again, select *YES* if the other car of the duplex serves that floor and *NO* if the other car does not. *Both* controllers in a duplex need to be programmed with this information.

5.4.2.7 PARKING FLOOR - Any landing can be selected to be the parking floor. The car will go to the parking floor when it is free of call demand. In addition, there is a Parking Delay Timer that will cause a free car to wait for a short time before parking. The timer is adjustable, with a value between 0.0 minutes (no delay) and 6.0 minutes (see Section 5.4.5.10 for more details). If the parking feature is not needed, choose NONE when the Parking Floor option message is on the display. The car will stay at the last call answered.

5.4.2.8 SECONDARY PARKING FLOOR - This option is for duplex systems only. Any landing can be selected to be the secondary parking floor. The car will go to this floor when it becomes free of call demand and the other car is already parked at the first parking floor. It is acceptable to make the secondary parking floor the same as the first parking floor, if both cars are to park at the same floor. If a second parking floor is not needed, choose *NONE* when the Secondary Park Floor option message is on the display. Then, the first free car will go to the first parking floor, but the second car will stay at the last call answered.

5.4.2.9 LOBBY FLOOR - Any landing can be selected to be the Lobby Floor. When the car answers either a hall or car call at this floor, the doors will stay open until the Lobby Door Timer elapses (the Lobby Door Timer is adjustable, see Section 5.4.5.4). NOTE: The Lobby Floor is also used for CTL input.

5.4.2.10 CAR IDENTIFIER - This option is for duplex systems only. Its purpose is to specify which controller is assigned to car A and which controller is assigned to car B. This is primarily used for controllers that use a peripheral device such as a CRT.

5.4.2.11 NUMBER OF IOX BOARDS? - Program the number of HC-IOX boards installed in the controller (valid range is 0 to 4).

5.4.2.12 NUMBER OF I4O BOARDS? - Program the number of HC-I4O boards installed in the controller (valid range is 0 to 3).

5.4.2.13 NUMBER OF AIOX BOARDS? - Program the number of HC-AIOX boards installed in the controller (valid range is 0 or 1).

5.4.3 FIRE SERVICE MENU OPTIONS

5.4.3.1 FIRE SERVICE OPERATION? - If Fire Service operation is not required, then this option should be set to *NO*. Otherwise, if set to *YES*, the options below will appear on the LCD display.

5.4.3.2 FIRE PHASE 1 MAIN FLOOR - Any landing can be selected to be the Main Fire Return Floor for Fire Service.

5.4.3.3 FIRE PHASE 1 ALT. FLOOR - Any landing can be selected to be the Alternate Fire Return Floor for Fire Service.

5.4.3.4 FIRE SVCE. CODE - The Fire Service Operation will conform to the selected fire service code. The fourteen different codes to choose from are:

1. CHICAGO (OLD)
2. VET ADMIN (Veterans' Administration)
3. NYC RS-18
4. ANSI A17.1 -89>
5. CALIF. TITLE 8
6. HAWAII
7. CSA B44-M90
8. 34 PA CODE, CH. 7
9. CITY OF HOUSTON
10. AUSTRALIA
11. CITY OF DETROIT
12. MASSACHUSETTS
13. ANSI A17.1 85 - 88
14. CITY OF DENVER
15. CHICAGO 2001

5.4.3.5 BYPASS STOP SW. ON PHASE 1? - This option was added to keep the stop switch from being bypassed on Fire Phase I. With this option set to *NO*, the CSB output will not come *ON* as the car is returning on Fire Phase I.

5.4.3.6 HONEYWELL FIRE OPERATION? (YES/NO) - This option is only available if the FIRE SVCE. CODE option is set to AUSTRALIA (see section 5.4.3.4). If this option is set to *YES* then the Australia fire code will conform to Honeywell's requirements. If this option is set to *NO* then the controller will conform to standard Australia code.

5.4.3.7 NEW YORK CITY FIRE PHASE 2 AND ANSI 89? (YES/NO) - This option is only available if the FIRE SVCE. CODE option is set to ANSI A17.1 89 (see section 5.4.3.4). If this option is set to *YES* then the ANSI A17.1 89 Fire Code will conform to New York City Fire Code requirements when on Fire Phase 2. If this option is set to *NO* then the controller will conform to standard ANSI A17.1 89 Fire Code.

5.4.3.8 WHITE PLAINS, NY FIRE CODE? - This option is only available if the FIRE SVCE. CODE option is set to ANSI17.1 89 (see Section 5.4.5.4). The city of White Plains requires that if fire phase one is still in effect, the car can exit fire phase two regardless of the position of the doors. Setting this option to YES will comply with this requirement.

5.4.4 DOOR OPERATION MENU OPTIONS

5.4.4.1 NUDGING? - This option causes Nudging Operation to occur when the doors are prevented from closing. During Nudging Operation, the controller will turn *ON* the NUDG output, to signal the door operator to close the doors at a reduced speed. The NUDG output will stay *ON* for the amount of time the Nudging Timer is set, and then cycle off for the same amount of time. This cycle will continue until the doors have become fully closed. The NUDG output can also be used to activate a buzzer. The PHE (Photo Eye) input will be ignored during nudging, if the Stuck Photo Eye Protection option has been selected (see Section 5.4.4.2). A Safety Edge or Door Open Button input will stop the doors from closing, but will not reopen the doors fully. Nudging Operation will begin when the Nudging Timer elapses. The Nudging Timer starts when the regular door timer elapses. The Nudging Timer is adjustable, with a value between 10 and 60 seconds (see Section 5.4.5.5).

5.4.4.2 STUCK PHOTO EYE PROTECTION? - This option causes the controller to ignore the PHE (Photo Eye) input and to close the doors. The PHE input will be ignored when the Nudging Timer elapses, if the Nudging option is selected or when the Time Out of Service Timer elapses, whichever comes first. If the Nudging option is not selected, then the PHE input will be ignored when the Time Out of Service Timer elapses (see Section 5.4.5.6 for more details).

If the Stuck Photo Eye Protection option is not selected, a PHE input that is stuck *ON* will keep the doors open indefinitely.

5.4.4.3 SEQUENTIAL DOOR OPER. (F/R)? - This option is available only if independent rear doors are present. If this option is set to *YES* then the front and rear doors of the car do not open at the same time. Whenever the controller receives a front and rear call to the same landing, the car will, upon reaching that landing, first open the front doors and close them, then open the rear doors and close them. The default is to open the front doors first unless the rear doors have already started to open.

5.4.4.4 CAR CALL CANCELS DOOR TIME? - If this option is selected, pressing a car call button when the doors are fully open will cause the doors to start closing. There is one exception. If the car is stopped at a floor, pressing the car call button *for that same floor* will not cause the doors to close, but will cause the doors to reopen if they are in the process of closing.

5.4.4.5 NUDGING DURING FIRE PH. 1? - If this option is selected, the controller will turn *ON* the NUDG output while the doors are closing during Fire Phase 1. The NUDG output signals the door operator to close the doors at a reduced speed. This option is useful for elevators that do not have mechanical safety edges. During Fire Phase 1, all smoke sensitive reopening devices must be disabled. This includes photo eyes and other devices that use infrared beams. If there are no other reopening devices active, then the doors should be closed at reduced speed.

5.4.4.6 RETIRING CAM OPTION? - This option should be selected for elevators with retiring cams. This option affects the car only when it is sitting at a floor. Without this option, the controller will wait until the doors are closed and locked before it turns *OFF* the door close signal. However, if the elevator has a retiring cam, the doors will not be locked until the retiring cam is activated.

If this option is selected, the controller will turn *OFF* the door close signal when the doors are *closed* instead of waiting for the doors to be locked. More precisely, the controller will turn *OFF* the door close output signal (DCF) when the DCLC (Doors Closed Contact) input is *ON* or when the DCL (Door Close Limit) input is *OFF*, instead of waiting for the DLK (Door Lock) input to turn *ON*.

5.4.4.7 PRE-OPENING? - If this option is selected, the controller will begin to open the doors just before the car completely stops at a floor. More precisely, the controller will turn *ON* the DOF (Door Open Function) output signal when the DZ (Door Zone) input turns *ON*. Typically, the DZ input first turns *ON* when the car is about 3 inches away from the final stopping point. This option is not recommended for elevators that may spend an extended period of time in leveling.

5.4.4.8 MECHANICAL SAFETY EDGE? - If this option is selected, the Nudging Operation will cycle until the doors are fully closed. Otherwise, the nudging function will operate continuously to comply with code requirements where a door reopening device is not used (see Section 5.4.4.1 for more details).

5.4.4.9 NUDGING OUTPUT/BUZZER ONLY? - If this option is selected with the Nudging option, the NUDG output will be activated when the Nudging Timer elapses. However, if either the Mechanical Safety Edge or the Door Open button is activated, the doors will stop and reopen fully. If this option is not selected, the doors will simply stop under these circumstances, but will not reopen fully. This option may be useful when only a nudging buzzer is required, but the actual Nudging Operation is not needed (see Section 5.4.4.1 for more details).

5.4.4.10 D.C.B. CANCELS DOOR TIME? - When the doors are fully open, this option will cancel any pre-existing door time and cause the doors to start closing when the Door Closed button is pressed.

5.4.4.11 LEAVE DOORS OPEN ON PTI/ESS? - With this option set and either the Power Transfer (PTI) input or the Elevator Shutdown Switch (ESS) input selected and active, once the car has stopped at a floor, the doors will remain open instead of cycling closed.

5.4.4.12 NUDGING DURING FIRE PHASE 2? - If this option is selected, the controller will turn *ON* the NUDG output while the doors are closing during Fire Phase 2. The NUDG output signals the door operator to close the doors at reduced speed.

5.4.4.13 DIR. PREFERENCE UNTIL DLK? - This option causes the car to maintain its present direction preference until the doors are fully closed. Otherwise, the direction preference is maintained only until the door dwell time expires.

5.4.4.14 FULLY MANUAL DOORS? - Set this option to *YES* whenever the doors are opened and closed manually versus automatically.

5.4.4.15 CONT. D.C.B. TO CLOSE DOORS? - When this option is set to *YES*, the doors will remain open while the car is at a landing until the Door Close button is pressed. While the Door Close button is pressed, the doors will continue to close. If the Door Close button is released before the doors have closed fully, the door will re-open.

5.4.4.16 CONT. D.C.B. FOR FIRE PH 1? - When set to *YES*, the doors will remain open when the car goes on Fire Phase 1 until constant DCB forces them closed.

5.4.4.17 MOMENT. D.O.B. DOOR OPENING ? - This option is used to require the momentary pressure on the Door Open Button (DOB) to open the doors. If set to *NO*, momentary pressure on the DOB is not required to open the doors when the car reaches a landing. The doors open automatically in response to a call.

> **5.4.4.17.1 MOMENT D.O.B. FOR:** *(FRONT CALLS/ REAR CALLS/ BOTH CALLS)* - Choose whether front calls, rear calls or both calls need momentary D.O.B.
>
> - *FRONT CALLS* - this option necessitates that DOB be pressed when the car responds to *front* door calls. Rear door calls are not affected.
>
> - *REAR CALLS* - this option necessitates that DOB be pressed when the car responds to *rear* door calls. Front door calls are not affected.
>
> - *BOTH CALLS* - this option necessitates that DOB be pressed when the car responds both *front* and *rear* door calls.
>
> **5.4.4.17.2 MOMENT D.O.B. FOR:** *(HALL CALLS/ CAR CALLS/ ALL CALLS)* - Choose whether hall calls, car calls or all calls need momentary D.O.B.
>
> - *HALL CALLS* - this option necessitates that DOB be pressed when the car responds to *hall calls*. Car calls are not affected.
>
> - *CAR CALLS* - this option necessitates that DOB be pressed when the car responds to *car calls*. Hall calls are not affected.
>
> - *ALL CALLS* - this option necessitates that DOB be pressed when the car responds to both *hall calls* and *car calls*.

5.4.4.18 DOORS TO OPEN IF PARKED: *(NONE/FRONT/REAR/BOTH)* - If set to *NONE*, the doors remain closed while the car is parked. When set to *FRONT, REAR,* or *BOTH,* the

corresponding doors automatically open and remain open while the car is parked. This option is available only if a parking floor is programmed in the Basic Features menu. *BOTH* option is not available if the car is programmed for sequential door operation. See Section 5.4.4.3 for more details.

5.4.4.19 DOORS TO OPEN ON MAIN FIRE? - The choices for this option are FRONT, REAR and BOTH. This option determines which door(s) should open once the car has completed a Main Fire return (only if option 5.4.2.4 is set to *YES*).

5.4.4.20 DOORS TO OPEN ON ALT FIRE? - The choices for this option are FRONT, REAR and BOTH. This option determines which door(s) should open once the car has completed an Alternate Fire return (only if option 5.4.2.4 is set to *YES*).

5.4.4.21 LEAVE DOORS OPEN ON CTL? - When set to *YES*, and the CTL (car to lobby) input is active, once the car has returned to the lobby, the doors will remain open instead of cycling closed.

5.4.4.22 LIMITED DOOR RE-OPEN OPTION - Once the doors begin to close after a door dwell time has expired, if a re-opening device input (PHE or SE) is seen, this option will allow the doors to re-open as long as the re-opening device is active. Once the re-opening device is inactive, the doors will immediately begin to close again. Without this option set, in this same case, the doors will re-open fully for a short door time and then close.

5.4.4.23 REDUCE HCT WITH PHOTO EYE - This option will cause a normal hall call time to be shortened to a short door time if a photo eye input is seen.

5.4.4.24 LEAVE DOORS OPEN ON EPI - When set to *YES*, and EPI (Emergency Power) input is active, once the car returns to the emergency power return floor, the doors are left open instead of cycling closed.

5.4.4.25 DOORS TO OPEN IF NO DEMAND: (*NONE/FRONT/REAR/BOTH*) - When set to NONE, the doors remain closed when the car is at a landing with no demand. When set to *FRONT, REAR,* or *BOTH,* the corresponding doors automatically open and remain open when the car is at a landing with no demand. *BOTH* option is not available if the car is programmed for sequential door operation. See Section 5.4.4.3 for more details.

5.4.4.26 CONST. PRESS OP. BYPASS PHE? - This option is used to indicate if Constant Pressure Operations, such as Independent Service, Attendant Service, or if the Constant Pressure Door Close option is set to YES, should bypass the Photo Eye when the Photo Eye is active and there is a demand to close the doors and move the car. When set to YES, the car will bypass the Photo Eye and nudge the doors closed. When set to NO, the car will not bypass the Photo Eye; the doors will remain open until the Photo Eye is cleared.

5.4.4.27 DOOR TYPE IS HORIZONTAL / VERTICAL - This option is used to indicate if the doors open horizontally or vertically. When set to vertical, requires constant pressure on the door close button (DCB) to shut the doors when exiting Fire Phase 2 away from the recall floor with Fire Phase 1 active (ASME A17.1 requirement).

5.4.5   TIMER MENU OPTIONS

5.4.5.1 SHORT DOOR TIMER (Range: 0.5-16.0 Seconds) - This is the length of time the doors will stay open after being reopened by the Photo Eye, Safety Edge or Door Open button.

5.4.5.2 CAR CALL DOOR TIMER (Range: 0.5-16.0 Seconds) - This is the length of time the doors will stay open when the car stops to answer a car call.

5.4.5.3 HALL CALL DOOR TIMER (Range: 0.5-16.0 Seconds) - This is the length of time the doors will stay open when the car stops to answer a hall call.

5.4.5.4 LOBBY DOOR TIMER (Range: 0.5-16.0 Seconds) - This is the length of time the doors will stay open when the car stops to answer either a hall call or a car call at the Lobby Floor. The location of the Lobby Floor is programmable (see Section 5.4.2.6).

5.4.5.5 NUDGING TIMER (Range: 10-60 Seconds) - This timer is used only if the Nudging option is selected. Door Nudging Operation will begin when the Nudging Timer elapses. The Nudging Timer will start when the regular door timer elapses (see Section 5.4.4.1 for more details).

5.4.5.6 TIME OUT OF SVCE. TIMER (Range: 15-120 Seconds) - This timer is used to take a car out of service when the car is held at one floor excessively when there are calls registered at other floors. The timer will start when there is a call registered at another floor. If the timer expires before the car closes its doors and begins to move, then the car will become out of service. Typically, this occurs when the doors are held open by continuous activation of the photo eye, a call button or another reopening device.

When the timer expires, the Timed Out of Service Indicator on the MC-PCA board will turn *ON*. The controller will ignore the PHE (Photo Eye) input, if the Stuck Photo Eye Protection option is selected. In duplexes, the car's assigned hall calls will be assigned to the other car. When the car closes its doors and begins to move again, it will go back into Normal service.

5.4.5.7 MOTOR LIMIT TIMER (Range: 1.0 - 6.0 Minutes) - This timer starts whenever the controller attempts to move the car in the up direction and is reset when the car reaches its destination floor. If the timer expires before the car reaches its destination, the controller will stop trying to move the car up, to protect the motor. The car will then lower to the bottom floor and shutdown. The Motor/Valve Limit Timer Indicator on the MC-PCA board will turn *ON*.

5.4.5.8 VALVE LIMIT TIMER (Range: 1.0 - 6.0 Minutes) - This timer starts whenever the controller attempts to move the car down, and is reset when the car reaches its destination floor. If the timer expires before the car reaches its destination, the controller will stop trying to move the car, in order to protect the valves. The Motor/Valve Limit Timer Indicator on the MC-PCA board will turn *ON*.

5.4.5.9 DOOR HOLD INPUT TIMER (Range: 0-120 Seconds) - This timer will be used only if there is a DHLD (Door Hold) input on the controller (see Section 5.4.7). Usually, a Door Hold Open button will be connected to this input. This timer determines the amount of time that the doors will stay open when the door hold open button is pressed. The timer will be canceled and the doors will begin to close, if either the Door Close button or a Car Call button is pressed. If a Door Hold Key switch (instead of a button) is connected to the DHLD input, this timer value should be set to 0, so that the doors will close when the switch is turned to the *OFF* position.

5.4.5.10 PARKING DELAY TIMER (Range: 0.0-6.0 Minutes) - This timer is used only if a parking floor is selected (see Sections 5.4.2.7 and 5.4.2.8). The timer starts when the car is free of call demand. The car will not park until the timer elapses.

5.4.5.11 FAN/LIGHT OUTPUT TIMER (Range : 1.0-10.0 Minutes) - Used with the FLO output. This timer sets the amount of time that will pass before the FLO output will be activated. The

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time will start when the car becomes inactive. The FLO output should be connected to a relay that when activated, will turn *OFF* the fan and light within the car.

5.4.5.12 HOSPITAL EMERG. TIMER (Range : 1.0-10.0 Minutes) - This timer sets the amount of time that the car will remain at the hospital emergency floor with the doors open before automatically returning to normal service (refer to Section 5.4.9.15).

5.4.5.13 DOOR OPEN PROTECTION TIMER (Range 8 - 30 Seconds) - This timer determines how long the door operator will attempt to open the doors. If DOL does not go low within this time, the doors will then begin to close.

5.4.5.14 CTL DOOR OPEN TIMER (Range: 2.0 - 60.0 seconds) - This timer is used to indicate how long the doors should remain open after lowering to the lobby floor when the CTL spare input is activated.

5.4.6 GONGS/LANTERNS MENU OPTIONS

5.4.6.1 MOUNTED IN HALL OR CAR? - This option determines when the lanterns and gongs will be activated, as the car slows into the floor for hall mounted fixtures or after the door lock opens for car mounted fixtures. If both types of lanterns will be used, then the Hall option is recommended.

5.4.6.2 DOUBLE STRIKE ON DOWN? - This option causes a double strike of the lanterns and gongs, if the direction preference of the car is down.

5.4.6.3 PFG ENABLE BUTTON? (Passing Floor Gong Enable Button) - If this option is selected, the Passing Floor Gong will only be operative when initiated by a momentary pressure pushbutton. Once initiated, the Passing Floor Gong will operate for the current direction of travel but will be rendered inoperative when the car reverses direction. The PFGE spare input (see Section 5.4.7) should also be selected if this option is turned *ON*.

5.4.6.4 EGRESS FLOOR ARRIVAL GONG? / MAIN EGRESS FLOOR # - To program this option (Michigan Code), set one of the spare outputs to EFG. Then, set EGRESS FLOOR ARRIVAL GONG? to *NO* (no gong) or press *S* to select the floor number where the gong should activate (after the door lock opens). If *S* is pressed, the display will read MAIN EGRESS FLOOR #1. Press *S* until the desired floor number is displayed.

5.4.7 SPARE INPUTS MENU OPTIONS

There is 1 additional or spare input terminal available on the Relay board, marked SP1. There are also 8 spare input terminals on the HC-IOX board(s) and 16 spare input terminals on the HC-I4O board(s). The maximum number of terminals possible is 49. Any of these spare inputs (SP1, SP2, ...) may be used for any of the input signals listed below.

SPARE INPUTS MENU OPTIONS	
ABI	Alarm Bell Input. This input monitors the car through the CRT or with CMS software. There are three conditions that will display a warning on the screen. First, if the Alarm Button is pressed when the car is stopped outside of the door zone. Next, if the Alarm Button is pressed four times in 60 seconds without the car moving. And lastly, if the car fails to complete an LSA movement check after being idle for 10 minutes at a landing. All of these failures will alert the monitoring station through the PA board.

SPARE INPUTS MENU OPTIONS	
ALV	Alive Input - This input is used in a duplex configuration and is received from the other car. If the input is on for this car, it states that the other car is powered. This input is used in emergency power applications.
API	Alternate Parking Input. This input is used to determine whether to park at the primary parking floor, or at the alternate parking floor. When API is low, the car will park at the primary floor. When API is high, the car will park at the alternate floor.
ATS	Attendant Service Input.
AUTO	Emergency Power Auto Selection Input. This input is for duplexes only.
AXR	Auxiliary Reset Input - Usually connected to a pushbutton on a controller to reset redundancy error conditions.
BSI	Building Security Input - This input is used to activate MCE Security when the Lockout Security Key (in the Extra Features Menu) is set to ENABLED.
CCC	Car Calls Cancel Input - Activation of this input will unconditionally cancel car calls. Because this input has no logical qualification in the software, it is highly suggested that necessary qualification be done in external circuitry (e.g., disable the signal feeding this input when on fire phase II).
CNP	Contactor Proof Input - This input is used for redundancy checking. It monitors the main power contactors. If any of these relays fail to open in the intended manner, the CFLT relay will pick, dropping the safety relays.
CTF	Car to floor Input - This input is used to return the car to a previously selected floor. The return floor is selected using the parameter CAR TO FLOOR RETURN FLOOR in the EXTRA FEATURES MENU. When activated, this input will cause the car to immediately become non-responsive to hall calls, and will prevent the registration of new car calls. The car will be allowed to answer all car calls registered prior to activation of the CTF input. Once all car calls have been answered, the car will travel to the return floor, perform a door operation, and will be removed from service.
CTL	Car-to-Lobby Input - When activated, this input will cause the car to immediately become non-responsive to hall calls, and will prevent the registration of new call calls. The car will be allowed to answer all car calls registered prior to activation of the CTL input. Once all car calls have been answered, the car will travel to the lobby landing, perform a door operation, and will be removed from service.
DCL	Door Close Limit Input - Breaks when the car door is approximately 1 inch from being closed. DCL input will be low once the doors fully close. Moving the door approximately 1 inch will reapply power to the DCL input due to the switch making up. Needed for CSA code with door lock bypass.
DCLC	Doors Closed Contact Input.
DHLD	Door Hold Input for Normal Service (not for Fire Service.) A Door Hold button or key switch can be connected to this input (see Section 5.4.5.9 for more details).
DHLDR	DHLD for Rear Doors.
DLI	Dispatch Load Input - A load weigher device can be connected to this input. When the input is activated, the door dwell time will be eliminated when the elevator has an up direction at the Lobby Floor.
DLS	Door Lock Sensor Input - Monitors the state of the contacts in the landing door lock string. Power will be present on the DLS input when all landing doors are closed and locked.
DLSR	DLS for rear doors.
DNI	Down Input (Attendant Service).

SPARE INPUTS MENU OPTIONS	
DSTI	Door Stop Input.
DSTIR	DSTI for rear doors.
ECRN	Emergency Car Freeze Input - This input is used with EMP-OVL product and will cause the car to freeze, allowing others cars to return on emergency power.
EMSC	Emergency Medical Switch Car.
EMSH	Emergency Medical Switch Hall.
EPI	Emergency Power Input (see Section 5.4.9.4 for more details).
EPR	Emergency Power Return Input - This input is used with the EMP-OVL product and allows the car to return to the lobby landing on emergency power.
EPRUN	Emergency Power Run Input.
EPSTP	Emergency Power Stop Input.
ERU	Emergency Return Unit Input
ESS	Elevator Shutdown Input - When this input is activated, the car stops at the next landing in the direction of travel, cycles the doors and shuts down.
EXMLT	External Motor Limit Timer
FCCC	Fire Phase 2 Call Cancel Button Input.
FCHLD	Fire Phase 2 Switch HOLD Position Input.
FCOFF	Fire Phase 2 Switch OFF Position Input.
FRAA	Fire Phase 1 Alternate (2nd alternate) Input.
FRAON	Fire Phase 1 Alternate Switch ON Position Input.
FRBYP	Fire Phase 1 Switch BYPASS Position Input.
FRHTW	Fire Sensor Hoistway - This input is used to indicate when a fire sensor placed in the hoistway has been activated. This input is normally high and is considered active low. When activated, Fire Phase 1 is initiated and the FWL output will flash.
FRMR	Fire Sensor Machine Room - This input is used to indicate when a fire sensor placed in the machine room has been activated. This input is normally high and is considered active low. When activated, Fire Phase 1 is initiated and the FWL output will flash.
FRON	Fire Phase 1 Switch ON Position Input.
FRON2	Fire Phase 1 Switch ON Position Input (additional input - same as FRON).
GS	Gate Switch Input - Makes up when the car door is approximately 1 inch from fully closed. With the car door closed, there should be power on the GS input.
GSR	Gate Switch Rear Input.
HEATD	Heat Detector Input.
HLI	Heavy Load Input - A load weigher device can be connected to this input. When the input is activated, the controller will not answer hall calls.
HML	Home Landing Input - This input is used with the primary parking feature and will determine whether the car will park or not.
HOSP	Hospital Emergency Operation Input.
LLI	Light Load Input - A load weigher device can be connected to this input (see Section 5.4.9.5 for more details).
LOS	Low Oil Switch - (PHC controllers) - This input is connected to a level switch in the oil reservoir. Once activated, the car will immediately lower to the bottom landing and cycle the doors. To clear this condition, the car must be put on inspection and then back into normal operation, or the RESET button must be pressed.

SPARE INPUTS MENU OPTIONS	
LSR	Landing System Redundancy Input - This input is used for redundancy checking. It monitors DZ (Door Zone), LU (Level Up), and LD (Level Down). The LSR input will go low at least once during a run. If, however, the DZ sensor has failed closed, power will be present on the LSR input and the car will not be able to restart. The LSR FAIL message will be displayed.
LWB	Load Weigher Bypass - This input is used to bypass the load weigher inputs (LLI, HLI, OVL and DLI).
NSI	Non-Stop Input (Attendant Service)
OVL	Overload Input.
PFGE	Passing Floor Gong Enable Input (see Section 5.4.6.3).
PTI	Power Transfer Input - When this input is activated, it causes the car to stop at the next landing in the direction of travel, open the doors and shut down. This input is typically used with Emergency Power when transferring from normal power to emergency power (testing) or emergency power to normal power.
R5, R4, R3, R2	Floor Encoding Inputs - These inputs are required for jobs with absolute floor encoding. See Section 5.4.9.2 for more information about floor encoding inputs.
RDLSR	Rear Hoistway Door Lock Contacts Relay Status - The RDLSR input monitors the status of the DLSR relays, for the purpose of redundancy checking.
REO	Re-Open Input.
RGS	Gate Switch Relay Redundancy - Makes up when the car door is approximately 1 inch from fully closed. With the car door closed, there will be power on the RGS input.
RGSR	Gate Switch Relay Redundancy Rear Input
SAB	Sabbath Operation Input. This input is used to select Sabbath Operation. This mode will move the car through the hoistway, stopping at landings that are programmed in the Extra Features Menu.
SIMP	Simplex Input - Activation of this input will cause the car to behave as a simplex. As a simplex, the car will respond to hall calls registered on its own call circuitry (it will not accept hall calls assigned to it by another controller connected to it) and will perform its own parking function (independent of the other controller).
STARTIN	Start Input - The STARTIN input is used for the START position of the three position fire phase two switch for Australian jobs. When activated, it will cause the front and rear doors to close. The car will not proceed to answer car calls during fire phase two until the STARTIN input has been activated.
SYNCI	Synchronization Input - (PHC controllers) - Momentary activation of this input will initiate the jack synchronization function. This function is intended to equalize hydraulic pressure in systems that utilize more than one piston to move the car(generally two). When appropriate (the car is idle), the car will be taken to the bottom landing. The down normal limit switch is bypassed by activation of a relay connected to the SYNC output, and the car is moved at slow speed in the down direction. The down slow valve circuits are energized for 30 seconds to ensure that the car has been lowered all the way to the buffer. Once this timer elapses the car is moved back up to the bottom landing.
TEST	TEST Switch Input. This input monitors the TEST/NORM Switch located on the Relay Board to differentiate between Test and Independent Operation. This input is normally high and will go low when the switch is placed in the Test position.
UPI	Up Input (Attendant Service).
VCI	Viscosity Control Input.
WLD	Emergency Dispatch Input.

5.4.8 SPARE OUTPUTS MENU OPTIONS

There are 8 spare output terminals on an HC-IOX board. The maximum number of spare outputs possible is 32, 8 on each HC-IOX board. Any of these spare outputs may be used for any of the output signals listed below.

SPARE OUTPUTS MENU OPTIONS	
ABZ	Attendant Service Buzzer Output.
CCT	Car Call Time Flag Output - This flag is activated upon *normal* response and cancellation of a car call, and remains active until the car call door dwell time elapses or is canceled.
CCDE	Car Call Disconnect Enable Output - This output comes *ON* when the car calls are canceled during PHE anti-nuisance operation
CD	Car Done on Emergency Power Output - This output is active when the car has finished returning on emergency power or when it has been determined that the car cannot lower.
CFLT	This output is currently used for Canadian Standards Association (CSA) code only. If this is the applicable code for the installation, please refer to the Compliance Report included with the job.
CGED	Car Gong Enable Down Output.
CGEDR	CGED for rear doors Output.
CGEU	Car Gong Enable Up Output.
CGEUR	CGEU for rear doors Output.
CGF	Car Generated Fault Output.
CSB	Car Stop Switch Bypass Output.
CSEO	Code Sequence Enable Output. Formerly called SCE (Security Code Enable). This output will be *ON* during the time a security code is being entered to register a car call while on MCE's Standard Security.
CSR	Car Selected to Run Output - This output is generated when the car is selected to run on emergency power phase 2 (via the AUTO or EPRUN input).
CTLDOT	Car-to-Lobby Door Open Timer Output - This output is generated upon completion of the car to lobby function (the car has returned to the lobby landing, the doors have opened, and the CTL door timer has expired).
DHEND	Door Hold End Output. This output will turn *ON* five seconds prior to when the Door Hold Timer expires.
DNENDR	Door Hold End Rear Output. This output will turn *ON* five seconds prior to when the Door Hold Rear Timer expires.
DHO	Door Hold Output - This output indicates that the doors are being held open by the *door hold input* function (the DHLDI input is active, or the timer associated with the door hold function has not yet elapsed).
DLOB	Door Left Open Bell Output.
DNO	Down output (Attendant Service).
DO1,	DO2, DO4, DO8, DO16, D032 Binary coded P.I. outputs for digital P.I. devices.

SPARE OUTPUTS MENU OPTIONS	
DSH	Door Time Shortening Output (intermediate) - This output is generated whenever a *destination car call* button is pressed (this action causes the shortening of the door dwell time if the doors are fully open).
DSHT	Door Time Shortening Front Output (final) - This output is generated if either a *destination car call* button is pressed, or if the door close button for the front doors is pressed
DSHTR	Door Time Shortening Front Output (rear) - This output is generated if either a *destination car call* button is pressed, or if the door close button for the rear doors is pressed.
ECRN	Emergency Power Car Run Output - This output is associated with the emergency power logic. Activation of this output indicates that the car is being prevented from running by the emergency power operation logic.
EFG	Egress Floor Gong Output.
EMSB	Emergency Medical Service Buzzer Output
EMSIC	Emergency Medical Service Indicator Car Output.
EMSIH	Emergency Medical Service Indicator Hall Output.
EP1	Emergency Power Phase 1 Output - This output is generated when the system is in the first phase of emergency power (the sequential lowering phase).
EP2	Emergency Power Phase 2 Output - This output is generated when the system is in the second phase of emergency power (the *normal running* of a car on emergency power generators).
FLO	Fan/Light Operation Output - This output is used to turn *OFF* the fan and the light within the car. The output is usually *OFF*. It is turned *ON* after the Fan/Light Timer elapses. The timing starts when the car becomes inactive.
FRC	Fire Service Phase 2 Output.
FRM	Fire Service Phase 1 Output.
FSA	Fire Service Alternate Output.
FSM	Fire Service Main Output.
FSO	Fire Service On Output.
FSVC	True Fire Service Output. This input is used to indicate when the car is on Fire Service Phase One or Two.
FWL	Fire Warning Light Output - This output is used to indicate when the car is on Fire Phase 1 or 2. It will flash if the Machine Room or Hoistway fire sensor is active.
HCP	Hall call pushed output - This output is active whenever a hall call button is pressed. It is only activated for the amount of time that the button is being pressed.
HCR	Hall Call Reject Output.
HDSC	Heat Detector Shutdown Complete Output.
HLW	Heavy Load Weigher Output - This output will be generated when the car is heavy loaded, shown by the HLI input (see Section 5.4.7).
INDFRC	Independent Service/Fire Service Phase 2 Output - This output is needed for all elevators with either Single Button Collective or Single Automatic Pushbutton Operation (see Section 5.4.2.2). This output will be used to cut out hall calls during Fire Service and Independent Service.

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SPARE OUTPUTS MENU OPTIONS	
ISRT	In Service and Running Output. This output reflects the car's ability to respond to hall calls(the ISRT status). ISRT is active when the car's status is such that it can answer hall calls.
ISV	In Service Output.
LLW	Light Load Weigher Output - This output will be generated when the LLI input is activated and the required number of car calls have been registered (see Section 5.4.9.5 for more details).
MISV	Mechanically In Service Output.
MLT	Motor Limit Timer Elapsed Output
MLTP	Motor Limit Timer Elapsed Output (not activated by EXMLT).
NCD	Car Not Done with Emergency Power Return Output - This output may only be used if the elevator has Emergency Power Operation (see Section 5.4.9.4).
OFR	One Floor Run Output - This output is generated when the car initiates a run and remains active until the car encounters the first door zone in its movement (the output is active while traversing the first floor height in its direction of travel).
OLW	Overloaded Car Threshold Output - This output is set when the threshold value considered to be unsafe to move the elevator is reached. When this threshold is exceeded, the car will remain at the floor with doors open.
PH1	Fire Service Phase 1 Return Complete Output - This output is most often used as a signal to activate the machine room sprinklers.
SEC	Security Code Incorrect - When the building's elevator security is on, this output will turn on for five seconds when an incorrect security code is entered.
SIMPO	Simplex Output - This output comes on when the SIMP input is activated or when Simplex Operation is chosen through KCE (if available).
SYNC	Synchronization Output - (PHC controllers) - This output is used to bypass the down normal limit switch to allow the car to be moved to the buffer at leveling speed. The computer generates the down direction output (DNDO) to move the car in the down direction. This output will be generated for 10 seconds to allow the car to move completely onto the buffer. Once this time elapses, the computer will generate the up direction output to move the car in the up direction at leveling speed, until the car reaches the bottom landing dead zone. At this time the up direction travel is initiated and the SYNC output is turned *OFF*, removing the bypass around the down normal limit switch.
TOS	Time Out of Service Output.
UPO	Up Output (Attendant Service).
WLDI	*Wildop* Indication Output - This output is generated if the car is in emergency dispatch mode of operation (i.e., if the hall call bus fuse is blown and *emergency dispatching* is activated).
ZADJ	Zero Adjust - This output is used to cause the analog load weigher to perform its zero adjust procedure. The output is generated once every 31 hours or whenever the car is idle at the bottom floor for 30 seconds.
900	Car Call Cancellation Output - This output is generated at the time of registration of a car call. This output is used to comply with specific handicap codes (*barrier-free* codes) that require an audible acknowledgment of car call registration

5.4.9 EXTRA FEATURES MENU OPTIONS

5.4.9.1 PI OUTPUT TYPE - Choose either 1 WIRE PER FLOOR or BINARY-CODED PIs, depending on the inputs required by the P.I. device itself.

5.4.9.2 FLOOR ENCODING INPUTS? - If this option is selected, whenever the car is in a door zone the computer checks the floor code inputs and corrects the P.I., if necessary. The code inputs are provided by the landing system (refer to the Job Prints). Refer to R4, R3, R2 in Section 5.4.7.

5.4.9.3 ENCODE ALL FLOORS? - This option is only available when the Floor Encoding option is programmed to YES. This option indicates at what landing the Absolute Floor Encoding values begin. When set to YES, then every landing must have AFE code values, including the terminal landings. When set to NO, then only intermediate landings must have AFE code values.

5.4.9.4 EMERGENCY POWER OPERATION? / EMERGENCY POWER RETURN FLOOR - If this option is selected, the controller will put the elevator into Emergency Power Operation when the controller receives the Emergency Power Input (EPI) signal. During Phase 1 of Emergency Power Operation, the car will be moved to the emergency power return floor. In a duplex controller, each car will be moved to the emergency power return floor, one at a time. During Phase 2 of Emergency Power Operation, if the car's Emergency Power Run (EPRUN) input is activated, the car will run normally. Otherwise, the car will remain at the emergency power return floor and will not respond to any calls.

For a simplex controller, the car's EPRUN input is sometimes connected to a switch, so that the input can be turned *ON* and *OFF*. For a duplex controller, both cars' EPRUN inputs are usually connected to a Run Selection switch. The position of this switch determines which car will run during Phase 2 of Emergency Power Operation.

Often there is an AUTO position on the Run Selection switch connected to the AUTO input on both controllers in a duplex. If the AUTO input is activated, then one car will be automatically selected to run during Phase 2 of Emergency Power Operation. For example: If one car happens to be out of service when the operation begins, the other car will be automatically selected to run.

If the Emergency Power option is selected, then the appropriate spare inputs should be selected also (see Section 5.4.7).

5.4.9.5 LIGHT LOAD WEIGHING? / LIGHT LOAD CAR CALL LIMIT - This option is only used when the Light Load Weigher Input is activated (refer to Section 5.4.7, LLI spare input). To program this option, activate the LLI input. Then, set LIGHT LOAD WEIGHING? to *NO* or press *S* to select the maximum number of car calls registered before all the car calls are canceled. If *S* is pressed, the display will read LIGHT LOAD CAR CALL LIMIT. Press *S* until the desired number is displayed.

5.4.9.6 PHOTO EYE ANTI-NUISANCE? / CONSEC STOPS W/O PHE LIMIT - When this option is *ON*, the car calls will cancel if the Photo Eye input has not been activated after a programmed number of consecutive stops. The number of consecutive stops must be programmed before the car calls will cancel. To program this option, set PHOTO EYE ANTI-NUISANCE? to *NO* or press *S* to select the number of consecutive stops. If *S* is pressed, the display will read CONSEC STOPS W/O PHE LIMIT. Press *S* until the desired number is displayed.

5.4.9.7 PERIPHERAL DEVICE? - If this option is set to *YES*, it allows for various peripheral devices to be used. Currently the controller has 2 Communication Ports that can be

programmed. Press *N* to select the media for COM Port 1. The display will read PA COM1 MEDIA. One of the following media may be selected:

- SERIAL CABLE
- MODEM
- LINE DRIVER
- NONE

Press N again to select the peripheral device that will be connected to COM Port 1. The display will read PA COM 1 DEVICE. One of the following peripherals may be selected:

- CRT - NO KEYBOARD (color or monochrome)
- CRT AND KEYBOARD (color or monochrome)
- PERSONAL COMP. (to be used with CMS or as a graphic display)

If one of the CRT options was selected, the next option will be COLOR CRT? Select *YES* if you have a color CRT or *NO* if you have a monochrome CRT. If PERSONAL COMPUTER was selected as the peripheral device, the next option will be FUNCTION. Select CMS or GRAPHIC DISPLAY.

A similar set of options will be displayed for COM Port 2. Each Communication Port (COM 1 and COM 2) must be programmed for a device and a media according to the particular job specifications to allow the particular peripheral device to operate properly.

5.4.9.8 AUTOMATIC FLOOR STOP OPTION? / AUTOMATIC STOP FLOOR #? - When this option is set to a specific floor number, the car will automatically stop at that floor if the car is in motion.

5.4.9.9 CC CANCEL W/DIR REVERSAL? - This option will cause all of the previously registered car calls to be canceled whenever a direction reversal is detected.

5.4.9.10 CANCEL CAR CALLS BEHIND CAR? - If this option is set to *YES* and the car has a direction arrow (SUA/SDA), no car calls can be registered behind the car's current position. For example: If a car is at the fifth floor moving down, no car calls can be registered from sixth floor and above.

5.4.9.11 CE ELECTRONICS INTERFACE? - This option allows information such as position and arrival gong outputs to be provided for a CE electronics device. This option is to be used with the CE2242 CE Electronics Interface board which provides a 3-wire serial interface to CE electronic fixtures.

5.4.9.12 MASSACHUSETTS EMS SERVICE? / EMS SERVICE FLOOR # - This option is provided in the state of Massachusetts only. This option is key-operated and provides immediate car service for Massachusetts Emergency Medical Service personnel.

5.4.9.13 MASTER SOFTWARE KEY - This option is a board-level control of the security system. MCE's Standard Security is initiated by the Master Software Key. There are three possible settings for the Master Software Key: ACTIVATED, ENABLED or DEACTIVATED.

- If set to ACTIVATED, Security is initiated.
- If set to ENABLED, Security is initiated only if the Building Security Input (BSI) is turned *On.*
- If set to DEACTIVATED, Security is deactivated regardless of the status of the BSI input.

5.4.9.14 PI TURNED OFF IF NO DEMAND? - Setting this option to *YES* will allow the PI outputs to turn *OFF* if the car has been inactive for an adjustable time (from 1 to 10 minutes).

5.4.9.15 HOSPITAL EMERG. OPERATION? - This option calls any eligible in-service elevator to any floor on an emergency basis. If this installation has Hospital Emergency Service Operation, a hospital emergency call switch will be installed at each floor where this service is desired.

When the hospital emergency momentary call switch is activated at any floor, the hospital emergency call registered light will illuminate at that floor only, and the nearest available elevator will respond to the hospital emergency call. All car calls within the selected car will be canceled and any landing calls which had previously been assigned to that car will be transferred to the other car. If the selected car is traveling away from the hospital emergency call, it will slow down and stop at the nearest floor without opening the doors, reverse direction, and proceed nonstop to the hospital emergency floor. If the selected car is traveling toward the hospital emergency floor, it shall proceed nonstop to that floor. At the time of selection, if the car happens to slow down for a stop, it will stop without opening the doors and then start immediately toward the hospital emergency floor.
When the car reaches the hospital emergency floor, it will remain with doors open for a pre-determined time interval. After this interval has expired, if the car has not been placed on in-car Hospital Emergency Service Operation, the car will automatically return to normal service.

A hospital emergency key switch will be located in each car operating station for selecting in-car Hospital Emergency Service Operation. Upon activation of the key switch, the car will be ready to accept a call for any floor, and after the doors are closed, will proceed nonstop to that floor. Returning the key switch to the normal position will restore the car to normal service.

Either car selected to respond to a hospital emergency call will be removed from automatic service and will accept no additional calls, emergency or otherwise, until it completes the initial hospital emergency function. If both cars are out of service and unable to answer an emergency call, the hospital emergency call registered light will not illuminate.

Four outputs are available on the first HC-CI/O board used for the hospital emergency service calls. Hospital Emergency Operation (HEO) will flash once the car has been selected to respond to a hospital emergency call and will remain flashing until the in-car hospital switch is returned to normal or the time interval that the car must wait for the in-car switch to be turned *ON* expires. Hospital Emergency Warning Indicator (HWI) will remain steadily *ON* for a car on Independent Service when the hospital call is registered. Hospital Emergency Select (HSEL) will remain steadily *ON*, indicating that the car has been selected to answer a hospital call, until the in-car hospital switch is turned *ON* or the time interval expires. Hospital Emergency Phase 2 (HOSPH2) will remain *ON*, indicating that the car has arrived at the floor where the hospital call was registered, until the in-car hospital switch is returned to normal or the time interval that the car must wait for the in-car switch to be turned *ON* expires.

If you do not have Hospital Emergency Service Operation, set this option to *NO* by pressing the *S* pushbutton. Then, press the *N* pushbutton to exit this option.

If you have Hospital Emergency Service Operation, set this option to *YES* by pressing the *S* pushbutton. Press the *N* pushbutton to continue. The following display will appear:
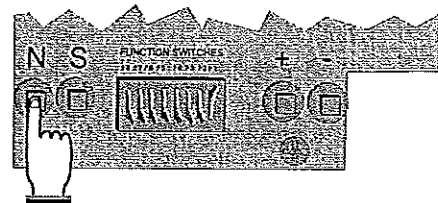
If you want Hospital Emergency Service to this landing, then set this option to *YES* by pressing the *S* pushbutton (press *S* again to set the option to *NO*). Press the '+' pushbutton to scroll through the available landings. Press the *N* pushbutton to continue. If this car has rear doors, then the following will be displayed:

Press the '+' pushbutton to scroll through the available landings. The computer will continue to present these options for each floor, up to the top floor. Press the *N* pushbutton to exit the Hospital Emergency Service option.

5.4.9.16 FIRE BYPASSES HOSPITAL? - Set this option to YES if Hospital Service is used for VIP, Priority or Commandeering Service. Set this option to NO if Hospital Service is *truly* used for Hospital Service.

5.4.9.17 HIGH SPEED DELAY AFTER RUN? - Setting this option will insert a fixed delay (3 seconds) between the completion of a run and the initiation of the next run. This option should be used in applications in which an immediate "stop/start" is undesirable. Under most "normal" circumstances, the initiation of a run is delayed by the time required for the door operation. In some cases, however, the car may stop and start immediately in the absence of a door operation (example: a direction reversal upon being assigned a hall call while the car is parking).

5.4.9.18 SABBATH OPERATION - If you do not have Sabbath Operation, set this option to *NO* by pressing the *S* Pushbutton. Then, press the *N* pushbutton to exit this option.

If you have Sabbath Operation, set this option to *YES* by pressing the *S* pushbutton. Press the *N* pushbutton to continue. The following display will appear:

"FRONT UP STOP AT FLOOR 1?"

If you want to set the car to stop at this floor while traveling in the UP direction, change *NO* to *YES* by pressing the *S* pushbutton (press *S* again to set this option to *NO*). Press the + pushbutton to increment floor value to the next landing. Continue until all of the desired front UP stops are set to *YES*.

Press the *N* pushbutton to proceed to the next eligibility map. If there are no walk through doors on this controller, then the rear eligibility maps will not display. In order, the next eligibility maps are as follows:

"REAR UP STOP AT FLOOR 1?"
"FRONT DOWN STOP AT FLOOR 2?"
"REAR DOWN STOP AT FLOOR 2?"

Remember that the + pushbutton increments the floor value to the next landing. And that the *N* pushbutton will proceed to the next eligibility map.

5.4.9.19 LEVELING SENSOR ENABLED/DISABLED - If this option is set to disabled, the LFLT ON, LFLT OFF and DZ STUCK errors will not be generated.

5.4.9.20 KCE ENABLE / DISABLE - The KCE Enable is set to ON when ENABLE is selected or OFF when DISABLE is selected from the menu display.

5.4.9.21 ANALOG LOAD WEIGHER? NONE / MCE / K-TECH - This option enables the analog load weigher logic and selects the type of learn operation to be performed, depending on the type of load weigher installed.

5.4.9.22 IND. BYPASS SECURITY? YES / NO - This option determines if Elevator Security is bypassed when the car is on Independent Service (available only when Security is enabled).

5.4.9.23 ATS. BYPASS SECURITY? YES / NO - This option determines if Elevator Security should be bypassed when the car is on Attendant Service (available only when Security and Attendant Service are enabled).

5.4.9.22 CAR TO FLOOR RETURN FLOOR - This option determines the floor to which the car will be returned when the CAR TO FLOOR input is activated (see CTF in Spare Inputs Menu Options).

5.4.9.25 SCROLLING SPEED (SLOW / NORMAL / FAST) - Menu options which are too long to be fully displayed on the LCD display are scrolled. This option determines the scrolling speed.
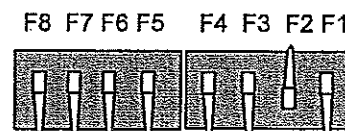
5.5   EXTERNAL MEMORY MODE

External Memory mode can be used to view memory addresses in the external RAM on the MC-PCA board. The external memory address is denoted by the letters DA (Data Address). The ability to view the external memory can also be helpful for diagnosing and troubleshooting the elevator system. The Computer External Memory Chart (Table 5.6) shows the meaning of the data digits at different addresses.

5.5.1   GETTING INTO EXTERNAL MEMORY MODE

External Memory mode is initiated by placing the F2 switch in the up position (see Figure 5.1). The following is a description of the LCD display format and the function of the N, S, +, and – pushbuttons during External Memory mode.

FUNCTION SWITCHES

F8 F7 F6 F5   F4 F3 F2 F1

External Memory mode

5.5.2   FUNCTION OF N PUSHBUTTON

The *N* pushbutton (see Figure 5.1) allows for the advancement of the computer memory address, which is displayed on the second line of the LCD display. For example, for this display, pressing the *N* pushbutton once (hold it for 1-2 seconds) will cause the 1 in the address 1234 to begin blinking. By continuing to press the *N* pushbutton, the 2 in the address 1234 will begin to blink. The cycle will continue while the *N* pushbutton is being pressed. Once the digit needed to be changed is blinking, the address can then be modified.

The data (8 digits) that correspond to the external memory address is displayed to the right of the address. This data display will change as the memory address changes.

5.5.3   FUNCTION OF S PUSHBUTTON

The *S* pushbutton (see Figure 5.1) ends the ability to change the address by stopping the digit from blinking. If the *S* pushbutton is not pressed, the selected digit will stop blinking automatically after 20 seconds.

5.5.4   FUNCTION OF + PUSHBUTTON

The + pushbutton (see Figure 5.1) modifies the digit of the computer memory address selected by the *N* pushbutton. If the + button is pressed, the selected digit is incremented by one. The

data display will also change as the address changes. For example, if the 2 of the address 1234 is blinking, pressing the + pushbutton once will change the address from 1234 to 1334. Pressing the + pushbutton several more times will change the address to 1434, 1534, 1634, etc., up to 1F34 and then back to 1034.

5.5.5 FUNCTION OF – PUSHBUTTON

The – pushbutton (see Figure 5.1) modifies the digit of the computer memory address selected by the N pushbutton. If the – pushbutton is pressed, the selected digit is decrement by one. The data display will also change as the address changes. For example: If the 2 in the address 1234 is blinking, pressing the – pushbutton once will change the address from 1234 to 1134. Pressing the – pushbutton several more times will change the address to 1034, 1F34, 1E34, etc.

## 5.5.6 TROUBLESHOOTING USING EXTERNAL MEMORY MODE

By using the computer's External Memory mode, it is possible to find out if the controller is receiving call signals correctly, as well as HC-IOX board input and output signals.

5.5.6.1 The following example illustrates how to use Table 5.6 to check a signal in the computer's external memory.

Example problem: The DHLD (Door Hold Open Switch) input will not cause the doors to stay open. DHLD is programmed for the Spare 5 input.

Step 1: Find SP5 in Table 5.6 (next page). Notice that the Address of SP5 is 02AF and the Position is 4.

Step 2: Look up the signal on the computer. Change the address on the display to Address 02AF (see Section 5.5). Look at data bit number 4 (from the right), which is underlined in the following display:
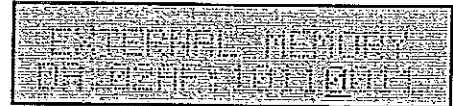
This digit represents the computer's interpretation of the Spare 5 input signal. If the digit is 1, the computer thinks that the SP5 signal is *ON*. If the digit is 0, the computer thinks that the SP5 signal is off.

This information can be used to determine the source of the problem. If the Spare 5 input is programmed for the DHLD (Door Hold) input and the doors are not staying open, the diagnostic display will show that the SP5 input is off. If this is the case, checking the voltage on the SP5 terminal will show whether the problem is inside or outside the controller.

TABLE 5.6   Computer External Memory Chart

ADD	HALL CALLS						CAR CALLS	
	8	7	6	5	4	3	2	1
0140:	601R/UC1R	601/UC1					101R/CC1R	101/CC1
0141:	602R/UC2R	602/UC2	502R/DC2R	502/DC2			102R/CC2R	102/CC2
0142:	603R/UC3R	603/UC3	503R/DC3R	503/DC3			103R/CC3R	103/CC3
0143:	604R/UC4R	604/UC4	504R/DC4R	504/DC4			104R/CC4R	104/CC4
0144:	605R/UC5R	605/UC5	505R/DC5R	505/DC5			105R/CC5R	105/CC5
0145:	606R/UC6R	606/UC6	506R/DC6R	506/DC6			106R/CC6R	106/CC6
0146:	607R/UC7R	607/UC7	507R/DC7R	507/DC7			107R/CC7R	107/CC7
0147:	608R/UC8R	608/UC8	508R/DC8R	508/DC8			108R/CC8R	108/CC8
0148:	609R/UC9R	609/UC9	509R/DC9R	509/DC9			109R/CC9R	109/CC9
0149:	610R/UC10R	610/UC10	510R/DC10R	510/DC10			110R/CC10R	110/CC10
014A:	611R/UC11R	611/UC11	511R/DC11R	511/DC11			111R/CC11R	111/CC11
014B:	612R/UC12R	612/UC12	512R/DC12R	512/DC12			112R/CC12R	112/CC12
014C:	613R/UC13R	613/UC13	513R/DC13R	513/DC13			113R/CC13R	113/CC13
014D:	614R/UC14R	614/UC14	514R/DC14R	514/DC14			114R/CC14R	114/CC14
014E:	615R/UC15R	615/UC15	515R/DC15R	515/DC15			115R/CC15R	115/CC15
014F:	616R/UC16R	616/UC16	516R/DC16R	516/DC16			116R/CC16R	116/CC16
0150:	617R/UC17R	617/UC17	517R/DC17R	517/DC17			117R/CC17R	117/CC17
0151:	618R/UC18R	618/UC18	518R/DC18R	518/DC18			118R/CC18R	118/CC18
0152:	619R/UC19R	619/UC19	519R/DC19R	519/DC19			119R/CC19R	119/CC19
0153:	620R/UC20R	620/UC20	520R/DC20R	520/DC20			120R/CC20R	120//CC20
0154:	621R/UC21R	621/UC21	521R/DC21R	521/DC21			121R/CC21R	121/CC21
0155:	622R/UC22R	622/UC22	522R/DC22R	522/DC22			122R/CC22R	122/CC22
0156:	623R/UC23R	623/UC23	523R/DC23R	523/DC23			123R/CC23R	123/CC23
0157:	624R/UC24R	624/UC24	524R/DC24R	524/DC24			124R/CC24R	124/CC24
0158:	625R/UC25R	625/UC25	525R/DC25R	525/DC25			125R/CC25R	125/CC25
0159:	626R/UC26R	626/UC26	526R/DC26R	526/DC26			126R/CC26R	126/CC26
015A:	627R/UC27R	627/UC27	527R/DC27R	527/DC27			127R/CC27R	127/CC27
015B:	628R/UC28R	628/UC28	528R/DC28R	528DC28			128R/CC28R	128/CC28
015C:	629R/UC29R	629/UC29	529R/DC29R	529/DC29			129R/CC29R	129/CC29
015D:	630R/UC30R	630/UC30	530R/DC30R	530/DC30			130R/CC30R	130/CC30
015E:	631R/UC31R	631/UC31	531R/DC31R	531/DC31			131R/CC31R	131/CC31
015F:			532R/DC32R	532/DC32			132R/CC32R	132/CC32

SPARE INPUTS								
ADD	8	7	6	5	4	3	2	1
02AF:	SP9	SP8	SP7	SP6	SP5	SP4	SP3	SP2
02B0:	SP17	SP16	SP15	SP14	SP13	SP12	SP11	SP10
02B1	SP25	SP24	SP23	SP22	SP21	SP20	SP19	SP18
02B2	SP33	SP32	SP31	SP30	SP29	SP28	SP27	SP26
02B3	SP41	SP40	SP39	SP38	SP37	SP36	SP35	SP34
02B4	SP49	SP48	SP47	SP46	SP45	SP44	SP43	SP42

SPARE OUTPUTS *								
ADD	8	7	6	5	4	3	2	1
02EF:	OUT8	OUT7	OUT6	OUT5	OUT4	OUT3	OUT2	OUT1
02F0:	OUT16	OUT15	OUT14	OUT13	OUT12	OUT11	OUT10	OUT9
02F1:	OUT24	OUT23	OUT22	OUT21	OUT20	OUT19	OUT18	OUT17
02F2:	OUT32	OUT31	OUT30	OUT29	OUT28	OUT27	OUT26	OUT25

* This table shows the spare outputs for HC-IOX boards. If an HC-I40 board is used, the outputs follow those of an HC-IOX board and are in the following format. Increment the output numbers accordingly.

HC-I40 board spare output format								
ADD	8	7	6	5	4	3	2	1
02xx:	OUT4	OUT3	OUT2	OUT1	not used	not used	not used	not used

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TABLE 5.7   Computer's Hospital Call and Eligibility Memory Chart

	HOSPITAL CALL ELIGIBILITY				HOSPITAL CALLS				
	OTHER CAR		THIS CAR		ASSIGNED HOSPITAL CALLS		REGISTERED HOSPITAL CALLS		
	REAR	FRONT	REAR	FRONT	REAR	FRONT	REAR	FRONT	
ADD	8	7	6	5	4	3	2	1	
0240:							ECR1	EC1	Floor # 1
0241:							ECR2	EC2	Floor # 2
0242:							ECR3	EC3	Floor # 3
0243:							ECR4	EC4	Floor # 4
0244:							ECR5	EC5	Floor # 5
0245:							ECR6	EC6	Floor # 6
0246:							ECR7	EC7	Floor # 7
0247:							ECR8	EC8	Floor # 8
0248:							ECR9	EC9	Floor # 9
0249:							ECR10	EC10	Floor # 10
024A:							ECR11	EC11	Floor # 11
024B:							ECR12	EC12	Floor # 12
024C:							ECR13	EC13	Floor # 13
024D:							ECR14	EC14	Floor # 14
024E:							ECR15	EC15	Floor # 15
024F:							ECR16	EC16	Floor # 16
0250:							ECR17	EC17	Floor # 17
0251:							ECR18	EC18	Floor # 18
0252:							ECR19	EC19	Floor # 19
0253:							ECR20	EC20	Floor # 20
0254:							ECR21	EC21	Floor # 21
0255:							ECR22	EC22	Floor # 22
0256:							ECR23	EC23	Floor # 23
0257:							ECR24	EC24	Floor # 24
0258:							ECR25	EC25	Floor # 25
0259:							ECR26	EC26	Floor # 26
025A:							ECR27	EC27	Floor # 27
025B:							ECR28	EC28	Floor # 28
025C:							ECR29	EC29	Floor # 29
025D:							ECR30	EC30	Floor # 30
025E:							ECR31	EC31	Floor # 31
025F:							ECR32	EC32	Floor # 32

Legend for Table 5.7:

▨ → Registered hospital calls for the floor opening.
1 = call is registered   0 = call is not registered

▨ → Assigned hospital calls for the floor opening.
1 = Call is assigned   0 = Call is not assigned

▨ → The car is eligible for Hospital Emergency Service Operation for the floor opening.
1 = Hospital emergency call can be entered for the floor opening
0 = Hospital emergency call cannot be entered for the floor opening

5.6 SYSTEM MODE

System mode allows the user to change certain system-wide options that do not require the car to be on Inspection. To enter System mode, move the *F3* switch to the up position. Press the *N* pushbutton to select the desired System Mode item:

System mode

- Building Security Menu (see Section 5.6.1)
- Passcode Request Menu (see Section 5.6.2)
- Load Weigher Thresholds (see Section 5.6.3)
- Analog Load Weigher Learn Function (see Section 5.6.4)
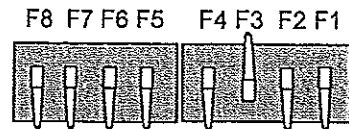
5.6.1 BUILDING SECURITY MENU

Elevator Security is typically used to prevent access to specific floors via the elevators, or to limit access to passengers with a valid security code. MCE's elevator security options include Basic Security and Basic Security with CRT. Basic Security provides a means to prevent registration of unauthorized car calls. Basic Security with CRT provides a means to prevent registration of unauthorized car calls and/or hall calls and additional programming options are available via the CRT terminal. Refer to MCE's Elevator Security User's Guide, part # 42-02-S024 for additional information and instructions for using the CRT terminal. The Appendix *Elevator Security Information and Operation* in this manual provides instructions for passengers who will be using the elevator while Security is ON. For both Basic Security and Basic Security with CRT, the security codes for each floor are programmed as described below.

The Security code for each floor may consist of one to eight characters where each character is one of the floor buttons found in the elevator car. With Basic Security, any floor with a programmed security code is a secured floor when Security is ON. Refer to the Elevator Security User's Guide for information on turning Basic Security with CRT ON or OFF. Basic Security (without CRT) is turned ON or OFF by the Building Security Input (BSI) in combination with the Master Software Key parameter in the Extra Features Menu (Program mode). There are 3 possible settings for the Master Software Key: ACTIVATED, ENABLED, and DEACTIVATED:
- If set to ACTIVATED, Security is ON.
- If set to ENABLED, Security is ON when the BSI input is turned *ON*.
- If set to DEACTIVATED, Security is OFF regardless of the status of BSI.

To find the BSI input, refer to the job prints. When Security is ON, all car calls are screened by the computer and become registered only if 1) the call is not to a secured floor, or 2) the call is to a secured floor and its security code is correctly entered within 10 seconds.

5.6.1.1 VIEWING THE BUILDING SECURITY MENU - Place the *F3* switch in the up position (with all other switches in the down position).
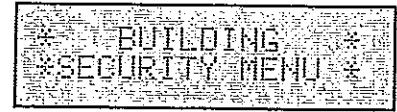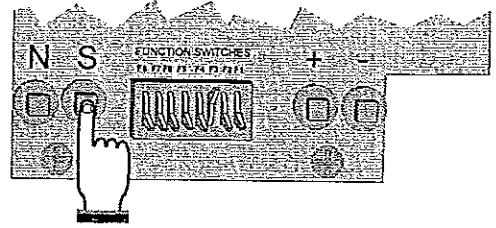
The following display appears:

Press the *N* pushbutton.

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The following display appears:

* BUILDING *
* SECURITY MENU *
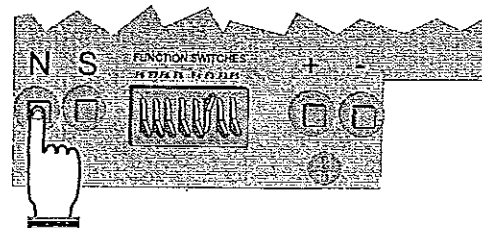
5.6.1.2 PROGRAMMING AND VIEWING THE SECURITY CODES - Press the *S* pushbutton

to start programming or changing the Security codes (or to view the codes).

If no code has been programmed, then the computer displays NO CODE PROGRAMMED for that particular floor number. Press the *S* pushbutton again to start programming the Security code.


FLR 1: NO
CODE PROGRAMMED
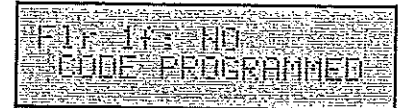
If a code has already been programmed, then the computer displays the security code. The cursor will blink below the floor number for the Security code being displayed.
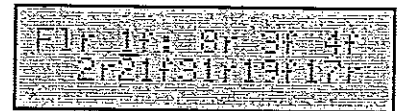
Press the + and − pushbuttons to change the floor number. The + pushbutton increments the value that is being displayed to the next eligible value. The − pushbutton decrements the value.
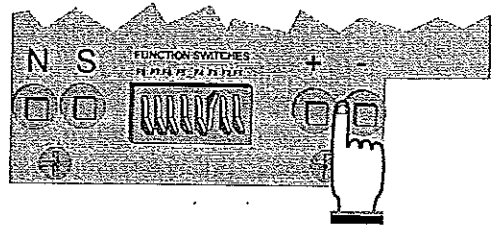
Press the *S* pushbutton to move the cursor to the first character of the Security code. Press the + and − pushbuttons to change the value of the first character. Repeat these steps (pressing the *S* pushbutton followed by the + and − pushbuttons) until the desired number of characters are programmed (maximum of 8 characters). The *S* pushbutton moves the position of the blinking cursor according to the diagram at the right. If any character is left blank, or after all eight characters have been programmed, and the *S* pushbutton is pressed, the cursor returns to the floor number.
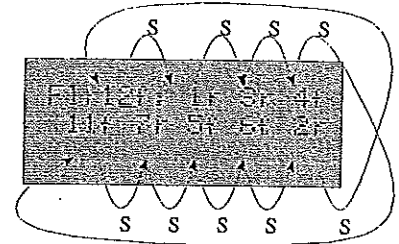
Repeat these steps (Section 5.6.1.2) to program the Security codes for all the floors. You may exit the Building Security Menu at any time during programming by pressing the *N* pushbutton. When the *N* pushbutton is pressed, the LCD will display the following:

Exit this menu?
N=No S=Yes

Press the *S* pushbutton to exit or the *N* pushbutton to return to the previous display. If *S* is pressed, the following will appear (only if changes have been made):

Press *S* to save the changes or *N* to exit without saving (any original codes will remain in effect if the changes are not saved).

Save Changes?
N=No S=Save

5.6.2 PASSCODE REQUEST MENU - The Passcode Request Operation can be used to require a password to be entered in order to run the car on any mode of operation other than Inspection.

NOTE: If a passcode has not been programmed for this controller, the Passcode Request Menu will not appear.

If a passcode has been programmed, the LCD screen will flash the "PASSCODE REQUESTED" message when Passcode Request Operation is activated.

In order to clear or set the Passcode Request Operation, the controller must first be placed into the System Mode as described in Section 5.6. By pressing the *N* pushbutton when the display reads "BUILDING SECURITY MENU," the Passcode Request Menu will appear:

Screen 1

CLEARING THE PASSCODE - With Screen 1 displayed, press the *S* pushbutton. If Passcode Request Operation is activated, the following screen appears:

Screen 2

The first character of the passcode to be entered will blink. The "+" and "-" pushbuttons will scroll through the numbers 0-9 and letters A-Z for each character of the passcode. The *N* pushbutton will advance to the next character position of the passcode. Pressing the *S* pushbutton will cause the program to verify that the passcode entered was correct. If it was not correct, the following screen will appear:

Screen 3

Pressing the *S* pushbutton will display Screen 2. Pressing the *N* pushbutton from this screen will return the display back to Screen 1.

If the correct passcode was entered, the following screen appears:

Screen 4

Pressing the *N* pushbutton will return the display to Screen 1. The car may now be run on Normal operation mode.

ACTIVATING THE PASSCODE - With Screen 1 displayed, press the *S* pushbutton. If Passcode Request Operation is not activated, the following display appears:
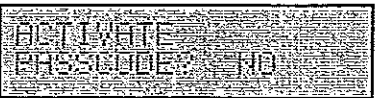
Screen 5

Pressing the *S* pushbutton will toggle the display from "NO" to "YES". Pressing the *N* pushbutton while "NO" is displayed will return the display back to the Screen 1. Pressing the *N* pushbutton while "YES" is displayed will activate the Passcode Request Operation and return the display back to Screen 1. With Passcode Request Operation *activated*, the passcode must be entered in order to run the car on any mode of operation other than Inspection.

5.6.3 LOAD WEIGHER THRESHOLDS - The load weigher (isolated platform or crosshead deflection) provides a signal that corresponds to the perceived load in the car. This signal is brought to the control system where it is conditioned, sampled and digitized, and the value is used to calculate the actual load *inside* the elevator. This load value is then used for logical dispatching operations. The load thresholds are user-programmable and determine when each of these logical operations should be performed.

- **LIGHT LOAD WEIGHER (LLW):** This value is used to define the load at which a limited number of car calls is to be registered (anti-nuisance). If the programmed number of car calls is exceeded, all car calls will be canceled.

  Example: LLW=20%. If the measured load in the car is less than 20%, the computer will only allow a certain number of car calls to be registered, defined by the parameter LIGHT LOAD WEIGHING? / LIGHT LOAD CAR CALL LIMIT in the EXTRA FEATURES MENU OPTIONS. If the limit is set to a value of three, the computer will only allow three calls to be registered if the load is less than 20%. If a fourth call is registered, all car calls will be canceled.

- **DISPATCH LOAD WEIGHER (DLW):** This value is used to define the load at which the lobby landing door timer is reduced. This threshold should be set to a value (defined in many specifications as 60%) at which it is appropriate to initiate the process of moving the car out of the lobby.

- **HEAVY LOAD WEIGHER (HLW):** This value is used to define the load value at which hall calls should be bypassed.

- **OVERLOAD WEIGHER (OLW):** This value is used to define the load at which it is considered unsafe to move the elevator. When this threshold is exceeded, the car will remain at the floor with doors open. Typically an application that requires OLW will use some type of visual and/or audible indicator to alert elevator passengers that the car is overloaded. This operation is overridden by Fire Service operation.

ADJUSTING THE LOAD THRESHOLDS

The typical values for the load thresholds are shown below. However, these thresholds are user-adjustable and may be changed at any time.

Load Threshold	Default Value	Range
• LIGHT LOAD WEIGHER (LLW)	20%	0 - 40%
• DISPATCH LOAD WEIGHER (DLW)	50%	20 - 80%
• HEAVY LOAD WEIGHER (HLW)	80%	50 - 100%
• OVERLOAD WEIGHER (OLW)	105%	80 - 125%

To adjust these thresholds:

a. Enter the SYSTEM mode of operation by placing the *F3* switch in the up position.

b. Press the *N* pushbutton until LOAD WEIGHER THRESHOLDS appears on the LCD display.

c. Press the **S** pushbutton to display the load threshold you wish to set.

d.   The value shown is the current threshold value expressed as a percentage of the full load value (see the table above). Press the '+' or '-' pushbutton to adjust the value. If the value is set to 0%, the load weigher function is disabled.

e.   Press the **S** pushbutton to select another load threshold to adjust or press the **N** pushbutton to exit this menu.

f.   Place the **F3** switch in the down position to exit SYSTEM mode when finished.

If an analog load weigher is used, the Analog Load Weigher Learn Function must be performed before the load weigher system will perform properly (see Section 5.6.4).

5.6.4   ANALOG LOAD WEIGHER LEARN FUNCTION

With the isolated platform load weigher (MCE), the system simply learns the reference values of the empty and fully loaded car weight. However, with the crosshead deflection load weigher (K-Tech), the system must learn the reference values at each floor due to the dynamics of the elevator system. This is necessary because the perceived load at the crosshead varies with the position of the car in the hoistway due to the changing proportion of the traveling cable hanging beneath the car and the position of the compensation cables.

The Analog Load Weigher Learn Function is performed as follows:

a.   Move the **empty** car to a convenient floor where the test weights are located. It is best to have one person in the machine room and another person at the floor to load the weights.

b.   Place the car on Independent Service operation. If an Independent Service switch is not available in the car, place a jumper between panel mount terminal 2 and terminal 49 on the Main Relay board (HC-RB4-x).

c.   Place the **F3** switch in the up position and press the **N** pushbutton to select the Analog Load Weigher Learn Function (scrolling message is displayed).

d.   Press the **S** pushbutton to start. The computer responds with one of two scrolling messages:

   • CAR NOT READY TO LEARN, MUST BE ON INDEPENDENT SERVICE.

   Verify that the car has been placed on Independent Service.

   • READY TO LEARN EMPTY CAR VALUES? PRESS S TO START.

   If the empty car values have already been learned and you want to be learn the full car values, press the **N** pushbutton (go to step 'e').

   To begin learning the empty car values, press the **S** pushbutton. The computer displays the message:

   • LEARNING EMPTY CAR VALUES. PRESS N TO ABORT.

   If the Extra Features Menu Option "Analog Load Weigher?" is set to K-TECH, the car will move to the bottom floor, record the empty car value and then move up, stopping at each floor to record the empty car value. When the top floor has been reached, the car will move back to the floor at which the Analog Load Weigher Learn Function was begun and the computer will display the scrolling message:

   • EMPTY CAR LEARN PROCESS COMPLETED. PRESS S TO CONT.

If the Extra Features Menu Option "Analog Load Weigher?" is set to MCE, the car will learn the empty car value and then display the message:

- EMPTY CAR LEARN PROCESS COMPLETED. PRESS S TO CONT.

Press the *S* pushbutton.

e. The computer displays the scrolling message:

- READY TO LEARN FULL CAR VALUES? PRESS S TO START.

f. Place the full load test weights in the car and press the *S* pushbutton to begin learning the full car values. The computer displays the message:

- LEARNING FULL CAR VALUES. PRESS N TO ABORT.

If the Extra Features Menu Option "Analog Load Weigher?" is set to K-TECH, the car will move to the bottom floor, record the full car value and then move up, stopping at each floor to record the full car value. When the top floor has been reached, the car will move back to the floor at which the Analog Load Weigher Learn Function was begun and the computer will display the scrolling message:

- FULL CAR LEARN PROCESS COMPLETED. PRESS S TO CONT.

If the Extra Features Manu Option "Analog Load Weigher?" is set to MCE, the car will learn the full car value and then display the message:

- FULL CAR LEARN PROCESS COMPLETED. PRESS S TO CONT.

Press the *S* pushbutton, place the *F3* switch in the down position and take the car off of Independent service.

g. To verify that the Load Weigher Learn Function has been performed successfully, place the *F8* switch in the up position. With the test weights in the car, the following should be displayed:

CURRENT LOAD
= 100%

If the Load Weigher Learn Function has not been performed successfully, the following will be displayed:

CURRENT LOAD
NOT LEARNED

h. The Load Weigher Learn Function (empty or full values) may be aborted at any time by pressing the *N* pushbutton. The computer will display the message:

- LEARN PROCESS ABORTED... PRESS S TO CONT.

When the *S* pushbutton is pressed the computer displays the scrolling message:

- ANALOG LOAD WEIGHER LEARN FUNCTION. PRESS S TO START

At this point you may exit System Mode by placing the *F3* switch in the down position, or you may re-start the learn function by moving the car back to the floor where the test weights are located and press *S* to start (go to step 'd').

If the empty car values have been learned but the full load learn function was aborted, you need not re-learn the empty car values. When the message READY TO LEARN EMPTY CAR VALUES is displayed, press the *N* pushbutton. The computer will display:

- READY TO LEARN FULL CAR VALUES? PRESS S TO START.

Press the *S* pushbutton to begin learning the full car values (go to step 'f').

5.7   DUPLEXING

A great advantage of the PTC Series is how easily it can be duplexed. Because the duplexing logic is completely internal to the computers, it requires only a connecting cable and the selection of the Duplex option (see Section 5.4.2.1). The duplexing logic provides for proper assignment of hall calls to cars and increases efficiency and decreases waiting time.

5.7.1   DISPATCHING ALGORITHM

The dispatching algorithm for assigning hall calls will be real time-based on estimated time of arrival (ETA). In calculating the estimated time of arrival for each elevator, the dispatcher will consider, but not be limited to, the location of each elevator, the direction of travel, the existing hall call and car call demand, door time, MG start up time, flight time, lobby removal time penalty and coincidence call.

5.7.2   HARDWARE CONNECTIONS

There are two critical items in duplexing hardware: Proper grounding between the two controller subplates and proper installation of the duplexing cable. The hall calls will be connected to both cars simultaneously. Once in a duplex configuration, either of the two controllers can become the dispatcher of hall calls. The controller that assumes the dispatching duty on power up remains the dispatching processor until it is taken out of service. If, for any reason, the communication link between the two controllers does not function, each car will respond to the registered hall calls independently.

5.7.3   TROUBLESHOOTING

In a duplexing configuration, the controller that assumes dispatching duty is identified by the letter *D* in the upper left corner of the LCD display. The other car is identified by the letter *S* (slave), in the upper left cor ner of the LCD. If the upper left-hand corner of the LCD is blank (neither the *D* nor the *S* is displayed), the cars are not communicating, the following troubleshooting steps should be taken:

Step 1:   Check for proper grounding between the two subplates.

Step 2:   Check the communication cable hook-up.

Step 3:   The JP3 jumper is installed on both MC-PCA boards (found next to the power supply terminals, see Figure 5.1) as the default configuration for duplex communication. JP3 is an EIA-485 Standard Communication Termination jumper. However, in an attempt to optimize the duplex communication, the JP3 jumper may be removed from either one or both of the MC-PCA boards.

Step 4:   If all of the above are unsuccessful, contact MCE.

If the *D* and/or *S* indicators on the LCD are flickering, it is most likely caused by bad communication and the following troubleshooting steps should be taken:

Step 1:   Check the Communication Time-Out Error Counter shown in Table 5.3 (Address 42). If the counter is actively counting errors, the slave computer is not responding to the dispatcher's request for information. If the cause is a communication problem, complete Steps 1-4 above.

Step 2:   Check the Communication Checksum Error Counter shown in Table 5.3 (Address 43). If the counter is actively counting errors, the data being received is bad or does not have integrity and cannot be used by the computer. If the cause is a communication problem, complete Steps 1-4 above.

SECTION 6
TROUBLESHOOTING

6.0 GENERAL INFORMATION

MCE's PHC controllers are equipped with certain features that can help field personnel speed up troubleshooting. The system is designed so that tracing signals from the field wires onto various boards and into the computer can be achieved without the need for mechanical removal of any components or for rear access to the boards. The following pages will describe how to use these features and speed up the troubleshooting process.

Overall, the computer (MC-PCA board) and the program are the most reliable parts of the system. Diagnostic mode on the computer is the most helpful tool for troubleshooting. Therefore, it is best to start with the computer. Refer to Section 5.3 of this manual for instructions on using Diagnostic mode. When viewing the diagnostic LCD display, be observant of any contradictory information (i.e., the High Speed light should not be on while the Doors Locked light is off).

6.1 TRACING SIGNALS IN THE CONTROLLER

Typically, a malfunction of the control system is due to a bad input or output signal. Inputs are signals generated outside the controller cabinet and are brought to the designated terminals inside the cabinet and then read by the computer. Outputs are signals generated inside the computer, and are usually available on terminal blocks inside the controller cabinet. Since a fault on any input or output can be the cause of a system malfunction, being able to trace these signals and find the source of the problem is essential. The following is an example that shows how an input signal can be traced from its origination point to its destination inside the computer. For example, look at the Door Zone (DZ) input. Using the Diagnostic mode instructions in Section 5.3 of this manual, use the *N*, *S*, +, and – pushbuttons to address and observe the Door Zone (DZ) flag, which shows the status of the Door Zone (DZ) input. Moving the car in the hoistway should cause this flag to turn on (1) and off (0) whenever the car passes a floor. If the status of the (DZ) flag does not change, one of the following could be a cause of the problem:

1. A defective Door Zone switch or sensor on the landing system car top unit.
2. Incorrect hoistway wiring.
3. Bad termination of hoistway wiring to the (DZ) terminal inside the controller.
4. A defect on the HC-RBH Relay board or HC-PCI/O board.

The first step is to determine if the problem is inside or outside of the controller. To do so, use a voltmeter to probe the Door Zone terminal (27) on the Relay board. This terminal is in Area 3 of the Job Prints (areas of the Job Prints are marked on the left-hand side of the pages and certain signals may be in locations different from the print area mentioned in this guide). Moving the car in the hoistway should cause the voltmeter to read 115VAC when the car is at Door Zone. If the signal read by the voltmeter does not change when the car passes the Door Zone, then the problem must be external to the controller and items (1), (2), or (3) should be examined. If the signal read by the voltmeter *does* change as the car passes the Door Zone, the problem must be internal to the controller and item (4) must be examined. From the print, notice that this input goes to the right-hand side of the DZ relay and to a 47K 1W resistor. The 47K 1W resistor conducts the signal to pin 8 of the C2 connector on the top of the HC-RBH Relay board. Next, a 20-pin ribbon cable conducts the signal to pin 8 of the C2 connector on the HC-PCI/O board.

FIGURE 6.1   HC-PCI/O Power and Call Input/Output Board Quick Reference

HC-PCI/O QUICK REFERENCE CARD

HC-PCI/O INPUT/OUTPUT DETAIL
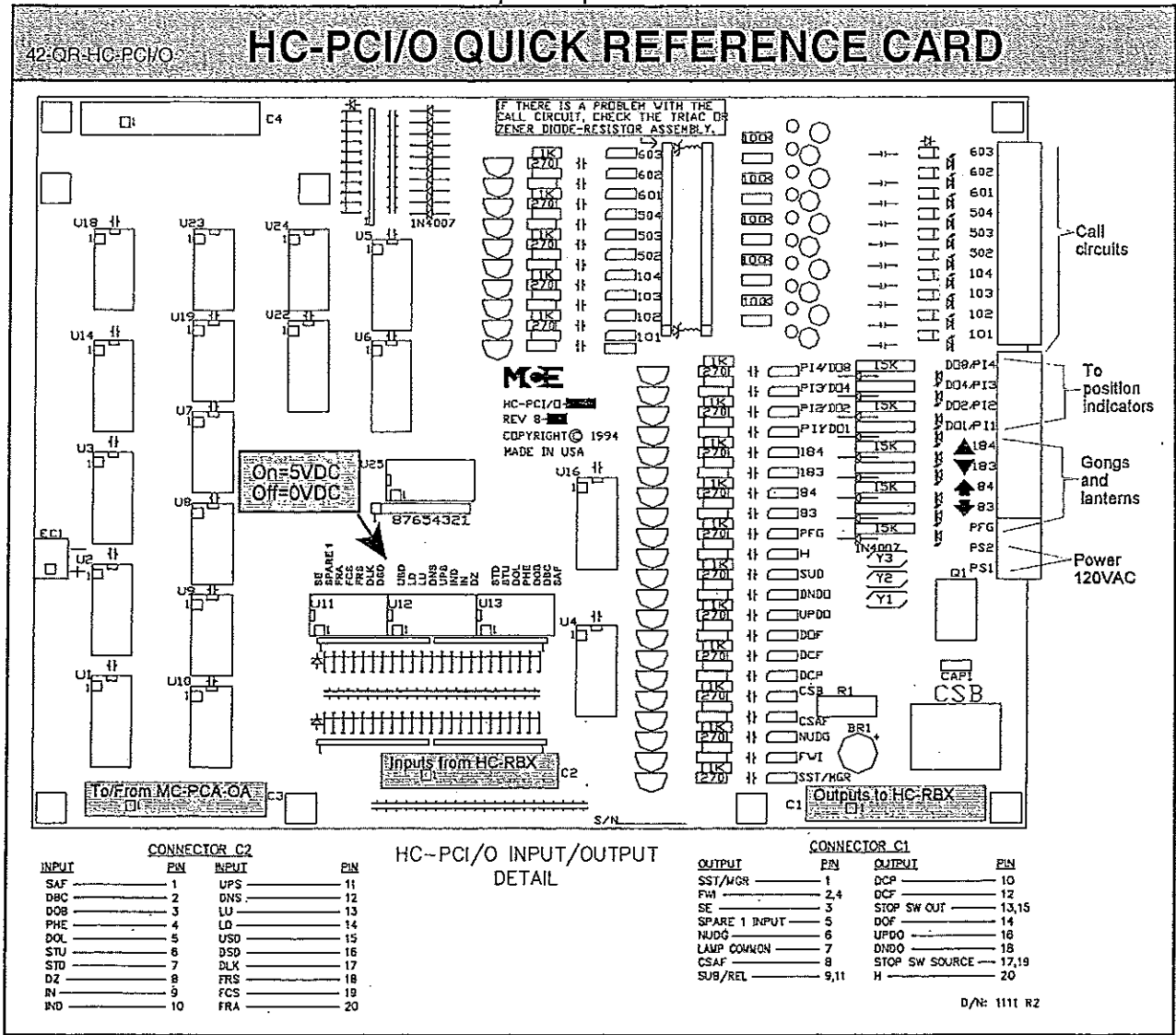
Figures 6.1 and 6.2 show pictures of the HC-PCI/O and HC-RBH boards showing where the DZ signal can be found on these boards. Notice that if terminal 27 is powered, there should be approximately 115VAC at the bottom of the 47K 1W resistor corresponding to DZ on the HC-RBH board . Whereas the top of the same resistor should read approximately 5VAC if the C2 ribbon cable is connected. If the ribbon cable is disconnected, the reading should be 115VAC at the top of this same resistor. This is because the other half of the voltage divider is on the HC-PCI/O board.

The HC-RBH board has test pads on the front of the board for every relay and connector. The relay on the lower left-hand side (RPI) has the legend describing which pad corresponds to which contact of the relay or its coil. To see if the input from terminal 27 is making its way to the relay coil, use the test pad on the lower right-hand side of the DZ relay (the right-hand side of the relay coil symbol on the job print corresponds to the right-hand side on the board). If 115VAC is present across the relay coil and the relay is not picked, then the relay may be defective.

It is therefore not necessary to remove the relay or access the back of the HC-RBH board to trace the signals on the board. The signals can also be traced on the HC-PCI/O board. See Figure 6.1 for details. If the signal gets to the HC-PCI/O board but does not get to the computer, it would be safe to assume that the problem is on the HC-PCI/O board.

FIGURE 6.2 HC-RBH Main Relay Board Detail
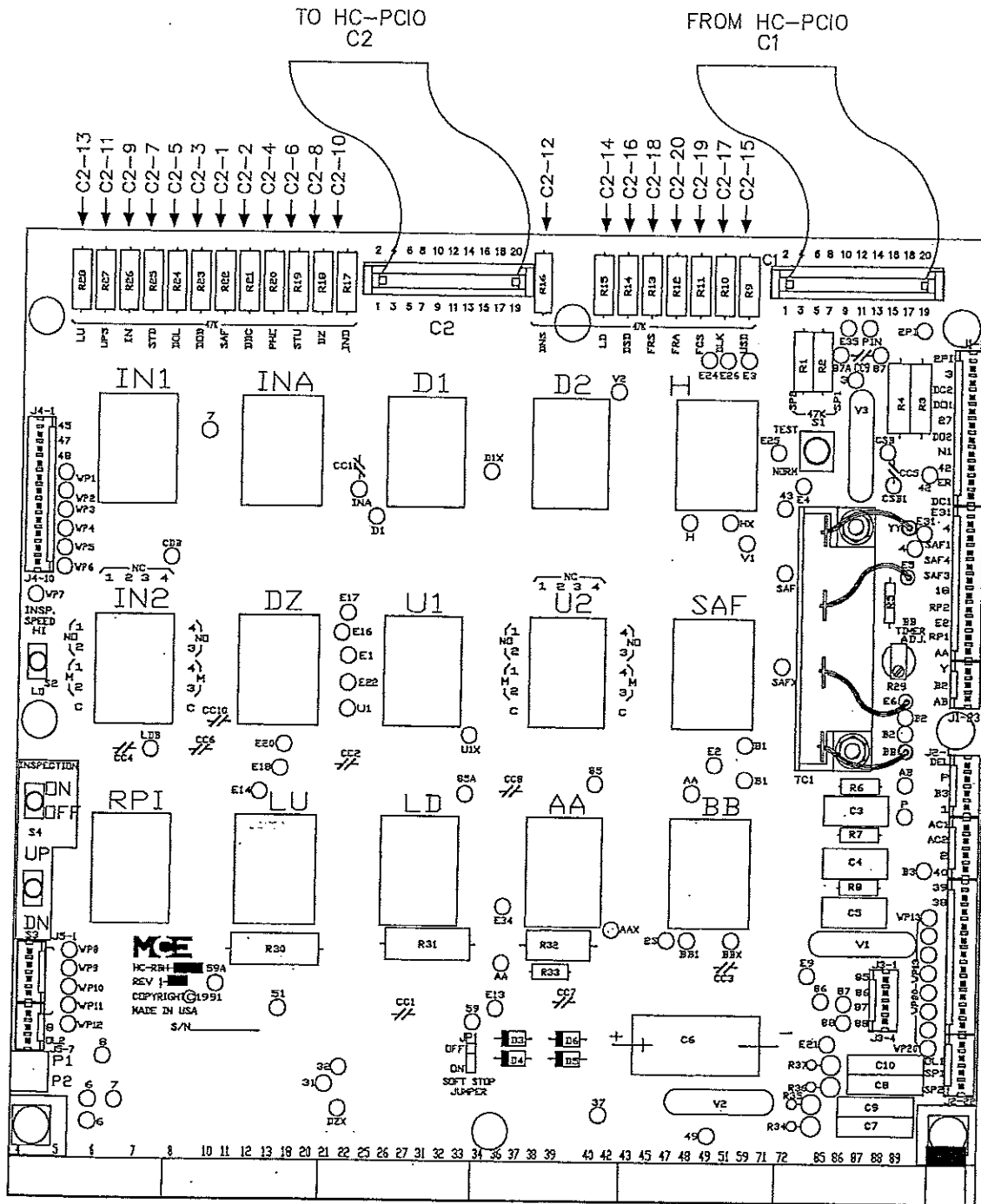
D/N: 1399 R2

6.2 DOOR LOGIC

As complex as it is, the Door Logic portion of the software answers one simple question: Should the doors be open? The computer looks at certain inputs and then calls upon specific logic to determine the answer to this basic question. All of these inputs and all of the flags generated by the specific logic are available for viewing through Diagnostic mode on the computer. When troubleshooting a door problem, inspecting the action and sequence of these flags and inputs is very important. When the meaning of the flags becomes more familiar, the state of these flags will generally serve to point to the root of the problem. Once the computer has determined the answer to the door status question, the appropriate outputs are turned on and/or off to attempt to cause the doors to be in the desired state.

The computer looks at the following inputs:

DBC	-	Door Close Button Input
DCLC	-	Door Closed Contacts Input (Retiring Cam only)
DLK	-	Door Locks Input
DOB	-	Door Open Button Input
DOL	-	Door Open Limit Input
DZ	-	Door Zone Input
PHE	-	Photo Eye Input
SE	-	Safety Edge Input

The computer generates the following outputs:

DCF	-	Door Close Function Output
DCP	-	Door Close Power Output
DOF	-	Door Open Function Output

Associated important computer-generated logic flags:

CCT	-	Car Call Time Flag
DOI	-	Door Open Intent Flag
DSH	-	Door Shortening (Intermediate) Flag
DSHT	-	Door Shortening (Final) Timer Flag
HCT	-	Hall Call Time Flag
LOT	-	Lobby Call Time Flag
SDT	-	Short Door Time Flag

The computer uses the flags and inputs listed above to make a decision concerning the desired state of the doors. This decision has only two possible goals: *doors open* or *doors closed*. The computer's answer to this question is reflected in the state of the Door Open Intent (DOI) flag. This flag can be seen by using Diagnostic mode on the computer.

- If the computer decides the **doors should be open,** *DOI flag is set to ON* (1)
- If the computer decides the **doors should be closed,** *DOI flag is set to OFF* (0).

The DOI flag is a useful flag to inspect when troubleshooting door problems. This flag shows the *intention* of the computer concerning the state of the doors. Figure 6.3 shows how DOI relates to door operation, as is described in the following paragraph.

Remember that if the DOI flag is *ON* (1), it will turn *ON* the DOF output which should pick the DO relay. The door will remain open until the DOL (Door Open Limit) input goes away. This will shut off the DOF output while the doors are open and DOI is on. Turning off the DOI flag will turn on the DCF output, which will pick the DC relay and close the doors. While there is no demand to go anywhere, the signal that shuts off the DCF output is DLK (Doors Locked), or possibly DCLC if the car has a retiring cam. However, there is a 2-second delay before the DCF output turns off after the doors are locked. If there is any demand (as is evidenced by the DMU or DMD flags being on) and if the DOI flag is *not* on (0), then the DCP output will be turned on regardless of the position of the door. The DCP output is used to provide door closing power for those door operators requiring power while the car is running, such as those manufactured by G.A.L. Corporation.

FIGURE 6.3   *Door operation flowchart*

```
┌─────────────┐                    ┌─────────────┐
│  DOI ON (1) │                    │ DOI OFF (0) │
└──────┬──────┘                    └──────┬──────┘
       │                                  │
       ▼                                  ▼
  ╭─────────╮                        ╭─────────╮
  │Turns ON │                        │ Tuns ON │
  │   DOF   │                        │   DCF   │
  ╰────┬────╯                        ╰────┬────╯
       │                                  │
       ▼                                  ▼
  ╭─────────╮                        ╭─────────╮
  │Picks DO │◄──┐                    │Picks DC │
  │  relay  │   │                    │  relay  │
  ╰────┬────╯   │                    ╰────┬────╯
       │        │                         │
       ▼        │                         ▼
     ╱ DOL ╲    │                     ╱Is there╲ ──no──┐
    ╱ timed ╲─no┘                    ╱ Demand? ╲       │
    ╲ out?  ╱                        ╲         ╱       │
     ╲     ╱                          ╲       ╱        │
      yes                               yes            ▼
       │                                 │       ╭──────────╮
       ▼                                 │       │DMU and DMD│
  ╭─────────╮                            │       │    OFF    │
  │ DO OFF  │                            │       ╰────┬─────╯
  ╰─────────╯                            ▼            │
                                  ╭───────────╮       ▼
                                  │DMU or DMD │ ╭──────────╮
                                  │is ON and  │ │  DLK + 2 │
                                  │DOI is OFF │ │ seconds  │
                                  ╰─────┬─────╯ │ turns    │
                                        │       │ OFF DCF  │
                                        ▼       ╰──────────╯
                                  ╭───────────╮
                                  │DCP ON     │
                                  │while car  │
                                  │is moving  │
                                  │(G.A.L.    │
                                  │type door  │
                                  │operators) │
                                  ╰───────────╯
```
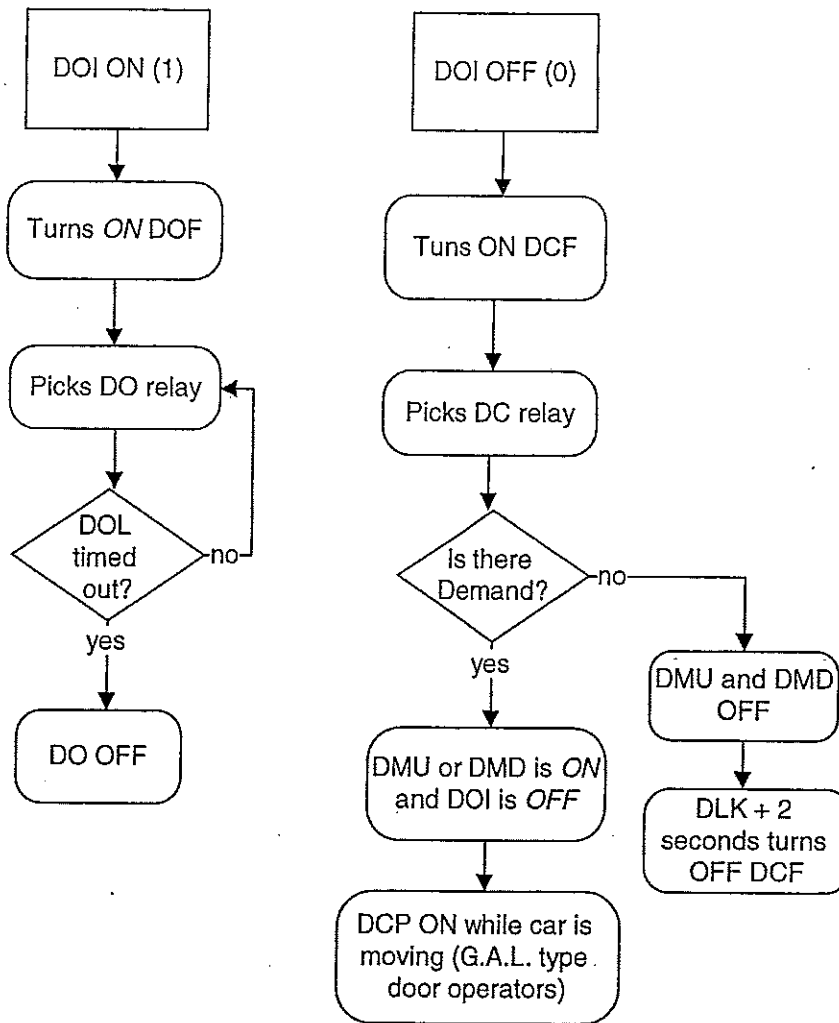
The various values of door standing open time result from the type of call canceled or responded to. A hall call cancellation will give an HCT flag and a car call cancellation will give a CCT flag. A door reopen from a hall or car call button at the lobby, or a lobby hall or car call cancellation will give a LOT flag. A door reopen from the Photo Eye, Safety Edge or Door Open button will give a SDT flag. Each flag (HCT, CCT, LOT or SDT) has a separate door standing open time.

The door logic provides protection timers for the door equipment both in the open and the close direction. If the doors get stuck because of the door interlock keeper failing to lift high enough to clear the door interlock during the opening cycle, then the doors cannot complete their opening cycle. This could result in damage to the door motor. The door open protection timer will eventually stop trying to open the doors so the car can go on to the next call. Similarly, if the doors do not close all the way (i.e., the doors do not lock), the computer will recycle the doors at a programmed interval in an attempt to clear the problem.

To provide a clearer understanding of the computer logic, note that the logic looks for a reason to open the doors. If a valid reason to open the doors is *not* found, or if conditions are detected that prohibit the opening of the doors, the logic will close the doors (reset or turn off DOI). To open the doors, the car must be in a door zone and not running at high or intermediate speed. Once the car has settled into a proper position to open the doors, a condition must exist that says to the logic that the doors should be open.

Some of these conditions are listed below:

- Call demand at the current landing (or a call has just been canceled)
- Safety Edge/Door Open button (DOB) input
- Emergency/Independent Service conditions
- Photo Eye input

When a call is canceled, one of the following door time flags should be set (turned on): CCT, HCT or LOT. When one of the reopening devices is active (SE, PHE or DOB), the SDT flag should be set. When an Emergency or Independent Service condition exists, the presence of a particular condition will cause the DOI flag to be set. Some of these conditions include the following: Fire Service, Emergency Power operation, Independent Service, Attendant Service, etc.

Once the intention of the computer has been determined, inspect the high voltage hardware to see if the appropriate functions are being carried out. For example, if the doors are closed and DOI is set, the doors should be opening (DO relay picked). If the doors are open and DOI is cleared (turned off), the doors should be closing (DC relay picked).

The trouble arises when the door control system is not doing what the mechanic thinks it should be doing. However, when troubleshooting, it is vital to determine if the control system is doing what *it* thinks it should be doing. If the control system (high voltage section) is doing what the logic intends it to do, then determining how the logic is coming to its conclusions is important. If the control system is *not* doing what the logic intends it to do, then determining what is preventing the desired function from being carried out is equally important (bad relay, bad triac, etc.). Diagnostic mode on the MC-PCA Computer board will help to determine which situation is present. The output flags will show which outputs the computer is attempting to turn on or off. These flags can be compared with what is actually happening in the high voltage hardware. Consider, as an example, this problem: the doors are closed and locked, but the DC relay is *always* picked, preventing the doors from opening when they should. The cause of the problem must first be isolated. If both the DCF and DCP flags are cleared (turned off) in the computer, the DC relay should *not* be picked. If the DC relay *is* picked, then a problem obviously exists in the output string to the DC relay. However, if either the DCF or DCP flag is *always* set in the computer, then the problem is not with the output circuit, but possibly a problem with the door lock circuitry. If the doors are truly physically locked, inspecting the DLK flag in the computer would be wise. If the flag is not set in the computer, then there is obviously a fault in the input circuit from the door lock input. A simple inspection of the computer's Diagnostic mode will substantially narrow down the cause of the problem.

6.3 CALL LOGIC

6.3.1 NORMAL OPERATION

In the MCE call input structure, calls are input to the system by grounding the appropriate call input, as labeled on the HC-PCI/O board (with more than four floors, both the HC-PCI/O board and one or more HC-CI/O-E Call boards). The act of physically grounding the call input terminal will illuminate the corresponding call indicator LED on the call board. Latching of the call by the computer (recognition and acceptance) will cause the indicator to remain illuminated on the board. Cancellation of the call will cause the indicator to turn off. With the MCE call input/output structure, the single input/output terminal on the HC-PCI/O (or HC-CI/O-E) board will accept a call input from the call fixture and serves as the output terminal which illuminates the call fixture to show registration of the call. This means that the field wiring is identical to that which would be used for most standard relay controllers.

Calls may be prevented from latching by the computer in certain circumstances. If none of the car calls are allowed to be registered, the computer may be purposely preventing these calls from being registered. When the computer prevents car call registration, it sets (turns on) the Car Call Disconnect (CCD) flag for that car. Inspection of this flag using Diagnostic mode will show if it is the computer that is preventing the registration of these calls. If the CCD flag is set (on), the reason for this CCD condition must be discovered. There are many reasons for a CCD condition: Fire Service, Motor Limit Timer elapsed condition, bottom or top floor demand, etc.

A corresponding flag exists for hall call registration prevention. The computer may detect conditions for preventing hall calls from being registered, and will set the Hall Call Disconnect (HCDX) flag. This is a system flag (as opposed to a per car flag), but is available for viewing in Diagnostic mode along with the car operating flags. There are also many reasons for the computer to reject hall call registration: Fire Service, a hall call bus problem, no available cars in service to respond to hall calls, etc.

It should also be mentioned that if a call circuit becomes damaged or stays on due to a stuck pushbutton, the elevator will release itself from the stuck call automatically. It will probably return there later, but will again release itself automatically, thereby allowing continued service in the building.

6.3.2 PREPARATION FOR TROUBLESHOOTING CALL CIRCUITS

Review Section 5.5 (External Memory mode) of this manual. Then, look at Table 5.6. It shows where to look up the calls in the computer memory (addresses 0140 through 015F). By looking at this memory, it is possible to see if a particular call is being recognized by the computer.

Prepare a jumper with one end connected to terminal #1 which is the same as ground (subplate is grounded), then use the other end to enter the call by grounding the call terminal in question.

6.3.3 TROUBLESHOOTING THE CALL CIRCUITS

1. Once the wires have been disconnected from the call input terminal, the system should be turned ON and in a normal running configuration. Use Diagnostic mode on the computer as described previously to check the status of the HCDX flag and CCD flag. If they are ON, they will shut OFF hall calls and car calls respectively.

> **NOTE:** If it appears that there is a problem with a call, disconnect the field wire (or wires) from that call terminal in order to find out if the problem is on the board or out in the field. The calls can be disconnected by unplugging the terminals or by removing individual wires. If the individual field wire is disconnected, lightly tighten the screw on the terminal. If the screw is loose while trying to ground the terminal using a jumper, contact may not be made.

2. If HCDX and CCD are normal (or OFF), take a meter with a high input impedance (such as a good digital meter) and check the voltage on the call terminal in question. Depending on the voltage that the call circuits were set up for, the reading should be approximately the voltage on the call terminal called for (or up to 15% less). If the voltage is lower than what is specified, and the call terminal is on an HC-CI/O-E board, turn OFF the power and remove the resistor-fuse associated with the call terminal (i.e., if the call terminal is the fifth one from the bottom, remove the fifth resistor-fuse from

the bottom). Turn the power back ON. The reading should be the voltage as discussed above. Note: the HC-PCI/O board does not have these resistor-fuses.

NOTE: The resistor-fuse is an assembly made up of a 10 Volt zener diode and a 22 ohm ¼ Watt resistor.

NOTE: Number 3 below relates to only those jobs that have more than 4 floors and therefore have a HC-CI/O-E board included.

3. If the job has more than four floors, the controller will include at least one HC-CI/O-E Call Input/Output board. If the problem terminal is on this board and the necessary voltage does not read on the terminal, make sure the jumper plug (or header) is in position on the Call board. The jumper plug socket is on the right-hand side of the Call board near the call indicators. If a Call board is replaced, this jumper plug must *always* be transferred to the new board and stay in the same position. If this plug is *not* installed, any calls on the new board may become registered if the field wiring is not connected, so make sure the jumper plug is in place (see Figure 6.4).

4. For both the HC-PCI/O board and the HC-CI/O-E board(s), make sure that the correct voltage is coming into the terminals on the board marked PS1, PS2, and PS3. Note that there may be power on all three of these terminals, only two, or at *least one*, depending on the type of calls on the board.

5. Once the proper voltage is on the call terminal in question, use External Memory mode and Table 5.6 to examine the call in the computer memory. The call should *not* be ON. If it is, reset the computer for that car. Let the car find itself or run it to a terminal landing to make sure the CCD flag is turned OFF. If the resistor-fuse has been removed (if necessary), the field wires disconnected, HCDX and CCD both OFF, and the proper voltage exists on the call terminal, the call should' *not* be registered. Shorting the call terminal to terminal 1 (or ground) should register the call in the computer according to External Memory mode. This does not mean the call registered light on the Call board will work correctly. If the call does not register and cancel under the conditions mentioned in this step, then a condition exists on the board that cannot be corrected in the field and the board should be replaced.

6. If the call works correctly in the previous step, and it does not register, and the board is not arranged for neon indicator lamps in the fixtures, the indicator for that call on the board will glow dimly. If the board *is* arranged for neon indicators, the call indicator on the board will not glow. In this case, a dim glow indicates that the incandescent bulb in the fixture is burned out (when the call has the resistor-fuse plugged in and the field wire connected normally).

FIGURE 6.4   HC-CI/O Call Input/Output Board Quick Reference

HC-CI/O QUICK REFERENCE CARD (BOARD 2)

Call Power Terminals

Bottom most CallTerminal*
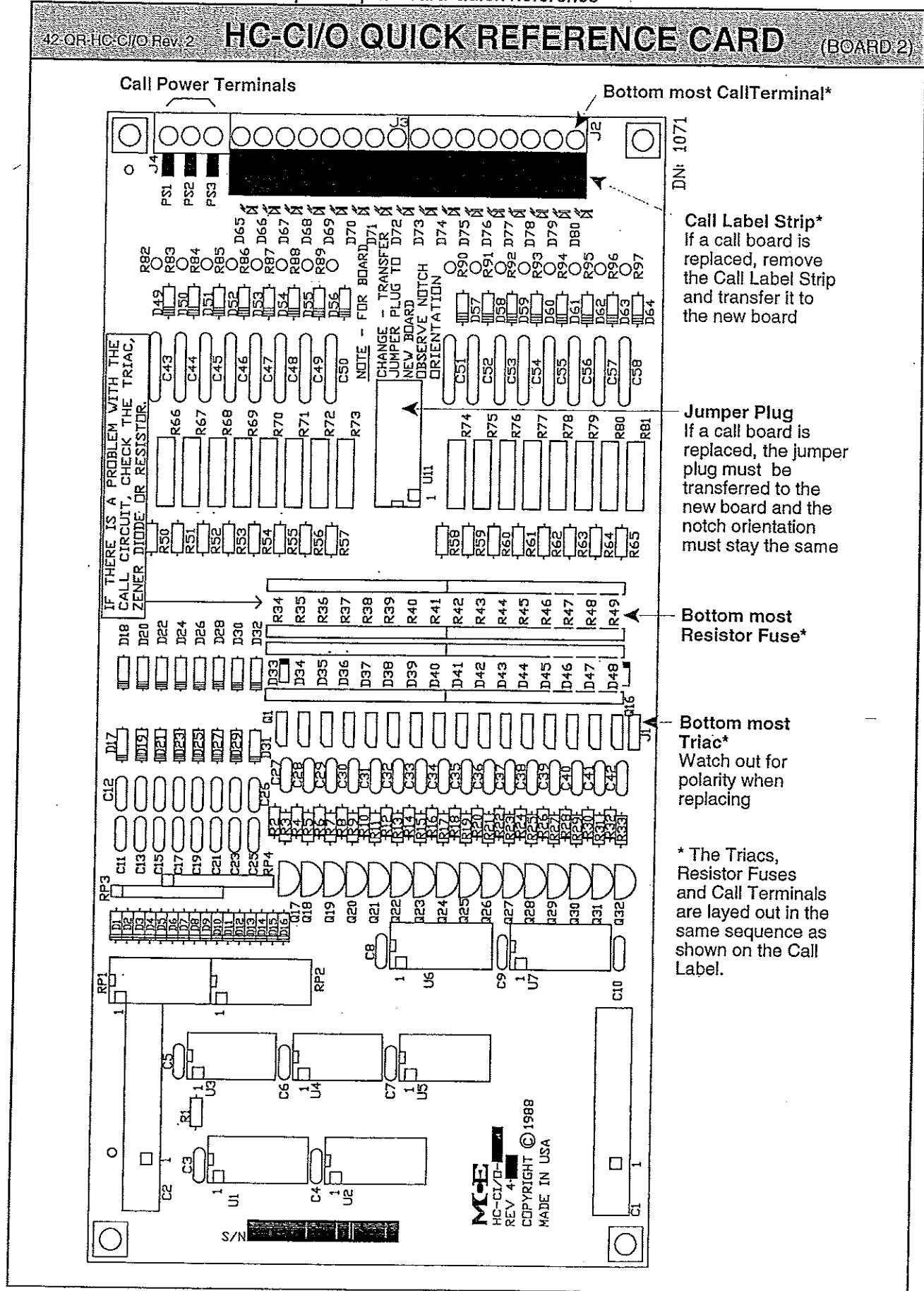
Call Label Strip*
If a call board is replaced, remove the Call Label Strip and transfer it to the new board

Jumper Plug
If a call board is replaced, the jumper plug must be transferred to the new board and the notch orientation must stay the same

Bottom most Resistor Fuse*

Bottom most Triac*
Watch out for polarity when replacing

* The Triacs, Resistor Fuses and Call Terminals are layed out in the same sequence as shown on the Call Label.

NOTE: Call terminal voltage must be ≥ 85% of call supply voltage. *Example:* If supply is 100VAC, terminal voltage may be 85VAC to 100VAC. 80VAC is insufficient.

If there is a problem with a call, first disconnect the field wire or wires from that call terminal to determine if the problem is on the board or in the hoistway wiring or fixtures. Disconnect the calls by unplugging the terminals, or removing individual wires. If the individual field wire is disconnected, lightly tighten the screw terminal since it may not make contact if an attempt is made to ground the terminal using a jumper when the screw on the terminal is loose.

Problem	Recommended steps to resolve the problem

Call Terminal Voltage is insufficient	1. Turn OFF the power and remove the resistor fuse associated with that terminal.
	2. Turn ON the power and check terminal voltage again.
	3. If no voltage is present on the terminal:
	   a. Check the jumper plug (header) on the HC-CI/O Call board. The jumper plug socket is located on the right hand side near the call indicators. If a Call board is replaced, this jumper plug must be transferred to the new board and stay in the same board position (more than one Call board on the controller).
	   b. Verify that the correct incoming power is on terminals marked PS1, PS2 and PS3. NOTE: Power will exist on *at least one* and possibly more of these terminals.

Call LED is ON even though the field wire is removed	1. Reset the computer (Computer Reset pushbutton on Swing Panel). 2. Run the car to the nearest landing to reset PI. 3. It may be necessary to reset the computer in the Group Supervisor (other car in a duplex system) in order to reset a latched hall call. 4. If the call does not cancel under these conditions--replace the call board
Cannot register a hall call at the call board	To discover whether the problem is with the call board or the field wiring: 1. First remove the resistor fuse and disconnect the field wire(s). 2. Verify that the HCDD, Hall Call Disconnect Computer Variable Flag is OFF (Address 2C, LED 6). For PTC or PHC controllers, verify that the HCDX flag is OFF (address 2C, LED4). 3. Verify that there is proper voltage on the call terminal. 4. Register a call by shorting the call terminal to terminal 1 or GND and verify with EOD as described in Section 4.3.4, *Viewing and Entering Calls* (the call registered light on the call board may not work correctly). For PTC or PHC controllers see Table 5.6. 5. If the call does not register under these conditions--replace the call board. 6. If the call circuit works with field wires removed, before connecting wires, jumper the wire(s) to ground or terminal 1 and press the call pushbutton. If a fuse blows, there is a field wiring problem. If connecting the call wires causes a problem, the call board may be damaged.
Call remains latched even though the car arrives at that landing	Remove the associated resistor fuse. If call cancels, replace the bad resistor fuse.

NOTE: Before troubleshooting the call indicators, ensure that the call circuit is working correctly, the field wires are connected and the resistor fuses are plugged in. If the board is arranged for neon (or LED) indicators (HC-CI/O -N board), the board indicators are not affected by the fixture bulbs.

When working correctly, a call indicator glows brightly when a call is registered and glows dimly or not at all when a call is not registered.

Problem	Recommended steps to resolve the problem
With a call registered, the Call Indicator is dimly lit (Call Board is HC-CI/O)	Incandescent bulb in the fixture for the call is burned out or missing. Replace the bulb.
Indicator glows bright whether or not there is a call registered	Bad triac or triac driver transistor. Check triac with power OFF and field wire removed. Failed triac usually measures a short circuit from the metal back (collector) to terminal 1. If board is not in system, measure short between metal back and pad area around mounting hole. Be careful, the metal back of the triac is connected to AC when power is ON. NOTE: bottom triac corresponds to bottom terminal.

7. With a known good resistor-fuse plugged into the proper call position, check to see that the indicator on the Call board works correctly (glows brightly when the call is registered and glows dimly, or not at all, when the call is not registered). If the call indicator burns brightly when the resistor-fuse is plugged in and shows no change in brightness whether the call is registered or not, then there is a bad triac or triac driver transistor. The triacs are plug-in types and can be easily replaced. Usually, if a triac has failed, it will measure as a short circuit between the metal base and terminal 1 with the power disconnected and the field wire removed. If the Call board is not in the system, check for a short circuit between the metal base of the triac to any pad area around a mounting screw hole. On the HC-CI/O-E board, the bottom most triac corresponds to the bottom most terminal, and terminals and triacs are corresponding from there on up (see Figure 6.4). On the HC-PCI/O board, the triacs are labeled the same as the call terminals (see Figure 6.1).

8. If the call has passed all of the previous tests, then it should be working properly while the field wires are not attached. Before reconnecting the field wires, jumper the wire (or wires) to terminal 1 and go out to that hall or car call push-button and press it. If a fuse blows, then a field wiring problem exists. If everything seems okay, then connect the call wires and test it. If connecting the call wires causes a problem, the board may have again been damaged. In any event, once the board checks out okay, any other problems will probably be field wiring problems and should be investigated.

FIGURE 6.5   MC-PCA Quick Reference

MC-PCA Quick Reference Part # 42-QR-MC-PCA (Rev 2)

PTC and PHC Connections

MC-PCA-OA Board | Simplex | Duplex Configuration

Configuration with MC-PA (Peripherals Adapter Board)

D/N: 3784 R2

COPYRIGHT © 1993   MADE IN USA
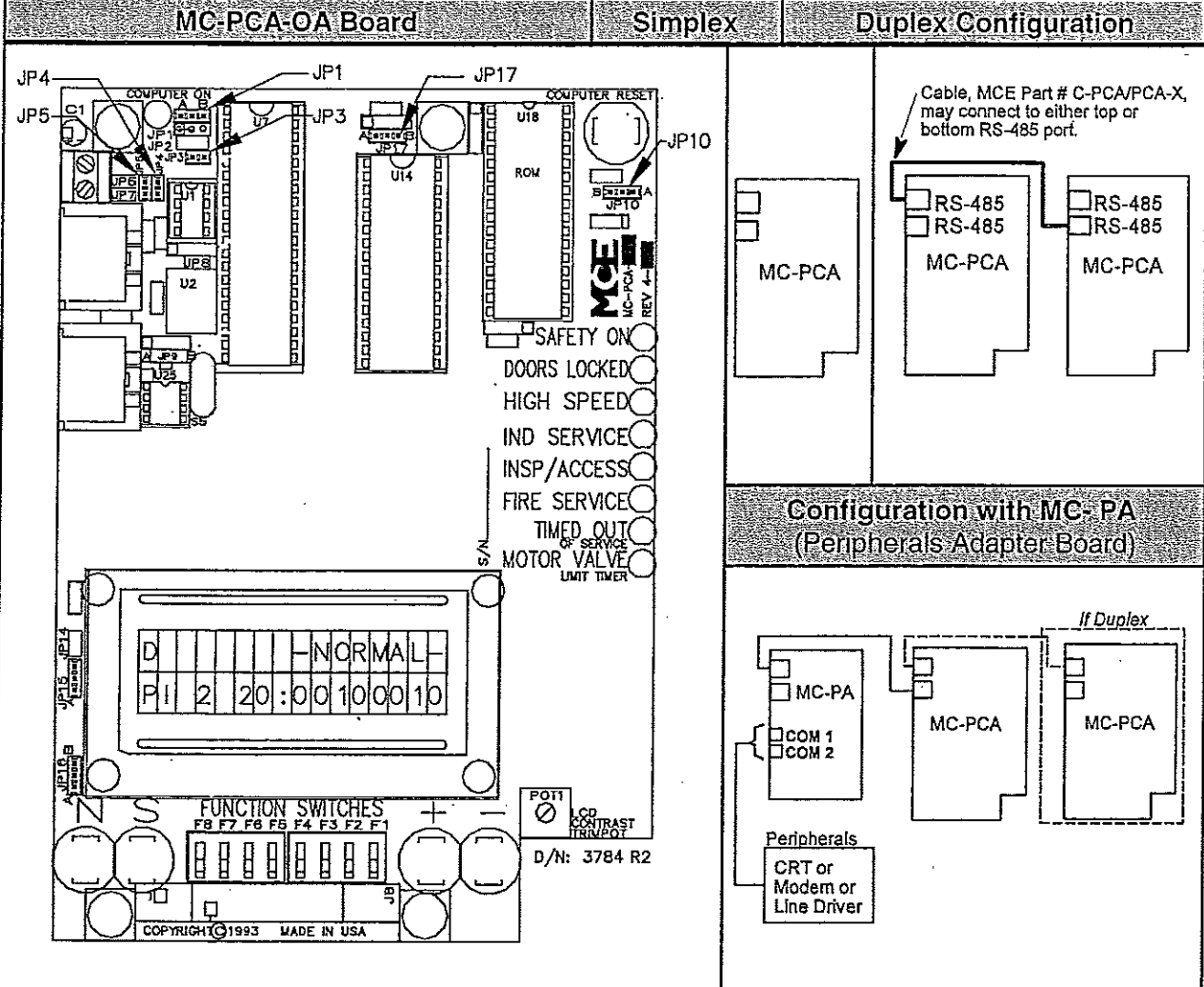
JUMPER TABLE	
MC-PCA-OA (PHC & PTC Controllers)	
JP1	B *
JP3	ON * *
JP4	ON * * *
JP5	ON * * *
JP8	N/A
JP9	N/A
JP10	A
JP15	Set at factory
JP16	Set at factory
JP17	A

* If U7 on the MC-PCA-OA board contains a 21-LB-217A microcontroller, set JP1 to position B, otherwise set to position A.

* * The JP3 jumper should be in the *OFF* position if the MC-PCA-OA board is not at the end of a daisy chain in a duplex configuration, i.e. between MC-PCA or MC-PA boards.

* * * Try JP4 and JP5 in either the ON or OFF position until car to car or car to PA communication is established.

FIGURE 6.6   MC-PA Quick Reference

MC-PA QUICK REFERENCE CARD

42-QR-MC-PA

MCE Part # C-PCA/PCA-X

MC-PCA

To Peripheral Device

OR→

OR→

MC-PA

COM1
COM2
COM3
COM4

COM4

NOTE: Refer to table 1.3 to set the DTE/DCE configuration switches correctly

Dnwp40

Port Switch Setting	Cable and Peripheral
DCE	SERIAL CABLE to CRT Terminal or PC
DTE	LINE DRIVER / MODEM to CRT Terminal or PC
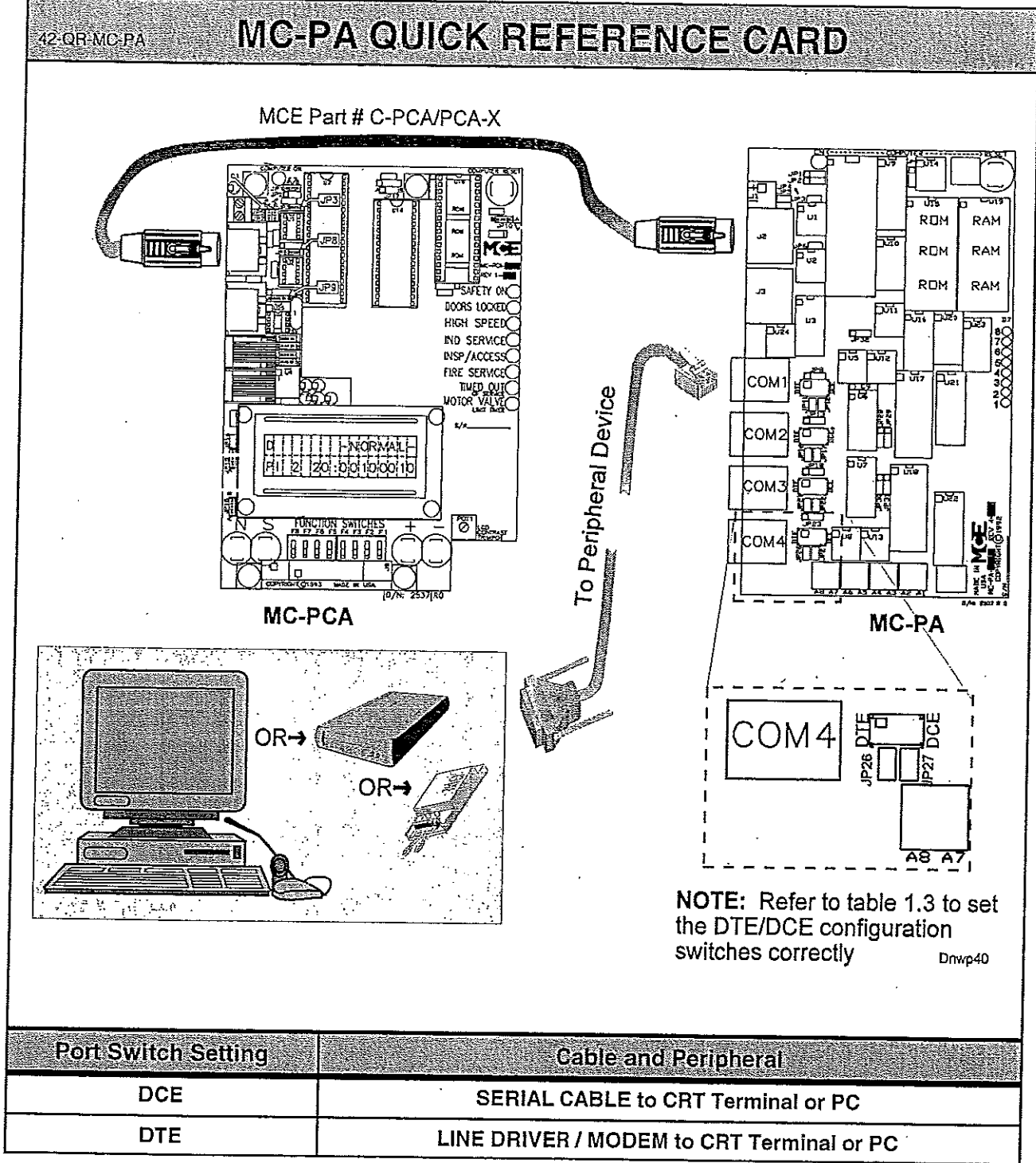
6.4 USING THE OPTIONAL CRT FOR TROUBLESHOOTING

6.4.1 GRAPHIC DISPLAY OF ELEVATOR (F3) SCREEN

The F3 screen shows the hoistway graphic display (see Figure 6.7).

a. HOISTWAY GRAPHIC DISPLAY - shows car position, direction arrows, car calls, assigned hall calls and position of the doors.

b. CAR STATUS DISPLAY - This portion of the display describes the current status of the car.

FIGURE 6.7   Graphic Display of Elevator (F3) Screen (Color CRT)


```
        98/05/08 14:26:02          F4 = Main Menu

   ┌─────────────────────────┐
   │      * Car A Status *    │
   │  * Automatic Operation   │       Up   Flr   A    B   Flr   Dn
   │  * In Service            │       Hall   #   DN   UP   #   Hall
   │                          │
   │                          │              4  ┌──┬──┐      4
   │                          │                 └──┴──┘
   └─────────────────────────┘
   ┌─────────────────────────┐
   │      * Car B Status *    │              3         C    3
   │  * Automatic Operation   │
   │  * In Service            │
   │                          │              2              2
   │                          │
   │                          │              1  ┌──┬──┐      1
   └─────────────────────────┘                 └──┴──┘

   -- DOORS LEGEND --                          B    C      B
   ┌──┬──┐ ┌────┐ ┌─┬─┐ ┌─┬─┐
   │  │  │ │    │ │< >│ │> <│
   └──┴──┘ └────┘ └─┴─┘ └─┴─┘
   Closed  Open  Opening Closing  ─── LEGEND ──────────────────
   HOISTWAY TOP:          HALLS:              HOISTWAY:
   IN  - In Service       H  - Hall Call      C - Car Call
   OUT - Out Of Service
   UP  - Up Direction
   DN  - Down Direction
```
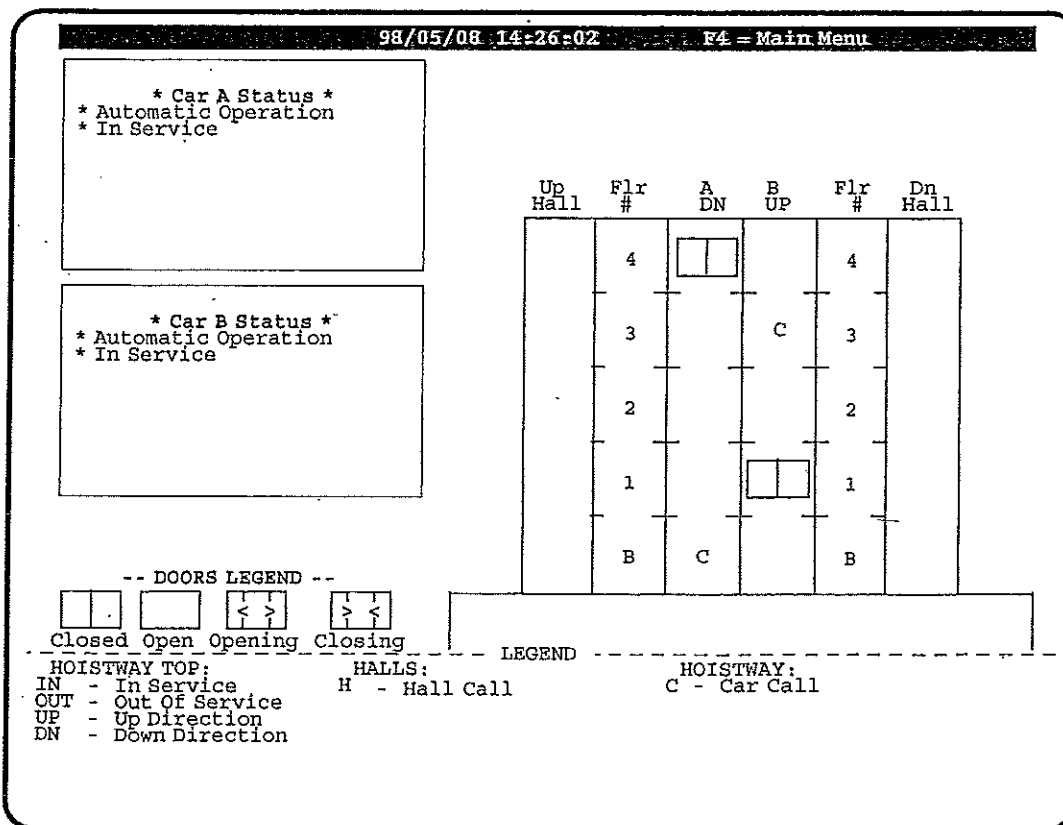
dnID168

6.4.2 MCE SPECIAL EVENTS CALENDAR ENTRIES (F7 - 1) SCREEN

Events that could affect car functions are recorded inside the MC-PA computer memory. This data is available to the mechanic for troubleshooting and analysis of the events (see Figure 6.8). The Special Events Calendar logs the following information:

- DATE (month/day)
- TIME (hour/minute)
- EVENT (cause for logging the data, such as; doorlock clipped, stop switch pulled, etc.)
- PI (car PI at the time the data was logged)

Table 6.1 provides a list of Special Events Calendar messages and their definitions.

42-02-1P00

FIGURE 6.8   Special Events Calendar - Display Special Event Entries (F7 - 1) Screen

```
  98/05/08 14:28:17                    Esc = Previous Menu


                    MCE Special Event Calendar Entries

   Date   Time                 Event            Status     Car  Flr   Miscel.
   ----------------------------------------------------------------------------
   10-23  02:15   Time Out of Service           Activated   A   2
   10-23  02:20   Door Close Protection         Activated   B   4
   10-23  02:21   Time Out of Service           Deactivated A   2
   10-23  02:25   Door Close Protection         Deactivated B   4
   10-23  13:59   Motor Limit Timer             Activated   A   5
   10-24  14:05   Motor Limit Timer             Deactivated A   5
   10-24  15:43   Excessive Commun. Error
   10-24  08:27   Hospital Service              Activated   A   L
   10-24  08:28   Hospital Service              Deactivated A   2
   10-25  08:30   Independent Service           Activated   B   2
   10-25  08:31   Independent Service           Deactivated B   L




  Up/ Dn Arrows: Scroll    Page Up/Dn: Previous/Next Page  Home/End: 1st/Last page
```

TABLE 6.1   Special Events Calendar Messages

Bottom Floor Demand	Generated when car comes off of Inspection or when car PI indicates top terminal landing but car is not there. Check top terminal landing slowdown switches and USD input.
Both USD and DSD are Open	Both USD and DSD are simultaneously active (low). Check wiring on terminal switches.
Bus Fuse Blown (2H)	No power exists on the Hall Call Common Bus. Check fuse F4 on group.
Bus Fuse Blown (2)	No power exists on the Car Call Common Bus. Check fuse F4 on car.
Car Out of Svc w/ DLK	Car was delayed from leaving a landing for a significant period of time. Doors were locked. Suspect a malfunction of the running circuits.
Car Out of Svc w/o DLK	Car was delayed from leaving a landing for a significant period of time. Doors were not locked. Suspect an obstruction that has kept the doors from closing, thus preventing the car from leaving the landing.
Communication Loss	Car not communicating with PA. See troubleshooting guide in manual.
DOL Open and DLK Active	Car is shutdown due to unsafe conditions of the DOL and/or DLK sensors. Door Open Limit input (DOL) activated (low) and Door Lock input (DLK), activated (high). Check DOL and DLK inputs.
Door Close Protection	Doors unable to close and lock in specified time. Check door lock string contacts and individual doors for physical obstruction.
Earthquake	Earthquake input (CWI or EQI) activated (high).
Emergency Power	System placed on emergency power. Power removed from EPI input.
Fire Service Main	Main Fire Service input (FRS) activated (low).
Fire Service Alternate	Main Fire Service input (FRS) activated (low) and Alternate Fire Service input (FRA) activated (high).
Fire Service Phase 2	Phase 2 Fire Service input (FCS) activated (high).

42-02-1P00

TABLE 6.1   Special Events Calendar Messages

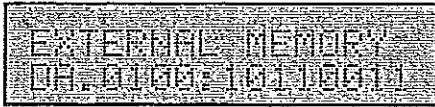| Hospital Service	Car assigned to a HOSPITAL EMERGENCY CALL.
Independent Service	Car placed on Independent Service.
Inspection	Hoistway access or car top inspection.
Lost DLK During Run	The DOOR LOCK input was deactivated while the car was traveling through the hoistway.
Motor Limit Timer	Motor stalled due to excessive time to complete run. Put car on inspection then take it off or reset processor. Check Up and Down Sense inputs (UPS and DNS), and generator and motor brushes.
Photo Eye Failure	The PHOTO EYE input has been continuously active for a considerable period of time. Suspect an abnormal blockage of the optical device or failure of the PHOTO EYE input circuit.
Safety String Open	Check on-car and off-car safety devices (e.g. governor overload, over- travel limit switches and car stop switches) and SAF input.
Stop Sw/Safety Relay Ckt	In-Car Stop switch activated or the Safety Relay Circuit opened.
System Out of Service	The supervisor has lost communication with all cars in the group or the hall call common bus (2H) has failed.
Top Floor Demand	Car PI indicates bottom terminal landing but car is not there. Check bottom terminal landing slowdown switches and DSD input.
Time Out of Service	Elevator abnormally delayed in reaching destination in response to a call demand. Doors cannot close and lock or motor stalled.
Valve Limit Timer	Down detection energized for excessive amount of time. Check jack packing and down section of valve assembly.

6.5   USING THE MLT / VLT DATA TRAP

The MLT / VLT "data trap" records many of the controller's operation "flags" at the moment the MLT or VLT occurs. This allows you to see what flags led up to the fault.

Once an MLT or VLT shuts down the car, use these steps to look at the stored flags.

1.   Do not reset the computer as this will clear the data trap on software version 5.19.0001 or earlier. To return the car to service and not harm the data, simply toggle the relay panel inspection switch from OFF to ON and back to OFF.

     Note: On software version 5.19.0002 or later, the data is not cleared on power up or reset. The data is overwritten each time a new MLT occurs. However, the data may be cleared and the MLT counter reset by placing the F1, F2, F7 and F8 switches in the up position.

2.   On the MC-PCA board place the F2 switch up (ON) to select External Memory. All other switches should be down (OFF). The LCD display shows the default address, DA.0100 (address 100H) followed by the eight memory bits at that location.

3.   Use the DATA TRAP MEMORY CHART to determine the addresses where the saved data is stored. Section 5.5 in the Controller Installation Manual provides a complete description of how to use the External Memory Mode. Briefly, use the **N** pushbutton to select the digit to be changed (digit blinks on and off). Press + or - to change the digit.

4.   Record the data displayed on the LCD for all rows shown on the chart. It helps if you have a few photocopies of the chart. Simply mark the positions in the chart that are shown as a "1"

on the LCD display. Addresses 480H thru 493H contain car status flags. Address 494H contains the car's position indicator value at the instant the MLT or VLT condition occurred and address 495H contains the MLT counter (ver 5.19.0002 or later). Only the labeled positions are important to mark.

5. Once all of the addresses have been marked you may reset the computer to clear the recorded memory area (software versions 5.19.0001 or earlier).

6. Use the recorded values and the timer logic flowcharts to help determine the cause of the problem. Then call MCE for assistance if any is needed.

PHC HYDRO DATA TRAP MEMORY CHART

	DIAGNOSTIC INDICATORS							
	8	7	6	5	4	3	2	1
480H	DOLM	PHE	DZ	DOL	DBC	DOB	GEU	GED
481H	TFA	DC	UC	CC	NDS	FDC	DHO	DOI
482H	DCFN	DCP	DOF	LOT	GHT	HCT	CCT	SDT
483H	DOC	SE	DCLC	CSB	DCC	NUDG	NUGBPS	DSHT
484H	VCI	FRA	FCS	FRS	DNS	UPS	STD	STU
485H	SCE	FCCC	FCHLD	HLI	VCA	EXMLT	FWI	PIC
486H	LFP	UFP	NYDS	CCH	DIN	DPR	GTDE	GTUE
487H	HD	FCOFF	DHLD	IND	IN	DLKS	MLTP	MLTDO
488H	LLW	DLK	DDF	SUD	ISR	INCF	REAR	LLI
489H	DNDO	LD	DPD	DDP	UPDO	LU	UPD	UDP
48AH	DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
48BH	TOS	MLT	VLT	SST	H	HSEL	DSH	RUN
48CH	DZP	STC	SAF	HCR	HCDX	CCD	ISV	ISRT
48DH	TEMPB	UFQ	DZORDZ	FCSM	FRM	FRSS	FRAS	FRC
48EH	SD	SDA	DSD	BFD	SU	SUA	USD	TFD
48FH	FRBYP	FRON	HYD1_TRC0	ECC	CD	ECRN	EPR	PFG
490H	CODE4	CODE2	CODE3	FREE	DEADZ	DHLD1	PH1	NDGF
491H	CTLDOT	CTLF	CTL	ALV	EPSTP	AUTO	EPRUN	EPI
492H	FRMM	OFR	WLDI	WLD	CCMEM	OLW	OVLM	OVL
493H	API	SAB	TEST	DHENDR	DHEND	CTST	HOSPH2	HOSP
494H	PI	PI	PI	PI	PI	PI	PI	PI
495H	LOS				MLT Counter	MLT Counter	MLT Counter	MLT Counter

Note 1: In software version 5.19.0001 and earlier, LOS is located at address 495H bit 2.

Note 2: In software version 5.19.0001 and earlier, TRAPLOCK is located at address 495H bit 1 and is cleared only when the controller is reset.