

Microsoft Dynamics® AX 2009

Shipping Carrier Interface

Technical White Paper

This white paper is intended for professionals who are involved in the implementation and support of the Shipping Carrier Interface functionality at a customer site, as well as for those who need to advise customers, or make modifications within the area. The paper offers an overview of the principles used within the Shipping Carrier Interface area of Microsoft Dynamics® AX 2009.

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Table of Contents

Introduction	4
Shipping Carrier Feature Concepts	4
Setup	4
Carrier Interface.....	5
Carrier Companies	6
Carrier IDs	8
Modes of Delivery.....	9
Terms of Delivery	11
Customers.....	13
Virtual Companies.....	16
Return address used for carrier transaction information.....	16
Processing sales orders	18
Making information available to the carrier.....	22
Packing Slip Journal.....	24
Carrier Transaction Information	24
Carrier issues.....	27
Carrier Processing	28
Warehouse management	29
Creating C.O.D. Packages.....	30
Sales Pickup (Will Call)	30
Technical Information	32
Single Shipment vs Multiple Packages.....	33
Enabling The Staging table to be managed by AOT.....	33
Methods of Integration.....	33
Moving Information into the Invoice.....	35
Using the Staging Table vs Direct Updates.....	35
Limitations	35
Adding Additional Carriers.....	35
Modifying the ShipCarrierStaging Table.....	35
Further Information for users of Clippership , FedEx, and UPS.....	36
Clippership.....	36
FedEx Ship Manager	37
Additional Notes for FedEx Ship Manager	37
URL for finding tracking numbers on the FedEx website.....	37
UPS WorldShip.....	38

Creating an Import Map.....38

Creating an Export Map.....42

Additional Notes for UPS WorldShip46

URL for finding tracking numbers on the UPS website47

Introduction

Microsoft Dynamics AX customers often use one or more shipping carriers to deliver their products to customers. Shipping software is available directly from these carriers, such as UPS and FedEx, and from third parties such as Kewill (the manufacturer of ClipperShip) that can work with many carriers and centralize the shipping process. This software is used to calculate shipping rates, produce labels and tracking numbers, and generate additional reports and documents.

The shipping carrier interface feature allows Microsoft Dynamics AX customers to integrate with shipping software. The shipping software packages can pull information from Microsoft Dynamics AX, process packages, and then move their information into Microsoft Dynamics AX, eliminating manual entry and improving tracking visibility.

Shipping Carrier Feature Concepts

The feature is designed to support carrier software that can read information from Microsoft Dynamics AX and write information back into Microsoft Dynamics AX. Figure 1 below illustrates the process that must be followed to use this feature:

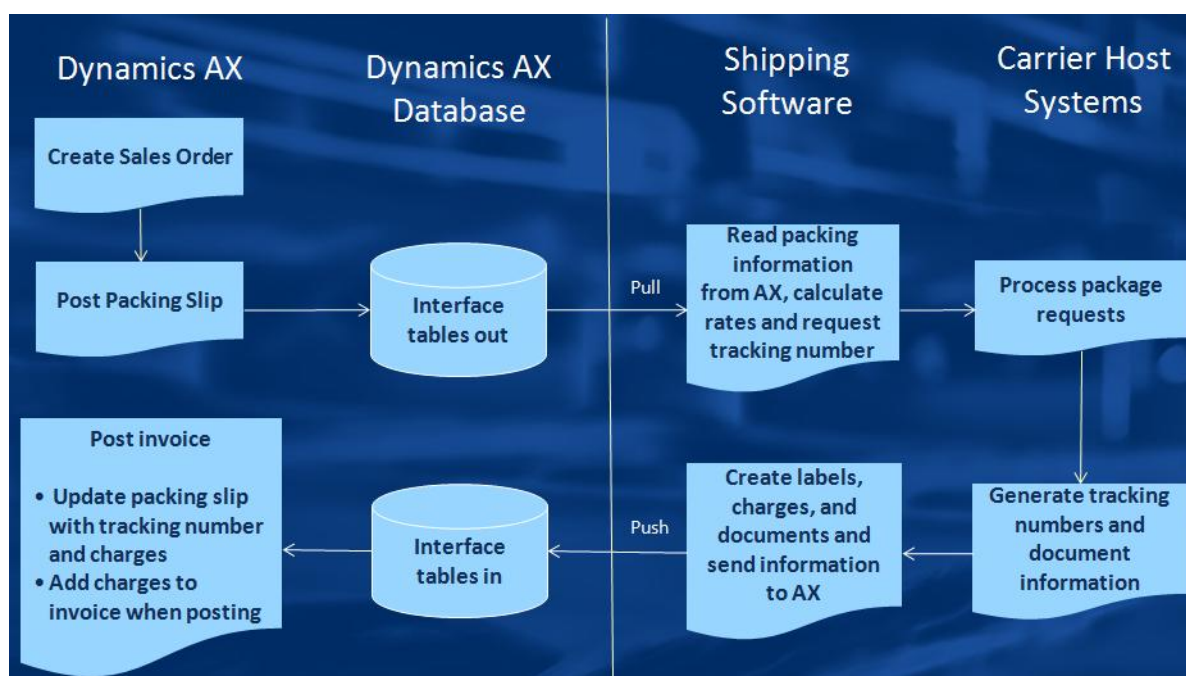


Figure 1: Shipping Carrier Interface feature flow

Setup

The Shipping Carrier Interface feature is controlled by a Trade configuration key called Shipping Carrier. This configuration key is shipped as active with the default installation.

The feature requires additional setup steps to be taken using the following forms to activate the process shown in Figure 1 above:

- Carrier Interface
- Carrier Companies
- Carrier IDs
- Modes of Delivery
- Terms of Delivery
- Customers
- Return address

Carrier Interface

All of the setup information that is entered into the list of forms above is activated or deactivated by the settings in the Carrier Interface form. The Carrier Interface form allows you to activate a carrier and initiate the movement of information into and out of the interface tables.

Based on feedback from our partners, three shipping software packages were identified as commonly used by Microsoft Dynamics AX: UPS WorldShip, FedEx Ship Manager, and Kewill Clippership. These packages are pre-populated on this form when the form is opened for use the first time. You cannot add additional shipping software packages to this form at this time.

Carrier interface ID	Enabled	Test mode
ClipperShip	<input type="checkbox"/>	<input type="checkbox"/>
FedEx Ship Manager	<input type="checkbox"/>	<input type="checkbox"/>
UPS WorldShip	<input type="checkbox"/>	<input type="checkbox"/>

Unique identification for carrier interface: EUR dat usr

Figure 2: Carrier Interface form

It is important to note that the feature was designed to allow partners to modify Microsoft Dynamics AX to add additional shipping software packages. However, if you are using shipping software that has similar integration capabilities as any of the interfaces listed on this form, you can use that shipping software for this interface and select one of the carrier interface IDs above to activate it. See the Technical Information section for information on how this works.

The Enabled check box on this form turns on or off the shipping carrier capabilities for all setup information associated with that carrier interface ID. For example, if a mode of delivery is associated with UPS WorldShip, then sales orders with that mode of delivery will only update the interface tables and process information returned from a carrier application when the UPS Worldship Enabled check box is selected.

The Test Mode check box allows you to test the flow of the carrier interface to ensure that all processes are working correctly. When the "Test Mode" is activated, a dialog box will be presented after a packing slip is posted. You can manually enter the values that were expected from the shipping software and then post the invoice and validate that you set up all the necessary options correctly.

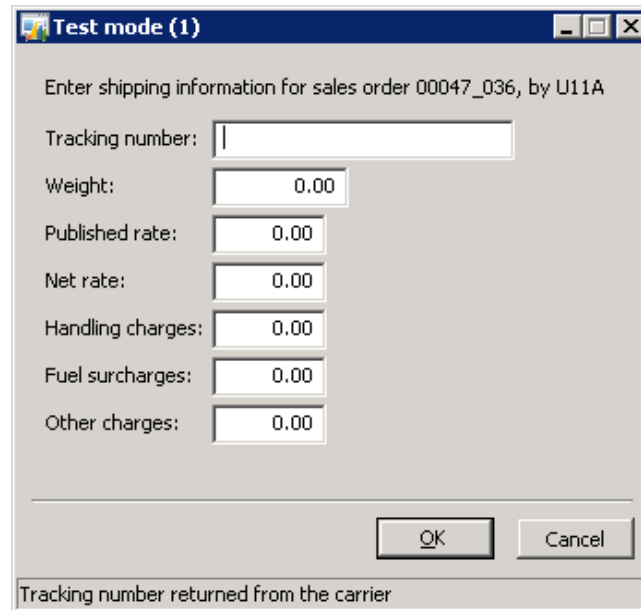


Figure 3: Form used when posting packing slips with test mode on

The information entered into this form is stored in the staging tables as if the shipping software sent the information directly into Microsoft Dynamics AX. It is written into one staging table when the UPS or FedEx interface is selected and a different set of tables when the Clippership interface is selected. See the Technical Information section for more details on how this works.

The Test Mode can also be used as a backup method for entering carrier information when the connection between Microsoft Dynamics AX and the shipping software has been severed for some reason. For example, if your shipping software is unavailable on the local PC but you can use the carrier's web site to process packages, you can activate the Test Mode. The Post Packing Slip process will display this form and you can manually enter the information. Once the communications issue has been resolved, you can turn off the Test Mode and continue to process packages using the shipping software.

Carrier Companies

The Carrier Company form is used to define additional setup options for the carrier interface in your company. There must be at least one carrier company for every interface that you activate. However, you can have more than one carrier company per carrier interface.

Carrier companies are most useful when the integration involves software like Clippership where you are processing packages for multiple carriers in the same product. Although you have one interface, you are using multiple companies and multiple carrier account numbers in your business. The account information can be used later in the Carrier transaction information form to view shipment information by account.

The screenshot shows a web browser window titled "Carrier company (1 - dat) - Carrier: FedEx, http://www.fedex.com/Tracking?ascend_header=1&clienttype=dotcom&cntry_code=us...". The browser has a menu bar (File, Edit, Tools, Command, Help) and a toolbar. Below the toolbar are tabs for "Overview", "General", and "Accounts". The "Overview" tab is active, displaying a table with the following data:

Carrier	Tracking number URL	Vendor account
FedEx	http://www.fedex.com/Tracking?ascend_header=1&clienttype=dotcom&cntry_code=us&language=english&tracknumbers=%1	
UPS	http://wwwapps.ups.com/WebTracking/processInputRequest?HTMLVersion=5.0&loc=en_US&tracknum=%1	

At the bottom of the browser window, there is a status bar with the text "WWW address for Internet homepage." and a small toolbar with buttons for "EUR", "dat", "usr", and a printer icon.

Figure 4: Carrier company form

The Carrier Company ID can be any value. It represents a group of settings that will be used when processing carrier information. The first setting, the tracking number URL, is shown on the first page. When viewing tracking information in the carrier transaction information form, this URL will be appended automatically in the Carrier transaction information form so you can connect directly with the carrier web site. The URLs displayed on this page were valid for UPS and FedEx as of the date of this document.

The General tab is used to define the miscellaneous charge accounts for use when posting the carrier charges in the invoice. These miscellaneous charge accounts are defined in the Accounts Receivable module.

The screenshot shows the same web browser window as Figure 4, but with the "General" tab selected. The "Overview" tab is still visible at the top. The "General" tab contains the following fields:

- Carrier:** A text box containing "FedEx".
- Tracking number URL:** A text box containing "http://www.fedex.com/Trac" with a globe icon to its right.
- Vendor account:** A dropdown menu.
- Miscellaneous charges:** A section with four dropdown menus:
 - Core charges:** Set to "Core".
 - Ancillary charges:** Set to "Ancillary".
 - Handling charges:** Set to "Handling".
 - Fuel surcharges:** Set to "Fuel".

At the bottom of the form, there is a text box labeled "Company name of shipping carrier" and a small toolbar with buttons for "EUR", "dat", "usr", and a printer icon.

Figure 5: Carrier company form – General Tab

The Accounts tab allows you to identify carrier specific information for each carrier account number that you have with a carrier. The account code represents the account that you have with the carrier. For example, if you have two FedEx accounts, you can enter FedEx1 and FedEx2.

Next, you enter the billing account that you have with the carrier and the currency that the carrier software uses when it sends you the actual charges. The Ship Via identifier is used specifically by ClipperShip to identify which shipping module to use.

Account code	Carrier company	Carrier account number	Currency	Ship via company
FedEx	FedEx	987654321	USD	2

Account code to identify the carrier account number that will be used ... EUR dat usr

Figure 6: Carrier company form – Accounts Tab

Carrier IDs

Each carrier software package uses specific internal codes to identify the services that they offer. For example, GND represents UPS Ground in UPS. These codes must be available to the carrier software to correctly identify the service that is needed.

The Carrier ID form allows you to enter those codes and assign them to an interface. These carrier IDs will later be mapped to modes of delivery.

Carrier ID	Carrier service description	Carrier company	Carrier interface ID
F06A	FedEx Standard Overnight	FedEx	FedEx Ship Manager
U01A	UPS Next Day Air	UPS	ClipperShip
U11A	UPS Ground	UPS	UPS WorldShip

Company name of shipping carrier EUR dat usr

Figure 7: Carrier ID form

The Carrier ID can be any value but it should match the value required by the carrier. Some carriers allow a mapping from the Microsoft Dynamics AX values to their internal values for a package service. We recommend that you make the carrier IDs match the mode of delivery when this situation occurs and then use the mapping tool in the carrier software to convert the value.

The Carrier service description is simply a description of the carrier ID. It not used in any other location.

Map the carrier ID to a carrier company. This connects all the setup information for that company with the carrier ID.

Although carriers like UPS and FedEx only process packages using their own services, Clippership and other similar applications process packages for multiple carriers. The Carrier Interface ID is used to identify which carrier interface will control this carrier ID.

Modes of Delivery

The Mode of Delivery form has been modified to allow the carrier interface information to be connected to a mode of delivery. This connection is made by mapping a carrier ID to a mode of delivery in a new Setup tab.

The screenshot shows a software window titled "Modes of delivery (1 - dat) - Mode of delivery: F06A, FedEx Standard Overnig...". The window has a menu bar with "File", "Edit", "Tools", "Command", and "Help". Below the menu bar is a toolbar with various icons. The main area has three tabs: "Overview", "General", and "Setup". The "Setup" tab is selected, displaying the following fields:

- Service:
- Carrier ID:
- Carrier company:
- Account code:

On the right side of the Setup tab, there are three buttons: "Language texts", "External codes", and "Transport calendar". At the bottom of the window, there is a "Service type" field and a status bar with "EUR", "dat", and "usr" indicators.

Figure 8: Mode of Delivery form

Backward compatibility with earlier versions of Microsoft Dynamics AX is maintained using a Service type called Miscellaneous. This type disables all carrier interface functionality when it is selected for a mode of delivery. By default, all modes of delivery are assigned to Miscellaneous during the upgrade process.

Figure 9: Mode of delivery form – Setup Tab

The Air and Ground service types enable the carrier interface functionality as long as the carrier interface assigned to the carrier ID is also enabled.

The Pickup service type is used for a new form called Sales Pickup. See the Sales Pickup section below for further information on how Pickup, Air, and Ground are used in the Sales Pickup form.

Once the service type is selected, you can select the carrier ID that will be associated with the mode of delivery. The carrier company is automatically populated to help you validate the carrier ID that you selected. The first account code for that carrier company is also populated but you can select another one from the list.

Modes of delivery (1 - dat) - Mode of delivery: F06A, FedEx Standard Overnig...

File Edit Tools Command Help

Overview General Setup

Service: Air

Carrier ID: F06A

Carrier company: FedEx

Account code: FedEx

Language texts

External codes

Transport calendar

Service type

EUR dat usr

Figure 10: Mode of delivery – Account code

Terms of Delivery

Every time a package is sent to a carrier, the carrier will calculate a charge for that package and that charge will be transferred into Microsoft Dynamics AX. However, you can decide if you want to charge the customer for those charges, charge a third party through the carrier, or not charge the customer at all for the charges received from the carrier software.

A new tab has been added to the Terms of Delivery form to define which carrier charges will be included on the customer invoice:

The screenshot shows a software window titled "Terms of delivery (1 - dat) - Delivery terms: CIF, Carriage Insuran...". It features a menu bar with "File", "Edit", "Tools", "Command", and "Help". Below the menu is a toolbar with various icons. The main area has three tabs: "Overview", "General", and "Setup". The "Setup" tab is selected, displaying a "Setup" sub-tab. Under this sub-tab, there are three fields: "Freight charge terms:" with a dropdown menu currently showing "N/A" and an open list of options including "N/A - third party/collect", "Core", "Ancillary and handling", and "Core, ancillary, and handling"; "Apply free minimum:" with a dropdown showing "N/A"; and "Free minimum:". To the right of these fields are two buttons: "Language texts" and "External codes". At the bottom of the window, there is a "Terms of freight charge" field and a set of buttons labeled "EUR", "dat", "usr", and a printer icon.

Figure 11: Terms of delivery form

The N/A option is used to stop all charges from being entered on the invoice. As you will see later in this document, the actual charges will be available for viewing on the packing slip even though you have chosen to not charge the customer.

The N/A-third party/collect option is used when your customer provides their account number with the carrier or they provide the account number of a third party who will pay the charges. Like N/A, the charges will not appear on the invoice but they will be available for viewing.

All charges received from the carrier are summarized into four totals: Core charges (the published rate from the carrier), Ancillary charges (miscellaneous or other charges not included in the published rate), Handling charges (added by the carrier), and Fuel Surcharges. The remaining options listed in Figure 11 define which of the core, ancillary, and handling charges that you want included on the invoice. Fuel surcharges will be discussed later in the Customer section.

You can also define free minimums on the delivery terms form. When you check the free minimum box, the freight charges will be evaluated to determine if they should be charged to the invoice. If the total invoice before taxes is greater than the free minimum amount, the freight will not be charged. In the example in figure 12, all orders with a value over 100 will not be charged freight.

In AX2009, the free minimum amount does not convert to the order currency. You must setup a separate delivery term for each currency.

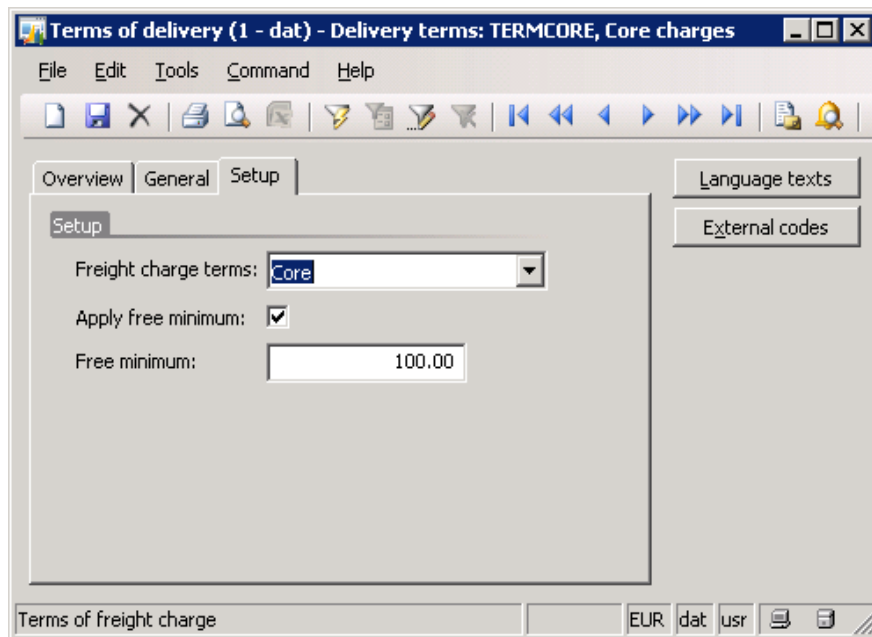


Figure 12: Terms of delivery – Setup Tab with free minimum

Customers

Customers can be set up with default delivery settings and third-party address settings that can then be moved into a new sales order automatically when it is created. These settings can also be changed on the order itself.

The Setup tab on the Customer form already contains fields for selecting a default mode of delivery and delivery terms. An additional field, Fuel Surcharge, has been added to setup. When this box is checked, all fuel surcharges returned from the carrier software will also be charged to the customer when packages are shipped.

Figure 13: Customer form – Setup Tab

A new address type, Third-party shipping address, has been created to store third party account information for the customer. When a sales order is created and the customer has a third party address exists, you will be asked if you want to move the information from this address into the sales order.

Public	Primary	Name	Address type
<input type="checkbox"/>	<input type="checkbox"/>	Jane Smith	Third-party shipping address
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Invoice

Figure 14: Setup Address form

Additional settings can be identified on the Other tab on the Alt. Address form using fields that have been added to the form to support the carrier interface feature:

The screenshot shows a software window titled "Alt. address (1 - dat) - Name: Jane Smith, Third-party shipping address". The window has a menu bar (File, Edit, Tools, Command, Help) and a toolbar with various icons. Below the menu bar are five tabs: Overview, General, Address, Contact information, and Other. The "Other" tab is currently selected. The form contains several sections with fields and checkboxes:

- Time zone:** A dropdown menu.
- Sales tax:** A dropdown menu for "Sales tax group".
- Delivery:**
 - Receipt calendar: A dropdown menu.
 - Delivery terms: A dropdown menu showing "TERMNA3RD".
 - Mode of delivery: A dropdown menu showing "U11A".
 - Blind shipment: A checkbox.
 - Residential destination: A checkbox.
- Carrier information:**
 - Carrier ID: A text field showing "U11A".
 - Account code: A text field showing "UPS".
 - Carrier account number: A text field showing "234-456".

At the bottom of the window, there is a status bar with the text "Preferred time zone for address." and a set of buttons: EUR, dat, usr, and a printer icon.

Figure 14: Setup Address form – Other Tab

Much like the customer setup tab, fields for delivery terms and mode of delivery can be entered in the Alt. Address form. Selecting the Blind shipment check box will modify the invoice so that the return address does not show the name of the shipping company. This is helpful when your company ships on behalf of another company and that company does not want your name on documents.

Residential destination is an indicator required by many carriers to identify that the shipment is going to a personal residence instead of a commercial address.

The carrier information is created, by default, based on the mode of delivery selected. You can then enter the customer's account number with the carrier in the Carrier account number field. If an address is included on the Address tab of this form, this account number is considered the billing address for that carrier account. If no address is stored on the Address tab, then the account number is considered the account for the customer on the order.

If an address is a third party address, the delivery terms must include the N/A-third party/collect option. Freight charges will be stored on the packing slip for any orders using this address but freight will not be charged on the invoice since the third party is paying for those charges.

The customer defaults are applied based on the following hierarchy when the order is created.

- If a third-party address is selected, then all of the settings on the address form above will be moved into the sales order.

- If there are settings for the private Delivery address on the Other tab, then those settings will be used when no third-party address is used.
- If there are settings for the Public Delivery address on the Other tab, then those settings will be used when no private delivery address or third party address are used.
- If there are settings for the public Invoice address on the Other tab, then those settings will be used if no third-party address or delivery addresses are used.
- Otherwise, the settings found on the Setup tab for the customer will be used.

In all cases listed, if the address has a blank value for the any default setting, then the settings on the Setup tab for the customer will be used. Note that only address types Invoice, Delivery, Alt Delivery, and Third-party shipping are allowed to have values for mode of delivery, delivery terms, and carrier account. Only settings from primary addresses will be used.

Virtual Companies

The Global Address Book allows you to share addresses as public addresses using virtual companies. However, the address information for shipping carriers can not be shared across virtual companies for the Dynamics AX 2009 release. The shipping carrier fields must be entered for shared customers in each company and validated against the appropriate values in the main tables of each company.

There is additional validation required for third party shipping addresses to ensure that the correct delivery terms and carrier accounts are present before the address is saved. Because of this validation, the third party addresses cannot be shared as public addresses.

Return address used for carrier transaction information

A return address is stored in the carrier transaction information that is available to a shipping carrier. By default, the return address is the company address. However, you can use the Inventory > Parameters form to change the default so that a warehouse address is stored instead. The parameter is located in the Shipping group on the form.

Inventory parameters (1 - dat)

File Edit Tools Command Help

General Journals Bills of materials Locations Transport AIF RFID Quality management Inventory c

Pick and ship rules

Outbound rule ID: Unit:

End output inventory order: ☐

Picking route bar code setup:

Inventory transactions

Automatic addition: ☒

Maximum unit cost price:

Reservation

Reserve ordered items: ☒

Closing

Extra batch helpers:

Helper batch group:

Physical posting

Post estimates periodically: ☐

Post physical sales tax: ☐

Counting

Lock items during count: ☐

Default values

Locations

Pallet type:

Manual sort codes: ☐

Check text:

Packing material

Calculate packing material fees: ☐

Fiscal LIFO

Calculation period:

Deviation Percent:

Fiscal LIFO WIP period:

Item price

Last price history: ☐

Shipping

Return to:

Item sales tax group

Mandatory item sales tax group: ☐

For order pick: Identification of the rule that defines how outbound items are proc... EUR dat usr

Figure 15: Inventory Parameters

When the default Company selection is changed to Warehouse, then the warehouse identified in the head of the sales order on the Setup tab will be used to determine which return address to use. The delivery address stored as an alternate address in the warehouse will be used. If a delivery address is not found, then the company address will be used.

The screenshot shows the 'Sales order 00058_036, Name Cars Garage, Item name Office Lamp 1000 1-tube (1 - dat)' window. The 'Setup' tab is active, showing various configuration fields. The 'Warehouse' field under the 'Inventory' section is set to 'GW'. Other fields include Recipient (AJE), Pool (DEF), Language (En-us), Sales unit, Sales responsible (AJE), Sales origin, Posting profile (Gen), Settlement type (None), Number sequence group, Sales tax group, Tax exempt number, Prices incl. sales tax, Enterprise number, Reservation (Manual), Commission, Sales group, Customer group, Giro money transfer slip, Invoice (None), RFID tagging, Item tagging, and Case tagging. A table of lines is visible below the setup fields, with the first line showing Item number OL-1000, Configuration, Size, Color, Warehouse GW, Batch number, Serial number, Quantity 1.00, Unit Pcs, Unit price 11.95, Discount, Disc. pct., and Net amount 11.95. At the bottom, there are fields for Requested receipt date (4/1/2008), Confirmed receipt date, Delivery date control (None), Requested ship date (4/1/2008), Confirmed ship date, Mode of delivery (U11A), and Shipping location time zone ((GMT-06:00) Central Time (US & Canada)).

Figure 16: Warehouse setting on the sales order form

Processing sales orders

The process for creating sales orders has been modified for the shipping carrier interface. When you create an order, the Create Order form appears, you select a customer, and you are prompted to determine if you want the customer address information copied into the order. If that customer has a third-party shipping address, then you also will be prompted to determine if you want their third-party information copied into the order as well.

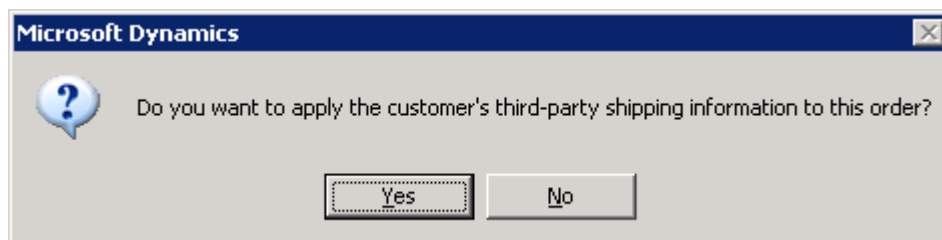


Figure 17: Third-party shipping dialogue box

An additional group has been added to the sales order form called Shipping. In this group, you define the delivery terms for the order. All orders that have a mode of delivery that is associated with a shipping carrier must have delivery terms.

The screenshot shows the 'Create sales order (1 - dat)' form with the following sections and fields:

- Customer Section:**
 - One-time customer: ☐
 - Customer account: 4504 (dropdown) | Cars Garage (text)
 - Contact: (empty dropdown)
 - Delivery address: RR 2 Box 98, Atlanta, GA 30316, US
 - Invoice account: 4504 (dropdown) | Cars Garage (text)
 - Enterprise number: (empty text field)
- General Section:**
 - Sales order: 00021_036 (text) | Sales order (dropdown)
 - Requested receipt date: 2/9/2008 (calendar icon)
 - Requested ship date: 2/9/2008 (calendar icon)
 - Currency: USD (dropdown)
 - Mode of delivery: U11A (dropdown)
 - Warehouse: (empty dropdown)
 - Delivery date control: None (dropdown)
 - Confirm dates: ☐
 - Shipping location time zone: (GMT-06:00) Central Time (US & Canada) (dropdown)
 - Simulate delivery dates: (button)
- References Section:**
 - Customer requisition: (empty text field)
 - Reference: (empty text field)
- Shipping Section (Expanded):**
 - Delivery terms: TERM CORE (dropdown)
 - Carrier account number: (empty text field)
- Administration Section (Collapsed):**
- Buttons:** OK, Cancel
- Footer:** Customer account that generated the order. | EUR | dat | usr | (print icon) | (refresh icon)

Figure 18: Create sales order form – shipping group

The carrier account field allows you to enter the customer's carrier account manually at order time instead of storing it in the customer address. Note that a delivery term with the N/A - third-party/collect option is required when you enter a carrier account.

Once the order is completed, you can modify the default settings that affect the shipping carrier interface on the sales order header and the details lines. The following fields are on the Delivery tab:

- Mode of delivery
- Delivery terms
- Blind shipment
- Charge fuel surcharge
- Expedited shipment
- Residential destination
- Carrier account number

Figure 19: Sales order form – Delivery Tab

All but one field used for shipping carriers has been described earlier in the document. The Expedited shipment field is used to override the Free Minimum feature. If this box is checked, the free minimum setting is ignored and freight is charged for this order. For example, if you normally do not charge for ground freight but the customer wants a Saturday shipment, you can check this box and the entire freight cost will be charged in the order.

Saturday delivery is controlled by the requested receipt date. If the confirmed receipt date at the time the packing slip is created is a Saturday, then the Saturday delivery value will be set in the carrier interface. If there is no confirmed receipt date, then the requested receipt date will be used to determine if the package requires Saturday delivery.

The information on the sales detail lines overrides the values on the sales order header. For example, the customer may want the entire shipment to be send with a ground shipment except for one

package which needs to be sent overnight. You would change the sales detail line to a different mode of delivery to accomplish the different shipment method.

The carrier interface looks at the mode of delivery for the packing slip to determine which interface settings to use. If you generate one packing slip for the entire order, it will only have one mode of delivery and that mode will be used by the interface. If you split packing slips by destination, you will be able to create multiple packing slips with multiple modes of delivery.

The Address tab has also been modified to hold the third-party shipping address. This is the address of the company that will pay for the shipping charges. If there is a carrier account on the Delivery tab but no address on the Address tab, then the carrier account represents the carrier account for the customer. If there is a third-party address, then the carrier account represents the carrier account for the company at the third-party address. You can have third-party addresses on both the sales header and sales detail lines.

Figure 20: Sales order form – Address Tab

You can also add up to four delivery e-mail addresses to an order. By default, the contact e-mail address for the customer is always moved into the order as the first e-mail address. To add additional e-mail addresses, you can click Setup > Delivery E-mail. The Delivery E-mail Addresses form will look at all contact e-mail addresses stored for the customer and display them on the form. The e-mail addresses must already exist for the customer before they will appear on this form. You also can delete e-mail addresses on this form if you do not want them to be sent to a carrier.

Making information available to the carrier

Sales order information is made available to the carrier when the packing slip is posted. A snapshot of the order information is stored in an interface table from which the carrier software can pull the information. This information can be viewed using the Packing Slip Journal form found in the Sales

Order under the Inquiries button or in the Carrier Transaction Information form found in the Inventory module under Inquiries.

Packing Slip Journal

The carrier charges can be viewed directly from the order by clicking **Inquiries > Packing Slip**. An additional tab has been added to the Packing slip journal to show the tracking numbers and the charges that were received. The Transferred check box indicates whether the charges have been invoiced or not.

Packing slip journal (1 - dat) - Packing slip: 00004_041, 4504

File Edit Tools Command Help

[Icons]

Overview | Lines | Order tracking

Tracking number
919515054720

Carrier ID: F06A
Carrier: FedEx
Confirmed ship date: 2/8/2008
Ship time: 12:00 am
Weight: 3.00
Published rate: 5.52
Net rate: 5.52
Handling charges: 0.00
Other charges: 0.00
Fuel surcharges: 0.67
Currency: USD
Transferred: ☒
Unit of measure:

Tracking number returned from the carrier

Figure 21: Packing slip journal – Order tracking tab

Carrier Transaction Information

[illegible]

Figure 22: Carrier transaction information form

The Shipping request tab shows all of the packing slips that have been sent to the carrier interface table in Microsoft Dynamics AX. Many of the parameters set for the packing slip are also shown on this tab.

The Address tab shows the addresses that the carrier software can use for the ship-to address, the return address, and the third-party address (when available). Although it is not shown on this form, the street name for each address is also divided into two additional 30 character fields in the carrier transaction information table to make it easier to integrate with the carrier software.

Carrier transaction information (1 - dat) - Packing slip: 00006_041, F06A

Filter: Account code: [] Carrier ID: []

Shipping request | Address | Package information | Shipping charges | Tracking

Ship-to address

Customer name: Cars Garage
 Street name: RR 2 Box 98
 ZIP/postal Code: 30316
 City: Atlanta
 County: Fulton
 State: GA
 Country/region: US
 Delivery contact: []

Third-party address

Third-party name: []
 Third-party street: []
 Third-party ZIP/postal Code: []
 Third-party city: []
 Third-party county: []
 Third-party state: []
 Third-party country/region: []

Return address

Return company name: The Light Company
 Return address: Frydenlands Alle 6
 DK-2950 Vedbaek
 Return ZIP/postal Code: DK-2950
 Return city: Vedbaek
 Return county: []
 Return state: []
 Return country/region: DK

Specify name of the company. EUR dat usr

Figure 23: Carrier transaction information form – Address Tab

The Package information tab shows the COD packages that were created when using Warehouse Management and a payment term with the COD settings. This feature is explained in more detail later in this document.

Carrier transaction information (1 - dat) - Packing slip: 00032_041, U11A

Filter: Account code: [] Carrier ID: []

Shipping request | Address | Package information | Shipping charges | Tracking

Sales order	Certified company check	Package ID	COD amount	Height	Length	Width	Weight	Unit of measure
00051_036	<input type="checkbox"/>	000050_101	12.60	0.00	0.00	0.00	0.00	

Identification of the order. EUR dat usr

The Shipping charges tab shows the charges that have been received back from the carrier. These charge will be moved into the invoice as miscellaneous charges when the order is invoiced. The charges have been included in the invoice when the Transferred check box (next to Currency) is checked..

Figure 25: Carrier transaction information form – Shipping charges tab

26

Carrier transaction information (1 - dat) - Packing slip: 00006_041, F06A

File Edit Tools Command Help

Filter

Account code: Carrier ID:

Shipping request Address Package information Shipping charges Tracking

Packing slip	Tracking number	Internet address
00006_041	919515054731	english&tracknumbers=919515054731

WWW address for Internet homepage.

1 unread notification EUR dat usr

Figure 26: Carrier transaction information form – Tracking Tab

Carrier issues

The Carrier issues form is used to display all orders that have been to the interface table but have not been processed. This allows you to see how large the shipping queue is and identify packages that need attention.

Warehouse management

The process for sending orders using warehouse management is the same as the process described above. When a packing slip is posted in the Shipment form, the order information is sent to the interface tables where the carrier can pick up the information. Charges are then moved into the invoice when the invoice is posted.

Additional features have been added to the Shipment form for the shipping carrier interface.

Shipment	Warehouse	Name	Outbound dock	Joint packing	Status	Pick	Pallet tran
000002_100	MW	Same customer	OUT-1	Same customer	Sent	Completed	
000004_100	MW	Same customer	OUT-1	Same customer	Sent	Completed	
000006_100	MW	Same customer	OUT-1	Same customer	Sent	Completed	
000008_100	MW	Same customer	OUT-1	Same customer	Sent	Completed	

Figure 28: Shipment form

The normal packing slip process presents a dialog box where you can change information before you post the packing slip. A new option was added to the Options form (accessed from the Functions button on the Shipment form) that allows you to set the packing slip default quantity to All and automatically print the packing slip instead of presenting the dialog box.

Options (1)

Use wizard when creating: ☒

Pack all quantities and print: ☒

OK Cancel

Do you want to use a wizard when cre...

Figure 29: Options form

Three additional buttons have been added to the Shipment form. The Process shipment button will be active when you have a C.O.D. order or a credit card order. Customer using these payment types often need an invoice included in the box. The Process shipment button initiates the invoice posting process,

printing the invoice and validating that the invoice can be posted. If a credit card is involved, the credit card is processed. However, the invoice process will be stopped if the credit card is not accepted.

The Invoice button is active for all other shipments that are ready for invoicing. The invoice is printed and posted when this button is used.

The Printer Setup button allows you to select the printer to use for packing slips and invoices.

Creating C.O.D. Packages

The packing slip process will store additional records in the interface for C.O.D. packages if a sales order has a C.O.D. payment term. If you want C.O.D. packages to be created, you must use the palette functionality when picking items on a picking route. Each palette is considered a unique C.O.D. package. The sales order value of all the items on that palette will be summed up and used as the C.O.D amount for the package. One record will be created in the C.O.D. interface table for each C.O.D. package.

Sales Pickup (Will Call)

A new form has been added to the Inventory > Common forms menu called Sales Pickup. This form will show all orders that have a mode of delivery in either the sales order header or detail lines that was setup with a Pickup service type. You can also select the All Service Types check box to display all orders.

Pickup (1 - dat) - Sales order: 00024_036, Cars Garage

File Edit Tools Command Help

Criteria

Service: Pickup All service types: ☐

Overview Delivery Credit card

Sales order	Customer account	Name	Invoice account	Ship date	Customer reference	Mode of delivery	Payment	Document status
00024_036	4504	Ca...	4504	2/9/2008		PICK	D30	None

Refresh Data
Refresh form view
Shipments
Packing slip
Invoice

Lines

Item number	Text	Quantity	Price unit	Unit price	Net amount	Service
OL-1000	Offic	1.00	1.00	11.95	11.95	Pickup

Identification of the order. EUR dat usr

Figure 30: Sales pickup form

The form provides basic information about the sales order. The counter person can generate a packing slip and create invoices from this form in the same way that you can through posting in a sales order. Additional refresh buttons are provided so that the counter person can quickly refresh the list with only the orders that have not been invoiced.

The Credit card tab allows the counter person to select a credit card for the customer when they arrive. The credit card must exist on the customer's account. It cannot be entered in this form. When the invoice process is initiated, the credit card is authorized and, if the card is accepted, the invoice process is completed. If the card is declined, the process is stopped and an Infolog is displayed with the decline information.

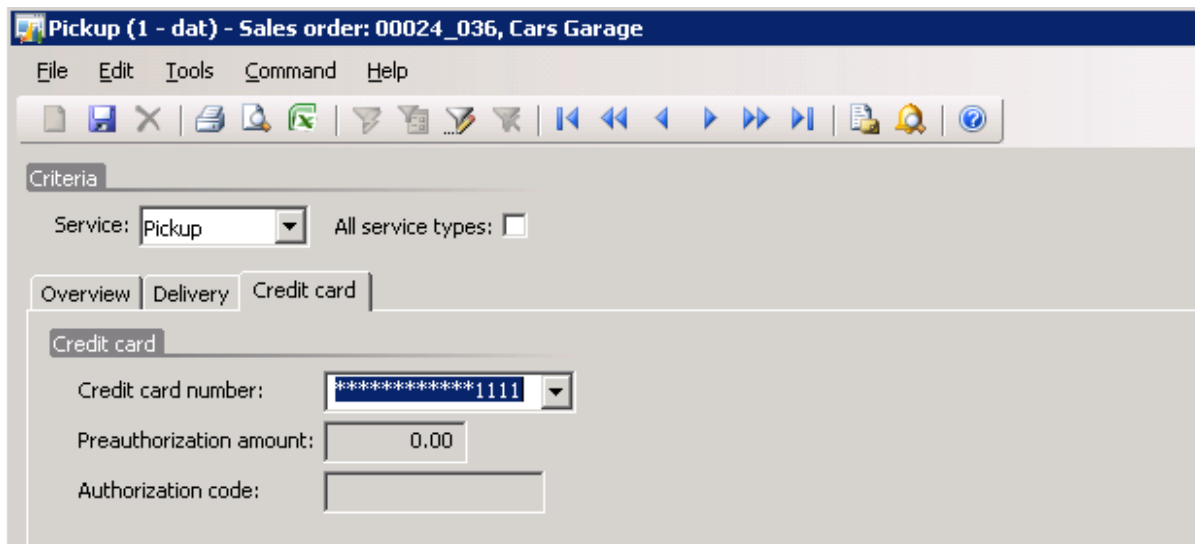
The screenshot shows a software window titled "Pickup (1 - dat) - Sales order: 00024_036, Cars Garage". It features a menu bar with "File", "Edit", "Tools", "Command", and "Help". Below the menu is a toolbar with various icons for file operations and navigation. The main area has a "Criteria" section with a "Service:" dropdown set to "Pickup" and an "All service types:" checkbox. Below this are three tabs: "Overview", "Delivery", and "Credit card", with the "Credit card" tab currently selected. Under the "Credit card" tab, there are three input fields: "Credit card number:" with a dropdown menu showing "*****1111", "Preauthorization amount:" with a text box containing "0.00", and "Authorization code:" with an empty text box.

Figure 31: Sales pickup form – credit card tab

Technical Information

The shipping carrier interface is a framework for integration with shipping carrier. In this section, we will provide more detail about the development approach and issues for the feature.

The shipping carrier interface uses three tables for the interface:

- ShipCarrierShippingRequest
- ShipCarrierCODPackage
- ShipCarrierStaging

ShipCarrierShippingRequest holds the sales order information that is shown in the Carrier transaction information form. This is the main table that the shipping carrier will map to. Each packing slip/sales order combination will have one record in this table.

ShipCarrierCODPackage holds the information about the C.O.D. packages that were created by the packing slip process in Warehouse Management. There will be one record for every C.O.D. package created and the palette ID will be stored in the PackageID field in the table.

The table contains the SalesID and PackingSlipID for use in linking the ShipCarrierShippingRequest table to the ShipCarrierCODPackage table. However, it is possible that a carrier software package cannot import from multiple tables to make use of the additional C.O.D. information. The ISCOD flag and CODAmount can be used from the ShipCarrierShippingRequest table if that situation occurs.

ShipCarrierStaging receives information from the shipping carrier software. This table contains text and numeric fields that contain the order number, packing slip ID, tracking number and charges. The following fields are used in this table for receiving shipping information:

- SalesID
- PackingSlipID
- PackageID
- ShipDate
- Weight
- PublishedRate
- ShippingCharge
- HandlingCharge
- HandlingCharge2
- HandlingCharge3
- OtherCharge
- OtherCharge2
- OtherCharge3
- FuelSurcharge

The only two fields that are required by the ShipCarrierStaging table are SalesID and PackingSlipID. These fields must be imported by the carrier from ShipCarrierShippingRequest and then returned back to ShipCarrierStaging using an export. The invoice process searches for these values in ShipCarrierStaging and they must match the packing slip and sales order or the charges will not be imported.

The PublishedRate is the retail rate that the carrier charges for their services. This is the amount that is used for core charges on the invoice. The ShippingCharge is only stored as comparative information. It is never used in the invoice. The FuelSurcharge is used when the Fuel Surcharge box is checked on the sales order.

There are three handling charges available. These charges are summed up during the invoice process into a single charge called Handling.

There are three other charges available. These are summed up during the invoice process into a single charge called Ancillary.

The ShipCarrierStaging also includes an additional text field for each numeric amount in the table. In some cases, carriers using ODBC to move information into Microsoft Dynamics AX cannot properly populate numeric fields. These fields allow a text version of the numeric fields to be exported to Microsoft Dynamics AX where they are converted into numeric values and moved into the numeric fields.

Single Shipment vs Multiple Packages

The ShipCarrierStaging table can be populated by using a single record for the entire shipment or by providing a record for each package shipped by the carrier. When the staging table is checked for charges, all of the package records are summarized into a single record and then summed up as described previously except for two fields, HandlingCharge3 and OtherCharge3.

In some cases, there are charges for the entire shipment. These charges must be mapped to HandlingCharge3 and/or OtherCharge3. When the staging records are summarized, only the values for HandlingCharge3 and OtherCharge3 in the first package are used.

Enabling The Staging table to be managed by AOT

All tables in the AOT have additional system fields that must be filled in correctly in order for Microsoft Dynamics AX to manage those tables. The shipping carrier software is not often able to update those fields correctly. To mitigate this issue, an Insert Trigger is used on the ShipCarrierStaging table. The trigger performs the following tasks:

- Set RecVersion to 1
- Increment the RecID so that it is unique
- Move amounts stored as text into the numeric fields
- Auto-generate the ShipDate

The carrier software packages are also not aware of the company from which the information has come. Because the carrier cannot send back the CompanyID, the ShipCarrierStaging table is shared by all companies and the DataAreaID is not present in the table. The charges are matched to orders by a combination of sales order number and packing slip number. The probability of those two numbers conflicting between two companies is very low. However, each company should be set up so that duplicates will not occur.

Methods of Integration

The preferred integration method is the Microsoft Dynamics AX Business Connector. Carrier packages such as Clippership are able to use the Business Connector to access the appropriate tables and write back package information using Microsoft Dynamics AX business logic. This approach also maintains all the security provided by Microsoft Dynamics AX.

Many carrier packages are unable to use the Business Connector, relying instead on ODBC. To support this method, additional changes were required to allow exports into Microsoft Dynamics AX, including:

- A SQL role used to limit access to the Microsoft Dynamics AX database by the shipping carrier software

- A form to capture the users that will be exporting information to Microsoft Dynamics AX and will be included in the role
- A stored procedure to create the role with the users added to the form

All users that will be exporting information into the Microsoft Dynamics AX database must be NT authenticated and be added to a security role in the database. The Shipping carrier role form that is found in Administration > Setup allows you to enter the alias of those users and the domain in which they are found.

During the setup of Microsoft Dynamics AX and the synchronization of tables, both the Insert Trigger for ShipCarrierStaging and a stored procedure called MaintainShipCarrierRole are created in the Microsoft Dynamics AX database. To enable the shipping carrier interface and enable the proper security, the database administrator must open the Microsoft Dynamics AX database and execute this stored procedure.

The stored procedure creates a security role called ShipCarrierRole in the Microsoft Dynamics AX database and adds the users to that role. It also and assigns the following rights to the interface tables:

- ShipCarrierShippingRequest: Select
- ShipCarrierCODPackage: Select
- ShipCarrierStaging: Select and Insert

Once this process is complete, the carrier interface software can import from the Microsoft Dynamics AX database and export information to it.

Moving Information into the Invoice

The invoice posting routine reads the ShipCarrierStaging tables to find charges that apply to the sales order that is being invoiced. These charges are summarized and moved into the ShipCarrierPackage table as a single record. The tracking numbers for each package are moved into the ShipCarrierTracking table.

Using the Staging Table vs Direct Updates

The preferred method for integration is to write information into the ShipCarrierStaging table. However, the invoice posting routines check both the ShipCarrierStaging and the ShipCarrierPackage table for charges. Clippership uses the Business Connector to write directly to the ShipCarrierPackage and ShipCarrierTracking tables instead of ShipCarrierStaging.

Limitations

This shipping carrier framework is very flexible. However, it can be limited by the capabilities of the shipping carrier software and its ability to read and write information. Although we have tried to anticipate the issues that may arise during an integration, it is possible that customization will be required to fully connect a carrier to this framework.

Adding Additional Carriers

Although there are three shipping software packages listed on the Carrier interface form, the framework does not limit access to the framework to only those three packages. There is only one process, Test Mode, that looks at the specific carrier interface ID to determine what process to follow.

When the test mode is on and UPS WorldShip or FedEx Ship Manager are selected as the interface used by the mode of delivery, the data entered into the test mode dialog box is written into ShipCarrierStaging. If Clippership is selected, the information is written directly to ShipCarrierPackage and ShipCarrierTracking.

Modifying the ShipCarrierStaging Table

It is possible to expand the ShipCarrierStaging table to send additional information to Microsoft Dynamics AX. However, table modifications must include both the table changes in ShipCarrierStaging and modifications to the Insert Trigger on the database.

The X++ code that creates the Insert Trigger is a part of the synchronization code and must be modified through AOT. Once the modifications are made, you can synchronize the ShipCarrierStaging table and the new Insert Trigger will be created.

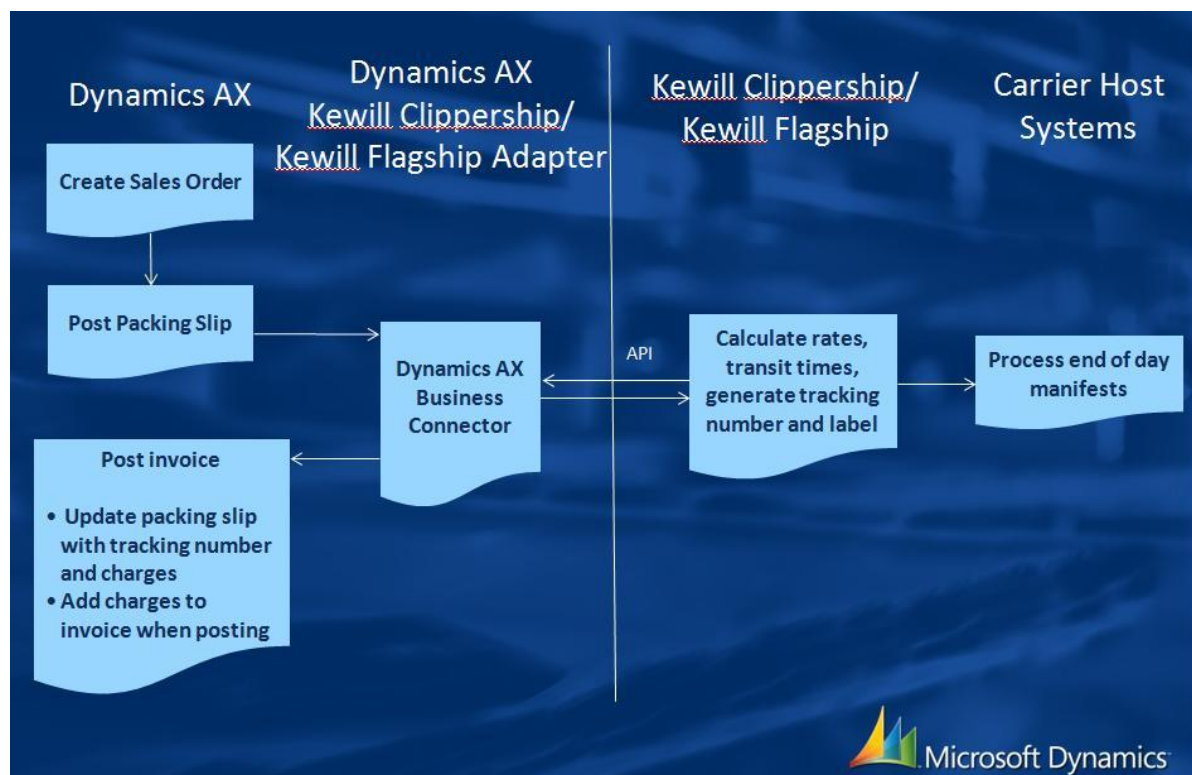
The X++ code that reads ShipCarrierStaging and updates ShipCarrierPackage and ShipCarrierTracking are stored as methods on the ShipCarrierStaging table.

Further Information for users of Clippership, FedEx, and UPS

Kewill Clippership

Kewill, the makers of Clippership, have developed a custom solution for Microsoft Dynamics AX using their integration tools and the Business Connector. Please contact Kewill at <http://www.kewill.com/microsoft> for more information on how to integrate with Clippership and obtain the Microsoft Dynamics AX solution.

Kewill also produces Kewill Flagship, a product that supports over 30 carriers and origins in North America, Europe, and Asian locations. They have also developed a custom solution for Microsoft Dynamics AX using their integration tools and the Business Connector. You can also contact them at the same web site for more information on how to integrate Kewill Flagship with Microsoft Dynamics AX.



Kewill can support an ODBC integration to connect with the Microsoft Dynamics AX database. However, the Business Connector solution is recommended due to the enhanced security and tighter integration to the Microsoft Dynamics AX business logic that it provides.

FedEx Ship Manager

The FedEx Ship Manager product uses ODBC integration to connect with the Microsoft Dynamics AX database. The integration can be setup using their Integration Assistant and a single ODBC data source (DSN) attached to a single import/export mapping.

Access to the FedEx Ship Manager software can only be obtained if you have an account with FedEx. Please contact FedEx for further information on how to obtain the software and setup the FedEx Ship Manager software.

Additional Notes for FedEx Ship Manager

The Service Type (CarrierID) coming from Microsoft Dynamics AX will not be accepted by Ship Manager unless a weight is provided. The shipping carrier interface does not calculate weight by default so you must either check the Read Scale box in Ship Manager to read the scale attached to the Ship Manager machine.

The Service Types for Ship Manager appear when you select the lookup button on their form. Ship Manager also provides a mapping form that allows you to map your Carrier IDs to their service types.

URL for finding tracking numbers on the FedEx website

As of the date of this document, the URL for linking to the FedEx website to find tracking numbers is:

http://www.fedex.com/Tracking?ascend_header=1&clienttype=dotcom&cntry_code=us&language=english&tracknumbers=%1

where the %1 represents the tracking number.

UPS WorldShip

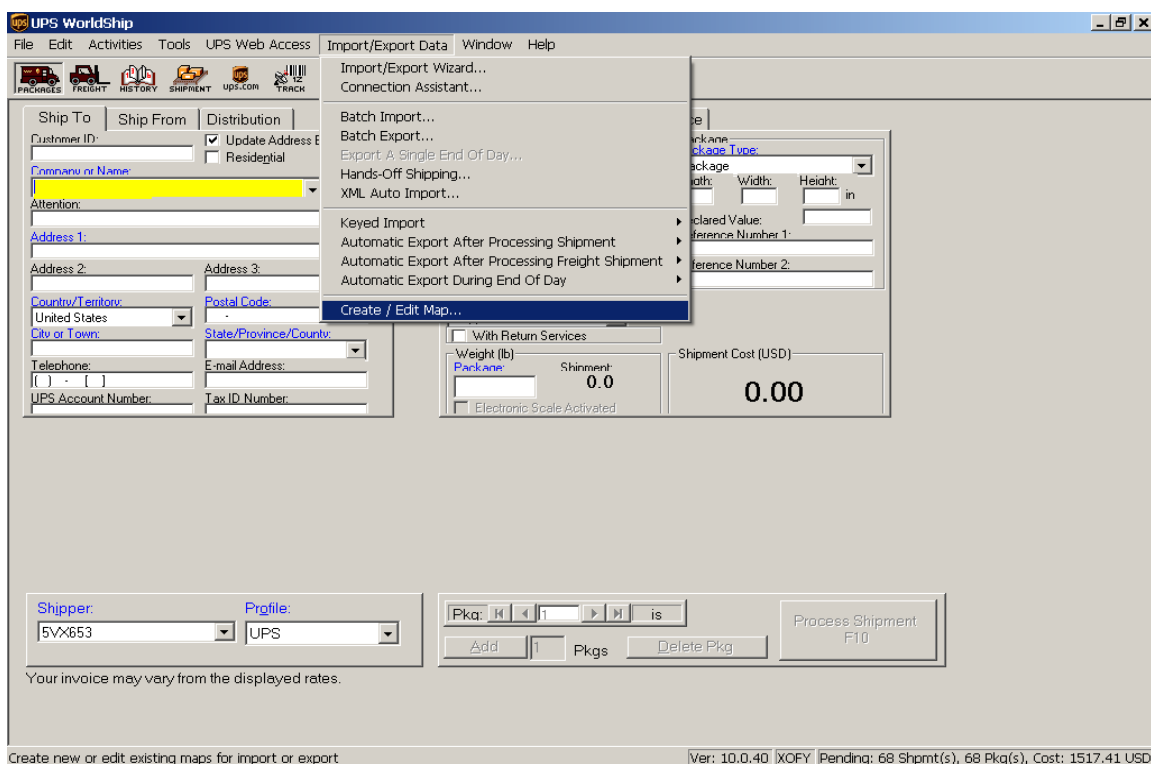
The UPS WorldShip product uses ODBC integration to connect with the Microsoft Dynamics AX database. The integration can be set up using their Integration Assistant and a single ODBC data source (DSN) attached to a single import/export mapping.

The following examples are provided as a guide to setting up UPS WorldShip for the shipping carrier interface. Your setup may vary depending on the needs of your company.

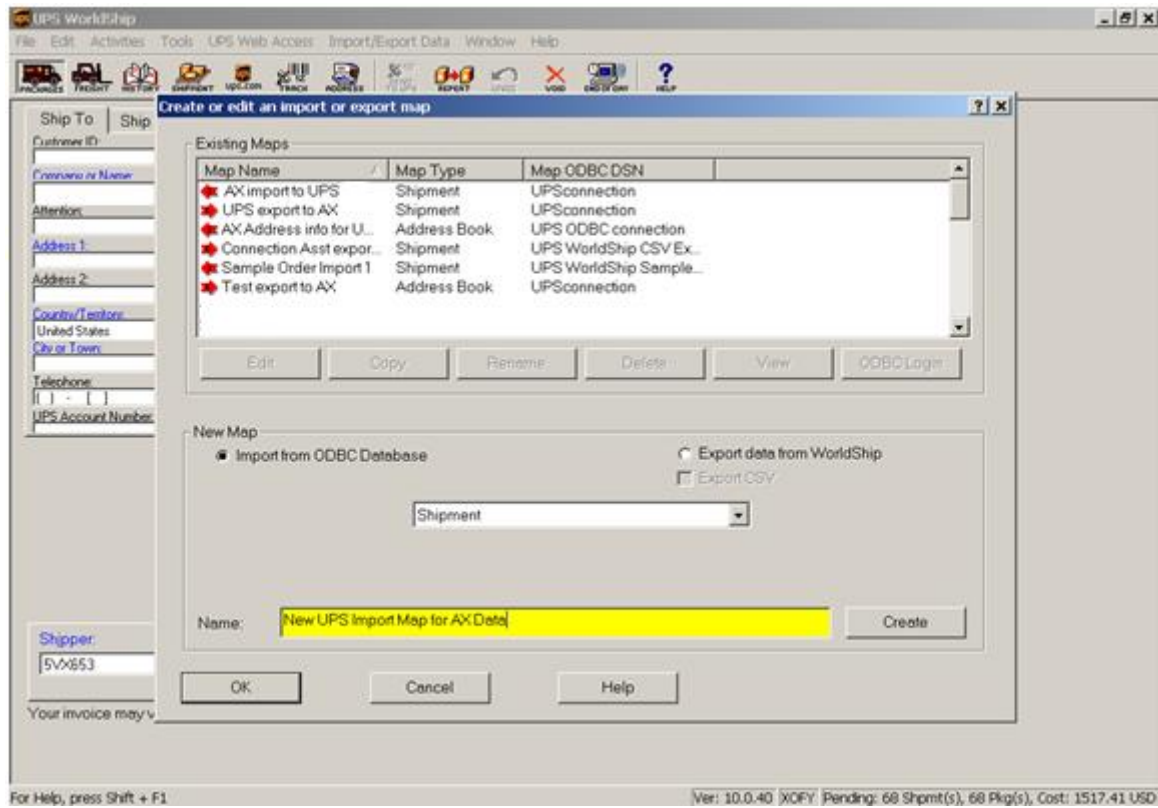
This example assumes that you have already set up an ODBC driver that connects to the SQL server where the Microsoft Dynamics AX data resides and that you are a member of ShipCarrierRole. We also assume that you will be pulling up the packing slips individually using the lookup form provided in this software.

Creating an Import Map

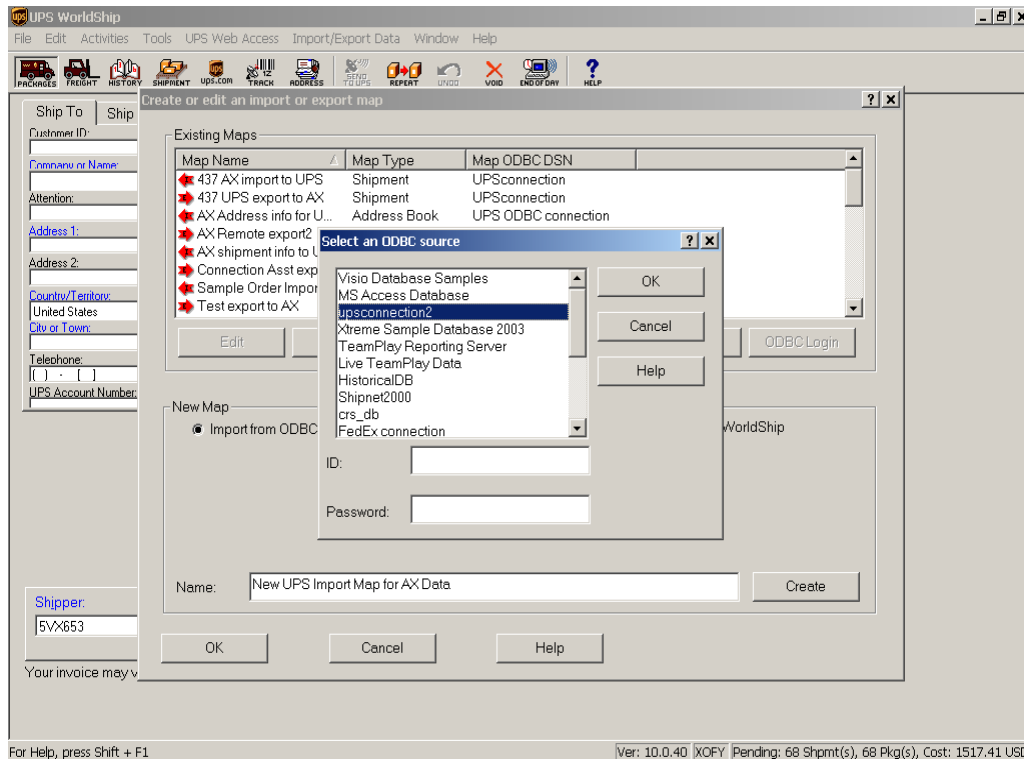
- Open UPS WorldShip and select the Import/Export Data menu, Create/Edit Map option.



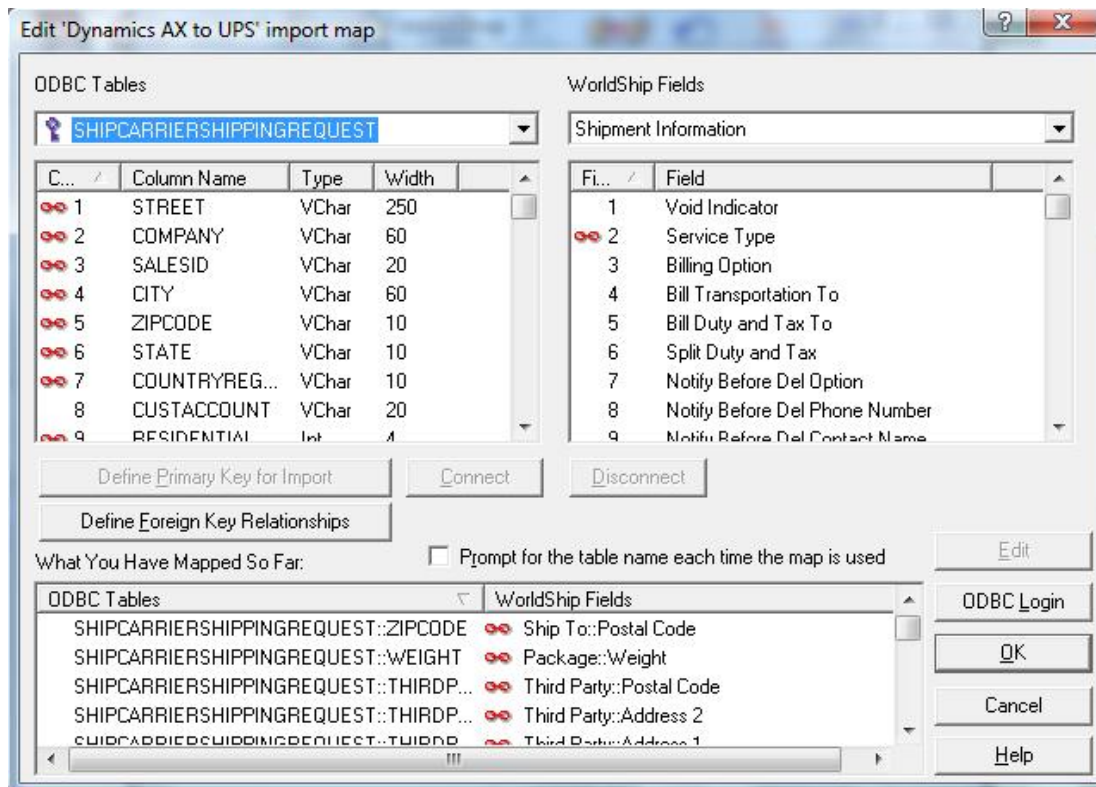
- Select Import from ODBC Database, choose the Shipment table from the middle menu, name your new import map, and click the OK button to proceed.



- Choose your ODBC driver from the Select and ODBC source dialog box. Click OK to proceed.



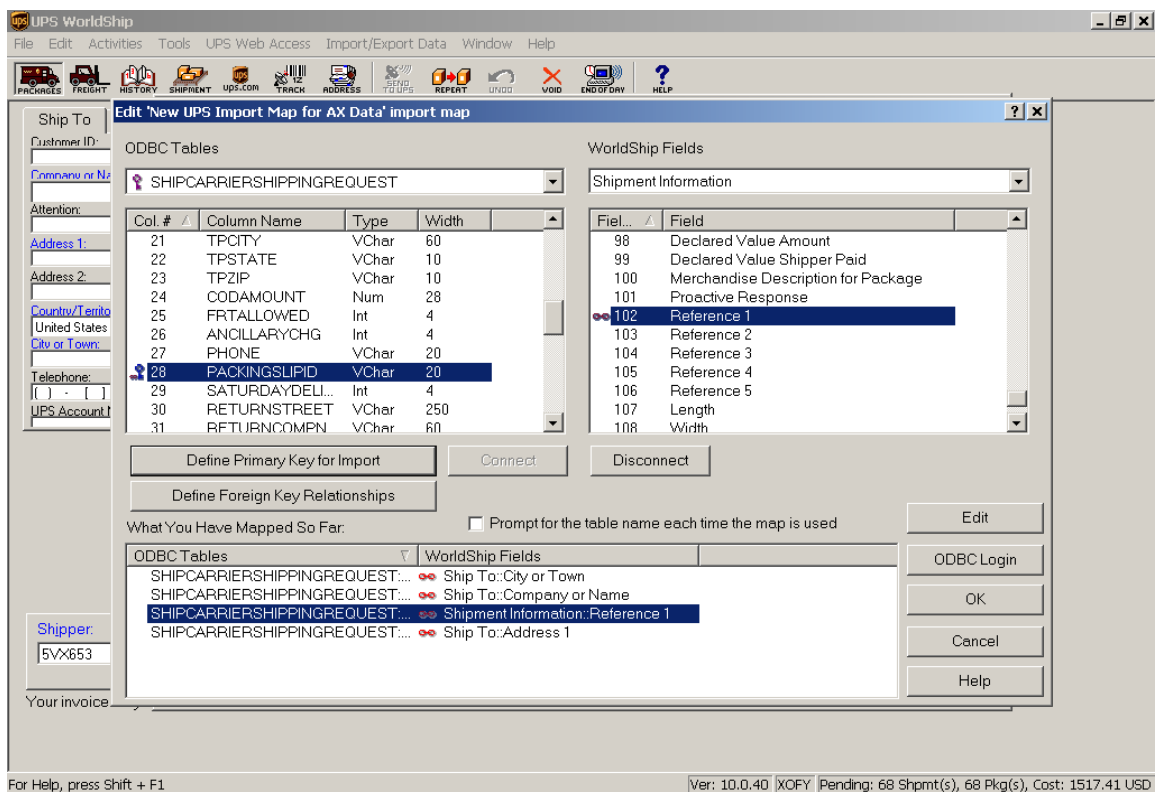
- Select the Microsoft Dynamics AX tables from the ODBC Tables list and UPS tables from the WorldShip Fields list, and use the Connect button to map them to one another.



- Typical mappings may include:

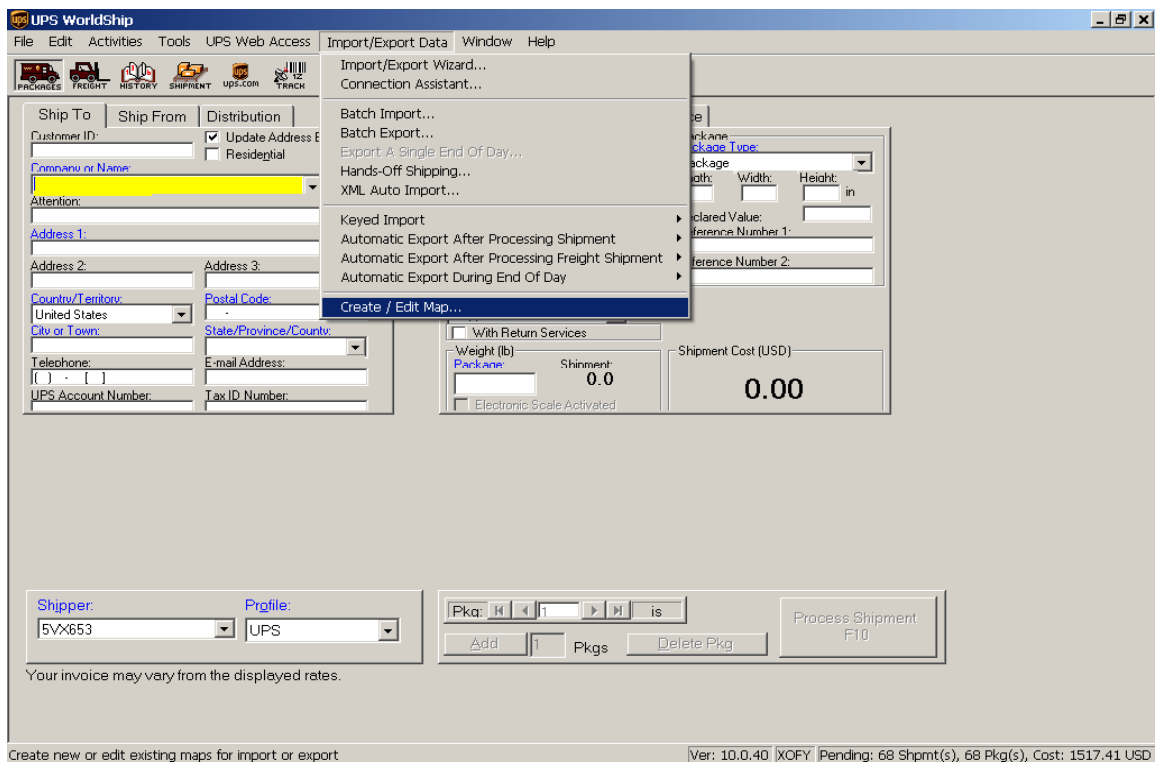
Dynamics AX Table	Dynamics AX Field	UPS Table	UPS Field
ShipCarrierShippingRequest	Street	Ship To	Address 1
ShipCarrierShippingRequest	Company	Ship To	Company or Name
ShipCarrierShippingRequest	SalesID	Shipment	Reference 2
ShipCarrierShippingRequest	City	Ship To	City or Town
ShipCarrierShippingRequest	Zip	Ship To	Postal Code
ShipCarrierShippingRequest	State	Ship To	State/Province/County
ShipCarrierShippingRequest	Country	Ship To	Country/Territory
ShipCarrierShippingRequest	Phone	Ship To	Telephone
ShipCarrierShippingRequest	Weight	Shipment	Actual Weight
ShipCarrierShippingRequest	DeliveryContact	Ship To	Attention
ShipCarrierShippingRequest	SaturdayDelivery	Shipment	Saturday Delivery Option
ShipCarrierShippingRequest	Residential	Shipment	Residential Indicator
ShipCarrierShippingRequest	CarrierID	Shipment	Service Type
ShipCarrierShippingRequest	CarrierAccount	Ship To	Receiver UPS Account
ShipCarrierShippingRequest	PackingSlipID	Shipment	Reference 1
ShipCarrierShippingRequest	ReturnStreet	Ship From	Address 1
ShipCarrierShippingRequest	ReturnCompName	Ship From	Company or Name
ShipCarrierShippingRequest	ReturnCity	Ship From	City or Town
ShipCarrierShippingRequest	ReturnState	Ship From	State/Province/County
ShipCarrierShippingRequest	ReturnZip	Ship From	Postal Code
ShipCarrierShippingRequest	Third Party Street	Third Party	Address 1
ShipCarrierShippingRequest	ThirdPartyCompName	Third Party	Company or Name
ShipCarrierShippingRequest	ThirdPartyCity	Third Party	City or Town
ShipCarrierShippingRequest	ThirdPartyState	Third Party	State/Province/County
ShipCarrierShippingRequest	ThirdPartyZip	Third Party	Postal Code

- Highlight the PackingSlipID/Reference1 connection on the list and press the 'Define Primary Key for Import' button. This will flag the PackingSlipID as the key field for this import. Click the OK button to complete the import map.



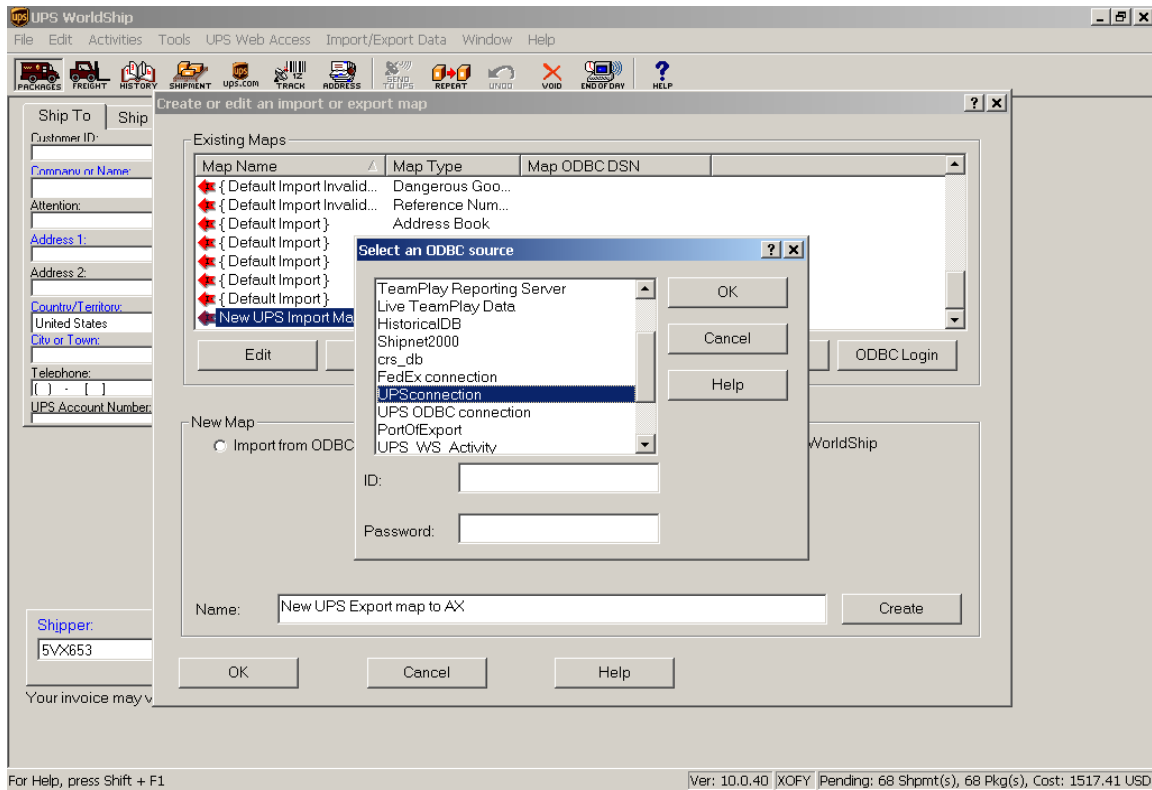
Creating an Export Map

- Open UPS WorldShip and select the Import/Export Data menu, Create/Edit Map option.

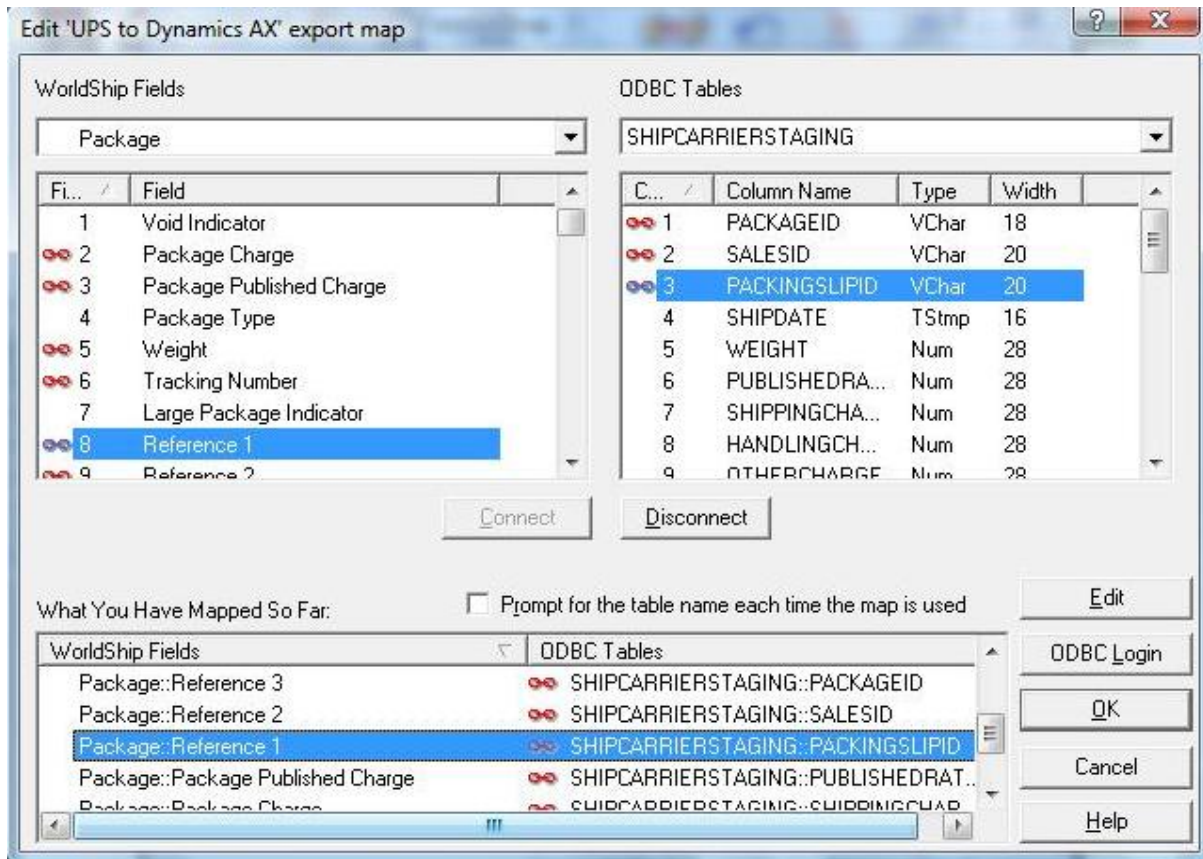


-
- Select Export data from WorldShip, choose the Shipment table from the middle menu, name your new export map, and click the OK button to proceed.

- Choose your ODBC driver from the Select an ODBC source dialog box. Click OK to proceed.



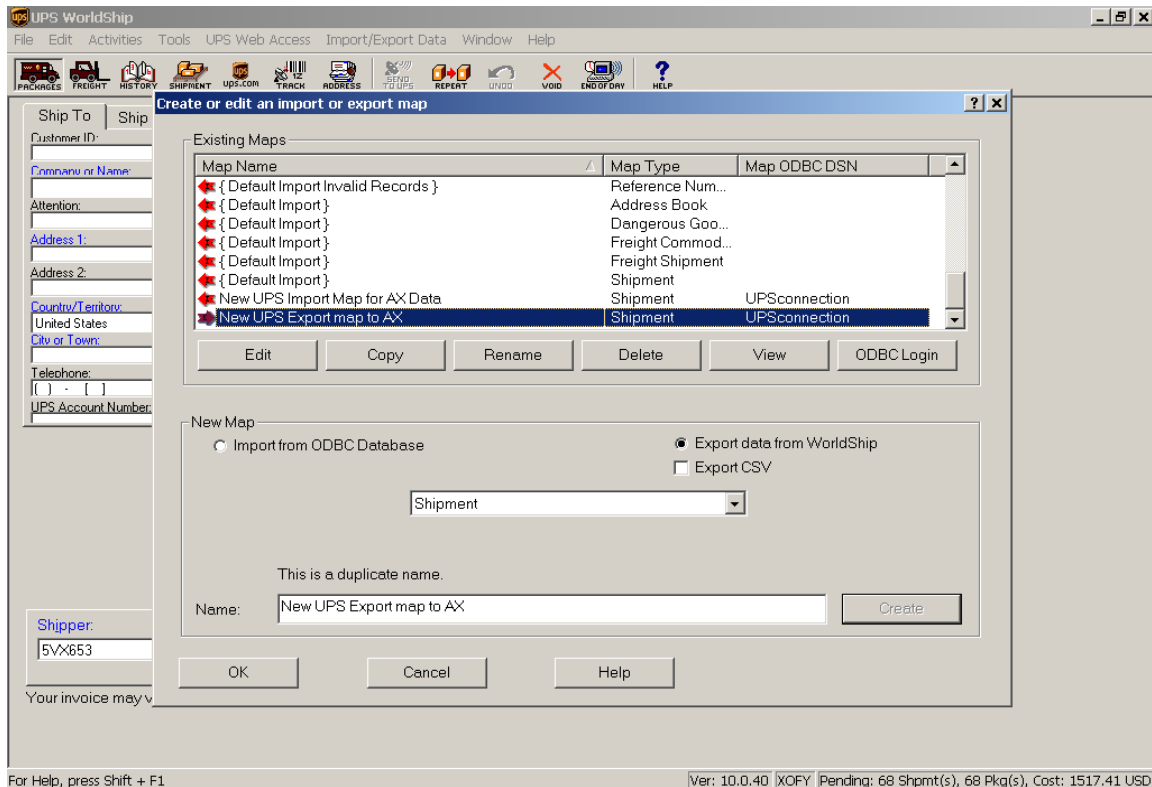
- Select the UPS tables from the WorldShip Fields list and Microsoft Dynamics AX tables from the ODBC Tables list and, use the Connect button to map them to one another.



- Typical mapping fields include:

UPS Table	UPS Field	Dynamics AX Table	Dynamics AX Field
Package	Reference 1	ShipCarrierStaging	PackingSlipID
Package	Reference 2	ShipCarrierStaging	SalesID
Package	Weight	ShipCarrierStaging	WeightText
Package	Tracking Number	ShipCarrierStaging	TrackingNumber
Package	Package Published Charge	ShipCarrierStaging	PublishedRateText
Package	Package Charge	ShipCarrierStaging	ShippingChargeText
Package	Package Handling Charge Amount	ShipCarrierStaging	Handling ChargeText
Shipment	Shipment Handling Charge	ShipCarrierStaging	HandlingCharge3Text
Shipment	Saturday Delivery Charge	ShipCarrierStaging	OtherCharge3Text

- Click the OK button to complete the export map.



Additional Notes for UPS WorldShip

The PackingSlipID and SalesID will not repeat automatically for each package unless you use a profile. In the profile, you can specify that Reference1 and Reference2 will be included in all packages. This will enable the correct information to be sent back to Microsoft Dynamics AX for all packages.

We encourage you to use the ShipCarrierRole when accessing the SQL database. This role will reduce the number of tables on the SQL server that are exposed to the ODBC drivers and UPS maps. However, because all SQL roles have access to the system views assigned to the public role in the database, the ShipCarrierRole includes these views by default. Removing these public views will further reduce the number of tables that are exposed to the UPS maps but these views cannot be removed from the role without specific database administrator intervention and changes to the public view.

UPS also uses internal codes to represent the service types that they offer. For example, GND represents Ground in WorldShip. The list of service type codes needed to create Carrier IDs is included in the WorldShip documentation.

When mapping UPS fields to Microsoft Dynamics AX fields, you may need to use the TEXT version of the numeric fields instead of the numeric fields in the ShipCarrierStaging Table. For example, if you want to map a handling charge, map it to HandlingChargeText instead of HandlingCharge. This situation may exist due to the behavior of certain ODBC drivers with the UPS software. If you do not experience any issues, use the numeric field for mapping.

URL for finding tracking numbers on the UPS website

As of the date of this document, the URL for linking to the UPS website to find tracking numbers is:

http://wwwapps.ups.com/WebTracking/processInputRequest?HTMLVersion=5.0&loc=en_US&&trackingnum=%1

where the %1 represents the tracking number.

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48