System 800xA for DCI

Configuration

System Version 6.0
System 800xA for DCI

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System Version 6.0
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Release: September 2016
Document number: 3BUA000135-600 A
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About this User Manual

Any security measures described in this User Manual, for example, for user access, password security, network security, firewalls, virus protection, etc., represent possible steps that a user of an 800xA System may want to consider based on a risk assessment for a particular application and installation. This risk assessment, as well as the proper implementation, configuration, installation, operation, administration, and maintenance of all relevant security related equipment, software, and procedures, are the responsibility of the user of the 800xA System.

This user manual describes the configuration steps related to 800xA for DCI.

User Manual Conventions

Microsoft Windows conventions are normally used for the standard presentation of material when entering text, key sequences, prompts, messages, menu items, screen elements, etc.

Warning, Caution, Information, and Tip Icons

This User Manual includes Warning, Caution, and Information where appropriate to point out safety related or other important information. It also includes Tip to point out useful hints to the reader. The corresponding symbols should be interpreted as follows:

Electrical warning icon indicates the presence of a hazard that could result in electrical shock.
Warning icon indicates the presence of a hazard that could result in *personal injury*.

Caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard that could result in *corruption of software or damage to equipment/property*.

Information icon alerts the reader to pertinent facts and conditions.

Tip icon indicates advice on, for example, how to design your project or how to use a certain function.

Although Warning hazards are related to personal injury, and Caution hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, fully comply with all Warning and Caution notices.

### Terminology

A complete and comprehensive list of terms is included in *System 800xA System Guide Functional Description (3BSE038018*)*. The listing includes terms and definitions that apply to the 800xA System where the usage is different from commonly accepted industry standard definitions and definitions given in standard dictionaries such as Webster’s Dictionary of Computer Terms. Terms that uniquely apply to this User Manual are listed in the following table.

<table>
<thead>
<tr>
<th>Term/Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCL</td>
<td>Controlware™ Command Language – creates Controlware phase logic executed by the DCU.</td>
</tr>
<tr>
<td>Composer™ CTK</td>
<td>CTK - Configuration Tool Kit.</td>
</tr>
<tr>
<td>Conductor</td>
<td>Refers to Symphony™ console applications such as Conductor NT or Conductor UX products. They interface to multiple ABB systems.</td>
</tr>
</tbody>
</table>
Released User Manuals and Release Notes

A complete list of all User Manuals and Release Notes applicable to System 800xA is provided in System 800xA Released User Manuals and Release Notes (3BUA000263*).

System 800xA Released User Manuals and Release Notes (3BUA000263*) is updated each time a document is updated or a new document is released. It is in pdf format and is provided in the following ways:

- Included on the documentation media provided with the system and published to ABB SolutionsBank when released as part of a major or minor release, Service Pack, Feature Pack, or System Revision.
- Published to ABB SolutionsBank when a User Manual or Release Note is updated in between any of the release cycles listed in the first bullet.

A product bulletin is published each time System 800xA Released User Manuals and Release Notes (3BUA000263*) is updated and published to ABB SolutionsBank.

<table>
<thead>
<tr>
<th>Term/Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlware</td>
<td>Harmony/DCI based control logic utilizing softwiring between function modules.</td>
</tr>
<tr>
<td>DCU</td>
<td>Distributed Control Unit (Harmony DCI Controller).</td>
</tr>
<tr>
<td>GDBA</td>
<td>Global Database Access (Harmony DCI).</td>
</tr>
</tbody>
</table>
Section 1  Introduction

Product Overview

The 800xA for DCI software product integrates the Harmony Distributed Control Unit (HDCU) controllers with the 800xA System. The Connectivity is accomplished through a pair of OPC® Data Access and Alarm & Event Servers. 800xA for DCI communicates with the Harmony DCU controllers on the DCI Control Network (CNet). Redundant communication can be provided via the ABB ECC MUX software. Single network communication can be provided via a third-party Ethernet NIC card.

800xA for DCI also includes DCI-specific PG2 and VB6 Faceplates and graphical elements, and an interface for Harmony DCUs to 800xA Batch.

800xA for DCI requires companion product Composer CTK, which is a software package that provides an integrated set of configuration tools in a graphical user environment for building HDCU control strategies. CTK is required to co-exist on the DCI Control Network (CNet) with 800xA for DCI to handle the configuration of HDCU controllers while establishing and maintaining devices on the DCI control network.

Refer to Composer CTK User’s Guide (3BUA000315*) for instructions on how to use the features needed to support 800xA for DCI.

Functional Description

800xA for DCI provides a pair of OPC® Servers to transfer data between Harmony DCUs and System 800xA. The Data Access (DA) Server provides the ability to write and read data to/from the Harmony DCU. The Alarm & Event server provides access to alarm and event data from the Harmony DCUs. The 800xA for DCI
Connectivity Server connects to both the DCI Control Network (CNet) and the 800xA network to transfer the data.

The 800xA for DCI package also includes DCI-specific PG2 and VB6 Faceplates and graphical elements, and an interface for Harmony DCUs to 800xA Batch.

800xA for DCI Connectivity Servers can be made redundant for increased reliability and availability.

Together these features facilitate the evolution of DCI System Six systems to System 800xA.
Section 2  Composer CTK Support Services

Introduction

Composer CTK is the tool that makes editing DCI tag object instance definitions possible. Once they are edited, these changes can be exported from Composer CTK using 800xA Tag List Export and then imported into the 800xA system using the DCI Tag Importer. Refer to Section 3 DCI Tag Importer for instructions on DCI Tag Importer.

800xA Tag List Export

The DCI Tag Importer aspect of the 800xA for DCI software requires a list of tag names and other module information so that it can create tag objects corresponding to DCU databases. The 800xA tag list is an XML file that contains the following information:

- Name - Name of the DCU module.
- Type - ASCII name of DCU Module Type.
- FIX - Numeric value indicating the Function of the designated module type.
- Description - Description entered by the user of the module (LEG atom).
- Project - Name of the CTK project to which the module has been assigned. When used for online controllers, the Project Name is blank.
- Controller - Name of the controller to which the module has been assigned. If the module was taken from a CTK project and was not assigned to a controller, the string UNASSIGNED will be used.
- Area - Area (number) to which the module has been assigned.
- MSET - Module Set to which the module has been assigned.
Refer to Section 6 in Composer CTK User’s Guide (3BUA000315*) for instructions about using 800xA Tag List Export.

DCU Manager

The DCU Manager icon launches a suite of utilities to configure and manage Harmony DCUs. This suite includes:

- DCU Status Display
- Network Device Assignment
- DCU Resident Configuration
- DCU Support Services
- DCU Operations
- DCU File Operations
- Program Download
- Database Download and Updump
- CCL Editing

Refer to Section 26 in Composer CTK User’s Guide (3BUA000315*) for instructions about using DCU Manager.
Section 3  DCI Tag Importer

Introduction

The DCI Tag Importer utility imports DCU configuration data from the DCU modules. All configuration changes must be made in Composer CTK and then imported into 800xA using the DCI Tag Importer aspect as shown in Figure 1.
The DCI Tag Importer is an Aspect of the DCI OPC Server Network Object that can be found in the Control Structure of 800xA (Figure 1). By selecting the aspect, DCI Tag Import, Figure 2 is displayed. Refer Section 6 in Composer CTK User’s Guide (3BUA000315*) for instructions about using 800xA Tag List Export.
Function

Figure 2 shows the Start and Stop function on the Standard Tab of the DCI Tag Importer that allows the user to begin the import operation. When the Start button is clicked, the Tag Importer will retrieve the XML file name from the Tag Import File Name aspect. If the File Name aspect is not configured, the Tag Importer will request the file name and then save the specified name in the File Name aspect.

Refer to Figure 3 for the location of the Tag Import File Name Aspect.

The XML file is the output of the Composer CTK 800xA Tag List export tool. This XML file is used as input to the retrieve phase of the Tag Import operation; the
output of this phase is an OCS file. The OCS file is then used in the append phase to generate the Tag Objects in the Control Structure.

When the start button is clicked, both the retrieve and append phases are run in sequence. The status of the operation is shown in the text window.

Figure 4 shows the tags from the Tag List file as they are typically used to populate the Control Structure. The tags are arranged alphabetically under the HDCU Controller in which they reside.
If the DCI Batch System Extension has been loaded, the tags in the Control Structure will be arranged in batch Unit groupings.

To avoid problems with the DCI Tag Importer when using DCI Batch, make sure that the DCU is online when importing tags. When the DCU is online, the MSET will be nonzero.

**Advanced Function**

The Advanced Tab containing the OCS file name information is shown in Figure 5.

![Figure 5. Advanced Tab - OCS Filename](image)
This tab allows the two phases of the Tag Import (retrieve and append) to be run independently. The default OCS file name is specified in the OCS Filename edit box and can be changed if desired. If the OCS file name is changed, the Apply button must be clicked for the new file to be recognized by either phase of the operation. The retrieve phase should be run first to load the XML file specified in the DCI Tag Import File Name aspect.

If the XML filename aspect is blank, a filename will be requested when the Retrieve Objects button is clicked. The append phase should be run to load the OCS file specified in the OCS Filename box and create the Tag objects in the Control Structure.

Although the DCI Tag Importer creates all imported DCU node objects in the Symphony DCI OPC Server Network object of the Control Structure, other DCI network node objects, such as the 800xA for DCI connectivity servers, are not created.

Since alarms cannot be seen unless an object is associated with the alarm, it is recommended that objects be created for the connectivity server nodes and other DCI nodes.

To prevent important alarms and events from being lost:

1. Create a new object of type *Generic OPC Object* under the Symphony DCI OPC Server Network object in the Control Structure.
2. Name the object \( DCIx \) where \( x \) is the DCI Node Number (example: DCI6). This Node Number can be obtained from the ABB 800xA for DCI Maintenance Utility which can be entered from:

   Click **ABB Start Menu > ABB Industrial IT 800xA > 800xA OCS Systems > DCI > DCI Maintenance**

3. Repeat Step 1 and Step 2 for all non-DCU DCI nodes on the network.
4. Restart the Event Collector for the DCI OPC AE Server. (Disable, then re-enable the DCI Service Group under [Service Structure]/Services/Event Collector).
Section 4  Network Services

Introduction

800xA for DCI uses a subset of Conductor NT Network Services for tasks such as DCU data access, time synchronization, and table synchronization. A complete list of services used is given in Table 2 below.

DCU Connectivity

The DCU has several interfaces for accessing (reading and writing) its internal data. The most prominent one is Symphony DCI Global Database Access (GDBA). Other interfaces are used much less often and are not used at all for process data. The Conductor NT Network Services have built-in support for all of the interfaces as shown in Table 1.

Table 1. Data Access Interfaces From DCU

<table>
<thead>
<tr>
<th>Interface</th>
<th>Name</th>
<th>Type of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Database Access</td>
<td>GDBA</td>
<td>Process Data</td>
</tr>
<tr>
<td>System Operations</td>
<td>SysOps</td>
<td>DCU internal board information and status.</td>
</tr>
<tr>
<td>Node Introduction</td>
<td>NodeIntro</td>
<td>Node and network connection status</td>
</tr>
<tr>
<td>Alarm/Event Messaging</td>
<td>Event Service</td>
<td>DCU Alarm and events</td>
</tr>
<tr>
<td>Other Interfaces</td>
<td>Various</td>
<td>—</td>
</tr>
</tbody>
</table>
Conductor NT/UX Synchronization

The 800xA for DCI Connectivity Server can be co-resident with Conductor NT and Conductor UX on the DCI Control Network (CNet). This requires synchronization of various network global tables. The DCI connectivity tasks are responsible for maintaining and establishing the tables such as the Network Device Assignment table.

Time Synchronization of DCU

The 800xA for DCI connectivity server performs time synchronization to other Symphony DCI nodes. The time synchronization is performed by the TSYNCD DAEMON. The time synchronizer is responsible for synchronizing time with the DCU, Composer CTK, and Conductor NT/UX nodes on the same network.

Propagate 800xA System Time to the HDCU Controller Nodes

In an 800xA network, careful consideration must be given to the integration of DCI time synchronization with the 800xA System. If multiple DCI System 6 control networks are used, it is always recommended to propagate the 800xA time down to the HDCU controller nodes, and all other nodes on the control network that participate in the DCI System 6 time synchronization method, such as Composer CTK and Conductor NT/UX nodes.

To force this, the 800xA for DCI Connectivity Server Nodes must have their time synchronization priority set higher than any existing node on the DCI System 6 control network. Follow the steps below to set the time synchronization priority:

1. Open the DCI Maintenance Utility on the 800xA for DCI Connectivity nodes.
2. On the Basic menu, set the Time Synchronization Priority to a number higher than the number set on any Composer CTK or Conductor NT/UX nodes.

Propagate HDCU Time to the 800xA System Node (DCI Connectivity Server)

If it is necessary to force the time from the DCI System 6 control network up to the 800xA network, the 800xA for DCI Connectivity node must be configured as the time master on the 800xA network. Follow the steps below to configure DCI Connectivity node as time master:
1. In the Service Structure, on the Server Object for Time:
   a. Enable the Service Provider for the 800xA for DCI Connectivity Server.
   b. Disable the Service Provider for other nodes.

2. In the Node Administration Structure, on the Node Object for the 800xA for DCI Connectivity Server:
   a. Open the Time Server Client Configuration Aspect.
   b. Click to set the **Allowed to Set Time** control.
   c. Disable it for other nodes.

On systems with multiple DCI System 6 control networks, forcing the time up from the control network is *not recommended*, as it may result in multiple time sources and can also cause time to switch back and forth on the 800xA network.

**Service Startup**

The startup sequencing of the DCI network services is controlled by a task similar to Conductor NT NWKSER service.

**List of Required DCI Network Services**

The following table (Table 2) lists the Conductor Network Services used by 800xA for DCI.

*Table 2. Conductor Network Services used by 800xA for DCI*

<table>
<thead>
<tr>
<th>Service Number</th>
<th>Service Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>N_MSG_SRVC</td>
<td>Message server</td>
</tr>
<tr>
<td>11</td>
<td>N_MESSAGE_SRVC</td>
<td>Service for message broadcast</td>
</tr>
<tr>
<td>12</td>
<td>N_TAB_SRVC</td>
<td>Global tables service</td>
</tr>
<tr>
<td>14</td>
<td>N_TAB_SRVC</td>
<td>Event subsystem- Alarm server</td>
</tr>
<tr>
<td>16</td>
<td>N_DCU_ALARM_UPDATE_SRVC</td>
<td>DCU Event subsystem- Update server</td>
</tr>
</tbody>
</table>
Table 2. Conductor Network Services used by 800xA for DCI (Continued)

<table>
<thead>
<tr>
<th>Service Number</th>
<th>Service Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>N_XDC_ALARM_UPDATE_SRVCC</td>
<td>XDC event subsystem- Update server</td>
</tr>
<tr>
<td>21</td>
<td>N_TABI_SRVCC</td>
<td>Internal global tables</td>
</tr>
<tr>
<td>22</td>
<td>N_EVENT_EVTMSG_SRVCC</td>
<td>Event subsystem - Message server</td>
</tr>
<tr>
<td>23</td>
<td>N_FSN_SRVCC</td>
<td>File sync service</td>
</tr>
<tr>
<td>25</td>
<td>N_EVTBIT_SRVCC</td>
<td>Event bit service</td>
</tr>
<tr>
<td>32</td>
<td>N_DBASER_SRVCC</td>
<td>DBA access box server</td>
</tr>
<tr>
<td>33</td>
<td>N_LICENSE_SRVCC</td>
<td>Software license server</td>
</tr>
<tr>
<td>56</td>
<td>N_MBIT_SRVCC</td>
<td>Event bit update messages</td>
</tr>
<tr>
<td>59</td>
<td>N_LOCAL_LIC_SRVCC</td>
<td>Local license counter service</td>
</tr>
<tr>
<td>60</td>
<td>N_TABIS_SRVCC</td>
<td>Table sync service</td>
</tr>
<tr>
<td>61</td>
<td>N_CLIENT_INFO_SRVCC</td>
<td>Client information request service</td>
</tr>
<tr>
<td>62</td>
<td>N_SYS_TAB_SRVCC</td>
<td>Global tables - system wide</td>
</tr>
<tr>
<td>63</td>
<td>N_SYS_TABI_SRVCC</td>
<td>Internal global tables - system wide</td>
</tr>
<tr>
<td>64</td>
<td>N_SYS_TABIS_SRVCC</td>
<td>Table sync service - system wide</td>
</tr>
</tbody>
</table>
Section 5  Finding and Fixing Corrupted DCI System Six Control Network Tables

Description

Intermittent red X’s on all DCI faceplates referencing one DCU may indicate that the network tables are corrupted. This can be determined by examining the following files (drive letter may vary) on any of the 800xA for DCI or Conductor NT nodes using a file editor such as Microsoft Notepad.

- C:\ABB\data\ethers
- C:\ABB\data\bootptab
- C:\Windows\System32\drivers\etc\hosts

The section labeled **DCI System Six Section Start** should contain only lines showing a Control Network (CNET) IP and/or MAC address and a DCI node name. Specifically, IP and/or MAC addresses of the 800xA network, or ‘garbage’ characters or line fragments, should not be present.

Examples of normal DCI System Six sections:

![Figure 6. DCI system six section start (host)](image-url)
Preventative Action

To reduce the probability of table corruption in 800xA for DCI nodes, it is recommended that the 800xA for DCI nodes be configured in a separate Console Group.

Corrective Action or Resolution

If any of the network tables (hosts, ethers, and/or bootptab) are corrupted, then perform this procedure on all 800xA Servers, Composer CTK, and Conductor NT Server and Direct Client nodes in the system. This must be done in the order listed to prevent re-corruption of these synchronized files.

1. Do a complete backup of Conductor NT configuration (*where ever applicable*).
2. Start up all of the nodes on the system.

---

**Figure 7. DCI system six section start (ethers)**

**Figure 8. DCI system six section start (bootptab)**
3. On each node:
   a. Edit the `<Drive>:\Windows\System32\drivers\etc\hosts` file using Notepad to clear out all node information in the DCI System Six Section. It should then look like:

   ![Hosts File](image1)

   **Figure 9. Clear out all node information in the DCI System Six Section**

   b. Navigate to `<Drive>:\ABB\data` and delete the files:
      - bootptab
      - ethers
      - tables.tab
      - stables.tab
      - Any other file that ends in .tab

   These files will be automatically recreated on startup.

4. Shut down all of the nodes.

5. Start the nodes one at a time. Confirm that each node is fully booted up before starting the next node.

6. Check the network table files to determine that only the nodes on the CNET appear in the DCI System Six section (no corruption).

7. Restore the Conductor NT configuration backup (where applicable).
Section 6  Creating DCI OPC Server

Introduction

This section describes the procedure for creating DCI OPC Server.

The DCI Opc_DA Service Group and Service Provider objects link the DCI OPC DA and DCI Batch OPC DA Servers to the 800xA System. These objects are automatically created and configured as part of the post install process during an automated system install.

Also, the DCI OPC Server Network object links DCI Tag objects to the service group, and, therefore, the service provider objects, and the DCI OPC DA servers. The DCI OPC Network Server object is also created and configured as part of the post install process during an automated system install.

The DCI Event Collector objects are not enabled when they are created. You must import all the DCI Tags into the DCI OPC Server network objects before enabling the Service Group.

If there is an issue with the automated creation and configuration of these Objects, you may need to use manual procedures to set them up.

For more information, refer to System 800xA Installation, Update and Upgrade Getting Started (2PAA111708*).
Section 7  Configuring the DCI AE Event Collector Structure

The DCI Event Collector Service Group and Service Provider objects link the DCI OPC AE Server to the 800xA System. These objects are automatically created and configured as part of the post install process during an automated system install. All DCI Connectivity servers with DCI OPC AE Service Providers that are connected to the same DCI Network should be configured with the same DciOpcAeID in the System Configuration Console.

The DCI Event Collector Objects are not enabled when they are created. You must import all the DCI Tags into the DCI OPC Server network objects before enabling the Service Group.

If there is an issue with the automated creation and configuration of these Objects, you may need to use manual procedures to set them up.

For more information, refer to System 800xA Installation, Update and Upgrade Getting Started (2PAA111708*).
Section 8  800xA Batch for DCI

There are two limitations to configuring 800xA Batch for DCI:

- Only one DCI Batch Service Group may run on a DCI Control Network.
- The DCI Batch Service Group may not have more than two Service Providers.

One 800xA for DCI Connectivity Server may be configured as an 800xA Batch for DCI Service Provider for a DCI Control Network. This server may have a redundant Connectivity Server in its 800xA Batch for DCI Service Group. An 800xA for DCI system may have up to four OPC DA Service Groups, each with redundant 800xA for DCI Connectivity Server pairs. Only one of these OPC DA Service Group DCI Connectivity Server pairs may be configured as an 800xA Batch for DCI Service Group if they are connected to the same DCI Control Network.

If there are multiple 800xA for DCI systems connected to the same DCI Control Network, only one of those 800xA for DCI systems may be configured to use 800xA Batch for DCI. Only one 800xA Batch for DCI Service Provider may be in Service on a DCI Control Network at any time.

If an 800xA for DCI system is connected to multiple DCI Control Networks, an 800xA Batch for DCI Service Group may be configured for each DCI Control Network. The DCI Control Network object for each DCI Control Network can be configured with optional 800xA Batch for DCI information.
Basic 800xA Batch for DCI Configuration

Figure 10 shows the configuration of 800xA Batch for DCI connectivity servers connected to a DCI Network.

![Diagram of Redundant DCI Batch Connectivity Servers connected to One DCI Network](image)

Figure 10. Redundant DCI Batch Connectivity Servers connected to One DCI Network

This would be a single 800xA system. The Harmony DCU controllers would all be controlled through the redundant pair of connectivity servers. 800xA Batch processing may be performed using any of these Harmony DCU controllers.
Multiple Redundant DCI Connectivity Servers, One 800xA Batch for DCI Service Group

![Diagram](image_url)

*Figure 11. Only one Redundant DCI Connectivity Pair may be configured for Batch*

When a second redundant 800xA for DCI Connectivity server pair connected to the same DCI Network is included in an 800xA system, only one DCI Connectivity Server pair may be configured for Batch. Figure 11 shows 800xA Batch for DCI configured on one DCI Connectivity Pair. The Harmony DCU controllers with 800xA tags loaded into the DCI Control Network object configured for 800xA Batch for DCI may have batch processing.
Multiple DCI Control Networks controlled by same 800xA for DCI system

For each separated DCI Control Network, an 800xA Batch for DCI Service Group may be configured. Since DCUs 1-3 are on a different DCI Control Network from DCUs 5 and 6, DCI Connectivity Server pairs may be configured with 800xA Batch for DCI for each. Figure 12 shows two 800xA Batch for DCI Connectivity pairs connected to separate DCI Control Networks on the same 800xA System.

**Figure 12.** Separate DCI Control Networks may be controlled by 800xA Batch for DCI
Section 9  Control Object Type Definition

Introduction

800xA for DCI uses Object Types to provide a connection to and control of the DCU Controlware modules from the 800xA System. Each DCU module type has a corresponding Aspect Object Type. Module types with multiple Functions (FIXs) have an Object Type for each FIX. The CIO module types (AIO, AIOB, etc.) also have corresponding Object Types.

The following functions are automatically provided by 800xA for DCI:

- Creation of all required Object Types and related Object Type Groups for DCU Controlware modules in the Object Type Structure.
- Creation of all Control Connection Aspect properties for each Object Type.
- Creation of a DCI OPC Control Network Object Type. This Network Object Type includes the DCI Tag Importer. Refer to the 800xA for DCI Operation (3BUA000129*) instruction for more information on the Tag Importer.
- Creation of required Aspect System Objects (ASOs) for the DCI Object Types.

Standard DCU Module Types

An Object Type has been defined for each of the supported module types in DCI. Each module type corresponds to an Object Type as shown in the Object Types structure. A Control Connection Aspect (CCA) exists for each Object Type. The properties included in the Object Types are all those that have DBA access for the given module type and FIX.
CIO Module Types

An Object Type exists in the Object Type Structure for each of the following CIO module types:

- AIO.
- AIOB.
- DIOB.
- XCON.
- XMSG.

Object Types Structure

The Object Types Structure in the Plant Explorer Workplace is where the Object Types are created. The Symphony DCI Controlware Modules Object Type Group resides under the Control System Object Type Group.
CCAs

Each Symphony DCI Module Object Type has an OPC CCA. The CCA lists all of the DBA accessible atoms as properties of the Aspect. Figure 13 shows a sample CCA Property View for an ANI FIX 0 Object Type.

![Property View of the Control Connection Aspect](image)

**Figure 13. Property View of the Control Connection Aspect**

Data Type Conversion

The Data Types assigned to the properties of the CCA are derived from the Data Types stored in the Composer CTK project databases. The Composer CTK data types are derived from the types stored in the DCUs ALD format. The ALD types are in turn derived from the DCUs Data Dictionary Data Types.
Table 3 and Table 4 show the conversion from DCU Data Dictionary Data types to the CCA property Data Types.

**Table 3. Data Types 1**

<table>
<thead>
<tr>
<th>DCU Data Dictionary Type</th>
<th>Composer CTK Data Dictionary Type</th>
<th>DCU Data Dictionary Type</th>
<th>Composer CTK Data Dictionary Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>UD</td>
<td>NULL</td>
<td>TO</td>
<td>TM</td>
</tr>
<tr>
<td>BI</td>
<td>BOOL</td>
<td>SY</td>
<td>TM</td>
</tr>
<tr>
<td>TI</td>
<td>INT:1</td>
<td>MD</td>
<td>PTR</td>
</tr>
<tr>
<td>UT</td>
<td>UINT:1</td>
<td>PT</td>
<td>NULL</td>
</tr>
<tr>
<td>CO</td>
<td>UNT:2</td>
<td>GD</td>
<td>GD</td>
</tr>
<tr>
<td>US</td>
<td>UNT:2</td>
<td>CD</td>
<td>CD</td>
</tr>
<tr>
<td>LO</td>
<td>INT:4</td>
<td>SU</td>
<td>TEXT</td>
</tr>
<tr>
<td>FL</td>
<td>FLOAT:4</td>
<td>DP</td>
<td>NULL</td>
</tr>
<tr>
<td>DO</td>
<td>FLOAT:8</td>
<td>BA</td>
<td>BOOL</td>
</tr>
<tr>
<td>TX</td>
<td>TEXT</td>
<td>MP</td>
<td>MP</td>
</tr>
<tr>
<td>ST</td>
<td>TEXT</td>
<td>BB</td>
<td>BOOL</td>
</tr>
<tr>
<td>B8</td>
<td>BITS</td>
<td>XD</td>
<td>PTR</td>
</tr>
<tr>
<td>B16</td>
<td>BITS</td>
<td>BIA</td>
<td>BITS</td>
</tr>
<tr>
<td>B32</td>
<td>BITS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 4. Data Types 2**

<table>
<thead>
<tr>
<th>Composer CTK Data Dictionary Type</th>
<th>Process Portal Variant Type</th>
<th>Composer CTK Data Dictionary Type</th>
<th>Process Portal Variant Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEXT</td>
<td>VT_BSTR</td>
<td>BITS:1</td>
<td>VT_U11</td>
</tr>
<tr>
<td>INT:1</td>
<td>VT_I1</td>
<td>BITS:2</td>
<td>VT_U2</td>
</tr>
</tbody>
</table>
Array Handling

Some Symphony DCI Controlware atoms are defined as arrays. These atoms appear in the CCA with a data type of either VT_BSTR|VT_ARRAY or VT_VARIANT|VT_ARRAY.

Object Type Definition for Symphony DCI OPC Control Network

This Object Type is a specialization of the Generic OPC Server Network Object Type. Its aspects include the DCI Tag Importer which is the uploader for the tags.
Section 10  Security

Introduction

GDBA write security is a function of the controller. GDBA write security is maintained on an Area basis and an access level. There are up to 255 areas in a DCI installation, and there are nine access levels as defined in Table 5.

Table 5. Symphony DCI Access Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Trust</th>
<th>Level</th>
<th>Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator 1</td>
<td>1 (low)</td>
<td>Engineer 3</td>
<td>6</td>
</tr>
<tr>
<td>Operator 2</td>
<td>2</td>
<td>Supervisor 1</td>
<td>7</td>
</tr>
<tr>
<td>Operator 3</td>
<td>3</td>
<td>Supervisor 2</td>
<td>8</td>
</tr>
<tr>
<td>Engineer 1</td>
<td>4</td>
<td>Supervisor 3</td>
<td>9 (high)</td>
</tr>
<tr>
<td>Engineer 2</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operator Level 1 is considered the lowest and least trusted level, while Supervisor Level 3 is the highest and most trusted level. Each level is a super set of the preceding level in terms of allowed access and trust. Beyond that, the actual implementation and use of the access levels is user designed and user specific.

Areas and access levels are fundamental to DCI security and must be preserved. Refer to the Controlware II Module Reference (3BUA000313*) instruction for information and detail concerning the dynamics of security in the DCU.
DCI Security

Each user login is assigned one of the nine access levels in Table 5 and anywhere from 1 to all 255 areas. The assignments are made when the user login is configured and may be modified by the customer when the need arises.

Each GDBA writable atom in each DCU module has an assignable write access level from Table 5. Access level assignment is a function of the DCU Data Dictionary. Also, each individual DCU module is assigned to a specific area as defined by the AREA atom. However, areas are dynamic and may be changed as part of the security for a control algorithm.

Each individual atom write request is checked to see if the AREA of the atom is set in the area mask, and if the access level of the atom matches that in the transaction. Only those that match are permitted. If any write request does not match, the overall transaction status is marked as containing errors, and the individual write request is marked as failed due to a security violation. It is left to the originating application to deal with the transaction status. In the case of a display, such as a point or graphic display, an error indication pops up with a text message describing why the transaction failed.

Symphony DCI users have the flexibility to design the security within these parameters and that it is vital to preserve the current functionality. The console does not have the ability to predict or track the dynamics of AREA manipulation as performed by Controlware. Security control must still be done within the DCU.

800xA System Security

800xA System security is an adjunct to Windows security and is achieved by association with Windows groups. The five 800xA System Security groups and their intended usage are shown in Table 6 (refer to the System 800xA Administration and
Security (3BSE037410*) instruction for more information).

Table 6. System 800xA User Groups

<table>
<thead>
<tr>
<th>800xA Group</th>
<th>Recommended Usage</th>
<th>DCI Approximation</th>
</tr>
</thead>
<tbody>
<tr>
<td>IndustrialITAdmin</td>
<td>Configure Admin. Structure.</td>
<td>None.</td>
</tr>
<tr>
<td>IndustrialITOOperator</td>
<td>Read and operate.</td>
<td>Operator 2.</td>
</tr>
<tr>
<td>IndustrialITApplicationEngine</td>
<td>Read, Operate, Configure, and Tune permission.</td>
<td>Operator 3 to Engineer 3.</td>
</tr>
<tr>
<td>IndustrialITSystemEngineer</td>
<td>Read, Administrate, Security Configure, and Configure permission.</td>
<td>Supervisor1 to Supervisor 3.</td>
</tr>
</tbody>
</table>

NOTE: All users must be added to the IndustrialITUser group.

Composer CTK Security

Some of the Composer CTK features are restricted by access rights that are associated with the CTK login. The following table (Table 7) shows the access rights required to use each CTK feature:

Table 7. CTK Security

<table>
<thead>
<tr>
<th>CTK Feature</th>
<th>Administrative Rights</th>
<th>Online Configuration Rights</th>
<th>Database Transfer Rights</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCU resident configuration</td>
<td>—</td>
<td>Read/write</td>
<td>—</td>
</tr>
<tr>
<td>DCU resident service</td>
<td>—</td>
<td>Read/write</td>
<td>—</td>
</tr>
<tr>
<td>File download (Send To DCU button)</td>
<td>—</td>
<td>—</td>
<td>Upload/download</td>
</tr>
<tr>
<td>File upload (Get From DCU button)</td>
<td>—</td>
<td>—</td>
<td>Upload/download</td>
</tr>
<tr>
<td>DCI System Security</td>
<td>Administrative</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
800xA for DCI Firewall Configuration

On all 800xA for DCI Connectivity Servers, run Windows Firewall Configuration and use the following procedure to add 800xA for DCI tasks to the Windows Firewall exception list.

1. Open the Windows Control Panel.
2. Open the Windows Firewall configuration window.
3. In the Windows Firewall window, click **Allow a program through Windows Firewall**.
4. In the Windows Firewall Settings dialog, select the **Exceptions** tab, if not already selected.
5. Click **Add Programs...** to view the **Add a Program** dialog.
6. In the **Add a Program** dialog, click **Browse...**, to locate the DCI Network tasks, usually the location would be, `C:\ABB\bin`.
7. Click **AbbDciNetRouter.exe** in the list of executable objects, and then click the **Open**. The Browse dialog disappears.
8. Click **OK** in the **Add a program** dialog. The Add a program dialog disappears and the AbbDciNetRouter.exe object appears in the list of programs in the Windows Firewall Settings programs with the check box selected.
9. Repeat Step 5 to Step 8 for **tsyncdd.exe**, **tsyncCtrl.exe**, and **tftpd.exe**.
10. Click **Apply** and then click **OK** on the **Windows Firewall Settings** dialog. The Windows Firewall Settings dialog disappears.
11. Close the **Windows Firewall** window.
12. Close the **Control Panel**.
13. Reboot each 800xA for DCI Connectivity server when the Windows Firewall configuration is complete.
Section 11  Administration

Introduction

This section describes the procedure for configuring the Users and Security settings.

Configure Users and Security

Refer the System 800xA Administration and Security (3BSE037410*) instruction for more detailed information. Configure the Users and Security using the following steps:

1. Assign Microsoft® users.
2. Assign Security Settings in the Administrative Structure > Domains > <computer name> System Domain according to the 800xA System documentation and assign the Security Settings.
3. Use the System Configuration Console to associate 800xA System groups to Microsoft groups.
4. Use the System Configuration Console to assign users to the groups in the user structure (Operator to Operators group).
Section 12  800xA Batch for DCI Maintenance

These procedures should be followed for all maintenance updates, security updates, and temporary corrections, unless noted in release documentation.

Non-redundant 800xA Batch for DCI Connectivity Server

Before starting the procedure on the 800xA for DCI Server, it is highly recommended that you allow any running batches to finish or that these batches are paused at the end of the current phase or breakpoint.

Steps:
1. Run Maintenance > Maintenance Stop through the Configuration Wizard on the DCI Batch Connectivity Server.
2. Start the Task Manager.
3. Make sure that the DCI OPC Servers are not running. If any of them are, terminate them by clicking on End Process from the Right-click context menu.
   – AbbDci800xAOpcDaServer
   – AbbDci800xAOpcAeServer
   – AbbDci800xABatchServer
4. Perform the planned Maintenance Update on the node.
5. Restart the node.
6. Open a Plant Explorer Workplace and select the Service Provider for the restarted node's DCI Batch OPC DA Service Provider in the Service Structure. Wait until the Service Provider goes back into Service.
7. Resume any paused batches and verify that the recipes are running correctly.
Redundant 800xA Batch for DCI Connectivity Servers

For this procedure, the in “Service” DCI Batch OPC Service Provider node is considered the primary, and the in “Initialize” DCI Batch OPC Service Provider node is considered the secondary.

Perform the following Maintenance Update on the secondary DCI Batch Server first.

1. Run Maintenance > Maintenance Stop through the Configuration Wizard on the DCI Batch Connectivity Server.
2. Start the Task Manager.
3. Make sure that the DCI OPC Servers are not running. If any of them are, terminate them by clicking on End Process from the Right-click context menu.
   - AbbDci800xAOpcDaServer
   - AbbDci800xAOpcAeServer
   - AbbDci800xABatchServer
4. Perform the planned Maintenance Update on the node.
5. Restart the node.
6. Wait until the DCI OPC Servers have reached their correct state:
   - AbbDci800xAOpcDaServer Service
   - AbbDci800xAOpcAeServer Standby
   - AbbDci800xABatchServer Initialize

Before starting the procedure on the primary, it is highly recommended that you allow running batches to finish or that you pause the batches at the end of the current phases or set breakpoints. This is to reduce or eliminate the need for manual intervention after the DCI Batch server switches from the primary to the secondary.

7. Perform steps 1-3 on the primary DCI Batch Server.
8. After the DCI Batch OPC DA Service Provider has stopped on the primary, wait until the Service Provider on the previous secondary comes in “Service”.
9. Resume any paused batches and verify that the recipes are running correctly.
10. Perform steps 4-6 on the primary DCI Batch Server.
Revision History

This section provides information on the revision history of this User Manual. The following table lists the revision history of this User Manual.

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<td>August 2014</td>
</tr>
<tr>
<td>A</td>
<td>Published for 800xA 6.0.3</td>
<td>September 2016</td>
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</thead>
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<td>Windows server and client versions are generalized as per Windows 10 system requirements.</td>
</tr>
<tr>
<td>Section 8 800xA Batch for DCI</td>
<td>Added new.</td>
</tr>
<tr>
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