

Logicon Accord- A Users Review

Introduction

Accord is a very innovative one step' configuration tool which facilitates the integrated development of all aspects required for the design, build and execute phases of a PLC based process control system project. This review looks at the product from a users' perspective and outlines some of the novel and beneficial features it incorporates.

Innovation in Design

While **Accord** is in essence a configurable PLC based control system programming tool, the unique aspect of this product stems from the fact that the configuration is very intuitive from a process perspective. It is presented in much the same way as one would prepare a P&ID. The use of standard and familiar process symbols in an 'object oriented' parent/child configuration makes the design of control system hardware, software and operator interface accessible to process and manufacturing personnel and reduces the reliance on specialist automation or systems integration resources.

Perhaps most significantly, particularly for use within regulated industries, the configuration tool also facilitates the embedding of documentation associated with each object and control strategy at the time of configuration. Unique to a PLC based product, **Accord** includes an embedded reporting tool which allows for the automatic generation of key design documents such as the Functional Design Specification (FDS), Input /Output list and Tag Lists.

Therefore the traditional design phase activities of information gathering and documentation can be executed directly using the equipment configuration and documentation features of the package as soon as a P&ID is available.

Significantly, the product has a full audit trail feature which simplifies the change management process for both the control system attributes and the associated documentation. This feature facilitates maintenance of revision control for the key design documents without the need for additional resources or resorting to retrospective updates or 'redlining' of FDS, instrument or I/O lists during the design phase of the project.

Innovation in Build

The true opportunity in using this product is that the often lengthy 'Build Phase' of the project has largely taken place during the 'Design Phase' configuration activities. Typically, a project will include a variety of detailed design activities prepared offline in several mediums, e.g. Design documents/FDS or process descriptions in MS Word, instrument, calibration and I/O listings in Excel or Access. When the design phase is conducted using **Accord** the 'one step' configuration activity, which is essentially broken into Hardware and Software aspects, includes all necessary data to complete the build of the underlying embedded PLC source code and the visualisation configuration data required by the Operator Interface. In **Accord** these activities take place using the **Equipment Configuration** menus.

'One Step' Configuration

The 'one step' hardware configuration requires setting up each object with the required tags, ranges, tolerances, engineering units etc. The only aspect of the hardware set up which may initially require some additional assistance from automation resources is in the assignment of PLC rack and card addressing. But even this activity, conducted once, should be easily completed by non specialist personnel.

The 'one step' software configuration, at an object level, requires the setting up of the interlock and alarm data for each device/equipment item. Again, simple process information which is required at the Design Phase but all too often is not well documented early enough in many projects resulting in late stage changes during commissioning and test execution.

Backend Configuration - PLC

Having already completed the **object** level hardware and software activities during the design phase, all that remains to complete the PLC Build Phase activities is to configure the control strategies at a single object, group of objects (Unit) or group of units (Plant), level. In **Accord** these activities take place using the **Program Configuration** menus.

Here again, no specialist knowledge of PLC source code programming is necessary as each control strategy can be built by selecting the type of control activity required from the **Program Configuration** menu and filling in the required information;

- **A Condition:** simple control condition such as >, <, = to setpoint or step count
- **A Combined Condition:** Boolean combinations of previously configured conditions
- **Alarm:** Process alarm setup at object, unit or plant level
- **A Step:** Group of conditions for an object or unit
- **An Operation:** Mathematical algorithm used for result or conversion calculations
- **A Recipe:** Setpoint data and running order for a group of steps for execution.
- **Unit Routes:** Assignment of parent/child relationships for devices and units.

The Program Configuration aspects of the package are easy to use and intuitive for any member of the project team with knowledge of the process. Significantly, the feature of the automatic audit trail makes project change management during the software development a much more manageable task.

In the build phase of the project real ongoing operational efficiencies can be gained by utilising the embedded documentation features to the full while configuring the control strategies. The menus allow for the addition of short and long descriptions, operator and maintenance information, recipe and step descriptions. Once completed, the information can be presented in a number of useful formats, such as providing a fully integrated and revision controlled FDS or plant data book information for operators and maintenance personnel. This will facilitate the formal review and approval of the updated FDS at the end of the build phase prior to its use in the testing and commissioning phases.

Once the build phase is complete another tool within the product which provides a useful feature is the 'consistency check' which reviews all fields configured and outlines where a required data field may have been left as a default value or duplicated in error. This feature ensures that the software cannot be downloaded to the PLC or the SCADA package until all data is correlated, checked and correct.

Front end Configuration – Operator Interface

For the visualisation and operator interface features of the Process Control System under design, **Accord** has an integrated HMI solution and also has other controls which have been developed to operate with a number of the leading SCADA packages currently in use in industry e.g. InTouch or RS View.

Utilising all of the process data configured during the 'one Step' configuration, at download the **Accord** Model may be imported into the SCADA system. This import, in conjunction with **Accord** controls and menu features, replaces the traditional HMI/SCADA programming activities and automatically facilitates the creation of the Dynamic features of the operator interface at an Object level through drop down menu selection of the previously configured process devices.

The key benefit of this automatic import facility is that it eliminates the traditional duplication of tasks such as the development of tag tables, device set ups etc. and is therefore error free. Furthermore, as all configuration data is single source, change management and documentation correlation is assured.

While there is still a requirement to configure the Static features of the Graphics Build in the traditional manner, e.g. screen background, static plant layout and some specialist automation or SCADA skills may be needed for this aspect, the majority of the SCADA build activities have been simplified through the **Accord** controls features.

SCADA features such as Alarm Management and Recipe Management have become redundant as these are also already established within the Program Configuration menus in **Accord**. Visualisation of these on-screen is automatic with standard features of Alarm Acknowledgment and Reset or Program Start, Stop, Hold. Additional features such as the Schedule control or Plan manager will allow start of programs automatically on a time basis which can be useful for filter back wash, sanitisation, CIP make up etc. and these will run off the PC clock. Preconfigured Trending is also available for all devices automatically imported, with up to 8 traces per trend. Other features available include fully searchable event logging and an option for an additional security set up which may be useful for OEM suppliers who wish to protect some of the configuration settings.

Innovation in Execution

Once the consistency check and download have been successfully completed the testing and commissioning execution phases of the project can commence.

The remaining features associated with the execution phase are the documentation and report features which allow for the automatic generation of key test documentation such as the Factory Acceptance Test (FAT), Installation Qualification (IQ) and Site Acceptance Test (SAT) test scripts. These test scripts are based on generic test procedures already embedded within the package. These can be easily customised, updated and approved by site quality or validation personnel prior to use. This aspect of the package is interesting and includes a number of key features such as;

- It has incorporated test documentation best practice features as recommended in GAMP5, such as a clear test objective, documented procedure, documented acceptance criteria and a facility to record both expected and observed results
- Uniquely numbered, and therefore editable, test procedures for each different type of device, analog/ digital inputs and outputs, motors, valves etc.

- It also facilitates the selection of single or dual feedback on devices and will alter the test script accordingly to include testing of feedbacks as appropriate.

The use of these test scripts along with the other available system documentation facilitates approaching both the formal and informal testing of the system in a much more structured, auditable and controlled manner. It also imposes a discipline during the build phase of the software which heightens the awareness of how each control strategy will be tested and proved to operate as intended. A common mistake in many projects occurs when the personnel responsible for the software development are not involved or communicating early enough with the personnel responsible for testing the system. This can come about due to time pressures, geography or project team structure but regularly results in late changes or repeat testing on site. If utilised correctly, **Accord** could eliminate the need for offsite software development offering the best possibility for the personnel directly responsible for the delivery of the project to work together to complete the design, build and execute activities.

Summary

At a PLC based control system level this certainly appears to be a unique and well thought out product. The combination of accessible configuration menus, novel documentation features complete with full audit trail would make this product suited for use in regulated industries, such as for use in pharmaceutical applications. When used within the Pharmaceutical industry these security, audit trail and embedded documentation features provide the means to comply with the best practice Computer Systems Validation guidance, **GAMP 5**. It may prove to be very useful in applications involving skid mounted equipment, e.g. CIP, Process Utilities, filtration, solutions preparation, compounding etc. where the process remains largely the same but individual applications require easy but traceable customisation.

Another application where it could be very useful is in pilot plant installations where process modifications involving addition of devices or reconfiguration of units or unit routes are regularly required for development purposes. With shorter turnaround times than code changes and simpler documentation, change management and re - qualification activities, **Accord** could be a particularly attractive platform.

Combining all necessary configuration for both the PLC and operator interface is particularly novel and while some additional specialist resources may be needed initially in the set up of the links between the SCADA and the PLC, **Accord** substantially reduces the set up times, eliminates the duplication and simplifies the visualisation activities required for the completion of a fully integrated process control system.

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