



2 General

2.1 Overview

Ticket Office Machine (TOM)/Excess Fare Office (EFO) is a machine in function with a booking office clerk mainly to issue tickets to customers in free area, and adjust tickets that are rejected by the gates in paid area. TOM/EFO is designed to be a stand-alone unit and the operator interfaces with the TOM/EFO with a keyboard and mouse or touch screen. TOM/EFO issues tickets, surcharges tickets, analyzes data recorded on tickets, and prints event records. Associated with these functions, TOM/EFO processes register accumulation and update, implements operator security authorization, and communicate with the SC to send information and get necessary parameters.

TOM/EFO has functions of Ticket Issuance/Sale (on CST/CSC), Add-value (on CSC), Analysis, Adjustment, Refund and handling passenger's enquiry as per Jaipur Metro Business Rules.

Each TOM and EFO will be composed almost same hardware/software system and operated by station operator. But TOM will be installed in the booking office and EFO will be installed at Customer Care Center at station. TOM/EFO mode can be changed by using TOM/EFO mode change function. Detailed information is explained Chapter 4.

TOM/EFO will consist of Main PC, Touch Screen Monitor, Card Reader/Writer, Token Dispensing Mechanism, Passenger Information Display, Receipt Printer, POS Terminal, Keyboard, and Mouse.

2.2 Basic Functions of TOM/EFO

The TOM/EFO is capable of setting different operating mode according to TOM/EFO installing area. For example, only service for non-paid area, only service for paid. Operator will be able to change operating mode in TOM/EFO GUI.

The functions of TOM/EFO are able to enable or disable by downloadable parameters, the functions are as below:

- Token issue
- Card sale
- Add value
- Ticket analysis
- Ticket adjustment
- Cancellation
- Ticket refund
- Transaction inquiry

Detailed information is explained Chapter 4.

The TOM/EFO display sufficient ticket and cash processing information on operator screen and display necessary ticket and cash information on passenger display when the operator



performs the processing of ticket and cash. The TOM/EFO is capable of printing relevant receipt for shift end report reconciliation, group tickets and passenger service results (token issue, card sale, add value, refund, adjustment and cancellation) through receipt printer if necessary.

The TOM/EFO is capable of security to prevent abusing. The TOM/EFO generates shift report automatically after operator shift.

The TOM/EFO transmits relevant transaction, revenue, shift and equipment status data to SC via station local network.

When token issue or add value, The TOM/EFO will play stored audio file to offer price information to customer through a speaker. This audio file will be downloaded from the SC.

Design of all kinds of TOM/EFO modules will be integrated in operating desk environment.

3 System Architecture

3.1 Hardware Architecture

Ticket Office Machine (TOM)/Excess Fare Office (EFO) will be composed of the following units:

- Main PC
- Touch Screen Monitor
- Passenger Information Display(PID)
- Ticket Dispensing Mechanism(TDM)
- Card Reader/Writer
- POS Terminal
- Receipt Printer
- AC/DC Power

The following figure represents the appearance of TOM/EFO detailed. (All the equipment presented in the below figure will be provided to the Employer except the table, chair and dispensing hole of table. The table, chair and dispensing hole of table are out of scope.)

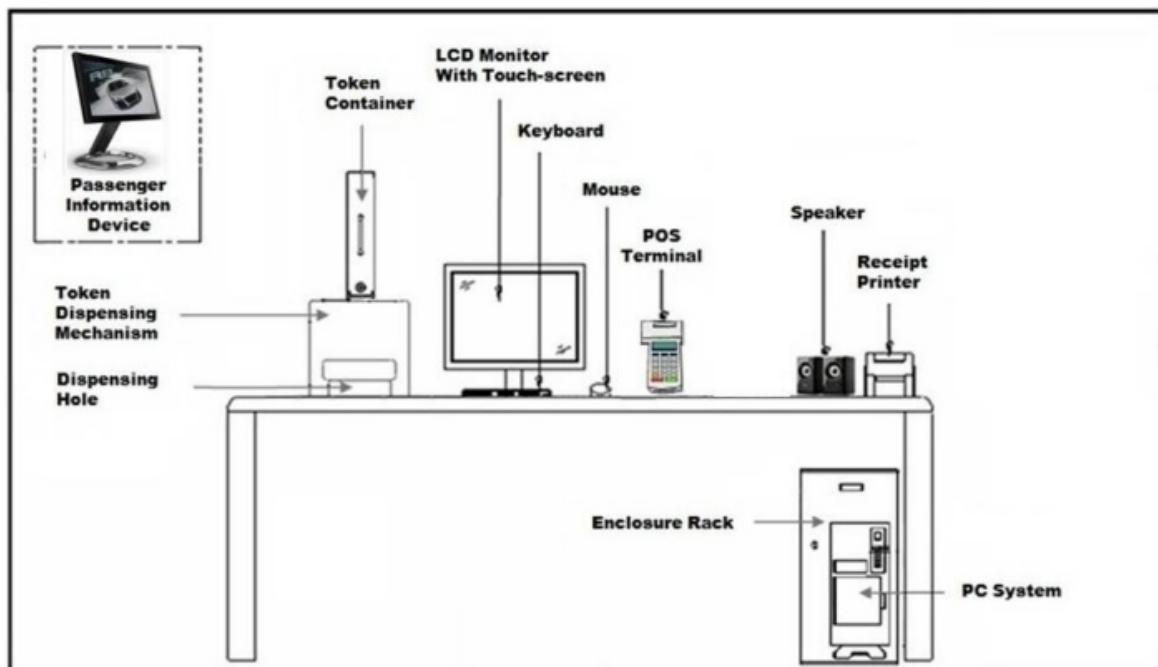


Figure 1 Appearance of TOM/EFO (Example)

TOM/EFO will be supplied with power by UPS, which was already set in Station office.

The following figure shows system modules of TOM/EFO.

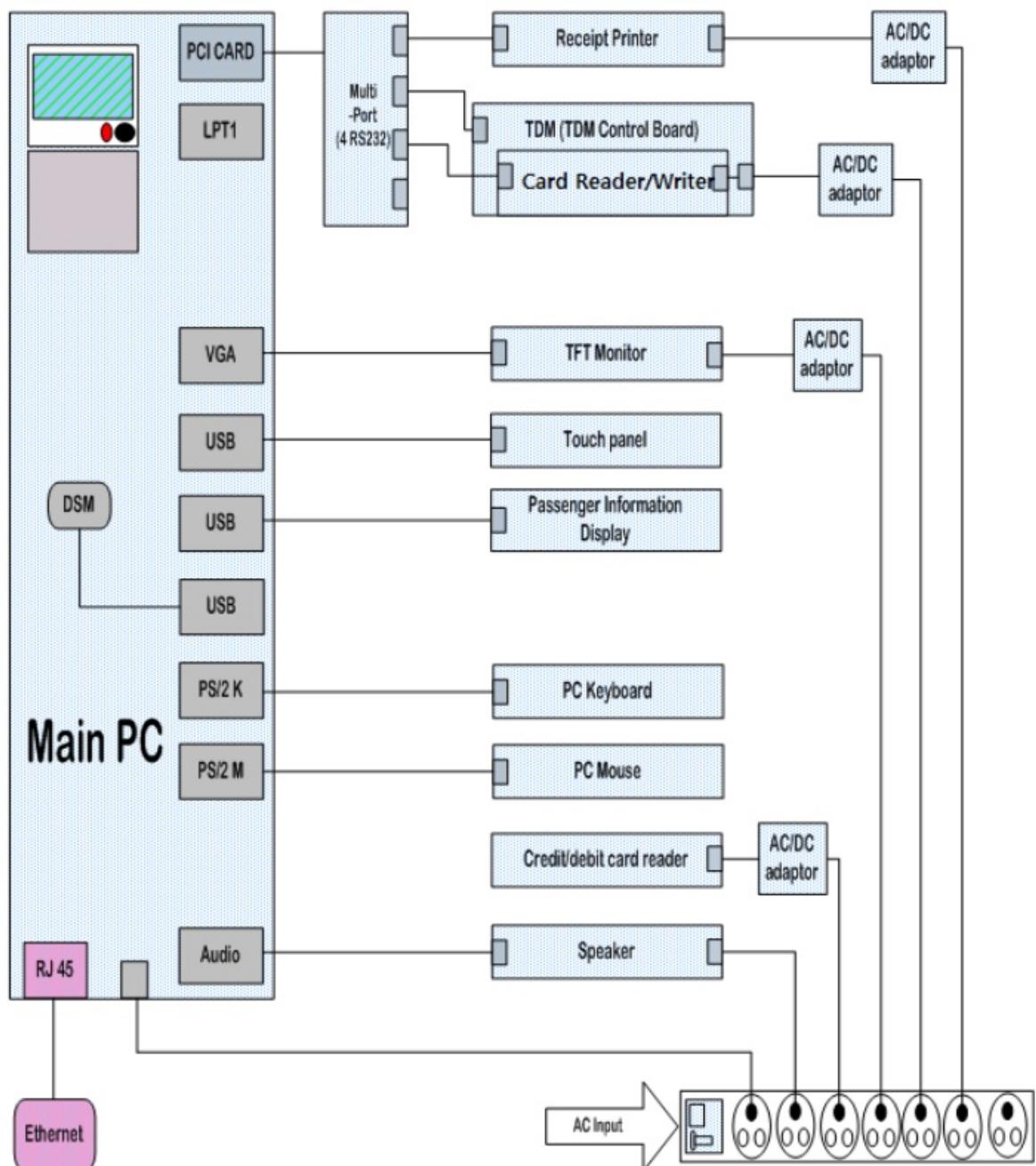


Figure 2 System Block Diagram of TOM/EFO

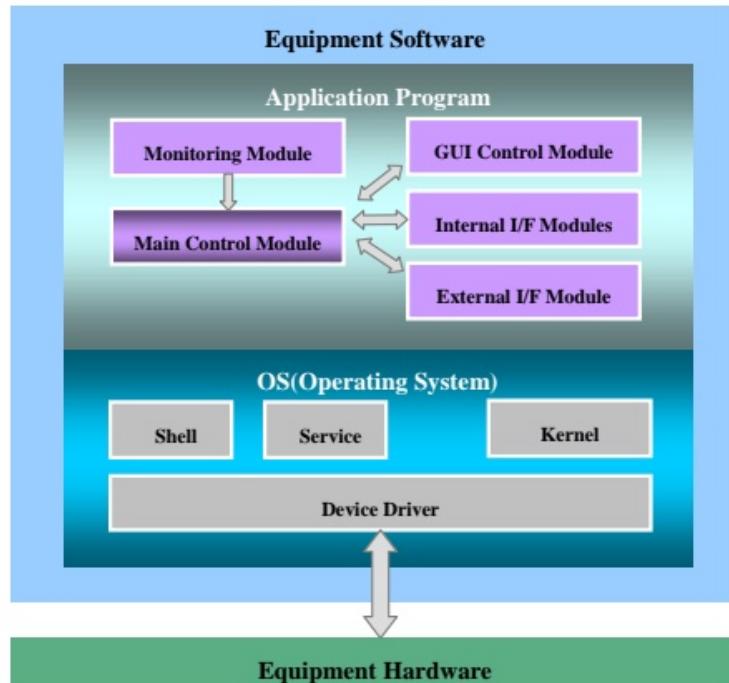


System	Item	Specification
Main PC	CPU	Intel Core i3-2120 CPU
	Memory	3GB
	HDD	500GB
	OS	Windows 7 Professional (32-bit)
	Ethernet	Gigabit
	ODD	DVD-Multi
Touch Screen Monitor	Type	17" TFT-LCD
	Resolution	1280(W) x 1024(H)
Touch Screen Panel	Type	4-wired Resistive Touch
	Interface	USB
Card Reader/Writer	RF Method	ISO14443 Type A, NFC Protocol Support
Token Dispensing Mechanism(TDM)	Token Container	1EA (will be up to 2,000 tokens)
	Token Hoppers	1EA
	Other Component	Main Control Board Card Reader/Writer
Passenger Information Display (PID)	Display	7 Inch Wide Screen
	Resolution	800 x 480 (WVGA)
	Interface	USB
	Display Language	Displayable in Hindi, and English
Receipt Printer	Printing Type	Serial Impact Dot Matrix 9-Pin
	Printing Columns	40/42, 33/35
	Printing Font	7 x 9 / 9 x 9
	Paper	Roll paper
	Data Buffer	16KB
	Interface	USB
POS Terminal	Type	The POS terminal is compatible with the Indian Banking System. One POS terminal will be supplied per each station. The product of POS Terminal will be determined according to the contract between Jaipur Metro and bank.
Other Components	Standard Keyboard and Mouse Multi-Serial Port Speaker	

Table 2 General Specifications

3.2 Software Architecture

Software architecture for this equipment is shown as follows and this structure is almost same as other equipments.



* I/F: Interface

Figure 3 Software Architecture

Items	Descriptions
Application Program	<p>Application program consists of several software modules as follows and performs specific functions required to each equipment.</p> <ul style="list-style-type: none"> ✓ Main Control Module: core module controlling several software modules to perform equipment functions ✓ Monitoring Module: checking module for equipment status ✓ GUI Control Module: display module controlling GUI ✓ Internal I/F Modules: interface modules communicating with internal devices ✓ External I/F Modules: interface module communicating with external system such as SC
OS(Operating System)	<p>Operating system is in charge of interface between equipment hardware and application program and manages computing resources of system overall</p>

Table 3 Software Specifications

3.2.1 Process Architecture

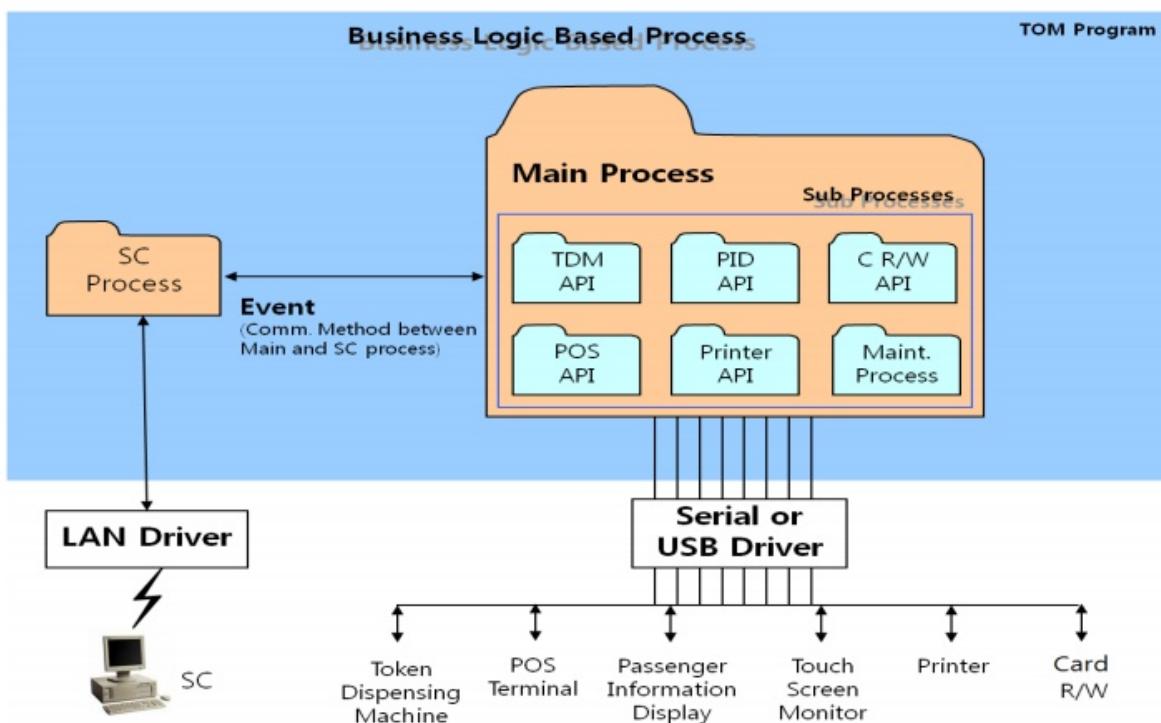


Figure 4 Process Architecture

This function describes processes of which are composed to TOM/EFO. Each process is a communication with the event procedure.

- Main Process: Main part of the TOM/EFO. Based on business logic, this process controls ticket issuing, add value, adjustment, refund replacement, cancellation and various operational process for operator service.
- Sub process:
 - PID API: PID process is to control PID communication.
 - TDM API: TDM process is to control TDM communication.
 - Card R/W API: Card R/W process is to control Card R/W communication.
 - POS API: POS process is to control POS terminal communication.
 - Printer API: This is process to control Printer communication.
 - Maint. Process: This process performs maintenance operation of TOM/EFO.
- SC Process: SC is sub-processes of the TOM/EFO to receive parameter to operate TOM/EFO from SC, to send operation result to SC. TOM/EFO can detect error with diagnostic each internal modules. The result of diagnostic is classified by code. If the result is critical, it uploads to SC by SC process. TOM/EFO send request of refund or replacement to the SC, SC respond to the TOM/EFO.



4 Function

4.1 General Description

TOM/EFO is normally operated by Metro staff and installed in station ticketing office. TOM/EFO is capable of processing token and stored value card sale. Operator is able to analyze, add value, adjust, replace, refund, extend date, and cancel, also to inquire transaction. Handle passenger claim and ticketing/administration charge by administrative disposition in ticketing office.

TOM/EFO is capable of setting different operating mode according to TOM/EFO installing area. For example, service for free area or paid area.

TOM/EFO can be set to below mode by configuration:

1) TOM (Free-Area)

TOM is capable of service of ticket sale, ticket analysis, add value, refund, adjustment, inquiry and handling loss of passenger from ticket issue failure for free area only. And it is able to handle invalid ticket from free area.

2) EFO (Paid-Area)

The EFO will be able to handle invalid ticket from paid area (e.g. excess fare, excess time). Also it provides issue exit ticket, register lost ticket and etc.

displays sufficient information on the processing of ticket and cash in the operator screen and PID (Passenger Information Display) when the operator performs the processing of ticket and cash.

Also TOM/EFO is capable of security to prevent abusing. TOM/EFO generates shift report automatically after end of shift and transmits relevant transaction, revenue, shift and equipment status data to SC via station local network. TOM transmits the query of refund and Bank Top-up to the relevant system (e.g. CC).

The TOM/EFO will incorporate an external debit/credit card processor capable of handling conventional and EMV credit cards.

- CSC issuing and adding value, using debit/credit cards

Before applying the above functions, the related Employer's business rules and protocols shall be provided by Jaipur Metro via the Bank or debit/credit card's business provider. And communication line and usage fee between AFC and banks are not scope of this project.



4.2 TOM/EFO Operation Mode

Operation mode

- Normal TOM/EFO using Mode like Ticket selling, Ticket analysis, Ticket add value, Ticket adjustment, Ticket refund and Cancellation, etc

Maintenance mode

- In maintenance mode, operator can test each module. For example, by choosing PID test, it tests whether it is normal or abnormal such as LCD Display.

Failure mode

- In case of no SAM in the Card Reader/Writer or failure to communicate with Card Reader/Writer, TOM/EFO cannot change its mode to In Service. In that case, TOM/EFO shows Out of Service Screen and do not operate any of TOM/EFO functions.

4.3 Operation Log-On

When the operator logs on prior to operate TOM/EFO, the operator should be authorized beforehand. The parameter information of operator PIN is downloaded from SC. The staffs of the different level are assigned different operating authorization.

The operator uses staff CSC or enters staff pin number and password to log on TOM/EFO.

TOM/EFO records all operating data occurred in the period from logon to logoff. The data include logon time, logoff time, ticket and cash processing statistic data. TOM/EFO is able to generate and print out shift report immediately after operator logoff. The staff is able to inquire and print out shift report of current days and passed day at TOM/EFO.

When the operator input wrong password/username more than 3 times continuously, TOM/EFO application will change the locking mode. Then the current status will be recorded in the system and sent to the upper system. The locking mode can only be unlocked when the supervisor logs on TOM/EFO application. We will update the design document.

The process serves to identify operating personnel and record an operator's start and end of shift. This information is transmitted to the SC.

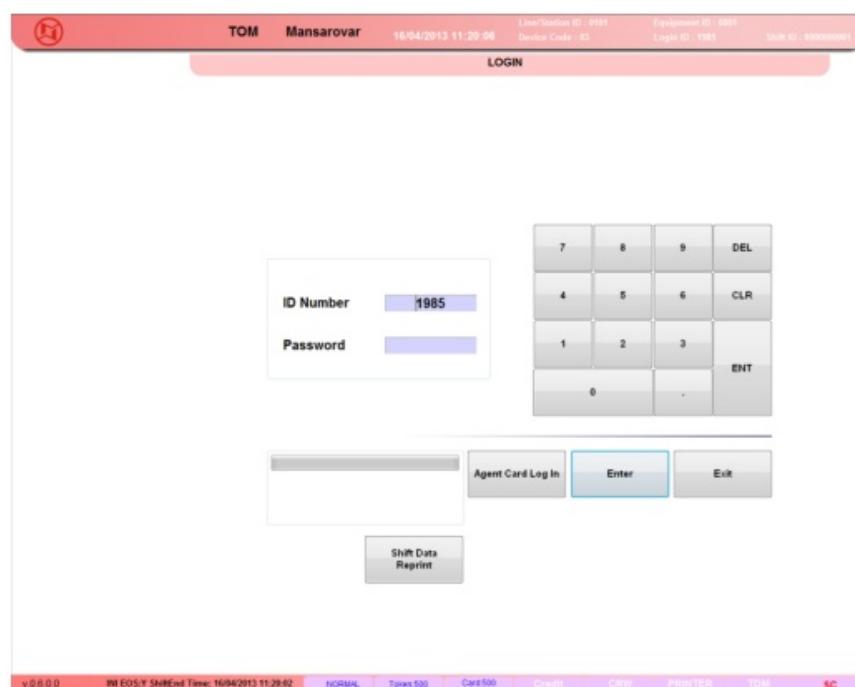


Figure 5 Log-on Screen

4.4 Operator Functions

4.4.1 Stock

The operator can manage CST and CSC stock on this menu.

If the CST/CSC quantity is not enough, the operator can replenish CST/CSC on this screen.

At the end of operation day, the operator can clear CST in the TDM on this menu. Also, if the failed token quantity is full, the operator can clear failed token on this menu.

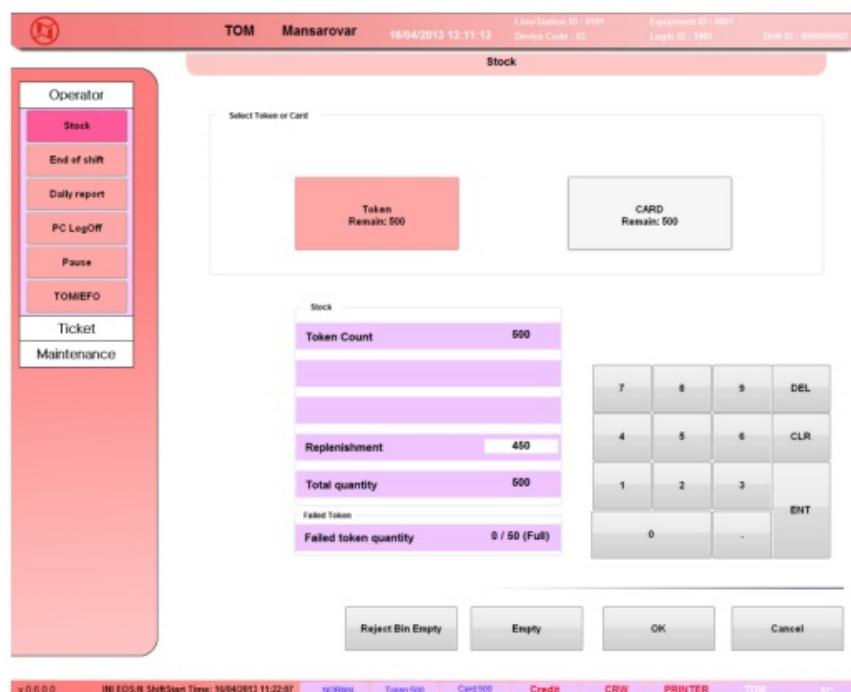


Figure 6 Stock Management Screen

4.4.2 End of Shift

On this menu, the operator can do end of shift. When the operator selects this menu, shift report is displayed on the screen. When the operator clicks "Shift End" button, shift end transaction is uploaded to SC, and shift report is printed in receipt printer.



Figure 7 End of Shift Screen

4.4.3 Daily report

On this menu, Shift Report ordered by data is shown. After inserting date, Shift list displays in 'Shift list' section. To see detail information, select one in 'Shift list' and click 'RePrint' button to print shift report in receipt printer.

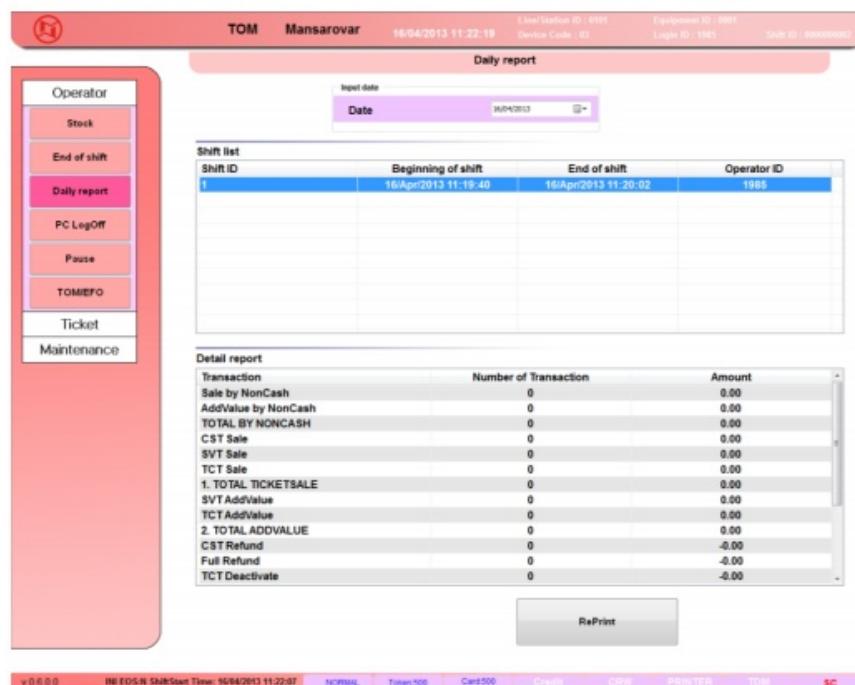


Figure 8 Daily Report Screen

4.4.4 PC LogOff

This function is used to log off PC. When the operator clicks "PC LogOff" button, the TOM/EFO PC automatically shuts down. But if the supervisor logs on present shift, this function closes the TOM/EFO application only.

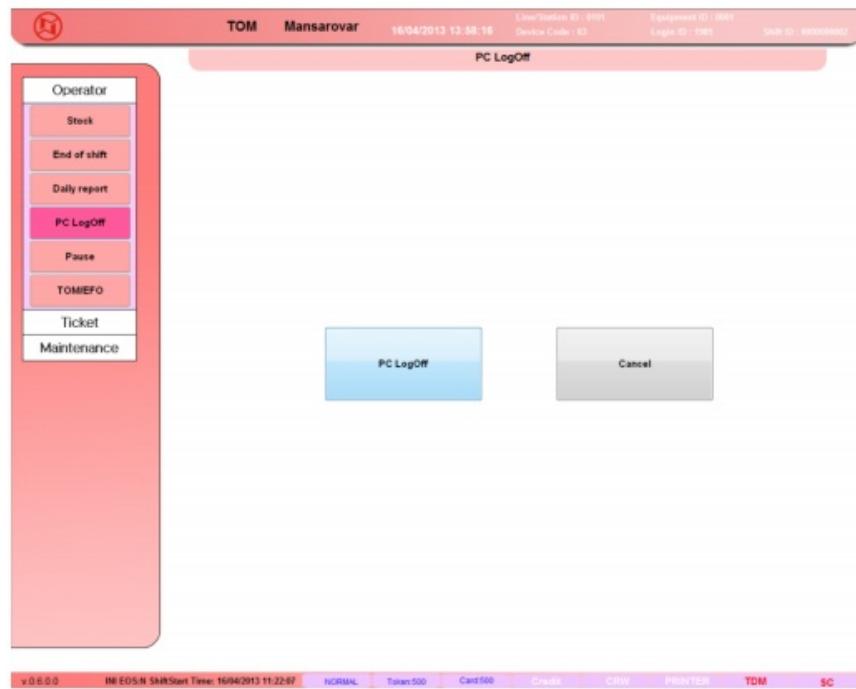


Figure 9 PC LogOff Screen

4.4.5 Pause

This function is used to pause the TOM/EFO application. When the TOM/EFO entered pause status, it is possible to log on the TOM/EFO application using just before ID or supervisor ID only.



Figure 10 Pause Screen

4.4.6 Operation Mode Change

This function is used to convert the operation mode. It is able to change from TOM to EFO or from EFO to TOM. The operator who has specific privilege can only use this function.

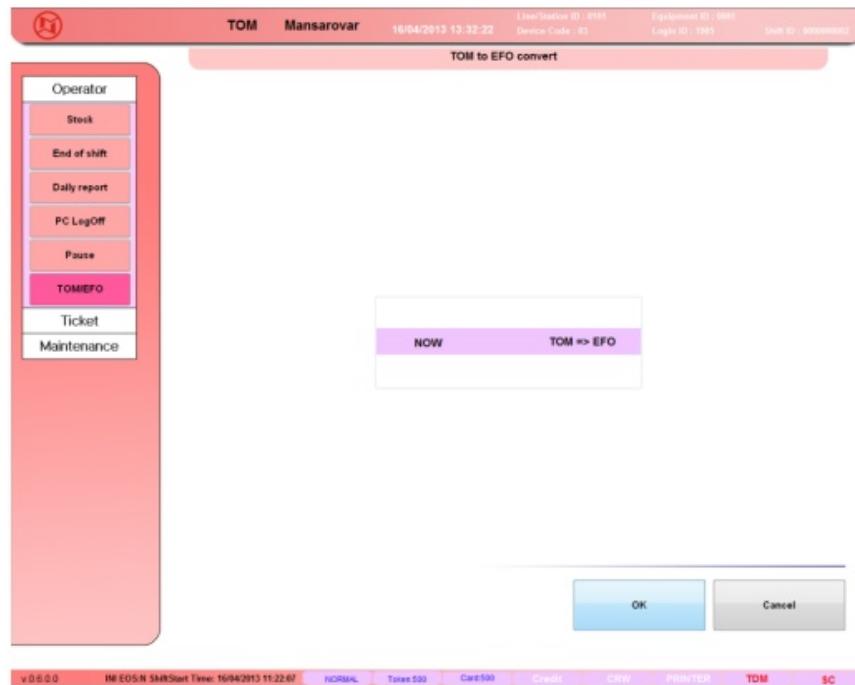


Figure 11 Operation Mode Change Screen

4.5 Ticket Processing Functions

TOM is able to process all types of ticket, it is downloadable parameter to enable or disable processing at TOM for each ticket type. The relevant selling value, purchasing value, and deposit value are downloadable parameters too.

The ticket validity will be checked before the ticket processing. In order to protect fraud transaction such as fast swapping of tickets, the ticket must be detected on the CSC tray in the TDM before every transaction. The Card R/W will read and save physical ID of the ticket when the ticket is detected. And then when the TOM processes any transaction, the Card R/W will read physical ID of the ticket again and verify just before saved physical ID. The TOM will keep last 10 transactions ticket ID and check it for protecting duplicated vending. TOM is capable of printing receipt if necessary.

4.5.1 Token Issue

Operator can issue token that is used for one time usage of entering and exiting metro system. Normally this ticket is Contactless Smart Token.

Through selecting ticket type, issuing value and quantity, TOM is capable of issuing tokens.

The token type is displayed on the Passenger Information Display, and the ticket type and the selling value are displayed on the operator screen before token issuing process. TOM displays actual selling value both on operator screen and Passenger Information Display after successful issuing. In failure of issuing, it displays relevant information on operator screen.

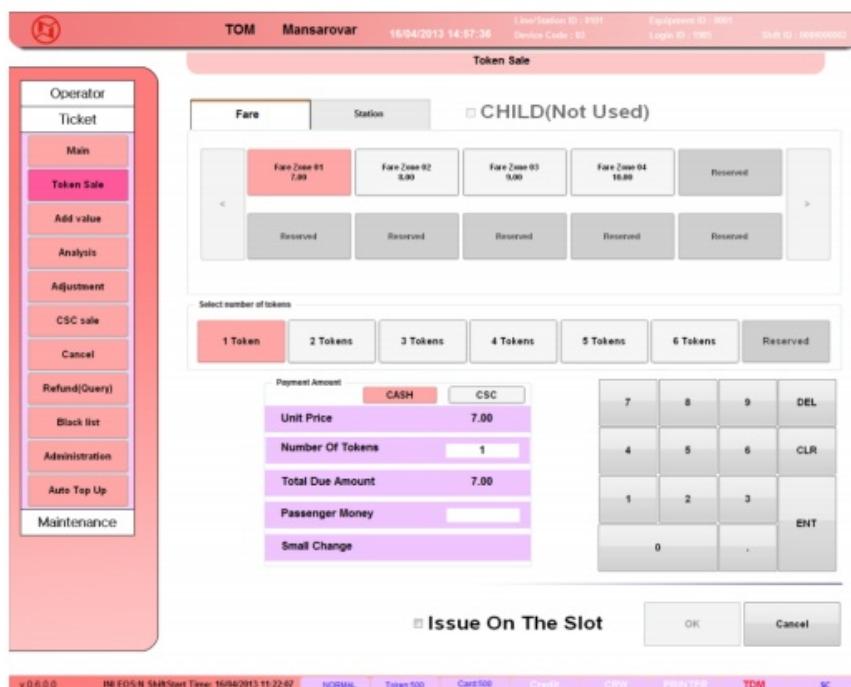


Figure 12 Token Sale – Zone Direct Selection

Operator can select Token value by using zone direct selection. If operator selects specific zone in touch screen, TOM calculates zone value and displays this value in the screen.

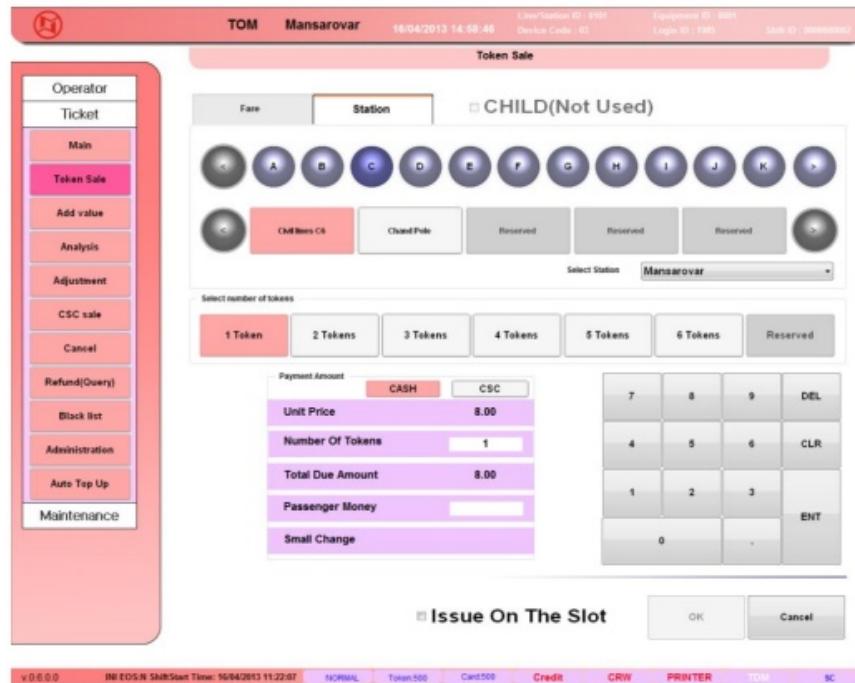


Figure 13 Token Sale – Station Selection

Operator can select Token value by station selection. If operator clicks alphabetical button in touch screen, TOM shows station name starts with that alphabet. Then, operator selects proper station name and TOM displays this station's value in the screen. When the operator checks "Issue On The Slot", the CST can be issued on the CSC tray, but this function cannot issue multiple CSTs.

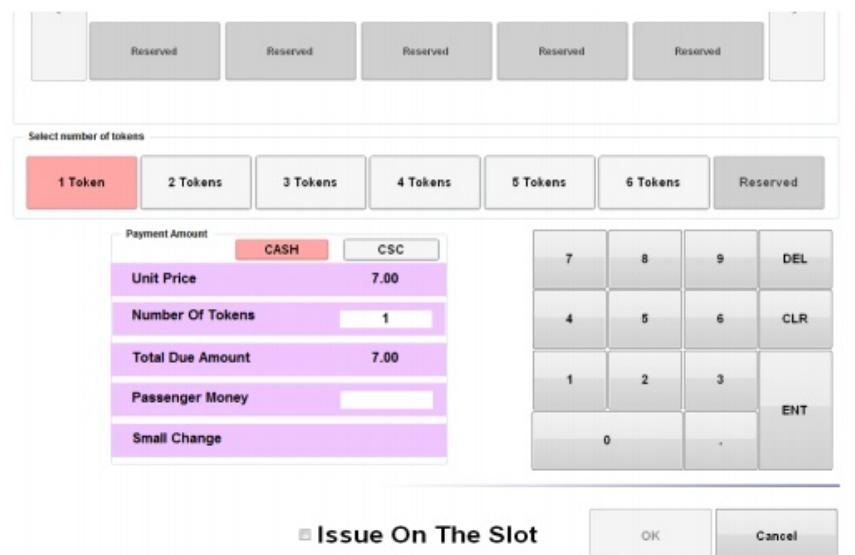


Figure 14 Token Sale – Quantity and Payment Selection

The passenger can buy token with cash or CSC. The operator can choose payment method through the "Cash" or "CSC" button on the "Token Sale" dialog. The operator can issue maximum six tokens at one time token sale when the payment method of token sale is Cash. But the operator can issue one token at one time token sale when the payment method of token sale is CSC because there is possibility of two fraud case if multiple token issue with CSC.

- First case, when e-purse in the CSC is deducted after tokens issuing, if the operator takes off CSC on the CSC tray in the TDM, tokens are issued but CSC is not deducted.
- Second case, when e-purse in the CSC is deducted before tokens issuing, if the token issuing is stop by some situation in the middle of issuing, deducted e-purse in the CSC is refunded but some tokens may be issued.

Because a one token issuing coincides with the CSC deducting, so to prevent these fraud case, the operator can issue one token at one time token sale when the payment method of token sale is CSC.

While issuing, TOM displays current issuing state in screen. If all the tokens are issued successfully, TOM displays success screen.

4.5.2 Card Sale

Operator can sale card that is used for usage of entering and exiting metro system. Normally this card is Contactless Smart Card. There is deposit for selling card. This is value for the cost and maintenance of card itself so this value will not be used for using metro system.

In card sale process, TOM displays amount value information both on operator screen and Passenger Information Display.

Amount for issue of card will be defined by parameter.

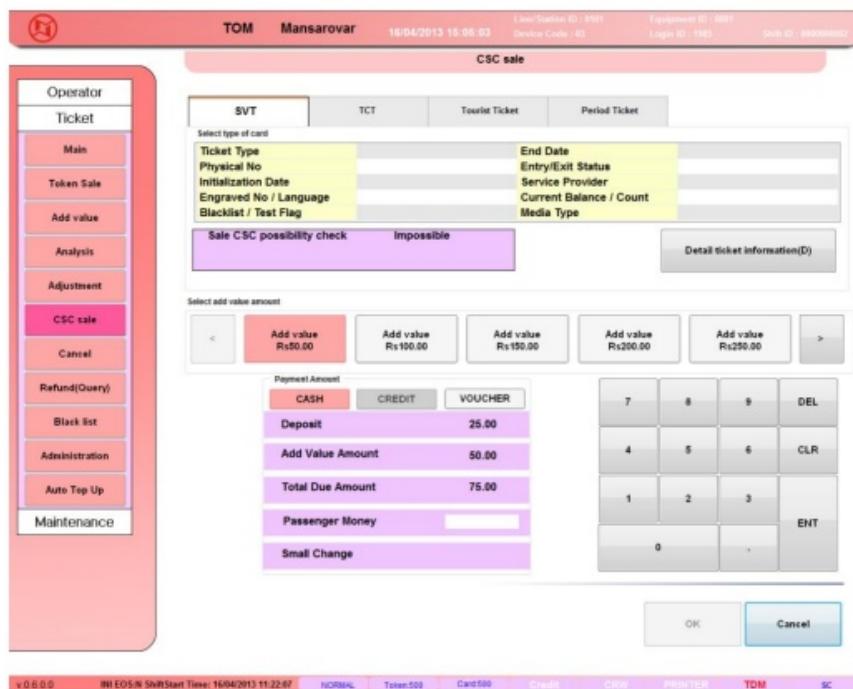


Figure 15 Card Sale Screen

On this page, the operator can issue multi ticket. For issuing multi ticket, the following conditions are satisfied.

- The CSC is normal SV.
- There is enough value to activate multi ticket in the CSC.
- The multi ticket activation is permissible by parameter.

The Multi ticket is able to have only 2 types, SV + TCT or SV + Tour.

The Multi ticket can be sold not by cash but by using own CSC common purse value.

4.5.3 Add value

The operator is able to perform add value for the ticket when the ticket meets below conditions after analyzing ticket:

- Ticket type to add value is allowed
- Ticket is within expiry date
- Ticket is not blacklisted
- The remaining value of ticket is under maximum value

If operator selects add value button in the TOM screen and put card on the CSC tray, TOM analyzes card and display information into the screen. Then operator selects amount in the TOM screen and finally clicks 'OK' button, then add value will be done.

The remaining value and add value are displayed both on Passenger Information Display and operator screen before ticket add value. TOM displays actual remaining value both on operator screen and Passenger Information Display after successful added value. In failure of add value it displays relevant information in operator screen.

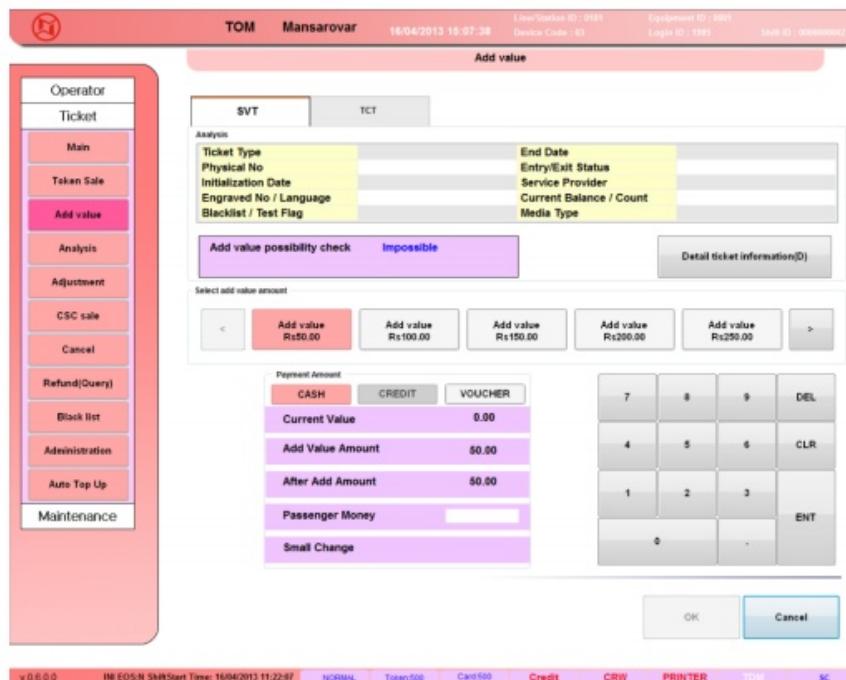


Figure 16 Add Value Screen

The TCT of Multi ticket add value can be sold not by cash but by using own CSC common purse value. And the tourist of Multi ticket cannot be added value. If the passenger wants to extend tourist validation, this ticket should be deactivated by using refund function.



4.5.4 Ticket Analysis

The operator is able to analyze ticket validity by using TOM. The ticket analysis process is available for all the tickets used in Jaipur Metro AFC system.

The ticket analysis items are applied to ticket type according to ticket usage scope and purpose. For example, staff card is not showing excess fare and time so these checking are not performed.

TOM is able to display transaction history data on operator screen. This history data holds time sequential information that is recorded by the passenger usage.

As a result of ticket analysis, remaining value is displayed both on operator screen and Passenger Information Display.

TOM can operate further ticket processing like surcharge, add value, refund after analysis according to the analysis result.

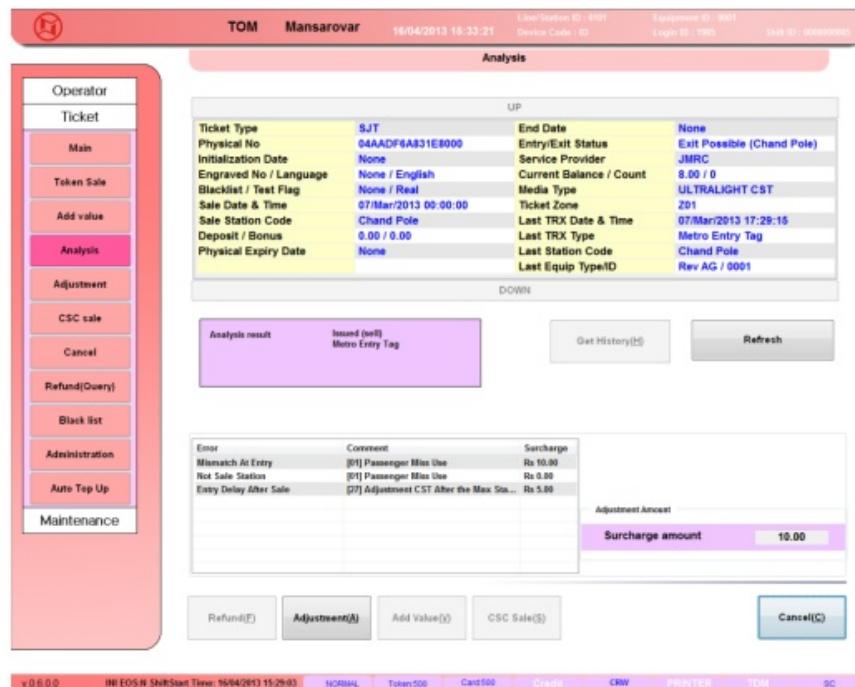


Figure 17 Analysis Screen

4.5.5 Ticket Adjustment

The operator is able to adjust and surcharge ticket after ticket analysis. Normally EFO has this functionality and passenger is assumed as existing paid area. If the passenger comes from free area, adjustment surcharge will be changed after the operator change operation mode from EFO to TOM.

The adjustment reasons and surcharge quantity will be displayed both operator screen and Passenger Information Display.

As a result of ticket adjustment, ticket will be changed to be available in AFC system.

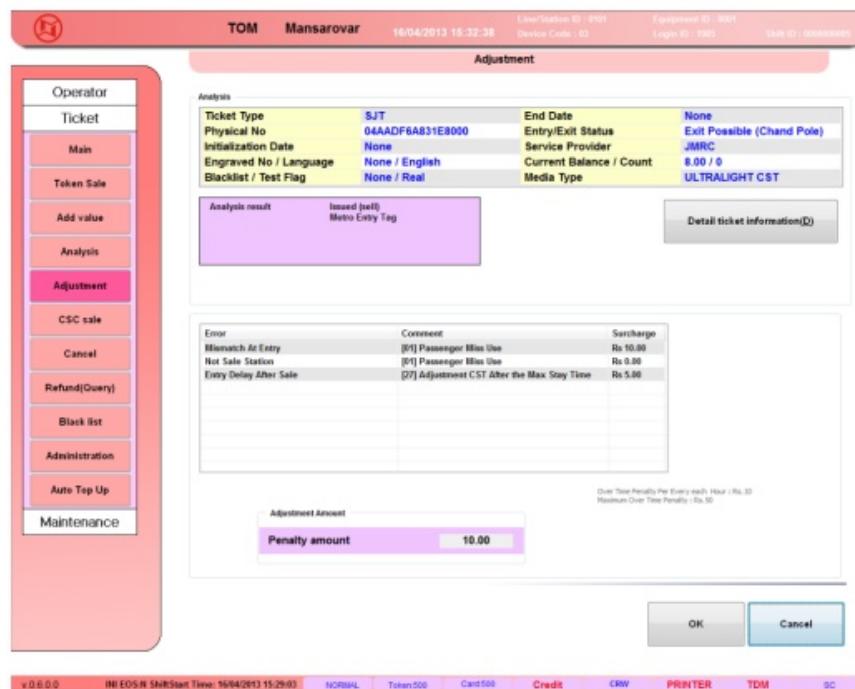


Figure 18 Adjustment Screen

4.5.6 Cancellation

Cancellation function will cancel add value amount in case of operator's mistake of adding different value from the passenger wanted value.

This is only possible for that add value proceeded machine, and the ticket has never been used since the operation and the ticket is the last transaction by this machine.

Token cancel is alternated to token refund. Please refer to chapter 4.5.7 Ticket Refund.

The ticket is changed to its previous state. Added value is removed and the operator can add correct value again. Cancel transaction is made and this value will be subtracted in the shift report.

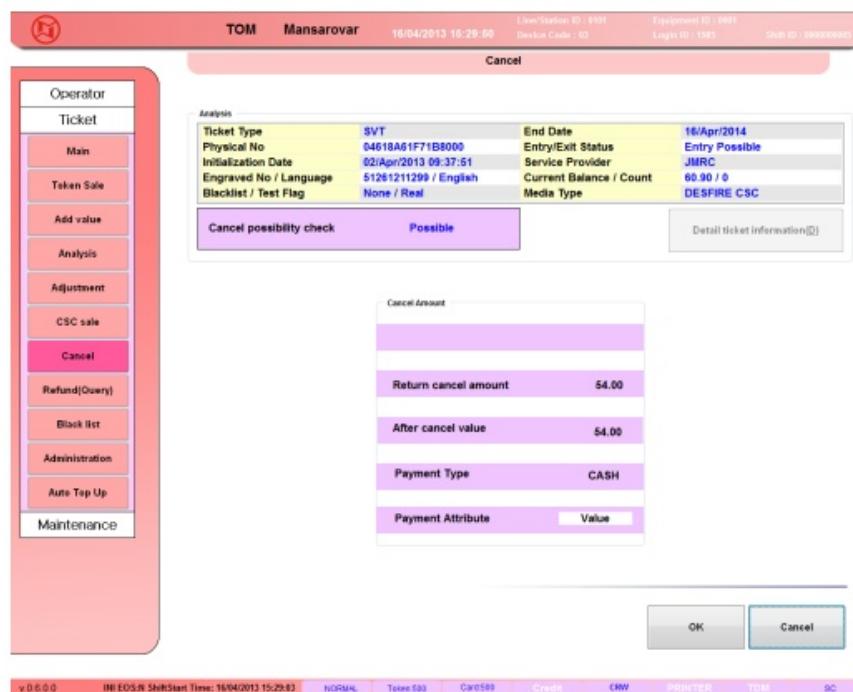


Figure 19 Cancellation Screen



4.5.7 Ticket Refund

TOM is able to process ticket refund, the refund method is different according to the ticket being physically damaged or not.

If the ticket can be analyzed by TOM and the encoding data isn't broken, the ticket which meets below conditions can be refunded:

- Valid ticket in system
- Remaining value is not zero
- Ticket type refund allowable by parameter
- Ticket not in blacklist

The confirm refund value have options to be performed replacement process or drawing in cash by the selection of passenger.

If the passenger wants refund, operator checks the value and draws cash to the passenger, gets tickets from the passenger and finally sends tickets to the specific office according to the Jaipur Metro rule.

In the case of token, if the passenger will return the token to the TOM during the defined time, then it is possible to refund fully. But if the passenger will return the token to the TOM after the defined time, then penalty will be charged.

The refund ticket will be rewritten ticket status and cannot be used after refund.

CSC Refund	
Analysis	
Ticket Type Physical No Initialization Date Engraved No / Language Blacklist / Test Flag	Trip (Zone 1) 042A230248238000 02/Apr/2013 09:29:08 20130326042 / English None / Real
End Date Entry/Exit Status Service Provider	16/Apr/2014 Entry Possible JMRC
Current Balance / Count Media Type	0.00 / 8 DESIRE CSC

Refund possibility check: Possible

Current balance/Trip	0.00/ 8
Deposit	30.00
Refund Surcharge	0.00
Total amount for refund	86.00

CC Detail Info OK Cancel

v 0.6.0.0 INI EOS.N Shrikant Time: 16/04/2013 15:29:03 NORMAL Token 500 Card500 Credit DRW PRINTER TDM SC

Figure 20 Refund Screen

In the refund process, the ticket analysis result and refund confirmation value are displayed on operator screen, the ticket transaction log is displayed if necessary. The ticket remaining value and refund value are displayed on Passenger Display Unit.

If refund CSC is unreadable electronically, the operator can query the refundable amount to the CC by using physical ID of CSC. In this case, the passenger will receive a receipt and refund amount after two working days because the time which transaction data is collected to the CC is about seven working days.

Refund of both remaining electronic value (plus bonus amount) and deposit which is retrieved from the Central Computer System.

Surcharge fee for refund of card will be defined by parameter.

4.5.8 Black List Unlock/Lost Stolen Register

Selecting "Black List" button on the left side menu, the operator can use black list unlock function and lost stolen register function.

4.5.8.1 Black List Unlock

When the passenger had black listed ticket, the operator can unlock ticket with surcharge. The TOM application determines whether the ticket is black listed or not when the ticket is detected.

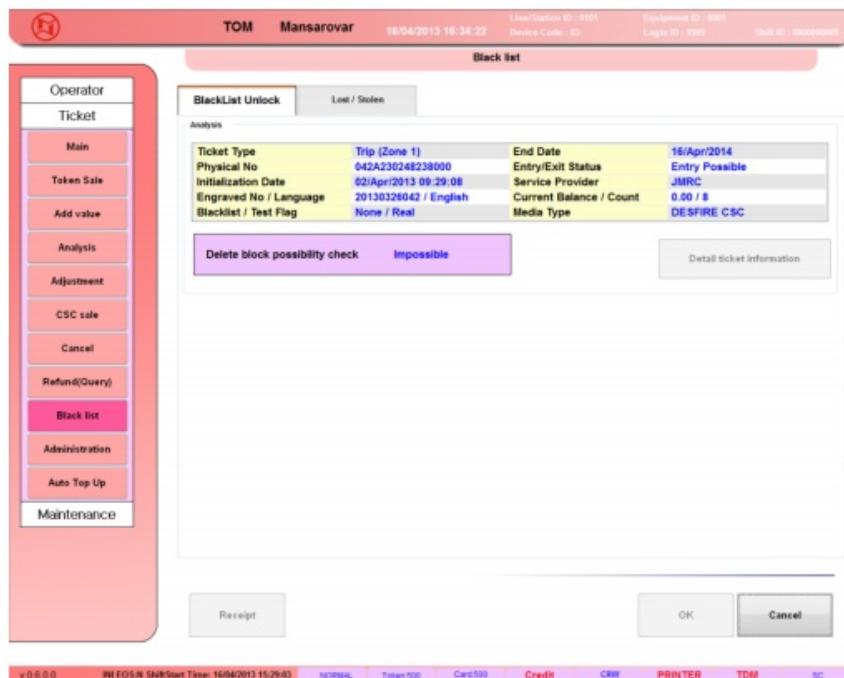


Figure 21 Black List Unlock Screen

4.5.8.2 Lost Stolen Register

When the passenger lost ticket, the operator can register lost stolen ticket. Registered ticket becomes black listed ticket for preventing invalid using in the AFC system.

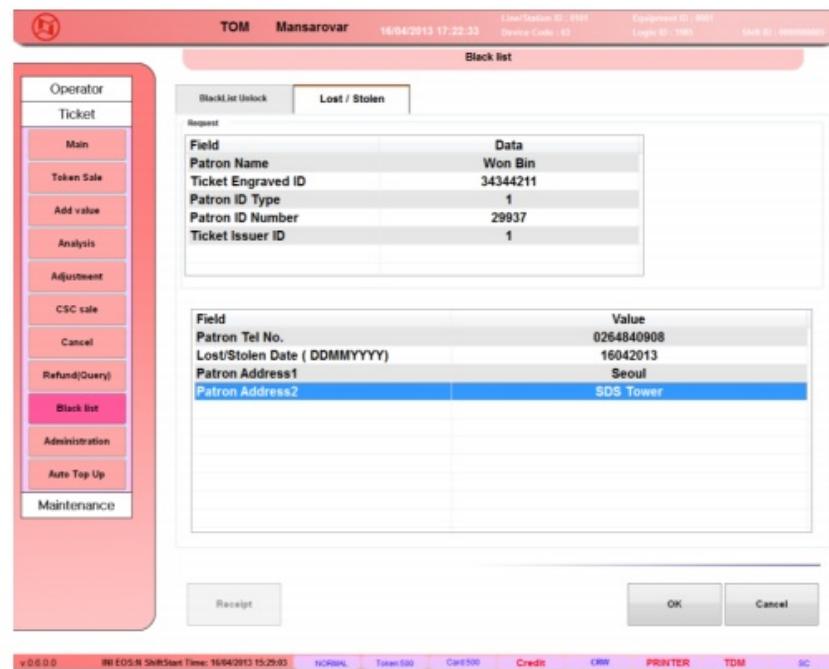


Figure 22 Lost Stolen Register Screen

4.5.9 Administration Handling

4.5.9.1 Payback/Penalty

When the passenger had invalid behavior like tailgating or abnormal usage of AFC system, operator can charge the penalty in Administration Handling menu.

In case of the passenger claim that cash is jammed from TVM or TVM didn't issue tickets to the passenger, or token is jammed in AG so passenger didn't enter to paid-area, a relevant ticket is issued to the passenger by TOM.

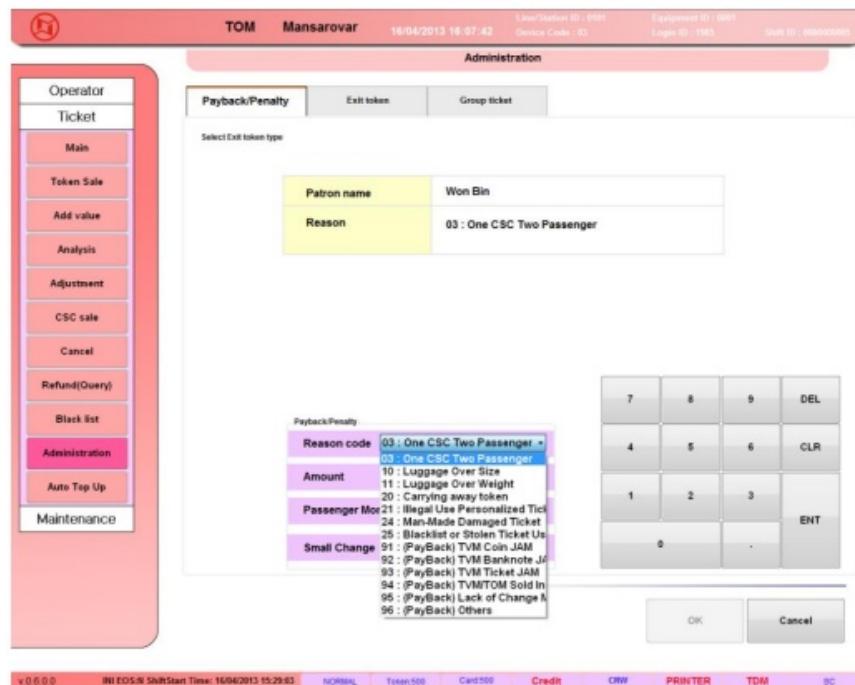


Figure 23 Payback/Penalty Screen

4.5.9.2 Exit Token

When the passenger cannot exit at the exit gate, the operator can issue free or paid exit token according to reason in Administration Handling menu. Exit token is issued only one token by one issuing through the TDM. Also, exit token can be issued on the CSC tray like CST issue.

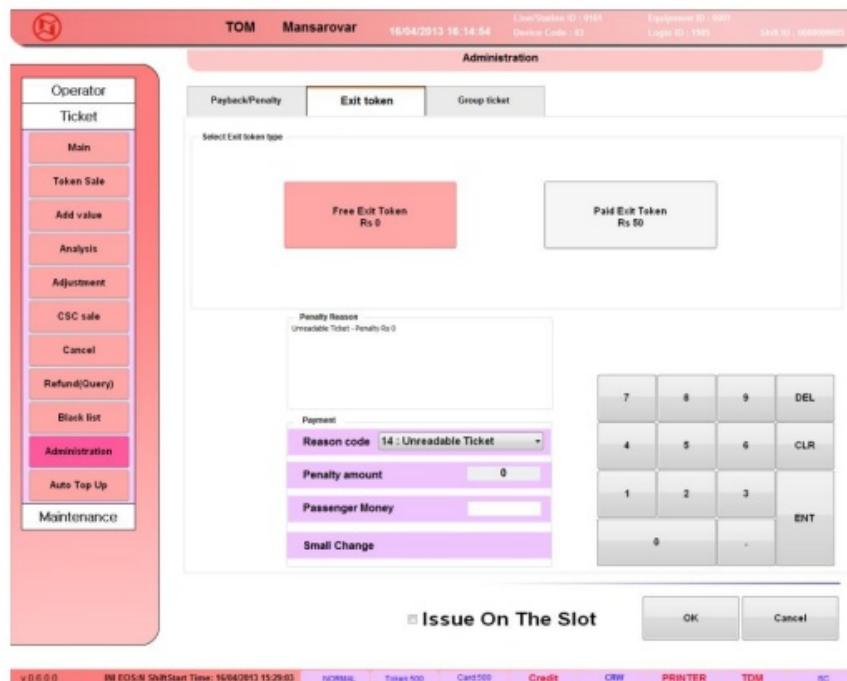


Figure 24 Exit Token Screen

4.5.9.3 Group Ticket

Group ticket will be printed at TOM to be used for booking large group (25~100) on a single ticket. Group ticket will not be processed at Gate and will be checked manually. Amount and traffic generated by group ticket will be accounted in the AFC reports

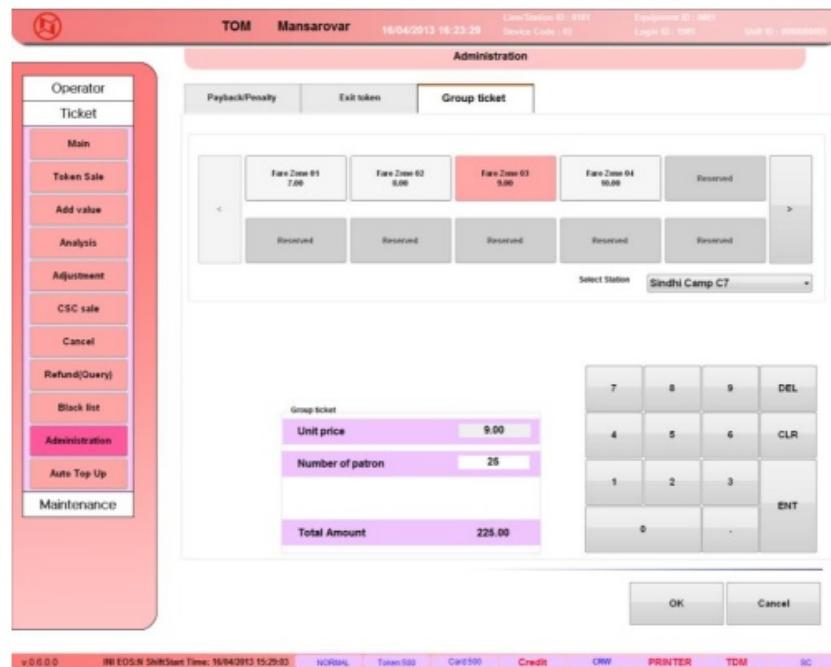


Figure 25 Group Ticket Screen

4.5.10 Auto Top-up

For using CSC auto top-up function, activation processing is needed by TOM. This activation is performed once and connected to CCS. Also, auto top-up deactivation is performed by TOM

Detail information about auto top-up will be determined after auto top-up bank interface is completed.

4.5.10.1 Activation

The activation process at TOM is as follows.

Step1. Online Query to CCS

The operator queries the availability of the passenger's CSC to CC with passenger's CSC ID or Personal information. If the CSC is available for auto top-up, CC returns auto top-up information of passenger's CSC

Step2. Activation to CSC

The auto top-up flag in the CSC is activated on the CSC tray of TOM.

Step3. Activation Transaction Transmission to CCS

The TOM makes the auto top-up activation transaction of the CSC and uploads them to CC.

4.5.10.2 Deactivation

The operator will change the auto top-up enable flag from 1(enabled) to 0(disabled) on his CSC after checking by CC. And the TOM makes auto top-up deactivation transaction and sends it to CC

Figure 26 Auto Top-up Screen (Example)

4.6 Maintenance Functions

4.6.1 Equipment Set and Test

The operator is able to manage peripheral devices and test them.

TOM/EFO has sub-modules. Those modules are connected to TOM/EFO main PC via serial communication. So it needs to set for connecting and it needs to test for testing and it needs to reset for reconnection.

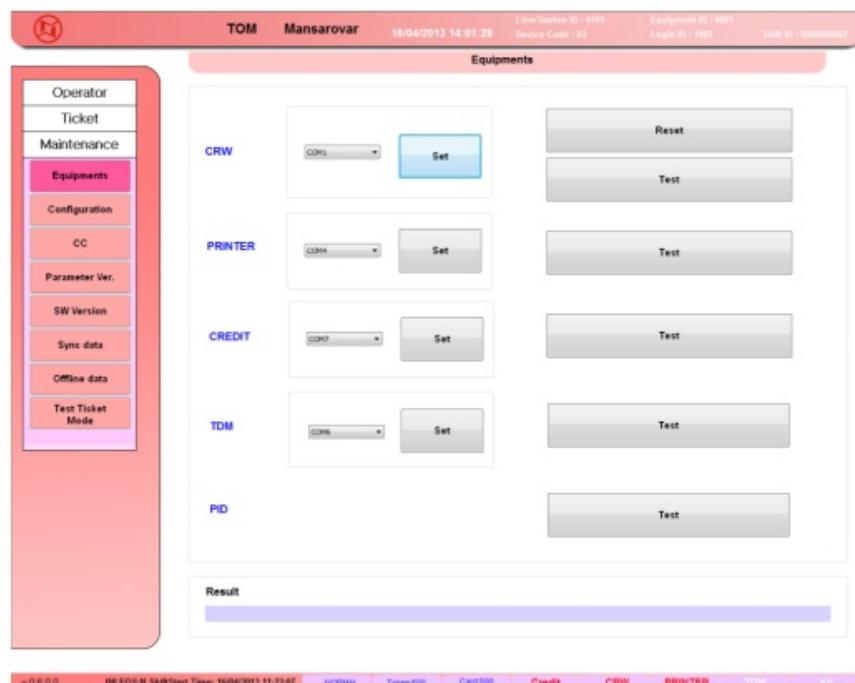


Figure 27 Equipment Set and Test

4.6.2 Configuration Set

The operator is able to configure some of TOM/EFO setting.

The configuration saved on this screen is applied after TOM/EFO application restarting.

On this screen, the operator can register TOM/EFO application in the windows starting program.

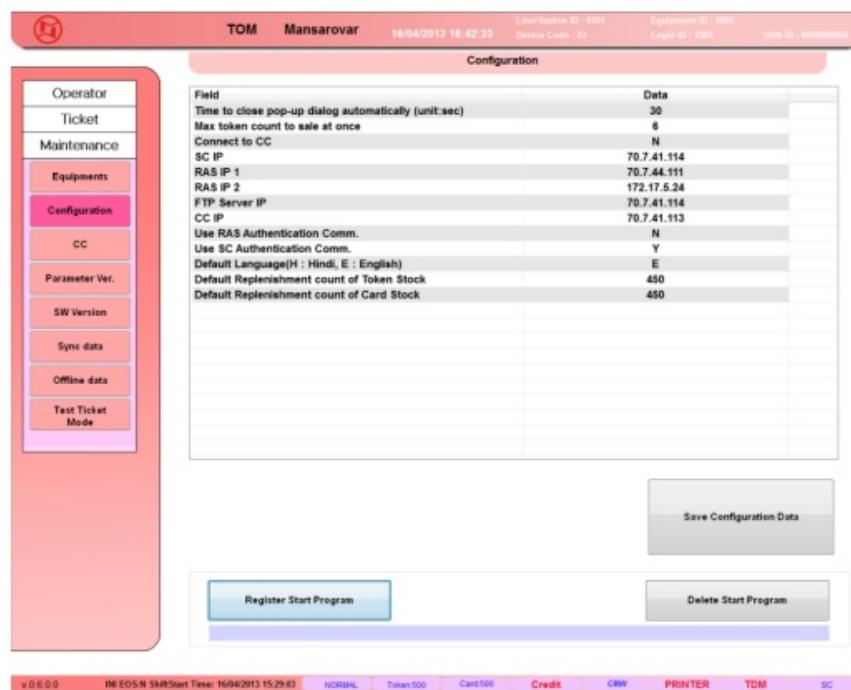


Figure 28 Configuration Set and Test

4.6.3 SC/CC IP Address Setting

The operator is able to set SC/CC IP address.

The configuration saved on this screen is applied after TOM/EFO application restarting.

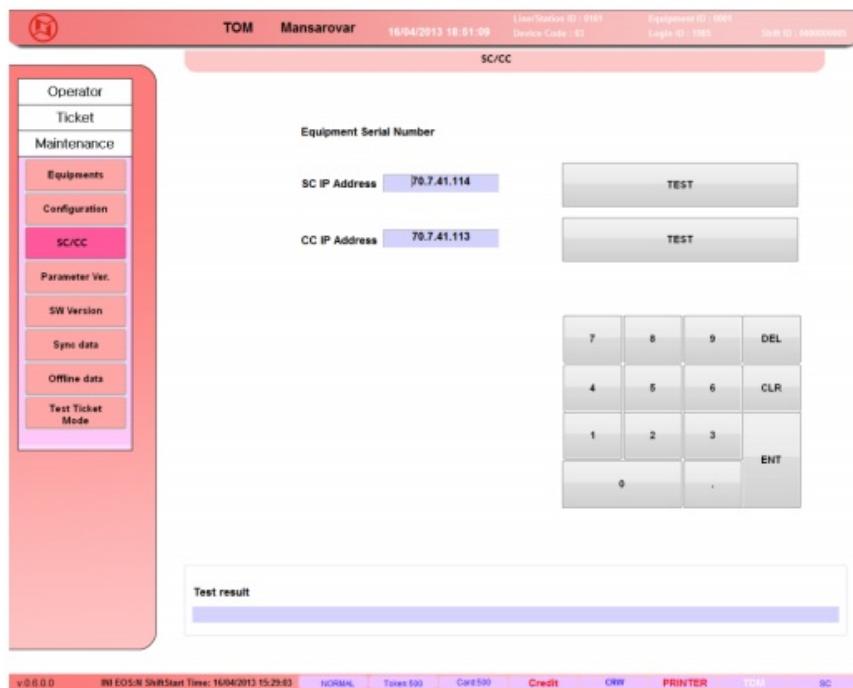


Figure 29 SC/CC IP Address Setting Screen

4.6.4 Parameter Version

The operator is able to inquire the version information of parameter.

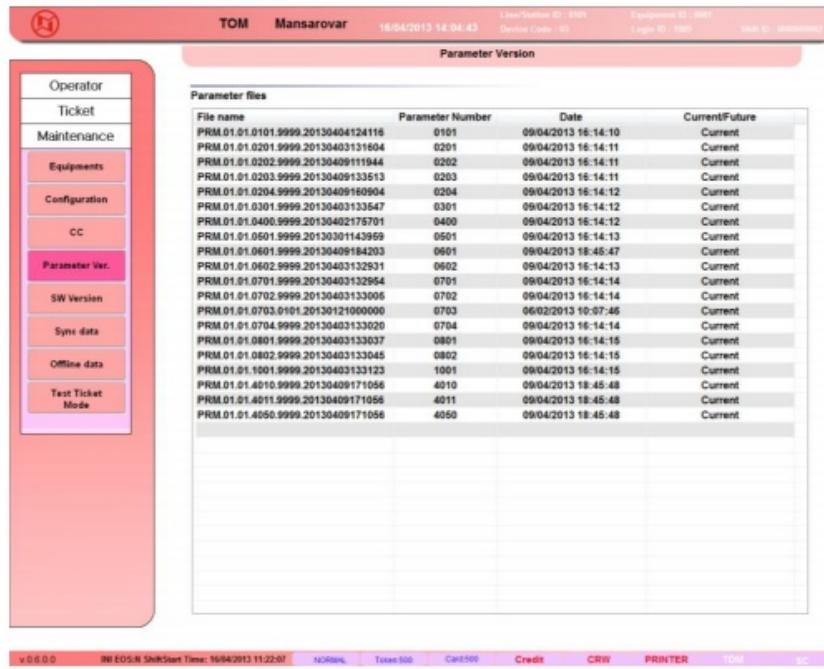


Figure 30 Parameter Version Screen

4.6.5 Software Version

The operator is able to inquire the version information of software.

The operator is able to download the Card Reader/Writer firmware, too.

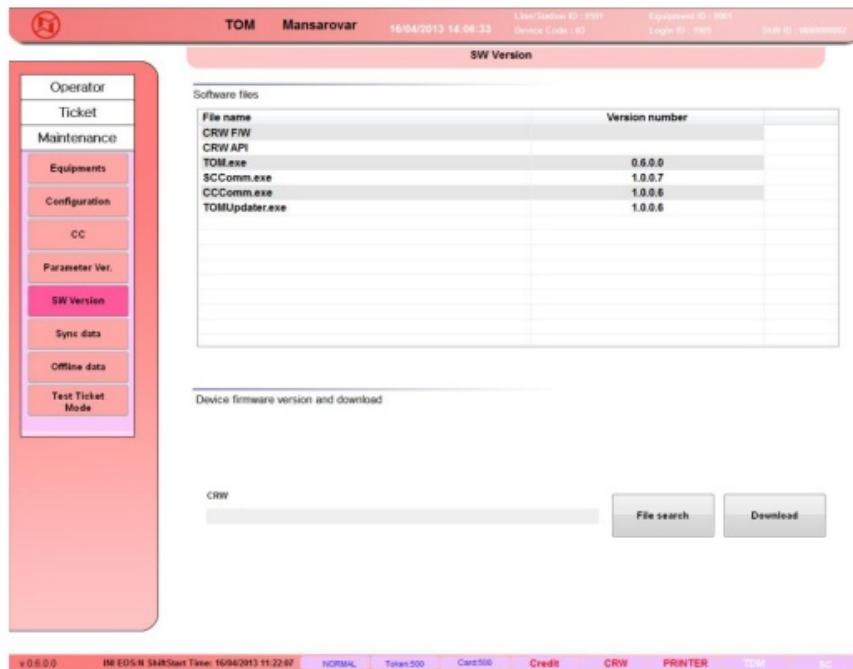


Figure 31 Software Version Screen

4.6.6 Sync Data

The operator is able to request parameter download and audit/shift data upload to SC.

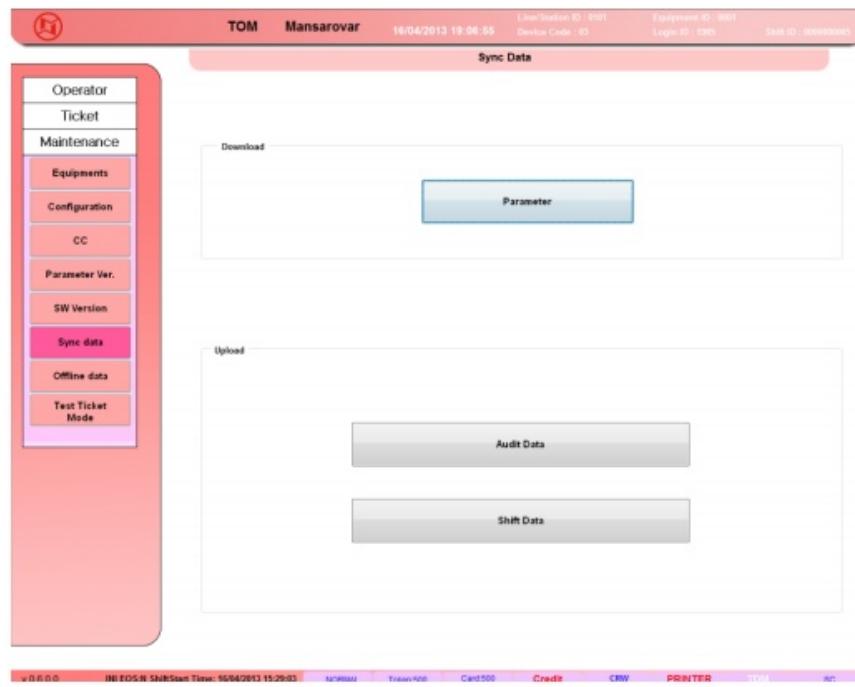


Figure 32 Sync Data Screen

4.6.7 Offline Data

When the connection with SC is fail, the operator is able to import parameter file and export data using USB.

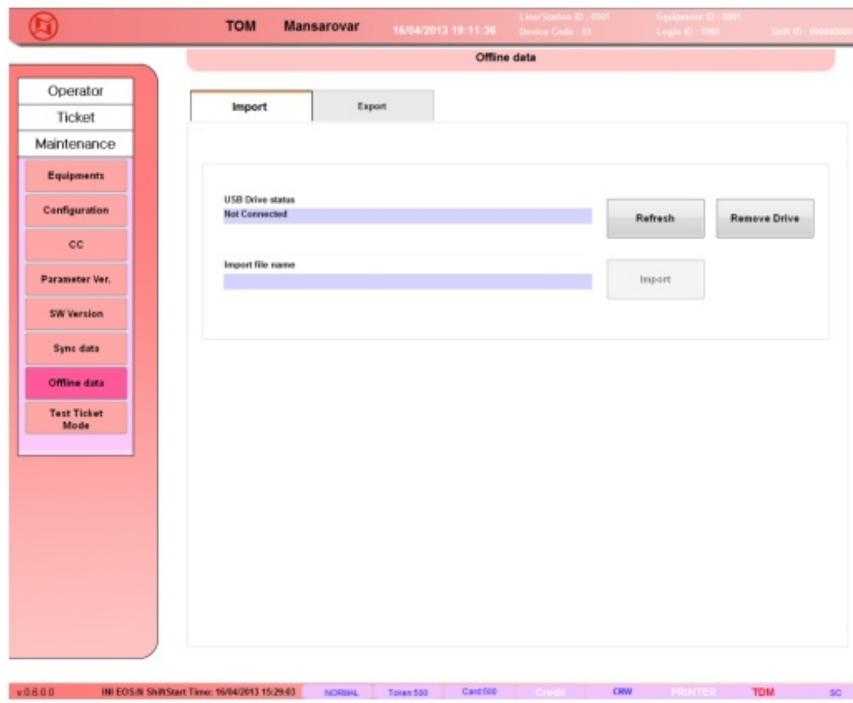


Figure 33 Offline Data Screen

4.6.8 Test Ticket Mode

The operator is able to change from real mode to test ticket mode, and vice versa.

The ticket which is issued in test ticket mode cannot use in the real system, because it is just using for test. Otherwise the ticket which is issued in real mode cannot use in the test mode system.

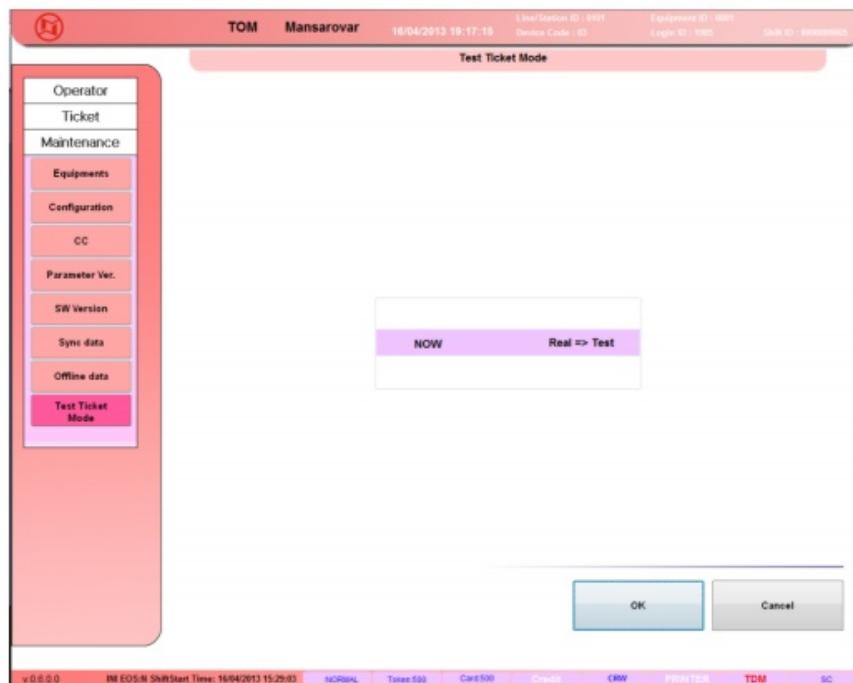


Figure 34 Test Ticket Mode Screen

5 Interface

5.1 SC Interface

TOM/EFO communicates with SC by using LAN communication. TOM/EFO downloads several files and message from SC, and uploads data and message. If the communications between TOM/EFO and SC is failure, all records uploaded to SC will be stored in TOM/EFO for seven days. All stored records will be uploaded to SC When the communication between TOM/EFO and SC is recovered.

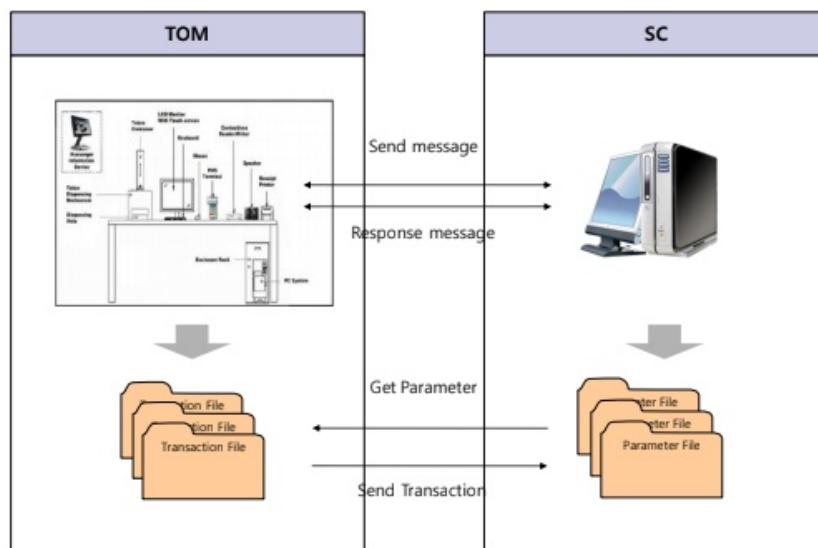


Figure 35 Interface with SC

5.1.1 Upload

TOM/EFO uploads the following data to SC.

- Transaction data
- Shift/Cut off data
- Audit register data
- Status data
- Event data

5.1.2 Download

TOM/EFO downloads the following data from SC.

- Parameter Files (Fare table, Blacklist and operation parameters)
- TOM/EFO application, audio files and image files
- Control command from SC

5.2 RAS interface

5.2.1 Normal Authentication

TOM/EFO communicates with RAS by using LAN communication. Before operation log-on, TOM/EFO needs equipment authentication from RAS, to provide the function of ticket selling or add value. If not, TOM/EFO changes to failure mode and can't be serviced.

For authenticate RAS, TOM system transmits following information.

- Equipment information
- Authentication code

Next flow chart is authentication flow between TOM and RAS.

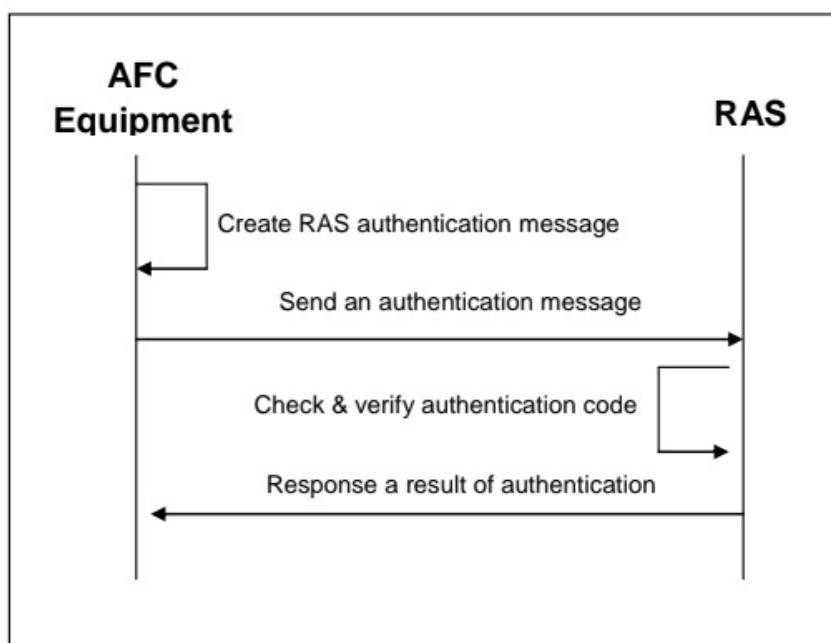


Figure 36 RAS Authentication Flow

5.2.2 OTP Authentication

Basically, the remote authentication via communication with RAS is needed before operation logon. That is default operation.

Even if there is no network connection, the TOM/EFO can be continuously operated without RAS connection, after RAS OTP authentication.

Generally the supervisor can only use the RAS OTP authentication.

The procedure for usage of RAS TOP authentication is as follows,

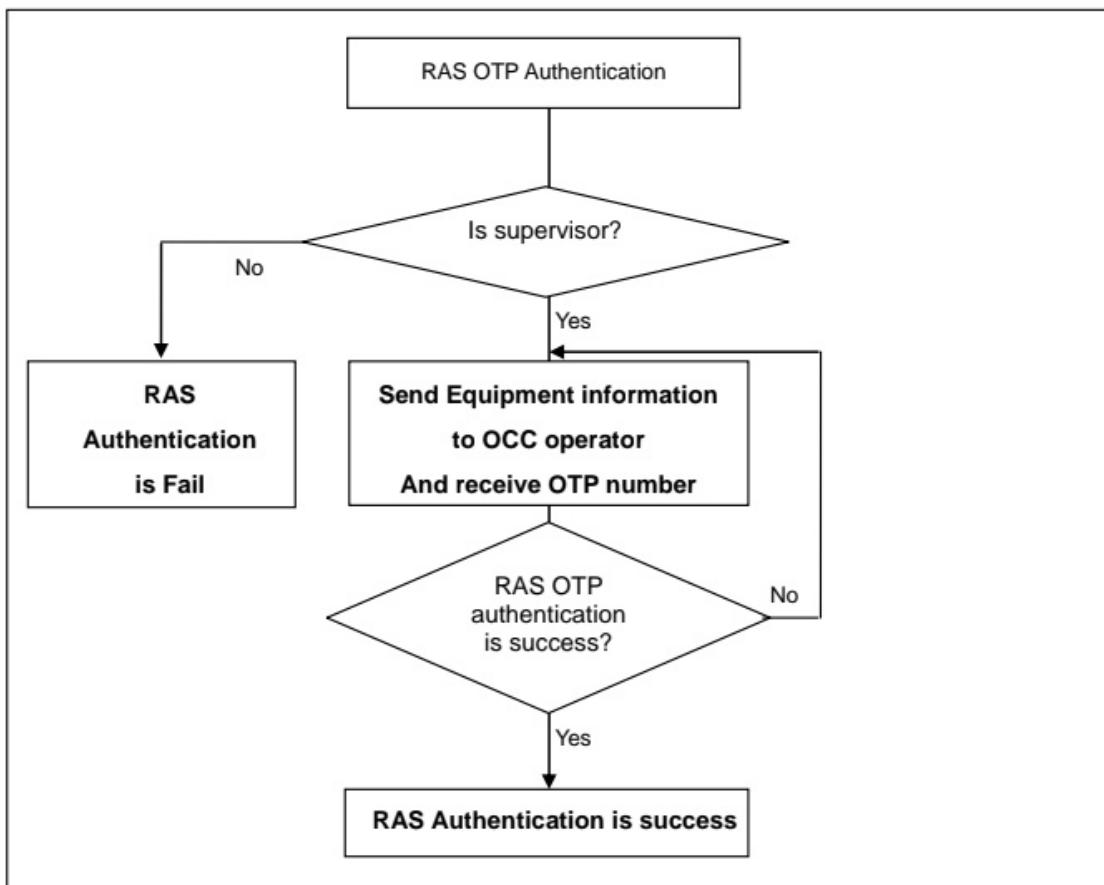


Figure 37 RAS OTP Authentication Flow

5.3 Debit/Credit Card Processor interface

As reference 4.1 3) , Before applying the above Interface, the related Employer's business rules and protocols shall be provided by Jaipur Metro via the Bank or debit/credit card's business provider. And communication line and usage fee between AFC and banks are not scope of this project.