

Purpose and Overview

Nexteer's PLC logic library, SingleStation example, MultiStation example, and HMI files have been updated. Nexteer's expectation is that our suppliers and designers have first reviewed SD-1020 and SD-1032 to have a level of understanding prior to reviewing this What's New document.

The purpose of this What's New document is to showcase significant changes to Nexteer's logic library and HMI files.

The What's New document includes two sections:

- Frequently Asked Questions
- Companion File Revisions

NOTE: The Nexteer logic library routines and HMI screens must be modified and designed by the OEM to match their machine application.

Frequently Asked Questions (FAQ)

- What is Nexteer's recommended starting point for an OEM designing a machine's PLC Logic?
 - It is recommended that the design start with a new PLC logic file configured to match the applications PLC type and I/O configuration. Nexteer Library routines should be exported and imported into the new machine file (or copy and paste).
 - The design should use the single station and multi station examples as a reference to help understand Nexteer's expectation of design philosophy and structure.
 - Nexteer library routines must be modified to match the machine application.
- How do I know which example to reference – the single station or multiple station?
 - Nexteer believes the real question pertains to those types of machines that fall into a grey area between a single station machine and a multiple station assembly line. Grey area machine might be dial tables or a two-station machine.
 - For these grey area machines Nexteer does not require the use of one reference or the other.
 - As an example: A simple dial table (with few stations and only one operator HMI) may be designed based on the single station reference with a single program, with controller scope tags, and with separate sequence routines for the index and for each of the stations. Conversely, a larger dial table (with several stations or multiple HMIs) may be designed based on the multiple station reference since the design-ease and maintenance-ease would warrant the use of multiple programs and program scope tags for each of the station.
- What about "duplicate" projects or "copy-jobs"?
 - A large portion of machines that are currently considered "duplicate" or "copy" are not exact copies of previous machines. Instead, the prior machine information was provided as a reference or "similar-to". Designs should be approached as a new machine. Sections of the reference machine may be used to provide import logic (sections such as sequence rungs, or fault rungs/routines) inserting into the new machine program and routines. The new machine logic must include the functions required from the new Nexteer SD-1032 and updated Library.
 - The logic expectations and requirements for exact copy machines must be discussed between the Nexteer controls engineer, the Nexteer purchasing engineer, and appropriate OEM personnel.

General Updates / All Logic Files

Logic Studio 5000 Version Level

The logic files use Studio 5000 (Logix Designer) Version 32.

Created Dial Table Example Logic File

A dial table logic example file was created to represent a typical hand load/unload 4 station dial, with file name of Nexteer_DialTable_20210930.ACD. This file should be used as a basis and modified as required based on the application. The concepts demonstrated in this file are consistent with requirements detailed in SD-1032 Programmable Logic Controller Application Specification.

Primary focus on:

- Main Task Program Structure and Naming (Similar to Multi-Station)
- Controller Scope Tags / Tag Naming Convention
- Dial Index Sequence Routine
 - Raise / Lower of Shot Pin when applicable
 - Cycle stations trigger
 - Runout Mode conditions
- Dial Index Data Routine
 - Clearing data on power up
 - Clear all cycled memories after index
 - Shift Pulse logic
- Cycle Routine Particulars
 - Conditions for clear to index
 - Conditions for memories are reset
 - Conditions for part ok to run
 - Conditions for all stations cycled
- Indexer Drive Routine
- Station Specific Example Logic
 - Part data
 - Part status indicators
 - Traceability considerations

Logic Updates / Nexteer_Library

Add-On Instructions (AOIs) Updated

- **AOI_NX_LotTrackingJFK_V2_1_3**
Updated AOI to provide additional data back to PLC based on requests from global plants. SupplierName and QADID tags were added as part of the request.

User-Defined Data Types (UDTs) Updated or Added

Nexteer Defined UDTs

- **NX_FANUC_InputData_V3** and **NX_FANUC_OutputData_V3**
Updated the FANUC robot UDTs for compliance with SD-1040 updated UOP and DI/DO mapping.
- **NX_Robot_FANUC_V2**
Updated background program heartbeat tag name to BG_HeartbeatTimeout, updated User Alarm tag names, updated model number tags for communicating last four digits of model number.
- **NX_LotTrackingJFK_V2_1_3** and **NX_LotTrackingJFK_V2_1_3_Component**
Updated UDT to provide additional data back to PLC based on requests from global plants. SupplierName and QADID tags were added as part of the request.

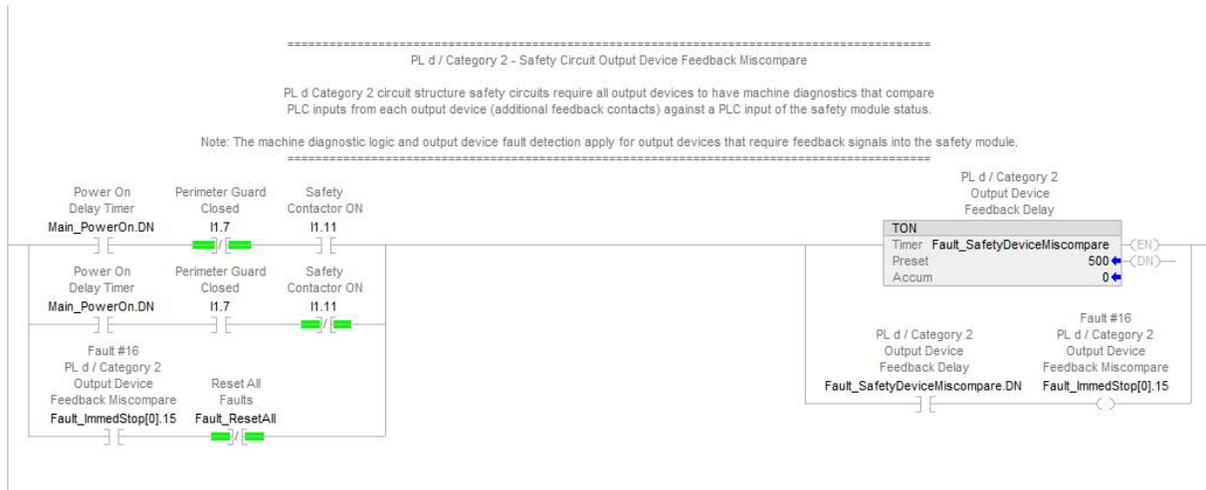
Application (user) Defined UDTs

- **u_Dial_PartData**
Created an example UDT for dial table part data storage and transfer.
- **u_FANUC_GroupInputs** and **u_FANUC_GroupOutputs**
The FANUC and Robot UDTs were updated due to the desire by the Automation group to require a new memory map layout between the robot and the PLC detailed in SD-1040. Additional members were created, and more detailed descriptions were provided for each member. This update coincided with the update of the *R36_Robot_FANUC* routine.

Logic Updates / Nexteer_Library – MainProgram

R08b_Fault_ImmedStop

Added example fault for PL d / Category 2 safety circuit output device feedback miscompare. PL d Category 2 circuit structure safety circuits require all output devices to have machine diagnostics that compare PLC inputs from each output device (additional feedback contacts) against a PLC input of the safety module status.



R09a_Message

Added machine message to display PLC Clock Not Set when the controller clock is outside of normal limits. See updated R20_DateTime routine.



R09b_MachineStatus, R09c_PartStatus & R09e_LotStatus

Updated message OTE tag descriptions to be consistent and lead off with message number description. For example Machine Status #0 – Ready to Cycle.

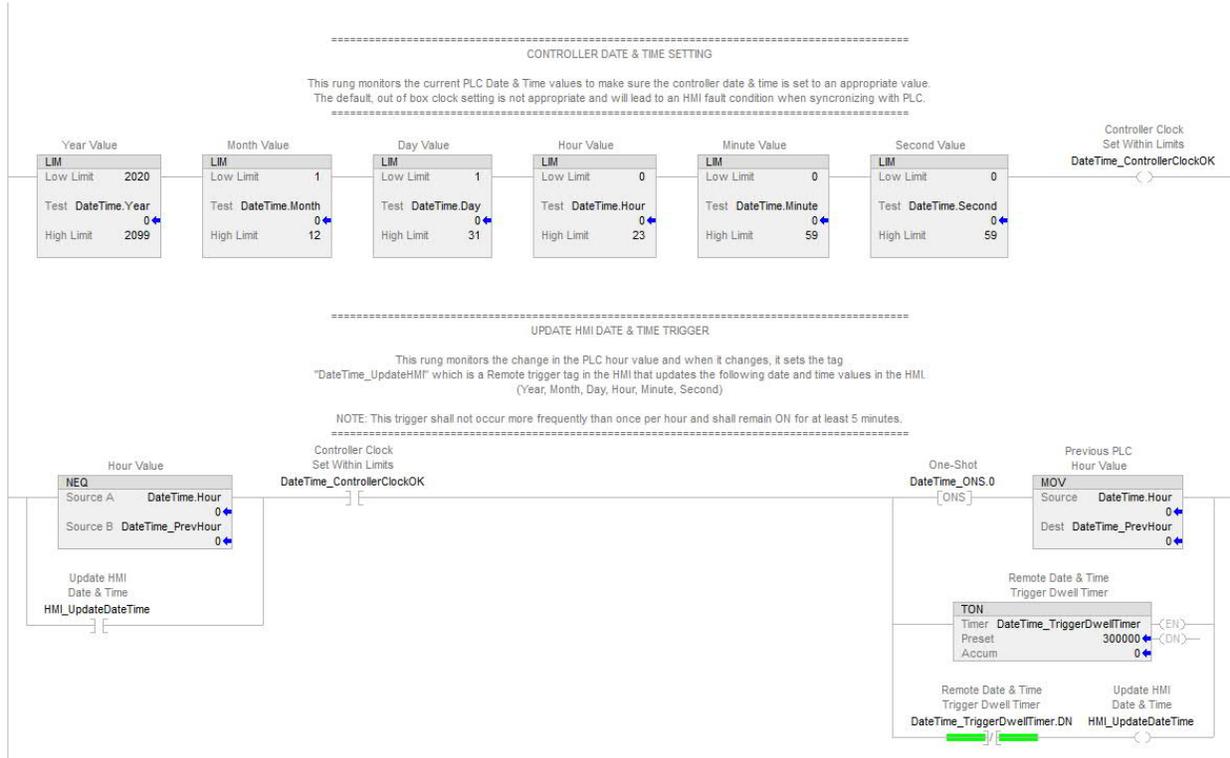
R17_Andon

Updated to allow the MES system to monitor the PLC time and be aware if the time is different than the server. This is required because the shift times are based on the PLC clock.



R20_DateTime

Update this routine to monitor the current PLC Date & Time values to make sure the controller date & time is set to an appropriate value. When abnormal date and time values are detected a machine message is displayed. See R09a_Message routine update



Logic Updates / Nexteer_Library - Library_Routines

R07_Output_PalletStops

This routine was created to contain logic pertaining to machine pallet stop motion outputs in a more bucketized format. This routine contains the pallet present dwell timers for both the pre-stop and in-station stops. The output motion logic for the pallet stops is also contained in this routine. This routine was added to the multi-station logic examples MainProgram program.

R13_Axis1

This routine was updated at rung 9 controlling the MSO and MSF instructions to accommodate Category 1 controlled stops.



Rung 13 was corrected to have a normally open Main_NoEStops tag instruction instead of a normally closed.



R24_CodeReader_COGNEX

The trigger logic on rung 5 was modified to include a trigger ready status to prevent triggering when the code reader is not ready.



R25_LotJFK_V2_1

Updated AOI to provide additional data back to PLC based on requests from global plants. SupplierName and QADID tags were added as part of the request.

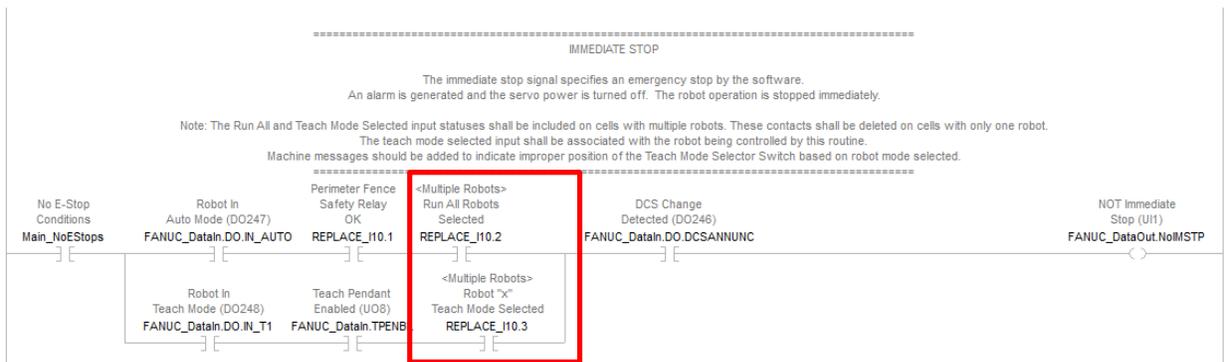
R36_Robot_FANUC

The FANUC and Robot UDTs were updated due to the desire by the Automation group to require a new memory map layout between the robot and the PLC detailed in SD-1040. Additional members were created, and more detailed descriptions were provided for each member. This update coincided with the update of the *R36_Robot_FANUC* routine.

UDT

- NX_FANUC_InputData_V3
- NX_FANUC_OutputData_V3
- u_Robot_FANUC
- u_FANUC_GroupInputs and u_FANUC_GroupOutputs

The routine was updated to include example logic for Teach Selection Switch use on robotic cells with multiple robots inside the same workspace. This logic requires both the robot controller and the Teach Mode selection switch to be placed in Teach for the appropriate robot.



Group input and group output UDT's were created to accommodate many more group I/O values due to this change the robot speed, model selection, and DCS signature rungs were modified to reference the appropriate tags



General Updates / All HMI Files

HMI screen FactoryTalk View Studio ME Version Level

The HMI screen files were created using FactoryTalk View Studio ME Version 11.

- Archive (APA) files on the supplier's website can only be restored using version 11 or newer.
- Runtime (MER) files on the supplier's website can be restored using version 10 or newer, being they were created as a version 10 runtime.

PanelView Plus 7 Models Used for Files

The HMI screen files were created using the new PanelView Plus 7 models.

- PanelView Plus 7 6.5" display has 640 x 480 resolution. (Same as PanelView Plus 6)
- PanelView Plus 7 10.4" display has 800 x 600 resolution. (PanelView Plus 6 display was 640 x 480)

HMI Updates / Individual Screens

03_Automatic Screen

The descriptions in the status indicators were modified to have Bold text.

AUTOMATIC CYCLE SCREEN	USER LOGOUT "s..s" Timeout = ## min	DIRECTORY SCREEN	s..s s..s SELECTED
MACHINE STATUS: READY TO CYCLE			SELECT AUTO MODE
PART STATUS: READY TO CYCLE			SELECT MANUAL MODE
LOT TRACKING: READY TO CYCLE			
CYCLE TIME: ###.## SECONDS	SERIAL: <input type="text" value="ssssssssssssssssssssssss"/>	PART STATUS: <input type="text" value="PERMISSIONS"/>	
PART-TO-PART TIME: ###.## SECONDS	PLC ID: <input type="text" value="ssssssssssssssssss"/>	STATUS: <input type="text" value="ssssssssssssssssss"/>	
OPERATOR PROMPT:	LOAD PART INTO FIXTURE		RETURN ALL MOTIONS
ABORT CYCLE			FAULT HISTORY SCREEN
000: NO MESSAGES PRESENT			
000: NO FAULTS PRESENT			

03_Automatic – Dial Table Screen

The Dial Table Automatic Screen was created to accompany the new dial table logic example file. Primary difference between the standard automatic screen and dial table automatic screen is the station statuses.

