tVC **Controller Manual**

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M6809 MICROPROCESSOR COLLECTIVE LIFT CONTROL MANUAL

SOFTWARE VERSION MSN 12.6 & LATER

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SECTION 1

INTRODUCTION

ILLUSTRATIONS

1.1 GENERAL

The TVC M6809 Microprocessor Lift Control Module is one of a number of modules supplied by TVC which together make up a lift control system. The module is designed using current technology to provide a cost-effective lift control panel whilst maintaining all the safety, reliability and flexibility features associated with Thames Valley products.

In addition to the normal features a number of refinements are included as standard; these include, for example, recognition of a stuck button (which is consequently ignored), LED indication of each incoming and outgoing signal, a numerical display of the lift position and direction of travel and on-request displays of certain past and present lift events. An optional 'English Language' event log is also available.

Features provided by the system include:

a) Fireman Control and Indicator

b) Special Service Control

c) Homing

d) Landing Door Re-open Once

e) Light Ray Failure

f) Stuck Button Detection

g) Differential Door Timing

h) Advance Call Cancel

j) Optional Separate Door Close Push

k) Weight Switch 95% FL. and By-pass Indicator

l) Car Call Dumping

m) Event Message Display (with optional 'English Language' Message)

n) Door Opening and Closing Protection

1.2 CONSTRUCTION

The system comprises a motherboard onto which a number of printed circuit cards are mounted (see Fig 1.0). Connections to the motor panel are achieved via Molex connectors on the motherboard. Shaft and car wiring are via screw-clamp type terminals also on the motherboard.

An additional expansion motherboard is necessary for systems over 11 floors.

The system voltages are derived from a transformer/power supply module mounted on the motor panel and are fed via a wiring loom to the microprocessor motherboard.

1.3 OVERALL SYSTEM DESCRIPTION (FIG 1.1)

The overall TVC Microprocessor Collective Lift Control System comprises a Microprocessor Unit and a Motor Panel Section plus Shaft and Car wiring.

The Microprocessor Unit is mounted on the Motor panel section and the whole is contained in a single cabinet (simplex).

The overall system is built around the 6809 Microprocessor which is used as the control centre for monitoring and addressing all incoming and outgoing signals to the remainders of the system.

The lift motor operation is controlled by the Motor Panel Section which receives signals from the Microprocessor, such as pilot up, pilot down, pilot high speed, pilot open doors and pilot close doors. The Motor Panel Section sends signals back to the Microprocessor Unit regarding which lift function it is carrying out, ie moving up, moving down, opening or closing doors, door zone or locks made etc.

The Motor Panel Section also transmits signals to and receives signals from the shaft and car, these being locks and safety circuit signals from the shaft wiring, door operator, car gate and safety circuit signals from the car wiring.

Signals to and from the shaft and car are also transmitted and received by the Microprocessor Unit. These include landing calls, position indicators, position resets and fire switch etc, from the shaft wiring and car calls, position indicators, service switch, attendant controls etc, from the car wiring.

Duplex and Triplex operation are possible, as is connection to an 'EMU' remote monitory system. There is a separate manual detailing connection requirements etc, for these features.

High reliability, field proven industrial standard components are used throughout the system and are readily available from many sources.

The system has signal protection, where all external incoming signals are optically isolated and filtered. Motor Panel signals are normally at 240V ac and all other incoming signals are at 100V dc. All incoming and outgoing signals have the ability to withstand incorrect connection, short circuits etc.

Other system voltages are also available.

The Microprocessor System regularly tests itself throughout its operation and in its program, if an error is detected the system will automatically reset itself.

1.4 PERFORMANCE CHARACTERISTICS

1.4.1 Electrical

System Input voltage: 400V ac + 10% - 15% 50HZ.
Note: other voltages available - consult factory.

Power Supply Module Voltages

Input Voltage	9v (30VA)	19v (50VA)	75v (75VA)
Fuse Indent Rating	F3/3A a/s	F2/3A a/s	F1/1A
Output Voltage	+10V dc	+24V dc	+100V dc
Fuse Indent Rating	F9/2A	F8/2A	Test Point F4/50ma CPF F7/250ma 100v F5/500ma LPF F6/250ma

Note 1: Fuses not denoted a/s are quickblow.
Note 2: The 5V supply is derived from the 10V supply via a voltage regulator fitted on the motherboard.

CPU Card	-	+5Vdc Power
	-	+10Vdc Power
I/O Card	-	+5Vdc Power
	-	+24Vdc Power
	-	Each input signal is sourced from *100Vdc (and must exceed 75Vdc) * Optional 24Vdc for call buttons
	-	Output Relays
	-	Single contact per relay
	-	Contact Rating 5A at 250Vac
	-	Coil Voltage 24Vdc
	-	16 relays per I/O Card
Position Card	-	+5Vdc Power
	-	+24Vdc Power
Serial Card	-	+5Vdc Power
	-	+10Vdc Power
	-	-Two/Four RS232 serial communications ports

Environmental Range

Humidity Operating Range	0-90% relative humidity (non-condensing)
Temperature Operating Range	5-40 deg.C ambient

1.4.2 **Mechanical**

Main Motherboard Assembly	Height	320mm
	Width	250mm
	Depth	170mm
	Weight	6Kg
Extension No. 1 Motherboard Assembly (large)	Height	230mm
	Width	250mm
	Depth	170mm
	Weight	2Kg
Extension No. 2 Motherboard Assembly (small)	Height	160mm
	Width	120mm
	Depth	170mm
	Weight	0.5Kg

1.5 Microprocessor System Description

The Microprocessor System comprises a number of printed circuit cards, all of which are mounted on the motherboard. These are namely:

a) The Motherboard itself which contains the basic pilot motion control relays and the inputs which go to and come from the Panel. It also contains the DJR journey timer and 8 user settable timers (door dwell time etc).

b) The Position Card provides outputs to indicate actual position and direction of the car and also receives absolute binary floor position inputs.

c) A number of I/O cards provides call inputs and acceptance outputs.

d) An Event Log Card which contains 5 pushbuttons to allow examination of the event log and a two-digit event display.

e) A Serial Communications Card which provides two/four RS232 ports (for Duplex, Triplex or group operation and/or a shaft encoder, EMU etc).

Further expansion of the system is provided by a choice of expansion Motherboards connected to the primary motherboard by means of a ribbon cable. There are two alternative expansion motherboards:

a) The 'small' expansion which provides for one additional I/O Card. This card can be used for either increased call inputs (increases the number of floors served from 10 to 15) or for the more unusual 'feature' inputs, for example ERET, UPK or DHP (see section 2.11).

b) The 'full' expansion motherboard which provdes for four additional I/O Cards and the circuitry necessary for rear door operation. This allows full collective control with up to 25 floors of which any 4 can include rear doors.

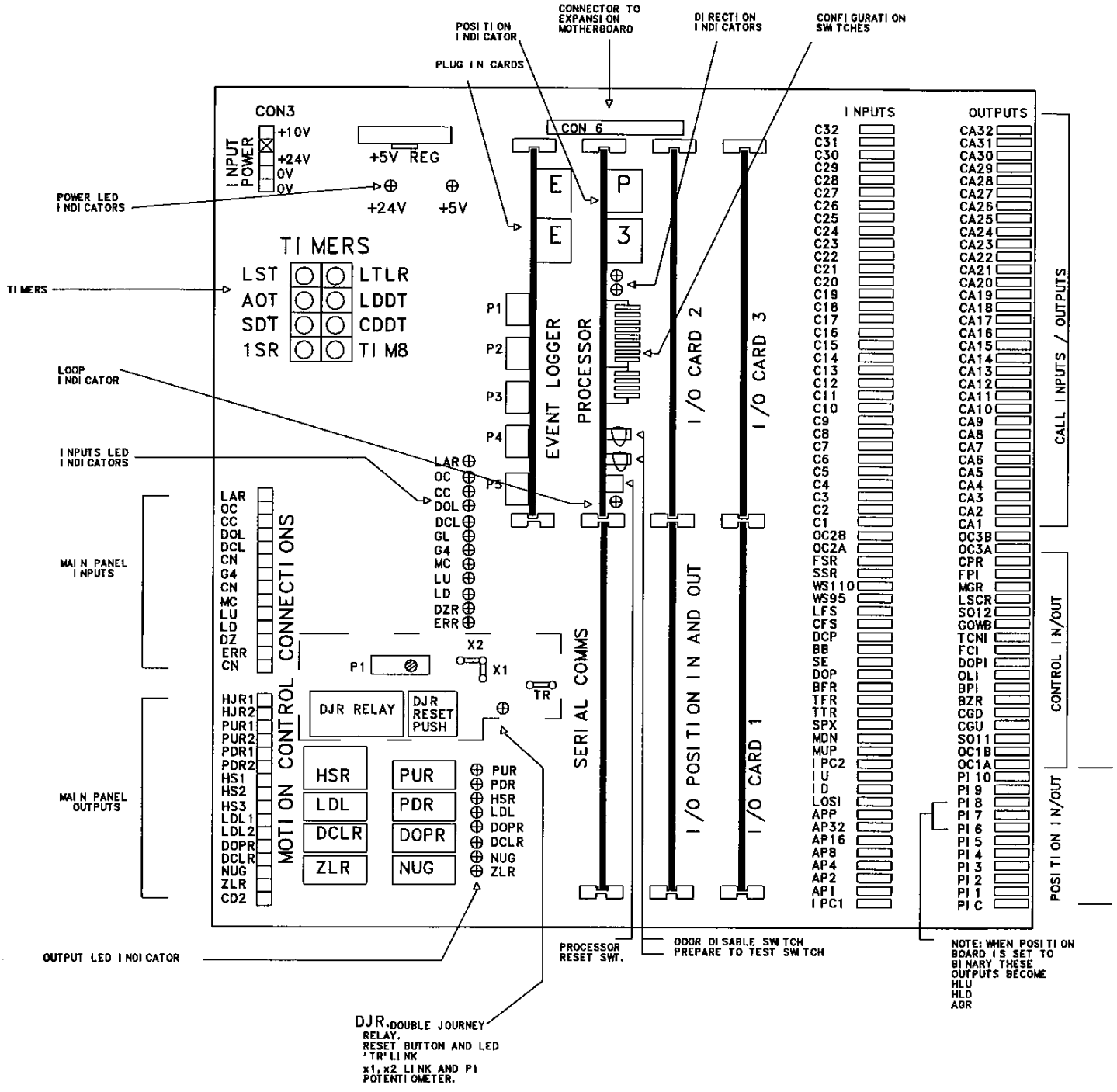


FIG 1.0 COMPONENT POSITIONS ON MOTHERBOARD

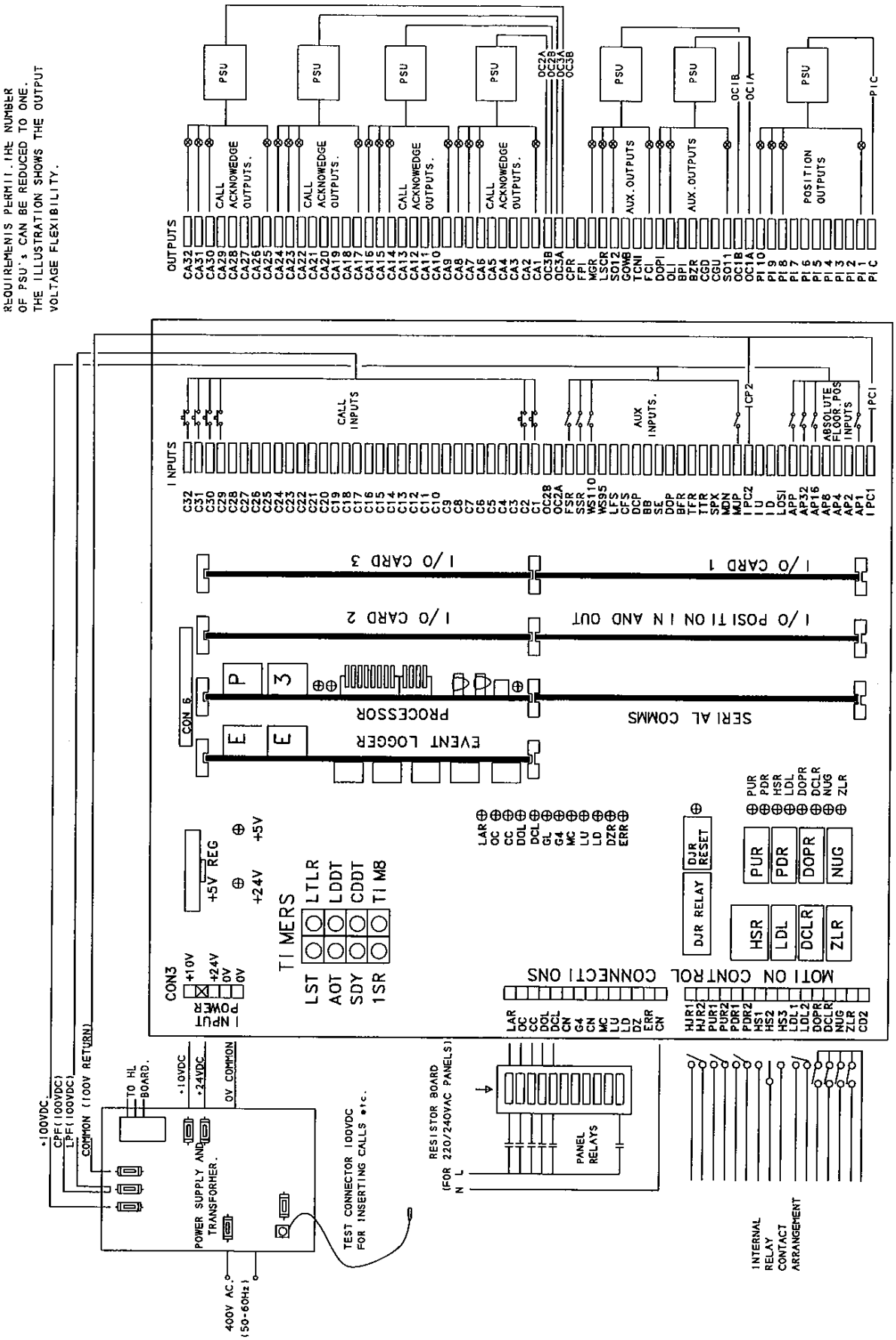


FIG 1.1 GENERAL WIRING SCHEMATIC (NON SPECIFIC)

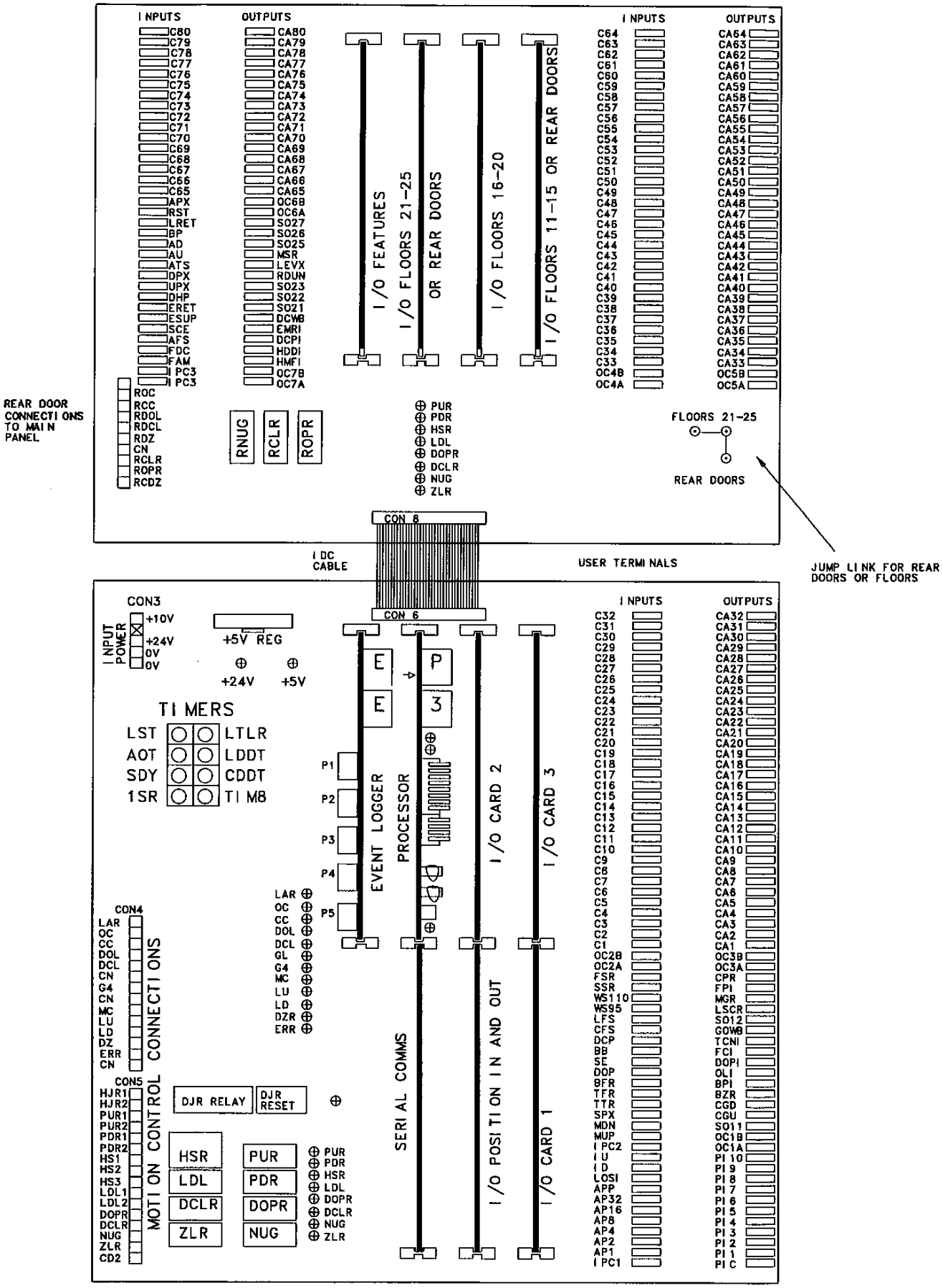


FIG 1.2 GENERAL ARRANGEMENT WITH FULL EXTENSION

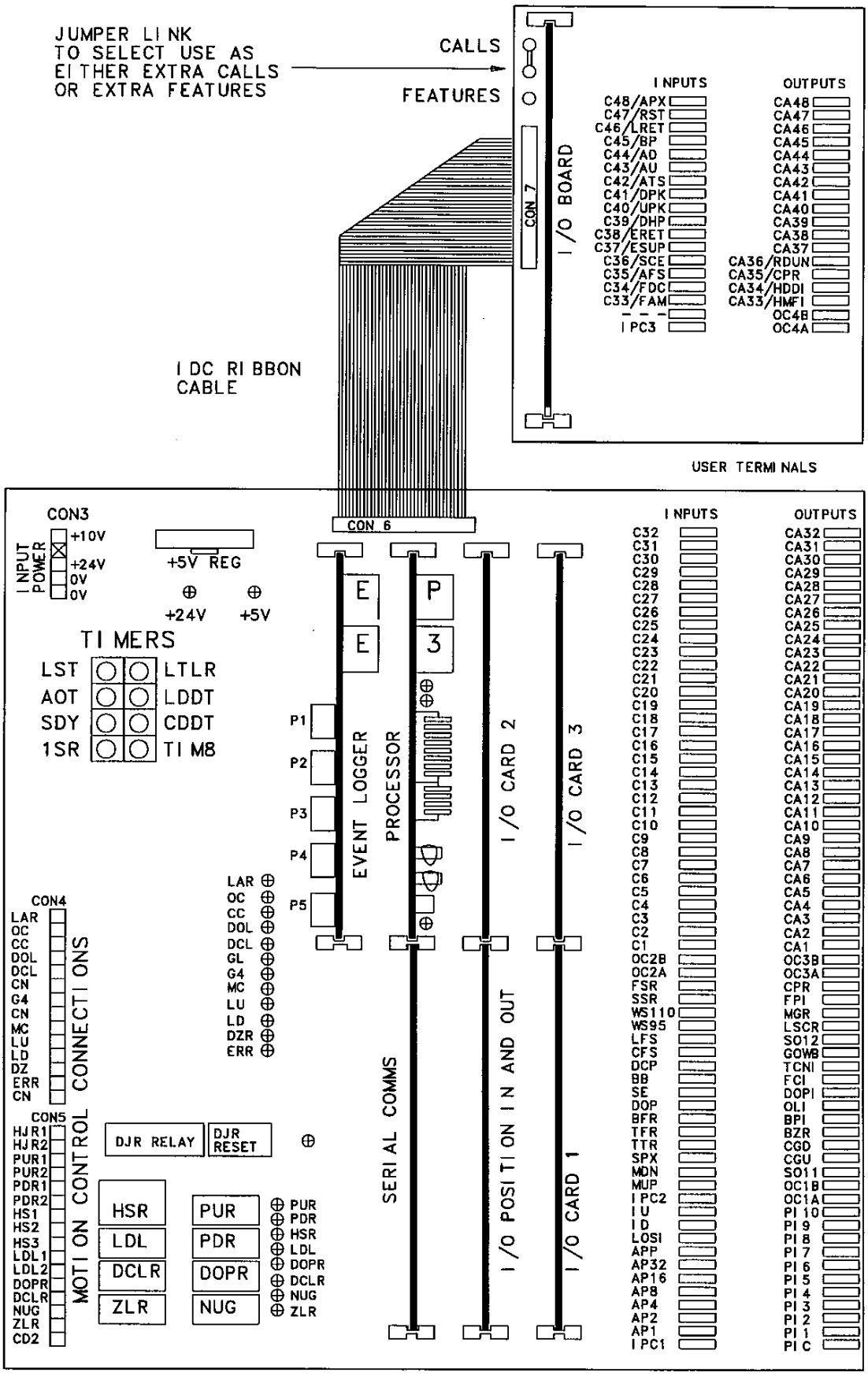


FIG 1.3 GENERAL ARRANGEMENT WITH SMALL EXTENSION

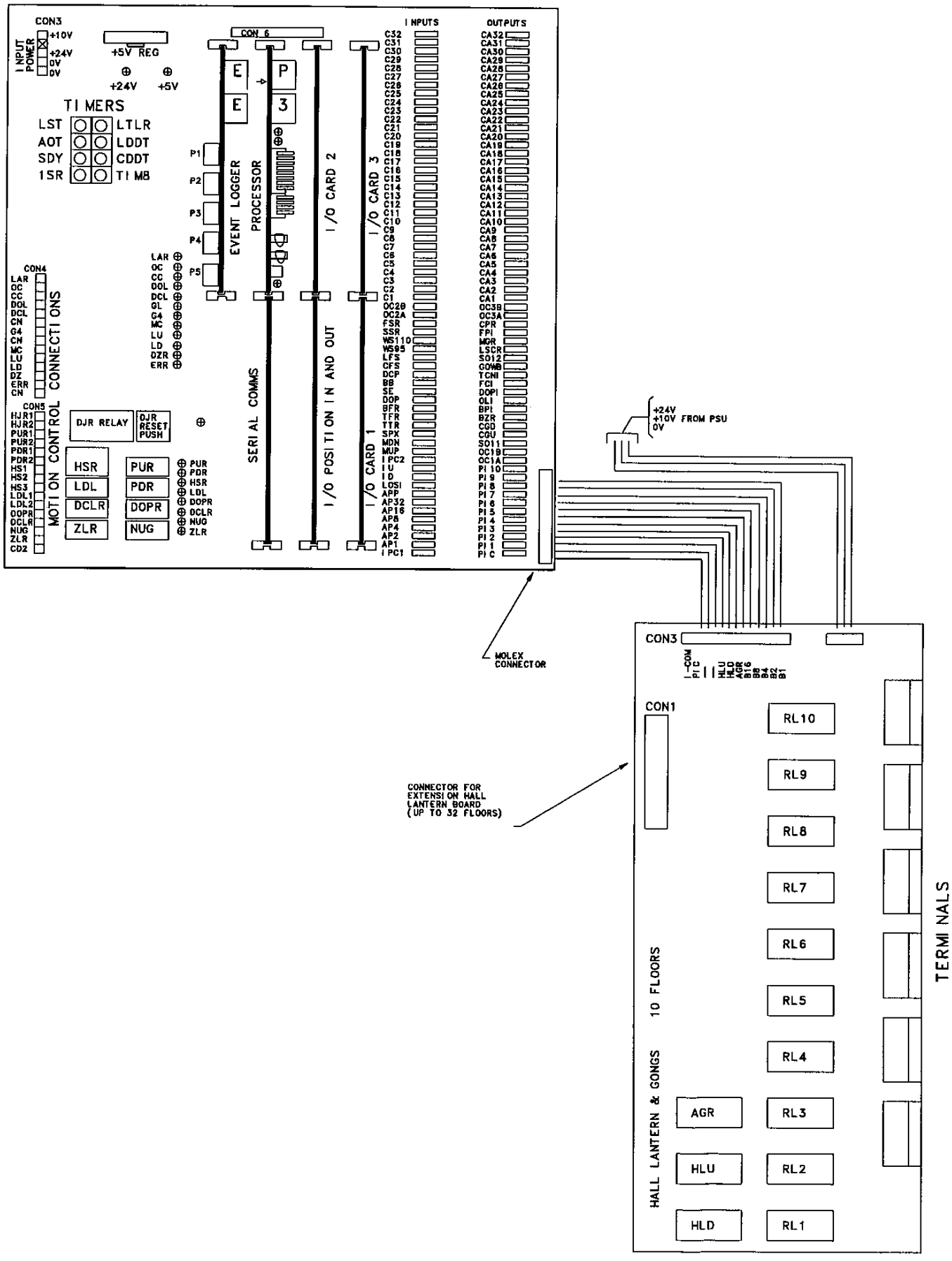


FIG 1.4 HALL LANTERNS ARRANGEMENT

SECTION 2

INSTALLATION AND COMMISSIONING

2.1 GENERAL

The external wiring for the Microprocessor controlled system is as shown in Fig 1.2.

All user incoming wiring to the Unit including Car and Landing pushes etc are at 100 V dc and all outgoing wiring for Indicators are at 12/24 V dc (other voltages available on request).

2.2 CONNECTOR ACCESS

All external wiring to the M6809 is made to the Motherboard terminals.

The common indicator return (INR) terminal is located with the main Motor Panel terminals, although the indicator output terminals are on the Motherboard.

2.3 MICROPROCESSOR CONNECTIONS TO THE SYSTEM (Ref. Fig 1.2)

a) **Transformer/PSU Connections (mounted on the Motor Panel)**

i) **Transformer Input**
The appropriate voltage tapping should be selected on the PSU transformer to suit the application.

ii) **PSU Outputs**
Power Supply Unit outputs go via a separate loom to socket Con 3 on the Microprocessor Motherboard.

Note: Keep Input and Output looms separate.

b) **LAR Line**

Connects from the Main Panel, to LAR terminal on the Microprocessor Motherboard.

2.4 CONTROL PANEL SWITCH-ON

Before switching on for the first time, carry out the following procedure:

a) Disconnect the power loom from connector Con 3 at the Microprocessor Motherboard.

b) Pull all the plug-in Cards out approximately 1/2".

c) Interrupt the supply to the transformer/PSU (this is done because at this stage microprocessor operation is not required).

Switch on the control panel and ensure that no 240V ac wiring has been connected to any of the orange connectors on the right hand side of the motherboard.

When the wiring has been fully checked out reverse the procedures a, b and c above.

2.5 MICROPROCESSOR UNIT SWITCH-ON

After switching on, the following checks should be made:

a) i) The two power supply LED indicators (top left) should be illuminated, to show that the +5V and +24V are available at the Motherboard.

ii) Earth Faults

Car push feed (CPF) earth fault	-	CPF fuse will blow.
Landing push feed (LPF) earth fault	-	LPF fuse will blow.

All fuses on the M6809 Power Supply are 20mm fuses.

b) The position indicator LED's on the position card will show the position of the lift when it was last switched off. If not on a terminal reset with a door zone registered the lift will, after a short delay "Dive" to the bottom floor.

c) The yellow LED on the CPU card designated "Loop" should flash continuously.

d) For a short time the EVENT CODE will display "0". It maybe over-ridden by a "1" which remains displayed. A "1" indicates that the lift has a primary safety circuit failure because the LAR relay is de-energised.

e) On the I/O cards, any of the top 16 red LED's illuminated shows that an incoming signal is present (refer to Para 2.11 for signal notations). Any of the bottom 16 LED's indicate that an output relay has been energised (refer to Fig. 1.2 and section 2 paragraph 2.12).

2.6 CALL ENTRY

Push Button I/O Boards (if fitted)

Car calls and landing calls can be entered by pressing the appropriate push button on the I/O cards. If done correctly the corresponding LED on the button will light indicating that the call has been accepted.

LCD Event Logger (if fitted)

See Section 3.8.5 for further details.

Calls can also be entered using the "test probe" which is attached to a terminal on the PSU. This wire carries 100V and is protected by a small (50mA) fuse on the PSU. The probe, connected to any of the call inputs, (down the right hand edge, of the motherboard, the inner of the two rows) will simulate a real input to that terminal.

Note: This method must not be used when 24Vdc I/O boards are fitted for call inputs..

2.7 HOMING

The lift will "Home" to the main floor (or a floor specified by the customer) when Home is switched to on. See Section 3.2.1.

2.8 TIMERS

The On-board timers T1-T8 are available to set to customers requirements. requirements.details of these switches and their ranges are found in paragraph 3.2.4.

2.9 STUCK PUSH BUTTON

The MPU automatically reads the input signal when a push button is pressed, memorises it and compares it with the previous input signal.

If both signals are the same the command is ignored by the system until the stuck button is released and re-operated.

2.10 INPUT/OUTPUT TEST

To test the operation of the I/O circuits proceeded as follows:

a) Press button "ENG ENT" and button "RESET DISPLAY" on the Event Log Card simultaneously. (The first and second button down from the top edge of the Card - Red and Blue respectively).

b) Ground each of the test pins on the I/O cards in turn to simulate an input signal. The appropriate Output Relay will energise and its corresponding LED will illuminate depicting correct operation of the I/O circuit.

Note: Buttons "ENG ENT" and "RESET DISPLAY" have to be pressed every 5 seconds approximately throughout the test period.

2.11 Duplex/Triplex Operation (Without Despatcher)

The Duplex/Triplex system consists of two/three Simplex lift control panels communicating with each other via a special interconnecting cable. The landing calls are then handled between the two/three lifts.

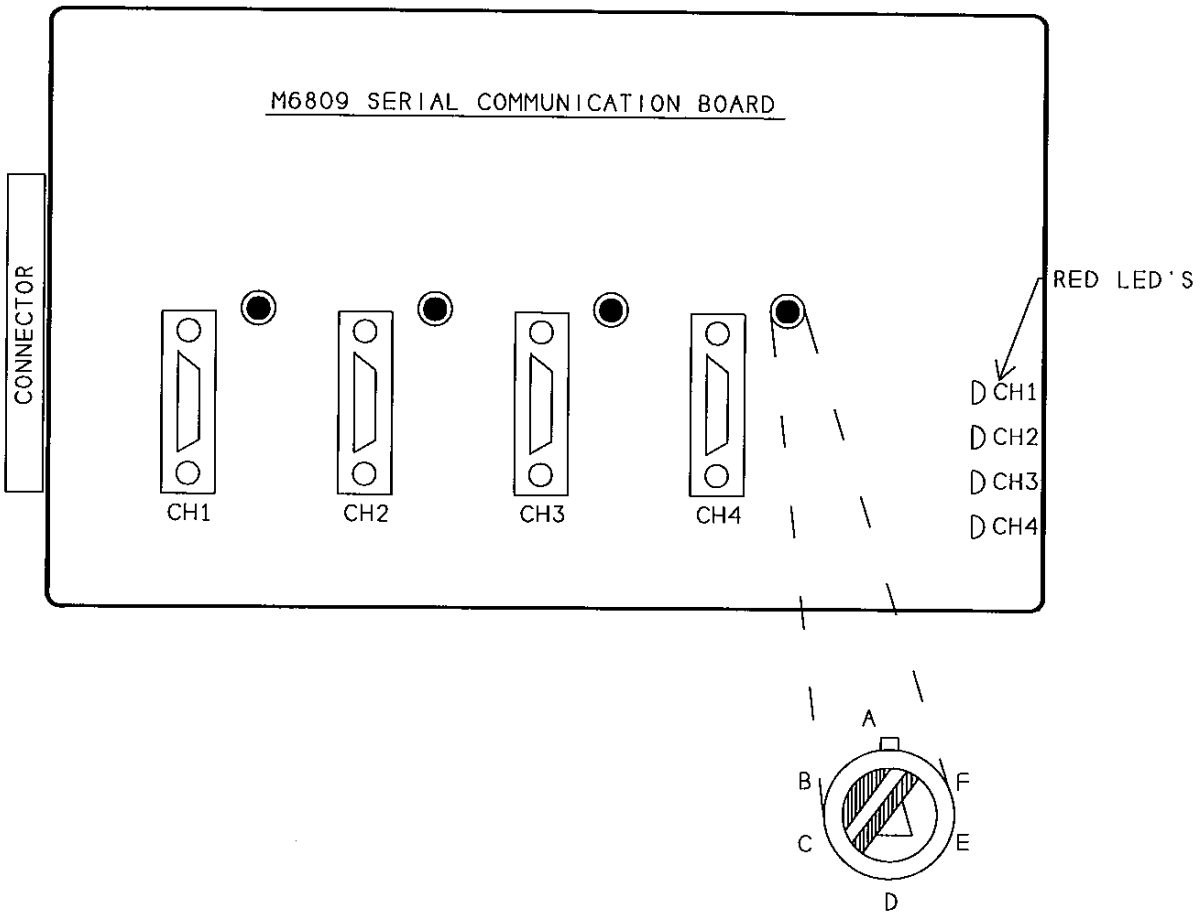
If the interconnection is unplugged, the lift will lose communication with other lifts and will assume Simplex operation.

After installation has been completed on the first lift of a Duplex/Triplex system, it can be commissioned for use ie. Simplex operation, whilst the second lifts installation is being completed. The connecting of the communications cabled and the landing calls, LPF, LAF and INR is done last to achieve Duplex and Triplex operation.

There is a common Landing Call Acceptance Feed (LAF) between lifts.

Therefore one lift can work in the Simplex mode whilst the other lift is switched off for maintenance work etc.

CAUTION: The reader should be aware that the LPF (100V), LAF (12/24V dc) and transitory signals from the landing call pushes of the lift, which is switched off, are still live because they are being sourced from the operational lift.



BAUD SWITCH

MAY BE LINKED OUT
ON LATER VERSIONS

"MSN" VERSION SOFTWARE

	CONNECTOR	BAUD SWITCH POS'N.	RATE
	CH1 TO EMU OR TVMP	'B'	(1K2)
DUPLEX-	CH2 TO CH2 ON OTHER LIFT	:E:	(9K6)
GROUP -	CH2 TO CON1 ON ADS ISOLATOR BOARD (040.000083)	'E'	(9K6)
TRIDENT-	CH2 TO CH3 ON OTHER LIFT	'E'	(9K6)
	CH4 TO SHAFT ENCODER	'B'	(1K2)

"P" VERSION SOFTWARE

DUPLEX -	CH1 TO CH1 ON OTHER LIFT	'E'	(9K6)
-	CH2 TO EMU	'B'	(1K2)

FIG 2.0 SERIAL COMMUNICATION BOARD.

Communication Cable Connection

The following procedure should be adhered to when connecting up the communications cable.

a) Run seperate from all other mains cabling, idealy in seperate trunking.

b) Switch off system.

c) Plug communications cable into the correct socket on the Serial Comms (see Fig 2) supporting the card with the other hand.

d) Ensure that the Baud rate switch on the Serial Comms Card is set the same on all lifts.

e) Ensure that the "TIM8" switch on the motherboard is set to a different value on each lift, see TIMER section.

f) Switch on system.

g) When the lifts are connected together correctly the RED LED for the relevent chanel should flicker.

h) On a duplex/triplex application ensure all main floor offset switches, see 3.2.1, are set the same in each lift processor.

2.12 MOTHERBOARD I/O DESIGNATIONS

Motherboard Inputs from main panel

12 Opto-isolated inputs rectified and smoothed.
Direct input from control circuit (110/240V ac or 110V dc)
*

Main panel monitoring inputs

1	LAR	Normal control relay
2	OC	Door open relay/contactor
3	CC	Door close relay/contactor
4	DOL	Front door open limit
5	DCL	Front door close limit
6	GL	Landing gate contact
7	G4	Car gate contact/Landing Lock contact
8	MC	Main motion contactor/Delta (Hydraulic)
9	LU	Levelling up switch
10	LD	Levelling down switch
11	DZ	Door zone switch
12	ERR	Drive failure (eg DJR, FDR) Traction - Shutdown and park with doors closed. Hydraulic - Return to bottom floor, shutdown and park with doors closed.

Motherboard Outputs to main panel

Main panel pilot relays

1	PUR	UP direction pilot
2	PDR	DOWN direction pilot
3	HSR	High speed pilot (c/o contact)
4	LDL	Low speed time limit
5	DOPR	Door open pilot
6	DCLR	Door close pilot
7	NUG	Door nudging pilot
8	ZLR/RC	Zone locking/Retiring ramp

Call inputs and outputs are referenced C1-C80 and CA1-CA80 respectively.

Note: 1 - 32 on main motherboard 33 - 80 on the extensions.

2.13 CALL DESIGNATIONS MAIN MOTHERBOARD

The call designations will vary, depending on the type of system required, as follows:

INPUTS				OUTPUTS			
TERMINAL	**FULL COLL**	**DOWN COLL/APB**	**GROUP**	**TERMINAL**	**FULL COLL**	**DOWN COLL**	**GROUP**
C1	CP1	CP1	CP1	CA1	CI1	CI1	CI1
C2	N/U	LIU/LP1	CP2	CA2	N/U	IIU	CI2
C3	LIU	CP2	CP3	CA3	I1U	CI2	CI3
C4	CP2	L2D/LP2	CP4	CA4	CI2	I2D	CI4
C5	L2D	CP3	CP5	CA5	I2D	CI3	CI5
C6	L2U	L3D/LP3	CP6	CA6	I2U	I3D	CI6
C7	CP3	CP4	CP7	CA7	CI3	CI4	CI7
C8	L3D	L4D/LP4	CP8	CA8	I3D	I4D	CI8
C9	L3U	CP5	CP9	CA9	I3U	CIS	CI9
C10	CP4	L5D/LP5	CP10	CA10	CI4	I5D	CI10
C11	L4D	CP6	CP11	CA11	I4D	CI6	CI11
C12	L4U	L6D/LP6	CP12	CA12	I4U	I6D	CI12
C13	CP5	CP7	CP13	CA13	CI5	CI7	CI13
C14	L5D	L7D/LP7	CP14	CA14	I5D	I7D	CI14
C15	L5U	CP8	CP15	CA15	I5U	CI8	CI15
C16	CP6	L8D/LP8	CP16	CA16	CI6	I8D	CI16
C17	L6D	CP9	CP17	CA17	I6D	CI9	CI17
C18	L6U	L9D/LP9	CP18	CA18	I6U	I9D	CI18
C19	CP7	CP10	CP19	CA19	CI7	CI10	CI19
C20	L7D	L10D/LP10	CP20	CA20	I7D	I10D	CI20
C21	L7U	CP11	CP21	CA21	I7U	CI11	CI21
C22	CP8	L11D/LP10	CP22	CA22	CI8	I11D	CI22
C23	L8D	CP12	CP23	CA23	I8D	CI12	CI23
C24	L8U	L12D/LP12	CP24	CA24	I8U	I12D	CI24
C25	CP9	CP13	CP25	CA25	CI9	CI13	CI25
C26	L9D	L13D/LP13	CP26	CA26	I9D	I13D	CI26
C27	L9U	CP14	CP27	CA27	I9U	CI/4	CI27
C28	CP10	L14D/LP14	CP28	CA28	CI10	I14D	CI28
C29	L10D	CP15	CP29	CA29	I10D	CI15	CI29
C30	L10U	L15D/LP15	CP30	CA30	I10U	I15D	CI30
C31	CP11	CP16	CP31	CA31	CI11	CI16	CI31
C32	L11D	L16D/LP16	CP32	CA32	I11D	I16D	CI82

2.14 CALL DESIGNATIONS (ON EXTENSION BOARD)

INPUTS				OUTPUTS			
TECHNICAL	**FULL COLL**	**DOWN COLL/APB**	**GROUP**	**TECHNICAL**	**FULL COLL**	**DOWN COLL**	**GROUP**
C33	L11U	CP17	CP33	CA33	I11U	CI17	CI33
C34	CP12	L17D	CP34	CA34	CI12	I17D	CI34
C35	LI2D	CP18	CP35	CA35	I12D	CI18	CI35
C36	L12U	L18D	CP36	CA36	I12U	I18D	CI36
C37	CP13	CP19	CP37	CA37	CI13	CI19	CI37
C38	L13D	L19D	CP38	CA38	I13D	I19D	CI38
C39	L13U	CP20	CP39	CA39	I13U	CI20	CI39
C40	CP14	L20D	CP40	CA40	CI14	I20D	CI40
C42	L14D	CP21	CP41	CA41	I14D	CI21	CI41
C42	L14U	L21D	CP42	CA42	I14U	I21D	CI42
C43	CP15	CP22	CP43	CA43	CI15	CI22	CI43
C44	L15D	L22D	CP44	CA44	I15D	I22D	CI44
C45	L15U	CP23	CP45	CA45	I15U	CI23	CI45
C46	CP16	L23D	CP46	CA46	CI16	I23D	CI46
C47	L16D	CP24	CP47	CA47	I16D	CI24	CI47
C48	L16U	L24D	CP48	CA48	I16U	I24D	CI48
LIMIT OF SMALL EXTENSION BOARD							
C49	CP17	CP25	CP49	CA49	CI17	CI25	CI49
C50	L17D	L25D	CP50	CA50	I17D	I25D	CI50
C51	L17U	CP26	CP51	CA51	I17U	CI26	CI51
C52	CP18	L26D	CP52	CA52	CI18	I26D	CI52
C53	L18D	CP27	CP53	CA53	I18D	CI27	CI53
C54	L18U	L27D	CP54	CA54	I18U	I27D	CI54
C55	CP19	CP28	CP55	CA55	CI19	CI28	CI55
C56	LI9D	L28D	CP56	CA56	I19D	I28D	CI56
C57	L19U	CP29	CP57	CA57	I19U	CI29	CI57
C58	CP20	L29D	CP58	CA58	CI20	I29D	CI58
C59	L20D	CP30	CP59	CA59	I20D	CI30	CI59
C60	L20U	L30D	CP60	CA60	I20U	I30D	CI60
C61	CP21	CP31	CP61	CA61	CI21	CI31	CI61
C62	L21D	L31D	CP62	CA62	I21D	I31D	CI62
C63	L21U	CP32	CP63	CA63	I21U	CI32	CI63
C64	CP22	L32D	CP64	CA64	CP23	I32D	CI64
			-------				------
			LIMIT				LIMIT

CONTINUED ON NEXT PAGE

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CALL DESIGNATIONS (FULL EXTENSION BOARD)

INPUTS			OUTPUTS		
TECHNICAL	**FULL COLL COLL**	**DOWN COLL/APB**	**TECHNICAL**	**FULL**	**DOWN COLL**
C65	L22D	CP33	CA65	I22D	CI33
C66	L22U	L33D	CA66	I22U	I33D
C67	CP23	CP34	CA67	CI23	CI34
C68	L23D	L34D	CA68	I23D	I34D
C69	L23U	CP35	CA69	I23U	CI35
C70	CP24	L35D	CA70	CI24	I35D
C71	L24D	CP36	CA71	I24D	CI36
C72	L24U	L36D	CA72	I24U	I36D
C73	CP25	CP37	CA73	CI25	CI37
C74	L25D	L37D	CA74	I25D	I3TD
C75	L25U	CP38	CA75	I25U	CI38
C76	CP26	L38D	CA76	CI26	I38D
C77	L26D	CP39	CA77	I26D	CI39
C78	L26U	L39D	CA78	I26U	I39D
C79	CP27	CP40	CA79	CI27	CI40
C80	L27D	L40D	CA80	I27D	I40D

ALTERNATIVE ARRANGEMENT FOR REAR DOORS

C65	RD0P	Rear Door Open Push	CA65	RHLU	Rear Hall Lantern Up
C66	RSE	Rear Safety Edge	CA66	RHLD	Rear Hall Lantern Down
C67	RBB	Rear Light Beam	CA67	RAGR	Rear Arrival Gong
C68	RCPI		CA68	RCI1	
C69	RLPD		CA69	RI1D	
C70	RL1U		CA70	RI1U	
C71	RCP2		CA71	RCI2	
C72	RL2D		CA72	RI2D	
C73	RL2U		CA73	RI2U	
C74	RCP3		CA74	RCI3	
C75	RL3D		CA75	RI3D	
C76	RL3U		CA76	RI3U	
C77	RCP4		CA77	RCI4	
C78	RL4D		CA78	RI4U	
C79	RL4U		CA79	RI4D	
C80	---		CA80	---	

2.15 KEY TO REFERENCES

N = FLOOR LEVEL (NOT FLOOR NAME)

C P N = CAR CALL PUSH
C I N = CAR CALL INDICATOR AND APB LANDING CALL INDICATORS

L N U = LANDING CALL UP PUSH
I N U = LANDING CALL UP INDICATOR

L N D = LANDING CALL DOWN PUSH
I N D = LANDING CALL DOWN INDICATOR

L P N = LANDING CALL PUSH APB/NON DIRECTIONAL
L I N = LANDING CALL INDICATOR NON DIRECTIONAL

REAR DOOR CALLS

M = NOMINATED FLOOR LEVEL (TO SUIT INSTALLATION)

R C P M = REAR CAR CALL PUSH
R C I M = REAR CAR CALL INDICATOR

R L M U = REAR LANDING CALL UP PUSH
R I M U = REAR LANDING CALL UP INDICATOR

R L M D = REAR LANDING CALL DOWN PUSH
R I M D = REAR LANDING CALL DOWN INDICATOR

Note:

i) SYS switch is ignored by the program if APB or NS collective flags are set in EPROM. See section 3.2.1.

ii) If APB or down collective control is required and the main floor is not the bottom floor, the software will set the main floor landing push as an UP call. If two landing pushes are required at the main floor (other than the bottom floor) then the controller should be set up as a full collective system.

2.16 I/O CARD DESIGNATIONS (Main Motherboard)

I/O CARD 1 INPUT (on main motherboard)
16 Opto-isolated inputs (100V dc smoothed)
*
Standard Inputs

1	UP	UP direction signal
2	DN	DOWN direction signal
3	SPX	Selector stepping switch
4	TTR	Lift on test
5	TFR	Top floor reset limit
6	BFR	Bottom floor reset limit
7	DOP	Door open push
8	SE	Safety edge
9	BB	Light beam broken
10	DCP	Door close push
11	CFS	Car push feed monitor
12	LFS	Landing push feed monitor
13	WS95	Weight switch 95% (by-pass)
14	WS110	Weight switch 110% (overload)
15	SSR	Car preference switch
16	FSR	Firefighting control switch

I/O CARD 1 OUTPUTS
16 relay outputs (n/o contact unless stated)
Indicator outputs (Ref to indicator supply)

1	SO11	Spare output 1
2	CGU	Top of car arrival gong
3	CGD	Bottom of car arrival gong
4	BZR	Buzzer
5	BPI	By-pass indicator
6	OLI	Car Overload indicator
7	DOPI	Door open push indicator
8	FCI	Firefighting control indicator

Miscellaneous outputs (Ref to Neutral)

9	TCNI	This car next indicator
10	GOWB	Gate open warning buzzer/Speed Selection**
11	SO12	Spare output 2/Regulator Inhibit Delay**
12	LSCR	RLS buffer shorting control/Pump Motor Delay (LST)/Brake Release Timer**
13	MGR	MG set control (SDT/FMT)
14	FP1	Fire control phase 1
15	CPR	Force Field (FFR)
16	*	Not terminated on M/board

** When used with VVVF Direct Interface REF: TVL201 manual.

I/O FEATURE DESIGNATIONS

I/O CARD 2 INPUTS (on extension Motherboard)
16 Opto-isolated inputs (100V dc smoothed)
Feature inputs

1	FAM	Emergency recall/fire alarm
2	FDC	Firefighting duty car
3	AFS	Main floor smoke sensor
4	SCE	Shaft count error
5	ESUP	Emergency power supply signal
6	ERET	Emergency return in sequence
7	DHP	Extended door hold push
8	UPK	Up peak clock input
9	DPK	Down peak clock input
10	ATS	Attendant control switch
11	AU	Attendant Up push
12	AD	Attendant Down push
13	BP	Attendant Bypass push
14	LRET	Lobby return switch
15	RST	Call reset push
16	APX	Advanced selector stepping switch

I/O CARD 2 OUTPUTS
16 Relay outputs (n/o contact unless stated)
Indicator outputs (Ref to indicator supply)

1	HMFI	Heavy main floor indicator
2	HDDI	Heavy down demand indicator
3	DCPI	Door close push indicator
4	EMRI	Emergency recall indicator
5	DCWB	Door close warning buzzer
6	UNDEFINED	Spare Output 1
7	UNDEFINED	Spare Output 2
8	UNDEFINED	Spare Output 3

Miscellaneous outputs (Ref. to Neutral)

9	RDUN	Emergency power sequence complete
10	LEVX	Levelling enable
11	UNDEFINED	Spare Output 4
12	UNDEFINED	Spare Output 5
13	UNDEFINED	Spare Output 6
14	UNDEFINED	Spare Output 7
15	UNDEFINED	Spare Output 8
16	UNDEFINED	Spare Output 9

POSITION I/O CARD

POSITION I/O CARD INPUTS

7 Opto-isolated inputs
Inputs for up to 64 floors potential

1	AP1	Absolute position binary 1
2	AP2	Absolute position binary 2
3	AP4	Absolute position binary 4
4	AP8	Absolute position binary 8
5	AP16	Absolute position binary 16
6	AP32	Absolute position binary 32
7	APP	Absolute position parity bit

POSITION I/O CARD OUTPUTS

13 relay outputs (n/o contact unless stated)
Outputs for up to 32 floors potential

1	PI1/B1	Position indicator 1/binary 1
2	PI2/B2	Position indicator 2/binary 2
3	PI3/B4	Position indicator 3/binary 4
4	PI4/B8	Position indicator 4/bonary 8
5	PI3/B16	Position indicator 5/binary 16
6	PI6/AGR	Position indicator 6/Arrival gong
7	PI7/HLU	Position indicator 7/Hall lantern DOWN
8	PI8/HLU	Position indicator 8/Hall lantern UP
9	PI9	Position indicator 9
10	PI10	Position indicator 10
11	LOSI	Lift out of service indicator
12	ID	Direction indicator down
13	IU	Direction indicator up

Absolute position binary coded inputs and parity. The position outputs are configurable for binary or decimal by the setting of switch 2:

i) Position 1 will output in decimal (one output per floor)
ii) Position 2 will output in binary

Note: Switch 2 must be set to binary (Position 2) for floors greater than 10 and for use with Hall Lanterns and gongs boards (which have binarydecoding).

Binary will be ouput in two forms by the program depending on the position of SW1 switch.

i) AB Position will output binary 1 for level 1.
ii) OV Position will output binary 0 for level 1.

EXTENSION MOTHERBOARD I/O DESIGNATIONS

EXTENSION MOTHERBOARD INPUTS

5 Opto-isolated inputs, rectified and smoothed.
Direct input from control circuit (110/240V ac or 100V dc)

Rear selective door inputs

1	**ROC**	Rear door open relay/contactor
2	**RCC**	Rear door close relay/contactor
3	**RDOL**	Rear door open limit
4	**RDCL**	Rear door close limit
5	**RDZ**	Rear door zone switch

EXTENSION MOTHERBOARD OUTPUTS

3 High switching capacity outputs (n/o contact)

Rear selective door outputs

1	**ROPR**	Rear door open pilot
2	**RCLR**	Rear door close pilot
3	**RNUG**	Rear door nudging pilot

SECTION 3

OPERATING PROCEDURES

3.1 OPERATION OF THE CONTROLS AND SIGNIFICANCE OF INDICATORS

Visual Indicators (Fig 1.0)

3.1.1 Power Supply Unit

Each voltage developed by the PSU has a red LED associated with it to indicate that power is available to the system. They also show that the relevant fuse is intact. The LED's are:

+10Vdc
+24Vdc
+100Vdc
+CPF
+LPF
TEST

3.1.2 Event Log Card

a) Event Code Display - This shows the EVENT CODE and displays it for approximately 5 seconds.

3.1.3 CPU Card

a) Position Display - This displays the current position of the lift.

b) Yellow LED's (2) - These show the direction of travel of the lift, the top one being "Up" and the bottom one being "Down".

c) Yellow LED (Flashing) - This is the "Loop" indicator and it indicates that the microprocessor is operating correctly.

3.1.4 I/O Card

a) Red LED's - There are 16 on each I/O Card and an illuminated LED indicates that an incoming signal is present.

b) Yellow LED's - There are 16 on each I/O Card and an illuminated LED indicates that an Output output Relay is energised.

3.1.5 Position Card

a) Red LED's - These seven LED's indicate the status of the Binary Absolute Floor Position Inputs which are used by the CPU to check the current position of the lift. NOTE: Only used on certain optional installations.

b) Yellow LED's - These 13 LED's indicate the status of the position output Relays. An illuminated LED indicates that an output relay is energised.

3.1.6 Serial Card

a) Red LED's - Two/Four LED's one for each serial port, indicate, when flashing that transmission is taking place.

b) Rotary Switches - Two/Four baud rate select switches. A chart on the serial board indicates the settings.

It is imperative that all lifts are set with the same baud rate when connected to each other for duplex or triplex operation.

3.1.7 AUDIBLE INDICATORS

3.1.7.1 Engineering Code

When the engineer enters the code, ie '11' a 'bleep' warning will accompany it.

3.1.7.2 Event Log

A 'bleep' warning is initiated when an EVENT CODE is registered.

3.1.7.3 Attendant Buzzer

A buzzer sounds discontinuously at the Attendant panel in the car if the attendant fails to respond to demand for service.

3.1.7.4 Limited Force Door Closing (Nudging)(Event Code 15)(optional)

Car mounted buzzer which sounds discontinuously if any of the following conditions occur.

a) Four door reversals have occurred.

b) Doors fail to close in 25 seconds due to being held open by the safety edge or, door open push.

3.1.7.5 Selfish User Buzzer (Event Code C)

Car mounted buzzer sounds discontinuously to encourage occupants to let the lift go.

3.2 SWITCHES

3.2.1 CPU and Configuration Switches

In order to configure the processor an 8 way DIL switch is fitted (switch 1).

Switch 1 (8 way)

Positions 1 to 5 configure the total number of floors.

Position 1	(FL1)	Binary	1 floor
Position 2	(FL2)	Binary	2 floors
Position 3	(FL4)	Binary	4 floors
Position 4	(FL8)	Binary	8 floors
Position 5	(FL16)	Binary	16 floors

Eg: Position 3 and 4 being 'ON' would select an 8+4=12 floor application.

Position 6 (SYS)	ON	=	down collective
	OFF	=	full collective

The main floor is typically factory set to level No. 1. Position 7 and 8 selects the homing floor offset.

(On duplex systems both panels must be set to the same level).

Position 7	(HO1)	Binary	1 floor offset
Position 8	(HO2)	Binary	2 floor offset

Eg: Position 7 and 8 being on would select the homing floor offset to the floor 1 + 2 + 1 = 4.

In order to set some of the other built-in functions a 4 way DIL switch is fitted (switch 2).

Switch 2 (4 way)

Position 1 invokes the homing feature

Position 1	(HOMEN)	ON	=	homing enabled
		OFF	=	homing disabled

Position 2 invokes the lift self test feature

Position 2	(LISEN)	ON	=	lift self test enabled
		OFF	=	lift self test disabled

Position 3 invokes the antinuisance feature

Position 3	(ANUEN)	ON	=	antinuisance enabled
		OFF	=	antinuisance disabled

Position 4 invokes the door nudging feature

Position 4	(NUGEN)	ON	=	door nudging enabled
		OFF	=	door nudging disabled

3.2.2 Reset Switch

This momentary action switch resets the processor.

3.2.3 Door Disable Switch

In order to invoke maintenance functions 2 toggle switches are fitted (switch 3 and 4).

SW3 (DDS)
ON = door operation disabled by processor
OFF= door operation as normal dependent on mode (test, service, fire etc)

3.2.3.1 Prepare To Test Switch

SW4 (PTT)
ON = responds to car calls only, to doors park close in absence of car calls.
OFF = calls accepted as normal dependent on mode (test, service, fire, etc)

3.2.4 Motherboard Timers

Eight user adjustable timers are available on the motherboard to allow for performing adjustments on site. Typical timers, functions and ranges are given on the following page:

TIMERS

NO	BOARD REF	DOOR TYPE	DRIVE TYPE							FUNCTION	RANGE	INCRE-MENT	REMARKS
			SSD	2SD	HYD	V3F	DCV	ACV	SCR				
1	LST	N/A N/A N/A		✓	✓	✓				Low Speed Buffer Shorting Pump Motor Delay Brake Release Timer	Ø - 4.5s Ø - 1.5s Ø - 3s	0.3s 0.1s 0.2s	Hydraulic Only When using Direct Interface (TVL201 Manual)
2	AOT	AUTO MANUAL	✓	✓	✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	Advance Door Open (0=Disable) Gate Open Warning "Off" Delay	Ø - 4.5s Ø - 1m	0.3s 4.0s	Closed Loop Only Must be > LDDT
3	SDT	N/A N/A				✓	✓			MG Set Shut Down Intermediate Speed Timer	Ø - 15m Ø- 1.5s	1m 0.1s	Ward Leonard only
4	ISR	AUTO	✓	✓	✓	✓	✓	✓	✓	Door Re-Open Delay	Ø - 1.5s	0.1s	A.C. Doors only
5	LTLR	N/A		✓	✓	✓	✓	✓	✓	Low Speed Time Limit	0 - 15s	1.0s	
6	LDDT	AUTO MANUAL	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	Landing Call Door Dwell Gate Open Warning "On" Delay	Ø - 15s Ø - 1m	1.0s 4.0s	 Must be < AOT
7	CDDT	AUTO	✓	✓	✓	✓	✓	✓	✓	Car Call Door Dwell	Ø - 15s	1.0s	
8	TIM8	N/A					✓			Sequential Start Interval	Ø - 15s	1.0s	

NOTES

1) REFER TO MAIN CONTRACT DRAWINGS FOR APPLICATION
2) ✓ = USED ON DRIVE/DOOR TYPE
3) SEE KEY TO ABBREVIATIONS
4) THE FUNCTION MAY VARY IN SPECIAL CASES

KEY

DRIVE TYPE

SSD	SINGLE SPEED/SLIP RING
2SD	TWO SPEED POLE CHANGE
HYD	HYDRAULIC
V3F	VARIABLE VOLTAGE VARIABLE FREQUENCY/VECTOR DRIVE
DCV	D.C. VARIABLE VOLTAGE (WARD LEONARD)
ACV	A.C. VARIABLE VOLTAGE
SCR	D.C. STATIC DRIVE

DOOR TYPE

AUTO	ONLY USED FOR AUTOMATIC POWER DOORS
MANUAL	ONLY USED FOR MANUALLY OPERATED DOORS

3.2.5 Motherboard Features

DJR Timer

The DJT timer has two ranges:	x1	20 - 60 seconds
	x2	40 - 120 seconds

The range is selected by jumper link.. Fine adjustment is made by potentiometer P1 : see Fig 1.0. DJR operation will cause the following sequence of events:

i) TRACTION

The contacts of DJR relay are brought out to Motherboard terminals for use in the main panel circuitry to remove power from the motion contactor and relays. The hardware DJR timer will start timing when inputs MC and LAR are present and will be reset each time the input LU is operated. This contact, in series with any drive fault condition outputs (eg FDR), will also remove the ERR input into the motherboard, thus initiating a shutdown and removal from group service. This mode requires jumper TR to be installed. See Fig 1.0.

Note: Since the DJR is reset at each floor it can be left at the factory setting (for Traction) of 25 Secs.

ii) HYDRAULIC

The contacts of the DJR relay are brought out to terminals for use in the main panel circuitry to remove power from the pump motor contactors S,D and M. The hardware DJR timer will start timing when input MC and LAR are present. This contact, in series with MOL (n/c) and PFRR (n/o), will also remove the ERR input into the motherboard, thus initiating an emergency hydraulic recall sequence. This mode requires jumper TR to be removed.

Note: The DJR Timer should be set for the appropriate site full travel time.

3.3 NORMAL CONTROL (SIMPLEX) FULL COLLECTIVE

Momentary operation of a car or landing push will register that call and it's related call acceptance indicator will be illuminated.

Car Calls: Car calls will be intercepted in the order in which the destinations are reached, regardless of the sequence in which they were registered or the current direction of the lift. Car calls are cancelled on intercept at the appropriate landing.

Landing Calls: Landing calls are cancelled on intercept at the appropriate landing if the car is available to accept that particular call. When travelling up the car will stop at a landing for which a car call or an up landing call has been registered, but will not stop at a landing at which only a down landing call has been registered unless the down call is the highest outstanding call.

Similarly, when travelling down, the car will not stop at a landing at which only an up call is registered unless this is the lowest call outstanding. If the car stops at a landing at which both up and down call are registered, only the call for the direction in which the car is committed will be accepted (and cancelled). Should a car without registered car calls arrive at a landing at which both up and down calls are registered only the landing call for the last direction of travel will be accepted and the previous direction will continue. If no car call is inserted the doors will close after a preset interval and if there is then no landing call registered beyond this floor in the last direction of travel, the doors will re-open and cancel the landing call.

If the car fails to start in response to calls within 100 seconds all calls will be cancelled.

The doors are normally arranged to park closed. when fully open, momentary operation of any car call push will cause the doors to close immediately, otherwise the doors will close automatically after a preset time interval. The safety-edge contact or the light-ray contact connect directly in the the microprocessor unit. Opening of the doors cannot be prevented by continuous operation of car-push or door-close push.

3.4 ATTENDANT CONTROL (IF FITTED)

Attendant control is established by closing a single-pole switch in the car, which allows the attendant start pushes and pilot direction indicators to become operational. The doors park open and may now only be closed by continuous operation of the attendant start pushes. All calls are registered in the normal way, but cannot of themselves either close the doors or start the car. The logic system determines a preferred direction and illuminates only the appropriate attendant pilot direction indicator, but the attendant is free to ignore this and override it by pressing the opposite direction push to close the doors and start the car. He cannot override the preferred direction once the car has started. When the attendant operates a start push the appropriate main direction indicators are illuminated. Also the car will not start in the opposite direction unless calls actually exist for that direction. The calls will only be cancelled on intercept as on automatic.

Should the attendant fail to respond to a demand for service within a pre-set time after the doors have opened, a car-mounted buzzer will begin to sound discontinuously until he starts the doors to close. If he fails to take action within 100 seconds then the outstanding calls are cancelled and the buzzer ceases operation.

At any time after the lift has started, the attendant may, by momentary operation of a by-pass push button (where fitted), cause all landing calls to be by-passed and the car to proceed to the nearest car call outstanding in the direction in which it is moving. If only landing calls were outstanding the car would travel to the furthest such call in the direction of travel.

3.5 FIRE CONTROL

Operation of a single pole Fire Control Switch installed on the main landing will immediately initiate Phase 1 Fire Control Return.

During Phase 1 Fire Control Return, the lift will return to the main floor as quickly as possible. The following operation will occur.

1) All calls will be cancelled except the main floor car call.

2) If the lift is travelling away from the main floor, the car will slow and stop at the next available landing, the doors will remain closed and following a short delay the lift will start to return to the main floor.

3) If the lift is travelling towards the main floor, the lift will continue to the main floor without interruption.

4) If the lift is at a landing with its doors open, the doors will close immediately and the lift will proceed to the main floor.

5) Throughout the Fire Service Control sequence the "Fire Control" indicator will be illuminated, landing calls will remain inoperative and the light ray (or other heat sensitive door devices) will be disabled.

6) Once at the main floor the fire fighting lift will park with its doors open and Phase 2 Fire Service operation will begin. Note: A non fire fighting lift will close its doors after a short delay to allow for the discharge of passengers and will not respond to any calls.

During Phase 2 Fire Service the following operations will exist on the fire fighting lift.

a) The doors will only open via constant pressure on the door open push, once they are fully closed. If the push is released before the doors have fully opened they will automatically close. Once the doors are fully open they will remain open until constant pressure of a call push causes them to close. If the call push is released before the doors are fully closed, the doors will re-open, all calls will be cancelled and the lift will park with its doors open until a car call push is re-operated.

b) The safety edge will be disabled.

c) Once the lift is moving, extra car calls can be inserted, but the lift will slow as the first call reached in its direction of travel and will cancel all calls upon stopping. The doors will remain closed until signalled to open by constant pressure operation of the door open push.

d) The lift will only return to normal operation if the fire control switch is in its 'Off' position, the lift is at the main floor and the doors are fully open.

e) Switching the fire control switch to 'Off' for a minimum of 5 seconds and then to 'On' again, at any time, will always cause the lift to return to the fire floor.

3.6 SERVICE CONTROL

Service or car-preference control is established by operation of a switch in the car. All outstanding calls are cancelled and landing calls cannot be registered.

On SERVICE CONTROL the system is non-collective and all outstanding car calls will be cancelled whenever the doors fully open. If more than one car call push is operated simultaneously then the car will travel to the nearest call and all calls will be cancelled when the doors open.

3.7 BY-PASS

If the car is fitted with a load sensing switch and this switch is closed when the doors are closing, then the by-pass feature operates so that the car cannot stop for intermediate landing calls and will only stop at the first car call encountered.

Acceleration or retardation cannot cause inadvertent operation of the by-pass feature.

3.8 EVENT MESSAGES

CODE	EVENT	CODE	EVENT
00	Power on reset sequence	37	Stuck down call
01	Loss of LAR	38	Stuck up call
02	Watchdog reset	39	Stuck rear car call
03	Lift stopped outside doorzone	40	Stuck rear down call
04	Door opening protection timeout	41	Stuck rear up call
05	Gate lock lost while stopped	42	Test Control
06	Gate lock lost on high speed	43	Rear SE overtime
07	Gate lock lost on slow speed	44	Rear door opening protection
08	No GL after doors closing	45	Rear door nudging
09	Door closing protection timeout	46	Not used
10	Weight switch 110% FL (Overload)	47	Not used
11	Lift engineer in attendance	48	SE comms fail
12	Calls transferred or cancelled	49	Rear door closing protection
13	Not used	50	Not used
14	Multiple start failures	51	Light duty
15	Door nudging	52	Up heavy duty
16	System RAM failures	53	Down heavy duty
17	System STACK failure	54	Up peak duty
18	Lift self test error	55	Heavy main floor
19	System EPROM failure	56	Down peak duty
20	Safety edge overtime	57	Hospital service
21	Start failure	58	MG set shut down
22	Event queue reset	59	Lobby return
23	Not used	60	VIP return
24	Not used	61	Emergency recall
25	Not used	62	Direction error from LU/LD
26	Lost car push feed	63	Not used
27	Lost landing push feed	64	Not used
28	Earthquake	65	Not used
29	Emergency supply.	66	Loss of feedback on high speed
30	Timer value fault	67	Loss of feedback on low speed
31	Gate locks bridged (Pre-flight)	68	Not used
32	Gate closing fault	69	Not used
33	LTLR timeout	70	Fire service operation
34	Stuck levellers	71	Special service operation
35	ERR lost (drive fault)	72	Dispatch failure
36	Stuck car call		

NOTE: (CODE 31) THE CONTROL PANEL MAY BE FITTED WITH "PRE-FLIGHT" LIFT SAFETY ENHANCEMENT SOFTWARE (OPTIONAL).

If the lift lies in an unsafe condition due to a short circuit in the safety circuit wiring, trailing cables, terminal connections etc, relative to the door interlock circuitry, PRE-FLIGHT WILL PREVENT LIFT MOVEMENT.

For this feature to operate effectively it is imperative that all door and lock status signals are working correctly, otherwise unnecessary "lockups" may be experienced.

CODE EVENT LOGGER CARD:

Whenever one of the above events occurs, the system will display the Event Code for approximately 3 seconds and "bleep" a warning. The code is also stored in a queue in memory together with the position of the lift when the event occurred.

If the code and the position of the lift are the same as the last entry in the queue and occurred within a four hour period, the code will not be added to the queue, but a memory location attached to this code will be incremented. We can therefore determine how may times this event occurred.

Up to 50 events can be stored in the queue. Introducing another entry will cause the oldest event in the queue to be lost. Also attached to teach event in the queue is a memory location which is incremented approximately every 24 hours, so that we can determine how many days ago the event occurred.

3.8.1 Recalling the Event Codes

Recalling the event codes does not interfere with the normal lift mode of operation and can be done at any time provided that the supply is available. While in the recall mode, new events are still recognised and entered into the queue.

The system will automatically reset itself to the normal mode of operation, in the event of no button being operated for 20 seconds while the system is in recall event operation (Using LCD Event Logger Card, recalling the event is possible while the LCD logger on MODE 1 of operation only).

3.8.2 Push Buttons on the coded Logger Board

STEP	Recalls event and changes position indicator to show at which floor event occurred.
OCC	Changes position indicator to show frequency of event.
DAYS AGO	Changes position indicator to show elapsed time in days since event occurred.
ENG ENT	Engineer entry as code.
RESET DISPLAY	Clear display and returns to normal operation. Also steps through modes when using LCD logger.

3.8.3 Push Button Functions

Pressing Button "Step" once on the Event Card, will cause the most recent Event Code to be displayed. At the same time, the local Position Indicator (on the CPU card), will display the position shown, is not necessarily the present position of the lift.

Pressing button "OCC", will cause the local position indicator to display the number of times this event occurred.

Pressing button "DAYS AGO", will cause the local position indicator to display the number of days ago that this event occurred. A "O" being displayed, indicates today.

Pressing button "STEP" once again, will cause the next, (that is the preceding), Event code to be displayed and the local position indicator will again display the lift position when that event occurred. Operation of buttons "OCC" and "DAYS AGO", (which is optional), is again as described on the following page.

Stepping through the event queue is therefore affected by pressing button "STEP". Following the oldest even, a "24" will be displayed. Pressing button "STEP" again, will recall the first most recent event.

3.8.4 Leaving The Event Recall Mode

Pressing the red button "RESET DISPLAY" will cause a hyphen "-" to be displayed and after 2 seconds, the local position indicator will then show the present position of the lift. This mode will also automatically exit itself, in the event that no button has been operated for 20 seconds.

3.8.5 Engineers Code

Upon completion of a lift inspection or repair, provided there is no event code being displayed, the Engineer can input an Engineers code by pressing button "ENG ENT" (Event Card), this creates a '11' display, on the local Position Indicator (CPU Card) and an audible warning (Code 11) will be automatically entered onto the event queue).

On his next visit the Engineer can step through the event queue by pressing button "STEP" (Event Card) until '11' is displayed. All event codes prior to this display have occurred since the previous visit.

3.8.6 LCD Event Logger Card (Optional)

Three different modes of operation are obtained when using this type of board, they are as follows;

3.8.6.1 MODE 1 - Event Display

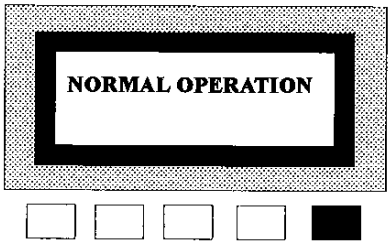
The default or standard mode in which the event code description is displayed in plain "English" phrases format. This card stored and processes the events in similar way to the normal Code Event Logger Card, however they are different on two operations.

First, the LCD event logger does not use the position indicator board to display the event details on recall mode (position of lift when the event occurred, frequency of event and elapsed time in days since event occurred), instead it displays the details in one single display when pressing the "OCC" button. Details of this operation is mentioned on the following page.

Secondly, from the event code log mentioned below, every event will have either an instant or constant operation mode. The system has been designed to display a message indicating the current system mode of operation as well as any fault events. For instance, if the lift is in normal operation, a message "NORMAL OPERATION" will constantly be displayed on the LCD logger. Changing the normal operation of the lift to Fire Serve will cause the system to display a constant "FIRE SERVICE OPERATION" message on the LCD logger. A maximum of 11 constant event modes of operation are supported. The system will log these events as usual and hold the message constantly as long as the modes condition are present.

Figure (1) represents a diagram of the LCD event logger in mode 1 operation. The description of the operation of the five buttons are as follows.

FIGURE (1): MODE 1



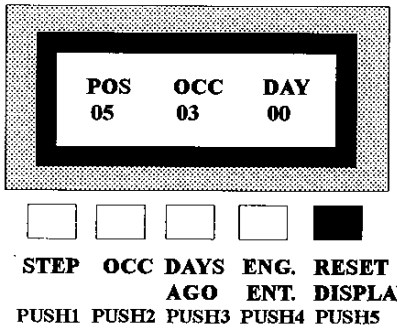
PUSH 1 - "STEP" BUTTON:

Pressing the button will cause the LCD to display the most recent event description to be displayed. Pressing the button once again will cause the next event in the queue to be displayed and so on. Stepping through the event queue is therefore effected by pressing button "STEP". Following the oldest event, a "END OF EVENT QUEUE" message will be displayed. Pressing button "STEP" again, will recall the first most recent event.

PUSH 2 - "OCC" BUTTON:

After selecting the event by pressing "STEP" button as mentioned above, pressing button "OCC" will cause the LCD to display all the recalled event details. See figure (2). (POS; position of the lift when the event occurred. OCC; frequency of the event. DAY; the elapsed time in days since event occurred).

FIGURE (2); RECALL EVENT OPERATION



PUSH 3 - "DAYS AGO" BUTTON: Not operational.

PUSH 4 - "ENG. ENT." BUTTON:

This button is used for recording purposes. The engineer can input an Engineers code by pressing "ENG. ENT." button. This will cause the LCD to display "LIFT ENGINEER IN ATTENDANCE" message for 3 seconds and "bleep" a warning. This event will be logged to the event queue as usual for future reference.

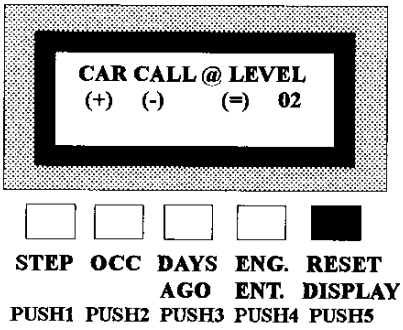
PUSH 5 - "RESET DISPLAY" BUTTON:

Pressing this button (RED BUTTON) will change the LCD mode of operation to mode 3.

3.8.6.2 MODE 2

The entered car call will be subjected to the normal car call operation (ie. lift on normal operation, blank or secure floors, car call reject operation and so on).

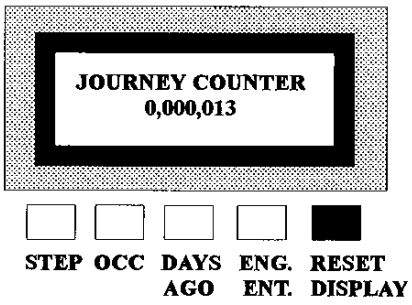
FIGURE (3); MODE 2



3.8.6.3 MODE 3 - JOURNEY COUNTER:

Every time the lift moves, an internal counter is incremented. This mode of operation will display a seven digit counter representing the number of journeys the lift has performed, see figure (4). The counter will keep its contents event on the removal of power and restore it upon return of power. No push button operation is required, except Push5 to reset the mode of operation.

FIGURE (4); MODE 3



3.8.7 Event Code Description

(N) = Code Number
[EVENT] = As displayed on LCD (if fitted)

(0) [POWER ON RESET SEQUENCE]

When the lift is switched on, the Microprocessor Unit (MPU), will begin its reset routine and store it in the event queue and then enter the lift program. The MPU can also be manually reset at any time by operation of the "Reset" Push on the CPU card.

(1) [LOSS OF LAR]

The LAR Relay (Lift Available Relay), on the motor panel provides this signal to the MPU. Whenever LAR Relay is de-energised, for example, due to the stop switch being operated, or the lift switched to maintenance control, the event will be displayed.

The event will remain displayed while this situation continues to exist. All car and hall calls will be cancelled and the "LSA" (Lift Service Available) indicator will be off. (This LSA indicator is only provided when requested).

(2) [WATCHDOG RESET]

This indicates that the MPU was unable to function properly through part of the lift program, such that it gets "stuck" and nothing else gets done. (Under normal circumstances this is unlikely to occur, but it is included for completeness).

After a short delay, the "Loop Flag Monitor" will deliberately reset the MPU. The MPU will again enter its reset routine, record the event and re-enter the lift program.

Part of the reset routine checks to see whether the call to reset was made by the "Loop Flag Monitor" circuit. If true, the MPU will also record the event.

(3) [LIFT STOPPED OUTSIDE DOOR ZONE]

Here an attempt has been made by the MPU, to pilot open the doors but the "Door Open Contactor" (OC), has not energised. After a short delay and the "Door Zone Relay" (DZ) not energising, the event will be recorded and the MPU will then seek another car or hall call elsewhere, to send the lift to.

This fault, for example, could be caused by a gate lock tip on low speed, or "Low Speed Time Limit" (LSTLR) time-out.

(4) [DOOR OPENING PROTECTION T/OUT]

This is when the door has failed to finish opening within 25 seconds. The event will be recorded, the MPU will stop piloting the "Door Open Contactor" (OC), and the "LSA" indicator will be cancelled. After a short delay the MPU will pilot the doors to close, so that the lift may move to another floor.

This fault, for example, could be caused by an obstruction in the landing door track.

(5) [GATE LOCK LOST WHILE STOPPED]

The lift is idle with the doors closed and with the gate locks made up. If a gate lock is then broken, the event will be recorded. The event will remain displayed while this situation continues to exist. This event can occur through excessive gate lock bounce, or by someone opening a landing door (not necessarily at the same floor as the lift's position).

(6) [GATE LOCK LOST ON HIGH SPEED]

Tipping a gate lock on high speed will cause the lift to stop immediately. The MPU will record the event in the log.

After a short delay, the lift will re-start provided that the gate lock has re-made. If the gate lock is still broken, the event (Gate Lock Fault), will be recorded as well.

(7) [GATE LOCK LOST ON LOW SPEED]

Tipping a gate lock on deceleration or slow speed will cause the lift to stop immediately. The MPU will record the event.. After a short delay, the lift will try to open the doors, (since it is most likely that the lift was intercepting that floor, in response to a call registered there). If the lift is in the door zone, the doors will open.

If the lift is not in the door zone, a code (3) will be generated. The lift will then Re-start provided that the gate lock is re-made and there are calls elsewhere. If the gate lock is still broken, a code (5) will also be generated.

(8) [NO GL AFTER DOORS CLOSED]

In this case, the lift is in the door zone, but unable to move in response to a call because of lock failure. The event will be recorded and the lift will re-open its doors in order to make another attempt to close and make up the gate lock.

After three unsuccessful attempts to start, the lift will then park with its doors open and a code (14) will be generated.

(9) [DOOR CLOSING PROTECTION T/OUT]

This is when the doors have failed closing within 25 seconds. The event will be recorded, the doors will reverse and park open and all calls will be cancelled. The "LSA" indicator will also be cancelled.

Prior to this situation occurring and if there are calls present, the MPU will reverse the doors if they failed to finish closing within 7 seconds, (without a code "9" generated or call loss etc). Three attempts are made to close within 10 seconds and then the doors will go for the full 25 seconds to close.

Following a door closing protection fault, the doors will park open and will only close again if a car or hall call is operated. If a door closing protection fault occurs again, the lift will then only respond to car calls.

This fault may be caused by an obstruction in the door track, or persons reluctant to move clear of the doors.

(10) [WEIGHT SWITCH 110% FL]

Where the input WS110 is active the MPU will record the event, cause the doors to re-open and refuse to close until the load is reduced. The event will remain displayed while this situation continues to exist, also the OLI output (Car Overload Indicator) will be on).

(11) [LIFT ENGINEER IN ATTENDANCE]

Pressing button "P4" on the Event Card will cause the MPU to record the event and store it in the event queue.

On the engineers next visit to the lift installation, the engineer can interrogate the MPU to find out what faults have occurred since the last visit.

(12) [CALLS TRANSFERRED OR CANCELLED]

If the lift has not moved in response to calls present for 45 seconds, hall calls to which it should have attended will be released to the other lift (if one exists), the event is recorded and the "LSA" indicator will be cancelled.

If "[DOOR NUDGING]" feature has been specified, the MPU will sound a "Selfish User Buzzer" discontinuously (if fitted), in the lift car, in order to encourage the occupant to let the lift go.

If the lift still has not moved in response to the calls present for over 100 seconds all car calls will be cancelled. The buzzer will stop and the "LSA" indicator will remain cancelled. If the lift is operating as a simplex, all hall calls will be cancelled as well.

(13) NOT USED

(14) [MULTIPLE START FAILURES]

After three successive pre-lock failures code (8), or three start failures code (21), all car calls will be cancelled, hall calls released, the "LSA" indicator cancelled, and the event recorded.

The lift doors will park open and will only close again if a car or a hall call is operated. If another code (14) is again generated, following a further three unsuccessful attempts to start, the doors will again park open, but will only respond to car calls.

(15) [DOOR NUDGING]

This feature is only available if the door operator is suitable. Provided that there are calls present, limited force door closing will come into operation if the doors are held open for over 40 seconds by safety edge or door open push, or if there have been 6 door reversals caused by the safety edge, light-ray etc.

A buzzer will sound discontinuously in the lift car, and the doors will close under limited force disregarding safety edge or light-ray operation. (The door open push is still effective in reversing and holding open the doors, but the doors will start closing immediately the door open push is released).

If the doors fail to finish closing after 15 seconds, so that the lift can move, door close protection will operate and code (9) will be generated. The doors will then reverse and park open (see code (9)).

(16) [SYSTEM RAM FAILURE]

The MPU has found fault with the integrity of its RAM. (included for completeness).

(17) [SYSTEM STACK FAILURE]

The MPU has found fault with its "Book Keeping" and has reset its "Stack Pointer". (Included for completeness).

(18) [LIFT SELF TEST ERROR]

(Lift in Service Indicator). If the lift has been idle for more than 10 minutes, it will test itself by going to an adjacent floor and returning, seeking a . . . (lift moving - lift stopped - doors opening) . . . sequence of events. If this sequence does not occur within defined time limits, the "LISI" is cancelled. Another attempt is made after a further 10 minutes of idleness for confirmation.

If all is well, no further attempts will be made. If again another failure the event is recorded, the doors will park open, and the lift will only try to respond to car calls. The lift will automatically test itself if the lift has been moving or has its doors open for an unusually long time.

Code (18) is also generated if any other condition should cause the "LISI" indicator to illuminate.

(19) [SYSTEM EPROM FAILURE]

The MPU has added up all its program instructions and data and the resultant number does not match with a "Checksum" number also fixed into the program. (Included for completeness).

(20) [SAFETY EDGE OVERTIME]

If the lift doors are held open by continuous operation of the safety edge for more than 15 seconds, the event is recorded.

(21) [START FAILURE]

The MPU has signalled for the lift to start and the lift has not done so. After a short delay, the lift doors will re-open and the event is recorded. After three unsuccessful attempts to start, the lift will then park with its doors open and event code (14) will be generated.

This fault, for example, could be caused by operation of the "Phase Failure and Reversal Relay" (PFRR), or the Motor Overload Trip.

(22) NOT USED

(23) NOT USED

(24) NOT USED

(25) NOT USED

(26) [LOST CAR PUSH FEED]

If the feed to the car pushes is lost, which could be caused by blown CPF fuse, the event is recorded. The lift will run in bus stop routine and be removed from group.

(27) [LOST LANDING PUSH FEED]

If the feed to the landing pushes is lost, which could be caused by blown LPF fuse, the event is recorded the lift will run in bus stop mode and respond only to car calls.

(28) [EARTHQUAKE] (NORTH AMERICA ONLY)

The earthquake routine has been activated.

(29) [EMERGENCY SUPPLY]

Indicates that normal power has been replaced by emergency power. In this condition the doors will park in the open position until the lift is requested to return to the main floor by the sequential return unit.

(30) [TIMER VALUE FAULT]

The MPU has found corruption of values within "RAM" and will initiate a full RESET of the system.

(31) [GATE LOCKS BRIDGED] (PRE-FLIGHT)

If a gate lock signal is present after the doors have finished opening then the gate locks are assumed to be bridged.

In this event several things occur:

i) Lift movement on normal service is inhibited.

ii) Landing, Car and homing calls are cancelled/disabled.

iii) Service control, Attendant control, and Prepare to test feature are all disabled.

iv) Emergency recall is disabled.

v) Fire service is disabled, if not already operating in phase II mode. If phase II is active then the PRE-FLIGHT check is disabled.

vi) During dormant parking on hydraulic systems the PRE-FLIGHT check is disabled.

(32) [GATE CLOSING FAULT]

During a normal closing cycle of the doors a contact of the door closing relay is fed back into the microprocessor. If, having initiated a door closing cycle (ie, operated DCLR), the feedback signal is not present within 1 second, then the doors will be reversed and will open. The lift will then only respond to car calls.

(33) [LTLR TIMEOUT]

If during the slowing cycle the lift has taken an excessive time to obtain floor level the MPU will cause the direction to be lost, thus stopping the lift, the event is recorded and

(34) [STUCK LEVELLERS]

If during running the MPU considers a proximity/relay contact in the levelling circuit to be operated at a time when it should not be operated, the event is recorded and advance door opening will be inhibited. The check is performed on each run.

(35) [ERR LOST] (DRIVE FAULT)

This signifies that a manual reset device has tripped (ie, DJR or FDR) and that power has been removed from the motor circuitry on the controllers. For traction lift applications the MP will shutdown and not accept any further calls. For hydraulic lift applications the MP will initiate a downwards dive. Once at the bottom floor the lift will park with its doors closed after allowing any passengers to alight. The DOP will remain operative in all instances providing the lift is in a door zone.

(36) [STUCK CAR CALL]

If one car push is not released within the expected time, it will be presumed stuck. The call will be ignored in future until it is released and reinserted, the fault is recorded along with the floor level that is affected.

(37) [STUCK DOWN CALL]

Similar to (36) except the call is a down landing call.

(38) [STUCK UP CALL]

Similar to (36) except the call is a up landing call.

(39) [STUCK REAR CAR CALL]

Similar to (36) except the call is a rear call call.

(40) [STUCK REAR DOWN CALL]

Similar to (36) except the call is a rear down landing call.

(41) [STUCK REAR UP CALL]

Similar to (36) except the call is a rear up landing call.

(42) [TEST CONTROL]

Indicates that the control system is in "Test control mode", ie. Car top control or Panel test. During this time no calls will be accepted and all features such as Fire or Service control are disabled.

(43) [REAR SE OVERTIME]

Similar to (20) but for the rear doors.

(44) [REAR DOOR OPENING PROTECTION]

Similar to (4) but for the rear doors.

(45) [REAR DOOR NUDGING]

Similar to (15) but for the rear doors.

(46) NOT USED

(47) NOT USED

(48) [SE COMMS FAIL]

This event is recorded if communication fails between the M6809 and the Shaft Encoder unit (if fitted).

(49) [REAR DOOR CLOSING PROTECTION]

Similar to (9) but for the rear doors.

(50) NOT USED

(51) [LIGHT DUTY]

This event is recorded after heavy duty or peak duty have finished, to indicate the system is back to normal.

(52) [UP HEAVY DUTY]

If the MPU senses a heavy demand on Up Hall Calls, the event is recorded and the system is biased to Up calls where possible.

(53) [DOWN HEAVY DUTY]

If the MPU senses a heavy demand on Down Hall calls the event is recorded and the system is biased to Down calls where possible.

(54) [UP PEAK DUTY]

While the "UPK" input is activated, the system will ignore all intermediate Down Hall calls and return the car to the main floor.

(55) [HEAVY MAIN FLOOR]

If the MPU detects a consistant demand at the main floor the system will invoke UP peak for a limited period.

(56) [DOWN PEAK DUTY]

While the "DPK" input is activated the system will ignore all intermediate Up Hall calls and return the car to the uppermost hall call.

(57) [HOSPITAL SERVICE]

Indicates that the system is in Hospital or Priority mode, the lift will cancel any existing calls or transfer hall calls if in group, the lift will then go immediately to the priority floor call and wait for car call entry. The lift will travel to the call floor, open doors then return to normal service.

(58) [MG SET SHUT DOWN]

On DCVV applications this event is recorded for reference.

(59) [LOBBY RETURN]

Indicates that the system is in LOBBY RETURN mode. This requires an external signed LRET to return the lift to the main floor. All hall calls are cancelled or transferred, all remaining car calls are answered, then the lift will return to the main floor and remain there until the LRET is released.

(60) [VIP RETURN]

Indicates that the system is in VIP return mode. This requires an external signal (defined per job), to call the lift to a predetermined floor, after which the lift will return to normal service.

(61) [EMERGENCY RECALL]

Indicates that the system is in EMERGENCY RECALL mode. This requires an external signed (defined per job), to return the lift to a predetermined floor (usually main). The lift will immediately return to the floor ignoring all calls and shut down.

(62) [DIRECTION ERROR FROM LU/LD]

If the LU/LD signals are received by the MPU in the incorrect sequence, the event is recorded and at what level. On some drive applications, ie. Open Loop VVVF, it is important to know that the lift is travelling the expected direction. The sequence in which the LU/LD signals are received can determine the actual direction of the car, ie. Travelling Up: LU, LU AND LD, LD
Travelling Down: LD, LD AND LU, LU.

The event may also be triggered if the LU/LD overlap is incorrect.

(63) NOT USED

(64) NOT USED

(65) NOT USED

(66) [LOSS OF FEEDBACK ON HIGH SPEED]

This event is recorded if the MPU losses the direction or MC feedback from the main panel while the lift is travelling on high speed.

(67) [LOSS OF FEEDBACK ON LOW SPEED]

This event is recorded if the MPU loses the direction, or MC feedback from the main panel while the lift is travelling on low speed.

(68) NOT USED

(69) NOT USED

(70) [FIRE SERVICE OPERATION]

Indicates that the system is in Fire Service mode. See section 3.5 for further information.

(71) [SPECIAL SERVICE OPERATION]

Indicates that the system is in Special Service mode. See section 3.6 for further information.

(72) [DISPATCH FAIL] (GROUP ONLY)

Indicates that the MPU has lost communication with the dispatcher, the lift will continue to respond to car calls and stop at alternating floors in the Up and Down direction to take passengers that may be waiting.

(73) [NORMAL OPERATION]

Indicates that the system is in normal operation.

"-" [END OF EVENT QUEUE]

When the last event in the logger has been recalled, the code "-" will be the next code recalled to show the end of the event queue.

SECTION 4

TECHNICAL DESCRIPTION

4.1 MOTHERBOARD (FIG 1.0)

The Motherboard contains sockets to mount the plug-in boards:

1. Event Logger
2. Processor
3. Serial Ports
4. Position
5. I.01, I/02, I/03

It also contains the Control Inputs and Outputs to the Panel, the Double journey Relay and eight system timer adjustments.

4.2 POWER SUPPLY

The Power supply Module is mounted directly on the top of the mains transformer to conserve panel space. AC voltages are connected directly from the transformer into the PSU module where they are fused, rectified, filtered and fused again. Each output of the PSU has an LED to indicate that it is operating correctly.

The Output Voltages of the PSU module are as follows:

+10vDC	Input to the 78s 05 +5v regulator on the Motherboard supplying power to the Microprocessor Logic circuits.
+24vDC	Power for the relays on the I/O Cards etc.
+100vDC	Power for the External Input signals to the I/O Cards
LPF	Landing Push 100Vdc Feed
CPF	Car Push 100Vdc Feed
TEST	A 'Quick-Connect' Terminal supplying 100Vdc to allow connection of a test probe wire to allow a Service Engineer to enter calls at the Call Terminals.

PSU Module Fuse Values (All fuses are 20 mm)

9Vac	3A	Anti-surge
19Vac	3A	Anti-surge
80Vac	1A	Anti-surge
+10Vdc	2A	Quick-blow
+24Vdc	2A	Quick-blow
+100Vdc	500Ma	Quick-blow
LPF1 & CPF	250Ma	Quick-blow
TEST	50Ma	Quick-blow

4.3 CPU CARD (CENTRAL PROCESSING UNIT)

The CPU Card contains the 6809 Microprocessor, RAM, EPROM and all support circuitry. It also contains the Two Digit Car Position Indicator, configuration switches and PTT (prepare - to - test) and DDS (door disable).

4.4 POSITION CARD

The Position Card provides Outputs to Lift Position displays. It contains a switch so that either Binary or 'Wire Per Floor' Output can be selected as required by the installation. The Position Card also contains inputs for Absolute Floor Resets (Binary) as required by certain Fire Codes.

4.5 EVENT LOG CARD

The Event Log Card contains the Event Display, the Loop-Flag Monitor, Audible Warning Device and Pushbuttons for recalling Events (See Event Codes in section 3).

Watchdog-Loop Flag Monitor

The end command of the main lift program instructs the MPU to go back to the start of the program, this loop continues servicing all the routines and signifies correct operation of the system. A Counter counts the number of loops completed and causes the LOOP FLAG indicator to flash.

If in any event the MPU stays in a particular routine, the LOOP FLAG indicator discontinues flashing and the fault is recognised by the LOOP FAILURE MONITOR which will reset the MPU, and cause it to re-enter the loop (EVENT CODE '0').

The MPU, during the reset routine, tests to see if the LOOP FAILURE MONITOR had called for a reset, if so the MPU generates an EVENT CODE '2'.

Audible Warning

A warning bleep will occur in conjunction with the EVENT CODE display, whenever an event occurs in the microprocessor system.

Pushbuttons

Five Pushbuttons, P1 to 5 (one red and four blue) are situated on the front of the Event Log card and are used for re-calling events which have occurred within the system and other special functions (Ref EVENT CODES SECTION 3, PARAGRAPH 3.8.2).

4.6 I/O CARD (INPUT/OUTPUT INTERFACE)

Each I/O card consists of 16 I/P's and 16 O/P's each having an LED indicator (Ref SECTION 3 paragraph 3.1.4). Each I/P is sourced from 100V dc and is opto-isolated. Each O/P uses a relay capable of switching 250 Volts ac at 5 amps.

Every incoming and outgoing signal, has the capability of withstanding wrong connections, a 500V Megger Test, Bell Buzzer or a short circuit.

The system monitors all I/P signal changes, if the I/P signal state does change, the system executes a 3 'loop' check ie the signal state is checked three times to verify it is a valid signal state change before it is accepted into the remainder of the system.

If during this 'loop' check, the signal state changes, the system will not accept it as a valid signal and ignores it. Such an event could occur due to relay contact bounce during relay energisation.

Output Interface

The relay "COMMON" contact are commoned in two groups of 8 O/P's. the N.O. (normally open) contacts go to O/P's OP1 - OP16. In parallel with each relay is an LED with a serial current limiting resistor, which gives a visual indication of its state, ie, illuminates when relay energised. All O/P signals can be set by the MPU by 'writing' to each interface card in turn.

SECTION 5

OVERHAUL & REPAIR

5.1 HANDLING OF EPROMS

WARNING 27C256 EPROMS MOS DEVICES WHICH REQUIRE CAREFUL HANDLING IN THE REMOVAL AND INSERTION STAGE, AS THEY CAN EASILY BE DAMAGED BY STATIC ELECTRICITY.

To change EPROM - see instructions in back of manual.

5.2 FAULT FINDING PROCEDURES

Initial Checks

1) Ensure all power supplies on MPU are operating satisfactory.

   a) 100V dc supply LED illuminated on power board.

   b) 24V dc supply LED illuminated on power board and on Motherboard.

   c) 10V dc supply LED illuminated on power board and on Motherboard.

   d) 5V dc supply LED illuminated on Motherboard.

If the power supply LED's are extinguished, check the fuses on the power supply card (situated in holders mounted on the card). If fuses persist to blow, remove all cards and reinsert one card at a time until fault is localised to a card which can then be replaced.

2) Check loop flag is pulsing on CPU card proving that the MPU program is continually scanning its programme loop.

If this condition cannot be achieved then the CPU card should be replaced. Remember when replacing the card that the EPROM contained on the original card must be moved into the test replacement card, (EPROMS must have labels with contract details covering a transparent window, label must not be removed). If satisfactory operation of the loop flag indicator is not achieved then replacement EPROMS must be tried, and closer monitoring of the power supplies must be carried out, this time with a meter.

3) Having achieved pulsing operation of the loop flag attention should be turned to the I/O cards. Individual testing of each I/O card may now be obtained by the following procedures:

   a) Operate together, and continuously the red reset and engineers entry pushes on the event card.

   b) For a period of approx. 5-10 seconds any input operated on an I/O card (by push or shorting pins at front of card) will be 'written' to operate the corresponding relay output on the same card (ie top input operates to relay).

      This action proves that the MPU program is scanning its inputs and writing to its corresponding outputs using its basic program and hardware facilities. After 5-10 seconds the engineers/reset buttons on the event card must be released and re-operated to continue further I/O card testing.

      This test checks the primary operation of the MPU structure and also a major section of the I/O card. It does not test the initial opto-isolator input stages of the I/O card, nor relay output contact wiring.

4) With all cards inserted into the motherboard the lift should be ready for initial operation.

   Switch the lift to card top test and observe the LED signals on the I/O cards. Check that the selected I/O signals are as TABLE 1 'LIFT STATIONARY ON TEST'. If LED's are not as described then check voltage to terminals at inputs to motherboard to verify that external signals are correct. If I/O card LED's do not coincide with input terminal voltages then wiring should be checked or cards replaced to isolate fault.

5) DOOR OPERATION

Door open and close operation on normal service is controlled by output signals DCPR and DCLR respectively. With doors closed DCLR, GL and DZ if in door zone, should be illuminated. Operation of SE or DOP signal on normal service should operate DOPR signal to open the doors providing DZ signal is present (lit in door zone). When doors open first GL and then DZ are extinguished. If lift is on normal service then after approx 7 seconds (adjustable by LDDT dwell timer) the doors should park closed.

FIG 3.0 SETTING UP OF SINGLE FLOOR RUN

ONLY APPLICABLE TO VVVF/VECTOR APLLICATIONS WHEN REQUIRED