DataGuard rf™
Tape Tracking System

DataGuard rf™ UHF Label Programmer Manual

Introduction

The Imation DataGuard rf Tape Tracking System is a complete turn-key solution that uses RFID technology to track the movement of tape cartridges in and out of a data center, off-site facility, or Data Recovery location. The user scans RFID-enabled cartridges, either individually or within a transport case, as they arrive and exit a location. The system automatically logs each cartridge transaction into a tracking database that is linked to the customer's tape management system. This solution efficiently accounts for the location of all data cartridges and provides both reporting and audit capabilities.

This manual describes the DataGuard rf UHF Label Programmer that scans barcode labels and converts and writes their label identification to RFID tags embedded in the labels. The system also reads the RFID tags and verifies that they match the barcode labels that are to be placed on the tape cartridges for tracking purposes.

Imation Programming Station Contents*

1. Imation Programming Station (66-0000-9000-2)
2. Power Adapter (Phihong Model PSA15R-090P and USA plug Model RPA)
3. USB Cable 2 m
4. Software and Documentation CD
5. USB to Serial Installation Guide
6. USB to Serial / Parallel CD

*Specifications are subject to change without notice.

Safety Instructions-please read thoroughly before using the Scan Station

Always follow the basic precautions listed below to avoid the possibility of serious injury or even death from electrical shock, short circuit, damages, fire, or other hazards. These precautions include, but are not limited to the following:

- Keep a copy of the operating manual close to the Scan Station for easy reference for all operators.

- Follow the operator's manual carefully. Follow the correct procedure when setting up the device.
- Do not open this device or attempt to disassemble or modify it. The device contains no user serviceable parts. If it appears to be malfunctioning, have it inspected by qualified service personal. Modifying or disassembling this product will void the warranty on this product.
- Do not expose this device to rain, use it near water, or in damp, or in wet conditions, or place containers on it that contain liquids that might spill into an opening.
- If unusual smells, sounds, or smoke emanate from the Programming Station, or if liquids enter the Programming Station, switch its power off immediately.
- Use this device in compliance with all national legal requirements and local electrical codes.
- Use this device only with the Imation supplied software.
- Use only with the supplied power adapter.

Using the DataGuard rf™ UHF Label Programmer

User Manual

Version 7.0
4/10/2008

Hardware and Software Installation

Follow these steps to install the hardware, and to install the software and the USB drivers for a host computer running Windows® 98SE, 2000, or XP operating systems:

A. Locate the DataGuard rf Label Programmer in a suitable location near the computer and power receptacle.

B. The DataGuard rf Label Programmer has a power jack and a power switch. Connect the supplied power adapter to the power jack and to a suitable power receptacle. Turn on the power switch.

C. Turn your computer on.

D. Once your computer has finished loading the operating system and any programs that launch when you start up, log onto the computer so that you have administrator privileges.

E. The DataGuard rf UHF Label Programmer contains a four port USB to serial adapter. Please follow the instructions in the USB to Serial Quick Installation Guide which is included with your unit to install the necessary drivers for this adapter. In the Hardware Installation section on page 3 where it says "Plug the other end into the back of the USB to Serial adapter", plug the other end into the USB port on the DataGuard rf UHF Label Programmer instead.

F. Insert your DataGuard rf UHF Label Programmer Setup disc into the computer drive. (If the installer does not automatically run, browse to the installation disc drive and double-click on the **Setup.exe** file to start).

G. Once the program has launched the Welcome screen, click **OK.**

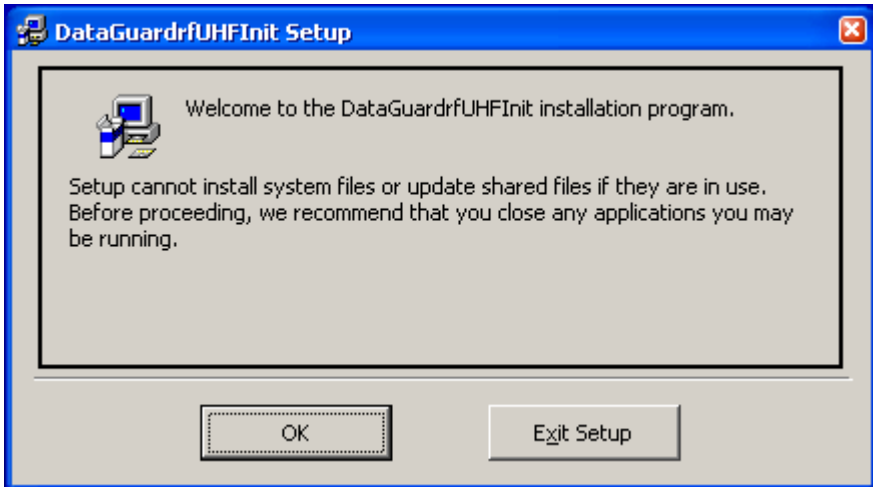

Figure 1

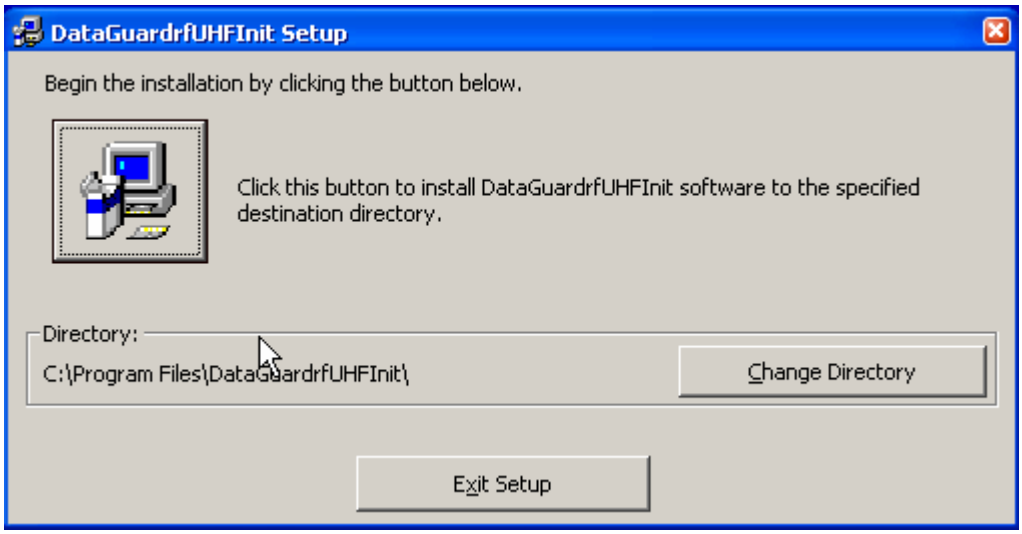

Figure 2

H. Select the installation folder where the DataGuard rf program will appear (Figure 2). If you prefer the default Program Files folder, click the large button with the install icon. If you prefer a different folder from the default folder, select that folder by clicking the **Change Directory** button.

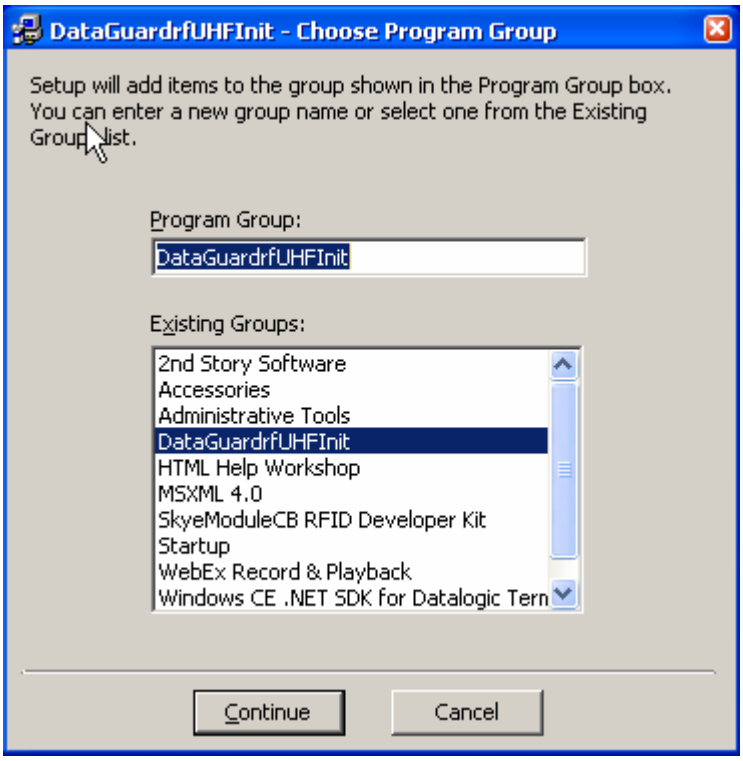

Figure 3

I. Choose the program group you wish to include the software in and press the **Continue** button on the Choose Program Group Installation dialogue box (Figure 3) to begin the installation. When the installation is complete, click on the **OK** button to exit the installation set up of the software for the DataGuard rf UHF Label Programmer.

Introduction

The Imation DataGuard rf UHF Label Programmer allows the user to write ("Program") the RFID tags embedded in barcode labels before the labels are removed from their printed sheets. The programmer has twin laser readers that pick up the barcode information as the labels pass below the readers and converts the laser barcode information to RFID identification data. Twin RFID antennas use those identification data to initialize the RFID tags in the labels. The RFID antennas can also read the RFID data in order to display the label information or to verify that the laser barcodes are identical matches with the RFID tags.

The startup screen appears below.

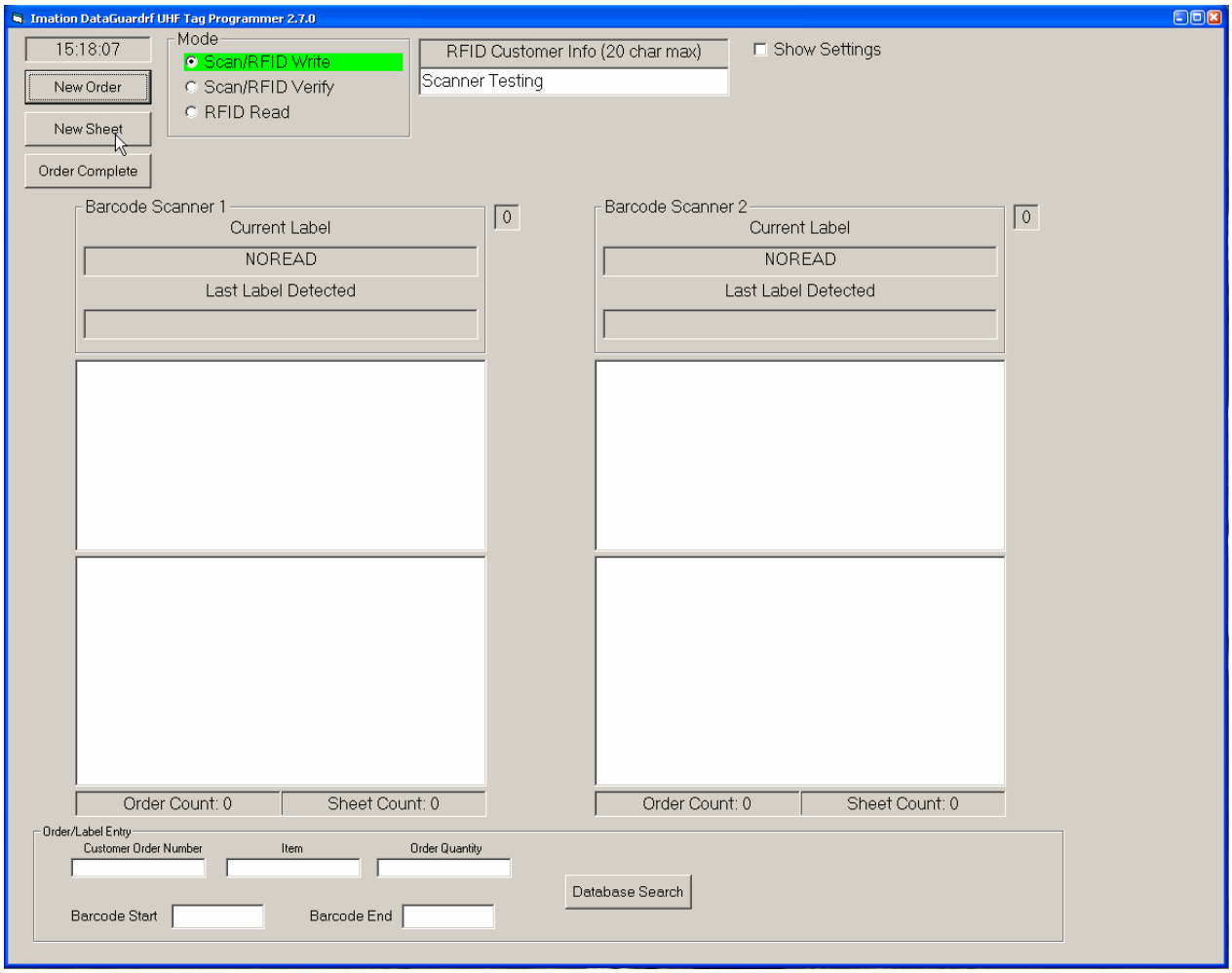

Figure 4

Before You Scan

Press the “New Order” button to initialize the software and prepare for scanning and programming an entire order of RFID tags.

Order/Label Entry Info

Fill in the customer order number in the box labeled “Customer Order Number”.
Fill in the RFID lot number in the box labeled “Item”.
Fill in the total number of tags in the order in the box labeled “Order Quantity”. When the “Order Complete” button is pressed at the end of the scan cycle the software will check to make sure that the number of tags scanned and programmed equals the number of tags in the order.
Fill in the “Barcode Start” and “Barcode End” fields with the first and last VOLSER label ID’s in the order. The software checks to make sure that all barcode labels read by the laser scanners fall within this range before the RFID tag will be initialized. Be sure to include the media identifier (“L1”, “L2”, etc) if present on the barcode label.
Fill in any additional information you may want to save about the order in the “RFID Customer Info” field.

It should be noted that the information in all of the above fields is optional. However, to get the maximum benefit of the logging and error checking algorithms built into the software Imation recommends that the info in the fields be entered prior to scanning.

1. Scan/RFID Write Mode

The **Scan/RFID Write** mode is the default mode. This mode is active when the software starts up, when the “New Order” button is pressed, or when the “New Sheet” button is pressed. It allows the user to scan labels printed with barcodes and convert those identification codes to RFID codes while simultaneously writing them to the RFID tags embedded in the labels. Once the program is in the Scan/RFID Write mode, place the sheet of labels on the programming station as shown below. Place the top two barcode labels under the laser scanners and pause there until the labels are initialized (there is an audible confirmation and the barcode number will appear in the lower window). Then slide the sheet up until the next two labels are in the scan region and pause there until the labels are initialized. Continue until all the tags on the sheet are initialized.

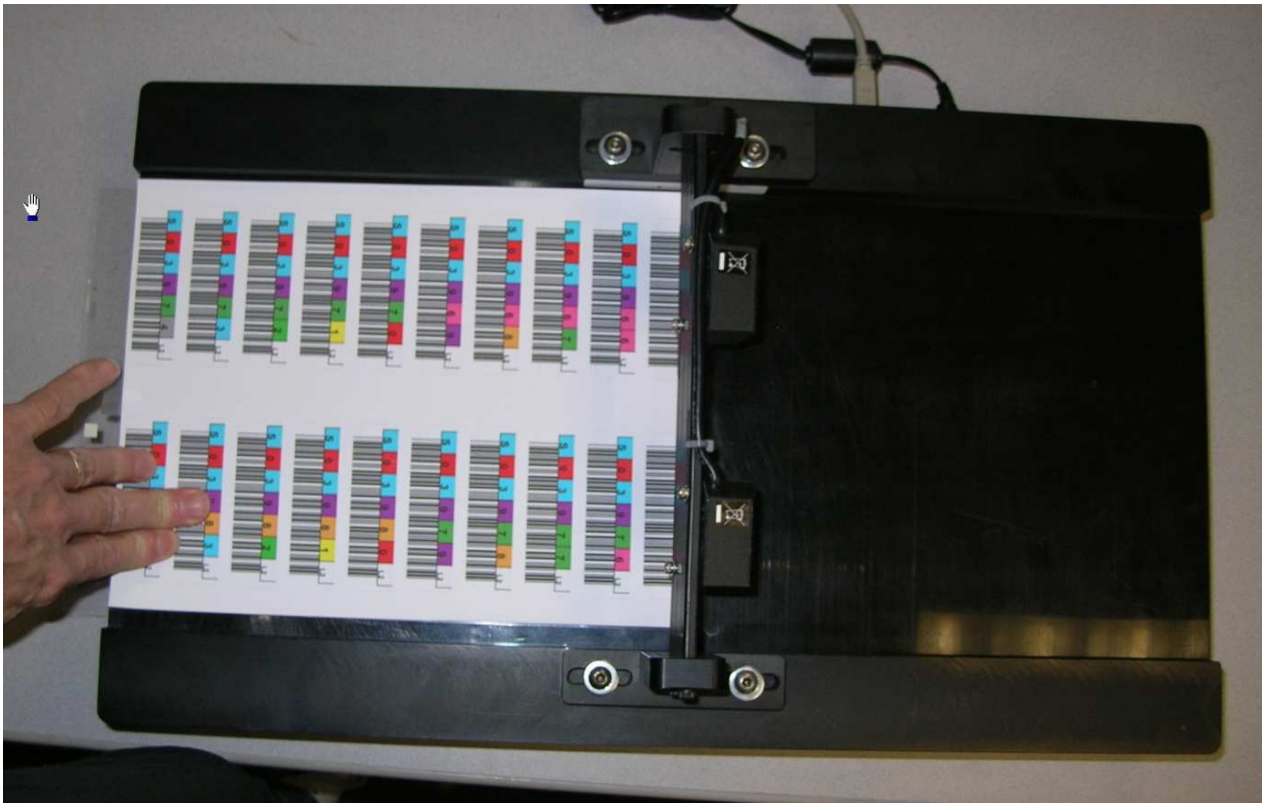

Figure 5

Barcode Scanner 1 / Barcode Scanner 2
These two columns list the current barcode label being scanned in the upper box and the last label detected in each column of labels on the printed sheet. The column background areas turn green when a label is detected in its respective column. The label identification number then appears in the respective column. Each column also includes a list count of the number of labels successfully programmed. Labels are counted only once even if they pass under the scanner more than one time. Thus, if you notice that you have missed a label it is OK to go back and try it again.

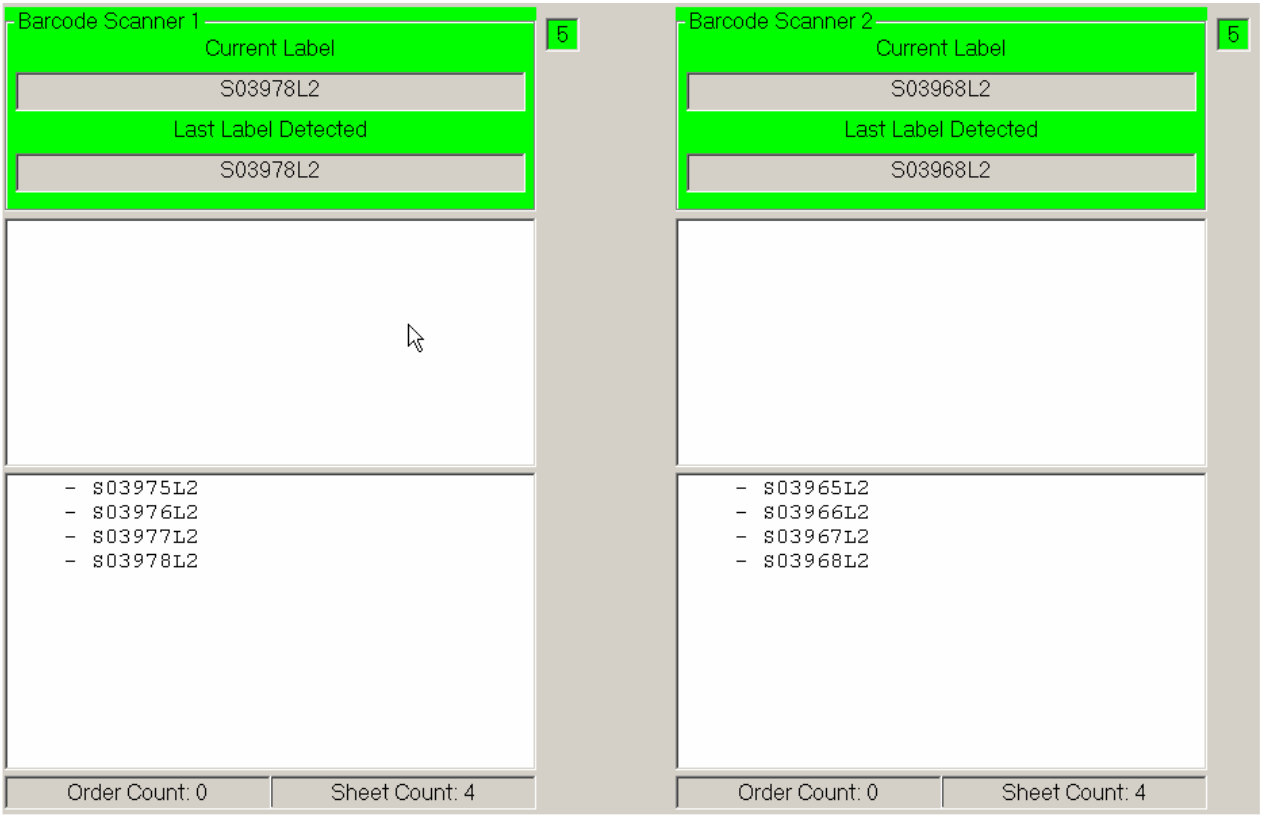

Figure 6

A small square to the right of each column contains a number identifying each step in the label identification programming process. The numbers run from 0 to 5:

0 = No label is being detected
1 = The initializer is decoding the barcode with the laser scanner. At this point the background turns green on each column that decodes the barcode.
2 = The initializer is detecting the RFID tag on each label.
3 = The initializer is trying to write to the RFID tag.
4 = The initializer is trying to write the “kill password” to the RFID tag.*
5 = The process is complete. The process is usually so quick that the user generally sees only a 0 or a 5.

* A “kill password” prevents an accidental or malicious overwrite of the RFID tag that will alter its identification number. Retail stores intentionally “kill” RFID tags as a security measure once an item bearing the tag has been purchased.

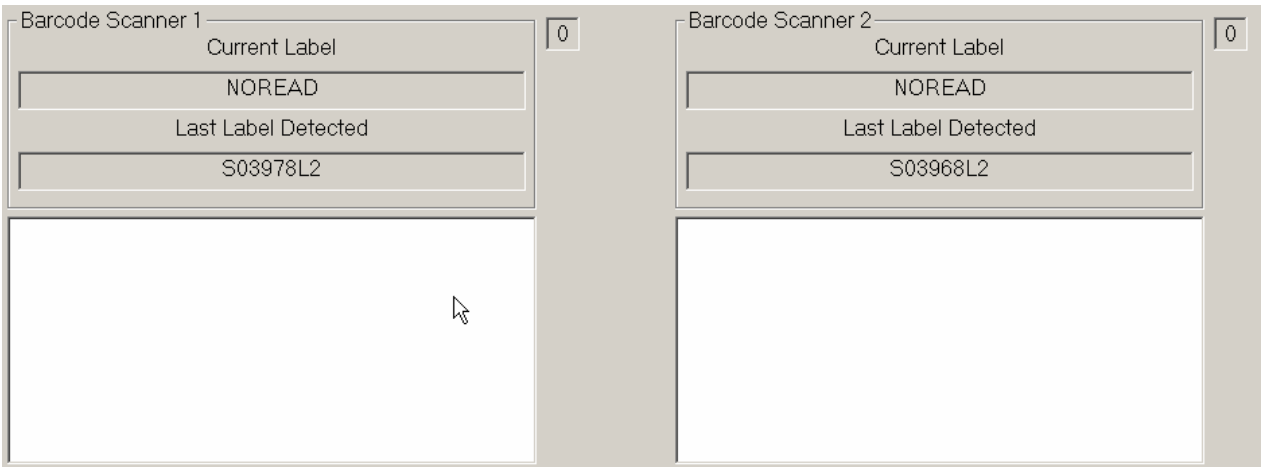

Figure 7

If one of the laser scanners cannot read the label currently under it, the “NOREAD” message appears in the box as in the example above (Figure 7).

If the value of the barcode label being scanned by the laser scanner does not fall within the range specified by the “Barcode Start” and “Barcode End” fields, the “Label Range Error” message appears in the box as shown in the example below (Figure 8). Check to make sure the sheet you are trying to program is the right one for the current order. Adjust the “Barcode Start” and “Barcode End” fields as necessary to resolve the error if the range was improperly specified.

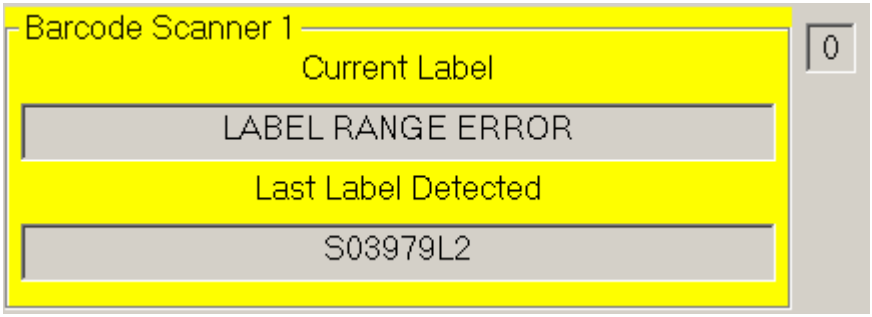

Figure 8

2. Scan/RFID Verify

The **Scan/RFID Verify** option allows the user to make sure that both the printed barcode identification number and the initialized RFID identification number match each other on each label. The identifications can be mismatched if, for example, a hand-fed sheet moves too quickly through the programmer and the decoded barcode of one label gets written to the following label accidentally. **All initialized RFID labels should be verified after being written.**

The verification process is quick and simple.

1. After scanning and writing the entire sheet of twenty RFID tags, the “Scan/RFID Verify” radio button will automatically be activated and the software will enter verify mode.

2. Pass the sheet of labels below the laser scanners once again, pausing at each pair of labels until they have been verified. It is most convenient to do this in the reverse direction, since you will already be on the bottom set of labels.
3. The system will put a “VER” confirmation next to each label identification number whenever the written RFID number matches the printed barcode ID, as in the example below. An audible confirmation is also provided.
4. If the “VER” confirmation does not appear for any label—
    a. Move that label back under the scan region. If the “VER” confirmation still does not appear:
    b. Click on “New Sheet.” The following dialogue box (Figure 9) will appear:

Figure 9

    c. Click **OK** to clear the sheet fields without adding the tags to the order list.
    d. Repeat the RFID write and verify process for this sheet again.
    e. Click **Cancel** to cancel the new sheet operation. You can then try again to verify the tags that were missed.

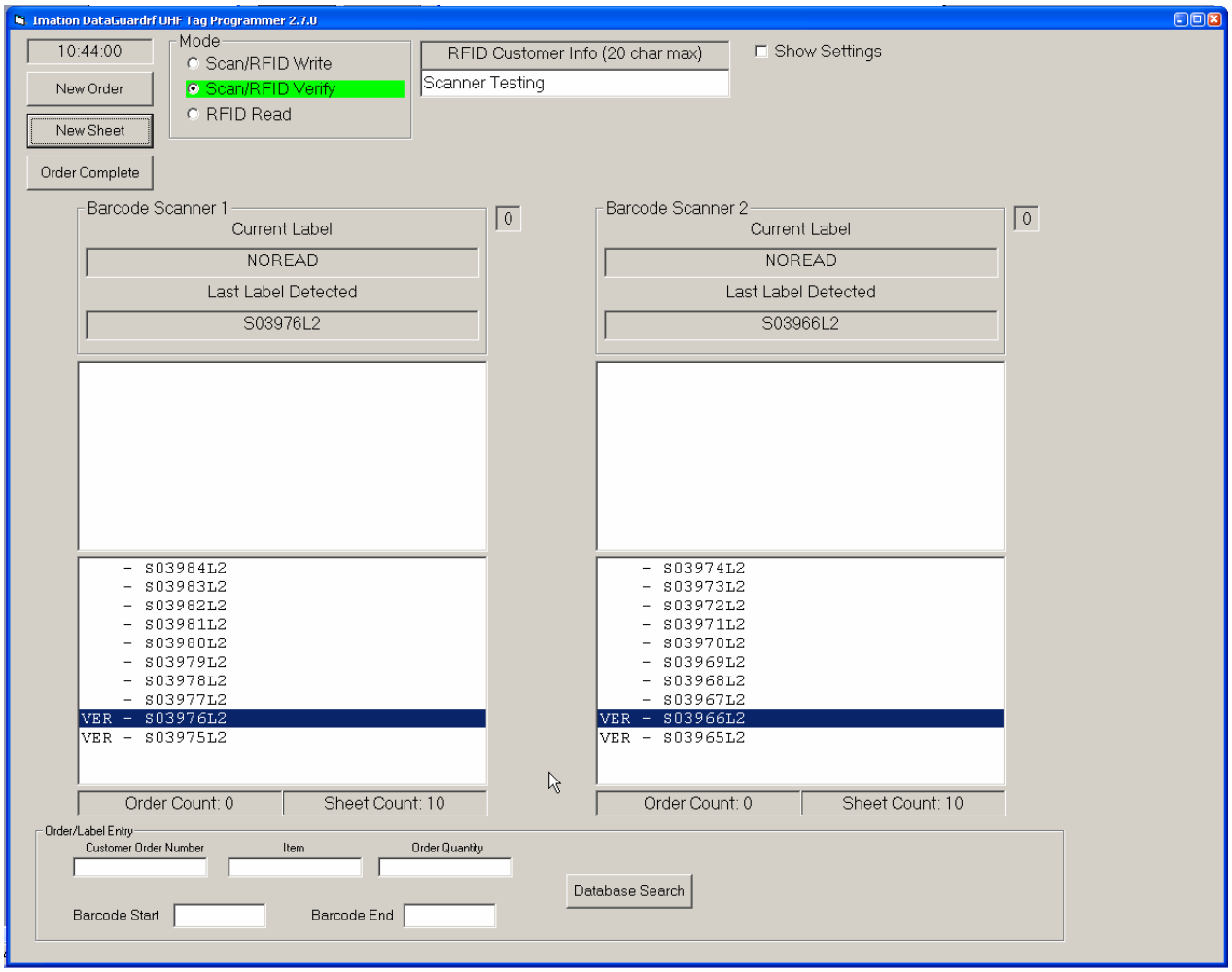

Figure 10

New Sheet

Clicking this button triggers a series of tests in the software in preparation for scanning a new sheet of labels. If fewer than twenty tags were successfully written and verified since the last time the “New Sheet” button was pressed the following warning will appear:

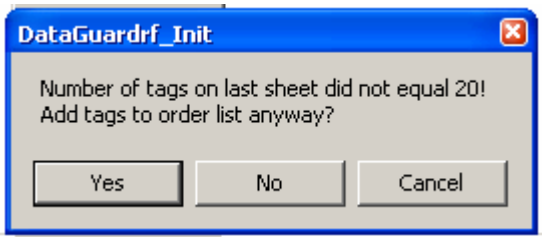

Figure 11

Press **Yes** to ignore this warning and continue to the next sheet. The tags listed in the sheet results windows will be added to the order results windows. Press **No** to clear the sheet results or press Cancel to go back and scan the rest of the tags on the sheet.

If one or more of the tags was written but not verified the following warning will appear:

Figure 12

Press **OK** to clear the sheet results and rescan the sheet, or continue to the next sheet. Press Cancel to go back and verify the tags that were missed on the current sheet.

Order Complete
Clicking this button triggers the tests for a new sheet as well as an additional test that compares the total number of tags written and verified to the number of tags in the order. If the totals do not match, the following warning will appear:

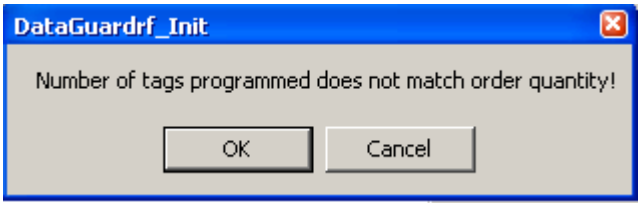

Figure 13

Press **OK** to ignore this warning and continue on to the next order or press Cancel to go back and scan additional tags.

3. RFID Read

The **RFID Read** option allows the user to scan the RFID tags on the labels without regard for the barcode label contents. The raw RFID tag information appears in each respective column. This mode is useful for verifying that the RFID reader can read the chip contents.

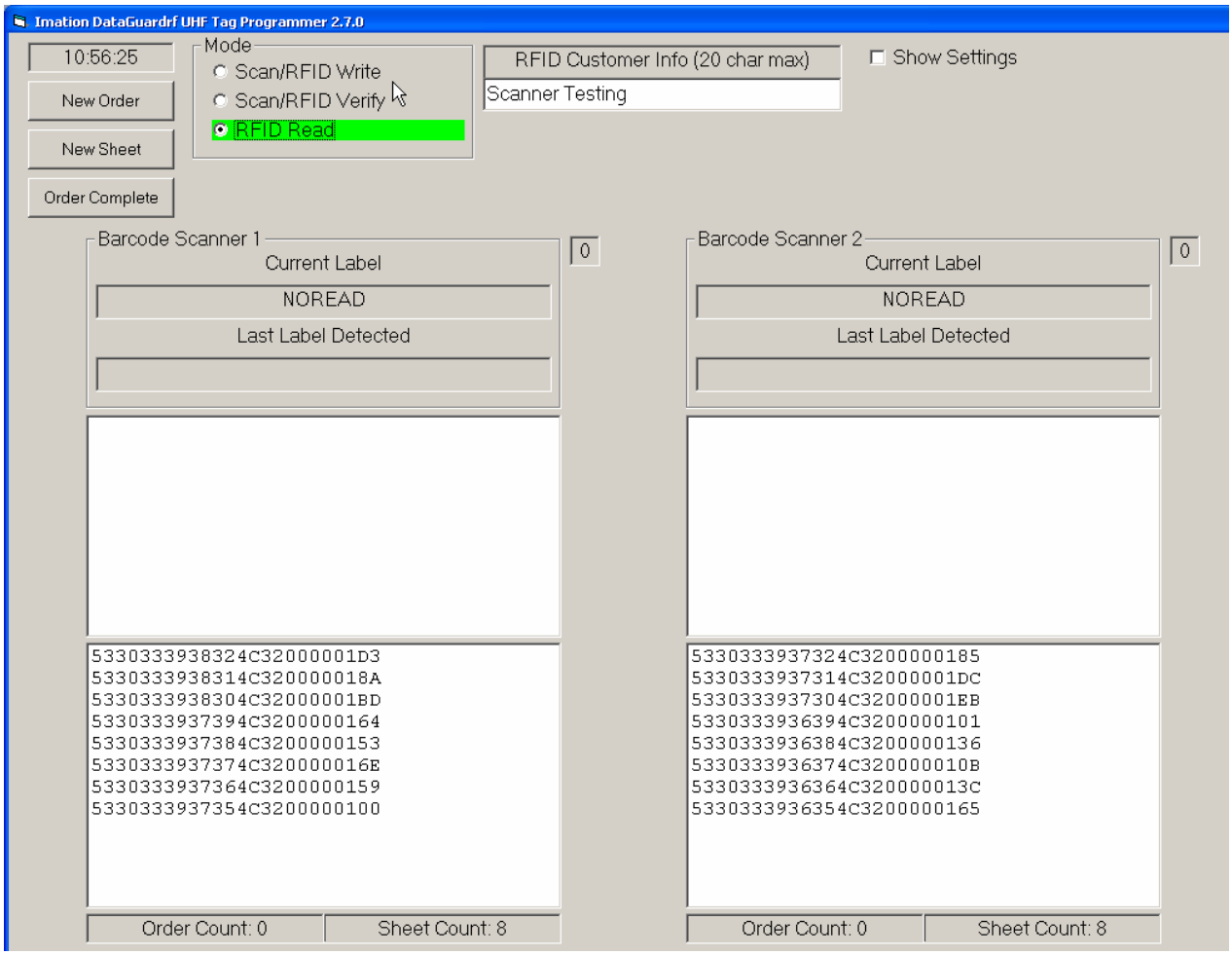

Figure 14

Show Settings

A check mark in this box brings up the settings to align the barcode laser readers, as well as set other system options. Both the left and the right laser readers have adjustment sliders that can adjust the start and stop positions of the laser scans. The user makes these adjustments to correspond with the types of barcode/RFID label sheets.

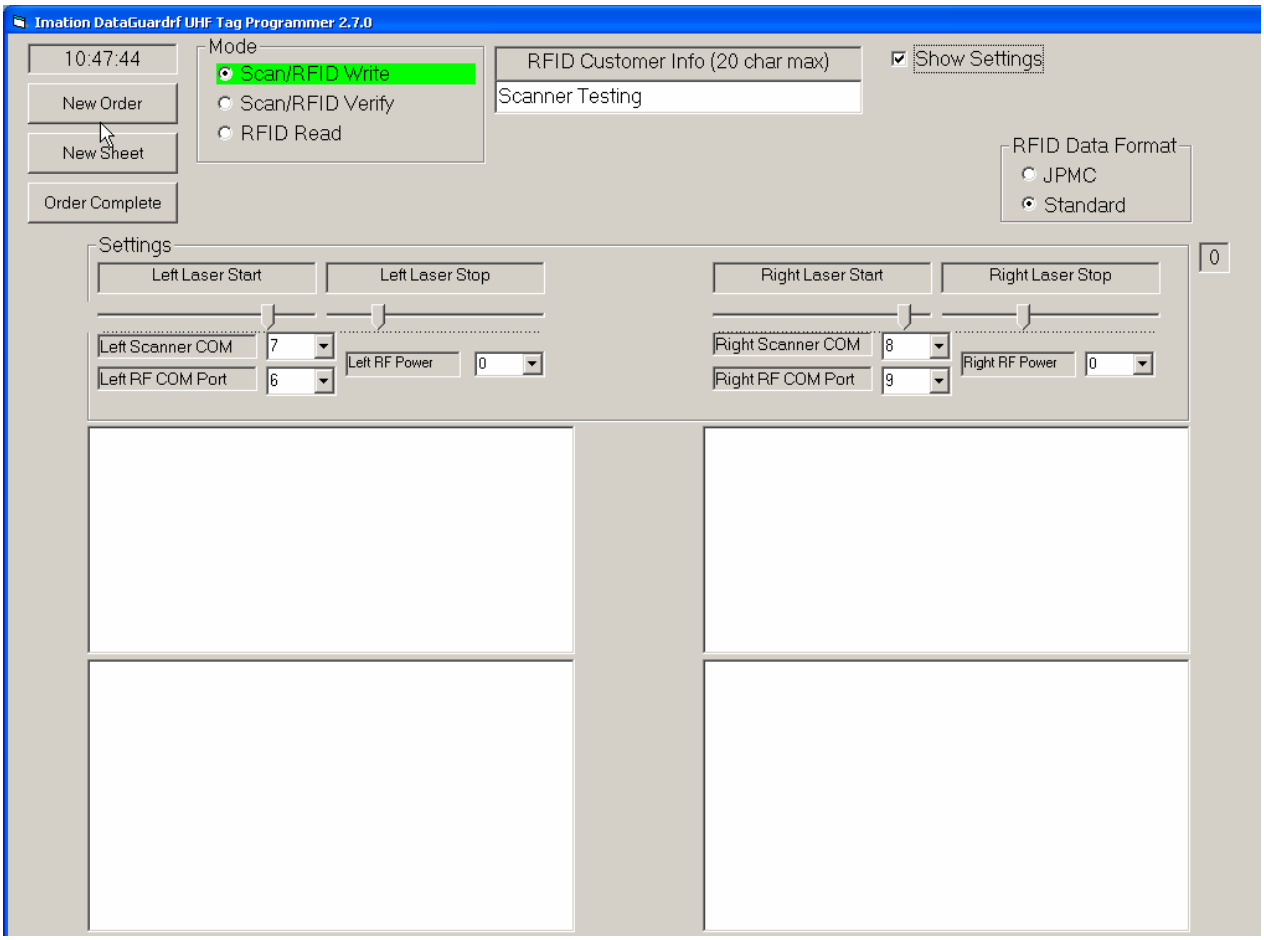

Figure 15: A screen shot with the settings check box active.

Left Laser Start and Stop / Right Laser Start and Stop
These settings are the adjustments for the laser scanners on the left and right sides of the DataGuard rf UHF Label Programmer. Moving the sliders under each column will visibly change the beginning and end points of each laser scan line.

Adjust the scan lines by moving the sliders so that each line extends slightly beyond the edges of its respective barcode label without interfering with the label in the other column.

Left Scanner COM / Right Scanner COM
The communication or "COM" ports exist as virtual ports on the programmer. A single USB cable links the programmer to the computer with the DataGuard rf UHF software, and the selection of com ports is automatic. The user can determine the communication ports for the laser scanners with these drop-down options. The range is none to 15 for the left and right scanners.

Left RF COM port / Right RF COM port
The user can also determine the communication ports for the RF scanners with these drop-down options. The range is none to 15 for the left and right scanners.

Left RF Power / Right RF Power

The user can set the power level for the RFID scanners with these drop-down options. The range is 0 to 220 for the left and right scanners. Imation will specify a recommended power level for the tags we supply.

RFID Data Format
There are two options for the RFID format that is written to the RFID tags: JPMC format and standard format. It is very important that the tags be written with the proper format, or they will not be able to be read by the customer once they get into the field. Unless specifically instructed in the order info, always use the standard format.

Database Search

The DataGuard rf UHF Tag Programming software records every tag written and verified in a file based database (Dataguardrf.mdb) which is located in the program directory. The software includes a simple front end to search the database, based on a number of user specified criteria, and display the resulting records. You can also view and manipulate the database using standard tools and programs available from Microsoft. Examples of programs with database access capability include Excel, Access, and many others.

The database search criteria are combined in a logical AND fashion, that is, a given record must satisfy all the specified search criteria in order to be included in the displayed results.

The database search and display tools in the programmer software are accessed by pressing the button marked **Database Search** near the bottom of the main screen. The following screen will appear:

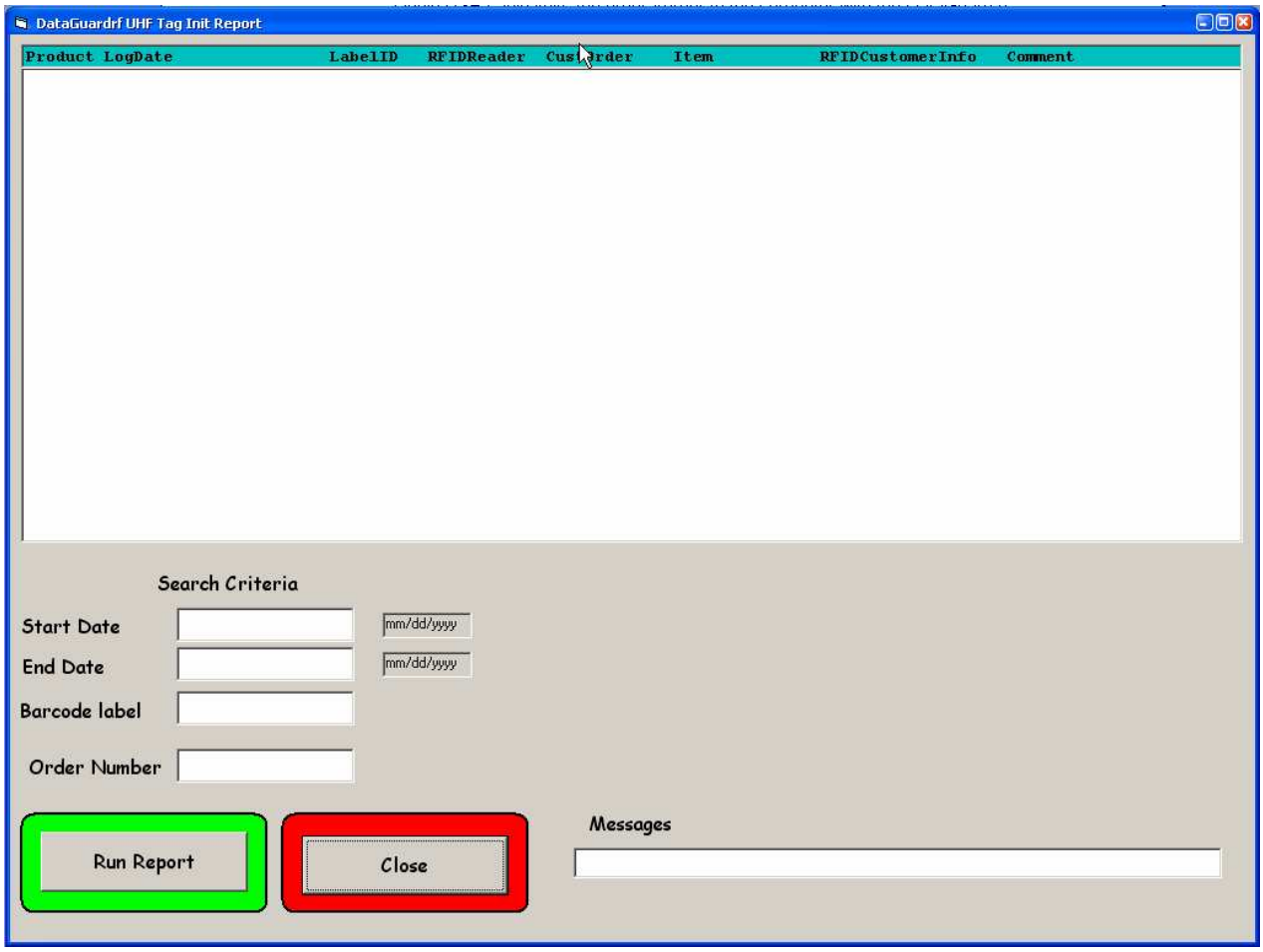

Figure 16

Start Date
The desired start date for the search can be specified in this field. It is possible to specify a start date without an end date. If that is the case, the end date is taken as today's date.

End Date
The desired end date for the search can be specified in this field. It is not possible to specify an end date without a start date. If that is the case, an error will occur.

Barcode Label
The desired barcode label value for the search can be specified in this field. The barcode label field must be an exact match.

Order Number
The desired order number for the search can be specified in this field. The order number field must be an exact match.

Run Report

Once you have specified the desired search criteria in the fields above, press this button to search the database and display the results in the viewing window. The results will appear as a scrollable list of database records that match the specified search criteria.

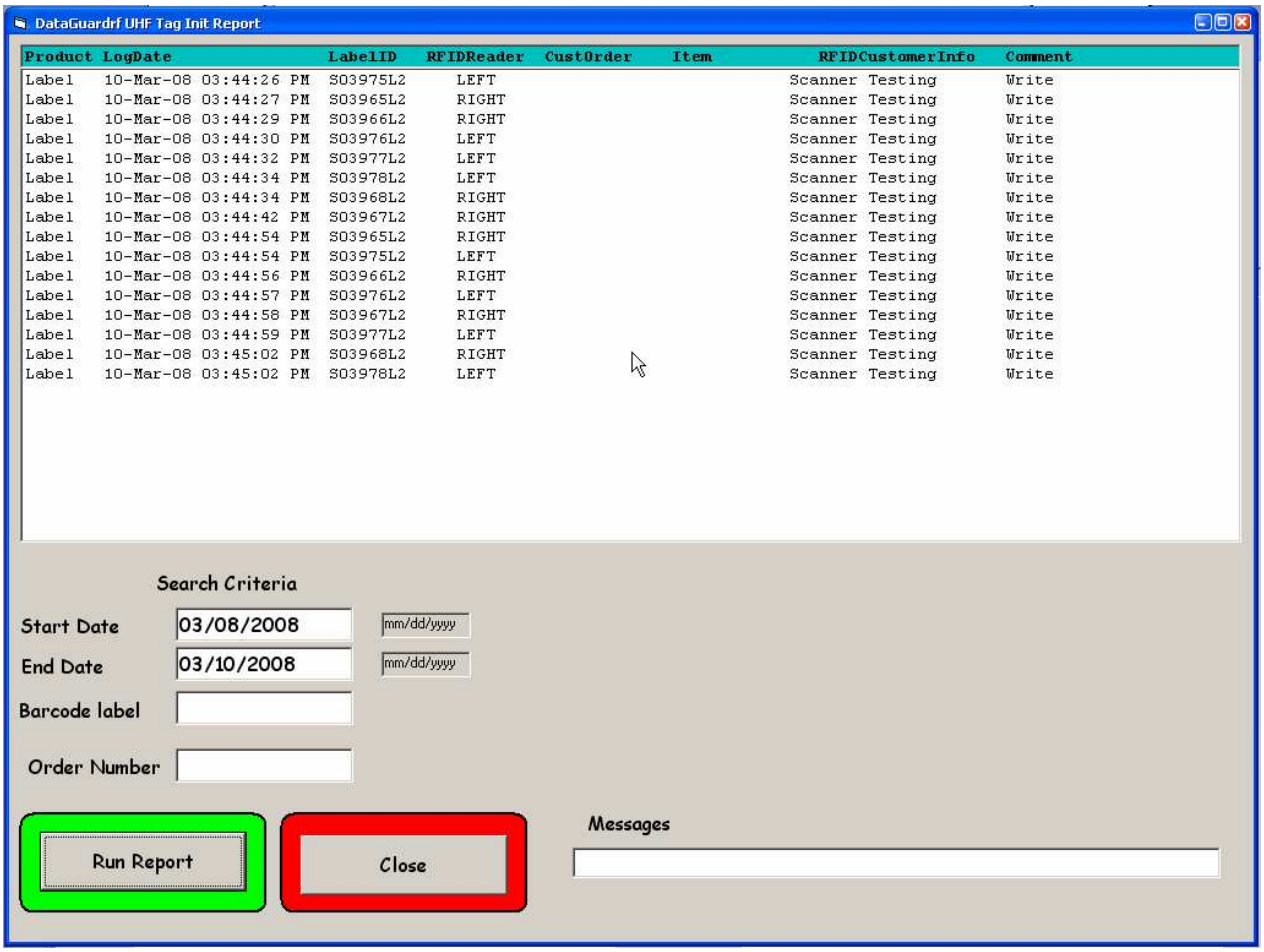

Figure 17

If you want, you can modify the search criteria and press the **Run Report** button again to display results based on the new search criteria.

Close
Press this button to close the database search window and return to the main screen.

Troubleshooting Guide

The DataGuard rf UHF Tag Programming software may display the following error upon startup:

Figure 18

This error occurs when the software cannot find the reader hardware. Possible causes and solutions are:

1) Power is not being supplied to the programmer.
Check to make sure the power cord is fully inserted into the programming unit.
Make sure the power switch on the programming unit is turned on.
Check to make sure the power cord is plugged into a live wall outlet. If the power cord is plugged into an outlet strip, make sure the power switch on the outlet strip is turned on.

2) The software cannot communicate to the hardware over the USB cable.
Make sure a functioning USB cable is connected to the tag programming unit and the computer running the tag programming software.

3) Software startup error.
Occasionally the software will have trouble talking to the hardware, especially right after powerup.

In all these cases, click **OK** to exit the software. Once you have corrected the problem, try restarting the software.

The software may also display the following errors upon startup:
Right RF reader not found!
Left Laser scanner not found!
Right Laser scanner not found!

There are 2 main causes for these errors, software startup errors and actual hardware malfunction errors. Try clicking **OK** to exit the software and then restart it to see if the error clears itself. If it doesn't, the problem is most likely due to a hardware error and the unit should be returned to Imation for servicing.

Occasionally Windows will display the following error when the programming unit is first plugged into the USB port:
USB Device Error. A USB device attached to this port has malfunctioned or is not recognized. Click here to troubleshoot.
Close the window by clicking on the **X** in the upper right hand corner. Remove the USB cable from the device. Wait ten seconds, and then reinsert the cable in the device.

Specifications

DataGuard rf UHF Label Programmer

Part Number	66-0000-9000-2

Physical Data:

Dimensions	53.3 x 31.2 x 17.5 cm (21.0 x 12.3 x 6.9 inches)
Weight	6.8 kg (15 lbs.)

Electrical Data:

Power adapter	100-240VAC 50-60HZ 0.5A
Programming station	9VDC 1.67A (TIP +, RING -) +9VDC ---o)--- GND
Operating frequency	902 to 928 MHz
Data Interface	USB Type B Jack

Environmental Conditions:

Operating temperature	5°C to 40°C (40°F to + 105°F)
Storage temperature	-25°C to +85°C (-10°F to +185°F)
Humidity	5%-80%, no condensation

RF Approval:

USA	FCC 47 CFR Part 15.247
Canada	RSS-210

USA

FCC ID: PB4DGPRG200

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Modifying this device may void the user's authority to operate the device.

CANADA

IC: 6900A-DGPRG200

The term "IC:" before the equipment certification number only signifies that the Industry Canada technical specifications were met.