Saturn Management Utility - User Manual

Version 1.30

Notice

REVISION HISTORY

Version	Description	Date
1.00	First version	Sep. 10, 2008
1.10	Updates to match Saturn management utility version 1.3.0	Oct. 18, 2012
1.20	Updates to match Saturn management utility version 2.25, new oti logo	Dec. 11,2014
1.30	Updates to match Saturn management utility version 2.2.5.11	May. 07,2015

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1 INTRODUCTION

The *Saturn Management Utility* is part of OTI's Software Development Kit (SDK) for its Saturn readers, designated for the payment field. This utility enables control of many aspects of the reader functions. It is composed from a number of modules, such as: configuration, programmer, payment transaction demo and transparent modes.

Each of these modules operates on a separate tab. All use the main form utilities, such as: log, info label and progress bar, and common Host-PCD commands.

The *Saturn Management Utility* interacts with OTI's readers, using all supported tags, based on the OTI's *Host-PCD Communication Protocol*.

This document contains easy-to-follow, step-by-step instructions for installing and operating the *Saturn Management Utility*.

2 INSTALLATION

To install ***Saturn Management Utility***, follow these steps:

1. **Right click** the '**Saturn Management Utility.msi**' file and select '**Install'** from the pop-up menu, or double click *Setup_Saturn_Management_Utility.exe*.
2. Follow the installation wizard instructions.
3. When the installation is complete, you may run the *Saturn Management Utility* by double clicking the program's shortcut icon on the desktop:

Note: When using Saturn **USB reader**, a special driver must be installed on the PC to allow the communication. The **OTI CDC driver** installation is supplied with the Saturn SDK package.

3 COMMUNICATING WITH THE READER

3.1 INITIAL CONNECTION

On start up, if a reader is connected and uses OTI's *Host-PCD Communication Protocol*, a communication with the reader will be initialized. The info label informs the user that the communication with the reader is OK, displaying the communication port number and communication baud rate. (See message in red rectangle in the figure below.)

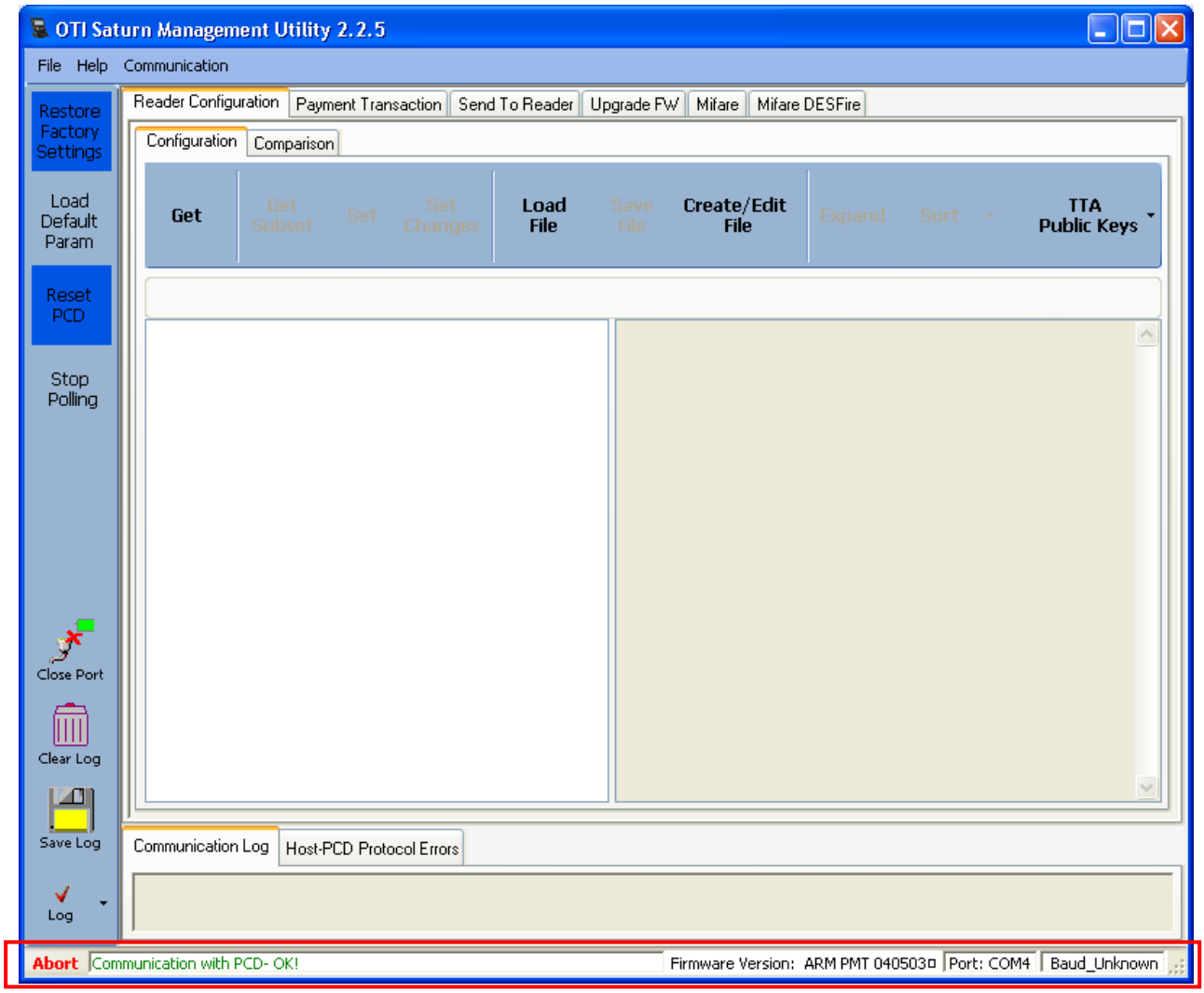


Figure 1- Info Label - Communication OK

If a reader cannot be found, e.g. the port is taken by another program, the info label informs the user that communication with the reader is not OK. The user will be prompted to configure the communication setting, indicated in the red rectangle in the figure below:

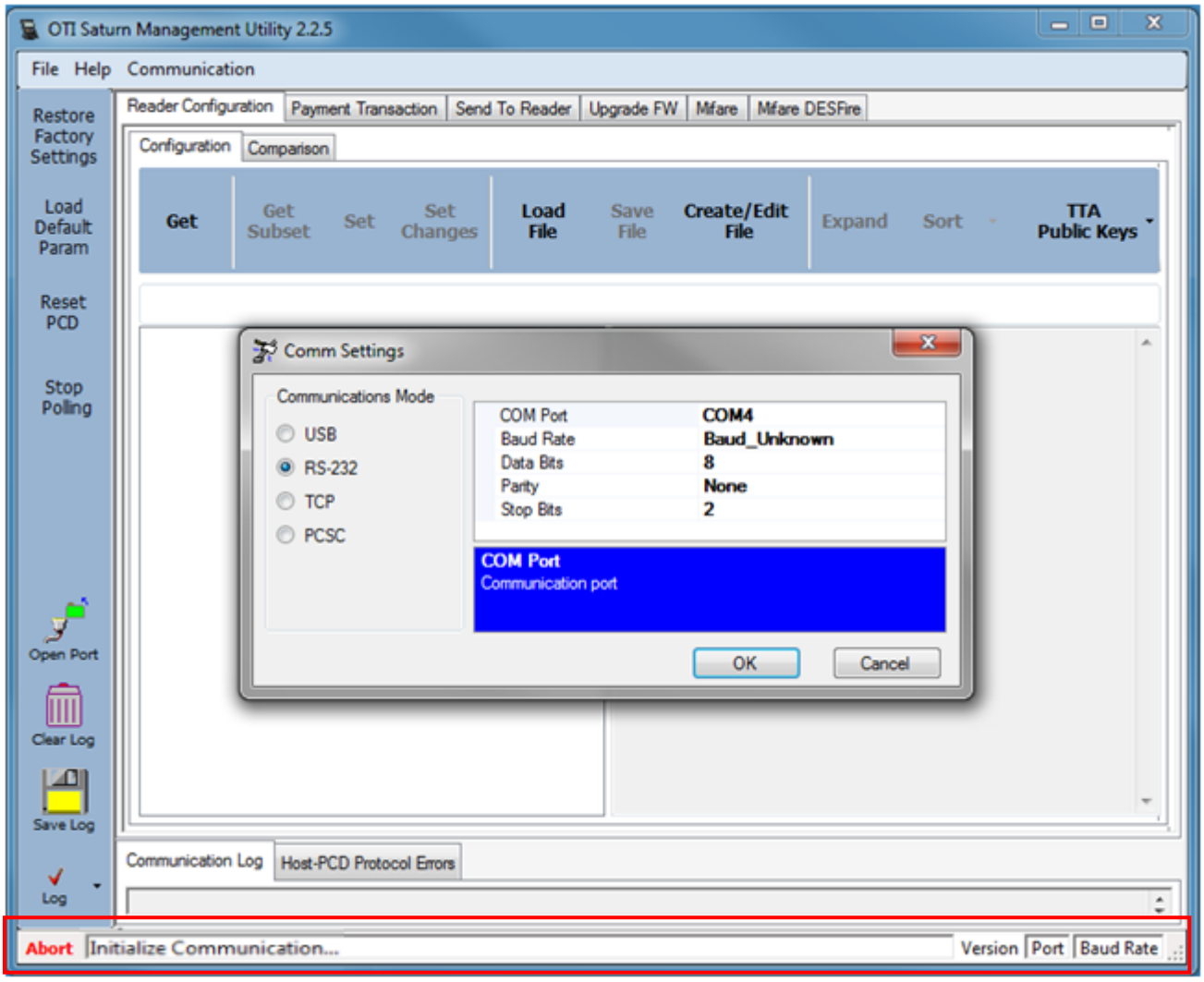


Figure 2- Communication Settings & Info Label - Communication Not OK

If the user clicks '**OK'** on the Comm Setting message box, a connection attempt will be made again. If the user clicks '**Cancel'**, communication will not be initialized, and only working with files will be enabled, as indicated in the red rectangle in the figure below:

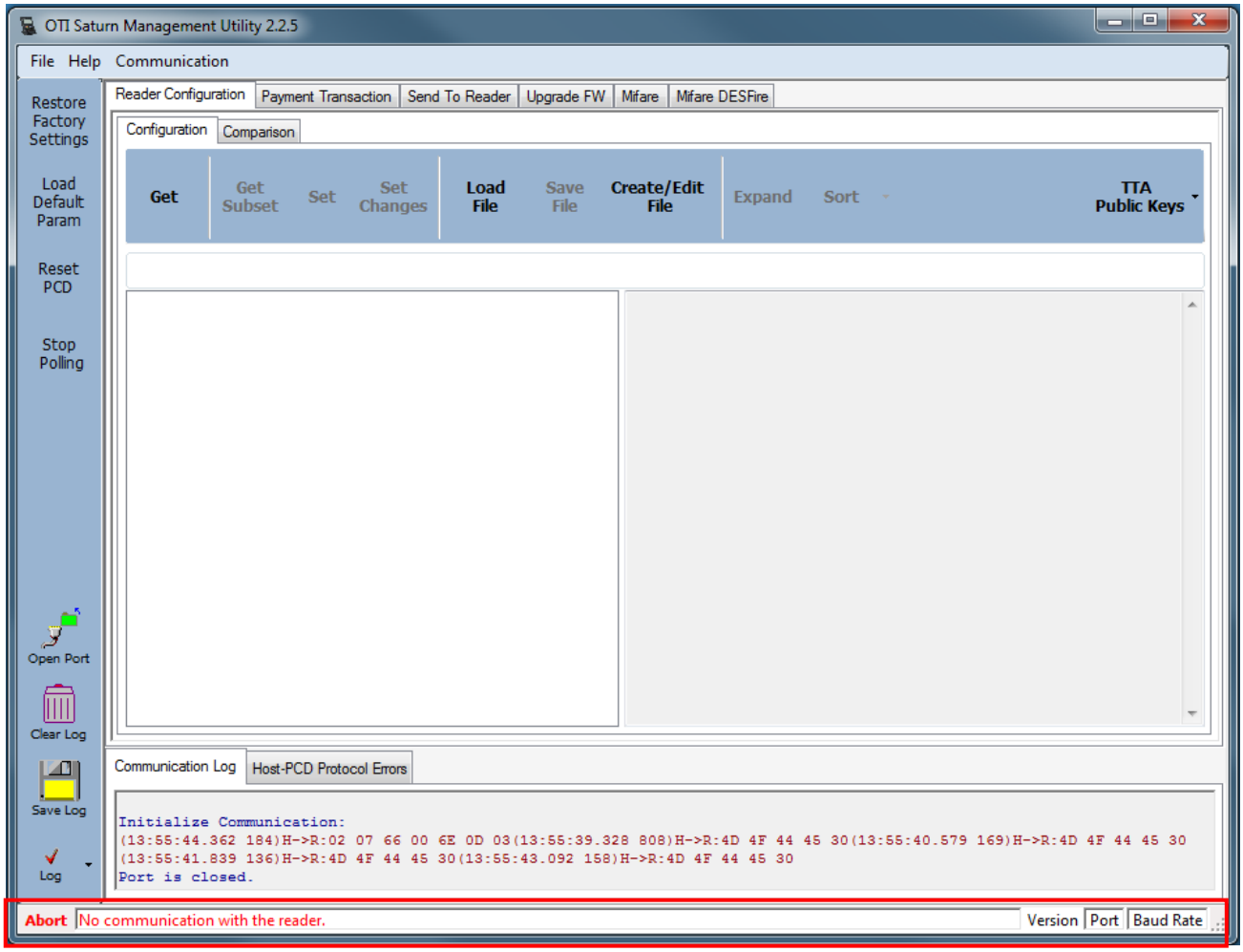


Figure 3- Info Label – No Communication

3.2 SETTING COMMUNICATION PARAMETERS

At any moment, e.g. after changing the readers' port, the user can set the communication parameters by selecting '**Communication'** | '**Settings'** from the menu bar, as shown in Figure 4.
The **Comm Settings** window then appears, as shown in Figure 5.

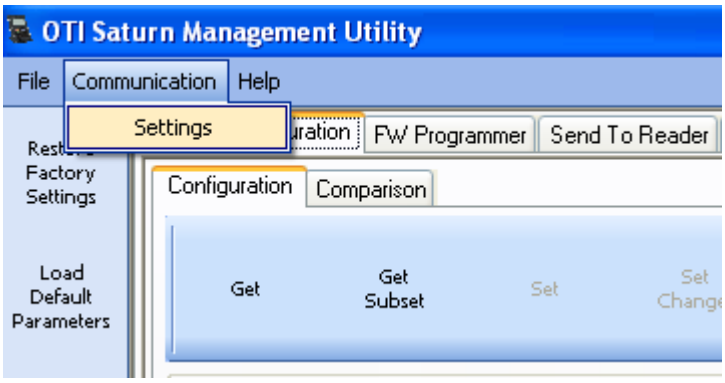


Figure 4- Communication Settings Menu Bar

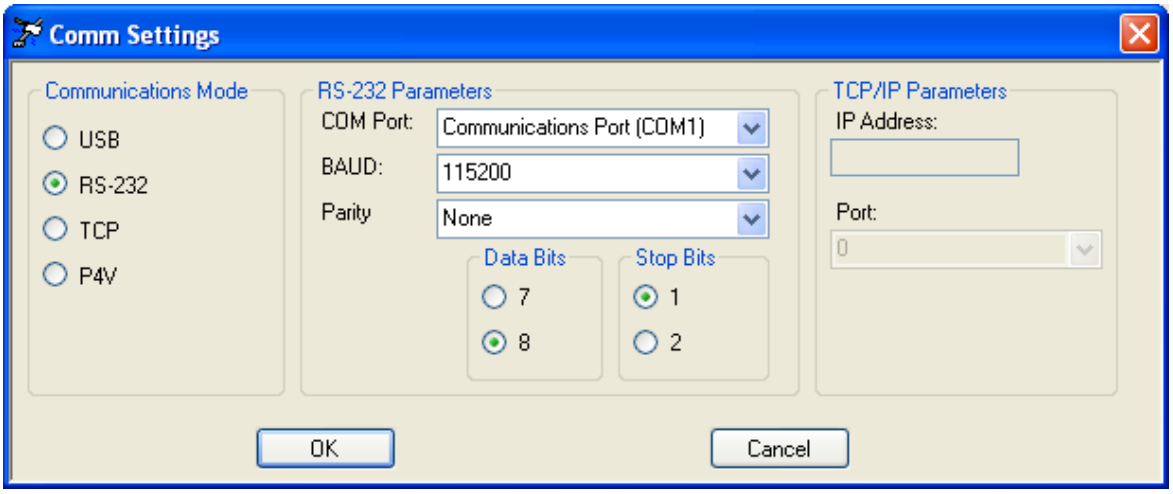


Figure 5- Communication Settings Window

In order for these settings to take effect, the user has to click Close Port and then Open Port. (See the bottom-left portion of the **Saturn Management Utility** window shown in Figure 3 on Page 6. The Open Port icon toggles between it and Close Port.)

4 COMMON INTERFACE

There are some components that are common to all modules. These components are:

- the menu bar
- the common bar
- the log pane
- the status bar

They are described in the sections below, and are displayed in red rectangles in Figure 6.

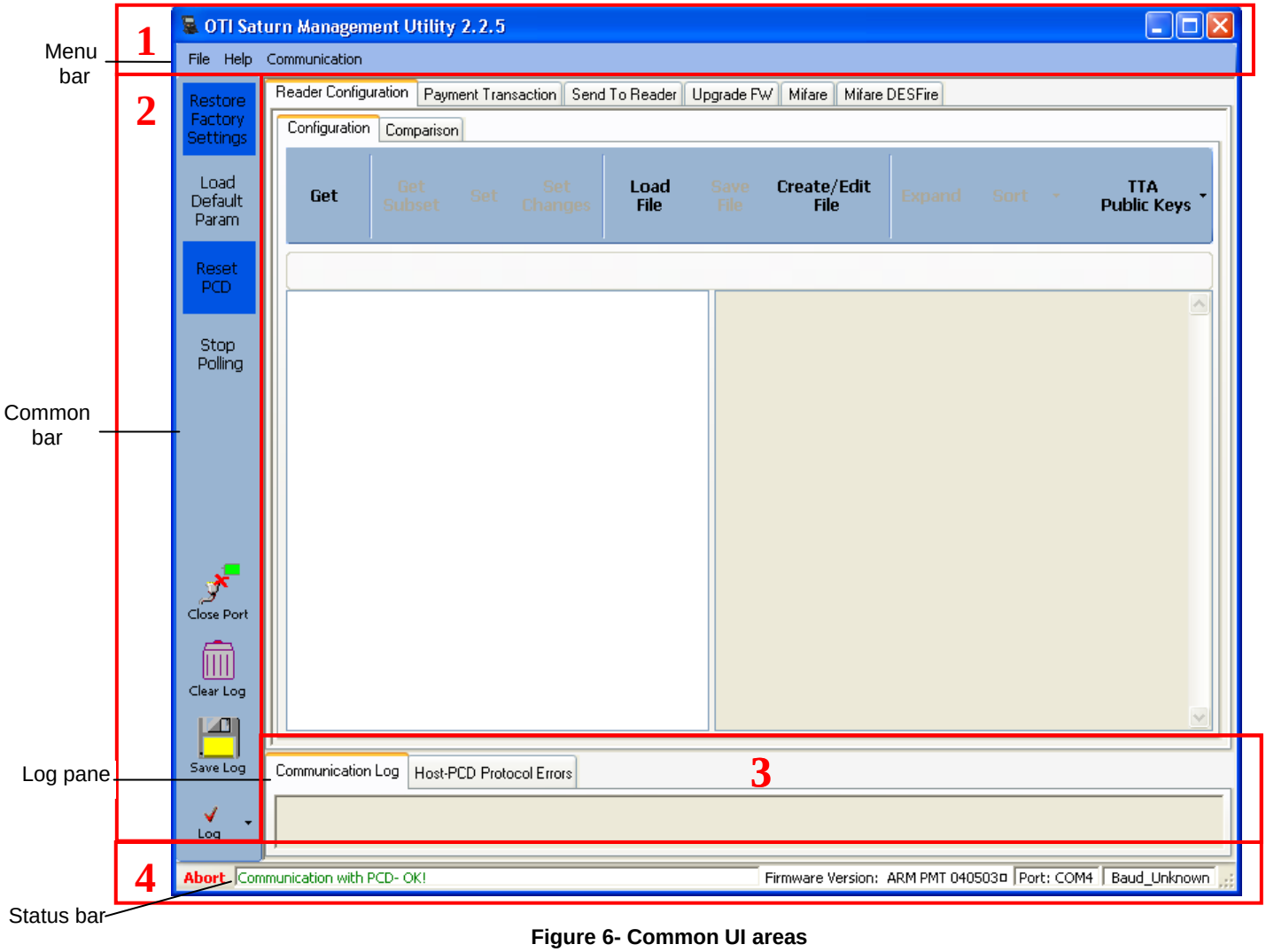


Figure 6- Common UI areas

4.1 MENU BAR

The menu bar (see red rectangle #1 in Figure 6 above) includes the following menus:

- ***File*** → ***Exit***: Close the program.
- ***Help*** → ***Color Glossary***: Glossary for the configuration tree view.
  → ***About***: About the Saturn Management Utility.
- ***Communication*** → ***Settings***: Configure the communication parameters (see Section 3.2 Setting Communication Parameters).

4.2 COMMON BAR

The left menu bar (see red rectangle #2 in Figure 6 above) contains the following, frequently used Host-PCD commands:

- Restore Factory Settings
- Load Default Parameters
- Reset PCD
- Stop PCD

Additional useful operations are available through common bar icons that are explained in the figure below:

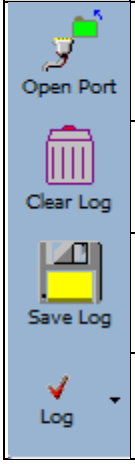
Icon	Functionality
	Open/Close the communication with reader and release its port.
	Clear the logs.
	Save the displayed log data to file.
	When checked, any communication between the Management Utility and the Reader will be displayed on the log window.

Figure 7 Explanation of common bar icons

4.3 LOG PANE

The log pane (see red rectangle #3 in Figure 6) contains two tabs:

- Detailed communication log between the Host and the PCD
- Protocol error log

The user may select the text in the log pane, **right click** and get popup menu with several useful operations as displayed in the figure below:

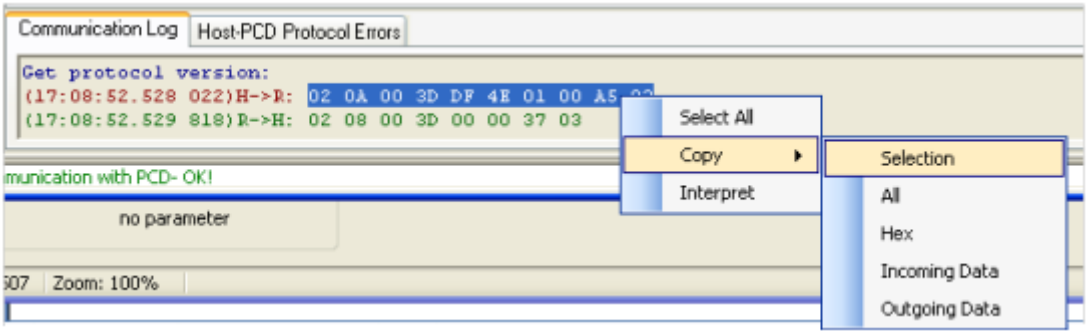


Figure 8- Log pane right click popup menu

For example, when selecting one or more lines from the log pane, **right clicking**, and choosing Interpret will open the **Log Interpretation** window (see figure below) with interpretation of the selected lines.

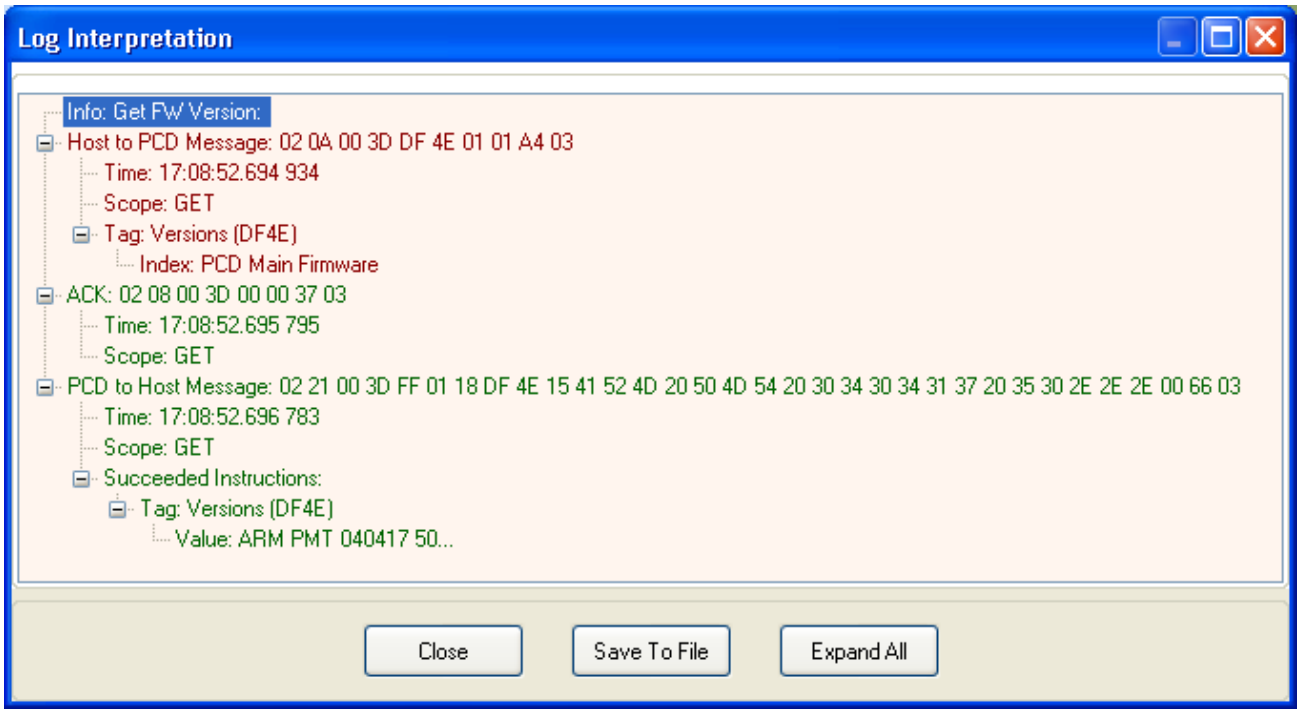


Figure 9- Log Interpretation window (for several selected lines)

4.4 STATUS BAR

All information messages are displayed in the status bar (see red rectangle # in Figure 6 on Page 8). During long procedures, the progress bar becomes active. When there is communication with the reader, the port and baud rate in use are displayed.

5 READER CONFIGURATION

The reader configuration module helps the user control all the configuration variables of OTI's Saturn Readers. It allows users to easily read all the configuration variables from the reader, alter them, and write the new configuration variables back to the same reader or any other reader.

In addition, the reader configuration module enables saving a reader's configuration to an *.FC file. Lastly, it enables comparing configurations.

The Reader Configuration module is used mainly for getting an overall mirror of the reader's configuration. Thus the user is able to examine the reader's parameters, alter them, duplicate and compare configurations.

5.1 BASIC OPERATIONS

Get reader configuration

By clicking Get, the program retrieves all of the reader's parameters. Every tag that exists in the OTI's *Host-PCD communication protocol* and is supported by the reader appears in the tree view window as shown in the figure below.

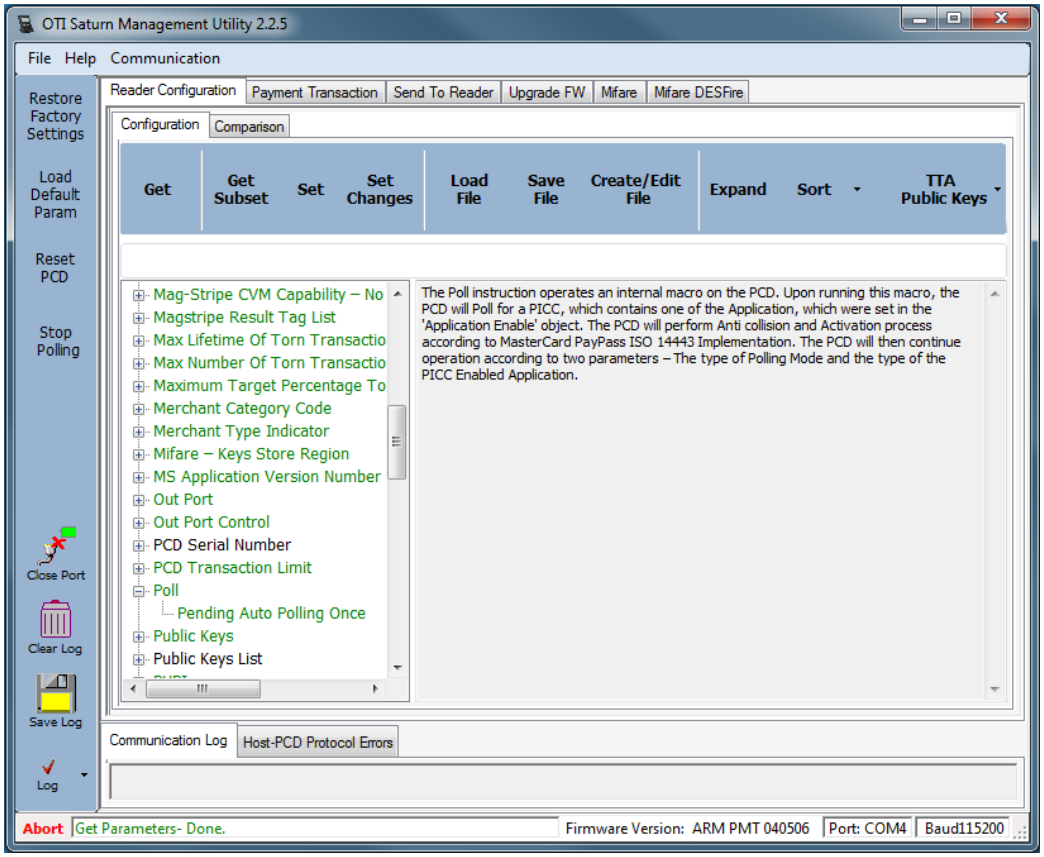


Figure 10- Reader Configuration module

Configuration Errors

If any error has occurred and the PCD has not performed any of the required instructions, the user will be notified. The error details will appear in the 'Host-PCD Protocol Errors' pane as shown in the figure below.

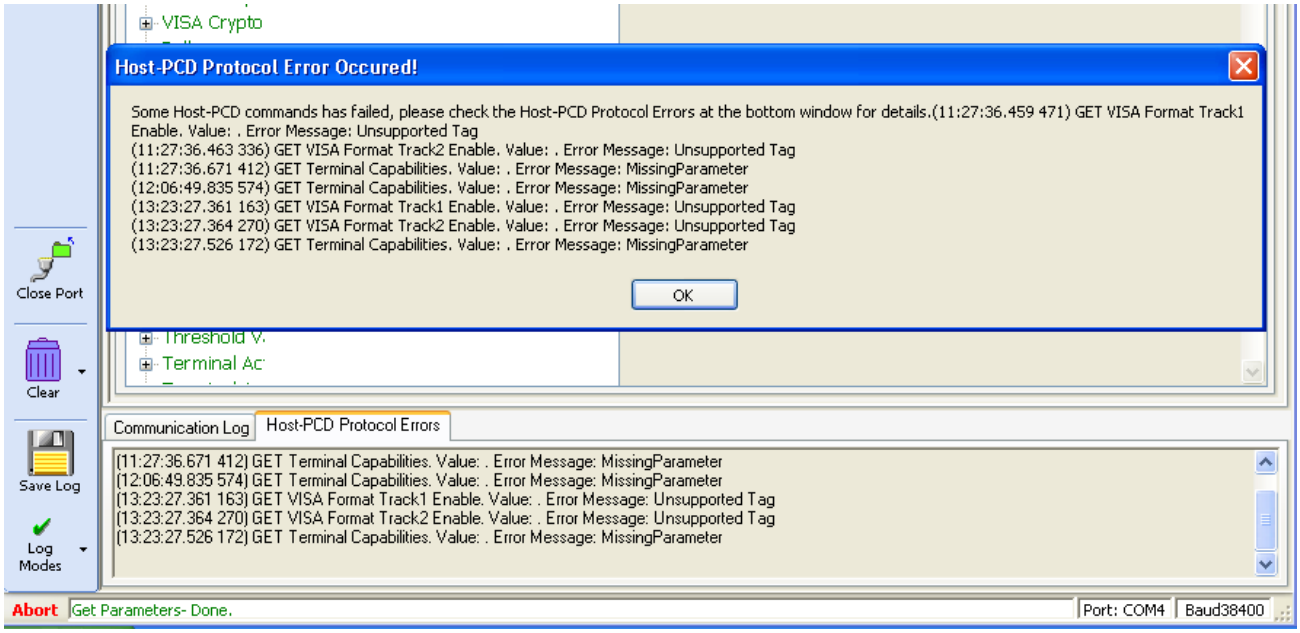


Figure 11- Error message and Protocol Errors pane

Get Subset

By clicking Get Subset, the program will retrieve from the reader only the tags that exist in the configuration tree.

Set

By clicking Set, the program will set the reader with all of the tag's parameters that appear on the tree view window. If any error has occurred and the PCD has not performed all the required instructions, the user will be notified.

Set Changes Only

By clicking Set Changes Only, the program will set the reader with only those tags' parameters that have been changed by the user. If any error has occurred and the PCD has not performed any of the required instructions, the user will be notified and the error details will appear in the Instruction's Error Log.

Edit Configuration

The user can edit any tag (except 'read only' tags colored in black) that appears on the tree view window, by clicking on the tag's value node. After selecting the value node there are three ways to edit a value according to the tag's properties:

- **Free text** – The user can enter any data. If the change is allowed, the node is painted blue; if not, red, as shown in the figure below:

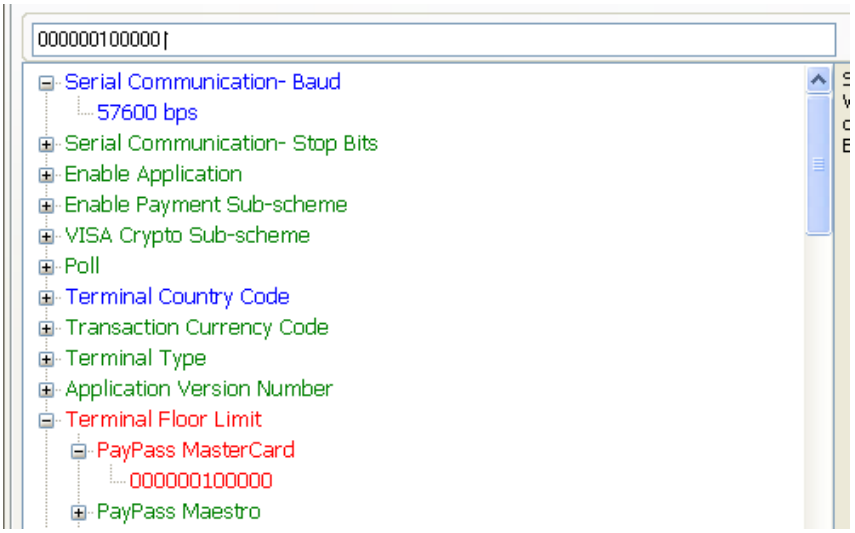


Figure 12- Free text configuration editing

- **Combo box options**- The user is able to choose data to enter from an options list. An example is shown in the figure below.

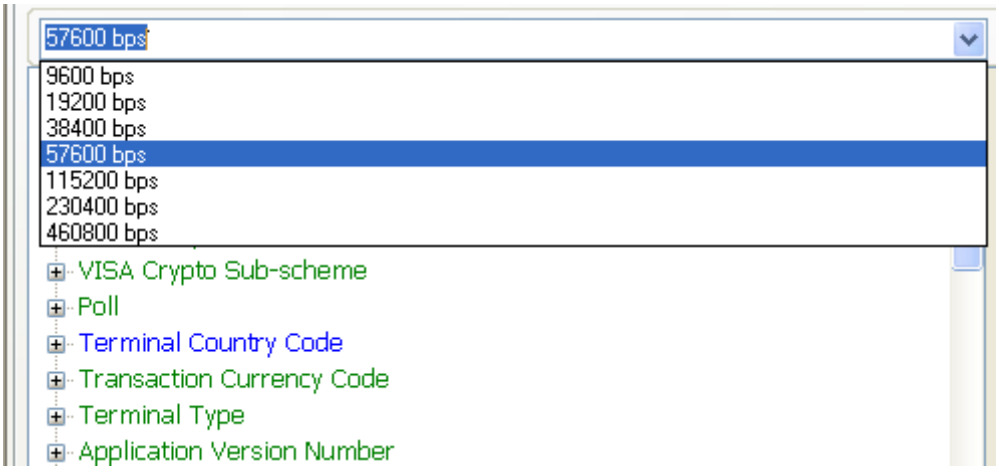


Figure 13- Combo box configuration editing

- **Special window**- The user is prompted by a designated window for the requested tag. An example is given in the figure below.

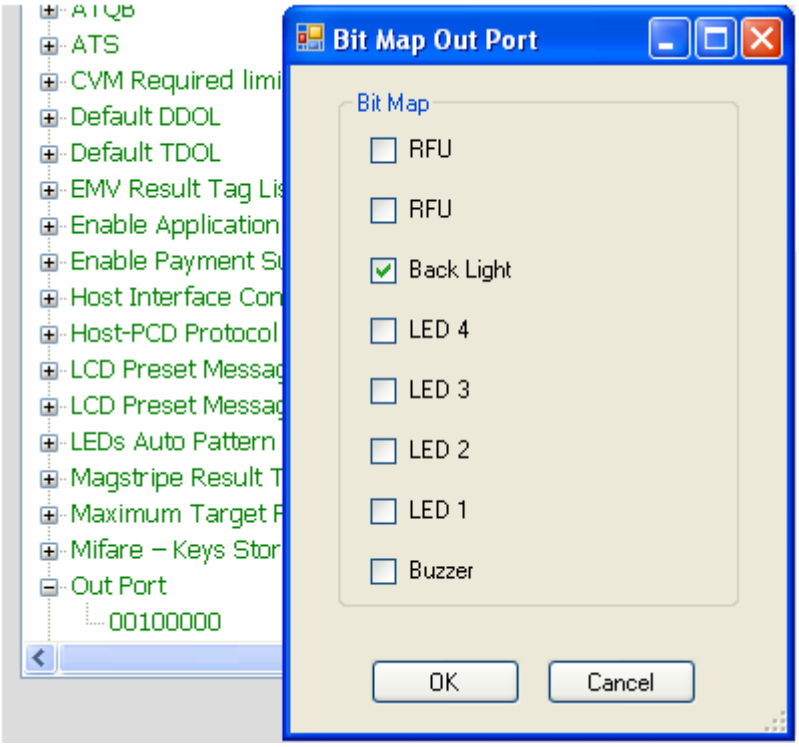


Figure 14- Special dialog configuration editing

NOTE: The user's changes in the tree view window takes affect only after performing one of the tasks: '**Set'**, '**Set Changes Only**' or '**Save'**.

5.2 WORKING WITH CONFIGURATION FILES

Load File

The user can load a configuration from an *.FC file or a configuration template *.FCT file (without values) to the program and it will appear in the tree view window. After loading a configuration, the user can edit it and set it to a reader.

Save File

The user can save the current configuration to different file formats:

1. Save the configuration that appears in the tree view window to an XML (*.FC) file.
2. Save the configuration that appears in the tree view window to several binary files (*.dat). Each file includes a "Host-PCD Protocol" SET commnad with several tags and can be used in order to "duplicate" the selected configuration on another Saturn reader by sending these SET commnds from the host.
3. Get all configuration tags from the connected reader, and save the data in 2 text files:
   - **Get All config tags.txt** – a list of "Host-PCD Protocol" GET commnads that can be used to retrieve all the configuration tags from another Saturn reader by sending these GET commnds from the host.
   - **Get All config tags response.txt** – a list of "Host-PCD Protocol" GET responses and calculated CRC. This file can be used to verify that a specific Saturn reader is configured in the same way as the reference reader.

   The way to use these last 2 files is:
   a. In the host program, write a loop that will send all the commands in "Get All config tags.txt" and calculate CRC of the responses.
   b. Compare the calculated CRC to the one the reference CRC that appears in the "Get All config tags response.txt" file.

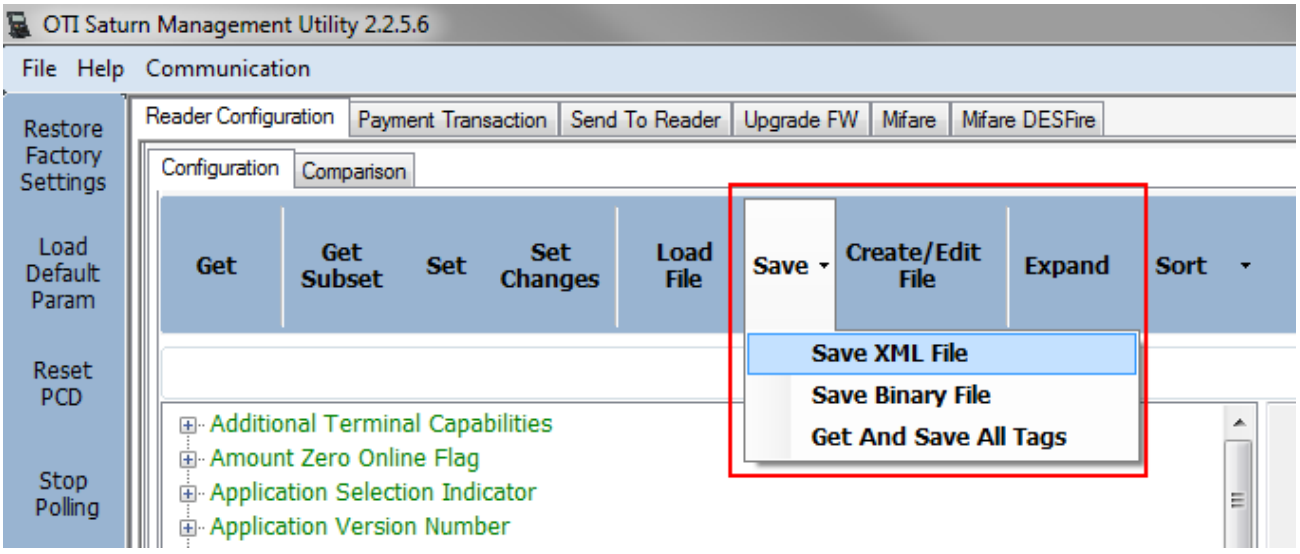


Figure 15- Save configuration file dialog

Create/Edit File

The user can create a custom configuration template file (*.FCT) or edit existing configuration file by clicking Create/Edit File. (See Figure 10 on Page 11.) The dialog shown in the figure below opens, allowing the user to choose a specific tag subset from the *Host-PCD communication protocol* tags:

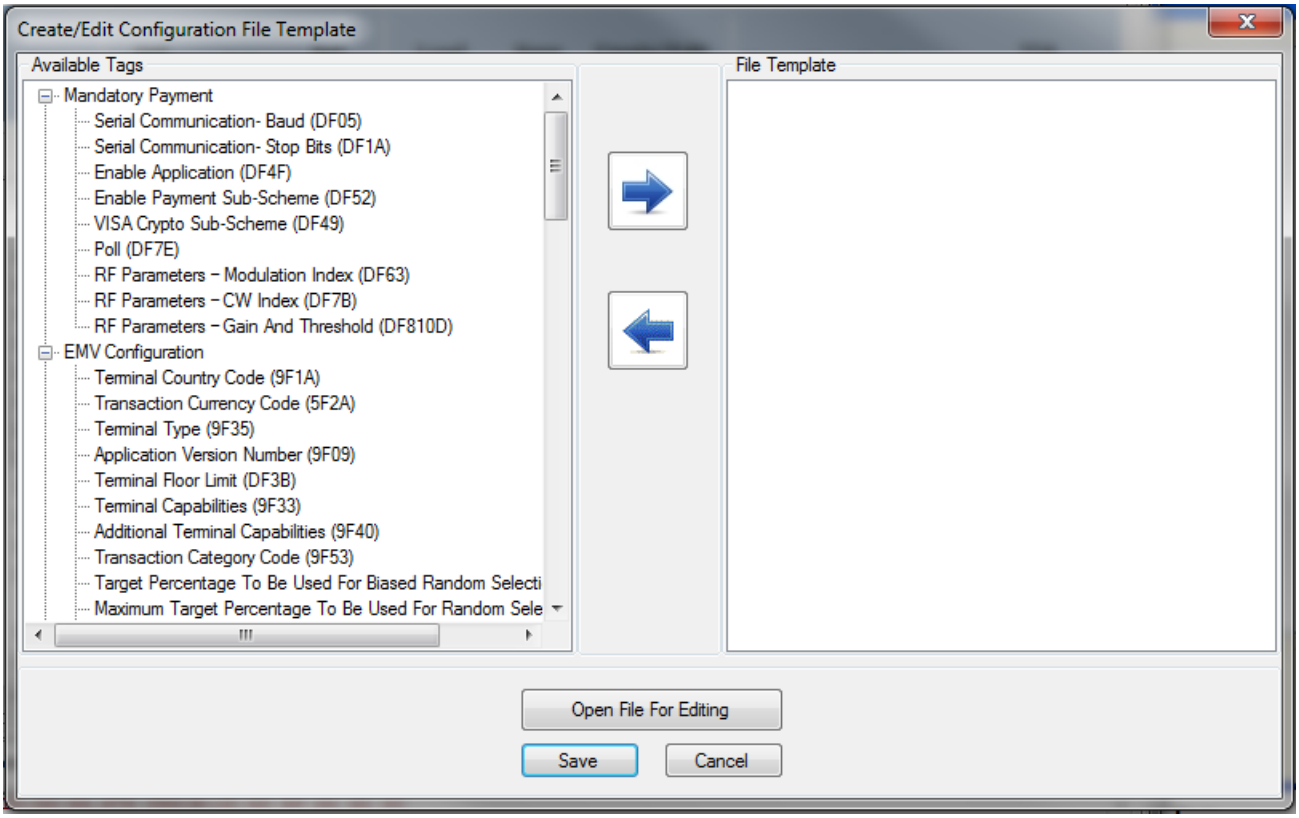


Figure 16- Create / Edit configuration file dialog

Note: Use the arrow buttons or **double-click** a required tag in order to add \ remove it from the template.

5.3 COMPARE CONFIGURATIONS

Compare Reader to File

The user can compare the reader's configuration to a configuration file. The program performs a 'Get' task, based on the tags in the file, and compares them to the tags in the selected file.

Compare Two Files

The user can compare two configuration files.

Comparison Window

When comparing two configurations, each side of the screen will show all the tags and the differences between the configurations, as shown in the figure below:

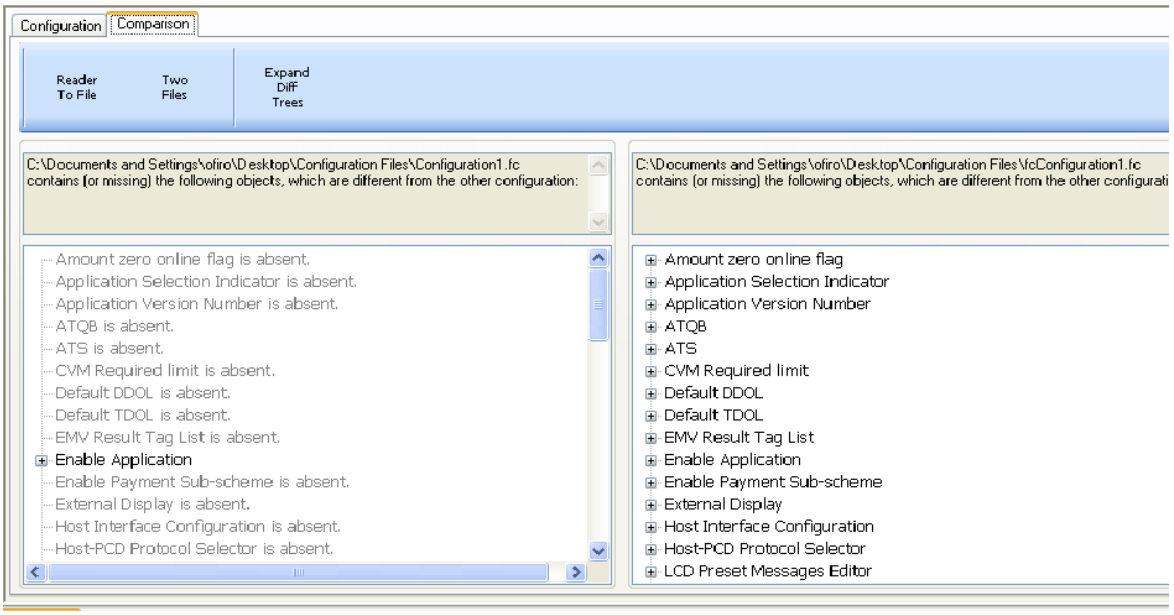


Figure 17- Configuration file comparison window

Tag's Information Window

When clicking on any tag that appears on the tree view window, a help text about that tag will appear in the information window, as shown in the red rectangle in the figure below.

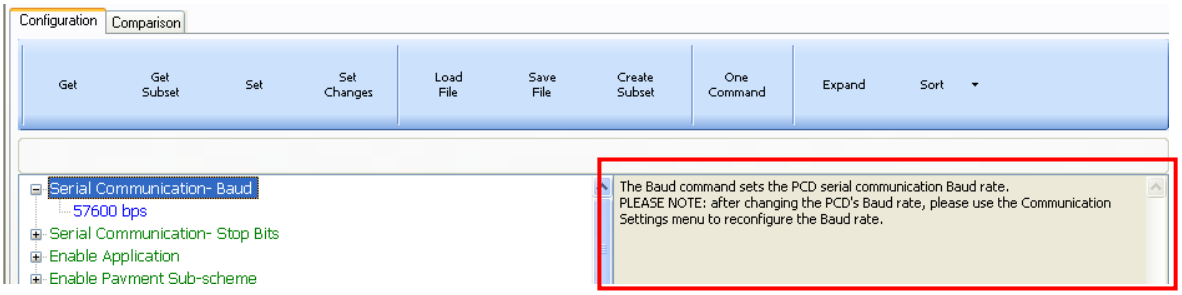


Figure 18- Tag information window

5.4 MANAGE CA PUBLIC KEYS

CA Public Keys are stored in the SAM and used for EMV transactions.
The user can load a pre-defined set of testing keys, delete keys and add new keys.

To load or delete pre-defined set of keys:

Press the TTA Public Keys button and select the required operation:

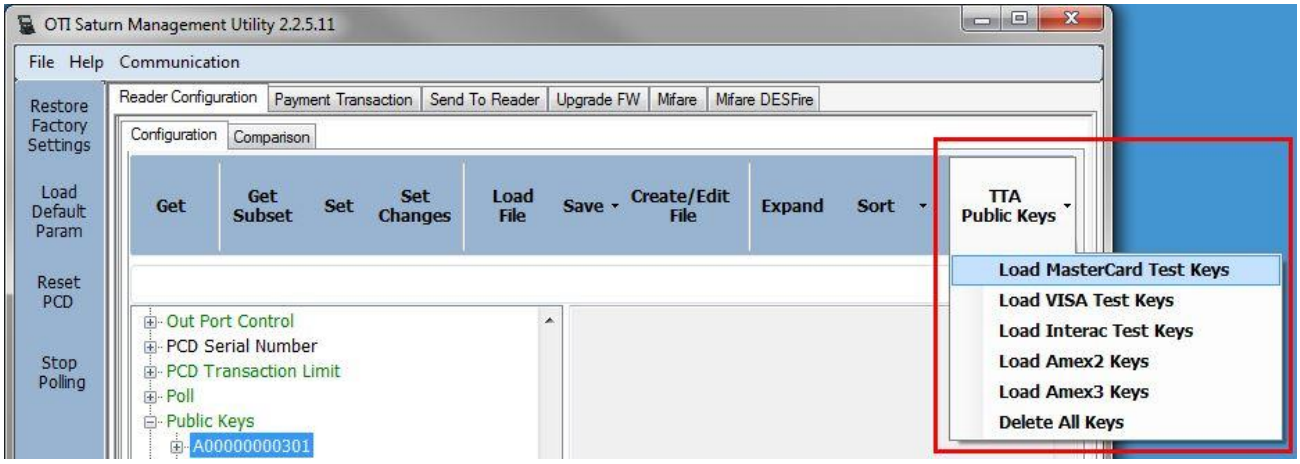


Figure 19- Load and Delete Public Keys menu

Note: The SAM memory is limited, if you get errors when trying to load keys, you may need to delete previously stored keys before you can load additional ones.

To add a user defined key:

Right click the **Public Keys** item in the tags tree and select the "**Add A Key"** pop-up menu:

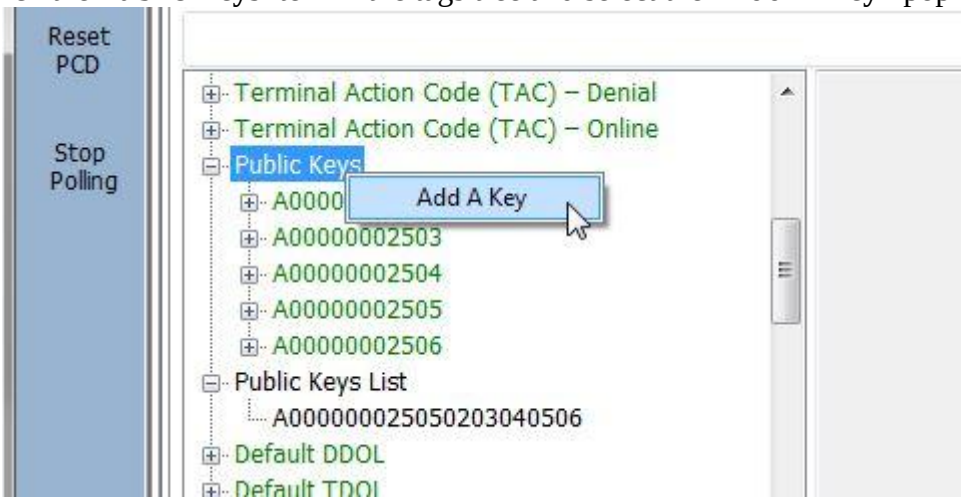


Figure 20- Add user defined Key

Enter the parameters to the **Add Public Key** dialog and press the **Add** button:

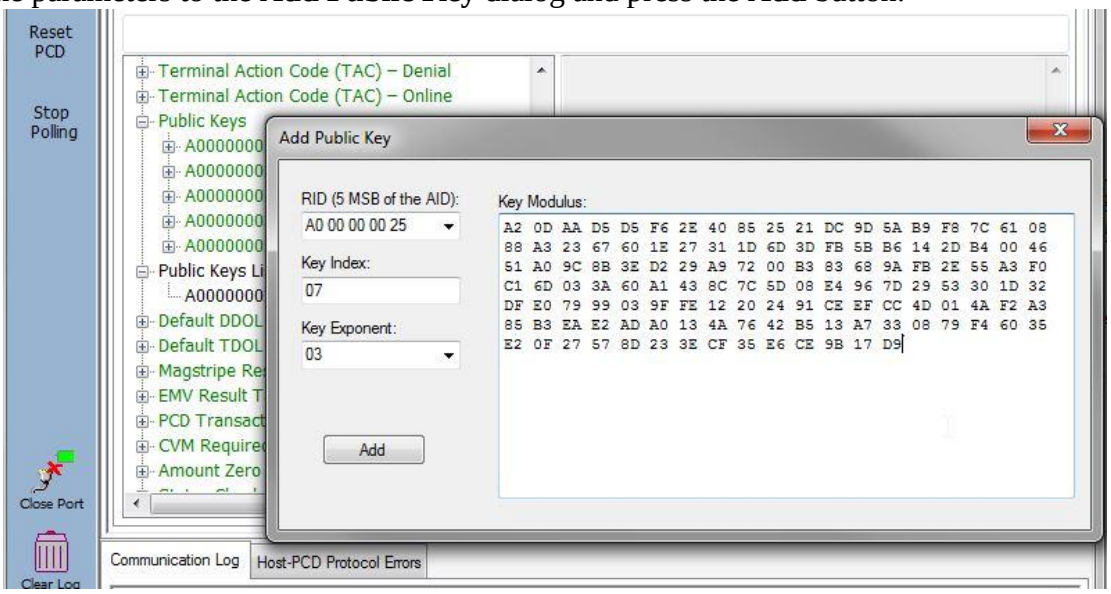


Figure 21- Add Public Key dialog

The new key will be added to the list:

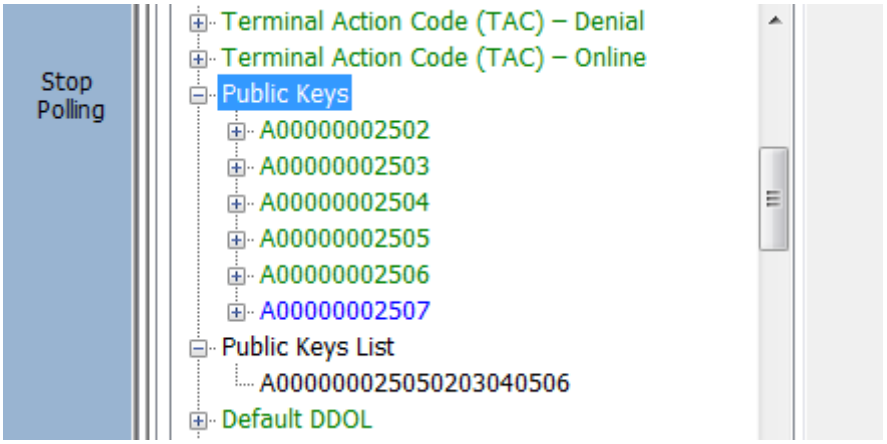


Figure 22- User defined key added to the tags tree (before Set changes)

Press the **Set changes** followed by the **Get** or **Get subset** to update the tree and show the new key:

Figure 23- User defined key added to the tags tree

6 FIRMWARE PROGRAMMER

The FW Programmer module enables a user to burn an OTI Saturn firmware (*.OEF file) on the reader. It also allows the user to set the reader parameters with one click, using a predefined configuration file following the FW programming. If the reader is locked for editing, a signature file (*.SIG) will be required (please contact OTI, if needed).

The update firmware window is shown in the figure below. The red rectangles are numbered according to the comments that follow.

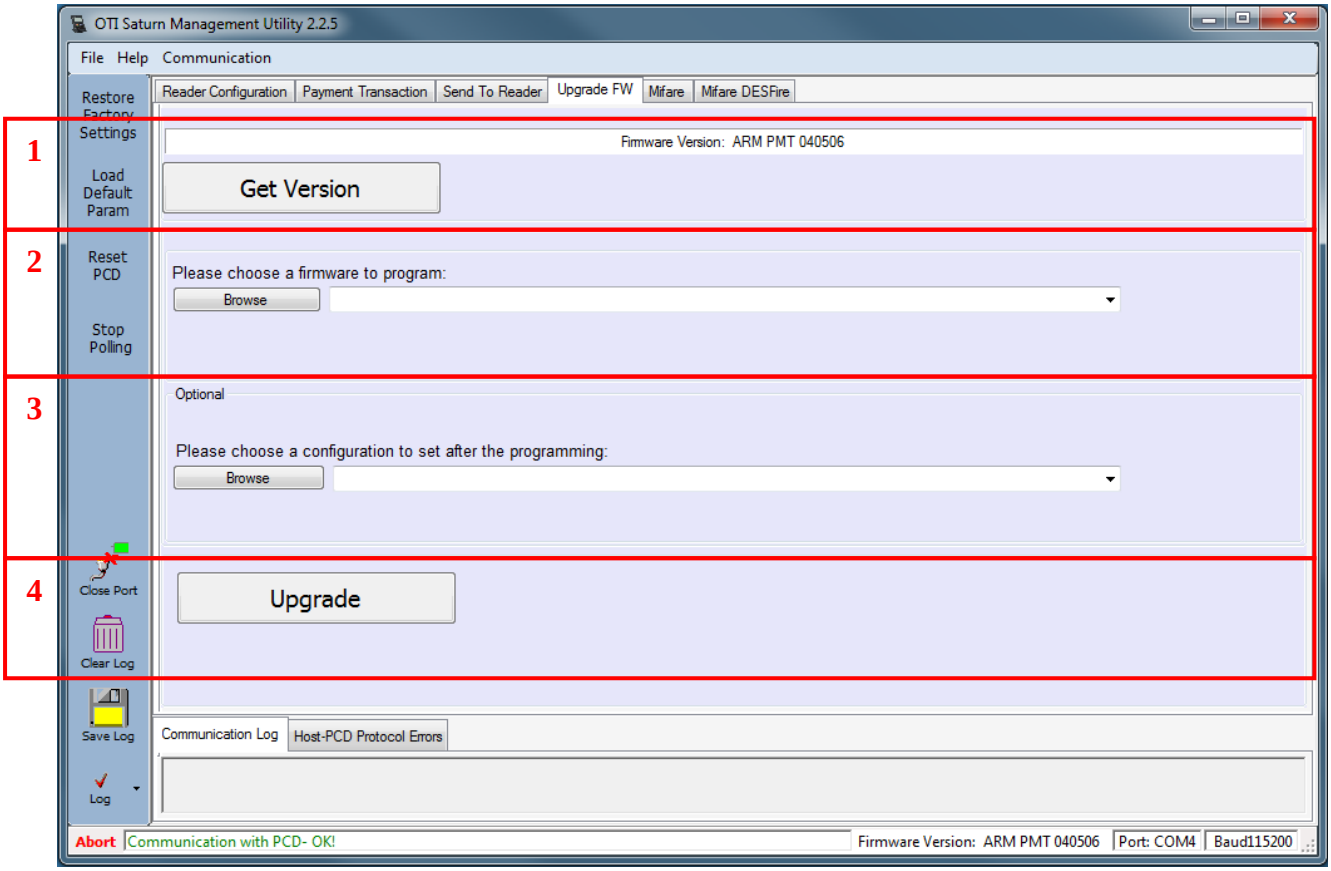


Figure 24- Firmware Programmer ('Upgrade FW') Module Window

1. If there is communication with the reader, then its firmware version will be displayed. If needed, the user can manually get the reader's firmware version.
2. Select a firmware to program.
3. If needed, the user can choose a configuration to be set immediately after the FW programming.
4. Lastly, the user executes the programming (and setting if chosen) by clicking Upgrade.

7 SEND TO READER

The 'Send To Reader' module allows the user to:

- Edit \ build commands with the correct structure according to OTI Host-PCD protocol.
- Send these commands to the reader and log communication.
- Create, save and load user defined 'command buttons' for the commands mentioned in the bulleted items above.

The screen capture in the figure below shows the different areas of the 'Send To Reader' module. The red rectangles are numbered according to the comments that follow.

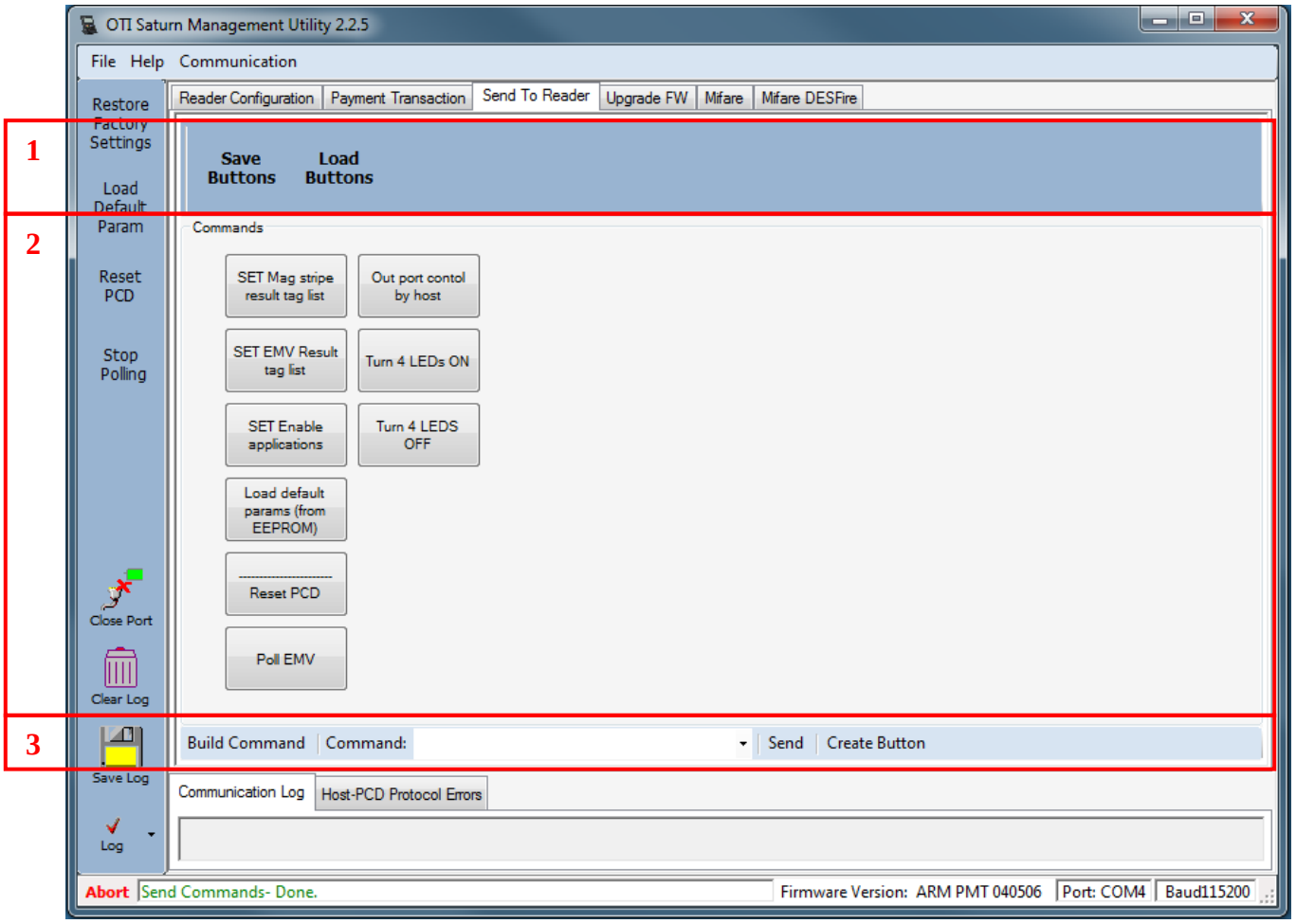


Figure 25- 'Send To Reader' Module

1. Save and load a set of user defined command buttons.
   Note that first you have to prepare these buttons using Build Command and Create Button (see area #3) and only then can you save this set of buttons to a *.btn file.
2. User-defined command button area. (This area is empty just after installation.)
3. This area contains the following functions:
   a. Build command according to OTI Host-PCD protocol.
   b. Send this command to the reader.
   c. Create user defined button for the command (preset button). See more details about the build process in the subsection below.

7.1 BUILDING A HOST-PCD COMMAND

Click Build command (area #3 in Figure 25) to open the 'Build Command' dialog shown in the figure below. The red rectangles are numbered according to the comments/instructions that follow.

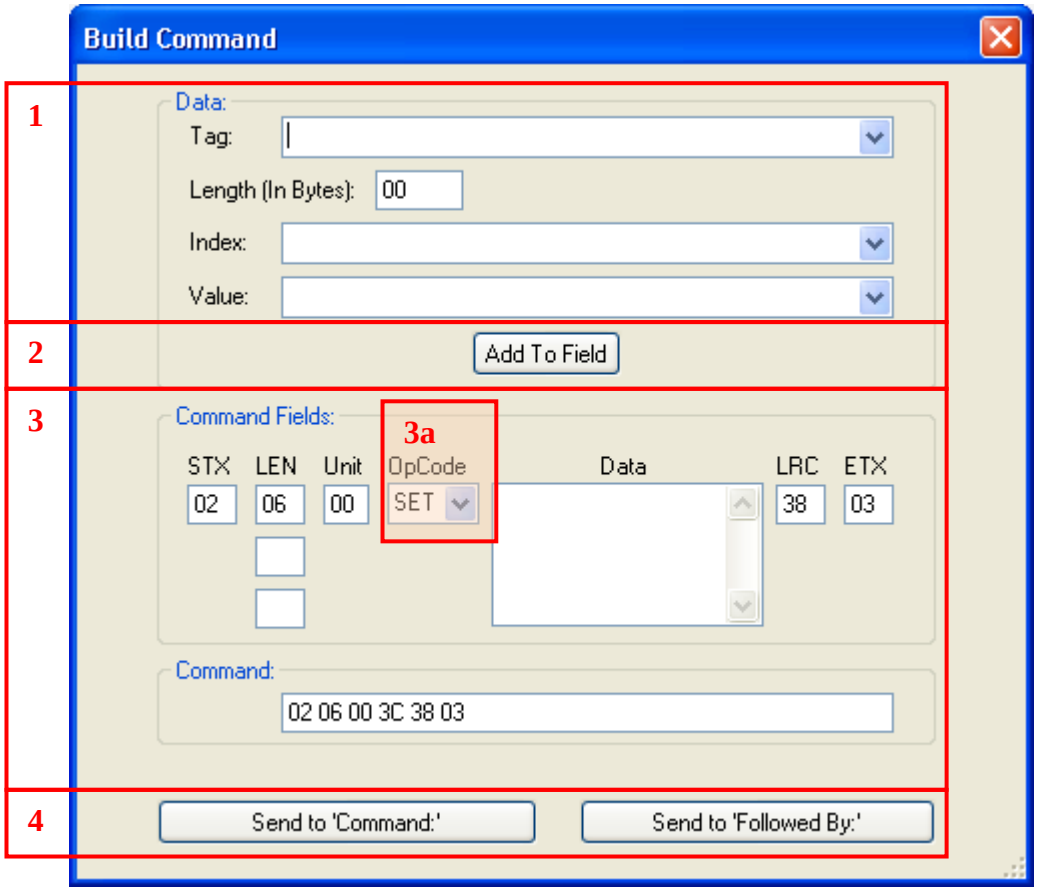


Figure 26- Build command window

In order to build a command, follow these steps:

1. Select the **Data** for the command as follows:
   a. Select the required **Tag** from the combo box.
   b. In case this tag requires an **Index** [1], select the appropriate index from the combo-box.
   c. In case the Tag requires a **Value,** select the value from the 'Value' combo-box.

> **Note:** The data '**Length (in bytes)**' field is automatically updated based on the combo-box selections; there is no need to manually edit this field.

2. Click Add To Field to add the data to the '**Command Fields**' area [2]. The structured command should now appear in the 'Command' edit box [2] with the appropriate prefix and suffix.

[1] See the section "Indexed Objects" in the document *OTI Host-PCD Communication Protocol*.
[2] See Rectangle #3 in Figure 26.

Note: Clicking Add to Field again will append new data to the previous one; make sure you delete the previous data if required.

3. Select the correct '**OpCode**' (SET, GET, DO) for the command, marked in '**3a'** in the figure above.

Note: The rest of the fields are calculated automatically; there is no need to manually edit them.

For an example of building a command, see the dialog in the figure below. The figure shows a command to perform (i.e., execute opcode DO – see the Commands Fields section in the figure) the (Tag) function 'Enable Payment Sub-scheme' for (Index) 'PayPass MasterCard' with Value 'Mag-Stripe Like Only'.

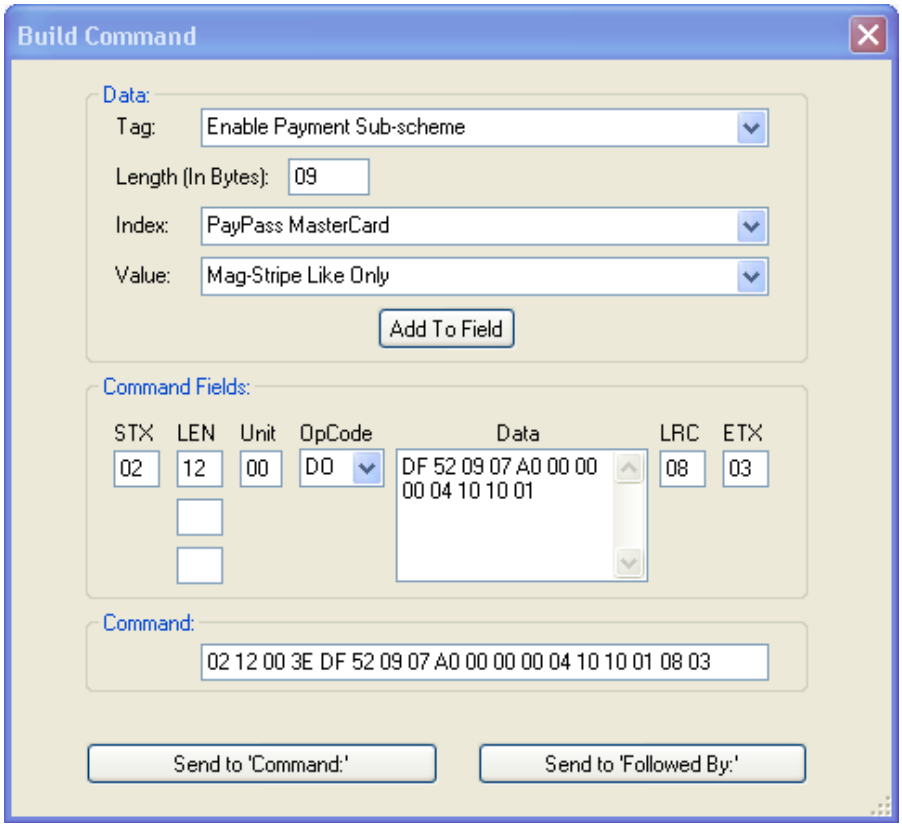


Figure 27- Build command window with data

4. Click Send to Command or Send to 'Followed By' in order to copy the structured command to the 'Command' or 'Followed By' edit box in the **Send To Reader** module window. (See Rectangle #3 in Figure 25 on Page 21.) See **Note** below.

Note: The 'Send To Reader' module allows sending two commands in a sequence, with the first one appearing in the Command field and the second one in the Followed By field.

7.2 CREATING A USER DEFINED COMMAND BUTTON

Once you have copied the structured command to the **Send To Reader** module window (see Figure 25 on Page 21), you can save this command as a user defined button as follows:

1. Click Create Button. (See Rectangle #3 in that figure.) The **Edit Button** dialog box shown in the figure below appears.
2. In the Name field, enter some meaningful name for the button.
3. Click Apply to add a command button to the set of user-defined buttons.

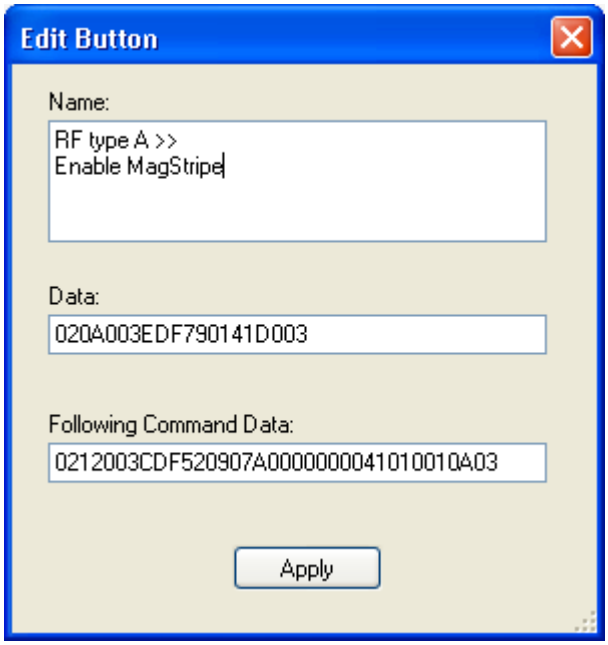


Figure 28- Edit Button dialog

Note: You may right click an existing user-defined button in order to edit or delete it.

8 PAYMENT TRANSACTION

The Payment Transaction module allows the user to start, set parameters and log payment transactions. The Payment Transaction work window is shown in the figure below. The red rectangles are numbered according to the comments/instructions that follow.

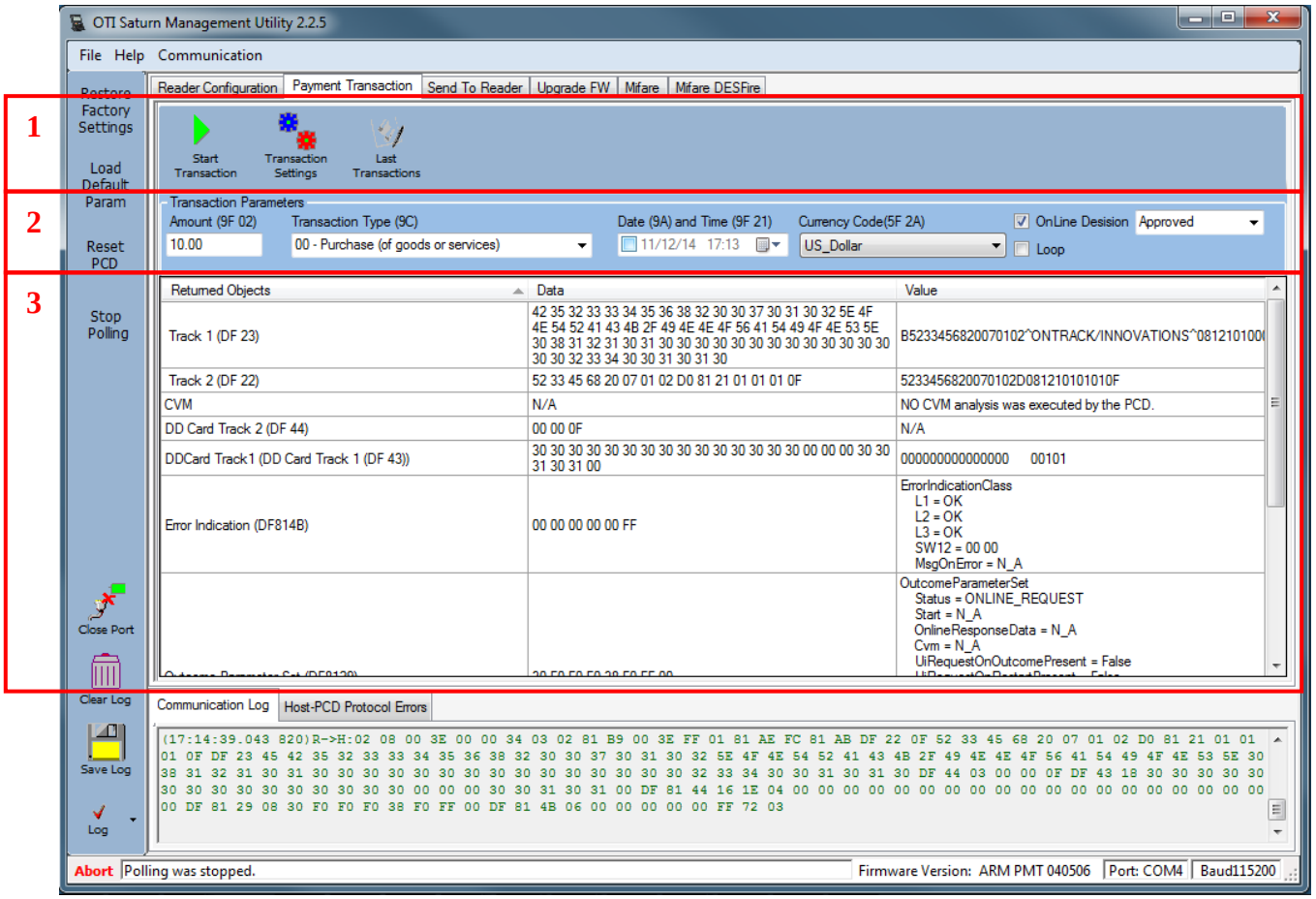


Figure 29- Payment Transaction module

1. In the figure above, Section #1 (boxed in red) contains buttons to **Start/STOP Transaction**, **Set Transaction Settings** and view **Last transactions log**.
2. In Section #2 (boxed in red), you can set **Transaction Parameters** (amount, type, date & time, online decision and loop – see Section 8.3 on Page 31 for an explanation of these parameters).
3. Section #3 displays the last transaction's returned data**.**

8.1 TRANSACTION BEHAVIOR SETTINGS

In addition to the transaction parameters, the user can select the transaction behavior in case back-office (on-line) or paper signature (POS) authorization is required.

Back Office settings

The screen capture in the figure below shows the different options for 'Back Office' (online) authorization behavior:

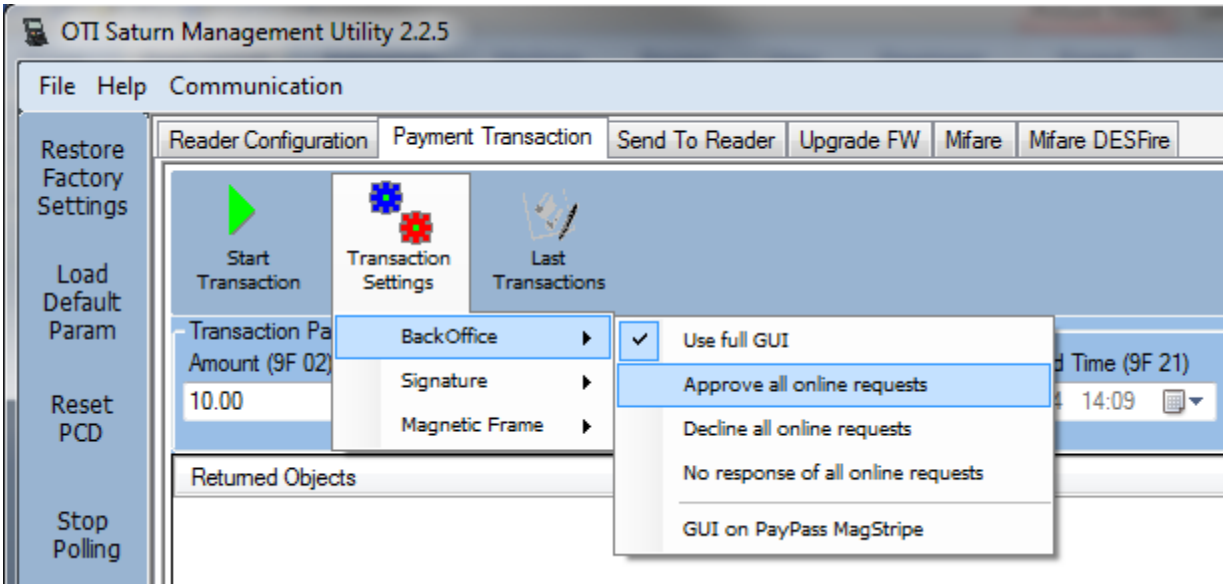


Figure 30- Transaction Settings: Back Office (online) authorization

In case '**Use Full GUI**' is selected, and both, the reader and the card are configured to use on-line authorization, the pop-up window shown in the figure below opens during the transaction:

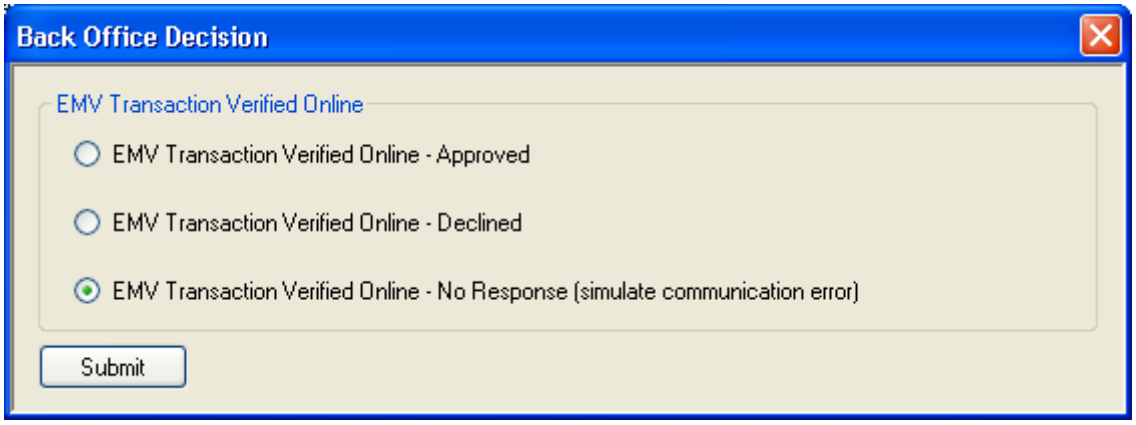


Figure 31- Back Office (online) Decision dialog

PIN Verification

In case '**Back Office**' settings is set for '**Use Full GUI**', and both, the reader and the card are configured to use '**PIN for off-line verification**', the pop-up window in the figure below opens during the transaction:

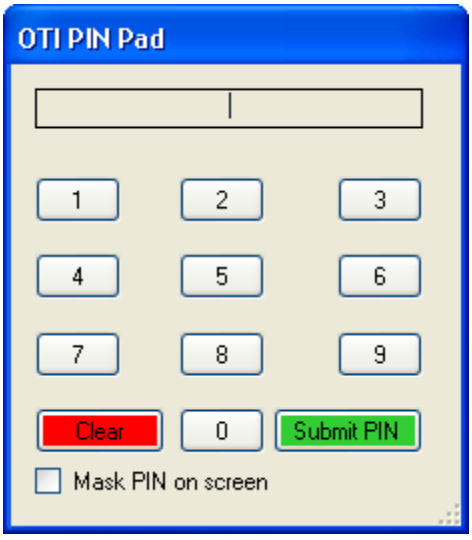


Figure 32- PIN Pad GUI for off-line transaction

Enter the PIN code and click Submit PIN to continue the transaction.

Signature Settings

The screen capture in the figure below shows the different options for **paper signature** authorization:

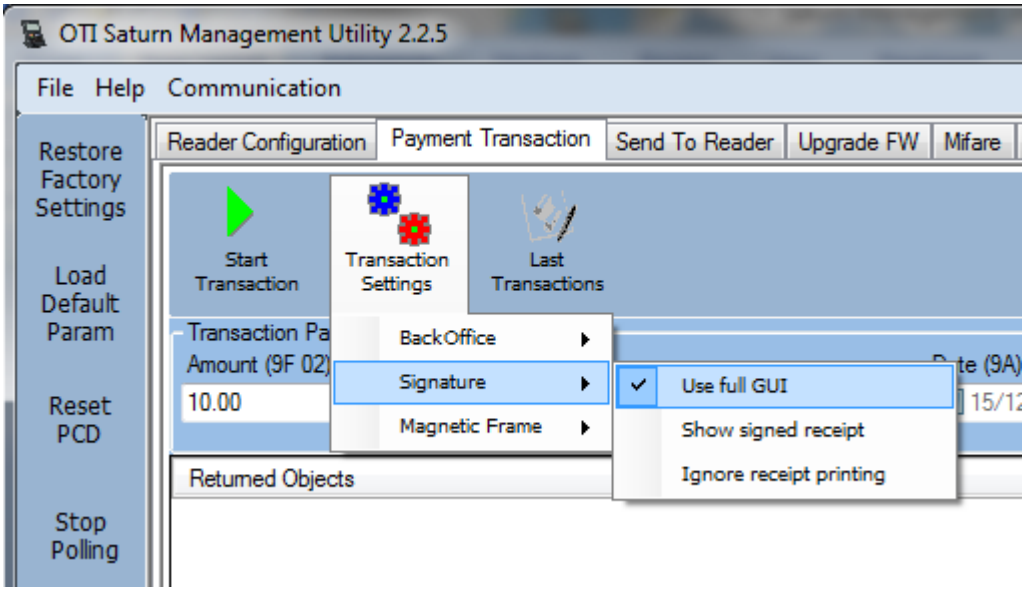


Figure 33- Transaction Settings: Signature (paper) authorization

In case '**Use full GUI**' is selected, and both the reader and the card are configured to request paper signature authorization, the pop-up window in the figure below opens during the transaction:

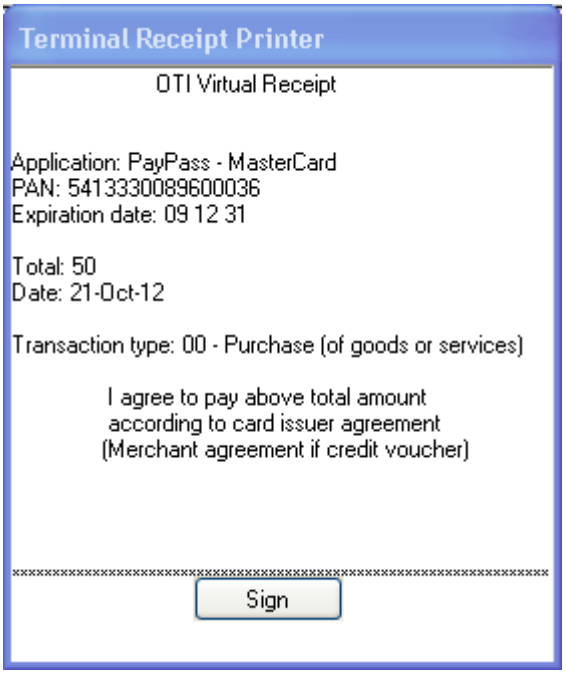


Figure 34- Terminal Receipt Printer simulation

In the **Terminal Receipt Printer** window, click Sign to simulate the paper signature, as shown in the figure below:

Figure 35- Terminal Receipt Printer simulation (signed)

Magnetic Frame settings

The '**Magnetic Frame**' settings (see figure below) allow the user to control the structure of the transaction tracks data, during the communication between the reader and the host:

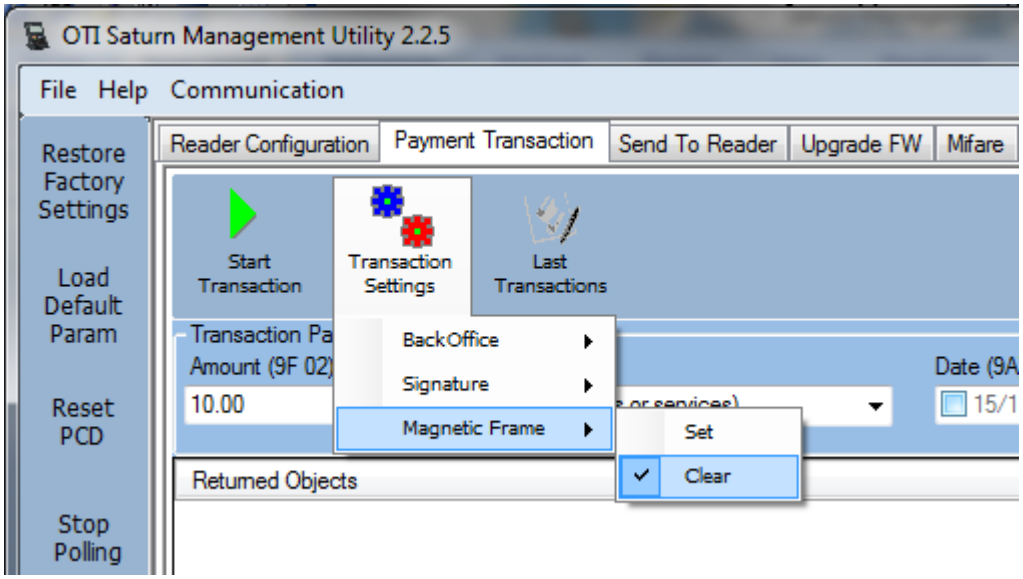


Figure 36- Transaction Settings: Magnetic Frame

Two options are available for settings:

- **'Set'** – Checking Set causes the reader to add start sentinel (STX) and end sentinel (ETX) to the transaction track data, as defined in ISO/IEC 7813.
- **'Clear'** – Checking Clear tells the reader **not** to add start sentinel (STX) or end sentinel (ETX) for the transaction track data. This is the option commonly used in contactless transactions.

Note: The '**Magnetic Frame'** settings affect the data communicated only between the reader and the host. The data between the card and the reader is always without the STX and ETX.

8.2 VIEW LAST TRANSACTIONS LOG

After performing one or more transactions, click Last Transactions (see top row in Payment Transaction window in Figure 36 above) to open the **Last Transactions** window containing a log of the most recent transactions, shown in the figure below:

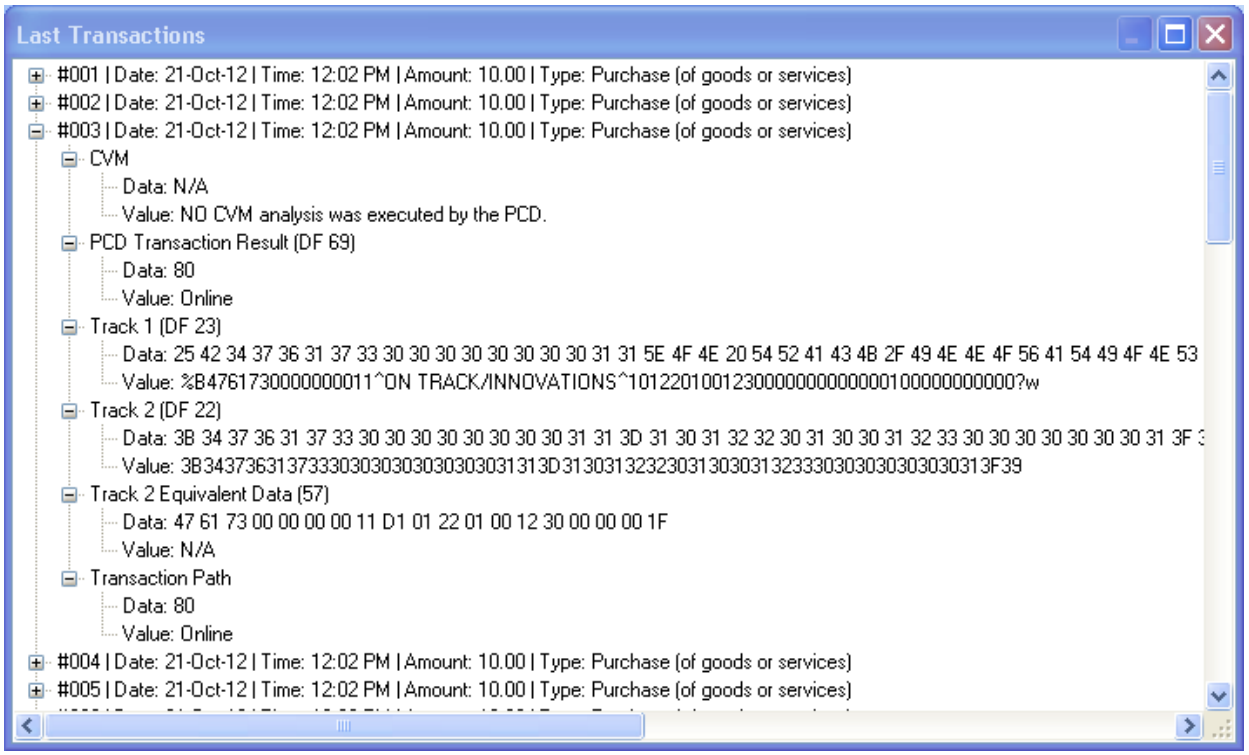


Figure 37- Last Transaction log window

8.3 TRANSACTION PARAMETERS

The transaction parameters pane (see Figure 38) allows quick setting of the parameters listed below the figure:

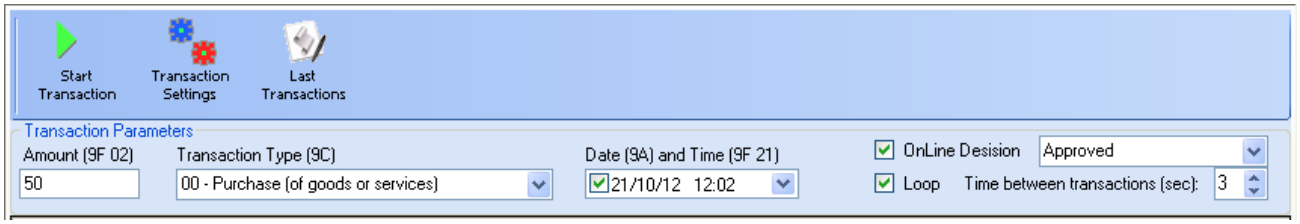


Figure 38- Transaction Parameters pane

- **Amount** – Note that the amount will influence on-line authorization when there is a 'floor limit' for such authorization.
- **Transaction Type**
- **Date and Time**
- **Online decision** – When checked, the transaction on-line decision will behave according to the combo box ('Approved' , 'Declined' or 'No response' – see the back office menu choices in Figure 30 on Page 26).

  Note: The '**Online Decision**' checkbox and combo-box affect the transaction behavior only when the Transaction Settings '**Back Office'** is set to '**Use Full GUI**'; all other 'Back Office' settings (e.g. 'Approve', 'Decline' 'No response') override the combo-box setting.

- **Loop –** When checked, the reader runs the transactions in a loop with the specified interval between transactions.

9 GLOSSARY

opcode	Portion of a machine language instruction specifying the operation to be performed.
*.OEF	OTI Executable File.
PCD	Proximity Coupling Device – Device through or near which magnetic stripe or PICC is passed, and which is capable of reading the card's data. (Saturn reader).
PICC	Proximity Integrated Circuit(s) Card. Contactless card operating without mechanical contact to the PCD.
PIN	Personal Identification Number.
Sentinel (value)	A special value whose presence guarantees the (beginning or) termination of an algorithm.
*.SIG	Text file that contains an electronic "signature" that has been created by a signature user.