

Industry-specific

QAD SOLUTIONS

Manufacturing Applications

User Guide

**Time Phased
Availability Check
(TIPAC)**



TIPAC Version 1.1
MFG/PRO Version eB
April 2003

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About this Guide

Audience

This guide is intended for use primarily by people with a working knowledge of MFG/PRO.

Structure of this guide

The TIPAC User Guide is structured as follows:

Chapter 1	Provides a brief introduction to the main features of TIPAC.
Chapter 2	Describes the set-up procedure for TIPAC.
Chapter 3	Contains examples of data used in the rest of the Guide.
Chapter 4	Shows you how to run TIPAC per Sales Order.
Chapter 5	Shows you how to run TIPAC per Item.
Chapter 6	Contains additional information about the basic TIPAC procedures.
Appendix A	Describes how to view and modify flags (the flags indicate which items can be included in a TIPAC (=simulation) run).
Appendix B	Describes how to view and modify TIPAC system messages.

Conventions

Any text displayed on-screen is shown in **bold** text. For example:
Complete the **Generate Work Orders** field.

Chapter 1

Features of TIPAC

1.1 Purpose

An organization receiving sales orders faces the challenge of providing the items listed on them within the required time frame. The Material Requirements Plan (MRP) is an important tool for deciding in which periods each item or component item should actually be ordered from a supplier or manufactured. When promising due dates for sales orders or sales quotes, one should ideally be able to perform a simulation process, so that the due date that is agreed upon is as realistic as possible.

TIPAC is a QAD Inc. USA product that is especially designed for checking feasibility of a required due date and / or proposing an alternative due date. It performs a simulation process for a Sales Order, a set of Sales Order lines or an Item and creates a proposed order network while doing so. It reports on the availability of items and component items, calculates quantities that are 'available to promise' and shows shortages. TIPAC also shows the critical path, being the shortest time needed to manufacture or procure a required item. After the simulation, the proposed order network (this is the chain of work orders and/or purchase requisitions that would have to be created to satisfy a demand) can either be deleted or converted to a set of actual orders.

1.2 Features

TIPAC enables you to:

- Enter the selection criteria for the 'time phased available to promise check' (TIPAC).
- Perform the simulation run.
- Display an overview of the results of the 'time phased available to promise check' per sales order line or per item.
- Inquire into the details of the simulation by viewing the proposed order network, the critical path, the 'available to promise' (ATP) quantities or the shortages.
- Convert the proposed order network to actual orders or delete the proposed network.

Additional functions are provided so that you can:

- Flag which items in the database are to be included in a simulation run.
- View, print or modify dedicated TIPAC system messages

Chapter 2

Setting up TIPAC

Before you use TIPAC, you must set up some data and program parameters.

2.1 Data required in MFG/PRO

Use the following checklist to make sure that the required data is present in the MFG/PRO database:

Task	MFG/PRO function
Create sites	Site Maintenance
Create locations	Location Maintenance
Create customer number	Customer Maintenance
Define items	Item Master Maintenance
Define Supplier	Supplier Maintenance
Create product structure	Product Structure Maintenance
Add routing	Routing Maintenance menu

NOTE: If you wish to try out a TIPAC run using example data, refer to *Chapter 5 - Examples*.

2.2 TIPAC Main Menu

TIPAC is considered as a separate customized module and can be approached in a separate menu 50 TIPAC

European Accounting 9.0 TEST : qaddb	
mfmnu	50. TIPAC
29/03/00	
1. Tipac / SO	13.
2. Tipac / Item	14.
3.	15.
4. TIPAC Item Flag Maintenance	16.
5. TIPAC Site Flag Maintenance	17.
6. TIPAC Item Flag Mass Update Rpt.	18.
7.	19.
8.	20.
9. TIPAC message Maintenance	21.
10. TIPAC Message Inquiry	22.
11. TIPAC Message Report	23.
12.	24. TIPAC Control File

Please select a function. F4 or blank to EXIT. _____

2.3 Set up the TIPAC control file

The TIPAC Control File enables you to enter default settings for the other TIPAC functions. The TIPAC Control File screen is shown below:

tptppm.p TIP60	50.24 TIPAC Control File	29/03/00
Default Tipac Status WO:	E	
Check MPS Level:	no	
Generate Network:	yes	
Default Network:	yes	
Display Capacity:	yes	
Forward Scheduling:	no	
ATP Boundary:	50	
Mark Items For Tipac:	yes	
Next Tipac ID:	99007034	

Complete the fields as follows:

Default TIPAC Status WO	Specifies the default status of the work orders that are created by the system when the proposed order network is generated. The usual choice for TIPAC items is F (Firm Planned).
Check MPS Level	Enter 'yes' to make TIPAC exclude those items from the simulation run that are marked as MPS items (Master Sched = 'yes' in the Item Planning Data). Enter 'no' if you want to include the MPS-items.
Generate Network	Enter 'yes' if you want to have the option of storing the order network after the TIPAC simulation. If you enter 'no', the order network will never be stored. This means that you expect the MRP to create the orders at a later stage.
Default Network	Contains the default value for the question 'Do you want to generate the proposed order network?' in the TIPAC check screens.
Display Capacity	Set this field to 'yes' if you want to view the impact of the proposed order network on the work center summary load before deciding to store the proposed network. Set it to 'no' if you're not interested in viewing these results. If you set the field to 'yes' the work center routings associated with the proposed order network are stored during the TIPAC run. They are deleted if you decide not to store the proposed order network.
Forward Scheduling	Enter 'yes' to set the default to Forward Scheduling. Enter 'no' to set the default to Backward Scheduling.
ATP Boundary	Reserved for future use.
Mark Items for TIPAC	If you enter 'yes', any new items that you create will be used in the TIPAC simulation. If you enter 'no', new items will not be used.
Next TIPAC ID	Identifies the next work order ID number or purchase requisition number for orders planned by TIPAC

NOTE: In order to minimise locking of essential data entities using the TIPAC functions, the Next ID number will be a separate range for the TIPAC proposed order network. Be careful with initiation of the ID number in order to have a different range than the normal work order ID range.

Chapter 3

Time Phased ATP Check/ Sales Order

This Chapter describes the ‘TIPAC per Order’ function (menu 50.1).
Section 3.1 sets out the basic elements of TIPAC, by way of a simple example.
The rest of the Chapter explains the ‘time phased available to promise’ process
in detail.

3.1 Normal flow illustrated by an example

To illustrate the flow of TIPAC, we will now go through the ‘TIPAC per Order’
function, using a simple example.

The flow of TIPAC consists of the following steps:

Step:	Task:	Described on page:
1	You enter the selection criteria for the ‘time phased available to promise check’.	3-3
2	The system performs the simulation run.	3-6
3	The system presents an overview of the results of the ‘time phased available to promise check’ per sales order line.	3-7
4	You can then inquire into the details of the simulation by viewing the proposed order network, the critical path, the ATP quantities or the shortages.	3-8
5	You can either convert the proposed order network to actual orders or delete the proposed network.	3-17

Each of these steps is described in the following sections.

3.2 Set up of base data

Function 50.24. TIPAC Control File:

tptppm.p TIP60		50.24 TIPAC Control File		29/03/00	
Default Tipac Status W0:	F				
Check MPS Level:	no				
Generate Network:	yes				
Default Network:	yes				
Display Capacity:	yes				
Forward Scheduling:	no				
ATP Boundary:	50				
Mark Items For Tipac:	yes				
Next Tipac ID:	99007034				

Function 1.4.1. Item Master Maintenance:

Item	Um	Product line	Status	Site	Master schedule	Order policy	Pur / Mfg	Mfg lt	Pur lt	Issue policy
File	Ea	1000	Ac	West	No	Lfl	M	2	---	Yes
Cover	Ea	1000	Ac	West	No	Lfl	P	---	3	Yes
Mechanism	Ea	1000	Ac	West	No	Lfl	M	4	---	Yes
Handle	Ea	1000	Ac	West	No	Lfl	M	1	---	Yes
Screw	Ea	1000	Ac	West	No	Lfl	P	---	1	Yes

Function 13.5: Product Structure Maintenance:

Parent item	Component item	Qty Per
File	Mechanism	1
	Cover	1
Mechanism	Handle	1
	Screw	4
Handle	Screw	1

Function 7.1.1: Sales Order Maintenance:

Order	Sold to	Order date	Line	Item	Due date	Site	Qty ordered
Tip10	0001	Today	1	File	Today + 6 months	West	2

3.3 Step 1: Entering selection criteria

This is the 'selection window' of the 'TIPAC per Order' function:

```

tpsoi q. p TIP60                    50.1 Ti pac / SO                    29/03/00

Sales Order: _____ Line : 0

Alt. BOM: _____
Alt. Routing: _____
Project: _____
Generate Work Orders: no
Generate requisitions: no

Forward Sched.: no

Calculate due date: 2 1 = Date required -> Lt shipping: (days)
                   2 = Due date Sales order line
                   3 = Manual -> Due Date:
    
```

This window allows you to specify the details of the simulation run that you want to do. Complete the fields as follows:

<p>Sales Order</p>	<p>Enter the number of the sales order for which you want to do the simulation. You must complete this field. A sales order browse is available to help you choose the correct one. The sales order number that you enter must belong to an existing sales order; if not, the following error message will be displayed:</p> <p>ERROR: SALES ORDER DOES NOT EXIST. Please re-enter.</p>
<p>Processed</p>	<p>Sales Order browse:</p> <pre> tpsoi q. p TIP60 50.1 Ti pac / SO 29/03/00 SO Browser For Ti pac Sales Order [V]10001 G Ge Sales Order Line Item Number Site Processed >10001 1 10-10000 10000 No 10001 2 90-100 10000 No 10001 3 90-110 10000 Yes 10001 4 sp1cdi tem 10000 No 10012 1 88-100 10000 No 10012 2 44-110 10000 No 10012 3 66-120 10000 No 10013 3 88-100 10000 No </pre> <p>[Yes] means that this line has been processed by TIPAC before and an order network already exists. If this line is selected, a warning is issued and the network may be deleted. AN ORDER NETWORK ALREADY EXISTS FOR S/O & LINE. Do you want to delete the order network? <u>yes</u></p>

You must now specify how you want the due date of the order or set of sales order lines to be calculated for the simulation. You do this by completing the **Calculate due date** field as follows.

Entry	Meaning
1	The required due date, calculated by subtracting the lead time for shipping from the due date of the sales order line. The user can manually enter the required lead time for shipping.
2	The due date from the sales order line. For each separate sales order line the simulation process is based on the due date of that particular sales order line.
3	A manually entered due date. If this method is used, it is mandatory to enter a due date and this due date must either be today or sometime in the future. If this condition is not met, the following error will be displayed: ERROR: DUE DATE MUST BE EQUAL OR GREATER THAN ACTUAL DATE! . PLEASE RE-ENTER. If you selected Forward scheduling above, the Calculate due date field will automatically be set to '3'. You will then be required to enter the due date of the sales order lines. The output field will be used in a later phase of the TIPAC process.

When you have finished, press 'go'. The system will start the simulation run for the sales order line(s) that meet(s) the specified criteria.

Actual values filled for the example:

```

tps01 q. p TIP60                50.1 Tipac / S0                29/03/00

Sales Order: tip10                Line : 1

Alt. BOM: _____
Alt. Routing: _____
Project: _____
Generate Work Orders: yes
Generate requisitions: yes

Forward Sched.: no

Calculate due date: 2 1 = Date required -> Lt shipping: (days)
                   2 = Due date Sales order line
                   3 = Manual -> Due Date:
    
```

3.4 Step 2: The simulation run

Most of the work for the simulation run will be done in the background. The status of the process is reported in a bar in the lower part of the screen. The following phrases are distinguished:

1. 'Calculating ATP (for article)'
2. 'Generating work order (for article)'
3. 'Generating purchase requisition (for article)'

The sales order line number will be displayed at the beginning of each message line. Here's the window for sales order line 1, taken from example 1:

```

tps01 q.p TIP60                50.1 Tipac / S0                29/03/00

Sales Order: tip10                Line : 1

  Alt. BOM:
  Alt. Routing:
  Project:
  Generate Work Orders: yes
  Generate requisitions: yes

  Forward Sched.: no

  Calculate due date: 2 1 = Date required -> Lt shipping: 0 (days)
                    2 = Due date Sales order line
                    3 = Manual -> Due Date:

1: Generating work order (for article mechanism) ...

```

NOTE: If processing is cancelled during the TIPAC execution (for example if you press 'control + c' on the keyboard during execution of TIPAC), the system tries to display a warning and tries to delete the already created proposed order network. If deleting the network is not possible because of specific problems, the system may stop without any warning. If this has happened, you must use the newly created utility (50.26) to delete the created temporary MRP records; in some cases additionally you must use standard MFG/PRO functions to correct the involved work orders. This will be described later.

3.5 Step 3: The results overview

When the system has finished the simulation run, the results overview window is displayed. This is the 'result overview window', taken from example 1.

Item Number: file		Alt. BOM:	
Description: tipac test item example 1		Alt. Routing:	
Quantity: 2.0	EA	Sales Order: tip10 /1 /	Project:
Due Date: 29/09/00			
Site: west			
Result: Required due date for item is valid Purchasing / Production required			
Start Date: 20/09/00			
Display Proposed Orders: <u>no</u>			
Display Critical Path: <u>no</u>			
Display Shortages: <u>no</u>			
ATP Quantities/Dates: <u>yes</u>			

You can leave the 'result overview window' in two ways:

- Press Esc. This will take you immediately to the beginning of step 5.
- Inquire into the details of the ATP check. This will take you to the beginning of step 4. When you have seen enough detailed information, you return to the 'result overview window' and then continue by pressing Esc.

3.6 Step 4: Viewing the details

The **Result** of the ATP check can be one of the following:

Required due date for item is valid

Purchasing / Production required

Required due date for item not valid

Problems with planning purchasing/production

The second panel also offers the opportunity to select the type of detail information that you want to see:

Choice:	Displays:
Display Proposed Orders	An overview of the proposed order network.
Display Critical Path	An overview of the orders that are on the critical path.
Display Shortages	The amount by which the required quantity exceeds the quantity that can be manufactured / purchased in time.
ATP Quantities/Dates	The uncommitted portion of inventory and planned production.

Press 'go' to make the system display the details.

The four detail options are explained in the following sections.

3.6.1 Display Proposed Orders

If you choose 'Display Proposed Orders', the following 'Proposed Order Network Browse' is displayed (with results from example 1):

User Menu Edit Navigate Config Options Window Help

Proposed Order Network Browse (1-) 29/03/00

Browse

Level	WO/PR	ID/Line	Parent/Component	Qty	Req	St
> 1	W tip10.1	99007057	file	2.0	27	
. 2	R 99007060	0	cover	2.0	24	
. 2	W tip10.1	99007058	mechanism	2.0	21	
. . 3	W tip10.1	99007059	handle	2.0	20	
. . . 4	R 99007061	0	screw	2.0	19	
. . 3	R 99007062	0	screw	8.0	20	

Filter = Off

Using standard browse functionality shows the rest of the details

User Menu Edit Navigate Config Options Window Help

Proposed Order Network Browse (1-) 29/03/00

Browse

ID/Line	Parent/Component	Qty	Req	St	Date	Due	Date
> 0.1	99007057 file	2.0	27/09/00	29/09/00			
7060	0 cover	2.0	24/09/00	27/09/00			
0.1	99007058 mechanism	2.0	21/09/00	28/09/00			
0.1	99007059 handle	2.0	20/09/00	21/09/00			
7061	0 screw	2.0	19/09/00	20/09/00			
7062	0 screw	8.0	20/09/00	21/09/00			

Filter = Off

The meanings of the fields are as follows:

Level	The level of a certain order/requisition in the proposed order chain. The level is dictated by the bill of material of the item in the first panel.
WO/PR	Whether the order on the row is a work order (indicated by 'W') or a purchase requisition (indicated by 'R'). The identifications for purchase requisitions are created by the system. See the field Next Tipacs Id in the TIPAC Control File for the next number that will be used. The format of the work order numbers is 'sales order number + dot + sales order line number' of the sales order line which demand this work order / purchase requisition helps to satisfy.
ID/Line	The Id or line of the work order/purchase requisition which items contribute to satisfying the demand shown in the first panel.
Parent/Component	The item that is demanded by way of the work order/purchase requisition on the row.

Qty Req	The quantity of the item in the 'Parent/Component' column that is demanded by way of the order/requisition /Id/line combination on the same row. For more details, see <i>About calculating the quantity required on the first level</i> in Chapter 6.
Due Date	The date on which the item on the work order/purchase requisition would have to be completed.
Start Date	The date on which the purchase would have to be made or on which the work for the work order would have to be started. For each item the start date is calculated by subtracting the purchasing lead time or the manufacturing lead time from the due date. The due dates are calculated by exploding the BOM (or the alternative BOM, if applicable) of the item in the first panel. As you can see, the due date of each lower level item is equal to the start date of the item on the previous level, thus reflecting that the components of a certain item must be available when production of that item starts.

NOTE: If you used forward scheduling, you entered a due date in the 'selection window'. In general the due date on the first row of the 'display proposed orders window', the one for the level 1 order/requisition, will be equal to this entered due date. However, if completing the required items on this date requires that you started working on the component items sometime in the past, then the system will show the order network as if you would start working today. This means that in the case of forward scheduling, the earliest possible date shown in the proposed order network is always today. For more details, see More about forward scheduling in Chapter 6.

3.6.2 Display Critical Path

The 'display critical path window' gives information about the critical path: the shortest length of time needed to manufacture or procure the item on the sales order. The sample screen below is again taken from example 1:

User Menu Edit Navigate Config Options Window Help

Proposed Order Network Browse (1-) 29/03/00

Browse

Level	WO/PR	ID/Line	Parent/Component	Qty	Req	St
> 1	W tip10.1	99007057	file	2.0	27	
. 2	W tip10.1	99007058	mechanism	2.0	21	
. . 3	W tip10.1	99007059	handle	2.0	20	
. . . 4	R 99007061	0	screw	2.0	19	

Filter = Off

Using standard browse functionality shows the rest of the details

User Menu Edit Navigate Config Options Window Help

Proposed Order Network Browse (1-) 29/03/00

Browse

ID/Line	Parent/Component	Qty	Req	St	Date	Due	Date
> 0.1	99007057	file	2.0	27/09/00	29/09/00		
0.1	99007058	mechanism	2.0	21/09/00	28/09/00		
0.1	99007059	handle	2.0	20/09/00	21/09/00		
7061	0	screw	2.0	19/09/00	20/09/00		

Filter = Off

The 'display critical path window' shows the following work orders and/or purchase requisitions:

Those starting on the earliest start date of the proposed order network.

Their parent items.

The parent items of the parent items etc. until the highest level is reached and including the top level item.

For an explanation of the contents of both panels, see Section 3.5.1 - *Display Proposed Orders*.

3.6.3 Display Shortages

This is the 'display shortages' window (another due date was entered):

User Menu Edit Navigate Config Options Window Help					
Browse For Shortages (1-)					29/03/00
Browse					
WO/PR: W_tip10.1					
WO/PR	ID/Line	Parent/Component	Qty Req	Qty Short	St.
>W_tip10.1	99007060	file	0.00	2.00	28/0
W_tip10.1	99007062	handle	0.00	2.00	21/0
W_tip10.1	99007061	mechanism	0.00	2.00	22/0
Filter = Off					

If the simulation indicates that the demand on the sales order line can be satisfied in time there are no shortages, as in the case of the example used. If this is the case, no details show up and the function goes directly back to the 'result overview window' as shown in 3.4.

This will be the case if the **Result ATP Check** column in the 'result overview window' says: **Available**.

For an explanation of the following columns, refer to *Section 3.5.1 - Display Proposed Orders*:

- WO/PR
- ID/Line
- Parent/Component
- Qty Req
- St. Date (for Start Date)
- Due Date.

The **Qty Short** column shows the difference between the required quantity and the quantity that can be manufactured/purchased in time. If the proposed order network indicates that the required quantity can be delivered in time (the network starts sometime in the future) then the 'display shortages window' is not shown. However, if the proposed order network indicates that delivering in time requires that you started to purchase or to manufacture sometime in the past, then the proposed order network is not feasible. In this case, the system shows all items for which production/purchasing should already have started in the 'display shortages window'. The quantities shown are identical to the quantities in the 'display order network window'.

If the system notices that for a certain reason it is not possible to fulfill the demand on the sales order by way of a complete order network, it gives a message in this window. For instance:

- No purchasing/production possible because of missing BOM.
- No purchasing / production required; MPS item.

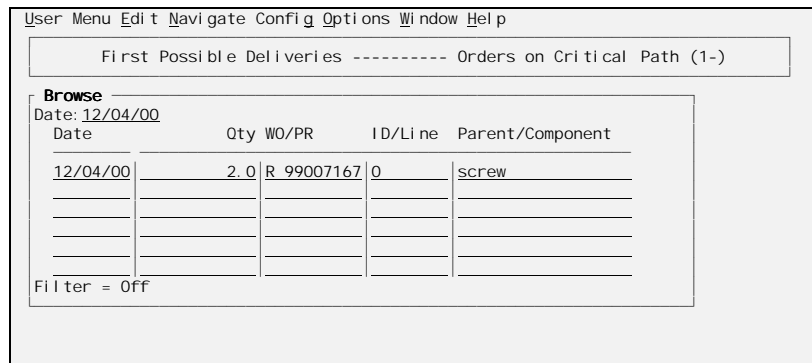
NOTE: In the case of forward scheduling, there are never any shortages, because in that case, the system always creates a proposed order network that doesn't start in the past.

3.6.4 Display First Possible Deliveries/Dates

As described earlier, the ‘display proposed order network window’ indicates whether or not requested items become available in time. When calculating the proposed order network, TIPAC always plans all production runs and purchasing ‘runs’ as far in the future as possible. For both types of scheduling, the date at which production is completed is always calculated under the assumption that by this date the total quantity that is requested on the sales order (lines) must have been produced.

In many cases organisations are not only interested in the end date for the total order, but also in the intermediate dates at which part of the required quantity becomes available. The ‘display ATP Quantities/Dates window’ offers this information. It is only available if the proposed order network that TIPAC generates is feasible. This is always the case when forward scheduling is used. It is also true when backward scheduling is used and the due date is sufficiently far in the future to allow starting production today or some time later.

The following screen shows the ‘display ATP quantities/dates window’ in the case of example 1.



The meaning of the columns is as follows:

ATP Qty	Contains the quantities that become available (thus: are available to promise) during the horizon of the simulation.
ATP Date	Shows the date on which these quantities are available to promise.

The remaining three columns are added to support you in tracking specific problems. They show the critical path of the network:

WO/PR	Indicates the type of the order on the critical path.
ID/Line	Shows the line of that same order.
Parent/Component	Shows the item on this order.

For more information about calculating ATP quantities and dates, refer to *More about ATP quantities and dates* in Chapter 6.

NOTES:

- The quantities in the first column are quantities of the item for which TIPAC is run, not of the item that shown in column 5, which is merely one of the items on the critical path.
 - The ATP delivery scheme is not the same as the proposed order network. This is because when it creates the order network the system only takes into account the sales order (or quantity) for which TIPAC is run whereas for the ATP delivery scheme it takes into account all demands during the horizon.
-

3.7 Step 5: Using or deleting the proposed order network

When you leave the 'result overview window' by pressing Esc, the system will ask the following question:

Question
Do you want to generate the proposed order network? [Yes] [No]

If you choose 'no', all work orders and purchase requisitions that were created during the simulation run will be deleted by the system. This is done by simulating a standard action ('control'+ 'd' on the keyboard) in a standard function (work order maintenance or purchase requisition maintenance). If these standard functions do not allow you to delete the order, the same will be true for TIPAC. After deletion the system will ask you to confirm this message:

Information
! (Old) proposed order network deleted [OK]

If you answer 'yes' to the question 'Do you want to generate the proposed order network?', the proposed work orders from the 'result overview window' will actually be created. The proposed purchase requisitions will also be created.

NOTE: For details of conditions under which the orders and requisitions will not be created, refer to the More about creating proposed work orders and purchase requisitions in Chapter 6.

Finally, the following message is displayed:

Information
! Workorder(s) and/or requisitions have been generated [(OK)]

Confirm this message to end the TIPAC per order procedure.

Time Phased ATP Check/Item

The 'Time Phased ATP Check per Item' function (menu 50.2 Custom, TIPAC, TIPAC / Item) enables you to:

- Check availability of an item if an order for that item has not yet been entered.
- Check availability for a specific quantity.

This function works almost the same as the 'TIPAC per Order' function and therefore only a very general description will be given. For full details, refer to Chapter 3 of this guide.

As with the TIPAC per Order function, the flow consists of five steps:

Step:	Task:
1	You enter the selection criteria for the 'time phased available to promise check'.
2	The system performs the simulation run.
3	The system presents an overview of the results of the 'time phased available to promise check' per sales order line.
4	You can then inquire into the details of the simulation by viewing the proposed order network, the critical path, the ATP quantities or the shortages.
5	You can either convert the proposed order network to actual orders or delete the proposed network.

4.1 Step 1: Entering selection criteria

This is the 'selection window' of the 'TIPAC per Item' function.

tppti q. p TIP60		50.2 Ti pac / I tem		30/03/00	
Item Number:	_____	Alt. BOM:	_____		
Description:	_____	Alt. Routing:	_____		
Quantity:	0.0 _____	Sales Order:	_____/____		
Forward Sched.:	no _____	Project:	_____		
Due Date:	____/____/____				
Site:	_____				

Complete the fields as follows:

Item	Enter the item for which you want to do a TIPAC check.
Quantity	Enter the quantity required.
Due Date	Enter the due date of the request (compulsory)
Site	Enter the site (compulsory).
Forward Sched.	Set the field to 'yes' if you want to use forward scheduling and to 'no' if you want to use backward scheduling.
Alt. BOM	If required, enter an alternative BOM.
Alt. Routing	If required, enter an alternative routing.
Sales Order/line	To enable you to distinguish between several ATP checks you can enter a sales order/line in the field. This is a free reference: the entries of the fields are not validated. The sales order number and line number are used in the order network for reference purposes: work order numbers get the format 'sales order number + dot + line number' and the 'Sales/Job' field of the work orders and purchase requisitions are filled with the sales order number. This enables you to trace the particular work orders after the order network has been generated and to execute several ATP checks with different due dates. If you do not enter a sales order number/line the system automatically uses the session number as the reference.
Project	If the item and quantity for which you want to run this function belongs to a certain project then you can make an entry in the field. During the simulation, the system will create temporary work orders and/or purchase requisitions all of which will have this project identification linked to them (stored in their own 'project' field) for reference purposes.

The system checks the validity of the various entries: existing item, quantity greater than 0, existing site and due date (today or someday in the future). It also checks if the alternative BOM and the alternative Routing (if any) exist. The system automatically adds the description of the item and the unit of measure. The output field becomes available later on in the TIPAC process.

4.2 Step 2: The simulation run

When you have entered the selection criteria, press 'go'.

The system performs a simulation run and shows a result and a start date in the second panel, as for the 'TIPAC per Order' function. Full details are provided in section 3.3.

4.3 Step 3: The result overview

The results of the simulation run are displayed in the 'result overview window'. Four options are available for viewing the details of the simulation.

tppti q.p TIP60		50.2 Tipac / Item		30/03/00	
Item Number:	file	Alt.BOM:			
Description:	tipac test item example 1	Alt.Routing:			
Quantity:	120.0 EA	Sales Order:	/		
Forward Sched.:	no	Project:			
Due Date:	14/04/00				
Site:	west				
Result: Required due date for item is valid Purchasing / Production required					
Start Date: 04/04/00					
Display Proposed Orders: <u>no</u>					
Display Critical Path: <u>no</u>					
Display Shortages: <u>no</u>					
ATP Quantities/Dates: <u>no</u>					

For a description of the fields in the overview window, refer to section 3.4.

If you select one option and press 'go', one of the following four windows is displayed:

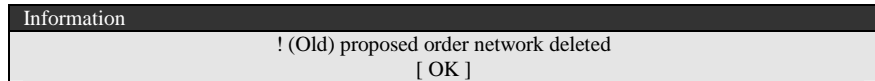
Window:	Described in section:
Display proposed orders	3.5.1
Display critical path	3.5.2
Display shortages	3.5.3
Display ATP quantities/dates	3.5.4

To leave any of these functions and return to the result overview window, press the spacebar on the keyboard.

To leave the result overview window, press Esc.

4.4 Step 5: Using or deleting the proposed order network

If you didn't enter anything in the 'Sales Order' field in the 'selection window,' the system gives the following message:

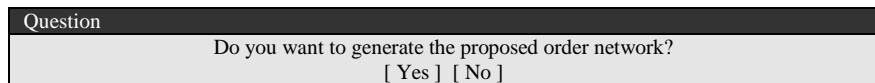


After confirming this you return to the 'selection window'.

If you:

- Completed the 'Sales Order' field in the 'selection window', and
- You leave the one of the four 'display detail' windows by pressing Esc

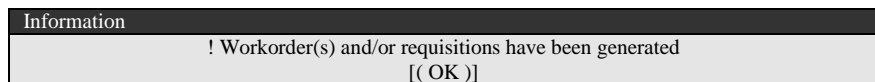
Then the system displays this message:



If you press 'no', then the message shown above will be given: (Old) proposed order network deleted and you return to the 'selection window'.

If you select 'yes', both the work orders and purchase requisitions of the proposed order network are generated.

Finally, the following message is displayed:



When you confirm this message, you return to the 'selection window'.

NOTE: If you do not generate the proposed order network, all work orders and purchase requisitions built during the simulation will be deleted, including the request you specified in the 'selection window' of the 'TIPAC per Item' function.

5.1 About Examples

This section contains the details of a number of examples that will be used throughout the description of the TIPAC functions.

NOTES:

- You will have to change the item numbers and/or the sales order numbers that are used in the examples if these numbers are already used by you for other purposes.
 - The numbers of work orders etc. as created during the simulation-run depend on the definition of the format of these numbers and on the numbers that already exist in your database. Therefore, the actual numbers that the TIPAC run generates when you enter the examples into your computer may differ from those mentioned in this document.
 - When practising with the given examples, you should make sure that you start with creating new items. This is because items that already exist in your own database may have existing orders or existing inventory linked to them and this may lead to a different outcome of the TIPAC run.
 - If you use the second example you should make sure that the sales order and all work orders and all purchase requisitions belonging to the first example have been removed.
 - The fields of which the contents are not specified in the examples contain their default value.
-

5.2 Example 2

The same as the example used in chapter 3, but now we choose a different due date on the sales order.

Function 7.1.1: Sales Order Maintenance:

Order	Sold to	Order date	Line	Item	Due date	Site	Qty ordered
Tip10	0001	Today	1	File	Today + 9 days	West	2

Function 50.1 TIPAC / SO:

Sales order	Line	To	Generate work orders	Generate requisitions	Forward sched.	Calculate due date
Tip10	1	1	Yes	Yes	No	2

5.3 Example 3

The same as example 1, but now we have safety lead time, inspection lead time, and minimum order quantity.

Item	Safety Time	Inspect	Min Ord
File	2	---	---
Cover	---	1	---
Screw	---	---	13

5.4 Example 4

The same as example 1, but now we have different values for the purchasing lead time and the manufacturing lead time.

Item	Um	Product line	Status	Site	Master schedule	Order policy	Pur / Mfg	Mfg lt	Pur lt	Issue policy
File	Ea	1000	Ac	Demo	No	Lfl	M	10	---	Yes
Cover	Ea	1000	Ac	Demo	No	Lfl	P	---	21	Yes
Mechanism	Ea	1000	Ac	Demo	No	Lfl	M	5	---	Yes
Handle	Ea	1000	Ac	Demo	No	Lfl	M	7	---	Yes
Screw	Ea	1000	Ac	Demo	No	Lfl	P	---	14	Yes

5.5 Example 5

This is an entirely different example. Lead times are long to make the example illustrate the essence better.
Today is 30/03/2000

Function 50.24. TIPAC Control File:

Default Tipac Status WO	Check MPS Level	Generate Network	Default Network	Display Capacity	Forward Scheduling	ATP Boundary	Mark Items for TIPAC
F	No	Yes	Yes	Yes	No	50	Yes

Function 1.4.1. Item Master Maintenance:

Item	Um	Product line	Status	Site	Master schedule	Order policy	Pur / Mfg	Mfg lt	Pur lt	Issue policy
Telephone	Ea	1000	Ac	Demo	No	Lfl	M	10	---	Yes
Receiver	Ea	1000	Ac	Demo	No	Lfl	P	---	20	Yes
Base	Ea	1000	Ac	Demo	No	Lfl	M	15	---	Yes
Plate	Ea	1000	Ac	Demo	No	Lfl	P	---	25	Yes
Buttonpanel	Ea	1000	Ac	Demo	No	Lfl	P	---	30	Yes

Function 13.5: Product Structure Maintenance:

Parent item	Component item	Qty Per
Telephone	Receiver	1
	Base	1
Base	Plate	1
	Buttonpanel	1

Function 7.1.1: Sales Order Maintenance:

Order	Sold to	Order date	Due date	Line	Item	Site	Qty ordered
Tip20	001	Today	29/12/2000	1	Telephone	Demo	10

Function 16.1: Work Order Maintenance:

Work Order	ID	Item number	Site	Qty Ordered	Due Date
WoTip20	15	Telephone	Demo	1	29/12/2000

Function 3.9: Receipts Unplanned:

Item Number	Quantity	Site	Effective
Telephone	1	Demo	Today
Receiver	5	Demo	Today
Base	4	Demo	Today
Plate	3	Demo	Today
Buttonpanel	5	Demo	Today

Function 50.1: TIPAC / SO:

Sales order	Line	To	Generate Work orders	Generate requisitions	Forward sched.	Calculate due date
Tip20	1	1	Yes	Yes	No	2 (SO-line) (= 29/12/2000)

5.6 Example 6

This example illustrates the same points as example 5, but in this example each item has no more than one component item.

Today is 29/05/1998

Function 50.24. TIPAC Control File:

Default Tipac Status WO	Check MPS Level	Generate Network	Default Network	Display Capacity	Forward Scheduling	ATP Boundary	Mark Items for TIPAC
F	No	Yes	Yes	Yes	No	50	Yes

Function 1.4.1. Item Master Maintenance:

Item	Um	Product line	Status	Site	Master schedule	Order policy	Pur / Mfg	Mfg lt	Pur lt	Issue policy
N1	Ea	1000	Ac	Demo	No	Lfl	M	10	---	Yes
N2	Ea	1000	Ac	Demo	No	Lfl	M	15	---	Yes
N2B	Ea	1000	Ac	Demo	No	Lfl	P	---	20	Yes
N3A	Ea	1000	Ac	Demo	No	Lfl	P	---	30	Yes
N3B	Ea	1000	Ac	Demo	No	Lfl	P	---	25	Yes

Function 13.5: Product Structure Maintenance:

Parent item	Component item	Qty Per
N1	N2B	2
	N2	2
N2	N3A	3
	N3B	1

Function 7.1.1: Sales Order Maintenance:

Order	Sold to	Order date	Due date	Line	Item	Site	Qty ordered
Tip50	001	Today	19/02/1999	1	N1	Demo	10

Function 16.1: Work Order Maintenance:

Work Order	ID	Item number	Site	Qty Ordered	Due Date
WoTip50	50	N1	Demo	1	19/02/1999

Function 3.9: Receipts Unplanned:

Item Number	Quantity	Site	Effective
N1	1	Demo	Today
N2	6	Demo	Today
N2B	10	Demo	Today
N3A	20	Demo	Today
N3B	6	Demo	Today

Function 50.1: TIPAC / SO:

Sales order	Line	To	Generate Work orders	Generate requisitions	Forward sched.	Calculate due date
Tip50	1	1	Yes	Yes	No	2

Chapter 6

More about using TIPAC

This Chapter provides additional information for the tasks described in Chapter 3 - *Time Phased ATP Check/Sales Order*.

6.1 About calculating the 'quantity required' on the first level

Here's the 'display order network window' again, taken from example 1. This section describes in short how the quantity in the **Qty Req** column on level 1 is calculated.

Proposed Order Network Browse (1-) 29/03/00						
Browse						
Level	WO/PR	ID/Line	Parent/Component	Qty	Req	St
> 1	W ti p10. 1	99007057	file	2.0	27	
.2	R 99007060	0	cover	2.0	24	
.2	W ti p10. 1	99007058	mechani sm	2.0	21	
.3	W ti p10. 1	99007059	handl e	2.0	20	
.4	R 99007061	0	screw	2.0	19	
.3	R 99007062	0	screw	8.0	20	
Filter = Off						

Proposed Order Network Browse (1-) 29/03/00						
Browse						
ID/Line	Parent/Component	Qty	Req	St	Date	Due Date
> 0.1	99007057	file	2.0	27/09/00	29/09/00	
7060	0	cover	2.0	24/09/00	27/09/00	
0.1	99007058	mechani sm	2.0	21/09/00	28/09/00	
0.1	99007059	handl e	2.0	20/09/00	21/09/00	
7061	0	screw	2.0	19/09/00	20/09/00	
7062	0	screw	8.0	20/09/00	21/09/00	
Filter = Off						

TIPAC only has to build a proposed order network if the ATP for the requested item on the date on which TIPAC is run is negative, because otherwise the existing quantity of the item is sufficient to cover the needs.

The quantity required as shown on level 1 is the lesser of two figures:

1. The quantity for which TIPAC is run.
2. The absolute value of the ATP on the date on which TIPAC is run.

The quantity for which TIPAC is run is shown in the **Qty** field in the first results screen. By running TIPAC for this quantity you indicate that you're interested in the availability of this quantity and the proposed order network should obviously not cover more.

The ATP quantity on the date on which TIPAC is run is the quantity of the receipts less the sum of the customer orders due between this date and the date of the receipt. If this quantity is positive, then you can still promise the item to the customers and there is no need for an extra order network to make delivering the products possible. But if the ATP quantity is negative, then this means that you should start purchasing and/or manufacturing to produce the quantity that is missing.

The receipts consist of:

- Quantity on hand (unallocated inventory)
- Purchase orders
- Existing work orders
- Repetitive schedules

The demands consist of:

- Requirements for work orders
- Components and sales orders (excluding forecasts and production forecast)

The ATP quantities per period are calculated as follows. Have a look at the diagram below to get a better idea of the procedure.

1. For the first period in which there's a receipt: calculate a result by subtracting the sum of all customer orders due between this date and the date of the next receipt from the received quantity. This result is called the ATP.
2. Continue this process for subsequent periods until the last period or until the ATP becomes negative. The negative ATP indicates that the quantity that was promised exceeds the quantity that is available.
3. If the last period is reached and all ATP values are positive stop the procedure, otherwise continue with step 4.
4. Store the absolute value of the negative ATP in a separate result and set the negative ATP to 0.
5. Go back to the most recent period that has a positive ATP.
If this is the first period with a positive ATP then
 subtract the stored result from the ATP and store the new ATP. This ATP may be negative. The absolute value of this ATP is the value that is compared to the quantity for which TIPAC is run to decide on the contents of the **Qty Req** column in the 'display order network window'.
If this is not the first period with a positive ATP then do the following.
 If the stored result from step 6 is smaller than or equal to this positive ATP then subtract the result from the ATP, store the new ATP and stop the procedure.
 If the stored result from step 6 is larger than this positive ATP then reduce the stored result with the value of the ATP, set the ATP to 0 and continue with step 8.
6. Repeat step 5.

Example

	Stock today	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7
Demand		10	4	10	7	21	5	5
Receipt	15			20		20		20
ATP								

Step 1: Period 1: $15 - (10+4) = 1$

Step 2: Period 2: 0 (no receipt)
 Period 3: $20 - (10+7) = 3$
 Period 4: 0 (no receipt)
 Period 5: $20 - (21+5) = -6$

Step 3: The ATP in the fifth period is negative. This is not the last period, so continue with step 4.

Step 4: The ATP for period 5 is -6. Store 6 and set the ATP for period 5 to 0. The 6 units that are lacking must be taken from ATPs in earlier periods.

	Stock today	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7
Demand		10	4	10	7	21	5	5
Receipt	15			20		20		20
ATP	1		0	3	0	-6		

Step 5: Period 3 is the most recent one with a positive ATP. Modify the stored result by subtracting the ATP: $6 - 3 = 3$ and set the ATP of period 3 to 0. Only 3 units are now still lacking.

Step 6: Period 1 is now the most recent one with a positive ATP. Subtract the stored result from the ATP, making it $1 - 3 = -2$. This means that over the whole horizon 2 units are missing.

	Stock today	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7
Demand		10	4	10	7	21	5	5
Receipt	15			20		20		20
ATP	-2		0	0	0	0		

The absolute value of the ATP quantity in the first period is compared to the quantity for which TIPAC is run. The smaller of the two values is used in the 'Qty Req' column in the 'display order network window'.

NOTE:

- The square brackets mean that production or purchasing includes the day shown before or after it.
- Between normal brackets is the number of working days or calendar days for the run.

This is the proposed order network according to the TIPAC per Order function (example 5).

tpsoi q. p TIP60 50.1 Tipac / S0 30/03/00

Item Number: telephone Alt. BOM:
 Description: tipac item example 5 Alt. Routing:

Quantity: 10.0 EA Sales Order: tip20 /1 /
 Due Date: 29/12/00 Project:
 Site: west

Result: Required due date for item is valid
 Purchasing / Production required
 Start Date: 30/10/00

Display Proposed Orders: yes
 Display Critical Path: no
 Display Shortages: no
 ATP Quantities/Dates: no

User Menu Edit Navigate Config Options Window Help

Proposed Order Network Browse (1-) 30/03/00

Browse

Level	WO/PR	ID/Line	Parent/Component	Qty	Req	St
> 1	W tip20.1	99007141	telephone	8.0	15	
2	W tip20.1	99007142	base	5.0	24	
3	R 99007143	0	plate	2.0	30	
2	R 99007144	0	receiver	4.0	25	

Filter = Off

User Menu Edit Navigate Config Options Window Help

Proposed Order Network Browse (1-) 30/03/00

Browse

ID/Line	Parent/Component	Qty	Req	St.	Date	Due Date
> 0.1	99007141 telephone	8.0	15/12/00		29/12/00	
0.1	99007142 base	5.0	24/11/00		15/12/00	
7143	0 plate	2.0	30/10/00		24/11/00	
7144	0 receiver	4.0	25/11/00		15/12/00	

Filter = On

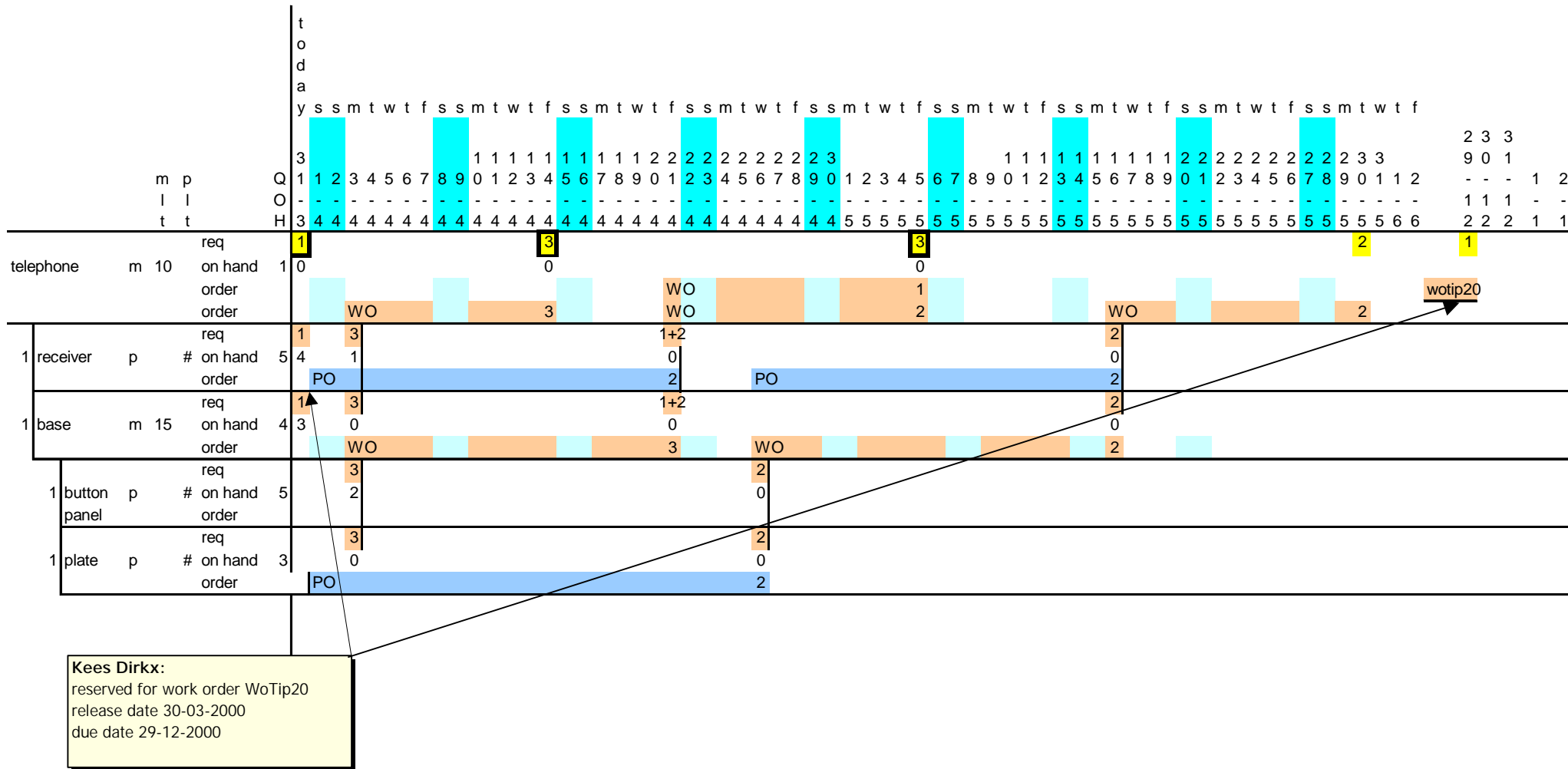
The start dates and due dates are consistent with the information in the diagram and the quantities are consistent with the ‘quantities to be purchased or manufactured’ as calculated above.

Now let’s investigate at what dates one or more units of item Telephone become available if we would start working today. Because we have some inventory both for the end item and for the component items we would probably be able to deliver part of the items much earlier than 29/12/2000.

To arrive at a possible scheme, we use the following assumptions.

1. Each production run starts as soon as possible and
2. The purchasing of materials is postponed until the material the last possible moment that guarantees the production doesn’t have to wait for the arrival of the purchased goods.

This results in the following scheme for producing the required items.



overview per order:

31/03	1 telephone from stock
01/04 - 21/04	purchasing gives 2 receiver
01/04 - 26/04	purchasing gives 2 plate
03/04 - 14/04	3 receiver from stock + 3 base from stock make 3 telephone
03/04 - 21/04	3 buttonpanel from stock + 3 plate from stock make 3 base
21/04 - 05/05	1 receiver from stock + 1 base from production make 1 telephone 2 receiver from purchasing + 2 base from production make 2 telephone
26/04 - 16/05	purchasing gives 2 receiver
26/04 - 16/05	2 buttonpanel from stock + 2 plate from purchasing make 2 base
16/05 - 30/05	2 receiver from purchasing + 2 base from production make 2 telephone
29/12	existing work order for 1 telephone

NOTES:

- The range of dates in each box indicates during what days production or purchasing takes place.
- Purchasing uses calendar days and Production uses working days.
- The existing work order for 1 telephone uses 1 receiver and 1 base from inventory

According to this diagram, the required units of the item Telephone become available on the following dates. (Units become available on the first working day after the last day of production).

Date	Quantity	Source
28/5/98	1 unit	From inventory
11/6/98	3 units	Produced
2/7/98	1 unit + 2 units	Produced
27/7/98	2 units	Produced
19/2/99	1 unit	On a work order

And here's the 'display ATP quantities/dates window' from the TIPAC per Order function (example 5). Press the space bar on the keyboard to reveal the remaining lines.

tps01 q. p TIP60 50.1 Tipac / S0 31/03/00

Item Number: telephone Alt. BOM:
Description: tipac item example 5 Alt. Routing:

Quantity: 10.0 EA Sales Order: tip20 /1 /
Due Date: 29/12/00 Project:
Site: west

Result: Required due date for item is valid
Purchasing / Production required
Start Date: 31/10/00

Display Proposed Orders: no
Display Critical Path: no
Display Shortages: no
ATP Quantities/Dates: yes

User Menu Edit Navigate Config Options Window Help

First Possible Deliveries ----- Orders on Critical Path (1-)

Browse
Date: 30/03/00

Date	Qty	WO/PR	ID/Line	Parent/Component
>31/03/00	1.0			telephone
14/04/00	3.0	W tip20.1	99007141	telephone
05/05/00	3.0	W tip20.1	99007142	base
30/05/00	2.0	R 99007143	0	plate
29/12/00	1.0	W wotip20	1721	telephone

Filter = Off

This window shows exactly the quantities (first column) and the dates (second column) that were calculated in the diagram.

Example 6

This is the logic in the case of example 6. (This is the same type of example but some items have more than one component item.)

Needed according to the sales order: 10 units of item N1

In inventory today:

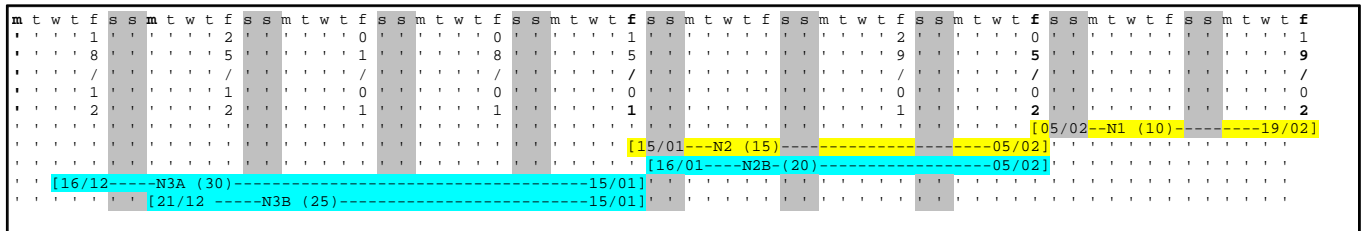
Lead Times:

Item	In inventory	Lead time	Unit of measure
N1	1	10	Working days
N2B	10	20	Calendar days
N2	6	15	Working days
N3A	20	30	Calendar days
N3B	6	25	Calendar days

This means that we still need the following quantities, either to be manufactured or to be purchased.

Item	Available	Quantity to be Purchased or Manufactured
N1	1 + 1 on the work order	8
N2B	10 + 2 incorporated in N1	8 (20 - 12)
N2	6 + 2 incorporated in N1	12 (20 - 8)
N3A	20 + 18 incorporated in N2 + 6 incorporated in N1	16 (60 - 44)
N3B	6 + 6 incorporated in N2 + 2 incorporated in N1	6 (20 - 14)

Using backward scheduling, we would arrive at this scheme for the production runs and purchasing 'runs':



NOTES:

- The square brackets mean that production or purchasing includes the day shown before or after it.
- Between normal brackets is the number of working days or calendar days for the run.

This is the proposed order network according to the TIPAC per Order function (example 6).

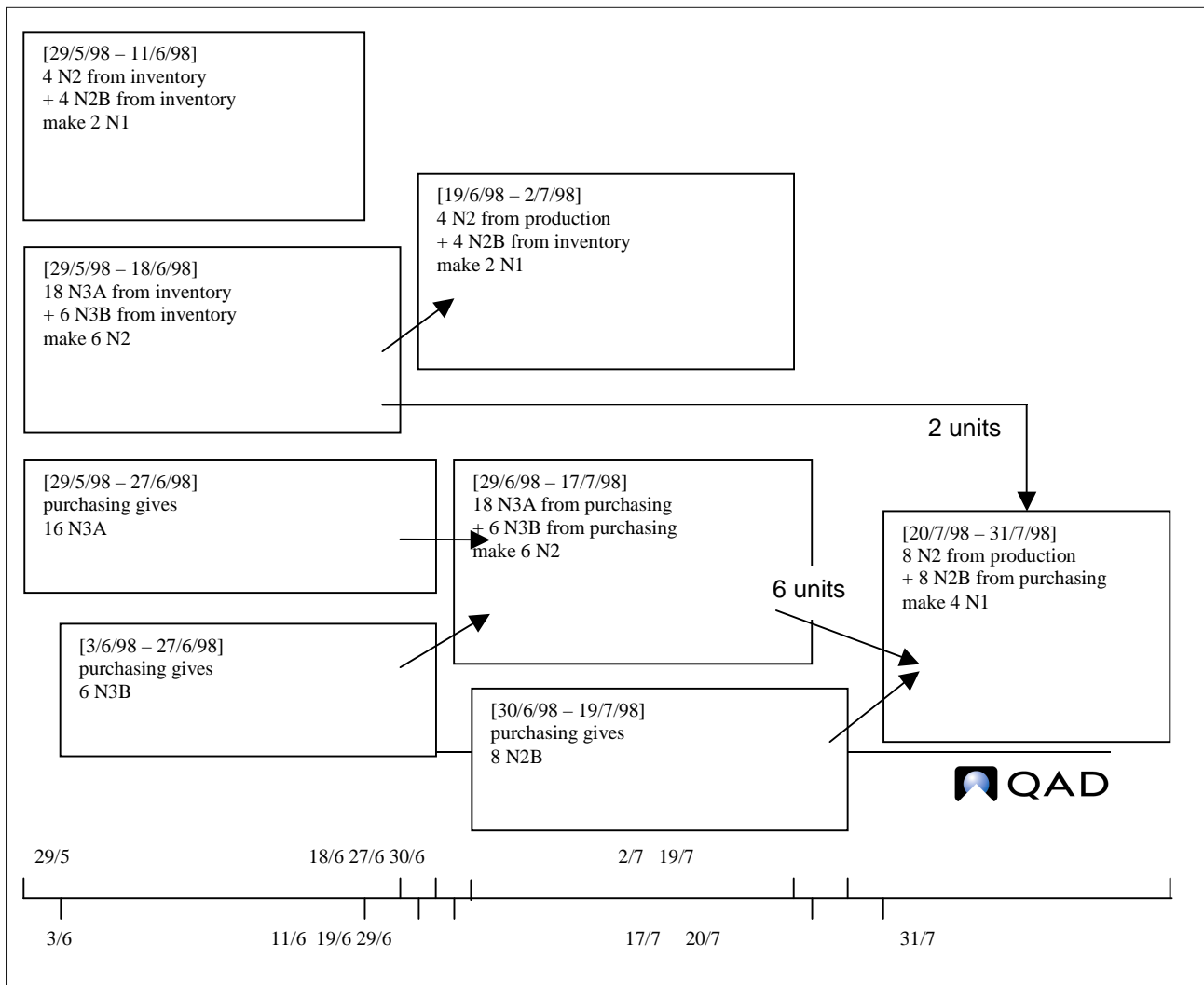
The start dates and due dates are consistent with the information in the diagram and the quantities are consistent with the 'quantities to be purchased or manufactured' as calculated above.

Now let's investigate at what dates one or more units of item N1 become available if we would start working today. Because we have some inventory both for the end item and for the component items, we would probably be able to deliver part of the items much earlier than 19/02/2000.

To arrive at a possible scheme, we use the following assumptions.

1. Each production run starts as soon as possible and
2. The purchasing of materials is postponed until the material the last possible moment that guarantees the production doesn't have to wait for the arrival of the purchased goods.

This results in the following scheme for producing the required items.



NOTES:

- The range of dates in each box indicates during what days production or purchasing takes place.
- The square brackets mean that production or purchasing includes the day shown before or after it.
- Purchasing uses calendar days and Production uses working days.
- The unit N1 that is in inventory and the unit on the existing work order are not shown in the diagram. The existing work order for 1 unit N1 uses 2 units N2 and 2 units N2B from inventory.

According to this diagram, the required units of the item N1 become available on the following dates. (Units become available on the first working day after the last day of production.)

Date	Quantity	Source
29/5/98	1 unit	From inventory
12/6/98	2 units	Produced
3/7/98	2 units	Produced
2/8/98	4 units	Produced
19/2/99	1 unit	On a work order

And here's the 'display ATP quantities/dates window' from the TIPAC per Order function (example 6). Press the space bar on the keyboard to reveal the remaining lines.

This window shows exactly the quantities (first column) and the dates (second column) that were calculated in the diagram.

6.3 About conditions for performing a simulation run

After you have entered all selection criteria in the 'selection window', the system will check if it is allowed to perform a simulation run. It will first determine whether or not an earlier simulation run was executed for the current item and sales order (line) number.

If no previous simulation was performed, the system will continue the current TIPAC run with doing a simulation using the just entered selection criteria. But if a previous simulation was done, the system will first have to decide if this old order network can be deleted before it continues with the simulation for the current TIPAC run. If the system detects that the previous simulation was stopped in an abnormal way, for instance as a result of a power failure, it will automatically delete the available order network that was made during the previous simulation without any messages and build up a new proposal during a new simulation run.

Before actually deleting an existing proposed order network, the system checks the following two conditions to decide whether or not deleting the network is permitted:

1. The status of the order network for the selected sales order line.
2. If the work order status is different from "F" (Firm Planned) (or "E" (exploded) for phantom items) it will not be possible to delete the order network via this function.
3. Material issues or receipts and/or hours registered for at least one of the orders of the order network. If either of these transactions has already taken place the existing order network can't be deleted.

If the existing order network can be deleted, the system will display this message:

Information
! For this Sales Order Line an Order network exists [OK]

After confirming this and pressing the space bar, you must answer the following question:

Information
! Do you want to delete the order network? [Yes] [No]

The system will react to the answer you give in the same way as was described in the section about using or deleting the proposed order network'. If you select **no** the system will present the 'selection window'. (If you enter the same criteria the system will again go through the same procedure, by informing you that an order network already exists.) If you select **yes** the existing order network will be deleted and after you have confirmed the message '(Old) proposed order network deleted' the system will continue its normal flow by executing step 2: the Simulation Run.

6.4 About exploding a Bill Of Material

If for the current item the quantity available is less than the quantity needed to fulfil a certain demand, the system explodes the BOM of this item. However, under certain circumstances the system will not explode the BOM of the current item. This is the logic.

1. If the TIPAC Control file contains the entry: check MPS Level = yes (see section 2.2) then if an item is defined as an MPS item availability will not be checked for this item. The BOM of such an item will not be exploded and availability for its lower level components will also not be checked. The reason for this is that it is assumed that for the ATP check this is the point in the product structure where the link between the production of components and the customer order is gone. If the BOM of an item contains MPS items then these items and their component items do not occur in the 'display proposed orders window', the 'display critical path window', the 'display shortages window' or the 'display ATP quantities/dates window'.
-

NOTE: MPS items are characterized by the fact that the entry in the 'Master Sched' field in the Item Planning Data is 'yes'.

2. If an item is a floor stock item it is not relevant on the pick list and it is assumed always to be available. For such an item the system does not create work orders or purchase requisitions and it will therefore not be part of the proposed order network. As a result it will never be exploded.
-

NOTE: Floor stock items are characterized by the fact that the entry in the 'Issue Policy' field in the Item Planning Data is 'no'.

3. The item is a purchased item. In this case the lead time to deliver the item will be taken into account while checking the required delivery date (via a purchase requisition).
-

NOTE: A purchased item is characterized by the fact that the entry in the 'Pur/Mfg' field in the Item Planning Data is 'P'.

4. If the BOM of a manufactured item is not available the system obviously can't continue the explosion.
5. If there is sufficient stock (the ATP quantities are greater than or equal to 0) then exploding the BOM is not necessary.

6.5 About forward scheduling

Forward scheduling is a method that is used to calculate the earliest delivery date of a sales order or a set of sales order lines. The basic principle of forward scheduling is that the resulting proposed order network should never require that production or purchasing was started sometime in the past. If the due date that you enter for the TIPAC run is not consistent with this principle then the system automatically updates this due date to guarantee that the proposed order network that results is feasible. The update is done by adding a number of working days to the original due date, thus shifting the due date to the future. The number of working days that is added is calculated by taking the difference between the start date (in the past) according to the proposed order network and today.

The basic process will now be illustrated by way of example 4.

The screen on the next page is the 'display proposed order network window' in the case that TIPAC per Order is run for sales order 'tip10' using backward scheduling and due date 26/09/98. This due date is a Friday. Today is Tuesday 26/05/98. We assume that only on Saturdays and Sundays no work is done:

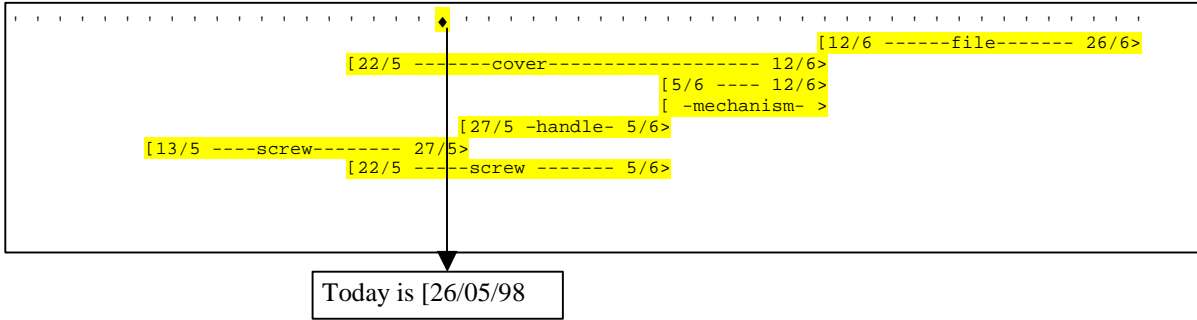
Tipac / SO						
User Menu Edit Queue Options Help						
Item: file		Qty: 2.0		Sales Order: tip10 / 1		
		Date: 26/06/98		Project		
		Site: 10000				
Level	WO/PR	ID/Line	Parent/Component	Qty Req	St.Date	Due Date
1	W tip10.1	9900633	file	2.0	12/06/98	26/06/98
.2	R 9900636	0	cover	2.0	22/05/98	12/06/98
.2	W tip10.1	9900637	mechanism	2.0	05/06/98	12/06/98
..3	W tip10.1	9900638	handle	2.0	27/05/98	05/06/98
...4	R 9900639	0	screw	2.0	13/05/98	27/05/98
..3	R 9900640	0	screw	8.0	22/05/98	05/06/98
Press space bar to continue.						

Tipac / SO						
User Menu Edit Queue Options Help						
Item: file		Qty: 2.0		Sales Order: tip10 / 1		
		Date: 26/06/98		Project		
		Site: 10000				
Level	WO/PR	ID/Line	Parent/Component	Qty Req	St.Date	Due Date
1	W tip10.1	99000635	file	2.0	12/06/98	26/06/98
.2	R 99000636	0	cover	2.0	22/05/98	12/06/98
.2	W tip10.1	99000637	mechanism	2.0	05/06/98	12/06/98
..3	W tip10.1	99000638	handle	2.0	27/05/98	05/06/98
...4	R 99000639	0	screw	2.0	13/05/98	27/05/98
..3	R 99000640	0	screw	8.0	22/05/98	05/06/98

Press space bar to continue.

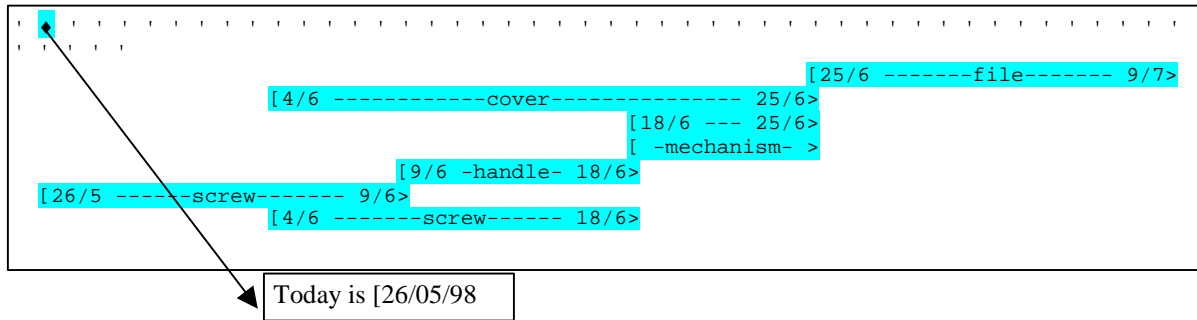
NOTE: For purchased items (cover and screw) the lead time is in calendar days, for manufactured items (file, mechanism and handle) the lead time is in working days.

This is a diagram of the output:



1. This diagram clearly indicates that in order to have the items ready on June 26, you should have started producing in the past.
2. In the case of forward scheduling the system notices this problem. It first calculates the difference in working days between the start date in the diagram and today. In this example this difference equals 26/05/98 – 13/05/98 = 9 working days.
3. Then it calculates a new due date by adding this difference to the original due date. This gives a due date of 26/06/98 + 9 working days = 09/07/98.
4. A new TIPAC run results in a new proposed network.

This is the corresponding diagram:



By replacing the original due date with the new one the system has guaranteed that the proposed order network does not require ‘producing in the past.’

NOTE: The screen that shows the original proposed order network (starting in the past) could not be generated by way of forward scheduling because of the fact that in the case of forward scheduling the system calculates its own new due date.

6.6 About minimum order quantities

This section describes how TIPAC uses the minimum order quantity. The minimum order quantity field in the Item planning data for an item is used to enter information about the order quantity for work orders and purchase requisitions of that item:

When TIPAC creates a proposed order network the quantity on the top level work order or purchase requisition are calculated using the information in the minimum order quantity field mentioned above. The quantities on the lower level orders and requisitions will all be influenced by the quantity for the top level item.

TIPAC shows these quantities in the 'display proposed order network window'.

Examples

The following 3 examples describe how the gross requirements could be influenced by the minimum order quantity .

Suppose Min Ord Qty = 13. If Order quantity = 12 then this becomes 13.

Suppose Min Ord Qty = 0. If Order quantity = 12 then this remains unchanged.

Suppose Min Ord qty = 13. If Order quantity = 14 then this remains unchanged.

6.7 About safety lead time and inspection lead time

This section describes how TIPAC uses the safety lead time and the inspection lead time of an item in MFG/PRO.

You can enter the safety lead time in the 'Safety Time' field of the Item planning data in MFG/PRO®. To enter an inspection lead time enter 'yes' in the 'Inspect' field and the inspection lead time in the 'Ins LT' field. TIPAC takes both lead times into account in the same way as the MRP process does.

The due date of an order with a safety lead time of x days is set to the original order due date minus x working days. The due date of a purchase order with an inspection lead time of z days is set to the original due date minus z working days.

The following page shows an example (taken from example 3):

The screenshot shows a software window titled "Tipac / SO" with a menu bar containing "User Menu", "Edit", "Queue", "Options", and "Help". Below the menu bar is a summary panel with the following information:

- Item: file
- Qty: 2.0
- Sales Order: tip10 / 1
- Date: 01/07/98
- Project:
- Site: 10000

Below the summary panel is a table with the following columns: Level, WO/PR, ID/Line, Parent/Component, Qty Req, St.Date, and Due Date.

Level	WO/PR	ID/Line	Parent/Component	Qty Req	St.Date	Due Date
1	W tip10.1	99000597	file	2.0	25/06/98	29/06/98
.2	R 99000598	0	cover	2.0	21/06/98	24/06/98
.2	W tip10.1	99000599	mechanism	2.0	19/06/98	25/06/98
...3	W tip10.1	99000600	handle	2.0	18/06/98	19/06/98
...4	R 99000601	0	screw	20.0	17/06/98	18/06/98

At the bottom of the window, there is a text prompt: "Press space bar to continue."

This screen shows that the due date on the first line is two days ahead of the due date of the order in the first panel. This difference is equal to the safety lead time. The due date of the purchase requisition for the item 'cover' is one day ahead of the start time of the work order on the first line. This difference is equal to the inspection lead time.

6.8 About (alternative) Bills Of Material

If an item is not available in the correct quantity, the system must decide for which component items it must generate work orders or purchase requisitions. The logic is as follows.

If the 'Alt. BOM' field is left blank, the system decides which BOM it must use in the following way:

1. If a BOM code is available in the Item Site Planning Information for this item (field 'BOM/formula'), then the BOM with this code will be used in the simulation process.
2. If no BOM code is available in the Item Site Planning Information, then the system will use the BOM code that is available in the general Item Planning Information (field 'BOM/formula'), if any.
3. If no BOM code is available in the general Item Planning Information, the BOM code with the same code as the item id will be used.

If you make an entry in the 'Alt. BOM' field, the system uses the alternative BOM with this code. The code must be a valid BOM according to Product Structure Maintenance function. If not, the following error message comes up.



NOTE: The system will not check whether or not using an alternative BOM is allowed for the current item.

6.9 About (alternative) Routings

The decision process for Routings is identical to that of Bills Of Material, as described section 6.8.

6.10 About creating proposed orders and requisitions

This is the logic for creating proposed work orders and purchase requisitions.

1. If the proposed order network requires producing or purchasing sometime in the past, then the system won't store anything because the proposed order network is not feasible.
2. If the question 'Do you want to generate the proposed order network' is answered with 'no' the system doesn't create work orders or purchase requisitions (even if 'yes' was entered in the fields in the second panel of the 'Result Overview' window).
3. If this question is answered with 'yes' the system creates work orders and purchase requisitions according to the contents of the fields in the second panel of the 'Result Overview' window (see the window shown below, taken from example 1), regardless of what was entered in the corresponding fields in the 'selection window'.

Calc. Lne	Due Date	M	Due Date	Required	Promised	Result ATP Check	Cr. WO	Cr. PR
1	01/07/98	2	01/07/98	01/07/98	01/07/98	Available	yes	yes

Calc. Lne	Due Date	M	Due Date	Required	Promised	Result ATP Check	Cr. WO	Cr. PR	Inq. Det
1	01/07/98	2	01/07/98	01/07/98	01/07/98	Available	yes	yes	yes

NOTES:

- The system keeps track of the relationship between a higher level work order and a lower level work order (by incorporating the work order id of the higher level order in the data of the lower level order).
 - The generation of the work orders is processed according to standard MFG/PRO. The status that is used for the work orders is indicated in the TIPAC Control file ('Default TIPAC Status WO'). The ATP check itself will be handled as if this work order status is E, but this status is corrected when you decide to store the proposed order network.
 - For purchase requisitions the contents of the following fields are determined by the ATP procedure: requisition, item number, site, qty, need date. All other fields get a default value. All processing of requisitions is performed according to the Purchase Requisition Maintenance function of MFG/PRO.
-

6.11 About viewing the Work Center Summary Load

During the TIPAC run, a proposed order network is created. You can view the effect of this network on the load of a work center by calling function 24.13 Work Center Load Summary Report. To call this function from TIPAC you should add it to the User Menu by taking the following actions:

1. Start function 36.4.11 User Function Maintenance.
2. Enter a number larger than 12 in the **Function Key** field and a sequence number in the **Sequence** field.
3. Press 'go' and enter 24 in the **Menu** field and 13 in the **Selection** field (24.13 being the number of the Work Center Summary Load Report function).
4. The system now automatically fills the **Execution file** field and the **Label** field ('Work Center Summary Load Inquiry').

Once you have done this, you can call this report from the 'type of detail window' in TIPAC. It comes up with the following screen:

Work Ctr	Machine	Site	Start	End	DAWM	Per Col	Output
		demo	08/06/98	/ /	W	1	

You can enter the selection criteria for the report in the various fields. For an explanation of how this function we refer to the relevant MFG/PRO documentation.

In order to present the impact on the work center load, the system stores the work center routings related to the generated work orders. This action is only executed if the entry in the 'Display capacity' field in the TIPAC Control file is 'yes'. If this entry is 'no' the system allows you to add the Work Center Summary Load Inquiry function to the User menu and to start this function, but will not show the impact of the proposed order network in the data. Thus, you can only view the result of the proposed order network on a work center if the entry in the 'Display capacity' field is 'yes'.

NOTES:

- The work order routings are automatically deleted if you decide not to store the proposed order network.
 - The system does not do a capacity check for the work centers involved in the proposed order network; it just stores the related work order routings.
 - This option can reduce the performance of the system.
-

Press 'go' to see the impact of the proposed order network on the selected work center. It is presented by way of the following two screens. For a description of the contents, please refer to the MFG/PRO User Guide

Appendix A

TIPAC Flag Maintenance

A.1 About the TIPAC flags

The TIPAC Flag Maintenance screens enable you to control which data in the MFG/PRO database is included in a TIPAC check.

The logic behind the TIPAC flag is as follows.

1. If you create a new item, the value of the TIPAC flag for this item will be copied from the TIPAC Control file (50.24).
2. To change this TIPAC flag for one or more items, use one of the following functions:
 - TIPAC Flag Maintenance Site Based function (50.4), described in section A.2
 - TIPAC Flag Maintenance Part Based function (50.5), described in section A.3.
 - TIPAC Flag Batch Maintenance function (50.6), described in section A.4.

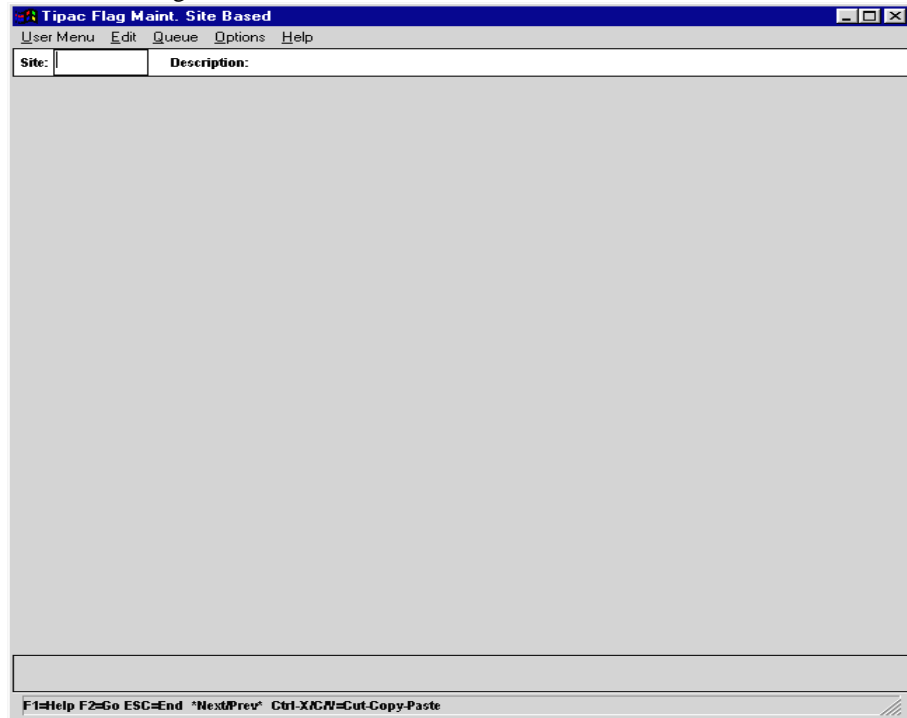
See the description of these functions to find out which one is most suitable. The functions TIPAC/SO (50.1) and TIPAC/Item (50.2) use the value of the TIPAC flag as shown in the 'part based' and 'site based' functions. If available, they use the value from the line with the correct site on it. If that line is not available, they use the value from the line of the correct item in which the site column is empty.

A.2 Maintaining Site-Based Flags

This function enables you to view whether or not an item will be taken into account by TIPAC when performing the simulation run. You can view this for:

- Items on a specific site
- Independently of a site.

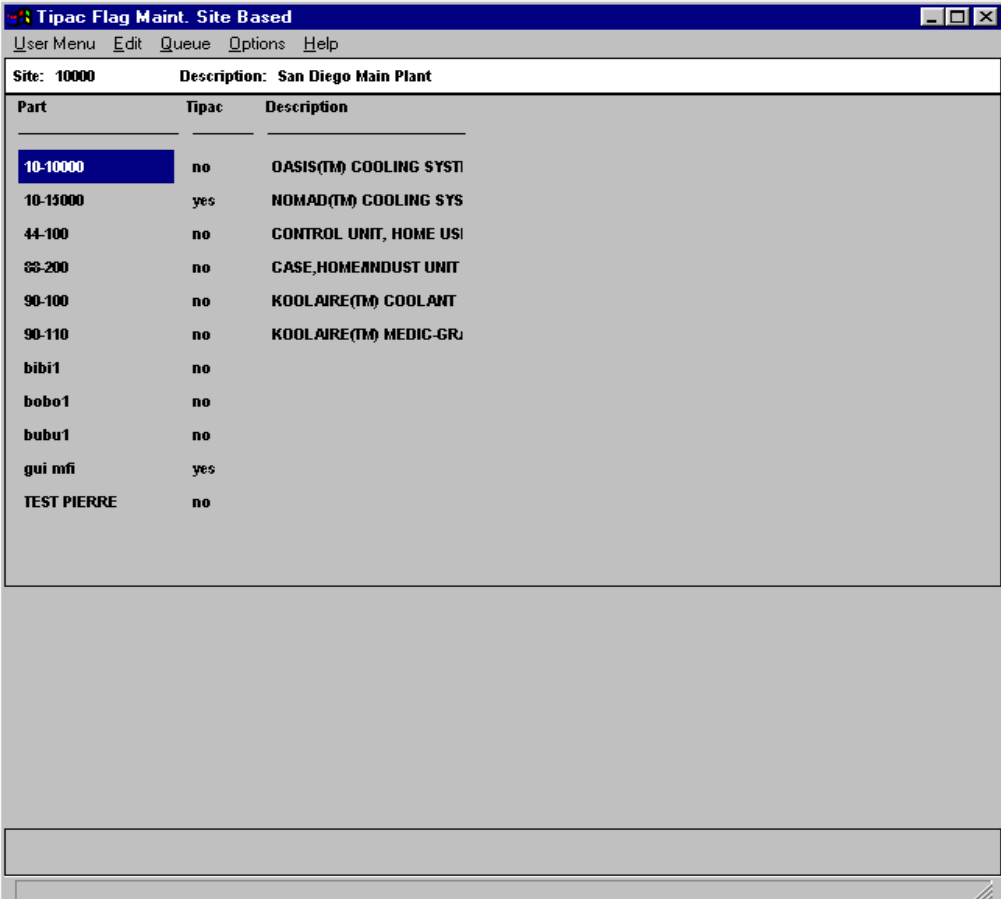
The TIPAC Flag Maintenance Site Based screen is shown below.



To see items for a specific site:

1. Enter the **Site** for which you want to see the details.
2. Press 'go'.

The system will show all items in the MFG/PRO database that are linked to that specific site.



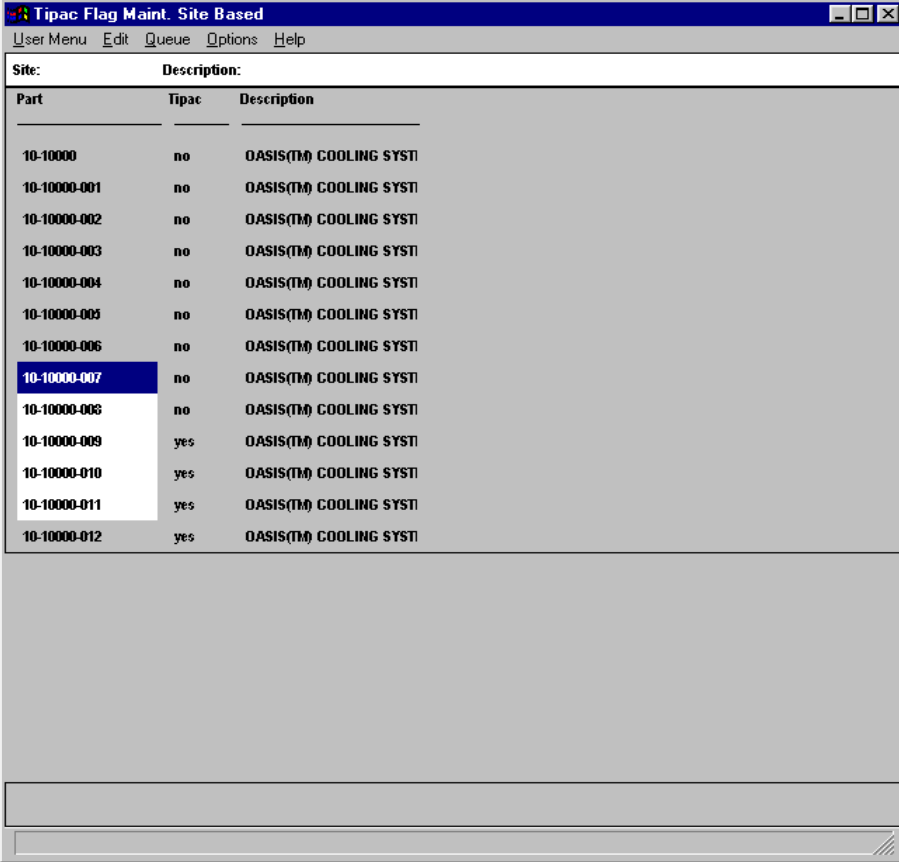
Part	Tipac	Description
10-10000	no	OASIS(TM) COOLING SYST
10-13000	yes	NOMAD(TM) COOLING SYS
44-100	no	CONTROL UNIT, HOME USI
88-200	no	CASE,HOMEMNDUST UNIT
90-100	no	KOOLAJRE(TM) COOLANT
90-110	no	KOOLAJRE(TM) MEDIC-GR
bibi1	no	
bobo1	no	
bubu1	no	
gui mfi	yes	
TEST PIERRE	no	

The second column shows 'yes' if the item will be taken into account by TIPAC during the simulation run, it shows 'no' otherwise. The third column shows the description of the item.

To see items for all sites:

- When the TIPAC Flag Maintenance screen is displayed, press 'go'.

The system will display all items in the MFG/PRO® database (regardless of the links they have to sites) as in the following example:



The screenshot shows a window titled "Tipac Flag Maint. Site Based" with a menu bar containing "User Menu", "Edit", "Queue", "Options", and "Help". Below the menu is a table with the following data:

Part	Tipac	Description
10-10000	no	OASIS(TM) COOLING SYST
10-10000-001	no	OASIS(TM) COOLING SYST
10-10000-002	no	OASIS(TM) COOLING SYST
10-10000-003	no	OASIS(TM) COOLING SYST
10-10000-004	no	OASIS(TM) COOLING SYST
10-10000-005	no	OASIS(TM) COOLING SYST
10-10000-006	no	OASIS(TM) COOLING SYST
10-10000-007	no	OASIS(TM) COOLING SYST
10-10000-008	no	OASIS(TM) COOLING SYST
10-10000-009	yes	OASIS(TM) COOLING SYST
10-10000-010	yes	OASIS(TM) COOLING SYST
10-10000-011	yes	OASIS(TM) COOLING SYST
10-10000-012	yes	OASIS(TM) COOLING SYST

Again, the second column shows whether or not the item will be taken into account by TIPAC when it's performing a simulation run and the third column shows the description of the item in the first column.

You can change the value in the second column by highlighting the correct item and pressing the 'enter' key on the keyboard. This will take you to the second column where you can change the contents and store them by pressing 'go' or 'enter'. You will then return to the first column and you can return to the white bar by pressing 'escape'.

NOTE:

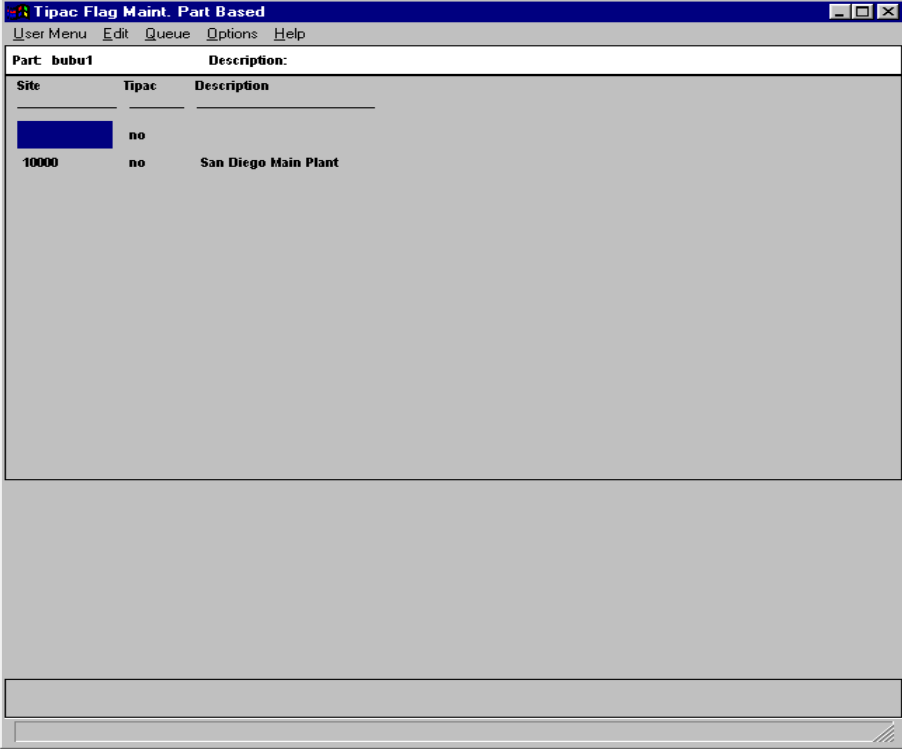
If you change the flag for a part without entering a site, then this change holds for all sites. You will see this change reflected in function 50.5 where the first line (the one without a site) will also be changed.

If you change the flag for a part for a given site, then this change holds for that specific site only. You will see this change reflected in function 50.5: the first line (the one without a site) will remain the same but the line for the specific site will be changed.

A.3 Maintaining Part-Based Flags

This function enables you to view the TIPAC flag of a specific item, both for a specific site and independently of a site.

The TIPAC Flag Maintenance Part Based screen is shown below:



Site	Tipac	Description
10000	no	San Diego Main Plant

Initially only the white bar is shown. In the **Part** field, enter the part you want to see, then press 'go'.

The first column shows all sites to which the item is linked. On the first line this column is empty. This line represents the details of the item independent of the site. The second column shows 'yes' if the item will be taken into account by TIPAC during the simulation run, it shows 'no' otherwise. The third column shows the description of the site.

To change the value in the second column:

1. Highlight the correct item.
2. Press Enter.
3. This will take you to the second column, where you can change the contents.
4. To store any changes, press 'go' or 'enter'.
5. You will then return to the first column. To return to the white bar, press Esc.

NOTE: If you change the flag for a part on the first line (the one without a site) then this change holds for all sites. You will see this change reflected in function 50.4 where the line for that part will also be changed provided that you left the site field blank.

If you change the flag for a part for a given site, then this change holds for that specific site only. You will see this change reflected in function 50.4 where the line for that part for the specific site will be changed.

A.4 Maintaining Batches of Flags

This function enables you to change the TIPAC flag for sets of items. The TIPAC Flag Batch Maintenance screen is shown below:

The screenshot shows a software window titled "Tipac Flag Batch Maint." with a menu bar containing "User Menu", "Edit", "Queue", "Options", and "Help". The main interface is split into two horizontal panels. The upper panel contains several input fields: "Item Number:" (with a small icon), "Prod Line:", "Buyer/Planner:", "Group:", "Item Type:", "PurMfg:", and "Activate:" (with the value "yes" entered). To the right of these fields are four "To:" labels, each followed by an empty input field. The lower panel is mostly empty, with the labels "Output:" and "Batch ID:" positioned on the right side. At the bottom of the window, a status bar displays the following keyboard shortcuts: "F1=Help F2=Go ESC=End Ctrl-X=Cut Ctrl-C=Copy Ctrl-V=Paste".

The first panel allows you to specify for which items you want to change the TIPAC flag. The TIPAC flag will be set to the value that is entered in the **Activate** field. Enter 'yes' if you want the system to include the items in the TIPAC simulation, enter 'no' if you want to exclude them. You can use the other fields to enter the characteristics of the items. For every item that meets all criteria the flag will be set to the value in the Activate field.

Item Number	Enter a range of item numbers.
Prod Line	Enter a range of product lines.
Buyer/Planner	Enter a range of buyers or planners.
Group	Enter a range of MFG/PRO® groups.
Item Type	Enter a range of item types.
Pur/Mfg	Use this field to indicate whether you want the change of the TIPAC flag to apply to manufactured items or purchased items.

NOTE: If you change the flag for a range of parts you will see this change reflected in functions 50.4 and 50.5 for all sites.

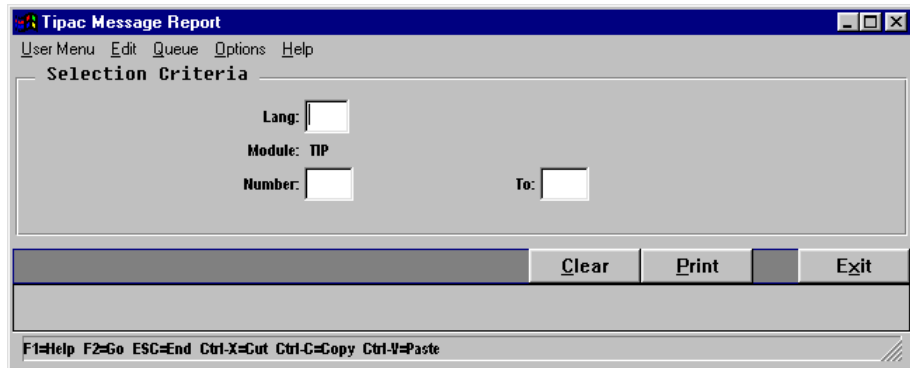
Appendix B

TIPAC Messages

B.1 TIPAC Message Report

NOTE: If you want to use a printer, you must first define the printer in MFG/PRO.

The message report function enables you to print the existing TIPAC messages or save them to a file. The window of this function looks like this:



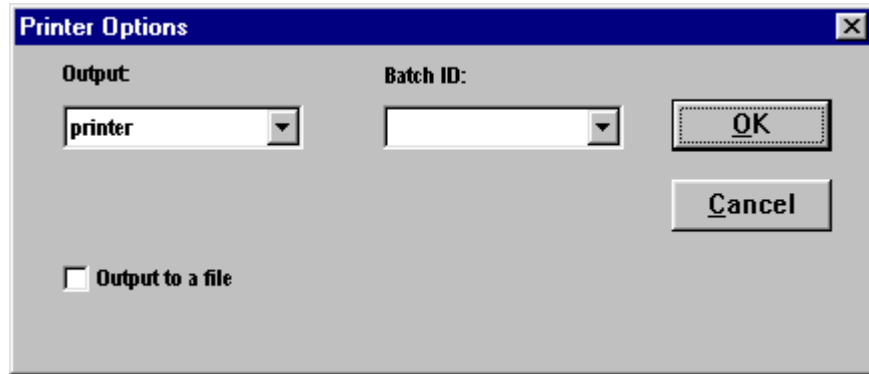
Complete the fields as follows:

Lang	Use the Lang field to enter the language of which you want to see the available messages: for instance us(english), du(tch), ge(rman), fr(ench), it(alian) or cs (for castillian spanish).
Number To	Use the Number and To fields to enter a range of message numbers that you want to see. (Of course, if the entry in the 'number' field is larger than that in the 'to' field the report will be empty.)

To clear all fields, press the **clear** button.

When you have completed the fields, you may then select how the message report should be displayed. To do this:

1. Press the **print** button or 'go'.
2. The following window is displayed:



Complete the fields as follows:

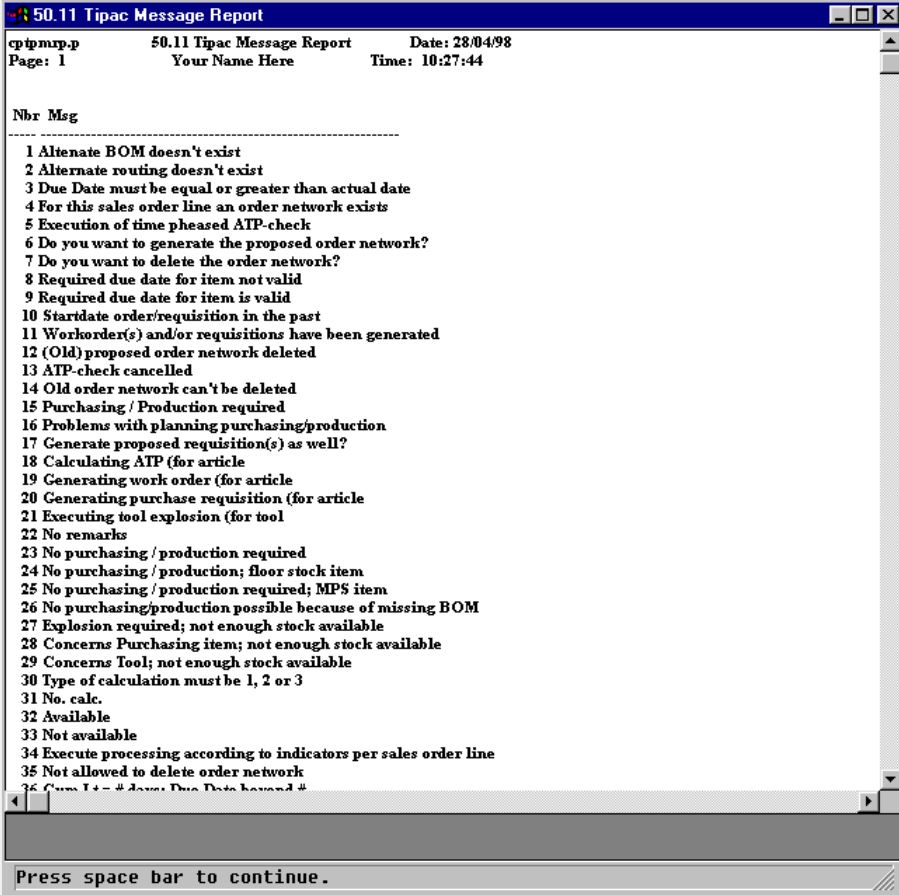
Output	Specify the output destination. This can be a printer or the terminal.
Output to a file	Select this checkbox if you want to save the output in a file.
Batch ID	Specify the identification of the batch you want to use.

3. To go back to the message report window, press **Cancel**.
To print the report, press **OK**.

- If you selected the **Output to a file** check box, the following window will be displayed:



- Enter the filename in the **Output to file** field.
 - To return to the message report window, press Cancel.
To create a report, press **OK**. The file is created in the working directory (start up directory) of MFG/PRO.
- The following example shows the output of the TIPAC Message Report function. The **Nbr** column contains the message number. The **Msg** column contains the message text.



```
50.11 Tipac Message Report
cp@mnp.p      50.11 Tipac Message Report      Date: 28/04/98
Page: 1      Your Name Here      Time: 10:27:44

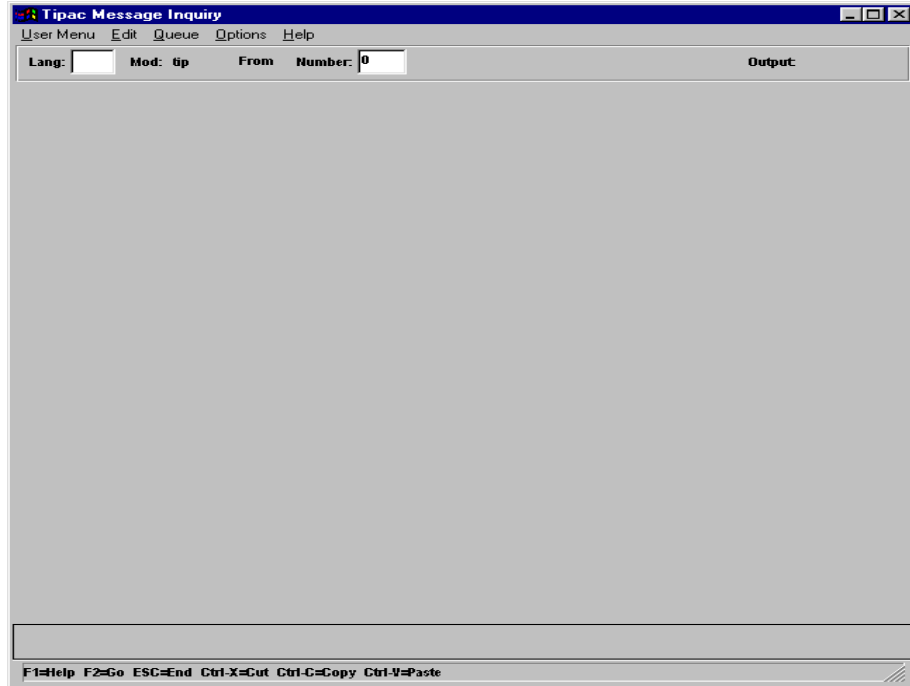
Nbr  Msg
-----
 1 Alternate BOM doesn't exist
 2 Alternate routing doesn't exist
 3 Due Date must be equal or greater than actual date
 4 For this sales order line an order network exists
 5 Execution of time phased ATP-check
 6 Do you want to generate the proposed order network?
 7 Do you want to delete the order network?
 8 Required due date for item not valid
 9 Required due date for item is valid
10 Startdate order/requisition in the past
11 Workorder(s) and/or requisitions have been generated
12 (Old) proposed order network deleted
13 ATP-check cancelled
14 Old order network can't be deleted
15 Purchasing / Production required
16 Problems with planning purchasing/production
17 Generate proposed requisition(s) as well?
18 Calculating ATP (for article
19 Generating work order (for article
20 Generating purchase requisition (for article
21 Executing tool explosion (for tool
22 No remarks
23 No purchasing / production required
24 No purchasing / production; floor stock item
25 No purchasing / production required; MPS item
26 No purchasing/production possible because of missing BOM
27 Explosion required; not enough stock available
28 Concerns Purchasing item; not enough stock available
29 Concerns Tool; not enough stock available
30 Type of calculation must be 1, 2 or 3
31 No. calc.
32 Available
33 Not available
34 Execute processing according to indicators per sales order line
35 Not allowed to delete order network
36 Cons. Item # down; Due Date beyond #

Press space bar to continue.
```

B.2 TIPAC Message Inquiry

NOTE: If you want to use a printer, you must first define the printer in MFG/PRO.

This function enables you to view the existing TIPAC messages and to send the output to a file, a printer or the terminal.



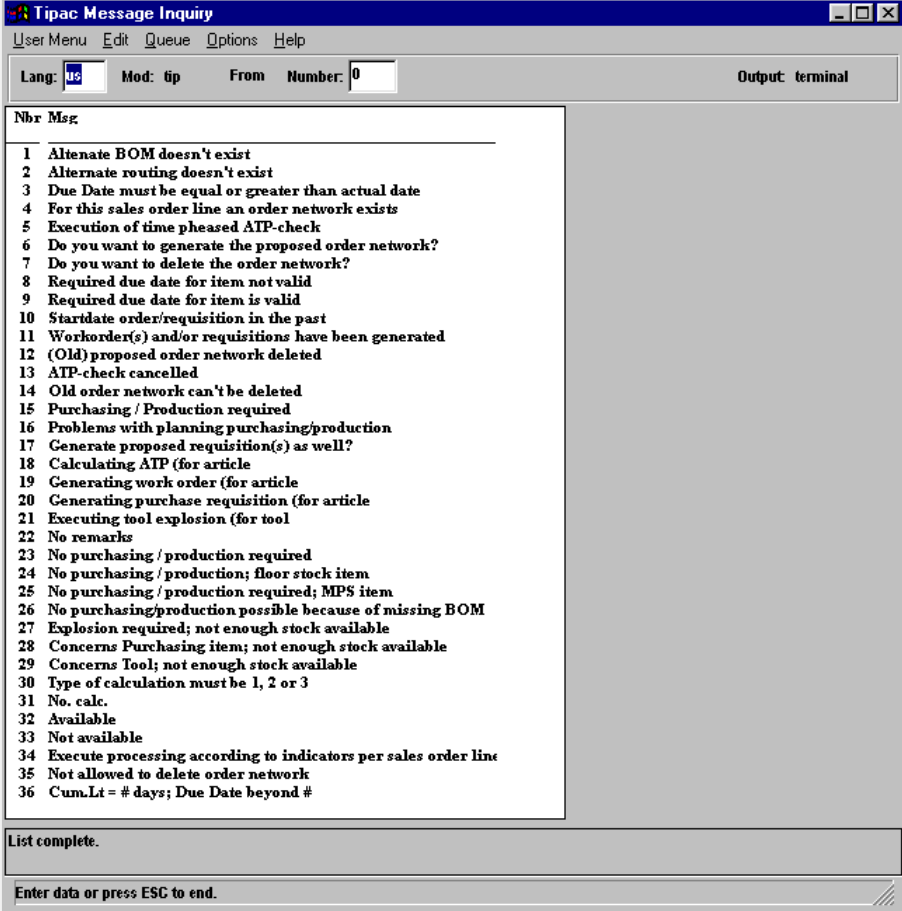
Complete the fields as follows:

Lang	Enter the language of which you want to see the available messages: for instance us(english), du(tch), ge(rman), fr(ench), it(alian) or cs (for castillian spanish).
From Number	Enter the lower bound of the range of message numbers that you want to see.
Output	Specify the output destination: terminal, printer or file. To send the output to a file, just enter the filename directly in this field. The file is created in working directory (also called start up directory) of MFG/PRO®.

To leave the message inquiry window, press **Cancel**.

To view or print the messages, press **OK**.

This is an example of the output showing message number and message text.



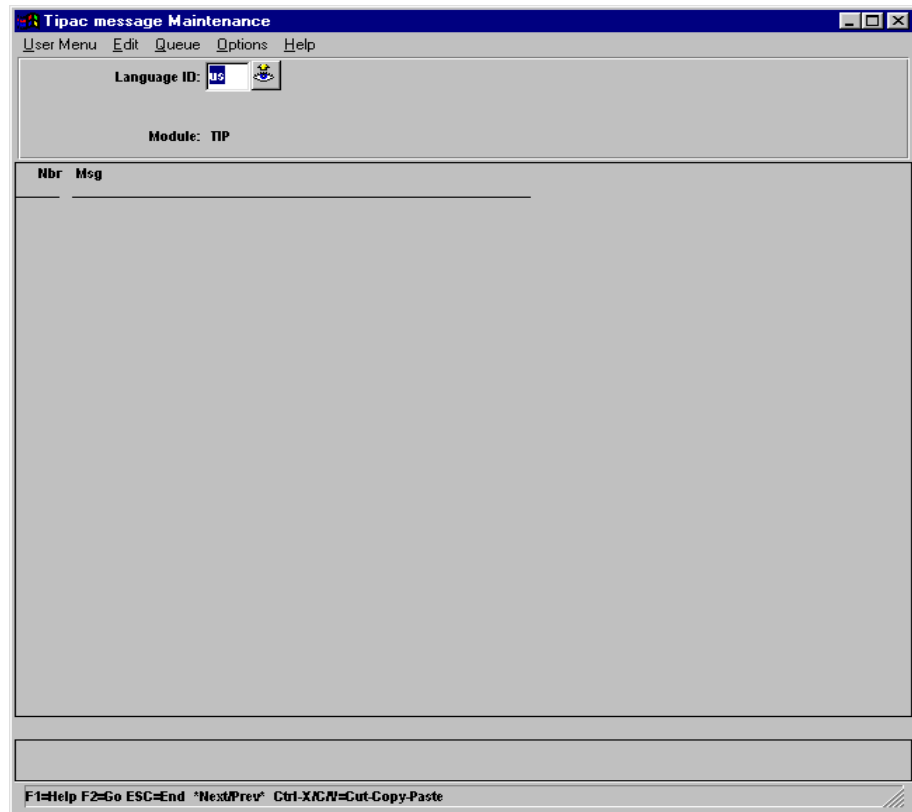
The screenshot shows a window titled "Tipac Message Inquiry" with a menu bar (User Menu, Edit, Queue, Options, Help) and a status bar (Output: terminal). The window contains a list of 36 messages, each with a number and a description. The messages are as follows:

Nbr	Msg
1	Alternate BOM doesn't exist
2	Alternate routing doesn't exist
3	Due Date must be equal or greater than actual date
4	For this sales order line an order network exists
5	Execution of time phased ATP-check
6	Do you want to generate the proposed order network?
7	Do you want to delete the order network?
8	Required due date for item not valid
9	Required due date for item is valid
10	Startdate order/requisition in the past
11	Workorder(s) and/or requisitions have been generated
12	(Old) proposed order network deleted
13	ATP-check cancelled
14	Old order network can't be deleted
15	Purchasing / Production required
16	Problems with planning purchasing/production
17	Generate proposed requisition(s) as well?
18	Calculating ATP (for article)
19	Generating work order (for article)
20	Generating purchase requisition (for article)
21	Executing tool explosion (for tool)
22	No remarks
23	No purchasing / production required
24	No purchasing / production; floor stock item
25	No purchasing / production required; MPS item
26	No purchasing/production possible because of missing BOM
27	Explosion required; not enough stock available
28	Concerns Purchasing item; not enough stock available
29	Concerns Tool; not enough stock available
30	Type of calculation must be 1, 2 or 3
31	No. calc.
32	Available
33	Not available
34	Execute processing according to indicators per sales order line
35	Not allowed to delete order network
36	Cum.Lt = # days; Due Date beyond #

At the bottom of the window, it says "List complete." and "Enter data or press ESC to end."

B.3 TIPAC Message Maintenance

This function enables you to modify existing TIPAC messages. The window of this function looks like this:



Use the **Language ID** field to enter the language for which you want to maintain the messages. A list is available for you to select a language.

Press 'go'. The second panel will automatically be filled in, as follows:

- The Nbr column shows the message number.
- The Msg column shows the message text.

Initially the first field in the **Nbr** column will be blank, but you can scroll through the available messages by pressing the arrow keys on your keyboard.

To modify a message:

1. Scroll through the list until the message is shown or type the message number in the field.
2. Press 'go'.
3. Type the new text in the text field that appears.
4. Press 'go' to store the message.
5. To modify another message, repeat steps 1 to 4. When you are finished, press 'end'.

The message maintenance screen is then displayed again (as shown on the following page):

