Owner's Manual

Card Based Electronic Payment System for Laundry

Oct 24, 2008
Ver. B.2

The Card Based Electronic Payment system eliminates the traditional Coin based payment methodology. The system significantly improves convenience of laundry usage to the user while providing the owner with more control and usage tracking.

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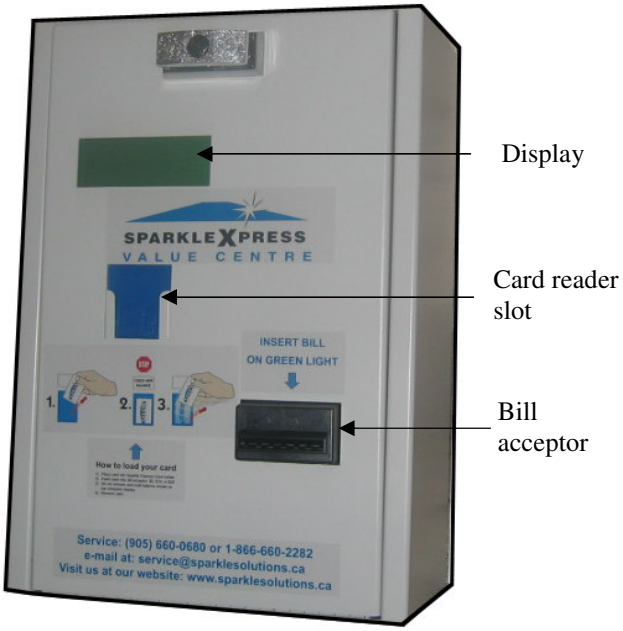
1. Functional System Behavior

The system consists of four main components:

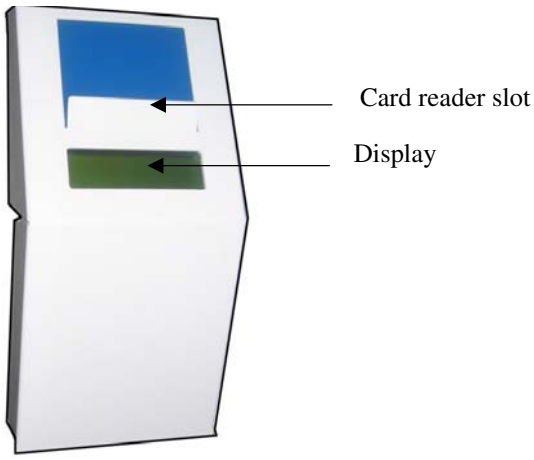
1. Card
This is a proximity smart card which is used to securely store various information. Information can be accessed and manipulated by placing it in a card reader slot. There exist a 'user' card for the user and several servicing cards for the owner

2. Money Transfer Unit (MTU)

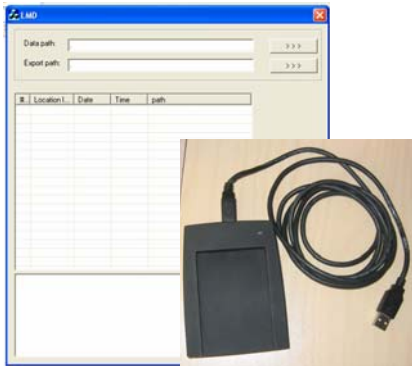
This is a standalone central controller which has a multitude of tasks but the primary task is to intake users' cash and transfer the cash value to the card's memory.



3. Washer/Dryer Card Reader and Controller (CRC)
This device is harnessed inside a washer or dryer machine whose task is to communicate with the card and to start the respective machine.



4. PC terminal
This includes a USB card reader and PC software. This combination is used to communicate with specific cards and export their data into formatted text



Upon system activation, the MTU, the associated CRCs, and some servicing cards are assigned a location ID and sub-location ID. These allow for system data tracking and ensure that only cards with the appropriate location and sub-location ID written to them are able to communicate with a system. The owner may activate a single system or a cluster of linked systems. A single system will only allow communication with cards belonging to that system. A system within a cluster may communicate with any card belonging to that cluster. For example, the user may load credits at one system's MTU and start washer/dryer machines in another system within the cluster.

The location and sub-location ID designation is as follows:

If it is a single system, the owner sets a unique 5-digit location ID and sets the 2-digit sub-location ID to 00. If the system belongs to a cluster of systems, the owner still sets a unique location ID for each system, but sets the same non-zero sub-location ID for all the systems in the linked cluster. See figure 1.1 below for an illustration and section 3.2 for activating machines and setting location IDs.

A 'user' card is assigned to a qualified user - typically a tenant. The very first time the user loads credits onto the card through the MTU (see section 5.1 on 'user card'), the MTU also writes its location and sub-location ID to the user card. The user card is now married to this single system or cluster of systems. The user may start a machine with this card provided that a) the card has enough credits for at least one cycle, and b) that the card's location ID matches the CRC's location or the card's non-zero sub-location ID matches the CRC's sub-location ID. Credits are deducted with every use.

The owner is provided with several servicing cards to monitor and control the system. The following is a list of features that are available to the owner.

- Collect transaction records and export them to the PC via the PC terminal (see section 6)
- Collect machine usage records and export them to the PC via the PC terminal (see section 6)
- Activate the MTU and set location and sub-location IDs (see section 3.3)

- Activate the CRCs (see section 3.3, 5.4)
- Deactivate the MTU and CRC (see section 5.5)
- Set wash and dry cycle costs and dryer top off costs (see section 4.3, 5.7)
- Set time and date for the CRCs' internal clocks (see section 4.2, 5.6)
- Set an upper limit on the credit a user can have on his/her 'user' card (see section 4.3)
- Set the screen language (see section 4.4)
- Test the Bill Validator (5.8)
- View CRC time setting and location IDs (see section 5.8)
- Freely start machines (see section 5.8)

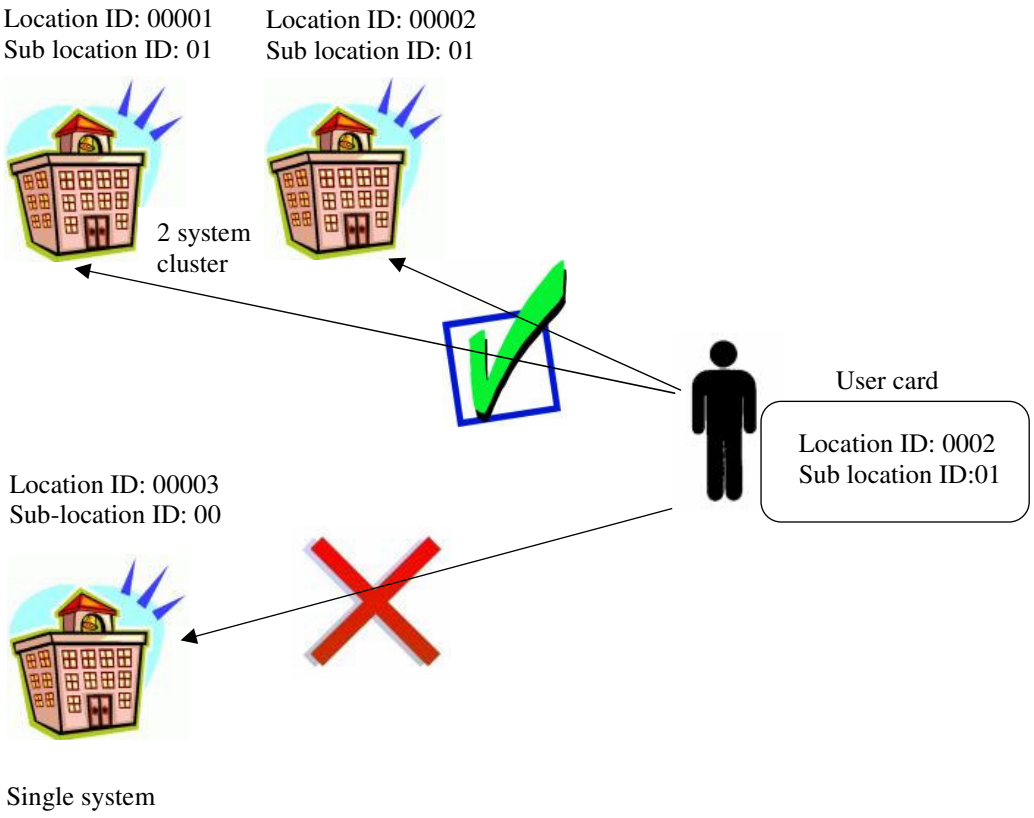
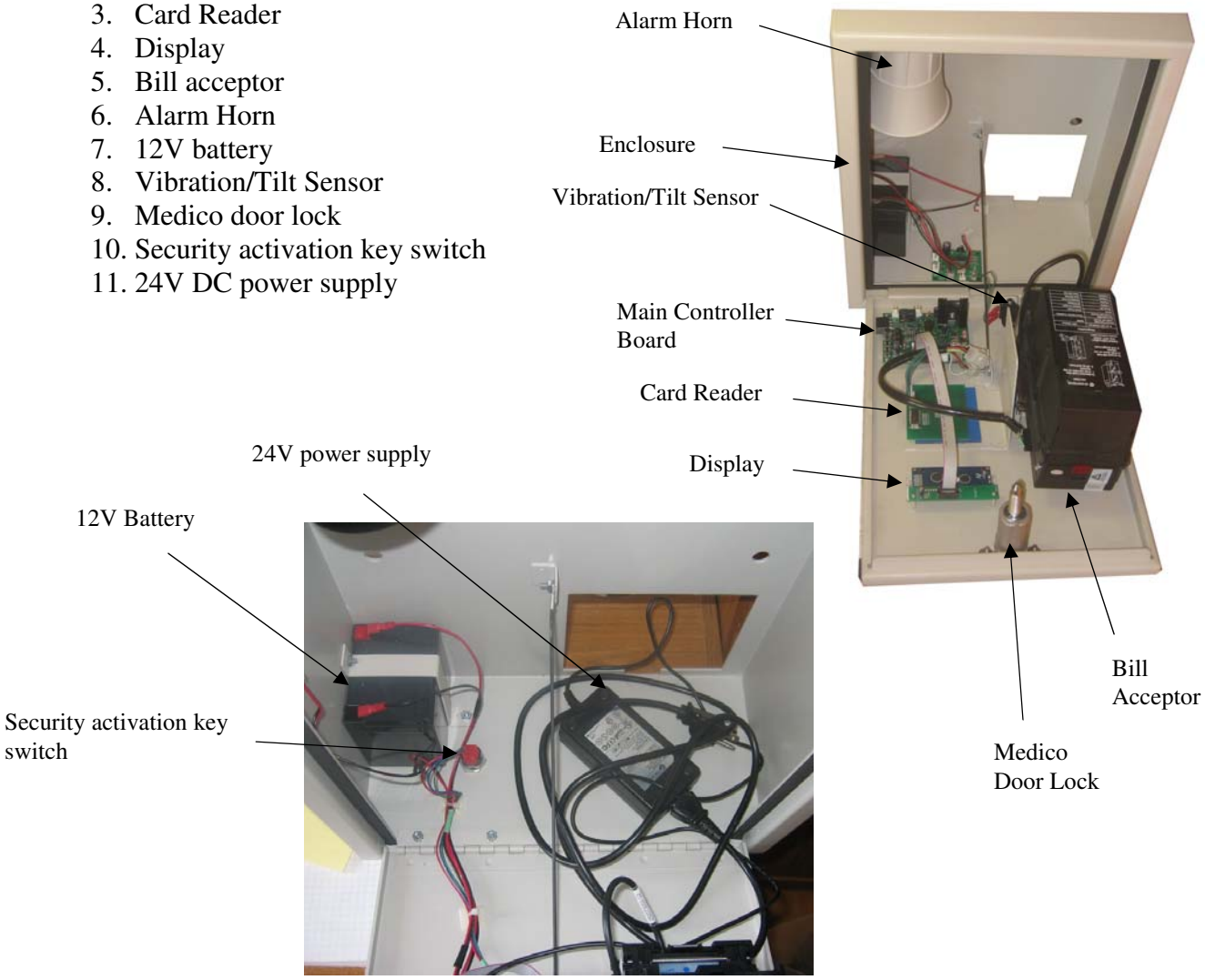


Figure 1.1

2. MTU

2.1 Components

1. Enclosure
2. Main controller board
3. Card Reader
4. Display
5. Bill acceptor
6. Alarm Horn
7. 12V battery
8. Vibration/Tilt Sensor
9. Medico door lock
10. Security activation key switch
11. 24V DC power supply



Note: Make sure that the AC plug is NOT plugged into the outlet when connecting or disconnecting the DC jack from the controller board. If resetting the system is required use the AC plug. This is due to harmful voltage spikes that may be induced at the DC connection if there exists a voltage on the DC connector.

2.2 Alarm Security System

The MTU can be equipped with an Alarm System (security system) as an option
The MTU an alarm security system consisting of an alarm horn, Vibration/Tilt Sensor, 12V battery, and security activation key switch. The Security activation key switch (accessed from the bottom) toggles the Enable/Disable state of the alarm security of the MTU. The system is disabled when the key is inserted and turned. Otherwise, the system is enabled. In case of AC power interruption, the 12V battery powers the security system components.

The following events trigger the Vibration/Tilt sensor:

-Vibrations
-Opening of cabinet door
-Tilting the cabinet in any direction

Because false positive vibration events may be responsible for tripping the sensor, the alarm horn only delivers a brief chirp for a single vibration event – warning the suspect. If four vibration events occur within a short period of time, the alarm horn delivers a continuous sound for three minutes, or until the security is disabled.

3. Installation

3.1 MTU Installation

1. 24VDC, 1.7A power supply is required to run the MTU. The desktop power supply is provided by the manufacturer of the MTU. The MTU's metal body should be grounded if an installer of the MTU will install receptacle box inside the MTU. The door rod's stud should be used for this purpose if the MTU box does not have a designated ground stud.

2. Secure the MTU flush against the wall with the help of six, ½" holes (figure 3.2).

3. The MTU can be equipped with an Alarm System (security system) as an option. This installation manual covered this option.
Once MTU mounted, use the switch key to disable security.

4. The MTU is delivered with the alarm horn connector disconnected from the main controller board. Connect it as per figure 3.4

5. Connect the DC power supply jack to the controller board as per 3.4.

CAUTION: Make sure that the AC plug is NOT plugged into the outlet when connecting the DC jack. Always remember to disconnect the AC plug when connecting or disconnecting the DC jack.

Figure 3.2

If for any reason other connectors are not connected, connect them as per figure 3.4. The tilt sensor connectors have no polarity, but the battery connectors do! Make sure to connect black to '-' and red to '+'.

6. Connect the power supply to the receptacle

7. Close and lock the MTU door.

8. Enable security by turning and removing the switch key.

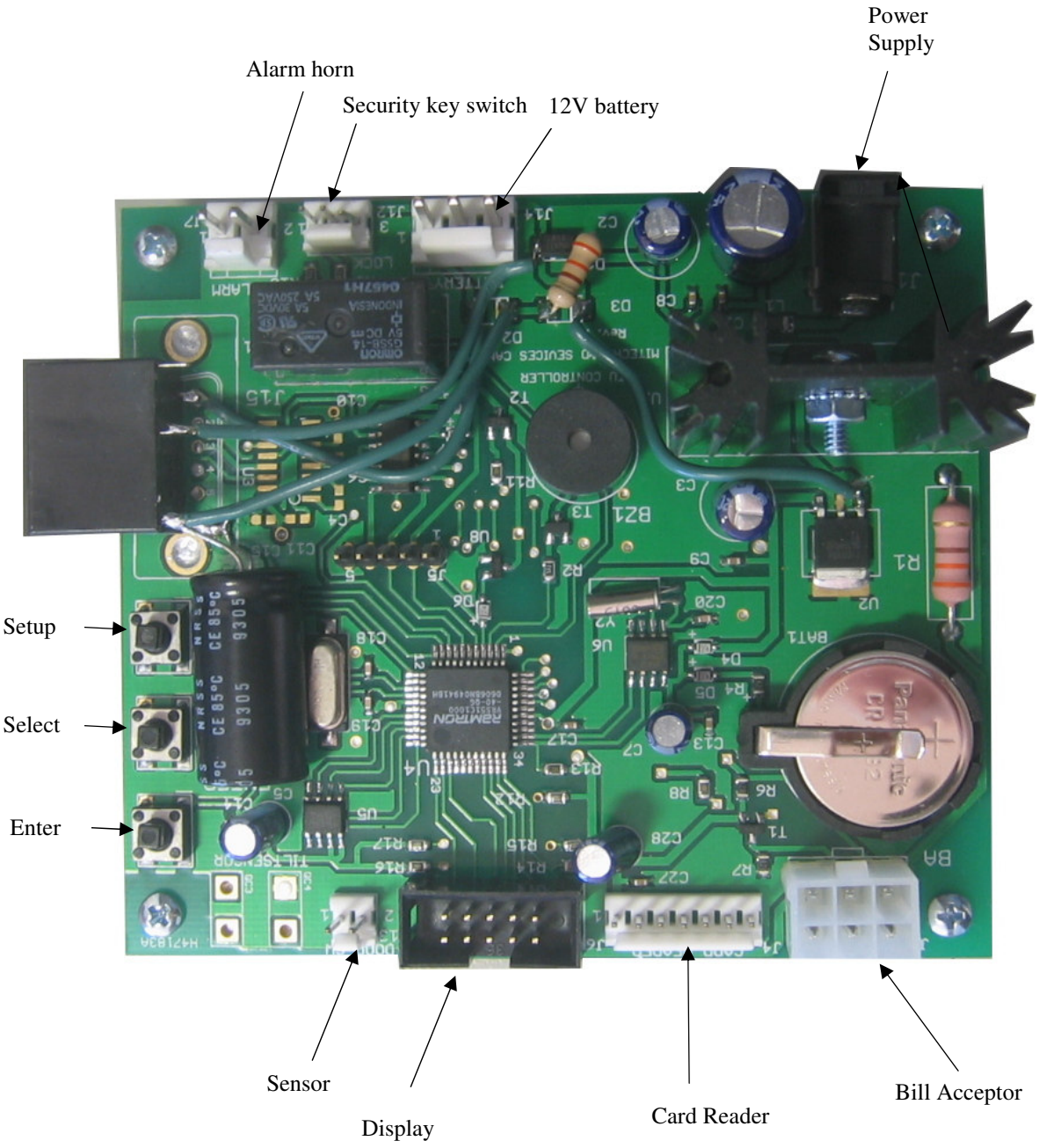


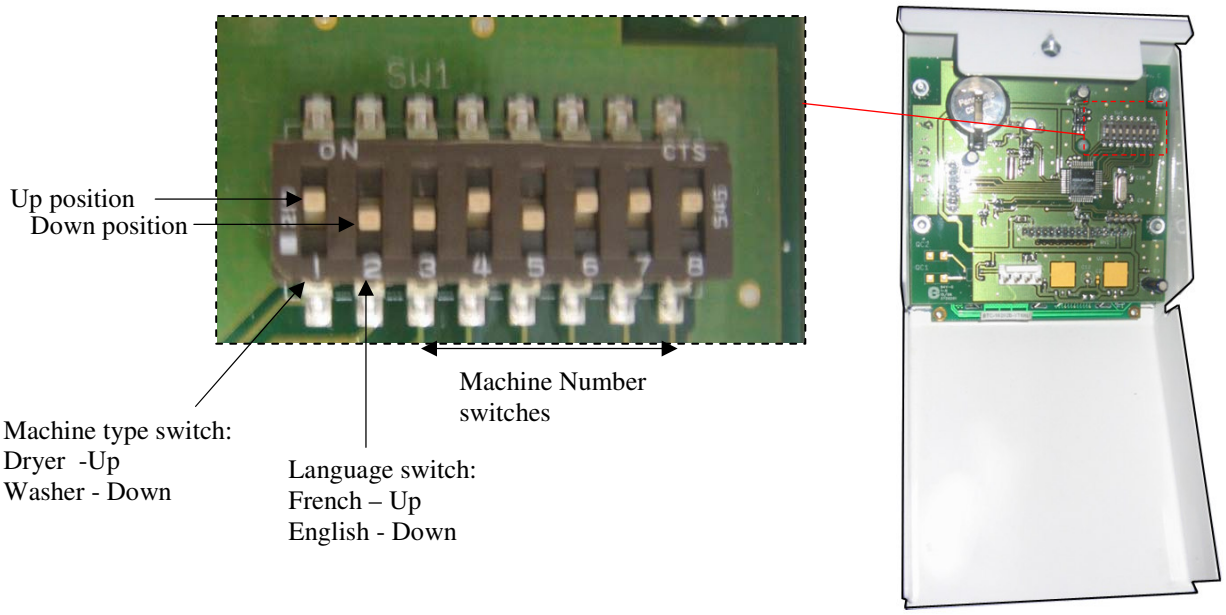
Figure 3.4: Main Controller

Note: The Alarm Horn, Security key switch, 12V battery, and Sensor Connectors are not to be utilized if a separate Alarm Controller Board is used.

3.2 CRC installation

Configure the CRC's setting using the dip switch on the electronic board (similar to figure 3.2.1). To set the machine number, use the table below.

Figure 3.2.1



Machine #	Switch number 3	4	5	6	7	8	Machine #	Switch number 3	4	5	6	7	8
1						X	33	X					X
	X	X	X	X	X				X	X	X	X	
2					X		34	X				X	
	X	X	X	X		X			X	X	X		X
3					X	X	35	X				X	X
	X	X	X	X					X	X	X		
4				X			36	X			X		
	X	X	X		X	X			X	X		X	X
5				X		X	37	X			X		X
	X	X	X		X				X	X		X	
6				X	X		38	X			X	X	
	X	X	X			X			X	X			X
7				X	X	X	39	X			X	X	X
	X	X	X						X	X			
8			X				40	X		X			

	X	X		X	X	X			X		X	X	X	
9			X			X	41	X		X			X	
	X	X		X	X				X		X	X		
10			X		X		42	X		X		X		
	X	X		X		X			X		X		X	
11			X		X	X	43	X		X		X	X	
	X	X		X					X		X			
12			X	X			44	X		X	X			
	X	X			X	X			X			X	X	
13			X	X		X	45	X		X	X		X	
	X	X			X				X			X		
14			X	X	X		46	X		X	X	X		
	X	X				X			X				X	
15			X	X	X	X	47	X		X	X	X	X	
	X	X							X					
16		X					48	X	X					
	X		X	X	X	X				X	X	X	X	
17		X				X	49	X	X				X	
	X		X	X	X					X	X	X		
18		X			X		50	X	X			X		
	X		X	X		X				X	X		X	
19		X			X	X	51	X	X			X	X	
	X		X	X						X	X			
20		X		X			52	X	X		X			
	X		X		X	X				X		X	X	
21		X		X		X	53	X	X		X		X	
	X		X		X					X		X		
22		X		X	X		54	X	X		X	X		
	X		X			X				X			X	
23		X		X	X	X	55	X	X		X	X	X	
	X		X							X				
24		X	X				56	X	X	X				
	X			X	X	X					X	X	X	
25		X	X			X	57	X	X	X			X	
	X			X	X						X	X		
26		X	X		X		58	X	X	X		X		
	X			X		X					X		X	
27		X	X		X	X	59	X	X	X		X	X	
	X			X							X			
28		X	X	X			60	X	X	X	X			
	X				X	X						X	X	
29		X	X	X		X	61	X	X	X	X		X	
	X				X							X		
30		X	X	X	X		62	X	X	X	X	X		
	X					X							X	

31		X	X	X	X	X	63	X	X	X	X	X	X
	X												
32	X												
		X	X	X	X	X							

There exist three versions of the CRC, each tailored to Huebsch, Frigidaire, or Continental washer/dryer machines. The following sections describe installation details for each of the three.

3.2.1 Huebsch CRC

This version of the Huebsch Card Reader uses pulse interface of the Huebsch machine.

1. Remove the coin interface (if one exists)
2. Open the front panel of the machine to expose the electronics
3. Open the meter case's service hatch using a key
4. Run the provided 6-wire cable (figure 3.2.2) through the front of the meter case as shown in figure 3.2.3, and through the opening on the side of the meter case as shown in figure 3.2.4
5. Connect the 6-pin connector to the CRC as shown in figure 3.2.3
6. Connect the 2-pin and 4-pin connectors to the machine controller board as shown in figure 3.2.4

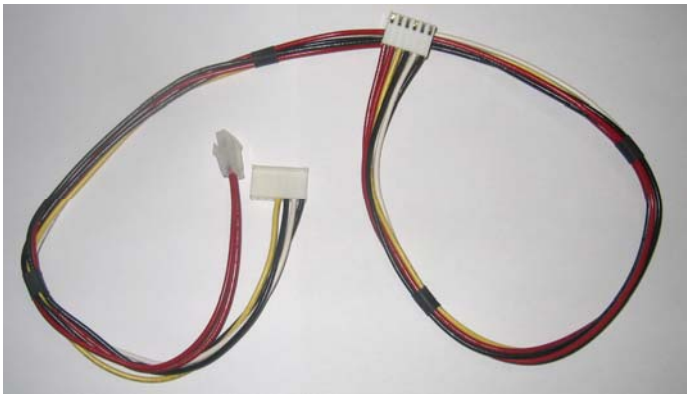


Figure 3.2.2

Figure 3.2.3

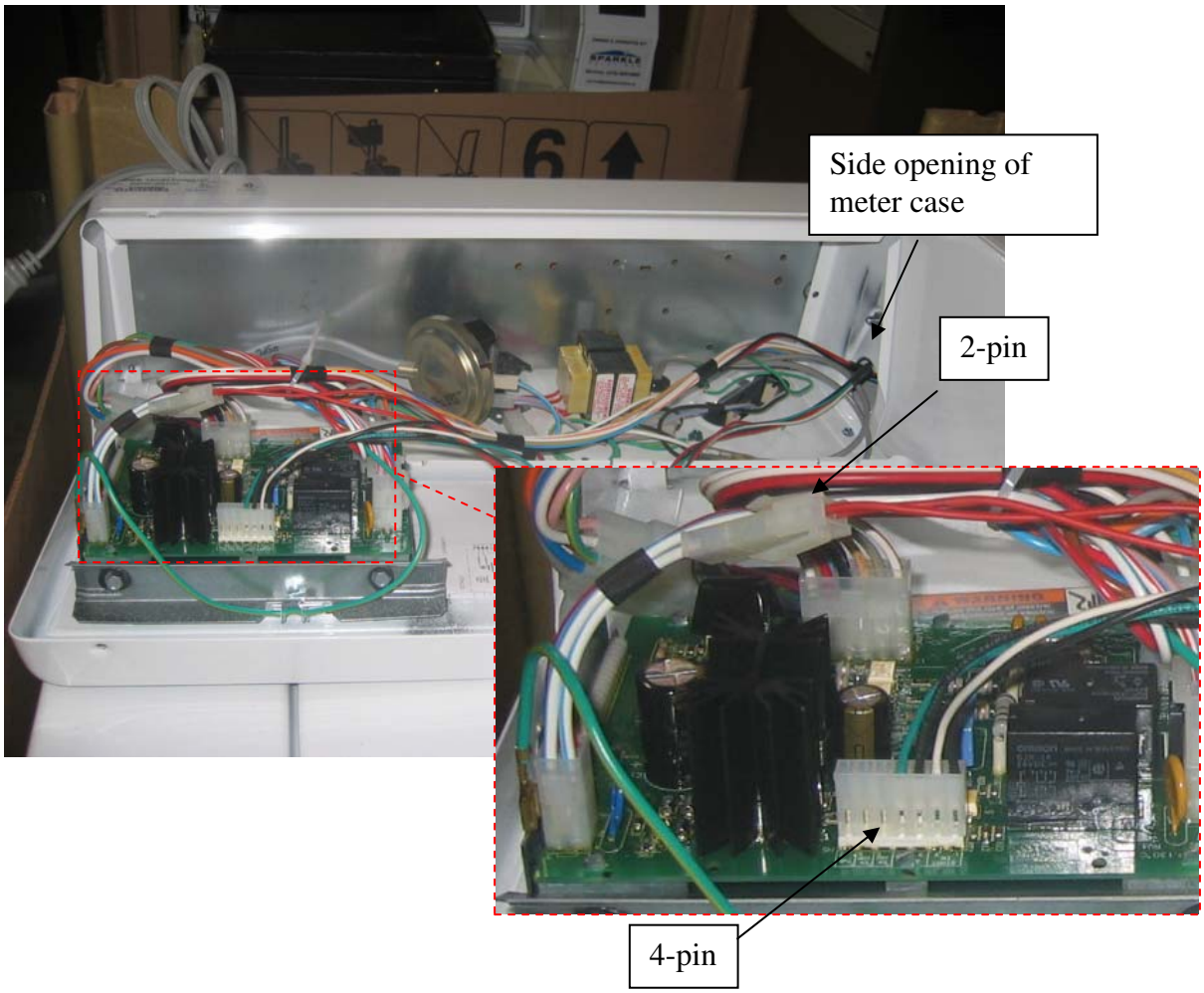


Figure 3.2.4

3.2.2 Frigidaire CRC

1. Remove the coin slider interface and the mechanical unit as in figure 3.2.7 (if any exists)
2. Open the meter case's service hatch using a key
3. The cable assembly includes a harness and a power supply as shown in figure 3.2.8. Connect the large 6-pin connector (figure 3.2.8) to its mating connector inside the meter case. Secure the ring lug of the green ground wire to the meter case with a bolt
4. Connect the other two connectors to the CRC as shown in figure 3.2.9
5. Connect one ring lug of a lone ground wire to the hex bolt as shown in figure 3.2.10
6. Reaching through the hatch, use the hex bolt to secure the CRC to the meter case's pem nut(similar to figure 3.2.5) and connect the other ring lug of the lone ground wire to the meter case using a bolt
7. Attach the power supply to the bottom of the meter case using the adhesive tape found on the back of the power supply.

Note that the entire cable assembly stays in the meter case

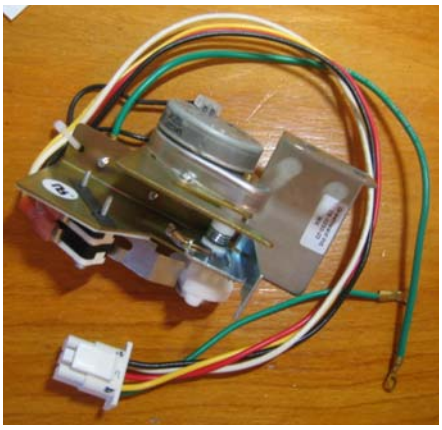


Figure 3.2.7

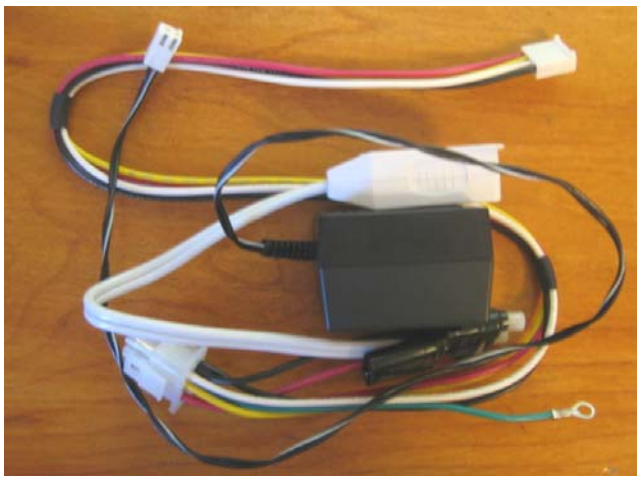


Figure 3.2.8

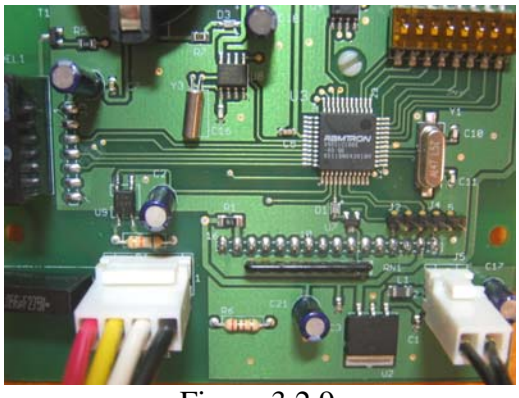


Figure 3.2.9

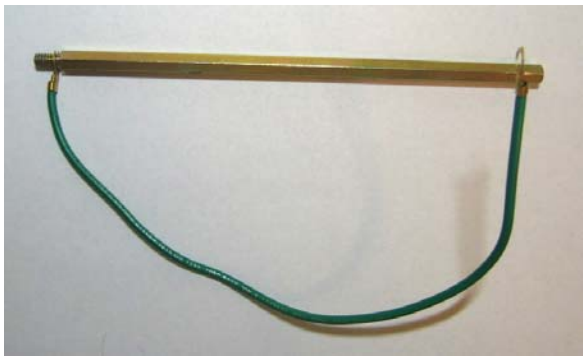


Figure 3.2.10

3.2.3 Continental CRC

1. Remove any coin drop interfaces (if any exist)
2. Open the front panel of the machine to expose the electronics
3. Use the provided cable(figure 3.2.11) to connect the machine and the CRC as shown in figures 3.2.12 and 3.2.13.
4. Secure the CRC with four nuts.

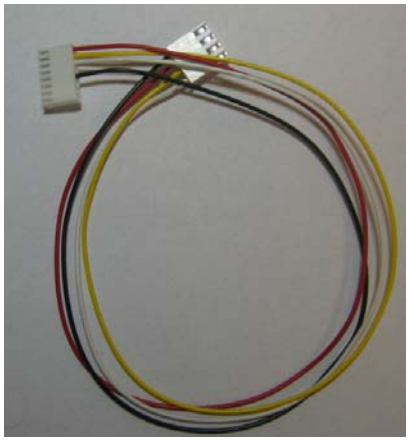


Figure 3.2.11

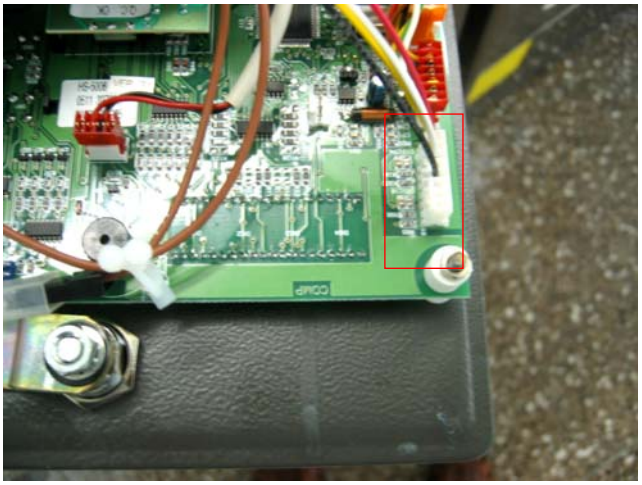


Figure 3.2.12: Machine

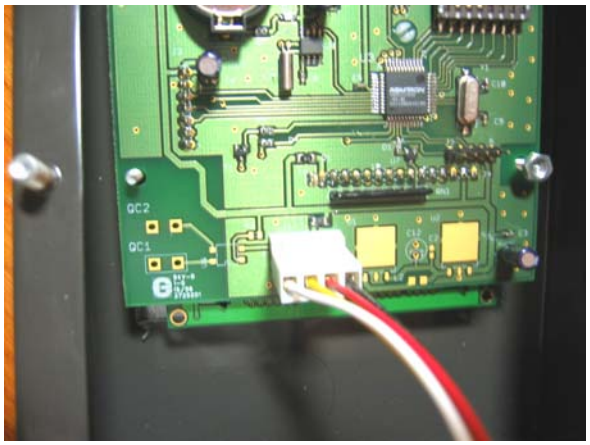


Figure 3.2.13 :CRC

3.3 First time activation

The MTU and CRCs are provided by the manufacturer in the deactivated state (screens should read “not active”). The following activation guideline only applies to units in the deactivated state.

Activating the MTU

1. Place the ‘activation’ card in the reader slot.

Activating the CRC

1. After activating the MTU, use the ‘activation’ card (one that activated the MTU) to activate all the CRCs by placing it in the CRC card slot. The CRC screen will display “Insert Card Below” in the first line, while the second line will alternate between displaying the machine number and cycle cost.
2. The CRCs are provided with pre-configured wash/dry costs, however it is likely that these should be changed. See section 4.3 on how to change the pricing.

4. Configuration Menu

Three push buttons on the main controller (Figure 3.4) allow the configuring of the following four items:

1. Deactivation state
2. Time and Date
3. User Card limit
4. Language

To enter the main configuration menu, press and hold the “Setup” button until the front panel display shows a menu with items corresponding to the four listed above. While in main menu, press “Setup” to quit.

4.1 Deactivate

This item is used to deactivate the system. To deactivate the system, place the Deactivation card in the card slot prior to entering the configuration menu, enter the configuration menu, and press the “Enter” button. (The deactivate item is the selected by default). The Deactivation card may now also be used to deactivate CRCs.

4.2 Time

This item is used to set the time and date of the system. To set the time, enter the configuration menu, navigate to the Time item by pressing “Select”, and press “Enter” to enter the Time and date setting sub-menu. Use the “Select” button to navigate between the different units and use the “Enter” button to change the selected unit. When the time and date configuration is completed, press the “Setup” button to save the configuration and return the main configuration menu.

4.3 Limit

This item is used to set the limit that user cards may be credited to. To set the limit, enter the configuration menu, navigate to the Limit item by pressing “Select”, and press “Enter” to enter the Limit setting sub-menu. Press “Select” to change the limit value. This will increase the limit by $10, up to $80 maximum. When the configuration is completed, press the “Enter” button to save the configuration and return the main configuration menu.

4.4 Language

This item is used to set select the language of the front panel display. To set the language, enter the configuration menu, navigate to the Language item by pressing “Select”, and press “Enter” to enter the Language setting sub-menu. Press “Select” to navigate between the languages, and press “Enter” to save the selected language and return to the main configuration menu.

5. Card Description and Operation

5.1 User Card

This card is used to store monetary credits toward laundry service. Currently, credits are loaded through the MTU by cash means only. With enough credits, the user card can start a washer or a dryer machine provided that the machine’s location ID or non-zero sub-location ID match that of the card.

5.1.1 Transferring Credit

The procedure for loading credits is as follows:

1. Place the card in the reader slot of the MTU
2. Insert your bill into the Bill Validator when the green lights begins flashing.
3. Do not remove your card until the screen shows “Deposited” and shows the loaded bill amount and an updated balance, or until the screen shows “Card Error”
4. Remove card

If the card is remove during the short wait period after inserting the bill, a buzzer will periodically sound and a message will appear on the screen notifying the user to place back the card. If it is not placed back after roughly 15 seconds, the system will remember this event by writing it to the error log and return to the main operating state. The next time this card is placed in the slot, the owed monies will immediately be transferred, the screen will show “Owed credit” and the updated balance values, and the error log entry is cleared.

It may also be the case that the card is partially malfunctioning where the card is recognized but the value cannot be transferred after user has inserted the bill. In such a case the screen reads “Card Error”. The system remembers this event and adds the owed monies to the error log.

5.1.2 Starting Machines

1. Place the card into a washer or dryer CRC card slot. The screen will show the card’s balance and a wait message.
2. Do not remove card until the machine is successfully started and the screen shows the new balance or until the screen reads “Machine can’t Start’. In the latter case, the machine is likely malfunctioning and the card is not charged.
3. While the machine is running, its screen reads “Machine in Use” in case of a washer, or displays a message regarding dryer top off cost in case of a dryer. The user may place the card back on CRC card slot for the dryer top off feature. The new balance will show on the screen and extra dry time will be added to the cycle.

5.2 Money Collect Card

This card is used to collect transaction data from the MTU. Data can be read from the money collect card through the PC terminal (see section 6).

5.3 Reader Collect Card

This card is used to collect machine usage data from the CRC. Data can be read from the reader collect card through the PC terminal (See section 6).

5.4 Activation Card

This card is used to activate the MTU and the CRCs which are in the deactivated state (screens to read “not active”). Note that the MTU must be activated prior to the CRCs. See section 3.3 for more information.

5.5 Deactivation Card

This card is used to deactivate the MTU and CRCs which are in the active state (screens display anything but “not active”). If the owner chooses to deactivate the CRCs, location IDs are written to the card and it should then be placed into each CRC’s card slot to deactivate it. See section 4.1 for more information.

5.6 Time Card

This card is used to copy the MTU’s clock’s date and time to the CRCs’ clocks. Simply place the card in the MTU’s reader slot and an instantaneous time stamp will be transferred to the card. The card should immediately be placed in CRC’s card slot to update its internal clock. To change the MTU clock time, see section 4.2.

5.7 Price Card

This card is used to transfer wash and dry prices to the CRCs. Simply place the card in the CRC card slot to update the CRC’s price values.

5.8 Service Card

This card is used to test the MTU’s Bill Validator as well as check CRC clock time, location IDs and start the machine.

Place the card into the reader slot of the MTU and insert a bill into the Bill Validator. The screen will display the value of the inserted bill if the Bill Validator is functioning properly.

The service card can also be used to check the internal clock location IDs of the CRC and freely start a machine. Place the card in the CRC card slot. The clock time as well as the full location ID will be displayed on the screen. If the card is present in the slot for roughly 5 seconds, the machine is started and the message changes to “Starting Machine”.

5.9 Service Collect Card

This card is used to collect data on Service Card usage. Place the card into the CRC’s reader slot to transfer this information to the card.

6. Collecting data and the PC Terminal

6.1 Collecting data

To collect a transaction record from a system, place the 'money collect' card in the MTU card slot. The most recent record(since last collection) will be transferred to the card. Upon successful data collection, the money collect card should now be taken to the PC terminal for exporting into a Windows environment (see section 6.2)

To collect machine usage data, first place the 'reader collect' card at the MTU's card slot so that location ID information can be transferred to the card. Then, place the card in the CRC card slot to transfer machine usage data records to the card. A "Card is Full" message may appear if the reader collect card's memory is full in which case it should be taken to the PC terminal for record exporting and automatic memory clearing. It is therefore advisory to carry a secondary reader collect card. Upon successful data collection, the reader collect card should be taken to the PC terminal for exporting into a Windows environment (see section 6.2)

6.2 Exporting data using the PC terminal

1. Connect the USB cable from the card reader to the PC
2. Open the LMD.exe file to launch the PC software. The window will look as follows.

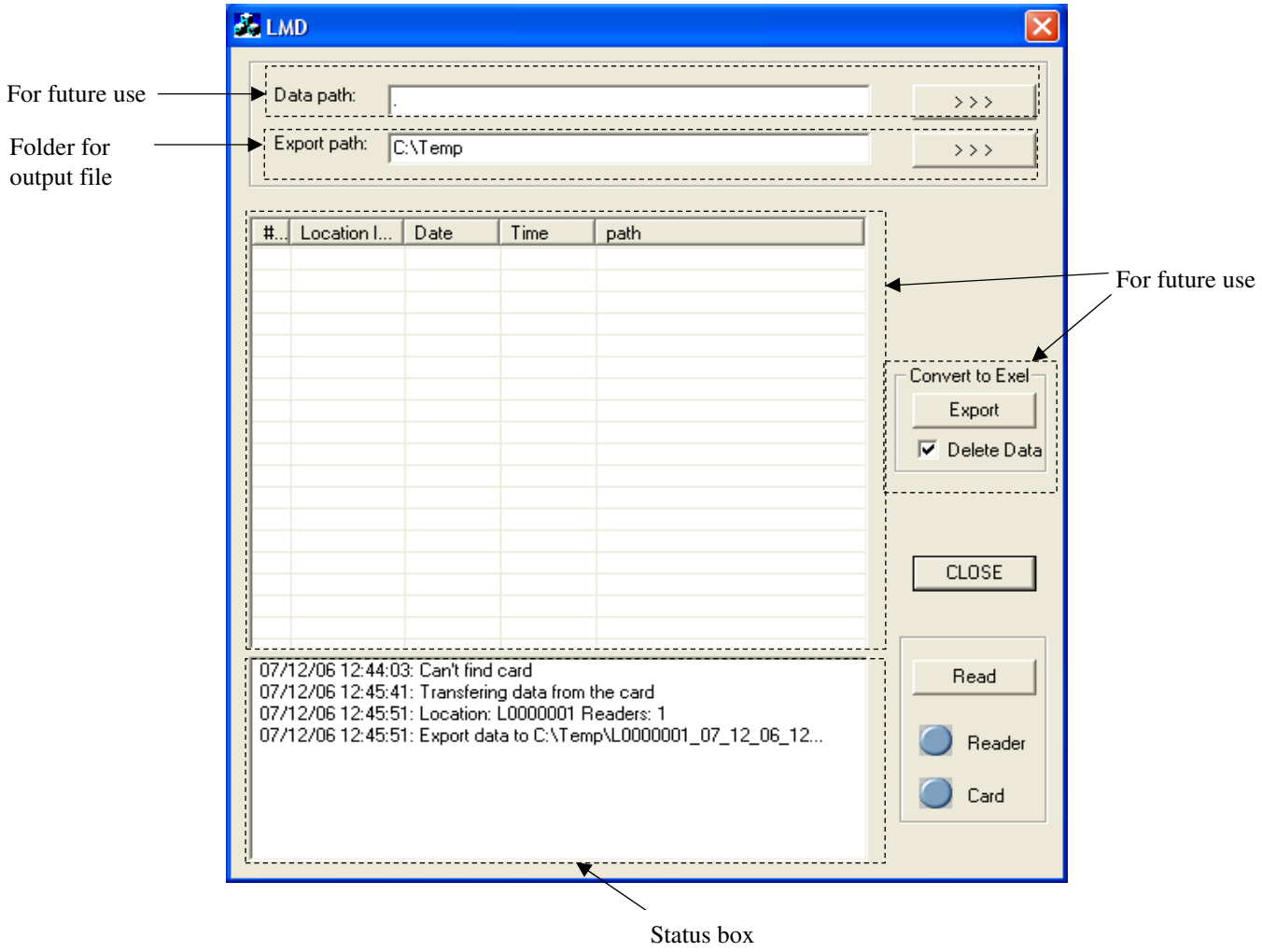


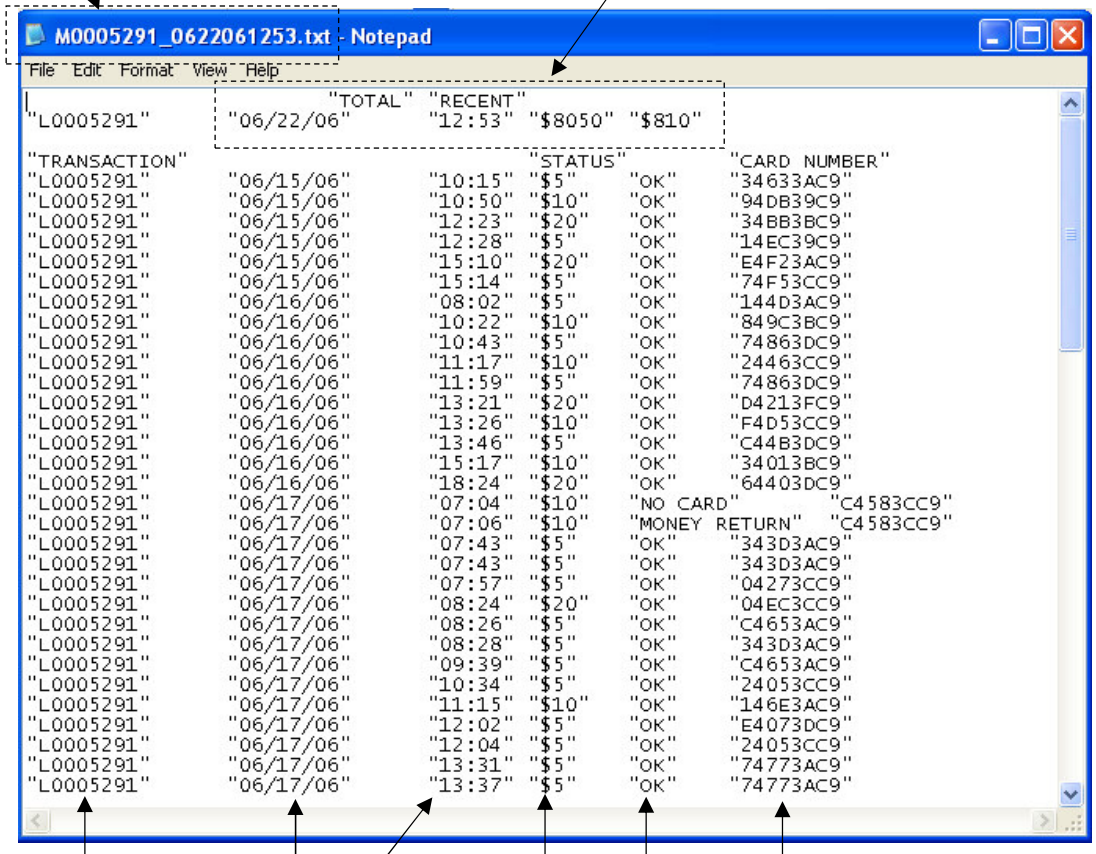
Figure 6.2.1

3. Press the '>>>' button to choose a folder for where the exported record files should be written
4. Place either the 'Money Collect' card or the 'Reader Collect' card on the reader and press the 'Read' button.
5. If card reading is successful, the status box will contain messages similar to the last three in Figure 6.2.1. The files have been created in the specified folder and the card has been cleared of records

The following is an example of an exported file from a 'money collect' card

File name. M signifies Money collect card.
0005281 signifies location and sub-location IDs.
0622061253 signifies the date/time of collection

Date and time of collection, the total transactions since system installation, and the total transactions in the current record



First 2 digits are sub-location ID, the next 5 are location ID

Transaction date and time

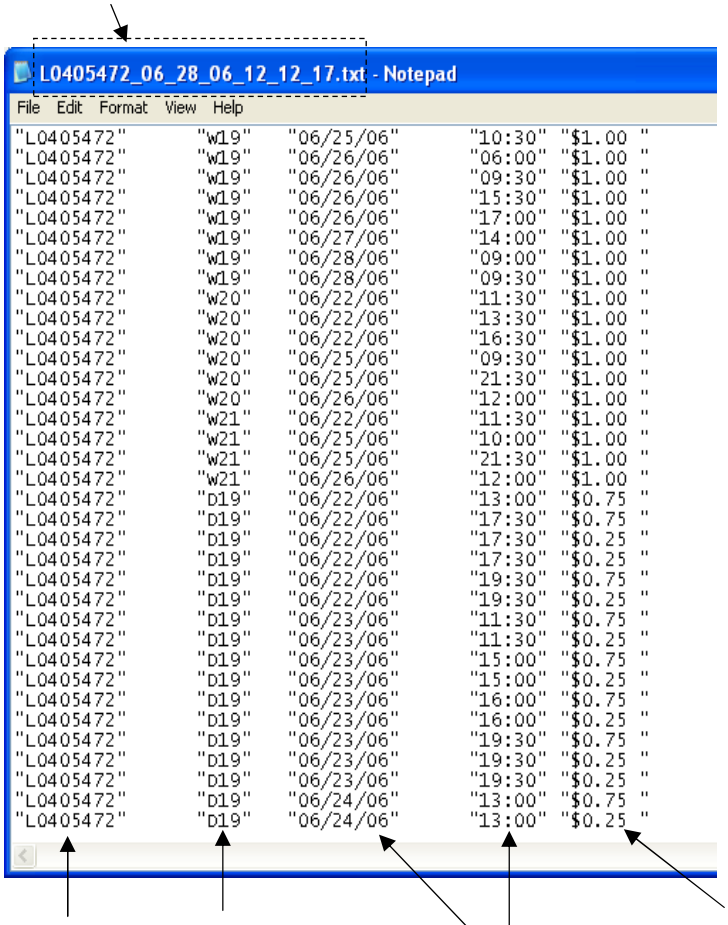
Transaction Value

Card Number

Transaction Status
OK – normal
NO CARD – user removed card too early after inserting bill, or card malfunctioned. In either case, the transaction value is owed
MONEY RETURN – Owed value returned to the user.

The following is an example of an exported file from the ‘Reader Collect’ card.

File name. L signifies reader collect card. 0405472 signifies location and sub-location IDs. 06_28_06_12_12_17 signifies the date/time of collection



First 2 digits are sub-location ID, the next 5 are location ID

"W" for washer, "D" for dryer. The number signifies machine number

Transaction date and time

Costs. The lesser of the dryer costs refers to a dryer top off

7. Troubleshooting and Error Messages

MTU

1.
MTU state: screen reads: "OUT OF SERVICE
ba"

Explanation: This denotes that the Bill Acceptor is malfunctioning.

2.
MTU state: screen reads: "OUT OF SERVICE
cr"

Explanation: This denotes that the Card reader is malfunctioning.

3.
MTU state: screen reads: "Wrong Card
Please Remove Card "

Explanation: There are two implications. Either the user card has a different location and sub location ID than the MTU, or simply that the card type is different from ones expected by the MTU at the current state.

4.
MTU state: screen reads: "Card Error"

Explanation: This implies that the card is malfunctioning. Although communication with the card begins, part of the card is damaged and cannot be read from and/or written to.

5.
MTU state: screen is stuck in some state (displaying a message or blank) and is immune to any actions from the keypad or a card.

Explanation: This is an undetermined state. To remedy, unplug the 110V AC adapter from the outlet and plug it back in. **Do not unplug the DC jack connected to the controller board while it is connected to the AC outlet**. Please report this error and any actions to recreate it to the manufacturer.

CRC

1.
CRC state: cable assembly is connected but the unit does not power since the screen remains dull and shows no message. If the screen brightens after connecting the power, but shows no message, see note 2 below.

Explanation:

The transparent insulator applied to the board during production landed on the connector pins thus disallowing a robust connection between the pins and the cable assembly connector. Use a hard object to lightly graze the pins to remove the insulator.

2.
CRC state: cable assembly is connected, the screen is bright but shows no message. If the screen does not brighten after connecting the cable assembly, see note 1 above.

Explanation: This implies that an error occurred during the programming of the CRC, or that parts of the CRC hardware are corrupted. Contact the manufacturer.

3.
CRC state: screen reads: "OUT OF SERVICE
cc"

Explanation: This denotes that the cycle cost has not been transferred to the CRC. The price card should be used to transfer the cycle cost to the CRC (see section 4.3)

4.
CRC state: screen reads: "Wrong Card"

Explanation: There are two implications. Either the user card has a different location or non-zero sub location ID than the CRC device, or simply that the card type is different from ones expected by the device at the current state.

8. Warranty

Mitech R&D Services warrants this product subject to any conditions set forth as follows:

Coverage time:
This product is covered by a full one-year warranty commencing the day the product is delivered. A signed and dated packing slip is provided with the delivery which serves as proof.

What is covered:

1. Repair or replacement of defective material or workmanship. This includes hardware and software.

What is not covered:

1. Damages caused by services performed by anyone other than Mitech R&D Services.
2. Damage to, or loss of, parts as a result of third-party actions (i.e vandalism)

If service is needed:

Contact Mitech R&D Services:

(416) 667-1307
219 Robert Hicks Dr.
Toronto, Ontario, Canada
M2R 3R3

Limitation of Liability:

MITECH R&D SERVICES IS NOT LIABLE FOR ANY OF THE FOLLOWING:

1. THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES
2. DAMAGE TO OR LOSS OF YOUR RECORDS OR DATA
3. CONSEQUENTIAL OR INCINDENTAL DAMAGES SUCH AS PROPERTY DAMAGE

9. Information to user

1. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in according with the instruction, may cause harmful interference to radio communications. However, this is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encourage to try to correct the interference by one or more of the following measures:
--- Reorient or relocate the receiving antenna.
--- Increase the separation between the equipment and receiver.
--- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
--- Consult the dealer or an experience radio/TV technician for help.

2. Any changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.