

## Seiki EAI

Seiki Systems has over 20 years experience in the development and provision of real time manufacturing execution and production control systems that provide an immediate, visual and dynamic picture of the 'plan to make' production process - your strategic and operational manufacturing management solution. We specialise in software that is designed to maximise the efficiency of production equipment and plant resources by addressing the complete works order lifecycle, from top floor to shop floor. The Seiki solution comprises of a suite of modular software including ERP, real-time scheduling, DNC and paperless manufacturing, SFDC and machine performance monitoring, W.I.P tracking, performance analysis and reporting and industrial touch screen PCs.



### Enterprise Application Integration

Using EAI (Enterprise Application Integration) software Seiki is able to offer an intelligent interfacing solution that can optimise data exchanges between different software products. EAI serves to connect ERP/MRP/PPS/CAD-CAM systems or other databases and software to the Seiki Scheduler database, in order to automate the task of data entry. A number of optional and mandatory data sets are required to provide the interface between the SQL database of the Seiki Scheduler and other systems' data sources, e.g. SQL database, Microsoft Access or CSV files. This data exchange may be configured to run either in a single direction or bi-directionally, depending on your requirements.

As well as being able to run manually, the EAI can also be configured to run automatically via a user configurable schedule. This may be at a set time each day or after a specific interval. You also have the flexibility to split the interface configuration into a number of sections, each with their own schedule regimen. For example, Company information may be exchanged once a day but Works Order information can be exchanged more frequently, such as every four hours.



### Data Exchange Methods

**ODBC** - This is by far the most common method of importing data from external systems and can be used with many standard database platforms as well as some spreadsheet applications including Microsoft SQL Server (v6 onwards), Oracle, Microsoft Access, Microsoft FoxPro and Microsoft Excel. A detailed structure or schema of the external database, along with expert knowledge would need to be made available to configure the interface correctly. Where this information is not readily available and documented, it may be necessary to request assistance from the external system's vendor or agent directly. In these circumstances, any additional costs incurred would be the responsibility of the customer.

**Comma Separated Value (CSV) Files** - An alternative method of providing data to be imported into the Scheduler database is via one or more CSV files. These files are structured such that each records line of data represents a single record, with each record having the individual field values separated by commas. This method differs from the ODBC method above in that the data import now becomes a two stage process. Firstly, the external system is required to generate the appropriate CSV file(s) which is usually the responsibility of the customer to configure and schedule this activity. Secondly, having recognised the presence of the CSV file(s), the EAI product reads the content and populates the Scheduler SQL database accordingly.

**NOTE:** Many suppliers of ERP/MRP systems prefer not to allow data from external sources to be written directly into their product databases. In such circumstances, the options available are to write data to a temporary table or tables, usually within the external database structure, or write data to a CSV file or files.

With both options, the external system would then import the data via their own routines or products in accordance with their own rules. It is then the customer's responsibility to liaise with the external systems' vendor to arrange for this data import.



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Table	Field Description	Mandatory	Remarks
Project/ Assembly Header Records	Project No. (Works Order Ref)	Yes	Maintains reference to top level assembly item and the system that the Scheduler is interfaced to
	Part Code/Item No.		
	Drawing No.	Yes	
	Description	Yes	
Works Order/Batch Header Records	Works Order No.	Yes	Maintains reference to the scheduled item and system the Scheduler is interfaced to.
	Part Code/Item No.		
	Drawing No.	Yes	
	Drawing Issue		
	Description	Yes	
	Customer Reference		i.e Customer No.
	Customer		
	Due Date	Yes	
	Quantity	Yes	
	Status		
Production Type		Customisable order types (urgent/quote/critical etc)	
Operation Records	Order ID		
	Operation No.	Yes	Usually 10, 20, 30 etc
	Operation Description/Method		Customer to decide if this is a requirement
	Workplace (Resource)	Yes	Resource that the operation is to be scheduled to
	Setup Time	Yes	Can be seconds/minutes/hours. NOTE: Either or both Setup or Work Time fields must have a time greater than 0 in order to be able to schedule the operation
	Work Time Each (Cycle Time)	Yes	Can be seconds/minutes/hours. NOTE: Either or both Setup or Work Time fields must have a time greater than 0 in order to be able to schedule the operation
	Delivery Time (Sub-Contract days)		Time estimated that the item will be out of the company in days
	Sub-Contract Company		Company that the item has been sent to
	Earliest Start Date		Earliest date that the item can be scheduled from (I.e. material availability)
	Latest End		High priority scheduling rule, used for important works orders
Operation Overlap %		Percentage overlap allowed against the previous operation	
Resources	Workplace Name	Yes	Name of the workplace (resource). Used as resource name on shop floor queue etc. (keep to 11 characters or less)
	Short Name		A shortened name of the resource
	Group Name		The name of the group that selected resources are linked if grouping is required
	Description		
	Efficiency		The efficiency factor of each individual resource
	Start Time		The shift start time on an individual resource
	Standard Hourly Rate		The standard hourly rate for an individual workplace (Used in production costs)
	Minimum Hourly Rate		The minimum hourly rate for an individual workplace (Used in production costs)
	Maximum Hourly Rate		The maximum hourly rate for an individual workplace (Used in production costs)

This table details both the standard mandatory and optional data required when importing records from existing systems. However should the existing system not have some of the mandatory data required it may be possible to create a solution for the customer. This will need to be discussed and agreed prior to the system installation. There are 2 standard methods of maintaining data within the Seiki Scheduler:

- Import ALL appropriate data from an external system
- Import ONLY Works Order data (section one in table above) and allow the Scheduler to hold static information, for example job routings, resources and standard times

**NOTE: Applicable to Seiki Scheduler Assembly Level**



# Net Plan

Net Plan is the order of manufacture for an assembly, for example:

Sub-assembly#1 has to be made before sub-assembly#2.

Within sub-assembly#1, component#1 has to be made before component#2 but components #3 and #4 can be manufactured at the same time.

The Scheduler will take the Net Plan into account as a rule for scheduling sub-assemblies and their components. If the Net Plan is not available it will be assumed that all sub-assemblies and component parts can be manufactured at the same time.

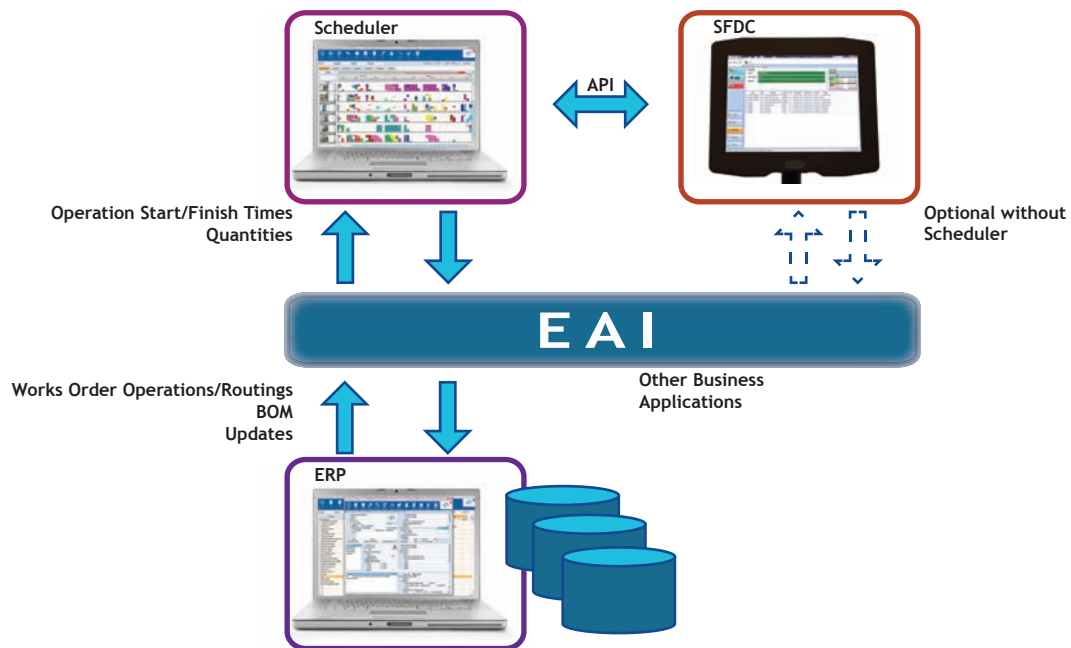
Project	Net Plan	7	6	5	4	3	2	1
0137 BLOCKASSEMBLY			BLOCK ASSEMBLY					
0137-01 Cylinderhead			Cylinderhead					
0137-01-001 Machine top			Machine top					
10 100 Machine sides only			10 100 Machine sides					
20 807 Drill 3 x 45			20 807 Drill 3 x 45					
30 600 Press bushings			30 600 Press bushing					
40 200 CNC Produce inner bore			40 200 CNC Produce					
50 804 Drill and deburr			50 804 Drill and deb					
1 4305 Flach 35x40			1 4305 Flach 35x40					
0137-01-002 Machine sides			Machine sides and bolts					
10 600 Straighten			10 600 Straighten					
20 250 Machine slots and fit			20 250 Machine slots					
30005 Black bar CI HAA BHAA			Black bar CI HAA BHAA					
0137-02 Gear housing			Gear housing					
0137-02-001 Produce housing			Produce housing					
10 Produce fixture and tool draw			10 Produce fixture and tool drawings					
20 100 Cut to length			20 100 Cut to length					
30 201 CNC Machine on fixture			30 201 CNC Machine on fixture main flat					
40 250 Center on spigot and neck			40 250 Center on spigot and machine flats					
50 10 100 200 Wagnerschlitten Vorkauf			Wagnerschlitten Vorkauf					
0137-02-002 Turn all ODs			Turn all ODs					
10 101 Machine all outside dia			10 101 Machine all on					
20 201 CNC machine sides			20 201 CNC machine					
30 250 Produce large cuts 130			30 250 Produce large					
40 301 Harden and Temper			40 301 Harden and T					
50 402 Grind flat surface and top			50 402 Grind flat surf					
1 4305 Flach 35x40			1 4305 Flach 35x40					
0137-03 Small cylinder head			Small cylinder head					
0137-03-001 Produce fixture			Produce fixture drawings					
10 100 Produce inspection nec			10 100 Produce ins					
20 807 Drill all holes			20 807 Drill all holes					
30 600 Secure bushings			30 600 Secure bush					
40 200 Turn all outside dia			40 200 Turn all out					
50 804 Drill and deburr			50 804 Drill and deb					
1 4305 Flach 35x40			1 4305 Flach 35x40					
0137-03-002 Secure bushings			Secure bushings					
10 600 Richten			10 600 Richten					
20 250 Zentrierm. Bohern, Gew			20 250 Zentrierm. B					

### NOTE:

The tables above are recommended by Seiki Systems to give the most effective results, however depending upon the information available, it may be possible to adapt the interface to account for alternative scenarios that could be encountered. For example, different methods of storing routing information (a total batch time instead of time per part)

ERP/MRP and databases differ in the way that data is stored and linked, therefore before committing to an assembly level interface a sample of the database structure and data is required. Common components or sub assemblies cannot be combined to make a single works order as it is not then possible to trace it back to the parent assembly.

## Seiki EAI - Enterprise Application Integration



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