



Property of WillowWare Incorporated

DS0180

Disassembly Utility



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Problem Definition

<i>Problem Definition</i>	CCDA
<p>ACMECO produces infrastructure systems for the telecommunications industry. The microprocessor based hardware runs within large legacy environments, and ACME's hardware needs to interact with a lot of existing software. Often the software will interact only with a specific serial numbered component (such as a motherboard or processor).</p> <p>When a client needs to upgrade the hardware, the entire unit is returned to ACME. ACME removes some of the serial numbered components for reuse in the upgraded assembly. The disassembly will involve only the serial or lot numbered components in the assembly. While most components are serial numbered, some are lot numbered.</p> <p>The hardware being disassembled is a sold unit, and is not actually returned into ACME's inventory.</p> <p>ACME needs to track the cumulative cost of the serial/lot numbered components over time. As a particular component is removed from an assembly and reused in a new assembly, that part increases in value. For example, it accumulates its original cost plus the labor used to build the original assembly that contained the part, plus the cost of other non-serial/lot tracked parts, plus the labor to disassemble the returned hardware, and so on.</p> <p>These reusable serial/lot numbered components are the focus of this modification, other miscellaneous parts on a BOM are just "cost" that accrues to the primary parts during disassembly.</p> <p>When these components are removed, they need to be linked to an RMA. ACME will have specific inventory sites set-up as "RMA Sites", and the disassembly process needs to allow the user to specify into which site the components should be produced.</p> <p>Additionally, the hardware may be composed of subassemblies, which themselves need to be further disassembled to extract specific components. ACME needs the ability to specify</p>	

which assemblies should be further disassembled. Some assemblies, such as a PC board with soldered components, cannot be disassembled.

Subassemblies are built using GP Manufacturing Orders (MOs). Serial/Lot linking is used to indicate which serial numbers go into which parent parts.

The subassemblies are “configured” into a final product using Inventory Assembly Transactions (ATrx). Serial/Lot linking is also used here to tie serial/lot numbered components to serial numbered finished items.

The disassembly process will need the ability to trace backwards from the sold serial number, to the ATrx that built it, and to the MO (or MOs) that produced the assemblies within the sold unit.

All components that will be involved in the disassembly are serial numbered or lot numbered.

Solution Overview

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<p>The proposed solution will provide a new window, Item Disassembly, that will be used to perform disassembly of finished good items made using Inventory Assembly Transactions (ATrx).</p> <p>The Item Disassembly window will locate the ATrx that made a Serial Number entered by the user. The user will then see an exploded Bill of Material view of the item that shows only the serial/lot numbered components and subassemblies.</p> <p>The user will be able to mark which items they want to remove (disassemble) from the finished good.</p> <p>During disassembly the cost of the made item will be allocated to the components based on a ratio of the component item(s) cost. Take the following example:</p> <table border="1" data-bbox="310 935 1146 1255"> <thead> <tr> <th colspan="4">Original Build: 2 units of Assembly at \$15 each</th> </tr> <tr> <th colspan="2">Assembly-1 (SN)</th> <th colspan="2">Assembly-2 (SN)</th> </tr> </thead> <tbody> <tr> <td>Component-1 (SN)</td> <td>\$2</td> <td>Component-1 (SN)</td> <td>\$4</td> </tr> <tr> <td>Component-A (SN)</td> <td>\$3</td> <td>Component-A (SN)</td> <td>\$4</td> </tr> <tr> <td>Other Parts</td> <td>\$1</td> <td>Other Parts</td> <td>\$1</td> </tr> <tr> <td>Labor</td> <td>\$2</td> <td>Labor</td> <td>\$3</td> </tr> <tr> <td>Setup</td> <td>\$5</td> <td>Setup</td> <td>\$5</td> </tr> <tr> <td></td> <td>\$13</td> <td></td> <td>\$17</td> </tr> </tbody> </table> <p>Both MO and ATrx average the cost of the made items, so in either case 2 units of ASSEMBLY will be produced at \$15 each, regardless of the fact that the “real” costs are \$13 and \$17.</p>	Original Build: 2 units of Assembly at \$15 each				Assembly-1 (SN)		Assembly-2 (SN)		Component-1 (SN)	\$2	Component-1 (SN)	\$4	Component-A (SN)	\$3	Component-A (SN)	\$4	Other Parts	\$1	Other Parts	\$1	Labor	\$2	Labor	\$3	Setup	\$5	Setup	\$5		\$13		\$17	
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When disassembly is performed on either Assembly-1 or Assembly-2, \$15 will be allocated to the parts removed from that unit.

Depending on the unit disassembled, the costs will be allocated differently. Assembly-1 has a 2/5 and 3/5 split based on the ratio of the original component costs of \$2 and \$3. Assembly-2 has a 1/2 and 1/2 split because both components had the same cost.

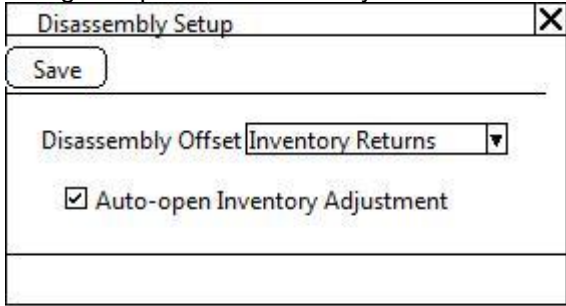

Disassembly would result in the following cost allocations:

Assembly-1 (SN)		Assembly-2 (SN)	
Component-1 (SN)	\$6.00	Component-1 (SN)	\$7.50
Component-A (SN)	\$9.00	Component-A (SN)	\$7.50

In both cases the total cost (Components + Other Parts + Labor + Setup) is distributed to the parts extracted from the unit.

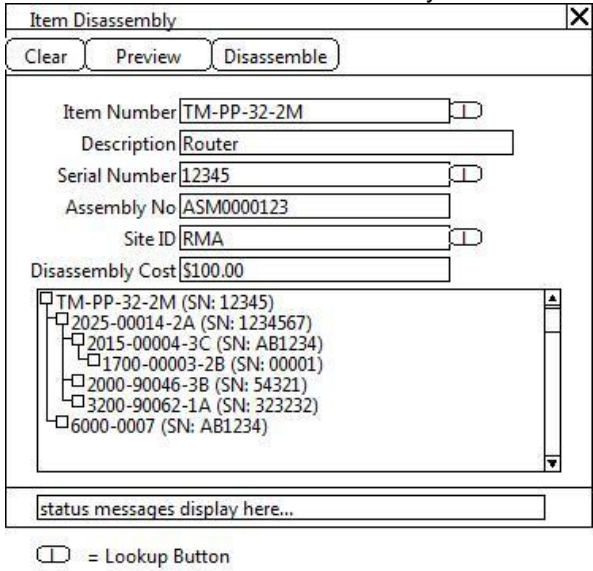
In addition, the Disassembly window will allow the user to enter an additional cost to be added to the disassembled parts. This additional cost is to cover labor and other costs associated with the disassembly process.

Design Features

Setup	
<p>Disassembly Setup is accessed from Tools >> Setup >> Manufacturing >> Disassembly Setup.</p> <p>This window is used to set global parameters used by the Item Disassembly window.</p> <div data-bbox="449 570 1010 873" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;">  </div> <p style="text-align: center;">  = Lookup Button </p>	
Field	Function
Disassembly Offset	<p>The drop-down displays all account labels (i.e. Inventory Offset, Cost of Goods Sold, Sales, etc) from the Item Account Maintenance window, except for "Inventory".</p> <p>The account selected here will be credited during the Inventory Adjustment to offset the debit to each item's inventory account.</p>
Auto Open Inventory	<p>The Disassembly process will create an unposted Inventory Adjustment. If this box is marked, and the user has security access to the Inventory Adjustment window, the disassembly process will create the transaction then display it for the user in the Inventory Adjustment window.</p>



	<p>If this box is marked, but a user does not have security access to the Inventory Transaction window, the disassembly process will create and save the transaction. It must be posted by a user with access Inventory Transaction Entry or Batch Entry.</p>	

Item Disassembly	CCDA										
<p>Item Disassembly will be used to disassembly a sold finished good item that was built with an Assembly Transaction (ATrx).</p> <p>The window will be accessed from Transactions >> Inventory >> Item Disassembly.</p>  <p><input type="checkbox"/> = Lookup Button</p> <table border="1"> <thead> <tr> <th>Field</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Item Number</td> <td>User enters an item number, or selects one from the Lookup. The item must be a serial numbered item. It must have an Inventory BOM.</td> </tr> <tr> <td>Description</td> <td>Displays the item description</td> </tr> <tr> <td>Serial Number</td> <td>User enters a serial number, or selects one from the Lookup.</td> </tr> <tr> <td></td> <td>The Lookup button opens a custom lookup window that shows only</td> </tr> </tbody> </table>	Field	Function	Item Number	User enters an item number, or selects one from the Lookup. The item must be a serial numbered item. It must have an Inventory BOM.	Description	Displays the item description	Serial Number	User enters a serial number, or selects one from the Lookup.		The Lookup button opens a custom lookup window that shows only	
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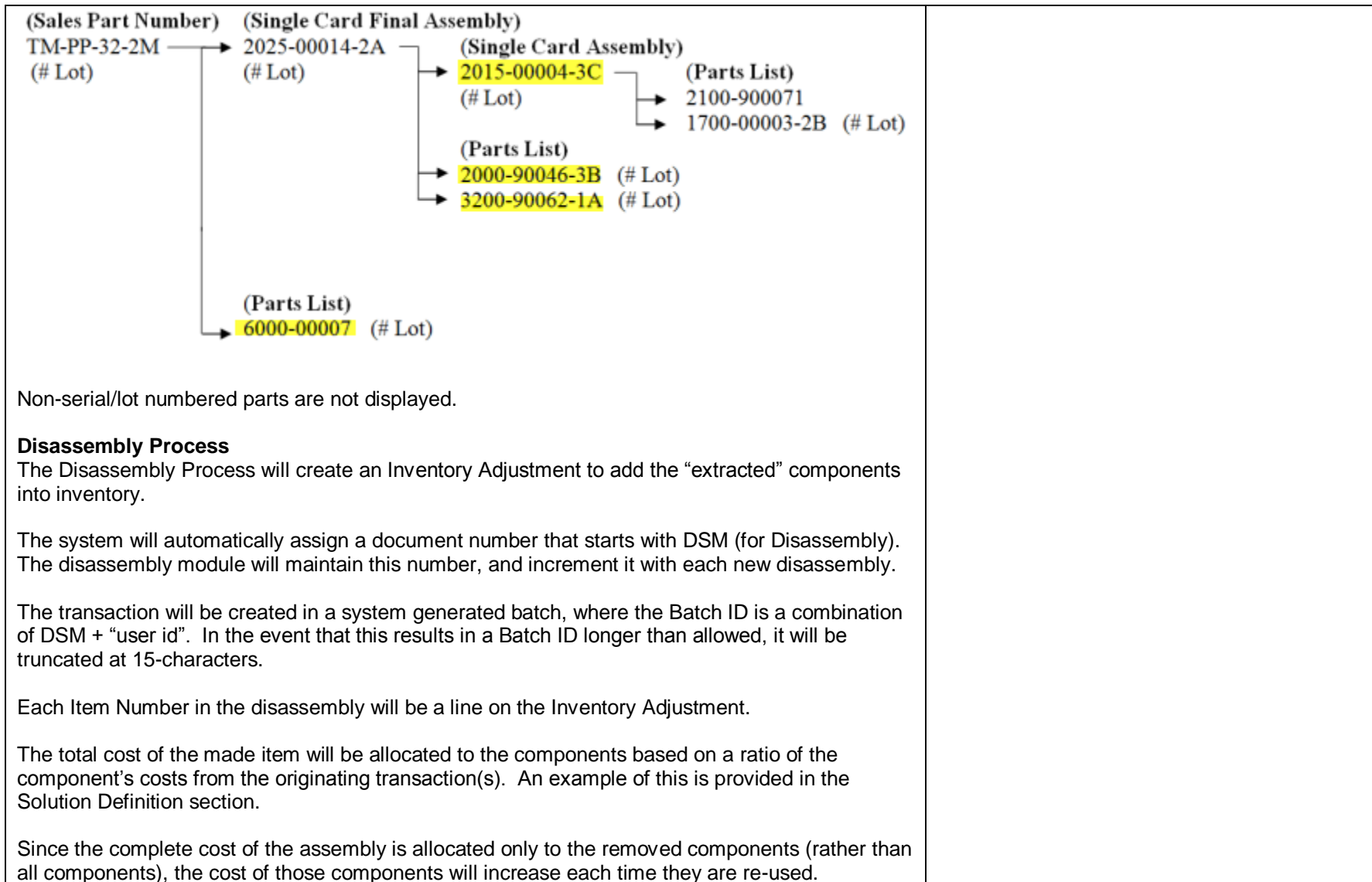
	serial numbers built on Assembly Transactions. Normally the serial number will not be in inventory, but it may be.		
Assembly No.	Displays the ATRx number which built the serial number.		
Site ID	User enters the Site ID into which the components will be posted.		
Disassembly Cost	User enters an additional cost to add to the disassembly.		
Treeview	<p>This window shows the exploded bill of materials for the serial number. It shows ONLY serial/lot numbered components and subassemblies.</p> <p>For subassemblies, the system will use the serial/lot linking information on the ATRx to locate the MO which built the subassembly part. The serial/lot numbered components of the MO will then be displayed below the subassembly.</p> <p>For example, the TM-PP part was built with an ATRx. The 2025- and 2015- parts were built with MOs.</p> <p>The boxes allow marking to indicate the level to which disassembly should be performed. If the 2025- part is marked, the 6000- part must also be marked (it will be marked automatically by the system).</p> <p>Marking at the 2025- level would result in the disassembly producing two parts: the 2025- and the 6000-, with the costs allocated to those two parts.</p> <p>If the 2015- part is marked, it will auto-mark the 2000- and the 32000- parts too, and, the 2025- and 6000- parts in the level above.</p> <p>In other words, if a subassembly is marked, every component at that level, and above that level, will be marked.</p>		

	<p>The disassembly output would be:</p> <ul style="list-style-type: none"> • 2015- • 2000- • 3200- • 6000- <p>The 2025- would be “disassembled” so it would not be one of the outputs. The cost allocated to 2025- at the first level, would become the cost that gets allocated to the 2015-, 2000-, and the 3200- parts.</p>	
	<p>BUTTONS</p>	
CLEAR	Clears all data from the window, without making any changes.	
DISASSEMBLE	The disassembly process will take apart the serial numbered item into the selected parts marked in the treeview.	
PREVIEW	“Calculates” the disassembly. After entering the Item Number, serial number, site and Disassembly cost, clicking the Preview button fills the treeview display. This button must be clicked prior to clicking Disassembly.	

The screen mockup shown above, uses the sample BOM provided below. The top-level item (TM-PP-32-2M) was built with an ATrx from 6000-00007 and 2025-00014-2A. The system identified that the 2025- part was built on an MO and can be further disassembled.

The Disassembly window located the most recent MO that produced the 2025 part, and added the 2000- and 3200- parts, and the 2015- assembly.

The 2015- itself was identified as being made on a different MO. While it has two parts on the BOM below, only the serial numbered part is shown in the disassembly window (1700-).



When the process of creating the disassembly transaction (Inventory Adjustment) is done, the Status bar will display “Done”, and the window will clear. Depending on Setup, and user security, the Inventory Transaction window will open and display the transaction. A user must manually post the transaction, or post the Batch containing one or more transactions.

Since the output is an unposted Inventory Adjustment, changes can be made to it like any other inventory adjustment. So, if posting accounts, costs, or even item numbers need to be edited, this information can be changed prior to posting.

The inventory adjustment will involve the Inventory Account from each item, and the Disassembly Offset account (see Setup) from each item. If the Site ID involved has a “Site Segment” (GL Segment) specified, the Site Segment of each of the accounts involved will be changed based on the Site Segment.

Posting the Disassembly Transaction will result in the following journal entry:

The disassembly transaction posting will:

DB	CR	Disassembly Offset (i.e. Inventory Returns)
		Inventory

Additional rules/conditions for the Disassembly Transaction.

- There is no reporting or other output from the Item Disassembly window. The inventory adjustment edit list can be printed prior to posting.
- Multi-bins is not supported
- Only linked, serial/lot-numbered components will be available for disassembly. If serial/lot numbered items are used in a build, but are not linked to the made item, they will NOT be available on the Item Disassembly window.
- All components must be FIFO or LIFO Perpetual. Any other valuation method will be an error condition that will prevent disassembly. A warning message will alert the user if this condition exists.
- If the linked quantity of an item is more than one, each serial number of that item will be listed in the tree view as a separate component. Since they are all at the same level, all such components would have to be disassembled (all three must be marked). The entire quantity for a Lot will be displayed as one line.

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