SR3 Type 1 Technical Manual

Money Controls

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1. Diary of Changes

Issue 2.0……………………………………………………………………………September 2000
Issue 3.0……………………………………………………………………………29th March 2002

- Title changed to SR3 Type 1
- Added credit code details
- Added label description
- Output diagrams added
- Totaliser option added
- Fault finding table added
- Sorter option added
- **ccTalk** headers and circuits added
- Power-up Diagnostics added
- Re-ordered headings
- Amended last page disclaimer
- Table references on page 13 corrected
- Table references on page 16 corrected
- Section references on page 16 corrected
- Table references on page 18 corrected
- Erase all windows **MechTool™** option added
- Dimensional information added
- Applied TMWP V3.0
- Pictures changed to .jpg
- Added section on available interface looms

Issue 4.0……………………………………………………………………………26th April 2002

- Added Figure 7: SR3 Parallel Connector
- Added switch drawings for visual indication

Issue 4.1……………………………………………………………………………6th Sept 2002

- Modification to disclaimer.

Issue 4.2……………………………………………………………………………18th Feb 2003

- Typing error in section 5.3 Pin 6 changed to Pin 5
- Applied TMWP V3.2
- Changed the 'high' voltage of Inhibit All.

Issue 4.3……………………………………………………………………………6th Aug 2003

- Changed ccTalk® to ccTalk throughout the document.

Issue 4.4……………………………………………………………………………30th June 2004

- Changed footer

2. Introduction

The SR3 series of coin acceptors has been designed to be compatible with the standard 3.5” mechanical and electronic acceptors currently used throughout the vending, amusement and leisure industries.

Through the development of Series Resonance Technology, the SR3 incorporates the highest levels of discrimination and functionality. Each acceptor within the series will accept up to 12 different coins from 15mm – 31mm in diameter.

The SR3 can be programmed on site without the use of coins using “**ccProgrammer**”, or using a **ccTeach** programmer but for total flexibility, if a new coin/token is required, the **Teach and Run™** function can be used.

The SR3 Type1 has the option to attach an external totaliser PCB and has the capability to drive an external sorter.

3. Mechanical Configuration

Figure 1: Accept and Reject Paths

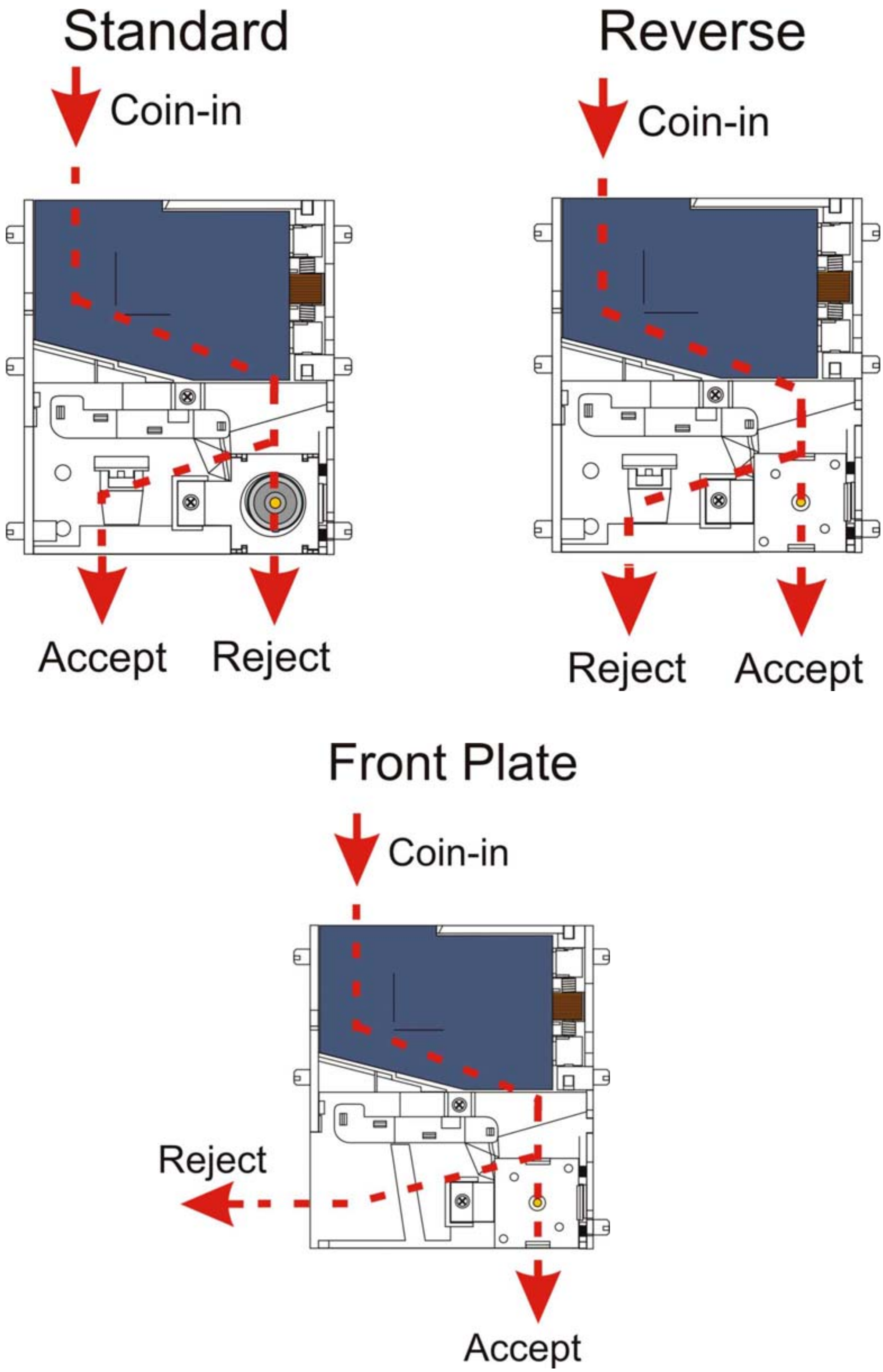


Figure 2: Front Plate Model Details

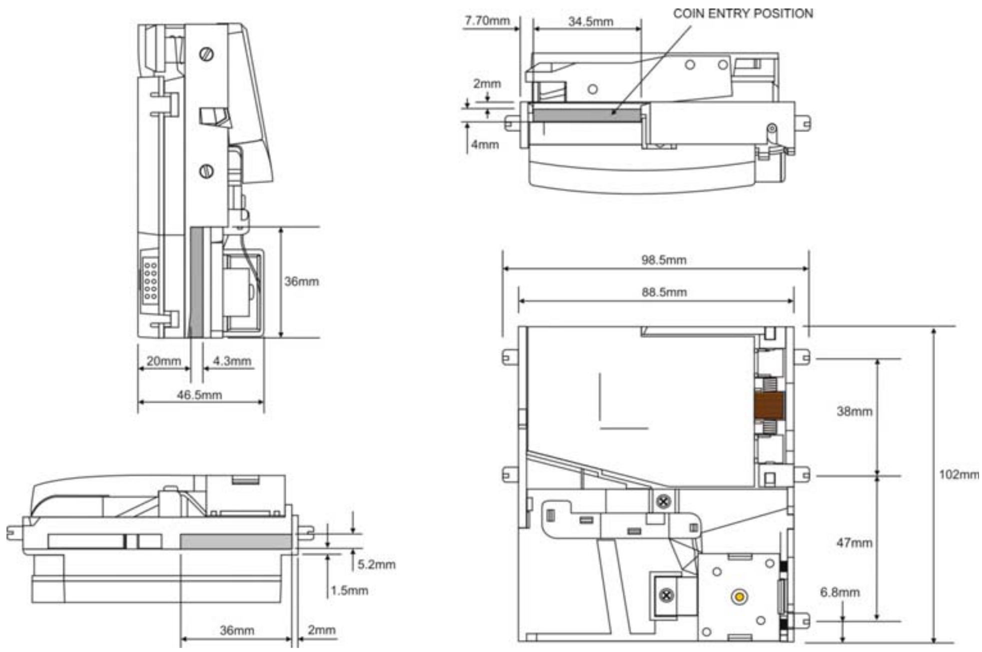


Figure 3: Front Plate Cut-out Details

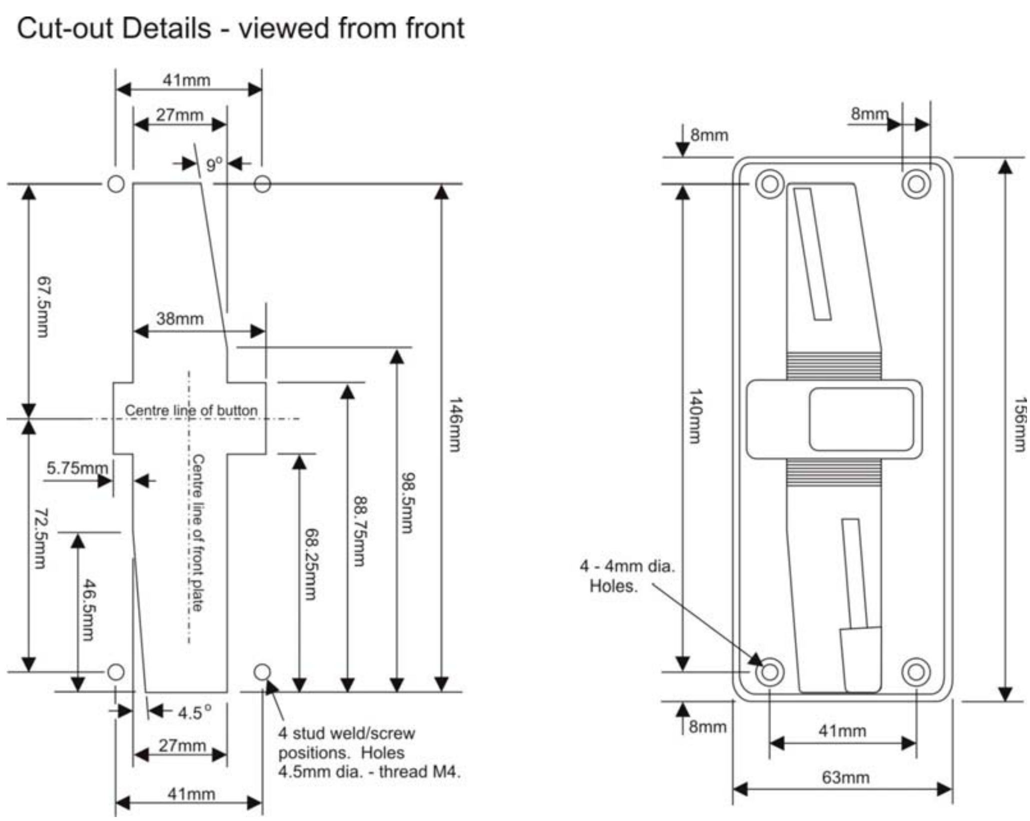


Figure 4: Standard Model Details

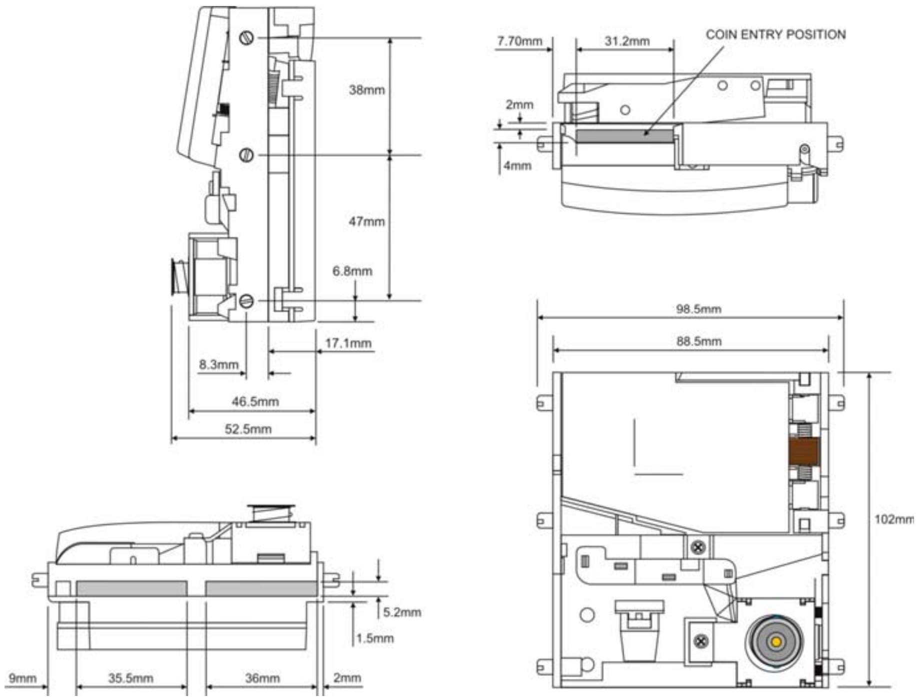
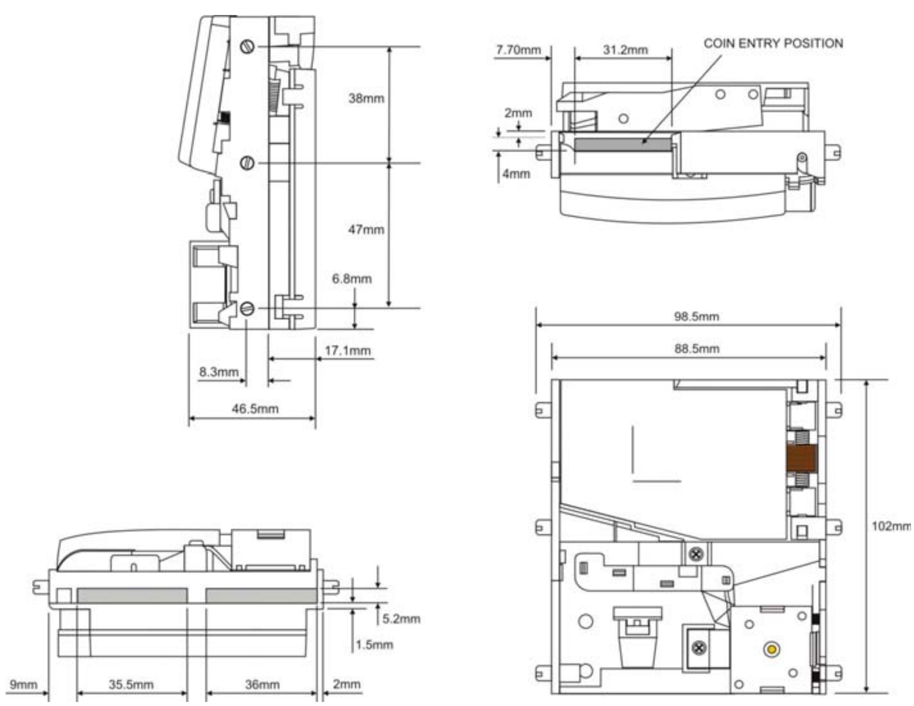


Figure 5: Reverse Model Details



4. Rear Cover Details

Figure 6: SR3 Connector Side

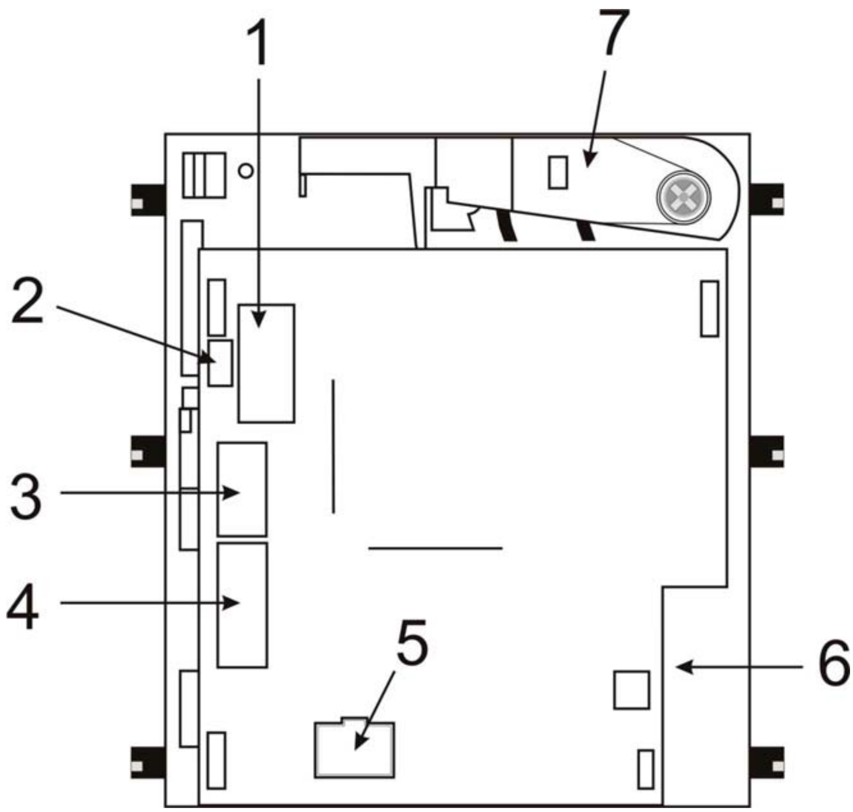


Table 1: SR3 Rear Cover Details.

1	Option Switches
2	LED
3	Serial Interface (ccTalk)
4	Sorter Connector
5	Totaliser Connector
6	Parallel Connector
7	Reject Lever

5. Parallel Interface

Figure 7: SR3 Parallel Connector

Industry standard interface.
Connector type: 10 pin DIL

Table 2: Parallel Interface

PIN	FUNCTION	ACTIVE
1	0 VOLTS	
2	+ SUPPLY	
3	Accept 5	Low
4	Accept 6	Low
5	Reject operated	Low
6	Inhibit All (Default Accept)	High
7	Accept 1	Low
8	Accept 2	Low
9	Accept 3	Low
10	Accept 4	Low

5.1 Inhibit All

When the input on pin 6 on the 10 way connector is high (>1.2 volts), all the coins will be rejected.

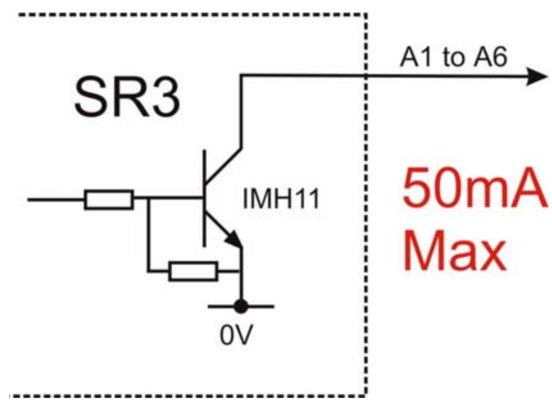
The Inhibit All pin has to be low (<1.2 volts) or not connected, in order for those coins not individually inhibited, determined by the programmed settings (See section 9), to be accepted.

If no coins are individually inhibited and both banks are enabled, then ALL coins will be accepted.

5.2 Coin Accept Outputs

Each coin accept output consists of an open collector NPN transistor. On acceptance of a true coin the transistor is turned on for a period of 100ms (+/- 20%) to less than 0.7 volts at a Max. 50mA. The host machine must look for valid credit pulses NOT LESS THAN 50ms. It is not sufficient to merely detect the edges of credit pulses. This 'debounce' will prevent credits being registered by the host machine as a result of any noise or false credit pulses being induced on the output lines.

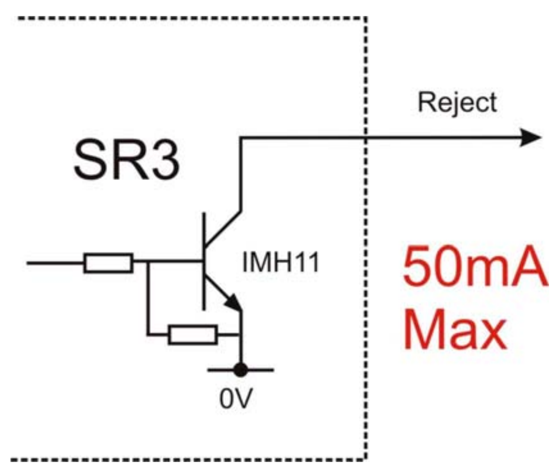
Figure 8: Coin Accept Outputs



5.3 Reject

Each time the reject lever is pressed, a lug on the reject lever breaks an optical beam, situated on the PCB. This is read by the processor and an output signal is sent to pin 5 (reject operated) on the parallel connector.
This output will remain active for as long as the reject lever is pressed, to less than 0.7 volts at a Max. 50mA.

Figure 9: Reject Operated Output



6. Credit Codes

6.1 Standard Parallel Credit Codes

This is the basic 6 coin pattern, one output is active per coin and the output corresponds to the coin position. Coins 7 to 12 are the same codes as coins 1 to 6.

Coin No.	A6	A5	A4	A3	A2	A1
Coin 1, 7	0	0	0	0	0	1
Coin 2, 8	0	0	0	0	1	0
Coin 3, 9	0	0	0	1	0	0
Coin 4, 10	0	0	1	0	0	0
Coin 5, 11	0	1	0	0	0	0
Coin 6, 12	1	0	0	0	0	0

6.2 Standard Binary Credit Codes

This pattern shows A4 as a strobe. This can be used as a check whereby the credit codes are only looked at **and valid** when A4 is active.

Coin No.	A6	A5	Strobe A4	A3	A2	A1
Coin 1	0	0	1	0	0	0
Coin 2	0	0	1	0	0	1
Coin 3	0	0	1	0	1	0
Coin 4	0	0	1	0	1	1
Coin 5	0	0	1	1	0	0
Coin 6	0	0	1	1	0	1
Coin 7	0	0	1	1	1	0
Coin 8	0	0	1	1	1	1
Coin 9	0	1	1	0	0	0
Coin 10	0	1	1	0	0	1
Coin 11	0	1	1	0	1	0
Coin 12	0	1	1	0	1	1

Please Note: Either Parallel or Binary must be selected when ordering.
You **CANNOT** switch between Binary and Parallel on the SR3 without re-programming.

Also, these are the standard available codes.
You can select different combinations of credits to suit your application.

A1 to A6 ALL ON is NOT available – this is the ALARM code.

7. Debug Features

Debug features are used to determine reasons for coin reject, and are output on the coin acceptor LED by a number of red pulses (see Table 3 below).

The coin acceptor LED under normal operation should be GREEN.

The LED is situated above the 6 way DIL switch on the connector side on the acceptor (See Figure 6).

Table 3: Debug Features

1 RED pulse	Coin accepted / reject lever pressed
2 RED pulses	Coin outside programmed sensor windows
3 RED pulses	Coin valid, but inhibited
4 RED pulses	Master Inhibit from host machine

Debug features will not be buffered and assume a single coin insertion. The insertion of several coins would cause an overflow and no useful information.

The debug features operate in normal acceptor operation.

The LED cannot be seen if the machine door is closed.

8. DIL Switch Options.

There are a number of options which can be selected via the 6 way DIL switch.
The 6 way DIL switch or Program Switch Bank can be used for field programming the following:

- Enable / disable a specific coin.
- Adjust coin security settings.
- Bank select.
- Enable / disable alarm.
- **Teach and Run™.**
- Erase all windows.

Table 4: DIL Switch Functions

1	2	3	4	5	6
Program 1	Program 2	Program 3	Program 4	Teach on/off	Security on/off

Table 5: SR3 DIL Switch Guide

SW1	SW2	SW3	SW4	SW5	SW6	FUNCTION
off	off	off	off	off	off	***Test credit accumulator**
off	**ON**	off	off	off	off	Enable bank 1 and bank 2
ON	**ON**	off	off	off	off	Enable a coin
off	off	off	**ON**	off	off	Disable alarm
ON	off	off	**ON**	off	off	Enable alarm
off	**ON**	off	**ON**	off	off	Erase all windows (Step 1)
ON	off	off	off	off	off	Erase all windows (Step 2)
ON	**ON**	off	**ON**	off	off	Inhibit a coin
off	off	**ON**	**ON**	off	off	Enable bank 1 only
ON	off	**ON**	**ON**	off	off	Enable bank 2 only

NOTE:- If all the switches are OFF and the reject lever is pressed within 20 seconds of power being applied, the SR3 will enter "Test credit accumulator" mode, even though one may not be fitted. The LED will turn RED and no coins will be accepted.
To exit this mode either remove power and re-apply or wait a further 20 seconds and the SR3 will automatically reset.

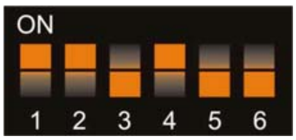
9. Accept and Inhibit Configuration

It is possible on the SR3 to inhibit a single coin or any combination of the 12 possible programmed coins by following the procedure below.

9.1 To Inhibit Specific Coins

Example:- To Inhibit 50p and 20p.

Switch off the power to the SR3.
Set the Program DIL switches to:-



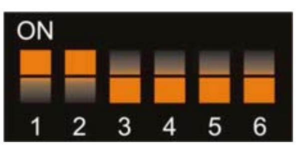
SW1	SW2	SW3	SW4	SW5	SW6
ON	**ON**	OFF	**ON**	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will turn RED.
Insert 50p and 20p and check that they are accepted.
Press the reject lever to return to normal operational mode.
The LED will turn GREEN.
Return ALL the DIL switches to the OFF position.
The inserted coin/s will now be rejected.

9.2 To Enable Specific Coins

Example:- To Enable 50p and 20p.

Switch off the power to the SR3.
Set the Program DIL switches to:-



SW1	SW2	SW3	SW4	SW5	SW6
ON	**ON**	OFF	OFF	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will turn RED.
Insert 50p and 20p and check that they are accepted.
Press the reject lever to return to normal operational mode.
The LED will turn GREEN.
Return ALL the DIL switches to the OFF position.
The inserted coin/s will now be accepted.

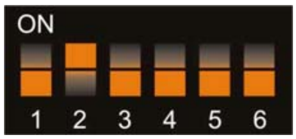
Note:- It is possible for a single coin to be enabled using the above procedure even though that particular bank has been disabled.

10. Bank Select

This function allows you to enable both or individually select banks of coins via the 6 way DIL switch.
This enables the selection of 2 different currencies, one in each bank, or 12 coins/tokens in both banks from the same country.
To enable/disable the banks follow the steps below.

10.1 Both Banks ON

Switch off the power to the SR3.

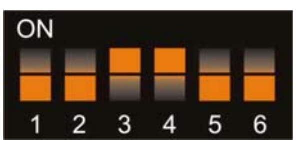


SW1	SW2	SW3	SW4	SW5	SW6
OFF	**ON**	OFF	OFF	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will flash GREEN.
Press the reject lever again.
The LED will be constant GREEN.
Set ALL the DIL switches to the OFF position.
Coins in Banks 1 and 2 will now be accepted.

10.2 Bank 1 ON Bank 2 OFF

Switch off the power to the SR3.

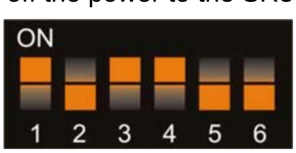


SW1	SW2	SW3	SW4	SW5	SW6
OFF	OFF	**ON**	**ON**	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will flash GREEN.
Press the reject lever again.
The LED will be constant GREEN.
Set ALL the DIL switches to the OFF position.
Coins in bank 1 will now be accepted.
Coins in bank 2 will be rejected.

10.3 Bank 1 OFF Bank 2 ON

Switch off the power to the SR3.



SW1	SW2	SW3	SW4	SW5	SW6
ON	OFF	**ON**	**ON**	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will flash GREEN.
Press the reject lever again.
LED will be constant GREEN.
Set ALL switches to the OFF position.
Coins in bank 1 will now be rejected.
Coins in bank 2 will be accepted.

11. Teach and Run™ Option

The SR3 can have the option to enable **Teach & Run™** on all 12 coins.
This option is selected at the time of order. The specific coin channel to be programmed is selected using switch 1 (MSB) to switch 4 (LSB) on the 6 way DIL switch.

11.1 Programming Steps

To programme a coin / token please follow these 6 Steps:

1. Switch off the power to the SR3.
2. Set the 6 way DIL switch to the relevant coin to be programmed. (See Table 6 and Table 7 below)
3. Switch on the power to the SR3.
4. Press the reject lever.
   The LED will turn RED.
5. Start entering the coins[1] or tokens[1] you wish to teach until the LED flashes GREEN, typically after around 10 insertions[2].
6. Press the reject lever and the LED will turn RED then GREEN.

The coin channel is now programmed[3].

To programme further coin channels, repeat from step 1.
Once you have finished programming return all switches to the OFF position.
The first coin inserted after **Teach & Run™** may reject. Subsequent coins should accept.

Notes:

[1] If a large sample of coins/tokens are used, then the coin channel sensor windows will be more accurate and a higher acceptance of true coins/tokens should be seen. If only a single coin/token is used, coin channel sensor windows will be programmed which may not truly reflect the coin/token population**.**

[2] If significantly more than 10 coins have been inserted and the LED is still not changing to GREEN, this could be caused by three possible reasons.

a) The coins/tokens being used are actually 2 different types although they look the same e.g. 1p old and 1p new.
b) The coins/tokens being used are poorly manufactured/minted to such an extent that the **Teach & Run™** is unable to correlate the readings taken.
c) The SR3 has a fault.

[3] Even though a coin/token has been programmed make sure that the coin channel or bank has actually been enabled (see sections **9** and **10**).
Teach & Run™ does NOT automatically enable the taught coin/token.

11.2 BANK 1

*Table 6: **Teach and Run™** Programming - Bank 1*

Coin Number	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6
1	Off	Off	Off	**ON**	**ON**	Off
2	Off	Off	**ON**	Off	**ON**	Off
3	Off	Off	**ON**	**ON**	**ON**	Off
4	Off	**ON**	Off	Off	**ON**	Off
5	Off	**ON**	Off	**ON**	**ON**	Off
6	Off	**ON**	**ON**	Off	**ON**	Off

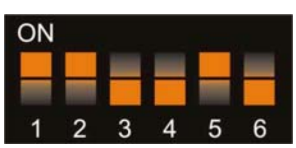
11.3 BANK 2

*Table 7: **Teach and Run™** Programming - Bank 2*

Coin Number	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6
7	Off	**ON**	**ON**	**ON**	**ON**	Off
8	**ON**	Off	Off	Off	**ON**	Off
9	**ON**	Off	Off	**ON**	**ON**	Off
10	**ON**	Off	**ON**	Off	**ON**	Off
11	**ON**	Off	**ON**	**ON**	**ON**	Off
12	**ON**	**ON**	Off	Off	**ON**	Off

Example:- To teach coin channel 12 for £1

Switch off the power to the SR3.
Set DIL switches to:-



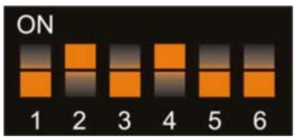
MSB SW1	SW2	SW3	LSB SW4	Total	SW5	SW6
ON	**ON**	OFF	OFF	**12**	**ON**	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will turn RED.
Start entering £1 coins into the acceptor until the LED flashes GREEN, typically after 8 to 10 insertions.
Press the reject lever and the LED will turn RED then GREEN.
The coin channel has been programmed.
Set ALL switches to the OFF position.

12. Erase All Windows

This function allows you to erase all the windows previously programmed, whether they were programmed by **Teach and Run**™, programmed using a programming device or programmed by Money Controls Ltd.
Because of the severity of this procedure, two steps are required, which reduces the risk of this being done accidentally.

Switch off the power to the SR3.
Set the Program DIL switches to:-



SW1	SW2	SW3	SW4	SW5	SW6
OFF	**ON**	OFF	**ON**	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will flash RED / GREEN.
Set the Program DIL switches to:-

SW1	SW2	SW3	SW4	SW5	SW6
ON	OFF	OFF	OFF	OFF	OFF

Press the reject lever again.
The LED will flash GREEN.
Set ALL the DIL switches to the OFF position.
Press the reject lever to return to operational mode.
LED will change to constant GREEN.

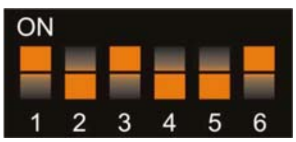
13. Adjustable Coin Security

The security of an individual coin/token can be adjusted using the 6 way DIL switches.

Switch 1	Allows sensor windows to be increased or decreased. (ON = increase windows / decrease security, OFF = decrease windows / increase security)
Switches 2, 3, 4	Determines the number of counts to be added or removed from the sensor windows (SW2 = MSB, SW4 = LSB). See Table 8 and Table 9 below.
Switch 5	Not used for adjusting coin security settings = OFF.
Switch 6	Enables coin security mode = ON.

For Example:
To increase the sensor windows / decrease the security on a £1 coin[4] by 2 counts[5,6] the following procedure should be followed:

Switch off the power to the SR3.
Set the 6 way DIL switches to:- (widen, 2 counts, security)



SW1	**SW2**	**SW3**	**SW4**	**SW5**	**SW6**
ON	OFF	**ON**	OFF	OFF	**ON**

Switch on the power to the SR3.
Press the reject lever within 20 seconds and check the LED turns RED.
Insert a £1 coin.
The LED now flashes GREEN.
Press the reject lever again.
The LED will now turn RED then GREEN.
The security has now been changed.
Set ALL the switches to the OFF position.

Notes:

4 The coin channel must be ENABLED for changes to be programmed.

5 +n counts will add n counts to the upper limits of the sensor windows and subtract n counts from the lower limits of the sensor windows for the coin channel selected. i.e. +2 counts will actually make the sensor windows a total of 4 counts wider on the coin channel selected.
-n counts will subtract n counts from the upper limits of the sensor windows and add n counts to the bottom limits of the sensor windows for the coin channel selected. i.e. +3 counts will actually make the sensor windows a total of 6 counts narrower on the coin channel selected.

6 If 2 counts were not enough and 3 counts were actually required, the procedure has to be repeated for +3 counts (NOT an extra +1 count).

13.1 Decrease Security

Table 8: DIL Switches - Decrease Security

Value	SW1	SW2	SW3	SW4	SW5	SW6
0	**ON**	Off	Off	Off	Off	**ON**
+1	**ON**	Off	Off	**ON**	Off	**ON**
+2	**ON**	Off	**ON**	Off	Off	**ON**
+3	**ON**	Off	**ON**	**ON**	Off	**ON**
+4	**ON**	**ON**	Off	Off	Off	**ON**
+5	**ON**	**ON**	Off	**ON**	Off	**ON**
+6	**ON**	**ON**	**ON**	Off	Off	**ON**
+7	**ON**	**ON**	**ON**	**ON**	Off	**ON**

13.2 Increase Security

Table 9: DIL Switches - Increase Security

Value	SW1	SW2	SW3	SW4	SW5	SW6
0	Off	Off	Off	Off	Off	**ON**
-1	Off	Off	Off	**ON**	Off	**ON**
-2	Off	Off	**ON**	Off	Off	**ON**
-3	Off	Off	**ON**	**ON**	Off	**ON**
-4	Off	**ON**	Off	Off	Off	**ON**
-5	Off	**ON**	Off	**ON**	Off	**ON**
-6	Off	**ON**	**ON**	Off	Off	**ON**
-7	Off	**ON**	**ON**	**ON**	Off	**ON**

13.3 Reset Security

Set the DIL switches to either Increase Security 0 or Decrease Security 0. This will set the sensor windows tweak value to 0 for the coin channel selected, i.e. the original programmed sensor windows.

14. Alarms

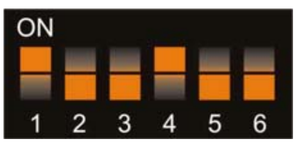
When enabled, an alarm condition will activate all the outputs (A1 to A6) for 100ms, except for condition iii.

Conditions which will indicate an alarm condition include:

i. An event which occurs out of sequence.
ii. A sequence of events occur which indicate a ‘Coin-on-string’ fraud is being attempted. There are a number of events that might lead to this condition.
iii. If the credit / reject sensor is blocked for more than 1.5 seconds, the alarm signal will remain active, for the duration of the blockage.
iv. During power-up diagnostics – if enabled.

14.1 Enable

To enable an alarm the following steps should be followed:
Switch off the power to the SR3.

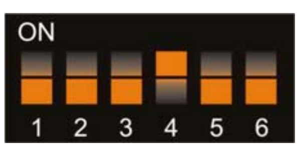


SW1	SW2	SW3	SW4	SW5	SW6
ON	OFF	OFF	ON	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will flash GREEN.
Switch off the power to the SR3.
Set all switches OFF.
Switch on the power to the SR3.
The alarm is now ON.

14.2 Disable

To disable an alarm the following steps should be followed:
Switch off the power to the SR3.



SW1	SW2	SW3	SW4	SW5	SW6
OFF	OFF	OFF	ON	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will flash GREEN.
Switch off the power to the SR3.
Set all switches OFF.
Switch on the power to the SR3.
The alarm is now OFF.

15. Diagnostics (power-up)

The SR3 performs a self-test at power-up. If a fault condition is detected and diagnostics is enabled, an Alarm is activated and the SR3 is inhibited. If the fault condition clears, say a coin blockage of the credit sensor, the inhibit will be lifted and the SR3 is then ready for normal operation. A diagnostics test failure is indicated in parallel mode in exactly the same way as an alarm.

The faults which are detected at power up are:-

- Credit sensor blocked.
- EEPROM checksum error.
- Blockage in the discrimination area.
- Sensor faulty.

16. Sorter Option

The SR3 can drive an external 5/6-way sorter. The SR3 and sorter attach to a new style frontplate. The coin exit positions from the sorter are identical to an industry standard OEM product. There are two operating modes for use with sorters. One mode is selected during the setup process.

16.1 Sorter Mode 1 (default)

The SR3 provides a logic signal to enable the sorter solenoids to be driven. The signal is active for 500ms and generated at the same time as the accept gate is activated There is no feedback from the sorter.

16.2 Sorter Mode 2

As soon as a coin is discriminated as true, its corresponding credit code is output for 1ms, after which the accept gate and sorter solenoids are activated. [provided Inhibit All is inactive].
If the Inhibit All is active (i.e. all coins inhibited), then the credit code is output for 10ms. No accept gate solenoid activity occurs and the coin is rejected. If during the first 9ms of the 10ms credit pulse, the Inhibit All changes to inactive (i.e. accept), then the coin will be accepted. The accept gate then operates and the coin accepts. A 100ms credit is issued as the coin passes the credit sensor.
The host machine drives the sorter solenoids in this application.

16.3 Sorter Mode 3

The issue of the 'early' 1ms credit is delayed by a fixed time from completion of coin discrimination **(TBD).** Provided the Inhibit All line is inactive when the coin completes discrimination, the coin accepts. The early credit pulse is issued after the fixed delay, followed by the standard credit pulse of 100ms duration as the coin passes the credit sensor.

Note: Sorter modes 1, 2 & 3 are mutually exclusive. One must be selected when ordering.

17. Sorter Drivers

Figure 10: Sorter Drive output circuit

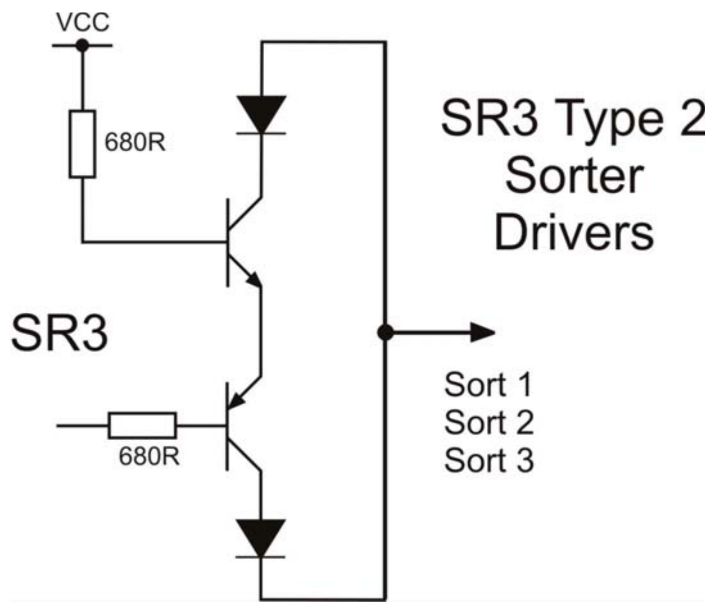
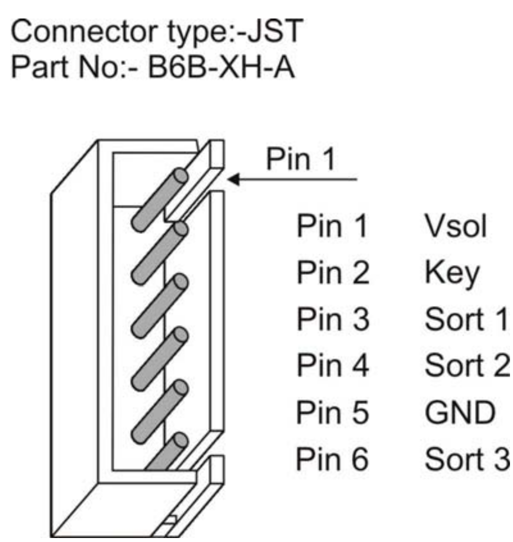


Figure 11: Sorter Drive Output connector details



Note:- When ordering please state which combination of Sort 1, 2 & 3 is required for each coin denomination.

18. Totaliser Mode

By connecting an additional 'piggy back' PCB to the SR3, (Figure 1 Connector 5), totalising functions are available. It is advisable to have the SR3 set-up in this mode if it is at all possible that the totaliser function may be used.
If a totaliser PCB is not connected, the SR3 will function normally.

NOTE: If the totaliser is fitted, credits can be obtained from the totaliser output AND the standard SR3 10 way interface simultaneously.

The totaliser board provides the following physical interface to the machine.

18.1 19 way Parallel Interface Connector

Table 10: 19 way Parallel Interface Connector

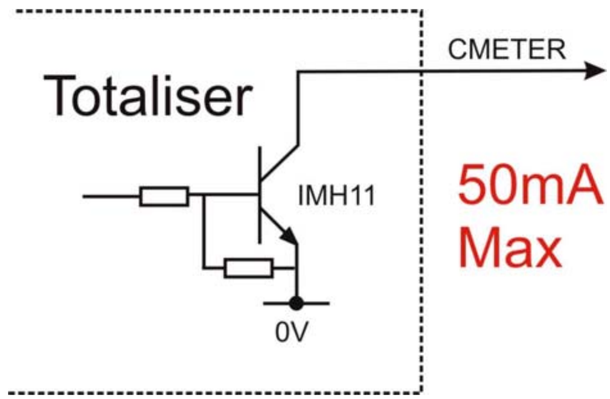
Pin No.	Function	I/P - O/P
1	No Function	
2	No Function	
3	No Function	
4	No Function	
5	CMETER (Coin Meter)	O/P
6	No Function	
7	No Function	
8	V Supply 12V	
9	Player 1 HI	O/P
10	Player 1 LOW	O/P
11	No Pin	
12	GND	
13	Dispense 1	I/P
14	Player 2	O/P
15	Dispense 2	I/P
16	Player 3	O/P
17	Dispense 3	I/P
18	Player 4	O/P
19	Dispense 4	I/P

This connector provides all the control pins for totalising for up to 4 players including supply voltages.

18.2 CMETER

CMETER (coin meter) sends out a number of active low pulses every time a coin is discriminated and accepted, the number of pulses and their time width is pre-programmed at MCL, or using a ccProgrammer. See Table 12

Figure 12: CMETER Output

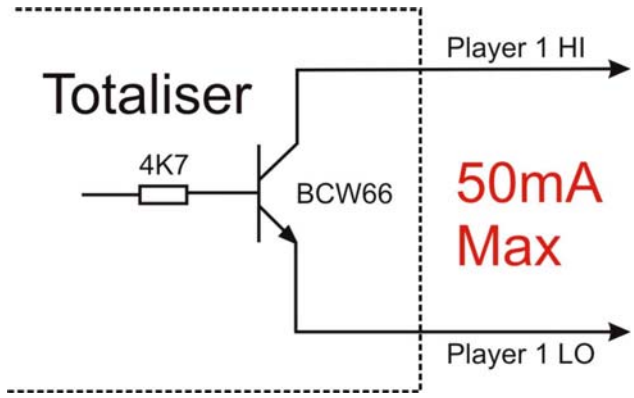


OFF State Voltage	ON State Voltage	Sink Current
+30V DC Max	+0.5 V DC Max	50mA Max

Example:
If a coin is accepted by the SR3, which has a credit value of 80 and the Coin Meter Scalar value is 20 then 4 pulses are output by the CMETER pin.

18.3 Player 1 HI / Player 1 LO

Figure 13: Player 1 HI / Player 1 LO Output

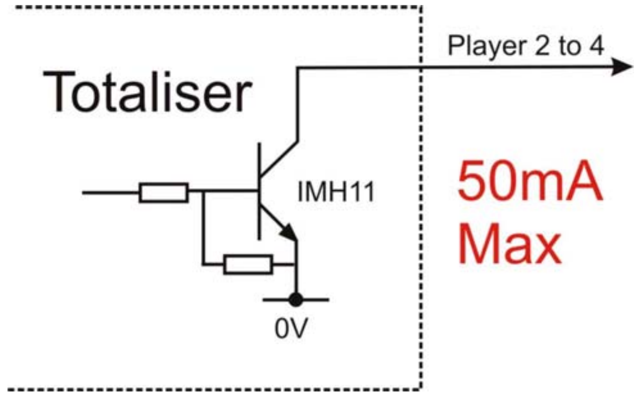


OFF State Voltage (Player 1 HI)	ON State Voltage (Player 1 HI)	ON State Voltage (Player 1 LO)	Sink Current
+30V DC Max	+0.5 V DC Max	0V Min	50mA Max

18.4 Player 2 to 4

Indicates a game output to the relevant player. Game pulse width is defined by the parameters shown in Table 12.

Figure 14: Player 2 to 4 Outputs

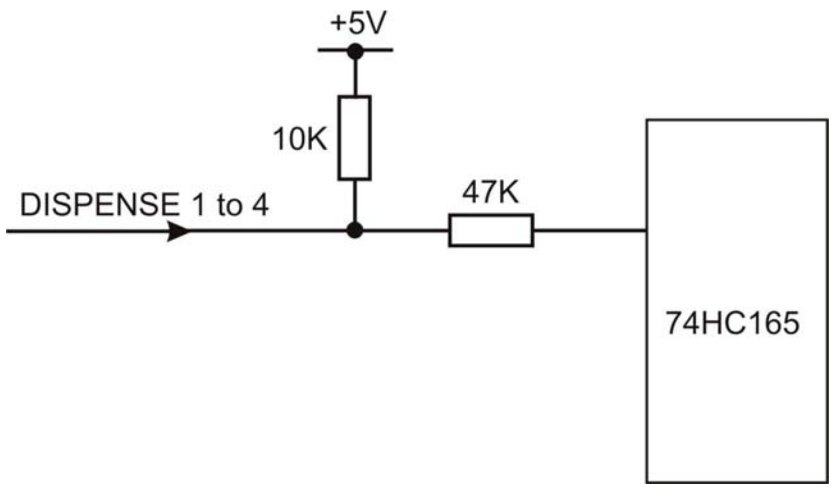


OFF State Voltage	ON State Voltage	Sink Current
+30V DC Max	+0.5 V DC Max	50mA Max

18.5 Dispense 1 to 4

Indication from the host machine that it is ready for a Game pulse from the corresponding PLAYER 1 to 4 output.

Figure 15: Dispense 1 to 4 Inputs



Inactive Vin	Active Vin
> +4V DC (+30V DC Max)	Between 0V and +1V DC

19. Totalising Options

The following information ONLY applies to a SR3 type 1 (piggy back style totaliser) and NOT a SR3 type 2 (totaliser in-built)

Table 11: SR3 Totalising DIL Switch Guide

FUNCTION	SW1	SW2	SW3	SW4	SW5	SW6
Set Game Price	off	off	**ON**	off	off	off
Set Bonus Level 1	off	**ON**	**ON**	off	off	off
Set Bonus Level 2	off	**ON**	**ON**	**ON**	off	off
Set Bonus Award 1	**ON**	**ON**	**ON**	off	off	off
Set Bonus Award 2	**ON**	**ON**	**ON**	**ON**	off	off

19.1 Set a Game Price

Example:- To set the price of 1 game at £1

Switch off the power to the SR3.
Set the Program DIL switches to:-

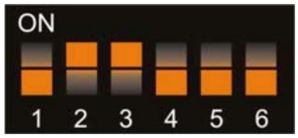
SW1	SW2	SW3	SW4	SW5	SW6
OFF	OFF	**ON**	OFF	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will turn RED.
Insert any combination of programmed coins that total £1 and check that they are accepted, i.e. 1 x £1, 2 x 50p, 5 x 10p + 1 x 50p etc.
Press the reject lever to return to normal operational mode.
The LED will turn GREEN.
Return ALL the DIL switches to the OFF position.

19.2 Set Bonus Level 1

Example:- When the game price is £1 and a bonus level is required at £2.50.

Switch off the power to the SR3.
Set the Program DIL switches to:-



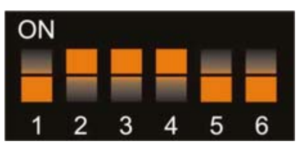
SW1	SW2	SW3	SW4	SW5	SW6
OFF	**ON**	**ON**	OFF	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will turn RED.
Insert any combination of programmed coins that total £2.50 and check that they are accepted, i.e. 2 x £1 + 1 x 50p, 5 x 50p etc.
Press the reject lever to return to normal operational mode.
The LED will turn GREEN.
Return ALL the DIL switches to the OFF position.

19.3 Set Bonus Level 2

Example:- When the game price is £1 and bonus level 2 is required at £5.00.

Switch off the power to the SR3.
Set the Program DIL switches to:-



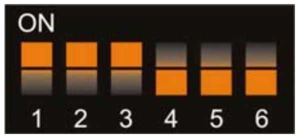
SW1	SW2	SW3	SW4	SW5	SW6
OFF	**ON**	**ON**	**ON**	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will turn RED.
Insert any combination of programmed coins that total £5.00 and check that they are accepted, i.e. 5 x £1, 10 x 50p etc.
Press the reject lever to return to normal operational mode.
The LED will turn GREEN.
Return ALL the DIL switches to the OFF position.

19.4 Set Bonus Award Level 1

Example:- To award **3** extra games when Bonus Level 1 is reached.

Switch off the power to the SR3.
Set the Program DIL switches to:-



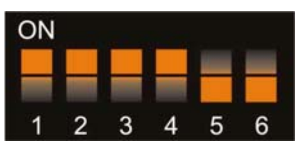
SW1	SW2	SW3	SW4	SW5	SW6
ON	**ON**	**ON**	OFF	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will turn RED.
Insert **THREE** of the programmed coins and check that they are accepted, i.e. 3 x £1, 1 x 50p + 1 x 10p + 1 x 20p etc.
Press the reject lever to return to normal operational mode.
The LED will turn GREEN.
Return ALL the DIL switches to the OFF position.

19.5 Set Bonus Award Level 2

Example:- To award **7** extra games when Bonus Level 2 is reached.

Switch off the power to the SR3.
Set the Program DIL switches to:-

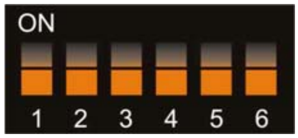


SW1	SW2	SW3	SW4	SW5	SW6
ON	**ON**	**ON**	**ON**	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will turn RED.
Insert **SEVEN** of the programmed coins and check that they are accepted, i.e. 7 x £1, 3 x 50p + 4 x 20p etc.
Press the reject lever to return to normal operational mode.
The LED will turn GREEN.
Return ALL the DIL switches to the OFF position.

19.6 Test Credit Mode

Switch off the power to the SR3.
Set the Program DIL switches to:-



SW1	SW2	SW3	SW4	SW5	SW6
OFF	OFF	OFF	OFF	OFF	OFF

Switch on the power to the SR3.
Press the reject lever within 20 seconds.
The LED will turn RED.

If manual[1] credit dispense mode is enabled then the SR3 will accumulate the test credits each time the reject lever is pressed. If a Dispense input then goes low – BEFORE timeout occurs – then these credits will be output on the corresponding Player output. If timeout occurs before a Dispense input changes, the credits will be lost.
If in automatic[2] credit dispense mode then the test credits will be issued to the host machine each time the reject lever is pressed.

<u>Example: In Automatic credit dispense mode.</u>

Press the reject lever 5 times, 5 game pulses will be output on the PLAYER 1 pin.
Wait 20 seconds for the SR3 to return to normal operational mode.
The LED will turn GREEN.

[1] Manual credit dispense mode is available in either 'single player mode' or 'multi-player mode' and is programmed by MCL or using a **ccProgrammer**.

[2] Automatic credit dispense mode is only available in 'single-player mode' and is programmed by MCL or using a **ccProgrammer**.

19.7 Summary of Totalising Functions

With every coin that is accepted by the SR3, the accumulated credit value is incremented by the value of that coin.

The SR3 can be used for either single (PLAYER1) or multi-player (PLAYER1-4) operation.

The SR3 can be configured at MCL or using a ccProgrammer, for either automatic or manual credit dispense.

If the Mech. is used for single player operation then either automatic or manual credit dispense can be pre-programmed.

If the Mech. is used for multi-player operation then manual credit dispense mode MUST be pre-programmed at MCL or using a **ccProgrammer**.

In manual credit dispense mode
Game pulses are sent to a PLAYER output when the corresponding DISPENSE input goes low and the accumulated credit exceeds the game price. After each game pulse the accumulated credit value decrements by the value of the game price, and any remaining credit is stored for later use.

For Example:
When DISPENSE 3 input pin goes low, (request from the host machine), and the accumulated credit exceeds the game price, then the PLAYER3 output transistor (active low) will switch on for the required pulse time as defined in Table 12.

In automatic credit dispense mode (Single player only)
Game pulses are output on the PLAYER 1 pin every time the accumulated credit exceeds the game price.

A maximum number of games is pre-programmed at MCL or using a **ccProgrammer**, when reached, prevents further coin acceptance.

Two bonus credit level settings can be defined and at each level a pre-specified number of bonus games are given. The additional games are given provided the bonus credit level is reached within a programmable time period. Refer to Bonus Levels modes 1 and 2, (*Pages* 30 *and* 31*),* and Bonus Awards modes 1 and 2, (*Page* 31*)* and Table 12*).*

20. Totalising Parameters

The following list of parameters are pre-programmed at MCL or using a ccProgrammer.
Further explanation of parameters:
Bonus Time Width:
Time out period after last coin entered while bonus is still valid.

Example: A bonus game is awarded at £1.00, and 80p has been entered. You must enter another 20p or more before the Bonus Time Width period elapses in order to be awarded the extra game.

Credit:
Credit attributed to coin 1 = Value of Coin 1 * Payment Scalar Factor

Table 12: Totalising Parameters

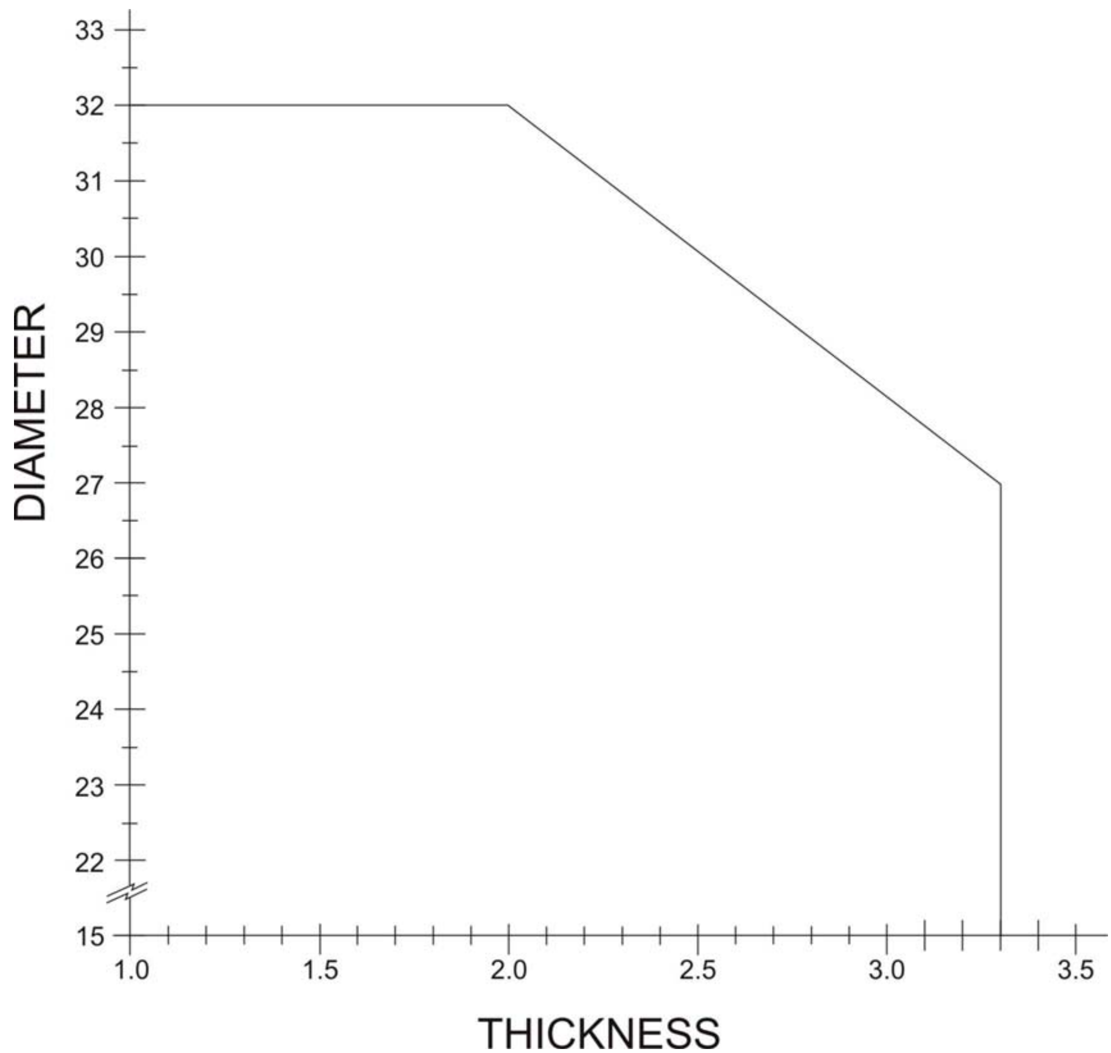
Parameter	Range	Meaning
Price	0-65,535	Required credit for game output
Value of coin 1 - 12	0- 65,565	Real coin value divided by payment scaling factor
Bonus level 1	0-65,565	Credit trigger level 1
Bonus award 1	0-127	No. Games awarded at trigger level 1
Bonus level 2	0-65,565	Credit trigger level 2
Bonus award 2	0-127	No. Games awarded at trigger level 2
Maximum game limit	0-127	Maximum no. of games limit
Coin meter value scalar	0-255	No. of pulses = credit/coin meter scalar
Bonus credit mode	0-1	0= disable 1=enable
Coin meter output enable	0-1	0= disable 1=enable
Manual credit mode	0-1	0= disable (Automatic) 1=enable (Manual)
Game pulse width	0-5	0= 75ms ON 75 ms OFF 1= 75ms ON 200ms OFF 2= 100ms ON 200ms OFF 3= 100ms ON 330ms OFF 4= 150ms ON 330ms OFF 5= 330ms ON 330ms OFF
Coin meter pulse width	0-3	0= 50ms ON 50 ms OFF 1= 100ms ON 100ms OFF 2= 150ms ON 150ms OFF 3= 200ms ON 200ms OFF
Bonus time width	0-15	Time in steps of 2.5secs
Totaliser mode	0 - 1	0 = disable 1 = enable

Default values = 0 (factory set if totaliser option not selected)

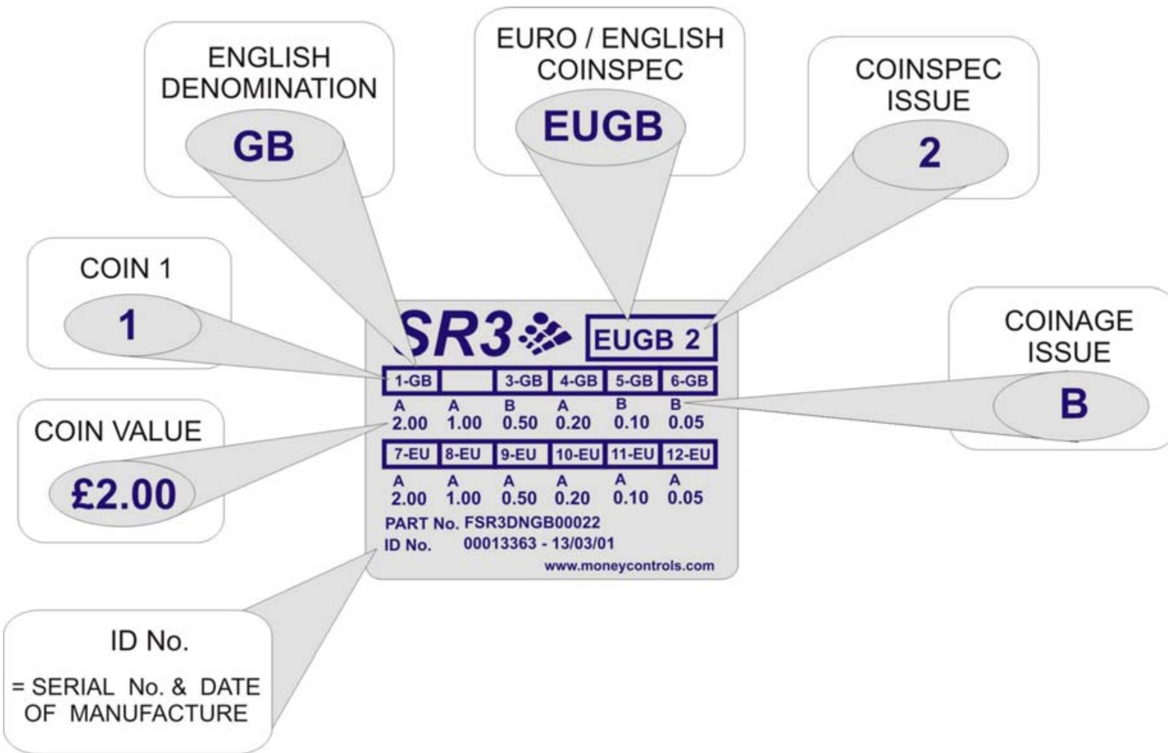
21. Coin Dimensions

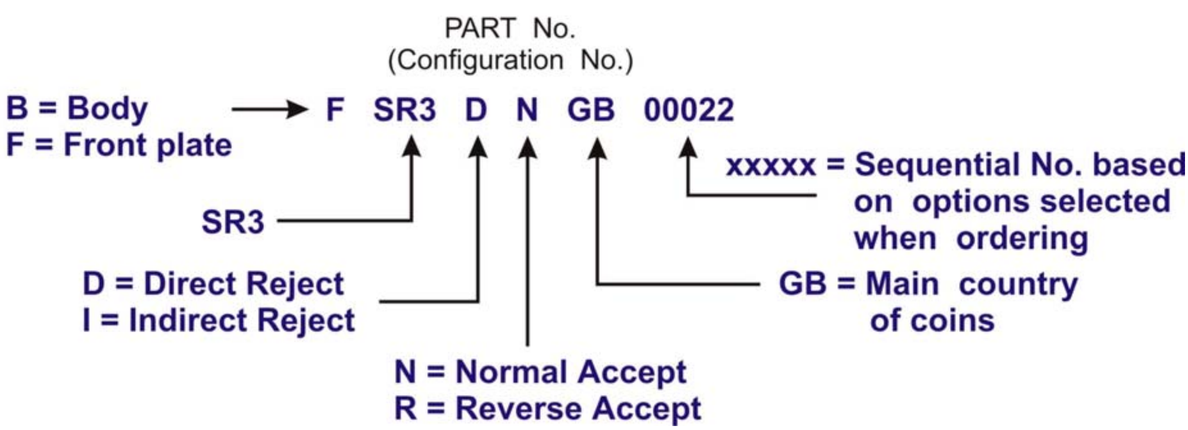
The accepted range of coin sizes are shown below:
This Graph is only intended as a guide. If a coin is required that is close to the limits shown, please check with Money Controls Technical Services department first.

Figure 16: SR3 Accepted Coin Dimensions Graph



22. Label Details Explained





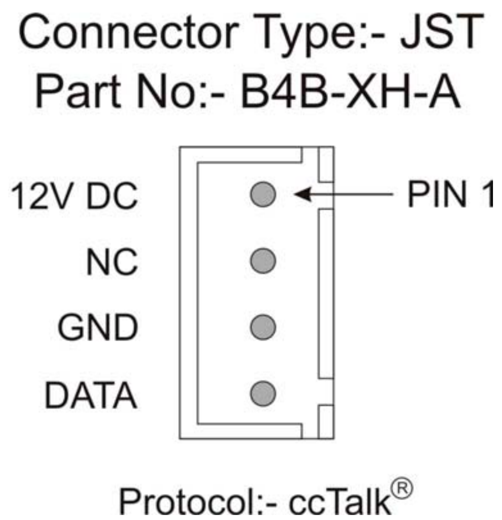
23. Protocols

23.1 Serial Interface

Protocol: **ccTalk** compliant implementation. For further details on this section please refer to the current **ccTalk** generic standard.

(Connector 3 on Figure 1).

*Figure 17: **ccTalk** Serial Connector*



24. ccTalk Serial Messages

*Table 13: **ccTalk** Serial Commands*

Header	Function	Header	Function
254	Simple poll	**222**	Modify sorter override status
253	Address poll	**221**	Request sorter override status
252	Address clash	**220**	One-shot credit
251	Address change	**213**	Request option flags
250	Address random	**212**	Request coin position
249	Request polling priority	**210**	Modify sorter paths
248	Request status	**209**	Request sorter paths
247	Request variable set	**202**	Teach mode control
246	Request manufacturer id	**201**	Request teach status
245	Request equipment category id	**197**	Calculate ROM checksum
244	Request product code	**196**	Request creation date
243	Request database version	**195**	Request last modification date
242	Request serial number	**194**	Request reject counter
241	Request software revision	**193**	Request fraud counter
240	Test solenoids	**192**	Request build code
238	Test output lines	**185**	Modify coin id
237	Read input lines	**184**	Request coin id
236	Read opto states	**183**	Upload window data
233	Latch output lines	**182**	Download calibration information
232	Perform self-test	**173**	Request thermistor reading
231	Modify inhibit status	**170**	Request base year
230	Request inhibit status	**169**	Request address mode
229	Read buffered credit or error codes	**4**	Request comms revision
227	Request master inhibit status	**3**	Clear comms status variables
226	Request insertion counter	**2**	Request comms status variables
225	Request accept counter	**1**	Reset device

For further details on this section please refer to the current **ccTalk** generic standard or contact Money Controls Technical Services Department.

The following error codes are supported.

Table 14: Error Codes

Code	Error
1	Reject coin
2	Inhibited coin
3	Multiple window (ambiguous coin type)
6	Accept sensor timeout
8	2nd close coin error (coin insertion rate too high)
14	Accept sensor blocked
15	Sorter opto blocked
17	Coin going backwards
23	Credit sensor reached too early
24	Reject coin (repeated sequential trip)
25	Reject slug
27	Games overloaded
28	Number of coin meter pulses overloaded
254	Coin return mechanism activated (flight deck open)

The following fault codes will be supported.

Table 15: Fault Codes

Code	Fault
1	EEPROM checksum corrupted
2	Fault on inductive coils
3	Fault on credit sensor
4	Fault on piezo sensor
8	Fault on sorter exit sensors
22	Fault on thermistor
34	Temperature outside operating limits

The following status codes will be supported.

Table 16: Status Codes

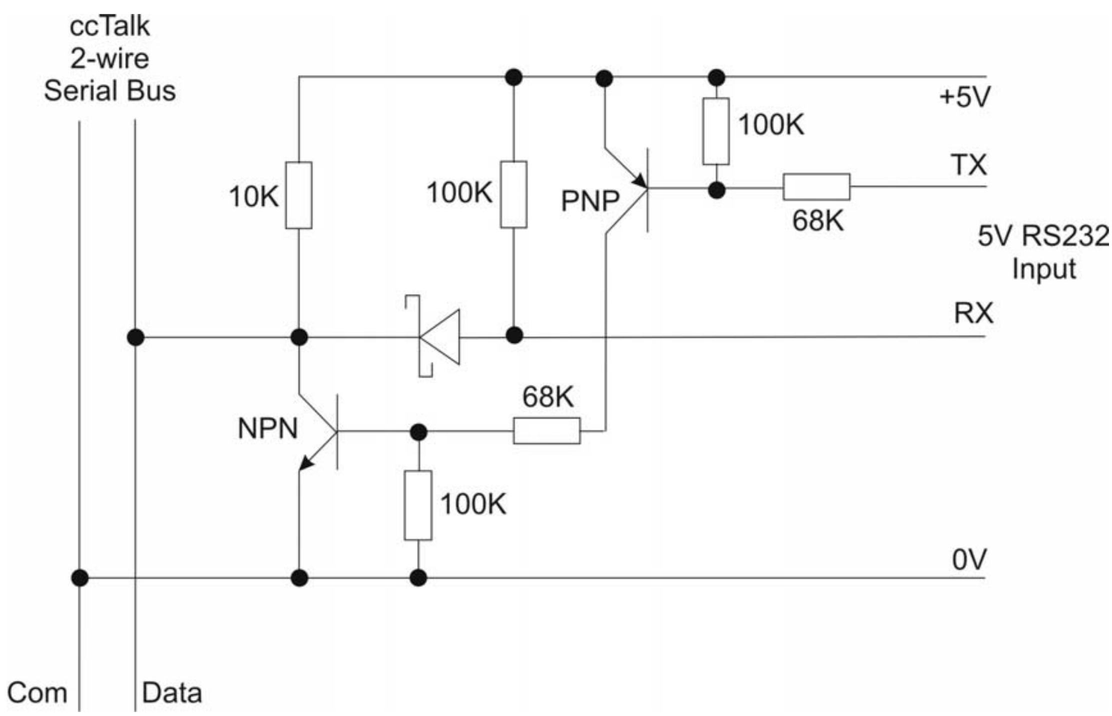
Code	Status
1	Coin return mechanism activated (flight deck open)

25. ccTalk Interface Circuits

25.1 Circuit 1 – ccTalk Standard Interface

This circuit uses an open-collector transistor to drive the data line and a diode protected straight-through receiver.

*Figure 18: Circuit 1, **ccTalk** Standard Interface*



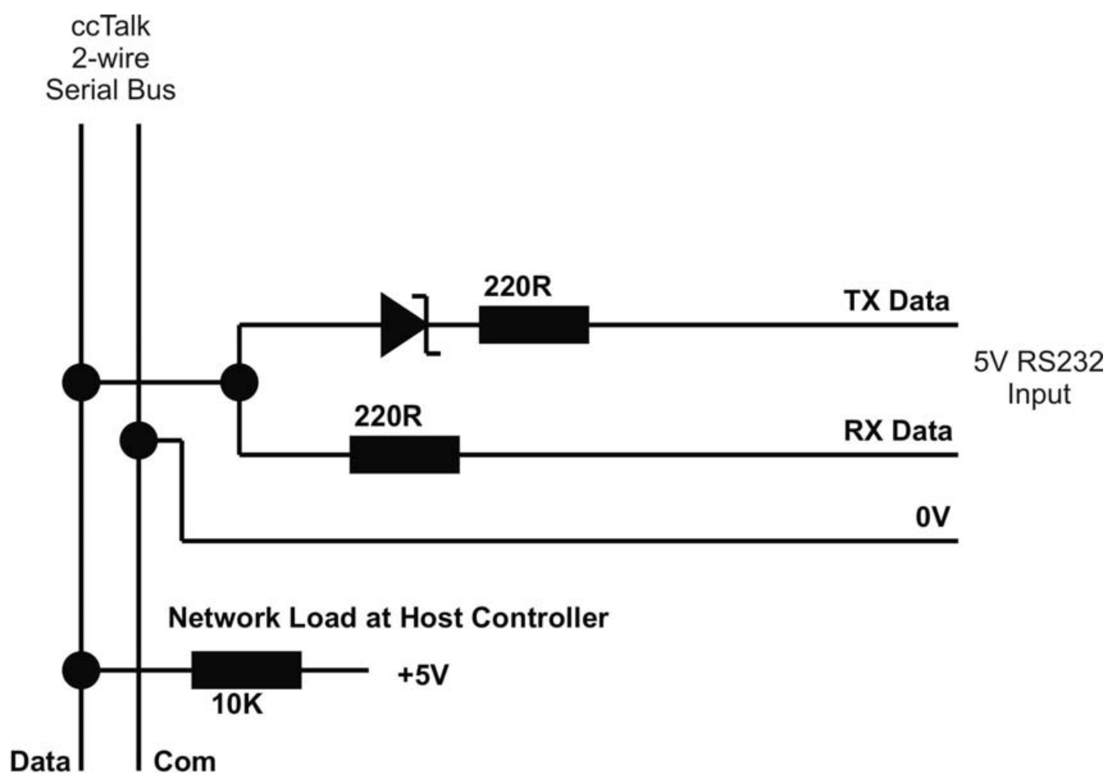
Typical Components

Diode	BAT54	Schottky Diode, low forward voltage drop
NPN	BC846B	High gain, medium signal, NPN transistor
PNP	BCW68	High gain, medium signal, PNP transistor

25.2 Circuit 2 – ccTalk Low Cost Interface

Assuming that the transmitting device is capable of sinking a reasonable amount of current, a direct diode interface can be used rather than a full transistor interface. Although cheaper to implement, this circuit does not have the drive capability or the robustness of other designs.

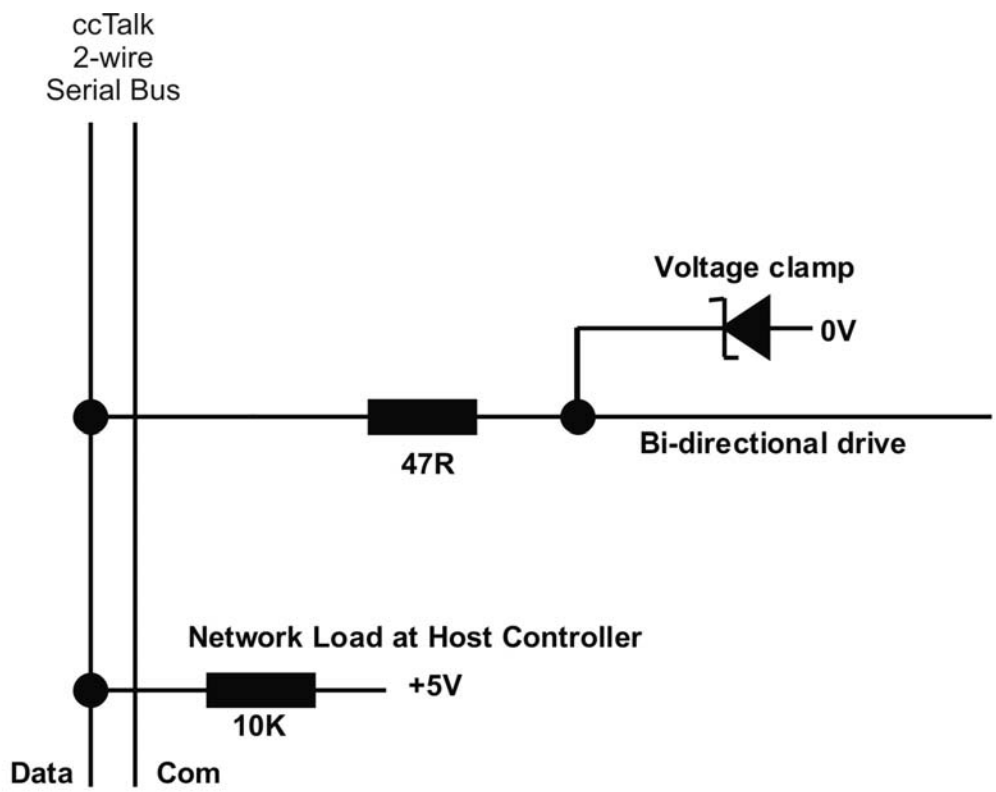
Figure 19: Circuit 2, ***ccTalk*** *Low Cost Interface*



25.3 Circuit 3 – ccTalk Direct Interface

A very low cost solution is to interface a single pin on a microcontroller directly onto the **ccTalk** data line. The pin can be switched between active-low for transmitting and high-impedance tri-state for receiving.

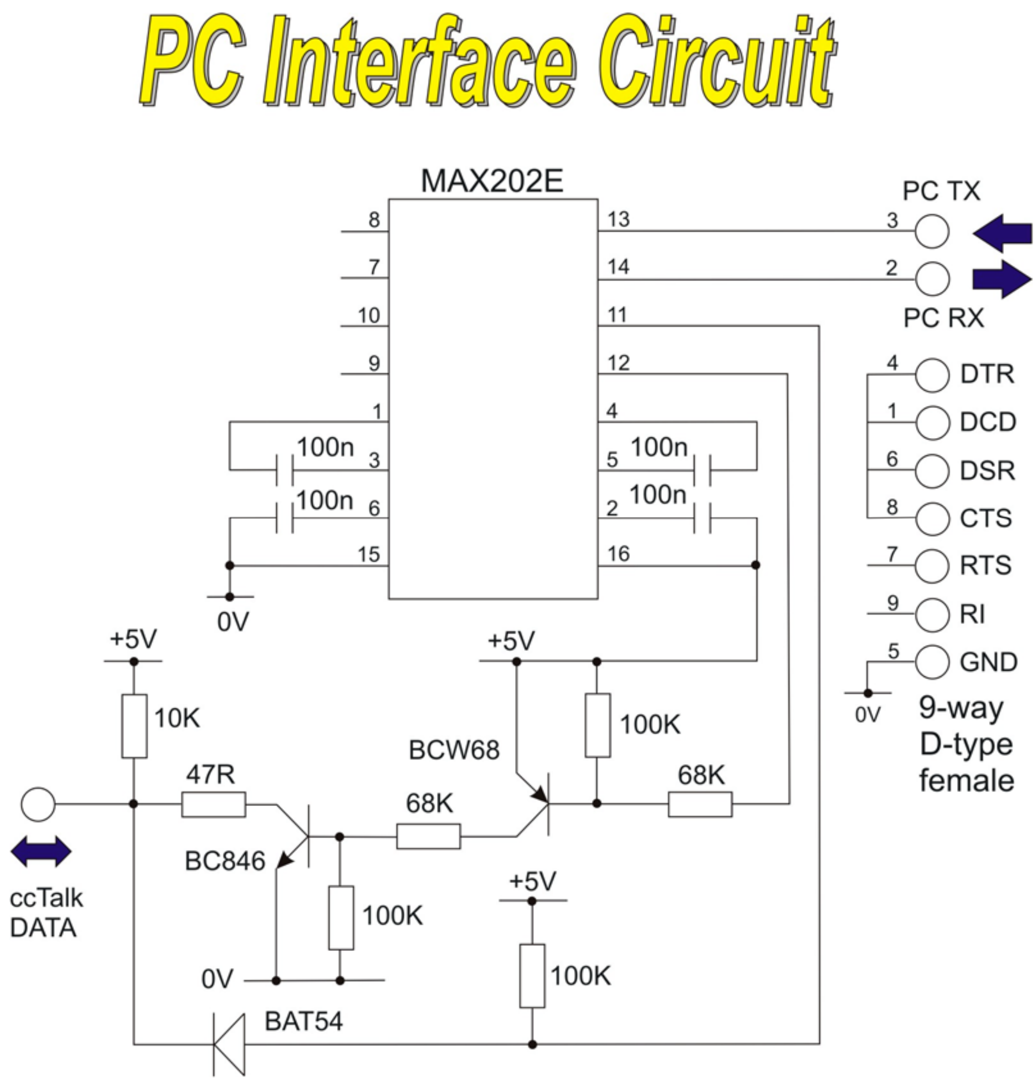
*Figure 20: Circuit 3, **ccTalk** Direct Interface*



25.4 Circuit 4 – ccTalk PC Interface

The circuit below shows how to connect the 9-pin serial port of a PC to the **ccTalk** data bus. The only integrated circuit required is a Maxim level-shifter which operates off a single +5V supply. Any small-signal diodes and transistors can be used.

*Figure 21: Circuit 4, **ccTalk** PC Interface*



26. Fault Finding

The following information is presented for customers' guidance in rectifying a fault but does not cover all possible causes.
All acceptors with electronic faults should be returned to Money Controls Ltd. or to an approved service centre for repair.

Symptom	Investigate	Possible Cause
Acceptor does not work (all coins reject).	Connector.	Poor contact. Loose wire.
	Power supply.	Not switched on. Incorrect voltage. Inadequate current. Rise time too slow.
	Inhibit inputs.	Acceptor inhibited.
	Accept gate.	Gate not free or dislocated.
	Accept channel.	Obstructed.
	Reject gate.	Not fully closed.
	LED on rear cover is RED.	EEPROM checksum error[6]. SR Sensor faulty[7,8]. Credit opto's faulty[7,8]. Credit sensor blocked[7]. Reject lever pressed[9]
	LED on rear cover is YELLOW.	Remove the power and re-apply. LED should be green.
Poor acceptance of true coins.	Power supply	Voltage less than 10V. (NB voltage drops when solenoid is activated).
	Accept gate.	Gate not free or dislocated.
	Connector.	Loose.
	Coin rundown.	Dirty.
	Bank select.	Both banks are enabled and programmed with the same coins[10].
Coins stick or jam in acceptor.	Rundown. Accept channel. Accept gate. Reject gate.	Dirty or mechanical damage.
One of the true coin types always rejects.	Label.	Coin not programmed.
No accept signal.	Connector.	Loose or broken wire.
	Accept channel.	Dirty or obstructed. (acceptor time-out)

[6] This condition requires the SR3 to be reprogrammed.
[7] These faults will only be seen if 'Power-up Diagnostics' is ON.
[8] These faults require to SR3 to be returned for repair.
[9] The SR3 will time out after 20 sec's. Alternatively, switch the power off then on.
[10] Refer to the MechTool section - page 15.

27. Service

The coin rundown area should be cleaned regularly to ensure accurate discrimination of coins and tokens. Only a damp cloth should be used.

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

Access to the rundown is gained by opening the reject gate.

28. Electrical Interface Requirements

Table 17: Power Supply

Voltage:	12V – 24V dc +/- 10%
Absolute:	Min 10V Max 28V
Min / Max rise time:	5ms / 500ms (From 0V to within supply range)
Min / Max fall time:	5ms / 500ms (From within supply range to 0V)
Acceptor Power up time:	200 ms from the application of a valid voltage supply. A valid supply must be between the limits specified above.
Ripple voltage [< 120Hz]:	< 1 Volt
Ripple voltage [> 120Hz]:	< 100mV
Ripple voltage [> 1KHz]:	< 20mV

Table 18: Current Consumption

Typically:	70mA
Maximum:	450mA

Table 19: Environmental Ranges

Operating temperature range:	0°C to 60°C 10% to 75% RH non-condensing
Storage temperature range:	-30°C to 70°C 5% to 95% RH non-condensing
(Recovery time by the acceptor after a temperature step change is 1 hour per 20°C. Maximum operating rate of change 20°C per hour.)	

29. Specified EMC Performance

29.1 Emissions

This product is compliant with EMC test specification EN55014-1; 1993

29.2 Immunity

This product is compliant with EMC test specification EN55014-2; 1997

29.3 Shock / Vibration Immunity

This product is compliant with BS 2011 part 2.1.[IEC 68-2-27]

30. Appendix A – Available Parallel Interface Looms

Table 20: Available Parallel Interface Looms

Loom Length	**Spares Part Number**
SR3 loom assembly 220mm	PSP12005
SR3 loom assembly 250mm	PSP12003
SR3 loom assembly 400mm	PSP12002
SR3 loom assembly 500mm	PSP12004
SR3 loom assembly 520mm	PSP12006
SR3 loom assembly 550mm	PSP12022
SR3 loom assembly 650mm	PSP12023
SR3 loom assembly 850mm	PSP12007
SR3 loom assembly 3000mm	PSP12061

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