



QAD Enterprise Applications  
Enterprise Edition

**User Guide**  
**Planning and Scheduling**  
**Workbench**

Overview  
Master Scheduling Workbench (MSW)  
Production Scheduling Workbench (PSW)  
Component Availability Check (CAC)  
Troubleshooting, Tips, and Errors

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# Overview

The following topics introduce the Master Scheduling Workbench (MSW), Production Scheduling Workbench (PSW), and Component Availability Check (CAC) and discusses basic features, functions, and options available to both workbenches.

***Introduction***    **2**

Introduces the Planning and Scheduling Workbench, components, and features.

***Common Workbench Elements***    **4**

Describes the elements of both the MSW and PSW and tells you the capabilities and purpose of each element.

***Synchronizing MSW and PSW Data***    **8**

Describes the way to use the MSW and PSW simultaneously to build schedules.

***Common Features***    **8**

Describes features and components that are common to both the MSW and PSW.

***Calculations***    **14**

Describes MSW and PSW calculations.

***Limitations***    **18**

Describes areas not covered by MSW or PSW.

***Performance***    **18**

Describes performance issues and tips to improve performance.

# Introduction

Successful scheduling deals with analysis, review, and manipulation of all data that impacts production machines, work centers, production orders, production lines, and other related resources of the manufacturing process. It also requires complex calculations that are immediately applied to manipulated schedules or any supporting data. More importantly, it requires immediate display of calculation results, especially when scheduling issues arise.

Previously, you needed several QAD Enterprise Edition (EE) programs to effectively view or manipulate schedule data, which could be time consuming and cumbersome. Now, new scheduling tools are provided through the .NET UI that let you effectively plan and schedule resources for a master schedule or a production schedule from a single workbench for each type of schedule.

You can select the Planning and Scheduling Workbench from the .NET UI's list of applications. When you do, you can select to run:

- Master Scheduling Workbench (MSW)
- Production Scheduling Workbench (PSW)
- Several QAD EE programs with supporting schedule data
- Component Availability Check (CAC)

Initially, building a master schedule, then a subsequent production schedule, was done in a step-wise manner, which is a cumbersome procedure that does not adapt to the changes in demand. Now, you can concurrently plan and schedule production based on any or all aspects of production that are available because changes that you make to data in the MSW update data in the PSW and vice versa.

Schedules built through MSW or PSW lets you build schedules that assist in doing the right job in the correct order and consumes less time for you when building them.

Ensuring scheduling building, though, is not enough if you cannot monitor and deal with component shortages. For that reason, several shortage-monitoring features are also available when you are building effective schedules.

## Master Scheduling Workbench (MSW)

The Master Scheduling Workbench (MSW) is a .NET UI application that increases scheduling efficiency by displaying and manipulating system demand, supply, scheduling, inventory, production order, advanced repetitive, and MRP data from several QAD EE programs into a single workbench.

**Note** Production orders are all orders associated with production—production lines, work centers, or other production areas—including discrete production orders, repetitive orders, scheduled orders, cumulative orders, and so on.

You can use the MSW to interact with production line and production order schedules and make changes where necessary. Within MSW, you can update the status, as well as release, create, or close orders, while considering all demand sources, from the single workbench. You can ensure items with similar attributes are scheduled together while ensuring there is enough capacity to take

advantage of running similar items. You can also identify items with demand which have no released production orders or check component availability for each production order to be released.

User-configurable parameters control the number of days you can directly manage a scheduling period, as well as the future and historical periods available for schedule review.

Event-based color coding lets you easily identify areas of concern. You can review and manipulate schedule and production order data, then export the updated information back to QAD EE in the form of firm repetitive production schedules or revised and new production orders. “Visual Indicators” on page 12 summarizes how the system uses color codes.

## Production Scheduling Workbench (PSW)

Once you generate a master production schedule over a monthly, weekly, or daily horizon, you may need to create a production schedule for a shorter two-to-five day period for the shop floor to use. Production scheduling entails:

- Sequencing jobs to obtain the maximum operational efficiencies
- Ensuring on-time completion
- Satisfy customer demand

Some companies run a single job over several days, while others run multiple jobs within a single day. Further, some companies define a production sequence by shift to monitor shift performance or ensure products are available for a specific shipment time.

The Production Scheduling Workbench (PSW) lets you schedule discrete and repetitive items on production lines. You can schedule items within a day and shift (sequencing). You can use the PSW to view and update production line schedules used with the QAD EE Advanced Repetitive module.

## Component Availability Check (CAC)

Component Availability Check is another component of the Planning and Scheduling Workbenches and is integrated into the PSW workbench. This lets you verify that materials are available before you release orders and print the orders and schedules. CAC within PSW serves two distinct purposes:

- 1 Schedulers and planners use CAC features to ensure the jobs they schedule have enough materials.
- 2 Buyers, materials planners, or materials expeditors use component check by item/order features to monitor shortages, even at specific locations.

Both types of users can use CAC supporting data to analyze component availability. Within the planning and scheduling workbenches, there are built-in frames at the bottom of the workbench that provide supporting data. For more information on the Component Check browse collections, see “Component Availability Check (CAC)” on page 73.

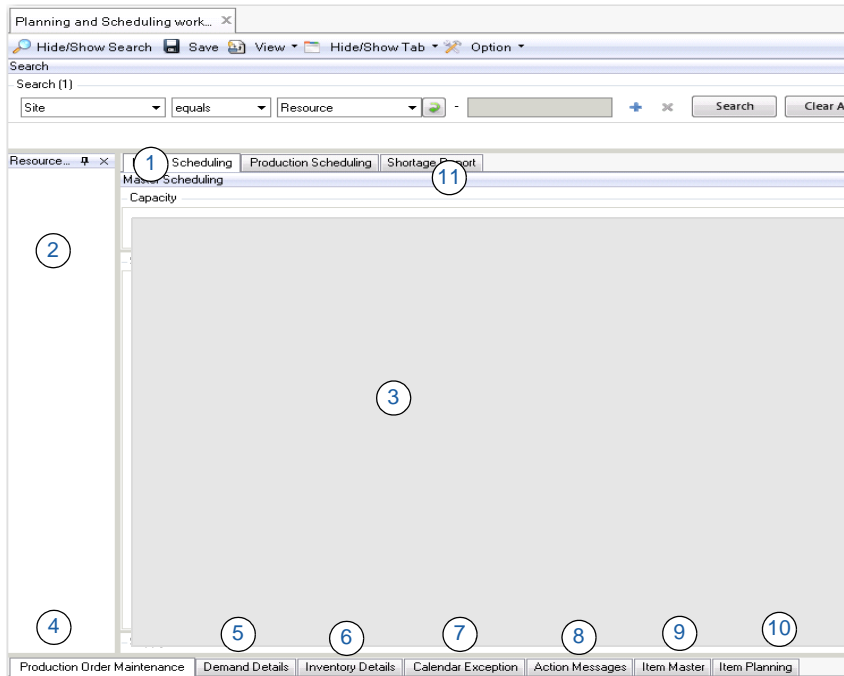
## Common Workbench Elements

You can interactively control the workbench behavior, the frames that display, interaction rules among frames, data filters, and business rules. You can save multiple creations of your setting preferences as Views and invoke them on demand, based on the type of scheduling you are performing.

When you make selections within some frames, the system displays supporting information related to the record selected in a result-set. This information is detail information; for example, demand detail records, supply detail records, item transaction history, item inventory details, bill of material, and routing. Also, when you make changes or create new data in some frames, data in other frames changes to reflect the new data.

The following depicts areas that are common to both MSW and PSW.

**Fig. 1.1**  
Common Scheduling Elements



### (1) Selection Frame

Use this area to select resources and items to schedule.

The selection results are limited to sites that you can access, based on security records defined in Site Security Maintenance (36.3.15). Additionally, if you are in a multiple-domain environment, the system only displays sites in domains that you can access based on settings in User Maintenance (36.3.1).

## (2) Resource Frame

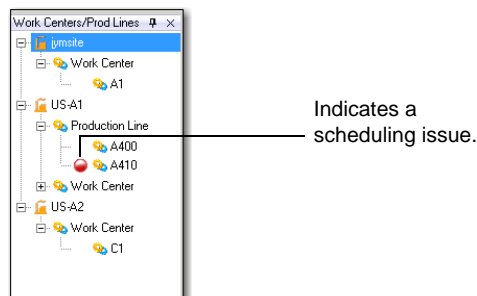
Based on your selection criteria, the Resource frame displays the sites and resources and defaults to the first record. Resources are grouped by site and resource type. Resource types consist of two categories:

- Production lines
- Work centers

When you click on a work center/machine or production line resource in this frame, the Schedule Grid displays only those items associated with the selected resource.

The Resource Navigator Frame highlights each resource with a POH shortage icon when one or more items associated with the resource have a POH shortage within the resources's defined scheduling horizon.

**Fig. 1.2**  
Resource Frame



## (3) Schedule or Sequence Grid

This area displays the Schedule Grid in MSW or the Sequence Grid in PSW. The MSW, PSW, and Shortage Report content are controlled by the Navigator Frame.

For information on MSW, refer to “MSW Schedule Grid Data” on page 37.

For information on PSW, refer to “Sequence Grid” on page 59.

## (4) Production Order Maintenance

You can run Production Order Maintenance within the MSW. Production Order Maintenance lets you view individual item production order supply records for items that display in the MSW Schedule Grid or PSW Sequence Grid. Production Order Maintenance uses a horizontal layout and supports scheduling of work centers, production orders, and production lines. You can view, monitor, and interact with all operations of a production order independent of the Schedule Grid.

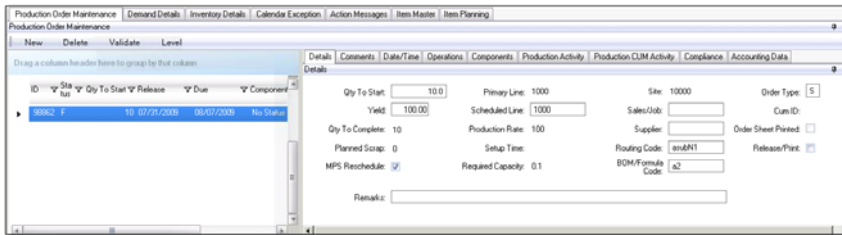
The left-side displays production order summaries with the order ID, status, quantity ordered, and release date columns. For each of these fields, you can select to see all, custom, blanks, or non-blanks. If you select custom, the system displays an additional frame to enter additional filter criteria for the field. For example, if you customize data to display for the Qty Ordered field, you can specify operands so that only those orders that equal a quantity ordered of 500 display. You can also add or delete conditions.

The right side displays production order details, comments, date/time, operations, component availability data, production activity, production CUM activity, compliance data, and accounting data for the order. Using these tabs, you can view several aspects of data that have an impact on the production order and alter data without leaving MSW/PSW. To hide the tabs, refer to “Repositioning/Hiding Tabs” on page 9.

Once you complete updates, you can save changes globally by clicking the workbench toolbar Save button. You can also create a new order, delete an order, or validate an order. When you validate the order, the system checks for correct data in production order fields and when errors occur, it indicates which fields require that you correct data.

**Note** Some validations are real-time while modifying the order on the workbench, while other validations are performed during the save process. The Validation button invokes the validations that would be performed during the save process.

**Fig. 1.3**  
Production Order Maintenance



Production Order Maintenance auto-selects the first production order on the selected Schedule Grid due date and displays additional production orders in the past and future. Scroll up to view orders with prior due dates; scroll down to view orders with future dates.

When you select an item on the Schedule Grid with a supply/demand issue, Production Order Maintenance displays any planned orders MRP generated to resolve the supply/demand issue and existing production orders of various statuses associated with the item.

For each due date, production orders display by status in this order: P(lanned), F(irm planned), A(llocated), E(ploded), R(eleased), C(losed). Then, for each status, they display by production order ID.

If you select a different production order in Production Order Maintenance, the Schedule Grid does not change.

You can also alter data, view results in a simulation, make additional changes, then save your final changes.

For field descriptions for Production Order Maintenance, see “Working with Order Summary List Data” on page 47 and “Working with Order Detail Records” on page 48.

## (5) Demand Details

When you select an item in one of the daily schedule fields, the system displays information about the components of the demand, such as sales order/line numbers and quantities or seasonal demand under the Demand Details tab. This display is based on MRP detail records.

When you select a specific day on the Schedule Grid, the Demand Details frame displays all demand records for the selected item.

For the item/day selected on MSW Schedule Grid, the Demand Detail Frame focuses on demand records, starting with the demand records with due dates equal to the selected item/day. If no matches are found, the frame focuses on the first demand record found—the oldest record. You can scroll to see all open demand records in the past or records in the future.

## (6) Inventory Details

The Inventory Details frame displays the item number, site, quantity on hand, inventory master data, location, lot/serial, status, expiration date, and the date created. For all areas, you can choose to display details for all, custom, blanks, or so on.

For field descriptions, see “Working With Inventory Details Data” on page 55.

## (7) Calendar Exception

Occasionally, exceptions such as overtime or machine downtime cause changes in productivity and capacity for various shifts. When you set up calendars in Calendar Maintenance, you specify a reference, such as downtime, and the number of hours per day affected. This information displays in the Calendar Exception Maintenance grid within MSW/PSW. Negative numbers can display for downtime or holidays. Holidays are days when no production is scheduled. Holidays differ from site to site.

## (8) Action Messages

The Action Messages frame displays information regarding the item issues generated by the legacy MRP action message logic. The MSW visual alerts depict negative projected on hand and below safety stocks, but the Action Messages frame can display additional information, such as canceled production orders.

**Note** For error messages and conditions, refer to Appendix A.

**Fig. 1.4**  
Action Messages

Item Number	Site	From Date	Order	Line/ID	Action Quantity	Message Detail	MESSAGE_DATE
A-F405	US-A1				10.0	Beginning available lot #Jan	10/08/2008
A-F405	US-A1	10/13/2008	08170008	195	10.0	Time fence conflict -Planned	10/08/2008
A-F405	US-A1	10/13/2008	08170008	195	10.0	Release due for Planned Order	10/11/2008

## (9) Item Master

The Item Master frame is a browse that displays critical item information used in planning/scheduling and the active field values. The frame lets you view/manage items on multiple resources at once.

**Note** You can modify the browse view in Browse Maintenance to include information from any field in Item Master Maintenance (1.4.1).

For field descriptions, see “Working with Items” on page 53.

## (10) Item Planning

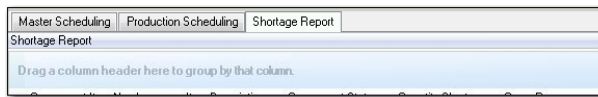
The Item Planning frame displays item master/planning details for a selected item. At any point during the scheduling process, you can refer to the item planning frame to find information to identify lead time, order quantity, and so on. If an item-site record exists, planning data from item-site record display for the selected item-site record. You can modify item details to include information from any field in the Item Master Maintenance.

For field descriptions, see “Working With Item Planning Data” on page 54.

## (11) Shortage Report

Materials planners and expeditors can use shortage-monitoring features to notify affected customers/suppliers and make corrections to shortages. Schedulers can use component availability check (CAC) features to monitor component availability. You can run a shortage report by selecting the Shortage Report tab; see Figure 1.5. For more information, refer to “Using CAC to Monitor Materials” on page 82.

**Fig. 1.5**  
Shortage Report Tab



## Synchronizing MSW and PSW Data

Typically, you work with master schedules in MSW and production schedules in PSW simultaneously. The two workbenches are designed to work together and are aligned as if they were a single workbench.

For example, you select an item on the MSW Schedule Grid and verify the item supply/demand are correct. You can then determine when the item is produced in relation to other items scheduled on the same day by looking at the PSW Sequence Grid. You can view the dispatch list on the PSW and see where the item/production order record displays in relation to other production orders.

Or, if you are working on the PSW and move the production order release/due date back, you can then determine the impact to supply/demand by viewing the MSW demand/supply summary frame. This lets you make decisions that are based on displayed data that you can easily verify.

If a filter applied to either the MSW or PSW hides a production line or item that is visible on one frame/grid and not another, the system still selects/focuses on the item record, even if not visible; in this way, if the user removes the filter, the selected record is already selected.

## Common Features

The following topics discuss features common to the workbenches.

### Views

There are a number of components of the workbenches that can be customized and saved as part of a view:

- Grid column settings (examples)
  - Sorting
  - Filter
  - Hide or unhide
  - Position
- MSW grids:
  - Capacity Grid
  - Schedule Grid
  - Supply/Demand Grid
- PSW grids:
  - Sequence Grid
  - Browse Grid

### Repositioning/Hiding Tabs

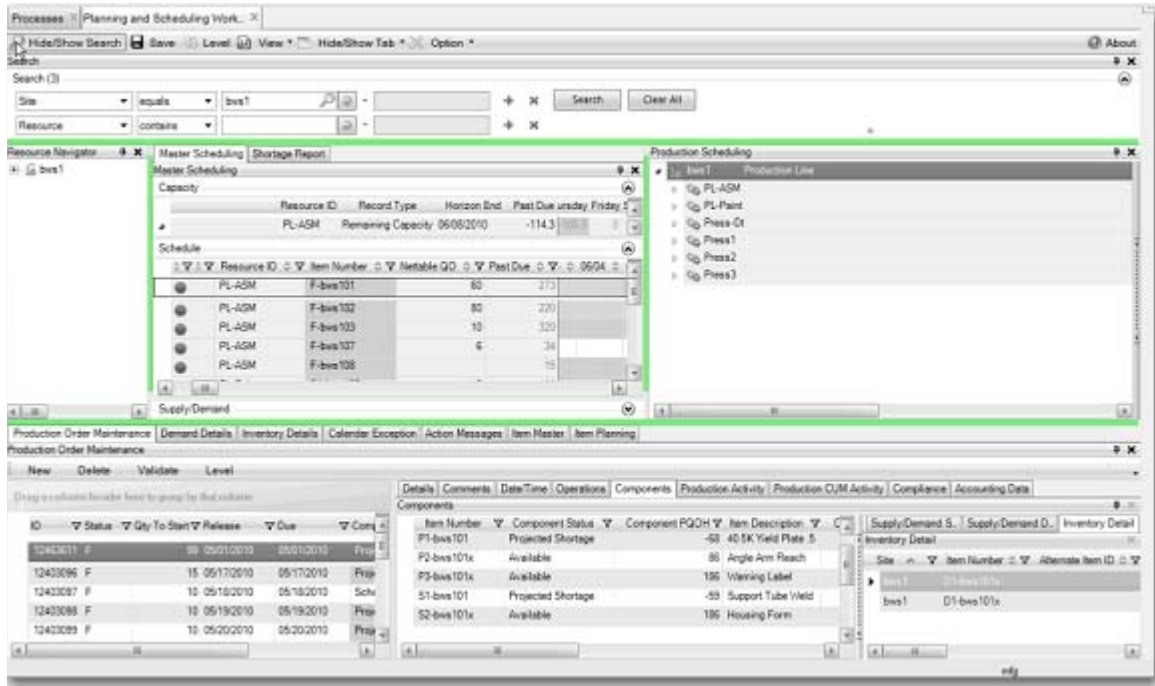
You can move a tab on a workbench to a new location or hide a tab that you typically do not use. Repositioning/hiding the following workbench tabs can be saved as part of a view:

- Supporting panels
- PSW, MSW, or Shortage Report tabs

If you are working in any of the supporting programs that display at the bottom of the workbenches, and the program has multiple tabs, you can right-click on the tab, then select the Auto Hide option to display only the data in that tab. For example, when working in Production Order Maintenance, you want to focus only on the dates and times of operations for a particular order. You select the order on the left side, then select the Date/Time tab on the right side. You right click to select Auto Hide so that only the date and time data for that order displays on the right side.

### Resizing Frames

You can resize a frame to accommodate viewing more or less data by grabbing the frame's perimeter and dragging the frame to the size that you desire. The following figure depicts examples of frames in green that can be repositioned and saved as part of the view.



## History Horizon

Once you set the History Horizon, you must perform a search to have data within the set horizon. If you change the History Horizon but do not do a search, the system can display an error in situations where history data is required but is not available in the workbench.

If the horizon is 0 (zero), the system does not display past calendar records in the workbench. So, when you schedule in the past, the system considers every day a working day. In this scenario, your expected results can differ from actual results since the workbench does not know which days in the past were working days vs. non-working days. QAD recommends scheduling in the future, which is the normal scheduling practice.

**Important** When you update the history horizon, the system informs you that you must re-search for records for the changes to take effect. If you change the history horizon without a search, the system can display an error. Also, changing history horizon values without performing a new search can cause the application to respond incorrectly.

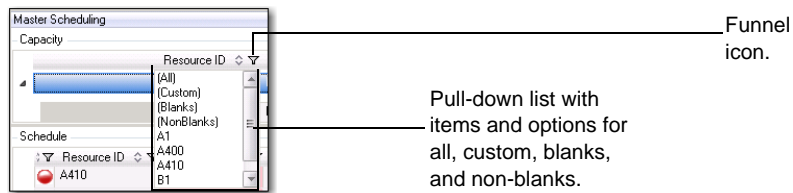
To set up the History Horizon, refer to:

- “Setting the MSW Schedule Horizon” on page 30
- “Sequence Horizon” on page 60

## Filters and Browses

In MSW browse column headers, you can click the funnel icon to display a pull-down list with items displayed for the column along with options for (All), (Custom), (Blanks), and (NonBlanks). This is a standard .NET UI filtering mechanism.

**Fig. 1.6**  
Filter



To display all data, choose (All). This is the default.

- To include custom criteria, choose (Custom).
- To include only blank items, choose (Blanks).
- To display everything except blank items, choose (NonBlanks).
- For a particular item, select the item from the list.

To define a custom browse, click the funnel icon, then choose (Custom). The Enter filter criteria pop-up menu displays. By default, the menu includes an initial criteria. You can add additional criteria by selecting Add a Condition, then selecting an operation.

## Displayed Records

You can filter records that the system retrieves to display in either MSW or PSW. You can display records for individual production lines and work center/machine combinations and specify several resource-specific control parameters.

Optionally, you can specify search operators such as equals, not equals, contains, range, starts at, greater than, less than, is null, is not null. This lets you narrow the search criteria, focusing on specific records, or broaden the search so that records for more than one site or resource, for example, displays.

When searching records to display, you can select from site, resource, resource type (production line or work center/machine), and scheduler ID from the Search pull-down menu. You can view items across a single resource or multiple resources by setting resource and search criteria.

## Drag and Drop

You can easily modify aspects of a job by dragging and dropping jobs within the PSW Sequence Grid or to the Resource Frame. You cannot drag and drop orders in the MSW Schedule Grid.

In PSW, when you drop an order onto another order, the order you drop acquires the properties of the receiving order, so, for example, if you drag and drop an unsequenced order onto a sequenced order, it becomes a sequenced order. Use the drag-and-drop method to:

- Change due dates by dragging and dropping a job from one release date to another job with a different release date.
- Modify resources by dragging and dropping from the source to the target destination after you select a single or multiple production orders.

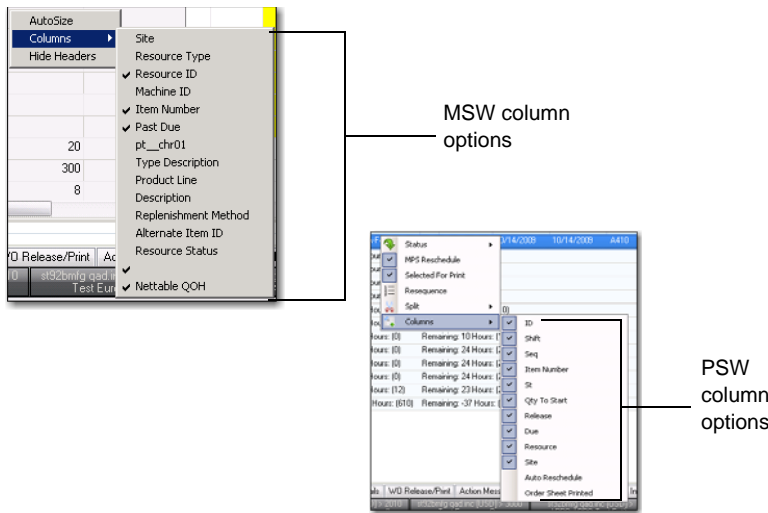
- Sequence production orders in PSW by dragging and dropping single or multiple orders after a sequenced job. Once you drop the orders, the system assigns the sequence number to the order(s) as greater than the prior sequenced numbers. Shift numbers are also automatically assigned if an order is dropped on a particular shift.
- Unsequence an order by dragging a sequenced order and dropping it on an unsequenced order. The system changes the sequence to 0 (zero).

## Columns

You can add hidden columns—a .NET UI feature—and select the additional column that you want to display in the workbenches.

To do this, while you are in the Schedule Grid, Production Order Maintenance window within MSW, or the Sequence Grid within PSW, right click, then select the Columns option. The following figure depicts options for both workbenches.

**Fig. 1.7**  
Column Options




## Visual Indicators

MSW displays visual status indicators to direct your attention to potential capacity and item shortage issues. The projected quantity on hand (PQOH) displays as soon as records display. The system calculates the PQOH for every item with supply/demand in the scheduling horizon. When the order that displays is repetitive, the system applies the indicator to only the item’s primary resource. When the order is a production order, the system applies the indicator to any resource associated with the item.

Shortage warning status applies to required capacity (the *load*), available capacity, part number, scheduled quantity, and projected on-hand (POH) quantity. Shortage warning status indicators can display as low warning status (yellow shading), which typically applies to non-critical potential shortages; for example, when the quantity on hand does not meet safety stock requirements. High

warning status (red shading) indicates a potentially critical capacity or item shortage problem; for example, when the projected on hand quantity is less than zero. The following table summarizes visual indicators.

**Table 1.1**  
Visual Indicator Summary

Area	Indicator	Meaning
Resource List		The resource includes one or more items with a potential scheduling problem.
Required Capacity	Yellow	The capacity required.
Period Available Capacity	Red	<ul style="list-style-type: none"> <li>Period available capacity is less than or equal to 0 for every day prior to this date.</li> </ul> AND <ul style="list-style-type: none"> <li>Required capacity is greater than capacity.</li> </ul>
	Yellow	<ul style="list-style-type: none"> <li>Excess capacity for the day is consumed by a future shortage.</li> <li>The system consumes excess capacity from a prior day.</li> </ul>
Schedule Grid	Red	Projected on-hand is less than 0.
	Yellow	Projected on-hand is less than safety stock value plus seasonal demand.
Projected On-Hand	Red	Projected on-hand is negative within firm schedule period.
	Yellow	Projected on-hand is less than safety stock plus seasonal demand.
Item Number	Various	A date within the firm schedule period for the item includes this indicator. Red supersedes yellow.

## Navigation Shortcuts and Keys

While you can use the mouse to click anywhere within the Schedule Grid, the following keyboard navigation shortcuts are available:

- Press Tab to move forward to the next day or to move across a row to skip the total column.
- Press Shift-Tab to move back to the previous day.
- Press the down arrow to move down to the next item.
- Press the up arrow to move up to the previous item.
- Press Enter to fix the cell value and accept the data change.

## Key Limitations

Shortcuts are available only within the window currently displaying. To display additional days or items, you must click the horizontal or vertical scroll arrows.

You cannot use the Esc key in the workbenches as you might in a spreadsheet.

## Calculations

Before you can begin master scheduling, you should understand MSW and PSW calculations, as described in the following topics.

### Planned Capacity

The repetitive formula for planned capacity is as follows:

$$\text{Planned capacity} = \text{shift hours (shift\_hour[1-4])} * \text{shift efficiency (shift\_load[1-4])} / 100 + \text{shift adjustments (cal\_det)}$$

Where:

hd\_mstr = holiday master

shft\_det = shift detail

cal\_det = calendar detail or non-work hours/days

The production order formula is as follows:

$$\text{capacity} = \text{WC capacity} + \text{Sum of adjustments (cal\_det)}$$

The calculation for a production line is as follows:

$$\text{Capacity per day} = [\text{Repetitive shift hours available} - \text{Downtime} + /- \text{Holiday Calendar}]$$

The calculation for a work center is as follows:

$$\text{Capacity per day} = [\text{Shop Calendar hours} - \text{Holiday Calendar}]$$

The past due calculation is always 0 (zero).

### PSW Required Capacity

The formula for required capacity for production orders per release date/shift is as follows:

$$\text{Prod Load} = [\text{Sum Production Order Required Capacity}]$$

With the rule:

$$[\text{Sumif(Production Order status} > [\text{P}] \text{anned})}]$$

### PSW Remaining Capacity

The formula for remaining capacity available by release date/ shift is as follows:

$$\text{Resource Capacity minus} [\text{Sum production orders by release date}]$$

With the rule:

$$[\text{Sumif(production order status} > [\text{planned}])] ]$$

The formula for remaining capacity, in terms of the quantity that can be produced per the resource defined run rate, is as follows:

$$\text{Production Line Run Rate} \times \text{Remaining Capacity}$$

## Production Load

The calculation for production load is as follows:

$$\text{Prod Load} = [\text{Sum production order Remaining Run Time}]$$

The calculation for a production order load is as follows:

$$(\text{run time} + \text{setup time}) \text{ for the release date}$$

The calculation for production load within the scheduling horizon:

$$\text{Prod Load} = [\text{Sumif}(\text{Production Order status} > [\text{P}]\text{lanned})]$$

The production load calculation for a work center is as follows

$$\text{Prod Load} = [\text{Sum operation remaining run time}]$$

The calculation for production load when the work center is within the scheduling horizon is as follows:

$$\text{Prod Load} = [\text{Sumif}(\text{Production Order status} > [\text{P}]\text{lanned})]$$

**Note** The calculation excludes closed production orders. Also, setup time is not included if production has been reported or is in process against the work order.

## Daily Load

The repetitive calculation for daily load is as follows:

$$\text{load} = \text{Item Qty Due} (\text{rps\_qty\_req} - \text{rps\_qty\_comp}) / \text{Production Line Item Run Rate/Productivity Factor} (\text{Ind\_rate/Productivity Factor}) + \text{Setup Time}$$

Where:

Ind\_det = production line detail

rsp\_mstr = repetitive schedule master

The load calculation cycles through all production lines for a given item and aggregates the load using the above calculation.

The production order calculation is as follows:

$$\text{load} = \text{Item Qty Due} (\text{WOOP qty} - \text{WOOP comp}) / \text{WO Run Rate/Productivity Factor} + \text{WO Setup Time}$$

WO setup time is not added if any reporting at operation level. Also, if the WO completed quantity > WOOP complete quantity, then the former takes precedence.

The past due calculation is as follows:

$$\text{pastDue} = \text{load summation for all prior days}$$

## Period Available Capacity

During master scheduling, you typically perform capacity analysis over periods of time rather than daily. Periods of time can be several days to weeks or months. Period available capacity indicates whether you have enough capacity to support the overall plan. The repetitive and production order period available capacity is as follows:

*If capacity - DailyLoad < 0, then PAC = (capacity - Dailyload + previous day capacity if > 0).*

Previous day consumption continues until today.

*If capacity - DailyLoad > 0 then PAC = (capacity - DailyLoad)*

This calculation can be affected by future day consumption.

The past due period available capacity is as follows:

*Past due DailyLoad \* -1*

The value is negative because it represents load that was due in the past. The calculation consumes just enough of the previous days available capacity to cover the current days gap. Since the calculation consumes previous days capacity, both previous and current days values are adjusted.

Based on the calculated results, the system uses the following color indicators to identify period available capacity issues:

- Red shading: All prior daily excess capacity has been consumed, and the period available capacity is still negative.
- Yellow shading: Excess capacity exists, but some or all of it is consumed by a future shortage. This can also indicate that period available capacity is not equal to capacity minus daily load; the system has consumed some excess capacity from another day.
- Unshaded: No shortage exists, and the period available capacity is the difference between capacity and required capacity—no excess capacity is consumed by future shortages.

## Cum Capacity

The repetitive, past due, and production order cum capacity calculation is as follows:

*capacity - load + prior days cum capacity*

This is a roll-forward calculation that aggregates capacity across days.

## Independent/Dependent Demand

Repetitive functions as follows for independent and dependent demand is as follows:

*summarize mrp\_qty*

Where:

For independent demand, mrp\_dataset = sod\_det, cs sch\_mstr, ds\_det, sob\_det, pb\_sold, pbo\_sold

For dependent demand, mrp\_dataset = jp\_det, wod\_det, wo\_scrap

The past due independent demand calculation is as follows:

*Summarize mrp\_qty prior to the beginning date*

## Forecast Demand

The system displays the net balance of current forecast demand from QAD EE for the selected item. Master production scheduling and MRP use the net forecast and abnormal sales order demand to calculate total demand. The net forecast is calculated as follows:

$$\text{Net Forecast} = \text{Forecast} - \text{Sales Order Demand}$$

**Note** When the shipment forecast is oversold—that is, the quantity sold exceeds the forecast amount—the net forecast will not go below zero.

Past due is not calculated.

## Seasonal Demand

The system performs the following calculation for each date when a Master Scheduled receipt is due or a seasonal build quantity is made available, causing a net increase in supply. It takes into account all sales order and required ship schedule demand and gross requirements up to the next increase in available supply.

$$\text{Master Scheduled Receipt} - \text{Sales Orders and Required Ship Schedules} - \text{Gross Item Requirements} - \text{Seasonal Build Net Increases} + \text{Seasonal Build Net Decreases} = \text{ATP}$$

Past due is not calculated.

## Projected and Status PQOH

The repetitive projected QOH calculation is as follows:

$$\text{WO Open Qty} + \text{Nettable Inv} - \text{Total demand}$$

Where:

$$\text{Nettable Inv} = \text{From MRP Detail (23.16)}$$

$$\text{Total Demand} = \text{Independent} + \text{dependent} + \text{forecast} + \text{seasonal}$$

$$\text{WO Open Qty} = \text{SNRD}$$

The PQOH status for both repetitive and production orders derives from the PQOH calculation. If any PQOH for that item is below safety stock, then PQOH status is set to safety stock status. If any PQOH is  $< 0$  then the PQOH status is set to below-zero status.

Additionally, the repetitive and production order PAC status derives from the PQOH calculation. If any PQOH for that item is below safety stock, then PQOH status is set to safety stock status. If any PQOH is  $< 0$  then the PQOH status is set to below-zero status.

## SNRD

Schedule Net Requirement Due (SNRD) is the summation of production order open quantities for all production orders for a specific order due date and production line:

$$(\text{wo open qty} = \text{wo qty} - \text{wo open qty})$$

For production orders, SNRD is the summation of the lesser (wo open qty, wo op open qty) for WO/WOOP or a given operation due date and a given work center:

$wo\ open\ qty = wo\ qty - wo\ open\ qty$

$wo\ op\ open\ qty = wo\ op\ qty - wo\ op\ open\ qty$

The past due is the total of SNRD results for days past.

## Production Reported

For completed repetitive production reported, the calculation is the summation of production reported from tr\_hist using tr\_hist dates for all repetitive schedules for that item.

For past due, production reported (completed) is the net open quantity for that item prior to today

For operational production reported, the past due is calculated as the lesser open (WO, WOOP) for all production orders where operation was due prior to today's date.

The operational production reported for a production order is the summation of operation at a work center reported for all production orders for that item for that date.

## Limitations

MSW and PSW do not support:

- Co-\by-products
- Standard repetitive functionality
- Integration with the QAD EE Flow Manufacturing module

**Note** MSW and PSW do support advanced repetitive functionality.

Production Order Browse within the Planning and Scheduling Workbench displays production orders with a zero open quantity if the production order is a discrete order. Repetitive scheduled orders with a zero quantity do not display; however, Production Order Browse still displays both production orders and scheduled orders.

## Performance

This section discusses the following performance topics:

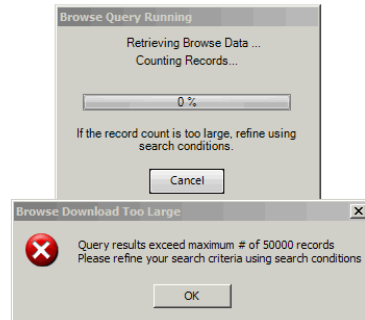
- Data Retrieval
- CAC

### Data Retrieval

MSW, PSW, and CAC performance can be impacted when the system processes a large number of records. Likewise, data retrieval can take a significant amount of time when the system retrieves a large number of records. To view retrieval progress, you can set the Display Search Progress field to Yes in the MSW Search User Preferences window in the Options drop-down menu to have the system display its progress when retrieving records. Depending upon search criteria that you set, the number of records that the system retrieves can be quite large. If you set this field to Yes, the system informs you of progress in minutes to retrieve the records.

The system displays a message when the number of records you are attempting to display exceeds the maximum. Refer to Figure 1.8.

**Fig. 1.8**  
Maximum Records



## CAC

In terms of CAC performance, the planning horizon may be weeks to months into the future while the production scheduling horizon may only be a few days. CAC, integrated into the planning/scheduling workbench, validates that:

- Sequenced production orders have adequate materials.
- Production orders that are to be released to the floor have no component shortages.

These activities are near term, so the need to calculate production order component requirements months into the future is not necessary in most circumstances. Since the CAC engine does require significant processing, providing the ability to define the CAC Horizon lets you control the number of records processed and, therefore, provides you with quicker responses during CAC processing.

When dealing with CAC and schedule changes on the planning or scheduling workbench client, you may make changes in the workbench client; however, the workbench does not dynamically recalculate component status. To do so would impact performance to the point that scheduling progress would be impeded.

Finally, when you enable CAC by selecting the Component Availability tab in the User Preferences window (under the Options drop-down menu), MSW performs CAC calculations. If disabled, then CAC is not calculated during data retrieval or after Save, and there is a noticeable improvement in retrieval and save performance.



# Master Scheduling Workbench (MSW)

The following topics describe how to use the features of QAD Master Scheduling Workbench (MSW).

***Introduction* 22**

Introduces the MSW, components, and features.

***Accessing MSW* 26**

Provides procedures to access the MSW in the .NET UI.

***Enabling the Workbenches* 26**

Tells you how to enable MSW.

***Setting Up Production Lines* 27**

Tells you how to mass set up production lines, then mass update the setup.

***MSW User Preferences* 30**

Lists fields, describes field input, and presents screens for all windows for user preferences.

***Processing Master Schedules* 34**

Provides a general procedure to create and process a master schedule and describes processing results.

***Working with Production Orders* 39**

Describes the pulled-in QAD EE programs and data presented in the MSW, including field descriptions for the various programs. Also, instructions to edit, modify, delete, and manipulate production orders are provided.

***Viewing/Editing Order Data* 46**

Describes ways to view data from the MSW.

***Working with Items* 53**

Describes the pulled-in QAD EE programs and data presented in the MSW, including field descriptions for the various programs that let you manipulate and view item data.

***Saving Your Changes* 55**

Provides a procedure to save changes in MSW.

## Introduction

Use the Master Scheduling Workbench (MSW) to create master schedules for medium to long periods of time (weeks to months) with supporting data to review on items, operations, demand, supply, capacity, and material.

## Features

Functions within the workbench let you concurrently manage work center and production lines within a single workbench. You can authorize work or schedule due dates for repetitive schedules on the production line. From a single workbench screen, master schedulers can:

- Split jobs (production orders)
- Reschedule or change the status of jobs
- Maintain job details
- Manage job operation lists
- Schedule alternate jobs
- Release jobs
- Export schedules

**Note** MSW does not support co-/by-products.

You can display:

- Supply, demand, and capacity in daily increments at the item level
- Capacity and demand issues
- A list of items requiring master scheduling attention
- Production orders that are past due, have conflicts, cannot complete on time, need production scheduling, have availability shortages, or are released
- Production order status
- Resources to be scheduled
- Demand details
- Action messages
- Item master or planning data
- Inventory details

The following topics provide more information on MSW elements, the functions they provide, and QAD EE program functions that you can access from within MSW.

## Visual Indicators

MSW displays visual status indicators to direct your attention to potential capacity and item shortage issues. The projected quantity on hand (PQOH) displays as soon as records display. The system calculates the PQOH for every item with supply/demand in the scheduling horizon. When the resource type is a production line, the system applies the indicator to only the item's primary and alternate resource. When the resource type is a work center/machine, the system applies the indicator to any resource associated with the item.

Shortage warning status applies to required capacity, available capacity, part number, scheduled quantity, and projected on-hand (POH) quantity. Shortage warning status indicators can display as low warning status (yellow shading), which typically applies to non-critical potential shortages; for example, when the quantity on hand does not meet safety stock requirements. High warning status (red shading) indicates a potentially critical capacity or item shortage problem; for example, when the projected on hand quantity is less than zero; Table 1.1 on page 13 summarizes visual indicators.

### Workbench Elements

MSW lets you schedule items qualified by item attributes and set the production order due/release dates and quantities within a certain weekly based horizon.

Fig. 2.1  
MSW

The screenshot displays the MSW Capacity Grid interface, which is divided into three main sections: Capacity, Schedule, and Supply/Demand. Each section has a header row with columns for Resource ID, Record Type, Past Due, and dates from 11/17 to 11/25.

Capacity											
Resource ID	Record Type	Past Due	11/17	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25
1000	Remaining Capaci	-250.1	0	0	-242.1	8	-234.1	0	0	8	8
	Planned Capacity		8	8	8	8	40	0	0	8	8

Schedule												
Resource ID	Item Number	Nettable QO	Past Due	11/17	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25
1000	100A	11498	7336					0				
100-01	100A	11498	7532.1					0				
100-01	100A-02		7263					0				
100-01	100B	9360	17231					0				
100-01	100C	-60	17965					0				
100-01	100A	2962						0				
100-01	100B							0				

Supply/Demand											
Item Number	Record Type	Past Due	11/17	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25
100A	Projected On Han	98.1		11498	11498	22996	11498	11498	11498	11498	11498
100A	Projected Availabl	98.1		11498	11498	22996	11498	11498	11498	11498	11498
100A	Supply	8795.1				0					

### Capacity Grid

The Capacity Grid displays resource capacity. Use data in this frame to view production order required capacity. The system calculates summaries and displays required capacity and available capacity data in this grid as you enter data in the Schedule Grid. Required capacity and available capacity data is updated when you enter data in the Schedule Grid.

When you select an item to schedule, the system shows you the impact on the resource capacity. Master scheduling typically involves balancing supply/demand/capacity; however, in MSW, the context and focus is on the resource, the resource capacity, and the required capacity. Items are scheduled on a resource. Since capacity is represented by one or more supply records, the primary context is capacity.

**Note** MSW does not perform capacity analysis at a daily level, but rather, over periods of time. Also, capacity does not default from a site record for a production line.

For information on field descriptions, see “MSW Capacity Grid Data” on page 36.

## Schedule Grid

The Schedule Grid displays item supply records; that is, production orders, with bucketed quantities of the production order supply records for the item. The records represent the master production schedule for a given period. The summarized quantity values within the Schedule Grid are production order quantities.

For more information, see “MSW Schedule Grid Data” on page 37.

## Daily Buckets

Each supply record is associated with one or more resources. For work orders, resources can be work centers or production lines; for repetitive orders, the resource is the production line. Schedule data bucketed by day is appended on the right for the range of days identified in the data selection criteria. You enter data in this right-hand area.

Descriptive and transactional item attributes identify items in the Schedule Grid. Descriptive item attributes are those found in the item master/detail tables; transactional item attributes include scheduled quantities past due and nettable on-hand inventory. Because the system calculates the net past due quantity remaining for an item, you can view items that are scheduled and are past due as your day begins. This lets you check results of prior shifts. As you scan items, you can monitor inventory levels and easily determine the nettable inventory on hand. You can easily spot inventory levels of concern.

You can make updates to existing quantities in the Schedule Grid. When you do, the system performs POH, required capacity, and other calculations and displays changes.

Planned orders within the scheduling horizon are not included in the POH and resource required capacity calculations in MSW, so planned orders do not display in the Schedule Grid. To view planned orders, drill down to data in the Demand/Supply Grid to view the supply of: P(lanned), F(irm), or R(eleased) production orders.

**Note** You can also view the orders in the Production Order Maintenance window within MSW.

## Supply/Demand Grid

Use the information in the Supply/Demand Grid to view the item’s total demand and total supply data over a period of time. Total demand is from sales, DRP, forecast, seasonal demand, or dependent demand. Total supply is from planned, firm, or released production orders.

The Supply/Demand Grid displays the item number, record type, and past due quantities. You can also view cumulative ATP, demand, projected available balance, POH, receipts, seasonal/safety stock and supply as the record type.

When the Schedule Grid displays the scheduled quantity for an item, the Supply/Demand Grid displays the remaining open quantity due for the item. When the resource selected is a production line or work center, the Supply/Demand Grid displays the quantity and due data per production orders.

The system provides visual indicators of items with issues. You can select the items with issues, then drill down to the Demand Details frame; for example, to view demand records by ascending due dates. You can then scroll up or down to see additional demand records within the history horizon or future demand. This helps you focus on a specific demand record to correct the issue.

For more information, see “Working with Supply/Demand Grid Data” on page 38.

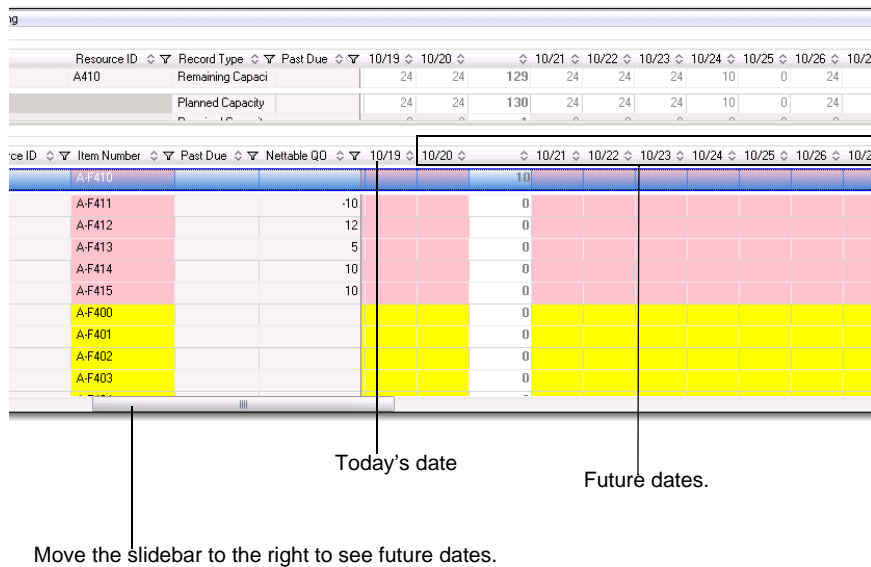
### Schedule Horizon

MSW gives you user-configurable control over where the MPS schedule horizon ends and where the future window begins. MSW calculates data differently in the scheduling horizon display than in the future window. Within the scheduling horizon, the system shows the period in which MSW applies the item visual indicators.

Fields in Work Center Maintenance (14.5) and duplicated in Production Line Maintenance (18.1.1) help control the schedule horizon. Specifically, you set the Horizon End field to either Day, Week, or Month, then set the number of periods for the increment in those programs. The system displays a read-only calculate date. The system calculates the date from period and period number, so if you set Horizon End to Day and Period to 5, the Calculate Date is five days starting with today. If you set Horizon End to Week and Period to 4, then the Calculate Date is four weeks from now including today.

Figure 2.2 shows a sample timeline in the MSW Schedule Grid. The left side shows the Schedule summary, while the right side shows individual dates, starting with today’s date of October 19.

**Fig. 2.2**  
Scheduling Period Example



Even though your future horizon may not fit into the .NET UI window on your screen, you can use the slider to display day-by-day future dates. When you scroll into future days, the day-by-day regions of the Capacity and Demand Grids are also scrolled.

Within MSW, only F and greater production orders within the MPS Scheduling Horizon impact these calculations:

- PQOH
- Available to promise
- Capacity/required capacity

Only F production orders or greater are displayed in the Schedule Grid within the MPS scheduling horizon.

MSW does not calculate for planned orders inside the scheduling horizon; however, you can view planned orders using supporting data in other programs within the MSW. To view a planned production order, view data in:

- Demand Details tab
- Production Order Maintenance tab
- Supply row to view the planned, firmed, released production orders

The scheduling horizon impacts the color logic, PQOH, auto firm, resource required capacity calculations as well as actual values within the Schedule Grid.

## Accessing MSW

You access QAD MSW through QAD .NET UI. You can enter the full name—Master Scheduling Workbench—or a partial name in the Applications field. You can also add MSW to your list of favorites.

## Enabling the Workbenches

You must set a field within QAD EE Site Maintenance (1.1.13) so that your site is enabled to run the workbenches.

**Fig. 2.3**  
Site Maintenance (1.1.13), Use Plan/Sched Workbenches Field

The screenshot shows the 'Site: 003' maintenance form. The 'Use Plan/Sched Workbenches' checkbox at the bottom is checked and highlighted with a dashed box. A line points from this checkbox to a text box on the right that reads: 'Select this field to enable the Planning and Scheduling Workbenches at this site.'

*Use Plan/Sched Workbenches.* Select this field to enable the Planning and Scheduling Workbenches for this site.

No: You cannot run the MSW or PSW workbenches for this site. Use Repetitive Menu (18) programs as usual.

Yes: Setting this field to Yes lets you use the MSW or PSW for this site. When a site is enabled to run the MSW and PSW workbenches, Capacity Requirements Planning (CRP) runs as part of MRP for orders that have a P status. When CRP runs as part of MRP, the system:

- Explodes planned orders as they are created
- Lets you access the orders using the work center schedule resource in MSW

So, once a site is enabled to run MSW or PSW, and you run MRP for the site to create planned orders; then within MSW, you can retrieve the orders for the item/site.

Setting this field to Yes also disables the following programs:

- Schedule Maintenance (18.2.1 and 18.22.2.1)
- Schedule Explosion (18.2.4)
- Cumulative Completed Maintenance (18.6)
- Line Schedule Workbench (18.22.1.10)
- Line Allocation Maintenance (18.22.1.11)
- Schedule Explosion (18.22.2.4)
- Cumulative Completed Maintenance (18.22.2.6)
- Planned Repetitive Schedule Approval (23.8)

## Setting Up Production Lines

You can set up items on production lines to be updated in a mass update method within QAD EE:

- Use Production Line Item Create (18.22.1.20) to set up items on production lines in a mass setup method.
- Use Production Line Item Update (18.22.1.21) to update the production lines/item setup in a mass update method.

### Production Line Item Create

If you have used QAD EE for scheduling, you have records, but you may or may not have items on production lines set up. To use the MSW and PSW, though, you must have production lines and items set up. To avoid manual re-entry of setup data, you can use Production Line Item Create to:

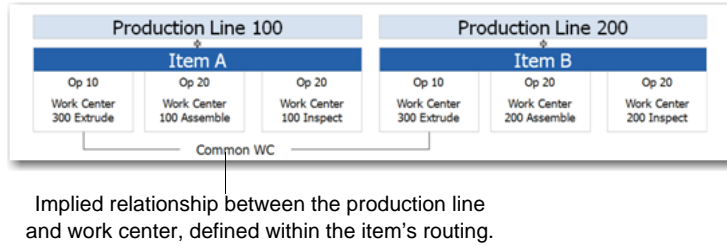
- Mass set up items on primary production lines.
- Mass set up items on alternate production lines.

This ensures that the MSW/PSW displays data and alerts the scheduler of all items requiring attention.

Since this program automates the setup of items on production lines, it also reduces the chances of newly introduced items not being added to a production line, which results in you not being able to schedule the item.

The following depicts the relationship between production lines and work centers.

**Fig. 2.4**  
Work Center/Production Line Relationship



The program locates sites where the item routing contains a specified work center/machine, and for those items, associates—sets up—those items to a specified production line. The default item routing is the source for the work centers associated with an item.

**Note** If the item has no routing (no item/resource record), the program does not find the item to associate with a production line.

You can run the program in batch mode to automate the process and eliminate the need to manually set up items on production lines.

The output report contains the following information:

- For each item, the current primary production and alternate production lines
- For each item, the new target production line

**Fig. 2.5**  
Production Line Item Create (18.22.1.20)

The screenshot shows a software window titled 'Production Line Item Create (18.22.1.20)'. At the top, there are menu options: 'Go To', 'Actions', 'Copy', 'Print', 'Preview', and 'Attach'. Below the menu, there are input fields for 'Work Center:' and 'Machine:'. The main area contains two sections: 'Process items for this Work Center/Machine:' and 'Assign items to this Site/Production Line:'. Each section has input fields for 'Work Center:', 'Machine:', 'Site:', and 'Production Line:'. At the bottom right, there is an 'Update:' checkbox.

Process Items for this Work Center Machine:

*Work Center.* Items processed by this work center within the routing.

*Machine.* Items processed by this machine within the routing.

Assign Items to This Site/Production Line:

*Site.* The site to process.

*Production Line.* The production line to associate items to for the update.

*Update.* Specify Yes to update according to criteria you set here.

### Production Line Item Update

You can use Production Line Item Update to mass update the setup. Use the program to:

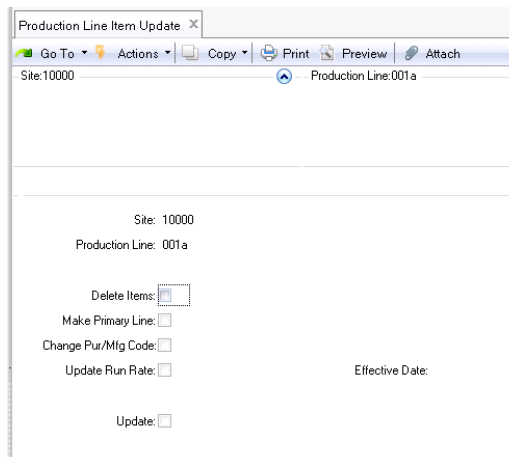
- Update/change the Pur/Mfg code for all items on a production line when you have not historically maintained the Pur/Mfg code.
- Apply the default production line run rate against all items on a production line.
- Apply run rates to production lines.
- Make a production line the primary line.
- Delete items from a production line.

The following table shows you the Pur/Mfg codes for production orders and order types.

**Table 2.1**  
Pur/Mfg Codes for Production Orders

Pur/Mfg Code	Production Order Status	Production Order Type
N/A	P	Generic
Blank	F	Discrete
M	F	Discrete
L	E	Repetitive
All others	F	Discrete

**Fig. 2.6**  
Production Line Item Update (18.22.1.21)



*Site.* The target site for the production line/items.

*Production Line.* The target production line/items for applied actions.

*Delete Items.* Lets you remove all items from production lines.

*Make Primary Line.* Lets you change the primary line of the existing item/production line target relationship.

*Update Run Rate.* Lets you apply the production line run rate against all items assigned to the target production line.

The Effective Date field associated with the Update Run Rate field informs the system of the starting point at which to update production line records. For example, you may only want to update recent records to reflect the new run rate but not older records because your company retains older records for historical purposes.

*Change Item Pur/Mfg Code.* Lets you change the item master and site master (if it exists) Pur/Mfg code on all items associated to the production line.

## MSW User Preferences

The following topics discuss options available to you when configuring MSW:

- Setting the MSW Schedule Horizon
- MSW Display Preferences
- MSW Consume Prior Remaining Capacity
- MSW Business Automation Preferences

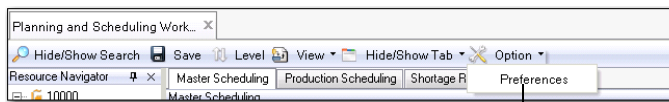
### Setting the MSW Schedule Horizon

You can configure the scheduling horizon so that you work with the number of days that make up your company's master schedule.

You can change the schedule horizon dynamically through the Preferences pull-down menu. You select Options, then Preferences, then Search to set the future and history horizon.

**Note** Fields in Work Center Maintenance (14.5) and duplicated in Production Line Maintenance (18.1.1) control the schedule horizon end and the number of periods within the schedule horizon. The Preferences settings control how far out in time you can view dates on the Schedule Grid.

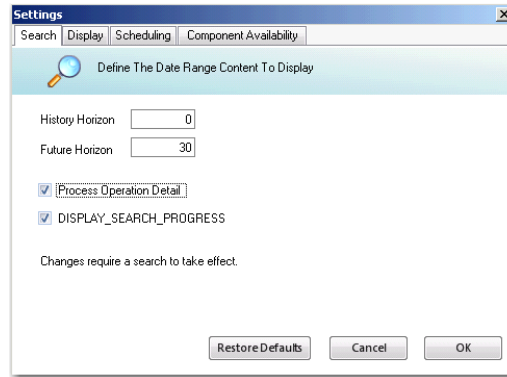
**Fig. 2.7**  
Preferences



Select Preferences in this Option pull-down menu.

Since the PQOH remains constant for an item, for convenience you can set the scheduling horizon to the same value for production lines and work centers that produce the item.

**Fig. 2.8**  
MSW, Search Preferences



*History Horizon.* Enter the number of days that constitute the past days of your history horizon. Once you set the History Horizon, you must perform a search to have data within the set horizon. If you change the History Horizon but do not do a search, the system can display an error or act unpredictably.

*Future Horizon.* Enter the number of days that constitute your future horizon.

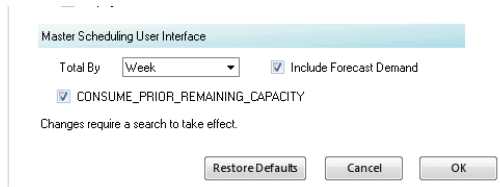
*Process Operation Details.* Indicate Yes for MSW to retrieve and display operation details for production orders.

*Display Search Progress.* Specify Yes or No to have the system display its progress when retrieving records. Depending upon search criteria that you set, the number of records that the system retrieves can be quite large. If you set this field to Yes, the system informs you of its progress in minutes to retrieve the records. For more information, see “Limitations” on page 18.

## MSW Display Preferences

Use the Display tab of the Settings window to define the increment by which MSW calculates totals. Select Option, Preferences, then the Display Tab. Use the Total By field under the Display tab to set the increment by which MSW totals quantities.

**Fig. 2.9**  
MSW, Display Preferences



*Total By.* Specify Week, Month, or None as the increment by which scheduling totals are displayed. When you enter a value, the totals in the main grid set display by the increment you enter. You still view data by daily increments in the Schedule Grid. To disable totaling, specify None.

You can drill down to view details. You can expand/collapse the detail records (columns) that comprise the total column. When you hover the cursor on the total column, the system displays the applicable date range. You enter the week start/end in MRP Control.

The totals reflect the data range (history/future) that you select. Projected on-hand quantities are not totaled. MSW uses the calendar definition of a month and the GL calendar period for the week.

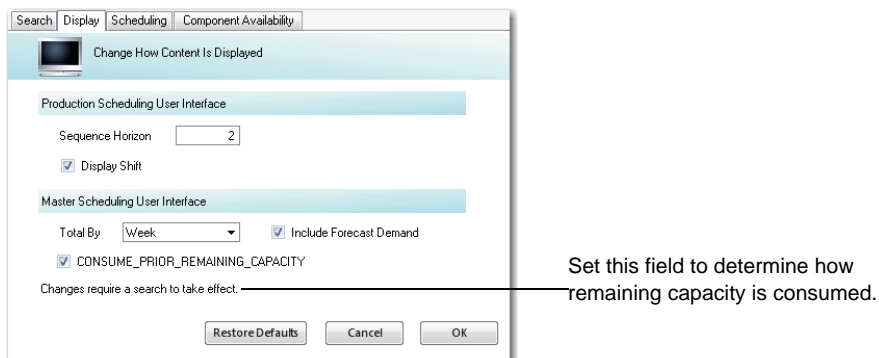
*Include Forecast Demand.* Specify Yes to include the forecast demand in MSW data. The system displays the net balance of current forecast demand from QAD EE for the selected item. Master production scheduling and MRP use the net forecast and abnormal sales order demand to calculate total demand.

*Consume Prior Remaining Capacity.* For information on the Consume Prior Remaining Capacity field, refer to “MSW Consume Prior Remaining Capacity” on page 32.

## MSW Consume Prior Remaining Capacity

You can specify whether capacity is consumed by future required capacity or not by setting the Consume Prior Remaining Capacity field in the Display Window of User Preferences. Color coding extends beyond the firm scheduling horizon for visibility of capacity shortages. When you set the field to Yes, the cell displays with yellow shading when the system uses available capacity from prior days to satisfy the required capacity. It displays with red shading when there is not enough available capacity on or in days prior to the required capacity date.

**Fig. 2.10**  
Display Window, Remaining Capacity Setup



*Consume Prior Remaining Capacity.* Specify whether prior days remaining capacity is consumed by future required capacity.

**Yes:** The prior days remaining capacity is consumed by future required capacity. In Figure 2.11, the current date is Wednesday, 07/07; however, Monday 7/12 displays 3.5 hours remaining after the system subtracts 4.5 hours of excessive capacity from Tuesday.

**No:** The prior days remaining capacity is not consumed by future required capacity.

**Fig. 2.11**  
Capacity Example 1

Resource ID	Horizon Start	Horizon End	Record Type	Past Due	Tuesday	Wednesd	Thursday	Friday	Saturday	Sunday	07/05 - 07	Monday	Tuesday	Wednesd
pl-asm	7/12		Remaining Capacity	-18	0	-18	6	8	7	4.7	15.7	3.5	0	0.3
			Planned Capacity		0	8	8	8	7	8	39	8	8	8
			Required Capacity	18	18	0	2	0	0	3.3	23.3	0	12.5	4.5
			Scheduled Quantity	180	180	0	20	0	0	33	233	0	125	45

Figure 2.12 shows results when the field is set to No. In the figure, the quantity shown for Tuesday displays as -18. The system corrected the quantity when remaining capacity was not consumed by the future capacity. Also, the system did not apply the past due netting. In the figure, Tuesday 7/12 displays 4.5 hours remaining and the system did not consume prior remaining capacity available on Monday. The system displays colors beyond the firm scheduling horizon for the capacity frame.

**Fig. 2.12**  
Capacity, Example 2

Resource ID	Horizon Start	Horizon End	Record Type	Past Due	Tuesday	Wednesd	Thursday	Friday	Saturday	Sunday	07/05 - 07	Monday	Tuesday	Wednesd
pl-asm	7/12		Remaining Capacity	-18	-18	8	6	8	7	4.7	15.7	8	-4.5	0.3
			Planned Capacity		0	8	8	8	7	8	39	8	8	8
			Required Capacity	18	18	0	2	0	0	3.3	23.3	0	12.5	4.5
			Scheduled Quantity	180	180	0	20	0	0	33	233	0	125	45

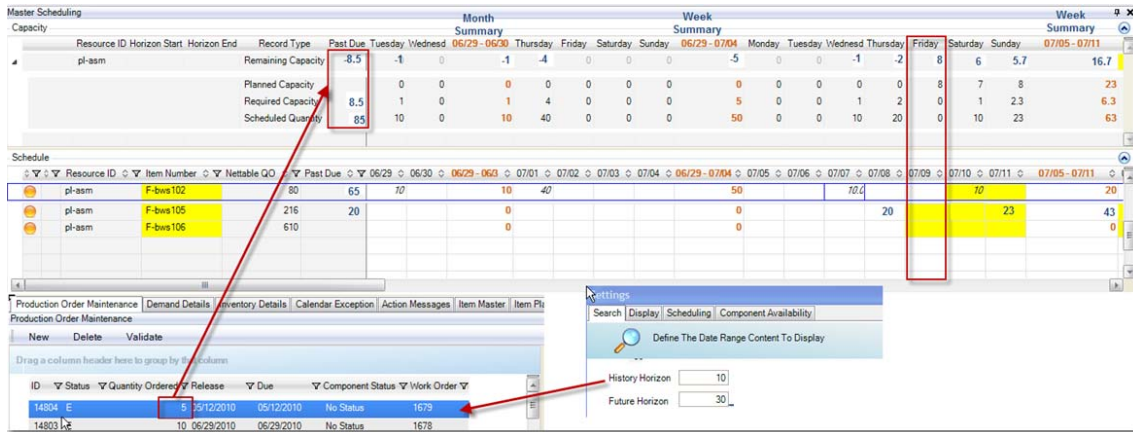
The system also displays the daily net. The remaining capacity row displays a daily delta between the required capacity and planned capacity with no consumption of remaining capacity of prior days. For the daily delta calculation:

- The firm scheduling horizon still excludes planned orders.
- The future horizon includes all open orders.

When you set the daily net method, the cell displays red if the difference between required capacity and planned capacity is negative.

In the following figure, the history horizon was set to 10 days and the future horizon was set to 30 days, and the current date is Friday, 07/09. The past due column totals display past due records; however, the history horizon columns display past due requirements in the Monthly and Weekly Summaries categories. The past due quantity of 5 from 5/12/2010, as shown in the Production Order Maintenance window below the grid, is summarized in the Past Due column. Even though the history horizon is 10 days, the system pulls in all past due supply/demand records.

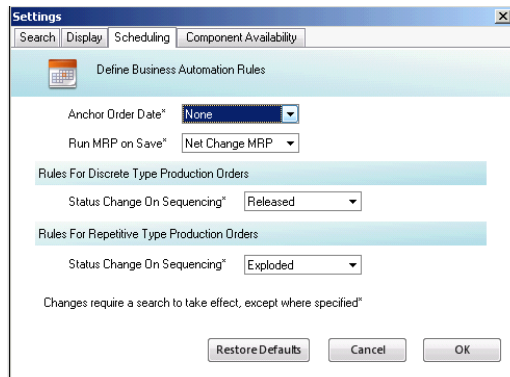
**Fig. 2.13**  
History Horizon, Daily Net Calculations



## MSW Business Automation Preferences

QAD EE applies a set of rules based on the production order status. You can set preferences for the rules in the Business Automation window.

**Fig. 2.14**  
MSW, Business Automation Window



**Run MRP on Save.** Optionally, you can run MRP when you save your changes in MSW. Choose from:

Select Net Change MRP: The system runs MRP for all changes made within MSW.

Selective Change MRP: The system runs MRP for only selected portions of the schedule that you changed in MSW.

None: MRP is not run when saving changes.

## Processing Master Schedules

This section tells you how to process your master schedules using MSW. A generic procedure is provided, along with descriptions of the fields within each grid. Individual tasks for the jobs that display follow the grid and field explanations.

## MSW General Procedure

Before you begin, you should have set fields in the Options Window under the Preferences pull-down menu; this includes setting history/future horizon, scheduling total options, and other scheduling options.

There are many different ways to access resource and scheduling data within MSW, and many different functions that you can perform using the data for a master schedule. The following provides one process flow that lets you perform a complete production order scheduling business cycle from the MSW:

- 1 From the Search Grid, select Scheduler ID in the first field, equals to in the operator search field, then your user ID in the third search field.

The system displays records of items related to the Scheduler ID. The system retrieves all transactional, demand and supply records for item with dates that also match the History and Future Horizon values that you set in the Option Window.

- 2 From the Views pull-down menu, select Save or Save As to save the view. If you select Save As, name your view, then save the view.

- 3 Identify resources and items that require scheduling intervention.

In the Scheduling Grid, items with scheduling issues have indicators within the Schedule Grid.

- Locate resources that have items with negative POH for every item with supply/demand within the scheduling horizon. The system reveals a visual indicator showing that one or more items on the resource have POH issues.
- Locate resources that have items with safety-stock issues within the scheduling horizon.
- Locate completed scheduled quantities and open scheduled quantities.
- Consider both static data and transactional data pertaining to the item. View any of the supporting data in the Supply/Demand Grid and view other details in the secondary tabs/browses, such as production orders, item planning, demand details, action messages, calendar exceptions and so on

- 4 Identify and correct capacity issues.

The Capacity Grid displays visual indicators for period available capacity issues through the scheduling horizon. If the daily required capacity is greater than planned capacity for a given day, the daily required capacity field for that day is highlighted in yellow. If the period available capacity is less than zero for a given day, that day is highlighted in red.

If the capacity is insufficient for the primary resource an item is produced on and you have set up alternate production lines for the item, you can assign the item to an alternate production line. You can select the alternate production line or work center from the resource selection field. When you do, the system calculates workbench data.

You can adjust capacity, for example, through Calendar Exception Maintenance or by adding or subtracting workday hours as needed for a work center. You can adjust the required capacity by modifying order due dates.

**Note** You can filter items for scheduling adjustments by action messages or sort by item status.

- 5 Schedule items by:

- Changing the quantity of items in the daily buckets in the right side of the Schedule Grid. If the quantity you are updating represents more than a single production order, then you cannot modify the quantity.
  - Retrieving the production order in Production Order Maintenance within MSW, then modifying the quantity, dates, or status of the order.
    - Modifying order operations, setup, or runtime
    - Aligning order dates
    - Creating a new production order
    - Deleting, copying, or splitting orders
    - Identifying and correcting capacity issues
- 6 Monitor a production order by displaying:
- Order supply summary or history
  - Order details or attributes
  - Production rates or comments
  - Order dates, times, shop floor activities
  - Basic and detailed routing data
  - Inventory details
- 7 Save your changes and optionally run MRP automatically upon the save.
- MRP does not replan these orders, but instead, generates action messages as needed. A firm planned order has a production order bill and a routing with scheduled operations. These are not fixed. Bills are re-exploded by MRP, while routings are re-exploded by CRP. Both are re-exploded when the status is changed to Exploded, Allocated, or Released. You can set Run MRP on Save to Yes under the Scheduling Tab of the Options Window to automatically run MRP.
- 8 Repeat the process until issues have been resolved for all resources.
- 9 Report production.

## MSW Capacity Grid Data

This frame includes required capacity and capacity information for the selected resource on each day of the schedule horizon, starting with the current day.

Capacity calculations start from the current system date and include the daily capacity. If the period available capacity results in a negative value, the system attempts to consume the excess capacity available from previous days and continues the consumption until either the period available capacity is zero or all previous days' excess capacity is consumed. This calculation runs from the system date until the last day of the schedule horizon. When past due, the period available capacity is zero minus the past due required capacity.

In the Capacity Grid, you can optionally display the daily delta of required and planned capacity in the MSW. You can set the Consume Prior Remaining Capacity field in the Display tab of the User Preferences window so that the capacity row displays. For more information, see “MSW Consume Prior Remaining Capacity” on page 32.

**Fig. 2.15**  
Capacity Grid

Resource ID	Horizon End	Record Type	Past Due	Thursday	Friday	Saturday	Sunday	07/29 - 08/05	Monday	Tuesday	Wednesday	Thursday	Friday
bmb1	08/31/2010	Remaining Capacity	-22.6	-10.8	12	0	0	1.4	2	12	12	12	12
		Planned Capacity		12	12	0	0	24	12	12	12	12	12
		Required Capacity	22.6	0	0	0	0	0	10	0	0	0	0
		Scheduled Quantity	226	0	0	0	0	0	100	0	0	0	0
san	07/29/2010	Remaining Capacity	-10	-10	0	0	0	-10	0	0	0	0	0

You can toggle the Capacity Grid to show only remaining capacity. You can optionally hide fields within the grid. When you collapse or hide aspects of the grid, however, you may lose sight of the firm schedule horizon dates that display in the grid. The frame includes the following fields:

*Resource ID.* The valid system identifier for the resource.

*Record Type.* You can filter this field to display all, none, blank, nonblank, or a customized filter value. The following are the different record types:

- **Planned Capacity**

This row displays the daily calculated capacity (in hours) of this line based on production line capacity parameters. It does not include past-due capacity; the Past Due column is always set to 0 (zero) and shows no quantities.

- **Remaining Capacity**

Identifies the resource required capacity overages and shortages based on a period calculation to help you isolate scheduling issues.

- **Required Capacity**

Identifies the capacity required for this resource (the *load* for the resource). Capacity shortage is calculated as capacity minus the load.

- **Scheduled Capacity**

Identifies the capacity, in terms of quantity, scheduled for this resource.

*Past Due.* This field displays past due capacity requirements.

## MSW Schedule Grid Data

The Schedule Grid displays item supply records—production orders—with bucketed quantities of the production order supply records for the item. The records represent the master production schedule for a given period. When you select an item by clicking a daily schedule cell, the entire row is highlighted in blue. Additional visual indicators, such as a blue line around cells, call your attention to potential issues.

When you make a change that remedies the problem, the system updates the cell to remove the color indicator.

**Fig. 2.16**  
Schedule Grid

Capacity		Production Li	Record Type	Past Due	11/08	11/09	11/10	11/11	11/05	11/11
A410	Remaining Capaci			-137.2	0	0	-113.2	24	-89.2	

Schedule		Production Li	Item Number	Nettable QOH	Past Due	11/08	11/09	11/10	11/11	11/05	11/11
A410	A-F411		-10							0	
A410	A-F412		12							0	
A410	A-F413		5	20						0	
A410	A-F410			927	5					5	
A410	A-F414		10	180						0	
A410	A-F415		10	245						0	

The following topics describe fields unique to the Schedule Grid:

*Item Number.* The valid system item number.

*Nettable QOH.* This column displays the nettable inventory on-hand. Nettable is an inventory status attribute that determines whether MRP includes items in its planning. As you scan items, use the data in this column to monitor inventory levels and easily identify inventory levels with issues or concerns.

The MSW Past Due field displays past due scheduled quantities.

You can also display the run sequence of an item in the grid. If multiple items are produced on a single production line, efficiency can be improved by producing the items in a certain order. Run sequences let you control the order, or sequence, in which items are scheduled on a production line.

### Working with Supply/Demand Grid Data

When the Schedule Grid displays the scheduled quantity for an item, the Supply/Demand Grid displays the remaining open quantity due for the item. When the resource selected is a production line or work center, the Supply/Demand Grid displays the quantity and due date per production order.

Sources of demand can include forecasts, safety stock requirements, sales orders, customer scheduled orders, component requirements from manufacturing, and so on. Sources of demand include nettable QOH, production orders, production/purchase orders, supplier scheduled orders, and so on.

**Fig. 2.17**  
Supply/Demand Grid

Item Number	Record Type	Past Due	10/12	10/13	10/14	10/15	10/16	10/17	10/18	10/19	10/20	10/21	10/22	10/23	10/24	10/25
A-F410	Projected Availabl	-200	400	10	10	10	10	10	10	10	10	10	10	10	10	10
A-F410	Supply										410	200				
A-F410	Demand	200	200									200	200			
A-F410	Cumulative ATP											0				
A-F410	Seasonal/Safety S		10	10	10	10	10	10	10	10	10	10	10	10	10	10
A-F410	Receipts											70	10	10	10	10

When an item is highlighted, the system displays the following associated data:

*Past Due (Demand).* The system displays past-due totals by demand type.

**Note** This includes all past-due demand for the item—not just demand from the specified historical period.

**Record Type.** You can filter this field to show All, blanks, non-blanks, or custom filter values. The following are examples of the types of records that display:

- Independent demand

The system displays independent demand from QAD EE for the selected item.

This quantity includes confirmed sales orders, DRP orders, and type 3 (required ship schedule) customer schedules.

All demand values match quantities shown in MRP Detail Inquiry (23.16).

- Dependent demand

The system displays additional demand from QAD EE based on dependent demand from parent-level items for the selected item.

- Forecast demand

The system displays the net balance of current forecast demand from QAD EE for the selected item.

QAD EE stores forecasts by week. The workbench shows the entire forecast for the week on one day.

- POH

The system displays the real-time projected inventory on hand for the item.

The projected on-hand calculation includes firm scheduled quantities from alternate resources for the item.

**Note** For POH and other calculations, see “Calculations” on page 14.

- Seasonal safety

The system displays seasonal build quantities as well as safety stock

- Receipts

The system displays supply from order receipts, such as production order receipts.

## Working with Production Orders

MRP generates planned orders, balancing supply and demand; however, when scheduling issues arise, you can manually adjust production order quantity, status, dates, and so on when you need to:

- Reduce the quantity to account for a capacity constraint.
- Increase the quantity by merging production orders into a single order.
- Increase the quantity due to an increase in demand during the scheduling horizon.

**Important** If you do not do not save your changes, the production order reverts back to its prior condition.

The following topics describe job (production order) tasks that you can perform in MSW.

## Scheduling Order Items

You can adjust the master schedule from the single-view workbench by performing a number of functions. Once you select the item and resource, you can make changes to production orders either in the Schedule Grid or under the Production Order Maintenance tab. Within the Schedule Grid you can:

- Update quantities directly in the daily buckets by entering new values.
- Update dates by cutting and pasting dates or manually changing them.
- Create a new production order by entering a quantity.
- Delete an order by overwriting a quantity with a 0 (zero).

## Modifying Production Order Resources

You can assign the item to an alternate resource once you select a production line and a specific item to analyze. Use the following procedure:

- 1 Ensure that alternate production lines are set up in the system for the item. Select a production line and specific item with resource issues.
- 2 In the Resource navigator, select an alternate resource.

If you select an item from a repetitive order, MSW displays all production lines defined for the item. If you select an item from a discrete order, MSW displays all work centers for the operation, including alternate routings.

When you click on the alternate resource, MSW updates all calculations. Color indicators may change.

**Note** You cannot assign a repetitive production order to a production line that belongs to another site.

## Modifying Production Order Quantities

Even though MRP generates planned orders, balancing supply and demand, in some cases, you may need to manually adjust the production order quantity. You can use MSW to do this. You can modify quantities directly in the Schedule Grid in any horizon period.

When you make a quantity change against a production order, the quantity change applies to the entire order, not just a specific operation. For example, if you change the quantity on work center A for operation 10, MSW applies the quantity change to the order and, subsequently, all operations.

You cannot modify the value in Schedule Grid:

- If the Schedule Grid cell value represents more than a single production order
- If the order is closed

If you change the order quantity to a quantity less than the quantity completed, the changes display in the Supply/Demand Grid. The open quantity is zero when the order quantity is equal to or less than the quantity completed.

**Note** You should not enter a completed quantity that is below the open quantity.

- 1 Select an item on the Schedule Grid.  
The system highlights the selected day/item.
- 2 Modify the value in the QTY column.  
The system validates the quantity change can be made.  
When the quantity change is valid, MSW updates all calculations. Color indicators may change.

**Note** You can also change the quantity using Production Order Maintenance within MSW.

## Creating Production Orders

You may need to create a new production order from within MSW; for example, for repetitive scheduling, MRP may create a planned order to cover weeks' worth of requirements; however, you may need to level the supply by entering daily production quantities. For a discrete environment, sales representatives can enter new sales orders into the system, and if the current demand for the sales order exceeds supply, MSW displays a visual indicator depicting the shortage. Since MRP has not run yet, there is no planned production order to firm, so you can create a new order.

Use the following procedure:

- 1 In the Schedule Grid, for the work center/machine/production line selected, enter a scheduled quantity for an existing item where no production order currently exists.

The system:

- Determines the order ID
- Obtains the default BOM/routing
- Sets the order status to F for a discrete order and E for a repetitive order

**Note** If the item you specify on the order is line scheduled (Pur/Mfg is L in Item Master Maintenance or Item Planning Maintenance) and the status of the order is not Released or Closed, then the system changes the order status to E.

- Calculates operation load

**Note** The actual scheduling of operation due and start dates occurs after you save the order, while planned orders already have calculated operation load and due/start dates.

- Updates the workbench calculations
- Updates the Production Order Maintenance Summary List within the workbench

- 2 Use Production Order Maintenance within MSW to complete other fields for the new production order.
- 3 Click the Save button to save your changes.

## Calculating Dates for New Orders

When you create a new production order, the system needs to calculate the projected release and due dates of the production order and the operations.

You can select an item/date and enter a new quantity in the Schedule Grid. When you do, the system:

- Sets the due date to date entered on the Schedule Grid
- Calculates the operation due date of all operations
- Moves the scheduled quantity for the operation on the Schedule Grid to the new calculated date, if applicable

**Note** When scheduling discrete orders on a production line, the system uses the manufacturing lead time from item or item-site planning, not operation calculations.

- Calculates the order release date, which is based on MRP lead time days
- Updates the workbench with the resulting calculation

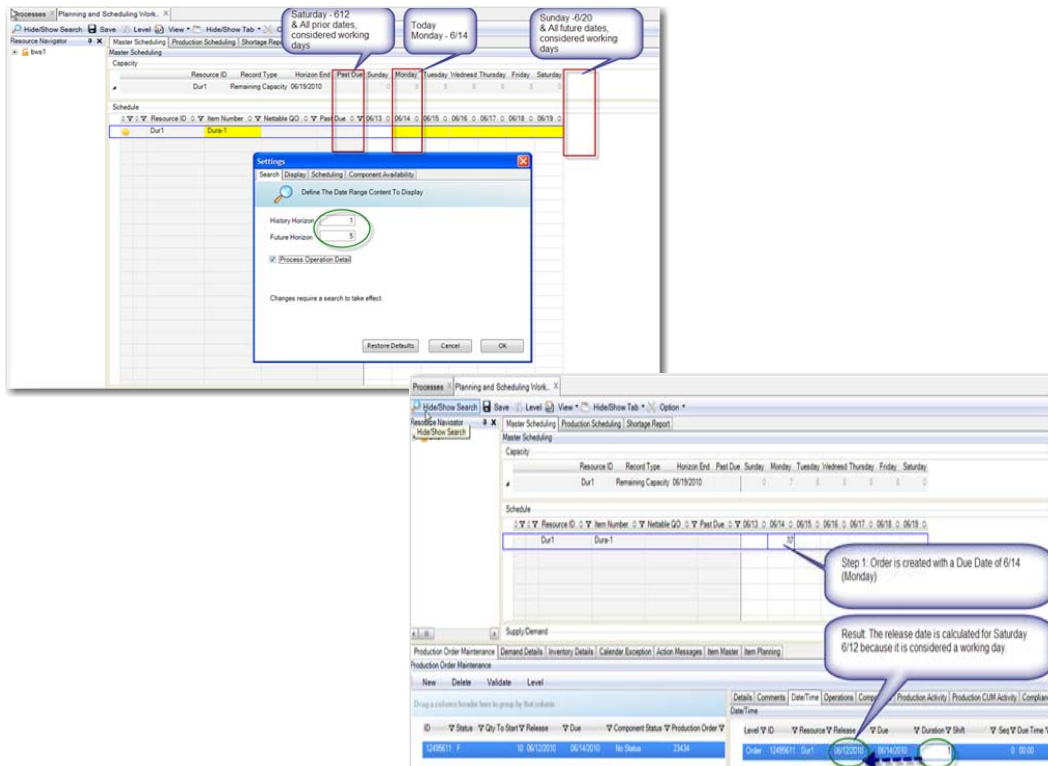
### Setting Dates Prior to Horizon Dates

When you create a production order where the production order release date is calculated prior to the History Horizon dates, the system calculates the dates.

**Example** Today is Monday 6/14. You set the History Horizon field for one day and the Future Horizon field for five days, then create an order with a due date of 6/14 for an item with a manufacturing lead time of 1 day. The system calculates the release date for Saturday 6/12 because it is considered a working day.

When determining dates in the past, MSW considers working days in the past; however, if you set a date that is beyond the history horizon, MSW treats every day beyond the history horizon as a working day. This also is true for dates beyond the future horizon. The Schedule Grid shows all dates between the start of the history horizon and the end of the future horizon, including working and non-working days.

**Fig. 2.18**  
Example Dates Prior to Horizon Date



### Scheduling Discrete Production Orders on a Production Line

You can use Work Order Maintenance (16.1) in QAD EE or the Production Order Maintenance function that displays inside the MSW to schedule a discrete work order on a production line.

To report production, you should use the normal discrete shop floor production reporting programs in the Shop Floor Control menu (16.20).

Select an order, then specify the production line for any:

- Discrete order: Type is blank or standard.
- Repetitive order: Type is S(cheduled).

**Note** All other order types prohibit access to the production line field.

The system validates that the items belong to the production line for both repetitive and discrete orders.

If the item you specify on the order is line scheduled (Pur/Mfg is L) in Item Master Maintenance, Item Planning Maintenance, or Item-Site Planning Maintenance, and the status of the order is not Released or Closed, then the system automatically changes the:

- Production order type to S
- Status to E

Otherwise, for a discrete order the Type is blank, and the Status is F. This occurs when Pur/Mfg code is blank or M(anufactured) for the item.

## Modifying Production Order Status

You can manually change production order status to accomplish scheduling goals.

For repetitive environments, a production order can have a P, E, or C status.

For discrete environments, a production order can have a P, F, R, or C status.

You cannot change the status of an order with issued materials or reported production.

Use the following procedure:

- 1 In the Schedule Grid, select an order and modify the order by changing quantity, date, and so on.  
If the discrete order status is P, MSW sets the status to F.  
If the repetitive order status is P, MSW sets the status to E.  
MSW updates all workbench calculations. Color adjustments are made.
- 2 Click the Save button to save your changes.

**Note** You can also change the order status using Production Order Maintenance within MSW and update QAD EE records.

## Auto-Firming Orders

In many businesses, MRP output is the starting point for master production scheduling. You can use the auto-firm function to quickly adjust orders and expedite your scheduling tasks. For discrete and repetitive orders, you no longer need to approve planned production orders to change the status to F. Auto-firming is based on the order due date.

You cannot auto-firm these item types:

- Purchased (items with a P code in Item Master Maintenance (4.1.1))
- Configured
- Routable
- Phantom

You can run the auto-firm process daily in batch mode to avoid missing orders that require this status change.

You can auto-firm orders using programs that are external to the workbenches. The programs firm planned orders for your work centers and production lines for a specific horizon or a range of dates. The program can run in batch mode nightly.

Use the following procedure:

- 1 Use Batch ID Maintenance (36.14.13) to define a batch ID.
- 2 Use Batch Request Processor (36.14.13) to run the batch ID you created, or you can use the `qpsbatch` ID that is supplied with the system.  
**Note** To run the batch daily, ensure that you set Repeat Processing to Yes.
- 3 Use any of the following to auto-firm planned orders:

- Set Process All Planned Orders in Scheduling Horizon to Yes in Auto Firm Planned Orders (22.13.3).
- Optionally, set a date in the Last Auto Firm field.

**Note** You must set Auto Firm to Yes in both Production Line Maintenance and Work Center Maintenance if you auto-firm for work center resources. If Auto Firm is set to No in these programs, the system will not firm any planned orders. You can see the Auto Firm field status and the date of the last auto-firm in work center and production line browses in QAD EE.

#### 4 View the firm orders in MSW.

Planned production orders for items scheduled on production line display as firmed on the default production line once you auto-firm them. For discrete production orders, that status changes to F. For repetitive production orders, the status changes to E.

Once a production order is firmed on the workbench, you:

- Can save order changes
- Can delete the order; however, MRP can re-create it, if the supply is still required
- Cannot set the order back to P.

## Modifying Production Order Dates

You can modify production order header dates in MSW to help you manage the due and release dates of production orders. Use the following procedure:

- 1 Select the Production Order Maintenance tab within MSW.
- 2 In the order summary list, modify dates in the Due Date or Release Dates field; see Figure 2.19.

When you modify the due date, MSW updates workbench calculations and other calculations impacted by order due date and quantity.

When a due date is changed, the system changes the corresponding release date so that the lead time from item planning remains the same.

If changing dates for a production line, MSW updates the production line required capacity; if changing dates for a work center, there is no impact.

- 3 Click the Save button to save your changes.

**Fig. 2.19**  
Production Order Maintenance, Date Fields

ID	Site	Qty To Start	Release	Due	Component Status	Production Order
1000	e	80	12/23/2008	12/25/2008	No Status	A2
1001	e	80	12/24/2008	12/26/2008	No Status	A2
1002	e	80	12/25/2008	12/29/2008	No Status	A2
1003	e	80	12/26/2008	12/30/2008	No Status	A2
1004	e	80	12/29/2008	12/31/2008	No Status	A2
592	R	1	12/01/2008	12/31/2008	No Component	
1005	e	80	12/30/2008	01/01/2009	No Status	A2

Modify  
dates in  
either Date  
field.

## Releasing and Printing Production Orders

You can print production orders from the MSW. To do this:

- 1 Mark some orders as selected for print.
- 2 Save the production orders you want to print.
- 3 Use QAD EE Print Orders Selected For Print (16.5); see Figure 2.20.

The orders selected on the MSW/PSW print. The Selected for Print field is cleared in MSW's Production Order Maintenance.

**Fig. 2.20**  
Print Orders Selected for Print (16.5)

', 'Print Routing: ', 'Print Co/By-Products: ', 'Print Bar Code: ', and 'Move to Next Operation: '. A separate box contains 'Include zero required: ', 'Include zero open: ', 'Reprint picked quantities: ', 'Print floor stock items: ', and 'Print Co/By-Products as First or Last Doc: Last'."/>

**Note** You can only print released orders with the Print Orders Selected for Print function.

## Deleting Production Orders

You can delete a production order from within MSW, using the Production Order Maintenance tab.

You cannot delete an order that has production reported for it.

Use the following procedure:

- 1 Select the Production Order Maintenance tab within MSW.
- 2 Select the order from the summary list.
- 3 Click the Delete button.
- 4 Click the Save button to save your changes.

## Viewing/Editing Order Data

The following topics discuss the data that displays in the MSW. Field explanations are included.

## Working with Order Summary List Data

When you select items in the Schedule Grid, you can manipulate order data through two-sided Production Order Maintenance functions. The left side includes a summary list, while the right side includes details.

The summary list starts with orders that have operation due dates on the selected day. To view past-due orders, click the up arrow on the left side of the Details window. To show additional records for the current day or for future days, click the down arrow. The sequence in which orders are listed is based on the due date of the order and the production order ID.

You can update some fields directly in this frame. Changes applying to the production order itself update QAD EE when they are saved.

**Fig. 2.21**  
Summary List

ID	Status	Qty To Start	Release	Due	Component Status	Production Order
1000	e	80	12/23/2008	12/25/2008	No Status	A2
1001	e	80	12/24/2008	12/26/2008	No Status	A2
1002	e	80	12/25/2008	12/29/2008	No Status	A2
1003	e	80	12/26/2008	12/30/2008	No Status	A2
1004	e	80	12/29/2008	12/31/2008	No Status	A2
592	R	1	12/01/2008	12/31/2008	No Component	
1005	e	80	12/30/2008	01/01/2009	No Status	A2

**Production Order.** The production order identifier. This can be the system-generated order ID from QAD EE. If you enter a new order, the system retrieves the next available number from QAD EE or you can optionally enter your own production order value.

**ID.** A production order lot identifier. The production order number and lot ID work together to identify a specific production order. The same production order can be used with different lot IDs.

**St(atus).** The current status of the order. With some restrictions—for example, you cannot change a firm order back to planned—you can update the status as needed. When you save your changes, the system updates the QAD EE order with the new status.

**Release.** The date this production order is scheduled to be released to production. The date you enter here initially changes to the actual release date when you release and print the production order. Release dates also determine the date components are required. Normally components are picked when an order is released.

The system calculates either release or due date, creating, in effect, forward or backward order scheduling.

**Due.** The due date defaults to today's date plus the manufacturing lead time for the item. The due date is the date this order is due to be completed. This is the date you plan to have product available for shipment to the customer or issue to another manufacturing order. All MRP plans are based on this due date.

## Working with Order Detail Records

When you click a cell in the daily supply grid, the system lists production orders for the associated item.

Field explanations are organized by tabs in the Order Detail portion on Production Order Maintenance, starting with the Details tab and ending with the Accounting Data tab.

### Details Tab

The following topics discuss fields in the Details tab. Field explanations are summarized. For full field explanations, refer to the field help for Work Order Maintenance (16.1) for QAD EE.

**Fig. 2.22**  
Production Order Maintenance, Detail Window

**Quantity Ordered.** The quantity to be produced on this production order, expressed in the item unit of measure.

**Primary Line.** This field displays whether the line is the primary production line. You set up a primary production line in Production Line Maintenance (18.22.1.1). You can use Production Line Item Update (18.22.1.21) to view primary production lines. You can also update a production line and make it the primary line with Production Line Item Update (18.22.1.21).

**Site.** The site associated with this production order.

**Order Type.** This field is display only and depicts the type of order. For most production orders it is blank. Other production order types include the following:

- **R(ework).** No routing. The only item in the bill is the item being reworked. To calculate variances, manually enter bill and routing standards.
- **E(xpense).** No routing or bill. As with rework orders, enter a bill and routing to calculate variances.
- **F(inal Assembly).** Generated from sales orders. The standard item-site routing is used. The bill matches the sales order bill.
- **S(cheduled).** Generated by Schedule Maintenance. Not normally processed using production orders, but they can be changed to normal production orders by changing the status from Exploded to Allocated or to Released. Once you do this, the system changes the type to blank and treats it like a normal order. Also, the system updates the repetitive schedule to exclude it.
- **C(umulative).** Generated by repetitive feedback transactions to collect costs. Not accessed by production order functions.

**W(ork Flow).** Generated by Flow Schedule Maintenance when you enter a flow scheduled

order that does not reference an existing production order. Not accessed by production order functions.

*Yield.* Enter the percentage of the number of items built on this work order expected to be in usable condition. Yield defaults from item-site or item planning data.

*Scheduled Line.* Enter the scheduled line for the order.

*Sales/Job.* This is an optional code associating this order with a specific sales/job. For a new order, the default is blank.

*Production Rate.* This field is display only and displays the standard run rate for the production line.

*Supplier.* The supplier associated with this order.

*CUM ID.* This field is display only and shows the system cumulative identifier.

*Run Time (Hrs).* This field informs you of the amount of run time that is required to produce the work order.

*Routing Code.* This field depicts the routing code associated with the production order

*Order Sheet Printed.* Indicate Yes if want to print the order sheet for this order.

*Setup Time (Hrs).* This field is display only and depicts the standard time in decimal hours required to prepare the work center to carry out the operation, independent of order quantity.

*BOM/Formula Code.* The identifier for the BOM/formula. Each formula consists of a parent and component. BOM/formula identifies the parent, usually an item number that has been predefined in Item Master Maintenance.

*Release/Print.* Indicate Yes to release or print this order; see “Releasing and Printing Production Orders” on page 46.

*Required Capacity (Hrs).* Identifies the capacity required or the total required capacity required to fully produce this production order

## Date/Time Tab

The following topics discuss fields in the Date/Time window.

**Fig. 2.23**  
Production Order Maintenance, Date/Time Window

Level	ID	Resource	Release	Due	Duration	Shi	Seq	Need Time
Order	151110	bmb2a	11/18/2008	11/25/2008	0		0	00.00
Operat	20	bmb2b	11/24/2008	11/25/2008				
Operat	10	bmb2a	11/20/2008	11/24/2008				

*Level.* This field displays either the order or operation.

*ID.* The routing operation number from the QAD EE production order routing detail record. If you create a new production order, the system determines the operation based on the routing.

*Resource.* The work center or production line identifier.

*Release.* The date this routing operation is scheduled for the item release.

**Due.** The date this routing operation is scheduled to complete work on this order.

The system validates that this date falls within the overall scheduling horizon defined by Historical Schedule Days and Future Schedule days in the site Configuration record.

**Duration.** The time between the start date and due date. Duration is calculated only at the order level and takes into account working and non-working days in its calculation.

**Shift.** This field depicts the shift defined for the resource. Shift schedules define how many days a week and how many hours the work center or production line is run.

**Seq.** This is the production sequence for the order. This field tells the system in which order to process orders as part of the production schedule that you create in PSW. You can set the Sequence value here, set it within PSW manually, or use the drag-and-drop method to set it.

**Due Time.** Optionally enter the time of day that this order should be completed.

Enter the time in HH:MM:SS format based on a 24-hour clock. For example, enter 1:30 pm as 13:30:00.

This field is for reference. It appears on some reports and inquiries, and can be used to introduce a greater level of detail into the sequence of activities on a production line.

## Operations Tab

The following topics discuss fields in the Operations window. Only those fields not previously described for other MSW windows are described. You cannot change values in the Operations fields.

**Fig. 2.24**  
Production Order Maintenance, Operations Window

**Op.** The number identifying the operation in the routing or process where this component is used.

**Standard Operation.** The valid standard operation code that identifies a process operation common to several products or applicable to different routings in different sequences.

**Status.** This field displays the production order status codes correspond to stages in the order's life cycle:

- Planned
- Firm planned
- Batch
- Exploded
- Allocated

- Released
- Closed

The status of an order determines how much control you have over its bill, routing, inventory allocations, inventory transactions, and labor feedback. An order progresses from one status code to the next and, unless prematurely released, does not return to an earlier status.

*Work Center/Machine.* A valid work center identifier for an individual machine, group of similar machines, or subcontract supplier. Work center and machine code work together to identify a work center, which is a basic production unit used in manufacturing and control.

*Tool Code.* Optionally, enter the code for a tool normally used during this operation. This is for reference only. To standardize tool codes, set them up in Generalized Codes Maintenance (36.2.13) for field ro\_tool.

*Setup, Run, and Move Time.* Enter the normal times, in decimal hours, to process items during this operation. Run time is per unit; setup and move time are independent of order size.

*Machines per Operation.* The number of machines per operation. As the number of machines increases, work center capacity and the number of hours a work center is available for work also increase. The number of machines per operation is also used for calculating the lead time and machine burden cost for an operation.

*Queue Time.* The standard time, in decimal hours, a job normally spends waiting at this work center before it is set up and processed.

*Wait Time.* The standard time in decimal hours that a job normally spends waiting at this work center after processing has completed.

*Overlap Units.* The number of units that must be completed at this operation before work can begin at the next operation.

## Components Tab

When you click the Components tab, you can view a summary list of components for the order, then view/edit supply/demand summary, supply/demand detail, and inventory detail by site data. This information is useful when you use the Component Availability Check features; for more information, refer to “Component Availability Check (CAC)” on page 73.

## Production Activity Tab

Use the Production Activity window to track production order activity. For an order, you can view the operation and description, open completed, rejected, and reworked quantity; the actual run time; and the actual setup time.

The actual time shows the time required to manufacture a single unit. Run time for an operation is a function of total run time, work center or shop calendar hours, and the machines per operation. Run time is expressed in terms of an hourly production rate. This time is differentiated expected run time. The actual time is the time required to set up a resource.

**Fig. 2.25**  
Production Order Maintenance, Production Activity Window

Production Activity									
Level	ID	Open Quantity	Actual Qty Completed	Actual Qty Rejected	Rework	In Queue	Out Queue	Actual Run	Actual Setup
Order	151110	4	2	0					
Operat	20	11	1	0	0	0	0	0	0
Operat	10	11	1	0	0	0	0	0	0

### Production CUM Activity Tab

Use the Production CUM Activity window to track cumulative order activity. For an order, you can view the CUM ID, the quantity processed, rejected, or in the reject queue; the number scrapped, reworked, and the number in and out of the queue. You can also see the actual run time and the actual setup time.

**Fig. 2.26**  
Production Order Maintenance, Production Cum Activity Window

Production CUM Activity									
Level	Cum ID	Open Quantity	Actual Qty Completed	Actual Qty Rejected	Rework	In Queue	Out Queue	Actual Run	Actual Setup
Order		4	2	0					
Operat	20	11	1	0	0	0	0	0	0
Operat	10	11	1	0	0	0	0	0	0

### Compliance Tab

Some features of production orders are affected when you use the Regulatory Attributes module. When Regulatory Attributes is active, you can assign batch numbers, restrict items issued to an order, restrict items received, and enforce stricter lot/serial control rules. The Compliance window of MSW lets you view Regulatory Attributes data.

The following topics discuss fields in the Compliance window. Only those fields not previously described for other MSW windows are described.

**Assay Percentage.** The presence, absence, or quantity of one or more components, usually expressed as a percentage.

**Grade.** Identifies the quality or physical properties of an inventory quantity. Graded products include raw materials, intermediates, and finished goods.

**Expire Date.** The expiration date for items that eventually spoil, and for pharmaceuticals that lose potency over time.

**Receipt Status.** The default receipt status for the order.

**Active.** Indicates whether the inventory status code entered in Receipt Status should override status assigned in item, site, and location data.

**Batch.** An arbitrary number for tracking a quantity scheduled to be produced or in production.

**Single Lot.** Determines whether each receipt from a production order should be assigned to a single lot. This is a default setting you can change at receipt.

**Lot Number.** The lot number for this production order. Enter a lot number in this field.

## Accounting Data Tab

The following topics discuss fields in the Accounting window. Only those fields not previously described for other MSW windows are described.

*WIP Account.* The general ledger account code used to track work in progress (WIP) inventory values for the order.

*Material Usage Var.* Material usage variance is calculated as the difference between the actual and expected quantities issued, extended by the cumulative order operation component cost. The expected issue quantity is the cumulative order operation standard quantity required per unit multiplied by the quantity processed at the operation.

*Material Rate Var.* When you issue components to a production order, material costs post to WIP as the quantity issued and multiplied by the GL cost of the material. Rate variance is calculated as the difference between the GL cost of materials used and the GL cost of materials required.

*Subcontract Usage Var.* Usage variance is an efficiency variance, calculated as the difference between the subcontracted quantity received and the standard subcontract quantity needed to make this order quantity complete.

*Subcontract Rate Var.* Rate variance is calculated as the difference between the order cost and the standard subcontract cost.

*Mix Variance Acct.* Mix variance is calculated as the difference between the standard or expected quantity and the actual quantity received, multiplied by the GL cost of the item.

*Floor Stock Account.* The GL account code used to track WIP stock adjustments for bulk issue items on this order.

## Working with Items

The following topics discuss the types of items with which you can work in MSW and explain item data that is presented in MSW.

The system displays a grid including each item that can be produced on the selected resource—sorted by item number, scheduled due date, or item status—including the current quantity on hand and any past-due quantity. Vertical scroll arrows let you display additional items.

**Note** Items without supply/demand are not included in the workbench.

Visual indicators in the item field reflect the highest-priority situation for a day within the firm scheduling period. For example, if the projected on-hand for the item is negative for one day in the period, while another day's quantity is just less than safety stock, the item number cell is shaded red to reflect the more critical issue.

When you select an item the system displays several types of item and production information, as well as messages related to status indicators and sources of demand.

Use additional tabs within MSW for more item information as described in the following topics.

## Working With Item Planning Data

This section explains fields in the Item Master window. Only those fields not previously described for other MSW windows are described.

**Fig. 2.27**  
Item Planning Window

MRP Required	Safety Stock	Minimum Order	Order Multiple	Yield Percent	Order Policy	Order Period	Time Fence
Yes	100	0	0	100.00%	POQ		7

**MRP Required.** The current value of the system-maintained MRP Required field in the QAD EE item-site or item master record. When this is Yes, the system has detected a change in such things as product structure, inventory, or transactional records that requires the item to be replanned.

**Safety Stock.** The safety stock quantity for the selected item defined in QAD EE item-site or item master records.

**Minimum Order.** The minimum quantity that can be placed on a single order for this item, as specified in QAD EE item-site or item master records.

**Order Multiple.** The order multiple specified for the item in QAD EE item-site or item master records. When Order Policy is POQ (period order quantity) or LFL (lot for lot), MRP rounds net requirements for the item up to the next multiple of this number.

**Yield Percent.** The yield percentage specified for the item in QAD EE item-site or item master records.

**Order Policy.** The order policy specified for the item in QAD EE item-site or item master records. This value determines the method MRP uses to plan orders for this item.

**Order Period.** The order period specified for the item in QAD EE item-site or item master records. This is the length of the planning period MRP uses when Order Policy is POQ (period order quantity).

**Time Fence.** The time fence specified for the item in QAD EE item-site or item master records. This is the number of days inside of which MRP does not replan this item.

**Safety Time.** The number of days of safety time specified for the item in QAD EE item-site or item master records. MRP adjusts actual need dates by this value as protection against late deliveries.

**Manufacturing Lead Time.** The manufacturing lead time defined in QAD EE Item-Site Planning Maintenance (1.4.17) or Item Master Maintenance (1.4.1).

**Cumulative Lead Time.** The total cumulative lead time for the item from QAD EE item-site or item master records.

**Buyer/Planner.** The user ID of the buyer/planner specified for the item in QAD EE item-site or item master records.

**Purchase/Manufacture.** The code indicating how this item is typically processed by the system. This code controls how the system explodes forecasts, plans and creates orders, and calculates costs for the item. It affects MRP and DRP.

**Phantom.** This field indicates whether an item is normally stocked or simply put together as part of a higher level assembly. When Yes, the item and its product structure are phantoms, typically used for transient assemblies or intermediate products.

**Order Quantity.** The standard production quantity defined in QAD EE item-site or item master records.

**Alternate.** An alternate item should the original item become unavailable.

## Working With Inventory Details Data

Use the data in the Inventory Details window to help you track attribute information entered on production orders. This helps you control the tracking of materials through manufacturing and into inventory. This section explains fields in the Item Master window. Only those fields not previously described for other MSW windows are described.

**Fig. 2.28**  
Inventory Details Window

Item Number	Site	Qty On Hand - Inv Mstr	Qty On Hand - Inv Detail	Location	Lot/Serial	Reference	Status	Expiry Date	Date Created
AFB13		10000	60.0	5.0 300		10		06/04/2009	05/26/2009
AFB12		10000	60.0	50.0 K5B1		10			05/26/2009

**Qty On Hand - Inv Detail.** The current on-hand inventory balance for the item from the inventory detail table.

**Qty On Hand - Inv Mstr.** The current on-hand inventory balance for the item from the inventory master table.

**Expire Date.** The expiration date associated with this specific inventory quantity. The system calculates this date when an item is received into inventory.

## Saving Your Changes

To save modified and new production orders to QAD EE, click Save.

**Note** When you change the site or resource and the system detects unsaved changes to production order detail records, a message displays. Click OK to save your changes; click Cancel to stay on the current site or resource with unsaved changes still displayed. If you change the resource, filter, or sort order without saving changes, the system displays a similar message.



# Production Scheduling Workbench (PSW)

The following topics describe how to use the features of Production Scheduling Workbench (PSW).

***Introduction* 58**

Introduces the PSW, components, and features.

***Accessing PSW* 60**

Provides procedures to access the PSW in the .NET UI

***Enabling PSW* 60**

Tells you how to enable PSW for a site.

***Setting Up Production Lines* 60**

Tells you how to mass set up production lines.

***PSW User Preferences* 60**

Describes user preferences for PSW, including field descriptions for all user preferences

***Processing PSW Schedules* 62**

Provides a general procedure to create and process a production schedule and describes processing results.

***Working with Sequence Grid Data* 64**

Describes various ways to manipulate dates, data, and other items within the PSW Sequence Grid.

***Dispatching and Printing* 71**

Provides instructions to dispatch and print PSW-built schedules.

***Reporting Production* 72**

Provides information to help you report production based on PSW-built schedules and data.

## Introduction

Use the Production Scheduling Workbench (PSW) to schedule items within a day and shift (sequencing). You can use the PSW to view and update production line schedules used with the QAD EE Advanced Repetitive module.

## Features

Using PSW, you can build production schedules with full knowledge of resources, orders, items, the shop floor, and more. Besides just scheduling items, you can:

- Determine production order status and whether they are sequenced or nonsequenced.
- Determine production progress.
- Define the sequence horizon and configure the display.
- Modify orders and order quantities.
- Create, delete, copy, and split production orders.
- Modify production order status or duration.
- Calculate order dates.
- Define defaults, shifts, and sequences.
- Sequence/unsequence production orders.
- Display shop floor activity and dispatch production to the shop floor.
- Print dispatch lists, picklists, production orders.
- Report production.

## Drag and Drop

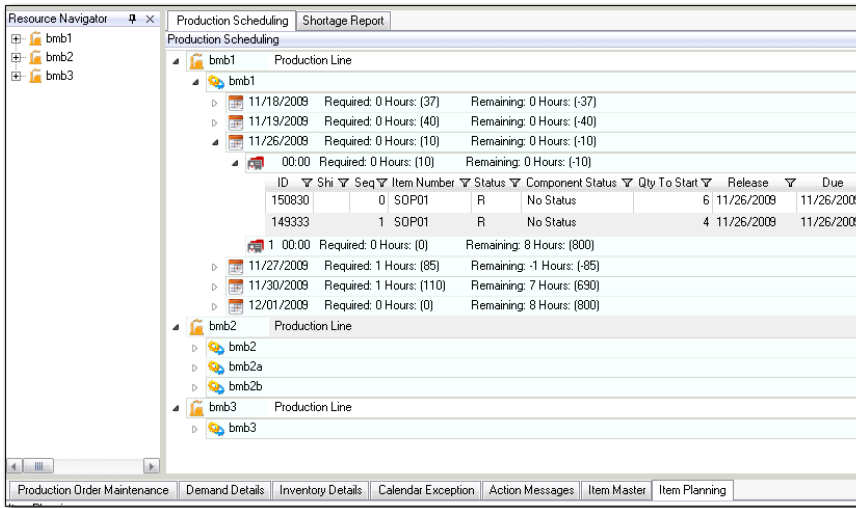
You can easily modify aspects of a job by dragging and dropping jobs within the PSW Sequencing and Work Order Browse frames. When you drop an order onto another order, the order you drop acquires the properties of the receiving order, so, for example, if you drag and drop an unsequenced order onto a sequenced order, it becomes a sequenced order. Use the drag-and-drop method to:

- Change due dates by dragging and dropping a job from one release date to another job with a different release date.
- Change status by dragging and dropping a selected order to change status. When you do, PSW updates the production order status to F if the status is P.
- Modify resource capacity by dragging and dropping from the source to the target destination after you select a single or multiple production orders.
- Sequence production orders in PSW by dragging and dropping single or multiple orders after a sequenced job. Once you drop the orders, the system assigns the sequence number to the order(s) as greater than the prior sequenced numbers and assigns the appropriate shift number if shifts are being used.
- Unsequence an order by dragging a sequenced order and dropping it after an unsequenced order. The system changes the sequence to 0.

## PSW Workbench Elements

Figure 3.1 displays the PSW workbench. The text following the figure describes how each frame is used.

**Fig. 3.1**  
Repetitive Workbench Overview



### Resource Frame

Based on your selection criteria, the Resource frame displays the sites and resources and defaults to the first record. For detailed information, refer to “(2) Resource Frame” on page 5.

### Sequence Grid

The Sequence Grid lets you concurrently view, both a list of sequenced and non-sequenced jobs (production orders).

The Sequence Grid displays item supply records, that is, production orders, with bucketed quantities of the production order supply records for the item. The records represent the master production schedule for a given period. The summarized quantity values within the Sequence Grid are production order quantities.

PSW shows capacity in hours and units. Units is the total quantity of parts scheduled. Hours is the required capacity for each production order, and required capacity is the run time plus the setup time.

### Additional Programs

You can modify and view data in additional data from the tabs that display at the bottom of the PSW. For information on updating data or field descriptions in these windows, refer to “Common Features” on page 8.

## Sequence Horizon

The sequence horizon determines the number of sequencing buckets that show in the PSW. If the horizon is three days, for example, then you see today plus two more days in the PSW. Past due orders always display in the Sequence Grid even if they are not within the current sequencing horizon.

**Fig. 3.2**  
Sequence Horizon

bmb1 Production Line		
bmb1		
07/21	Required: 5.8 Hours (58)	Remaining: -5.8 Hours (-58)
07/23	Required: 17.3 Hours (168)	Remaining: -17.3 Hours (-173)
08/02	Required: 10.5 Hours (100)	Remaining: -10.5 Hours (-105)
08/18	Required: 0 Hours (0)	Remaining: 12 Hours (120)
08/19	Required: 0 Hours (0)	Remaining: 12 Hours (120)
08/20	Required: 0 Hours (0)	Remaining: 12 Hours (120)
08/23	Required: 0 Hours (0)	Remaining: 12 Hours (120)

## Accessing PSW

You access QAD PSW through QAD .NET UI. You can enter Master Scheduling Workbench, or part of this name, in the Applications field. You can also add MSW to your list of favorites.

## Enabling PSW

You must enable PSW by setting the Use Plan/Sched Workbenches field in Site Maintenance 1.1.13); see “Enabling the Workbenches” on page 26.

## Setting Up Production Lines

You can mass setup production lines and items for a production line in preparation to use PSW; see “Setting Up Production Lines” on page 27.

## PSW User Preferences

The following topics discuss the following setup parameters for PSW:

- Defining PSW Sequencing Horizon
- Configuring Display
- Defining Defaults

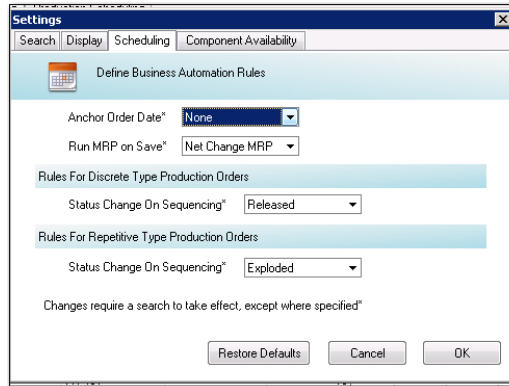
### Defining PSW Sequencing Horizon

The PSW horizon setting is based on calendar days, not the shop calendar, and always shows past due released orders.

For manageability, the PSW should contain a much smaller data set. This way, you can easily view and manage production lines, release date buckets, and release date details. So, for example, if you set the horizon for one day, you can see all production lines and easily schedule from one to ten lines in a single view. You can also see the production schedule over several production lines.

You define the sequence horizon dynamically through the Options pull-down menu. You select Option, then Preferences, then the Display tab to set the sequence horizon.

**Fig. 3.3**  
Settings Window, Display Tab



*Sequencing Horizon.* Enter the number of days for the sequence horizon. When working on the production schedule, the typical horizon is 24 hours to five days.

During production sequencing (scheduling orders within the next few days), you can view supply and demand, and any potential issues for sequence schedules, then drill down to determine the problem and possible resolutions

*Display Shifts.* Set this field to Yes to display shifts in the Sequence Grid, as shown in Figure 3.3. When you have multiple lines to view in PSW, you can avoid expanding the lines to view shift information. This saves you time.

Shift buckets display:

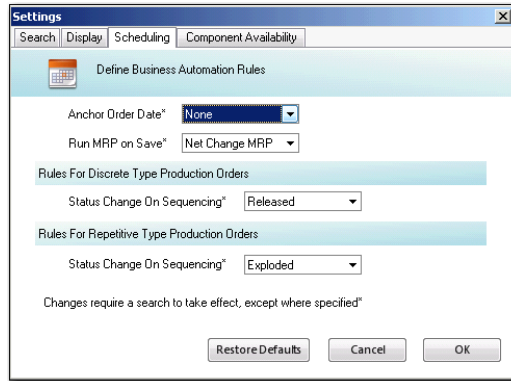
- When orders exist for the item/shift/release date
- When capacity exists for a shift
- For standard capacity
- For exception capacity, which is based on the standard calendar of the resource, not exception records. Manually enter a shift ID if it is an exception.

You set the shift start time in Shift Maintenance (18.1.22).

## Configuring Display

Use the fields in the Display tab of the Settings window to set display options for PSW.

**Fig. 3.4**  
Settings, Scheduling Tab



*Anchor Order Date.* Enter a production order due date that the system locks and prohibits changing during the production schedule process. For more information, see “Anchoring Production Orders” on page 69.

*Status Change on Sequencing.* Indicate the status to which you want to change the order status when sequencing orders. Set this field for either repetitive or discrete orders helps you to specify order rules. Select from Firm, Exploded, Allocated, Released, and Closed statuses.

## Defining Defaults

You can define defaults for:

- Shift scheduling behavior
- Sequencing behavior

For shifts, you can enter a blank shift to indicate that production orders do not have a shift. This is useful, for example, when you have planned orders that are not firm and you do not want the planned orders defaulting to shift 1, which may cause unauthorized items to be produced on the shop floor.

You can remove the display of shifts though the Options pull-down menu.

## Processing PSW Schedules

Before you begin, you should have set fields in the Settings Window under the Options pull-down menu; this includes setting history/future horizon, sequencing horizon and scheduling total options, and other scheduling options.

## Procedure

There are many different ways to access resource and scheduling data within PSW, and many different functions that you can perform using the data when creating or modifying a production schedule. The following provides one process flow that lets you perform a complete production order scheduling business cycle from the PSW:

- 1 From the Search Grid, select Scheduler ID in the first field, equals to in the operator search field, then your user ID in the third search field.

The system displays records of items related to the Scheduler ID. The system retrieves all transactional, demand, and supply records for items with dates that also match the History and Future Horizon values that you set in the Option Window.

- 2 From the Views pull-down menu, select Save or Save As to save the view. If you select Save As, name your view, then save the view.

- 3 Identify resources that require scheduling intervention; click on the resource in the Resource frame.

Determine if production orders should be released and sequenced over the next few hours/days.

The production orders may not be assigned to the resource in view; they may be assigned to a default resource. Uses Production Order Maintenance to find items and production orders that you can move to the selected resource.

- 4 Schedule items.

Focus on finalizing the details of the production schedule for the next 2 to 5 days. In addition to changing resources, dates, or status, you can:

- Change the quantity to start of items.
- Sequence jobs.
- Scheduling by shifts.
- Drag and drop scheduled jobs.
- Retrieve the production order in Production Order Maintenance, then:
  - Modify order setup.
  - Align order dates.
  - Create a new production order.
  - Delete, copy, or split orders.
  - Identify and correct capacity issues.

- 5 Monitor a production order by displaying:

- Order supply summary or history
- Order details or attributes
- Production rates or comments
- Order dates, times, shop floor activities
- Basic and detailed routing data
- Inventory details

- 6 Repeat the process until all issues have been resolved for your production schedule.
- 7 Save your changes.
- 8 Optionally, export data to a spreadsheet.
- 9 Report production.

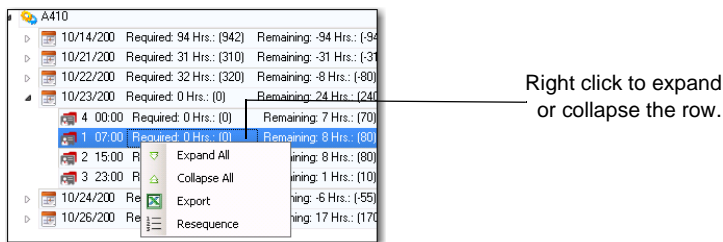
## Working with Sequence Grid Data

The following topics explain the data within the Sequence Grid and describes ways that you can interact with the data.

### Expanding/Collapsing Data

You can expand or collapse data within the Sequence Grid. To do this, right click on any job, then select the expand or collapse option.

**Fig. 3.5**  
Expand Options



### Viewing Capacity

You can view the capacity and required capacity of a production line by release date and shift.

Unlike the MSW, the PSW does not display a Capacity Grid; instead, you view capacity/required capacity at the production scheduling level. This is because you use the Sequencing Grid to manage production orders by release date, not due date. In some cases, the order release/due date are the same, and in other cases they differ by as many as 60 days or more. With master schedules, the capacity load of the production line must be expressed by the production order load for the release date, so capacity data is critical for manipulation in master schedules.

When you select a resource from the Resource Frame, the Sequence Grid displays the production line and a list of release dates. For each release date header record, the system displays capacity/required capacity information.

When you expand release date details, the Sequence Grid displays the capacity/required capacity of each shift header record.

**Fig. 3.6**  
Sequence Grid

bmb1			
07/21	Required: 5.8 Hours (58)	Remaining: -5.8 Hours (-58)	
07/23	Required: 17.3 Hours (168)	Remaining: -17.3 Hours (-173)	
08/02	Required: 10.5 Hours (100)	Remaining: -10.5 Hours (-105)	
08/18	Required: 0 Hours (0)	Remaining: 12 Hours (120)	
08/19	Required: 0 Hours (0)	Remaining: 12 Hours (120)	
08/20	Required: 0 Hours (0)	Remaining: 12 Hours (120)	
08/23	Required: 0 Hours (0)	Remaining: 12 Hours (120)	

The following topics explain fields within the PSW.

*ID.* The valid system production order identifier.

*Shift.* The production line shift as defined in Production Line Shift Maintenance.

*Seq.* The production order sequence number.

*Run Seq 1, 2.* Run sequence fields can be used to control the sequence in which planned orders for line-manufactured items are added to a production line schedule.

Run sequences are used when MRP planned orders are approved for line manufacture using Planned Repetitive Schedule Approve (23.8).

If multiple items are produced on a single production line, efficiency can be improved by producing the items in a certain order. Run sequences let you control the order, or sequence, in which items are scheduled on a production line.

An item's run sequences are sorted by primary run sequence and then secondary run sequence. A two-digit numeric value should be the first characters of a run sequence. This convention provides enhanced control over the sorting of run sequences.

*Item Number/Description.* The valid item number and description.

*Status.* The production order status code. Production order status codes correspond to stages in a production order's life cycle:

- Planned
- Firm planned
- Batch
- Exploded
- Allocated
- Released
- Closed

The status of a production order determines how much control you have over its bill, routing, inventory allocations, inventory transactions, and labor.

*Quantity Ordered.* The planned quantity of the production order. Compare this with the closed quantity, which is the good quantity reported for the order.

*Release Date.* The date this production order is scheduled to be released to production. The date you enter here initially changes to the actual release date when you release and print the production order. Release dates also determine the date components are required. Normally components are picked when an order is released.

The system calculates either release or due date, creating, in effect, forward or backward order scheduling.

**Due Date.** The due date defaults to today's date plus the manufacturing lead time for the item. The due date is the date this order is due to be completed. This is the date you plan to have product available for shipment to the customer or issue to another manufacturing order. All MRP plans are based on this due date.

**Resource.** Either the production line or work center as listed in the Resource Frame. The resource header row dynamically changes based on the type of resource type you are reviewing.

**Site.** The site to which the resource belongs.

## Modifying Production Order Quantities

You can manually adjust the production order quantity in PSW. When you make a quantity to change against a production order, PSW applies the quantity change to the entire order, not a specific operation. For example, when you change the quantity on a work center for a specific operation, PSW applies the quantity change to the order and, subsequently, all operations.

- 1 Select a job on the Sequence Grid.  
The system highlights the selected job.
- 2 Modify the value in the Qty Ordered column.  
The system validates the quantity change can be made.  
When the quantity change is valid, PSW updates all calculations. Color indicators may change.

**Note** You can also change the quantity using Production Order Maintenance within PSW.

## Creating/Deleting Production Orders

Procedures to create and delete production orders are in Chapter 2, "Master Scheduling Workbench (MSW)," on page 21.

## Splitting Production Orders

PSW lets you split a production order into smaller production orders while tracking costs to a cumulative order.

**Note** This section also applies when you work in the Production Order Maintenance summary list window; see "Working with Order Summary List Data" on page 47.

To split a new discrete production order into several production orders:

- 1 Select the production order to split.
- 2 Split the order by selecting the line, then right-clicking to display the pull-down menu.
- 3 Select Split.  
A window displays additional options; see Figure 3.7.
- 4 Enter the split quantity, release date, and the shift.
- 5 Press OK.

The system:

- Creates new production scheduled orders per the data entered in the split pop-up window.
- Reduces the open quantity of production orders.

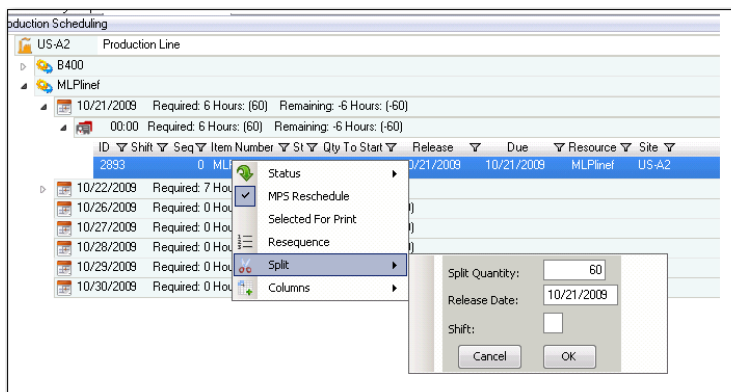
To split a new repetitive production order into several production orders:

- 1 Select the production order to split.
- 2 Split the order by following steps 2 through 5 for a discrete order.

The system:

- Creates new production scheduled orders per the data entered in the split pop-up window.
- Reduces the open quantity of the production orders.

**Fig. 3.7**  
Splitting Orders



## Modifying Resources by Dragging and Dropping

When production scheduling, you may need to assign an item to an alternate resource (production line, machine) upon which you now intend to produce the item.

For a selected production order, you can drag and drop from the source resource to the target resource.

- 1 Select the production order in Production Order Maintenance Summary List within PSW.
- 2 Drag the order to the PSW Sequence Grid target resource.

A drop indicator displays, indicating the location at which you can drop the production order.

**Note** The indicator does not display if the production line target is not defined as a primary or alternate production line.

PSW updates and recalculates data.

## Modify Production Order Status

You can modify the status of one or many production orders easily within the PSW Sequence Grid.

To do this, use the following procedure:

- 1 Drill down in the Sequence Grid to view orders.
- 2 Right click, then select Status.
- 3 Select the status for the change:
  - A(llocated)
  - C(losed)
  - E(xploded)
  - F(irm)
  - R(eleased)

**Fig. 3.8**  
Status Change

ID	Shit	Seq	Item Number	St	Component Status	Qty To Start	Release	Due	Resource
2152		0	A-F414	A	No Component	180	10/29/2009	10/29/2009	A410 US-A1
2159		0	A-F415	A	No Component	140	10/29/2009	10/29/2009	A410 US-A1
2615		0	A-F410	A	No Component				A410 US-A1
3029		0	A-F413	A	No Component				A410 US-A1
3071		0	A-F410	A	No Component				A410 US-A1
3179		0	A-F413	E	No Component				A410 US-A1
3301		0	A-F415	E	No Component				A410 US-A1
3302		0	A-F415	E	No Component				A410 US-A1
3303		0	A-F415	E	No Component				A410 US-A1
3304		0	A-F415	E	No Component	20	10/29/2009	10/29/2009	A410 US-A1

## Modifying Production Order Duration

Occasionally, you may need to manually increase or decrease the production order duration. For example, you may want to expedite a production order and thereby collapse the average duration of the order. Or you may need to expand the duration, starting earlier to complete by the due date.

Production order duration is initially derived from manufacturing lead-time, which is defined for an item and used to define the amount of time to produce an item, considering:

- Average capacity
- Order quantity
- Operation lead time
- Process time

Duration can be:

- Greater than the calculated routing duration.
- Less than the calculated routing duration
- Equal to the calculated routing duration

To modify the duration:

- 1 Retrieve the production order in Production Order Maintenance within PSW.
- 2 Modify the Due/Release dates in the Details Frame.

**Note** If the Due Date is anchored, then modifying the Due and Release Dates increases/decreases the duration value; otherwise, you can modify the Duration field on the Date/Time tab to manually increase/decrease the duration.

### Anchoring Production Orders

Master schedulers typically define production order due dates. Occasionally, you may need to start a production order earlier than planned; however, you want production order due dates to stay intact. Anchoring a due date lets you lock in the production order due date so that it does not change during the production schedule process.

**Example** The master schedule provides the shop floor with a schedule that shows works orders due by Friday. You must determine upon which date the production orders run, but only the Master Scheduler can change the Friday due date; therefore, you anchor the Friday due date.

### Defining Shifts/Sequences

Sequencing determines the order in which manufacturing processes jobs. Within QAD EE, sequenced orders have a unique sequence number that identifies the order as sequenced. Sequencing of production orders is by release date and shift, and the shift is a reference. Sequence IDs are unique to each shift. Within PSW, the order in which shifts display is based on the shift start time defined in Shift Maintenance (18.22.1.22).

Production scheduling determines the order start (release) date and sequence. Sequencing is by release date because in a repetitive environment, the release/due dates are equal; however, in discrete environments, they may not be. So, sequencing is based on the production order release date.

For repetitive production reporting, the system consumes production against the oldest due date first. The system considers the release date and sequence of the production order to determine which is consumed first.

**Note** When working with Component Availability Check (CAC), the system prioritizes by order status, release date, then sequence for component consumption. When you have multiple shifts per day and the sequence number repeats within that day, CAC cannot determine the shift. For more information on CAC, refer to Chapter 4, “Component Availability Check (CAC),” on page 73.

To change an order from unsequenced to sequenced or to change an existing sequence number, select a single production order and enter a sequence ID in the Seq field. You modify the shift by entering a shift number in the Shift field.

**Fig. 3.9.** Sequence and Shift Field

ID	Shift	Seq	Item Number	St	Qty	To Start	Release	Due	Resource
2152	0	A-F414	A		180	10/14/2009	10/14/2009	A410	US-A1
2159	0	A-F415	A		140	10/14/2009	10/14/2009	A410	US-A1

Enter a sequence number or shift.

Once you update the sequence, the Sequence Grid displays the new position of the production order per the specified sequence. If the sequence number you enter is assigned to an existing order, PSW resequences the existing sequenced order number by increasing the number as well as all subsequent orders for the release date.

### Dragging and Dropping for Sequence/Shift Changes

You can also select a single or multiple production orders to sequence and drag and drop from the source to the target destination. Once you drop the orders, the system assigns the sequence number to the order(s) and assigns the shift number(s) as greater than the prior sequenced numbers.

If you change production order release dates, outside of a drag and drop, PSW sets the sequence and shift to (0). You cannot drop an order onto a production line that does not have a release date.

### Unsequencing Production Orders

Occasionally, you may need to unsequence a production order, removing the sequence ID and replacing an unsequenced status.

You can do this by:

- Entering a 0 (zero) or 999 in the Seq field of the Sequence Grid on the Seq field within the production order in Production Order Maintenance within PSW.
- Dragging a sequenced order and dropping it after an unsequenced order. The system changes the sequence to 0 or 999.

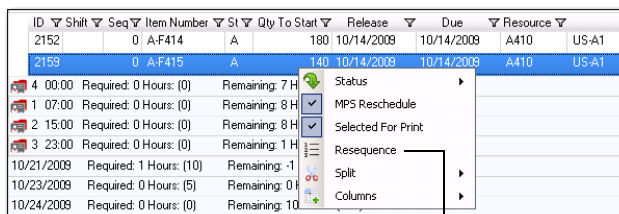
### Resequencing Production Orders

You can quickly resequence selected orders by right-clicking on a line, then selecting the Resequence option.

Resequencing should happen automatically whenever release date, shift or production line change on an order; however, occasionally, resequencing does not occur automatically. When this occurs, use the resequencing option in the right-click menu.

When you delete a production order, the system resequences the orders.

**Fig. 3.10**  
Resequence Option



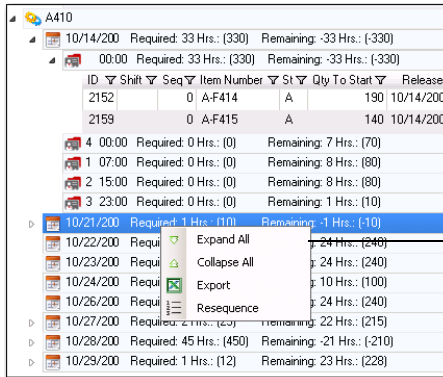
Select Resequence after you select the lines.

## Dispatching and Printing

You can publish production schedule data to the shop floor via a dispatch list. To do this, you export PSW data to a Microsoft Office Excel spreadsheet.

While in the Sequence Grid, right click on a job. A window with options to expand, collapse, export, and resequence displays. Select export, then browse for the Microsoft Office Excel spreadsheet. The system creates a temporary spreadsheet file. You should rename the file from Microsoft Office Excel.

**Fig. 3.11**  
Export Window



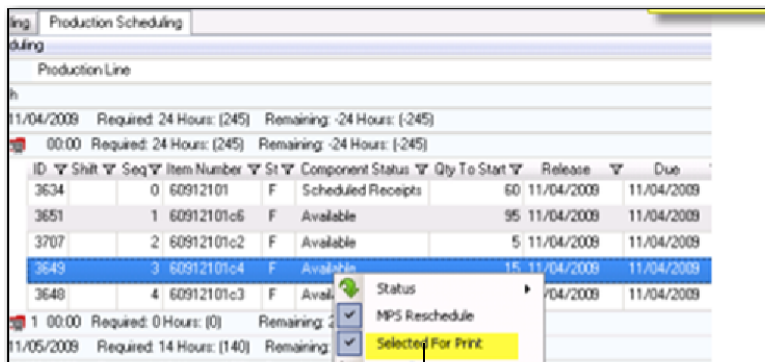
Right click to display this window.

## Printing Production Orders

You can print production orders from the PSW. To do this:

- 1 Right-click on a production order, then select the order for print; see the following figure.
- 2 Save the work orders.
- 3 Follow the instructions for using QAD EE Print Orders Selected for Print (16.5) provided in the MSW chapter; see “Releasing and Printing Production Orders” on page 46.

**Fig. 3.12**  
Print Function



Select the order for printing.

## Reporting Production

Use the standard QAD EE reporting programs for discrete and repetitive orders.

For information on data that displays for both PSW and MSW, refer to “Common Workbench Elements” on page 4.

### Displaying Shop Floor Activity

You can monitor the activity against CUM production orders for an item when analyzing where WIP or reject quantities exist.

When multiple CUM orders exist for an item, PSW displays the CUM data for the item based on the match of site, item, or production line.

You can view production order data in Production Order Maintenance. If the production order is closed or disabled, the system informs you of this.

# Component Availability Check (CAC)

This chapter presents an overview of the features within the planning and scheduling workbenches that help you check component availability. Specific topics include:

***Introduction*** 74

Introduces the CAC, components, and features.

***CAC User Preferences*** 75

Describes user preferences for CAC, including field descriptions for all user preferences.

***Using CAC to Schedule Production*** 76

Prior to releasing production schedules or orders to the shop floor, you can verify which orders have the necessary materials before releasing them to the shop floor. This section describes how you use CAC to do this.

***Using CAC to Monitor Materials*** 82

Describes features and functions that buyers, planners, and materials expeditors need to monitor component availability across all locations, including locations designated for specific products or production lines.

***Supporting Data*** 84

Describes supporting data that helps you find the cause of a shortage and find a solution.

## Introduction

In the MSW/PSW, you can identify resources and items that require interventions. You can also balance demand, supply, and resources, ensuring a feasible production plan and sequence orders by item attributes and resource allocations to optimize the shop floor. But you now need to verify materials are available before you release orders and print the orders and schedules. You can use component availability check (CAC) and other features built into the MSW/PSW to do this.

CAC serves two distinct purposes:

- 1 Schedulers and planners use CAC features to ensure the production orders they schedule have enough materials. They check component availability across a range of production orders and order statuses, then use CAC supporting data to identify and analyze the shortage so that orders can still be met.
- 2 Buyers, materials planners, and materials expeditors use CAC by item/order features to monitor shortages, even at specific locations. They need features to help them trace component shortages across multiple levels that include the parent and all child components of the parent and the ability to notify others of existing or potential shortages to correct the shortages; for example, by purchasing or building more components.

Both types of users can use CAC supporting data to analyze component availability. Within the MSW/PSW, there are frames included that provide supporting data for:

- Component list  
When you select the Component tab in Production Order Maintenance in MSW, component information is divided into two parts: the left side displays the BOM list of a production order, including component status, picking and issuing status, and more. See “Component List” on page 84.
- Supply/demand summary  
To get a summary of the issue, you look at Supply/Demand Summary to determine the total source of the supply demand for this component. See “Supply/Demand Summary” on page 85.
- Supply/demand details  
The Supply/Demand Detail frame provides MRP details of the selected component. You can drill down into the details, viewing projected QOH based on supply and demand by date. See “Supply/Demand Details” on page 86.
- Inventory details by site  
Use data in the Inventory Details by Site frame to drill into component inventory detail records to determine options when dealing with component shortages. See “Inventory Details by Site” on page 87.

This chapter is divided into the following sections.

- 1 The first section covers features and procedures for schedulers and planners.
- 2 The second section covers features and procedures for buyers, materials planners, and expeditors.
- 3 The last section covers supporting data that either group of users can access.

## CAC User Preferences

The following topics discuss options available when configuring CAC within the MSW/PSW.

You select Option, then Preferences, then the Component Availability tab to set CAC preferences. Set the horizon, then select the components the system includes in the component check:

**Important** Changes to preferences require that you click Search again.

**Fig. 4.1**  
Settings Window, Component Availability Tab

**Enable.** Indicates whether to enable CAC.

**No:** CAC calculations do not occur during data retrieval and save. The Shortage Monitor and Production Order Maintenance Component Supply/Demand Summary and Detail windows are blank.

**Yes:** CAC is enabled and calculations occur during data retrieval and save. Data displays in the Production Order Maintenance order grid, the order component list grid, the Component Supply/Demand Summary and Details grids, and the Shortage Monitor grid.

**Horizon.** Enter the number of days into the future within which the CAC calculations consider MRP detail data. This helps improve the performance of CAC calculations by excluding MRP detail data after a certain point in the future. Typically, CAC statuses are relevant only for production orders to be released in the near-term future; therefore, you should set this to the horizon within which you expect to be releasing production orders.

**Note** If the number is too small, the system may not be able to compute some production order CAC statuses. For example, this can occur for production orders with a due date that is after the end of the horizon.

**Only Key Items.** Indicate whether to include only key items when calculating CAC. Key items are identified using Item Master Maintenance (1.4.1), Item Inventory Data Maintenance (1.4.5) or Item-Site Inventory Data Maintenance(1.4.6).

**No:** Both key items and non-key items are included in the CAC calculation.

**Yes:** Only key items are included in the CAC calculation.

**Issue Policy.** Indicate whether to include items according to their Issue Policy. Issue Policy is set using Item Master Maintenance (1.4.1), Item Planning Data Maintenance (1.4.7) or Item-Site Planning Data Maintenance(1.4.17).

**Issue Policy Yes:**

Not checked: Items with Issue Policy set to Yes are not included in the CAC calculation.

Checked: Items with Issue Policy set to Yes are included in the CAC calculation.

**Issue Policy No:**

Not checked: Items with Issue Policy set to No are not included in the CAC calculation.

Checked: Items with Issue Policy set to No are included in the CAC calculation.

*Replenishment Method.* Indicate whether to include items according to their replenishment method. You set the replenishment method using Item Master Maintenance (1.4.1), Item Planning Data Maintenance (1.4.7) or Item-Site Planning Data Maintenance(1.4.17).

**Replenishment Method Kanban:**

Not checked: Items whose Replenishment Method is set to Kanban are not included in the CAC calculation.

Checked: Items whose Replenishment Method is set to Kanban are included in the CAC calculation.

**Replenishment Method Orders:**

Not checked: Items whose Replenishment Method is set to Orders are not included in the CAC calculation.

Checked: Items whose Replenishment Method is set to Orders are included in the CAC calculation

**Note** This field is also in Item-Site Planning Maintenance (1.4.17).

*Purchase/Manufacture.* Indicate whether to include items according to their Purchase/Manufacture code. Purchase/Manufacture code is set using Item Master Maintenance (1.4.1), Item Planning Data Maintenance (1.4.7) or Item-Site Planning Data Maintenance(1.4.17). Items for each possible Purchase/Manufacture code type can be selected or not selected by checking or unchecking it:

Not checked: Items with the indicated Purchase/Manufacture code are not included in the CAC calculation.

Checked: Items with the indicated Purchase/Manufacture code are included in the CAC calculation.

## Using CAC to Schedule Production

CAC provides visibility during master scheduling, production scheduling, and the releasing of production orders. For each production order, you can view the component status of the order. During production sequencing, you can determine if there are material constraints in the production schedule, and drill down to determine the problem and possible resolutions.

Prior to releasing production schedules or orders to the shop floor, you can verify which orders have the necessary materials before releasing to the shop floor. You have full details of the materials issued and specific shortages by item.

Use CAC features within PSW to:

- Perform a component availability check across multiple production orders using item, production order, or resource selection criteria.

- Release production orders to the shop floor that have the necessary components available.
- Calculate and display the severity of a material shortage at the production order and component levels.
- Display single-level component availability on a scheduled, kitted, in-progress production order, or an assembly part number and quantity.
- Drill down into the material shortage details for a component to analyze the cause and possible solutions.
- Simulate a schedule change and recalculate production order material status for all production orders sharing common components when a production order is modified.
- Output component check data to a spreadsheet

The following subsections provide procedures to check components during production scheduling, followed by information to configure CAC.

### Procedure to Check Components for Production Scheduling

You can anticipate when a material shortage typically occurs in your production cycle to determine if your supply meets future demand. For instance, if a material shortage typically occurs two to three days before a standard supplier delivery on the first of every month, you can factor in this anticipated shortage and view incoming supply to determine if the demand can be met.

Since you can view both planned and confirmed orders for short components, you can always take into account the worst case items; that is, you can factor in orders, receipts, or work centers for items that take the longest time to process.

Follow this process to run a component check against all production orders that you schedule over a defined future horizon—generally 1 to 15 days.

- 1 Select production orders to calculate the material availability by selecting from the following attributes:
  - Item attributes such as buyer/planner code or product line
  - Resource attributes such as Scheduler ID, work center, or production line
  - Production order attributes such as release date/due, status, or production order ID

The system displays the list of retrieved production order records. Calculations are run on data from the standard system. Calculations display in the Component Status column.

- 2 Review production order material statuses, looking for orders with component shortages. Select a production order with a shortage to investigate.
 

**Note** If necessary, revise the search criteria to find shortages with the highest severity.
- 3 Drill down to Production Order Maintenance, then select the Components tab; then view the MRP supply demand summary and detail data or inventory detail by site data.
- 4 Make changes required to address issues by using the default maintenance programs, or other programs that you add to the browse collections.
- 5 Retrieve data again in the MSW/PSW to view updated production order and component CAC statuses.

### Component Check Example

As a Production Planner, you want to ensure that all production orders scheduled over the next week have enough components available. You run the MSW/PSW to look at production orders that have a release date during the next seven days.

The Shortage Monitor display in the MSW/PSW displays all production order component records with a status of Projected Shortage or Shortage. You look at the Supply/Demand Summary data under the Components tab in Production Order Maintenance to see the cumulative supply and demand information for that production order component detail record. To get more information, you look at data under the Supply/Demand Details tab to view the MRP details the system used to calculate the production order component status.

You have several options to resolve the shortage. You can reschedule either supply or demand. For example, to reschedule supply you can reschedule a purchase order receipt if the component is purchased. Or, if the component is manufactured, you can reschedule a production order. To reschedule demand, you could reschedule a sales order or forecast demand.

Once you make the change, refresh the data to determine if the shortage no longer exists for the component.

### Working with CAC Data

The system retrieves production order component detail records. The system calculates CAC statuses when it returns data from your initial search for records and displays the production order component status of each production order retrieved. Results are shown in the Component Status column within the Sequence Grid; see Figure 4.2. They are also displayed in the same-named column in the Production Order Maintenance Summary List in the workbench; see Figure 2.19 on page 45.

Where the production order Component Status or the Sequence Grid Component Status field displays the value, the system highlights the Projected Shortage or Shortage in red.

### Changing Production Orders

When you make changes to production order data, then save the changes, the system recalculates component availability status.

If you change the quantity of an order or change the release date, this can affect CAC data. When you are scheduling, you should track your own changes, noting if the original calculated status of other orders still applies.

**Important** Changing a production order can render many or all CAC statuses invalid. To recalculate CAC statuses, you must save your changes.

### Component Check Calculations

The system calculates component availability for a production order component record by calculating projected quantity on hand (PQOH) using MRP supply and demand detail information.

The system calculates, considering production order sequencing by production order *shift and sequence*. The system makes adjustments during calculations—in particular for the following:

- Forecast and sales demand records are applied as demand input.
- Forecast demand is considered planned demand input.
- Sales demand is considered firm demand. Sales demand is an input to firm PQOH and planned PQOH.
- Released/allocated production orders are applied as an allocated supply input; the supply input is, therefore, applied to the allocated PQOH.
- R and A orders have priority over F and P orders, regardless of consumption date.
- Expiring inventory is considered as demand and is applied to the allocated PQOH in the Demand/Supply Detail Frame.

## Displayed Calculation Results

The calculation results display in the Component Status column within the PSW Sequence Grid.

**Fig. 4.2**  
Sequence Grid, Component Status Column

ID	Shift	Seq	Item Number	St	Component Status	Qty To Start	Release	Due	Resource
2152		0	A-F414	A	No Component	180	10/23/2009	10/23/2009	A410 US-A1
2159		0	A-F415	A	No Component	140	10/23/2009	10/23/2009	A410 US-A1
2615		0	A-F410	A	No Component	12	10/23/2009	10/23/2009	A410 US-A1
3029		0	A-F413	A	No Component	10	10/23/2009	10/23/2009	A410 US-A1
3071		0	A-F410	A	No Component	300	10/23/2009	10/23/2009	A410 US-A1
3179		0	A-F413	E	No Component	10	10/23/2009	10/23/2009	A410 US-A1
3301		0	A-F415	E	No Component	5	10/23/2009	10/23/2009	A410 US-A1
3302		0	A-F415	E	No Component	10	10/23/2009	10/23/2009	A410 US-A1
3303		0	A-F415	E	No Component	15	10/23/2009	10/23/2009	A410 US-A1
3304		0	A-F415	E	No Component	20	10/23/2009	10/23/2009	A410 US-A1
3305		0	A-F415	E	No Component	25	10/23/2009	10/23/2009	A410 US-A1
3306		0	A-F415	E	No Component	30	10/23/2009	10/23/2009	A410 US-A1

System-calculated shortage severity displays here.

The Component Status column displays a textual description of the status. The following lists the possible component status in order of severity.

**No components:** The production order does not have any components.

**Issued Complete:** The component open quantity for the production order is 0 (zero). This applies only to production orders with a status of R.

**Available:** There is enough QOH to cover production order component requirements.

**Authorized Receipts:** There are unconfirmed Advanced Ship Notices (ASNs) that cover the production order component requirements.

**Scheduled Receipts:** There are scheduled receipts that cover the production order component requirements.

**Planned Receipts:** There are planned receipts that cover the production order component requirements.

**Projected Shortage:** Not enough QOH and unconfirmed shipper receipts, scheduled receipts, and planned receipts to cover the production order component requirements. This only applies to production orders with status of P, F, B, or E.

Shortage: Not enough QOH to cover the production order component requirements. This only applies to production orders with status of A or R.

### Production Order Status

When calculating component availability, the system considers the status of a production order. production orders can have a status of:

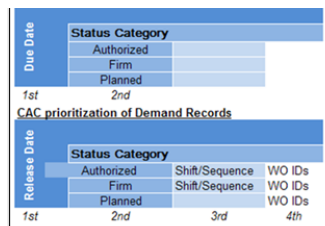
- (P)lanned
- (F)irm
- (B)atch
- (E)xploded
- (A)llocated
- (R)eleased

The system groups the production order statuses into three status categories when calculating component availability:

- Planned: Planned production orders are in this category.
- Firm: Firm, Batch, and Exploded production orders are in the Firm category.
- Authorized: Allocated and Released production orders are in this category.

The following depicts where the system applies demand/supply records to the appropriate status category.

**Fig. 4.3**  
Supply/Demand and Status Categories



Supply/Demand	Order Type	Applied To Status Categories		
		Authorized	Firm	Planned
Both	Production Order (released)	x	x	x
Both	Production Order (allocated)	x	x	x
Supply	ASN Receipt	x	x	x
Supply	DRP (intransit)	x	x	x
Supply	Expiring Inventory	x	x	x
Both	Production Order (firm)		x	x
Demand	Sales Order		x	x
Supply	Purchase Order		x	x
Supply	Supplier Schedule (firm)		x	x
Demand (site)	DRP Intersite Request (follows same logic as supply work orders)	.....	....	.....
Supply (site)	DRP Intersite Demand (shipped)	x		
Supply (site)	DRP Intersite Demand (scheduled) "follows same logic as work orders"	.....	...	.....
Supply	Supplier Schedule (plan)			x
Demand	Forecasts			x
Both	Production Order (planned)			x
Supply	DRP (planned)			x

The processing flow used for sequencing production orders when calculating PQOH and CAC status is as follows:

- 1 Process each production order status category.
- 2 Within a production order status category, process by due date then shift, with shift order determined by the shift start time.
- 3 If no shift start time is defined, then shift processing is sequential (1.2.3.4...and so on). Shift 0 is processed last for each status category.
- 4 Within a production order status category, process by sequence. Sequence 0 is processed last.
- 5 If no sequence number is defined, process by production order ID.

## Outputting Data

For data that displays in the Sequence Grid, you can select Export to Excel by right-clicking on the line within the Sequence Grid. The system launches Microsoft Excel.

## Shortage Report

You can click on the Shortage Report tab at the top of the workbench to display a report that provides the following data:

- Component item number, description, and CAC status
- Quantity short and gross requirements
- Next scheduled receipt and receipt ID
- Buyer/planner
- Pur/Mfg code and parent item
- Production order ID, status, and operation
- Production line, work center, and site

## Reporting Negative PQOH

If you need to identify items where demand is greater than supply, use Master Schedule Summary Report (22.19). Set the Include Negative Projected On Hand Qty field to Yes, then run the report to view negative PQOH.

The Include Negative ATP Only field is similar in that only items that have a negative ATP will display in the report. ATP (Available To Promise) is the quantity of uncommitted inventory and planned production that will be available to fill an order on a specified due date. If an item has negative ATP, it indicates that a quantity greater than the inventory and planned production has been committed to fill an order. This differs from the negative PQOH, which includes all demand including forecast and is a projected negative balance of inventory as of a certain date. ATP includes only firm demand from orders.

## Using CAC to Monitor Materials

If you are a buyer, planner, or materials expeditor, you need features that monitor component availability across all locations, including locations designated for specific products or production lines. You need shortage visibility across all levels of an item, from the parent to all its multi-level child components. This lets you know that if components are not received prior to the scheduled production of the parent item, shortages can occur on the production floor or for a production line.

Like production schedulers, you can drill down into data to analyze component availability issues; however, you have features that let you look into specific locations or trace requirements for a component, from the parent item through the component level.

Shortage-monitoring features let you know the source of each shortage item, the date and time required, contact information, information to support alternate planning, such as inventory at other production lines or storage locations, or other suppliers.

The system displays shortage items in priority order; items that may be short first are listed first. Knowing this lets you expedite the item either by fax or by e-mail to the supplier or to the buyer.

Items identified as being in a shortage condition must be expedited either from the supplier or from the producing process. You can:

- Track actions taken by a materials planners on expeditors to determine:
  - For whom supplier orders are expedited
  - Customer impacted when material shipments are late
- Confirm which assembly items influence part shortages.
- Check the order when a shortage is detected.
- Search for shortages; then simulate a sequence schedule with shortages.
- Determine if purchase orders need to be issued for material requirements driven from firmed production orders.
- Report:
  - Shortages
  - Back ordered detail balances and open order quantity for shortage checks
- Quickly add comments to an order, regarding captured expedite information to save as Check Components for Requirements

### Check Components for Requirements

Use the following topics to help you check components for production order requirements. You can check the Component Status column. Planned Receipts can display in the column. When it does, there is sufficient inventory projected to be available for the production order component. This includes nettable on-hand inventory, unconfirmed shipper receipts, scheduled receipts, and planned receipts.

If have planned orders only, you can see planned receipts, too, by clicking on the Components Tab within Production Order Maintenance; see Figure 4.4.

**Fig. 4.4**  
Planned Receipts

Supply/Demand Summary						
		Calculate Thru:	8/20/09		Selected Production ID: 1379	
<b>Supply</b>	P	On-Hand	Authorized Receipts	Firm Receipts	Planned Receipts	
		150	0	60	1603	
<b>Demand</b>		Gross Reqs	Projected On Hand			
	Authorize	1242	-1092	-1092	-1032	571
	Firmed	138	-1230	-1230	-1170	433
	Planned	263	-1603	-1603	-1543	60

View planned receipts in Production Order Maintenance, Components Tab.

You can rectify shortages by moving up receipts. Then, you can change the schedule in Schedule Maintenance, launched from the browse collection, then optionally, rerun Net Change Materials Plan to clear any planned receipts.

## Adding Comments

You can click the Production Order Maintenance tab at the bottom of the workbench, then the Comments tab to add comments to an order. You can cut, copy, and paste ASCII text. In general, any rich text formatting is removed from copied text when the text is pasted

Material expeditors can comment on:

- When the buyer contacts the supplier to make changes to the order, such as delivery date changes or order cancels
- Line item when the buyer contacts the supplier to make changes to line entry
- Conversations with the external/internal supplier
- Production order record, providing information regarding a component delay for visibility to the production scheduler

## Sending Email

You can send QAD .NET UI program links in an e-mail using the Email feature:

- 1 Open the Planning and Scheduling Workbench in .NET UI.
- 2 Select a production order, then drill down to the Production Order Maintenance tab to view a list of orders for the production order. Select an order.
- 3 From the .NET UI Actions pull-down menu, choose Email.  
Alternatively, right-click in the program screen and choose Email from the pop-up menu.
- 4 A pop-up Information window informs you that a URL to the program will be copied to the clipboard. Click OK.
- 5 Your default email client program launches, opening a new e-mail for you to compose. By default, the subject of the e-mail is the name of the QAD .NET UI program.
- 6 In the body of the e-mail message, paste the URL to a production order, listed in the production order list, from the clipboard using Ctrl+V.

If a record was selected when you created the link, the program opens with that record selected when the recipient clicks on the link. So, you have established a URL link to the purchase order.

The system connects the order to the address master, where you can pull the e-mail address of the supplier.

**Note** Your default e-mail client is defined in the browser Tools|Internet Options|Programs setting. You can also set the e-mail program from the QAD .NET UI using Tools|Internet Options.

## Exporting Data

You can export the data that displays in the Shortage Report and the PSW to a Microsoft Office Excel spreadsheet. For information, refer to “Dispatching and Printing” on page 71.

When you export, the system retains the structure/formatting of the source data.

## Supporting Data

When you have a shortage, you can drill down to supporting data that displays at the bottom of the workbench.

Specifically, you can drill down to Production Order Maintenance, then select the Components tab to see data for:

- Component list
- Supply/demand summary
- Supply/demand details
- Inventory details

You can also run a Shortage Report by selecting that tab.

The following topics discuss data found under the Production Order Maintenance Components tab. For information on the shortage report, see “Reporting Negative PQOH” on page 81.

## Component List

When you select the Component tab in Production Order Maintenance in PSW, component information is divided into two parts: the left side displays the BOM list of a production order, including component status, picking and issuing status, while the right side provides more data through tab selections.

**Fig. 4.5**  
Component Summary List

Item Number	Qty Required	Qty Allocated	Qty Issued	Op	Component PQOH	Work Ctr	Item Description	Open Quantity	Component Status
A-C410	110	0	0	10			Component Inscr	110	No Status
A-C411	110	0	0	20			Component Cap	110	No Status
A-C412	110	0	0	30			Component Brack	110	No Status

View the component status here. A ? indicates the system has not calculated the status yet.

*Item Number/Description.* The number and description of the selected item.

*Component Status.* The component status of the production order; see “Component Check Calculations” on page 78.

*Qty Required.* The original quantity required for the item/production order.

*Qty Allocated.* The quantity allocated for the item/production order.

*Qty Issued.* The quantity already issued for the item/production order.

*Op.* The ID of the operation from where the component is backflushed.

*Work Center.* The ID of the work center to which the component is issued.

*Component PQOH.* The system-calculated value for projected quantity on hand for the component, considering all prior demand/supply, including the demand of the selected order.

*Open Quantity.* The open quantity for the production order.

**Note** You can add/remove fields to this frame in the .NET UI Browse Maintenance program.

## Supply/Demand Summary

The Supply/Demand Summary frame provides a summary of all supply/demand records for the selected component. You can drill down to investigate the component shortage summary to identify the total demand and supply for the component as it relates to the selected component/production order record and prior orders competing for the same component.

Use the data in this frame to determine how the component projected on-hand was calculated using the following data:

- Prior production orders that also require the component
- Prior incoming supply for the component
- Authorized, firmed, or only planned replenishment

Rows, cells, and columns are automatically highlighted in the frame as follows:

- Demand rows: Highlighted demand row cells indicate that the demand row status category (planned, scheduled, authorized) is equal to the selected production order status.
- Projected On Hand: Highlighted Projected On Hand cell indicates the source PQOH for the selected component.
- Supply cell column: The highlighted supply cell column indicates the Projected On Hand value that was used to determine the component status.

There can be hundreds of MRP detail records for the component you select; but how do the records relate to the component of the production order you selected? For a selected production order component record, the system collects and totals all MRP supply and demand records prior to, and including, the production order record you selected. You can see these aggregated records in the Supply/Demand Detail Frame.

The Supply/Demand Summary frame lets you view the aggregated records from a matrix point of view:

- The top portion displays supply quantities. It lists the current quantity On Hand for the production order component item and other sources of cumulative supply up to the due date of the production order component record.

- The lower portion displays demand quantities. It lists the three categories of demand (Authorized, Scheduled, and Planned). Each row starts with prior demand requirements and the gross requirements of the selected production order component record. Then, from left to right, it adds in the current QOH, then adds in the other cumulative supply quantities to calculate the projected on-hand quantities.

This supply and demand matrix format provides you with a global view of component supply/demand.

**Fig. 4.6**  
Supply/Demand Summary Frame

SUPPLY		On Hand	Authorized Receipts	Scheduled Receipts	Planned Receipts
Demand	Demand				
	Authorized				
	Scheduled				
	Planned				

*Calculated Thru.* The issue date of the selected production order component record.

*Selected Production Order ID.* The production order ID of the selected production order component record.

*On Hand.* The nettable, on-hand inventory found in all locations.

*Authorized Receipts.* The sum of all authorized receipts prior to the Issue Date of the selected production order component record.

*Firm Receipts.* The sum of all firm receipts prior to the Issue Date of the selected production order component record.

*Planned Receipts.* The sum of all planned receipts prior to the Issue Date of the selected production order component record.

*Gross Reqs.* The current open quantity of the selected production order component record.

## Supply/Demand Details

Use the data in the frame to easily:

- View demand detail information; for example, demand source, due date, and quantity.
- View supply detail information; for example, supply source, due date, and quantity.
- Determine when inventory expires and the impact on production.
- Identify where you should reprioritize; for example, you can correct a shortage if you expedite production order B and reschedule production order A.

**Fig. 4.7**  
Supply/Demand Details

Supply/Demand Summary		Supply/Demand Detail			Inventory Detail By Site				
Date	Demand	Supply	Auth PQOH	Firm PQOH	Plan PQOH	Source	Reference		
09/16/2008	0	60	150	210	210	Order, Supplier: Quality Products Div 1000	Order: bws Line: 1		
10/29/2009	180	0	-30	30	30	W/O Component, Line: A410 Work Ctr: A410	W/O: 10050036 ID: 2152 Assembly: A-F414 W/O Stat: A		
10/29/2009	140	0	-170	-110	-110	W/O Component, Line: A410 Work Ctr: A410	W/O: 10050043 ID: 2159 Assembly: A-F415 W/O Stat: A		
10/29/2009	12	0	-182	-122	-122	W/O Component, Line: A410 Work Ctr: A410	W/O: brent ID: 2615 Assembly: A-F410 W/O Stat: A		
10/29/2009	300	0	-482	-422	-422	W/O Component, Line: A410 Work Ctr: A410	W/O: bws2 ID: 3071 Assembly: A-F410 W/O Stat: A		
10/30/2009	610	0	-1092	-1032	-1032	W/O Component, Line: A410 Work Ctr: A410	W/O: 10050008 ID: 2124 Assembly: A-F410 W/O Stat: A		
11/11/2009	5	0	-1092	-1037	-1037	W/O Component, Line: A410 Work Ctr: A410	W/O: A-F510 ID: 4378 Assembly: A-F410 W/O Stat: F		
11/12/2009	120	0	-1092	-1037	-1157	W/O Component, Line: A411 Work Ctr: A410	W/O: 10050013 ID: 2129 Assembly: A-F411 W/O Stat: P		
11/12/2009	108	0	-1092	-1037	-1265	W/O Component, Line: A410 Work Ctr: A410	W/O: 10050019 ID: 2135 Assembly: A-F412 W/O Stat: P		
11/13/2009	35	0	-1092	-1037	-1300	W/O Component, Line: A410 Work Ctr: A410	W/O: 10050027 ID: 2143 Assembly: A-F413 W/O Stat: P		
11/14/2009	0	1603	-1092	-1037	303	W/O	W/O: 10050051 ID: 2170 W/O Stat: P		
11/16/2009	100	0	-1092	-1137	203	W/O Component, Line: A411 Work Ctr: A410	W/O: 10050014 ID: 2130 Assembly: A-F411 W/O Stat: F		

**Date.** The release dates for demand records or the due dates for supply records.

**Demand.** The standard MRP definition for demand.

**Supply.** The standard MRP definition for supply.

**Auth PQOH.** The PQOH of all authorized demand/supply records.

**Firm PQOH.** The PQOH of all firm and authorized demand/supply records.

**Plan PQOH.** The PQOH of all planned, firm and authorized demand/supply records

**Source.** The demand/supply record source; for example, production order, sales order, production line, and so on.

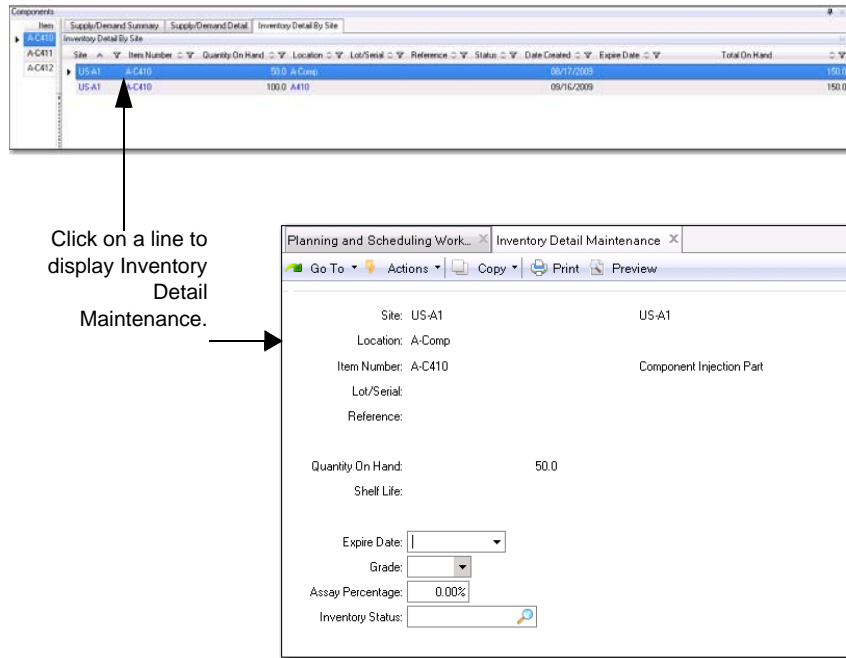
**Reference.** The demand/supply record reference; for example, the order number, assembly item number, and so on.

## Inventory Details by Site

Use the data in the Inventory Details by Site frame to drill into component inventory detail records to determine options when dealing with component shortages.

When you select a record within the Inventory Details by Site frame, and click on the record, the system launches the QAD EE Inventory Detail Maintenance program.

**Fig. 4.8**  
Inventory Details by Site



Click on a line to display Inventory Detail Maintenance.

*Site.* The site associated with the inventory.

*Item Number.* The item number.

*Quantity on Hand.* The system organizes inventory detail data by item, site, location, lot/serial, then reference. For each unique combination of these values, the system tracks the quantity on hand and other inventory attributes, such as expire date and status.

*Location.* The ID of the physical location where inventory is stored.

*Lot/Serial.* The lot/serial number for the item.

*Reference.* The lot reference number.

*Status.* The inventory status code associated with the inventory quantity. Inventory status codes determine whether inventory balances are available for allocation, are considered by MRP, or are allowed to go negative. Status codes also restrict particular transactions at specific locations.

*Date Created.* The date the inventory detail record was created.

*Expire Date.* The date the inventory expires.

*Total on Hand.* The total on hand quantity of this item in inventory.

# Troubleshooting, Tips, and Errors

Use this appendix when issues arise in functionality.

**Overview 90**

Presents an overview of the type of information found in this appendix.

**Errors 94**

Describes errors that can display in the workbenches and provides solutions or workarounds to correct them.

## Overview

The PSW, MSW, CAC, and other workbench features play a crucial role in your day-to-day scheduling operations. So when problems occur or issues arise, your workday is affected, and this, in turn, indirectly affects production.

You can take a number of basic steps to solve workbench problems on your own, or, at the very least, narrow down their causes. So the next time you encounter a misbehaving function, try performing the troubleshooting tips in this appendix.

You can also document the steps you take; that way, if a tech-support call becomes inevitable, you can eliminate what is not causing the problem.

### Item Number Displays, but Not Planned Orders

For a production line, the item number displays on the workbench, but none of the MRP planned orders for the item display.

Assumptions:

- MRP planned orders exist for the item number.
- The item number is defined as an L(ine) type item in Item Planning Maintenance (1.4.7).
- The item is set up on a production line.

### Possible Causes

You defined a production line for an item after you ran MRP. The planned order created by MRP does not have the planned orders assigned to the production line.

You define the item on two or more production lines. The production line you are viewing is NOT the primary production line. Planned production orders are only defaulted on the primary production line.

### Solution

Check primary production line for item. Regenerate MRP.

### Repetitive Scheduled Order S Type Not Created

For a production line, you firm a planned order, but the system did not create a repetitive, S-type, scheduled order.

In MSW, it is possible to schedule a discrete production order on a production line.

Assumption: The item is set up on a production line.

### Possible Causes

The item number is not defined in the item master (site master) as a Pur/Mfg item of L type.

### **Solution**

Set the Pur/Mfg code to L in Item Data Maintenance (1.4.1). Pur/Mfg codes other than L default the firm order as a discrete order.

### **Item Does Not Display in MSW**

In MSW, the item for the order does not display.

#### **Possible Causes**

The item does not have a routing defined for it.

The item does not have active supply and demand in the scheduling horizon you specified.

### **Solution**

Set up a routing for the item in Routing Maintenance (14.13.1) and generate a work order routing for a work order containing this item. This creates the records needed to show the item in the planning and scheduling workbench.

If a routing is defined, alter the scheduling horizon through the Options pull-down menu by selecting Preferences, then the Search tab in the planning and scheduling workbench.

### **Item Does Not Default as a Repetitive Scheduled Item**

On a production line, the item does not default as a repetitive scheduled item.

#### **Possible Cause**

The Pur/Mfg code is not set to L for the item master.

### **Solution**

Set the Pur/Mfg code to L in Item Master Maintenance (1.4.1).

### **MSW-Selected Item Does Not Display in PSW**

#### **Possible Cause**

A filter has been applied to the MSW/PSW that hides a production line or item that is visible on one frame/grid and not another. The system will still select/focus on the item record, even if not visible.

Also, the sequencing horizon may be less than the MSW scheduling horizon.

### **Solution**

Remove the filter. The selected record displays as selected.

Change the horizons through the Options pull-down menu by selecting Preferences, then the Search tab in the planning and scheduling workbench.

### Some Workbench Grids Do Not Show Past Due Data

The Schedule Grid, Supply/Demand Grid, and Capacity Grid do not show data related to past due orders.

#### Probable Cause

The Schedule Grid, Capacity Grid, and Supply/Demand Grid only show data related to past due orders when they are within the setting of the History Horizon field in the Search window of the Preferences option.

#### Solution

If you see past due orders but not the detail related to them, expand the history horizon value to see the related data (supply, demand, and so on).

Also, the Production Order Maintenance window within the workbench shows past due orders. Past due open production orders display first, regardless of the history horizon setting you have selected in your user preferences.

### Item Highlighted in Red in MSW but No Shortage

The system highlights an item in red for a PQOH issue in the MSW workbench, but there are no shortages within the production line's scheduling horizon end date.

#### Probable Cause

This occurs because the item that is on that particular resource is also on other resources in the Schedule Grid. When this is the case, the system looks at the number of firm scheduling days for all resources for which the item is scheduled in the grid; then, it selects the number of firm days that is the highest to associate with the item. So, even though the specific work center that is highlighted may have zero (0) firm scheduling days, another resource for which the item is scheduled may have, for example two firm scheduling days, so the system uses the two firm scheduling days for the item status for the item, regardless of the resource with which the item is paired.

#### Solution

No solution required.

## Completed Production Order and Item No Longer Display on Workbench

The MSW displays completed production orders where the production order due date is within the history/future horizon that you define through the Options pull-down menu by selecting Preferences, then the Search tab in the planning and scheduling workbench. When the item you produced has no other active supply/demand records (mrp\_det) records, the item/order no longer displays on the workbench.

### Probable Cause

If an item has no mrp\_det records in the system for any of the sites, then that item and its production orders do not display. For example, if you have an item with just one production order in the system, and you receive the production order but do not close it, the production order can have a zero open quantity but an exploded status. Normally, the order displays as a search result, but once the production order was fully received, the system deleted the mrp\_det record for that order. Since that was the only production order for the item and no other mrp\_det records exist, that item and the order do not display.

## Item Does Not Display in MSW

Item does not display on a repetitive production line in the MSW.

### Probable Cause

An item does not display in the MSW when:

- It does not have a routing/BOM defined.
- It does not have active supply/demand in the horizon you are viewing.

When you add an item to the production line, the system displays warnings when the routing or BOM does not exist for the item. Also, the system displays a warning when the item is not set as a repetitive manufactured item in item planning records.

### Solution

In Item Planning Maintenance (1.4.7) or Item Data Maintenance (1.4.1), set the Purchase/Manufacturer code for the item to L.

**Note** If the message displays because you are scheduling discrete orders on a production line or working with items that may only be manufactured discretely, you can overlook the warning and continue processing.

Ensure that a routing exists in Routing Maintenance (14.13.1) and that a product structure (BOM) exists in Product Structure Code Maintenance (13.1).

## Errors

### WO Record Locked By Another User

If you are working in MSW, then use QAD EE Work Order Maintenance (16.1) to edit an order that MSW receives, then return to the MSW workbench to modify the order and attempt to save the order, the system displays a red icon in the MSW and an error message, informing you the record is locked by another user.

Additionally, when Work Order Control (16.24) is locked, it may lock Production Order Maintenance, so that MSW cannot create new production orders when you leave the ID and Number fields blank. When this occurs, you may receive an error message.

### Data Modified by Another User

You can receive an error message in the workbenches, indicating that another user modified data. When you receive this error while attempting to update records, the system does not let you update. You must refresh data by searching for records again before you update.

The error can display in the following situations:

- You are saving several orders in the workbenches; however, one record is open in the CHUI version of QAD EE.
- You open a production order record in MSW, then change that same production order in another program. After, you attempt to update the order along with several others in MSW and click save.
- You make changes as described above but from one of the following tabs: Detail, Comments, Date/Time, and Compliance.
- You open a planned order in the Production Order Maintenance window, delete demand, run MRP so that the system deletes planned orders, then save the planned order.
- You open a planned order, change demand so that the system creates new planned orders, run MRP, then save the planned order.

### System Unable to Process Request

The system can display a message indicating that it cannot process a request. This can occur, for example, when the system is retrieving a large number of records for a search. When this happens, check the log file. Typically, the system cannot process requests because it has run out of memory.

When this occurs, try any or all of the following:

- Reboot the PC to clear memory usage.
- Change the search criteria to extract less data.
- Upgrade the PC with more memory 4 GB or more.

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