



Property of WilloWare Incorporated

DS0432
Assembly Serial Entry & SVC Enhancements



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Problem Definition

<i>Problem Definition</i>	CCDA
<p>ACME Co. produces serial numbered units with several serial numbered subassemblies. Many of these items are from subcontractors and never go through ACME inventory.</p> <p>GP Manufacturing is used to produce the complete unit, and many of the subcontracted items are not part of the Picklist. GP provides a way to record the serial number of the final assembly but since the subassemblies are not part of the Picklist, there is no place to record these serial numbers. Many of the subassemblies also have serialized subassemblies that need to be recorded.</p> <p>GP Service is used to track equipment records, configurations and returns. When a sales invoice is posted, the Service module automatically creates Equipment Records (ER) for the serial number of the final unit, but not for serialized subassemblies.</p> <p>ACME processes all returns from Service Calls. The RMA is generated from the Service Call Parts Line. ACME adds an "R" suffix to the item number of the returned serial number before creating the RMA and an ER Supersession is created to update the Equipment Record with the "R" suffix.</p> <p>A solution is required that will allow ACME to record the serial numbers of the subassemblies that will be linked to its final serial numbered unit. ACME should be able to record this information at any time during the manufacturing process, and also change the information up to the time of shipping. The user should be able to use a scanner to scan the serial numbers for the subassemblies.</p> <p>The list of subassembly items that need to be tracked will be listed in a Kit item, so a method needs to be provided to tie the final unit item number to the kit item number. This information should be used to provide the user with an entry window that shows the subassembly item numbers, and provides a place to enter their serial numbers.</p> <p>When the Equipment Record is created for the sold unit, the system should also create ERs</p>	

for each of the tracked subassemblies and build a multi-level configuration.

When an I-Line item is added to a SVC Call, an "R" needs to be added to the item number in the 6th position and used for the R-Line. If the I-Line item is serialized, and more than one item exists in the item master with the same first 5 digits, a window needs to pop-up, allowing the user to select which item to choose.

When the SN is identified on the replacement item, the replacement serial number should replace the returned serial number on its configuration. The new serial number is installed by the tech, it needs to take over the warranty and contract information from the returned serial number. The warranty on the replacement serial number is the remaining warranty of the returned serial number or 90 days, whichever is greater. The returned item needs to be canceled off the contract.

If an item number that ends in "RR" is entered as the I-Line, this needs to be treated as a Repair and Return as follows:

1. If the "RR" item doesn't already exist, it needs to be created as a copy of the SVC Call header item, but at \$0 cost.
2. When the R-Line is returned, an equipment record is created for the "RR" item that is a duplicate ER of the item from the SVC Call header.
3. When the I-Line is shipped, the ER for the "RR" item is moved to the Equipment Record Audit table and then deleted from the SVC Master table.

Occasionally, the actual serial number returned to inventory is different than the serial number on the RMA. Since the linked In-Transit Transfer changes the equipment record customer and equipment status before the RMA is received, the original serial number is left with the wrong customer and status. ACME needs the original equipment record to change back to the original customer and the equipment status back to the default equipment status.

SVC allows saving default accounts to service types. These account numbers are used by SVC when billing a SVC Call. Once account type absent from this list is for Markdowns. ACME would like to record a default Markdown account number and have it flow to billing.

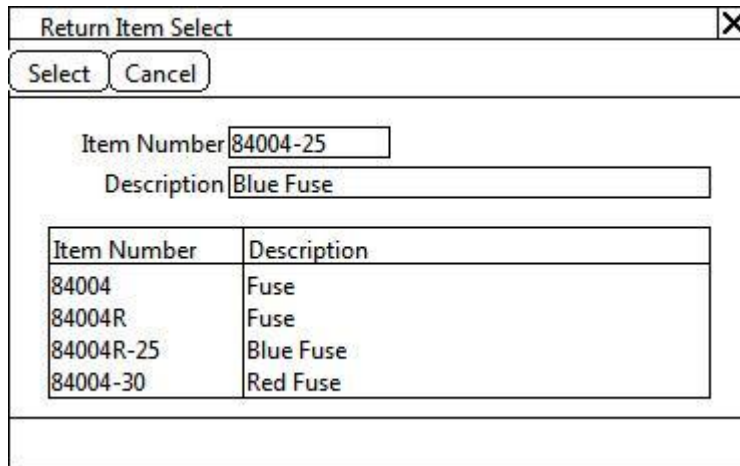
All changes to Equipment Records and Configurations need to be recorded in an audit table and be viewable from the UI.

Solution Overview

<i>Solution Overview</i>	CCDA																														
<p>Serial Number Linking</p> <p>The proposed solution will link a manufactured finished item to a GP Kit item. The kit will be created to include the serial numbered subassemblies that need to be linked to the finished good.</p> <p>At any time during the manufacturing process, a window will then be used to record the serial numbers of the subassemblies. The serial numbers will also be able to be modified up to the time the finished item is shipped. After that time the information is only viewable. The serial selection window will be optimized to allow a scanner to be used to scan the serial numbers for the subassemblies.</p> <p>Equipment Records & Configuration Modification</p> <p>When the finished item Equipment Record is created at the time of SOP Invoice posting, the system will also loop through the subassembly tree and create ERs for each of the linked subassemblies and build a multi-level configuration. The configuration will be named by using the Finished Item Serial Number.</p> <p>Service Call Modification</p> <p><i>Permanent Swapping</i></p> <p>When an I-Line item is added to a SVC Call, an “R” will be added to the item number in the 6th position and used for the R-Line. For example:</p> <table border="1" data-bbox="197 1153 1134 1373"> <thead> <tr> <th colspan="3">Line</th> <th colspan="2">Line</th> </tr> <tr> <th>Type</th> <th>Orig Item Num</th> <th>Item Type</th> <th>Type</th> <th>New Item Num</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>85025</td> <td>new 5 digit part</td> <td>R</td> <td>85025R</td> </tr> <tr> <td>I</td> <td>85025R</td> <td>refurb 5 digit</td> <td>R</td> <td>85025R</td> </tr> <tr> <td>I</td> <td>85025-xx</td> <td>new 8 digit part</td> <td>R</td> <td>85025R-xx</td> </tr> <tr> <td>I</td> <td>85025R-xx</td> <td>refurb 8 digit</td> <td>R</td> <td>85025R-xx</td> </tr> </tbody> </table>	Line			Line		Type	Orig Item Num	Item Type	Type	New Item Num	I	85025	new 5 digit part	R	85025R	I	85025R	refurb 5 digit	R	85025R	I	85025-xx	new 8 digit part	R	85025R-xx	I	85025R-xx	refurb 8 digit	R	85025R-xx	
Line			Line																												
Type	Orig Item Num	Item Type	Type	New Item Num																											
I	85025	new 5 digit part	R	85025R																											
I	85025R	refurb 5 digit	R	85025R																											
I	85025-xx	new 8 digit part	R	85025R-xx																											
I	85025R-xx	refurb 8 digit	R	85025R-xx																											

If the new R-Line does not exist in inventory, it will be added to the item master as an exact duplicate of the I-Line, but at 50% of the original cost.

If the I-Line item is serialized, and more than one item exists in the item master with the same first 5 digits, a window needs to pop-up, allowing the user to select which item to choose.



Item Number	Description
84004	Fuse
84004R	Fuse
84004R-25	Blue Fuse
84004-30	Red Fuse

The header displays the I-Line from SVC Call Parts. The scrolling window displays all items in the item master that begin with the same 5 digits as the I-Line. The user can select an item and click SELECT to update the R-Line with the selected item, or choose CANCEL to close the window and use the I-Line as the R-Line item.

When the SN is identified for the returned item ("R"-Item), a supersession will be automatically generated to update the ER with the new "R" item number.

When the SN is identified on the replacement item, the replacement serial number will replace the returned serial number on its configuration. When the new serial number is installed by the tech (QTY Sold field is updated), it will take over the warranty and contract information from the returned serial number. The warranty on the replacement serial number is the remaining warranty of the returned serial number or 90 days, whichever is greater.

The returned item will be canceled off the contract.

The Equipment Records of the replacement serial number and returned serial number will each be updated. The replacement SN will have the returned serial number saved to the User Defined 5 field on its ER, while the returned SN will have "REPLACED" saved to its User Defined 5 field and the replacement SN saved to the Reference Field. The Version field on both ER's will have the SVC Call number saved to it.

NOTE: If the returned item serial number is not known when the replacement item is installed, the warranty information will and configuration will update when the returner serial number RMA is generated.

Return and Repair of Serialized Equipment

If an item number that ends in "RR" is entered as the I-Line, this will be treated as a Repair and Return and the following will occur:

1. If the "RR" item doesn't already exist, it will be created as an exact duplicate of the SVC Call header item, but at \$0 cost.
2. When the R-Line is returned, an equipment record is created for the "RR" serial number that is a duplicate ER of the item from the SVC Call header.
3. When the I-Line Qty Sold is updated, the ER for the "RR" item is moved to the Equipment Record Audit table and then deleted from the SVC Master table.

RMA Serial Number Swapping

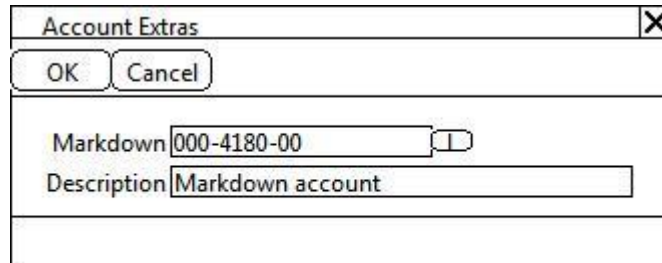
Occasionally, the actual serial number returned to inventory is different than the serial number on the RMA. Since the linked In-Transit Transfer changes the equipment record customer and equipment status before the RMA is received, the original serial number is left with the wrong customer and status. The original equipment record will change back to the original customer and the equipment status back to the default equipment status.

Service Type Default Markdown Account

SVC allows saving default accounts to service types. These account numbers are used by SVC when billing a SVC Call. One account type absent from this list is for Markdowns. Users can record a default Markdown account number and have it flow to the invoice when billing.

Service Type Account Extras will be a new window accessed from the Service Type Account window.

(Service Type Maintenance >> Accounts button >> Additional >> Account Extras)



 = Lookup Button

The user will enter an account number or select one from the lookup. If the user clicks OK, the account number entered into the window will be linked to the Service Type. When an Invoice is generated from a SVC Call with that Service Type, the indicated Markdown account will be used.

ER and Config Audit Trail

An audit trail will be created for Equipment Record and Configuration changes. When a change is made to the following fields of the ER, a complete snapshot of the ER will be captured:

- Customer ID
- Address ID
- Any Warranty ID or Dates

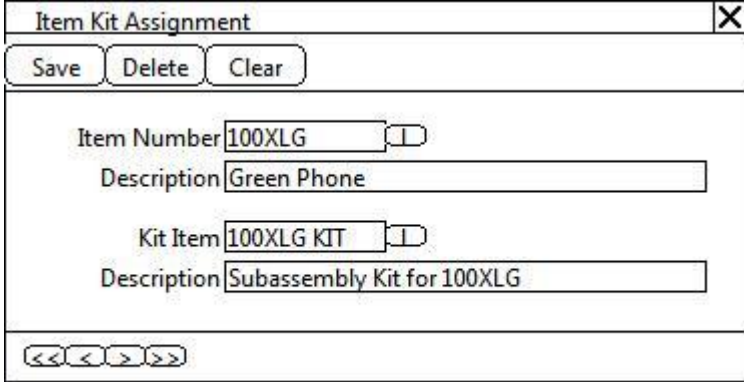

A snapshot will be taken of the entire Configuration when the following fields are changed:

- Customer ID
- Primary Address
- Any change to a line



The archived ERs and Configurations will be viewable in GP through Inquiry windows.	
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Design Features

<i>Item Kit Assignment</i>		CCDA							
<p>A new window will be created called Item Kit Assignment, which will be accessed from Cards >> Inventory >> Item Kit Assignment. It can also be opened from the Extras menu when Item Maintenance is open.</p> <div data-bbox="359 602 1098 982" data-label="Form">  </div> <p> = Lookup Button</p>									
<table border="1"> <thead> <tr> <th>Field</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Item Number</td> <td>If opened from Item Maintenance the Item Number will auto-populate. Otherwise the user will enter an item number, or select one from the lookup. If an item-kit assignment exists it will be displayed, and the Kit Item field and lookup will be disabled.</td> </tr> <tr> <td>Description</td> <td>Fills from Item Master</td> </tr> <tr> <td>Kit Item</td> <td>User will enter or select a Kit Item from the item number lookup. This field will validate that the selected item is an Item Type = KIT.</td> </tr> </tbody> </table>	Field	Function	Item Number	If opened from Item Maintenance the Item Number will auto-populate. Otherwise the user will enter an item number, or select one from the lookup. If an item-kit assignment exists it will be displayed, and the Kit Item field and lookup will be disabled.	Description	Fills from Item Master	Kit Item	User will enter or select a Kit Item from the item number lookup. This field will validate that the selected item is an Item Type = KIT.	
Field	Function								
Item Number	If opened from Item Maintenance the Item Number will auto-populate. Otherwise the user will enter an item number, or select one from the lookup. If an item-kit assignment exists it will be displayed, and the Kit Item field and lookup will be disabled.								
Description	Fills from Item Master								
Kit Item	User will enter or select a Kit Item from the item number lookup. This field will validate that the selected item is an Item Type = KIT.								

Description	Fills from Item Master	
Scroll Buttons	Will move through the list of Item-Kit assignments.	
<p>The window will not allow an item to be assigned to more than one kit. The existing item-kit would have to be deleted before creating a new item-kit assignment.</p>		

Assembly Serial Entry

CCDA

A new window will be created called Assembly Serial Entry. This window will be available from the following locations:

- MO Entry via Extras >> Additional >> Assembly Serial Entry
- MO Receipt Entry via Extras >> Additional >> Assembly Serial Entry
- Transactions >> Inventory >> Assembly Serial Entry

X
Assembly Serial Entry

Clear

Item Number

Description

Kit Item

Description

Serial Number Sold

Component

Serial Number Add

- 100XLG
 - MEMMOD001: 1X2008-00
 - CBA10G: ?
 - *MEMMOD002: ?
 - BA100G: ?
 - TA100G: ?
 - GA100G: ?

= Lookup Button * = Selected Item

In the actual user interface the user will be able to “mark” an item in the Tree View, this is shown here as an asterisk. After selecting an item from the Tree View, the Serial Number Entry field on the right will become enabled and display the Item Number for the selected Item.

Field	Function
Manufacture Order	When opened from MO Entry or MO Receipt Entry the MO Number will pull from the previous MO window. The user does not have to enter a Manufacturing Order—see Serial Number field below.
Item Number	Populates from the MO. User can also lookup or enter an Item Number if the window is not opened from MO Entry or MO Receipt Entry.
Description	Populates from the Item Master
Kit Item	Populates from Item-Kit Assignment. If an Item-Kit assignment exists this field will automatically fill, and the field and lookup will be locked. If an Item-Kit does not exist, the user can select a kit here. They will then be prompted if they want to create a new Item-Kit Assignment, which will then open the Item-Kit Assignment window.
Kit Description	Populates from the Item Master
Serial Number	The user can enter a serial number, or select one from the Lookup. If a MO is selected, the serial number lookup will show serial number from both Manufacturing Serial Number Pre-Entry, and serial numbers on posted MO Receipts. If just an Item Number is selected, the Lookup will show serial numbers from the Inventory Serial Number Master.
Tree View	Shows the exploded Kit-BOM for the parent item where each node is an Item Number-Serial Number pair. As shown above, empty nodes (?) are created for each unit of a subassembly. For the CBA10G assembly the window shows it contains 4 EACH of DIO-1A, none of which have been assigned serial numbers yet.
Serial Number	When a part is marked in the Tree View, the Serial Number field

	will display the part number. The user will enter the new serial number, then click ADD.	
ADD	The Add button will assign the Serial Number to the selected node in the tree.	
Clear	Clears the screen	

When the user enters or selects a parent-item serial number, the system will read through the Parent Item linked Kit-BOM, and check each component to see if it is serial numbered and if it is on the Kit. If so, it will create empty item-serial nodes, 1 per BOM Quantity, for that component. If the component is also a made item with a linked kit, the process will continue down to the next level in the Kit-BOM.

The Kit U of M and Quantities are not used.

The SOLD Flag will be marked if the parent serial number exists on a posted sales invoice. The user will be able to view the serial number information in the Tree View, but not edit the serial number information.

The system will be setup to allow for efficient use of a scanner while entering the sub-component serial numbers. When the parent serial number is entered into the window, the system will locate the first sub-component on that needs a serial number and select it. When the user scans the a serial number, the ADD button will automatically be clicked and then the next item number without a serial number assigned will be selected.

The method that the system uses to find the next required serial number is to process down each branch of the tree before proceeding to the next branch. In the mock-up above, the order of serial number processing if using the automated scanner method would have been:

MEMMOD001 - CBA10G – MEMMOD002 – BA100G – TA100G – GA100G

The user can also use the keyboard and mouse to assign serial numbers in any sequence.

<i>Auto-Generate Component Equipment Records & Configurations</i>	CCDA
<p>When a Sales Invoice is posted that contains a serial numbered item, the Service module will automatically create an Equipment Record (ER) for the top-level item.</p> <p>The custom code will monitor the sales posting activity. When a top-level serial number is posted, the system will locate it in the Assembly Serial BOM table, then create ERs for each subassembly Item Number-Serial Number pair that has been linked to the top level item.</p> <p>Each ER will add the SOP Number and Ship Date from the posted invoice. Each will have its own Warranty Codes based on the item setup.</p> <p>It will also create Service Configuration records to tie the subassemblies to the top-level unit. The Service Configuration will be created with the same structure as the Assembly Serial Kit-BOM for the top-level unit. The name for the Configuration will be the Finished Item Serial Number. The description will include the SOP Invoice Number and the Finished Item Number.</p>	



<i>Service Call Enhancements</i>	CCDA
See Solution Overview Section	

Service Records Audit Trail

CCDA

ACME wants to create an audit trail of changes to ERs and Configurations. When a change is made to the following fields of the ER, a complete snapshot of the ER will be captured:

- Customer ID
- Address ID
- Any Warranty ID or Dates

Navigation: Inquiry >> Service Call >> Equipment Audit Inquiry

The screenshot shows a software window titled "Equipment Inquiry" with a menu bar (File, Edit, Tools, Help, Debug) and a toolbar (OK, Clear). The window displays the following data:

Equipment Number	WD106546271	Change Date	< >
Item Number	4-E2094A	Equipment Status	INSTALL Qty 1.00
Serial Number	Laserjet Printer WD106546271	Reference	2094-271
Customer ID	ASSOCIAT0001	Version	
Address ID	Associated Insurance Company	Asset Tag	
Contact Name	PRIMARY	Service Area	CENTRAL Central Service Area
Address	Dmitry Rodin	Office ID	
City	309 Garden Mall	Tech ID	
State		Date History:	
ZIP Code	Lincoln	Ship	7/7/2004
Country	NE	Install	7/7/2004
Time Zone	68502-3090	Register	7/7/2004
Vendor ID	USA	Last P.M.	
Vendor Warranty Start	CST Central Time Zone	Last Serviced	
Seller Warranty Start		PM Month	
Contract Start/End		PM Day	
		Contract	
		Contract Type	
		Contract Start/End	0/0/0000 - 0/0/0000

A custom Equipment Inquiry window will be created similar to the window above. The window above is a modified version of the real Equipment Inquiry, and is provided for demonstration purposes. Since the audited records will be stored in a custom table, the existing Inquiry window cannot be used.

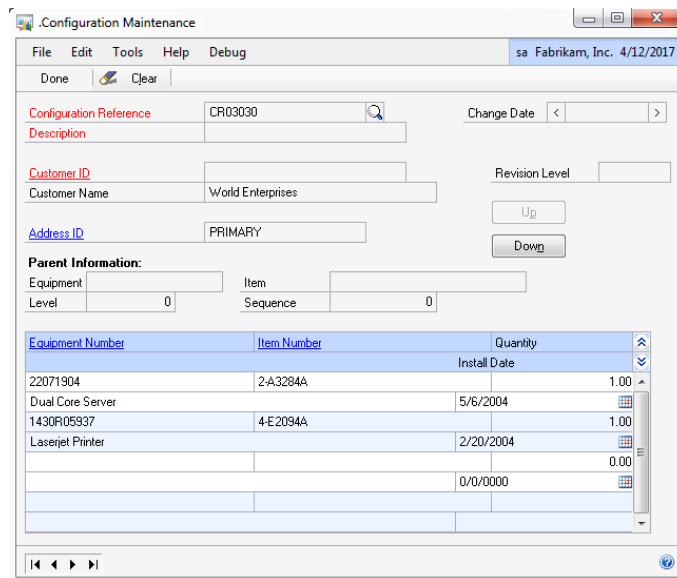
The key change is the addition of the Change Date field in the upper right. When an Equipment record is retrieved the window will default to show the most recent change first. The user can click the scroll buttons on either side of the Change Date field to move forwards and backwards through the change history.

This window will show only archived versions of the Equipment records. The current version must be viewed through the standard Field Service windows.

A snapshot should also be taken of the entire Configuration when the following fields are changed:

- Customer ID
- Primary Address
- Any change to a line

Navigation: Inquiry >> Service Call >> Configuration Audit Inquiry



The screenshot shows a software window titled ".Configuration Maintenance" with a menu bar (File, Edit, Tools, Help, Debug) and a status bar (sa Fabrikam, Inc. 4/12/2017). The main area contains several input fields and buttons:

- Configuration Reference:** CR03030 (with a search icon) and **Change Date:** with left and right arrow buttons.
- Description:** (empty text field)
- Customer ID:** (empty text field) and **Revision Level:** (empty text field)
- Customer Name:** World Enterprises
- Address ID:** PRIMARY (with Up and Down buttons)
- Parent Information:**
 - Equipment:** (empty text field) and **Item:** (empty text field)
 - Level:** 0 and **Sequence:** 0
- Table:** A table with columns: Equipment Number, Item Number, Quantity, and Install Date.

Equipment Number	Item Number	Quantity	Install Date
22071904	2-A-3284A	1.00	5/6/2004
Dual Core Server	4-E-2094A	1.00	2/20/2004
1430R05937		0.00	
Lasernet Printer		0/0/0000	

A custom Configuration Inquiry window will be created similar to the window above. The window above is a modified version of the Configuration Maintenance window, and is provided for demonstration purposes. Since the audited records will be stored in a custom table, the existing Maintenance window cannot be used.

The Configuration Inquiry will be view-only, allowing no changes to the historical record. After selecting a Configuration Reference, the window will display the most recent change. The user can click the scroll buttons on either side of the Change Date field to move to forwards and backwards through the change history. If the configuration contains multiple levels the user will be able to select a line and move Down or Up in the configuration.

This window will show only archived versions of the Configuration records. The current version must be viewed through the standard Field Service windows.