



QAD Enterprise Applications  
Standard and Enterprise Edition

# Training Guide **MRP/CRP**

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**QAD Inc.**

100 Innovation Place  
Santa Barbara, California 93108  
Phone (805) 566-6000  
<http://www.qad.com>

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# MRP/CRP Change Summary

The following table summarizes significant differences between this document and the last published version.

<b>Date/Version</b>	<b>Description</b>	<b>Reference</b>
March 2014/v2014 SE_EE	Rebranded for QAD 2014 SE_EE	--
September 2013/v2013.1 SE_EE	Rebranded for QAD 2013.1 SE_EE	--
May 2013/v2013 SE_EE	Edited for style and clarity	--
March 2013/v2013 SE_EE	Rebranded for QAD 2013 SE_EE	--
September 2012/v2012.1 SE_EE	Rebranded for QAD 2012.1 SE_EE; Consistency edit	--
March 2012/v2012 SE_EE	Rebranded for QAD 2012 SE_EE	--
September 2011/v2011.1 SE_EE	Rebranded for QAD 2011.1 SE_EE	--



# **About This Course**

## Course Description

QAD designed this course to cover the basics of preparing to implement Material Requirements Planning (MRP) and Capacity Requirements Planning (CRP) in QAD Enterprise Applications.

The course includes”

- An introduction to MRP and CRP in QAD Enterprise Applications
- An overview of key business issues
- Instructions on how to set up the MRP module
- Instructions on how to operate the MRP module
- Instructions on how to process CRP
- References to other QAD materials, such as on-line help
- Activities and exercises throughout the course let student practice key concepts and processes

## Course Objectives

In this course, you learn how to:

- Identify some key business considerations before setting up MRP and CRP in QAD Enterprise Applications
- Set up MRP and CRP in QAD Enterprise Applications
- Use MRP and CRP in QAD Enterprise Applications

## Audience

- Implementation consultants
- Members of implementation teams
- Operators

## Prerequisites

- *Initial QAD Enterprise Applications Setup* training course
- Basic knowledge of:
  - American Production and Inventory Control Society (APICS) theory
  - Theory of MRP and CRP
  - QAD Enterprise Applications as it is used in the business
- Working knowledge of the manufacturing industry in general

**Note** If you are unfamiliar with QAD Enterprise Applications, read *User Guide: Introduction to QAD Enterprise Applications* before attending this class.

## Course Scheduling and Credit

This course is typically taught in one day and is valid for six credit hours.

## Virtual Environment Information

This guide applies to both the Standard Edition and the Enterprise Edition of QAD Enterprise Applications. Use the hands-on exercises in this book with the latest Enterprise Edition learning environment in the 10USA > 10USACO workspace. When prompted to log in, specify *demo* for user ID and *qad* for password.

**Note** If you use Standard Edition, complete the exercises in the EE environment; the concepts are the same in both environments and can be applied to Standard Edition. Features that only apply to Enterprise Edition are noted in the text.

## Additional Resources

If you encounter questions on QAD software that are not addressed in this book, several resources are available. The QAD corporate Web site provides product and company overviews. From the main site, you can access the QAD Learning or Support site and the QAD Document Library. Access to some portions of these sites depends on having a registered account.

<http://www.qad.com/>

### QAD Learning Center

To view available training courses, locations, and materials, use the QAD Learning Center. Choose Education under the Services tab to access this resource. In the Learning Center, you can reserve a learning environment if you want to perform self-study and follow a training guide on your own.

### QAD Document Library

To access release notes, user guides, training guides, and installation and conversion guides by product and release, visit the QAD Document Library. Choose Document Library under the Support tab. In the QAD Document Library, you can view HTML pages online, print specific pages, or download a PDF of an entire book.

To find a resource, you can use the navigation tree on the left. You can also use cross-document search, which finds all documents matching your search terms and lets you refine the search by book type, product suite or module, and date published.

### QAD Support

Support also offers an array of tools depending on your company's maintenance agreement with QAD. These support resources include the Knowledgebase and QAD Forums, where you can post questions and search for topics of interest. To access the Knowledgebase or QAD Forums, choose Visit Online Support Center under the Support tab.



Chapter 1

# **Introduction to MRP and CRP**

## Course Overview

### Course Overview

- Introduction to Material Requirements Planning (MRP) and Capacity Requirements Planning (CRP)
- Business Considerations
- Set up MRP and CRP
- Use MRP and CRP



MRP-IN-040

## Planning and Scheduling Overview

Activity	Personnel	Planning Horizon (varies with industry)
Strategic Planning	CEO, CFO, VPs, etc.	3-5 years
<b>MFG/PRO Planning and Control Modules</b>		
Product Line Planning	Senior VPs, Plant Managers	Varies (1 Month is typical)
Forecasting, Master Scheduling, and RCCP	Master Schedulers	Cumulative Lead Time
MRP and CRP	Planners, Shop Floor Managers	Cumulative Lead Time

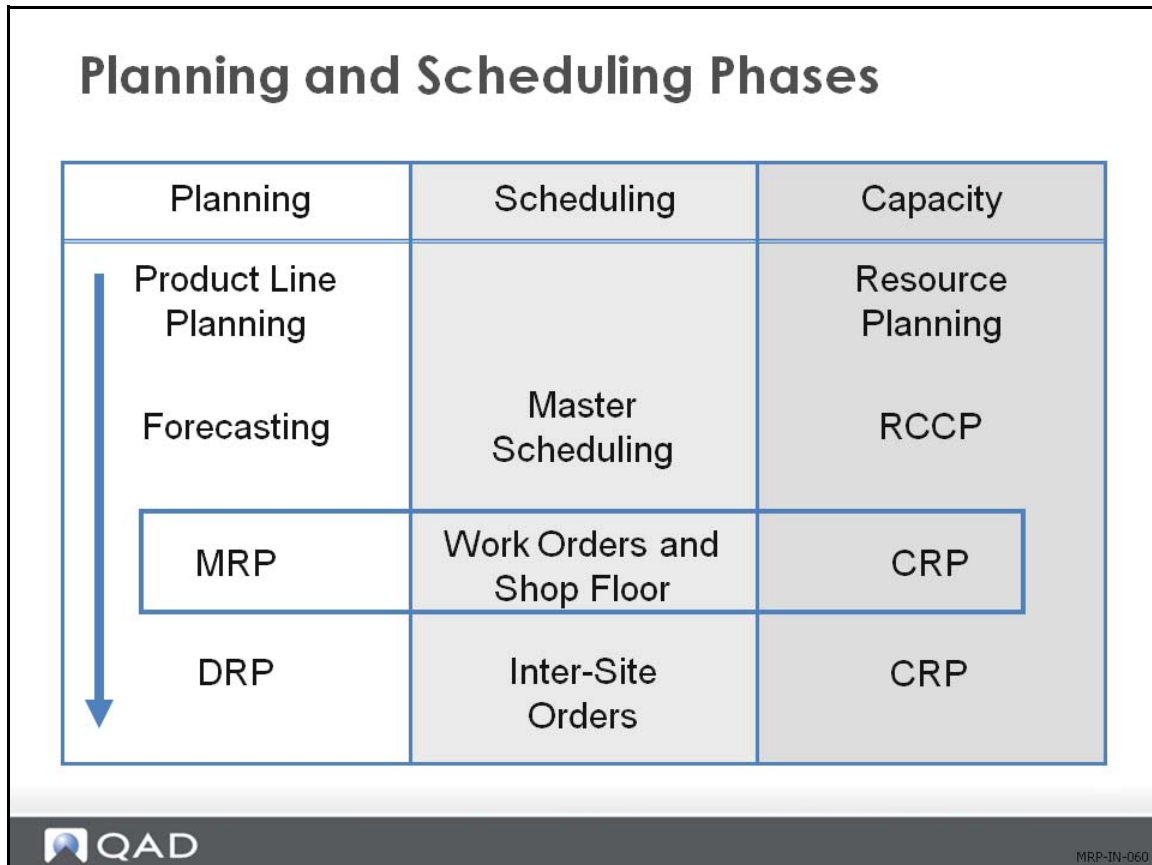
Component planning takes place in the Material Requirements Plan (MRP) module and the plans are checked against capacity in the Capacity Requirement Plan (CRP) module.

This tool enables you to schedule and issue orders for the items and for the work required to support the master schedule. You can use CRP to determine at a fairly precise level how this plan loads the resources you have at your site.

Component planning enables you to determine which work centers and components are used to meet the plan. The check is to determine whether the work centers have the capacity to meet the schedule.

Items that are not master scheduled are planned using MRP with master schedule as input. Master schedules generate demand for components. MRP uses this demand to schedule orders for components.

## Planning and Scheduling Phases







Planning and execution generally move down and to the right through the matrix shown here.


MRP is a time-phased priority planning system that calculates material requirements using:

- Product structures
- Inventory status
- The master schedule
- Open order dates

MRP plans orders: what to order, when and how much. Supply is scheduled and rescheduled to meet changing demand and maintain valid due dates.

## Planning and Scheduling Areas of Concern

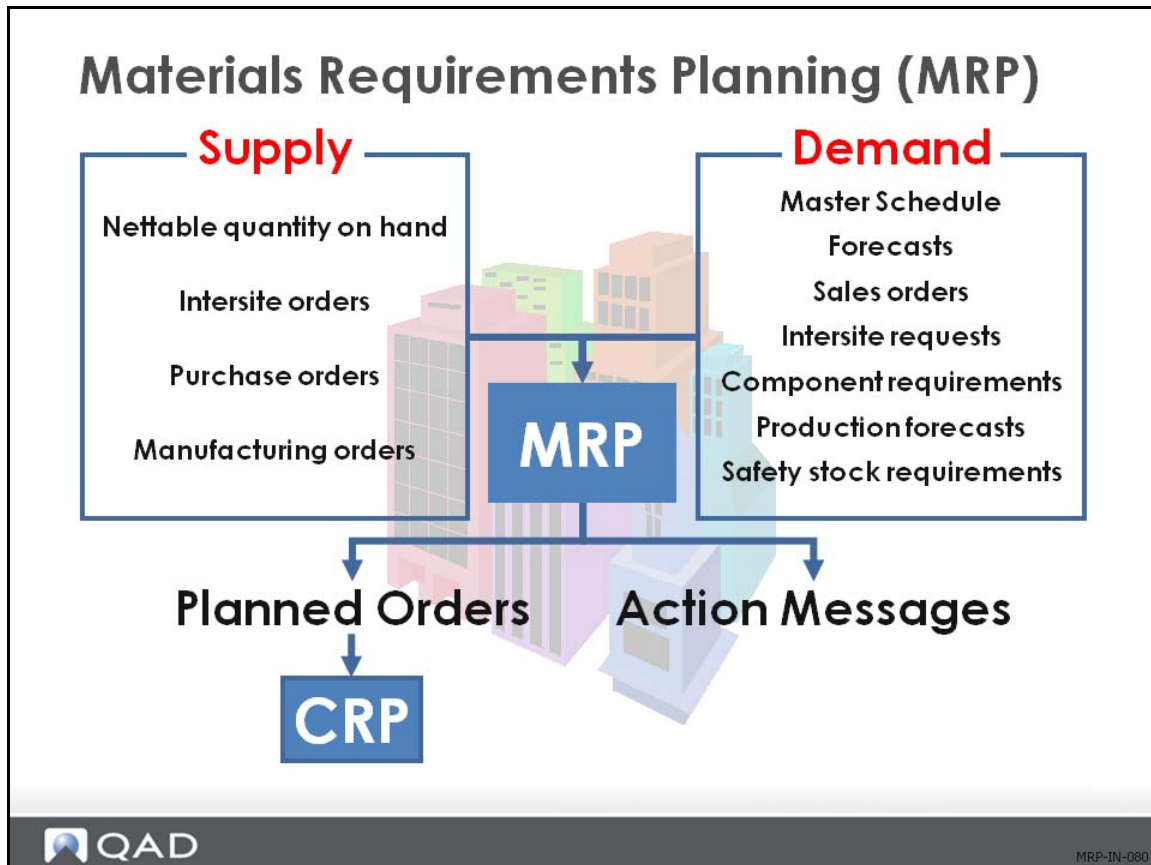
Activity	Concerns	Expectations vs Feasibility
Strategic Planning	 Sales and Profitability	Income vs Outlays
Product Line Planning	 Factories	Gross Sales vs Gross Production
Forecasting, Master Scheduling and RCCP	 End Items	Units vs Resources
MRP and CRP	 Departments, Work Centers, and Components	Planned Production vs Actual Production

 MRP-IN-070

MRP and CRP deal with departments, work centers, and components.

Planners and shop floor personnel use MRP results to determine manufacturing schedules, which have the same time horizon as master schedules.

## Materials Requirements Planning



MRP balances supply and demand for purchased and manufactured items. Given a set of demands or requirements, MRP automatically calculates a time-phased schedule of planned supply orders or replenishments to satisfy those demands. It also generates action messages to alert you to any problems such as shortages and late receipts.

MRP looks at demand for finished items and uses product structure information to calculate demand for component items. For each item, MRP looks at the:

- Ordering information
- Amount currently on hand
- Lead times

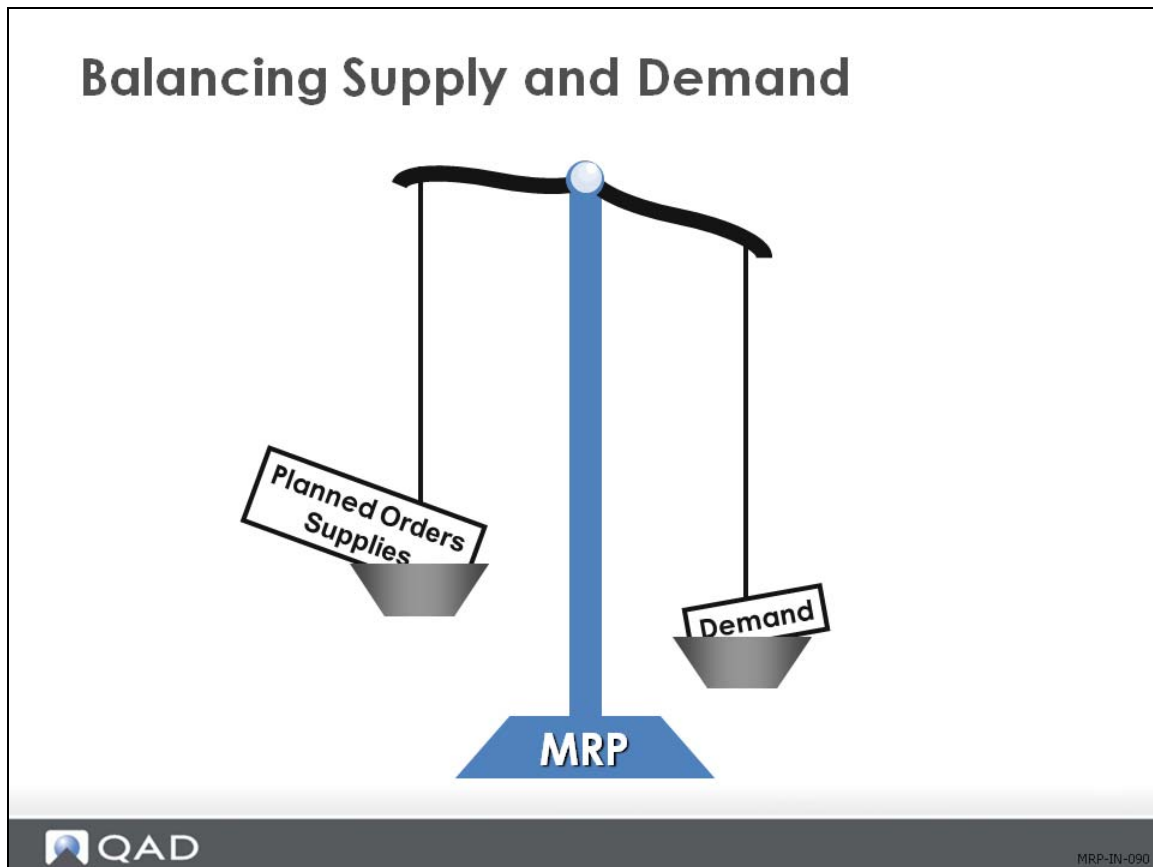
MRP then generates planned orders suggesting how many of each item to buy or make and when to do so

MRP performs planning activity by site. Each site's material plan is independent from inventory, demand, and supply at other sites. To plan for multiple sites, you run MRP for each site separately.

Reliable MRP processing depends on accurate:

- Inventory data
- Product structures and formulas
- Manufacturing and purchasing lead times

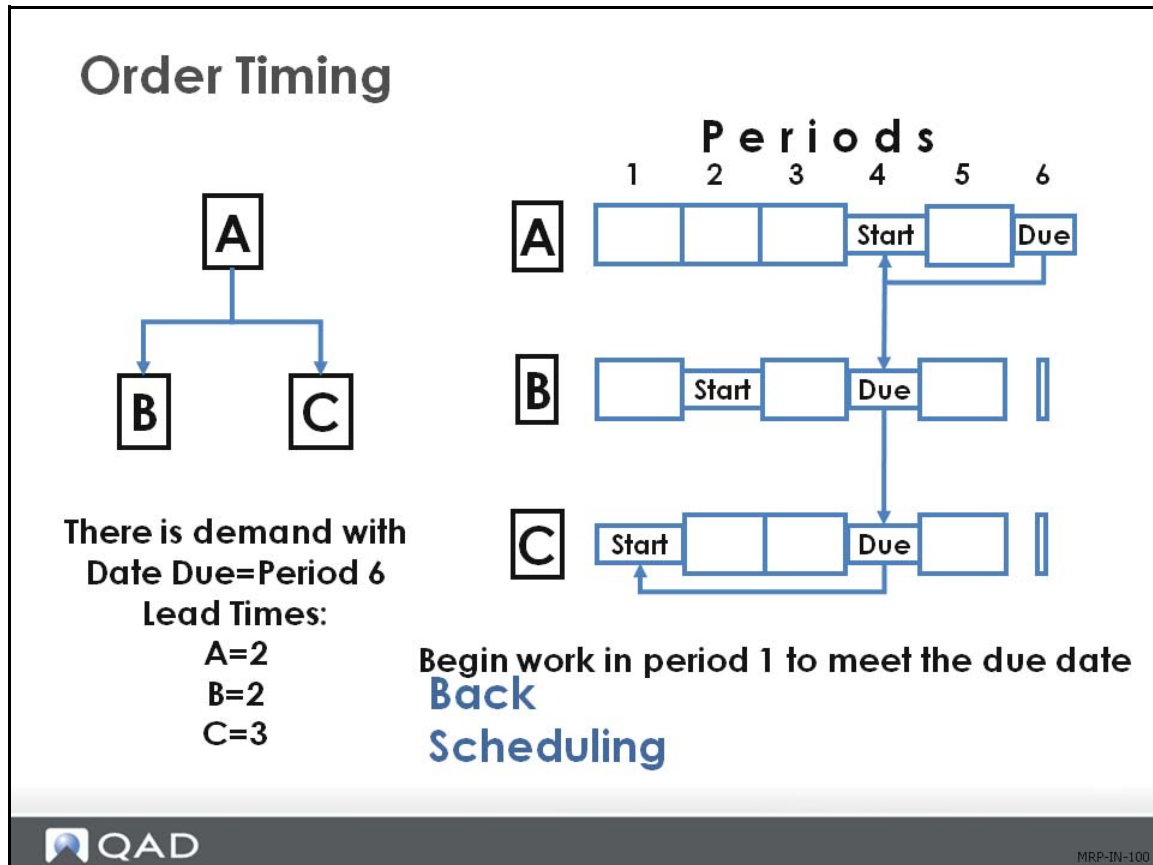
## Balancing Supply and Demand



MRP attempts to balance supply and demand. It detects imbalances in the plan and makes recommendations to restore the balance.

- It tries to drive inventory to zero, never planning more than it needs
- It plans without respect to capacity

## Order Timing



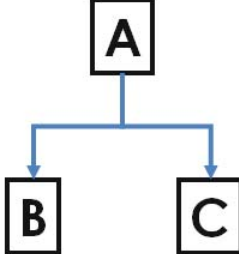
The master schedule sets the overall plan on which MRP bases the timing. MRP uses backward scheduling to determine the start date. In backward scheduling, the lead time is subtracted from the due date to arrive at the start date. MRP performs this calculation on all planned orders.

Some guidelines of MRP:

- A component due date is generally the parent item's release date; however, lead time offsets adjust the component due date.
- For all non-purchased items, MRP counts only work days as defined in the shop calendar.
- For purchased items, MRP uses regular calendar days; if the release date is a non-workday, MRP uses the prior workday.

## MRP Calculations

**MRP Calculations**




```
graph TD; A[A] --> B[B]; A --> C[C];
```

Gross Requirements = 100  
– Nettable Quantity on Hand = 54  
– Scheduled Receipts = 17

---

**Net Requirements (MRP Orders) = 29**

 QAD MRP-IN-110

MRP uses this calculation for each period.

- Maintaining the balance across the planning horizon complicates the calculations

## Calculations

**A** LT=1

**B**      **C**

	Past Due	1	2	3	4
Gross Requirements		70	150	50	100
Scheduled Receipts		250			
On-Hand Inventory	50	230	80	30	0
Net Requirements		0	0	0	70
Planned Orders Due					70
Planned Order Release				70	

Demand for item A in period 4 is 100

**MRP also calculates the requirements for components B and C**

MRP-IN-120

The illustration here shows the calculations for end item A. MRP also calculates the requirements for all components


$$\text{Net Req.} = \text{Gross Req.} - \text{Scheduled Receipts} - \text{Nettable On Hand}$$

## MRP Prerequisites

**Prerequisites**

- Demand Requirements
- Item Planning Data
- Product Structures & Routings
- Inventory Balances

**98%**  
**Accurate**

 MRP-IN-130

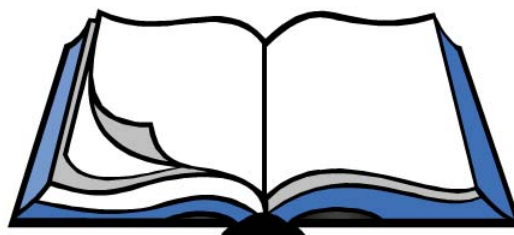
MRP is as accurate as its input allows it to be.

For useful output, make the inputs more than 98% accurate.

## Terminology

### Terminology

- Action messages
- Available to promise (ATP)
- Low-level code
- Pegging
- MRP horizon



MRP-IN-140

**Action Message.** A system message created during MRP calculations to flag a current or potential problem and suggest corrective action.

**Available to Promise (ATP).** The uncommitted portion of inventory or planned production, maintained in the master schedule to support customer order promising. ATP quantity is the uncommitted inventory balance in the first period and is normally calculated for each period in which a Master Production Schedule (MPS) receipt is scheduled. In the first period, ATP equals on-hand inventory less customer orders due and overdue. In any period containing MPS scheduled receipts, ATP equals MPS minus customer orders for the period and all subsequent periods before the next MPS scheduled receipt. A negative ATP reduces prior period ATP.

**Low-Level Code.** The lowest level in a product structure (BOM) at which a particular component can appear. Net requirements for an item are not calculated until gross requirements are calculated down to that level. The system normally calculates and maintains this value automatically.


**Pegging.** In MRP and MPS, the capability to identify for a given item the sources of its gross requirements and/or allocations.

**MRP Horizon.** Also known as the MRP planning horizon. The MRP horizon is how far to plan forward in time. How far ahead demand is known and the lead times through the manufacturing operation determine its value.

## Action Messages

### Action Messages

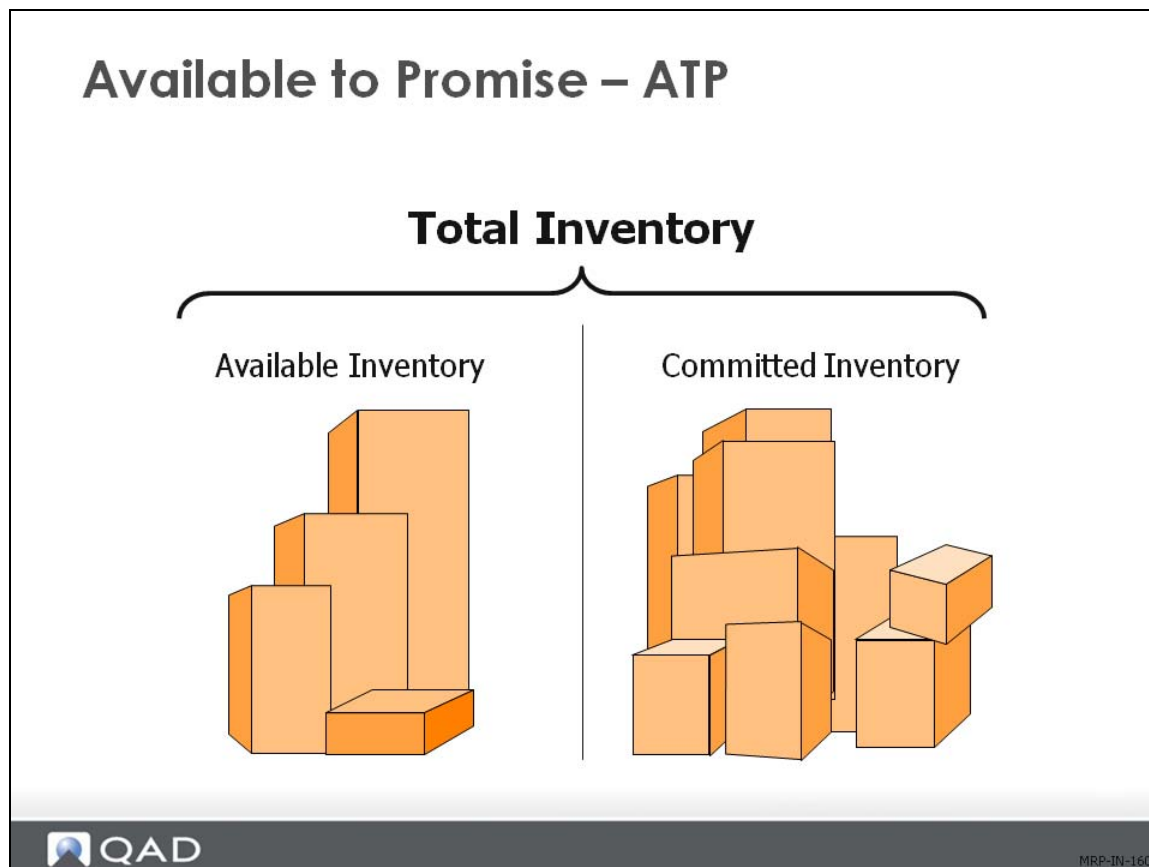
Supply exceeds demand	Demand exceeds Supply
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;"><b>Action Messages</b></div> <div style="border: 1px solid black; padding: 5px;">           De-expedite those orders            Cancel that order         </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;"><b>Action Messages</b></div> <div style="border: 1px solid black; padding: 5px;">           Expedite those orders            or Add an order         </div>


MRP-IN-150

Action messages recommend the actions a planner takes to balance supply with demand, such as rescheduling, canceling, or releasing orders.

MRP generates action messages, as required, for all items with non-blank order policies. Order policy codes that the system does not recognize are planned as LFL (lot for lot).

## Available to Promise



Available-to-promise (ATP) is the uncommitted portion of inventory or planned production that is available to be promised to new sales orders. The system displays ATP quantities on master schedule reports and inquiries.

ATP can be used to verify whether a sales order can be filled within a specific time frame given other demands and currently scheduled supply orders. The system calculates ATP by time period by deducting real demand from real supply:

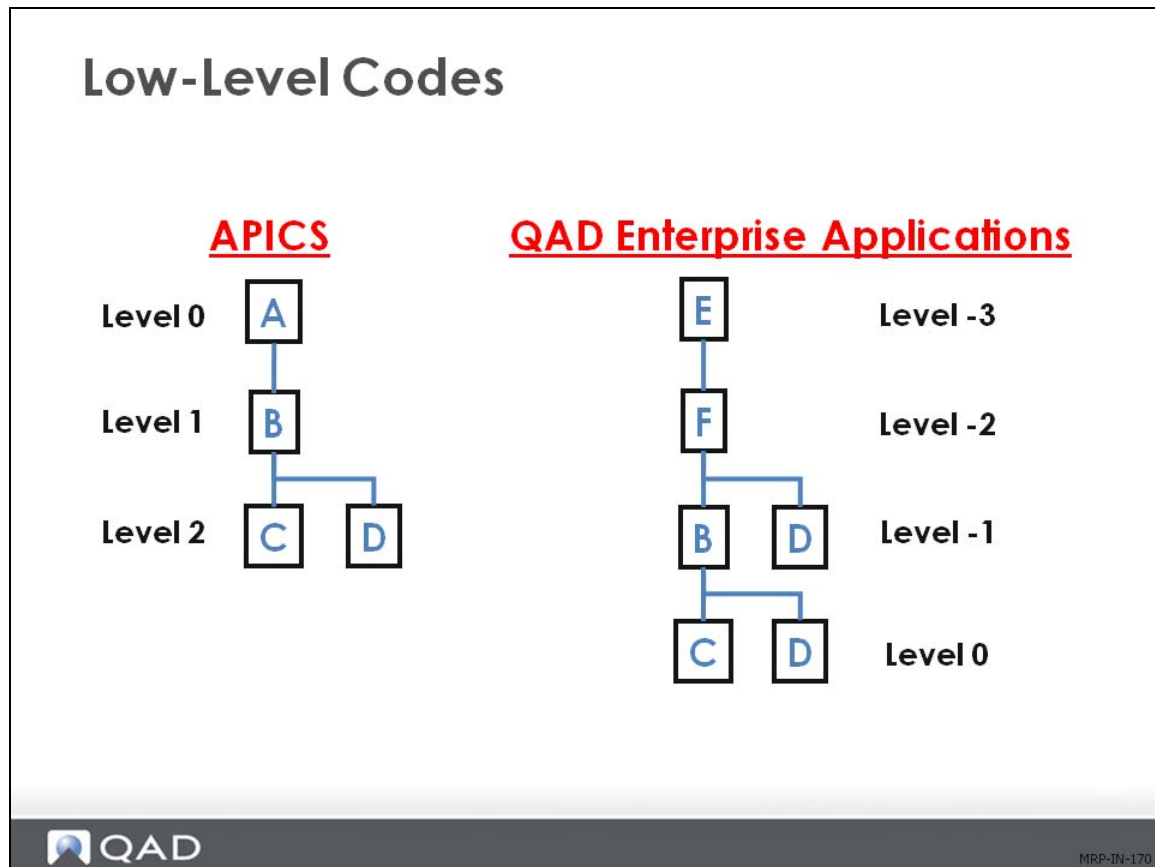
- Real demand includes requirements for work order components, sales orders, and required ship schedules
- Real demand excludes forecast and production forecast
- Real supply includes quantity-on-hand, purchase orders, work orders, and repetitive schedules
- A net decrease in demand increases ATP, while a net increase in demand decreases ATP

Traditionally ATP was only displayed for periods that had a master schedule quantity. ATP from a prior period was not carried forward. QAD EA lets you display ATP in the traditional format and also in a cumulative format that allows prior period unconsumed ATP to be carried forward.

You also have the option of enforcing ATP in sales order maintenance with either a warning or an error. An ATP error indicates that there is insufficient quantity of the item on the date requested, but lets you take the order anyway. An ATP error does not allow the item to be processed.

You can also specify an ATP horizon, which tells the system how far into the future to look for ATP to fill a demand.

## Low-Level Codes



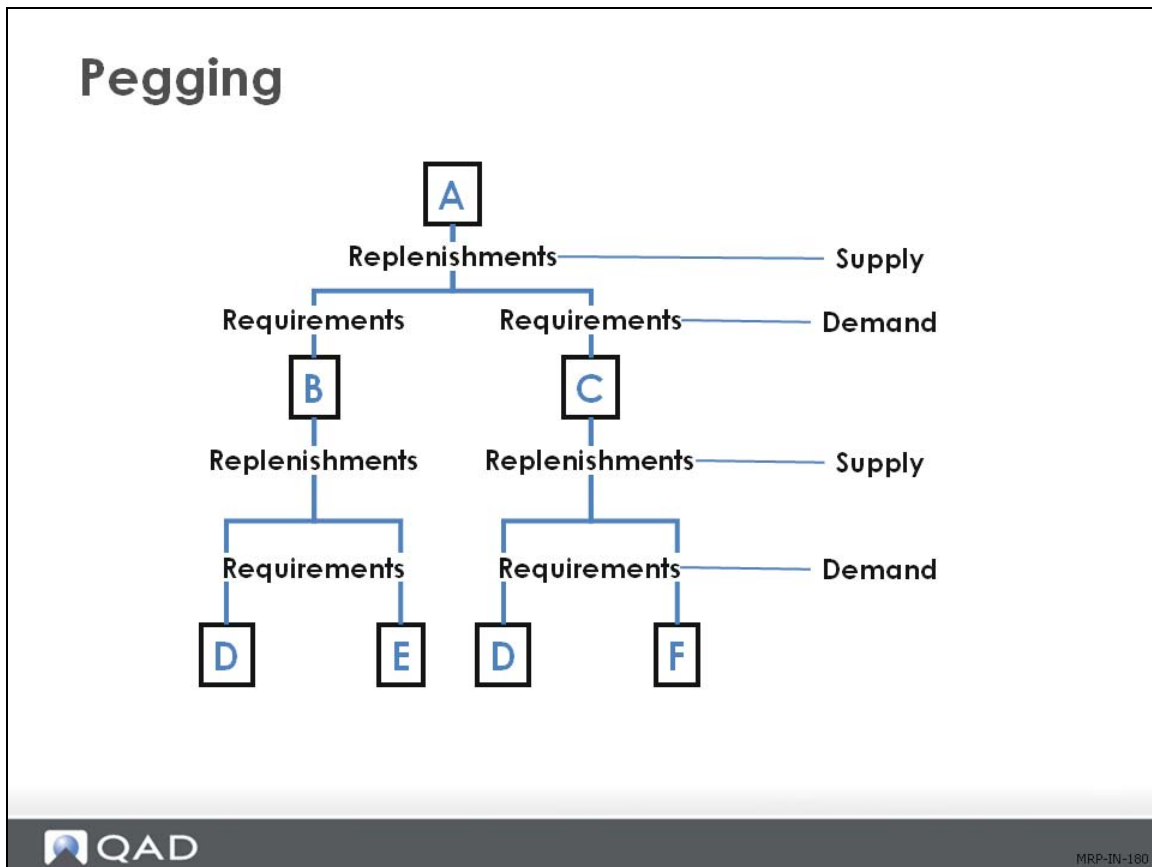
Low-level codes indicate the relative position of each item within the product structures. MRP uses low-level codes to ensure that all dependent demands from parent items are included. In the diagram, the product structure for Item E determines the low-level code of Item C, not the low-level code of Item A.

- MRP stops searching for occurrences of the item when it reaches the lowest level in each product structure, thus saving time
- QAD Enterprise Applications and APICS number the levels differently, but the process is the same: search for the item from the top down in each structure and stop searching after the lowest-level code for the item
- QAD Enterprise Applications automatically updates the low-level codes when you enter or modify product structures

Low-level codes can be inaccurate if you import data without testing it, or if you modify structures directly from Progress. If you believe that the codes are incorrect, run Low Level Code Update (23.22).

**Note** Product structure data is often imported from CAD/CAM systems.

## Pegging




Pegging identifies the source of the requirements. For example, pegging identifies the sales order or forecast that is creating the need for an item.

Pegging is made possible by the low-level codes. Pegging is maintained for one level. In the example, you can see that the requirement for E came from B, and the requirement for B came from A. However, you cannot inquire about E and see that its requirement comes from A.

## MRP Horizon

### MRP Horizon

**The number of calendar days to include in MRP**


MRP-IN-190

The MRP horizon or planning horizon is the number of calendar days to be planned forward in time. How far ahead demand is known and the lead times through the manufacturing operation determine the MRP horizon.

- MRP only processes material requirements within this planning horizon, ignoring activity outside this horizon
- Make this horizon at least one day longer than your longest cumulative lead time

If you change the MRP planning horizon, replan all items by running Regenerate Materials Plan (23.2).

## Capacity Requirements Planning

### Capacity Requirement Planning (CRP)

Do we have enough capacity to meet the plan?

Department

Work Center 1	Work Center 2	Work Center 3	Work Center 4	Work Center 5
---------------	---------------	---------------	---------------	---------------

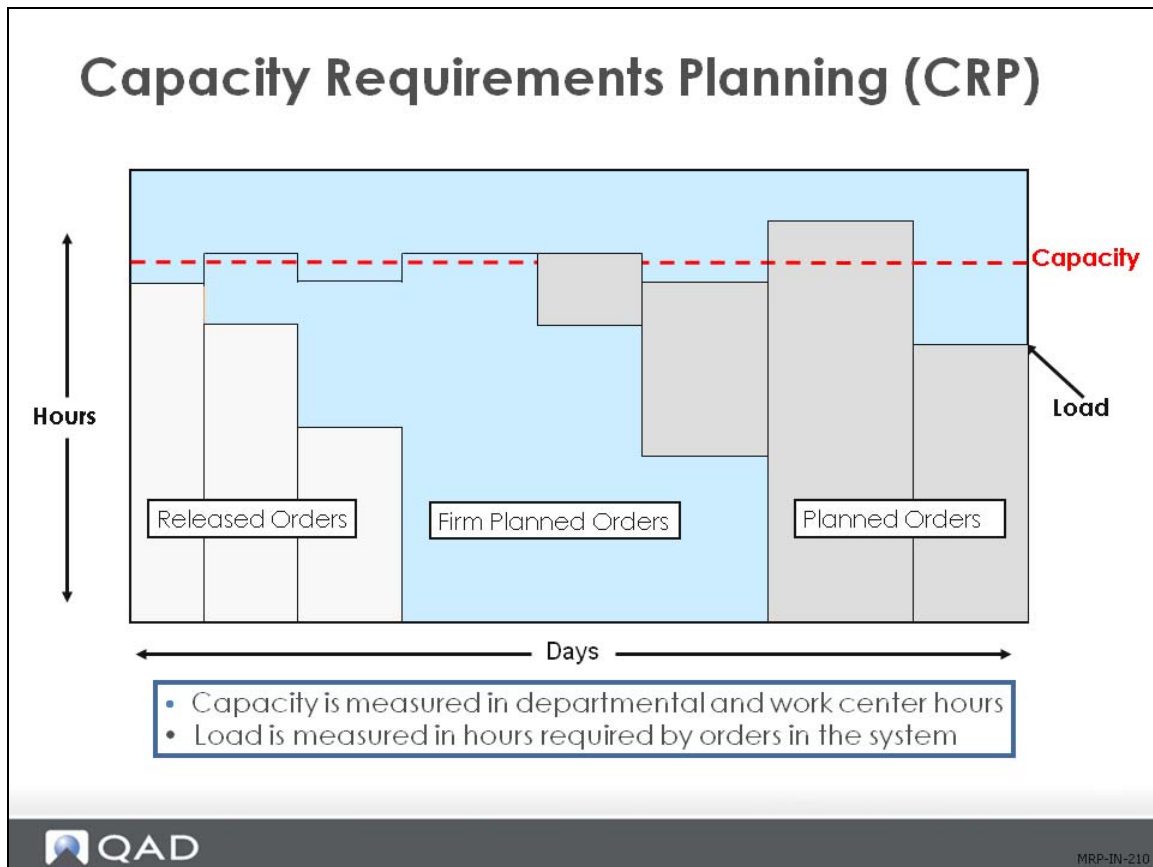
QAD

MRP-IN-200

CRP calculates the workload in a given department or specific work center or machine by:

- Exploding the routings and processes for MRP planned and firm planned orders and updating or creating work order routings
- Determining the start/due dates for each operation using:
  - Work center and shop calendars
  - Back scheduling (start date of the last operation is the due date of the previous operation)

## The Foundation for CRP



MRP provides the foundation for calculating CRP, a tool used to complete the master schedule.

Master scheduling and rough-cut capacity planning (RCCP) have removed most of the capacity constraints before MRP is run.

**Note** Discussed in *Training Guide: Master Scheduling and Rough-Cut Capacity Planning (RCCP)*

- MRP looks at the inventory and at orders
- CRP uses routings and work centers
- RCCP uses resources and resource bills

### Back Scheduling

When CRP back schedules orders, it takes the due date of an order or repetitive schedule and schedules each of its operations from the last operation in the order routing or process backward to the first one.

CRP assigns each operation a start date and a due date, using the operation lead time components—queue, setup, run, wait, and move—to calculate operation start dates.

- The start date of an operation is the same as the due date of the previous operation
- CRP calculates run times based on the actual order quantity: order quantity less the quantity completed

## Departments and Work Centers

Resources used to process orders on the shop floor, from subassembly to end item, are:

- Departments
- Work centers
- Number of machines

### Departments

The capacity of a department is the total number of available labor hours per day for all work centers in the department, as defined in Department Maintenance (14.1).

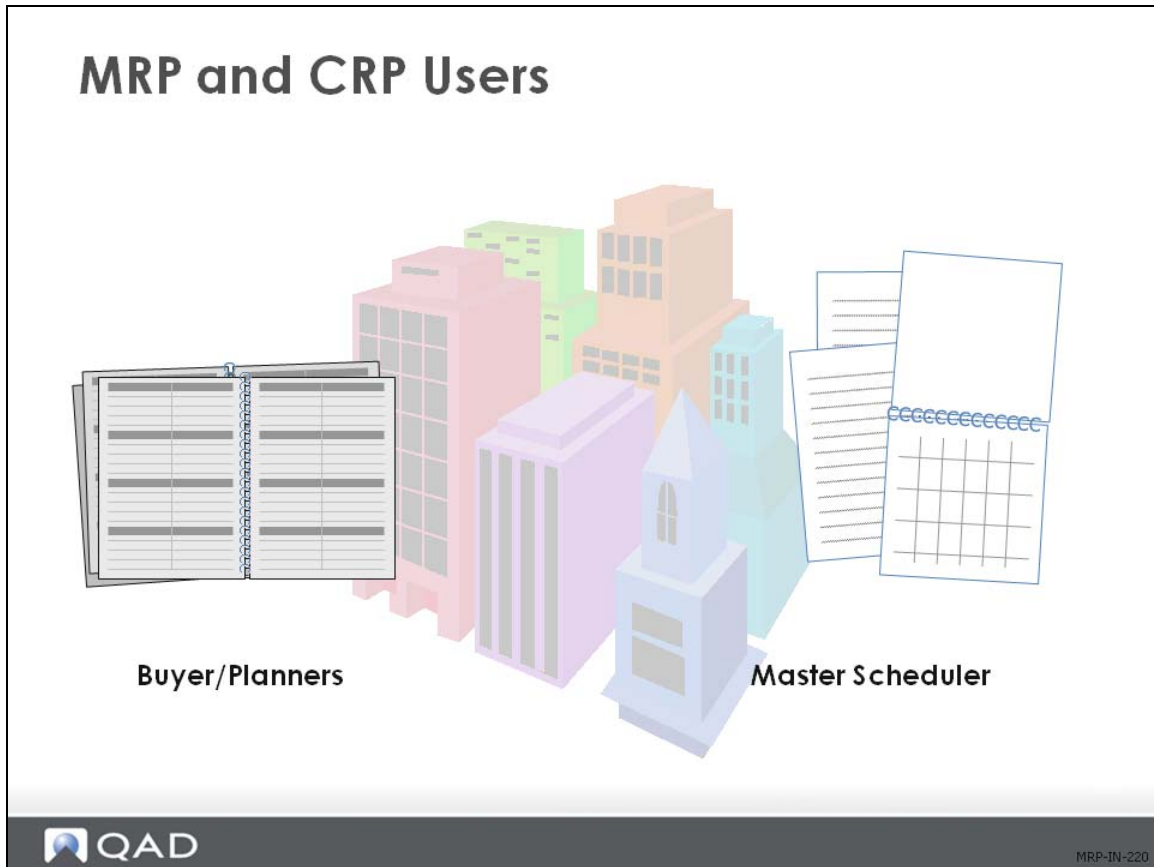
CRP provides a Department Load Summary that shows the total load hours for all the work centers in a department against the total capacity. This function can be a useful quick check on load conditions. However, be aware that labor from one work center may not be interchangeable with other work centers in the department.

### Work Centers

The capacity of a work center is the number of machines and personnel available multiplied by work hours in a period, as defined in Work Center Maintenance (14.5) and Calendar Maintenance (36.2.5).

CRP loads (or simulates) the expenditure of work center and department hours using orders as production demand. Work order routings provide data about which orders are using which work centers and when.

## MRP and CRP Users



MRP and CRP are high-level operations. Control access to these functions with security so only qualified employees use them.



Chapter 2

# **Business Considerations**

## Business Considerations

### Business Considerations

- Planning Parameters
- Kanban
- Batch Processing
- Cumulative Lead Times



MRP-BU-020

In this section, you learn how to identify some key business considerations before setting up MRP and CRP in QAD Enterprise Applications.

There are several business issues to consider before using MRP and CRP:

- Planning parameters
- Kanban
- Batch processing
- Cumulative lead times

This section does not discuss all potential issues, but presents some issues to generate thought and discussion.

## Planning Parameters

The screenshot shows the 'Item Planning Maintenance' window for Item 01010 (Medical Ultrasound). The 'Item Planning Data' section is highlighted with a red box and contains the following fields:

- Mstr Sched:
- Plan Orders:
- Time Fence: 0
- MRP Required:
- Order Policy: POQ
- Order Qty: 0
- Batch Qty:
- Order Period: 7
- Safety Stock: 0
- Safety Time: 0
- Reorder Point: 0
- Item Rev: D
- Issue Policy:

Other sections include:

- Buyer/Planner:** 1-01, Supplier: [lookup], PD Site: [lookup], Purchase/Manufacture: M, Configuration Type: [lookup], Inspect: , Ins LT: 0, Cum LT: 0, Mfg LT: 4, Pur LT: 0.
- Phantom:**  Minimum Order: 1, Maximum Order: 5, Order Multiple: 1, Op Based Yield:  Yield Percent: 100.00%, Run Time: 17,000, Setup Time: 7,500, EMT Type: NON-EMT.
- ATP Enforcement:** NONE, Family ATP:  ATP Horizon: 0, Run Seq 1: 2.
- Network Code:** [lookup], Routing Code: U-001, BOM/Formula: [lookup].

The QAD logo is visible in the bottom left corner, and the text 'MRP-BU-030' is in the bottom right corner.

You set these planning parameters in Item Planning Maintenance (1.4.7) and Item-Site Planning Maintenance (1.4.17).

### Definition

Planning parameters are established for each item in your database; they govern the way MRP handles the items.

### Why Consider?

MRP is only as accurate as the data it processes; 98% or greater accuracy in your planning parameters is required for best results.

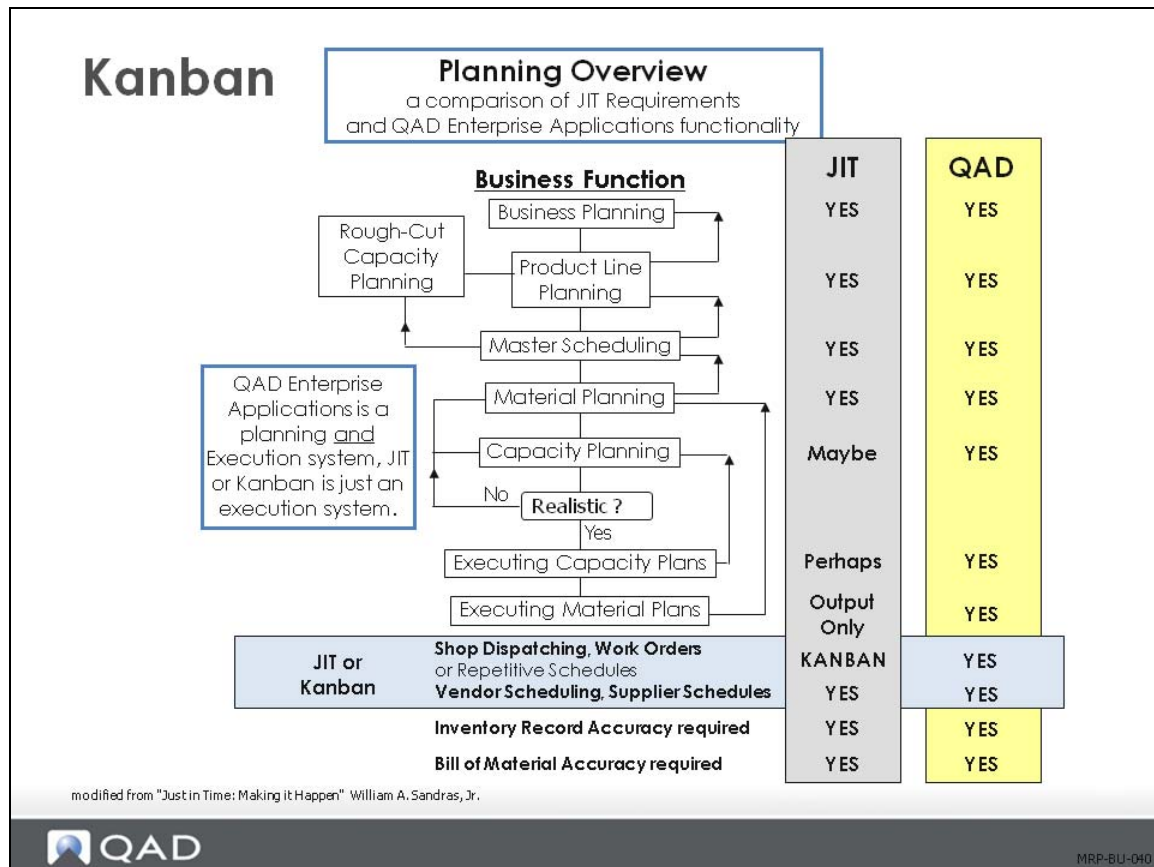
### Functionality in QAD Enterprise Applications

The item planning data is the most used information in your database.

### Setup Implications

- Inaccurate data can be catastrophic
- A good clean-up of the database is always worthwhile

## Kanban



### Definition

A Japanese method of production and inventory control first developed and used at Toyota.

- Designed for day-to-day, on-floor control of production and inventory, it relies on a series of control triggers, typically a visual one in the form of cards
- Kanban is the predecessor of Just-in-Time (JIT)

Kanban is an appropriate way to schedule a plant when you use advanced repetitive with single-step routings or multiple steps with a milestone at the last operation. Otherwise, you need a repetitive exploded schedule in place to net the work in process.

### Why Consider?

Many companies use it. Some QAD customers use kanban in their plants and MRP to create supplier schedules. You can set up separate buyer/planner codes to apply to kanban and non-kanban items.

### Setup Implications

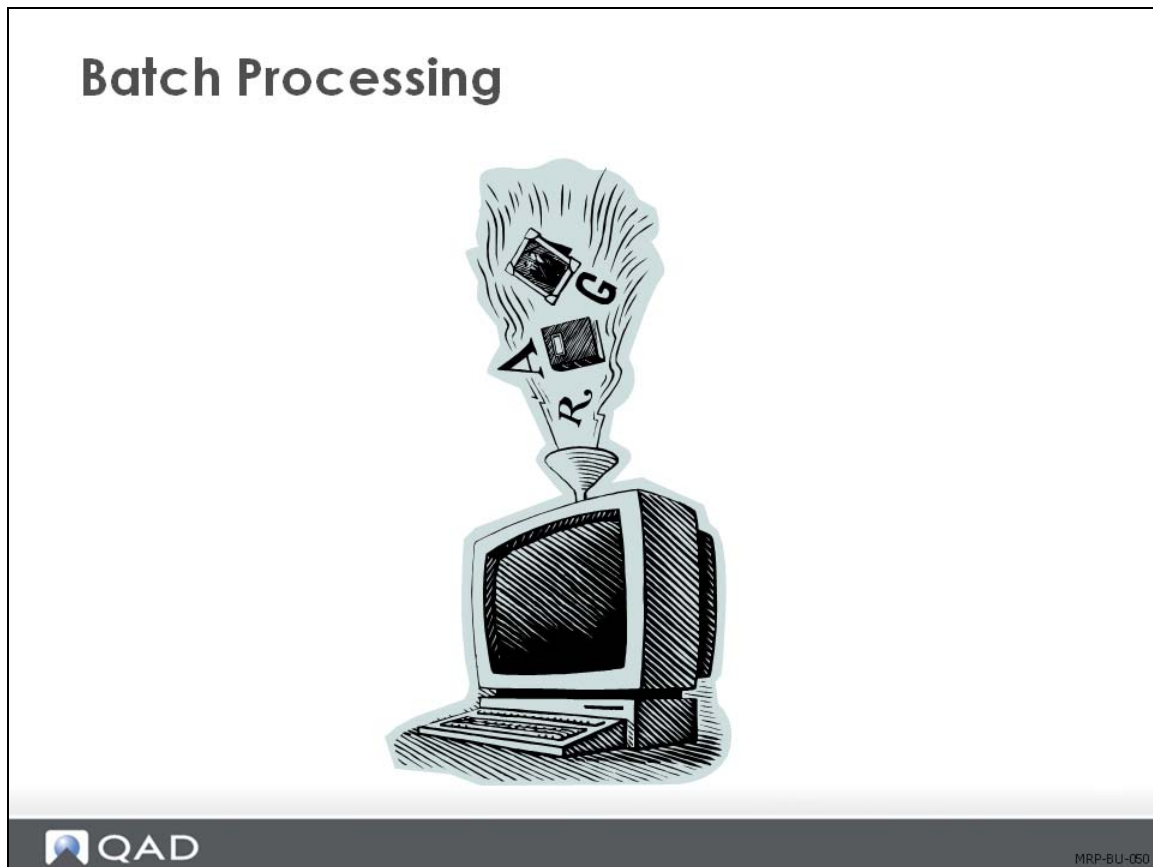
Planning parameters in Item Planning Maintenance (1.4.7) can be set to meet kanban needs.

- Set Order Policy to POQ with a period of one or two days
- Avoid order modifiers or use them to set Kanban quantity

QAD Enterprise Applications offer several production options including Kanban, Flow manufacturing, Repetitive Line Scheduling, and Sequenced Line Scheduling. Which of these methods you choose to use has a significant impact on setting your planning parameters. This choice in turn has a significant impact on how MRP calculates requirements.

Before setting planning parameters for an item, it is necessary to understand the total manufacturing environment for all items at all sites. Different items may be processed differently at different sites.

## Batch Processing



### Definition

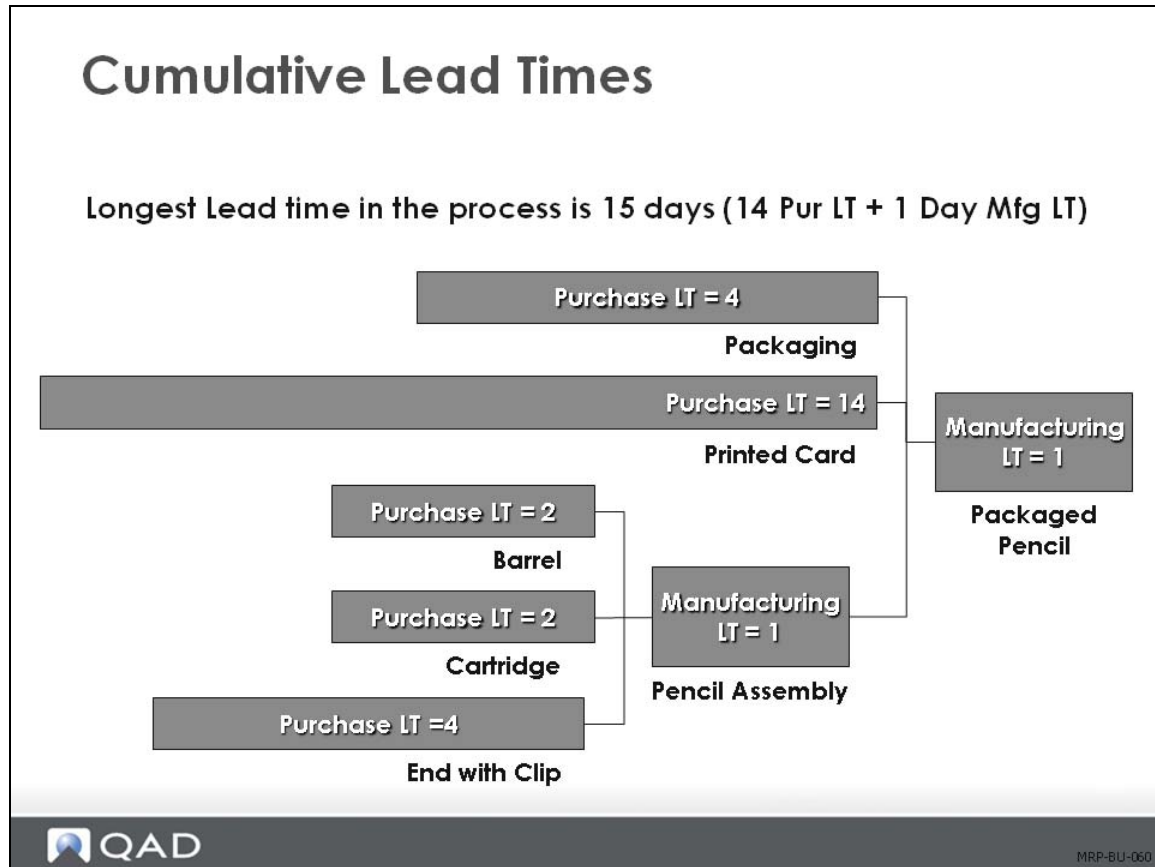
A computer technique where transactions are accumulated and processed together.

### Why Consider?

MRP runs can take a long time. Schedule MRP at reasonable intervals, depending on:

- How often you require change
- How often your suppliers need updates
- The length of your MRP horizon

## Cumulative Lead Times



### Definition

The time required to produce an item, based on component lead times.

### Why Consider?

- MRP considers component lead times in generating its plan
- Inaccurate lead times result in faulty plans
- MRP horizon must be at least one day longer than longest cumulative lead-time

Discussed in *Training Guide: Product Structures and Formulas*.




Chapter 3


# Set Up MRP

## MRP Setup

### MRP Setup



- Creating Work Schedules
- Managing the Control Program
- Maintaining Planning Parameters

 MRP-SU-020

In this section, you learn how to set up MRP and CRP in QAD Enterprise Applications. This lesson covers the data required to configure a successful MRP implementation.

### Reading the Training Flow


- The current step is highlighted
- Optional steps are marked (optional)

A suggested setup sequence for MRP includes three steps:


- First, verify the accuracy of your work schedules and holidays so that MRP can properly plan your activities.
- Second, set up or maintain the MRP control program.
- Third, verify the planning parameters of your items so that MRP can properly process them.

## Creating Work Schedules

### MRP Setup



- **Creating Work Schedules**
- Managing the Control Program
- Maintaining Planning Parameters

 QAD MRP-SU-030

Here you look at how to create calendars and holidays in QAD Enterprise Applications.

## Holiday Maintenance



Use Holiday Maintenance (36.2.1) to schedule holidays and other nonwork days that apply to an entire site.

### Field Definitions

The information shown describes the key fields in the screen.

*Site.* The site to which the holiday applies.

*Date.* The holiday date.

*Holiday.* A brief, reference-only description.

## Calendar Maintenance

**Calendar Maintenance**

Calendar Maintenance X

Go To Actions Copy Print Preview

Site: 10-100 Work Center:

Site: 10-100 Ultrasound Mfg Site

Work Center: Machine:

Work Day

Sunday:

Monday:

Tuesday:

Wednesday:

Thursday:

Friday:

Saturday:

Hours:

Sunday: 0.00

Monday: 8.00

Tuesday: 8.00

Wednesday: 8.00

Thursday: 8.00

Friday: 8.00

Saturday: 0.00

Reference:

Start:

End: Daily Hours:

Set up one like this for each site

QAD

MRP-SU-050

Calendars provide the basis for MRP scheduling functions. Calendars define the standard work week for a site and the work centers in it. They also define exceptions to the normal calendar, such as scheduled overtime or shutdown periods. In Calendar Maintenance (36.2.5), you can create calendars for individual work centers or for the entire site. You are required to define at least one calendar.

### Field Definitions

The following information describes the key fields in the screen.

**Site.** You can also set up for each domain a generic calendar with both site and work center blank.

This field contains the site code to which this shop calendar applies. For each site, set up at least one calendar without specifying work centers or machines. This action sets the default for the site.

**Work Center.** The work center to which this shop calendar applies. A work center code and a machine code uniquely identify a work center.

**Machine.** The machine to which this shop calendar applies.

**Work Day / Hours.** Shows which days are work days and how many hours are available for work.

When calculating schedule due and release dates, the system only looks at scheduled work days, ignoring exceptions and holidays. Note:

- If you set work day to No on a Sunday, the system does not schedule a work order or purchase order due date that day.
- If you sometimes work on a Sunday, enter Yes in work day and set the scheduled hours to zero, allowing due dates to fall on a Sunday.

A reference code and a start and end date identify exceptions to the normal calendar. Use these fields to schedule overtime, increased shifts, reduced shifts, preventative maintenance, or shutdowns. The number of hours specified is added to (or subtracted from) the normal work day for each day in the range of dates specified.

*Reference.* A reference code identifying an exception to the shop calendar, usually describing the type of exception, such as Overtime or Shutdown.

Exceptions only record holidays if the holiday only applies to some work centers. If the holiday applies to all work centers, use Holiday Maintenance (36.2.1).


*Start / End.* The start and end dates of the exception.

Enter start and end dates carefully. The exception applies to all work days in the range of dates specified.


*Daily Hours.* Daily hours can be positive or negative. A positive number increases scheduled work hours; a negative number decreases them.

## Maintaining the Control Program

### MRP Setup

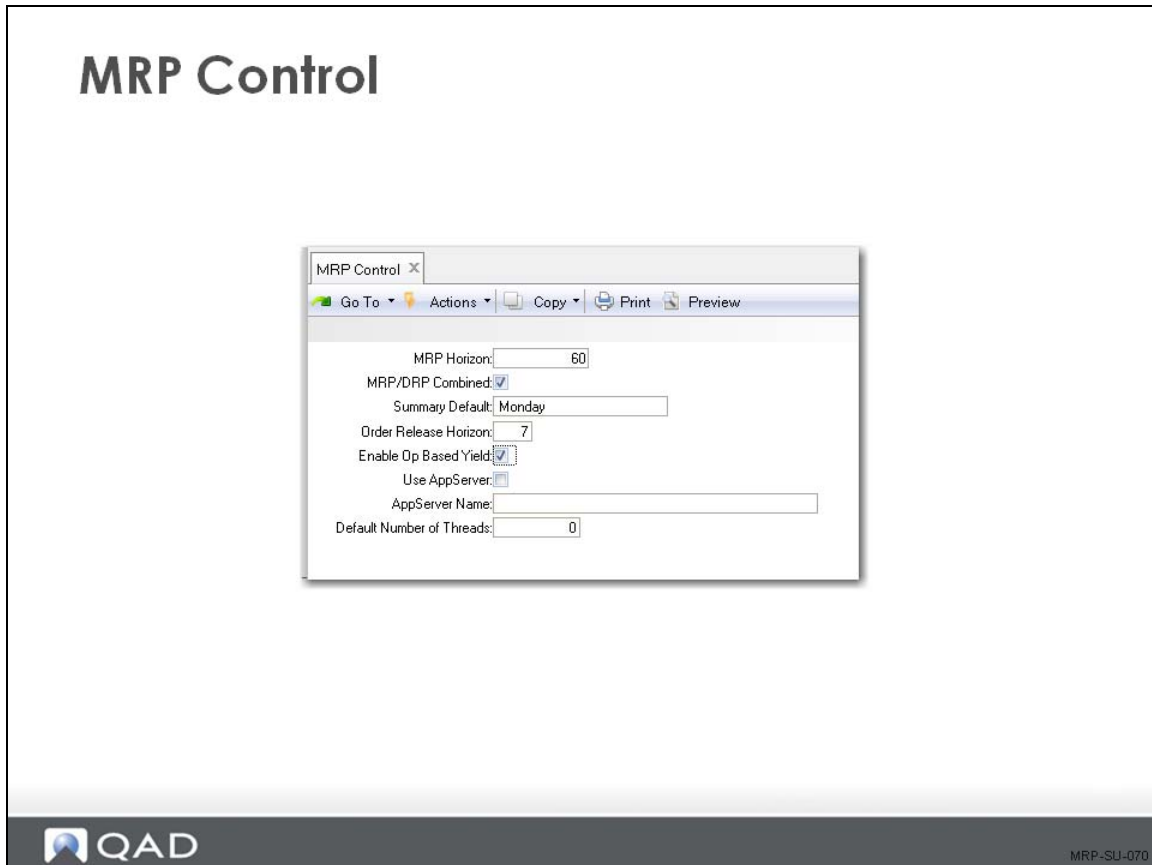


- Creating Work Schedules
- **Managing the Control Program**
- Maintaining Planning Parameters

 QAD MRP-SU-060

The MRP control program sets some basic parameters.

## MRP Control



Enter appropriate values in MRP Control (23.24).

### Field Definitions

*MRP Horizon.* The period, in calendar days, which MRP plans. MRP calculations ignore data outside this time period. Set the horizon at least one day longer than the longest item cumulative lead time in the database to avoid planning it late.

**Note** If you change the MRP planning horizon, affected items are not automatically replanned when you run Net Change Materials Plan (23.1). Ensure that all items are replanned by running Regenerate Materials Plan.

*MRP/DRP Combined.* Indicates whether MRP planned items can also be planned with Distribution Requirement Planning (DRP). DRP is the balancing of supply and demand for items transferred between sites. If this field is set to:

No: MRP planned items can be recalculated only using the MRP functions

Yes: MRP planned items can be recalculated using the DRP planning functions

Choosing when to run DRP and MRP depends on where your DRP items are in the structure:

- If you are distributing finished products, you can usually run DRP, then MRP
- If you are supplying component items between sites, you can usually run MRP, then DRP

You would normally only need to run a combined MRP/DRP when you have DRP items at multiple levels of the product structure.

**Summary Default.** Indicates the day of the week all MRP summary reports and inquiries start.

**Order Release Horizon.** The number of calendar days before planned order release that an action message appears.

- MRP assigns *Release Due* action messages to orders with release dates within this release horizon

For example, if you set the release horizon to seven days, all orders due to be released within the week have a *Release Due* action message

- Setting this date gives planners time to take appropriate actions
- Set the order release horizon to reflect your normal paperwork lead time and how often you run MRP

If you run MRP once a week, set the release horizon to at least seven days

If you run MRP daily, you can leave this field at zero

**Enable Op Based Yield.** This field determines how the system calculates yield for component items when product structures and routings are exploded in material requirements planning (MRP) programs, work orders, repetitive, advanced repetitive, and configured products.

No: The system uses the Yield % field associated with the parent item in Item Planning Maintenance or Item-Site Planning Maintenance to calculate component requirements.

Yes: The system derives the yield percentage amount for components from operations on the parent item's routing. The Yield % field associated with the item is used for the parent item only, not the components.

**Note** Even when Enable Op Based Yield is Yes, this calculation method is only used for parent items with Operation Based Yield set to Yes in either Item Planning Maintenance or Item-Site Planning Maintenance.

**Use AppServer.** Specify whether your system uses a Progress application server to run MRP/DRP processes on a Symmetric Multiple Processor (SMP) computer.

**AppServer Name.** When Use AppServer is Yes, enter the name of the application server that is configured to run the MRP/DRP programs.

**Default Number of Threads.** When your system uses an AppServer for MRP/DRP processing, enter the default number of processing threads, or agents, that the AppServer can create. This value can be any integer up to 99.

## Maintaining Planning Parameters

### Order Policies and Modifiers

A LT=1

```

      graph TD
        A[A] --> B[B]
        A --> C[C]
          
```

**Demand for item A  
in period 4 is 100**

MRP also calculates the requirements for components B and C

	Past Due	1	2	3	4
Gross Requirements		70	150	50	100
Net Requirements		0	0	0	0
Scheduled Receipts		250			
On-Hand Inventory	50	230	80	30	0
Planned Orders Due					70
Planned Order Release				70	

**Min Ord:** 0

**Max Ord:** 1,000

**Ord Mult:** 50

100

↑

Order policies and modifiers control the type and quantities of MRP-generated orders

MRP-SU-110

The material planning department uses item planning data to determine how and when to replenish inventory. This data affects MRP, purchasing, manufacturing, configured products, and costing. Most of the fields are used in MRP.

Understanding these parameters is essential so that buyer/planners can set them appropriately for your company.

## Item Planning Maintenance

Item Planning Maintenance

Item: 01010    Item Number: 01010 (2)    Supplier:

Item Number: 01010    Description: Medical Ultrasound  
Unit of Measure: EA

Item Planning Data

Mstr Sched:     Buyer/Planner: 1-01    Phantom:   
 Plan Orders:     Supplier:    Minimum Order: 1  
 Time Fence: 0    PD Site: 10-100    Order Multiple: 5  
 MRP Required:     Purchase/Manufacture: M    Order Based Yield:   
 Order Policy: PDQ    Configuration Type:    Yield Percent: 100.00%  
 Order Qty: 0    Inspect:     Run Time: 17.000  
 Batch Qty:    Ins LT: 0    Cum LT: 0    Setup Time: 7.500  
 Order Period: 7    Mfg LT: 4    Pur LT: 0    EMT Type: NON-EMT  
 Safety Stock: 0    ATP Enforcement: NONE    Auto EMT Processing:   
 Safety Time: 0    Family ATP:     Network Code:    Routing Code: U-001  
 Reorder Point: 0    ATP Horizon: 0    BOM/Formula:     
 Item Rev: D    Run Seq 1:    2:     
 Issue Policy:

QAD MRP-SU-090

MRP uses item planning data to plan items. You define this data in Item Planning Maintenance. If an item is used at multiple sites, you can set up planning data differently for each site using Item-Site Planning Maintenance. Data not defined in Item-Site Planning Maintenance defaults from Item Planning Maintenance.

Independent demand items can be identified in the Master Production Schedule (MPS) and planned by a master scheduler. In contrast, MRP plans dependent demand items, except for items replenished according to a reorder point policy. The MPS represents what the company plans to produce expressed in specific configuration, quantities, and dates.

**Note** The manufacturing lead time (Mfg LT) stored with the Item Planning Data is the value calculated during the routing rollup using the Order Quantity value also found in Item Planning Data. The lead time value in days is truncated to a whole number. The Purchase Lead Time is entered by the planner based on information from the supplier and the company's experience with that supplier.

### Master Schedule Item Parameters

- Master Schedule: Yes
- Plan Order: Yes
- Time Fence: Management policy
- Order Policy: Any policy except blank. Non-valid policies are treated as LFL

### MRP Items

- Master Schedule: No
  - Yes if there is spare part or other independent demand usage to be master scheduled
- Plan Orders: Yes
- Time Fence: Optional
- Order Policy: Any policy except blank

### Reorder Point Items

- Master Schedule: No
- Plan Orders: No
- Time fence: 0
- Order Policy: <blank>
- Reorder Point: Non-zero quantity, such as demand during lead time
- Issue Policy: No (Optional)

For details, see “Order Policies and Modifiers” on page 48.

## Item-Site Planning Maintenance

## Item-Site Planning Maintenance


Item: 01010      Item Number: 01010 (2)      Supplier:

Item Number: 01010      Description: Medical Ultrasound

Unit of Measure: EA

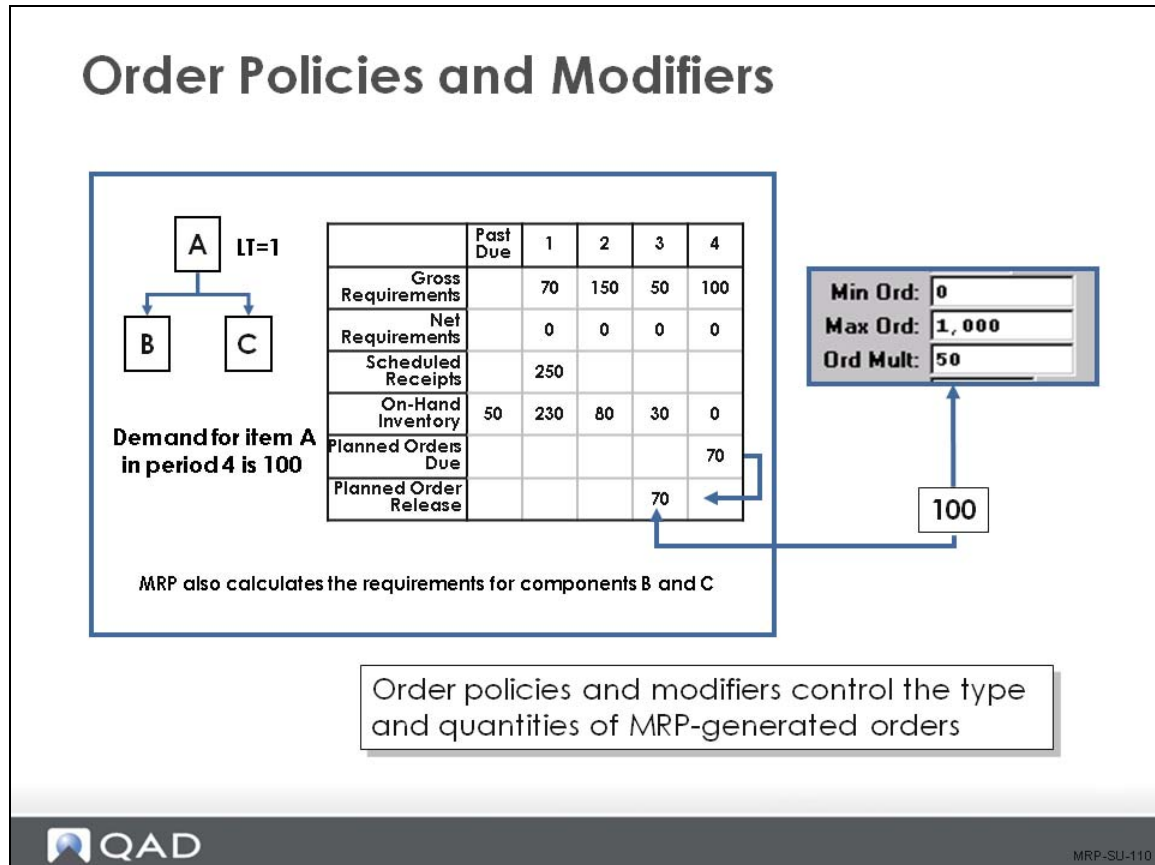
Item Planning Data

<input checked="" type="checkbox"/> Mstr Sched: <input checked="" type="checkbox"/> Plan Orders: Time Fence: <input type="text" value="0"/> <input type="checkbox"/> MRP Required: Order Policy: <input type="text" value="POQ"/> Order Qty: <input type="text" value="0"/> Batch Qty: Order Period: <input type="text" value="7"/> Safety Stock: <input type="text" value="0"/> Safety Time: <input type="text" value="0"/> Reorder Point: <input type="text" value="0"/> Item Rev: <input type="text" value="D"/> <input checked="" type="checkbox"/> Issue Policy:	Buyer/Planner: <input type="text" value="1-01"/> Supplier: <input type="text"/> PO Site: <input type="text" value="10-100"/> Purchase/Manufacture: <input type="text" value="M"/> Configuration Type: <input type="text"/> <input type="checkbox"/> Inspect: 1.0    Ins LT: <input type="text" value="0"/> Cum LT: <input type="text" value="0"/> Mfg LT: <input type="text" value="4"/> Pur LT: <input type="text" value="0"/> ATP Enforcement: <input type="text" value="NONE"/> <input type="checkbox"/> Family ATP: ATP Horizon: <input type="text" value="0"/> Run Seq 1: <input type="text"/> 2: <input type="text"/>	<input type="checkbox"/> Phantom: Minimum Order: <input type="text" value="1"/> Maximum Order: <input type="text" value="5"/> Order Multiple: <input type="text" value="1"/> <input type="checkbox"/> Op Based Yield: Yield Percent: <input type="text" value="100.00%"/> Run Time: <input type="text" value="17.000"/> Setup Time: <input type="text" value="7.500"/> EMT Type: <input type="text" value="NON-EMT"/> <input type="checkbox"/> Auto EMT Processing: Network Code: <input type="text"/> Routing Code: <input type="text" value="U-001"/> BOM/Formula: <input type="text"/>
---	---	---


MRP-SU-100

Use this function to set planning data for item on a site-by-site basis. The same item made at different sites often has different product structures, routes, and planning data. This generally results in a different lead time.

## Order Policies and Modifiers



The graphic shows the MRP calculation from the introduction and how it would change when the Order Multiples field is set to 50.

### Order Policies

**Lot-for-Lot (LFL).** Planned orders are created for the net requirement quantities for each demand. LFL consumes on hand available and on order available before creating a supply order to cover this demand.

**Period Order Quantity (POQ).** Planned orders are created to satisfy requirements for the number of calendar days specified in the Order Period field each time an order is created. Orders are only created when needed.

**Fixed Order Quantity (FOQ).** Planned orders are created for the quantity specified in the Order Quantity field.

**One Time Only (OTO).** A planned order is made for a quantity of one only. As long as one order exists, another is not created. This choice is useful for prototypes.

**No Order Policy (blank).** MRP does not plan the item even when the Plan Orders field is Yes.

## Order Modifiers

Order modifiers change planned order quantities.

*Order Quantity.* A specified quantity used with the Fixed Order Quantity (FOQ) order policy. It is also used for all item cost and lead time calculations as the standard order quantity.

*Safety Stock Quantity.* A specified quantity used as inventory reserve to compensate for unexpected demand and to maintain service levels. This modifier applies to all order policies, including a blank. The system never plans to use safety stock, but always replaces it when consumed.

*Minimum Order Quantity.* This value is the smallest order quantity that can be planned. Vendors often set minimum quantities for purchased items. This value could be a case or pallet quantity or a quantity established for a quantity discount. For manufactured items, this value is often the minimum quantity required to incur the setup costs for the item. Use minimum quantities with items that have continuing demand, since the minimum order quantity could exceed the actual current demand.

*Maximum Order Quantity.* MRP generates a warning message in the event a planned order quantity is larger than the specified maximum order quantity. Excessively large lot sizes can tie up a resource so that other orders are delayed unnecessarily. Further, setting a quantity limit can uncover data entry errors (for example, entry of 1,000 instead of 100).

*Order Quantity Multiple.* Planned orders are created in multiples of this quantity. That is, if the order multiple is 100, planned orders are only created for quantities of 100, 200, 300, and so on. Order multiples are appropriate, for example, with multiple cavity molding applications and packaging.

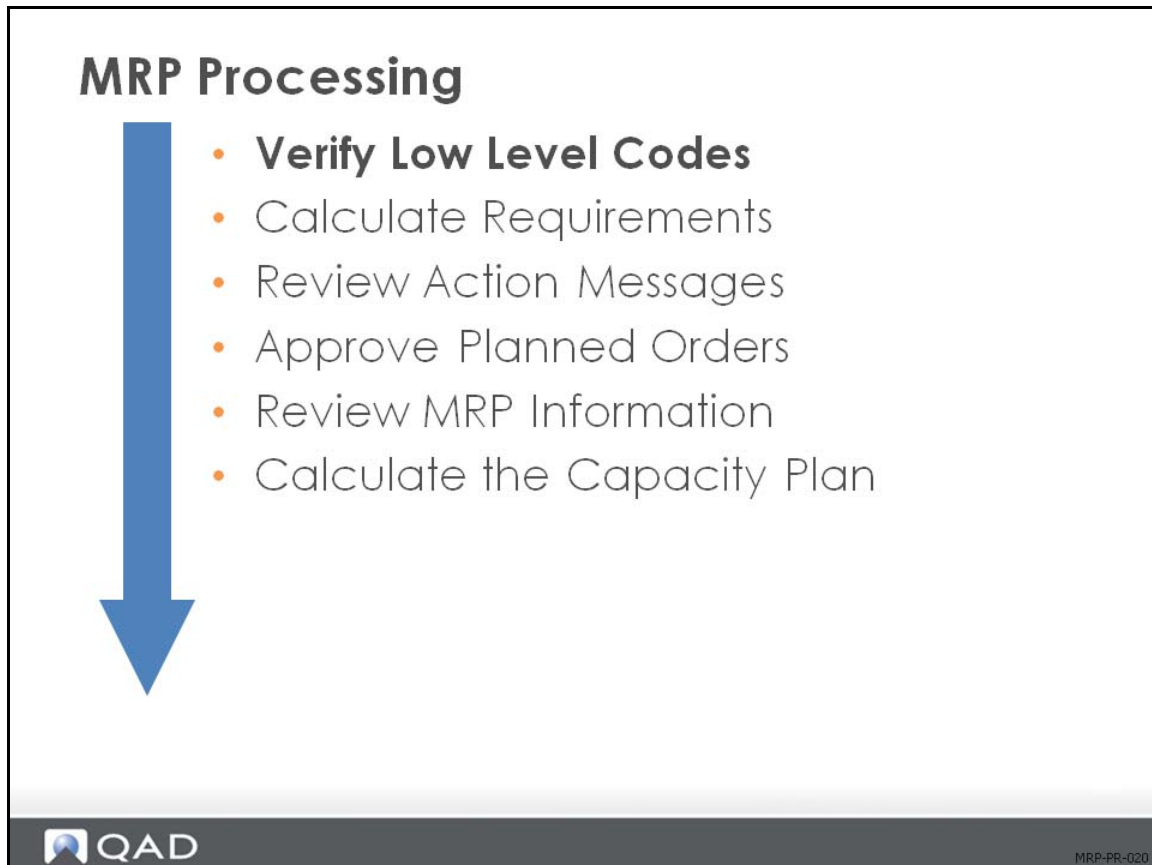
Order multiples are commonly used for multiples of case or pallet quantities, kanban pull quantities or other convenient storage or transport unit of measure. Items whose calculated requirement has a decimal value due to scrap or yield factors can be forced to a whole number by setting the multiple to one, or any whole number.



Chapter 4

# Use MRP and CRP

## Use MRP and CRP



The slide is titled "MRP Processing" and features a large blue downward-pointing arrow on the left side. To the right of the arrow is a bulleted list of six steps. The first step, "Verify Low Level Codes", is bolded. The slide includes the QAD logo in the bottom left corner and the code "MRP-PR-020" in the bottom right corner.

### MRP Processing

- **Verify Low Level Codes**
- Calculate Requirements
- Review Action Messages
- Approve Planned Orders
- Review MRP Information
- Calculate the Capacity Plan

QAD MRP-PR-020

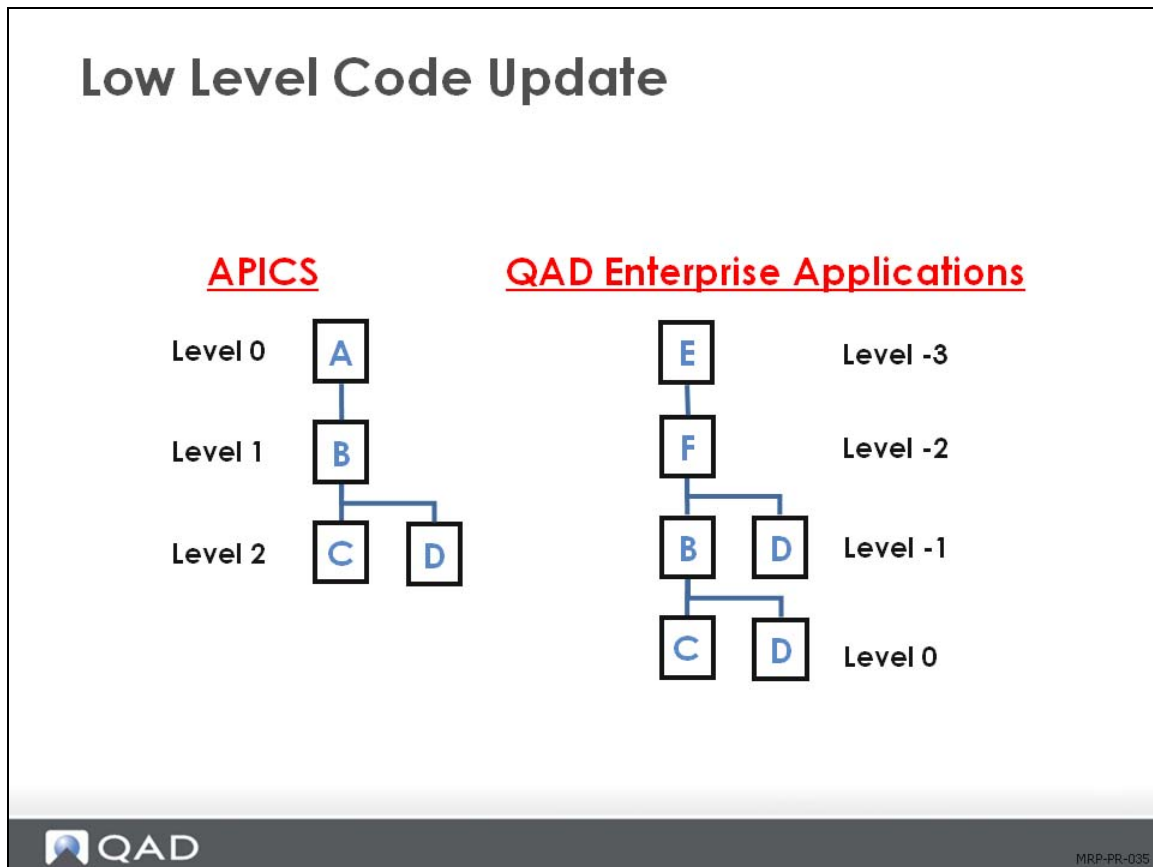
In this section, you learn how to use MRP and CRP in QAD Enterprise Applications.

The slide shown is a suggested sequence of steps for processing MRP based on information that flows from one step to another and the prerequisites for each of those steps.

The diagram shows the steps that are covered in this course:

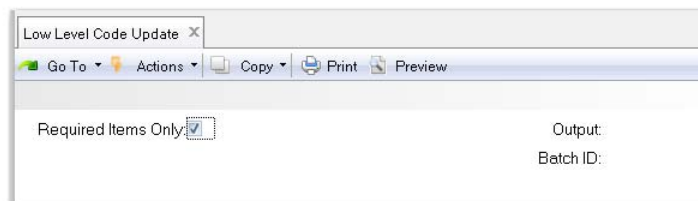
The MRP output is the direct input to CRP. Once the MRP has been reviewed and action messages acted upon, the capacity plan can be run.

## Low-Level Code Update



Low-level codes maintain a numeric value for each item relative to its parent item. This structure accelerates MRP processing time. Normally, QAD Enterprise Applications automatically updates these codes through item planning, BOM, MRP, and DRP transaction.

## Low Level Code Update



MRP-PR-040


You can update these codes anytime with Low Level Code Update (23.22) as shown here. You can also do this update through Selective Materials Plan (23.3).

Depending on the number of items in your database, this program can take a long time to run.


This process is discussed in *Training Guide: Product Structures and Formulas*.

## Calculate Requirements

### MRP Processing



- Verify Low Level Codes
- **Calculate Requirements**
- Review Action Messages
- Approve Planned Orders
- Review MRP Information
- Calculate the Capacity Plan

 QAD MRP-PR-050

QAD Enterprise Applications offers three ways to run MRP:

- Net Change Materials Plan (23.1) calculates requirements only for those items that have changed since the last update
- Regenerate Materials Plan (23.2) updates the entire database
- Selective Materials Plan (23.3) updates selected items only

MRP ignores items with an order policy of blank.

## Net Change Materials Plan

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
  - **Net Change Update**
  - Regenerate Plan
  - Selective Update
- Review Action Messages
- Approve Planned Orders
- Review MRP Information
- Calculate the Capacity Plan

## Net Change Materials Plan



MRP-PR-070

Net Change Materials Plan (23.1) considers only items with MRP Required set to Yes in their item planning data. The system sets this field to Yes automatically when changes occur for an item in any of the following areas:

- Item or item-site planning data
- Product structures
- Sales or purchase orders
- Work orders or repetitive schedules
- Inventory
- Forecasts
- Master production schedule
- Intersite demand

About this functionality:

- It takes some time to process. Consider submitting it in batch.
- It does not see demand or forecast for items moving into the MRP horizon as time passes.
- Many companies use it for their normal MRP runs.

If more than 50% of items have changed since the last MRP, it takes about the same amount of time as a full regeneration.

## Field Definitions

The key fields in Net Change Materials Plan (23.1) are:

*Site/To* . Enter the sites to plan for. One site's material plan is independent from inventory, demand, and supply in other sites.

*Synchronized Calculation* . Determines whether this MRP/DRP calculation runs simultaneously with other calculations sharing synchronization code. Synchronized calculations benefit you if you have Symmetric Multiple Processor (SMP) computers.

## Regenerate Materials Plan

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
  - Net Change Update
  - **Regenerate Plan**
  - Selective Update
- Review Action Messages
- Approve Planned Orders
- Review MRP Information
- Calculate the Capacity Plan

## Regenerate Materials Plan



MRP-PR-090

Regenerate Materials Plan (23.2) recalculates demand and plans supply for all items in the site. This method generates a plan for all items, not just the items that have changed since the last run. The outputs of net change and regenerative MRP are the same. However, net change MRP generally runs faster than regenerative, since it only plans for items that changed since MRP was last run.

### Guidelines:

- Run MPR in regenerative mode the first time you use it.
- Always schedule periodic regenerative MRP runs, even if you primarily use net change MRP, since net change MRP does not consider demand or forecast for items entering the MRP horizon over time.
- For forecasting, it is useful to run MRP at 12:01 a.m. Monday.

## Selective Update

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
  - Net Change Update
  - Regenerate Plan
  - **Selective Update**
- Review Action Messages
- Approve Planned Orders
- Review MRP Information
- Calculate the Capacity Plan

## Selective Materials Plan

Selective Materials Plan (23.3) plans only for items and sites you select. It can be run in net change mode by setting the Required Items Only field to Yes, or in regenerative mode by setting Required Items Only to No.

You can use Selective Materials Plan to plan master schedule items separately from other items. You can also plan small groups of items by using buyer/planner, product line, group, type, supplier, or any combination as selection criteria.

Guidelines:

- Limit program use to master schedulers only.
- This program plans down one level only.
- You can use Selective Materials Plan (23.3) to plan master schedule items separately from other items. You can also plan small groups of items by using buyer/planner, product line, group, type, supplier, or any combination as selection criteria.

In the selection fields, enter data for the criteria relevant to your needs; bypass fields by leaving them blank.

### Field Definitions

This section describes the key fields in Selective Materials Plan (23.3).

*Item Number/To* . Enter the range of item numbers that you want to update.

*Site / To.* Enter the range of sites that you want to update.

*Master Scheduled Items.*

Yes: Replan those items with Master Sched set to Yes in Item Planning Maintenance (1.4.7).

No: Ignore these items.

*Non Master Scheduled Items.*

Yes: Replan items with Master Sched set to No in Item Planning Maintenance (1.4.7).

No: Ignore these items.

*MRP Items.*

Yes: Replan items with Plan Orders set to Yes in Item Planning Maintenance (1.4.7).

No: Ignore these items.

*DRP Items.*

Yes: Replan distribution items. These items have Pur/Mfg set to D in Item Planning Maintenance (1.4.7)

This field can only be set to Yes if the DRP/MRP Combined field is set to Yes in DRP Control. Typically, these items are planned using DRP calculations.

No: Ignore these items.

*Required Items Only.*

Yes: Include only items marked for replanning. The system flags replanning whenever a change is made affecting order timing or quantity, including changes to:

Planning data

Inventory balance

Product structure

Purchase requisitions and orders

Sales orders

Work orders

Master schedule

Repetitive schedule

Forecast

No: Include all selected items.

*Resolve Low Level Codes.*

Yes: Analyze and resolve all low level codes.

No: Ignore the low level codes.

**Note** If low-level codes are unresolved when MRP is run, the results of the MRP run can be inaccurate.


*Synchronized Calculation.* Determines whether this MRP/DRP calculation runs simultaneously with other calculations sharing this synchronization code. Synchronized calculations benefit you if you have Symmetric Multiple Processor (SMP) computers.

*Synchronization Code.* A user-defined alphanumeric code that multiple, concurrent synchronized MRP/DRP calculations share.


*Buyer/Planner, Prod Line, Group, Item Type, Supplier, Pur/Mfg fields.* If you enter a code in any of these fields, MRP limits planning to items so flagged.

## Review Action Messages

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
- **Review Action Messages**
- Approve Planned Orders
- Review MRP Information
- Calculate the Capacity Plan


MRP-PR-120

Action messages suggest courses of action to resolve problems MRP finds. The following table lists common action messages.

Message	Meaning
Beginning Quantity Less Than Zero	Indicates that the initial nettable quantity on hand is negative.
Beginning Available Less Than Zero	Indicates that the quantity on hand less safety stock is negative.
Create	Indicates that a negative projected on hand balance requires creation of a supply order. This message is only generated if Plan Orders is No or if a new requirement appears within the time fence.
De-Expedite	Indicates that a scheduled supply order is due before it is needed. Delay the order or reschedule demand rescheduled to an earlier date.
Expedite	Indicates that a scheduled supply order is due after it is needed. Reschedule the order to an earlier date, or reschedule demand to a later date.
Cancel	Indicates that a scheduled supply order is no longer needed. Delete the order.
Release Due For	Indicates that a supply order is ready for release. If it is a planned order, approval is also required.  Use the Order Release Horizon field in MRP Control (23.24) to specify the number of days before the order release date for this action message to display.
Release Past Due For	Indicates that a supply order was not released when it was due. Either release or expedite the order now or reschedule demand for a later date.

<b>Message</b>	<b>Meaning</b>
Quantity Less than Minimum	Indicates that a supply order was created for a quantity less than the minimum quantity set in the item planning data.
Quantity Exceeds Maximum	Indicates that a supply order was created for a quantity greater than the maximum quantity set in the item planning data.
Past Due	Indicates that a scheduled supply order receipt is past due.
Time Fence Conflict	Indicates that there is an unsatisfied material requirement inside the planning time fence for this item. Either manually schedule and expedite orders to fill this demand or delay fulfillment of the requirement that created the demand.
Shipment Due	Indicates that a shipment for an intersite request item is due. Act at the source site to ensure that the order is received on time.
Shipment Past Due	Indicates that a shipment for an intersite request item is past due. Either delay the orders that created the requirement for the item or expedite them when the item does arrive.
No Source Of Supply	Indicates that the planning data for an intersite request item does not specify a valid source network for the date an intersite request is required.
Planned Order Count Exceeds Maximum	Indicates that the item site has generated the maximum allowable number of 9999 planned orders per day. Calculation for other items is not affected.

## Action Message Review/Update

# Action Message Review/Update

Starting Item Number: 01010

BOM/Formula Code:

Site: 10-100

Buyer/Planner:

Show Phantom Items:

Include Base Process Orders:


QAD

MRP-PR-130


Action Message Review/Update (23.5) reports on action messages using various selection criteria. Select the messages you want using the criteria.

## Approve Planned Orders

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
- Review Action Messages
- **Approve Planned Orders**
- Review MRP Information
- Calculate the Capacity Plan

 MRP-PR-140

MRP produces orders based on demand. The status of these orders is planned. They can be for manufactured and purchased items and work orders:

- You release the orders for manufactured items as work orders
- You release the orders for purchased parts as requisitions

Subsequent MRP runs can change planned orders. To move these orders out of the control of MRP, you approve them.

## Planned Work Order Approval

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
- Review Action Messages
- Approve Planned Orders
  - **Work Orders**
  - Purchase Orders
- Review MRP Information
- Calculate the Capacity Plan

## Planned Work Order Approval: 1 of 2

Planned Work Order Approval

Go To Actions Copy Print Preview Attach

Item: 01010 Item Number: 01010 (2) To:

Item Number: 01010 To:

BOM/Formula: To:

Site: 10-100 To: 10-100

Release Date: To:

Default Approve:

Buyer/Planner:

Include Phantoms:

Include Line Manufactured Items:

Include Purchased Items:



MRP-PR-160

Planned Work Order Approval (23.10) approves the MRP plan, generating a firm order for the amount of each planned order, changing the status from P to F. After this step, items are ready for release. The new status prevents MRP from changing the order dates and quantities. Select orders for approval with the criteria displayed.

The screen displays the relevant work orders in the top half. In the bottom, you select orders by line number for processing:

## Planned Work Order Approval: 2 of 2

Ln	Work Order	ID	Item Number	Qty Ordered	Rel Date	OK
1	08020002	2286305	01010	12.0	8/10/2010	<input checked="" type="checkbox"/>
2	08020003	2286306	01010	25.0	8/17/2010	<input checked="" type="checkbox"/>
3	08020004	2286307	01010	25.0	8/24/2010	<input checked="" type="checkbox"/>
4	08020005	2286308	01010	25.0	8/31/2010	<input checked="" type="checkbox"/>
5	08020006	2286309	01010	25.0	9/7/2010	<input checked="" type="checkbox"/>
6	08020007	2286310	01010	25.0	9/14/2010	<input checked="" type="checkbox"/>
7	08020008	2286311	01010	25.0	9/21/2010	<input checked="" type="checkbox"/>
8	08020009	2286312	01010	25.0	9/28/2010	<input checked="" type="checkbox"/>
9	08020010	2286313	01010	25.0	10/5/2010	<input checked="" type="checkbox"/>
10	08020011	2286314	01010	25.0	10/12/2010	<input checked="" type="checkbox"/>



MRP-PR-170

### Field Definitions

The key fields on the screen are described here.

*Ln.* Enter the line number of the work order, shown in the top half of the screen.

*Work Order.* The MRP-assigned number.

*ID / Item Number / Qty Ordered / Release.* Display-only fields.

*OK.*

- Yes to release the order, place a check mark in the box by cursor clicking in the box.
- No to prevent its release.

*Is all information correct?*

- Yes = Process
- No = Correct the data
- Cancel = Cancel the function

Discussed in *Training Guide: Work Orders*

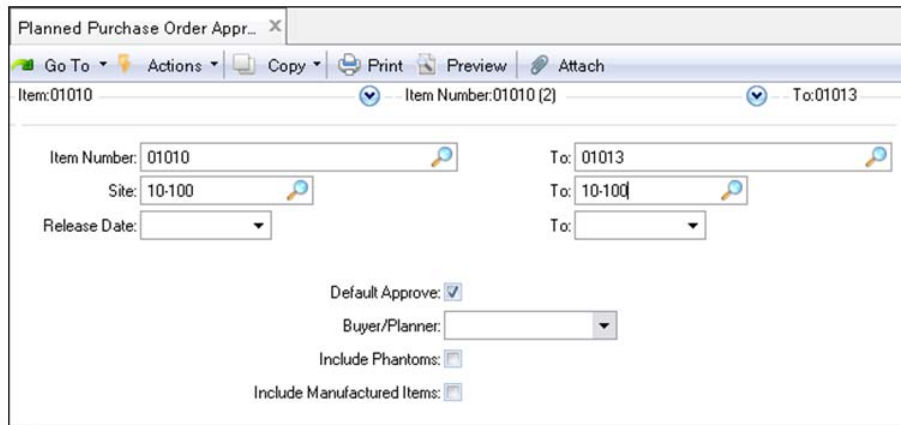
## Planned Purchase Order Approval

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
- Review Action Messages
- Approve Planned Orders
  - Work Orders
  - **Purchase Orders**
- Review MRP Information
- Calculate the Capacity Plan

## Planned Purchase Order Approval: 1 of 2



Planned Purchase Order Appr... x

Go To Actions Copy Print Preview Attach

Item:01010 Item Number:01010 (2) To:01013

Item Number: 01010 To: 01013

Site: 10-100 To: 10-100

Release Date: To:

Default Approve:

Buyer/Planner:

Include Phantoms:

Include Manufactured Items:



MRP-PR-190

Planned Purchase Order Approval (23.11) approves the MRP plan, generating purchase requisitions for the amount of each planned order. From here, the requisitions are ready to print. This action moves the purchase orders out of the MRP module and into the purchasing module.

On the first screen, select the planned orders to approve, usually for a range of items and release dates. To approve the entire group, set Default Approve to Yes.

## Planned Purchase Order Approval: 2 of 2

Ln	Req	Item Number	Qty Ordered	Rel Date	Due Date	Appr
1	G1010001	60001	34.0	9/23/2010	9/28/2010	<input checked="" type="checkbox"/>
2	G1010001	60001	40.0	9/30/2010	10/5/2010	<input checked="" type="checkbox"/>
3	G1010001	60001	40.0	10/7/2010	10/12/2010	<input checked="" type="checkbox"/>
4	G1010001	60001	52.0	10/14/2010	10/19/2010	<input checked="" type="checkbox"/>
5	G1010001	60002	22.0	9/30/2010	10/5/2010	<input checked="" type="checkbox"/>
6	G1010001	60002	25.0	10/7/2010	10/12/2010	<input checked="" type="checkbox"/>
7	G1010001	60002	37.0	10/14/2010	10/19/2010	<input checked="" type="checkbox"/>
8	G1010001	60003	25.0	8/12/2010	8/17/2010	<input checked="" type="checkbox"/>
9	G1010001	60003	40.0	8/19/2010	8/24/2010	<input checked="" type="checkbox"/>
10	G1010001	60003	40.0	8/26/2010	8/31/2010	<input checked="" type="checkbox"/>


This screen displays outstanding MRP-generated purchase requisitions and enables you to approve them. Enter the line number in the indicated field to access the appropriate data.




MRP-PR-200

## Review MRP Information

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
- Review Action Messages
- Approve Planned Orders
- **Review MRP Information**
- Calculate the Capacity Plan

 QAD MRP-PR-210

This section covers:

- MRP Summary
- MRP Details
- Past Due Receipts

## MRP Summary

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
- Review Action Messages
- Approve Planned Orders
- Review MRP Information
  - **MRP Summary**
  - MRP Details
  - Past Due Receipts
- Calculate the Capacity Plan

## MRP Summary Inquiry

## MRP Summary Inquiry

Category	Past	10/18/2010	10/25/2010	11/1/2010	11/8/2010	11/15/2010
Gross Requirements	100	10	10	10	10	
Sched Receipts	0	0	0	0	0	
Projected QOH	50	65	55	45	35	
Plan Ords Due	150	25	0	0	0	
Plan Ords Rel	175	0	0	0	0	

MRP Summary Inquiry (23.13) gives you a brief view of the MRP outlook for specified date buckets.

The top portion of the MRP Summary Inquiry screen shows the item planning data stored in the item master along with the current quantity on hand.

The MRP Summary Inquiry screen layout follows APICS standards. The top row shows the Gross Reqs (Gross Requirements) for the period. The calculation of gross requirements was covered in an earlier section.

The time buckets are user defined at the selection screen for the summary inquiry. You can specify the periods in days, weeks, months, or General Ledger calendar periods. The display defaults to weeks. In addition, you can specify how many periods to display in each vertical column. For example, selecting months and two periods per bucket displays a year of data in a single row.

The second line shows Sched Receipt (Scheduled Receipts). Scheduled Receipts are released orders, either purchase or work orders due to be received in the period the quantity appears in.

The third line Projected QOH (Quantity on Hand) is a calculated value based on the current quantity on hand, plus the scheduled receipts, less the gross requirement.

The fourth line Plan Ords Due (Planned Orders Due) is the quantity of items on MRP-planned, not-yet-released orders intended for receipt in the period.

The last line, Plan Ords Rel (Planned Orders to Be Released) is the quantity of items on planned, not-yet-released orders in the period.

Once an order that appears on the Plan Ords Rel line is release, it becomes a Scheduled Receipt.

Item Number	Site	Start Date	End Date	Column Type	Per Column	Columns																																																																																																						
01030	10-100	10/18/2010		Week	1	12																																																																																																						
Item Number: 01030 Consumer Ultrasound Site: 10-100																																																																																																												
Qty on Hand:	0.0 EA		Pur/Mfg:	M																																																																																																								
Buyer/Planner:	1-01	Order Policy: P0Q	Mfg LT:	2	Minimum Order:	25																																																																																																						
Master Schedule:	Yes	Order Period: 7	Purchase LT:	0	Maximum Order:	500																																																																																																						
MRP Required:	No	Time Fence: 0	Inspect LT:	0	Order Multiple:	25																																																																																																						
Plan Orders:	Yes	Safety Time: 0	Inspect Req:	No	Order Quantity:	0																																																																																																						
Issue Policy:	Yes	Safety Stock: 0	Cumulative LT:	0	Yield Percent:	100.00%																																																																																																						
<table border="1"> <thead> <tr> <th>Category</th> <th>Past</th> <th>10/18/2010</th> <th>10/25/2010</th> <th>11/1/2010</th> <th>11/8/2010</th> </tr> </thead> <tbody> <tr> <td>Gross Requirements</td> <td>100</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> </tr> <tr> <td>Sched Receipts</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Projected QOH</td> <td>50</td> <td>65</td> <td>55</td> <td>45</td> <td>35</td> </tr> <tr> <td>Plan Ords Due</td> <td>150</td> <td>25</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Type</td> <td>Order</td> <td>Line ID</td> <td>Date</td> <td>Qty</td> <td>10/18/2010</td> <td>10/25/2010</td> <td>11/1/2010</td> <td>11/8/2010</td> </tr> <tr> <td>Planned Order</td> <td>08020029</td> <td>2286330</td> <td>8/2/2010</td> <td>50</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Planned Order</td> <td>08020030</td> <td>2286331</td> <td>8/9/2010</td> <td>25</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Planned Order</td> <td>08020031</td> <td>2286332</td> <td>8/23/2010</td> <td>25</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Planned Order</td> <td>08020032</td> <td>2286333</td> <td>9/13/2010</td> <td>25</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Planned Order</td> <td>08020033</td> <td>2286334</td> <td>9/27/2010</td> <td>25</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Planned Order</td> <td>08020034</td> <td>2286335</td> <td>10/18/2010</td> <td>0</td> <td>25</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Plan Ords Rel</td> <td></td> <td></td> <td></td> <td>175</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>							Category	Past	10/18/2010	10/25/2010	11/1/2010	11/8/2010	Gross Requirements	100	10	10	10	10	Sched Receipts	0	0	0	0	0	Projected QOH	50	65	55	45	35	Plan Ords Due	150	25	0	0	0	Type	Order	Line ID	Date	Qty	10/18/2010	10/25/2010	11/1/2010	11/8/2010	Planned Order	08020029	2286330	8/2/2010	50	0	0	0	0	Planned Order	08020030	2286331	8/9/2010	25	0	0	0	0	Planned Order	08020031	2286332	8/23/2010	25	0	0	0	0	Planned Order	08020032	2286333	9/13/2010	25	0	0	0	0	Planned Order	08020033	2286334	9/27/2010	25	0	0	0	0	Planned Order	08020034	2286335	10/18/2010	0	25	0	0	0	Plan Ords Rel				175	0	0	0	0
Category	Past	10/18/2010	10/25/2010	11/1/2010	11/8/2010																																																																																																							
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Planned Order	08020029	2286330	8/2/2010	50	0	0	0	0																																																																																																				
Planned Order	08020030	2286331	8/9/2010	25	0	0	0	0																																																																																																				
Planned Order	08020031	2286332	8/23/2010	25	0	0	0	0																																																																																																				
Planned Order	08020032	2286333	9/13/2010	25	0	0	0	0																																																																																																				
Planned Order	08020033	2286334	9/27/2010	25	0	0	0	0																																																																																																				
Planned Order	08020034	2286335	10/18/2010	0	25	0	0	0																																																																																																				
Plan Ords Rel				175	0	0	0	0																																																																																																				

**Note** Drill down detail shown on the screen.

## MRP Summary Report

MRP Summary Report (23.14) gives you summary information on MRP for specified date buckets. Information appears in columns, with one column per time period. Activity before the start date appears in the first column under the label Past.

Select the data according to the criteria displayed.

*Print Detail.* Allows to print order details following the summary. Useful to help resolve shortage situations. This function creates a report that is both summary and detail format.

*Use Cost Plans.* Allows you to print a summary of production costs for each period. Normally production costs are based on the GL cost of the item, but if a cost plan is in place, costs are based on these planned future costs.

Costs plans are entered in the Cost Management module and they allow you to project future cost changes. This function is useful for commodities or seasonal items.

*Print Action Messages.* Allows you to print action messages following the summary report. Useful to help resolve shortage situations.

*Day / Week / Month.* Indicates the length of each column period:

- D for Day
- W for Week
- M for Month (requires that you set the Per Column field to 1)
- P for GL calendar period (works only if you are using the General Ledger module)

Sample MRP Summary Report

## MRP Summary Report: Sample

MRP Summary Report - 10/21/10 X

**MRP Summary Report**  
**10USA**

10/20/10 21:25:30

Page: 1

Item Number: 01010 Qty on Hand: 10.0 Order Policy: POQ Order Period: 7 Order Qty: 0	Medical Ultrasound UM: EA Minimum Order: 1 Maximum Order: 5 Ord Mult: 1	Time Fence: 0 Safety Time: 0 Safety Stk: 0 Yield%: 100.00%	Buyer/Planner: 1-01 Manufacturing Lead Time: 4 Pur/Mfg: M Inspect: No Cumulative Lead Time: 0 BOM/Formula Code:	Site: 10-100 MRP Required: No Mstr Sched: Yes Plan Orders: Yes Issue Policy: Yes
---	---	---	--	--

	Past	10/18/10	10/25/10	11/01/10	11/08/10	11/15/10	11/22/10	11/29/10	12/06/10	12/13/10	12/20/10	12/27/10	01/03/11
		10/17/10	10/24/10	10/31/10	11/07/10	11/14/10	11/21/10	11/28/10	12/05/10	12/12/10	12/19/10	12/26/10	01/02/11
Gross Reqs		250	25	25	25	25	25	25	25	25	25	25	4
Sched Receipt		0	0	0	0	0	0	0	0	0	0	0	0
Projected QOH		5	17	17	-8	-33	-37	-62	-87	-112	-137	-150	-154
Plan Ords Due		245	37	25	0	0	21	0	0	0	0	12	0
Plan Ords Rel		270	37	0	0	0	21	0	0	0	0	12	0

	Past	01/10/11	01/17/11	01/24/11	01/31/11	02/07/11	02/14/11	02/21/11	02/28/11	03/07/11	03/14/11	03/21/11	03/28/11
		01/09/11	01/16/11	01/23/11	01/30/11	02/06/11	02/13/11	02/20/11	02/27/11	03/06/11	03/13/11	03/20/11	03/27/11
Gross Reqs		504	0	0	21	0	0	0	0	0	0	0	0
Sched Receipt		0	0	0	0	0	0	0	0	0	0	0	0
Projected QOH		-154	-154	-133	-154	-154	-154	-154	-154	-154	-154	-154	-154
Plan Ords Due		340	0	21	0	0	0	0	0	0	0	0	0
Plan Ords Rel		340	0	21	0	0	0	0	0	0	0	0	0

Item Number: 01011 Qty on Hand: 0.0 Order Policy: POQ Order Period: 7 Order Qty: 0	Supplies Kit UM: EA Minimum Order: 0 Maximum Order: 0 Ord Mult: 0	Time Fence: 0 Safety Time: 0 Safety Stk: 0 Yield%: 100.00%	Buyer/Planner: 1-03 Manufacturing Lead Time: 5 Pur/Mfg: C Inspect: No Cumulative Lead Time: 0 BOM/Formula Code:	Site: 10-100 MRP Required: No Mstr Sched: No Plan Orders: Yes Issue Policy: Yes
--	---	---	--	---

MRP-PR-240

The summary report shows the same information as the summary inquiry.

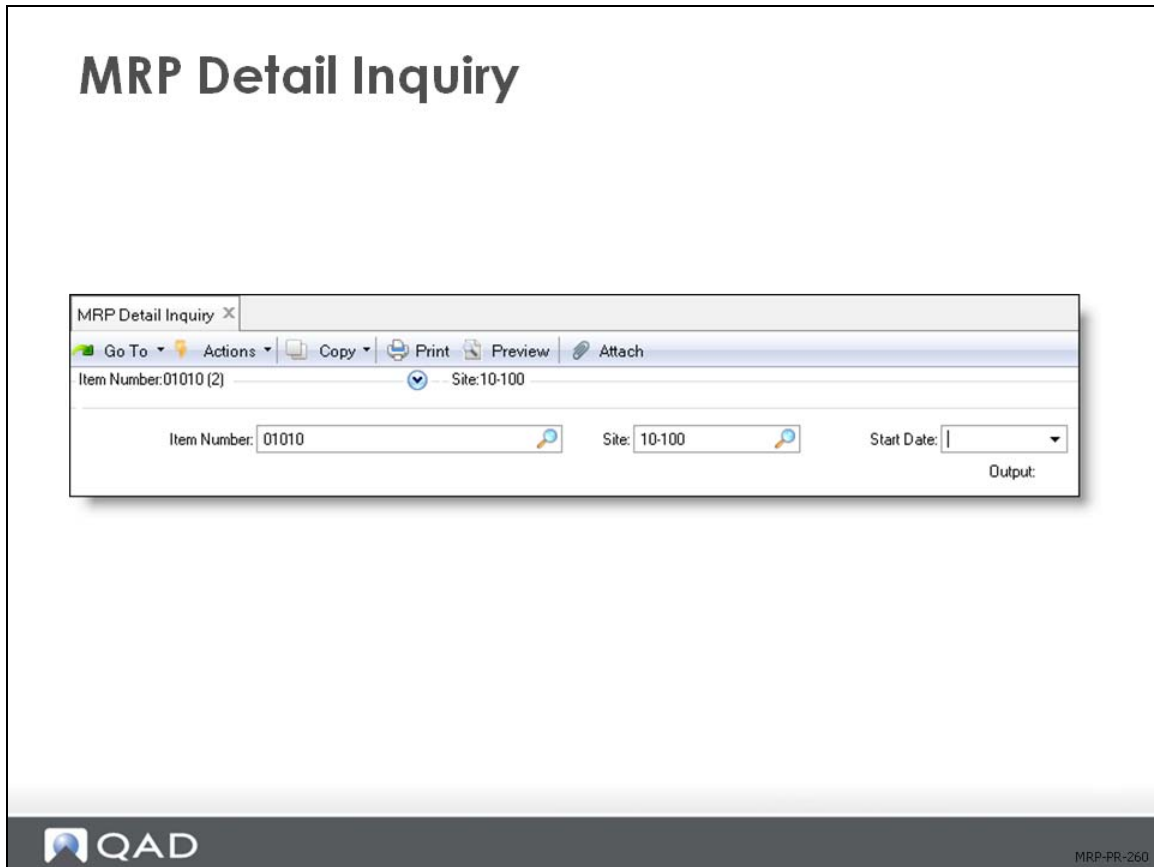
## MRP Details

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
- Review Action Messages
- Approve Planned Orders
- Review MRP Information
  - MRP Summary
  - **MRP Details**
  - Past Due Receipts
- Calculate the Capacity Plan

## MRP Detail Inquiry



MRP Detail Inquiry (23.16) gives you a detailed look at MRP for specified date buckets. Buyer/Planners use this inquiry often.



## Past Due Receipts

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
- Review Action Messages
- Approve Planned Orders
- Review MRP Information
  - MRP Summary
  - MRP Details
  - **Past Due Receipts**
- Calculate the Capacity Plan

## Past Due Receipts Inquiry

## Past Due Receipts Inquiry

10/20/10

**QAD**

Item Number	Site	Buy Pln	Show MRP Required	Items	Show Phantom Items	Output PAGE
01010	10-200		no		no	

Item Number: 02001      Buyer/Planner: 2-01      Site: 10-200  
Automotive Connector

Due Date	Release	Quantity	UM	Detail
08/21/10	08/20/10	563.0	EA	Work Order Past Due
09/21/10	09/20/10	1,125.0	EA	Work Order Past Due
10/21/10	10/20/10	563.0	EA	Work Order Release Due w/o: 1010030      ID: 2282822

Item Number: 02003      Buyer/Planner: 2-01      Site: 10-200  
Standard Connector

Due Date	Release	Quantity	UM	Detail
08/17/10	08/16/10	575.0	EA	Work Order Past Due
09/17/10	09/16/10	1,150.0	EA	Work Order Past Due
10/17/10	10/16/10	575.0	EA	Work Order Past Due w/o: 1010001      ID: 2282793

**QAD**

MRP-PR-290

Past Due Receipts Inquiry (23.19) shows you past due receipts.

Because the projected quantity on hand value uses released order due dates for supply, orders that become past due are a real problem. It is imperative that past due orders be rescheduled with a due date in the future for the projected quantity on hand value to be meaningful.

MRP has no logic to deal with past due orders, they are lumped into the first column of the summary inquiry screen as past due.

## Calculate the Capacity Plan

The diagram illustrates the process of calculating a capacity plan. On the left, a stylized illustration of a factory floor shows a conveyor belt with several yellow boxes being processed. A speech bubble above the factory asks, "Do we have enough capacity to meet the plan?". On the right, a hierarchical organizational chart shows a box labeled "Department" at the top, with an arrow pointing down to a row of five boxes labeled "Work Center 1", "Work Center 2", "Work Center 3", "Work Center 4", and "Work Center 5".

**QAD** MRP-PR-295

Once the MRP has been reviewed and action messages acted upon, the capacity plan can be run. The MRP output is the direct input to CRP. Capacity Requirements Planning uses all work orders on the system to calculate the load.

All capacity planning and reporting is organized around work center/machine.

## Calculate the Capacity Plan

### MRP Processing



- Verify Low Level Codes
- Calculate Requirements
- Review Action Messages
- Approve Planned Orders
- Review MRP Information
- **Calculate the Capacity Plan**

## Recalculating the Capacity Plan

### Recalculate Capacity Plan

Recalculate Capacity Plan X
 Go To Actions Copy Print Preview Attach

Item: Site:10-100 To:10-100

Site: <input type="text" value="10-100"/>	To: <input type="text" value="10-100"/>
Work Order: <input type="text"/>	To: <input type="text"/>
Item Number: <input type="text"/>	To: <input type="text"/>
Release Date: <input type="text"/>	To: <input type="text"/>
Due Date: <input type="text"/>	To: <input type="text"/>
Sales/Job: <input type="text"/>	To: <input type="text"/>
ID: <input type="text"/>	
Supplier: <input type="text"/>	

Planned Orders  
 Firm Planned Orders  
 Exploded Orders  
 Allocated Orders  
 Released Orders

MRP-PR-310

### Capacities and Load

The capacity plan is recalculated after an MRP run. CRP looks at the available hours or machines for departments and work centers. CRP then loads the work center by locating all orders that meet the selection criteria and applies them to operations by start date, using backward scheduling from the orders' due dates.


**Note** This recalculation takes some time to process. Consider submitting it in batch mode.

Additional discussion in *Training Guide: Work Centers, Routings, and WO Subcontracting*

Like selective MRP, CRP is restricted to certain ranges of sites, items, and other factors as seen on the Recalculate Capacity Plan selection screen. Like selective MRP, be aware of what you are leaving out of the capacity plan.

## Recalculate Capacity Plan


# Recalculate Capacity Plan



**10USA**

Recalculate Capacity Plan - 10\_ x

Work Order	ID	Item Number	Rel Date	Due Date	ST	Qty Ordered	Qty Completed	First Op Due Date	
								Start	Last Op
0111002	2283377	50011	01/16/11	01/17/11	F	25.0	0.0	01/17/11	01/17/11
0111020	2283394	50001	01/18/11	01/19/11	F	25.0	0.0	01/18/11	01/19/11
0111021	2283395	50010	01/18/11	01/19/11	F	25.0	0.0	01/14/11	01/19/11
0111028	2283402	01010	01/20/11	01/21/11	F	21.0	0.0	11/19/10	01/21/11
0111029	2283403	01020	01/20/11	01/21/11	F	21.0	0.0	03/12/10	01/21/11
08020002	2286305	01010	08/10/10	08/16/10	P	12.0	0.0	07/09/10	08/16/10
08020003	2286306	01010	08/17/10	08/23/10	P	25.0	0.0	06/08/10	08/23/10
08020004	2286307	01010	08/24/10	08/30/10	P	25.0	0.0	06/15/10	08/30/10
08020005	2286308	01010	08/31/10	09/06/10	P	25.0	0.0	06/22/10	09/06/10
08020006	2286309	01010	09/07/10	09/13/10	P	25.0	0.0	06/29/10	09/13/10
08020007	2286310	01010	09/14/10	09/20/10	P	25.0	0.0	07/06/10	09/20/10
08020008	2286311	01010	09/21/10	09/27/10	P	25.0	0.0	07/13/10	09/27/10
08020009	2286312	01010	09/28/10	10/04/10	P	25.0	0.0	07/20/10	10/04/10
08020010	2286313	01010	10/05/10	10/11/10	P	25.0	0.0	07/27/10	10/11/10
08020011	2286314	01010	10/12/10	10/18/10	P	25.0	0.0	08/03/10	10/18/10
08020012	2286315	01010	10/19/10	10/25/10	P	25.0	0.0	08/10/10	10/25/10
08020013	2286316	01040	07/27/10	08/02/10	P	60.0	0.0	02/03/10	08/02/10
08020014	2286317	01040	07/27/10	08/02/10	P	15.0	0.0	06/17/10	08/02/10
08020015	2286318	01040	08/03/10	08/09/10	P	15.0	0.0	06/24/10	08/09/10
08020016	2286319	01040	08/10/10	08/16/10	P	15.0	0.0	07/01/10	08/16/10
08020017	2286320	01040	08/17/10	08/23/10	P	15.0	0.0	07/08/10	08/23/10
08020018	2286321	01040	08/24/10	08/30/10	P	15.0	0.0	07/15/10	08/30/10
08020019	2286322	01040	08/31/10	09/06/10	P	15.0	0.0	07/22/10	09/06/10
08020020	2286323	01040	09/07/10	09/13/10	P	15.0	0.0	07/29/10	09/13/10
08020021	2286324	01040	09/14/10	09/20/10	P	15.0	0.0	08/05/10	09/20/10
08020022	2286325	01040	09/21/10	09/27/10	P	15.0	0.0	08/12/10	09/27/10
08020023	2286326	01040	09/28/10	10/04/10	P	15.0	0.0	08/19/10	10/04/10
08020024	2286327	01040	10/05/10	10/11/10	P	15.0	0.0	08/26/10	10/11/10
08020025	2286328	01040	10/12/10	10/18/10	P	15.0	0.0	09/02/10	10/18/10
08020026	2286329	01040	10/19/10	10/25/10	P	15.0	0.0	09/09/10	10/25/10
08020029	2286330	01030	07/29/10	08/02/10	P	50.0	0.0	07/21/10	08/02/10
08020030	2286331	01030	08/05/10	08/09/10	P	25.0	0.0	08/03/10	08/09/10
08020031	2286332	01030	08/19/10	08/23/10	P	25.0	0.0	08/17/10	08/23/10
08020032	2286333	01030	09/09/10	09/13/10	P	25.0	0.0	09/07/10	09/13/10



MRP-PR-311


## CRP Planning

### Lead-Time Components

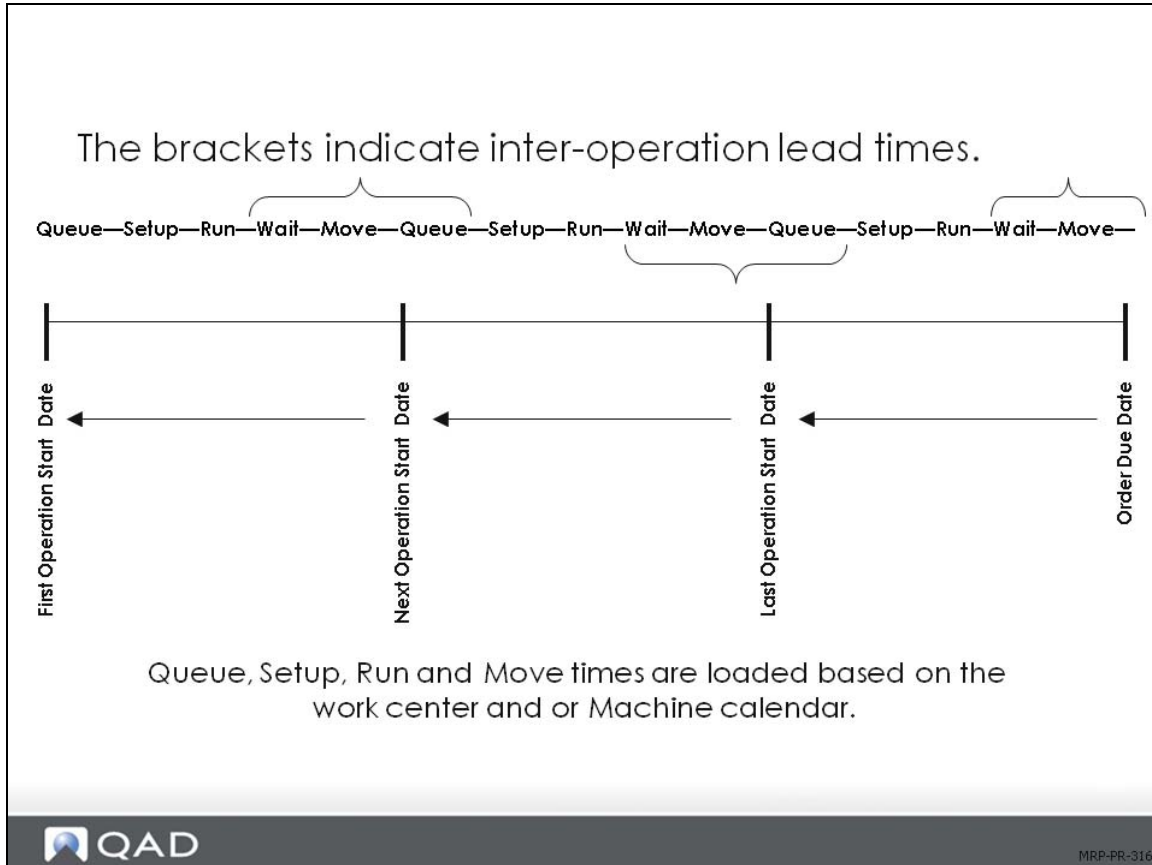
<b>Queue</b>	<b>Setup</b>	<b>Run</b>	<b>Wait</b>	<b>Move</b>
--------------	--------------	------------	-------------	-------------

- **Queue**
    - Time waiting before operation begins
  - **Setup**
    - Time getting ready for operation
  - **Run**
    - Time performing operation
- **Wait**
    - Time waiting after operation ends
  - **Move**
    - Time physically moving between operations

**Queue, Setup, Wait and Move times are referred to as Order times, that is they do not vary with order size. They can be different for every operation.**


MRP-PR-313

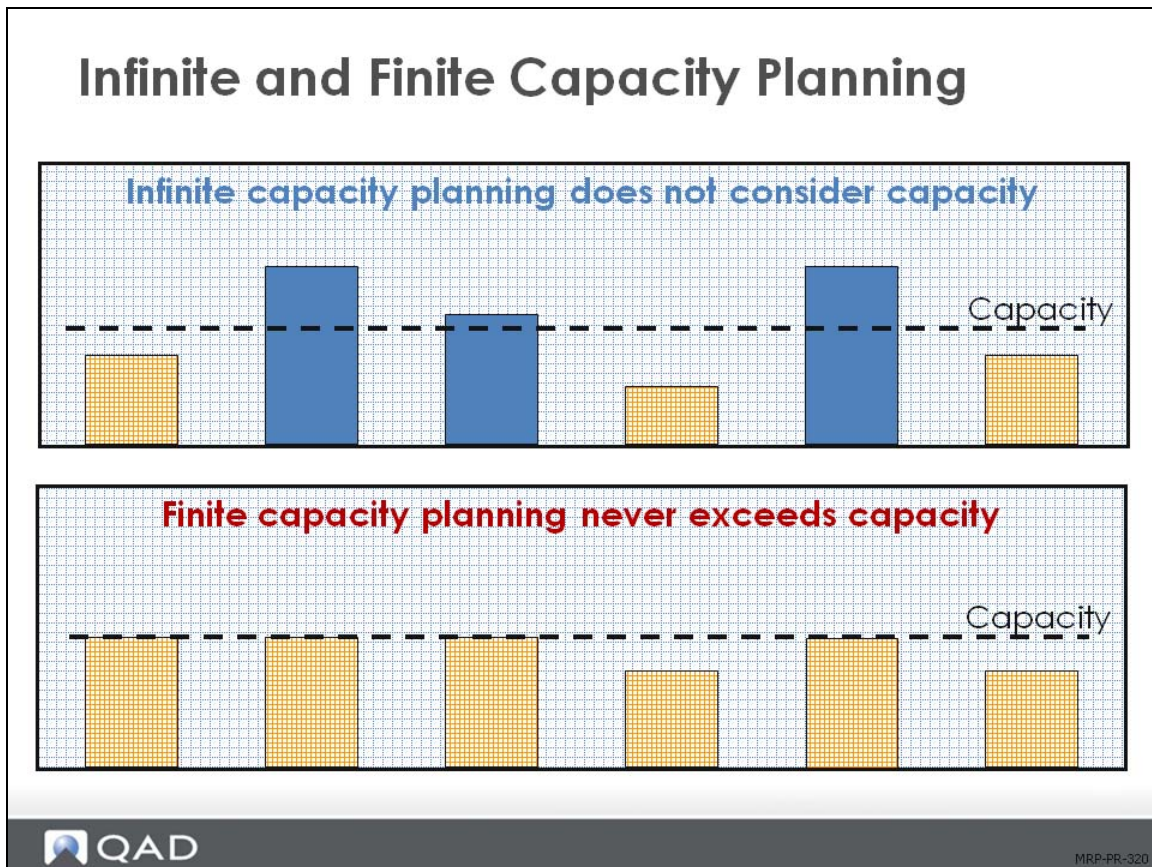
CRP uses different logic than MRP to calculate load. MRP offsets from a demand due date the fixed lead time to arrive at a release date for the supply order. CRP calculates from the same due date, but backward schedules all the five elements of lead time from the specific work order route, which is based on the work order quantity. CRP does this calculation for each operation.



Each element of lead time is added up backwards from the order due date. Each work center/machine has its own calendar. The system uses the actual order quantity, which is sometimes different from the standard order quantity.

In addition, the machines per operation and operation overlap values from the route also effect the lead time calculation. For these reasons, it is entirely possible for CRP to calculate a first operation start date before the order release date from MRP. This situation generates CRP action message.

## Infinite and Finite Capacity Planning



### Infinite (Unfixed) Capacity Planning

QAD Enterprise Applications CRP uses infinite loading to schedule operation and work center production loads based on work order due dates:

- No work order routing dates are changed to accommodate insufficient capacity
- Loading continues into the future without regard to capacity

### Finite (Fixed) Capacity Planning

Finite capacity planning assigns no more work to a work center than the work center can be expected to execute in a given time period. The Advanced Repetitive Workbench uses finite loading:

- Loading to finite capacity extends deliveries; as a result, the Master Schedule requires changes.
- Finite capacity looks at capacity and determines how much to produce, or how long it takes to produce it.

## The Plan

The capacity plan is sorted by:

- Work order and item
- Work order due and release dates
- Quantity ordered and quantity completed
- CRP-scheduled start and last operation dates

The CRP indicates:

- *No Routing* for orders that cannot be exploded
- *Op Conflict* difference between operation start date and work order release date

## Department and Work Center Capacities

# Department Maintenance

Department: 0010

Default Sub-Account:  Override:

Default Cost Center:  Override:

Description:

Labor Capacity:

Cost of Production:	5770		Mech		<input type="text"/>	
Labor:	5120		Mech		mfg	
Burden:	5220		Mech		mfg	
Labor Usage Variance Acct:	5140		Mech		mfg	
Labor Rate Variance Acct:	5150		Mech		mfg	
Burden Usage Variance:	5240		Mech		mfg	
Burden Rate Variance:	5250		Mech		mfg	

MRP-PR-330

The resources used to process orders on the shop floor are work centers, departments, and machines. The capacity of a department or work center is the time available for production in that location.

The capacity of a department is the total number of available labor hours per day for all work centers in that department, as defined in Department Maintenance (14.1), shown.

High level rough cut capacity information can be obtained using Department Load Summary and Detail Inquiries.

Consider this situation:

- A department has four work centers
- Each work center has four people
- Each person is available to work for 7.5 hours per day

The total labor for the department per day is 120 hours. ( $4 \times 4 \times 7.5 = 120$ ) This assumes that the labor in a department is relatively interchangeable between work centers.

**Note** The labor capacity field is the only field that capacity planners or shop floor personnel maintain. Restrict all the account codes fields to appropriate finance personnel. See the appropriate user guide for information on implementing role permissions and security:

- In EE, see *User Guide: Security and Controls*
- In SE, see *User Guide: Manager Functions*

## Work Center Maintenance

### Work Center Maintenance

Work Center Maintenance X
Go To Actions Copy Print Preview Attach

Work Center: 1000 (1) Machine:


Work Center:  Machine:

Description: General Assembly

Department: 0400 Assembly

Queue Time: 0.25  
Wait Time: 0.25  
Mach/Op: 1

Setup Crew: 1.00	Setup Rate: 5.00
Run Crew: 1.000	Labor Rate: 4.50
Machines: 1.000	Labor Burden Rate: 0.02
Mach Bdn Rate: 0.05	Labor Bdn %: 0.01%


MRP-PR-340

The capacity for a work center is the number of machines or personnel available for that work center, as defined in Work Center Maintenance (14.5). This value is multiplied by work hours, as defined in Calendar Maintenance (36.2.5).

If a work center or machine is over or under-loaded, you can modify either its capacity, the timing, or amount of the load. For example, a work center with a 7.5m day and five interchangeable machines has 37.5 hrs/day of capacity.

**Capacity.** Adjust capacity using one of the following functions:

Calendar Maintenance

Holiday Maintenance

- Add or subtract workday hours as needed for work center or shop calendars

**Adjusting Load.** Adjust the timing or amount of load by modifying:

Work order due dates

Operation lead time components

Repetitive schedules

**Note** If you manually adjust operation start and stop dates, CRP reschedules them the next time it is run.

In addition, repetitive schedules sometimes have multiple shifts and each shift sometimes has a productivity factor that increases or decreases the line production rate.

## Input/Output Inquiry

The screenshot shows the 'Input/Output Inquiry' window in QAD. The window has a title bar with 'Input/Output Inquiry' and a close button. Below the title bar is a menu bar with 'Go To', 'Actions', 'Copy', 'Print', 'Preview', and 'Attach'. The main area contains several input fields: 'Work Center: 1000 (1)' with a dropdown arrow, 'Machine:' with a dropdown arrow, 'Work Center: 1000' with a search icon, 'Machine: |' with a search icon, 'Start Date: 10/20/2010' with a dropdown arrow, 'Day/Week/Month: W' with a dropdown arrow, 'Per Column: 1' with a text input field, and 'Output:' with a text input field. The QAD logo is in the bottom left corner, and 'MRP-PR-350' is in the bottom right corner.

To provide shop floor data about planned versus actual results, compare the planned load input and output for a work center/machine with the actual load and output hours against that load. Input/Output Inquiry (24.4) and Input/Output Report (24.5) help evaluate a work center or machine's response to planned loads by:

- Displaying planned and actual input and output in daily, weekly, or monthly periods
- Spotting “bottlenecks”
- Giving a perspective apart from traditional load reports

# Input/Output Inquiry

Input/Output Inquiry - 10/21/20... X

**Input/Output Inquiry** 10/20/10

**QAD**

Work Center: 1000 Machine: General Assembly

Start Date: 10/20/10 Day/Week/Month: W Per Column: 1 Output: PAGE

Work Center: 1000 Description: General Assembly  
 Department: 0400 wc\_qad01: 0.0 Mach/Wk Ctr: 1.000  
 Mach/Op: 1 Run Crew: 1.000 Labor Rate: 4.50  
 Lbr Bdn Rate: 0.02 Labor Bdn %: 0.01% Mach Bdn Rate: 0.05  
 Queue Time: 0.25 Wait Time: 0.25 Work Location:  
 Machine: Percent Utiliza: 0.000 Percent Eff1: 0.000  
 wc\_qad02: 0.000 Uf1d1: Uf1d2:  
 Setup Crew: 1.00 Setup Rate: 5.00 Mod Date: 10/20/10  
 User ID: qmi Setup Bdn Rate: 0.00 Setup Bdn %: 0.00%  
 Mach Setup B: 0.00 FSM Type: QAD Character:  
 QAD Character: QAD Character: QAD Decimal: 0.00  
 QAD Decimal: 0.00 QAD Logical: No User Character:  
 User Character: User Character: User Decimal: 0.00  
 User Decimal: 0.00 User Logical: No Domain: 10USA

	Past	10/20/10	10/27/10	11/03/10	11/10/10	11/17/10	11/24/10
	10/19/10	10/26/10	11/02/10	11/09/10	11/16/10	11/23/10	11/30/10
Input Plan	690	0	56	0	97	0	0
Input Actual	243	0	0	0	0	0	0
Cumulative Dev	-448	-448	-504	-504	-601	-601	-601
Output Plan	662	28	0	0	59	94	0
Output Actual	281	0	0	0	0	0	0
Cumulative Dev	-381	-409	-409	-409	-468	-562	-562
Queue Plan	28	-28	56	0	38	-94	0
Queue Actual	-39	-39	-39	-39	-39	-39	-39

The Input/Output Inquiry and Report display the same information. The inquiry screen displays one work center/machine at a time. The report selection allows you to select a range of work centers and or machines.

## Input/Output Report

## Input/Output Report

The screenshot shows a web browser window titled "Input/Output Report". The browser's address bar shows "Work Center:1000 (1)". The page has a toolbar with "Go To", "Actions", "Copy", "Print", "Preview", and "Attach". Below the toolbar, there are input fields for "Work Center:" (containing "1000"), "Machine:", "Start Date:" (a dropdown menu showing "10/20/2010"), "D/W/M/P:" (containing "W"), and "Per Column:" (containing "1"). There are also "To:" fields for both "Work Center:" and "Machine:". In the bottom right corner, there are labels for "Output:" and "Batch ID:". The QAD logo is in the bottom left, and "MRP-PR-360" is in the bottom right.

The Input/Output Inquiry and Report display the same information. The inquiry screen displays one work center/machine at a time. The report selection allows you to select a range of work centers and or machines.

**Note** Enterprise Edition includes an additional enhanced version of Input/Output Report for .NET UI users.



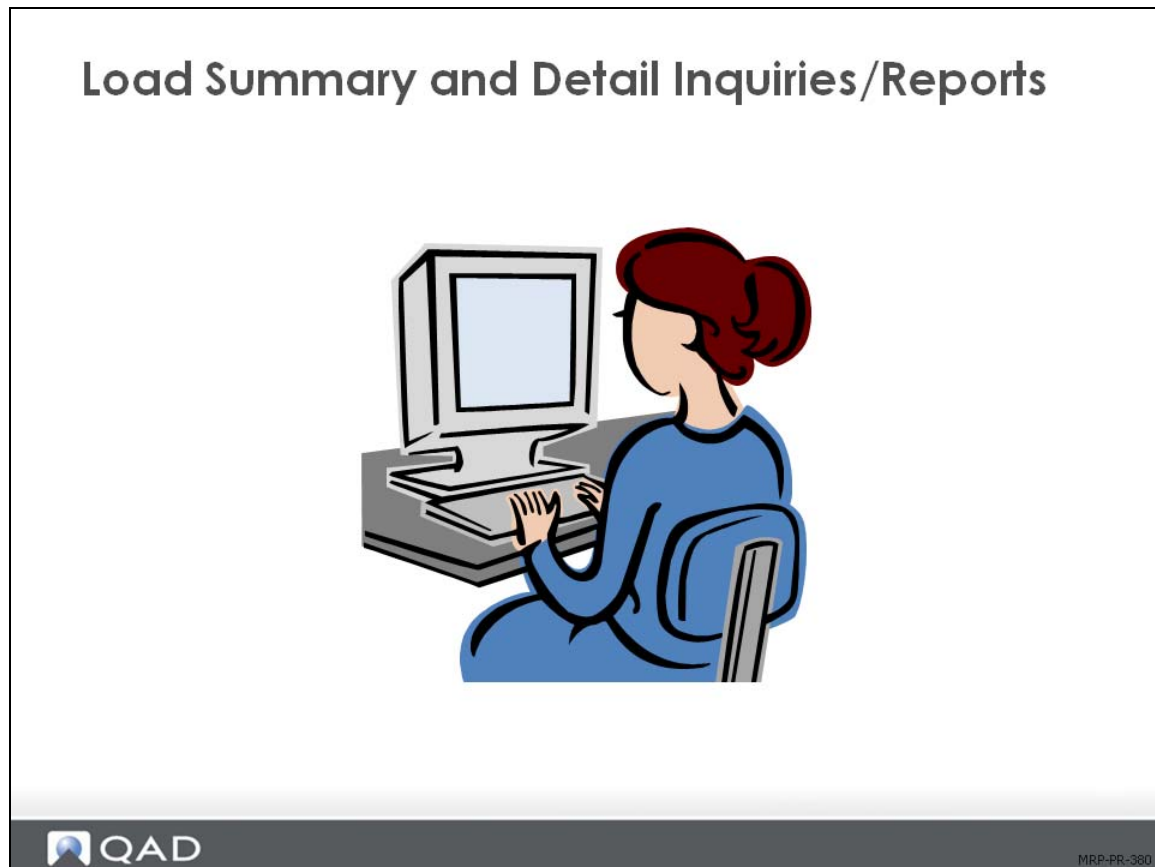
*Planned Queue.* Difference between planned input and planned output

*Actual Queue.* Difference between actual input and actual output

Experienced shop floor planners scan the Input/Output Report Queue line for a fast indication of how things are going. Assuming they have loaded a given work center/machine to a relatively fixed planned queue, an actual queue that is either growing or shrinking is an indicator work is building up or running out.

**Note** Use Shop Floor Control (17.24) in order for this report to be helpful

## Summary and Detail Inquiries and Reports



You can generate load reports by department, work center, or machine using the work center and department load inquiries and reports.

CRP determines load hours for a work center based on setup and run times. Queue, wait, and move times are excluded from load calculations. To include queue times in load calculations, set up separate operations for queue. CRP then considers these operations when calculating load.

CRP determines the load an operation exerts on a work center using the following calculation:

$$\text{Operation Load} = \text{Setup Time} + (\text{Run Hours/Unit} * \text{Quantity Open})$$

The quantity open for an operation is the order quantity minus any quantities reported complete.

The system assigns the entire load for an operation to its scheduled start date. Even for operations with run times longer than one day, load is not spread between operation start and due dates

## Work Center Load Summary Inquiry and Report

### Work Center Load Summary Inquiry

Work Center Load Summary In... x

Run Export to Excel View as PDF

Work Center: 1000 Machine: Site: 10-100 Start Date: 10/20/2010 End Date: Column Type: Week Per Column: 1 Columns: 12

Work Center: 1000 Machine: Site: 10-100 Run Crew: 1.000  
 Description: General Assembly Queue Time: 0.25 Mach/Wk Ctr: 1.000  
 Department: 0400 Assembly Wait Time: 0.25 Mach/Op: 1

Category	Past	10/20/2010	10/27/2010	11/3/2010	11/10/2010	11/17/2010			
Work Days	0	5	5	5	5	5			
Available Hours	0	40	40	40	40	40			
Load Hours	6.651	0	0	0	3				
Order	ID/Line	Operation	Date	Past	10/20/2010	10/27/2010	11/3/2010	11/10/2010	11/17/2010
0810021	2282401	10	8/13/2010	1.8	0	0	0	0	0
0810002	2282383	20	8/17/2010	0.013	0	0	0	0	0
0910021	2282618	10	9/13/2010	3	0	0	0	0	0
0910002	2282600	20	9/17/2010	0.025	0	0	0	0	0
1010002	2282794	20	10/15/2010	0.013	0	0	0	0	0
1010021	2282813	10	10/15/2010	1.8	0	0	0	0	0
1110021	2283010	10	11/15/2010	0	0	0	0	3	
1110002	2282992	20	11/17/2010	0	0	0	0	0	0
1210021	2283202	10	12/13/2010	0	0	0	0	0	0
1210002	2283184	20	12/17/2010	0	0	0	0	0	0
Capacity Less Load				-6.651	33.349	73.349	113.349	150.349	

MRP-PR-390

### Inquiry

The work center load summary displays total load from all orders in the period compared to available capacity, with the difference and the cumulative difference. The inquiry displays data for one work center/ machine at a time.

A cumulative difference that continues to move in one direction is a sure indication of an imbalance to address.

## Report

## Work Center Load Summary Report

Work Center Load Summary R... x

Go To Actions Copy Print Preview Attach

Site: 10-100 To: 10-100 Work Center: 1000 (1)

Site: 10-100 To: 10-100

Work Center: 1000 To: 1000

Machine: To:

Department: To:

Start Date: 10/20/2010

End Date:

D/W/M/P: W

Per Column: 1

Under Cap %: 0.00%

Over Cap %: 0.00%

Filters to show exceptions

Output:

Batch ID:

QAD MRP-PR-400

The work center load summary report displays the same information as the inquiry however it allows you to select a range or work centers and or machines. Direct the output to page to view this report on your terminal.

# Work Center Load Summary Report

Work Center Load Summary Report														
														10/20/10 23
10USA														P
Site: 10-100 Work Center: 1000 General Assembly Queue Time: 0.25 Run Crew: 1.000 Machine: Mach/Wk Ctr: 1.000 Department: 0400 Assembly Wait Time: 0.25 Mach/Op: 1														
Past 10/20/10 10/27/10 11/03/10 11/10/10 11/17/10 11/24/10 12/01/10 12/08/10 12/15/10 12/22/10 12/29/10 01/05/11 10/19/10 10/26/10 11/02/10 11/09/10 11/16/10 11/23/10 11/30/10 12/07/10 12/14/10 12/21/10 12/28/10 01/04/11 01/11/11														
Workdays	0	5	5	5	5	5	5	5	5	5	5	5	5	5
Work Ctr Cap	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Work Ctr Load	7	0	0	0	3	0	0	0	2	0	0	0	0	0
Cap Less Load	-7	40	40	40	37	40	40	40	38	40	40	40	40	40
Cumulative	-7	33	73	113	150	190	230	270	309	349	389	429	469	



MRP-PR-410

## Work Center Load Detail Inquiry and Report

### Work Center Load Detail Inquiry

Work Center Load Detail Inquir... X

**Work Center Load Detail Inquiry** 10/20/10

**QAD**

Work Ctr Machine 1000 1001 General Assembly-Ultra Output PAGE

Work Center: 1000 General Assembly-Ultra

Machine: 1001

Department: 0400 Assembly Mach/Op: 1 Queue Time: 0.25

Mach/Wk Ctr: 1.000 Wait Time: 0.25

Run Crew: 4.000

Work Order	ID	ST	Op St	Start	Load Hours	Qty	Open
0910029	2282626	F	10	11/10/09	850.0		21
01020							
1110029	2283018	F	10	01/08/10	850.0		21
01020							
08020013	2286316	P	10	02/03/10	605.0		60
01040							
0810029	2282409	F	10	02/22/10	490.0		12
01020							
0111029	2283403	F	10	03/12/10	850.0		21
01020							
1010029	2282821	F	10	04/23/10	490.0		12
01020							
08020003	2286306	P	10	06/08/10	255.0		25
01010							
08020004	2286307	P	10	06/15/10	255.0		25
01010							
08020014	2286317	P	10	06/17/10	155.0		15
01040							
08020005	2286308	P	10	06/22/10	255.0		25
01010							
1210029	2283210	F	10	06/23/10	490.0		12
01020							
08020015	2286318	P	10	06/24/10	155.0		15
01040							
08020006	2286309	P	10	06/29/10	255.0		25
01010							
08020016	2286319	P	10	07/01/10	155.0		15


**QAD** MRP-PR-420

The work center load detail inquiry and report display the order detail associated with the load shown in the summary inquiry. If the summary inquiry indicates that there is no problem, the planner is finished. If the summary, however, indicates an overloaded condition, the next step is to look at the load detail inquiry to see which orders and which operations are causing the overload.

The planner can then decide which orders (or operations) to reschedule or move to a different work center.

# Work Center Load Detail Report

Work Center Load Detail Repo... X



### Work Center Load Detail Report

10USA

Work Center: 1000    General Assembly-Ultra    Department: 0400    Assembly  
 Machine: 1001    Mach/Wk Ctr: 1.000    Run Crew: 4.000    Queue Time: 0.25    Wait Time: 0.25    Mach/Op: 1

Work Order	ID	Due Date	Op	Operation Description	Start	Setup	Run Time	Load Hrs	Open Qty	Status
0910029	2282626	09/21/10	10	ASSEMBLE COMPONENTS Item: 01020	11/10/09	10.0	840.0	850.0	21	
1110029	2283018	11/21/10	10	ASSEMBLE COMPONENTS Item: 01020	01/08/10	10.0	840.0	850.0	21	
08020013	2286316	08/02/10	10	ASSEMBLE COMPONENTS Item: 01040	02/03/10	5.0	600.0	605.0	60	
0810029	2282409	08/21/10	10	ASSEMBLE COMPONENTS Item: 01020	02/22/10	10.0	480.0	490.0	12	
0111029	2283403	01/21/11	10	ASSEMBLE COMPONENTS Item: 01020	03/12/10	10.0	840.0	850.0	21	
1010029	2282821	10/21/10	10	ASSEMBLE COMPONENTS Item: 01020	04/23/10	10.0	480.0	490.0	12	
08020003	2286306	08/23/10	10	ASSEMBLE COMPONENTS Item: 01010	06/08/10	5.0	250.0	255.0	25	
08020004	2286307	08/30/10	10	ASSEMBLE COMPONENTS Item: 01010	06/15/10	5.0	250.0	255.0	25	
08020014	2286317	08/02/10	10	ASSEMBLE COMPONENTS Item: 01040	06/17/10	5.0	150.0	155.0	15	
08020005	2286308	09/06/10	10	ASSEMBLE COMPONENTS Item: 01010	06/22/10	5.0	250.0	255.0	25	
1210029	2283210	12/21/10	10	ASSEMBLE COMPONENTS Item: 01020	06/23/10	10.0	480.0	490.0	12	
08020015	2286318	08/09/10	10	ASSEMBLE COMPONENTS Item: 01040	06/24/10	5.0	150.0	155.0	15	
08020006	2286309	09/13/10	10	ASSEMBLE COMPONENTS Item: 01010	06/29/10	5.0	250.0	255.0	25	
08020016	2286319	08/16/10	10	ASSEMBLE COMPONENTS Item: 01040	07/01/10	5.0	150.0	155.0	15	
08020007	2286310	09/20/10	10	ASSEMBLE COMPONENTS Item: 01010	07/06/10	5.0	250.0	255.0	25	



MRP-PR-430

## Department Load Summary Inquiry and Report

Department Load Summary Inquiry								
Department Load Summary In... X								
Run Export to Excel View as PDF								
Department	Start Date	End Date	Column Type	Per Column	Columns			
0410	7/1/2010	8/6/2010	Week	1	7			
Department: 0410 Fabrication			Labor Capacity: 8					
Category		Past	7/1/2010	7/8/2010	7/15/2010	7/22/2010		
Work Days		0	5	5	5	5		
Available Hours		0	0	0	0	0		
Load Hours		0	18.5	45.5	45.5	0		
Order	ID/Line	Operation	Date	Past	7/1/2010	7/8/2010	7/15/2010	7/22/2010
08020087	2286375	10	7/6/2010	0	18.5	0	0	0
08020087	2286375	20	7/8/2010	0	0	45.5	0	0
08020087	2286375	30	7/16/2010	0	0	0	45.5	0
08020088	2286376	10	8/5/2010	0	0	0	0	0
08020088	2286376	20	8/5/2010	0	0	0	0	0
08020088	2286376	30	8/6/2010	0	0	0	0	0
Capacity Less Load				0	-18.5	-45.5	-45.5	0
Cumulative				0	-18.5	-64.0	-109.5	-109.5

The department inquires and reports work the same as the work center inquires and reports except they are summarized for all work center/machines in the department. The value of these reports and inquires depends on how you have set up your department/work center relationships.

Where work centers and machines in a department are relatively similar and it is possible to share between them, a department level overview gives a good indication things are OK.

In the case where work centers and machines are different, the high-level overview could be meaningless. In this situation, one work center could be overloaded and another underloaded, but the department view makes the situation look manageable. Yet because the work centers are so different, you cannot shift work from one center to the other to adjust the load.

# Department Load Summary Report

Department Load Summary Re... X

Go To Actions Copy Print Preview Attach

Site:10-200 To:10-200 Department:1

Site: 10-200 To: 10-200

Department: 1000 To: 1000

Start Date: 10/18/2010

End Date:

D/W/M/P: W

Per Column: 1

Under Cap %: 0.00%

Over Cap %: 0.00%

Output:  
Batch ID:

# Department Load Summary Report

Department Load Summary Report													
10USA													10/21/10 00:00
Department: 1000    General Press Area    Site: 10-200													
	Past	10/18/10	10/25/10	11/01/10	11/08/10	11/15/10	11/22/10	11/29/10	12/06/10	12/13/10	12/20/10	12/27/10	01/03/11
		10/17/10	10/24/10	10/31/10	11/07/10	11/14/10	11/21/10	11/28/10	12/05/10	12/12/10	12/19/10	12/26/10	01/02/11
Workdays	0	5	5	5	5	5	5	5	5	5	5	5	5
Dept Capacity	0	16	40	40	40	40	40	40	40	40	40	40	40
Dept Load	0	0	0	0	0	0	0	0	0	0	0	0	0
Cap Less Load	0	16	40	40	40	40	40	40	40	40	40	40	40
Cumulative	0	16	56	96	136	176	216	256	296	336	376	416	456

End of Report



## Department Load Detail Inquiry and Report

# Department Load Detail Inquiry

**Department Load Detail Inquiry**

10/21/10

Department: 0400    Assembly Starting:    Ending:    Output: PAGE

Work Order	Item	Work Ctr	Machine	Op Start	Dept Load	Open Qty
0910029		1000	1001	10 11/10/09	850.0	21
1110029	Item: 01020	1000	ID: 2282626 1001	10 01/08/10	850.0	21
08020013	Item: 01020	1000	ID: 2283018 1001	10 02/03/10	605.0	60
0810029	Item: 01040	1000	ID: 2286316 1001	10 02/22/10	490.0	12
0111029	Item: 01020	1000	ID: 2282409 1001	10 03/12/10	850.0	21
1010029	Item: 01020	1000	ID: 2283403 1001	10 04/23/10	490.0	12
08020003	Item: 01020	1000	ID: 2282821 1001	10 06/08/10	255.0	25
08020004	Item: 01010	1000	ID: 2286306 1001	10 06/15/10	255.0	25
08020014	Item: 01010	1000	ID: 2286307 1001	10 06/17/10	155.0	15
08020005	Item: 01040	1000	ID: 2286317 1001	10 06/22/10	255.0	25
1210029	Item: 01010	1000	ID: 2286308 1001	10 06/23/10	490.0	12
08020015	Item: 01020	1000	ID: 2283210 1001	10 06/24/10	155.0	15
08020006	Item: 01040	1000	ID: 2286318 1001	10 06/29/10	255.0	25
08020016	Item: 01010	1000	ID: 2286309 1001	10 07/01/10	155.0	15
08020007	Item: 01040	1000	ID: 2286319 1001	10 07/06/10	255.0	25
08020017	Item: 01010	1000	ID: 2286310 1001	10 07/08/10	155.0	15
	Item: 01040	1000	ID: 2286320			

MRP-PR-470

# Department Load Detail Report

Department Load Detail Report											
10USA										10/21/10	
QAD											
Department: 0400 Assembly											
Work Order	ID	Op	Operation Description	Work Ctr	Machine	Start	Std Setup	Run Time	Load Hours	Open Qty	St
0910029	2282626	10	ASSEMBLE COMPONENTS Item: 01020	1000	1001	11/10/09	10.0	840.0	850.0	21	
1110029	2283018	10	ASSEMBLE COMPONENTS Item: 01020	1000	1001	01/08/10	10.0	840.0	850.0	21	
08020013	2286316	10	ASSEMBLE COMPONENTS Item: 01040	1000	1001	02/03/10	5.0	600.0	605.0	60	
0810029	2282409	10	ASSEMBLE COMPONENTS Item: 01020	1000	1001	02/22/10	10.0	480.0	490.0	12	
0111029	2283403	10	ASSEMBLE COMPONENTS Item: 01020	1000	1001	03/12/10	10.0	840.0	850.0	21	
1010029	2282821	10	ASSEMBLE COMPONENTS Item: 01020	1000	1001	04/23/10	10.0	480.0	490.0	12	
08020003	2286306	10	ASSEMBLE COMPONENTS Item: 01010	1000	1001	06/08/10	5.0	250.0	255.0	25	
08020004	2286307	10	ASSEMBLE COMPONENTS Item: 01010	1000	1001	06/15/10	5.0	250.0	255.0	25	
08020014	2286317	10	ASSEMBLE COMPONENTS Item: 01040	1000	1001	06/17/10	5.0	150.0	155.0	15	
08020005	2286308	10	ASSEMBLE COMPONENTS Item: 01010	1000	1001	06/22/10	5.0	250.0	255.0	25	
1210029	2283210	10	ASSEMBLE COMPONENTS Item: 01020	1000	1001	06/23/10	10.0	480.0	490.0	12	
08020015	2286318	10	ASSEMBLE COMPONENTS Item: 01040	1000	1001	06/24/10	5.0	150.0	155.0	15	
08020006	2286309	10	ASSEMBLE COMPONENTS Item: 01010	1000	1001	06/29/10	5.0	250.0	255.0	25	
08020016	2286319	10	ASSEMBLE COMPONENTS Item: 01040	1000	1001	07/01/10	5.0	150.0	155.0	15	
08020007	2286310	10	ASSEMBLE COMPONENTS Item: 01010	1000	1001	07/06/10	5.0	250.0	255.0	25	



MRP-PR-480

## MRP/CRP Processing Summary

### MRP Processing



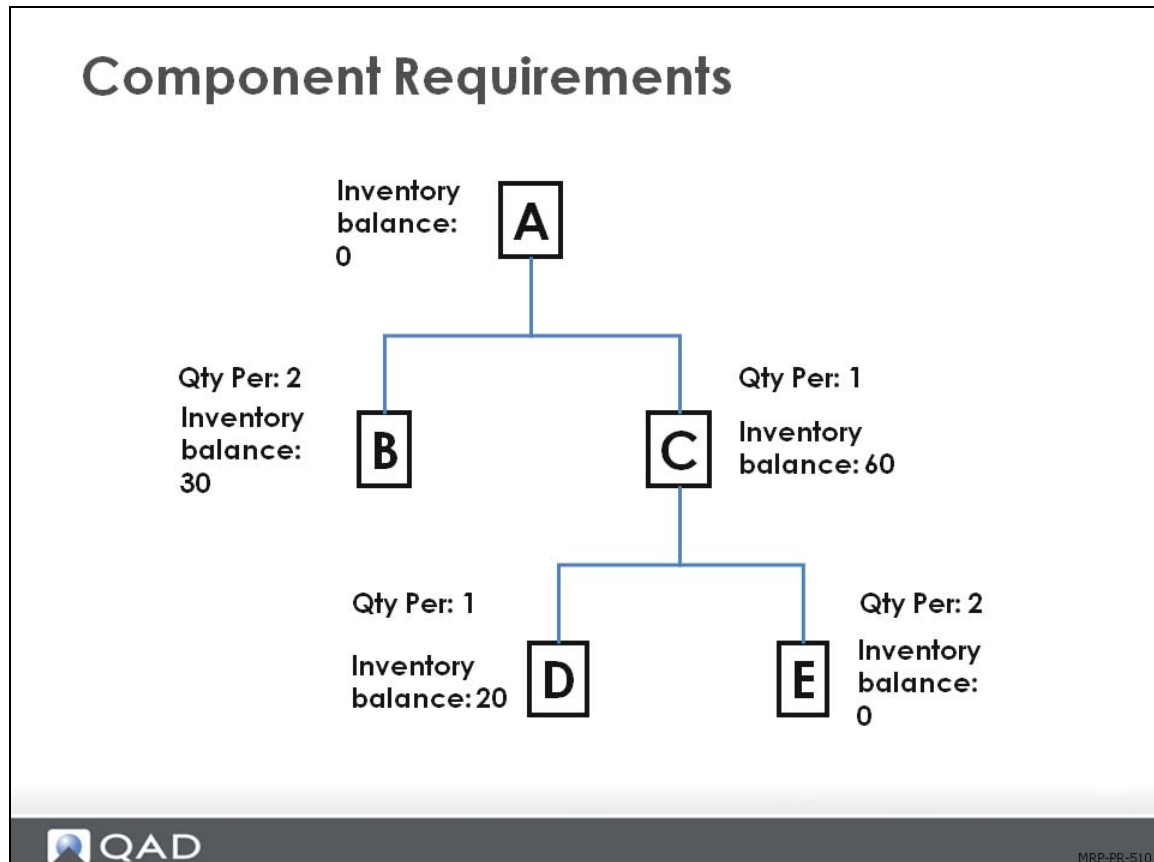
- Verify Low Level Codes
- Calculate Requirements
- Review Action Messages
- Approve Planned Orders
- Review MRP Information
- Calculate the Capacity Plan

## Processing Exercises

The data used in the following exercises is not always the same as the data shown in the screen captures in this lesson.

**Note** If you use Standard Edition, complete the exercises in the EE environment. The concepts are the same in both environments. The data referenced in the following exercises is not found in the SE training database.

### Exercise: Component Requirement Calculations



In this exercise, you describe the determination of gross requirements (product structure explosion) and the subsequent determination of net requirements.

#### Instruction


Using the product structure shown here, determine the net requirements for items B, C, D, and E to make 100 of Item A.

**Note** There are no item As or Es in inventory, but there are on-hand inventory balances of 30 Bs, 60 Cs and 20 Ds.

**Exercise: Order Policies and Modifiers**

## Order Policies and Modifiers

Period	1	2	3	4	5	6	7	8	9	10
<b>Demand</b>	25	30	20	35	25	30	25	35	30	25
<b>LFL</b>										
<b>FOQ=35</b>										
<b>POQ 2 Periods</b>										
<b>POQ-2 Periods Min Qty =60</b>										
<b>POQ-2 Periods Multi Qty=25</b>										


MRP-PR-520

This exercise tests your knowledge of order policies and modifiers.

**Instruction**

Using this table, determine in which periods orders are required and for what quantities. Assume that there is no on-hand inventory.

Exercise: Order Calculation (1 of 2)

## Order Calculation

Each period = 1 week (7 days)

**Gross Requirement = 100, Period 5**

```

graph TD
    A[A] --- C[C]
    A --- B1[B]
    C --- D[D]
    C --- B2[B]
    style C stroke-width:2px
    style D stroke-width:2px
    style B1 stroke-width:2px
    style B2 stroke-width:2px
            
```

1 per C, 2 per B, 1 per D, 2 per B

**A** Lead time = 1 wk  
Min = 200

	Period				
	1	2	3	4	5
Gross requirements					
Scheduled receipts					
On hand	0				
Planned order receipt					
Planned order release					

**B** Lead time = 1 wk  
Mult = 250

	Period				
	1	2	3	4	5
Gross requirements					
Scheduled receipts					
On hand	30				
Planned order receipt					
Planned order release					

**C** Lead time = 2 wks  
Mult = 50

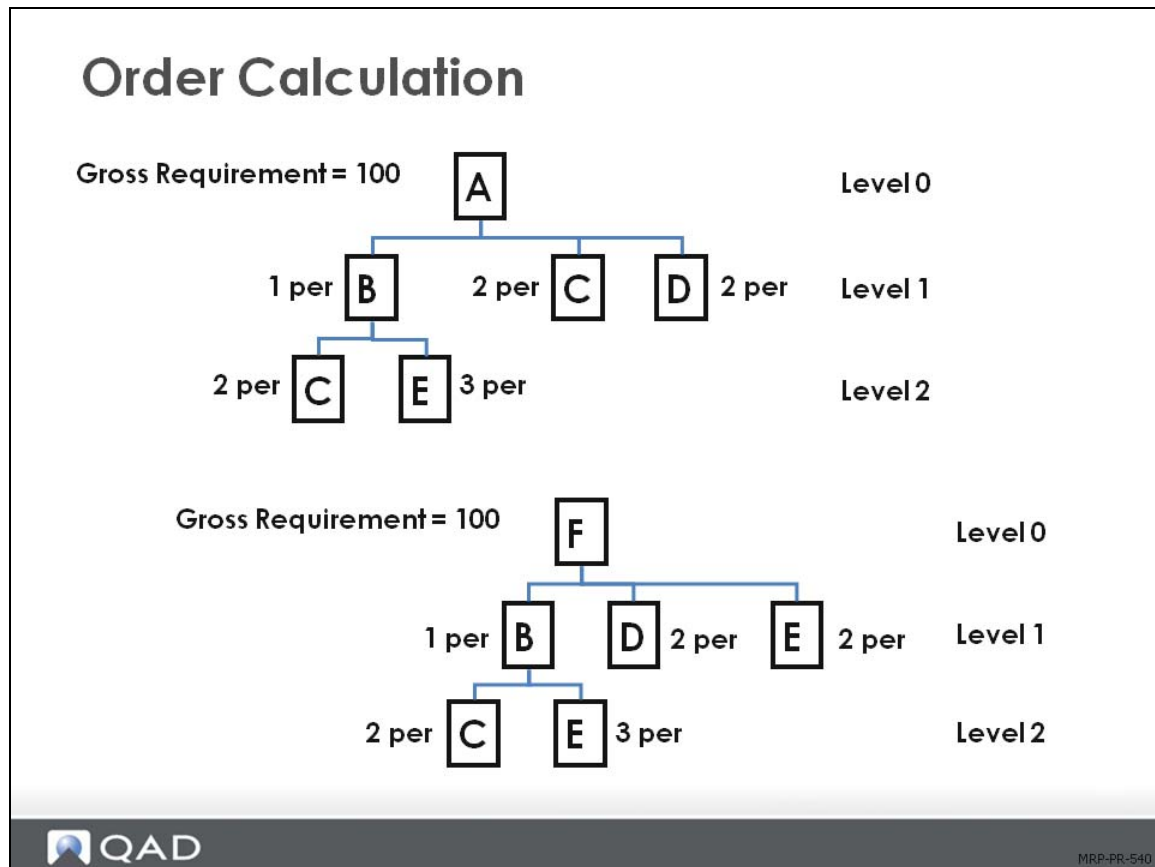
	Period				
	1	2	3	4	5
Gross requirements					
Scheduled receipts					
On hand	60				
Planned order receipt					
Planned order release					

MRP-PR-530

Instruction

This exercise tests your knowledge of order policies and modifiers. Using this table, determine in which periods orders are required and for what quantities. Assume that there is no on-hand inventory.

**Exercise: Order Calculation 2 of 2**



**Instruction**

Using the product structures shown, determine the required quantities of:

Item:

B =

C =

D =


E =

## Exercise: Running MRP

In this exercise, you:

- Review the product structure of an item
  - Review the item planning data
  - Create a forecast for that item
  - Review MRP Control
  - Run MRP
  - Review and act on the results
- 1 Use Product Structure Inquiry (13.6) to review the product structure for item 50010. This is what a proper structure looks like:

Product Structure Inquiry - 6/28/10 X



### Product Structure Inquiry


06/28/10

Parent Item/BOM Code: 50010      Acoustic Transducer      EA  
 As Of: 06/28/10      Levels:      Rev:      Domain:      Output: PAGE  
 PCO Number:      ID:      Domain:      Output: PAGE

Level	Component Item	Description	Quantity	Per	UM	Ph	T	Iss
Parent	50010	Acoustic Transducer						EA
1	50011	Ultrasound Array	1.0		EA			
.2	60010	Pepered Layered Mat	233.42		G			
.2	60011	Oscillator Elements	4.0		EA			
1	60012	Electrodes	6.0		EA			

- 2 Use Routing Inquiry (14.13.3) to review the routing for item 50010. This is what a proper route looks like:

Routing Inquiry - 6/28/2010 5:5... X



### Routing Inquiry

06/28/10

Routing Code: 50010      Acoustic Transducer  
 Effective: 06/28/10      Output: PAGE

Op	Work Center	Machine	Setup	Run Time	Move	Yield%
10	1000 General Assembly ASSEMBLE ULTRASOUND		0.5	0.1	0.0	100.00%
15	2270 Subcontract Supplie Subc Attach Elec/Plate		0.0	0.0	0.0	100.00%
20	1040 Electical Test TEST ACOUSTIC TRANSDUCER		0.5	0.05	0.0	100.00%

- 3 Use Item Planning Maintenance (1.4.7) to review item planning data for item 50010. Verify the following information:

Field	Data
Order Policy	POQ
Order qty	0
Mfg LT	4

- 4 Use Item Planning Maintenance (1.4.7) to review item planning data for item 50011, 60010, 60011, and 60012.

**Note** Item 60012 has order policy FOQ with a quantity of 1,000 and a yield of 100%

- 5 Use Forecast Maintenance (22.1) to enter a forecast, starting next week for the following three weeks for item 50010 at site 10-100:

Field	Data
Item	50010
Site	10-100
Next Week	1000
Week + 1	1250
Week + 2	1500
Week + 3	1750

- 6 In MRP Control (23.24), set MRP horizon to 60 days and set Order Release Horizon to 7 days.
- 7 Use Regenerate Materials Plan (23.2) to run MRP at site 10-100. Set Output to mrp.
- 8 Use Master Schedule Summary Inquiry (22.18) to review items 50010, 50011, 60010, 60011, and 60012.
- 9 Use MRP Detail Inquiry (23.16) to review each of these items. The program displays pegging information, such as the scrap requirements, seasonal builds, forecasts, and product structure requirements
- 10 Use Action Message Browse (23.6) to examine the action message details for these items.

## Exercise: Calculating Work Center Load

### Calculating Work Center Load

<b>Item Number</b>	01030
<b>Site</b>	10-100
<b>Work Center</b>	1000
<b>Total Workers</b>	2
<b>Worker Hours</b>	8 hrs/day
<b>Worker Days</b>	Monday-Friday

WO Number	Qty	Status	Oper	Setup	Run Hours	Sch. Start
1000	25	Planned	10	2.0	1.0	Week 2
1001	1000	Planned	10	0.5	0.001	Week 1
1002	50	Firm	30	0.0	0.1	Week 2
1003	5000	Firm	10	1.5	0.01	Week 1
1004	200	Released	30	0.0	0.05	Week 2
1005	600	Planned	20	4.0	0.02	Week 3
1006	4000	Allocated	10	0.0	0.01	Week 1



MRP-PR-570

This exercise is intended to help you learn how to calculate work center load and compare it to capacity.

Use item number 01030 at site 10-100, work center 1000. There are 2 workers, working 8 hours a day, Monday through Friday, for a combined total of 80 hours a week. Use the data in the graph to calculate your answers.

- 1 Determine the total run time and the total load for each work order.

WO Number	Total Run Time	Setup Time	Total Load
1000		2	
1001		.5	
1002		0	
1003		1.5	
1004		0	
1005		4	
1006		0	

- 2 Determine the cumulative load for weeks 1 through 3

	Week 1	Week 2	Week 3
Load	93	42	124
Capacity	80	80	80

	Week 1	Week 2	Week 3
Over/Under Capacity	-13	38	-44
Cumulative Load			

- 3 What might be deduced from these results? What should be done?
- 4 Two hours of overtime for each worker is added per day. How does this situation affect the cumulative load calculations?

	Week 1	Week 2	Week 3
Load	93	42	124
Capacity	$80 + (2 \times 5 \times 2) = 100$	100	100
Over/Under Capacity			
Cumulative			

- 5 What would be a more optimal solution to this resource problem?

### Exercise: Recalculating the Capacity Plan

In this exercise, you recalculate the capacity plan and then review the changes in the work center resulting from the recalculation

- 1 Run Recalculate Capacity Plan (24.1) using the following information:

Site:	10-100		To: 10-100
Item Number:	50010		To: 50010

Accept the defaults for all remaining fields.

**Note** You would not usually recalculate the capacity plan based on a range of items. The capacity plan is usually run for a site, a work center, or some range of sites and work centers. We are specifying the item number so that we can narrow the scope of data that goes into this calculation.

- 2 Review the Work Center Load Summary Inquiry (24.13) for work center 1000 at site 10-100. Use today as the start date.
  - a How is the work center capacity calculated?
  - b How is the work center load determined?
  - c Why is the Cumulative row so important?
- 3 Use Work Center Load Detail Inquiry (24.16) to review the work center load detail for work center 1000.
- 4 Can you tie these work orders to the work center load from Work Center Load Summary Inquiry (24.13)?
- 5 What can you do to rebalance the load at this work center? Spend some time balancing the work center.

## Exercise: Approving MRP Suggestions

- 1 Use Planned Work Order Approval (23.10) to approve work orders for item 50010 requiring release before the end of this week.
- 2 Use Planned Purchase Order Approval (23.11) to approve purchases for the components associated with item 50010 requiring release before the end of this week.
- 3 Go to Work Order Browse (16.2) to see if status of the planned order changed from P (Planned) to F (Firm Planned) when you approved the Planned Work Order.  
The work orders you approved now have a status of F (Firm). The work orders you did not approve still have a status of P (Planned).
- 4 Go to Purchase Requisition Browse (5.1.5) to see the Purchase Requisitions that were created when the planned purchase orders were approved. These requisitions would then be used to create purchase orders for these items.

## Answers to Exercises

Answer to: “Exercise: Order Policies and Modifiers” on page 114

Period	1	2	3	4	5	6	7	8	9	10
<b>Demand</b>	25	30	20	35	25	30	25	35	30	25
<b>LFL</b>	25	30	20	35	25	30	25	35	30	25
<b>FOQ=35</b>	35	35	35	35	---	35	35	35	35	---
<b>POQ 2 Periods</b>	55	---	55	---	55	---	60	---	55	---
<b>POQ-2 Periods Min Qty =60</b>	60	---	60	---	60	---	60	---	60	---
<b>POQ-2 Periods Multi Qty=25</b>	75	---	---	75	---	50	---	75	---	25

Component Requirement Calculation

B=170 C=40 D=20 E=80

Order Policies and Order Modifiers

Answer to: "Exercise: Order Calculation (1 of 2)" on page 115

## Order Calculation

**Answer Sheet**  
**Gross Requirement = 100, Period 5**

```

graph TD
    A[A] --- C[C]
    A --- B1[B]
    C --- D[D]
    C --- B2[B]
    style C stroke-width:2px
    style B1 stroke-width:2px
    style D stroke-width:2px
    style B2 stroke-width:2px
            
```

Each period = 1 week (7 days)

**A** Lead time = 1 wk  
Min = 200

	Period				
	1	2	3	4	5
Gross requirements					
Scheduled receipts					
On hand	0				
Planned order receipt					200
Planned order release			200		

**B** Lead time = 1 wk  
Mult = 250

	Period				
	1	2	3	4	5
Gross requirements		300		400	
Scheduled receipts					
On hand	30				
Planned order receipt		500		250	
Planned order release	500		250		

**C** Lead time = 2 wks  
Mult = 50

	Period				
	1	2	3	4	5
Gross requirements				200	
Scheduled receipts					
On hand	60				
Planned order receipt				150	
Planned order release		150			

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Answer to: "Exercise: Order Calculation 2 of 2" on page 116

Using the these product structures, determine the required quantities of:

Item:

- B =200
- C =600
- D =400
- E =800

Answer to: "Exercise: Calculating Work Center Load" on page 119

1 Determine the total run time and the total load for each work order.

WO Number	Total Run Time	Setup Time	Total Load
1000	2.5	2	27
1001	1	.5	1.5
1002	5	0	5
1003	50	1.5	501.5
1004	10	0	10

WO Number	Total Run Time	Setup Time	Total Load
1005	12	4	16
1006	40	0	40

2 Determine the cumulative load for weeks 1 through 3

	Week 1	Week 2	Week 3
Load	93	42	124
Capacity	80	80	80
Over/Under Capacity	-13	38	-44
Cumulative Load	-13	25	-19

3 What might be deduced from these results? What should be done?

4 Two hours of overtime for each worker is added per day. How does this situation affect the cumulative load calculations?

	Week 1	Week 2	Week 3
Load	93	42	124
Capacity	$80 + (2 \times 5 \times 2) = 100$	100	100
Over/Under Capacity	7	58	-24
Cumulative	7	65	41

What would be a more optimal solution to this resource problem?

pull load from week 3 forward to week 2

Appendix A

# **Study Questions**



## Answers to Study Questions

- 1 *Net Change* plans only those items that have changed since the last MRP run. *Regenerative* replans all items. *Selective* allows you to specify which items to plan.
- 2 Set A represents independent demand items (MPS). Set B represents dependent demand items (MRP).
- 3 Minimum Order Quantity.
- 4 Lot-for-Lot (LFL).
- 5 False. Sales orders and forecasts are independent demand.
- 6 True.
- 7 False.
- 8 False. MRP does not reschedule firm orders; MRP generates action messages.
- 9 False. MRP increases the order quantity for items with less than 100% yield.



Appendix B

# **Reports, Inquiries, Browsers**

**MRP and CRP  
Reports, Inquiries, and Browsers**

Name	Function / Purpose
Action Message Browse	Displays Action messages
Action Message Report	Prints action messages
Planned Order Browse	Displays planned orders
Planned Order Report	Prints planned orders
MRP Summary Inquiry	Displays summary MRP data
MRP Summary Report	Prints summary MRP data
MRP Detail Inquiry	Displays detailed MRP data
MRP Detail Report	Prints detailed MRP data
Past Due Receipts Inquiry	Displays past due receipts
Past Due Receipts Report	Prints past due receipts
Input/Output Inquiry	Compares planned load input and output for a work center/machine with actual load and actual output hours against that load.
Input/Output Report	Provides a report on input/output analysis; helps to spot bottlenecks. In Enterprise Edition, an additional enhanced version of the report is available to .NET UI users.

*The following summary and detail inquiries and reports display load information by work center, machine, and department.*

Work Center Load Summary Inquiry	
Work Center Load Summary Report	
Work Center Load Detail Inquiry	
Work Center Load Detail Report	
Department Load Summary Inquiry	
Department Load Summary Report	
Department Load Detail Inquiry	
Department Load Detail Report	

Appendix C

# **MRP Utilities and Troubleshooting**

## Why are there MRP Utilities?

### Why Are There MRP Utilities?

- To correct and update system data that has been corrupted for unreported or undetected system problems.
- To update data once an ECO, to correct a reported problem, is added.



MRP-UT-020

In general, these utilities are used when a problem is detected in your MRP run. The first step is to contact QAD Support and initiate a call. The main concern of Support is to identify and resolve the cause of the problem, not address only the symptoms with utilities.

The MRP utilities allow you to clean up corrupted data and continue with business. They can also be used to establish a baseline to track the cause of a problem and aid in analysis and correcting the issue.

Some sites run these utilities before running MRP as a precaution. Do not use utilities to continually mask a recurrent problem.

## Rebuild 'mrp\_det' Table

### 23.25.1 Rebuild 'mrp\_det' Table

- Program mrmpupe.p was created in 1988.
- Data Checked:  
Sales Order, Work Order, Purchase Order,  
Requisitions, Forecasts, Distributed Orders,  
Scheduled Orders,  
etc...
- Output: None

## 23.25.1 Rebuild 'mrp\_det' Table

Rebuild 'mrp\_det' Table x

Rebuild 'mrp\_det' Table: GoTo - Actions -

This utility will delete all material requirements records from the MRP workfile which cannot be validated against a current valid source record (Sales Order, Work Order, Purchase Order, etc.) In addition, all action messages, available to promise, and production forecast details will be erased. Because of this, a full MRP Regeneration after completion of this utility is recommended.

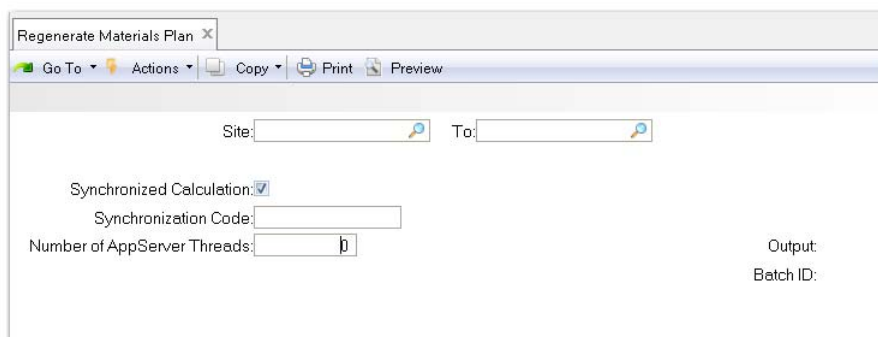
Please confirm update

yes no

## 23.25.1 Rebuild 'mrp\_det' Table (cont)

- **What Should be Done at Completion:**

All action messages, available to promise, and production forecast details are erased. Because of this, a full MRP Regeneration after completion of this utility is recommended.



The screenshot shows a web-based utility window titled "Regenerate Materials Plan". The window has a menu bar with "Go To", "Actions", "Copy", "Print", and "Preview". Below the menu bar, there are two search fields labeled "Site:" and "To:". Underneath, there is a "Synchronized Calculation:" checkbox which is checked. Below that are two input fields: "Synchronization Code:" and "Number of AppServer Threads:". On the right side of the form, there are labels for "Output:" and "Batch ID:".

## Sync. MRP/DRP Work Table Delete

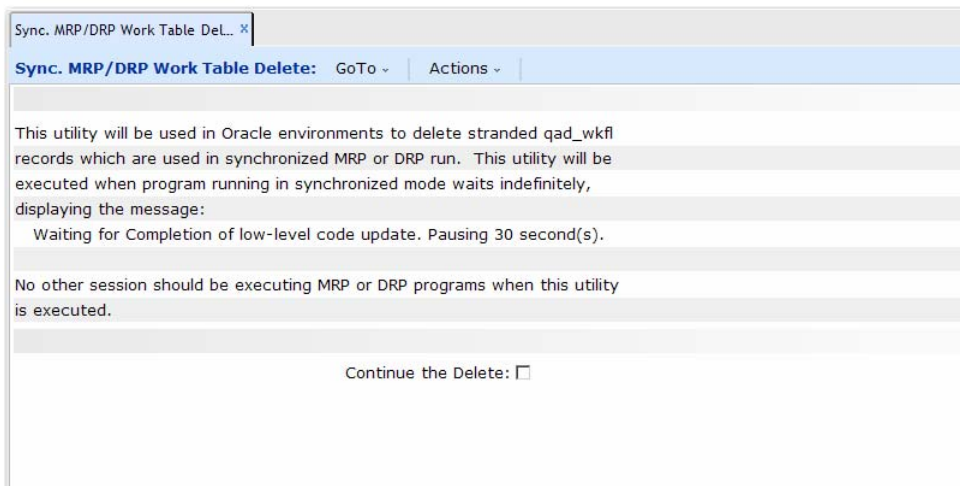
### 23.25.2 Sync. MRP/DRP Work Table Delete

- Program utmrpwnd.p was created in 1998
- Running utility program utmrpwnd.p deletes stranded workfile (qad\_wrkfl) records which were created when synchronized mode MRP/DRP run was abnormally interrupted (ie: power failure).
- Previously with stranded workfile records, the MRP/DRP run in synchronized mode displayed messages "Waiting for completion of low-level code update. Pausing 30 second(s). Press space bar to continue.", and not letting the users proceed further.
- Output: None
- When to Run: On Oracle DB's after an abnormal interruption of MRP/DRP and/or when message appears.
- What Should be Done at Completion: Restart MRP/DRP.



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## 23.25.2 Sync. MRP/DRP Work Table Delete



## Low Level Code Update

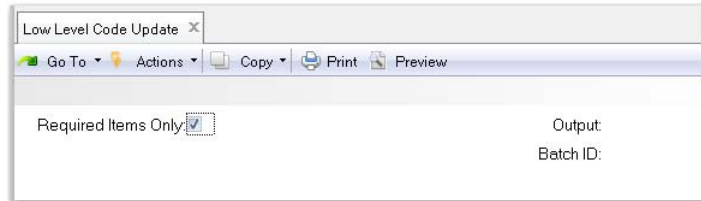
### 23.22 Low Level Code Update

- Program mrlup01.p was created in 1994
- Data Checked:  
If "Required Items Only: Yes"  
Item with a Low Level Code (in\_level) equal to 99999 are recalculated.  
If "Required Items Only: No" then all items are recalculated regardless of the present Low Level Code.

## 23.22 Low Level Code Update

- What Should Be Done at Completion:  
The items that did not have their Low Level Codes resolved (`in_level = 99999`) should be reviewed and corrective actions taken.  
Example:
- Invalid Item: (no `pt_mstr`) a `pt_mstr` should be created (ie: 1.4.1), or the part should be deleted from the system.
- Invalid Site: (no `si_mstr`) an `si_mstr` should be created (1.1.13) or the item deleted from the system.
- Possible Cyclic: (available `pt_mstr` and `si_mstr`) the item should be researched to find the problem source. (Cyclical product structure? Cyclical network code? Etc.....)

## 23.22 Low Level Code Update



## 23.22 Low Level Code Update

- Program mrlup.p, the program where the recalculations are made, is a program that can be run as a utility (23.22) and is a pre-processor to any MRP runs. The in\_level, Low Level Codes, need to be updated and recalculated based on changes to other structures such as Networks, BOM and Formula codes and Product structures.

## 23.22 Low Level Code Update

- **Program mrlup.p is called from and executed in:**

12.13.1 Net Change Distribution Plan  
12.13.2 Regenerative Distribution Plan  
12.13.3 Selective Distribution Plan  
23.1 Net Change Materials Plan  
23.2 Regenerate Materials Plan  
23.3 Selective Materials Plan  
23.22 Low Level Code Update

### **Also In:**

Kanban Functionality  
Flow Schedule Functionality  
and throughout the system in other functions.



MRP-UT-120

## 23.22 Low Level Code Update

- Output: The output from MRP/DRP 12.1,2,3 and 23.1,2,3

```

xterm
File Edit Search Buffer Compile Tools Help
614 website vkp_test1          0    1    26 ms
615 website we-rm             0    0    12 ms
616 website x165c             0    0    12 ms
617 website ze                0    0    11 ms
618 website zf                0    0    12 ms
(483) *** SUBTOTAL ***          136  0  0:00:24
619 website *90              99999  0    13 ms
620 website dr1              99999  0    12 ms
621 website dr2              99999  0    12 ms
622 website dr3              99999  0    12 ms
(4) *** SUBTOTAL ***           0 99999  0:00:24

Process Started      Items      Planned      Elapsed
                   Processed   Orders      Time Process Stopped
-----
08/07/08  6:49:15 AM      622          171  0:00:24 08/07/08  6:49:39 AM
- File: wee.prn -----
F1=RUN F3=MENUS F5=OPEN F6=SAVE F8=CLOSE                               Insert

```

## 23.22 Low Level Code Update

- Output: The output 23.22

mrlup01.p 2+		23.22 Low Level Code Update				Date: 08/07/08		
Page: 1		col141 RAD eB2.1 DEM01				Time: 06:47:00		
Unresolved Inventory Master Low Level Codes								
Item Number	Description	Site	P/M	BOM/Formula Code	Network Code	Invalid Item	Invalid Site	Possibly Cyclic
1 0820	test part	wesitel	F					X
2 0115		wesite	M			X		
3 1004		F43L	F				X	
4 00001A		10000				X		

**Invalid Item:** No pt\_mstr is available

**Invalid Site:** No si\_mstr is available

**Possibly Cyclic:** Available pt\_mstr and si\_mstr and in\_level is unresolved.

## Stranded qad\_wkfl's where qad\_key1 = mrp/drp

### Stranded qad\_wkfl's where qad\_key1 = mrp/drp.

- Prior to ECO P45W (eB2 SP11, eB2.1 SP4 and eB3 SP1 (October, 2005)), due to abnormal termination of an MRP/DRP run, qad\_wkfl's would become stranded and the item/site represented by the qad\_wkfl value would be by passed in the planning process. This required the user to execute a Progress query to search, the delete the stranded work files prior to running MRP/DRP. The scripts were never developed into a utility, but documented in a Solution (K-base).



MRP-UT-150

## Stranded qad\_wkfl's where qad\_key1 = mrp/drp.

- Progress Query (while MRP/DRP is not running) :  
for each qad\_wkfl where  
    qad\_key1 = "mrp/drp":  
    display qad\_wkfl with side-labels 2 col.  
end.

If data is returned then:  
for each qad\_wkfl where  
    qad\_key1 = "mrp/drp":  
    delete qad\_wkfl.  
end.

What Should be Done at Completion: Run MRP/DRP.



MRP-UT-160

## Stranded qad\_wkfl's where qad\_key1 = mrp/drp.

- After the introduction of P45W (eB2 SP11, eB2.1 SP4 and eB3 SP1 (October, 2005)), the above scripts were incorporated into program gpmpup.p, a subprogram called from all MRP/DRP executions.
  - 12.13.1 Net Change Distribution Plan
  - 12.13.2 Regenerative Distribution Plan
  - 12.13.3 Selective Distribution Plan
  - 23.1 Net Change Materials Plan
  - 23.2 Regenerate Materials Plan
  - 23.3 Selective Materials Plan
- Any stranded qad\_wkfl's are removed prior to the execution of MRP/DRP systematically. No user intervention is required.

## Set Qty Oh/Qty All/Qty Req


### 36.25.15 Set Qty Oh/Qty All/Qty Req


- **What Should be Done at Completion:**  
Variations should be researched and resolved. These could be procedural problems causing the discrepancies or undetected system problems. Tracing through the transaction history file, (tr\_hist) could lead to problem resolution.
- If this utility is run in a regular batch (nightly), then the output should be reviewed on a regular (daily) basis and the proximate cause resolved.

## 36.25.15 Set Qty Oh/Qty All/Qty Req


Set Qty Oh/Qty All/Qty Req x


Set Qty Oh/Qty All/Qty Req: GoTo - Actions -


Item Number:  

Site:  


Line:


Type:  


Buyer/Planner:  


Supplier:  


Update:


Sort by Site/Item:  


To:  

To:  

To:  

To:  

To:  

To:  

Output:  
Batch ID:

## 36.25.15 Set Qty Oh/Qty All/Qty Req

- Program utptqty.p was created in 1987
- Output: Report/Update (y/n)

Set Qty Oh/Qty All/Qty Req x Set Qty Oh/Qty All/Qty Req - 8... x

**QAD** **Set Qty Oh/Qty All/Qty Req** 08/07/08 08:53:32  
 United States - DB 101 **Page: 1**

Item Number	Site	Qty on Order	Qty Required	Qty Allocated	Qty on Hand	QOH Non-nettable	Avail Status	Qty On Hand
50011	10-100	Old		5.0		30.0		30.0
		New		0.0		0.0		0.0
02003	10-100	Old		1.0				
		New		0.0				
60004	10-100	Old			1,000,379.0			1,000,379.0
		New			0.0			0.0
60003	10-100	Old			998,637.0			998,637.0
		New			0.0			0.0

**QAD** MRP-UT-200

## Seasonal Build MRP Utility

### 22.12 Seasonal Build MRP Utility

- Menu item '22.12 Seasonal Build MRP Utility' (fcfcmrp.p).
- This function will report seasonal build records and the impact they have on MRP, optionally correcting any invalid MRP records (either stranded records or those built with the old date format).
- Executing the MRP Rebuild utility (23.25.1 -- mrmpe.p) will also correct these records, but this new program can be executed without rebuilding the entire MRP workfile (should run faster than mrmpe.p and does not require a full regen calculation afterwards).
- Individual seasonal build records can be corrected by maintaining them using 22.9 Seasonal Build Maintenance (fcfcmt.p).



MRP-UT-210

## 22.12 Seasonal Build MRP Utility

The screenshot shows a web browser window titled "Seasonal Build MRP Utility". The browser's address bar and tabs are visible. The page has a header with "Seasonal Build MRP Utility:" followed by "GoTo" and "Actions" dropdown menus. The main content area contains several input fields: "Site:" and "Item Number:" are text boxes with search icons; "Date:" is a dropdown menu; "Update:" and "Delete:" are checkboxes. On the right side, there are "To:" text boxes with search icons and another "To:" dropdown menu. Below these is an "Output:" section with a "Batch ID:" label. At the bottom right, there are "Back" and "Next" buttons.





# Product Information Resources

QAD offers a number of online resources to help you get more information about using QAD products.

[QAD Forums \(community.qad.com\)](http://community.qad.com)

Ask questions and share information with other members of the user community, including QAD experts.

[QAD Knowledgebase \(knowledgebase.qad.com\)\\*](http://knowledgebase.qad.com)

Search for answers, tips, or solutions related to any QAD product or topic.

[QAD Document Library \(www.qad.com/documentlibrary\)](http://www.qad.com/documentlibrary)

Get browser-based access to user guides, release notes, training guides, and so on; use powerful search features to find the document you want, then read online, or download and print PDF.

[QAD Learning Center \(learning.qad.com\)\\*](http://learning.qad.com)

Visit QAD's one-stop destination for all courses and training materials.

\*Log-in required



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