

SR3 Technical Manual

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1) 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 via a hand held “ccProgrammer” and for total flexibility, if a new coin/token is required, the Teach and Run™ function can be used.

2) Mechanical Configuration

Figure 1: SR3 External Dimensions

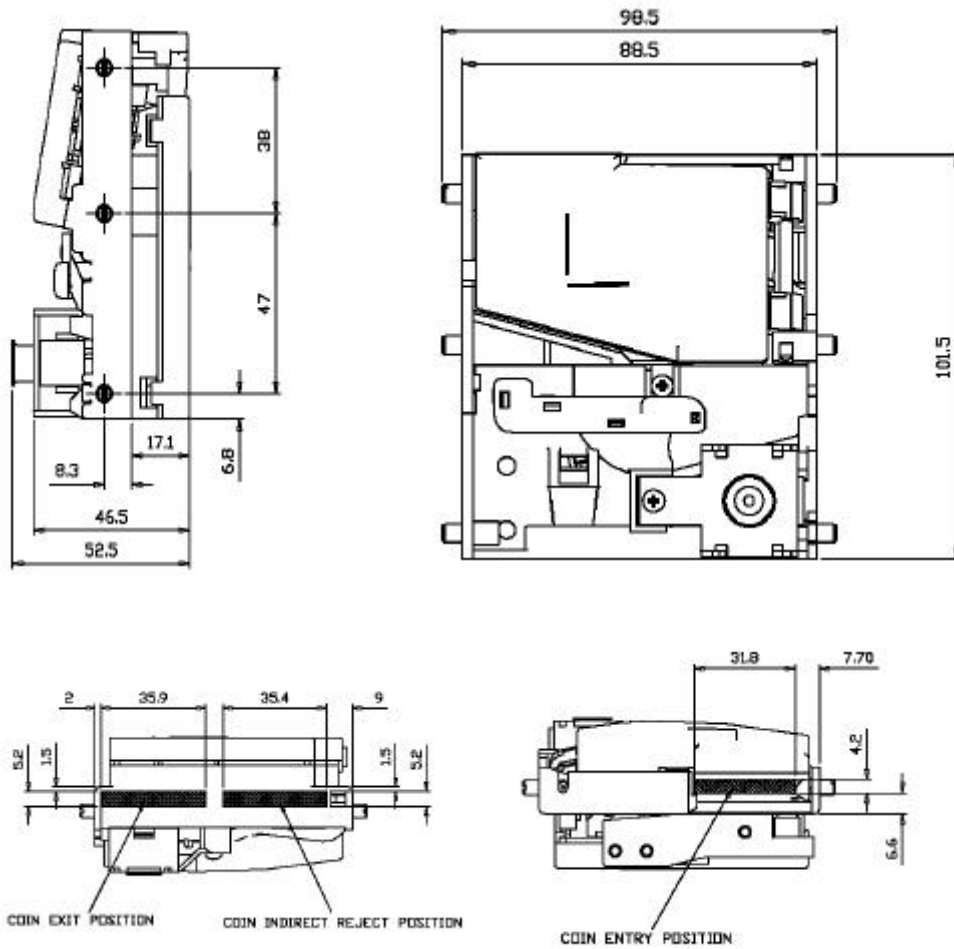
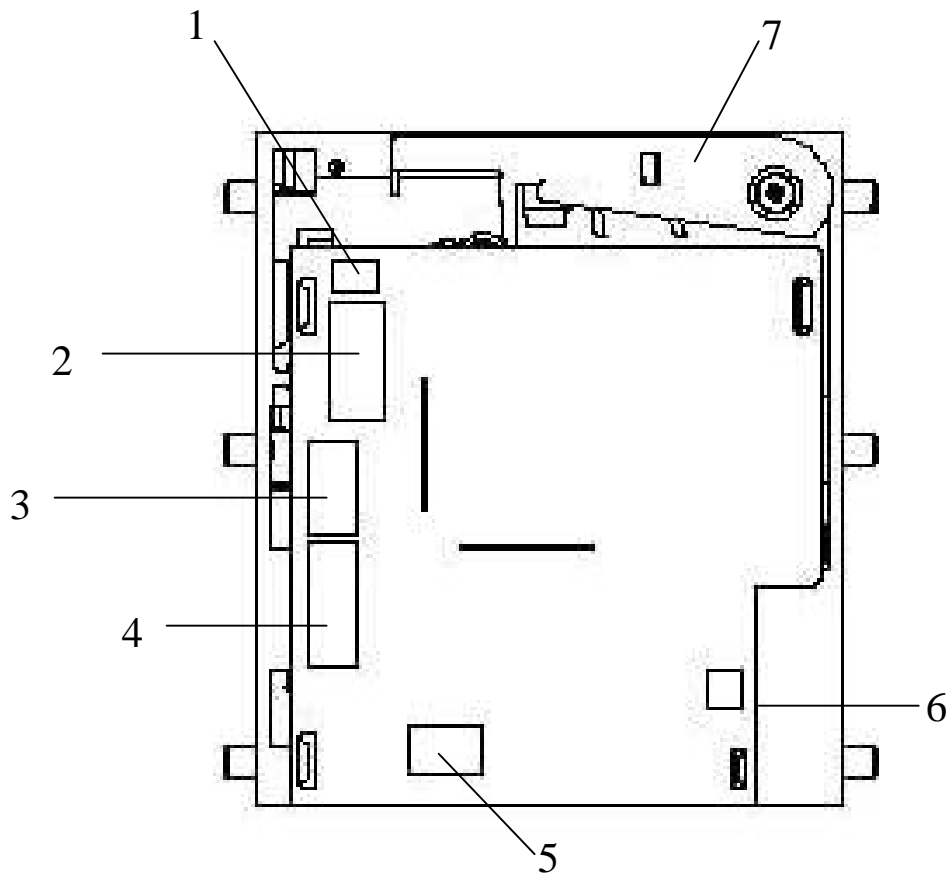


Figure 2: SR3 Connector Side*Table 1: SR3 Rear Cover Details.*

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

3) Coin Dimensions

The accepted range of coin sizes are shown below:

Table 2: Coin Dimensions

Diameter	15 - 31mm
Thickness	1.25 - 3.3mm

4) Electrical Interface Requirements

Table 3: 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 4: Current Consumption

Typically:	70mA
Maximum:	450mA

Table 5: 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.)		

5) Specified EMC Performance

◆ Emissions

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

◆ Immunity

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

◆ Shock / Vibration Immunity

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

6) Parallel Interface

Industry standard interface.
Connector type: 10 pin DIL

Table 6: 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	High
7	Accept 1	Low
8	Accept 2	Low
9	Accept 3	Low
10	Accept 4	Low

◆ 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.

◆ Inhibit All

When the input on pin 6 on the 10 way connector is high (>2.0 volts) or not connected, all the coins will be rejected.

The Inhibit All pin HAS to be low (<1.2 volts), in order for those coins not individually inhibited, determined by the programmed settings (See Accept and Inhibit Configuration), to be accepted.

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

7) Reject Operation

A "Reject operated" output, (open collector NPN transistor), is available on both body and front plate versions of SR3 - pin 5 of the 10 way DIL parallel connector.

This pin, outputs an active low signal whenever the reject lever is pressed.

Pressing the reject lever, will turn on an open collector transistor, for as long as the lever is pressed, to less than 0.7 volts at a Max. 50mA.

8) Service

The coin rundown area should be cleaned regularly to ensure accurate validation 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.

9) 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 7 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 2).

Table 7: 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.

10) 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:

◆ Accept and Inhibit Selection

Inhibit a specific coin
Enable a specific coin
Bank Select

◆ Security Features

Adjust Coin Security Settings
Alarm Activation

Table 8: DIL Switch Functions

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

Table 9: 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.

11) 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.

◆ To Inhibit Specific Coins

Example:- To Inhibit 50p and 20p.

Switch off the power to the SR3.

Set the Program DIL switches to:-

1 = ON, 2 = ON, 3 = OFF, 4 = ON, 5 = OFF, 6 = 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.

◆ To Enable Specific Coins

Example:- To Enable 50p and 20p.

Switch off the power to the SR3.

Set the Program DIL switches to:-

1 = ON, 2 = ON, 3 = OFF, 4 = OFF, 5 = OFF, 6 = 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.

12) 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.

◆ Both Banks ON

Switch off the power to the SR3.

Set switch 2 ON all other switches should be 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.

◆ Bank 1 ON Bank 2 OFF

Switch off the power to the SR3.

Set switches 3 and 4 ON all other switches should be 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.

◆ Bank 1 OFF Bank 2 ON

Switch off the power to the SR3.

Set switches 1, 3 and 4 ON all other switches should be 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.

13) 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.

◆ 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 tables 10 and 11 below)
3. Switch on the power to the SR3.
4. Press the reject lever.
The LED will turn RED.
5. Start entering the coins¹ or tokens¹ you wish to teach until the LED flashes GREEN, typically after around 10 insertions².
6. Press the reject lever and the LED will turn RED then GREEN.

The coin channel is now programmed³.

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 11/12). Teach & Run™ does NOT automatically enable the taught coin/token.

◆ BANK 1

Table 10: 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

◆ BANK 2

Table 11: Teach and Run™ Programming - Bank 2

Coin Number	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6
1 (7)	Off	On	On	On	On	Off
2 (8)	On	Off	Off	Off	On	Off
3 (9)	On	Off	Off	On	On	Off
4 (10)	On	Off	On	Off	On	Off
5 (11)	On	Off	On	On	On	Off
6 (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:-

1 = ON, 2 = ON, 3 = OFF, 4 = OFF. (= 0C Hex, = 12 Decimal).

Set switch 5 "Teach" ON.

Set switch 6 "Security" 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 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.

14) Adjustable Coin Security

The security of an individual coin/token can be adjusted using the 6 way DIL switches (See Figure 2: SR3 Connector Side)

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 tables 12/13 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 coin⁴ 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:-

1 = ON, 2 =OFF, 3 =ON, 4 =OFF, 5 =OFF, 6 =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).

◆ Decrease Security

Table 12: DIL Switches - Decrease Security

	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

◆ Increase Security

Table 13: DIL Switches - Increase Security

	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

◆ 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.

15) Alarms

When enabled, an alarm condition will activate all the outputs (A1 to A6) for 100 ms, except for condition 3.

Conditions which will indicate an alarm condition include:

1. An event which occurs out of sequence.
2. 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.
3. 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.

◆ Enable

To enable an alarm the following steps should be followed:

Switch off the power to the SR3.

Set switches 1 and 4 to the ON position. All other switches should be 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.

◆ Disable

To disable an alarm the following steps should be followed:

Switch off the power to the SR3.

Set switch 4 to the ON position. All other switches should be 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.

16) Protocols

◆ Serial Interface

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

Connector type: 4 Way (Connector 3 on Fig. 2 SR3 connector side).

Pin 1 - V Board

Pin 2 - Not Connected

Pin 3 - GND

Pin 4 - Data

17) Serial Messages

Table 14: Serial Commands

Header	Function
254	Simple poll
249	Request polling priority
248	Request status
247	Request variable set
246	Request manufacturer id
245	Request equipment category id
244	Request product code
242	Request serial number
241	Request software revision
238	Test output lines
236	Read opto states
233	Latch output lines
232	Perform self-test
231	Modify inhibit status
230	Request inhibit status
229	Read buffered credit or error codes
227	Request master inhibit status
210	Modify sorter paths
209	Request sorter paths
197	Calculate ROM checksum
196	Request creation date
195	Request last modification date
192	Request build code
4	Request comms revision
3	Clear comms status variables
2	Request comms status variables
1	Reset device

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The following error codes are supported.

Table 15: 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
35	Number of coin meter pulses overloaded
36	Games overloaded
254	Coin return mechanism activated (flight deck open)

The following fault codes will be supported.

Table 16: 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 17: Status Codes

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

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