

Client Information System

By

Phil Infante

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Client Information System

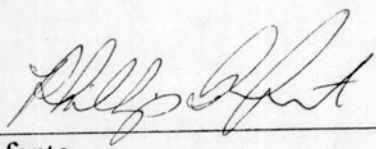
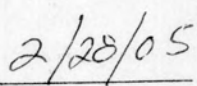
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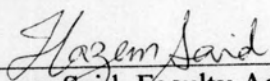
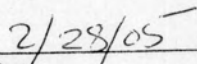
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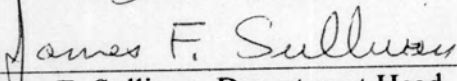
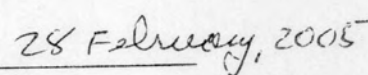
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Phil Infante	Date

	
Dr. Hazem Said, Faculty Advisor	Date

	
James F. Sullivan, Department Head	Date

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Abstract

Client Information System or CIS is designed to centralize the ability to log, track, and organize credit for parts returned and phone calls from dealership part managers with any array of problems. CIS uses Microsoft Access as a front-end interface and Microsoft Access database for a back-end with capabilities for database. The software program will be built using Microsoft rapid-application-development (RAD) software, Access/Visual Basic. The program is designed for use on Microsoft Windows 2000/XP operating systems. The CIS user interface will consist of Windows GUI with mouse point-and-click functionality.

Client Information System

1. Statement of the Problem

The current system at General Motors Service Parts Warehouse in Cincinnati consists of an informal collection of hard copy forms, spreadsheets, and notes that often vary among the five members of the customer service department. There is no uniform method of obtaining a clear, comprehensive picture of customer care. Phone calls from dealership part managers are written on note pads detailing the time, identification of dealer, problem type, and any information collected. Since there is a lack of uniformity in handling phone calls, poor communication between members of the five member customer service department is a problem. At any given time people in the department will be on vacation, sick, training, or assigned other jobs. Parts managers may need something handled within a specific amount of time. Response time is a concern.

There are several needs that will be addressed in order to solve the problem. There is a need for the ability to log or input credit for parts sent to dealership parts managers. Also there is a need for the ability to track damaged material parts, returned claims, and query reports. In addition there is a need for the ability to input detailed information from part manager phone calls in a uniform manner so that all members of the five member customer service department have access to the information. Finally a need for the ability to create reports including customer performance complaints, wrong part claims, and damage freight claims exists.

2. Solution

Client Information System or CIS is a software application specifically designed for the customer service department in GMSPO. CIS uses Microsoft Access as a front-end interface and Microsoft Access database for a back-end with capabilities for database. The software program will be built using Microsoft rapid-application-development (RAD) software, Access/Visual Basic. The program is designed for use on Microsoft Windows 2000/XP operating systems. The CIS user interface will consist of Windows GUI with mouse point-and-click functionality. CIS will be versatile by including the following capabilities:

- The VBA programming language is used to power the GUI interface and create the GUI as a front-end.
- The use of Microsoft Access linking allows the ability of separating the database into a front-end and back-end.
- General Motors has a license agreement with Microsoft Office.
- Multiple tables for the database allows creating, inserting, or subtracting data for manageable use, such as tables for user groups, dealer information, inventory of part numbers, and parts prices.
- Security settings for users can be programmed in VBA for permission to certain users and creation of groups for software use.

2.1 User Profile

The intended users for CIS are the members of the customer service department of General Motors Service Parts Operation or GMSPO in West Chester, Ohio, and future customer service departments within GMSPO. The customer service department handles about 65 phone calls a day from car dealership part managers. The West Chester GMSPO plant is responsible for servicing a total of 700 car dealership part managers in the Midwest. The user must be able to use a standard Microsoft Office Application, be able to navigate the GUI and enter relating data pertaining to job. The user also must have knowledge and agreement of commonly used practices and guidelines in the customer service department.

2.2 Design Protocols

The flow of CIS consists of one main menu with five choices. Those choices include contacts which allow the customer service user to enter information of businesses related but not part of GM. Examples of contacts are contractors or services used by GM. Another choice is called dealers, which enables users to find dealers by dealer code, route, or dealership name. Return to Dealer or RTD allows users to enter data for additional credit or parts returned. Reports allow users to print reports for additional credit, parts returned, or problem types. The final choice is the exit option to quit the program. (See Figure 1.) for the organizational schema for an example of the main menu screen shot.

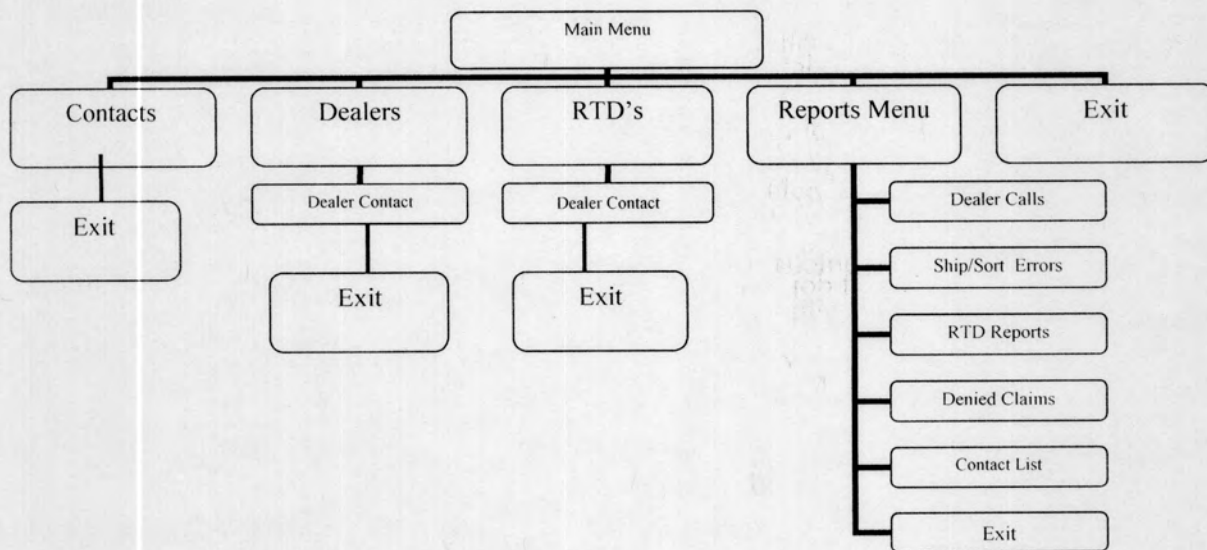


Figure 1. Organizational Scheme Flowchart

2.3 Database Design

The Microsoft Access database scheme will consist of eight tables related to the GM Customer Service Department schema. (See Figure 2.) displays the relational flow of data related to each of the tables in the database.

Examples of these requirements are:

- A customer service user enters data relating to job from communication with dealership.
- Parts Returned to Dealer or RTD is specifically logged for any parts returned or credits issued.

- Problem types identified between communication with dealership and customer service user is entered and logged as a call.

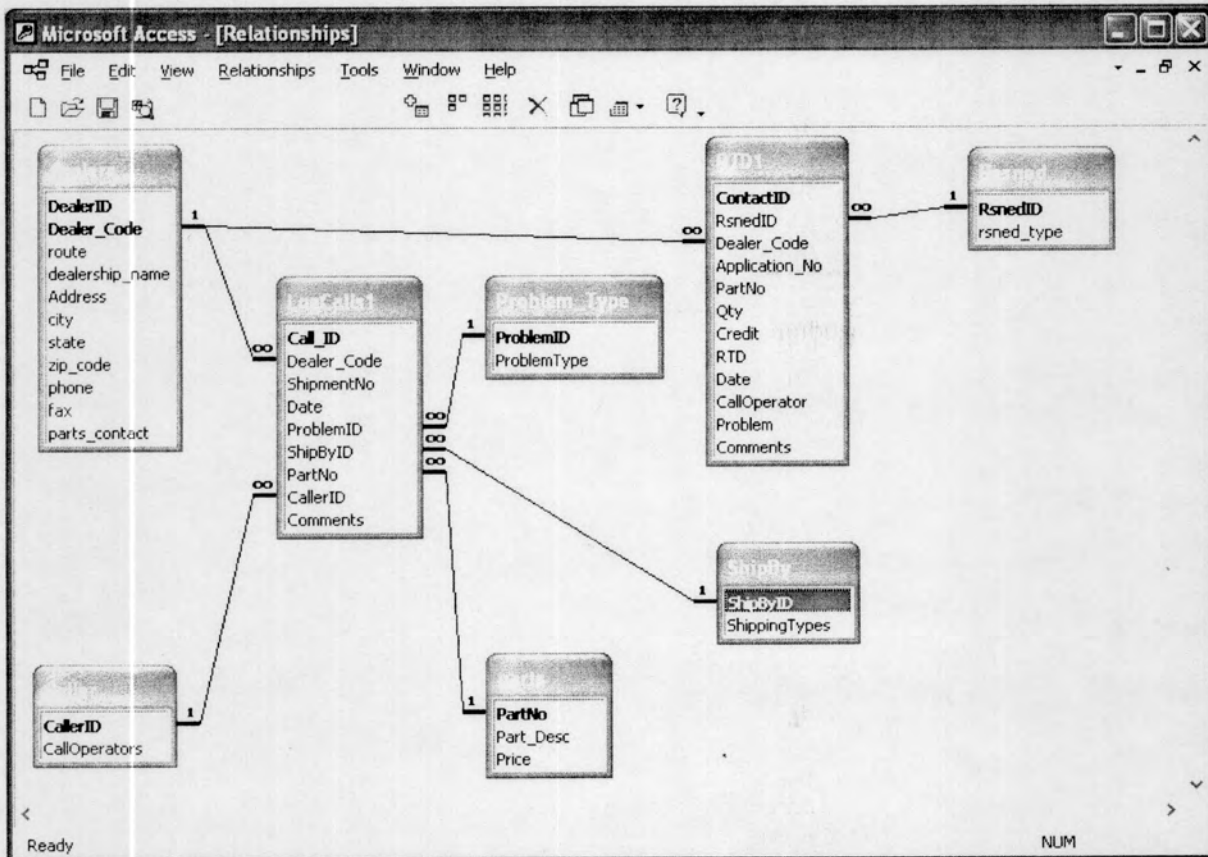


Figure 2. Microsoft Access Database Schema

2.4 Programming Coding Standards

The CIS Project is written to a set of coding standards which makes the project more readable and maintainable.

2.4.1 Programming VB Coding Standards

1. Complete detailed comments throughout the project within the programming environment.
2. Use compound names for objects, variables, functions, and sub-routines, when applicable. Use of proper case (i.e. capitalize the first letter of each word). For example txtDealerCode.
3. All variable names must be meaningful/descriptive.
4. Do not use global variables.
5. Use indentation to show scope. Indent 3 or 4 spaces. Indent inside functions, sub-routines, loops, if and case statements.
6. Be consistent.
7. Design and implement Error Handling Routines.

Data Type	Prefix	Example
Arrays	a	alngOrders
Boolean/Bit	bln	blnShipped
Character	chr	chrRsnedID
Integer	int	intPartID
Long	lng	lngOrder
Short	shrt	shrtIndex
Single Float	sng	sngAverage
Double Float	dbl	dblAverage
String	str	strFirstName
Forms	frm	frmDealerContact
Modules	mod	modPrint
Class Modules	cls	clsDealers
Label	lbl	lblDealerCode
Text	txt	txtRsned
List Box	lst	lstPartList
Command	cmd	cmdLogin
Option Box	opt	optShipped
Check Box	chk	chkClaimResolution

Figure 3. VB Naming Conventions

2.4.2 Programming SQL Coding Standards

1. Capitalize reserved words in any SQL command or query.
 2. All variable, table, view, and constraint names must be meaningful/descriptive.
 3. All columns must not contain NULLS.
 4. Be consistent.
 5. Use indentation to show scope.
- Examples:

```
SELECT Publishers.*, PubInfo.Logo, PubInfo.PrInfo
FROM Publishers
INNER JOIN PubInfo ON Publishers.PubID = PubInfo.PubID
```

3. Deliverables

Database Management and Programming

A Software Program Tracking System

1. A Microsoft Access Based Software that manages and tracks customer calls along with tracking Return to Dealer (RTD) credits.
2. A user interface written in VBA which allows ease of navigation.
3. The Client Information System (CIS) uses ODBC to communicate between the client and database.
4. A login that is authenticated by the database.
5. Users will be able to complete the following tasks:
 - Create and edit data

- Manage and track damaged material parts, returned claims, and query reports
- Create, edit, or add RTD credit for parts sent to dealership part managers
- Create reports including customer performance complaints, wrong part claims, and damage freight claims
- Search for existing problems by DealerID or Problem Type

4. Design and Development

4.1 Timeline

Detailed estimated timetable schedule for project from proposal, design, documentation, and final demonstration.

4.1.1 Senior Design I Winter 2003

Weeks 1-5 (January 3, 2003 to February 7, 2003)

- Gather Information

- Progress Report

- Problem/Area of Inquiry

Weeks 6-10 (February 10, 2003 to June 2, 2004)

- Proposal Draft submitted February 10, 2003

- Proposal Presentation submitted and presented on June 2, 2004

4.1.2 Senior Design II Summer 2004

Weeks 1-5 (June 28, 2004 to August 2, 2004)

- Design Organizational Scheme Flowchart
- Design User Interface
- Draft of Project Description and Intended Use and User Profile

Weeks 6-10 (August 9, 2004 to August 23, 2004)

- Design Database
- Program Code to Microsoft Access Database for Presentation
- Documentation
- Demonstration of Prototype submitted and presented on August 23, 2004

4.1.3 Senior Design III Winter 2005

Weeks 1-5 (January 3, 2005 to January 31, 2005)

- Complete Project Functionality
- Complete Testing and Troubleshooting

Weeks 6-10 (February 7, 2005 to February 28, 2005)

- Submit Preliminary Draft of Final Report/ Documentation
- Submit Abstract of Project
- Submit Final Documentation and Demonstrate Project on February 28,

2005

4.2 Budget

Item	Cost
Development Budget	
Programming fee \$35 per hour for 310 hours	\$ 10,850.00
Developmental Total	\$10,850.00
Production Budget	
Microsoft Office 2000 Bulk Licensing per 250 computers	Free
Production Total	Free
Developmental Total	\$10,850.00
Project Total	\$10,850.00

5. Proof of Design

The next section demonstrates in detail how the deliverables of the project were fulfilled and what challenges were encountered.

5.1 Main Menu Interface

The customer service user role is to view, enter, and print reports with CIS. The main menu becomes the main point of entry to the specific uses related to knowledge of service department. The first screen shot organizes the categories, which relates to the Customer Service Department (See Figure 4.). The first button takes you to the GM Dealers form, the second button takes you to the RTD form, the third button takes you to the reports form, and the final button lets you exit the program.

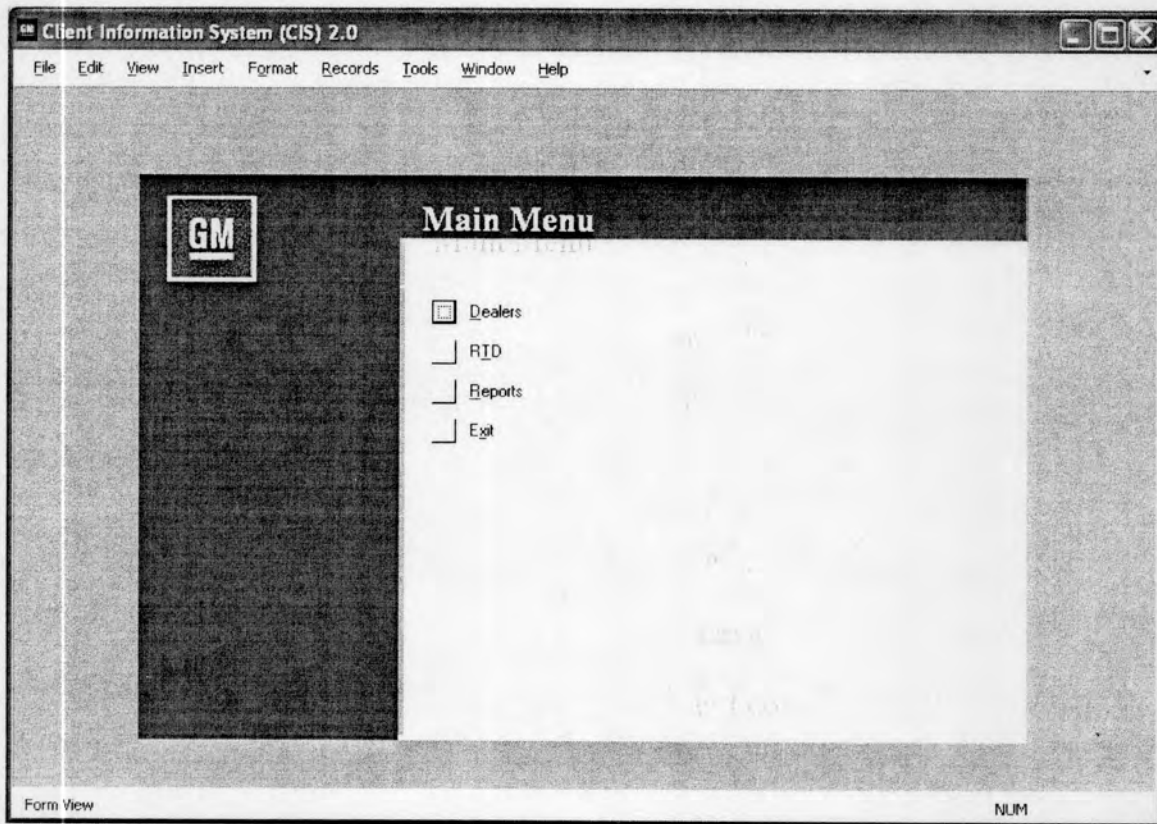


Figure 4. Main Menu

5.1.1 GM Dealers Form

The customer service personal clicks the button for Dealers from the Main Menu. The GM Dealers form is display with information pertaining to the Dealerships, along with the history of problems entered by the customer service person to that dealer (See Figure 5.). There are three text boxes categorized under Lookup by, which allows the person to find a dealer by there unique dealer code. The remaining two boxes lets the user search the dealer by there route or company name. These text boxes are the main focal point because they allow the user to query the dealer by there unique dealer code, assigned route number, and the name of the dealership. When the customer service user

needs to find the dealer in order to view the history or add a phone call problem he/she uses the query to find that particular dealer.

The upper right hand corners of the form are the buttons that the customer service person will use to enter information. The Add Call button allows the user to enter future problems discussed for tracking. The Add Dealer button allows the user to add a new dealer which the GMSPO will be the servicing administrator. The exit button allows the user to exit the GM Dealers form and return the user to the Main Menu form.

Client Information System (CIS) 2.0

File Edit View Insert Format Records Tools Window Help

GMDealers

Customer Log

Add Call Exit

Sunday, February 27, 2005

Lookup by...
 Dealer Code [509696] Route [3107] Company Name [BOBBY LAYMAN CHEVROLET INC.]

Dealer Code [509696] Route [3107] Notes: []

Company [BOBBY LAYMAN CHEVROLET INC.]

Address [3900 W BROAD] Contact Name [DAVID]

City [COLUMBUS] State [OH] Zip Code [43228] Email []

Phone [614-275-0500] Fax [614-278-4260]

Call History:

Call_ID	Date	Call Operator	ProblemID	Comments
51	2/6/2005 10:34:00 AM		08	Dealer received part t
(AutoNumber)				

Record: [1] of 1

Form View NUM

Figure 5. GM Dealer's Form

5.1.2 Adding a New Call Problem

The customer service personal clicks the button for Add Call from GM Dealer form. The Dealer Contact form is displayed with text boxes for information pertaining to the Dealers problems (See Figure 6.). The dealer code is automatically inherited from the GM Dealer form the person is viewing. A date and time stamped is automatically filled along with caller name. The upper right hand corner of the form has the buttons that the customer service person will use to update the information entered, a report button to view reports, and a cancel button to exit the form.

The user will ask a series of questions from the dealer. The user will ask the dealer what ship by carrier did the problem occurred. There choices are none, Schneider, CSO-3, Fedex, UPS, Bax, or other. Theses choices are identified by the unique Ship ID.

Client Information System (CIS) 2.0

File Edit View Insert Format Records Tools Window Help

Customers

GM

Dealer Code: 509696 Date / Time: 2/6/2005 11:11:53 AM Call Operator: Ship By:

Caller Name: Shipment No.: Problem:

Work Assgn.:

Comments:

ShipByID	ShippingTypes
00	None
01	Schneider
02	CSO-3
03	Fedex
04	UPS
05	Bax
06	Other

A combo box listing of Carriers used for GM shipments. NUM

Figure 6. Dealer Contact Form

The Caller Name, Shipment No., and Problem text boxes the next series of boxes to be entered by the user (See Figure 7.). The Problem text box has choices which are PC-31 claim, Financial Adjustment, Transportation Issue, Ordering Issue, Lost/Missing Item, Freight, or None. These choices are identified by the unique Problem ID. The Problem text box is important because it allows the customer service department to track the type of problem a dealer is calling about. The Problem text box must be chosen in order to save the information entered, otherwise a dialog box appears telling the user they are missing a category and they must choose a category or click the cancel and close button (See Figure 8.).

Client Information System (CIS) 2.0

File Edit View Insert Format Records Tools Window Help

Customers

GM Dealer Contact Form

Add Update Cancel and Close

Dealer Code: 509696 Date / Time: 2/6/2005 11:11:53 AM Call Operator: Ship By: 01

Caller Name: Ken Shipment No: 115457 Problem:

ProblemID	ProblemType
01	PC-31 Claim
02	Financial Adjustment
03	Transportation Issue
04	Ordering Issue
05	Lost/Missing Item
06	Freight
07	None

Work Assign: Comments:

A combo box listing a problem category. NUM

Figure 7. Choosing Problem Type

Missing data

Missing a Category; Please choose a category or cancel

OK

Figure 8. Missing Data

The final series of text boxes are the Work Assgn and Comments. The Work Assgn text box is unique number that identifies the person who picked the parts originally for the dealer. This information is found on the dealer paperwork when the order is received. The Comments text box allows the user to explain the problem to the dealer (See Figure 9.). The user has three buttons in the upper right-hand corner. They are the

Add Update, Report, or Cancel and Close buttons. When the user has entered all the information they click on the Add Update button to save the information for that dealer. If the user chooses not to save the information, he/she would chooses Cancel and Close. The information will not be saved, and he/she exits out of the form back to the GM Dealers form.

Client Information System (CIS) 2.0

File Edit View Insert Format Records Tools Window Help

Customers

GM

Add Update Cancel and Close

Dealer Code: 509696 Date / Time: 2/6/2005 11:13:49 AM Call Operator: Ship By: 01

Caller Name: Ken Shipment No: T115457 Problem: 05

Work Assign: 414545

Comments: Dealer received part that belongs to another dealer. The dealer is 509412 and it is part number 9597276. I have fax a sheet to the dealer and faxed one to schneider. The will contact dealer 509412 and let them know the part will be picked up by schneider and delivered to them in a couple of days.

Update Information entered to database. NUM

Figure 9. Completed Form

The GM Dealers form has a Call History section to view all the problems a dealer has had in the past from the phone calls logged from the customer service user. This information can be useful for identifying any reoccurring problems or complaints (See Figure 10.).

The screenshot shows the 'Client Information System (CIS) 2.0' window. The 'Customer Log' form is active, displaying details for Bobby Layman Chevrolet Inc. The form includes fields for Dealer Code (509696), Route (3107), Company Name (BOBBY LAYMAN CHEVROLET INC), Address (3900 W BROAD), City (COLUMBUS), State (OH), Zip Code (43228), Phone (614-275-0500), Fax (614-278-4260), and Contact Name (DAVID). A 'Call History' table is visible below the form, showing a single record for a call on 2/6/2005 at 10:34:00 AM, with the comment 'Dealer received part t'. The interface also features a menu bar (File, Edit, View, Insert, Format, Records, Tools, Window, Help) and buttons for 'Add Call', 'Add Dealer', and 'Exit'.

Call_ID	Date	Call Operator	ProblemID	Comments
1 (AutoNumber)	2/6/2005 10:34:00 AM		08	Dealer received part t

Figure 10. Querying the Dealer History

5.1.3 Return to Dealer (RTD)

The customer service personal clicks the button for RTD from the Main Menu. The Return to Dealer (RTD) form is displayed. The Return to Dealer (RTD) form displays information pertaining to the Dealer's history of credit issued for parts or parts returned back (See Figure 11.). The form has two subforms within the Return to Dealer form. The first display is a history of parts returned back to dealer and credit issued. The second will consist of parts data related to each particular application field in the first subform.

There are three text boxes categorized under Lookup by, which allows the person to find a dealer by the unique dealer code. The remaining two boxes let the user search the dealer by the route or company name. These text boxes are the main focal point

because they allow the user to query the dealer by the unique dealer code, assigned route number, and the name of the dealership. When the customer service user needs to find the dealer in order to view the history or add a phone call problem he/she uses the query to find that particular dealer.

In the upper right hand corner of the form are the buttons that the customer service person will use to enter information. The Add button allows the user to enter future parts credit or returned for tracking. The exit button allows the user to exit the Return to Dealer (RTD) form and return the user to the Main Menu form.

Client Information System (CIS) 2.0

File Edit View Insert Format Records Tools Window Help

Return To Dealer

GM **Return To Dealer (RTD)** Add Exit

Filter By... Sunday, February 06, 2005

Dealer Code [] Route [] Company Name []

Dealer Code 509412 Dealership MCCLUSKEY CHEV INC

RTD History:

ContactID	Date	Application No
4093	6/28/2003	1429643-W
* toNumber)		

Part History:

PartNo	Price	Qty	Cre-Qty	RTD-Qty	RS

Record: [] 1 of 1

Form View NUM

Figure 11. Return to Dealer (RTD) Form

5.1.4 RTD Contact

The customer service user clicks the Add button from the Return to Dealer (RTD) form. The RTD Contact form displays text boxes with information pertaining to the Dealers problems. The dealer code is automatically inherited from the Return to Dealer (RTD) form the person is viewing. A date and time stamped is automatically filled along with caller name. The user will ask a series of questions from the dealer. The Caller Name, Application No., and Comments text boxes are to be entered by the user (See Figure 12.). The Parts Adjustment section allows the user to enter the part number information to be credited or returned.

Client Information System (CIS) 2.0

File Edit View Insert Format Records Tools Window Help

RTD Contact Form

Save and Close Cancel and Close

Dealer Code: 509412 Date / Time: 2/6/2005 11:57:54 AM Contact ID: Call Operator:

Caller Name: Lisa Application No: 114545-w

Comments: Dealer has a part, which he has problems in the past. The part is labeled correctly, but the part is unidentifiable inside the box. The part was returned back to him from MFR department. He wants to return the part a second time.

Parts Adjustment

Part Number: 88890196

Quantity: 88890206

Quantity Credit: 88890525

Quantity Returned: 88890930

Resned Code: 88891152

88891222

88891258

88891398

Listing of Part Numbers. NUM

Figure 12. RTD Contacts Form

The Parts Adjustment section allows the user to enter the part number information to be credited or returned. The user will ask the dealer what is the quantity number of parts and the credited quantity or returned quantity for the parts. The Resned Code text box has choices for that type of problem that a part will be issued credit or return. The choices are identified by the unique Resned ID. The Resned text box is important because it allows the customer service department to track the types of problems a dealer is having with a part (See Figure 13.). The Resned text box must be chosen in order to save the information entered, otherwise a dialog box appears telling the user they are missing a category and they must choose a category or click the cancel and close button (See Figure 15.).

Client Information System (CIS) 2.0

File Edit View Insert Format Records Tools Window Help

RTD Contact Form

GM

Save and Close Cancel and Close

Dealer Code: 509412 Date / Time: 2/6/2005 11:57:54 AM Contact ID: Call Operator:

Caller Name: Lisa Application No: T14545-w

Comments: Dealer has a part, which he has problems in the past. The part is labeled correctly, but the part is unidentifiable inside the box. The part was returned back to him from MR department. He wants to return the part a second time.

Parts Adjustment

Part Number: 88890196

Quantity: 1

Quantity Credit: 0

Quantity Returned: 1

Resned Code:

ResnedID	rsned_type
00	Warranty
01	Not Authorized for Return
02	Wrong Part for PartNo
03	Part Used or Painted
04	Part Damaged or Rusty
05	Container Opened
06	PartNo Altered or Handwriting

Form View NUM

Figure 13. Parts Adjustment Section

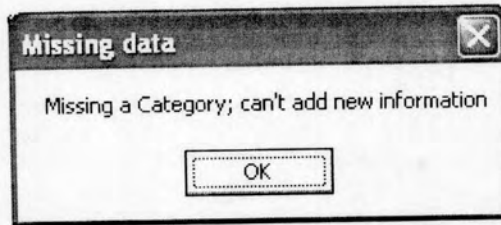


Figure 14. Missing data from Resned type

The Return to Dealer (RTD) form has a RTD History and Part History sections to view all credited or returned parts a dealer has had in the past. This information can be useful for identifying any reoccurring credits or returned parts a dealer is currently or has had in the past (See Figure 15.).

The screenshot shows the "Return To Dealer (RTD)" form within the "Client Information System (CIS) 2.0". The form has a menu bar (File, Edit, View, Insert, Format, Records, Tools, Window, Help) and a title bar. Below the title bar, there's a GM logo and a "Return To Dealer (RTD)" header. To the right of the header are "Add" and "Exit" buttons and a date field showing "Sunday, February 06, 2005".

Below the header, there are filter options: "Filter By:" with dropdowns for "Dealer Code", "Route", and "Company Name". The "Dealer Code" is set to "509412" and the "Company Name" is "MCCLUSKEY CHEV INC".

The form is divided into two main sections:

- RTD History:** A table with columns "ContactID", "Date", and "Application No". It contains two rows of data:

ContactID	Date	Application No
6781	2/6/2005 11:57:54 AM	114545-w
4093	6/28/2003	1429643-W

 Below the table is a text field labeled "toNumber)".
- Part History:** A table with columns "PartNo", "Price", "Qty", "Cre-Qty", "RTD-Qty", and "Rt". It contains one row of data:

PartNo	Price	Qty	Cre-Qty	RTD-Qty	Rt
88890196	\$5,274.00	1	0	1	02

At the bottom left, there is a "Record:" field with navigation buttons and a page indicator "1 of 2". At the bottom right, there is a "NUM" label.

Figure 15. Querying the Dealer RTD History

5.1.5 Print Report Interface

The customer service personal clicks the button for Reports from the Main Menu. The Reports form is displayed with a Select Report to Preview text, which is populated with reports to be viewed. Currently the Reports form consists of five choices for reports with related data from the GM Dealers and Return to Dealer (RTD) forms (See Figure 16.).

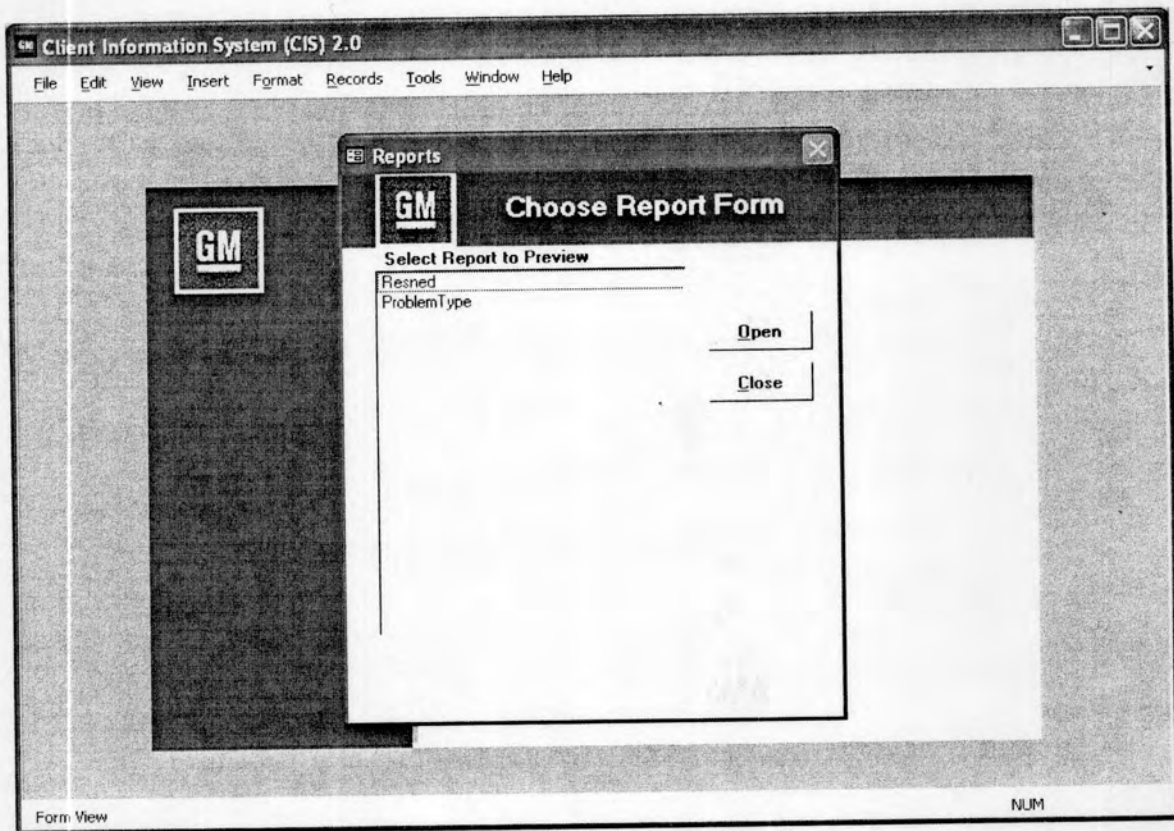


Figure 16. Reports Menu Form

5.1.6 Resned Report

The Resned Report is shown as a grouping of all the Resnd Type related to the information entered by the user for all credits or returned parts (See Figure 17.). This information can be useful for identifying how often a dealer is requesting to receive credit and returning parts. Any reoccurring credits or returned parts a dealer is currently or has had in the past can be interpreted as abuse of the process.

Client Information System (CIS) 2.0 - [rptResned]

File Edit View Tools Window Help

100% Close Setup

GM *Report of Resned Code Types* Sunday, February 06, 2005

Category of RTD Not Authorized for Return

Dealer Code 517275

Date	Application#	Part#	Qty	Credit	Returned
8/22/2004	25154	15120163	1	0	1

Category of RTD Wrong Part for PartNo

Dealer Code 509412

Date	Application#	Part#	Qty	Credit	Returned
2/6/2005	114545-w	88890196	1	0	1

Category of RTD Part Used or Painted

Dealer Code 307019

Date	Application#	Part#	Qty	Credit	Returned
8/22/2004	88888-w	10046089	1	1	0

Dealer Code 309088

Page: 1 Ready NUM

Figure 17. Resned Report

5.1.7 Problem Category Report

The Problem Category Report is shown as a grouping of all the Problem Types related to the information entered by the user from phone calls received by the customer service department (See Figure 18.). This information can be useful for identifying what types of problems are reoccurring for the dealer or has had in the past. This information can be passed on to the supervisors involved with the process for corrective action.

Client Information System (CIS) 2.0 - [rpfProblemType]

File Edit View Tools Window Help

100% Close Setup

GM *Problem Category* Sunday, February 06, 2005

Problem **PC-31 Claim**

Dealer Code: **109640**

Date	Transportation	Shipment #	Comments
8/22/2004	CSO-3	1025414	Short a part on order and wants claim approved.

Dealer Code: **508683**

Date	Transportation	Shipment #	Comments
8/22/2004	Schneider	102541	PC-31 Claim was denied and he as a wrong part picked. Wants claim approved.

Problem **Transportation Issue**

Dealer Code: **109640**

Date	Transportation	Shipment #	Comments
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Page: 1 Ready NUM

Figure 18. Problem Category Report

6. Testing

The testing phase occurred during a four month period in the GMSPO Customer Service Department from August 4, 2004 and completed on January 3, 2005. Since I am a part of the Customer Service Team, I monitored and tested the prototype. The scheduled

meetings with the Customer Service Department was planned by the plant manager and held every three weeks to collect feedback from the users in order to make the prototype more effective. The purpose of testing is to determine ways of making an application expose flaws in either the design or execution of the development process, along with making changes to relevance to the GMSPO business.

The overall testing breakdown consisted of: identifying problems such as syntax errors, logic errors, and miscellaneous user errors. The miscellaneous user errors can be defined as wrong characters entered by the user in textboxes for numerical value, empty textboxes where the user did not enter any data, and any error that is not identified in the early stages of development, such as any network problems. These problems account for fifty percent of the testing; the other fifty percent was the relevance of data to be used by GMSPO with CIS and what fields would be used.

The three related components of the usability in the testing process I focused on: 1) the recording feedback process, 2) the software observation process and 3) management of the data. Samplings of the feedback from the users in the Customer Service Department, along with consideration of the need are listed in a table (See Figure 19.). Many of the ideas were put in a category of feasibility and importance.

Suggestion	Need
1.) Whenever I click on CIS it takes a little longer to load. Is there a way to speed up this process?	Since CIS is on a server and uses Microsoft Access for a back end. This will continue to be a problem as the database grows. This is a performance issue and will have to be addressed in the future as CIS continues to grow.
2.) Minimize the amount of text boxes to enter information. I need to only enter information that is important. I do not want to spend all day entering information because of my other work and phone calls to answer.	I can take into account the user's time for entering information. It makes sense to enter information that is currently not accessed by other applications. I can keep CIS minimized to a few text boxes for certain types of information.
3.) It does not make sense to enter a part number, then have CIS store the price of the part, especially when I fill out the information in Dealer Contact form.	It is important for the price of the part, when entering the part number for the Return to Part (RTD) form. The Material Return department needs to know the amount is being effective. I agree the Dealer Contact form does not need that information at the present time.
4.) The user ID does not need to be recorded because sometimes others who rarely use the program may want access to CIS. There are a few members in the Customer Service department and what is really important is the information entered. This moment in time security is not an issue.	People may want to find out who logged a problem with a dealer. People may have a question or like something elaborate on information entered by that person. True there are not many people in the department, but as the amount of users grow using CIS it would be smart, in case there is confusion. I agree security is not an issue at the present time.
5.) Can we make CIS do more or can we add more functionality than its intended use?	CIS can grow and expand as the Customer Service Department deems necessary or as the responsibility increases. I can add in more features then the original concept. I have allowed for comments in the code for future alterations by a programmer.

Figure 19. Table of Suggestions from Users

The program was tested everyday during the testing phase by seven individuals with two uses; entering problems from dealer phone calls, adding and tracking RTD, and supplying reports of both the problems from the dealers and RTD credits.

There were issues during the testing phase about basic software performance such as logging in for the user. Initially I created a log screen which prompts for a username and password. Later during one of the meetings it was decided to eliminate the prompt, but let the user software identification to match a table with all the names. The name would be displayed in the Main Menu upper right-hand side (See Figure 20. and Figure 21.). This was to show who the user was and be able to track the person who added or edited any information in the database. GMSPO decided it was not necessary because the person entering the information was not as important as the data itself.



Figure 20. Original Menu Main



Figure 21. Current Menu Main

There are many examples of certain types of information to be entered by the user. One of these examples is the GM Dealers form which has information about a particular dealer including a history of problems that have been entered in the past (See Figure 22.). The plant manager decided that the form had too much dealer information

the familiarity with Microsoft Access. The project fulfilled all Design Freeze deliverables. Testing was performed to ensure the product's usability.

8. Recommendations

While working on this project, I encountered quite a few challenges. A solid understanding of warehousing inventory is recommended along with understanding the need of the customer, Customer Service Department at the GMSPO. I spent a month understanding Microsoft Access and VB Programming. I needed to know what I was able to perform and deliver before accepting the project. I had to present in a meeting the issues involved and deliverables for the project.

Once CIS was implemented to the specification of General Motors Service Parts Operation Customer Service Department, I determined there was a better use for CIS as a multi-user database over Microsoft Access.

The main concern I had with using Microsoft Access as a backend database is described in the table (See Figure 24.). I assessed a comparison between Microsoft Access as a stand alone database versus a multi-user database for an understanding the positive and negative uses of Microsoft Access. The issues of security, user base, portability, and relocation were the most important to research for the effective use of CIS as it expands and grows.

	Microsoft Access	Multi-user Database
Security	The database can usually be copied locally, which can allow a relatively in-experienced hacker to find out any passwords you've protected it with.	The database is never visible to a database user in its entirety. While these are rarely hacked, if they are it tends to be a denial-of-service attack and the data remains secure.
User Base	Access claims to be a multi-user database and can be set up to work as such, but the way that it works exposes the problems in using it for multi-user work. In Access, processing is done on the client machine which means that that client machine has to take the networked Access database, lock part of it, copy that part of it over the network, work on it, put it back and unlock it again. This relies on the network not to leave the database half written to. As a result of this, the possibility that the data will get corrupted increases.	These databases have an engine on the server on which they are sitting. They work on a Transaction Processing system, where a transaction is defined as a complete unit of work. Unless a transaction can be fully applied it waits for a few minutes for a response from the client before throwing the transaction away. There is no need to recover from this – a typical transaction would be an employee's address – and in any case that user knows they've crashed and can go and check that record when their network connection is returned.
Portability	Most Access databases that get large enough to justify conversion to a fully scalable database platform have to be re-written. This process is much more difficult than creating them on a scalable platform from the outset. Conversion of the data is an effort, but not impossible. The code and forms however will need re-writing.	While a server based database can be accessed with platform specific tools, applications written against them, especially on the web are on the whole non-platform-specific. Examples of these tools are Perl, PHP, C, and Java. Not only are all these tools available on a range of hardware platforms, they all have plug-ins for many relational databases.
Relocation	If the server hosting a multi-user Access application changes, all the client machines will need re-pointing to it.	We can set up all users to point to an entry in the Primary Name Server for the university, which means that clients should very rarely need additional reconfiguration.

Figure 24. Listing of Reason for MS Access versus Multi-user Database.

It is my recommendation not to use Microsoft Access if you want to share the database across the network between more than 2 or 3 users. Security, robustness, and scalability become an issue because storing a lot of data and needing good performance becomes a problem if the customer wants to depend on the application for important business processes.

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