

DCD200 Technical Manual



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1. Diary of Changes

Issue 1.0.....2nd May 2002

Issue 1.1.....6th Sept 2002

- Modification to disclaimer

2. Introduction

Manufactured to the industry standard size cards, the DCD 200 is made from high-strength, wear resistant materials. This card dispenser is designed to be mechanically and electrically compatible with existing equipment.

The cards are stored in a channel located in the tower section of the unit. They are held in place by a polycarbonate guide, which ensures correct alignment and stacking of the cards within the machine. The cards are placed in the device manually from the rear when required.

Upon receiving vend pulse, the card is picked up by the main cam roller and fed to the pinch rollers through the card adjustment plate. Once the motor is activated, the debit card has a specific amount of time to reach the first optic sensor, and then the second optic sensor. The motor will turn until the entire card is dispensed (full dispense version), or until approximately half of the card is dispensed (half-dispense version). A vend is complete when the card is removed from the unit (or payed out) the optic sensors are clear, and the "ready" signal is restored. If the unit detects a jam condition, it may try and give an error code, or may attempt to clear the jam by reversing the motor. For full details, refer to section [3.7](#) for further details.

2.1 Models

The DCD200 is available in 2 formats. The standard version (plastic card) and the paper card version. Within these formats there are various models. There is a half dispense model. This model is intended to be mounted directly to the front of the cabinet. When a vend signal is received, the card is dispensed halfway, so that it is held in the slot of the cabinet until removed by the customer. The standard half dispense version is manufactured with additional anti-cheat safeguards in mind. There is also a full dispense option available. This model is intended to be used when the dispenser is mounted inside the machine; the card is fully ejected and is sent via a chute to a cup or tray until removed by the customer. Refer to section [3.7](#) for further differences within these options.

2.2 Card Dimensions

Table 1: Card Dimensions

Material	Size L x W	Thickness
Plastic	3.375" x 2.125"	0.010" to 0.030"
Paper	86 x 54mm	0.030" only

Note: Plastic card must have radius corners only.

2.3 Card Capacity

The DCD 200 card capacity is dependent upon the card thickness. [Table 2](#) shows the minimum & maximum capacities.

Table 2: Card Capacity

Thickness	Quantity
0.010" (0.254mm)	390
0.030" (0.762mm)	130

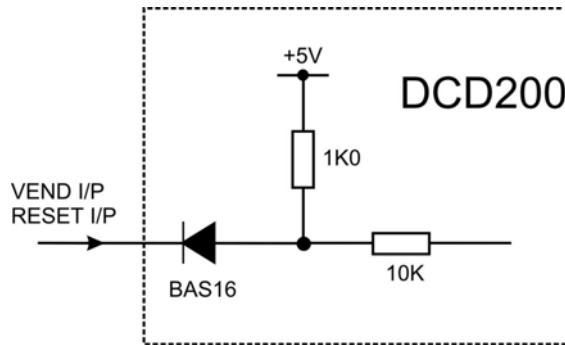
2.4 Dispense Time

The card dispense time is approximately 1 second from the trailing edge of the vend pulse.

3. Electronic Description

Operation of the DCD 200 is controlled by an 8-bit microprocessor. The microprocessor governs the motor control ready output, out of card output, error output and monitors the directional optic sensors, out of card switch, vend and reset inputs. The unit does not require a separate power supply for the logic elements.

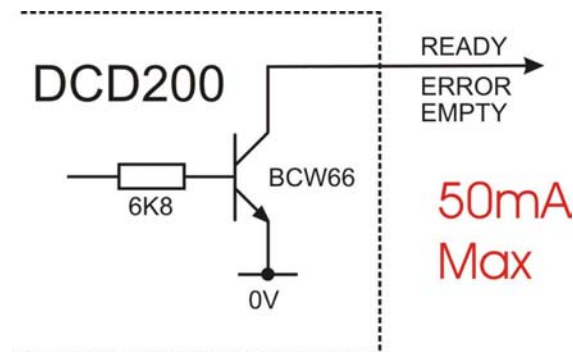
3.1 Input / Output Circuits



The input signal is active low, <1 volt, internally pulled up to +5V, protected against over voltage.

The signal is debounced in software so that only pulses between 15ms and 1s are treated as valid.

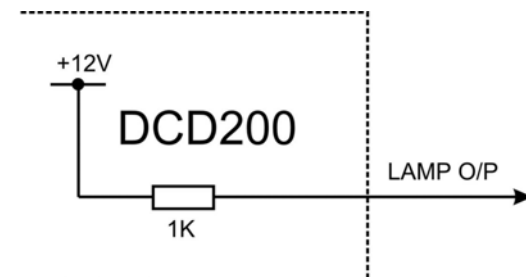
Figure 1: Input Circuit



Outputs to the host machine are all open collector NPN transistors, maximum voltage 30V @ 50mA.

50mA
Max

Figure 2: Output Circuit



Lamp outputs are +12V DC, $\pm 10\%$, with a series resistor of 1K Ω on board for limiting current.

Figure 3: Lamp Output Circuit

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3.2 Main Connector

The main connector to the host machine is a 12-way (0.1" pitch) JST connector:

Table 3: Main Connector

PIN	FUNCTION	ACTIVE
1	0 VOLTS	
2	+ 24V DC	
3	0 VOLTS	
4	Vend Input	Low
5	Reset Input	Low
6	0 VOLTS	
7	+12V Lamp output	
8	"Ready" Output	Low
9	+12V Lamp output	
10	"Error" Output	Low
11	+12V Lamp output	
12	"Empty" Output	Low

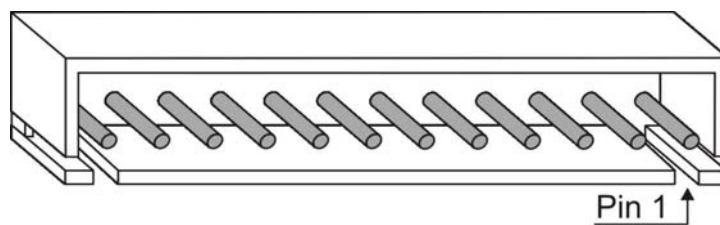


Figure 4: Main Parallel Connector

3.3 Motor Connector

Table 4: Motor Connector

PIN	FUNCTION
1	+ 24V DC
2	-
3	0V

Connector type: molex kk modular locking header - 0.1" pitch.

3.4 Empty Connector

Table 5: Empty Connector

PIN	FUNCTION
1	+ 5V DC
2	0V
3	-

Connector type: molex kk modular locking header - 0.1" pitch.

3.5 Opto Sensor A Connector

Table 6: Opto Sensor A Connector

PIN	FUNCTION
1	+ 12V DC
2	-
3	Output
4	0V
5	0V

Connector type: molex kk modular locking header - 0.1" pitch.

3.6 Opto Sensor B Connector

Table 7: Opto Sensor B Connector

PIN	FUNCTION
1	+ 12V DC
2	Output
3	-
4	0V
5	0V

Connector type: molex kk modular locking header - 0.1" pitch.

3.7 Alarm/Error Conditions

Half Dispense – If the unit detects a jam condition or either optic sensor is blocked, an error signal will be output.

Full Dispense (Standard) – If the unit detects a jam condition, the motor will reverse in an attempt to clear the jam. It will retry five times for a total of six attempts, before outputting an error signal.

Full Dispense (incl. Alarm) – If the unit detects a jam condition, the motor will not reverse and the unit will output an error/alarm signal.

4. Setting Up For Card Thickness

The DCD card dispenser may be reset to vend cards of different thickness by adopting one of the following setting methods.

4.1 Static setting

- 1) With the unit supply switched off; rotate the rear roller so that one of the flats is level with the front support plate. (This can be done by manually turning the front upper roller or plastic drive gears by hand).
- 2) Place one card of the desired thickness into the back of the unit, turn the adjuster screw anti-clockwise until the cards pass freely under the adjuster pin.
- 3) Move the card back and forth, at the same time gradually turn the adjuster screw clockwise until a resistance is felt on the card.

Using one of the four points of the screw head as reference, turn the adjuster screw anti-clockwise by the number of turns shown in the box below:

Card Thickness	Turns (0.025" pitch)
0.030 inch (0.76mm)	3/4
0.024 inch (0.60mm)	1/2
0.018 inch (0.46mm)	1/4
0.010 inch (0.25mm)	1/8

- 5) The unit is now set.
- 6) Follow the loading instructions (See section [5.1](#))

4.2 Dynamic setting

- 1) With the supply switched on but no cards in the back of the unit, turn the adjuster screw so the bottom of the adjuster pin is as close to the front support plate as possible. (Care must be taken not to bend the front support plate by over winding the adjuster screw!)
- 2) Load the back of the machine with the cards to be vended
- 3) Trigger the vend signal to the DCD, the unit will attempt to vend a card but should be unsuccessful (if the unit does vend one card or more, the gap between adjuster pin and front support plate is still too large. Close the gap further and re-prompt the vend signal). As the unit attempts to vend a card turn the adjuster screw anti-clockwise, the unit will follow this sequence:
 - i. Cards will not vend.
 - ii. Cards vend, though struggling
 - iii. Cards vend satisfactorily, without the next card entering the set gap.
 - iv. Cards vend, though the next card starts enter through the set gap.
 - v. Two cards vend or the unit has to reverse the next card back to the stack.

The aim is to determine the point at which the unit vends the cards most efficiently (i.e. 'iii'). This is the set position for the particular thickness of card to be used.

Note: The unit will attempt to vend a card six times, after which an error is signalled and the machine stops. If at this stage a card has not vended, cancel the error and re-prompt the vend signal.

4.3 Bent Card Compensation

Vending consistently bent cards can effect the performance of the unit, so to compensate for this the height of the rear support plate is adjustable (if required).

- i. With the rear supporting plate securing screws in the centre of the kidney bean slot the unit vends flat cards (factory setting).
- ii. With the rear support plate securing screws at the top of the kidney bean slot the unit vends cards that are concave (i.e. the centre of the card is the lowest).
- iii. With the rear support plate securing screws at the bottom of the kidney bean slot the unit vends cards that are convex (i.e. the centre of the card is the highest).

4.4 General

All DCD units are identified with factory settings.

5. Maintenance

5.1 Card Loading

In order to fill the tower unit of the DCD 200 with cards, the following steps must be followed:

1. Remove power from the unit
2. Remove the card weight (which is attached to the body with a chain)
3. Place a small amount (3 cards) in the unit, insuring that the cards are situated firmly on the lower surface.
4. Place the remainder of the cards on top of the 3 cards that were initially placed in the unit.
5. Replace the card weight, insuring that the chain link is up. (On units manufactured after 1/8/98, the front and back of the weight are identical).
6. Restore power to the unit.

5.2 Clearing Jams

Should a card jam ever occur, the following precautions should be taken:

1. Remove power from the unit.
2. Remove all loose cards from the unit.
3. When removing the jammed card, the card adjuster may need to be loosened.
Do not use excessive force.
Do not pry the plastic parts with any tools.
4. If necessary, re-adjust for card thickness and load tower with cards (see section 3.7).

5.3 Cleaning

The DCD 200 should be relatively maintenance-free. However this does depend on the type of cards used. Newly manufactured plastic cards (and also paper cards) can sometimes have excessive dust on them. This may mean that the DCD200 requires more maintenance as the dust collects on the unit. The amount of maintenance required will depend in part on the level of dust in the environment. The dust should be blown out of the DCD 200 approximately every 1300 cards or 6 months (whichever occurs first) to minimise the possibility of optic failure. A damp cloth can be used to wipe the inside of the tower section, including the rubber roller. A damp cloth should also be used to clean the upper roller in the front section of the unit. Do not allow any water to drip onto the PCB, and allow all components to dry fully before applying power to the unit. No alcohol or other chemicals should be used to clean the DCD 200.

5.4 PCB Replacement

1. Remove power from the unit. Remove cards and turn DCD 200 upside down.
2. Remove all connections (both optic sensors, motor and microswitch).
3. Remove the 4 screws that attach the PCB to the DCD 200 body.
4. Remove PCB and insulating paper.
5. Replace insulating paper and new PCB.
6. Replace the 4 screws that attach the PCB. Do not over tighten screws.
7. Replace motor, optic sensor and microswitch connections to the PCB.
8. Turn DCD 200 upright. Restore power via the 12 way JST connector.

5.5 Microswitch Replacement

1. Remove power from the unit via the 12 way JST connector.
2. Remove the microswitch connector from the PCB.
3. Push the microswitch upward to loosen from the rear support plate; pull the wires and connector up through the rear support plate.
4. Install new microswitch assembly, inserting connector end first.
5. Plug the new microswitch connector into the PCB.
6. Restore power to the DCD 200.

6. Specifications

6.1 Mechanical

Refer to [Figure 5](#)

Height	7.95"	202mm
Width	3.67"	94mm
Length	6.12"	156mm

6.2 Electrical

Table 8: Electrical Specification

Voltage	
Supply Voltage	24V ±10%
Worst Case Ripple at 24V DC	±1V
Current Consumption at 24V DC	
Nominal Running Current	0.2A
Nominal Start-up Current	0.7A
Nominal Jam Current	0.9A
Quiescent Current	<0.1A
Peak Current	1A

6.3 Environmental Specification

Table 9: Environmental Specification

Operating Temperature	14 ⁰ F to 104 ⁰ F, (-10 ⁰ C to +40 ⁰ C)
Operating Humidity	10 to 90% R.H. (non-condensing)
Position in use	Upright or within 2° in any direction

7. Mechanical Dimensions

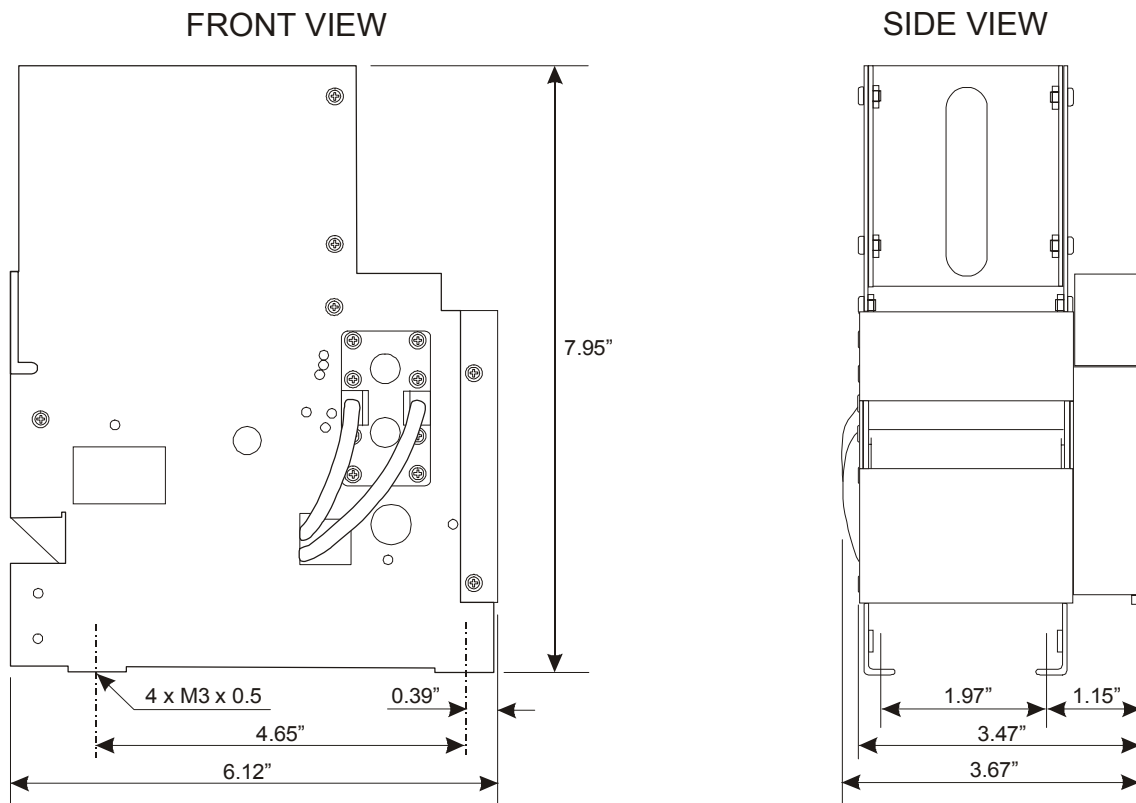


Figure 5: DCD200 External Dimensions

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8. Troubleshooting

If.....	Check.....
A card will not dispense.. -	<ul style="list-style-type: none"> ▪ There is no power to the DCD 200. ▪ A vend signal is not being sent. ▪ The signal was received when the unit was not "ready". ▪ There is a loose connection or broken wire.
The "empty" light is on, but there are cards in the tower section of the DCD 200...	<ul style="list-style-type: none"> ▪ The cards are not properly loaded. ▪ The connector from the microswitch to the PCB is loose. ▪ There is a broken wire. ▪ The microswitch needs replacing.
The unit should be "ready", but the signal is not being output	<ul style="list-style-type: none"> ▪ There is a card stuck condition being detected (an optic sensor is blocked or failed). ▪ The microswitch is not in the "ready" position, or has failed.
The card is not being dispensed straight	<ul style="list-style-type: none"> ▪ The cards are out of spec (< 0.01"). ▪ The plexiglass opposite the optic side is missing. ▪ An O-ring on the lower front roller is missing ▪ The DCD 200 card slot is not lined up with the host machine cabinet slot.

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