



THE RIDE GUIDE:

POSTMAN PAT

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1.0 WHAT IS THE RIDE GUIDE?

THE RIDE GUIDE: POSTMAN PAT is one of a series of guides designed to help owners/operators of POSTMAN PAT coin operated children's rides get the most out of their rides. It also serves as an installation, operation, and maintenance manual. It will be periodically updated. Other RIDE GUIDES in the series currently available are;

THE RIDE GUIDE: FIREMAN SAM

THE RIDE GUIDE: ROSIE & JIM

THE RIDE GUIDES are available as a booklet, or on floppy disk, suitable for IBM PCs and compatibles. Both 5.25" (360k) and 3.5" (720k) formats are available.

THE RIDE GUIDES make reference to schematic and assembly diagrams which are not an integral part of THE RIDE GUIDE, but are available as a supplement. Diagrams are only required for low level servicing or repair purposes. The servicing information assumes the reader has a sound technical background. Servicing should be carried out by qualified personnel only. Contact OMC Electronics Ltd. if you require schematic and/or assembly diagrams.

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Thank you for your time and assistance and for supporting THE RIDE GUIDE concept.

We would appreciate copies of anything you print regarding THE POSTMAN PAT RIDE and/or THE RIDE GUIDE: POSTMAN PAT. Please send us a copy of any reviews, articles, catalogue descriptions, or other information you print or distribute.

Please be aware that old copies of THE RIDE GUIDES may be kept on disk libraries for years. If the date of last update at the top of this file is more than twelve months old please contact OMC Electronics Ltd. to ensure that you have the most current version.

2.0 INTRODUCTION

THE RIDE GUIDE: POSTMAN PAT is published to help you install, operate, maintain, and get the best out of your POSTMAN PAT coin operated children's ride, model 1021. It is completely revised and updated.

If you have a query or problem with your Postman Pat child's ride, this guide should have the answer. If, after consulting THE RIDE GUIDE, you are still having problems, phone the helpline on 01 242 232 521. When you contact us with a problem, we will need to know:

- 1) Your name, address, and post code.
- 2) Your telephone and fax number.
- 3) Clear and concise details of your problem.
- 4) The serial number of your ride.
- 5) When it was purchased.

In addition to being an operating, maintaining, and servicing manual, THE RIDE GUIDE aims to become a forum for advice, troubleshooting etc., so drop us a line.

THE RIDE GUIDE: POSTMAN PAT is split into the following main sections; Introduction, Installation, Operation, Maintenance, Troubleshooting, Technical Specification, and Servicing Information.

2.1 OVERVIEW

Postman Pat has enjoyed ten years at the top of BBC children's television ratings. Here he is now as a coin operated child's ride, or 'kiddie ride', driving his red delivery van, with Jess the cat alongside him. The child's seat is inside the van, next to Pat. It has the following features:

- Instantly recognisable by both children and adults. Enchanting and captivating for pre school children.
- Ideal for stores, arcades, shopping malls, and theme parks.
- It has an excellent earnings record, with many sites reporting sustained record takings.
- Designed and manufactured by OMC Electronics Limited, under licence from Woodland Animations Limited.
- Meets BACTA safety standards (Draft 4) and BSI safety recommendations.
- Acceptance of any combination of 10p, 20p, 50p, and one Pound coins, in any order. Reliable 'jam resistant' coin mechanism. Accepted coins are fully metered. Tamperproof meter. Large capacity discrete cashbox.
- The price of ride is adjustable from 10p to 150p, in 10p increments. Excess money (above the price of ride) buys further rides. A display on the dashboard shows how many rides have been 'bought' or are remaining.
- The duration of the ride is adjustable from six seconds to eighty three seconds in thirteen second intervals.
- Original high quality, reliable (no moving parts), digitised sounds, including the Postman Pat theme tune, Jess's meow, van horn, and van engine. Volume is adjustable up to 8 Watts of output power.
- A slow start feature prevents children being jolted on start up. The van engine is heard to start up and drive away, and then the van starts its side to side and back and forth motion.
- Safety overload protection. Excessive loads will cause the van to halt its motion, with no resulting damage to any components of the ride.
- The horn is sounded followed by the sound of the van engine every three minutes when not in use, to attract attention (this feature can be inhibited).

- Easy upgrade to the ROSie system (Ride Operating System), offering even more sophisticated features.
- More gentle on the environment, only 150W power consumption.
- Twelve months full warranty.
- Dimensions : Length 1400mm x Width 730mm x Height 1150mm
- Weight : 100Kg.
- Nominal Working Load : up to 40Kg.

2.2 SAFETY INFORMATION

Warning - This apparatus must be earthed. Dangerous voltages exist within the equipment.

This equipment is 'Class I apparatus' as defined in the International Electrotechnical Commission (IEC) Publication 65, 'Safety requirements for mains-operated electronic apparatus for household use.' Protection against electric shock does not rely on basic insulation only, but means are provided for the connection of accessible conductive parts to the protective (earthing) conductor in the fixed wiring of the installation, in such a way that accessible conductive parts cannot become live in the event of a failure of the basic insulation.

To prevent electric shock, do not remove screws, covers, or insert any metallic object into the machine. Never handle the machine with wet hands. High voltages may exist within the machine, even sometime after the power disconnected, so use extreme caution. Servicing should be carried out by qualified skilled personnel only. Do not turn on the machine until you have thoroughly read this service manual.

Please retain this information for future reference.

3.0 INSTALLATION

Installation procedures must be carried out with care, to ensure correct and safe operation. If you are in any doubt, consult qualified and competent engineering personnel.

3.1 UNPACKING

Although the packing material of the machine was designed to protect it from the roughest handling in shipping, abuse or severe drops may cause injury to the fibreglass moulding. Whilst you are unpacking the machine, inspect it for physical damage to the van, and for loose or rattling parts. Careful attention to quality control ensures that the machine left the factory in perfect condition, so if damage is evident, notify your supplier and request instructions on how to proceed.

Remove all packing from around the ride. Retain the original packaging for safe future transportation.

3.2 POWER SUPPLY SETTING

The Serial number label is located beneath the rear service door of the van, It tells you the supply voltage for which the ride is set (110/220/240). If your mains supply is different, or

becomes different in the future, get a qualified and competent engineer to change the voltage setting for you.

3.3 SITING

This child's ride is for indoor use, but may be used outdoors in dry conditions. To prevent fire or shock hazard, do not expose the ride to water, rain or other moisture. The installation site should not be subject to high humidity, direct sunlight, or dusty atmospheres. In addition to these environmental restrictions, the ride should not obstruct access to fire extinguishers, fire hydrants, hydrant indication plates, emergency exits, or be in the proximity of inflammable substances. Adequate clearance should be provided and maintained in the immediate vicinity of the ride. The ride must stand on a firm, flat surface, which is not subject to vibration.

To conform with safety regulations, the mains lead should be covered by a rubber cable protector, and be connected to a mains socket via an RCD (Residual Current Device). These devices may also be referred to as a RCCB (Residual Current Circuit Breaker), or ELCB (Earth Leakage Circuit Breaker). They are available from the manufacturers, OMC Electronics Ltd.

3.4 FITTING A MAINS PLUG

This equipment is class I, and must be fitted with a protective earth. The PVC insulated mains lead conforms to BS6500, HO5-VV-F. If the machine is supplied without a mains plug, please observe the instructions on the label attached to the free end of the mains cord. The wires of the mains lead are coloured in accordance with the following code:

Blue - Neutral Brown - Live Green/Yellow - Earth

If these colours do not correspond with the colour markings identifying the terminals in your plug, then proceed as follows:

The brown wire must be connected to the terminal that is marked with the letter L or coloured red. The blue wire must be connected to the terminal that is marked with the letter N or coloured black. The green/yellow wire must be connected to the terminal that is marked with the letter E or coloured green. Ensure that the supply voltage for which the machine is set corresponds to that of your mains supply. This apparatus must be protected by a 5 Ampere fuse in the mains plug. If in doubt, consult a qualified electrician.

4.0 OPERATION

The ride has no external mains on/off switch. However, note that removal of the rear service door of the van will automatically disconnect the mains supply to the ride. The mains lead is captive, in compliance with safety regulations.

With power applied to the ride, the two front and two rear lights will start flashing. Note that the ride takes approximately four seconds to 'power up' correctly; attempts to start the ride within the power up period will fail. Money inserted into the ride within the power up period will be accepted but credits will not be granted.

Flashing lights will operate continuously at an approximate rate of one cycle per second, with

a fifty percent duty cycle. Front left and rear right lights flash in phase, and these are out of phase with front right and rear left lights.

At 3 minute intervals, the horn sounds followed by the sound of the van engine. This 'attract mode' sound can be disabled (see below).

The ride is supplied (unless otherwise requested) with the following 'default' settings:

- Eighty three second ride duration
- Attract mode on
- 20p per ride, 10p, 20p, 50p, and one Pound coin accepted.

Coins are inserted into the coin mechanism located to the right hand side of the child's seat, thus a child or supervising adult may insert money. Inserting money does not start the ride. The display on the dashboard shows how many rides have been bought or are remaining. Up to nine rides can be bought. The display will flash to indicate the ride is ready to go.

Note that the dashboard display does not flash with rides fitted with Controller PCB issue numbers 1.0 and 2.0. This feature is operative with PCB issues 3.0 and later.

By pressing the START pushbutton on the dashboard, the ride will start, and decrement the number on the display. The van engine is heard to start up and drive away, and then the van gradually starts its side to side and back and forth motion. A slow start feature (duration of two seconds approximately) prevents abrupt movement, and allows time for an adult who has inserted money into the machine to stand clear. The Postman Pat theme music continues after the van engine, and plays repeatedly (with a twenty second cycle) until the ride is over. The pushbuttons on the dashboard cause the horn to sound and Jess to 'meow'. The pushbutton sounds cannot be produced simultaneously, but work on a first come, first served basis.

Note that credited rides are lost if the mains power supply is interrupted or turned off. The credit display will read zero when the power supply is resumed.

A list of operator adjustable controls follows. Some information in this guide is duplicated within the ride itself, so that adjustments can be made without reference to this guide. Most operator adjustable controls are by means of Dual-In-line Package (DIP) switch settings. These are small plastic packages which contain several switches within the package. The switches have a slide action, and usually require a pointed tool or screwdriver (or extremely nimble fingers!) to operate them. The plastic package indicates the ON and OFF positions of the switch.

Note that where information is presented in a tabular format for Dual In-line Package (DIP) switch settings, a 'X' may be shown. This means that the switch referred to is not involved with the feature being described. However, the switch may well be associated with some other feature and thus should not be disturbed without referring to that feature.

4.1 ADJUSTING THE VOLUME

The volume control is located on the control PCB inside the rear of the ride. A small terminal screwdriver may be required to adjust the volume.

- i) Unlock and remove the rear service door.
- ii) Lift the safety cover clear of the control assembly.
- iii). On the Control PCB, locate the trimmer potentiometer, component legend reference VR700, grid reference A6.

- iv) Use a small screwdriver to rotate the potentiometer (the potentiometer may be a finger adjustable type, in which case a screwdriver will not be required). Rotate clockwise to increase the volume, anti-clockwise to decrease the volume.
- v) Replace the safety cover and rear door.

4.2 CHANGING THE DURATION OF THE RIDE

The duration of the ride may be adjusted from six seconds to eighty three seconds in thirteen second increments. The ride duration adjustment is located on the control PCB inside the rear of the ride.

- i) Unlock and remove the rear service door.
- ii) Lift the safety cover clear of the control assembly.
- iii). On the Control PCB, locate the Dual In-line Package (DIP) of four switches, component legend reference SW300, grid reference K5.
- iv) Switches 1, 2, and 3 within the package determine the duration of the ride. Refer to the table below to determine the required parameters. The switches can be switched ON or OFF by sliding to the appropriate position. Use a screwdriver or pointed instrument to change switch settings. Ensure the switch are firmly ON or OFF as required.

SW300	SW4	SW3	SW2	SW1
83 Seconds	X	ON	ON	ON
70 Seconds	X	ON	ON	OFF
58 Seconds	X	ON	OFF	ON
45 Seconds	X	ON	OFF	OFF
32 Seconds	X	OFF	ON	ON
19 Seconds	X	OFF	ON	OFF
6 Seconds	X	OFF	OFF	ON
Zero	X	OFF	OFF	OFF

Note : 'X' means that this switch is not involved with this feature.

- v) Replace the safety cover and rear door. The ride is now set for the selected duration.

4.3 ATTRACT MODE SOUND ENABLE/DISABLE

The ride features an 'attract mode' whereby at three minute intervals and when the ride is not being used, the horn is sounded followed by the sound of the van engine, to attract attention. This feature may be enabled or disabled. The attract mode enable/disable is located on the

control PCB inside the rear of the ride.

- i) Unlock and remove the rear service door.
- ii) Lift the safety cover clear of the control assembly.
- iii). On the Control PCB, locate the Dual In-line Package (DIP) of four switches, component legend reference SW200, grid reference M3.
- iv) Switch 4 within the package enables or disables the attract mode function. Refer to the table below to determine the required parameters.

SW200	SW4	SW3	SW2	SW1
Enabled	ON	X	X	X
Disabled	OFF	X	X	X

Note : 'X' means that this switch is not involved with this feature.

- v) Replace the safety cover and rear door. The ride is now set for the selected duration.

IMPORTANT. Do not disturb any other switch settings on SW200. If you do, refer to 'Incorrect switch settings'.

4.4 CHANGING THE PRICING STRUCTURE

One of two coin mechanism types can be fitted, a Coin Controls Series 10 uni-coin mechanism (S10), or a Coin Controls Sentinel multi-coin mechanism. In both instances, this will be located to the right hand side of the child's seat, thus a child or supervising adult may insert money into the mechanism.

Nearly all rides have a multi-coin mechanism fitted. In this instance, the ride has an extremely flexible pricing structure. Four denominations of coins can be accepted. Price per ride, additional rides for highest and second highest value coin, standard or non standard coin set, and coin enable/inhibit is determined by the Credit Control Unit (CCU) fitted behind the meter door (this door is on the 'offside' of the van, and requires a service key to unlock it). The CCU is programmable by DIP switches.

The DIP package SW200 on the Control PCB **MUST** have its switch settings as shown below when a multi-coin mechanism is fitted. Incorrect settings will result in incorrect operation. See incorrect switch settings.

SW200	SW4	SW3	SW2	SW1
Multi-Coin	X	OFF	ON	ON

Note : 'X' means that this switch is not involved with this feature.

4.4.1 PRICE PER RIDE

CCU Switches SW2 to SW5 determine the basic price of ride. Refer to the table below:

SW5	SW4	SW3	SW2	SW1	Units/Ride
OFF	OFF	OFF	OFF	X	150
OFF	OFF	OFF	ON	X	140
OFF	OFF	ON	OFF	X	130
OFF	OFF	ON	ON	X	120
OFF	ON	OFF	OFF	X	110
OFF	ON	OFF	ON	X	100
OFF	ON	ON	OFF	X	90
OFF	ON	ON	ON	X	80
ON	OFF	OFF	OFF	X	70
ON	OFF	OFF	ON	X	60
ON	OFF	ON	OFF	X	50
ON	OFF	ON	ON	X	40
ON	ON	OFF	OFF	X	30
ON	ON	OFF	ON	X	20
ON	ON	ON	OFF	X	10
ON	ON	ON	ON	X	5

4.4.2 ADDITIONAL RIDES FOR HIGH VALUE COINS

To encourage greater income, higher denomination coins (or multiple lower denomination coins) can be made to credit bonus rides. So for example, a price structure of one ride for 30p, two rides for 50p, and five rides for one Pound can be created. This would be achieved with price per ride at 30, two additional rides for the one Pound coin, and one additional ride for a 50p coin.

CCU switches SW6 to SW10 determine bonus ride settings. Refer to the tables below for bonus ride settings:

Additional Rides for one Pound coin (Coin 1)

SW8	SW7	SW6	Function
OFF	OFF	OFF	7 Additional rides
OFF	OFF	ON	6 Additional rides
OFF	ON	OFF	5 Additional rides
OFF	ON	ON	4 Additional rides
ON	OFF	OFF	3 Additional rides
ON	OFF	ON	2 Additional rides
ON	ON	OFF	1 Additional ride
ON	ON	ON	0 Additional rides

Additional Rides for 50p coin (Coin 2)

SW10	SW9	Function
OFF	OFF	3 Additional rides
OFF	ON	2 Additional rides
ON	OFF	1 Additional ride
ON	ON	0 Additional rides

4.4.3 TOTALISING SWITCH

This switch (CCU SW11) is normally ON. This ensures that bonus rides can be gained not only with the higher denomination coins, but also with their equivalent value in smaller denominations. That is, five 20p coins would have the same effect as a single one Pound coin.

SW11	Function
------	----------

OFF	Non Totalise mode
ON	Totalise mode

4.4.4 CURRENCY SELECT

This switch (CCU SW12) is normally OFF for standard coin sets.

SW12	Function
OFF	Standard Coin Set (100, 50, 20, 10)
ON	Non Standard Coin Set (100, 25, 10, 5)

4.4.5 INHIBIT SWITCHES

The default settings for these switches (CCU SW13 to SW18) is ON. Leave all the inhibit switches ON unless you wish to prevent a certain coin from being accepted. For example, if you do not wish the ride to accept one Pound coins, SW13 should be turned OFF.

SW13	Coin 1: One Pound
SW14	Coin 2: 50p
SW15	Coin 3: 20p
SW16	Coin 4: 10p
SW17	Coins 5 and 6
SW18	Coins 7 and 8

Switch On = Coin Enabled; Switch Off = Coin Inhibited

Appendix A is a summary of the CCU programming information.

4.4.6 PRICING STRUCTURE FOR UNI-COIN MECHANISMS

It is unlikely that your ride is fitted with a uni-coin (Coin Controls S10) mechanism. They are easily identified however; the control panel does not have a START pushbutton. For those

that do have a uni-coin mechanism, only one denomination of coin will be accepted. Acceptance of the appropriate coin(s) will activate the ride. Price of ride can be controlled by the number of coins required to activate the ride. The setting of internal DIP switches on the control PCB will determine how many coins will be required to activate the ride.

Follow the procedure below:

- i) Unlock and remove the rear service door.
- ii) Lift the safety cover clear of the control assembly.
- iii). On the Control PCB, locate the Dual In-line Package (DIP) of four switches, component legend reference SW200, grid reference M3.
- iv) Switches 2 and 3 within the package determine the price of play. Note that switch 1 must be in the OFF position for uni-coin mechanisms. Refer to the table below to determine the required parameters.

	SW4	SW3	SW2	SW1
Three Coin	X	ON	ON	OFF
Two Coin	X	ON	OFF	OFF
One Coin	X	OFF	ON	OFF
Continuous	X	OFF	OFF	OFF

IMPORTANT NOTE : This table applies only to rides fitted with uni-coin mechanisms (Coin Controls S10).

Note : 'X' means that this switch is not involved with this feature.

4.4.7 FREE PLAY

The ride features a 'free play' mode whereby simply pressing the START button will start the ride. This feature is introduced by adjustment of DIP switch settings, located on the control PCB inside the rear of the ride.

- i) Unlock and remove the rear service door.
- ii) Lift the safety cover clear of the control assembly.
- iii). On the Control PCB, locate the Dual In-line Package (DIP) of four switches, component legend reference SW200, grid reference M3.
- iv) Set switches SW1, SW2, and SW3 within the package as shown below.

	SW4	SW3	SW2	SW1
Free Play	X	OFF	ON	OFF

Note : 'X' means that this switch is not involved with this feature.

v) Replace the safety cover and rear door. The ride is now set for free play.

4.5 SOAK TEST

The ride can be forced into a continuous motion mode for test purposes. In this mode, the ride motion operates continually. However, the following other effects take place:

- i) The flashing lights freeze in a fixed state.
- ii) All sounds will not operate (including pushbuttons).

To enter soak test mode, follow the procedure below:

- i) Unlock and remove the rear service door.
- ii) Lift the safety cover clear of the control assembly.
- iii). On the Control PCB, locate the Dual In-line Package (DIP) of four switches, component legend reference SW200, grid reference M3.
- iv) Set switches SW1, SW2, SW3, and SW4 within the package as shown below.

	SW4	SW3	SW2	SW1
Soak Test	OFF	OFF	OFF	OFF

v) Replace the safety cover and rear door. The ride is now set for soak test.

4.6 SAMPLE PRICING STRUCTURES

Shown below are some sample pricing structures and the switch settings required to achieve them.

30p per ride, two rides 50p, five rides one Pound

SW5	SW4	SW3	SW2	SW1	Units/Ride
ON	ON	OFF	OFF	X	30

SW8	SW7	SW6	Function
ON	OFF	ON	2 Additional rides for one pound coin.

SW10	SW9	Function
ON	OFF	1 Additional ride for 50p

ON	ON	ON	ON	ON	ON	ON	OFF	ON	ON
----	----	----	----	----	----	----	-----	----	----

CCU Switch Bank 2.

SW18	SW17	SW16	SW15	SW14	SW13	SW12	SW11
ON	ON	ON	ON	ON	ON	OFF	ON

4.8 CASHBOX REMOVAL/REFITTING

The cashbox is located in the base of the ride, on the 'offside' beneath the meter door. Two keys are required to unlock it. Unlock both locks and withdraw the cashbox from the ride. Replacement is a reversal of this procedure.

The cashbox capacity is approximately 600 Pounds (if largely in 20p coins), but varies depending on the denomination of coinage accepted. Withdrawal of the cashbox can be difficult if coins are allowed to build up above the level of the top of the cashbox. By noting meter readings, the status of the cashbox can be assessed.

Note that early models had a smaller cashbox accessed by opening the meter door, and unlocking a hasp over the cashbox.

4.9 METERING

A six digit, non resetable, electromechanical meter counts the money being taken by the ride. It is located behind the meter door. Any attempt to disconnect the meter will result in all coins being rejected by the ride. Note that the meter counts in 10p units. Therefore;

- An accepted 10p coin will increment the count by one.
- An accepted 20p coin will increment the count by two.
- An accepted 50p coin will increment the count by five.
- An accepted one Pound coin will increment the count by ten.

Thus the meter counts the total ride income.

The meter does not increment in the following instances:

- i) When the ride is in free play mode;
- ii) When the service switch is pressed;

4.10 SERVICE SWITCH

For test purposes, a service switch is located on the control PCB, grid ref. J6. A single press will activate the ride. Note that the rear service door must be removed to press the service switch, and in removing the back door, power will be disconnected.

To maintain power to the ride with the rear door removed, pull the safety switch on the right hand side of the rear door frame. CAUTION! Take extreme care when working with live

circuitry. This procedure is not recommended for inexperienced or unqualified personnel.

4.11 ADDITIONAL SAFETY FEATURE

The ride features electronic safety motor overload circuitry, whereby excessive loads or severely restricted motion (including halted motion) will result in the current supply to the motor to be limited, and thus its torque also will be limited. Hence, no damage to the ride will occur in such circumstances, and the risk of accident is reduced. The motor, nor any other components, will not suffer damage in the halted state.

5.0 MAINTENANCE

The ride requires a regular maintenance and safety schedule to be performed to keep it in good working order, and increase the life of the ride. The following checks should be carried out at the intervals specified. These checks should take only a few minutes of your time.

5.1 DAILY MAINTENANCE

The following safety checks should be carried out by the site manager.

- i) Check that the mains plug is undamaged and securely attached to the cable by the cord grip.
- ii) Check that the mains cable is undamaged.
- iii) Check that there are no broken or damaged parts of the ride that may cause injury.
- iv) Check that all guards (if any) are in place thus preventing any access to the mechanism.
- v) Apply pressure to the ride to check that it is firmly secured to the base stem and check that all advisory literature is in place.
- vi) Ensure the area around the ride is free from obstruction and that persons passing by are not in any danger.
- vii) The ride should be free from any customised additions unless approved by the manufacturer.

5.2 WEEKLY MAINTENANCE

The daily maintenance above and in addition:

- i) Wipe the machine with a dry cloth to keep free of dust. Turn the machine off prior to cleaning. If further cleaning is needed, use a chamois leather slightly moistened with water. Do not use cleaning agents containing alcohol, spirits, ammonia, or abrasives.

5.3 THREE MONTHLY MAINTENANCE

The weekly maintenance above and in addition:

- i) Check that all of the plug-in connectors are firmly in place. If any connectors are found unplugged, reconnect them, observing any polarising keys which ensure correct orientation.
- ii) Check all sub assemblies (such as the controller PCB) are securely mounted.

6.0 TROUBLESHOOTING GUIDE

The troubleshooting guide below takes the user through an ordered set of procedures and a series of checks following each procedure. If the fault you experience is not covered, or the solution indicated does not cure your problem, the ride may have malfunctioned. Contact OMC Electronics on 0684 298004 as described in section 2.0. Start with procedure 1 and work logically through to procedure 4, moving onto the sections that follow as instructed in the procedures.

6.1 PROCEDURE 1

Power up the ride, wait a few seconds, and make the following checks:

CHECK - Is the coin entry slot illuminated? If the ambient light level is very bright, you may need to shade the light with your hand to establish if the illumination is on. If NOT illuminated, go to NO POWER.

CHECK - The four indicator lights on the body of the vehicle (two front and two rear) should be flashing. If they are all off, go to NO POWER.

CHECK - Are two indicator lights on the body of the vehicle permanently on whilst the other two are permanently off? If YES, go to SOAK TEST MODE.

CHECK - Are all four indicator lights flashing? If NOT, go to BULB FAIL.

CHECK - Does the ride motion start automatically and continue following a four second delay after power up? If YES, go to SOAK TEST MODE.

CHECK - Does the ride start when the START pushbutton is pressed, even though no credits are shown on the dashboard display? If YES, go to FREEPLAY MODE.

CHECK - Does the credit display on the dashboard show '0'? If NOT, go to DIL SWITCH.

6.2 PROCEDURE 2

Insert money into the ride equivalent to one ride (one credit). Perform the following checks:

CHECK - Is the money accepted? If not, go to REJECT MONEY. If the money is neither rejected or accepted, the coin mechanism is jammed. Go to JAMMED COIN MECH.

CHECK - Is the credit display indicating one ride is available? If not, goto WRONG CREDIT.

CHECK - Observe the meter to see if it increments correctly. If NOT, see WRONG METER.

6.3 PROCEDURE 3

Insert more coins to see if appropriate number of credits appear. Check the following:

CHECK - Is credit display still correct? If not, goto CCU SWITCHES.

6.4 PROCEDURE 4

Press the START pushbutton. Make the following checks:

CHECK - Does the ride motion start? If not, goto MOTOR.

CHECK - Is the theme tune correctly played? If not, goto SOUNDS.

CHECK - Do Pushbuttons work? If not goto PUSHBUTTONS.

CHECK - Is the ride motion excessively noisy, and/or erratic? If so, goto BASE.

CHECK - Is the duration of the ride as expected? If not, go to DIL SWITCH.

6.5 NO POWER

1) Does the mains supply voltage match that of the ride? Check the serial number label on the back of the ride for the correct mains operating voltage. Serious damage may have occurred if the mains voltage applied has exceeded the rated mains voltage.

2) Is power reaching the ride? Check with another appliance that the mains outlet is OK. If power is reaching the ride, may just be that one or more bulbs may have blown, see BULB FAIL.

3) If the ride is plugged into the mains via a RCD device, this may have tripped. Check it.

4) Is the internal on/off switch turned on? (applies only to rides manufactured before February 1993). Remove the rear door and the safety cover. Locate the mains IEC socket and mains switch. It is marked 0 and 1. Press 1 to switch on.

5) Has a fuse blown? Check the following four fuses:

i) The fuse in the mains plug.

ii) The mains T2A fuse in the internal IEC switch/fuse/socket (if fitted, January 1993 and earlier)

iii) The mains T2A fuse on the Controller PCB (if fitted, February 1993 onwards)

iv) Secondary T5A fuses FH100 and FH101 on the controller PCB.

6) Note the function of the power safety switch on the rear door jamb. With the door in place, the switch is pressed in and 'made'. When the door is removed, the switch is open and power is turned off. This can be overridden by pulling out the power safety switch. CAUTION! Take extreme care when working with live circuitry. This procedure is not recommended for inexperienced or unqualified personnel.

6.6 SOAK TEST MODE

The Controller PCB DIL switch settings are in soak test mode, and therefore incorrect. See section 4.7.

6.7 BULB FAIL

One or more bulbs have blown. Replace with correct bulb type and try again.

6.8 FREEPLAY MODE

The DIP switch settings on the Controller PCB are incorrect. See section 4.7.

6.9 DIL SWITCH

The DIP switch settings on the Controller PCB are incorrect. See section 4.7.

6.10 REJECT MONEY

Money can be rejected for several reasons. Suspect the following in the order given:

- 1) The meter has been disconnected. All coins are rejected if the meter is not in circuit (there is a 12v link on the connector to the meter so that disconnecting the meter results in refusal to accept coins).
- 2) The CCU switch settings are disabling coin acceptance. If only certain coin denominations are being rejected, it may be that only those coins are disabled.
- 3) There is no power to the coin mechanism. Press the test switch on the CCU, which should increment the credit display on the dashboard. If there is no power to the CCU or it is faulty the display does not increment.
- 4) The coin mechanism has malfunctioned.
- 5) The Mains Voltage has fallen to less than 20% of its nominal value. The supply to the coin mech is not regulated, and has been known to drop below tolerable levels in some areas. For 240V machines, changed tap on transformer to 220V. For 220V machines, refer to OMC for alternative transformer.

6.11 JAMMED COIN MECH

Disconnect and remove the coin mechanism from the ride. Lift the coin path cover on the side of the mechanism to release any blockage. Replace and reconnect the mechanism.

6.12 WRONG CREDIT

The wrong credits can be issued for a variety of reasons. Suspect the following in the order given:

- 1) Switch off, wait a few seconds, switch on again, wait a few seconds, try coins again.
- 2) Switch settings are incorrect (on CCU and/or Controller PCB).
- 3) The coin mechanism has malfunctioned.
- 4) The CCU has malfunctioned. Press the test switch on the CCU, which should increment the credit display on the dashboard. If it is faulty the display will not increment.
- 5) The Controller PCB has malfunctioned.
- 6) The credit display has malfunctioned.
- 7) The Mains Voltage has fallen to less than 20% of its nominal value. The supply to the coin mech is not regulated, and has been known to drop below tolerable levels in some areas. For 240V machines, changed tap on transformer to 220V. For 220V machines, refer to OMC for alternative transformer.

6.13 CCU SWITCHES

The CCU switches are incorrectly set up. See section 4.7.

6.14 MOTOR

Can the motor be heard running but there is no movement of the ride? If so, see MECHANICAL DRIVE.

If the motor cannot be heard running, this can be for one of two reasons; the Control electronics is not driving the motor, or alternatively, the motor is stalled because it cannot overcome the load presented to it. The reason can only be established by removing the upper assembly and removing the motor/gearbox assembly. If the rocking assembly can be moved freely, the problem is electrical.

- 1) If the rocker assembly cannot be moved by hand, this can be caused by incorrect assembly of the shaft/boss/bearing. See section 8.0.
- 2) If the motor is suspected, disconnect the 3 way connector and measure the DC resistance of the motor which should measure 30 to 50 ohms (Parvalux) or 16 to 22 ohms (Baldor). The motor is very reliable. Check that the motor/R312/R313 combination is correct (See section 9.4).
- 3) Motor speed control pot VR300 is turned down too low. See section 9.1.
- 4) If it is shown to be failure of the drive electronics; it is usually one of four components: U302 (TDA2086), Q302 (TIC225), R307 (15K 6W), or D900. Suspect R307 on rides up to June 1992.

6.15 MECHANICAL DRIVE

The motor can be heard running but no movement. The transmission system has failed. Refer to OMC Electronics for details on how to proceed.

6.16 SOUNDS

- 1) The volume control is turned down. See section 4.1.
- 2) The theme tune pitch control is not correctly adjusted. See section 9.1.
- 3) The loudspeaker or Control PCB have malfunctioned.

6.17 PUSHBUTTONS

- 1) The volume control is turned down. See section 4.1.
- 2) The pushbutton pitch control is not correctly adjusted. See section 9.1.
- 3) The loudspeaker or Control PCB have malfunctioned.

6.18 BASE

If the ride motion is excessively noisy, and/or erratic, this may mean the upper assembly is not correctly aligned with the base. Reposition the ride on the base (loosen the four mounting bolts) such that there are no tight spots (skirt to base). Spraying a silicone oil such as RS 691-892 between the skirt and base can help considerably, but may need to be re-applied periodically.

The other potential source of noise is the friction pad assembly (only fitted to rides with Baldor motors, serial numbers KR101 to KR152 plus a few more after, 56 in total).

The friction pad assembly starts to squeak in some instances. Easing the spring tension can cure this (or removal all together), but an increase in motor noise may result.

Erratic movement can be caused by the grub screws in the motor/drive shaft coupling coming loose. Ensure the grub screws are securely tightened. Alternatively, the skirt is catching against the base. Reposition van as in section 6.18 above.

6.19 WRONG METER

Incorrect meter readings usually indicate that not all coins are finding their way into the cashbox. If the cashbox overflows, coins may find their way into the base of the ride. Ensure that the cashbox is emptied frequently enough to prevent this from happening.

7.0 TECHNICAL SPECIFICATION

The physical, environmental, and electrical specifications are detailed below.

7.1 PHYSICAL SPECIFICATION

Model : OMC 1021 Postman Pat Child's Ride

Dimensions : Length 1400mm

Width 730mm

Height 1150mm

Net Weight : 100Kg

Shipping Weight : 130Kg

Nominal Working Load : 40Kg. Greater loads may be tolerated but the safety overload trip will prevent any damage to components.

7.2 ENVIRONMENTAL STORAGE AND OPERATING CONDITIONS

Storage and shipment ambient temperature : -20 to +60 degrees Centigrade.

Storage and shipment relative humidity : Less than 95%, non condensing.

Operating ambient temperature : +15 to +35 degrees Centigrade.

Operating relative humidity : 25% to 75%, non condensing.

Operating air pressure : 86kPa to 106 kPa (860 mbar to 1060 mbar)

7.3 ELECTRICAL AND OPERATING SPECIFICATIONS

Price of Play : Adjustable, by DIP switches.

Duration of Ride : Adjustable, by DIP switches, in 13 second increments.

Motor type: 180V, 108W (Continuous), 180W (30 Min) DC motor with integral gearbox, final shaft thirty rpm.

Meter type: 12V, 6 digit, non resettable.

Lamps: 12V, up to 5W each.

Sound: Digitally stored, up to 8 Watts output.

Power Consumption : 180 Watts Maximum.

Line Voltage Requirements : Supply voltage may be preset to 220 or 240Vac. The machine is protected by a 2 Ampere anti-surge fuse. For continued protection, replace the power fuse only with the same type and rating as that supplied. The serial number label attached to the machine, tells you the supply voltage for which it is set.

8.0 SERVICING INFORMATION - MECHANICAL

This Section describes the procedure to follow in the event of a mechanical breakdown.

8.1 MECHANICAL DISASSEMBLY/ASSEMBLY

The ride comprises two basic mechanical assemblies, the Upper Assembly, which may be referred to as the vehicle, the body, or the van, which is the moving section of the ride, and

the Base Assembly. The Base Assembly contains the motor, gearbox and drive mechanics (rocking assembly). The design of this is such that no routine maintenance is required and access should only be necessary in the event of a mechanical breakdown.

Access to the Base Assembly is achieved by removing four M6 cap head bolts, two located in the footwell of the passenger compartment and two in the rear of the van. In early models, the control unit assembly in the rear of the van must be removed to gain access to the two rear M6 cap head bolts. To remove the Control Unit Assembly the following procedure must be adhered to:

- i) Disconnect from the mains. Unlock and remove the rear service door.
- ii) Lift the safety cover clear of the control unit assembly.
- iii) Disconnect the rear lights, a three way in-line plug and socket located to the left hand side of the Control PCB.
- iv) Remove the eighteen way connector P3 in the top left hand corner of the Control PCB.
- v) Remove the fourteen way DIL ribbon cable taking great care not to damage any of the pins.
- vi) Remove the six way connector P5 in the top centre of the Control PCB.
- vii) Disconnect the motor connector, a three way in-line connector located to the top right hand side of the Control Unit Assembly.
- viii) Remove the IEC mains input connector.
- ix) Remove the Earth connector attached to the top of the motor armature choke.
- x) Disconnect the door safety switch connector which is a four way in-line connector situated on the right hand side of the door aperture.
- xi) Remove the retaining screws, two situated at the rear of the Control Unit Assembly and one at the front.
- xii) Lift the Control Unit Assembly clear of the van.

Once the Control Unit Assembly has been removed and the four retaining bolts undone the Upper Assembly can be lifted clear of the Base Assembly. Assembly is the reverse of the above procedure. Take care to ensure that the rubber/textile safety seal is not caught up in the Base Assembly housing when placing the Van back on the Base Assembly.

8.2 ROCKING MECHANISM DISASSEMBLY/ASSEMBLY

The movement of the rocking mechanism is controlled by a dc motor. The movement traced is a rocking motion in two axis', providing back and forth and sideways motion. The slow start duration is approximately two seconds. The motor gearbox combination is a Parvalux PM2 M1W, or Baldor GPP12547 (with custom winding). The motor is protected by a current limit circuit that prevents any damage occurring if the ride is stalled for any reason. The motor output shaft is directly coupled to the main drive shaft which itself is connected to the eccentric drive. When rotated the eccentric rocks the load bearing shaft producing the required motion. The load is largely taken by the central bearing. Every endeavour has been made to ensure that the unit is strong enough to withstand a large overload without any damage occurring.

The component parts of the rocking mechanism are listed in Appendix D. The assembly drawing referred to is appended to this guide. Prior to any work on the rocking mechanism, the van must be removed from the base assembly as described above. Reference should be made to the assembly drawing and parts list in Appendix D when dismantling or replacing any part. This section describes how to remove and replace the following: the motor and gearbox assembly; the drive coupling; the vee bracket assembly; the eccentric drive shaft assembly; the link arm assembly. All other faults should be referred to the manufacturer.

8.2.1 MOTOR AND GEARBOX REPLACEMENT

The motor and gearbox are a combined assembly and should be replaced as a complete package if any malfunction occurs. The following procedure must be adhered to.

- i) Remove the four button head M6 bolts, part 26, on the underside of the base frame that locate through the frame into the gearbox casing.
- ii) Remove the motor and gear box assembly, part 4.
- iii) Remove the M6 locking grub screw, part 16, and slacken the M6 retaining grub screw, part 15, in the half coupling, part 12, on the gearbox output shaft. Remove the half coupling complete with key way, part 14.
- iv) The fitting of a motor and gearbox unit into the base frame is a reversal of the above procedure.

8.2.2 DRIVE COUPLING REPLACEMENT

- i) Remove motor and gearbox following the procedure above.
- ii) Remove the M6 locking grub screw, part 16, and slacken the M6 retaining grub screw, part 15, in the half coupling, part 12, on the eccentric drive shaft, part 3. Remove the half coupling complete with key way, part 14.
- iii) The fitting of a drive coupling is a reversal of the above procedure. Note that the coupling spider, part 13, must be fitted with the inner recess facing the gearbox output shaft.

8.2.3 VEE BRACKET ASSEMBLY REPLACEMENT

The Vee Bracket Assembly, part 1, should be replaced by a complete assembly in the case of any bearing failure and the following procedure must be adhered to.

- i) Remove the two cap head M6 bolts, part 20 (see detail F), that locate the vee bracket to the tilt frame. Ensure that all nuts and washers are retained.
- ii) Remove the M12 nut, part 24, the bearing cover, part 25 and the M12 spring washer, part 5, from the end of eccentric drive shaft, part 3 (see detail A).
- iii) The fitting of a Vee Bracket Assembly to the drive shaft and tilt frame is a reversal of the above procedure. Note the fitting of the plain and spring washers, parts 19 and 23, is critical and they must be assembled as shown in detail F.

8.2.4 ECCENTRIC DRIVE SHAFT ASSEMBLY REPLACEMENT

The Eccentric Drive Shaft, part 3, should be replaced as a complete assembly including bearings and spacers in the case of any bearing failure or damage to the drive shaft and the following procedure must be adhered to.

- i) Remove the vee bracket assembly, part 1, following the procedure above.
- ii) Remove the M6 locking grub screw, part 16, and slacken the M6 retaining grub screw, part 15, in the half coupling, part 12, on the eccentric drive shaft, part 3.
- iii) Release circlip, part 11 from its groove in the drive shaft.
- iv) Ease the drive shaft forward out of the bearing housing until the half coupling, shaft key,

circlip and spacers can be removed from the shaft.

v) Remove the drive shaft complete with bearings and spacers, parts 6, 7 and 8 (see detail A).

vi) The fitting of a drive shaft assembly is a reversal of the above procedure. Note the fitting of spacers, parts 6, 9, and 10, is critical and they must be assembled as shown in detail A.

8.2.5 LINK ARM ASSEMBLY REPLACEMENT

The Link Arm Assembly, part 2, should be replaced by a complete assembly in the case of any bearing failure and the following procedure must be adhered to.

i) Remove the two button head M6 bolts, part 22 (see details E and D), that locate the link arm to the tilt frame shaft and base frame. Ensure that all nuts and washers are retained.

ii) The fitting of a Link Arm Assembly to the tilt frame shaft and base frame is a reversal of the above procedure. Note that the fitting of the plain and spring washers, parts 19 and 23, is critical and they must be assembled as shown in details E and D.

9.0 SERVICING INFORMATION - ELECTRICAL

This section provides information on electrical servicing information. Adjustments, fuses, PCB interface specification, and circuit description. Note that there have been several revisions to the controller PCB Ref. 1018. Below is a brief summary of the PCB issues and changes associated with them:

ISSUE 1.0 - Pre Production

This was the first pre production PCB and none are fitted in production rides.

ISSUE 2.0 - Serial No.s KR001 to KR027

This was the first production PCB. It measured approximately 266mm * 175mm. Several 'cut and link' modifications were on the solder side of the PCB. It did not flash the credit display, and did not illuminate the control panel pushbuttons. Some mains circuitry was offboard, which was 'wired' in the ride itself.

ISSUE 3.0 - Serial No.s KR028 to KR551

This PCB corrected the 'cut and link' modifications of the Issue 2.0 PCB. The credit display flashed when credits were available. Control panel pushbuttons were illuminated. Mains wiring was still as per Issue 2.0 PCBs. A later modification which incorporated two additional decoupling capacitors on the solder side of the PCB cured a noise susceptibility problem. It is fully interchangeable with Issue 2.0 PCBs.

ISSUE 4.0 - None in production

This was the pre-production prototype which never appeared in a production ride.

ISSUE 4.1 - Serial No.s KR552 to KR905

This PCB incorporated the mains wiring into the PCB, and thus loom changes occurred also. The size of the PCB increased to 334mm * 175mm. Issue 3.0 based rides can be upgraded to a Issue 4.1 or 4.2 ride, but this does involve some detailed technical knowledge and we do not recommend it. The Issue 4.1 PCB also increased the potential sound storage capacity to 80 seconds for the main theme (which has not been used in the Postman Pat ride). Early 4.1 boards used four 32K*8 EPROMs to store the theme tune. A later modification allowed the theme tune to be stored in a single 128K*8 EPROM (it can be identified by the fact that there are three empty sockets where EPROMs would normally be located).

ISSUE 4.2 - Serial No.s KR906 to date

This PCB incorporated circuitry which prevented short mains interruptions from starting the ride. Parvalux/Baldor motor configuration is made easier. It is fully interchangeable with Issue 4.1 PCBs.

In development at OMC Electronics is a new PCB referred to as the ROSie system (Ride Operating System). This will be fully interchangeable with Issue 4.1 and 4.2 PCBs. It will incorporate several innovative features aimed at improving the ride's appeal to both children and operators.

9.1 ADJUSTMENTS

The control PCB, all issues, in addition to DIP switches and volume control adjustments described in the operating section, contains a further three trimmer potentiometers, namely: VR300, VR400, and VR600. These potentiometers are pre-set before leaving the factory, and should require no maintenance. For reference, their function is as follows:

VR300 (PCB grid reference N9) is the motor speed control; turn it clockwise to increase motor speed. Note at low settings of this pot there is insufficient power available to drive the motor. For rides fitted with Parvalux motors, the pot is close to its maximum setting. For rides fitted with Baldor motors, the pot is turned back slightly as the rated rpm of the Baldor motor is thirty percent faster than that of the Parvalux.

VR400 (grid reference G3) is the theme music pitch; turn it clockwise to increase the pitch of the theme tune.

VR600 (grid reference C7), is the cat/horn pushbutton pitch; turn it clockwise to increase the pitch of the sounds from these pushbuttons.

9.1.1 EPROM TYPE

This applies to PCB Issue 4.1 only. An additional DIP switch, U500, grid reference location

C4, is incorporated into the PCB. The switch settings of SW500 determine the type of EPROM used at locations U500 to U503, and thus the repeat period of the theme music. The switch settings **MUST NOT BE CHANGED** unless different EPROMs are being fitted. Wire links, instead of the DIP switch, were fitted to later Issue 4.1 PCBs to prevent incorrect settings. All Issue 4.2 PCBs have wire links fitted.

For reference, the switch settings are as shown below:

For 32K EPROMs fitted at locations U500 to U503, the switch settings are as follows:

Control PCB	SW4	SW3	SW2	SW1
SW500	OFF	ON	OFF	OFF

(The 28 pin device is aligned in the 32 pin socket such that pins 1, 2, 31, and 32 of the socket remain unused.

For a single 128K EPROM fitted at location U500, the DIP switch will not be fitted, but a single wire link from pin n to pin n. In addition, Issue 4.1 PCBs will have a 'cut and link' modification on the solder side of the PCB. Issue 4.2 PCBs will not have this modification.

9.1.2 MAINS VOLTAGE SETTING

This applies to Issues 4.1 and 4.2 only. The power supply setting is determined by links on the controller PCB (grid reference T2). The component legend shows the settings for a given mains voltage. The information is duplicated here:

240V : Link 1-3, and 5-7

220V : Link 2-4, and 5-7

110V : Link 2-4, 3-5, and 7-8 (requires custom motor and transformer)

9.2 FUSES

The ride contains three fuses. One mains fuse, a 20mm 2Amp anti-surge type. PCB Issues 4.1 and 4.2 incorporate this fuse onto the PCB itself. Earlier issues do not have an onboard mains fuse but it is incorporated into an integral mains socket/switch/fuse.

Two 20mm 5Amp anti-surge fuses are fitted on the Controller PCB, in the transformer secondary circuit. **DO NOT** fit other types of fuses.

Ensure the correct fuses are fitted:

FH100 (Grid Ref Q1) : T5A (20mm, 5A anti-surge)

FH101 (Grid Ref Q2) : T5A (20mm, 5A anti-surge)

Issues 4, 4.1, and 4.2 only:

FH900 (Grid Ref S4) : T2A (20mm, 2A anti-surge). A cover must be placed over this fuse.

9.3 CONTROL PCB CONNECTORS AND PIN DESIGNATIONS

A summary of the connectors to the control PCB is given below.

- P1 Power Connector, 4 way 0.156" SIL*
- P2 Motor Interface, 3 way Mate and Lock or 5 way 0.156" SIL*
- P3 Vehicle Interface, 18 way 0.156" SIL*
- P4 Volume, 4 way 0.156" SIL*
- P5 Coin Controls CCU, 6 way 0.156" SIL*
- P6 Expansion and Sundries, 6 Way 0.156" SIL*
- P7 Transformer Primary Interface, 6 way Mate and Lock.*
- P8 Armature Choke, 2 way Mate and Lock*
- P9 Mains Safety Switch, 4 way Mate and Lock*
- LED800 Seven Segment Display, 14 way DIL (footprint DIP14)*
- POWER Mains Input, IEC socket (CE22)*
- EARTH1 - EARTH4 Earth connections, 1/4" spades (4 off)*

9.3.1 POWER SUPPLY CONNECTOR

The power supply connector (connector Ref. P1) is a 4 Way Molex KK 0.156 inch connector. The pin designations and colour coding are described below. The connector is not polarised and thus may be connected both ways around without damage. When connected either way around, the ride will function correctly.

Designation	Pin Ref.	Wire Colour
S1 - 9V AC	1	YEL or VIO
S1 - 0V AC	2	ORG
S2 - 9V AC	3	RED
S2 - 0V AC	4	BLK

Applies to all PCB issues.

9.3.2 MOTOR CONNECTOR

The motor connector (Ref. P2) is a PCB mounted 3 way Mate and Lock connector (1*3), with socket contacts. The pin designations and colour coding are described below.

Designation	Pin Ref.	Wire Colour
Motor+	1	BRN
Earth	2	GRN/YEL
Motor-	3	BLU

Applies to PCB issues 4.1 and 4.2 only.

For PCB issues 3.0 and earlier, the motor and mains connector (Ref. P2) is a five way Molex KK 0.156 inch connector. The pin designations and colour coding are described below. Note pin four is used as a polarising position.

Designation	Pin Ref.	Wire Colour
Motor Switched	1	VIO
Motor Live	2	BLU
Mains Live	3	BRN
No Connection (polarising)	4	-
Mains Neutral	5	BLU

Applies to PCB issues 3.0 and earlier.

9.3.3 VEHICLE INTERFACE

The vehicle interface connector (Ref. P3) is a eighteen way Molex KK 0.156 inch connector. It interfaces to all electrical parts within the body. These are the coin mechanism (start switch), electromechanical meter, lights, loudspeaker, sound buttons, and optional service switch. The pin designations and colour coding are described below. Note pin fourteen is used as a polarising position.

Designation	Pin Ref.	Wire Colour
Coin mech/Start switch N.O.	1	PNK
Ground (Coin mech/Start Gnd)	2	PNK
Meter Negative	3	BLU
Meter Positive (+12V)	4	RED

Lamp Front Left	5	YEL
Lamp Front Right	6	YEL
Lamp Rear Left	7	RED
Lamp Rear Right	8	RED
Ground (Lamp Common)	9	BLK
Cat push-button	10	WHT
Ground (Cat p/b return)	11	WHT
Horn push-button	12	GRN
Ground (horn p/b return)	13	GRN
No connection (polarising)	14	-
-12V	15	-
Service Switch Contact	16	-
Speaker Out	17	GRY
Speaker Ground	18	GRY

Applies to all PCB issues.

Note that connections to pins one and two are used as either connections to a uni-coin mechanism, or to a start pushbutton, dependent on whether the machine is configured with a uni-coin or multi-coin mechanism.

9.3.4 VOLUME CONTROL P4

The Volume control connector (Ref. P4) is a four way Molex KK 0.156 inch connector. The pin designations and colour coding are described below. Note pin four is used as a polarising position.

Designation	Pin Ref.	Wire Colour
Volume In	1	RED

Volume Wiper	2	BLU
No Connection	3	-
Ground	4	SCREEN

Applies to all PCB issues.

Note that this facility for an offboard volume control has never been used, volume being adjusted on the control PCB.

9.3.5 MULTI COIN MECHANISM (CCU) CONNECTOR P5

The multi coin mechanism (CCU) connector (Ref. P5) is a six way Molex KK 0.156 inch connector. The pin designations and colour coding are described below. Note pin two is used as a polarising position.

Designation	Pin Ref.	Wire Colour
Meter	1	-
No Connection (polarising)	2	-
Credit	3	WHT
Credit Ground	4	GRN
-12V (Ground to CCU)	5	BLK
Ground (+12V to CCU)	6	ORG

Applies to all PCB issues.

This connects via a one to one cableform to the Coin Controls CCU. The meter is not connected to this connector, but the signal passes through to P3 (see above). Note that the 12V supply to the CCU, via pins five and six, is derived from the -12V rail. DO NOT attempt to link pins four to five on this connector or at the CCU, as is frequently done in many designs using this interface standard. The result is that the -12V rail gets shorted to ground, and blows the -12V fuse.

9.3.6 EXPANSION AND SUNDRIES P6

The connector Ref. P6 is a six way Molex KK 0.156 inch connector. The pin designations and colour coding are described below. Note pin five is used as a polarising position. No connections are made to this interface. It is reserved for future use.

Designation	Pin Ref.	Wire Colour
+12V	1	-
+5V	2	-
Ground	3	-
PLAY-	4	-
No Connection (polarising)	5	-
POR-	6	-

9.3.7 TRANSFORMER PRIMARY

The Transformer Primary connects to connector P7, a PCB mounted 6 way Mate and Lock connector (2*3) with socket contacts. The pin designations and colour coding are described below.

Designation	Pin Ref.	Wire Colour
P2-0	1	BLU
P1-110	2	ORG
P1-130	3	BRN
P1-0	4	VIO
P2-110	5	YEL
No Connect	6	-

Applies to PCB issues 4.1 and 4.2 only.

9.3.8 ARMATURE CHOKE

The Armature Choke connector (Ref. P8) is a PCB mounted 2 way Mate and Lock connector (1*2), with socket contacts. The pin designations and colour coding are described below.

Designation	Pin Ref.	Wire Colour
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Choke	1	BLK
Choke	2	BLK

Applies to PCB issues 4.1 and 4.2 only.

9.3.9 MAINS SAFETY SWITCH

The Mains Safety Switch connects to connector P9, a PCB mounted 4 way Mate and Lock connector (1*4) with socket contacts. The pin designations and colour coding are described below.

Designation	Mnemonic	Pin Ref.	Wire Colour
Mains Line	LINEIN	1	BRN
Mains Line switched	LINEOUT	2	BRN
Mains Neutral	NEUTRALIN	3	BLU
Mains Neutral Switched	NEUTRALOUT	4	BLU

Applies to PCB issues 4.1 and 4.2 only.

9.3.10 SEVEN SEGMENT DISPLAY CONNECTOR

The credit display, a seven segment LED type, connects to the PCB via component legend Ref. LED800, a fourteen pin DIL socket. The pinning is compatible with common cathode, 0.3 inch, 14 pin DIL LED seven segment displays, thus a direct one to one connection via ribbon cable is possible (the display may also plug directly into the PCB).

Designation	Pin Ref.
Anode F	1
Anode G	2
No Connection	3
Common (GND)	4

No Connection	5
Anode E	6
Anode D	7
Anode C	8
Anode Decimal Point	9
No Connection	10
No Connection	11
Common (GND)	12
Anode B	13
Anode A	14

This connector is present on all PCB issues. Note that early rides, up to KR046, used a fourteen pin DIL plug (rather than a socket) on the PCB.

9.3.11 MAINS INPUT

The mains input connector, reference POWER, is a PCB mounted IEC CE22 socket, with line, neutral, and earth connections. PCB issues 4.1 and 4.2 only.

9.3.12 EARTH CONNECTIONS

EARTH1 - EARTH4 are 4 PCB mounted 1/4 inch spade terminals for mains earth connections. PCB issues 4.1 and 4.2 only.

9.4 CIRCUIT DESCRIPTION

The circuit description that follows assumes the reader is familiar with the device characteristics of electronic components used within the circuit, and of general logic design rules and techniques. The text throughout this document refers to schematic diagram OMC reference 101820 issue 4.2, appended to this guide.

The circuit diagram for the PMP/FMS Controller is contained on nine sheets of schematic diagram. Sheet one of the circuit diagram contains a sheet key that identifies what each sheet

of the circuit diagram contains. Integrated circuits are given 'U' reference numbers, the first digit of which refers to the sheet number on which it appears. For example, U601 will appear on sheet six of the circuit diagram. Sheet one also contains a cross reference key that shows where a particular device is located on the PCB. Its position is identified by a grid reference, which appears on the component legend of the PCB. Inter sheet signal names on the circuit diagram are always followed by a '+' or '-'. This indicates an active high or active low signal respectively.

Sheet one contains the sheet key, a reference grid/component cross reference, decoupling, list of sundry components, and power supply section. Two independent 9V ac supplies pass via 5A anti surge fuses to bridge rectifiers D100 and D101. The DC is smoothed by C100 and C101, to produce +12V and -12V. U100, a voltage regulator, converts the +12V to +5V for the logic supply. R102, D102, and Q100 ensure that the power on reset circuit (see below) is triggered as soon as power is interrupted, thus a brief mains interruption will cause a full reset cycle to occur.

Sheet two contains much of the 'glue' logic which holds the system together. A dual timer device, U202, is configured as a power on reset circuit (U202B) and an oscillator (U202A). The power on reset period is long (about four seconds) to ensure all circuitry is initialised. The oscillator has a period of 12.5mS, with a 30/70 (approx.) mark/space ratio. The output of the oscillator (CLK+) is divided down by U203, to generate FLASH+, DURCLK+, and ATTR+. These signals are square waves with periods of 1.6 seconds, 12.8 seconds, and 204.8 seconds (3 min 24.8 sec.) respectively. They represent the lamp flash period, the single time unit for ride duration (one to seven units can be programmed) and attract mode interval.

U208A buffers the input from the start button/coin mech (depending on the configuration). U200 debounces this signal, to produce a clean signal, STRT+.

U201 counts the incoming pulses and reaches its terminal count at fifteen. SW200 determines the start point of the count, from twelve to fourteen. Thus, dependent on the settings of SW200, three, two, or one pulse(s) are required to reach the terminal count. The function of this counter is intended for unicon coin mechanism applications where up to three coins will be accepted before the ride starts. For multicon coin mechanism applications, SW200 is set such that only one pulse is required to reach the terminal count. The terminal count output (MAX/MIN) is inverted with U206D and presets U205A, which subsequently starts shifting a '1' through U204, the first three stages of which are configured as a shift register. Most of the timing signals for the circuit are derived from this shift register.

U206A and U206B are cross coupled NANDs that debounce the onboard service switch, SW201. When pressed, U205A is toggled and thereon has the same effect as the coin counter reaching its terminal count.

U202B is configured as a power on reset circuit, whose output is high for approximately four seconds after power on. U202A is configured as an astable oscillator, with a period of approximately 12.5mS. Its output, CLK+, is used throughout the circuitry. The clock signal is further divided down by U203, which produces a further three clock signals, FLASH+ (lamp flash period), DURCLK+ (ride increment interval), and ATTR+ (attract mode interval). These signals have a period of 1.6 Sec, 12.8 Sec, and 204.8 Sec (3 Min 24.8 Sec) respectively.

Sheet three contains the meter pulsing circuit, flashing lamp drivers, ride duration counter, and motor drive circuit. Taking each in turn:

The rising edge of STRT+ triggers the monostable U300A, which produces a 60mS pulse. The pulse is fed to a darlington driver U303A, which pulses the meter. FLASH+ has a period of about 1.2 Seconds, and is the input to the driver circuit comprising U303B, R303, R301, and Q300. Q300 sources current from the +12V rail to supply lamps connected to P3 pins six

and seven. FLASH+ is inverted by U208B whose output is connected to an identical driver stage, thus lamps connected to P3 pins five and eight will flash alternately with those connected to P3 pins six and seven.

Counter U301 dictates the duration of the ride, which is programmable by SW300. U301 counts up from its initial value that is loaded into the counter by DURLD-, a pulse produced at the start of the ride. The initial value is determined by the setting of SW300, and may be in the range '8' to '15'. The counter is clocked at 6.5 second intervals. When the terminal count of '15' is reached, the counter is disabled by max/min pulling the counter enable line high. It can only be released by a negative pulse on DURLD-.

The motor drive circuit is based upon U302, a TDA2086 motor control IC. The circuitry varies little from the application note for this device. Because the 'common' line for U302 must be mains neutral, an opto isolator OI300 is used to allow the 0V of the logic to be isolated from the mains. VR300 determines the motor speed.

NOTE: When used in conjunction with Baldor motors, the following deviation in component values applies:

R312 = 62K, 1/4W, 5%

R313 = 2R2, 2W, 5%

Sheet four is a sound reproduction circuit. It can reproduce two stored sounds (not simultaneously); one stored in U504 and one stored in U500-U503. Sound reproduction is based upon U401, a UM5100 voice recorder/playback IC. The configuration is playback mode only, based upon the application note circuit supplied by UMC. Data is supplied from memory contained on sheet five of the circuit diagram. The addressing range of the UM5100 is 32K bytes, but to reproduce twenty seconds of high quality theme tune, the addressing capability is extended by U404A and U404B, addressing up to 1M byte of memory. U404A is clocked by the trailing edge of A14, generating a further five address bits, A15 to A19 inclusive. These are decoded by U405A (on sheet five) to give four memory chip select signals, MEM0- to MEM3-.

When PLAY- is pulled low, flip flop U205B will initially be reset, the result of which is that the digitised data in U504 is replayed (the rescue conversation). U403 decodes the end of this data, and causes U205B to be set. The change in state of U205B is input to U406 and U405B. Two pulsed signals are produced, representing a 0 to 1 and 1 to 0 transition of U205B. Both transitions are ORed by U402A to reset U401. U401 now starts to replay the digitised data contained in U500-U503, and does so repeatedly until PLAY- is taken high. In attract mode, SG1PL+ is pulsed to cause U401 to replay the data contained in U504 only.

Sheet five contains EPROM memory devices U500 to U504. They store the digitised sound information. The data in U500 to U503 is played continuously whilst the ride is active, whilst U504 is played on start up and as an attract feature only. SW500, U505, and U405A steer the decode pulses according to the type of memory device fitted, ie. 32K*8, 64K*8, 128K*8, or 256K*8.

Sheet six, like sheet four, is a sound reproduction circuit. It can similarly reproduce two stored sounds (not simultaneously), both of which are stored in EPROM, U601. The sounds are reproduced when the ride is active, and they have been triggered by pushbutton inputs to P3 pins ten and twelve. U603 and U604 arbitrate between the two inputs, on a first come first served basis.

Sheet seven contains analogue circuitry that comprises: sound generator 2 buffer and filter; mixer stage for sound generators 1 and 2; level control; and power amplifier.

The analogue stages for sound generator 2 are identical with those for sound generator 1. The post filter outputs are fed to U701A, an inverting unity gain mixer stage. The output is fed to a potentiometer VR700, the volume control. An external volume control can be fitted through P4 (in which case VR700 would have to be removed). The output of the potentiometer is DC blocked by C700 before passing to the integrated power amplifier U700. The combination of R705 and R704 produces a gain of approximately 32. C701 filters out the low frequencies. R703 provides DC bias to the non inverting input of U700. The loudspeaker connects to P3 pins seventeen and eighteen. The +/-12V rails limit the output power to about 7W (into eight ohms), above which distortion will be excessive. U700, mounted on a heatsink, has no difficulties dealing with these power levels.

Sheet eight contains the logic that stores credits, control of the incrementing/decrementing of the credit counter, a BCD to seven segment decoder/driver, and the output to the credit display. U800 is the credit counter. It counts up to increment the credit count, and down to decrement it. When a uni-coin mechanism is fitted, credits are not stored. In this instance, MULTI- will be high, and the asynchronous load signal to U800 will be held low, via U805A. The outputs of U800 will be forced to '8', and the max/min output held low (enabling circuitry connected to it). When a multi-coin mechanism is fitted, MULTI- is low and does not hold the credit counter in the load mode (that is, it is free to count).

The counter is incremented during a pulse from the credit control unit, and decremented by a pulse from PLAY+ (unless it was already at zero). These pulses, which may occur simultaneously, are arbitrated (for) by U803B and U804B. These D type flip flops are clocked on opposite edges of the clock (CLK+ and CLK-), and if one of them is set, it prevents the other one from being set until it is cleared again. U803A and U804A detect the leading edge of the pulses. The CCU input is debounced by U802.

The outputs of U800 feed U801, a BCD to seven segment decoder/driver, whose outputs pass to RP800 to limit output current to approx. 10mA. The seven segment LED display can be plugged directly into LED800, or be remote via ribbon cable.

Sheet nine contains the mains circuitry. The mains enters via a CE22 mains socket, and is then fused by F900. The mains is then taken out and then back into the board via P9. This connects to the mains safety switch, found on the rear service door of the ride. Once back on the board, the mains is fed through link selectors to send the correct mains voltage to P7, the isolating transformer primary. Mains voltage is also fed to the motor speed control circuitry. The output of this circuitry is rectified by D900 before being passed to P2 and P8, the motor and armature choke interfaces.

9.5 SEMICONDUCTOR DEVICE BIBLIOGRAPHY

The following list of semiconductor manufacturers databooks gives full technical specifications for all of the semiconductor devices used within the PMP/FMS Controller.

- CMOS Logic Databook 1988, National Semiconductor (74HC family).
- Linear Voltage Regulator Manual, Motorola (MC78T05CT).
- Linear Databook, Part IC11, Philips (NE555).
- Power Semiconductors, Book 1, Part 1b, Philips (BD202).
- Power Control IC Handbook, Plessey Semiconductors (TDA2086).
- Power Integrated Circuits Databook, Integrated Power (ULN2003).
- UM5100 Data Sheet and Application notes, United Microsystems Corporation (UM5100).
- Linear 1 Databook 1988, National Semiconductor (LM348).
- Memory Databook 1988, National Semiconductor (27256 EPROM).

APPENDIX A - CREDIT CONTROL UNIT PROGRAMMING

Price per ride for 100, 50, 20, 10 unit coin set

SW5	SW4	SW3	SW2	SW1	Units/Ride
OFF	OFF	OFF	OFF	X	150
OFF	OFF	OFF	ON	X	140
OFF	OFF	ON	OFF	X	130
OFF	OFF	ON	ON	X	120
OFF	ON	OFF	OFF	X	110
OFF	ON	OFF	ON	X	100
OFF	ON	ON	OFF	X	90
OFF	ON	ON	ON	X	80
ON	OFF	OFF	OFF	X	70
ON	OFF	OFF	ON	X	60
ON	OFF	ON	OFF	X	50
ON	OFF	ON	ON	X	40
ON	ON	OFF	OFF	X	30
ON	ON	OFF	ON	X	20
ON	ON	ON	OFF	X	10
ON	ON	ON	ON	X	5

Additional Rides for highest value coin (Coin 1)

SW8	SW7	SW6	Function
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OFF	OFF	OFF	7 Additional rides
OFF	OFF	ON	6 Additional rides
OFF	ON	OFF	5 Additional rides
OFF	ON	ON	4 Additional rides
ON	OFF	OFF	3 Additional rides
ON	OFF	ON	2 Additional rides
ON	ON	OFF	1 Additional ride
ON	ON	ON	0 Additional rides

Additional Rides for second highest value coin (Coin 2)

SW10	SW9	Function
OFF	OFF	3 Additional rides
OFF	ON	2 Additional rides
ON	OFF	1 Additional ride
ON	ON	0 Additional rides

Totalising Switches

SW11	Function
OFF	Non Totalise mode
ON	Totalise mode

Currency Select

SW12	Function
OFF	Standard Coin Set (100, 50, 20, 10)
ON	Non Standard Coin Set (100, 25, 10, 5)

Inhibit Switches

SW13	Coin 1: One Pound
SW14	Coin 2: 50p
SW15	Coin 3: 20p
SW16	Coin 4: 10p
SW17	Coins 5 and 6
SW18	Coins 7 and 8

Switch On = Coin Enabled

Switch Off = Coin Inhibited

APPENDIX B - BILL OF MATERIALS (COMPLETE RIDE ASSEMBLY)

Child's Ride Complete Assembly Revised: September 7, 1992

102121 Revision: 4.0

Bill Of Materials, February 16, 1993

The Bill of Materials is not included in this Internet Issue of the Ride Guide.

APPENDIX C - BILL OF MATERIALS (CONTROLLER PCB 1018)

PMP Controller PCB Assembly Revised: June 2, 1993

101820 Revision: 4.2

Bill Of Materials

The Bill of Materials is not included in this Internet Issue of the Ride Guide.

APPENDIX D - BILL OF MATERIALS (ROCKING MECHANISM)

PART NO. AND DESCRIPTION

1 VEE BRACKET ASSEMBLY
2 LINK ARM ASSEMBLY
3 ECCENTRIC DRIVE SHAFT
4 MOTOR & GEAR BOX UNIT
5 SPRING WASHER M12
6 NYLON SPACER
7 BEARING
8 BEARING SPACER
9 NYLON SPACER
10 SPACER
11 CIRCLIP
12 DRIVE COUPLING
13 COUPLING SPIDER
14 SHAFT KEY
15 GRUBSCREW M6
16 GRUBSCREW M6
17 CIRCLIP
18 PLAIN WASHER M8
19 PLAIN WASHER M6
20 CAPSCREW M6
21 NYLOK NUT M6
22 BUTTON HEAD SCREW M6
23 SPRING WASHER M6
24 NYLOK NUT M12
25 BEARING COVER
26 BUTTON HEAD SCREW M6

APPENDIX E - DISTRIBUTORS

Additional distributors will almost certainly have been appointed by the time you read this. Contact OMC Electronics Ltd. on +44 684 298004 if your country is not represented.

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