

Bulk Coin Recycler



OEM User Manual



Model version 2013 onwards

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Contents

1.	Diary of Changes	3
2.	Safety Notes:	4
3.	Introduction	5
3.1	1 Terminology	5
3.2	2 Supporting Documentation and Software	5
	3.21 Retail Interface Software	5
	3.22 BCR206 OEM User Manual TSP198	5
	3.23 BCR206 Technical Manual TSP199	5
	3.24 Host Interface Specification TSP151	5
	3.25 BCR206 User Operation Guide TSP200	5
4.	Packaging and Shipping	6
4.1	1 Reshipping	7
_	4.11 Repackaging	7
5.	Installation	8
5.	Environment.	8
5.2		8
5.	3 Position	8
5.4	Ground connection	8
5.5	Power connection	9
c 5.0	Dert Names	9
0.	Fait Nailles	10
0. 6 (i niyin hahu suu	10
0.4		10
0 6.	Coin Accountar Eagle	12
7	Acress	14
'. 7	Restart hutton and LED indicators	1/
7 1	 Signulator and Escalator 	15
7 '	Coin Accentor	16
74	1 Manifold	18
7 !	5 Cashbox	19
7 6	S Hopper Trav	19
8.	Coin paths	20
8.1	Coin input / output chute	20
8.2	2 Singulator	.21
8.3	Coin acceptor with 4-way sorter	22
8.4	4 Manifold	22
8.5	5 Coin Hoppers	23
8.6	6 Cashbox	23
8.	7 Escalator	24
9.	Electrical System	25
9.1	Description of Main Modules and systems	25
	9.11 Main Controller Board	25
	9.12 Coin Acceptor	25
	9.13 Coin Transport	25
	9.14 Interlocks and sensors	26
	9.15 Coin Hoppers	26
10.	Refilling Hoppers	27
10	.1 Automatic sorting and filling – topping up	27
	10.11 Refill Mode	27
10	.2 Manual Coin Filling	27
11.	Maintenance and Cleaning	.28
11	.1 Cleaning a Hopper	29
11	.2 Cleaning the Coin Acceptor Eagle	31
11	.3 Cleaning the manifold	33
11	.4 Cleaning the coin rundowns	33
11	.o Creaning the input output chute	34
12.	1 Status LEDs	31
12	1 Otalus LEDS	3/
12	2 Area of Error	30
12		39
12	.4 I YPES UI ETIUI	.40 ⊿ว
12	12.51 Double honoers	40
12	Clearing Jams	44 17
15.		

13.1	Singulator	
13.2	Coin Acceptor	
13.3	Hopper	
14.	Service Schedule	
15.	Power Supply Specification	50
16.	Exploded Parts View	51
17.	Appendix A	

1. Diary of Changes

Issue V0-01	03 rd May 2013
Draft issue	
Issue V0-02	24th May 2013
Change title to include Bulk Coin Recycler	
 3.21 Opdate the firmware of the main controller and coin acceptor (no 5.2 Removed wording 'either in a fixed position or to runners' All references to 'Diverter' are now 'Manifold' 	DE IOF SKOI)
Issue V1-0	11 th June 2013
First Release	
Issue V1-01	17 th July 2013
Corrected 12.51,2 example with four hoppers	
leque \/1.02	12 th Sont 2012
Revised exploded diagram	. 13 Sept 2013
Issue V1-03	27 th Jan 2014
Added error code 11-6	
Issue V1-04	17 th Oct 2014
Coin Acceptor details all reference NRI Eagle	

2. Safety Notes:

The equipment must be installed according to the following requirements:-

- The equipment must be supplied from a 24V dc SELV limited power source, which must comply with the requirements for EN60950-1. See Specifications section for more details on power supply.
- Fuse Type: 2.5A (Time lag Fuse) Replace** with same type and rating
- 3V Lithium Coin Battery:

Replace with one of the following:

Manufacturer	Туре
Renata	CR2450N
Varta	CR2450
Energiser / Eveready	CR2450

When changing** the battery ensure that power to the unit is removed.

** Refer to BCR206 Technical Manual TSP199 for details on changing the fuse and battery.

Caution: Risk of explosion if the battery is replaced by an incorrect type or is incorrectly fitted. Dispose of used batteries according to the battery manufacturer's instructions.

2.1 Installation and Removal

Installation and removal must only be carried out by qualified personnel. Warning: Ensure that the power has been disconnected before removal or servicing. Refer to the Installation section for more details on installation

2.2 Hazardous Moving Parts

Warning: There are hazardous moving parts, keep fingers and other body parts and loose clothing away. Consideration to this hazard must be assessed in the end use application. No attempt must be made to defeat or circumvent safety interlocks and switches.

2.3 Health and Safety

Warning: Coin dust may accumulate in the unit during use; Due to the potential respiratory hazards, it is highly recommended that a facemask be worn to prevent the inhalation of dust particles dislodged during maintenance, the cleaning process, or the clearing of jammed coins.

2.4 Environmental Ranges

Operating Temperature	0 to 55 ⁰ C
Storage Temperature	-20 to 70 ⁰ C
Operating Humidity	10 to 75% RH
Storage Humidity	10 to 95% RH non condensing

3. Introduction

The BCR206 Coin Recycler is designed for cash handling solutions that demand fast reliable and robust coin transactions in a compact format.

Features:

- Bulk coin in accepts bulk mixed coins in via coin entry chute
- Coin recycling coin payout hoppers are replenished from inserted coins
- Multi hopper payout pays out optimum coin combinations
- Cashbox adds capacity to accept more coins
- Auto jam detection and clearance reduces user intervention
- Auto hopper position and value id safeguards correct operation if hoppers are repositioned
- High capacity

This manual contains all the information needed to ensure virtually trouble-free operation of the product. If a fault occurs that cannot be cleared using the instructions in this manual, a service engineer must be called — <u>NO OTHER REMEDIAL ACTION IS TO BE ATTEMPTED.</u> See Troubleshooting section for more details.

The BCR206 Coin Recycler has been designed to minimise the possibility of coin jams. If a jam should occur, the unit will normally be able to self-clear and continue operation unaffected. In the unlikely event of a jam not clearing automatically, it can be easily and quickly cleared following the relevant instructions in this manual. See Troubleshooting section for more details.

3.1 Terminology

References throughout this manual will use the following terminology: OEM – Original Equipment Manufacturer BCR206 – Bulk Coin Recycler Recycler – BCR206 System – Enclosure or solution of which the BCR206 is a part of Operator – Person or company responsible for the System

User – Person responsible for keeping the recycler operational

Customer - Person who interacts with the system to receive intended service

3.2 Supporting Documentation and Software

3.21 Retail Interface Software

This software allows the following to be performed:

- Test the recycler for coin in and coin out operations
- Update the coin acceptor table e.g. for new coins
- Update the firmware of the main controller
- Produce an error log history file

3.22 BCR206 OEM User Manual TSP198

This is intended to be used by the OEM

3.23 BCR206 Technical Manual TSP199

The BCR206 Technical Manual is intended as a reference guide for qualified service personnel and gives information relating to disassembly, part replacement and reassembly.

3.24 Host Interface Specification TSP151

The BCR206 Host Interface Specification document outlines the ccTalk commands required to correctly operate the BCR206. Operation of the unit is through the ccTalk serial protocol with commands being sent over USB using a virtual COM port.

3.25 BCR206 User Operation Guide TSP200

The BCR206 User Operation Guide provides the information relevant to the site operator.

4. Packaging and Shipping

The recycler is shipped in quantities of either 6 or 1; a palletised carton containing 6 units or individually in a single carton. In this palletised configuration, pallets should be stacked no higher than 2, see (fig 4-1). Exceeding this will cause damage to the cartons and product. Observe the handling information marked on the carton, (fig 4-2).



fig 4-1



fig 4-2

Note the packaging arrangement for six units, (fig 4-3), and the input/output chute is not fitted and is wrapped separately within the carton. The coin acceptor is not fitted and is supplied separately.

The recyclers should be packed with the flat sides facing outwards to increase the rigidity of the package.



fig 4-3

4.1 Reshipping

When reshipping the recycler, the original carton and packaging pieces must be used in all cases. The carton(s) must be palletised for transportation. Additional single cartons can be ordered (PK150). Refer to (fig 4-4) for packaging arrangement within carton.

Single carton contents (PK150)

2. Internal packaging pieces top 3. Internal packaging pieces middle Internal packaging piece bottom

Bubble wrap for i/o chute

Top card piece

1. Outer carton



fig **4-**4

4.11 Repackaging

4.

5. 6.



Place recycler on bottom packaging piece

Insert middle packaging pieces



Insert top card piece



Insert top packaging pieces and wrapped i/o chute

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5. Installation

5.1 Environment

The recycler is designed to operate within an enclosure. Dusty and/or Smokey environments may increase the requirement to clean the unit and reduce the service intervals.

5.2 Fixing

There are two fixing slots at the rear and two bolt holes at the front, which allow the unit to be mounted. See appendix A for details. The right hand fixing point can be accessed with the hopper tray open, see (fig 5-1)



fig 5-1

5.3 Position

The BCR206 must be installed within the following angles:

Front to back 2 degrees (see fig 5-2) Side to side 2 degrees (see fig 5-3)

Operation outside of these requirements may affect performance.



fig 5-2

fig 5-3

5.4 **Ground connection**

The grounding connection is part of the front left hand side fixing point; see (fig 5-4). This point must be used to provide electrical continuity between the recycler metalwork and the enclosure metalwork.



fig 5-4

5.5 **Power connection**

The equipment must be supplied from a 24V DC SELV limited power source, which must comply with the requirements for EN60950-1. Connection is made either the System Power or Powered USB connections (fig 5-5). See Power Supply Specification section for more details on power supply. It is recommended that the overall system, that the recycler is integrated into, is supplied via an uninterruptable power supply (UPS).

Electrical Connections

- 1. Cabinet cup sensors USB 2.
- 3.
- Powered USB 4. System Power



fig 5-5

5.6 **Communication ports**

Communication is via USB and 2 connection types are available: USB B and Powered USB (retail). Use a high quality screened USB cable which, preferably with an integrated ferrite core. The chosen USB cable should be as short as possible. Avoid routing the cable near electrical cables and sources of electrical noise.

6. **Part Names**

6.1 **Right hand side**



fig 6-1

Part Names - RHS

- 1. Input / output chute
- 2. Main cover
- 3. Inspection hole Coin Acceptor chute
- 4. Restart push panel
- 5. Cable connections
- 6. Coin Acceptor
- 7. Acceptor latch
- 8. Cable routing
- 9. Carry handle
- 10. Coin Sorter
- 11. Coin rundown channels/manifold
- 12. Escalator motor
- 13. Coin Hoppers
- 14. Locking cashbox door with handle
- 15. Hopper tray
- 16. Restart button
- 17. LED Status indicators



fig 6-2

6.2 Front



Part Names - front

- Bulk coin input 1.
- Coin entry flap 2.
- 3. Coin fall-through
- 4. Coin output
- 5. Carry handle
- 6. Cashbox door
- 7. Lock
- Hopper tray handle 8.
- Cashbox 9.
- 10. Ground connection



fig 6-3



fig 6-6



fig 6-5

6.3 Left hand side



fig 6-7

.

Part Names - LHS

- Singulator door
 Escalator door
- 3. Door catch



fig 6-8

6.4 Coin Acceptor Eagle



fig 6-9



fig 6-11



fig 6-12



fig 6-14



fig 6-10



fig 6-13

Eagle Coin Acceptor

- 1. Reject lever
- 2. Flight deck door
- 3. Flight deck Locking Tab
- 4. Sensor coils
- 5. DCE/diverter connection
- 6. Power/comms connection
- 7. Diagnostics LED
- 8. Reject coin path
- 9. Coin sorter exit paths (4)
- 10. Locating pin LHS
- 11. Locating pin RHS

7. Access

The unit can be fitted to sliding runners, to allow easy access when it is mounted within an enclosure. Occasional access maybe required to the areas covered in this section. In this scenario, the main handle (fig 7-1) should be used to move unit between its home and forward positions. The handle is the only part designed to move the unit, do not use any other part as this may cause damage to the unit. When the unit is loaded with coins then it may be heavier than expected. Always move the unit with care between positions.



fig 7-1

7.1 **Restart button and LED indicators**

The restart button (fig 7-2) can be used in the event the recycler has stopped, due to an error, or has become unresponsive due to an unexpected condition. Press and release the button to restart the recycler.

LED indicators are used to show the current status of the recycler. Refer to the Troubleshooting section for more details.





LED	SYM	Function	Description
LED 1		Heartbeat	Flashing green during normal operation
LED 2	1	Communication Link	Flickering green during normal operation
LED 3 X		Fault Code X	Refer to the Troubleshooting section
LED 4	Y	Fault Code Y	Refer to the Troubleshooting section
LED 5	Ċ	Power	Steady green during normal operation

7.2 Singulator and Escalator

The recycler is fitted with doors which can be opened to allow access to the singulator and escalator coin chambers. The doors are transparent to aid inspection. Squeeze the catches to open the singulator and escalator doors. The doors can be closed using the catches or by pushing the door closed. The recycler will not run with either door open.

To maintain visibility into the coin chambers it may be necessary to clean the inner surface of the doors, this should be included as part of the regular cleaning schedule.



fig 7-3



fig 7-4

Note: Do not force the doors open past their end point. Do not defeat the door micro-switch.

7.3 **Coin Acceptor**

Coins that enter the recycler pass through the coin acceptor where they are identified and validated.

Important - The coin acceptor is a measurement device and can be easily damaged. Always handle with care. Never drop the coin acceptor.

The recycler has one type of coin acceptor - NRI Eagle

7.31,1 Locking latch

The coin acceptor is held in position with the red locking latch indicated. Push the red locking latch to the right (fig 7-5) to release the coin acceptor.



fig 7-5

7.31,2 Removal

The coin acceptor is now free to tilt forwards on its mounting pins. Supporting the coin acceptor with your hand; tilt the coin acceptor forwards as indicated (fig 7-6).



fig 7-6

7.31,3 Flight deck

With the coin acceptor tilted forwards, the flight deck can be opened by pulling in the direction shown (fig 7-7).

Note: The flight deck is spring loaded, a 'snap' will be heard as the spring releases, this is normal.

The flight deck must be secured using the 'Locking Tab' before refitting.

DO NOT EXCEED MAXIMUM OPENING ANGLE SHOWN





fig 7-7

7.31,4 Refitting

Firstly, with the coin acceptor tilted, engage the lower mounting pins into their positions. Push the coin acceptor back into position until the latch engages with the top locating pin (fig 7-8). Only minimal force is required to refit the coin acceptor. Never force the coin acceptor back into position, if necessary, remove and check the lower locating pins are correctly engaged.



See Maintenance and Cleaning section for more details.

fig 7-8

7.4 Manifold

Coins leaving the 4 way sorter drop into the sorting manifold. The manifold provides two possible paths for each coin - coins leaving roll down one of seven rundowns to either hoppers or the cashbox.



fig 7-9

Two red LED indicators (fig 7-10), on the front face of the manifold, blink as each coin passes through. If these LEDs are illuminated permanently (fig 7-11) then this indicates that there may be a blockage or the manifold needs cleaning - check for stuck coins or debris; refer to Cleaning section for more details.



fig 7-10

The two manifold gates can be accessed after removing the coin acceptor (see previous section). The gates are linked and freely move together (fig 7-12 & fig 7-13); whilst it is possible to move the gates with a finger to check movement, avoid excessive force.





fig 7-12



fig 7-13

7.5 Cashbox

The cashbox (fig 7-14) is located behind the locking cashbox door. Unlock and lift the door until horizontal. Do not apply excessive upward force on this door. The cashbox pulls forwards to remove. The recycler will not operate whilst the cashbox is not present



fig 7-14

7.6 Hopper Tray

The hopper tray pulls forwards (fig 7-15) on sliding runners for easy access to six coin hoppers. The hopper tray can easily be moved between its open and closed positions using the hopper tray handle, marked with a green label. The hopper tray handle is part of the cashbox door, and is the only part designed to move the hopper tray, do not use any other part as this may cause damage to the unit. Unlock the door and lift until horizontal. Do not apply excessive upward force on this door. If the hoppers are full of coins then the hopper tray may be heavier than expected. With the hopper tray in the open position, individual hoppers can easily be refilled or removed for emptying. Each hopper can be removed by firmly pulling it upwards. When refitting a hopper firmly press it down into position ensuring it is seated properly on the tray. The recycler auto detects each hopper position meaning the hoppers can be refitted into any order.

When closing the hopper tray push it firmly into its home position. Avoid slamming the tray open or closed



fig 7-15

Coin paths 8.

The path that the coins take throughout the recycler are indicated in orange

8.1 Coin input / output chute

Coins enter and leave the recycler via the input / output chute. There are three coin paths through the input output chute:

1. Coin input chute - unit enabled

When the unit is enabled to accept coins, this path opens to allow coins in (fig 8-1).



2. Coin input chute fall through - unit disabled When the unit is disabled, all input coins fall straight to the coin output (fig 8-2).





fig 8-2

3. Coin output chute Coins which are paid out or are rejected are returned down this chute (fig 8-3).



8.2 Singulator

Coins travel to the singulator (fig 8-4) from the coin input chute. The singulator is a moving track which transports each coin individually to the coin acceptor.

There is an inspection door which allows access to the singulator coin chamber in case user intervention is required.

The entry chute is fitted with an avalanche sensor which is used to monitor the flow of coins entering the recycler. If the level of coins entering exceeds a certain level then the entry chute closes diverting any further coins to the output. This ensures that the singulator is not overwhelmed. The entry chute re-opens, to continue accepting coins, when the recycler is ready.



fig 8-4

8.3 Coin acceptor with 4-way sorter

Coins drop into the coin acceptor where they are identified. If a coin is valid then it is diverted to one of four 'accept' paths via the 4-way sorter (fig 8-5). If the coin is invalid then it is diverted to the 'reject' path. Rejected coins are passed to the escalator for return to the customer.



fig 8-5

8.4 Manifold

Coins drop into the manifold from the 4-way sorter. (fig 8-7) The purpose of the manifold is to further sort the coins to their final destinations (Cashbox or Hoppers).



fig 8-6

8.5 Coin Hoppers

There are six hoppers (fig 8-7) used to dispense coins. Coins reach the hoppers from the manifold or by manually filling them. Coins are ejected from the hoppers onto a communal ramp leading down into the escalator.



8.6 Cashbox

The cashbox provides extra capacity for accepted coins. Coins which have been accepted and either do not have an assigned hopper or their designated hoppers are full, route to the cashbox.

The recycler will not operate whilst the cashbox is full or not present.





fig 8-8

8.7 **Escalator**

Coins that are paid out from the hoppers, and rejected coins from the coin acceptor, drop into the escalator (fig 8-9). The escalator is a moving track, which transports coins to the output chute. There is an inspection door which allows access to the escalator coin chamber in case user intervention is required.



fig 8-9

9. Electrical System

The electronics used within the recycler comprises the following parts:-

- Main controller board
- Coin acceptor
- Coin transport
- Auto reject
- Coin hoppers

9.1 Description of Main Modules and systems

9.11 Main Controller Board

- 32 bit processor based core comprising 1 x PWM motor controllers, 3 x dedicated serial ports, I2C and parallel external interfaces for supervisory control and multi-channel A/D ports
- Firmware upgradeable via USB interface
- Battery backed Real Time Clock data memory to ensure continuous time/date/data storage.
- Bi-directional motor control for singulator, escalator and motorised reject via Pulse Width Modulation (PWM) comprising speed and current feedback for dynamic speed control and jam prevention.
- Main supply lines monitoring for brown out and drop out safety control
- Current monitor circuitry for 24v and 5v

9.12 Coin Acceptor

The recycler is designed to function with either the NRI Eagle coin acceptor. The acceptor controls or interacts directly with the following components:

- Main controller board
 - Acceptor relays credit information to the main controller board
 - Integrated 4-way sorter
 - Valid coins are sorted to one of the four paths
- Reject path
 - Coins which are not recognised as valid are routed to the reject path
- Coin acceptor chute
 - The chute that feeds coins to the coin acceptor is monitored for approaching coins
- Manifold control
 - The manifold is controlled by the coin acceptor to further sort the coins

9.13 Coin Transport

- The input flap solenoid operated allowing access to the entry chute when the recycler is enabled
- Coin entry chute gravity fed chute
- Singulator motor driven track
- Coin acceptor chute gravity fed
- Coin acceptor gravity fed with solenoid operated accept/reject path
- 4 way sorter solenoids (two) operate to sort gravity fed coins
- Manifold solenoid operated to sort gravity fed coins
- Hoppers motor driven dispensers
- Escalator motor driven track
- Coin output gravity fed chute

9.14 Interlocks and sensors

- Singulator door switch prevents recycler operating whilst door is open
- Escalator door switch prevents recycler operating whilst door is open
- Cashbox present switch prevents recycler operating cashbox is missing
- Avalanche sensor entry flap is closed if overwhelming coin flow is detected
- Singulator approach coil detects coins on the singulator track
- DCE chute detects coins passing through the chute
- Coin acceptor sensors detect and verify coin type
- 4 way sorter detect passing coins
- Manifold detect passing coins with visual indicators
- Hopper exit sensor detects coins being dispensed
- Escalator approach coil detects coins on the escalator track

9.15 Coin Hoppers

- Based on the Compact Hopper these are simple single coin denomination payout units
- Jam resistant
- High speed payout

10. Refilling Hoppers

10.1 Automatic sorting and filling – topping up

Coins placed into the recycler via the coin entry chute will be sorted automatically into their respective hoppers. If too many coins enter the coin entry chute, then the entry chute closes, reopening when the preceding coins have been processed. If the hoppers are close to empty, then manual filling is preferable to save time.

10.11 Refill Mode

The host can place the recycler in refill mode. In this mode the system is optimised for refilling e.g. coin validation scrutiny is relaxed. Refer to Host Specification Manual TSP151 for more details

10.2 Manual Coin Filling

Pull forward the hopper tray. Fill hoppers, taking care that the coins do not fall between the hoppers or mix into the other hoppers. Ensure that debris e.g. coin bag etc. does not enter the hoppers. Do not overfill. Do not force down or shake coins into the hopper as this may increase the risk of a coin jam. Slide back the hopper tray.

11. Maintenance and Cleaning

Cleaning and preventative maintenance are largely dependent on the environment that the recycler is installed into, and what the operator and the end user put into it.

Coins, in general circulation, carry varying levels of contamination. This results in deposits being transferred onto the surfaces that they meet within the recycler. These deposits can build up at different rates, depending on how contaminated the coins are, and can reduce the performance of the recycler. For example coins may become more contaminated in locations where people are eating with their fingers etc.

The operator should look for and monitor dirt build-up, cleaning the unit on a regular basis as required; this may be determined to be monthly, quarterly or annually depending on how many coins go through the recycler and how much deposit has been left behind.

A reduction in performance, e.g. lower acceptance rate or higher jam rate, may be an indication that the recycler requires cleaning.

The recycler should be inspected each day for any foreign objects which may have entered the recycler.

To reduce the incidents where the recycler may go offline due to foreign objects:

Ensure the operator and customer know that the coin entry area is for coins only – inserting non-coin objects will potentially cause a malfunction.

In retail environments, ensure that there is clear signage for receipt disposal slots – unwanted receipts/coupons etc. must not enter the recycler.

Foreign object – whilst small particles of debris (<5mm dia.) will pass through the recycler, larger foreign objects can cause the recycler to go offline requiring manual intervention. These objects can normally be retrieved via the side access doors. If necessary, the design of the entry cup should be considered, to prevent larger objects from entering the recycler.

Coin jam – the recycler is able to detect and, in most cases, clear a coin jam. Damaged or bent coins, however, may require the operator to manually remove the coin. Normally these coins would be rejected, if they had been inserted via the coin entry chute; however they are sometimes introduced by the operator during the hopper refill process (when emptying bags/rolls etc. directly into the hopper.)

Cleaning and inspection				
	Check for foreign objects	Clean		
Coin input output chute	Daily	3-6 months or 100000 coins		
Singulator	Daily	3-6 months or 100000 coins		
Coin Acceptor	If poor acceptance is seen	When acceptance rate drops		
Escalator	Daily	3-6 months or 100000 coins		
Hoppers	Daily or when filled	3-6 months or 100000 coins		

The unit should be inspected on a regular basis and cleaned as necessary to remove any dirt build up. A damp microfiber or lint-free cloth is all that is needed, in most cases, to remove typical residue. Cleaning wipes may also be used as necessary.

Under NO circumstances should any solvent, abrasive or foam-type cleaner be used

Before undertaking any cleaning work, ensure that the recycler is powered down. Ensure the power indicator is not lit.



11.1 Cleaning a Hopper

Before undertaking any cleaning work, ensure that the recycler is powered down. Ensure the power indicator is not lit.



General cleaning of the hopper bowl can be done using a damp lint free or microfiber cloth. The hoppers may need a more detailed clean if there is reduction in performance e.g. intermittent or regular payout errors.

- Ensure the recycler is powered off •
- Pull out hopper tray
- Remove hopper to be cleaned (refer to Hoppers errors section, if necessary, to identify which hopper) •
- Remove all coins from bowl
- Wipe the inside of the bowl with a damp lint free or microfiber cloth
- Do not rotate the coin disk whist any coins are still present coins could be ejected at high velocity.
- Separate the hopper bowl from its base as follows: •
- Whilst pressing out the two bowl securing clips, push the bowl up until it is clear of the clips (fig 11-1)





fig 11-1

- Slide the bowl forward until the • locating lugs, at the front of the bowl, are clear of their slots in the base (fig 11-2)
- Lift out the rear chute to reveal the • coin exit window opto-slot



- Remove any debris from the coin exit window opto-• slot area (fig 11-3).
- Using a damp ear bud (or similar), clean the hopper exit • window opto-slot (fig 11-4)
- fig 11-3



fig 11-4

- Remove any debris from around and under the coin disk area • (fig 11-5)
- Reassemble as follows:
 - Ensure the rear chute is in position
 - Engage the bowl front lugs first, then rear clips
 - Ensure cables are not trapped
- Replace hopper and refill.
- Slide back hopper tray and test the hopper



fig 11-5

11.2 Cleaning the Coin Acceptor Eagle

The coin acceptor may need cleaning if the acceptance rate is lower than normal.

Before undertaking any cleaning work, ensure that the recycler is powered down. Ensure the power indicator is not lit.





Carefully unplug the coin acceptor chute/manifold and power/comms connections.

Push the red locking latch to the right to release the coin acceptor (fig 11-6)

Tilt the coin acceptor forwards, on its locating pins, and lift clear.

Important - The coin acceptor is delicate and easily damaged. Always handle with care. Never drop the coin acceptor.



fig 11-6

Turn the unit over.

Open the flight deck door (fig 11-7) and check for signs of dirt and debris.

Using a damp lint free or microfiber cloth, gently wipe away any dirt and debris in the areas highlighted.

Cleaning wipes may also be used as necessary.

Under NO circumstances should any solvent, abrasive or foam type cleaner be used

Important: When the flight deck is closed ensure the holding spring is reset by pressing the spring button. A click sound confirms the spring has engaged. If this step is skipped then coins will not be accepted correctly.



fig 11-7

Note: The flight deck is held closed with a spring, it must be secured with the 'Locking Tab'

Refit the coin acceptor by firstly, engaging the lower locating pins into their positions. Push the coin acceptor back into position until the latch engages with the top locating pin (fig 11-8). Only minimal force is required to refit the coin acceptor. Never force the coin acceptor back into position, if necessary, remove and check the lower locating pins are correctly engaged.

Reconnect the coin acceptor chute/manifold and power/comms connections taking care to plug them in correctly.



fig 11-8

Test the recycler after the coin acceptor has been refitted, ensuring all coins are accepted and routed correctly.

11.3 Cleaning the manifold

Red LED indicators are used to indicate passing coins, flashing on briefly as each coin passes through. If these LEDs are lit constantly (fig 11-9) then the manifold should be inspected for a blockage or dirt build-up. Use an air duster to clear the manifold optos and prisms.

The manifold can be accessed after removing the coin acceptor.

An air duster will aid cleaning the optos, prisms and through-holes in each gate (fig 11-10 & fig 11-11).

The manifold gates are linked and freely move together; Whilst it is possible to move the gates with a finger, avoid excessive force.

11.4 Cleaning the coin rundowns

The rundowns can be cleaned by inserting a damp cotton bud or similar from the top. Open the hopper tray to avoid and dirt or debris passing down into the hoppers.





fig 11-10

fig 11-11





11.5 Cleaning the input output chute

Using a damp lint free or microfiber cloth, gently wipe away any dirt or debris from all coin paths (fig 11-13 & fig 11-14). Cleaning wipes may also be used as necessary.

Clean areas show in orange



fig 11-13



fig 11-14



fig 11-15



PUSH BUTTON



If the input output chute is particularly dirty then a more detailed clean may be necessary. Remove the chute by pressing the release button on the underside and lifting the chute up (fig 11-15).

Carefully unplug the two connecting cables (fig 11-16).



fig 11-16

Using a damp lint free or microfiber cloth, gently wipe away any dirt or debris from the coin exit chute (fig 11-17). Cleaning wipes may also be used as necessary.

Clean the coin sensor prism on all four surfaces (fig 11-17)



fig 11-17

Clean the escalator exit chute using a damp lint free or microfiber cloth (fig 11-18). Cleaning wipes may also be used as necessary.

Carefully reconnect the two connecting cables. Refit the input output chute by engaging its five mounting pins into the slotted holes.



fig 11-18

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Push down until it engages with the latch (fig 11-19).



fig 11-19

12. Troubleshooting

The following section details the areas to check should the recycler report an error. Before calling for service any fault code must be noted.

12.1 Status LEDs

There are five status LEDs (fig 12-2) visible through the cover (Error! Reference source not found. & Error! ference source not found.). In normal operation the green power led (LED 5) will be on, the green communication led (LED 2) will flicker and the heartbeat indicator (LED 1) flashes. If LED 1 is not lit then check the power to the recycler.

If the recycler detects a fault then 2 red led's, LED 3 and LED 4, flash an error code to indicate the area of trouble.

The Eagle Coin Acceptor also has a Red status LED – see table below.





fig 12-2

fig 12-1

BCR Diagnostics LED functions:				
LED	SYM	Function	Description	
LED 1	¥	Heartbeat	Flashing green during normal operation	
LED 2	1	Communication Link	Flickering green during normal operation	
LED 3	Х	Fault Code X	Flashes red fault code (Area)	
LED 4	Υ	Fault Code Y	Flashes red fault code (Description)	
LED 5	Ċ	Power	Steady green	

Eagle Coin Acceptor LED Status			
OFF	No Power or Coin Acceptor disconnected		
Flashing on/off	Normal operation		
Flashing x3 then pause	Abnormal condition, acceptor disabled		

12.2 XY Error codes

If a fault is detected, the recycler will stop and display an XY error code by means of two red LED indicators; LED3 and LED4. The error code can be read to determine where the problem area is and what the problem is in that area.

LED3 [code X] is flashed first, then LED4 [code Y]. This XY code repeats until the fault condition is cleared and the recycler restarted. Refer to the XY error code table to check the relevant area of the recycler for signs of the problem.

Example:



Read: X1, Y2. Problem: The hopper tray is not fully pushed back.

Observe and make a note of the error code.

12.3 Area of Error

LED3 flash code refers to the area of the problem: The errors are as follows:





fig 12-5



fig 12-4

fig 12-3

12.4 Types of Error

CONFIG Configuration Error

A simple check and corrective action by the operator will resolve these errors. Errors which are easily clearable, e.g. singulator door has been left open – resolve by closing door and restarting the recycler.

JAM Coin Jam or foreign object **

The fault could be caused by a coin jam or foreign object which would be possible to clear by the operator. eg possible coin jam in hopper – resolve by removing jammed coin and restarting the recycler.

FAULT Faulty Unit **

The diagnostics indicate a possible fault in a sub-system or component. A service callout maybe required.

**Important – If the error has been identified as JAM or FAULT then remove the power to the recycler before investigating the problem.



Note that some fault conditions are only detected when a money in or money out transaction is in progress.

Some errors can be cleared by pressing the restart button

Refer to the table, on the next page, when any error codes are observed.

XY E	XY Error code table				
Flash	codes	Area of Error	Description of Error	Type of	Action
LED3 X	LED4 Y			Error	
1	1	System	Coin acceptor missing	CONFIG	Check connections to coin acceptor
1	2	System	Hopper tray missing	CONFIG	Ensure hopper tray is home and locked
1	3	System	Must have at least 1 hopper fitted	CONFIG	Check hoppers are fitted. Ensure hopper tray is home.
1	4	System	Must have a hopper dispensing the lowest-value coin in that currency	CONFIG	Check 1 cent hopper is fitted
1	5	System	Must have at least 1 hopper with a matching coin in the coin acceptor	CONFIG	Check hoppers for correct currency
1	6	System	Initialisation timeout	FAULT	Check for too many coins in singulator.
1	7	System	Cashbox missing	CONFIG	Check cashbox is present and pushed in.
1	8	System	Cashbox full (opto blocked)	CONFIG	Empty the cashbox
1	9	System	Avalanche coin detected with entry flap shut	CONFIG	Check entry chute for debris or obstructions
1	10	System	Singulator coin seen without belt moving	FAULT	Check for coins in singulator.
1	11	System	Escalator coin seen without belt moving	FAULT	Check for coins in escalator.
1	12	System	The exit cup full sensor is blocked during purge	JAM	Check exit cup area for blockage or jam
1	13	System	Mixed currencies have been programmed into the coin acceptor	CONFIG	Ensure correct coin files and firmware are installed
1	14	System	Mixed currencies have been programmed into the hoppers	CONFIG	Ensure correct coin files and firmware are installed
2	1	Coin Acceptor	Unhandled coin acceptor event	FAULT	Check and clean coin acceptor.
2	2	Coin Acceptor	Coin specification programming error	FAULT	Reload coin files.
2	3	Coin Acceptor	EEPROM checksum corrupt	FAULT	Restart the recycler, if error persists call for service.
2	4	Coin Acceptor	Fault / block detected on validation coils	JAM	Check and clean coin acceptor.
2	5	Coin Acceptor	Fault / block detected on credit sensor loop coil	JAM	Check and clean coin acceptor.
2	6	Coin Acceptor	Fault detected on piezo sensor	FAULT	Check and clean coin acceptor.
2	7	Coin Acceptor	Fault / block detected on sorter optos	JAM	Check and clean coin acceptor 4 way & manifold
2	8	Coin Acceptor	Fault detected on coin return mechanism (motorised reject stuck open)	JAM	Check and clean coin acceptor.
2	9	Coin Acceptor	Fault detected on temperature measurement thermistor	FAULT	Restart the recycler, if error persists call for service.
2	10	Coin Acceptor	Fault / block detected on coin acceptor DCE (singulator exit sensor)	JAM	Check DCE chute
2	11	Coin Acceptor	Incorrect coin acceptor firmware (not BRM-F1-Vx.xx)	CONFIG	Check coin acceptor is correct part
2	12	Coin Acceptor	Coin acceptor firmware requires updating to a newer version	CONFIG	Load current firmware into coin acceptor
2	13	Coin Acceptor	Incorrect coin acceptor build	CONFIG	Check coin acceptor is correct part
2	14	Coin Acceptor	Coin acceptor to manifold opto fault. This error is non-fatal.	CONFIG	Check connections to coin acceptor
2	15	Coin Acceptor	Fault detected on coin acceptor DCE (= singulator exit sensor)	JAM	Check DCE chute

Refer to the diagram on the next page to identify the hopper position, within the recycler, from the X code (3 to 8)					
3 to 8	1	Hopper 1 to 6	Hopper is empty but required for payout	CONFIG	Refill hopper
3 to 8	2	Hopper 1 to 6	Maximum allowed current exceeded	JAM	Check hopper for jam
3 to 8	3	Hopper 1 to 6	Opto blocked during idle	JAM	Check hopper exit chute
3 to 8	4	Hopper 1 to 6	Opto short-circuit during idle	FAULT	Check hopper exit chute
3 to 8	5	Hopper 1 to 6	Opto blocked during payout	JAM	Check hopper exit chute
3 to 8	6	Hopper 1 to 6	Opto short-circuit during payout	FAULT	Check hopper exit chute
3 to 8	7	Hopper 1 to 6	EEPROM checksum corrupt	FAULT	Replace hopper
3 to 8	8	Hopper 1 to 6	Power fail during EEPROM write	FAULT	Replace hopper
3 to 8	9	Hopper 1 to 6	Level sensor configuration error	FAULT	Check hopper level
					sense connector
3 to 8	10	Hopper 1 to 6	Reserved		
3 to 8	11	Hopper 1 to 6	Incorrect hopper firmware (not SCH2-Vx.x)	FAULT	Replace hopper
3 to 8	12	Hopper 1 to 6	Hopper firmware requires updating to a newer version	FAULT	Replace hopper
3 to 8	13	Hopper 1 to 6	Incorrect hopper build (see Request product code & Request build code)	FAULT	Replace hopper
3 to 8	14	Hopper 1 to 6	Bad hopper config indicates double bowl with another hopper in its footprint.	CONFIG	Reprogram or replace hopper
9	1	Controller Board	Fault with on-chip RAM	FAULT	Check or replace
9	2	Controller Board	Program checksum error	FAULT	Reprogram or replace controller board
9	3	Controller Board	Fault with NVRAM	FAULT	Check or replace
9	4	Controller Board	+5V rail out of spec.	FAULT	Check or replace
9	5	Controller Board	+24V rail out of spec	FAULT	Check power input
9	6	Controller Board	Real-time clock fault	FAULT	Check or replace battery
9	7	Controller Board	RTC battery low		Check or replace battery
9	8	Controller Board	Error during firmware upgrade	FAULT	Reprogram firmware
9	9	Controller Board	Stack overflow	FAULT	Check or replace
Ū.	Ŭ				controller board
10	1	Singulator	No motor tach signal	FAULT	Check singulator motor &
10	2	Singulator	Motor jammed / over-current detection	JAM	Check singulator for jam,
10	2	Cingulator	Deerenen	CONFIC	manually move belt
10	3	Singulator	Door open		
10	4	Singulator	Singulator belt sensor missing	FAULT	Check sensor & cabling
10	5	Singulator	Singulator belt sensor blocked	JAM	Check for jam, manually
					move belt
10	6	Singulator	Singulator belt broken	FAULT	Re-attach belt
11	1	Escalator	No motor tach signal	FAULT	Check escalator motor & cabling harness
11	2	Escalator	Motor jammed / over-current detection	JAM	Check escalator for jam, manually move belt
11	3	Escalator	Door open	CONFIG	Close door
11	4	Escalator	Coin return sensor missing	FAULT	Check sensor & cabling harness
11	5	Escalator	Coin return sensor blocked	JAM	Check for jam, manually move belt
12	1	Auto Reject	Micro-switch faulty	FAULT	Check reject switch & cabling harness
12	2	Auto Reject	Motor jammed / over-current detection	FAULT	Check coin acceptor and reject cam

Note that some fault conditions are only detected when a money in or money out transaction is in progress.

12.5 Hopper errors

When attending to hopper errors, use the following table and image to determine which hopper is indicated and where it is located:

Flash	Physical location		
code X			
3	Front		
4	2 nd from front		
5	3 rd from front		
6	4 th from front		
7	5 th from front		
8	Back		

Example error X3, Y3 - check hopper located at address 3 (front).



fig 12-6

X flash	Y flash	Hopper affected
X Y x3	x2 x3 x5	
X Y ♥ ♥ (x4	x2 x3 x5	
x y x5	x2 x3 x5	
x Y ♥ ♥ x6	x y x2 x3 y y x5	
X Y ♥ ♥ x7	x2 x3 x5	
x y x8	x y x2 x3 y y x5	

12.51 Double hoppers

Double bowl hoppers occupy two spaces on the hopper tray, however only one connection. This should be considered when determining any hopper related error code:





12.51,1 Three hoppers

The double hoppers in a three hopper recycler are fitted in the following configuration. The respective error codes that could be encountered are shown





X flash	Y flash	Hopper affected
x Y V V X 4	x2 x3 x5	
x ¥ ₩ ₩ x6	x2 x3 x5	
x Y V V X X	x2 x3 x5	

12.51,2 Four Hoppers

The double hoppers in a four hopper recycler could be fitted in a number of configurations. The respective error codes that could be encountered in this example are shown



fig 12-9

X flash	Y flash	Hopper affected
X V Ø Ø ₫	x2 x3 x5	
x Y F F x5	x y x2 x3 x5	
x6	x2 x3 x5	
x Y x8	x2 x3 x5	

12.51,3 Five hoppers

The double hopper in a five hopper recycler could be fitted in a number of configurations. The respective error codes that could be encountered in this example are shown.



fig 12-10

X flash	Y flash	Hopper affected	
x v v x3	x2 x3 x5		
X Y Ø Ø ₩ K	x2 x3 x5		
X Y x6	x2 x3 x5		
X Y ₩ ₩ x7	x2 x3 x5		
X Y ₩ ₩ k	x y x2 x3 x5		

13. Clearing Jams

The recycler is capable of detecting and clearing most jams automatically.

A common cause of jamming is damaged or bent coins. Do not put these coins back into the recycler. Foreign objects and debris may cause the recycler to malfunction or jam.

In situation where by the recycler cannot clear a jam then an error code is displayed, refer to the Troubleshooting section for more details.

Before attempting to clear any coin jams, ensure that the power to the recycler is disconnected. Ensure the power indicator is not lit.



13.1 Singulator

The singulator belt will reverse in the event a jam is detected. If the jam is not cleared by this action then the recycler will report an XY error (see Troubleshooting section) [Error codes X10, Y2 & X10, Y5]

- Ensure power is off
- Open the singulator door
- Rotate the track anticlockwise then clockwise to clear the jam
- Remove any foreign objects
- Inspect any recovered jammed coins for signs of damage do not put these back into the recycler
- Inspect the singulator for damage
- If the jam cannot be cleared manually call for service

13.2 Coin Acceptor

The motorised reject system automatically attempts to clear any jams detected in the coin acceptor. Where a jam persists then the recycler will report an XY error (see Troubleshooting section) [Error codes X2,Y4 X2,Y5 X2,Y7 X2,Y8 X2,Y10]

- Ensure power is off
- Remove coin acceptor (Refer to cleaning section)
- Check for stuck coins and foreign objects in all of the following areas
 - o Coin acceptor chute
 - Coin acceptor flight deck
 - 4 way sorter
 - Manifold
 - Manifold coin rundowns

13.3 Hopper

The hopper may be jammed or need cleaning if the following are true:

Coins are present in the hopper but do not get dispensed

The recycler reports an XY error (see Troubleshooting section) [Error codes X3-8,Y2 X3-8,Y3 X3-8,Y5]

- Slide out hopper tray
- Remove hopper which is jammed (refer to Hopper errors section, if necessary, to identify which hopper)
- Remove all coins from bowl
- Inspect hopper for any remaining stuck coins or debris and remove.
- If necessary separate hopper bowl to access hopper disc and exit slot; refer to Cleaning section for details.
- Clear any jammed coin(s) by either:
 - Rotating the coin disk manually*, first anti-clockwise then clockwise to free the coin(s) or
 - Push the coin(s) back in using another coin

* Keep away from face as a stuck coin could be ejected at high velocity.

- Remove any debris from around and under the coin disk area
- Whilst apart inspect and, if necessary, clean the exit window opto-slot using a damp ear bud (or similar).
- Re-assemble and test the hopper

Note: A common cause of jamming is damaged or bent coins. Do not put these coins back into the recycler.

14. Service Schedule

If service is required then the technicians who call to attend to any service related issues must be fully trained on the recycler.

Service Schedule		
Every 3 years* ¹	Replace RTC battery	
Hopper at 500,000* ² coins	Replace hopper ejector fingers and spring	
Hopper at 1,000,000* ² coins	Replace hopper adjuster plate	
Expected overall product lifetime*3	5 million coins*4 with routine maintenance	

^{*1} when changing the battery ensure that power to the unit is removed. Refer to Technical manual for details.

^{*} Figures refer to each individual coin hopper. In a typical installation whereby 6 hoppers are present and give change in one currency, it is unlikely that any individual hopper will require service before the end of the overall expected product life.
 ^{*3} the point at which failures occur at a higher than specified rate (usually increasing), even with preventative

*³ the point at which failures occur at a higher than specified rate (usually increasing), even with preventative maintenance at the prescribed intervals, as a result of use or wear. Often this is also the point at which replacement becomes more economical than repair.

*⁴ Figure includes coins in and out.

15. Power Supply Specification

	Quiescent	Coin-in (max)	Coin-out
Mean Current *	165mA	380mA (640mA)	430mA
Peak *	340mA <20uS	1.5A <300mS (2.4A <400mS)	1.07A <200mS

* Nominal operation

Starting current 1A <250mS Peak jam current 10A <250mS

The Control PCB has connection provision to supply auxiliary circuitry e.g. coin cup illumination. This output is limited to 150mA.

Supply: 24V DC +/- 5%



Power supply and communication connection. Use either

- 1. The red connector and USB B or
- 2. The black combination connector

16. Exploded Parts View



17. Appendix A





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