

# MK2 Serial Compact Hopper User Manual



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## 1. Diary of changes

Issue 1.0.....	26 <sup>th</sup> September 2002
➤ First Issue	
Issue 1.1.....	18 <sup>th</sup> August 2003
➤ Changed ccTalk <sup>®</sup> to ccTalk throughout the document.	
➤ Updated section <a href="#">7.1 Serial Connector Type:</a> .	
➤ Applied TMWP V3.2.	
Issue 1.2.....	24 <sup>th</sup> September 2003
➤ Added section <a href="#">7.3 Level Sense Connector</a> .	
➤ Ammended coin sizes in section <a href="#">3.3</a> .	
Issue 1.3.....	30 <sup>th</sup> June 2004
➤ Changed footer	

## 2. Introduction

The Serial Compact Hopper MK2 (SCH2) is a serially controlled version of the Compact Hopper.

Rather than using the parallel interface of the standard Compact Hopper, the SCH2 uses a serial interface called “ccTalk”.

The SCH2 has proved security features as well as the ability to “daisy chain” multiple devices to the same wiring bus. It is also possible with SCH2 to integrate other Money Transaction devices such as coin, note or card acceptors.



### 3. Mechanical Features

#### 3.1 Hopper Dimensions

The hopper overall dimensions, mounting arrangement, coin entry and exit points are detailed in [Figure 1](#). Note that, when used in the side exit mode, the rear of the motor protrudes from the rear of the casing, within the overall dimensions of the hopper envelope.

#### 3.2 Hopper Weight

570 grams

#### 3.3 Coin Size Range

Hoppers can be configured to pay out coins in the diameter range 16.25 - 31.0mm, and within the thickness range 1.25-3.20mm. However, each coin needs to be qualified on an individual coin basis.

*For further information on qualification of coins, please contact Money Controls Technical Services Department.*

#### 3.4 Coin Capacity

The coin capacity of the hopper is between 200 and 1000 depending on their physical size.

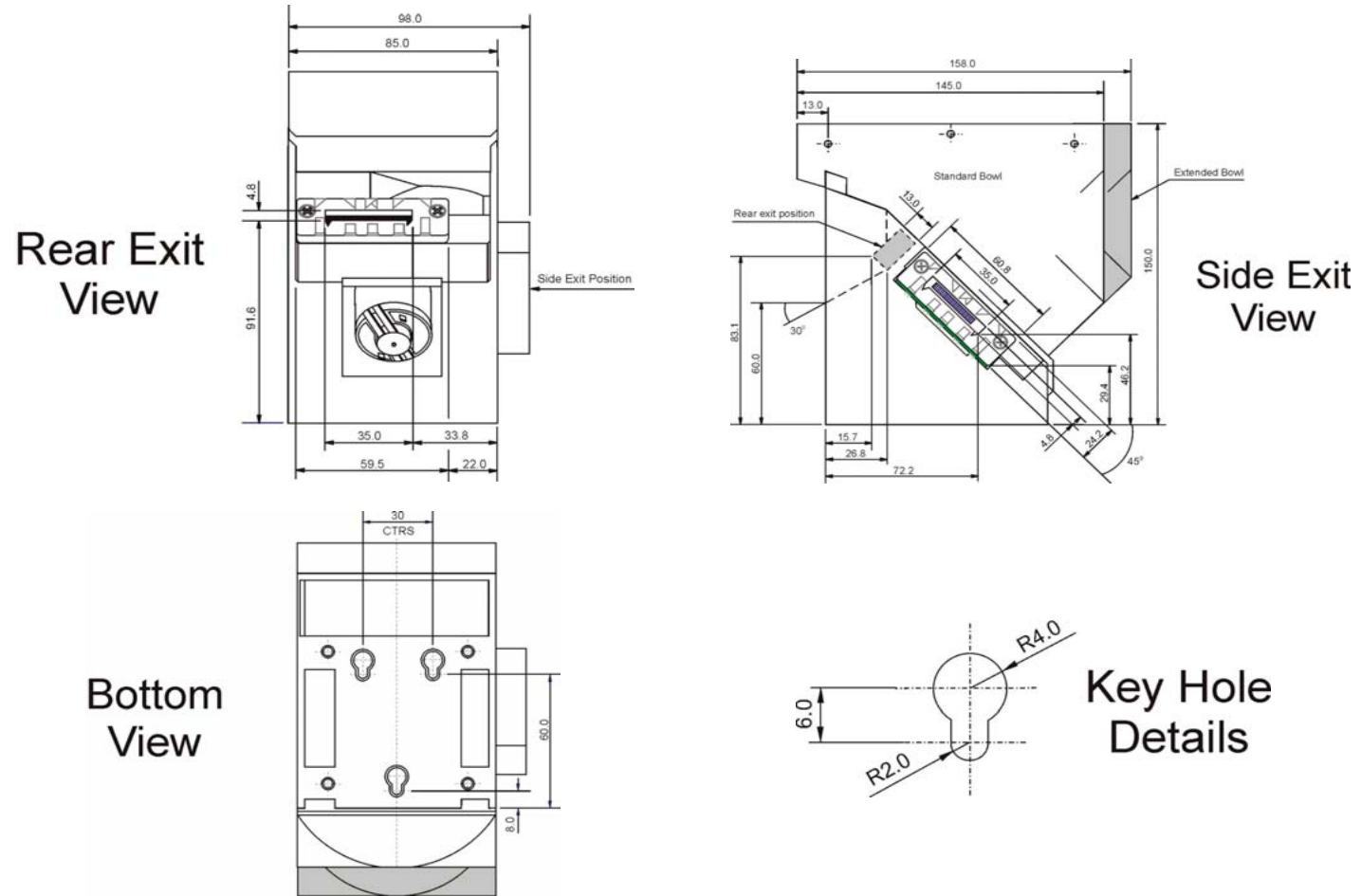
*Table 1: Coin Capacities*

Coin	Diameter (mm)	Thickness (mm)	SCH2 STD	SCH2 Extended
£2	28.40	2.50	189	252
£1	22.50	3.10	235	314
50p new	27.30	1.80	282	376
20p	21.40	1.80	459	613
10p	24.50	1.83	349	465
5p	18.00	1.73	679	905
2p	25.90	1.80	316	421
1p	20.25	1.43	652	870

**Note: these capacities are subject to a +/- 10% error.**

### 4. Overall Dimensions

Figure 1: Hopper Dimensions



## 5. Installation and Removal

**Warning: Ensure that the power has been disconnected from the hopper before removal.**

### 5.1 Securing the hopper base

- Two sets of fixing holes have been provided in the base to allow the hopper to be secured in a host machine.

### 5.2 Using the 4mm Holes

- Drill 4 holes on the centres
- Dismantle the hopper
- Place base over holes and fix into position using M3 screws

### 5.3 Using the keyholes

- Drill 3 holes in the centres shown
- Insert 3 holes on the centres shown
- Insert 3 x M3.5 screws. DO NOT tighten
- Dismantle the hopper
- Place base over the back and push far back as possible
- Tighten the screws to fit the base in position

### 5.4 Dismantling the hopper

- Gently pull out the securing clips on the back of the base.
- Tilt the bowl forward until it is clear of the clips.
- Slide the bowl forward until the locating lugs are clear of the slots in the base.
- Remove the motor assembly from the base and disconnect the cable.

### 5.5 Hopper Assembly

- Connect the cable to the motor assembly.
- Lower the motor assembly into the base, ensuring the coin exit is in the desired position.
- Locate the lugs at the front of the bowl into the slots at the front of the base.
- Gently press down on the top of the bowl until the securing clips (on the base) click into the slots on the bowl.

## 6. Mechanical Description

Each disc contains a number of holes in which the coins are held. The disc is driven via a gear train, by the motor. As the disc rotates, the coin at the bottom of one of the stacks will make contact with the ejector fingers. The fingers will move back and, at the same time, the coin will start to move outwards to the exit slot.

Once the coin reaches the exit slot, the spring loaded ejector fingers will be able to return to their original position and, in doing so, will push the coin out of the hopper.

An optical coin detector is created by infrared transmitters and photo detectors situated on the PCB. The infrared light beam is routed across the exit slot via a light guide. When a coin passes through the exit the light beam will be broken and a coin output signal will be generated.

There are a range of discs, ejector fingers and adjuster plates available to provide optimum performance for coins within the specified range.



## 7. ccTalk Interface

The SCH2 uses ccTalk interface with a 10 pin connector with the pinouts as follows:-

*Table 2: ccTalk pin out*

Pin	Function
1	Address Select 3 – MSB
2	Address Select 2
3	Address Select 1 – LSB
4	+ V s
5	+ V s
6	0V
7	0V
8	/DATA (ccTalk)
9	N/C
10	/RESET

ccTalk parameters:

Remember to configure the baud rate to 9600.

**The hopper can only operate at 9600 baud.**

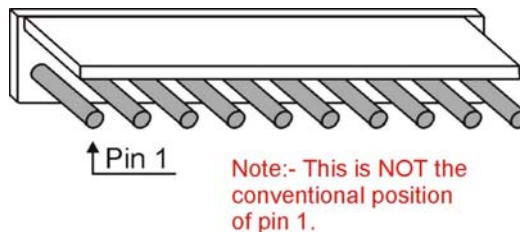
**Note: Refer to issue 4.2 of the 'ccTalk Serial Communication Protocol/Generic Specification' for an explanation of the protocol and it's implementation on any platform.**

### 7.1 Serial Connector Type:

PCB Connector

2.54mm (0.1-inch) pitch 10 way with locking wall.

Part number: Molex 22-27-2101 or equivalent



Serial Connector Pinout:-

Operation can be achieved with just 3 wires.

+24 V to pin 4.

GND to pin 6.

Bi-directional serial data line to pin 8.

Pins 4 and 5, and pins 6 and 7 are linked internally. The provision of extra pins is to simplify the manufacture of a multi-drop cable using thicker wire for the power leads. There can be a 'power in' and a 'power out' pin, and the hoppers can be 'daisy chained'.

## 7.2 Address Selection:

The default ccTalk bus address for a 'payout' device is 3. This is the address of the Serial Compact Hopper if no connections are made to the address select pins (pins 1 to 3) on the connector.

*Table 3: Address Selection*

Address Select 3	Address Select 2	Address Select 1	Serial Address
			3
		X	4
	X		5
	X	X	6
X			7
X		X	8
X	X		9
X	X	X	10

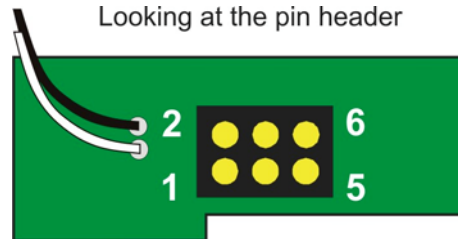
For applications requiring more than one hopper on the serial bus, one or more of the address select lines may be connected to +Vs. A total of 8 unique bus address may be generated in this way, in the range 3 to 10 inclusive.

**X = Connect to +Vs**

A number of mating connections on a multi drop bus cable may be wired uniquely to allow operation of multiple hoppers. Since address selection is done externally, any Serial Compact Hopper may be plugged into any position on the bus and the host machine will know which one is paying out a particular coin. Address determination from the connector is only done at power up or reset. Changing the address select lines afterwards has no effect.

### 7.3 Level Sense Connector

Figure 2: Level Sense Connector



Pin	Function
1	High Level Plate
3	Low Level Plate
5	Plate Common
2	High Level Link
4	Low Level Link
6	Link Common

#### Operation

To notify the hopper software that level plate sensors are fitted, the link pins should be connected as follows...

Mode	Connections
High level plates only	pin 2 to pin 4
Low level plates only	pin 4 to pin 6
High & low level plates	pin 2 to pin 4 to pin 6

Otherwise, no connections should be made.

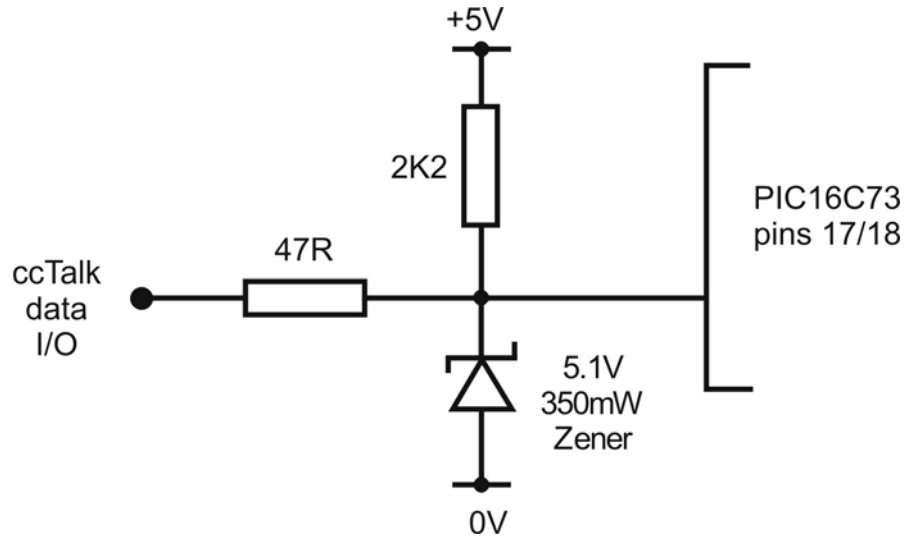
The level plates themselves should be connected through the corresponding plate pin ( pin 1 for high level, pin 3 for low level ) and the plate common ( pin 5 ).

## 7.4 ccTalk Interface Circuit:

This is the ccTalk electronic interface circuit on SCH2.

There are many options for the host interface circuit but we recommend an open collector drive.

*Figure 3: ccTalk cct.*



## 8. Maintenance

Warning: Coin dust may accumulate in the hopper during use. Inhalation of the dust should be avoided during maintenance operation. Ensure that the power has been disconnected before any maintenance operations are performed.

*Table 4: Maintenance Schedule*

Maintenance Schedule	
Every 50,000 to 100,000 depending on coin type.	Using a mild detergent on a damp cloth. No spray solvents should be used.
Every 500,000 coins	Replace ejector fingers and spring
Every 1,000,000 coins	Replace adjuster plate
Expected product lifetime	3 Million coins (with routine maintenance)

### 8.1 Clearing a coin jam:

- Remove all coins from bowl.
- Remove motor assembly from base as described.
- Clear the jammed coin by either:
  - i. Rotating the disk manually, first anti-clockwise then clockwise to free the coin  
OR
  - ii. Push the coin back in using another coin.
- Remove any debris from the disk bed assembly.
- Clean the exit window opto with a clean dry cloth.
- Re-assemble, as described.
- Refill and test the hopper.

## 9. Electrical Specification

**MCL recommend a 24V, 4A power supply.**

24 volt motor version

*Table 5: Electrical Specification*

Electrical Specification	Value
Supply Voltage	+24V
Typical Operating Current/No Load	0.35A
Typical Operating Current/Max Load	0.9A
Surge Current/Start Up and Reverse	3.6A
Typical Payout Rate	8 to 10 coins per second

### 9.1 External Reset:

Signal, active low with 10K pull up to +5V

Input volts (low)	0.6V max
Input volts (High)	3.5V min (5.0V max)

### 9.2 Coin Payout:

*Table 6: Coin Payout Rate*

Mode	Rate
Multi coin payout	8 - 10 coins per second approx
Single coin payout	2 coins per second approx

### 9.3 Environmental:

*Table 7: Environmental Ranges*

Operating Temperature	0 to 60 <sup>0</sup> C
Storage Temperature	-20 to 70 <sup>0</sup> C
Operating Humidity	10 to 75% RH
Storage Humidity	10 to 95% RH non condensing

**Note: For cctalk protocol information, please contact Money Controls Technical Services Department on +44 161 955 0124.**

## 10. Fault Finding and Repair

*Table 8: Fault Finding and repair.*

<b>Problem:</b>	<b>Check:</b>	<b>Cure:</b>
Coins fail to unjam:	Ensure coin exit is clear.	Remove blockage from coin exit.
	Ensure correct coins in hopper.	Fill hopper with correct coins.
	Ensure no badly bent coins in hopper.	Remove bent coin/s.
Motor fails to run:	Supply fuse.	Replace fuse.
	Protection device tripped.	Wait 30 seconds with supply OFF.
	Hopper has detected an opto fault.	Check EEPROM flags.
Over payout of coins:	Check opto area/coin exit area for dirt.	Clean opto/coin exit area.
Under Payout Of Coins:	Check opto area/coin exit area for dirt.	Clean opto/coin exit area.
	Ensure hopper contains sufficient coins.	Refill hopper.

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