

**Automatic Ticket System  
Field Surveys  
Report  
March 2001**

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## Executive Summary

In March 2001, the Office of the Director of Public Transport (ODPT) commissioned an Independent Audit of the Automatic Ticketing System (ATS). A component of the Independent Audit involved the conduct of on-site surveys of the ATS equipment to assess in-field functionality from the customer's perspective. The scope of the field surveys included a census of all ticket machines and validators at train stations, and a sample of ticket machines and validators on board trams and buses.

This report advises on the functionality of ticket machines with regard to the ability to obtain a ticket, and the presence and type of 'defects'. A distinction is made between major 'defects' and minor 'defects'. The distinction between major and minor 'defects' relates to the likelihood of that 'defect' affecting the ability to obtain a ticket and receive correct change. Please note that this classification system has been developed with a new customer in mind.

Ticket machine functionality has been classified as fully operational, partially operational or non-operational. Fully operational indicates that a ticket was obtained, correct change was received, and any 'defects' observed were only minor. Partially operational indicates that a ticket was obtained; however the machine had one or more major 'defects'. Non-operational indicates that no ticket could be obtained. The table on the following page presents the results of the field surveys.

Of the ticket machines tested in the field, 72.8% of those at train stations were fully operational, 88.5% of those on board trams, and 87.6% on board buses. 78.1% of ticket machines at staffed stations were fully operational. This dropped down to 69.9% at unstaffed stations. Partially operational machines comprised 8.5% of machines surveyed at train stations, 7.5% on board trams, and 10.1% on board buses. Non operational machines comprised 18.7% of machines surveyed at train stations, 4.0% on board trams, and 2.2% on board buses.

Where ticket machines were identified as partially operational, the most frequent major 'defect' observed was the machine returning incorrect change. This occurred on 15 of the 39 partially operational machines at train stations, and on 20 of the 24 partially operational machines on board trams.

Where ticket machines were identified as non-operational at train stations, the most frequent major 'defect' observed was the coin slot being blocked (36 of 86 non-operational machines), followed by no change being received when the cancel button was pushed (19 machines), and coins being rejected (15 machines).

Where ticket machines were identified as non-operational on board trams, in addition to not providing a ticket, the most frequent major 'defect' observed was the machine returning incorrect change, which was observed on all of the 13 non-operational machines.

Of the validators tested in the field, 94.3% of validators at train stations were fully operational, 95.9% on board trams, and 96.4% on board buses. The balance were non-operational – in that a ticket could not be validated. A validator cannot be partially operational.

In summary there was a higher proportion of ticket machines and validators fully operational on board buses than on trams; and on trams than at train stations. The proportion on non-operational ticket machines was highest at train stations, and lowest on board buses, with trams in the middle.

## AUTOMATIC TICKET MACHINE FIELD SURVEY – SUMMARY OF RESULTS

TICKET SELLING MACHINES		Train Stations	Trams	Buses	
Total Machines In System <sup>(1)</sup>		473	424	1420	
Unique Machines Tested	Total No.	459	322	267	
	% of Total	97.0%	75.9%	18.8%	
<b>Fully Operational<sup>(2)</sup></b>	Total No.	334	285	234	
	% of Tested	72.8%	88.5%	87.6%	
	Staffed Stations	78.1%	n/a	n/a	
	Unstaffed Stations	69.9%	n/a	n/a	
<b>Partially Operational<sup>(3)</sup></b>	Total	39	24	27	
	% of tested	8.5%	7.5%	10.1%	
<b>Major Defects Identified<sup>(4)</sup></b>					
	Incorrect Change	15	20	n/a	
	Coins Rejected	2	1	n/a	
	New \$5 note rejected	6	n/a	n/a	
	Other notes rejected	2	n/a	n/a	
	'Out of Order' on the display screen	0	2	n/a	
	'Out of Order' sign placed on the machine	1	0	n/a	
	Buttons Were Unreadable	5	0	n/a	
	Had 'correct change only' signs	2	1	n/a	
	No change when cancel button pushed	1	0	n/a	
	Scratched screen (major)	10	0	n/a	
<b>Non Operational<sup>(5)</sup></b>	Total	86	13	6	
	% of tested	18.7%	4.0%	2.2%	
<b>Major Defects Identified<sup>(4)</sup></b>					
	Incorrect Change	3	13	n/a	
	Coins Rejected	15	3	n/a	
	New \$5 note rejected	5	n/a	n/a	
	Other notes rejected	8	n/a	n/a	
	Machine Was Off	5	1	n/a	
	'Out of Order' on the display screen	3	3	n/a	
	'Out of Order' sign placed on the machine	11	0	n/a	
	Buttons Were Not Working	3	1	n/a	
	Had 'correct change only' signs	4	0	n/a	
	No change when cancel button pushed	19	0	n/a	
	Coin slot blocked	36	2	n/a	
	Scratched screen (major)	3	0	n/a	
VALIDATORS		Train Stations	Trams	Buses	
Unique Machines Tested		494	1453	277	
<b>Fully Operational<sup>(2)</sup></b>	Total No.	466	1393	267	
	% of Tested	94.3%	95.9%	96.4%	
<b>Non Operational<sup>(5)</sup></b>	Total No.	28	60	10	
	% of tested	5.7%	4.1%	4%	
		machine was off	1	20	1
		manually tagged	0	0	1
		vandalised	24	4	0
		other text displays	3	14	0
		reason not recorded	0	22	9

(1) Total ticket machines for trams excludes those in the W class trams, as they were not in the system at the time of the survey.

(2) Fully Operational indicates that a ticket was obtained and there were no 'defects' or only minor 'defects' observed with the machine.

(3) Partially Operational indicates that a ticket was obtained, and major 'defects' were observed with the machine. For buses the 'defect' is that the Metcard had to be inserted more than once into the Ticket Issuing Machine (TIM).

(4) Non Operational indicates that a ticket was unable to be obtained

(5) 'Defects' Identified are not necessarily the cause of non-operation of the machine. A number of major 'defect' types have not been included where no observations of these 'defect' types were made in the field for either train or tram. For partially operational ticket machines these include: machine was off, buttons were not working, and coin slot blocked. For non-operational ticket machines these include: buttons were unreadable.

## 1 INTRODUCTION

### 1.1 Background

The Melbourne ticketing system was upgraded to an Automatic Ticketing System (ATS) in 1995. The contract for the development and deployment of the ATS was awarded to OneLink Transit Systems Pty Ltd. The primary elements of the ATS from the consumer's perspective include the ticket vending machines, ticket validators, and the tickets themselves.

The ticket vending machines come in two types – large, which accept notes, coins and EFTPOS; and small, which accept coins only. The large and small machines can be found on train stations. Trams have only the small machines on board the vehicle. Buses have Ticket Issuing Machines (TIMs) which are under the control of the bus driver and to which the public have no access.

Ticket validators come in 3 types: *posts* found at platform entrances to train stations, *barriers* (bat wings) found at entrances to platforms at stations (generally premium stations only), and *pole mounted* (green) units found on board trams and buses.

The ATS also has many other elements including a control centre, automatic communications system between the ticket machines and the control centre, all of which are less relevant to the current study.

### 1.2 Independent Audit of the ATS

Recently, there have been media reports of poor performance of the Automatic Ticketing System (ATS) – specifically that there are significant numbers of the ticket machines that are faulty, and that vandalism is widespread. In order to assess the veracity of these claims, the Office of the Director of Public Transport (ODPT) commissioned an Independent Audit of the ATS. The contract for the Independent Audit was awarded to the Miller Network Group.

### 1.3 Field Surveys of the ATS

A component of the Independent Audit involved the conduct of on-site surveys of the ATS equipment to assess in-field functionality from the customer's perspective. The ODPT commissioned Steer Davies Gleave to conduct a range of field surveys. The scope of the field surveys included a census of all ticket machines and validators at train stations, and a sample of ticket machines and validators on board trams and buses. The methodology for the field surveys is described in Appendix 3, and was developed following a pilot managed and conducted by the ODPT.

The field surveys collected information on various aspects of the ATS from the presence of graffiti, through to the inability to purchase a ticket.

#### Defects

Throughout the report we refer to 'defects' of the ticket machines or validators. The term '**defect**' is used in this report to record where an aspect of the ATS has been observed in the field not to be satisfactory from the customer's perspective. Please note that a 'defect' does not necessarily indicate an inability to purchase a ticket in the case of a ticket machine or validate a Metcard in the case of a validator.

A further distinction is made between major ‘defects’ and minor ‘defects’. Table 1.3a lists those ‘defects’ that have been classified as major, and those ‘defects’ that have been classified as minor. The distinction between major and minor ‘defects’ relates to the likelihood of that ‘defect’ affecting the ability to obtain a ticket and receive correct change.

Please note that this classification system has been developed with a **new customer** in mind. For example ‘buttons that were unreadable’ would affect the ability of a new customer to purchase a ticket, as they would not be familiar with the location and sequence of buttons required to obtain a ticket.

Field staff were instructed to subjectively assess the degree of vandalism (scratched screen, graffiti and other vandalism) and record the extent of vandalism as either major or minor. The classification of vandalism into major ‘defects’ and minor ‘defects’ is as follows.

Graffiti and other vandalism have been classified as minor ‘defects’ regardless of the extent. The data collected in the field does not allow for an assessment of whether major graffiti or major other vandalism was likely to affect the ability to purchase a ticket. Sometimes it may have, and other times it may have had no impact at all. Scratched screen ‘defects’ however have been classified as a major ‘defect’ where the extent of the scratched screen was significant, as we can surmise that a user would have had difficulty reading the instructions on the screen and therefore have difficulty purchasing a ticket.

TABLE 1.3A – IDENTIFIED ‘DEFECTS’ – MVMS

Major ‘Defect’	Minor ‘Defect’
Incorrect Change	Scratched screen (minor)
Coins Rejected	Graffiti (major and minor)
New \$5 note rejected <sup>(1)</sup>	Other vandalism (major and minor)
Other notes rejected <sup>(1)</sup>	
Machine Was Off	
‘Out of Order’ on the display screen	
‘Out of Order’ sign placed on the machine	
Buttons Were Unreadable	
Buttons Were Not Working	
No change when cancel button pushed	
Had ‘correct change only’ displayed	
Coin slot blocked	
Scratched screen (major)	

1) Defects associated with rejection of notes relate only to the large Metcard Vending Machines.

### Metcard Vending Machine Functionality

Ticket machine functionality has been classified as fully operational, partially operational or non-operational. The definitions for these terms are as follows:

**Fully Operational.** A ticket was obtained and correct change was received. Any ‘defects’ observed were only minor (see table 1.3a)

**Partially Operational.** A ticket was obtained, however the machine had one or more major ‘defects’ (see table 1.3a)

***Non-Operational*** No ticket could be obtained.

## 2 RESULTS

In this section of the report we present a summary of the findings of the field surveys of the ATS. Detailed analyses can be found in the appendices. The results are presented by mode (train, tram and bus), and within each mode by four topics – ticket purchase success, ticket machine ‘defects’, ticket machine vandalism, and validators. It is emphasised that these results represent the findings of the in-field surveys conducted at specific times, and therefore reflect what the travelling public would have experienced at that time. These results however do not reflect the ‘availability’ of the ATS – which is defined in OneLink’s contract, and is covered in the report from the Miller Network Group.

### 2.1 Trains

#### 2.1.1 Stations Selected

The scope of the survey was a census of all Metcard Vending Machines (MVMs) and ticket validators at all train stations on the metropolitan train system. This included the V/Line stations on the Melton, St Albans, Broadmeadows, and Stony Point Line. Due to the long breaks between services on the V/Line section of the Melton line, the following stations were not surveyed: Ardeer, Deer Park and Rockbank. The Flemington Racecourse, Showgrounds, and General Motors stations were also excluded from the survey, as normal train services are not provided to these stations. Burnley station and South Kensington station were inadvertently missed by the field staff. Of the 204 eligible train stations, 199 (98%) stations were surveyed.

#### 2.1.2 Purchase Success Overall and by Line

Of all surveyed ticket machines (459<sup>1</sup>) across all train lines<sup>2</sup>, it was not possible to buy a ticket from almost 1 in 5 (19%, 86) machines (see Table 2.1.2a). While it was possible to buy a ticket from 373 MVMs, 39 (8.5%) MVMs had a major ‘defect’ of some sort. The nature of these ‘defects’ is reported in section 2.1.3. Table 2.1.3b summarises ticket machine ‘defects’ according to whether a ticket could be purchased (with some ‘defect’) or a ticket could not be purchased.

Metcard purchase success (with minor or no ‘defect’) was higher (78%, 125 of 160 machines) at staffed stations than at those stations that are not staffed (70%, 209 of 299 machines).

The table in Appendix 1 shows the summary of purchase success at surveyed stations by train line. Note that stations represented on more than one line appear in all the relevant lines. The reason for doing this is to represent the traveller’s perceptions of the ATS functionality by line.

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<sup>1</sup> From data provided by the ODPT there are 472 MVMs at train stations and 1 MVM on the Stony Point service. The 461 MVMs observed in the field survey represent 98% of all MVMs for the train system. For 2 machines we obtained no information, as they were fenced off due to renovations at Bayswater Station. Therefore all tables relate to the 459 machines that were tested.

<sup>2</sup> The stations associated with each line were defined by the ODPT. Note that some stations appear on multiple lines, as they are at junctions. The list of stations by train line can be found in Appendix 4.

TABLE 2.1.2A SUMMARY OF TICKET PURCHASE SUCCESS, TRAINS

	Purchase with major 'defect'	Unsuccessful Purchase	Purchase with minor or no 'defect'	Metcard Vending Machines Surveyed
<b>Staffed Stations</b>				
No. of Metcard Vending Machines (MVMs)	12	23	125	160
% of MVMs Surveyed at Staffed Stations	7.5%	14.4%	78.1%	100.0%
<b>Unstaffed Stations</b>				
No. of Metcard Vending Machines (MVMs)	27	63	209	299
% of MVMs Surveyed at Unstaffed Stations	9.0%	21.1%	69.9%	100.0%
<b>All Stations</b>				
No. of Metcard Vending Machines (MVMs)	39	86	334	459
% of MVMs Surveyed Total	8.5%	18.7%	72.8%	100.0%

The best level of purchase success was achieved on the City Loop where a ticket was purchased successfully from a machine with minor or no 'defects' from 25 of the 26 machines surveyed<sup>3</sup> (96%). The Alamein line also performed well where a ticket was purchased successfully from a machine with minor or no 'defects' from 31 of the 33 machines surveyed. The lowest level of purchase success was observed on the Sandringham line and the StAlbans/Melton line where a ticket was purchased successfully from a machine with minor or no 'defects' from almost half (54.3%, 19 of 35) of the machines surveyed.

A ticket could not be purchased at all at 86 machines (19%). The greatest incidence occurred on the Broadmeadows line (34%, 14 of 41 machines surveyed) and Glen Waverley (32%, 12 of 37 machines surveyed). Further details of the purchase success on all train lines can be found in Appendix 1.

### 2.1.3 Train Station - Ticket Machines 'Defects'

The field surveys sought to identify 'defects' with the ticket machine, which would be of concern to the public. This included:

- 'defects' which made obtaining a ticket impossible – e.g. the machine was off;
- 'defects' which impaired obtaining a ticket – e.g. the buttons were unreadable; and
- 'defects' which were aesthetic, but did not impair obtaining a ticket – e.g. minor vandalism.

Ticket machines could and often did have more than one 'defect'. Table 1.3a lists the separate 'defects' that were identified in the field survey, and their classification into categories of major 'defect' and minor 'defect'.

The breakdown of the frequency of major 'defects' is shown in table 2.1.3a. Please note that this table does not provide any sense to the impact of these 'defects' on obtaining a 'ticket'.

<sup>3</sup> Data supplied by the ODPT indicate there are 27 MVMs on the City Loop. The field survey identified 26 MVMs.

**TABLE 2.1.3A – FREQUENCY OF TICKET MACHINE MAJOR ‘DEFECTS’ – TRAINS**

No. of major ‘Defects’ per Machine	No. of Machines	% of Machines
0	342	74.5%
1	84	18.3%
2	26	5.7%
3	5	1.1%
4	2	0.4%
No. of Machines with minor or no ‘defects’	342	74.5%
No. of Machines with one or more major ‘defects’	117	25.5%
No. of machines surveyed	459	100.0%

Note: A ticket machine major ‘defect’ does not necessarily indicate that a ticket could not be obtained.

The no. of machines with at least one major ‘defect’ (117) includes those where a ticket could be purchased (39 – see table 2.1.2a) and those where a ticket could not be purchased (78).

The no. of machines with minor or no ‘defects’ (342) includes those machines where a ticket could be purchased (334 – see table 2.1.2a), and those where a ticket was unable to be purchased, but no obvious reason why could be ascertained (8).

Table 2.1.3b provides details of the train MVMs, which were identified as having a major or minor ‘defect’ in some way or another.

The most common ticket machine ‘defects’ were scratched screens -minor observed on 126 (27.5%) of the 459 machines surveyed, and graffiti (major and minor) on almost 1 in 5 machines (85, 18%). The coin slot being blocked was also a significant ‘defect’ being observed on 36 machines (8%). Vandalism is dealt with in greater detail in section 2.1.4. Machines giving incorrect change accounted for 18 machines, which was approximately 4% of machines surveyed.

When a ticket was not obtained the most common ‘defect’ was that the coin slot was blocked. This accounted for 36 (42%) of the 86 machines where a ticket was not obtained.

When a ticket could be purchased and there was a major ‘defect’, the most common major ‘defect’ was incorrect change. This accounted for 15 (38.5%) of the 39 machines where a ticket was obtained and there was at least one major ‘defect’.

It is important to note incorrect change (or any of the other ‘defects’) could occur when a ticket was obtained, and also when a ticket was not obtained. This would be doubly frustrating for a customer who has not been able to obtain a ticket, but who also has not received all their money back.

Machines not returning any change when the cancel button was pushed occurred 20 times, 19 of which occurred when a ticket was not obtained at all. For many of these, surveyors noted that the coins slot was vandalised in some way (but not blocked completely), which affected the path of the coins into the machine.

TABLE 2.1.3B TICKET MACHINE 'DEFECTS' – TRAINS

Ticket Machine Defects	No. of Machines			All Machines	
	Successful Purchase with major 'defect'	Un-successful Purchase	Purchase with minor or no 'defect'	No. of Machines Surveyed	% of Machines Surveyed
<b>Major 'Defects'</b>					
Incorrect Change	15	3	0	18	3.9%
Coins Rejected	2	15	0	17	3.7%
New \$5 note rejected	6	5	0	11	2.4%
Other notes rejected	2	8	0	10	2.2%
Machine Was Off	0	5	0	5	1.1%
'Out of Order' on the display screen	0	3	0	3	0.7%
'Out of Order' sign placed on the machine	1	11	0	12	2.6%
Buttons Were Unreadable	5	0	0	5	1.1%
Buttons Were Not Working	0	3	0	3	0.7%
Had 'correct change only' signs	2	4	0	6	1.3%
No change when cancel button pushed	1	19	0	20	4.4%
Coin slot blocked	0	36	0	36	7.8%
Scratched screen (major)	10	3	0	13	2.8%
<b>Minor 'Defects'</b>					
Scratched screen (minor)	13	19	94	126	27.5%
Other vandalism (major and minor)	2	3	9	14	3.1%
Graffiti (major and minor)	19	10	56	85	18.5%
<b>No. of Machines</b>	<b>39</b>	<b>86</b>	<b>334</b>	<b>459</b>	<b>100.0%</b>

Please note that as some ticket machines had multiple 'defects', the total number of ticket machine 'defects' therefore exceeds the total number of machines.

As has been noted earlier in the report, machine 'defects' are not mutually exclusive. In order to better appreciate from the customers perspective, the functionality of machines, an analysis of the other 'defects' identified when a machine had 'out of order' displayed on the screen and when a machine had an 'out of order' sign placed manually on the machine (see table 2.1.3c).

When a machine was identified as 'out of order', either through the screen display or through a note placed manually on the machine, field staff were instructed to observe any other 'defects' such as vandalism, and also to attempt to obtain a ticket in order to ascertain why the machine was 'out of order'.

There were three machines, which had 'out of order' displayed on the screen. No ticket could be obtained from any of these machines. Other 'defects' identified with these machines only include 'scratched screen', which does not explain why a ticket could not be obtained.

There were twelve machines which had an 'out of order' sign placed manually on the machine. No ticket could be obtained from eleven of these machines. Other 'defects' identified which are likely to explain why a ticket could not be obtained include: machine was off (2 machines), and coin slot blocked (3 machines).

TABLE 2.1.3C – ‘OUT OF ORDER’ SIGN PLACED ON MACHINE - TRAINS

	Ticket Obtained	
	Yes	No
Out of Order' sign placed on machine	1	11
Other 'defects' identified		
Machine was off	0	2
Buttons were not working	0	1
had 'correct change only' signs	0	0
No change when cancel button pushed	0	1
Coin slot blocked	0	3
Scratched Screen	1	1
Graffiti	1	0
No other 'defects' identified	0	5

Please note that 'other defects' are not mutually exclusive, and multiple 'other defects' can occur on a single machine. Therefore the total number of 'other defects' can exceed the total no. of machines with 'other defects'.

An assessment was made of 'defects' at machines located at staffed and unstaffed stations. Table 2.1.3d details the type of 'defects' found, and the no. of machines with each type of 'defect' according to the location (staffed station or unstaffed station) of the machine. The type and proportion of 'defects' does not differ markedly from machines located at staffed stations to those at unstaffed stations. Please note that differences in the degree (major or minor) of vandalism cannot be found in this table. Further details of vandalism are presented in section 2.1.4.

TABLE 2.1.3D TICKET MACHINE 'DEFECTS' &amp; STAFFING AT STATIONS - TRAINS

Ticket Machine Defects	Staffed Stations		Unstaffed Stations		Ticket Machines Surveyed	
	No.	% of machines at staffed stations	No.	% of machines at unstaffed stations	No. of Machines	% of Machines Surveyed
<b>Major Defects</b>						
Incorrect Change	5	3.1%	13	4.3%	18	3.9%
Coins Rejected	2	1.3%	15	5.0%	17	3.7%
New \$5 note rejected	2	1.3%	9	3.0%	11	2.4%
Other notes rejected	0	0.0%	10	3.3%	10	2.2%
Machine Was Off	2	1.3%	3	1.0%	5	1.1%
'Out of Order' on the display screen	2	1.3%	1	0.3%	3	0.7%
'Out of Order' sign placed on the	6	3.8%	6	2.0%	12	2.6%
Buttons Were Unreadable	1	0.6%	4	1.3%	5	1.1%
Buttons Were Not Working	1	0.6%	2	0.7%	3	0.7%
Had 'correct change only' signs	2	1.3%	4	1.3%	6	1.3%
No change when cancel button	4	2.5%	16	5.4%	20	4.4%
Coin slot blocked	9	5.6%	27	9.0%	36	7.8%
Scratched screen (major)	9	5.6%	4	1.3%	13	2.8%
<b>Minor Defects</b>						
Scratched screen (minor)	47	29.4%	79	26.4%	126	31.4%
Other vandalism (major and minor)	4	2.5%	10	3.3%	14	3.7%
Graffiti (major and minor)	26	16.3%	59	19.7%	85	21.6%
<b>No. of Machines</b>	<b>160</b>		<b>299</b>		<b>459</b>	

Please note that as some ticket machines had multiple 'defects', the total number of ticket machine 'defects' exceeds the total number of machines.

### 2.1.4 Train Station - Ticket Machine Vandalism

The prevalence and extent of vandalism as a proportion of all ticket machines differed according to whether the machine was at a staffed station or an un-staffed station. This is shown in detail in Appendix 2.

Please note that the definition of major and minor used in this report is not as defined in the OneLink contract.

Field staff were instructed to subjectively assess the degree of vandalism (scratched screen, graffiti and other vandalism) and record the extent of vandalism as either major or minor. The classification of vandalism into major 'defects' and minor 'defects' was described earlier in section 1.3.

**TABLE 2.1.4A – SUMMARY OF TICKET MACHINE VANDALISM – TRAIN STATIONS**

	Staffed		Unstaffed		Subtotal	
	No. of Machines	% of machines at staffed stations	No. of Machines	% of machines at unstaffed stations	No. of Machines	% of all machines
Vandalism types						
Coin slot blocked	9	5.6%	27	9.0%	36	7.8%
Scratched screen - major	4	2.5%	9	3.0%	13	2.8%
Scratched screen - minor	47	29.4%	79	26.4%	126	27.5%
Graffiti - major	6	3.8%	10	3.3%	16	3.5%
Graffiti - minor	20	12.5%	49	16.4%	69	15.0%
Other vandalism - major	0	0.0%	4	1.3%	4	0.9%
Other vandalism - minor	4	2.5%	6	2.0%	10	2.2%
Subtotal	90		184		274	
Major Vandalism						
Large Machines	7	4%	16	5%	23	5%
Small Machines	10	6%	26	9%	36	8%
Unknown Size Machines	0	0%	0	0%	0	0%
Minor Vandalism						
Large Machines	28	18%	46	15%	74	16%
Small Machines	27	17%	54	18%	81	18%
Unknown size Machines	0	0%	2	1%	2	0%
Total Machines with Major Vandalism	17	11%	42	14%	59	13%
Total Machines with Minor Vandalism	55	34%	102	34%	157	34%
Total Large Machines Vandalised	32	20%	58	19%	90	20%
Total Small Machines Vandalised	33	21%	72	24%	105	23%
Total Unknown Size Machines Vandalised	0	0%	2	1%	2	0%
Total Vandalised	65	41%	132	44%	197	43%
Total Machines	160	100%	299	100%	459	100%

Note. The sum of number of machines from vandalism types is greater than the total number of machines that are vandalised as machines can and do have more than one type of vandalism. This is also the case for the sum of machines with major and minor vandalism being greater than the total number of machines that are vandalised, as machines can and do have both major and minor vandalism.

Table 2.1.4a summarises the incidence of vandalism to ticket machines by the degree of vandalism (major or minor), the location of the machines (at staffed or unstaffed stations), and by machine type (small or large machines). Please note that multiple categories of vandalism were recorded for some machines, and therefore the total instances of vandalism (274) exceeds the number of machines vandalised (197).

One hundred and ninety seven (43%) of the 459 ticket machines surveyed had some vandalism. About 13% (59) of machines surveyed had major vandalism, and 34% (157%) had minor vandalism.

The most common form of vandalism was a scratched screen (minor), which was observed on 126 of the 197 machines that were vandalised. The most serious category of vandalism is the coin slot being blocked, which occurred on 36 machines. This stops customers from purchasing a ticket from the machine.

The scale and type of vandalism at unstaffed stations is similar to that at staffed stations with 44% of machines at unstaffed stations are vandalised to some degree. This dropped to 41% of machines at staffed stations that were vandalised to some degree.

Of the 197 machines vandalised, 90 were the large ticket machines, and 105 were the small ticket machines, and 2 were of unknown size (information inadvertently missed).

### 2.1.5 Train Station - Validators

Validator faults included being off, 'out of service' displayed on the screen, manually tagged as 'out of order', displaying something other than the time of day, and vandalism.

Of the 199 stations surveyed, 20 (10%) of stations were observed to have at least one faulty validator during the survey. Of the 494 validators (not including barriers/bat wings) surveyed, only 28 (5.7%) were faulty to some degree. The major reason for being faulty was vandalism (24 of the 28 validators with a fault). A summary of the number of faulty validators at each station is provided in table 2.1.5a below.

**TABLE 2.1.5A VALIDATOR 'DEFECTS' - TRAINS**

Validators in System	501	
Validators Tested	494	98.6%
Validator Faults		
	Off	1
	Out of Service	0
	Manually Tagged	0
	Vandalised	24
	Other Text	3
Validators with at least one fault	28	5.7%

## 2.2 Trams

### 2.2.1 Purchase Success by Tram Route

A sample of tram routes and ticket machines was conducted to survey the functionality of the ticket machines and validators on board trams.

43 tram routes were surveyed, from which 447 ticket machines were checked. Of these 447 ticket machines, there are 125 machines that were surveyed more than once. This leaves 322 observations of unique ticket machines. These were all small machines (i.e. accept coins only) so all tests related to the small machine methodology.

Where a ticket machine was surveyed more than once, the first time the machine was tested has been included in the analysis, and the subsequent times the machine was tested have been excluded.

Included in the data set were 10 observations where the serial number was the same as another observation, but the tram number was different or vice versa. Careful examination of the data indicates that the most likely explanation is that some numbers were recorded incorrectly in the field.

Of the 322 unique Metcard Vending Machines (MVMs) surveyed on board trams, it was not possible to buy a ticket from only 13 (4%) machines. While it was possible to buy a ticket from 309 MVMs, 24 (7.5%) MVMs had a major 'defect' of some sort. The nature of these 'defects' is reported in section 2.2.2. Table 2.2.2b summarises ticket machine 'defects' according to whether a ticket could be purchased (with some major 'defect') or a ticket could not be purchased. It was possible to buy a ticket from a machine with only minor or no defects from 88.5% (285) of the 322 MVMs surveyed.

TABLE 2.2.1A SUMMARY OF TICKET PURCHASE SUCCESS, TRAMS

	Purchase with major 'defect'	Unsuccessful Purchase	Purchase with minor or no 'defect'	Metcard Vending Machines Surveyed
No. of Metcard Vending Machines	24	13	285	322
% of Metcard Vending Machines Surveyed	7.5%	4.0%	88.5%	100.0%

### 2.2.2 Tram - Ticket Machines 'Defects'

The field surveys sought to identify 'defects' with the ticket machines, which would be of concern to the public. This included:

- 'defects' which made obtaining a ticket impossible – e.g. the machine was off;
- 'defects' which impaired obtaining a ticket – e.g. the buttons were unreadable; and
- 'defects' which were aesthetic but did not impair obtaining a ticket – e.g. graffiti.

Ticket machines could and often did have more than one 'defect'. Table 1.3a lists the separate 'defects' that were identified in the field survey, and their classification into categories of major 'defect' and minor 'defect'.

The breakdown of the frequency of major 'defects' is shown in table 2.2.2a. Please note that this table does not provide any sense to the impact of these 'defects' on obtaining a 'ticket'.

**TABLE 2.2.2A – FREQUENCY OF TICKET MACHINE ‘DEFECTS’ - TRAMS**

No. of ‘Defects’ per Machine	No. of Machines	% of Machines
0	285	88.5%
1	29	9.0%
2	6	1.9%
3	2	0.6%
No. of Machines with no ‘defects’	285	88.5%
No. of Machines with one or more ‘defects’	37	11.5%
No. of machines surveyed	322	100.0%

Note: A ticket machine ‘defect’ does not necessarily indicate that a ticket could not be obtained.

Table 2.2.2b provides details of the tram MVMs, which were identified as having a major or minor ‘defect’ in some way or another.

The most common ticket machine ‘defect’ was incorrect change, making up 10% (33) of all machines sampled. The next most frequent ‘defect’ was graffiti (major and minor) occurring on 32 (10%) of the machines sampled.

Where ticket machines were identified as non-operational on board trams, in addition to not providing a ticket, the most frequent major ‘defect’ observed was the machine returning incorrect change, which was observed on all of the 13 non-operational machines.

When a ticket could be purchased and there was a major ‘defect’, the most common major ‘defect’ was incorrect change. This accounted for 20 (83%) of the 24 machines where a ticket was obtained and there was at least one major ‘defect’.

TABLE 2.2.2B TICKET MACHINE 'DEFECTS' - TRAMS

Ticket Machine Defects	No. of Machines			All Machines	
	Purchase with major 'defect'	Un-successful Purchase	Purchase with minor or no 'defect'	No. of Machines	% of Machines Surveyed
<b>Major Defects</b>					
Incorrect Change	20	13	0	33	10.2%
Coins Rejected	1	3	0	4	1.2%
Machine Was Off	0	1	0	1	0.3%
'Out of Order' on the display screen	2	3	0	5	1.6%
'Out of Order' sign placed on the machine	0	0	0	0	0.0%
Buttons Were Unreadable	0	0	0	0	0.0%
Buttons Were Not Working	0	1	0	1	0.3%
Had 'correct change only' signs	1	0	0	1	0.3%
No change when cancel button pushed	0	0	0	0	0.0%
Coin slot blocked	0	2	0	2	0.6%
Scratched screen (major)	0	0	0	0	0.0%
<b>Minor Defects</b>				0	
Scratched screen (minor)	0	0	8	8	2.5%
Other vandalism (major and minor)	0	0	8	8	2.5%
Graffiti (major and minor)	4	0	28	32	9.9%
<b>No. of Machines</b>	<b>24</b>	<b>13</b>	<b>285</b>	<b>322</b>	<b>100.0%</b>

Please note that as some ticket machines had multiple 'defects', the total number of ticket machine 'defects' exceeds the total number of machines.

### 2.2.3 Trams - Ticket Machine Vandalism

Vandalism of ticket machines on trams was lower than at train stations, with 50 (15.5%) of the 322 ticket machines surveyed having some vandalism. About 14% (44) of machines surveyed had minor vandalism, and only 3 (1%) had major vandalism.

TABLE 2.2.3A – SUMMARY OF TICKET MACHINE VANDALISM – TRAMS

	No.	% of Machines Tested
Coin slot blocked	2	0.6%
Scratched screen major	0	0.0%
Scratched screen minor	8	2.5%
Graffiti major	1	0.3%
Graffiti minor	31	9.6%
Other vandalism major	0	0.0%
Other vandalism minor	8	2.5%
Machines with major vandalism	3	0.9%
Machines with minor vandalism	44	13.7%
<b>Total Machines Vandalised</b>	<b>50</b>	<b>15.5%</b>
<b>Total Machines Tested</b>	<b>322</b>	<b>100.0%</b>

Note. The sum of number of machines from vandalism types is greater than the total number of machines that are vandalised as machines can and do have more than one type of vandalism.

The most common form of vandalism was graffiti (minor), which was observed on 31 of the 50 machines that were vandalised. The most serious category of vandalism is the coin slot being blocked, which was only observed on 2 machines.

#### 2.2.4 Validators

Of the 1453 validators tested on the unique trams sampled, 60 or 4% were faulty in some way. This includes 20 validators that were turned off, 4 were vandalised and 14 displayed other text such as 'closed', with 2 having no reason recorded for not working.

**TABLE 2.2.4A – VALIDATORS WITH FAULTS – TRAMS**

Validators Tested	1453	
Validator Faults		
Off	20	
Out of Service	0	
Manually Tagged	0	
Vandalised	4	
Other Text	14	
Validators with at least one fault	60	4.1%

## 2.3 Buses

The Automatic Ticket System differs on buses from the system for trains and trams. When a passenger purchases a ticket on-board, the driver keys in the ticket information on the Ticket Issuing Machine (TIM) and then inserts a blank Metcard into the Validator for coding, then hands over the coded, printed and validated ticket to the passenger. Passengers will only use the Validator if they already have a ticket on boarding. The survey tested two key aspects of the ATS for buses. These included:

1. Purchasing a ticket from the driver; and
2. Validating a pre-purchased Daily Zone 1+ 2+ 3 ticket.

Buses were sampled from five major interchanges: Moonee Ponds, Northland Shopping Centre, Chadstone Shopping Centre, Southland Shopping Centre and Dandenong Train Station. From these interchanges, 279 individual buses from 65 routes were surveyed. These 65 routes represent 91.5% of the 71 different routes that operate through the five interchanges. The results of these surveys are detailed below.

### 2.3.1 Ticket Purchase Success

Attempts were made to purchase a ticket from the bus driver on 324 separate occasions. Excluding buses that were surveyed more than once (45), and excluding those occasions when the bus driver advised there was insufficient time to conduct the survey (6), and those occasions when the field surveyor had no change (6), 267 unique purchases were executed.

A ticket could be purchased on 261 (98%) of the 267 unique buses surveyed, however on 27 of these occasions the ticket had to be entered more than once into the Ticket Issuing Machine (TIM). A ticket could not be obtained on 6 (2%) occasions. Of the 6 instances when a ticket purchase was unsuccessful, the surveyor has noted no reason.

TABLE 2.3.1A - TICKET PURCHASE SUCCESS - BUSES

	Purchase Metcard from Driver
Total no. of buses surveyed	324
Buses surveyed more than once	45
Insufficient time for survey	6
Field surveyor had no change	6
Unique no. of attempts	267
Successful Purchase (no retry)	
No.	234
% of Unique Attempts	87.6%
Partially Successful Purchase (with retry)	
No.	27
% of unique attempts	10.1%
Unsuccessful Purchase	
No.	6
No. % of unique attempts	2.2%

When a driver sells a ticket on-board, he/she will enter into the TIM the ticket type being purchased and insert a blank Metcard into the validator for coding and printing. It has been reported that often the validators will not code a ticket and will return 'RETRY'. After each instance, the driver must hit 'Cancel' on the TIM and try again.

This adds considerably to the time taken to process passengers at each stop. When purchasing the Metcard from the bus driver, field staff observed that drivers had to insert the Metcard into the validator more than once on 27 (10%) occasions.

### 2.3.2 Validation Success

Field staff tested validating pre-purchased Metcards on 324 occasions. Excluding buses that were surveyed more than once (45), and excluding those occasions when the bus driver advised there was insufficient time to conduct the survey (2), 277 unique validations of pre-purchased Metcards were executed.

Of these validations, 267 (96%) were successful on the 279 unique buses surveyed, and unsuccessful on 10 (4%) occasions. Of the 10 instances when validation was unsuccessful, an error message was displayed on 6 occasions.

TABLE 2.3.2A - VALIDATOR FUNCTIONALITY ON BUSES

	Validation of Pre-purchased Metcard
Total no. of buses surveyed	324
Buses surveyed more than once	45
Insufficient time for survey	2
Unique no. of attempts	277
Successful Validation	
No.	267
% of Unique Attempts	96.4%
Unsuccessful Validation	
No.	10
% of unique attempts	3.6%

### 2.3.3 Bus Summary

Ticket purchase success (98%), and validation success (96%) were both very high on the buses that were surveyed. This is intuitively correct, with the bus driver on board, any faults are likely to be reported quickly. Also the presence of the bus driver and his control of the Ticket Issuing Machine, and proximity to the validator make vandalism almost impossible.

The need for the bus driver to insert bus tickets purchased on board into the validator more than once occurred on 10% of purchases. This would be frustrating to drivers and customers, as it would slow down the ticket purchase process.

### 3 LONGITUDINAL SURVEY OF TRAIN TICKET MACHINES

The Office of the Director of Public Transport (ODPT) has identified some problems with the performance of automated ticket machines at train stations. Steer Davies Gleave was asked to monitor the performance of five ticket machines at two stations, Prahran and South Yarra over a period of three days. Observations were made during business hours (approximately 8am – 5pm) on Thursday 22nd, Friday 23rd and Monday 26th of March 2001. The observers were Graham Roddis from Steer Davies Gleave and Philippa Hall from OneLink.

The records made by the observers of their attempts to purchase tickets were compared with the data recorded by OneLink of errors automatically recorded by the ticket machines **or** manually logged by OneLink staff.

#### 3.1 South Yarra

##### 3.1.1 Small ticket machine (serial no. 017-01259)

There were 50 attempts to purchase tickets from this machine over the three survey days. On all of these occasions a ticket was obtained and the change was correct. No errors were recorded by OneLink.

##### 3.1.2 Small ticket machine (serial no. 017-01269)

On the first two survey days, 28 attempts were made to purchase tickets from this machine and all were successful. All purchases returned correct change, except one on 23 March, which provided an additional 5c in change. No errors were recorded by OneLink for these two days.

On the third survey day, the first three attempts were successful, but at 9:06am the observers reported that the ticket machine was rejecting coins and that a ticket could not be obtained. By 9:32am this fault was manually logged with OneLink and, after a visit by a technician, was corrected by 10:17am. The fault was recorded as vandalism. The observers were able to make two more successful ticket purchases after this, but at 11:23am the machine automatically reported a fault and the screen displayed 'out of service' until 3:57pm. The observer was then able to purchase a ticket.

##### 3.1.3 Large ticket machine (serial no. 018-01228)

This machine also had very few problems on the first two survey days and no errors were recorded by OneLink. On two occasions a \$10 note was rejected by the machine and on one occasion an extra 5c was given in change.

On the third survey day, the observers obtained 16 tickets from 18 purchase attempts, but many of these purchases returned incorrect change or required exact change only.

	Attempts	Tickets	Exact change tendered	Correct change received	Change error
Morning	10	10	2	3	5
Afternoon	8	6	5	1	0

Most of the purchases in the morning returned incorrect change or the machine required exact change only. At 1:40pm a purchase attempt was not successful, as the machine required 'exact change only' and the observer was unable to comply. At 2:34pm the OneLink manually reported a 'hopper fail' error. The screen continued to show 'exact change only' until the observers ceased for the day. OneLink reported at 4.25pm that the fault was resolved.

### **3.2 Prahran**

Two automated ticket machines, at Prahran Station, were tested by two observers 98 times over three days: Thursday 22 March, Friday 23 March and Monday 26 March.

At the first attempt to purchase tickets on the morning of 22 March, neither machine was performing properly. The small machine was rejecting coins and the observer was not able to purchase a ticket. The large machine rejected a new \$5 note, however a ticket could be purchased using a \$10 note. The change was incorrect, with the observer receiving an extra 5c. When the observers attempted to purchase tickets at 10:35am, neither machine was functioning correctly and a ticket could not be purchased. The same problem occurred on Monday 26<sup>th</sup> when both ticket machines were not functioning between 11:00am and 12:15pm.

#### **3.2.1 Small ticket machine (serial no. 017-01065)**

On the first survey morning, tickets could not be purchased from this machine at 8:44am and 9:30am due to rejection of coins. By 9:55am OneLink had logged a manual error report relating to incorrect change being issued. This error was recorded as resolved at 10:20am, but the observers were still unable to purchase a ticket as the machine was taking coins but not issuing tickets due to a blockage in the coin slot. The coins were not returned to the observer. At 11:02am a 'coin jam' error was logged manually by OneLink and reported as resolved a few minutes later. Observers were able to purchase tickets from this time until mid-afternoon when a similar error occurred. At 3:05pm coins were entered into the machine but a ticket was not issued and the coins were not returned. Shortly afterwards another 'coin jam' error was manually logged by OneLink. This was repaired by a technician within an hour and tickets could then be purchased.

On the second survey day, there were no problems with this machine recorded by either the observers or OneLink.

Observers made 18 attempts to purchase a ticket from this machine on the third survey day, 67% of which were unsuccessful. The first six attempts were successful, but at 10:15 coins were entered into the machine, no ticket was issued and the coins were not returned. The observer reported this error to OneLink and a 'coin jam' error was manually logged at 10:24am. The error was reported as resolved at 12:15pm. However the observers were still unable to purchase a ticket from this machine in four subsequent attempts, due to problems with accepting coins. At 2:41pm OneLink manually logged another 'coin jam' error. The observers tried unsuccessfully to purchase tickets four more times until 4:05pm. OneLink reported the error was resolved at 4:10pm.

#### **3.2.2 Large ticket machine (serial no. 018-01050)**

On the first survey day, 13 attempts were made to purchase tickets from this machine, with only one being unsuccessful. The unsuccessful purchase attempt occurred at

10:35am as the machine was rejecting notes and the screen showed that EFTPOS was unavailable.

Of the 12 attempts when a ticket was obtained, two attempts involved a problem. The first purchase the machine rejected a new \$5 note and provided an additional 5c in change. On one attempt the machine initially rejected a note but accepted it on the second entry.

Four errors were logged automatically with OneLink throughout the day. A manual 'incorrect change' error was logged at OneLink at 9:44am. An automatic 'note jam' error was logged at OneLink at 10:16am. A further error was manually recorded at 10:46am stating that 'note unit faulty'. At this time neither ticket machine at Prahran was functioning. At 11:00am OneLink recorded that these three errors were resolved and all subsequent purchase attempts were successful.

On the first purchase attempt on the second survey day, the ticket was issued but incorrect change returned. The second purchase of the morning provided an additional \$2 in change, which appeared to have been change from the previous person's purchase that had jammed in the machine, and this money was given to the previous purchaser. At 8:44am a manual 'incorrect change' error was logged and recorded as resolved at 9:05am as 'no fault found'. A successful purchase was made at 9:28am but two subsequent attempts were unsuccessful, as the machine was not recognising coins. On the third subsequent attempt (10:35am) a ticket was purchased but the change was incorrect. The observer reported this to the OneLink and a manual "incorrect change" error was logged at 10:48am. This error was resolved at 11:27am and recorded as equipment failure. At the next attempt the purchase was successful but an additional 5c was received in change. Nine further ticket purchases were successful that day, with one producing an extra 5c in change and another initially rejecting a \$5 note, which was accepted on the second try.

On the third survey day, 13 purchases were completely successful out of 18 attempts. The first six attempts were successful (8:20am to 10:05am) with an extra 5c in change being returned on one occasion. The next purchase (10:15am) provided a ticket but the machine failed to recognise a new \$5 note and this was not returned to the observer. The machine automatically recorded a 'note jam' error at 10:30am, and a 'coin jam' error at 11:03am. The following two purchase attempts were unsuccessful as the screen showed 'debit card only' and the observers were only making cash purchases. At this time both Prahran ticket machines were not fully functional. A technician was repairing the machine at 11:30am and at 12:30pm OneLink recorded the coin jam and note jam errors were resolved. On the next two purchase attempts, tickets were obtained but the first (1:30pm) produced an extra 60c in change and the second (1:50pm) failed to recognise a new \$5 note or return it to the observer. The machine automatically recorded a 'note jam' error at 1:59pm and it would only accept debit cards at 2:20pm when the observer next attempted to purchase a ticket. OneLink reported the error was resolved at 2:50pm as 'no fault found'. Subsequent purchase attempts were successful.

### 3.3 Error Logs

There were 16 errors logged for the five machines over the three survey days. Five (31%) errors were automatically identified by the machine and the other 11 (69%) were recorded manually by the OneLink observer. From the comparison of the field

observations, with OneLink's records, it appears that the machines do not automatically detect minor change errors or rejection of notes.

At South Yarra there were three errors logged over the three survey days on two machines, two which were manually logged (presumably as a result of a complaint by a passenger) and one of which was an automatically generated 'out of service' error. On the morning of 26 March, these two machines were rejecting coins or requiring exact change only and no automatic error logs were recorded. In one instance the manual error log was recorded more than six hours after the observers first observed incorrect change being issued by the machine.

At Prahran there were 13 errors recorded over the three survey days for the two machines, nine manually recorded and four automatically identified by the machines. The automatic 'note jam' errors appear to have been triggered twice by insertion of a new \$5 note that was not recognised and not returned to the observers.

APPENDIX 1  
Trains - Summary of Purchase Success - Lines

Train Line		Purchase with major 'defect'	Unsuccessful Purchase	Purchase with minor or no 'defect'	Metcard Vending Machines Surveyed
Alamein	No. of MVMs	2	0	31	33
	% of MVMs surveyed for this line	6.1%	0.0%	93.9%	100.0%
Belgrave	No. of MVMs	9	14	43	66
	% of MVMs surveyed for this line	13.6%	21.2%	65.2%	100.0%
Broadmeadows	No. of MVMs	0	14	27	41
	% of MVMs surveyed for this line	0.0%	34.1%	65.9%	100.0%
City Loop	No. of MVMs	1	0	25	26
	% of MVMs surveyed for this line	3.8%	0.0%	96.2%	100.0%
Cranbourne	No. of MVMs	6	6	39	51
	% of MVMs surveyed for this line	11.8%	11.8%	76.5%	100.0%
Epping	No. of MVMs	1	2	38	41
	% of MVMs surveyed for this line	2.4%	4.9%	92.7%	100.0%
Frankston	No. of MVMs	2	12	53	67
	% of MVMs surveyed for this line	3.0%	17.9%	79.1%	100.0%
Glen Waverley	No. of MVMs	0	12	25	37
	% of MVMs surveyed for this line	0.0%	32.4%	67.6%	100.0%
Hurstbridge	No. of MVMs	0	4	43	47
	% of MVMs surveyed for this line	0.0%	8.5%	91.5%	100.0%
Lilydale	No. of MVMs	7	12	44	63
	% of MVMs surveyed for this line	11.1%	19.0%	69.8%	100.0%
Pakenham	No. of MVMs	7	6	44	57
	% of MVMs surveyed for this line	12.3%	10.5%	77.2%	100.0%
Sandringham	No. of MVMs	6	10	19	35
	% of MVMs surveyed for this line	17.1%	28.6%	54.3%	100.0%
St Albans/Melton	No. of MVMs	6	10	19	35
	% of MVMs surveyed for this line	17.1%	28.6%	54.3%	100.0%
Upfield	No. of MVMs	2	2	19	23
	% of MVMs surveyed for this line	8.7%	8.7%	82.6%	100.0%
Werribee	No. of MVMs	9	3	17	29
	% of MVMs surveyed for this line	31.0%	10.3%	58.6%	100.0%
Williamstown	No. of MVMs	7	0	16	23
	% of MVMs surveyed for this line	30.4%	0.0%	69.6%	100.0%
All Lines	No. of MVMs	39	86	334	459
	% of MVMs surveyed all lines	8.5%	18.7%	72.8%	100.0%

APPENDIX 2  
Trains – Ticket Machines – Vandalism Summary

Ticket Machine Defects	No. of Machines			All Machines	
	Successful Purchase with major 'defect'	Unsuccessful Purchase	Purchase with minor or no 'defect'	No. of Machines Surveyed	% of Machines Surveyed
<b>Major 'Defects'</b>					
Incorrect Change	15	3	0	18	3.9%
Coins Rejected	2	15	0	17	3.7%
New \$5 note rejected	6	5	0	11	2.4%
Other notes rejected	2	8	0	10	2.2%
Machine Was Off	0	5	0	5	1.1%
'Out of Order' on the display screen	0	3	0	3	0.7%
'Out of Order' sign placed on the machine	1	11	0	12	2.6%
Buttons Were Unreadable	5	0	0	5	1.1%
Buttons Were Not Working	0	3	0	3	0.7%
Had 'correct change only' signs	2	4	0	6	1.3%
No change when cancel button pushed	1	19	0	20	4.4%
Coin slot blocked	0	36	0	36	7.8%
Scratched screen (major)	10	3	0	13	2.8%
<b>Minor 'Defects'</b>					
Scratched screen (minor)	13	19	94	126	27.5%
Other vandalism (major and minor)	2	3	9	14	3.1%
Graffiti (major and minor)	19	10	56	85	18.5%
No. of Machines	39	86	334	459	100.0%

- 1) Please note that as some ticket machines had multiple 'defects', the total number of ticket machine 'defects' therefore exceeds the total number of machines.

Ticket Machine Defects	Staffed Stations		Unstaffed Stations		Ticket Machines Surveyed	
	No.	% of machines at staffed stations	No.	% of machines at unstaffed stations	No. of Machines	% of Machines Surveyed
<b>Major Defects</b>						
Incorrect Change	5	3.1%	13	4.3%	18	3.9%
Coins Rejected	2	1.3%	15	5.0%	17	3.7%
New \$5 note rejected	2	1.3%	9	3.0%	11	2.4%
Other notes rejected	0	0.0%	10	3.3%	10	2.2%
Machine Was Off	2	1.3%	3	1.0%	5	1.1%
'Out of Order' on the display screen	2	1.3%	1	0.3%	3	0.7%
'Out of Order' sign placed on the machine	6	3.8%	6	2.0%	12	2.6%
Buttons Were Unreadable	1	0.6%	4	1.3%	5	1.1%
Buttons Were Not Working	1	0.6%	2	0.7%	3	0.7%
Had 'correct change only' signs	2	1.3%	4	1.3%	6	1.3%
No change when cancel button pushed	4	2.5%	16	5.4%	20	4.4%
Coin slot blocked	9	5.6%	27	9.0%	36	7.8%
Scratched screen (major)	9	5.6%	4	1.3%	13	7.8%
<b>Minor Defects</b>						
Scratched screen (minor)	47	29.4%	79	26.4%	126	31.4%
Other vandalism (major and minor)	4	2.5%	10	3.3%	14	3.7%
Graffiti (major and minor)	26	16.3%	59	19.7%	85	19.6%
No. of Machines	160		299		459	

## APPENDIX 3 Methodology

## TEST OF ATS EQUIPMENT AT TRAIN STATIONS

### OBJECTIVE:

To test ticket vending machines and ticket validators at every train station in the metropolitan Melbourne network.

The test will cover 213 stations. Showgrounds, Flemington Racecourse and General Motors stations are excluded. Melton, Sunbury and Stony Point services are included as Metcards apply on these routes.

Each tester will be assigned a train line to cover. You will be provided with:

- a list of stations
- survey forms
- cash with which to purchase tickets
- Daily Zone 1+2+3 Metcard with which to travel that day
- Authorisation letter and ID tag

### TESTING TICKET VENDING MACHINES:

There are two types of ticket vending machines available at stations –

- the larger machine which accepts notes and coins and has EFTPOS facility
- the smaller machine that accepts coins only.

You will not be testing the EFTPOS facility.

### Procedure:

1. Note your name, date, time, station name and whether station is staffed on the top of the survey form
2. Note machine model (i.e. large or small)
3. Note machine location and serial number

If Large machine...

4. Purchase a Daily, Full Fare, Zone 1+2+3 ticket (cost will be \$10.80)
5. Insert \$10 note and \$2 coin. If you don't have sufficient or it consistently rejects a note/coin, then use other denominations. Mark on survey form which denomination used and if any notes/coins were rejected.
6. Mark on survey form how much change was returned and if ticket was dispensed.
7. Start a new transaction for the same ticket type (Daily Full Fare Zone 1+2+3 ticket). Insert new \$5 note. See if machine 'reads' the note, then hit Cancel to return the \$5

note. (This is to test if the machine accepts the new \$5 notes, not to actually buy a ticket.)

If Small machine...

1. Purchase a 2 Hour, Full Fare ticket for the single Zone that you are in (i.e. either Zone 1, Zone 2 or Zone 3). The cost will be \$2.60 for Zone 1 or \$1.90 for Zones 2 or 3.
2. Insert enough coins into the coin reader so that the amount tendered is in excess of purchase price (this is so that you can test that the correct change was returned). E.g. if in Zone 1, insert \$2 + \$1 coins, if in Zone 2 or 3, insert \$2 coin. Mark on survey form which denomination used and if any notes/coins were rejected.
3. Mark on survey form how much change was returned and if ticket was dispensed.
4. Note if ticket was returned, was the correct change dispensed.
5. Note any damage to machines, any faults found

### TESTING TICKET VALIDATORS:

1. Testing of validators will be by visual examination. **DO NOT VALIDATE THE TICKETS YOU PURCHASED.** Only ever validate the one ticket that you were provided for travel that day.
2. Note how many validators are available on each platform or concourse (i.e. on the inbound side, the outbound side and any island/concourse areas if relevant)
3. Note how many validators do not appear to be working.
4. For those validators that do not appear to be working or are vandalised, note down the serial number and the faults that you can determine.
5. A 'ready' validator should read the time of the day (e.g. 12:13 PM) and show green lights. If the display shows any other text, then note down that text and also the colour lights (if not green, then may be orange or red.)



## TEST OF ATS EQUIPMENT ON-BOARD TRAMS

### OBJECTIVE:

To test ticket validators and ticket vending machines on board trams in the metropolitan Melbourne fleet.

You will be allocated to a general location and range of tram routes for which to test. Please try and test different trams. To do this, check the tram number (not the route) before boarding to see if you have previously tested that tram. There will be some overlap of testing, but try to minimise this where possible.

You will be attempting to purchase a single zone 2-hour ticket from the coin-only ticket machine on board the tram. You will also have to validate the Zone 1-2-3 travel card you are travelling on upon boarding each tram. All other validators should be visually inspected.

You will be provided with:

- The location and routes in the tram network you will be surveying.
- survey forms
- cash with which to purchase tickets
- Daily Zone 1+2+3 Metcard with which to travel that day and to test in tram validators
- Authorisation letter and ID card

### TESTING TICKET VALIDATORS:

1. Note the date, your name, your location, the stop number you board at (if easily identified), the tram route, tram number (usually on front of the tram) and time of test before boarding.

2. Use your Daily Zone 1+2+3 ticket and insert into a validator.
3. Note on survey form if validated correctly. If not, note what was displayed.
4. Count and visually inspect all validators on the tram and note any obvious problems.

### TESTING TICKET PURCHASE:

1. Purchase a 2 Hour, Full Fare ticket for the single Zone that you are in (i.e. either Zone 1, Zone 2 or Zone 3). The cost will be \$2.60 for Zone 1 or \$1.90 for Zones 2 or 3.
2. Insert enough coins into the coin slot so that the amount tendered is in excess of purchase price (this is so that you can test that the correct change was returned). E.g. if in Zone 1, insert \$2 + \$1 coins, if in Zone 2 or 3, insert \$2 coin. Mark on survey form which denominations were used and if any coins were rejected.
3. Mark on survey form how much change was returned, was this amount correct and if ticket was dispensed.
4. Note any damage to machines, any faults found.
5. Ensure you keep the ticket that has been purchased.

## TEST OF ATS EQUIPMENT ON-BOARD BUSES

### OBJECTIVE:

To test ticket validators and ticket purchasing equipment on board a sample of buses in the metropolitan Melbourne fleet.

The test will cover 71 different bus routes run by 18 different bus operators at 5 heavily serviced shopping centres or multi-modal interchanges. Buses belonging to National Bus Company will not be tested as they do not have ATS equipment on board (still sell paper tickets).

You will be allocated to a shopping centre/ interchange to test buses passing through that stop. Test 5 different buses (i.e. they have different bus numbers) per route.

If a bus is running behind schedule or will not be at the stop long enough to do the tests, then use your judgement whether to skip that bus and target the next available bus. It is important not to impact on the on-time running of the bus services.

You will be testing the validator first with your own travel ticket, then purchasing a ticket from the driver before disembarking. As this is unusual behaviour, you should introduce yourself to the driver before commencing the tests. Please be polite as you are representing the Department of Infrastructure.

You will be provided with:

- a list of routes to target
- survey forms
- cash with which to purchase tickets
- Daily Zone 1+2+3 Metcard with which to travel that day and to test in each bus validator
- Authorisation letter and ID tag

### INTRODUCTION TO THE DRIVER:

You must introduce yourself to each driver before commencing the tests. You may like to use words such as:

“Hello, my name is \_\_\_\_\_. I’m conducting a test of ticketing equipment on behalf of the Department of Infrastructure. Would you mind if I conduct a couple of quick tests?”

One tests a prepaid Metcard and the other tests the purchase of a ticket on-board.”

If the driver tells you that he doesn’t have time for you to conduct the tests, then politely thank him/her and move on to the next bus.

### TESTING TICKET VALIDATORS:

1. Note the bus route, bus number (usually on front of bus) and time of test before boarding.
2. Use your Daily Zone 1+2+3 ticket and insert into validator.
3. Note on survey form if validated correctly. If not, note what was displayed.

### TESTING TICKET PURCHASE:

1. Ask the driver for a 2 Hour, single Zone ticket (i.e. Zone 1, 2 or 3 depending on the Zone you are located within)
2. Hand driver EXACT fare. For Zone 1 will be \$2.60, for Zone 2 or 3 will be \$1.90. If not possible, then the nearest you can get to exact fare.
3. The driver will enter into his keypad the type of ticket you want, and then will insert a blank Metcard into the validator for coding. The Ticket Issuing Machine will send a message to the Validator to tell it which type of ticket it should ‘code’ it as in the magnetic strip. The driver will then hand you the coded and printed ticket.
4. Ensure you keep the ticket that has been purchased.
5. Note on the survey form which denominations you gave to the driver, if a ticket was obtained, the type of ticket, and any machine faults evident.
6. A common problem experienced by the drivers is that when a blank Metcard is inserted into the validator, it is rejected with the word “RE TRY”. The driver then needs to hit Cancel on his keypad before reinserting the Metcard. This is why we have included the question on the survey form...”Did the driver have to insert the blank Metcard more than once?”.

### REMEMBER TO THANK THE DRIVER AFTER TEST IS COMPLETED.

APPENDIX 4  
Train Stations by Train Line

