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SECTION III

MPH I AND II HAND HELD TERMINAL AND TROUBLESHOOTING

3.1 MPH I

The basic troubleshooting step with MPH I is to check the LED's. Figure 3-1 shows the LED's and their normal state for a single car, inservice, with no calls and the car at the bottom floor. The LED's are shown in four groups;

a. Should be off (shown as a circle)
b. Should be on (shown as a solid dot)
c. Could be either one (shown as a circle with question mark near by)
d. Blinking (DS15 only) shown as a circle with a dot.

The LED's marked with a star (*) should be off and the LED's marked with a plus (+) should be on. The ones with a question mark can be either way.

PROG (DS15) must always be flashing if the car is running or not. If this LED does not flash at a steady rate, the program is not running correctly.

DMANTR (DS17) Dead Man Timer should be lit and not flash at all. +5 (DS18) should always be lit to show 5 volts good.

If the LED's show a problem, then log on with the HHT for more information about the elevator operation and/or use the troubleshooting section that follows the HHT flow charts.

The special operation LED's that show the Fire Return and Emergency Power operations are across the bottom row.

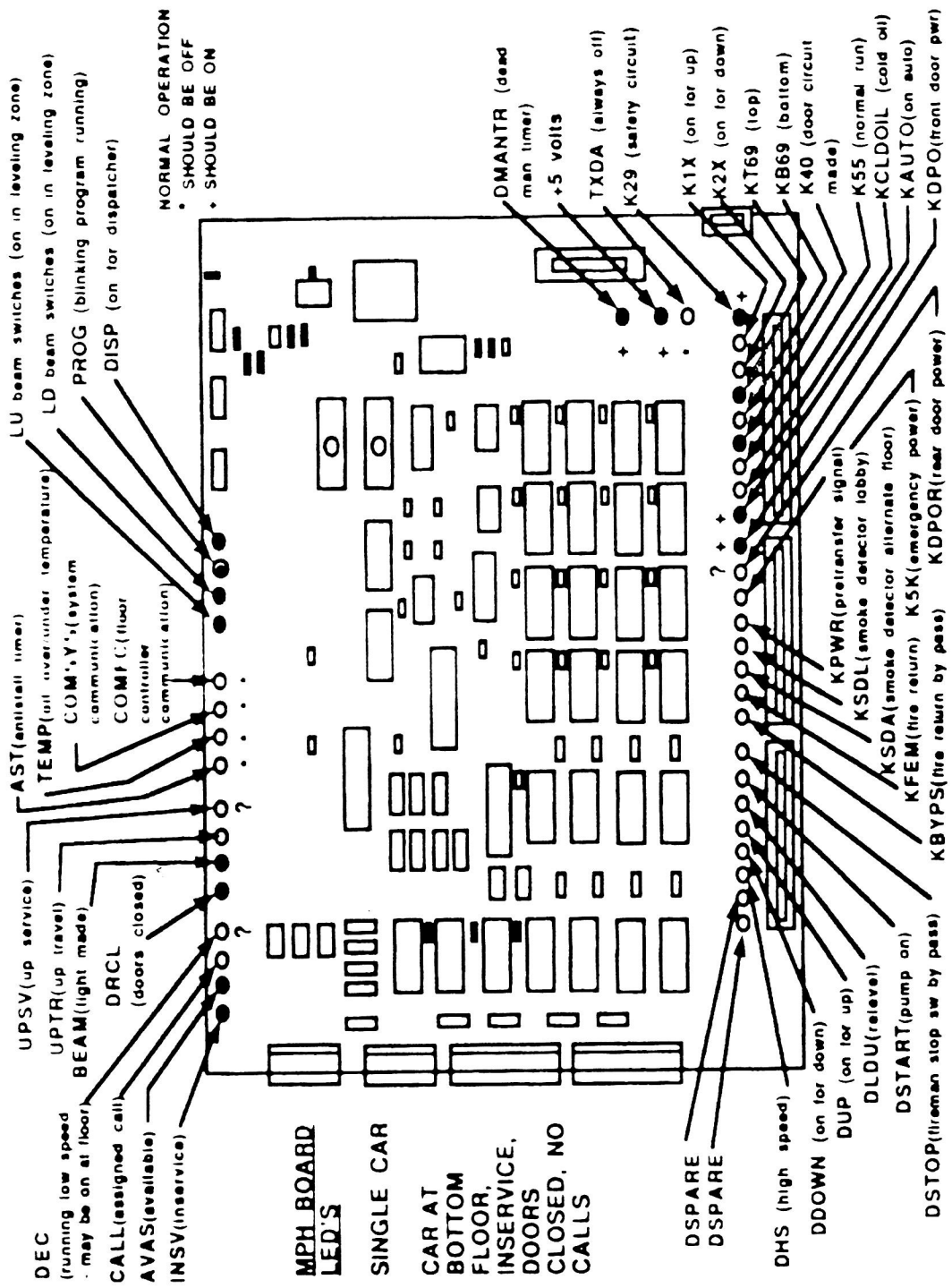
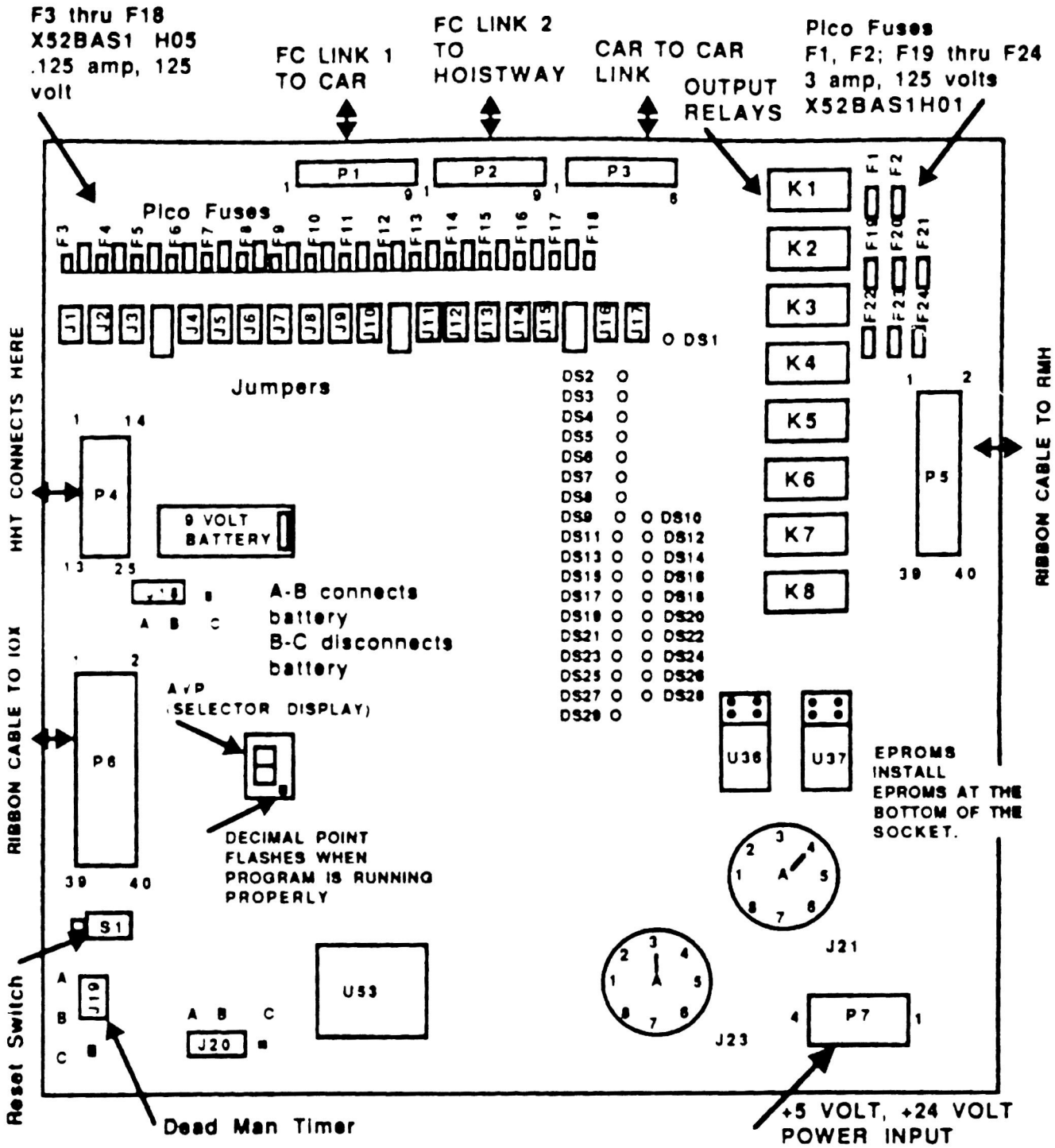


Figure 3-1 MPH Board LED's

3.2 MPH II

The MPH II LED's (see figures 3-2, 3-3, and 3-4) do not provide as much information as the ones for MPH I. The first thing to check on the MPH II is the AVP (selector display) LED unit to see if the decimal point is flashing. This decimal point serves the same function on MPH II as the PROG LED on MPH I. This decimal point should be flashing at a steady rate to show that the program is running correctly. The AVP display should show the correct location of the car and the LED's for a single car should be as shown in the drawing on the next page.

For more information, log on with the HHT. The flow charts (section 3.3) will help you find the different screens available. The flow charts will work for both MPH I and MPH II. The troubleshooting charts in this section will work for both units.



MHC Board Part No. 998C187 H24 (NEW)
MHC Board Part No. 998C187 H13 (OLD) Had a plug in 9-volt battery. (Shown)

Figure 3-2. MHC Board

OUTPUTS

DSTART (DS1) 0 - UPA circuit Col. 10
DSTOP (DS2 0 - Bypass step switch Col. 9
DLDU (DS3) 0 - Relevel - Col. 10
DUP (DS4) 0 - Up direction circuit - Col. 10
DDOWN (DS5) 0 - Down direction circuit - Col. 10
DHS (DS6) 0 - High speed circuit - Col. 9
SPARE (DS7) 0 - APE active - Col. 11
SPARE (DS8) 0 - Col. 11

INPUTS

Col. 11 - Emergency power K5K/OBU (DS9) 0
Col. 11 - Lobby smoke det. KSDL/1BU (DS11) 0
Col. 4 + 5Vdc 5V(DS13) ●
Col. 9 - Rear door power KDPOR (DS15) 0?
Col. 5 - Horstway + 24Vdc K24B (DS17) ●
Col 8 - Safety circuit K29 (DS19) ●
Col 8 - Cold oil KCLDOIL (DS21) 0
Col. 8 - Motor oil overtemp K55 (DS23) 0
Col. 8 - Door closed K40 (DS25) 0
Col 9 - Bottom terminal KB69 (DS27) ●
Dead man timer KRESET (DS29) ●

INPUTS

0 (DS10) KPRW / 1BD EMP Prewarn - Col. 11
0 (DS12) KSDA / 2BD Alt Flr Smoke det. - Col 11
● (DS14) KDPO Front door power - Col. 9
0 (DS16) KFEM Fireman's Phase 1 - Col. 11
0 (DS18) KBYPS Fireman s Phase 1 Bypass - Col. 11
● (DS20) KAUTO Automatic - Col 9
● (DS22) K24A 24-volt power - Col. 4
0 (DS24) KT69 Top terminal - Col. 9
0 (DS26) K2X Down direction - Col. 8
0 (DS28) K1X Up direction - Col. 8

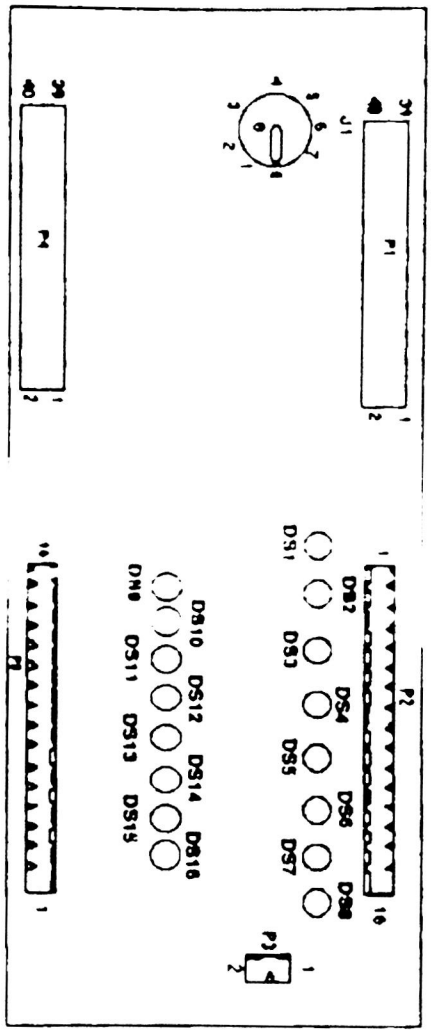
NOTE: * For MPH II Case 1, the DS9, 10, 11, and 12 squares are different
DS9 = bottom floor up button
DS10 = 2nd floor down button
DS11 = 2nd floor up button
DS12 = 3rd floor down button

LED's shown in the normal state for a single care, in service, with no calls and the car at the bottom floor:

should be OFF shown as a circle
should be ON shown as a solid dot
could be either way shown as a circle with a question mark

Figure 3-3. MHC Board LED's

TOP OF BOARD



NOTE FOR CLARITY, ONLY JUMPER, CONNECTORS, AND LED'S ARE SHOWN

10X0

(DS9) o 3BU	(DS1) o FFS
(DS10) o 3BD	(DS2) o 0LU
(DS11) o 2BU	(DS3) o 1LD
(DS12) o 2BD	(DS4) o 1LU
(DS13) o 1BU	(DS5) o 2LD
(DS14) o 1BD	(DS6) o 2LU
(DS15) o 0BU	(DS7) o 3LD
(DS16) o KLD0B	(DS8) o 3LU

10X1

(DS9) o ALD0B	(DS1) o 4LD
(DS10) o 7BD	(DS2) o 4LU
(DS11) o 6BU	(DS3) o 5LD
(DS12) o 6BD	(DS4) o 5LU
(DS13) o 5BU	(DS5) o 6LD
(DS14) o 5BD	(DS6) o 6LU
(DS15) o 4BU	(DS7) o 7LD
(DS16) o 4BD	(DS8) o 7LU

10X2

(DS9) o 4th BUR ALSD	(DS1) o 1st LDR
(DS10) o 4th BDR	(DS2) o 1st LUR
(DS11) o 3rd BUR	(DS3) o 2nd LDR
(DS12) o 3rd BDR	(DS4) o 2nd LUR
(DS13) o 2nd BUR	(DS5) o 3rd LDR
(DS14) o 2nd BDR	(DS6) o 3rd LUR
(DS15) o 1st BUR	(DS7) o 4th LDR
(DS16) o 1st BDR	(DS8) o 4th LUR

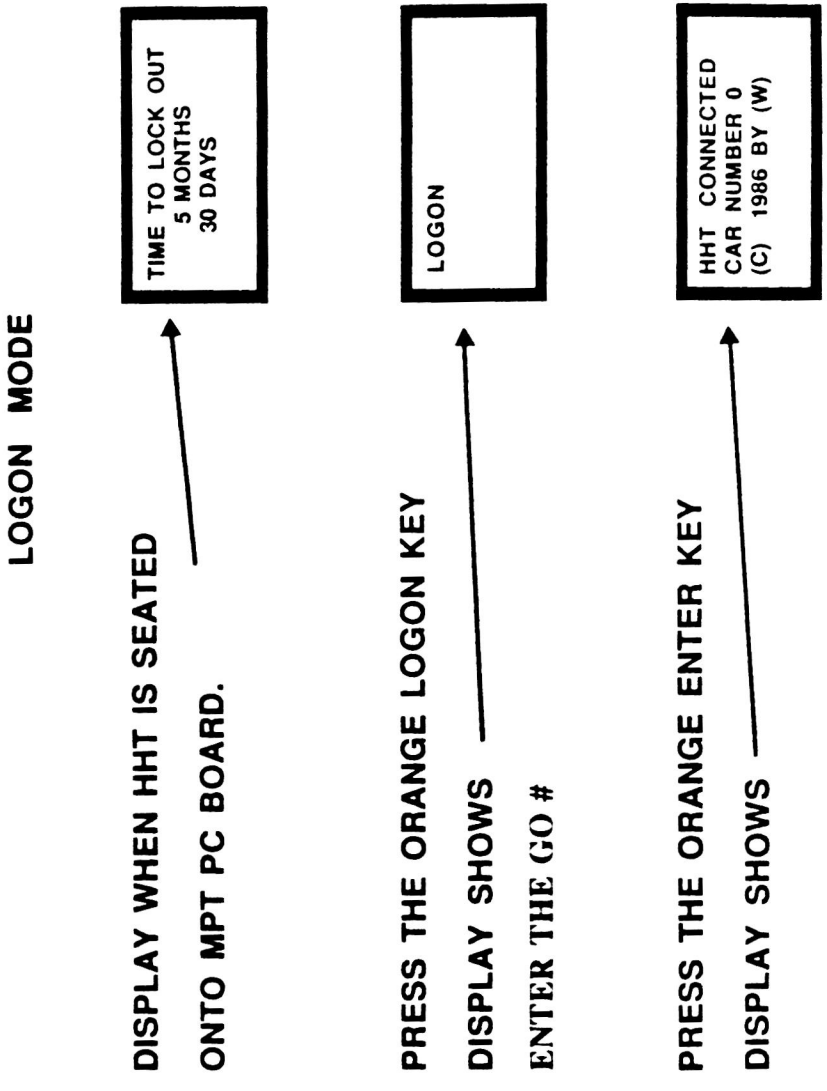
BU = BUTTON UP
BD = BUTTON DOWN
LU = LANTERN UP
LD = LANTERN DOWN
FFS = FLASHING FIRE SIGN
KLD0B = LOBBY DOOR OPEN BUTTON
ALD0B = ALTERNATE LOBBY DOOR OPEN BUTTON
R = REAR
ALSD = ALTERNATE LOBBY SMOKE DETECTOR
NOTE: SOME LED's MAY HAVE FIFFERENT USES OR SPECIAL APPLICATIONS.

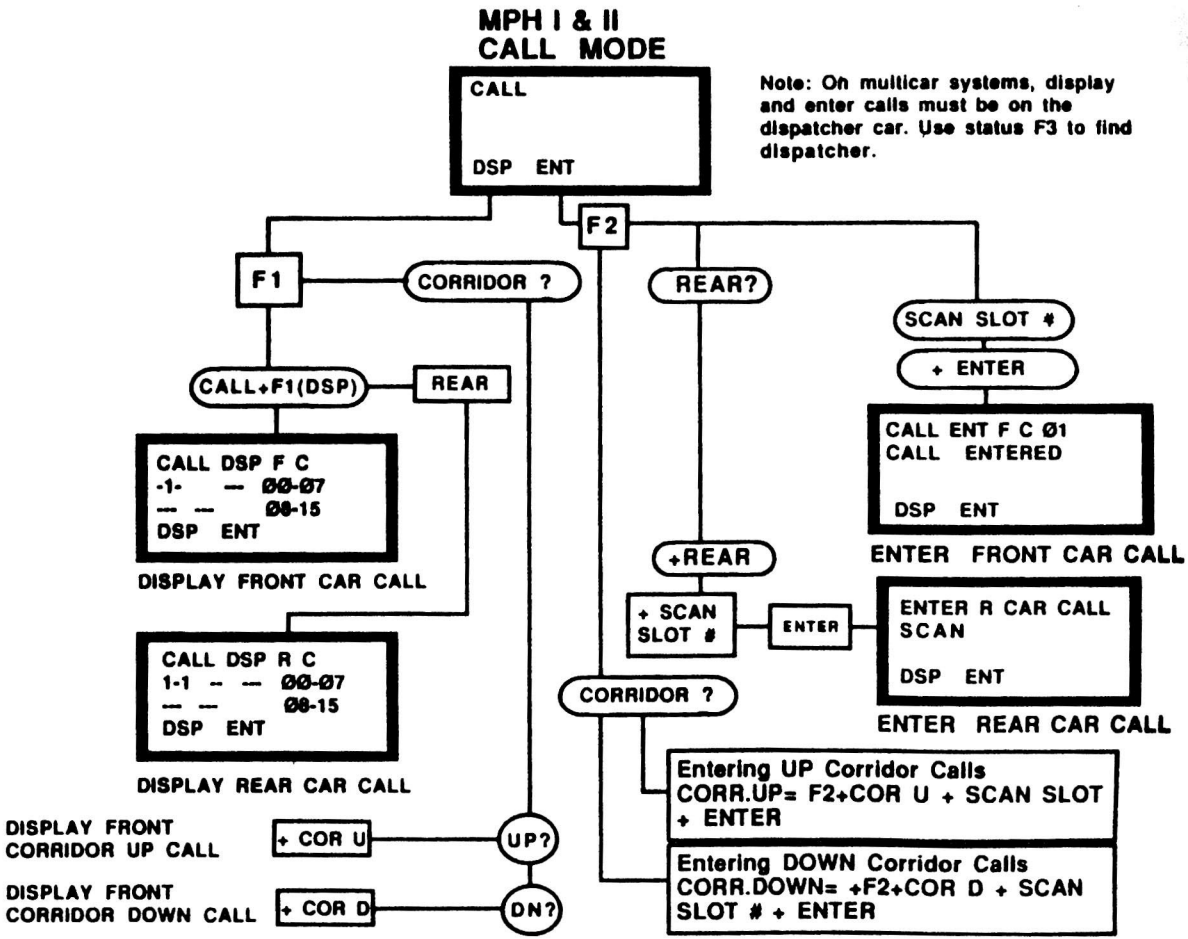
Figure 3-4. I0X Board LED's

3.3 INDEX OF HHT ITEMS

The following alphabetical listing is included as an aid in locating detailed information concerning status modes, features, and abbreviations.

3.4 FLOW CHARTS





MPH I & II STATUS MODE

NOTE: WHEN A PROBLEM EXISTS, ALWAYS PRESS NXT TO SEE IF MORE INFORMATION OR PROBLEMS ARE SHOWN

STATUS

FC HFC BNK CAB

F1 F2 F3 F4

COMMUNICATION

FC = CAR FLOOR CONTROLLER BOARDS
HFC= HATCH FLOOR CONTROLLER BOARDS
BNK= BANK STATUS INFORMATION
CAB= CAB STATUS INFORMATION

STATUS FC
COMM OK

FC HFC BNK CAB

CAR COMMUNICATION OK OR

STATUS FC
COMM PROBLEM
7Ø
FC HFC BNK CAB

COMMUNICATION PROBLEM WITH BOARD FC7Ø

See the following pages for CAR FLOOR CONTROLLER LOCATIONS

ON MULTI CAR JOBS MUST BE FLOOR CONTROLLER MASTER

CHECK F3(BNK) TO FIND

STATUS HFC
COMM OK

FC HFC BNK CAB

NOTES:
ODD NUMBERED FCB'S ARE FOR FRONT OPENINGS, EVEN NUMBERED FCB'S ARE FOR REAR OPENINGS. EACH FCB CAN HANDLE 2 FLOORS. FCB'S 11-18 ARE FOR AUXILIARY RISER FOR MORE THAN 3 CARS.

HFC 78 IS FOR EMERGENCY POWER STATION FOR CARS Ø AND 1.
HFC 79 IS FOR EMERGENCY POWER STATION FOR CARS 2 AND 3.
HFC'S 7Ø-73 ARE HORIZONTAL P.I. FOR CARS Ø-3.

STATUS BANK
CAR# Ø 1 2 3
COMP 1 1 1 1
FC HFC BNK CAB

NOTES:
NO INFORMATION WILL SHOW ON SINGLE CAR SYSTEM.

SEE PAGE 3-14 FOR COMPLETE LISTING OF BANK STATUS INFORMATION. USE NXT TO STEP THROUGH THE LIST.

STATUS CAB
KDOB Ø1
KDCB ØØ
FC HFC BNK CAB

FOR CAR STATUS INFORMATION & LIST SEE PAGES 3-15 & 3-16

CAR FLOOR CONTROLLER BOARD LOCATIONS (COMMUNICATION LINK #1)

MPH I	MPH II
Main Car Station	Main Car Station
FCO1	FC00
FC02	FC01
FC03	FC02
FC04	FC03
FC70 **	FC70 **

(** FC70 is used for cab position indicator board and can be located in one of the car stations but is normally in the cab transom.)

Rear Car Station

FC05
FC06
FC07

Auxiliary Car Station	Auxiliary Car Station (May be located in front or rear of cab.)
FC08	FC05
FC09	FC06

To locate the board for an individual signal, check pages 3-18 and 3-19 of this section.

HOISTWAY FLOOR CONTROLLER BOARD NUMBERS

Main Riser Data Link #2 Cars 0 - 1

Floor No.	Front	Rear	Car 0	Car 1
0 - 1	HFC01	HFC02		
2 - 3	HFC03	HFC04		
4 - 5	HFC05	HFC06		
6 - 7	HFC07	HFC08		
Horizontal P.I.			HFC70	HFC71
Status Panel			HFCs0	HFCs1
Emergency Power Panel			HFC78	HFC78
Detroit Fire Codes			HFC7E	HFC7E

Auxiliary Riser Data Link #2 Cars 2 - 3

Floor No.	Front	Rear	Car 2	Car 3
0 - 1	HFC11	HFC12		
2 - 3	HFC13	HFC14		
4 - 5	HFC15	HFC16		
6 - 7	HFC17	HFC18		
Horizontal P.I.			HFC72	HFC73
Status Panel			HFCs2	HFCs3
Emergency Power Panel			HFC79	HFC79
Detroit Fire Codes			HFC7E	HFC7E

Hoistway floor controller board individual signals (Communication Link #2) can be found on pages 3-20, 3-21, and 3-22 of this section.

CHECKING STATUS OF BANK OPERATION

Information for 4 cars displayed at the same time. The number 1 under the car number means that the feature or condition displayed is in effect or true for that car.

Bank communication status (COMP) for each car appears first on the display.

Press NXT and PREV keys to scroll through the complete list of features and conditions. The complete list of features and conditions follows:

COMP	1 = Communication problem
DISP	1 = Dispatcher
FCMS	1 = FC master car
FC1P	1 = Car to MPH communication problem
INSV	1 = Car in service
AVAS	1 = Car available
UPTR	1 = Car traveling up
UPSV	1 = Car doing up service
AVP	# = Target landing
DRCL	1 = Doors fully closed
K29	1 = Safety circuit complete
LVLZ	1 = Car in leveling zone
INDS	1 = Car on independent service
FIRE	1 = Car on fireman's return
LOIL	1 = Car oil is low
TEMP	1 = Oil is too hot
AST	1 = Antistall timer has timed out

CHECKING STATUS OF CAR OPERATION

Car status can only be checked for the car that the HHT is connected to.

Some items may not be displayed on MPH I.

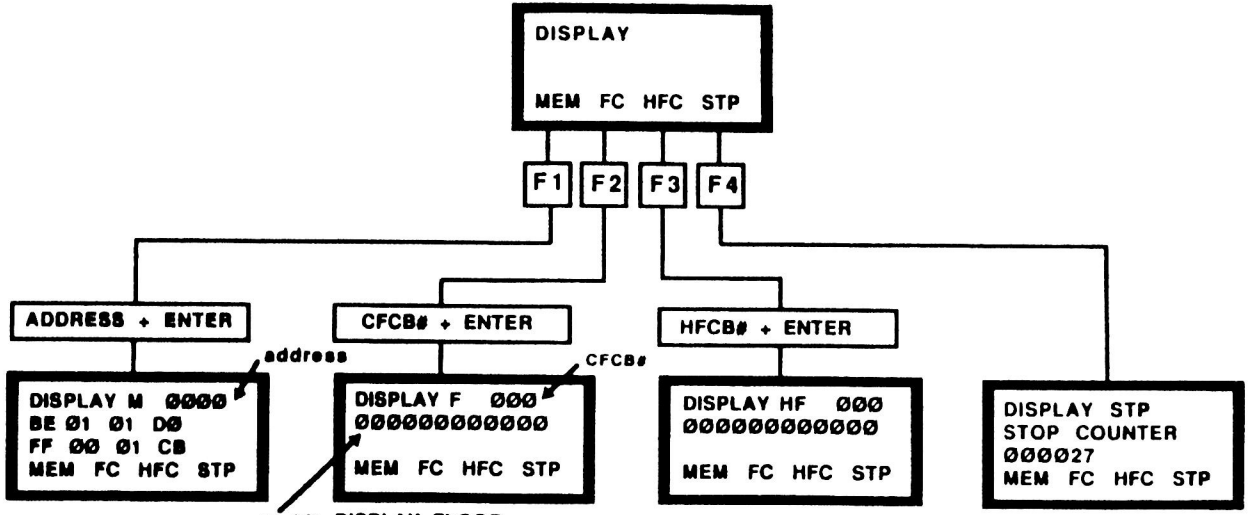
Open button (KDOB) and door closed button (KDCB) status appear first on the display.

Press NXT and PREV keys to scroll through the complete list of features and conditions. The complete list of features and conditions follows:

KDOB	1 = Door open button pressed
KDCB	1 = Door close button pressed
KHOLD	1 = Fireman's return phase 2 switch set to HOLD
KFEMCM	1 = Fireman's return phase 2 switch set to ON
KFCR	1 = Car fire call cancel pressed
KSTE	1 = Safety edge input
KDOL	1 = Doors fully open (TDC board) 0 = Doors fully open (DCB board)
KDCL	1 = Doors fully closed (TDC board) 0 = Doors fully closed (DCB board)
DRCLS	1 = Front door close limit switch is made, and interlocks are made, and gate switch is made
RDRCLS	1 = Rear door close limit switch is made, and interlocks are made, and gate switch is made
KHCS	1 = Handicap button pressed
KHEM	1 = Car in Hospital Emergency mode
HD	1 = Down slowdown input from photo switch
HU	1 = Up slowdown input from photo switch
KDOBR	1 = Rear Door Open button depressed
KDCBR	1 = Rear Door Close button depressed
KSTER	1 = Rear Door safety edge microswitch closed (normally closed)
KDOLR	Cab Rear Door Open Limit Input 1 = Doors fully open (TDC board) 0 = Doors fully open (DCB board)
KDCLR	Car Rear Door Close Limit Input 1 = Doors fully closed (TDC board) 0 = Doors fully closed (DCB board)
KTSA	1 = Cutout contact made
BLOCK	1 = On block operation
DMYRUN	1 = Making dummy run
CARRUN	1 = Car is running up or down

RDYMVE	1 = Car ready to move
CCFLG	Car Call Flag 1 = Last call answered, or current call being answered, was car call
CORFLG	Corridor Call Flag 1 = Last call answered, or current call being answered, was corridor call
TARGET	Target Floor Car is Running to Floor number FF = no current calls
457T	1 = Failure in 457T function (out of service)
TARGETFR	Door to Open (F/R) at Target Floor 00 = Neither door will open 01 = Front door will open 02 = Rear door will open 03 = Both doors will open
LOST	1 = Controller recognizes that selector is lost
NVRMBD	NVRAM Good/Bad Condition
NVRMER	1 = Battery-backed memory is bad NVRAM Data Error Condition
MUIZ	1 = Battery-backed memory has an error Times 8256 MUART Initialized Hex count of number of times that MUART has been initialized. Rolls over to zero when maximum count is reached
RESET	Microprocessor Reset Count Hex count of number of times that microprocessor has been reset
FCTRB	FCB Trouble Count Hex count of number of times that a communication problem with a single FCB was observed
HCTRB	HFCB Trouble Count Hex count of number of times that a communication problem with a single HFCB was observed
TMRTRB	Timer Trouble Hex count of number of times that a problem with a timer was detected
FBID	Failed Bid Number that identifies last bid to fail
FBIDCT	Failed Bid Count Hex count of total number of failed bids. Rolls over to zero when maximum count is reached

MPH I & II - DISPLAY MODE



DISPLAY ROM or RAM Memory.

Displays eight bytes at a time. Addressed byte shown at first location ("BE" in display shown)
Each time the NXT key is pressed, the memory address increases by eight. Eight new bytes of data appear on the display starting with the new address. Each time the PRV key is pressed, the memory address decreases by eight.

DISPLAY FLOOR CONTROLLER BOARD OUTPUTS

1 = true

Display will show a string of twelve 1's and Ø's. The rightmost value is output number Ø . The leftmost value is output number 11. See table to identify the purpose of each output.

To read the outputs for the next car floor controller board, press NXT key; to read outputs for the previous car floor controller board, press PREV key.

DISPLAY HOISTWAY FLOOR CONTROLLER BOARD OUTPUTS

Display will show a string of twelve 1's and Ø's. The rightmost value is output number Ø . The leftmost value is output number 11. See table to identify the purpose of each output.
To read the outputs for the next hall floor controller board, press NXT key; to read outputs for the previous hall floor controller board, press PREV key.

DISPLAY STOP COUNT

MPH II

The stop count is shown as a decimal number, and increments every time the car makes a high speed run. The counter cannot be reset.

MPH I - CAB FLOOR CONTROLLER BOARD INPUT/OUTPUT ASSIGNMENTS

Floor Cont. Board	Input/Output Bits											
	11	10	09	08	07	06	05	04	03	02	01	00
FC01	DDOUBLE	DSINGLE	CLD	CLU	KLD	KLU	KDCB	KDOB	DFRL	KHOLD	KFEMCM	KFCR
FC02	1B	0B	KTSA	KTS2	KTS1	KTSE	KDOL	KDCL	DHYD	DNUDG	DCLOSE	DOPEN
FC03	CS1	CS0	KHCS	KHEMO	KHD	KHU	7B	6B	5B	4B	3B	2B
FC04	DEML	DEQL	CS5	CS4	CS3	CS2	KDCBR	KDOBR	3BR	2BR	1BR	0BR
FC05	KDCB	KDOB	1BR	0BR	7B	6B	5B	4B	3B	2B	1B	0B
FC06		KDCBR	KDOBR	KTS2R	KTS1R	KSTER	KDOLR	KDCLR	KHUDR	KNUDGR	DCLOSER	DOPENR
FC07					3BR	2BR	CLDR	CLUR	KHDR	KLDR	KLUR	KHUR
FC08	CLD	CLU	KDCB	KDOB	7B	6B	5B	4B	3B	2B	1B	0B
FC09							KDCBR	KDOBR	3BR	2BR	1BR	0BR
FC70			DN ARROW	UP ARROW	AYP7	AYP6	AYP5	AYP4	AYP3	AYP2	AYP1	AYP0
PI PIN NO.	7	8	9	10	11	12	13	14	15	16	17	18

MPH II - CAB FLOOR CONTROLLER BOARD INPUT/OUTPUT ASSIGNMENTS

CFCB NO.	Input/Output Bits 11	10	09	08	07	06	05	04	03	02	01	00
00	KSTE	DNUDG	DCLOS	DOPEN	KDCL	KDOL	KHEM	KDOB	KTS2	KTS1	- -	DTONE
01	KDCB	KTSA	3B	2B	1B	0B	CLD	CLU	KHD	KHU	KLD	KLU
02	7B	6B	5B	4B	- -	3BR	2BR	KHCS	FIRELT	KHOLD	KFCMCN	KFCR
03	KSTER	DNUDGR	DCLOSR	DOPENR	KDCLR	KDOLR	KDCBR	KDOBR	KTS2R	KTS1R	1BR	0BR
04	CS11	CS10	CS9	CS8	CS7	CS6	CS5	CS4	CS3	CS2	CS1	CS0
05	KDCB	KDOB	CLD	CLU	7B	6B	5B	4B	3B	2B	1B	0B
06	KDCBR	KDOBR	- -	- -	- -	- -	- -	- -	3BR	2BR	1BR	0BR
70	- -	- -	AVP7	AVP6	AVP5	AVP4	AVP3	AVP2	AVP1	AVP0	UP	DN
PI PIN NO.	7	8	9	10	11	12	13	14	15	16	17	18

MPH I - HALL FLOOR CONTROLLER BOARD INPUT/OUTPUT ASSIGNMENTS

FLOOR CONT. BOARD	Input/Output Bits 11	10	09	08	07	06	05	04	03	02	01	00
HFC01	KFEM	OBU	KSDBYP	LU00	DFFS	LU01	1BD	1BU	LD10	LU10	LD11	LU11
HFC02		OBUR		RLU00		RLU01	1BDR	1BUR	RLD10	RLU10	RLD11	RLU11
HFC03	2BD	2BU	LD20	LU20	LD21	LU21	3BD	3BU	LD30	LU30	LD31	LU31
HFC04	2BDR	2BUR	RLD20	RLU20	RLD21	RLU21	3BDR	3BUR	RLD30	RLU30	RLD31	RLU31
HFC05	4BD	4BU	LD40	LU40	LD41	LU41	5BD	5BU	LD50	LU50	LD51	LU51
HFC06	4BDR	4BUR	RLD40	RLU40	RLD41	RLU41	5BDR	5BUR	RLD50	RLU50	RLD51	RLU51
HFC07	6BD	6BU	LD60	LU60	LD61	LU61	7BD		LD70		LD71	
HFC08	6BDR	6BUR	RLD60	RLU60	RLD61	RLU61	7BDR		RLD70		RLD71	
HFC11		OBU		LU02		LU03	1BD	1BU	LD12	LU12	LD13	LU13
HFC12		OBUR		RLU02		RLU03	1BDR	1BUR	RLD12	RLU12	RLD13	RLU13
HFC13	2BD	2BU	LD22	LU22	LD23	LU23	3BD	3BU	LD32	LU32	LD33	LU33
HFC14	2BDR	2BUR	RLD22	RLD22	RLD23	RLU23	3BDR	3BUR	RLD32	RLU32	RLD33	RLU33
HFC15	4BD	4BU	LD42	LU42	LD43	LU43	5BD	5BU	LD52	LU52	LD53	LU53
HFC16	4BDR	4BUR	RLD42	RLU42	RLD43	RLU43	5BDR	5BUR	RLD52	RLU52	RLD53	RLU53
HFC17	6BD	6BU	LD62	LU62	LD63	LU63	7BD		LD72		LD73	
HFC18	6BDR	6BUR	RLD62	RLU62	RLD63	RLU63	7BDR		RLD72		RLD73	
HFC70			AYP70	AYP60	AYP50	AYP40	AYP30	AYP20	AYP10	AYP00	UP	DN
HFC71			AYP71	AYP61	AYP51	AYP41	AYP31	AYP21	AYP11	AYP01	UP	DN
HFC72			AYP72	AYP62	AYP52	AYP42	AYP32	AYP22	AYP12	AYP02	UP	DN
HFC73			AYP73	AYP63	AYP53	AYP43	AYP33	AYP23	AYP13	AYP03	UP	DN
HFC78							DEMP1	DEMP0			KEMP1	KEMP0
HFC79					DEMP3	DEMP2			KEMP3	KEMP2		
PI PIN NO.	7	8	9	10	11	12	13	14	15	16	17	18

LUIO = Up Lantern at Floor 1, Car 0

IBUR = Rear Up Corridor Call at Floor 1

MPH II - HOISTWAY FLOOR CONTROL BOARD INPUT/OUTPUT ASSIGNMENTS (MAIN RISER)

HFCB NO.	Input/Output Bits 11	10	09	08	07	06	05	04	03	02	01	00
01	–	0BU	–	LU00	–	LU01	1BD	1BU	LD10	LU10	LD13	LU11
02	–	0BUR	–	RLU00	–	RLU01	1BDR	1BU	RLD10	RLU10	RLD11	RLU11
03	2BD	2BU	LD20	LU30	LD21	LU21	3BD	3BU	LD30	LU30	LD31	LU31
04	2BDR	2BUR	RLD20	RLU20	RLD21	RLU21	3BDR	3BU	RLD30	RLU30	RLD31	RLU31
05	4BD	4BU	LD40	LU40	LD41	LU41	5BD	5BU	LD50	LU50	LD51	LU51
06	4BDR	4BUR	RLD40	RLU40	RLD41	RLU41	5BDR	5BU	RLD50	RLU50	RLD51	RLU51
07	6BD	6BU	LD60	LU60	LD61	LU61	7BD	–	LD70	–	LD71	–
08	6BDR	6BUR	RLD60	RLU60	RLD61	RLU61	7BDR	–	RLD70	–	RLD71	–
70	–	–	AVP70	AVP60	AVP50	AVP40	AVP30	AVP20	AVP10	AVP00	UP	DN
71	–	–	AVP71	AVP61	AVP51	AVP41	AVP31	AVP21	AVP11	AVP01	UP	DN
78	–	–	–	–	–	–	DEMP1	DEMP0	–	–	KEMP1	KEMP0
PI PIN NO.	7	8	9	10	11	12	13	14	15	16	17	18

Floor control boards 70 and 71 are for hallway horizontal P.I. for cars 0 and 1, respectively.

Floor control board 78 is for the Emergency Power Station for cars 0 and 1.

Even numbered floor controllers (2,4,6,8) are for rear openings only.

Odd numbered floor controllers (1,3,5,7) are for front openings only.

LU10 = UP lantern at floor 1 for car 0.
1BUR = Rear UP button at floor 1.
AVP61 = Position indicator lamp for floor 6 and car 1.

MPH II - HOISTWAY FLOOR CONTROL BOARD INPUT/OUTPUT ASSIGNMENTS (AUXILIARY RISER)

HFCB NO.	Input/Output Bits 11	10	09	08	07	06	05	04	03	02	01	00
11	--	0BU	--	LU02	--	LU03	1BD	1BU	LD12	LU12	LD13	LU13
12	--	0BUR	--	RLU02	--	RLU03	1BDR	1BUR	RLD12	RLU12	RLD13	RLU13
13	2BD	2BU	LD22	LU22	LD23	LU23	3BD	3BU	LD32	LU32	LD33	LU33
14	2BDR	2BUR	RLD22	RLU22	RLD23	RLU23	3BDR	3BUR	RLD32	RLU32	RLD33	RLU33
15	4BD	4BU	LD42	LU43	LD43	LU43	5BD	5BU	LD52	LU52	LD53	LU53
16	4BDR	4BUR	RLD42	RLU42	RLD43	RLU43	5BDR	5BUR	RLD52	RLU52	RLD53	RLU53
17	6BD	6BU	LD62	LU62	LD63	LU63	7BD	--	LD72	--	LD73	--
18	6BDR	6BUR	RLD62	RLU62	RLD63	RLU63	7BDR	--	RLD72	--	RLD73	--
72	--	--	AVP72	AVP62	AVP52	AVP42	AVP32	AVP22	AVP12	AVP02	UP	DN
73	--	--	AVP73	AVP63	AVP53	AVP43	AVP33	AVP23	AVP13	AVP03	UP	DN
79	--	--	--	--	DEMP3	DEMP2	--	--	KEMP3	KEMP2	--	--
7E	ASD	--	--	FF5	ALD03	ALD02	ALD01	ALD00	MLD03	MLD02	MLD01	MLD00
PI PIN NO.	7	8	9	10	11	12	13	14	15	16	17	18

Auxiliary riser is used with 3-car and 4-car systems.

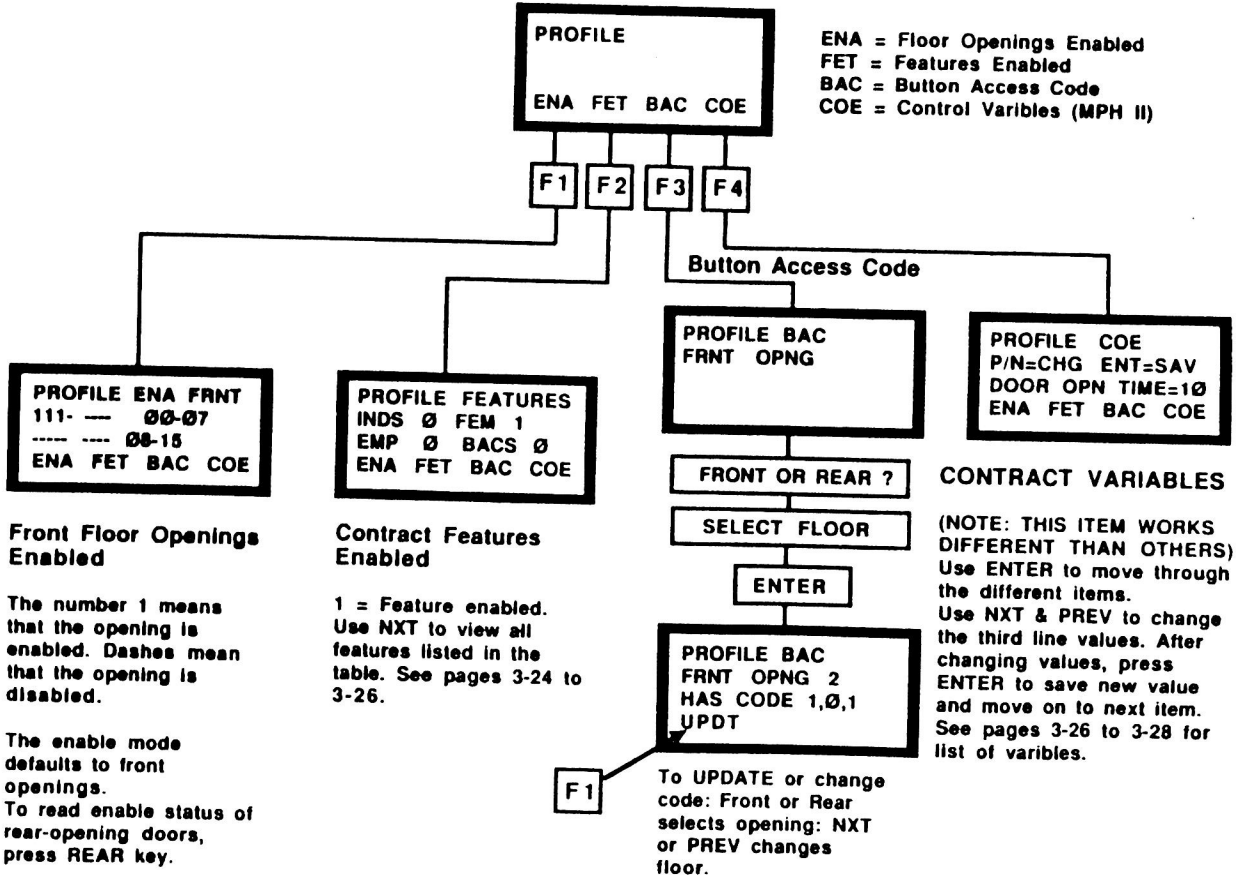
Floor control boards 72 and 73 are for hallway horizontal P.I. for cars 2 and 3, respectively.

Floor control board 79 is for the Emergency Power Station for cars 2 and 3.

Even numbered floor controllers (12,14,16,8) are for rear openings only.

Odd numbered floor controllers (11,13,15,17) are for front openings only.

MPH I & II - PROFILE MODE



CONTRACT FEATURES AND ABBREVIATIONS

Feature	Meaning
INDS	Independent Service
EMP	Emergency Power
FEM	Fireman's Emergency
BACS	Restricted Button Access
STIP	Status Indicator Panel
CLM	Cab Lantern Module
HPI	Horizontal Position Indicator
HLM	Hall Lanterns
HHPI	Hoistway Horizontal Position Indicator
PARK	Parking Feature
DPI	Digital Position Indicator (Car)
KEYS	Keyed Cutouts
HE	Hospital Emergency
APE	Anti Power-Outage Entrapment
HDPI	Hoistway Digital Position Indicator
CTLB	Car to Lobby
DOOR OPN TIME	Door open time. When the car answers a car or hall call, the doors will stay open for the amount of time specified by this variable (hexadecimal, 1/2 second per bit), normally 6 seconds (0C Hex.)
SHT DOPN TIME	Short door open time. If the safety ray is interrupted when the doors are opening in response to a car call, the doors will remain open for the time specified by this variable (hexadecimal, 1/2 second per bit), normally 3 seconds (06 Hex.) then reclose.

Feature	Meaning
NUDGING FTR	Nudging feature. This variable enables (01) or disables (00) the nudging feature.
NUDGING TIME	If the doors are prevented from closing, nudging begins after the amount of time specified by this variable (hex, 1/2 second per bit), normally 20 seconds (28 hex).
STALL TIME	If the doors are stalled while opening or closing for the amount of time specified by this variable (hexadecimal, 1/2 second per bit), normally 8 seconds (10 hex) they will reverse and try again.
MAIN TS TIME	Main traffic sentinel time. While at the main floor, if the doors are closing and the safety ray is interrupted, then they will open and remain open for the amount of time specified by this variable (hexadecimal, 1/2 second per bit), normally 2 seconds (04 hex) then reclose.
CORR TS TIME	Corridor traffic sentinel time. Same as MAIN TS TIME, but when the car is answering a hall call away from the main floor. Normally 1.5 seconds (03 hex).
CAR TS TIME	Car traffic sentinel time. Same as CORR TS TIME, but when the car is answering a car call away from the main floor. Normally 1 second (02 Hex.).
MAIN FLOOR	Specifies the main floor as the return floor for emergency power. A longer traffic sentinel time (MAIN TS TIME) is in effect at this floor.
PARKING FLOOR	If the car has the parking feature, it will park at this floor when it becomes available, and there are no calls in the system.
PARK DOOR OPR	Determines which doors will cycle when the car reaches the parking floor: 00 = no doors cycle 01 = front doors cycle 02 = rear doors cycle 03 = front and rear doors cycle
CALL ENT TONE	Call enter tone. When ON, single tone sounded when car call is latched. Y = ON; N = OFF.
FL0 DPI LSDIG	Floor 0 Digital Position Indicator (PI) Least Significant Digit (character). Same as FL0 DPI MSG except that the least significant character is the character on the right.

Feature	Meaning
FLX DPI LSDIG	Floor X Digital PI Least Significant Digit, where X equals individual floor number.
FLX DPI MSDIG	Floor X Digital PI Most Significant Digit, where X equals individual floor number.
AEMP X CAR	Automatic emergency power X car, where X equals car number. The car selected as the first car will be the first to travel to the return floor during emergency power, the car selected as second will be second to travel to the return floor, etc.
FRNT CUT SWX	Identifies the front openings that are cut out by switch X, where X equals switch number. Displayed as a two digit hex number. Example: C4 is hex for 1100 0100. The digit 1 indicates a cutout; therefore, front openings are cut out at three floors: 2, 6, and 7.
REAR CUT SWX	Identifies the rear openings that are cut out by switch X, where X equals switch number. Displayed as a two digit hex number. Example: C4 is hex for 1100 0100. The digit 1 indicates a cutout; therefore, rear openings are cut out at three floors: 2, 6. and 7.

Profile - Contract Variables List Column Headings

VARIABLE	A contract variable that may be altered onsite by use of the HHT.
LOW, HIGH	Lowest and highest allowable values for the variable.
DEFAULT	Preset value used by the system if not changed using the HHT. The value set with the HHT is stored in the battery-backed memory on the controller board.
TYPE	0 = Hexadecimal number 1 = Yes (Y) or No (N) variable 2 = ASCII character (A,B,C,D, ... Z, 1,2,3, ... 8,9,?,!,...)

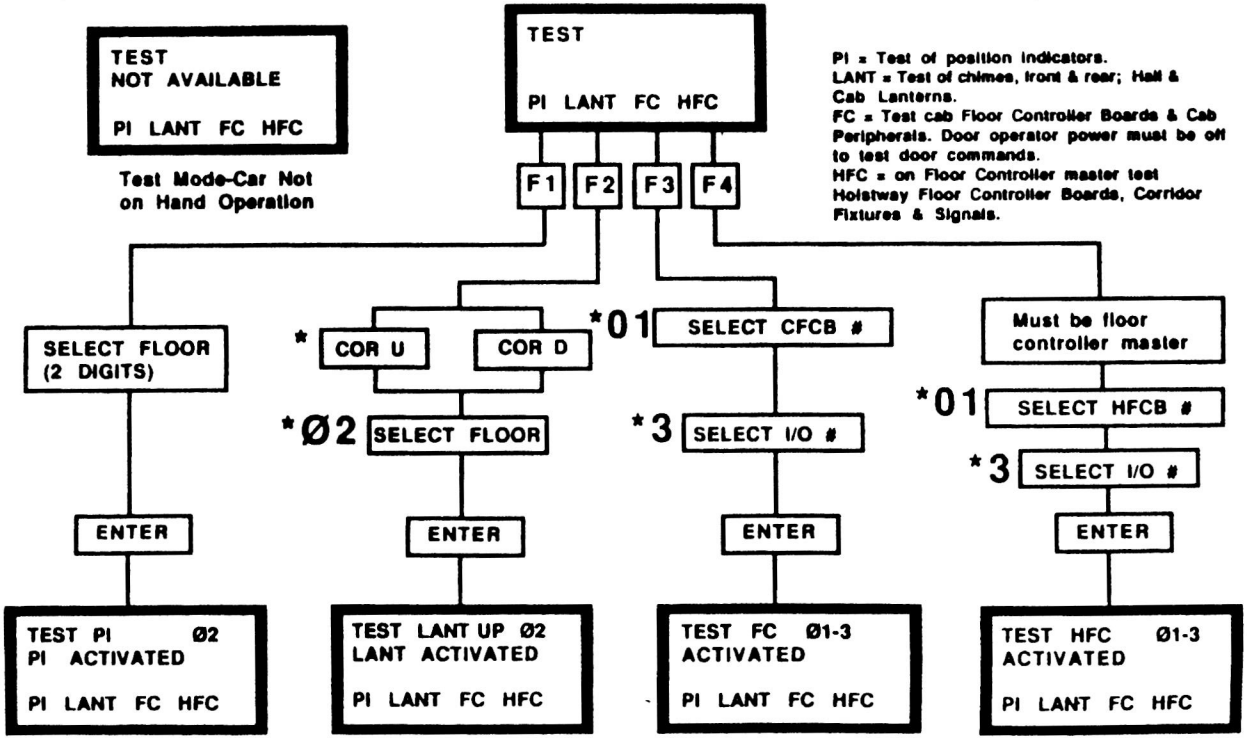
Profile - Contract Variables List MPH II Software-Level 01

Variable	Type	Low	High	Default
DOOR OPEN TIME	0	00	99	0C
SHT DOPN TIME	0	00	99	0C
NUDGING FTR	1	00	01	Y
NUDGING TIME	0	00	99	28
STALL TIME	0	00	99	10
MAIN TS TIME	0	00	99	04
CORR TS TIME	0	00	99	03
CAR TS TIME	0	00	99	02
MAIN FLOOR	0	00	07	
PARKING FLOOR	0	00	07	
PARK DOOR OPR	0	01	03	
CALL ENT TONE	1	N	Y	N
FL0 DPI MSDIG	2	20H	5FH	
FL0 DPI LSDIG	2	20H	5FH	1
FL1 DPI MSDIG	2	20H	5FH	
FL1 DPI LSDIG	2	20H	5FH	2
FL2 DPI MSDIG	2	20H	5FH	
FL2 DPI MSDIG	2	20H	5FH	3
FL3 DPI MSDIG	2	20H	5FH	
FL4 DPI LSDIG	2	20H	5FH	
FL4 DPI MSDIG	2	20H	5FH	5
FL5 DPI LSDIG	2	20H	5FH	
FL5 DPI MSDIG	2	20H	5FH	6
FL6 DPI LSDIG	2	20H	5FH	
FL6 DPI MSDIG	2	20H	5FH	7
FL7 DPI LSDIG	2	20H	5FH	
AEMP 1ST CAR	0	00	03	00
AEMP 2ND CAR	0	00	03	01

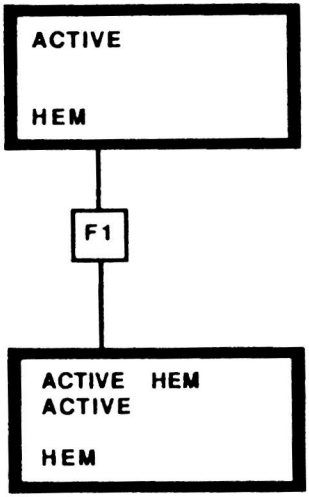
Variable	Type	Low	High	Default
AEMP 3RD CAR	0	00	03	02
AEMP 4TH CAR	0	00	03	03
FRNT CUT SW0	0	00	0FFH	01
REAR CUT SW0	0	00	0FFH	01
FRNT CUT SW1	0	00	0FFH	02
REAR CUT SW1	0	00	0FFH	02
FRNT CUT SW2	0	00	0FFH	04
REAR CUT SW2	0	00	0FFH	04
FRNT CUT SW3	0	00	0FFH	08
REAR CUT SW3	0	00	0FFH	08
FRNT CUT SW4	0	00	0FFH	10
REAR CUT SW4	0	00	0FFH	10
FRNT CUT SW5	0	00	0FFH	20
REAR CUT SW5	0	00	0FFH	20
FRNT CUT SW6	0	00	0FFH	40
REAR CUT SW6	0	00	0FFH	40
FRNT CUT SW7	0	00	0FFH	80
REAR CUT SW7	0	00	0FFH	80
FRNT CUT SW8	0	00	0FFH	00
REAR CUT SW8	0	00	0FFH	00
FRNT CUT SW9	0	00	0FFH	E0
REAR CUT SW9	0	00	0FFH	E0
FRNT CUT SW10	0	00	0FFH	F0
REAR CUT SW10	0	00	0FFH	F0
FRNT CUT SW11	0	00	0FFH	F8
REAR CUT SW11	0	00	0FFH	F8

MPH I / II - TEST MODE

Before selecting a test function the elevator must be in HAND operation.



MPH I & II
ACTIVE MODE



HEM

Activates and deactivates the Hospital Emergency feature at the controller.

The Hospital Emergency feature can also be deactivated without use of the HHT by toggling the controller HAND switch.

Before selecting the Hospital Emergency function, the car must be on normal Automatic Operation with no other features enabled.

To deactivate the Hospital Emergency feature, simply press F1 again.

3.5 MPH I AND II TROUBLESHOOTING

INDEX OF TROUBLE PROBLEMS

TROUBLE PROBLEM 01 - FUSES BLOW

PROBLEM	CAUSE	CHECK/FIX
Door fuse blows.	Door controller board is bad.	Replace door controller board.
	Current limit set too high.	Readjust current limit potentiometer.
Control fuse blows.	Short in system.	Place pigtail with 60-W bulb across blown fuse. Brilliance will show presence of short. Isolate short.
	Shorted relay coil.	Put lamp across blown fuse and remove relays one at a time until lamp goes out or dims.

TROUBLE PROBLEM 02 - OVERLOADS TRIP BREAKERS

PROBLEM	CAUSE	CHECK/FIX
Main line breaker fuses blow or overloads trip.	Loose connections.	Check motor and linestarter connections.
	Motor locked (rotor).	Inspect.
	Short in motor windings.	Check each motor winding with ohmmeter.
	Linestarter shorted.	Check with ohmmeter.
	Elevator is overloaded.	Reduce load and try again.
	Pump defective.	Inspect. Pump shaft should spin freely by hand.
	Extremely cold oil.	KCLDOIL LED is lit; motor is running; oil is much colder than 80°F.
	Loss of one phase.	Check building power and motor leads at linestarter.
	Overload setting incorrect.	Reset at rated motor current for across the line start, or 85% of motor rated current for Wye-Delta.

TROUBLE PROBLEM 03 - MOTOR/PUMP PROBLEMS

PROBLEM	CAUSE	CHECK/FIX
Motor does not run, thermal overloads will not stay set.	Short in system.	3-phase ac should be present at input to linestarter. Check for short from motor windings to ground. If short is found, replace motor.
	Bad linestarter.	3-phase ac should be present at line starter. If 3-phase ac is not present at input to overload, replace linestarter.

TROUBLE PROBLEM 03 - MOTOR/PUMP PROBLEMS (cont)

PROBLEM	CAUSE	CHECK/FIX
	Poor solder connection at thermostat.	With cool motor, check continuity between TP2-1 and TP2-2. If open, drain oil from tank, check solder connections of thermostat terminals in oil. If bad connection, re-solder.
	Faulty thermal overload.	If thermostat solder connections are good, check continuity at motor overload leads. If continuity does not exist, replace motor. Additional thermostats are in motor windings and cannot be replaced.
Motor will not run.	No power to motor (faulty linestarter).	If 3-phase ac is present at linestarter input, and 3-phase ac is not present at input to motor when UPA relay is picked, and overloads are not tripped, replace linestarter.
Noisy motor not foaming.	Bad pump.	Check pump/motor assembly for smooth, oil free rotation. If pump binds or won't spin freely by hand, replace pump.
	Lost phase/s.	Check 3-phase ac present at linestarter input. Check for loose linestarter wiring lugs.
Pump motor growls.	Extremely cold oil.	KCLDOIL LED is lit; oil is much colder than 80°F.
	Low oil level.	Check oil level.
	Loss of one phase (or low phase).	Check motor leads at linestarter, with linestarter picked.
	Defective motor.	Check field, winding, and bearings.
	Shutoff valve closed.	Check valve position.
Pump runs continuously. Car does not move.	Low oil level.	AST = 1 on HHT (Bank-Status) when motor stops, and oil level is low. Add more oil.

TROUBLE PROBLEM 03 - MOTOR/PUMP PROBLEMS (cont)

PROBLEM	CAUSE	CHECK/FIX
	MPH or MHC failure - shorted DSTART output.	Check DSTART output.
	Shorted cold oil thermostat.	KCLDOIL LED is lit, but oil is not cold. Do continuity check of thermostat.
	UP or UPA relay bad.	Replace relay.
	Welded linestarter contact.	DSTART LED not lit. Motor continues to run when UPA relay is removed. Replace linestarter.
	UP valve solenoid not energized.	Test if valve solenoids are energized by checking for magnetic force at coil. If no magnetism is observed and connections are proper, replace solenoid.
	On Wye-Delta Application	Jumper on RMH board may not be removed.
	Acceleration set too slow, causing bypass not to close when oil is very hot.	Readjust valve and try again to run the car.
	Shutoff valve/s closed.	Check shutoff valve/s. Make sure they are open.
	MPH or MHC failure - open DUP output.	UP and UPA relays OK; up limit switch not open; DUP LED on MHC is lit; 120 Vac not present at DUP output on MHC. Try to run car up on Hand operation.

TROUBLE PROBLEM 04 - CORRIDOR CALLS

PROBLEM	CAUSE	CHECK/FIX
No corridor calls will latch.	No +24 V power supply.	Check +24 V output. On MPH I check TC30(+24) to TC31(GND). On MPH II check TH-4(+24) to TH-1(GND).

TROUBLE PROBLEM 04 - CORRIDOR CALLS (cont)

PROBLEM	CAUSE	CHECK/FIX
	Corridor data link is bad.	Check data link and correct as necessary. On MPH I COMFC(CD12) is lit.
	Cars not in service (on Hand control, HE, Fireman's Return, AST).	HHT PROF-FET shows HE, FEM, EMP, APE, or INDS, or Hand/Auto switch set to Hand. Put car back in service.
	Floor locked out.	Check for keyed cutouts in corridor.
	MPH or MHC is bad.	Check to see if problem is running. On MPH I PROG LED should be flashing. On MPH II the decimal point should be flashing. The 5 Vdc LED should be lit.
Single corridor call will not latch.	Wiring open between HFCB and button.	Corridor buttons will not light and button is OK. Correct wiring as necessary.
	Button is bad.	Do continuity check. Replace button as necessary.
	Floor locked out.	Check for keyed cutout in corridor.
	HFCB is bad.	Button is OK, but HHT DISP-HFC shows no calls received from that button.
	On MPH II IOX is bad.	Check IOX. Correct or replace as necessary.
One corridor call causes others.	MPH or MHC is bad.	Shut down MHC with DISP indicated on HHT STAT-BANK to transfer dispatching function to another. If problem disappears, replace MHC or MPH.
	HFCB failure.	Replace CFCB in hoistway.
	HFCB DIP switches set to wrong address.	Check DIP switches on hoistway floor control boards.
	Corridor data link bad.	Check corridor data link for miswire or other bare wires touching data link.

TROUBLE PROBLEM 04 - CORRIDOR CALLS (cont)

PROBLEM	CAUSE	CHECK/FIX
	Button is miswired.	Check for short in wiring between buttons and floor control board.
Corridor calls will not cancel.	Multicar data link failure.	HHT STAT-BANK indicates a communication problem between cars in bank. Check data links between cars.
	MPH or MHC is bad.	Shut down controller with DISP indicated on HHT STAT-BANK to transfer dispatching function to another controller. If corridor calls are answered, replace MHC or MPH.
	Stuck button.	Check button. Replace as necessary.
	Corridor or HFC data link bad.	If HHT DISP-HFC shows corridor call input always active when no buttons are pressed, replace HFCB or check data link wiring.

TROUBLE PROBLEM 05 - CAR CALLS

PROBLEM	CAUSE	CHECK/FIX
Car will not latch car calls.	Car not in service.	Car not in service because of one of the following: emergency power or APE, Fireman's Return switch set to ON; hot oil; car on Hand control.
	Car on Phase I	KFEM is lit. Remove car from Phase I.
	Car on Phase II hold or cancel.	Check status with HHT. Remove car from Phase II.
	Car on security.	Check floors enabled with HHT. HHT PROF-ENA will display floors not restricted by Button Access, keyed cutouts, or software error.
	MPH or MHC bad.	Decimal point on MHC not flashing, and 5 Vdc is present at MHC P7-1 and P7-2.

TROUBLE PROBLEM 05 - CAR CALLS (cont)

PROBLEM	CAUSE	CHECK/FIX
	Communications bad. Data link miswired, no 24 Vdc, or wrong address on DIP switch.	If HHT STAT-FC indicates a communication problem, check data link wiring, 24 Vdc and address. Correct as necessary.
	CFCB is bad.	HHT DISP-FC indicates no car calls received by MPH (I/O does not change state when activated). Button wiring OK. Replace FCB.
	KAUTO relay failure.	Replace relay.
Car latches but does not respond to any car calls.	DOOR switch set to OFF, or blown fuses.	KDPO and/or KDPOR LED's not lit. Check door operator. Set DOOR and RDOOR switches on.
	Car or hatch doors ajar.	K40 LED not lit. (40 and 40A relay not picked.) Determine which door is open and correct.
	Door close limit switch not opening.	HHT DISP-FC indicates that the close limit is not in proper state. For DCB, DRCL (normally closed switch) should = 0 when doors are fully closed. For TDC, DRCL (normally open switch) should = 1 when doors are fully closed.
	Safety circuit open.	K29 LED (DS 19) is not lit. Check safety circuit. Correct as necessary.
	MPH or MHC is bad.	HHT indicates car calls received by MHC or MPH.
	CFCB is bad.	COMF LED on MPH is lit or the HHT indicates car calls not present.
Car latches but does respond to some car calls.	Communication bad.	HHT STAT-FC indicates a communication problem with FCB's in car station. Correct wiring, address, or replace FCB as necessary.

TROUBLE PROBLEM 05 - CAR CALLS (cont)

PROBLEM	CAUSE	CHECK/FIX
Car calls will not cancel.	Stuck button.	Car call does not cancel when elevator is set to Hand control. Check pushbutton, correct as necessary.
	Communication bad.	Check HHT STAT-FC for communication problems. Check wiring or address, or replace FCB.
	Wiring (data links).	Check wiring and check as necessary.
	CFCB bad.	Check wiring and replace FCB in car station.
	MPH or MHC is bad.	If all other causes are eliminated, replace MHC or MPH.
Car responds to wrong floor in response to a car call.	CFCB DIP switches set to wrong address.	Check DIP switches, correct as necessary.
	Beam-switch bad, or reflector missing.	Observe light on beam-switches as car runs through hoistway. Replace, add, or adjust reflector as necessary.
	Selector is out of step.	Check car position on MHC in relation to actual position. If incorrect, move car on HAND to bottom floor, to reset selector.
One car call latches others.	CFCB bad.	Replace CFCB.
	Shorted CFCB wiring.	Check wiring to FCB in car station. Correct as necessary.

TROUBLE PROBLEM 06 - LANTERNS/CHIMES

PROBLEM	CAUSE	CHECK/FIX
Hall lanterns will not light.	+24 V power supply bad.	No corridor and car pushbuttons or hall lanterns light. +24 V not present. Check +24 V supply.

TROUBLE PROBLEM 06 - LANTERNS/CHIMES (cont)

PROBLEM	CAUSE	CHECK/FIX
	Hall lantern socket bad.	If 24 Vdc is present at wires to lantern when output is activated via HHT TEST LNT or TEST FC (car on Hand Operation), replace lantern socket.
	Burned out bulb.	Put in new bulb.
	FCB is bad.	If HHT STAT FC (floor controller status) indicates floor controller board communication problem, and data link wiring and DIP switch settings are correct, and 24 Vdc is present, replace floor controller board. If HHT STAT FC does not indicate a communication problem, put car on Hand and activate the output via HHT TEST LNT or TEST FC. If 24 Vdc is not measured at the FCB terminals for the lantern, replace the FCB.
	Corridor data link failure.	HHT STAT-HFC indicates communication error.
No cab lanterns.	Burned out bulb.	Check bulb or put in good bulb.
	FCB bad.	HHT STATUS-FC indicates floor controller board communication failure with FC01. Do voltage checks on floor controller board output when lantern should be lit. Replace floor controller board.
	Car data link failure.	HHT STATUS-FC indicates communications error.
Hall chime rings continuously.	Shorted chime board.	Replace chime board.
	Door close limit switch not opening, nudging.	HHT DISP KDCL input not proper.

TROUBLE PROBLEM 06 - LANTERNS/CHIMES (cont)

PROBLEM	CAUSE	CHECK/FIX
	FCB is bad.	If HHT DISP FC indicates that channel is not active, replace floor controller board.
	MHC is bad.	If HHT DISP FC indicates that channel is continuously active, replace MHC board.
	Doors on nudging.	HHT DISP-FC 00 indicates DNUDGE output is active.
Car chime rings continuously.	Fireman's Return Phase 1 on.	Check profile with HHT.
Hall chime does not ring.	FCB is bad.	If lamp does not light and chime does not ring: Make sure 24 Vdc is present between the FCB terminals and data link wiring and DIP switch settings are correct. If HHT STAT FC indicates a communication problem with the FCB, replace the FCB. If lamp does not light and chime does not ring, and HHT STAT-FC does not indicate a communication problem: Place car on Hand and activate (via HHT TEST LNT or TEST FC) the FCB output for the lantern, and check 24 Vdc output at floor control board terminals for the lantern. If 24 Vdc does not drop to 0 Vdc at the lantern terminals and there is no communication problem with this FCB, replace the FCB.
No chime.	Chime board failure.	+24 V present on chime board, and chime does not sound when pins 3 or 4 are shorted to ground.
	CFCB bad.	HHT FC display indicates bell output is present. Bell and bell wiring OK.

TROUBLE PROBLEM 07 - CAR DOES NOT RUN, OR DOES NOT RUN PROPERLY

PROBLEM	CAUSE	CHECK/FIX
Car does not run, advances selector, and cancels call.	HU beam-switch receiving reflection from reflective beam-switch.	Check HU input HHT DISP-FC. FCB input should be 0 if there is no reflection. Or, check the surface in hoistway. If a reflection is indicated, remove or spray reflective surface with flat black paint.
	Defective HU or HD beam-switch.	FCB input or LED on beam-switch indicates a reflection. No reflective surfaces in hoistway. HHT shows input = 1. Replace beam-switch.
	Defective FC01	FCB input indicates a reflection, but LED on beam-switch does not indicate a reflection. Replace FC01.
MPH or MHC runs intermittently or does not run.	Improper +5 V level.	Check +5 V. On MPH or MHC should be 5.01 Vdc. Replace 5 V power supply or correct as necessary.
	Data link problem of P1 data link.	Disable deadman timer and check communications via HHT STAT-FC. Correct as necessary.
	MPH or MHC is bad.	Replace board.
Car starts hard and/or jitters or bounces when running.	Improper valve adjustment.	Readjust valve, and check operation.
	Wear ring groove not deep enough in cylinder head sleeve.	Order new sleeve with deeper groove.
	Oil too cold (up direction).	KCLDOIL is lit.

TROUBLE PROBLEM 07 - CAR DOES NOT RUN, OR DOES NOT RUN PROPERLY (cont)

PROBLEM	CAUSE	CHECK/FIX
	Oil too hot, more than 130°F.	Check oil temperature. Let oil cool down.
	HS relay bad.	Replace with good relay.
	Tight jack head packing.	Apply lubricant to piston at jack head, such as WD-40 or silicone. If condition improves, order new jack head sleeve with deeper wear ring groove.
	Wear ring groove not deep enough. (Down direction only)	Order new cylinder head sleeve.
	Roller guides misaligned.	Check runout. Correct roller guide alignment.
	Air in oil.	Oil is milky colored. Let car sit idle overnight then bleed air from jack.
	Muffler bad.	Replace muffler.
	Pump bad.	Problem present only in up direction, and everything else is OK. Replace pump.

TROUBLE PROBLEM 08 - CAR - STOPPING

PROBLEM	CAUSE	CHECK/FIX
Car lands hard.	Valve out of adjustment.	Readjust valve and check operation.
	Oil too cold (up direction) less than 80°F.	KCLDOIL LED is lit.
	Oil too hot, more than 130°F.	Check oil temperature, let oil cool down.

TROUBLE PROBLEM 08 - CAR - STOPPING (cont)

PROBLEM	CAUSE	CHECK/FIX
	HS relay bad, contacts stuck.	Substitute with good relay.
Car hits buffer or stop ring.	USD or DSD limit switch failed, and elevator lost selector.	KT69 or KB69 LED is lit, when car is at top or bottom terminal. Replace defective switch.
	HS relay bad, contacts stuck.	KT69 or KB69 LED is not lit, when car is at top or bottom terminal. Elevator stopped hard. Replace HS relay.
	Valve bad.	Solenoid de-energized (no magnetism), but oil still passing through valve. Inspect or replace valve.
Car stopped between floors.	+5 Vdc or +24 Vdc power supply failure.	Check voltages at MHC P7-1 to P7-2 (5 V), and RMH TH-1 to TH-4(24 V). Replace fuses, or power supplies as necessary.
	Power failures.	Check voltages at linestarter.
	Normal to emergency power transition.	Car has attempted transfer to emergency power.
	Emergency to normal power transition.	The car has returned to normal power.
	Low oil level.	Motor stops, and oil level is low. Determine reason for low oil, repair any leaks. Add more oil. Reset by toggling Hand/Auto switch.
Frequent re-levels.	Too much oil seeping from jack.	Check if too much oil is seeping from jack, loose or worn seal, cylinder leaking into ground, or leaking pipe. Replace seal, jack, or pipe as necessary.

TROUBLE PROBLEM 08 - CAR - STOPPING (cont)

PROBLEM	CAUSE	CHECK/FIX
	Oil too cold (up direction).	KCLDOIL and DSTART LED's are lit. Motor is running.
	Valve out of adjustment.	Readjust valve and check operation.
	Leveling zone too tight.	Check spacing on LU and LD zone detectors. They should be 2-1/2 inches apart, with transmit and receive lenses horizontal.
	Landing reflector obscured.	Observe operation of LU and LD LED's. Clean off reflector plates.
	Landing reflector misaligned.	Check installation. Align plate so that it is perpendicular to LU and LD beam-switches.
Car fails to land correctly.	Floor controller board failure.	KLU and KLD inputs are correct. Replace floor controller board.
	Valve failure.	Replace up or down slow valve coil, or replace valve as necessary.
	Pump.	Check working pressure.
	Oil level low. (Undershoots top floor)	Oil level below sight glass or low oil mark on DIP stick. Add oil.
	AST time out.	Use HHT to check STATUS-BANK. If AST = 1, clear by toggling Hand/Auto switch. Determine reason for AST. Note: Car goes on AST when micro-processor does not receive signal from floor reflector within 2 minutes from the time that the linestarter picks.

TROUBLE PROBLEM 08 - CAR - STOPPING (cont)

PROBLEM	CAUSE	CHECK/FIX
	(UP) Oil temperature below 80°F.	Check KCLDOIL LED after car becomes available (AVAS LED lit). If KCLDOIL LED is lit and motor is running, oil temperature is below 80°F.
	HS relay bad (contacts stay closed).	Do continuity check or exchange relay.
	Bad LU or LD beam-switch.	Car LU and LD LEDs do not go off when car is level, or do not light when car is out of landing zone, and HHT FC status indicates that CFC01 is communicating. HHT DISP-FC (01) indicates that KLU or KLD signal is always = 1, even when car is not in level zone. Replace LU or LD beam-switch as necessary.

TROUBLE PROBLEM 09 - LEVELING PROBLEMS

PROBLEM	CAUSE	CHECK/FIX
Car levels too low or too high.	Beam-switches are positioned too high or too low, or too close together in car station.	Make sure beam-switches are 2-1/2 inches apart, and that the center line between them is 42 inches above car sill. Also, it helps to insure that the beam-switch is oriented so that the source and receiver are horizontal. The LED should be up at the 12 o'clock position.
	KLU or KLD photo.	If LED at back of beam-switch is always out, even when away from a reflector, or HHT DISP-FC (01) indicates that KLU or KLD signal always = 1 even when away from reflector, replace. KLU or KLD signal should = 1 only when beam-switch sees a reflector.

TROUBLE PROBLEM 09 - LEVELING PROBLEMS (cont)

PROBLEM	CAUSE	CHECK/FIX
	Beam-switch (KLU or KLD) miswired.	Two types of beam-switch may be used: blue body or orange body. See system reference drawings for appropriate hookup.
	Floor control board is bad.	If beam-switches are wired properly and are functioning properly, but HHT DISP-FC still shows incorrect KLU or KLD signal status, replace CFCB. (Note: STATUS-FC may not indicate a communication problem.)
Car passes by floor and levels at next (wrong) floor.	Dirty or missing reflective tape.	Clean or install new reflective tape or check for reflective surfaces in HATCH.
	Reflective tape is too close (less than 6 inches) to beam-switches.	Move reflective tape farther away from beam-switches or adjust beam-switches farther inside cab.

TROUBLE PROBLEM 10 - SWITCHES NOT WORKING CORRECTLY

PROBLEM	CAUSE	CHECK/FIX
Fireman's Return Phase II does not work.	CFCB in car is bad.	If HHT STAT FC indicates communication problem with CFCB and wiring and address are correct, replace CFCB.
	Data links bad or DIP switch not properly set.	HHT (STATUS-FC) indicates a communication failure with CFCB. Check data link wiring and DIP switches per system reference drawings.

TROUBLE PROBLEM 11 - DOORS

PROBLEM	CAUSE	CHECK/FIX
Doors stall.	Mechanical bind.	Doors do not move freely when operator is manually turned. Remove obstruction, correct bind.
	Door fuse blown.	KDPO LED is not lit. Replace fuse.
	Door motor bad.	Check door motor. Replace if necessary.
	Microswitch bad.	Cam is properly adjusted, but open or close limit microswitch is not in correct state. Rewire or replace microswitch as necessary.
	Cam or cams out of adjustment.	Observe door operation. Adjust cams as necessary.
	FCB is bad.	Replace FCB.
	Door controller board (TDC or DCB) is bad.	Replace door controller board.
Doors slam.	Cam (or cams) out of adjustment.	Observe door operation. Adjust cams as necessary.
	Microswitch failure in door operator.	Operate doors manually, and check electrical operation of microswitches. Replace microswitch as necessary.
	Door controller board is bad, or board out of adjustment.	Observe door operation. Adjust door controller board as necessary. If operation is not satisfactory, replace board.
	Door motor is bad. (DCB board).	Check resistance: F1 - F2 (800 ohms) A1 - A2 (24 ohms). Replace motor.
Doors nudge or cycle continuously.	Safety edge not retracting.	Check safety edge adjustment. Adjust or replace safety edge.
	Safety edge switch stuck or shorted.	Do continuity check. Replace switch if necessary.

TROUBLE PROBLEM 11 - DOORS (cont)

PROBLEM	CAUSE	CHECK/FIX
	Safety ray beam dirty, blocked, or misaligned.	If HHT DISP-FC shows KTS1 or KTS2=0, check safety rays.
	Door open button stuck.	If HHT DISP-FC shows KDOB=1, repair or replace button.
	FCB is bad.	HHT display mode shows that DNUDGE is not active, but DNUDGE output from floor controller board is active. Replace FCB.
	MPH or MHC failure.	HHT display mode DISP-FC shows that DNUDGE is active for no apparent reason. Door open button, safety ray, and safety edge are working properly. Replace board.
Safety ray not working.	Safety ray not aligned.	Doors always go on nudging. Check HHT DISPLAY-FC. Check alignment and correct. KTS1 and KTS2 signals should be equal to 1 when beam is established, and equal to 0 when beam is broken.
	Safety ray wiring is bad.	Check proper inputs KTS1 and KTS2 at floor controller board in car station as described above. Voltage is 24 Vdc when beam is broken, 0 Vdc when beam is established.
	Safety ray unit is bad.	Outputs not generated when beam is broken. Replace safety ray.
	FCB is bad.	Beam 1 and 2 inputs from safety ray are present, but HHT indicates those signals not present.

TROUBLE PROBLEM 11 - DOORS (cont)

PROBLEM	CAUSE	CHECK/FIX
	Doors close limit makes too early.	Check DRCL signal on CFC with HHT. HHT DISP-FC indicates for DCB, DRCL should = 1 when doors are closing, and = 0 when doors are fully closed. For TDC, DRCL should = 0 when doors are closing, and = 1 when doors are fully closed.
Safety edge not working.	Faulty cord.	Microswitch OK, but signal not present at input to floor controller board.
	FCB is bad.	KSTE input from safety edge is present, but HHT indicates that signal not present from floor controller board.
	Bad switch.	KSTE output from safety edge not present.
	Safety edge not retracting.	Check operation.

TROUBLE PROBLEM 12 - MPH II PROGRAM NOT RUNNING

PROBLEM	CAUSE	CHECK/FIX
Decimal point is off or not blinking.	U36 and U37 not plugged in properly.	Make sure all pins are inserted into socket. EPROM's are plugged into lower end of socket, and not inserted upside down. (Notched end of EPROM should be up.)
	Bad U36 and U37 EPROM chips.	If EPROM's are plugged in properly and decimal point is still not blinking, EPROM's may be defective. Replace EPROM's with known good EPROM's from another car.

TROUBLE PROBLEM 12 - MPH II PROGRAM NOT RUNNING (cont)

PROBLEM	CAUSE	CHECK/FIX
	MHC jumper J20 in wrong location.	Make sure that J20 jumper is in the A-B position for 28-pin EPROM's and B-C position for 32-pin EPROM's.
	Bad MHC board.	If good chips do not work properly, MHC board may be bad. Replace MHC board.
	5 Vdc not present.	If 5 Vdc is not present at MHC P7-1 and P7-2, check wiring connections from 5 V power supply.
		If 115 Vac is not present across AC and ACC terminals, check 3 amp ACSC fuse (RMH-F1) and switch for 5 Vdc (RMH-S6).

3.6 ABBREVIATIONS FOR HHT WORDS

Abbreviation	Description
457T	Fail to Dispatch Timer
AEMP X CAR	Automatic Emergency Power X Car, where X equals car number
APE	Anti Power-Outage Entrapment
AST	Anti-Stall Timer (Car Runs Too Long or Low Oil)
AVAS	Available Cars
AVP	Advanced Car Position
BAC	Button Access Code
BACS	Restricted Button Access
BLOCK	Block Operation Internal Signal
BNK	Bank
CAB	Cab or Car Information
CALL ENT TONE	Call Enter Tone
CAR TS TIME	Car Traffic Sentinel Time
CARRUN	Car is Running Internal Signal
CCFLG	Car Call Flag
CLM	Cab Lantern Module
COE	Contract Features (Contract Order Engineering)
COMP	Bank Communications Status