

Physical Database Description Highland Basic Order Tracking System

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GLOSSARY OF PROJECT-SPECIFIC TERMS	
Glossary of Software Engineering Terms	A standard glossary of software engineering terms is maintained at www.elucidata.com/refs/seglossary.pdf . Terms specific to this project are maintained below.
Basic Office Tracking System	Software to be developed during this project.
BOTS	Acronym for Basic Office Tracking System.

INTRODUCTION

ABOUT THIS DOCUMENT

This document contains the core database structure information for the BOTS application. The structure of the database supporting BOTS is described at three levels: Entity-Relationship, Access Control Matrix, and Data Dictionary.

The Entity-Relationship Diagram (ERD) describes the relationships between the tables that store the data. Unlike the Logical ERD presented during the requirements gathering stage, this is a physical ERD, and represents the physical structure of the database at a high level.

The Access Control Matrix (ACM) describes the user roles and the allowed actions each role can take against each table in the ERD. These user roles and interactions were originally presented during the planning stage. Here, the roles are confirmed against the final database structure, which includes bridging tables and other items that were not defined until the design stage.

The Data Dictionary (DD) provides a full description of each table in the ERD, as well as the relationships between tables. Further, it defines the properties assigned to each field in these tables.

DOCUMENT STRUCTURE

The actual ERD, ACM, and DD contents are maintained in specialized tools and inserted into this document. As a result, their pagination schemes, and often their page sizes, do not follow the structure of this document. For this reason, they are included as appendices to this document. This results in a very short “document” with large appendices that may not print well on a normal printer. Large ERDs and ACMs generally require a plotter for paper output. For this reason, we recommend you review this document online, instead of trying to print it out.

APPENDIX A – ENTITY-RELATIONSHIP DIAGRAM

The Entity-Relationship Diagram (ERD) describes the relationships between the tables that store the data. Unlike the Logical ERD presented during the requirements gathering stage, this is a physical ERD, and represents the physical structure of the database at the table level.

APPENDIX B – ACCESS CONTROL MATRIX

The Access Control Matrix (ACM) describes the user roles and the allowed actions each role can take against each table in the ERD. These user roles and interactions were originally presented during the planning stage. Here, the roles are confirmed against the final database structure, which includes bridging tables and other items that were not defined until the design stage.

Database operations against stored records fall into four specific classes:

Create	A record is inserted into a database table for the first time.
Read	A copy of any record is retrieved from the database for review purposes only.
Update	A record is retrieved from the database, modified, and saved back into the database. While the record is being modified, other users can read the original information, but cannot make modifications of their own. Once a record is saved back into the database table, other users can read the updated information, or retrieve the record in a locked status to perform their own updates.
Delete	A record is permanently removed from the database table.

To enforce security, a database restricts the ability of users to perform the above database operations against specific tables to those belonging to specific classes in the access control hierarchy.

For this application, the following matrix identifies which user classes can perform specific operations against the various database tables. Each intersection cell defines the operations allowed by a User Role against a table as C – Create, R – Read, U – Update, D – Delete.

BOTS Access Control Matrix

Tables	User Roles															
	DB Administration				Management				Sales				Shipping			
	C	R	U	D	C	R	U	D	C	R	U	D	C	R	U	D
Categories	X	X		X		X				X				X		
CustDemogs	X	X	X	X		X			X	X	X			X		
Customers	X	X	X	X		X			X	X	X			X		
Demographics	X	X		X		X				X				X		
OrderLines	X	X	X	X		X	X		X	X	X			X	X	
Orders	X	X	X	X		X	X		X	X	X			X		
ProdCats	X	X	X	X		X				X				X		
Products	X	X	X	X		X				X				X		
References	X	X	X	X		X				X				X		

APPENDIX C – DATA DICTIONARY

The Data Dictionary (DD) provides a full description of each table in the ERD, as well as the relationships between tables. Further, it defines the properties assigned to each field in these tables.

Table: Categories

Categories are used to classify Products, such as Papers, Markers, Pens, etc.

A Category record may be associated with one or more ProdCats records, which establish the relationship with Products.

Table: CustDemogs

The CustDemogs table acts as a bridging table between the Customers table and the Demographics table. It contains only the primary identifiers from each of the related records.

Each CustDemog record must be associated with one and only one related Customers record, and one and only one related Demographics record.

Table: Customers

A customer is a person or business entity that purchased his office products from Highland. Information stored here will include Contact and Company Name, Addresses, Contact Numbers, Etc.

Customers may be associated with one or more Orders. Each customer may be associated with one or more CustDemogs records, which establish the relationship with Demographics.

Table: Demographics

Demographics are core categories of information about customers, such as Large Company, Medium Company, Small Company, Individual, Manufacturer Services, Government, etc.

A Demographic may be related one or more CustDemog records, which establish the relationship with Customers.

Table: OrderLines

Each Order has one or more line items, containing information about the designated product, the quantity ordered, the price, extension, etc.

Each OrderLine record must be associated with one and only one related Order record, and one and only one related Product record.

Table: Orders

Customers place orders for one or more products. The order contains related Customer information, specific order information such as Order Number and Order Date, and a listing of products and quantities ordered.

An Order must be related to one and only one Customer. An Order must have at least one line item (OrderLines record), which establishes the relationship with Products.

Table: **ProdCats**

The ProdCats table acts as a bridging table between the Products table and the Categories table. It contains only the primary identifiers from each of the related records.

Each ProdCats record must be associated with one and only one related Products record, and one and only one related Categories record.

Table: **Products**

Products are items carried by Highland for sale. Information stored here includes Product ID, Description, Current Price, etc.

Each Product may be related with one or more Orders via the OrderLines table. Each Product can have zero to many Categories via the ProdCats table.

Table Categories

[Categories] Cat_ID [Longint]

Label: ID

Mandatory

Range:

Modifiable

Format: 123456

Display Only

Default: Auto sequence

Indexed

Unique

Unique numeric identifier for the category. Automatically entered by the system.

Primary key

[Categories] Cat_Name [Character 30]

Label: Category

Mandatory

Range:

Modifiable

Format: As entered.

Display Only

Default:

Indexed

Unique

Name of the category. Unique, required.

Table **CustDemogs**

[CustDemogs] Customer_ID [Longint]

Label: Customer ID

Mandatory

Range:

Modifiable

Format: 123456

Display Only

Default:

Indexed

Unique

Identifier of the related Customer record (required).

[CustDemogs] Demographic_ID [Longint]

Label: Demographic ID

Mandatory

Range:

Modifiable

Format: 123456

Display Only

Default:

Indexed

Unique

Identifier of the related Demographic record (required).

Table Customers

[Customers] Billing_Addr1 [Character 40]

Label: Billing Address 1 *Mandatory*
Range: *Modifiable*
Format: As entered. *Display Only*
Default: *Indexed*
 Unique

First line of the billing address (required).

[Customers] Billing_Addr2 [Character 40]

Label: Billing Address 2 *Mandatory*
Range: *Modifiable*
Format: As entered. *Display Only*
Default: *Indexed*
 Unique

Second line of the address (optional).

[Customers] Billing_City [Character 25]

Label: Billing City *Mandatory*
Range: *Modifiable*
Format: As entered. *Display Only*
Default: *Indexed*
 Unique

City as it should appear on a mailing label (required).

[Customers] Billing_State [Character 2]

Label: Billing State *Mandatory*
Range: *Modifiable*
Format: AA *Display Only*
Default: NM *Indexed*
 Unique

State abbreviation, defaults to "NM," (required).

[Customers] Billing_Zip [Character 10]

Label: Billing Zip Code *Mandatory*
Range: *Modifiable*
Format: 12345-6789 *Display Only*
Default: *Indexed*
 Unique

Zip code, with room for "plus four" zips (required).

[Customers] Comments [Text]*Label:* Comments *Mandatory**Range:* *Modifiable**Format:* As entered. *Display Only**Default:* *Indexed* *Unique*

A free-form text field for entry of various pieces of information that don't fit anywhere else (optional).

[Customers] Company_Name [Character 40]*Label:* Company Name *Mandatory**Range:* *Modifiable**Format:* As entered. *Display Only**Default:* *Indexed* *Unique*

Company name as it should appear on a mailing label (optional).

[Customers] Contact_Name [Character 25]*Label:* Contact Name *Mandatory**Range:* *Modifiable**Format:* As entered. *Display Only**Default:* *Indexed* *Unique*

Name of the primary contact, as it should appear on a mailing label (required).

[Customers] Customer_ID [Longint]*Label:* Customer ID *Mandatory**Range:* *Modifiable**Format:* 12345 *Display Only**Default:* Auto sequence *Indexed* *Unique*

Unique identifier for each Customer record. Automatically assigned by the system.

Primary Key

[Customers] Email [Character 40]*Label:* Email *Mandatory**Range:* *Modifiable**Format:* someone@somewhere *Display Only**Default:* *Indexed* *Unique*

Electronic mail address for the contact (optional).

[Customers] Extension [Character 4]

<i>Label:</i> Extension	<input type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> 12345	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Optional extension for the contact's phone number.

[Customers] Fax [Character 15]

<i>Label:</i> Fax	<input type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> (123) 456-7890	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Fax number for the contact, with area code (optional).

[Customers] Phone [Character 15]

<i>Label:</i> Phone	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> (123) 456-7890	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Phone number of the contact person, with area code (required).

[Customers] Shipping_Addr1 [Character 40]

<i>Label:</i> Shipping Address 1	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> As entered.	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

First line of the shipping address (required).

[Customers] Shipping_Addr2 [Character 40]

<i>Label:</i> Shipping Address 2	<input type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> As entered.	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Second line of the address (optional).

[Customers] Shipping_City [Character 25]

<i>Label:</i> Shipping City	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> As entered.	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input checked="" type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

City as it should appear on a package label (required).

[Customers] Shipping_State [Character 2]

Label: Shipping State

Mandatory

Range:

Modifiable

Format: AA

Display Only

Default: NM

Indexed

Unique

State abbreviation, defaults to "NM," (required).

[Customers] Shipping_Zip [Character 10]

Label: Shipping Zip Code

Mandatory

Range:

Modifiable

Format: 12345-6789

Display Only

Default:

Indexed

Unique

Zip code, with room for "plus four" zips (required).

Table **Demographics**

[Demographics] **Demog_ID** [Longint]

Label: ID

Mandatory

Range:

Modifiable

Format: 123456

Display Only

Default: Auto sequence

Indexed

Unique

Unique numeric identifier for the demographic description. Automatically entered by the system.

Primary key

[Demographics] **Demog_Name** [Character 30]

Label: Demog Name

Mandatory

Range:

Modifiable

Format: As entered.

Display Only

Default:

Indexed

Unique

Name of the demographic. Unique, required.

Table OrderLines

[OrderLines] Backorder [Date]

<i>Label:</i> Backorder	<input type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> 00/00/00	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input checked="" type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Date the item was placed on backorder.

[OrderLines] Extension [Real]

<i>Label:</i> Extension	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> As calculated.	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i> Calculated	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Total price of the line, calculated by the system as Quantity*Price.

[OrderLines] Order_ID [Longint]

<i>Label:</i> Order ID	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> 123456	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input checked="" type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Order to which the line item belongs (required).

Foreign key

[OrderLines] Price [Real]

<i>Label:</i> Price	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> 1,234.56	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i> Product.Current_Price	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Unit price of product, drawn from related product record (required). Stored redundantly to preserve history when product price changes.

[OrderLines] Product_ID [Longint]

<i>Label:</i> Product ID	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> 123456	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input checked="" type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Product associated with the line item (required).

Foreign key

[OrderLines] Product_Name [Character 40]

<i>Label:</i> Product Name	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> False. 2 Pencil	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i> Product.Product_Nam	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Name of product being ordered, drawn from related product record (required). Stored redundantly to preserve history when Product name changes.

[OrderLines] Quantity [Integer]

<i>Label:</i> Quantity	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> 1,234	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Number of units being ordered.

[OrderLines] Shipped [Date]

<i>Label:</i> Shipped	<input type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> 00/00/00	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input checked="" type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Date the item was shipped to the customer.

[OrderLines] Units [Character 10]

<i>Label:</i> Units	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> Each	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i> Product.Sales_Unit	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Units description, drawn from related product record (required).

Table Orders

[Orders] Customer_ID [Longint]

Label: Customer ID *Mandatory*
Range: *Modifiable*
Format: 123456 *Display Only*
Default: *Indexed*
 Unique

Identifier of the customer associated with this order.

[Orders] Note [Character 40]

Label: Note *Mandatory*
Range: *Modifiable*
Format: As entered. *Display Only*
Default: *Indexed*
 Unique

Optional note to be included with the order.

[Orders] Order_Date [Date]

Label: Order Date *Mandatory*
Range: *Modifiable*
Format: 1/1/2001 *Display Only*
Default: Current Date *Indexed*
 Unique

Date the order was placed. Defaults to the current date as the order is being entered (required).

[Orders] Order_ID [Longint]

Label: Order ID *Mandatory*
Range: *Modifiable*
Format: 123456 *Display Only*
Default: Auto sequence *Indexed*
 Unique

Unique number for each order, automatically assigned by the system.

Primary key

[Orders] Salesperson_Initials [Character 3]

Label: Salesperson Initials *Mandatory*
Range: *Modifiable*
Format: As entered. *Display Only*
Default: *Indexed*
 Unique

Initials of the salesperson responsible for the order (required).

[Orders] Shipping [Real]

Label: Shipping *Mandatory*
Range: *Modifiable*
Format: As entered. *Display Only*
Default: *Indexed*
 Unique

Shipping charges. Entered by shipping personnel as the order is fulfilled.

[Orders] Ship_Via [Character 30]

Label: Ship Via *Mandatory*
Range: *Modifiable*
Format: As chosen. *Display Only*
Default: Second day *Indexed*
 Unique

Shipping method. One of "Next day," "Second day," "Standard," "US Mail."

[Orders] Subtotal [Real]

Label: Subtotal *Mandatory*
Range: *Modifiable*
Format: As calculated. *Display Only*
Default: Calculated *Indexed*
 Unique

Sum of Order_Lines.Extension fields. Automatically calculated.

[Orders] Tax [Real]

Label: Tax *Mandatory*
Range: *Modifiable*
Format: As calculated. *Display Only*
Default: Calculated *Indexed*
 Unique

Tax charges. Calculated by the system.

[Orders] Total [Real]

Label: Total *Mandatory*
Range: *Modifiable*
Format: As calculated. *Display Only*
Default: Calculated *Indexed*
 Unique

Total charges. Calculated by the system as Subtotal+Shipping+Tax.

Table **ProdCats**

[ProdCats] **Category_ID** [Longint]

Label: Category ID

Mandatory

Range:

Modifiable

Format: 123456

Display Only

Default:

Indexed

Unique

Identifier of the related Category record (required).

Foreign key

[ProdCats] **Product_ID** [Longint]

Label: Product ID

Mandatory

Range:

Modifiable

Format: 123456

Display Only

Default:

Indexed

Unique

Identifier of the related Product record (required).

Foreign key

Table Products

[Products] Current_Price [Real]

<i>Label:</i> Current Price	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> 1,234.56	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Current price of a unit, as it would appear in a catalog.

[Products] Description [Character 80]

<i>Label:</i> Description	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> As entered.	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Description of the product, as it would appear in a catalog.

[Products] Last_Cost [Real]

<i>Label:</i> Last Cost	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> 1,234.56	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

The most recent price we paid for each unit of this product. Used by salespeople to avoid discounting too deeply.

[Products] Product_ID [Longint]

<i>Label:</i> Product ID	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> 12345	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i> Auto sequence	<input checked="" type="checkbox"/> <i>Indexed</i>
	<input checked="" type="checkbox"/> <i>Unique</i>

Unique identifier for each product record. Automatically assigned by the system.

Primary key

[Products] Product_Name [Character 40]

<i>Label:</i> Product Name	<input checked="" type="checkbox"/> <i>Mandatory</i>
<i>Range:</i>	<input checked="" type="checkbox"/> <i>Modifiable</i>
<i>Format:</i> As entered.	<input type="checkbox"/> <i>Display Only</i>
<i>Default:</i>	<input checked="" type="checkbox"/> <i>Indexed</i>
	<input type="checkbox"/> <i>Unique</i>

Name of the product, as it would appear in an Order line item.

[Products] Reorder_Level [Integer]

Label: Reorder Level *Mandatory*
Range: 0 *Modifiable*
Format: 1,234 *Display Only*
Default: 5 *Indexed*
 Unique

When the number of units in stock drops to this level, purchasing should be alerted so they can place another order for this product.

[Products] Sales_Unit [Character 10]

Label: Sales Unit *Mandatory*
Range: *Modifiable*
Format: As entered. *Display Only*
Default: Each *Indexed*
 Unique

Units the product is sold in, typically "Each," but may be "Carton," "Bag," etc.

[Products] Suppliers [Text]

Label: Suppliers *Mandatory*
Range: *Modifiable*
Format: *Display Only*
Default: *Indexed*
 Unique

Companies that normally supply this product to us.
