



MicroCODE **Control** GM SEP

MicroCODE Control (SEP) App SEP Simulation Tool for GM Strategic Suppliers

June 2023

This document is a user's guide for the new MicroCODE Simulation Tool add-on for the General Motors Scalable Error Proofing (SEP) System.

For the latest App information and documentation visit:

<https://www.mcode.com>

This app is part of our Extensible Error Proofing collection...



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Document Status

This table reflects the current status of this document.

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Author:	Tim McGuire, MicroCODE Incorporated
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Document and App Conventions

Throughout the MicroCODE Control (EPP) App and its documentation the following conventions are used....

Live/Online PLC Data

Invalid/Online PLC Data

Old/Offline PLC Data

App or File Data

Read Only Data



Fault / Fatal



Errors: Severe/Destructive



Errors: Controlled/Repaired



Warning



Confirmation



Configuration / Selection



Information



Revision History

This table records the edit history of this document.

Document Version	Date Updated	Revision Author	Description of Changes
v1.0.10 a (1)	10-Oct-2019	TJM	Initial creation of MicroCODE Control (SEP) User Guide.
v1.0.11 a (1)	28-Oct-2019	TJM	Updates after ALPHA testing at KUKA.
v1.0.12 a (1)	28-Oct-2019	TJM	Added sections for PROFILE configuration, SATs, and use of the API program.
v1.0.12 a (2)	29-Oct-2019	TJM	Proof-reading, minor additions, ‘App Special Features’.
v1.0.12 b (4)	03-Nov-2019	TJM	Expanding explanations, documenting new features.
v1.0.12 b (5)	05-Nov-2019	TJM	Expanding explanations, corrections, documenting new features.
v1.0.12 b (6)	05-Nov-2019	TJM	Updating FILTERING documentation to reflect new ‘progress panel’.
v1.0.12 b (6)	06-Nov-2019	TJM	Added required CNV Simulation Routines (. L5Ks) to this document in Appendix B.
v1.0.12 b (6)	08-Nov-2019	TJM	Added diagram in Chapter 5 to help explain the construction of Simulated Jobs from a ‘Seed’ and other clarifications.
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v1.1.1 b (1)	20-Nov-2019	TJM	Documentation updates for the Release.
v2.0.0 a (9)	04-Feb-2021	TJM	Documentation updates for the Release.
v2.0.1 b (4)	27-Mar-2021	TJM	New Features from support Strategic Suppliers.
v2.0.1 b (9)	05-Oct-2021	TJM	New Features from support Strategic Suppliers and corrections for AGVs.
v2.0.2 b (1)	07-Oct-2021	TJM	Corrections to the AGV/ALS Simulation – requires new API and new CNV Simulated I/O routine in GMP.
v2.1.2 a (4)	7-Mar-2023	TJM	Added support for use scaling and display resolution and updated the App to use .NET 4.8 for Windows 10.
V3.0.0 a (1)	29-Jun-2023	TJM	Reverted all Apps to .NET 4.5 for GM compatibility, added JSON CFG, Console LOG, see Release Notes.



October 2019 – June 2023

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All readers of this document are requested to return feedback (corrections, improvements, additions and subtractions) to the document owner. Please use the **Reader's Comments** form at the end of this document.



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Purpose of this Document

This document, **MCX-U01 (Control – SEP – User Guide)**, is the user's guide for the MicroCODE Control Simulation App. It is intended to guide SEP support personnel through the process of configuring a simulation and testing a SEP Error Proofing System in a General Motors Strategic Supplier plant.

Intended Audience

The intended audience of this document is GM Strategic Supplier support personnel who are going to implement, test, and support a GM SEP in a General Motors plant.

Audience Prerequisites

GM SEP support personnel need the following training prior to reading this document:

- Microsoft Windows 10
- General Motors Scalable Error Proofing (SEP) System Training (Advanced)

GM SEP support personnel also need to be familiar with the following GM SEP documents prior to reading this document:

- GMSEP-U01 (SEP System Overview)
- GMSEP-C04 (SEP Test Procedures)
- GMSEP-C16 (SEP Process Tool Testing)

Software Prerequisites

Support personnel need the following laptop environment for this App:

- Microsoft Windows 10 or higher
- Microsoft .NET 4.5 or higher
- GEPICS Export Files (SEP Build Data format from GEPICS Coordinator)
- SEP GMP and GXP PLC Programs from target GM Facility

Hardware Prerequisites

Support personnel need the following hardware environment for this App:

- Windows 10+ PC
- Spec support for .NET 4+
- Logix 5000 L5x, L6x, L7x, L8x



Document Structure

This manual contains the following chapters:

- **Chapter 1** – Introduction to the MicroCODE Control (SEP) App
- **Chapter 2** – Installing MicroCODE Control (SEP) App
- **Chapter 3** – Configuring the Site for Simulation
- **Chapter 4** – Monitoring Production as a Viewer
- **Chapter 5** – Configuring the Simulated Vehicle Orders
- **Chapter 6** – Running System Acceptance Tests (SATs)
- **Chapter 7** – Handling App Support and Issue Reporting
- **Appendix A** – The MicroCODE Logix 5000 API Program
- **Appendix B** – Required SEP DHFs and DHEs for the App
- **Appendix C** – Memory and I/O Management in the App

Associated Documents

For additional information on SEP Simulations, see the following documents:

- **GMSEP-U01** — (*SEP System Overview*).
- **GMSEP-C04** — (*SEP Test Procedures*).
- **GMSEP-C16** — (*SEP Process Tool Testing*).
- **GMSEP-U11** — (*SEP Simulation Tool User Manual*).



1 Introduction to the MicroCODE Control (SEP) App

This app is used to control the generation of simulated GEPICS Jobs (Customer Orders) during System Acceptance Tests (SATs) outside of a normal GM production facility. This app can also control the SEP Conveyor simulation software held within the SEP Cell Controller, without opening the SEP ControlLogix Program. In addition it allows a user to view the GSIP Defect Queue and GEPICS Trace Data Queue to check the results of any Error Proofing Action test. This allows Strategic Supplier personnel to simulate conveyor movement, Build Data delivery and Error Proofing Actions (EPAs) without having the actual conveyor at the Strategic Supplier's site, enabling them to test Error Proofing Actions and perform System Acceptance Tests (SATs)... all from one App.

Example 1 The MicroCODE Control (SEP) App

This tool is used in connection with several other components:

- SEP Cell Controller (GMP and GXP PLCs) – **mandatory**
- Control Laptop (Windows 7 or Windows 10) – **mandatory**
- SEP I/O Networks – **mandatory**
- SEP Error Proofing Stations – **mandatory**

This tool was written with the assumption that the GM IT Systems would **not** be available:

- SEP CIMPLICITY HMI – **optional** (but highly recommended)
- GEPICS Server – **optional**
- GSIP Server – **optional**
- GPM&C Server – **optional**



The high-level work process for performing SATs at the Strategic Supplier Sites (SSS) is as follows:

- Configure the new I/O and Error Proofing Actions in the target Plant's environment
- Save the GMP and GXP PLCs from the Plant (after configuration download*)
- Take the Logix ACD Files to the SSS and load into Test Area Controller
- Use the MicroCODE Control (SEP) App to generate simulated Vehicle Orders
- Perform SATs of the staged hardware and tooling
- Use the MicroCODE Control (SEP) App to check the generation of GSIP Defects
- Use the MicroCODE Control (SEP) App to check generation of GEPICS Trace Data

* In order to reserve I/O Nodes addresses in the target GM plant you must go there and configure into their SQL database—thru the SEP HMI—all I/O you will be installing. This ensures the plant will not use these same Node address for changes they make while the supplier is staging new equipment at their build shop.

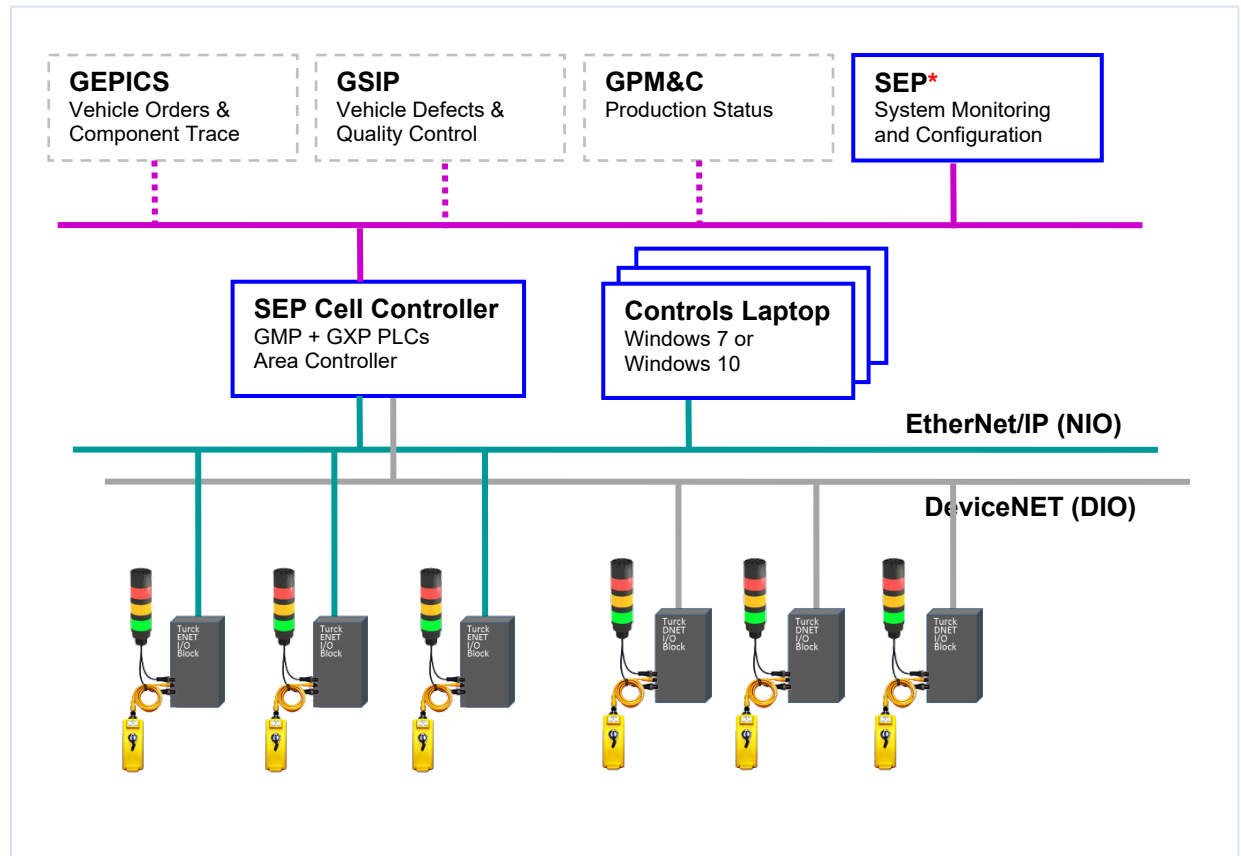
After this I/O is configured the Supplier must perform a Partial Configuration Download into the SEP PLCs. This must be done to ensure the Plant can continue doing their normal work and will not be caught in a situation where SEP requires a 'Full Configuration Download' which cannot be down while the Plant is running.

Be aware: Any changes to the Production system require start-up support. The Supplier cannot come into the Plant make changes, download them, and walk away.



Figure 1 The GM Strategic Supplier Site (SSS) Environment

The dotted line elements are optional* in the Strategic Supplier Sites, all other components are mandatory. The required Hirschmann (or Cisco) Ethernet switches are not shown.



* The GEPICS, GSIP, and GPM&C Servers are optional because you can use the MicroCODE App to view the queues and buffers used to communicate with these GM IT systems and verify the data *that will be transmitted to the servers in the Plant when installed*.

* An SEP Server (actual or Laptop) is required to view or change any SEP Configuration. So, while the SEP Control App does not need this Server, the User will need this to complete SATs. **New in v2.0** If the SEP Server is available the Control App can be auto-configured from the SQL DB on the Server.

If Error Proofing Actions (EPAs) are going to be created or edited at the Strategic Supplier site, they will need an SEP Server with the SQL Database from the target GM Facility. Changes to EPA or I/O Configurations can be performed in the Test site and downloaded to the SEP PLCs. But these changes will have to be documented carefully and reproduced in the GM production facility because there are no import/export tools for SEP SQL configuration at this time.



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2 Installing MicroCODE Control (SEP) App

The Control App uses a standard Windows install procedure.

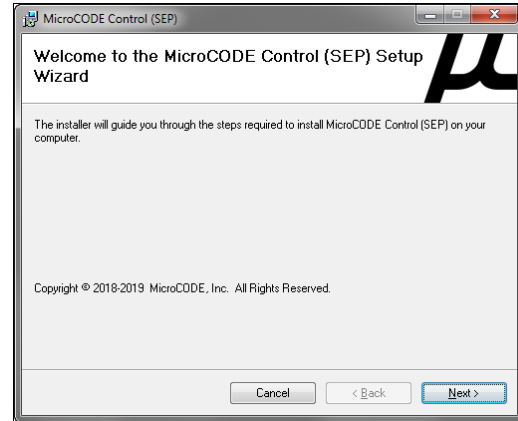
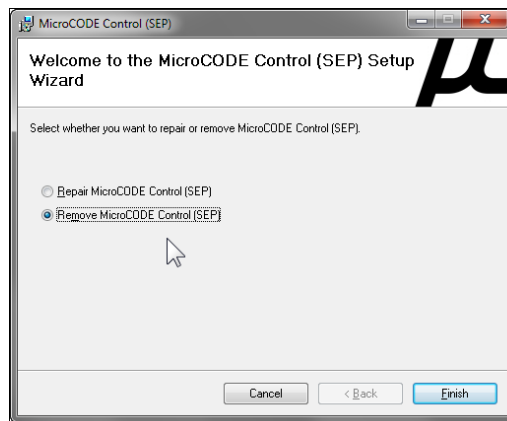
STEP 1: Acquire the Microsoft Installer (.MSI) file for the version you want to install.

The App installs from a single MSI file that is approximately 10MB in size. The **setup.exe** file is optional and is not required for an installation.

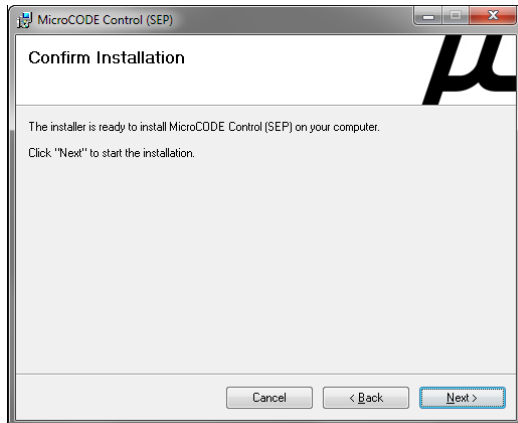
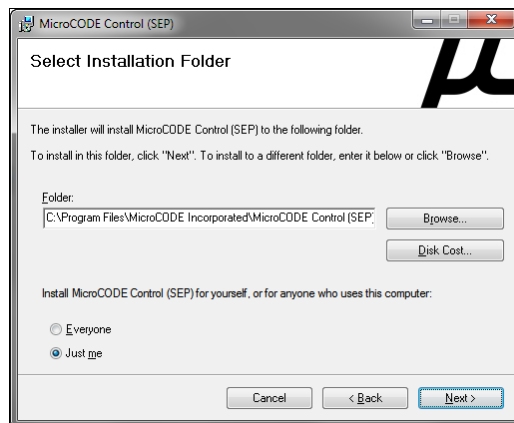
Name	Date modified	Type	Size
Control (SEP) Setup.msi	10/25/2019 3:07 PM	Windows Installer ...	10,500 KB
setup.exe	10/25/2019 3:07 PM	Application	773 KB

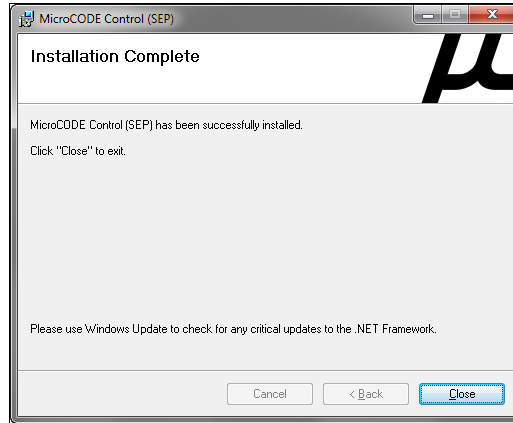
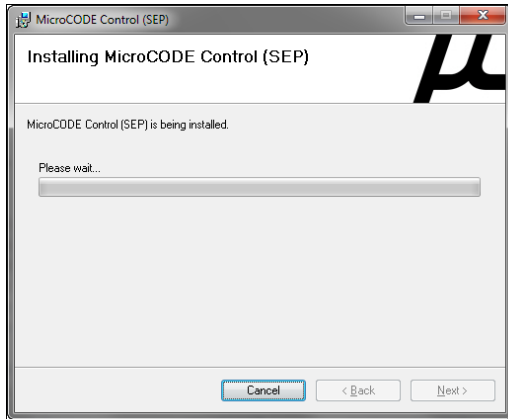
STEP 2: Double-click the .MSI file to start the installation

NOTE: If you have a previous version installed its best to uninstall it first. Uninstalling the App does not delete any user configured data (which is held in your 'Documents' folder).



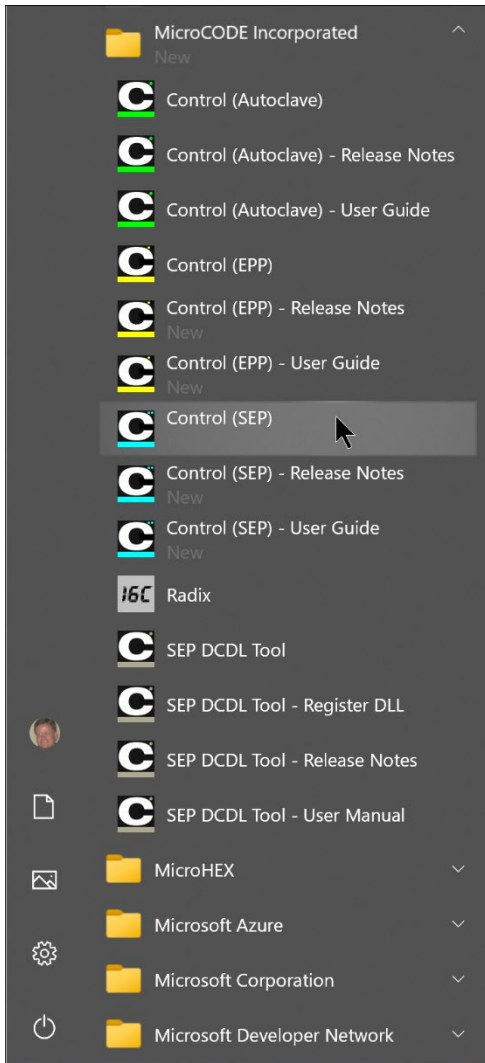
The simplest thing is to just accept all the default install locations...





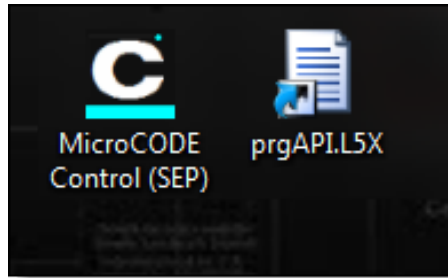
After installation you will have the following:

- **START MENU** Shortcuts are created for the App, its Release Notes, and the App's User Guide





- **DESKTOP Shortcuts** – there two (2): 1) the Windows App, and 2) the importable .L5K file for the Logix 5000 API program needed in the SEP Cell Controller.



- **Program Files** – App Executable and Data Files

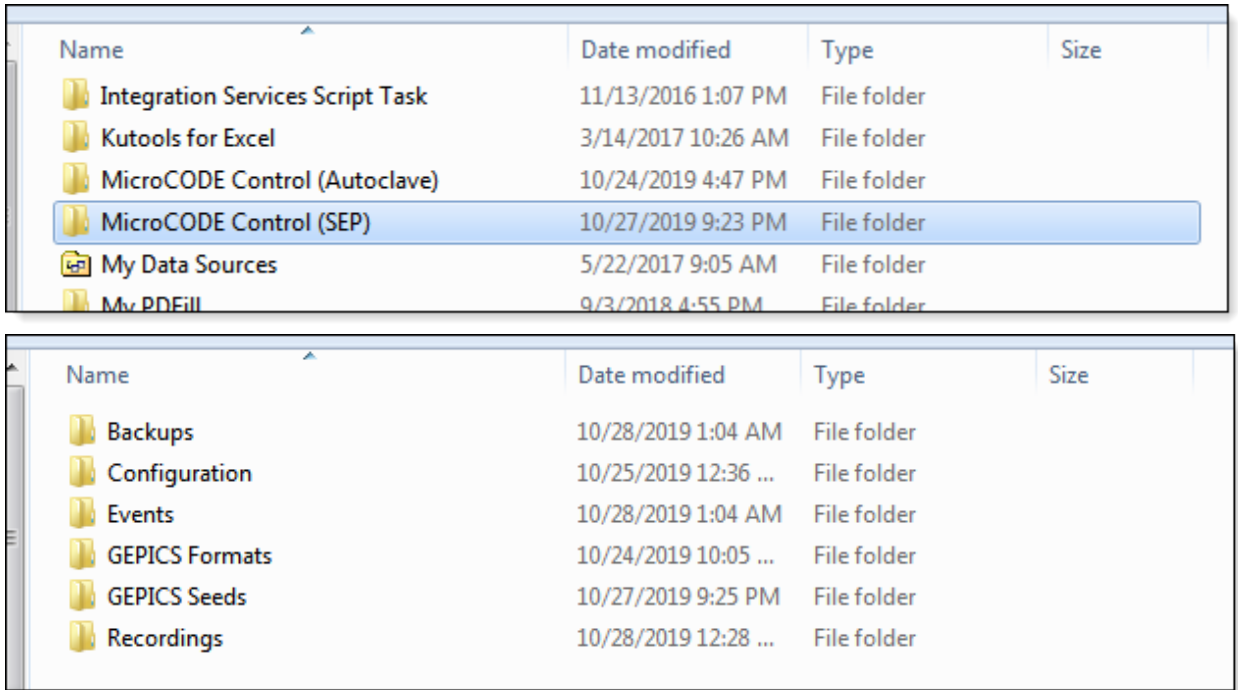
Logitech	10/4/2010 8:03 PM	File folder
McAfee	11/6/2018 8:06 AM	File folder
MicroCODE Incorporated	10/27/2019 11:54 PM	File folder
Microsoft	12/23/2018 11:45 PM	File folder
Microsoft Analysis Services	12/23/2018 11:45 PM	File folder
Microsoft ASP.NET Core Runtime Package S...	12/23/2018 10:43 PM	File folder
Microsoft Device Emulator	11/8/2016 6:40 PM	File folder

Name	Date modified	Type	Size
MicroCODE Control (Autoclave)	10/25/2019 3:14 PM	File folder	
MicroCODE Control (SEP)	10/27/2019 11:54 ...	File folder	

Name	Date modified	Type	Size
DHEs	11/14/2019 8:31 PM	File folder	
DHFs	11/14/2019 8:31 PM	File folder	
Examples	11/14/2019 8:31 PM	File folder	
Fonts	11/14/2019 8:31 PM	File folder	
GFXs	11/14/2019 8:31 PM	File folder	
Images	11/14/2019 8:31 PM	File folder	
L5Xs	11/14/2019 8:31 PM	File folder	
PDFs	11/14/2019 8:31 PM	File folder	
Sounds	11/14/2019 8:31 PM	File folder	
Control (SEP).exe	11/14/2019 8:26 PM	Application	990 KB
Control.ico	10/24/2019 3:59 PM	Icon	67 KB
DeployLX.Licensing.v4.dll	10/6/2010 2:40 PM	Application e...	809 KB
INGEAR.NET.Interfaces.dll	7/14/2010 12:10 PM	Application e...	20 KB
INGEAR.NET.Logix.dll	10/20/2010 4:34 PM	Application e...	160 KB
n3rt409947.lic	1/29/2019 3:42 PM	LIC File	2 KB

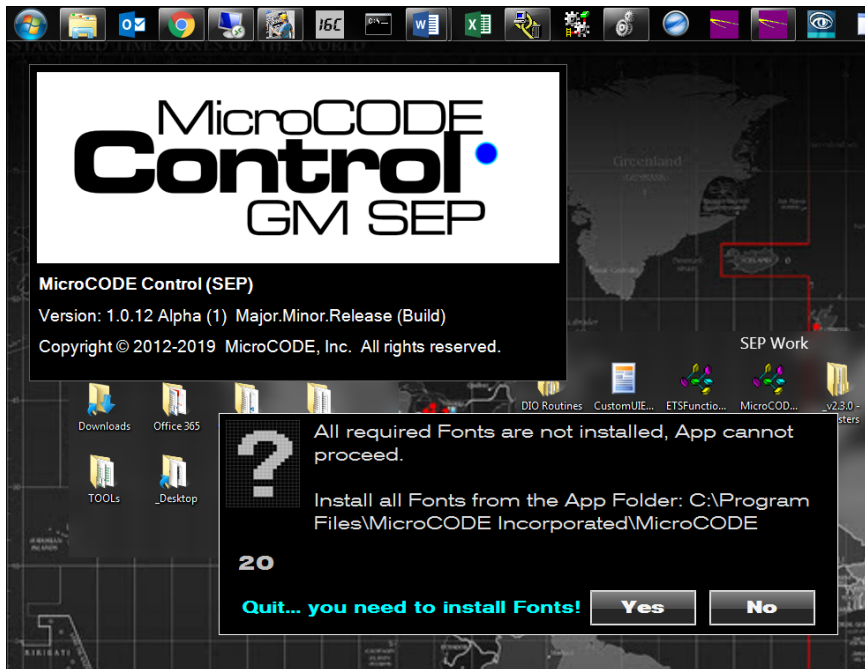


- **Documents** – Your data, Profile Configurations, Event Logs, Seed Jobs, etc.

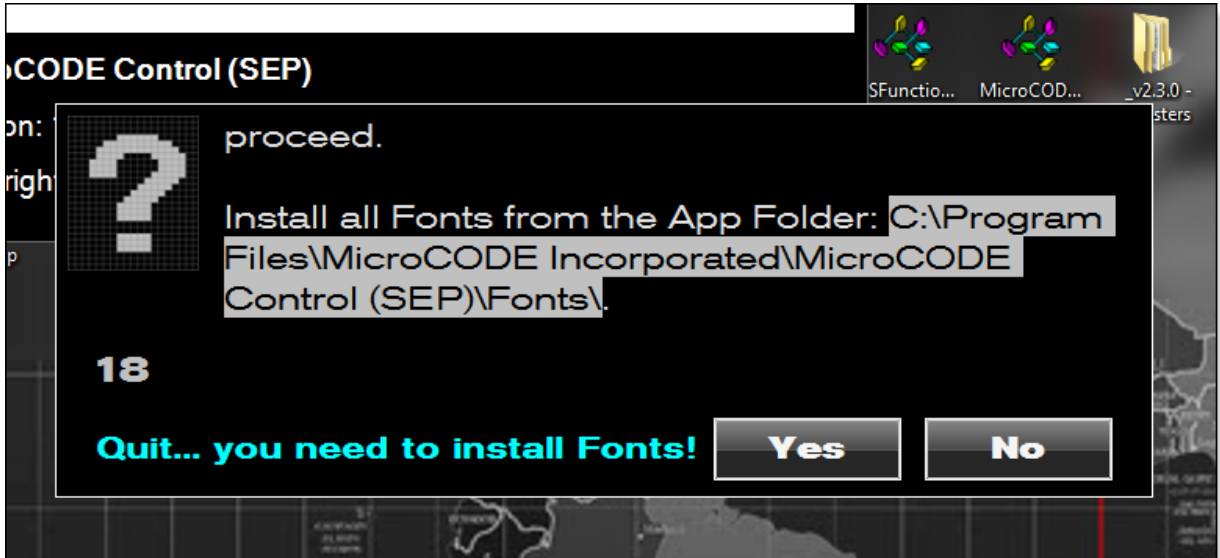


STEP 3: Install the supplied FONTS

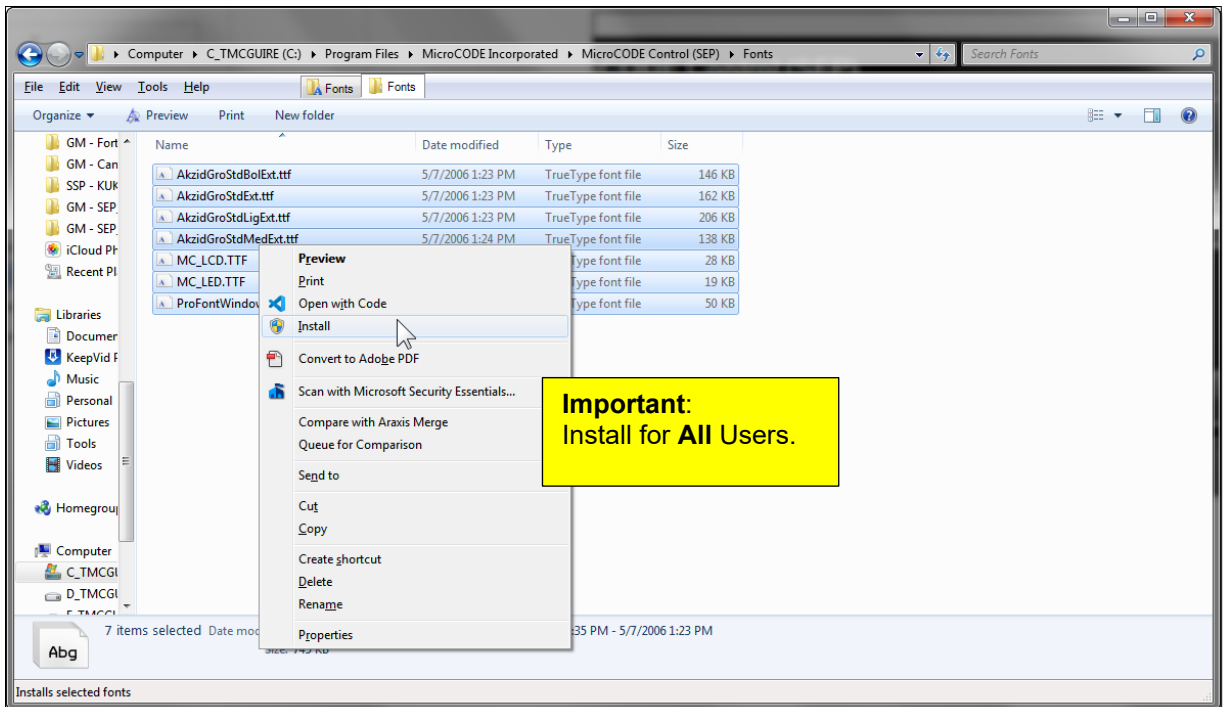
The first time you run the App it checks for a set of **Fonts** it requires for proper operation. If any of them are missing, you will see the following...



You can select the **path** to the required Fonts right from the dialog box...

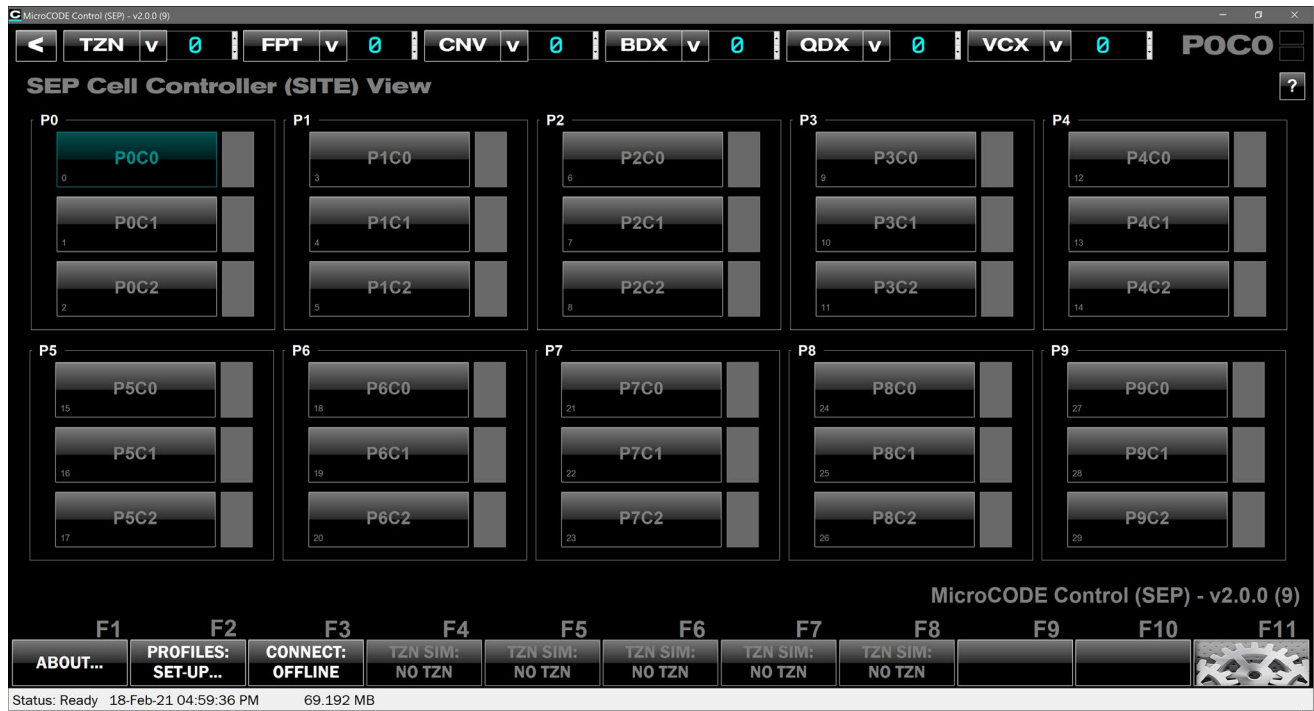


Paste the path into Windows Explorer to get to the supplied Fonts, select them all, right-click, and select **Install...** **Note: On Windows 10 machines it is necessary to Install for All Users.**





The next run of the App will go right to the main App Screen...



That completes the installation. There is nothing else to install.

You do **not** need:

- GE Fanuc – **CIMPLICITY**
- Rockwell Automation – **RSLinx**
- Microsoft – **Office**

Just the MicroCODE Control (SEP) App.



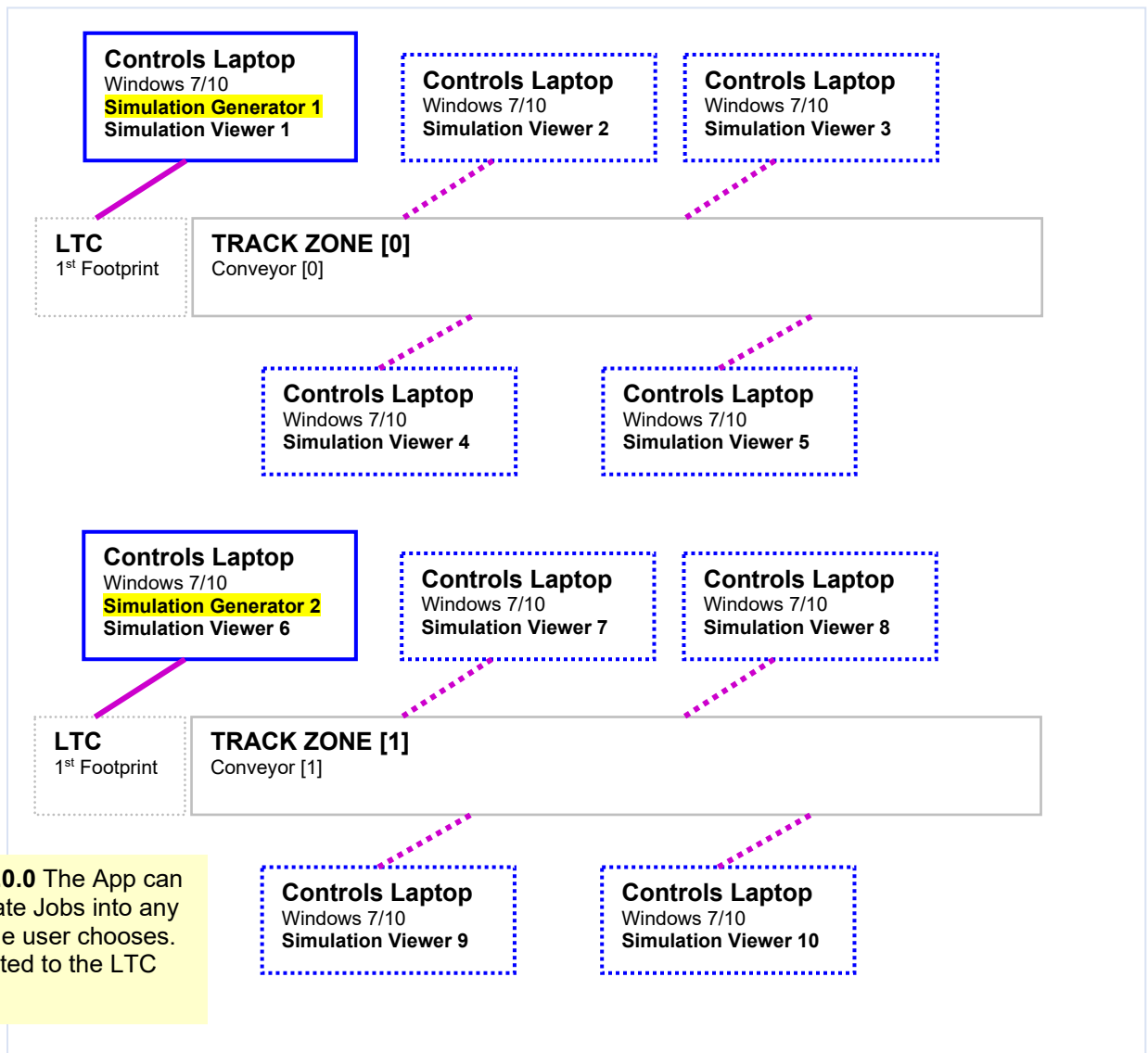
3 Configuring the Site for Simulation

Multiple copies of the MicroCODE Control (SEP) App can be run against the same SEP Cell Controller simultaneously. This allows multiple SAT Teams to work on different Track Zones in the Area.

There is **no limit to the number of ‘Viewers’** connected to a Cell Controller in this App, other than load on the associated Ethernet Card(s) in the PLC.

While only one of the Stations can generate simulated GEPICS Jobs for a particular Track Zone, other Viewers of the Track Zone can have their own simulation running from a different client. **The ‘Generators’ are mandatory and must stay ‘connected’ to the Cell Controller.** The ‘Viewers’ can come and go as they please.

Example 2 Multi-user MicroCODE Control (SEP) App Architecture





The user can tell if they are the ‘Generator’ by the “Simulation Owner” indicator at the bottom of the screen.

NOTE: This indicator is only visible when a Simulation is running in the SEP Cell Controller.

GENERATOR:



VIEWER:



Any ‘Viewer’ can take over the Simulation but aborting the current Simulation and starting a new one...

- On the Viewer—or current Generator—press [F6] TZN SIM: ABORT
- On the Viewer (the new Generator), press [F5] TZN SIM: START



A Station is configured for a specific SEP Cell Controller in the **SITE SET-UP** dialog box.

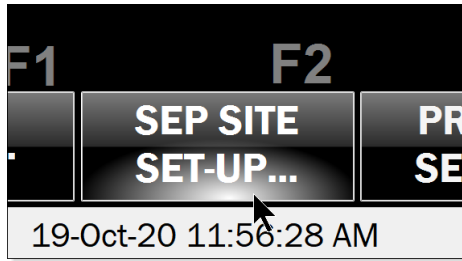


Figure 2 SITE: SEP Cell Controller Tab

Currently selected Cell Controller.

Configured Controller but not currently 'selected'.

Unconfigured Controller.

SEP Site

Cell Controllers
Units
Language
Options
SQL

Cell Controllers																			
P0C	0	1	2	P1C	0	1	2	P2C	0	1	2	P3C	0	1	2	P4C	0	1	2
P5C	0	1	2	P6C	0	1	2	P7C	0	1	2	P8C	0	1	2	P9C	0	1	2

Selected Cell Controller (CLX) Configuration

Panel: Cell: Cell Name:

TCP/IP:

Cell Controller is configured

Cell Controller is deployed

GEP Main Processor (GMP) Slot:

GEP eXtensions Processor (GXP) Slot:

GEPICS Format:

This is the GEPICS Format used to view Job Build Data from the SEP Line Tracking (LTA) and GXP GEPICS Buffer (BDX) in this Cell Controller.

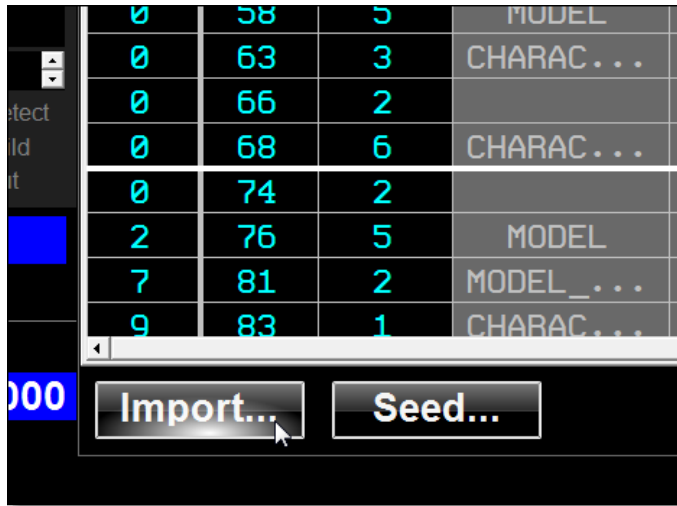
GEPICS Format for this Cell Controller Selection & Viewer

TCP/IP Address of the SEP PLC EN2T Card Selection & Viewer

Logix Chassis Slot #s
For both the GMP and GXP PLCs.



Whenever you open a Job’s GEPIC Build Data it will be viewed through this GEPICS Format. You can change to any other Format you have available ‘on-the-fly’ by using “Import” in the GEPICS Viewer.



However, this does not change the default you selected in the Site Dialog box. If you want to change your default, you must return to this dialog box and import a different Format.



Figure 3 SITE: Units Tab

Imperial / Metric support is a standard feature of the MicroCODE Control Apps, but is not required for SEP.

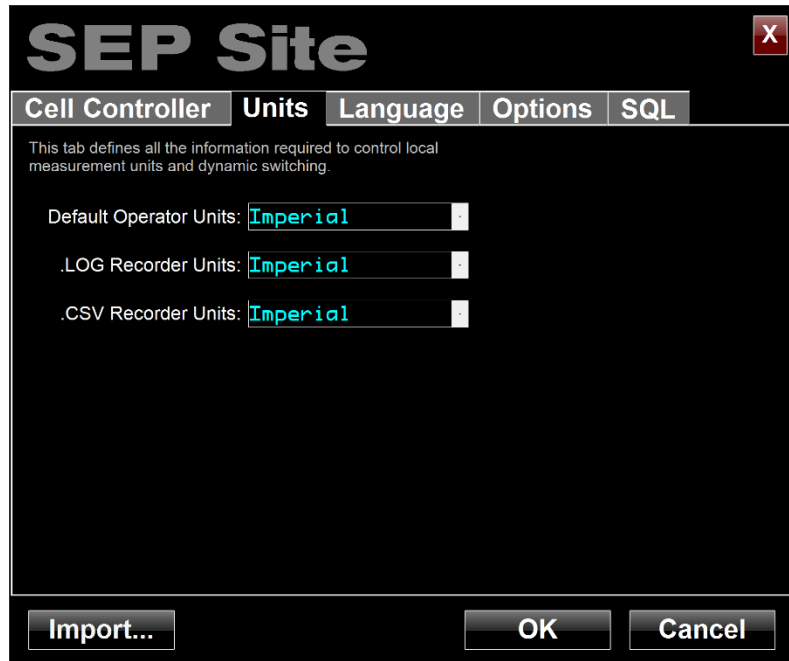


Figure 4 SITE: Language Tab

Multi-Language support is a standard feature of the MicroCODE Control Apps, but is not implemented in this SEP App, the App is locked in English mode.





Figure 5 SITE: Options Tab

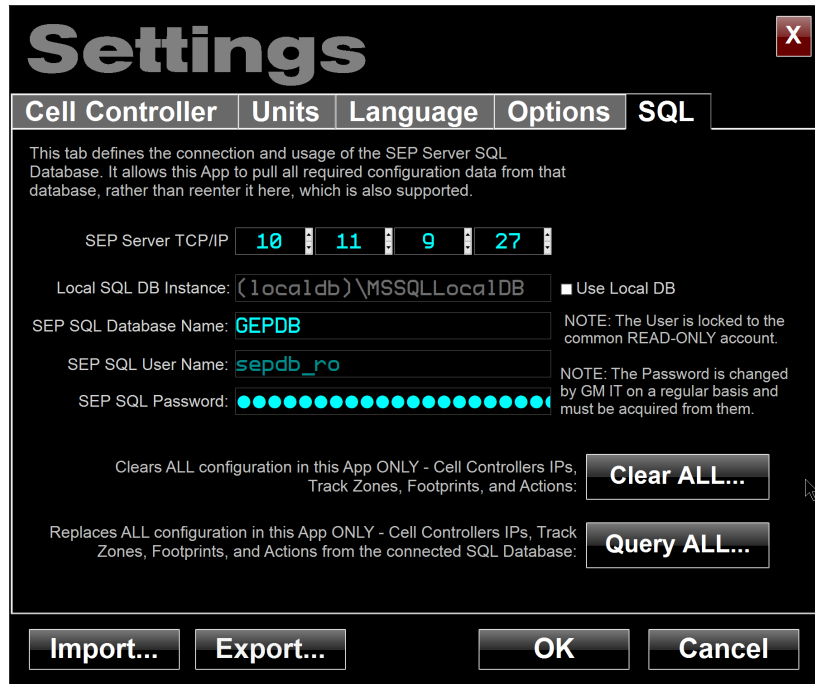
Data file control is a standard feature of the MicroCODE Control Apps, simply set your own retention rules.





Figure 6 SITE: SQL Tab

The Control App is capable of connecting to an existing SEP SQL Database and auto-configuring itself to match the Site. **New in v2.0**



NOTE: The command to clear and query only the Track Zones has been removed starting in v2.1. it was an unnecessary complication. It was originally there to increase App speed but importing all the SEP configuration only takes seconds. **Removed in v2.1.**





In addition to being able to pull the configuration of all Cell Controllers—for communication—the App now extracts Track Zone and Footprint (DSOA) names from the SEP SQL DB.

SEP SQL Server

New in v2.0, configures READ-ONLY access to the SQL Configuration Database. The Username and Password of this account are fixed by GM IT.

SQL Configuration

New in v2.0, users can now pull all required configuration from a GM Site's SEP SQL Database.

Erase All Configuration

New in v2.0, clears all SEP configuration within the Control App, it has no effect on the SEP SQL Database.

Get All Configuration

New in v2.0, pulls all required SEP configuration from the SEP SQL Database into the Control App.



The SQL Extraction allows the App to automatically display the DSOA Placards names with no user input and handles 'custom' DSOAs that do not follow the standard pattern.

- If the Track Zone configuration has been extracted into the App the Footprint Placards from the SEP SQL Database are used.
- If the SQL Database has not been queried, then the starting Placard—configured in this App—is used to generate all Placards for the Track Zone.

TRACK ZONE (TZN) View

500-1

Starved: COMM OK In: COMM OK Out: Entering: Pre-Leave: Leaving: @FPS: Stopped: Production: Blocked: EPx Stop(s): Andon Stop(s): Run Stop(s): End-of-Travel(s): SIM Stop(s): SIM Bypass(s): COCKPIT

Data Shift: 0% Conveyor Type: ??? I/O Type: ??? Position: 0% 0 EPAs:

17-CP-001L PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 0 LTAI: 0	17-CP-002L PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 1 LTAI: 0	17-CP-003L PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 2 LTAI: 0	17-CP-004L PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 3 LTAI: 0	17-CP-005L PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 4 LTAI: 0	17-CP-006L PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 5 LTAI: 0
17-CP-001R PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 0 LTAI: 0	17-CP-002R PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 1 LTAI: 0	17-CP-003R PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 2 LTAI: 0	17-CP-004R PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 3 LTAI: 0	17-CP-005R PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 4 LTAI: 0	17-CP-006R PVI: <input type="checkbox"/> CSN: wait... SVI: <input type="checkbox"/> CID: <input type="checkbox"/> VIN: <input type="checkbox"/> Model: <input type="checkbox"/> Incomplete: 0 Carrier: <input type="checkbox"/> Job Detect: <input type="checkbox"/> No Read: <input type="checkbox"/> No Build: <input type="checkbox"/> Set-In: <input type="checkbox"/> Set-Out: <input type="checkbox"/> A/B FPTI: 5 LTAI: 0

Sync Options: 0

COCKPIT 30

Class: Application
Object: App
Name: MicroCODE

Operator: All the CONTROLLERs were REPLACED in this App with the local SEP SQL configuration. [1] [18-Feb-21 05:06:53 PM] CLEAR EVENT

ABOUT... PROFILES: SET-UP... CONNECT: OFFLINE TZN SIM: NO TZN TZN SIM: NO TZN TZN SIM: NO TZN TZN SIM: NO TZN TZN SIM: NO TZN

Status: Ready 18-Feb-21 05:07:08 PM 68.754 MB



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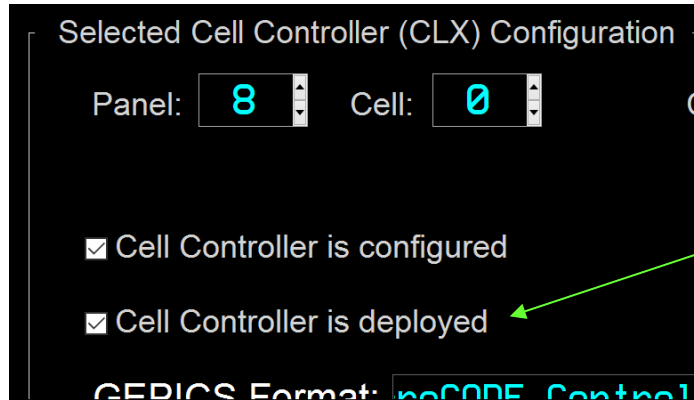


4 Monitoring Production as a Viewer

The MicroCODE Control (SEP) App can be used as a ‘Viewer’ to monitor an SEP Cell Controller – without the risk of entering simulation.

Starting with v2.0.0 the App can now act as an SEP Site Monitor.

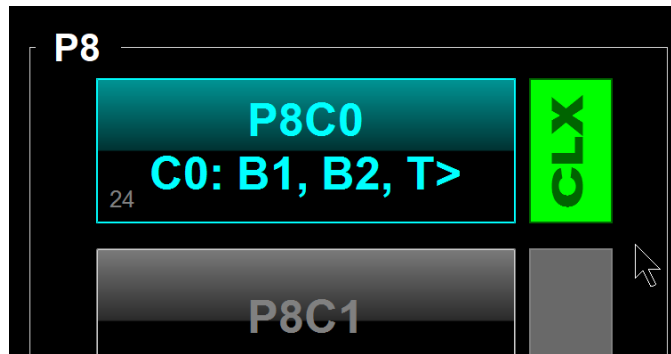
When you CONNECT the App to the Site it establishes a READ ONLY connection to every SEP Cell Controller in your configuration that is marked “Configured” and “Deployed”.



NOTE #1: If there are any Cells you do not want the App to connect to simply uncheck ‘Deployed’.

NOTE #2: The initial settings of ‘Configured’ and ‘Deployed’ are taken from the SEP SQL Database.

Once connected all the Cell Controllers have their diagnostics available in the App. This is displayed in a rotating indicator to the right of the Cell Controller button.





Clicking on the ‘Diagnostics Indicator’ open a complete view into the Controller showing all Subsystems summaries...

Cell Status: P8CO CO: B1, B2, TU, TG ? X

GEP Main Processor (GMP)		GEP eXtensions Processor (GXP)	
GMP GEP/SEP - Main Processor (GMP)	SIM Simulation Interface <Apps + Web> (GMP.SIM)	GXP GEP/SEP - eXtensions Processor (GXP)	SIM Simulation Interface <Apps + Web> (GXP.SIM)
DGN Internal SEP/GEP Diagnostics (GMP.DGN)	PVW PanelView Interface (GMP.PVW)	DGN Internal SEP/GEP Diagnostics (GXP.DGN)	PVW PanelView Interface (GXP.PVW)
CLX ControlLogix Hardware (GMP.CLX)	PMX Plant Monitoring Interface <GPM&C> (GMP.PMX)	CLX ControlLogix Hardware (GXP.CLX)	PMX Plant Monitoring Interface <GPM&C> (GXP.PMX)
GEP Main GEP/SEP Program (GMP.GEP)	UIX User Interface <Configuration> (GMP.UIX)	GEP Main GEP/SEP Program (GXP.GEP)	UIX User Interface <Configuration> (GXP.UIX)
	IOX External I/O Interface(s) (GMP.IOX)		IOX External I/O Interface(s) (GXP.IOX)
LTS Line Tracking Subsystem (GMP.LTS)	CNV Conveyor Interfaces (GMP.CNV)	BDX Conveyor Interfaces (GXP.CNV)	
SCN Scanner Interfaces (GMP.SCN)	QAX Quality Andon Interface <QAS 1,2,4> (GMP.QAX)		
EPX Error Proofing Actions (GMP.EPX)	VQX VOX Vehicle Quality Interface <GSIP> (GMP.VQX)		
196 Controller Scan Time <Milliseconds> (GMP.CLX.CLS)	47 Controller I/O Connections (GMP.CLX.CLC)	37 Controller Scan Time <Milliseconds> (GXP.CLX.CLS)	50 Controller I/O Connections (GXP.CLX.CLC)
7% Communication Time slice Remaining (GMP.CLX.TSR)		16% Communication Time slice Remaining (GXP.CLX.TSR)	

...the question / help indicator opens a Key explaining the status coloring:

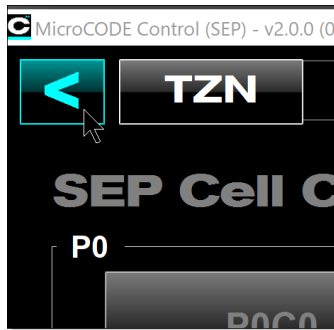
Key X

SEP Subsystem States

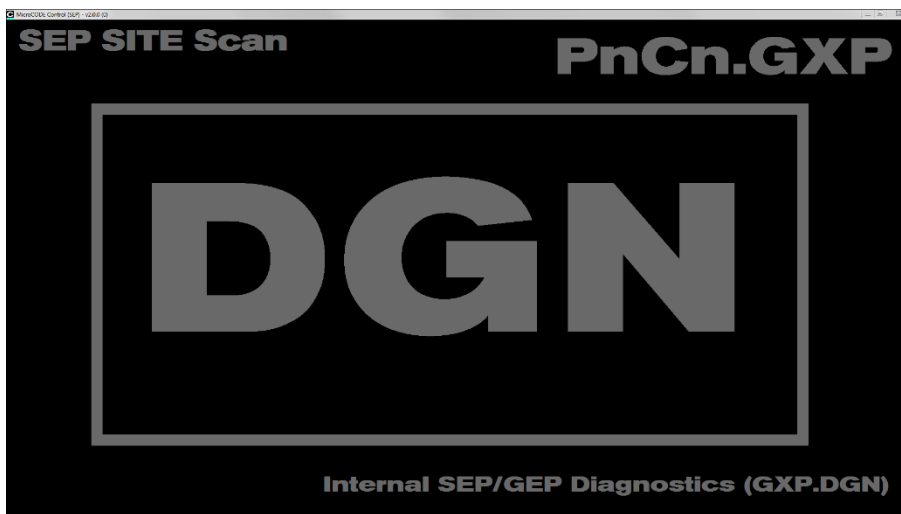
AXP	UNCONFIGURED
AXP	CONFIGURED
AXP	INITIALIZED
AXP	RUNNING - NORMAL
AXP	RUNNING w/WARNINGS
AXP	RUNNING w/ERRORS
AXP	RUNNING w/FAULTS
AXP	STOPPED



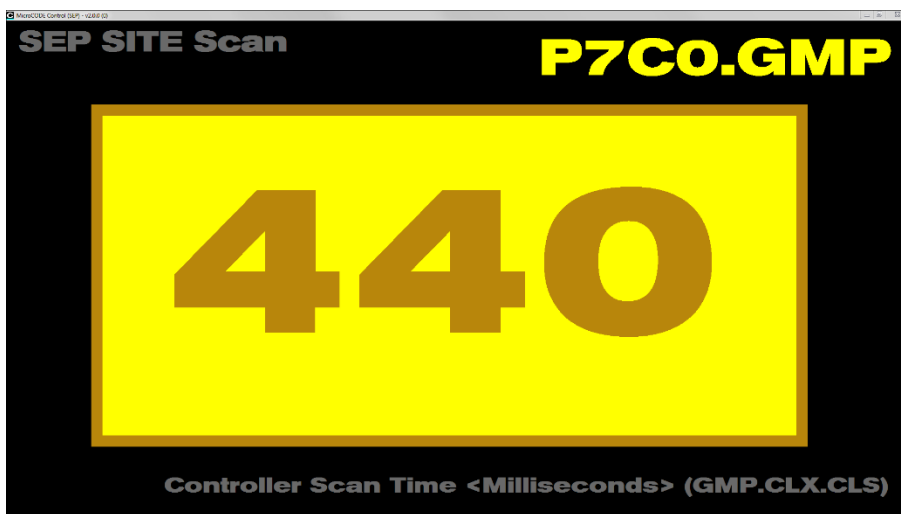
While connected to the Site, backing up from the ‘Site’ screen reveals a rotating monitor of all the Subsystems, in all the Cell Controllers.



If all the SEP Subsystems in all Site Cell Controllers are fine—all Running with no Warnings, Errors, or Faults—the display rotates through them one at a time with a ‘dim gray display’, nice and boring.



If an abnormal condition is found the display shows the Cell Controller with the worst Subsystem state, shows the Cell Controller ID (**PnCn.PLC**) and shows the abnormal condition colorized by severity to draw attention to the issue.





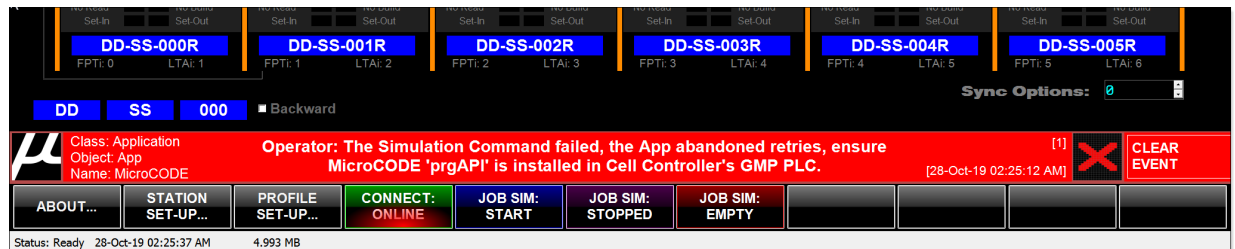
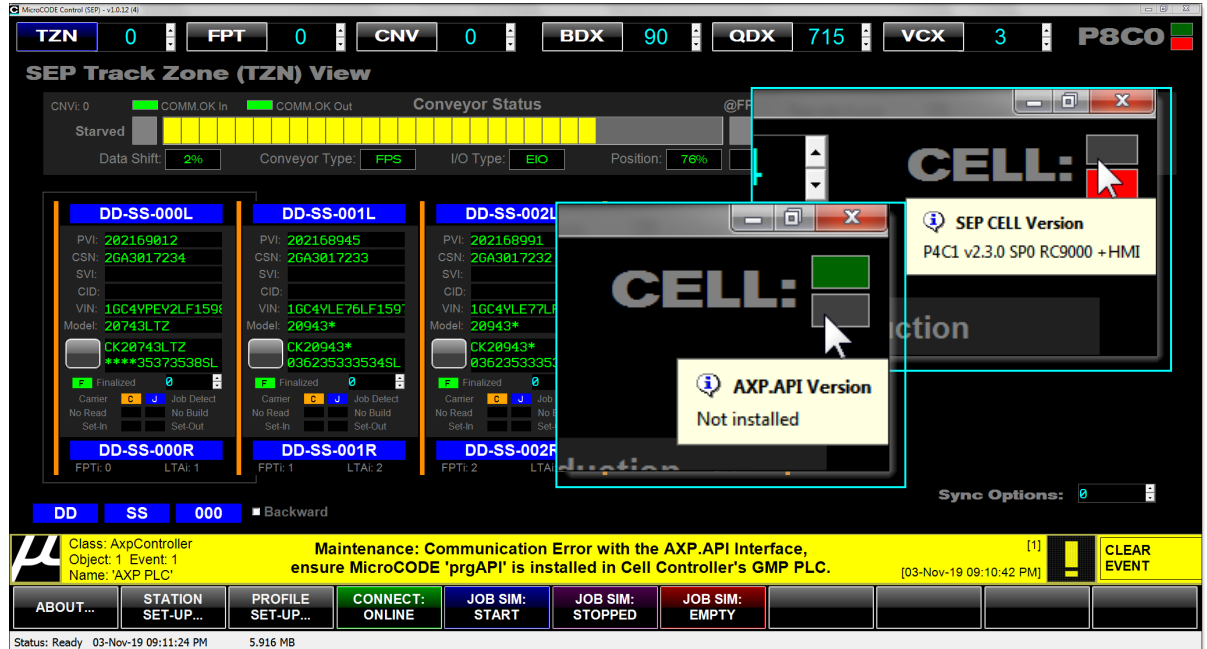
Clicking anywhere on the SITE Scan screen returns you to SITE View screen...

The screenshot displays the MicroCODE Control (SEP) - v2.0.0 (0) interface. At the top, there is a navigation bar with buttons for TZN (4), FPT (3), CNV (0), BDX (109), QDX (771), VCX (3), and P8C0. Below this, the interface is divided into two main sections: 'SEP Cell Controller (SITE) View' and 'GEP/SEP - eXTensions Processor (GXP)'. The 'SITE View' section contains panels P0 through P7, each with three sub-panels (P0C0, P0C1, P0C2) and a 'DPY' button. The 'GXP' section contains panels P3 through P9, also with three sub-panels and 'DPY' buttons. Panel P8C0 is highlighted in green and shows 'C0: B1, B2, T>' with a green 'GXP' indicator. At the bottom, there is a function key bar (F1-F11) with buttons for 'ABOUT...', 'SEP SITE SET-UP...', 'PROFILE SET-UP...', 'CONNECT: ONLINE', 'TZN SIM: START', 'TZN SIM: ABORTED', 'TZN SIM: EMPTY', 'TZN SIM: SAVE', and 'TZN SIM: RESTORE'. The status bar at the very bottom shows 'Status: Ready 19-Oct-20 12:34:50 PM 67.285 MB'.



The App establishes two (2) distinct connections to the ‘Active’ SEP Cell Controller PLCs...

- The first is a connection to the ‘SEP Cell Controller’ – as a READ ONLY connection.
- The second is a connection to the ‘MicroCODE Application Programming Interface (API)’ which can be added to any SEP Cell Controller – this is a READ/WRITE connection for giving the Cell Controller simulation commands.

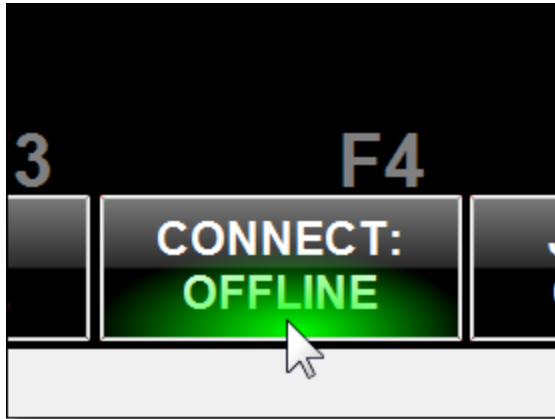


If the MicroCODE API program is not installed this App cannot write anything to the Controller, i.e.: it cannot start/stop/run a simulation; all it can do is act as a ‘Viewer’.

So, it is normal in this case to get the warning and errors shown above, these can be ignored if you only want ‘Viewer Mode’ and closed by clicking CLEAR EVENT (or F12).



To use the App as a ‘Viewer’, simply click F4 **CONNECT: OFFLINE**, this button glows green to show it will start the connection if clicked.



Once ONLINE the display shows the live data from the Cell Controller...

MicroCODE Control (SEP) - v2.0.0 (0)

Navigation: **TZN** 4 | **FPT** 19 | **CNV** 7 | **BDX** 138 | **QDX** 771 | **VCX** 3 | **P8CO**

SEP Track Zone (TZN) View

CNV: 7 | COMM.OK In | COMM.OK Out | @FPS

Starved | Blocked | Stopped | Break Time

Data Shift: 2% | Conveyor Type: SIM | I/O Type: SIM | Position: 0% | EPAs

Station	PVI	CSN	SVI	CID	VIN	Model	Status
17-B2-020L	LOST LTC!						Incomplete
17-B2-021L	202169963	2GA3018137			1GC4MLE76LF1607	20943*	Finalized
17-B2-022L	202169928	2GA3018136			1GC4YUEY9LF1607	30943LTZ	Finalized
17-B2-023L	202169958	2GA3018135			1GC4YUEY1LF1607	30943LTZ	Finalized
17-B2-024L	202169926	2GA3018134			1GC1VLEY9LF1607	20743*	Finalized
17-B2-025L	202169953	2GA3018133			1GT49REYXLF1607	TK20743S1ER***	Finalized

Carrier: C J | Job Detect: No Build | Scanned: [Green] [Red] | Set In: [Green] [Red] | Set Out: [Green] [Red]

Sync Options: 0

B2_BOXLINE2 4

MicroCODE Control (SEP) - v2.0.0 (0)

Function Keys: F1 ABOUT... | F2 SEP SITE SET-UP... | F3 PROFILE SET-UP... | F4 **CONNECT: ONLINE** | F5 TZN SIM: START | F6 TZN SIM: ABORTED | F7 TZN SIM: EMPTY | F8 TZN SIM: SAVE | F9 TZN SIM: RESTORE | F10 | F11

Status: Ready 19-Oct-20 11:58:09 AM 69.528 MB



TRACK ZONE View – FPS Conveyor

The main App Screen is used to both configure, monitor, and control all the GM SEP functions.

Track Zone Selection & Viewer

Footprint / Job Selection & Viewer

Conveyor Selection & Viewer

Build Data 'Seed' Selection & Viewer

GSIP Queue Defect Viewer

VCVS Queue Trace Viewer

SITE Set-Up
Communication Set-up, PLC connections.

Job Control Profiles (JCP)
Controls the creation of simulated Jobs.

Connect
Connects the App to the SEP Cell Controller.

TZN SIM: Start / Stop Toggle
Starts a new stream of simulated Jobs based on the active Profile. (It starts by taking a snap-shot of the existing tracking).

TZN SIM: Abort
Aborts the simulation and restores the active Track Zone from the snap-shot.

CNV: Simulator Controls
Starts or Stops simulated Conveyor motion. Clears Andon Holds, Bypasses Andon, changes Speed.

TZN SIM: Empty
Fill the active Track Zone with EMPTY CARRIERS.

TZN SIM: Save
Takes a SNAP-SHOT of the active Track Zone only.

TZN SIM: Restore
Retrieves the SNAP-SHOT of the active Track Zone only.



TRACK ZONE View – ALS / AGV / AGC / VAC Conveyors

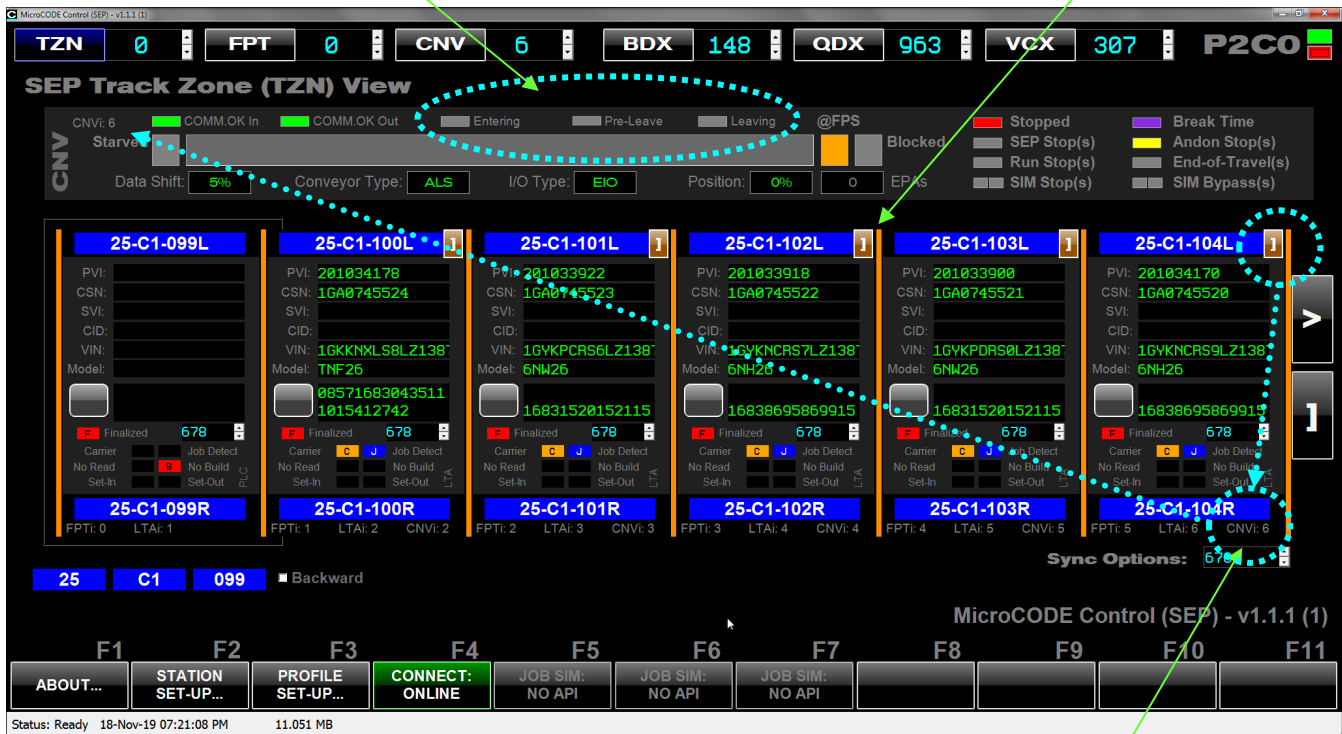
The Track Zone screen has features to better support asynchronous conveyors.

Starting with v1.1.1 the App supports the display of all data associated with Stop Stations, i.e.: Carrier Positions on Accumulating Lane Stop (ALS), Automated Guided Vehicles (AGVs), Vertically Adjusted Carriers (VAC), and Automated Guide Carts (AGCs).

Changes for ALS Tracking Support:

Stop Station Interlocks Entering, Pre-Leave, and Leaving, only visible on Stop Station Conveyors

Stop Indicator Position where a Carrier can be held



Interface Index
Stop Station specific
Conveyor Interface
index in the GMP PLC

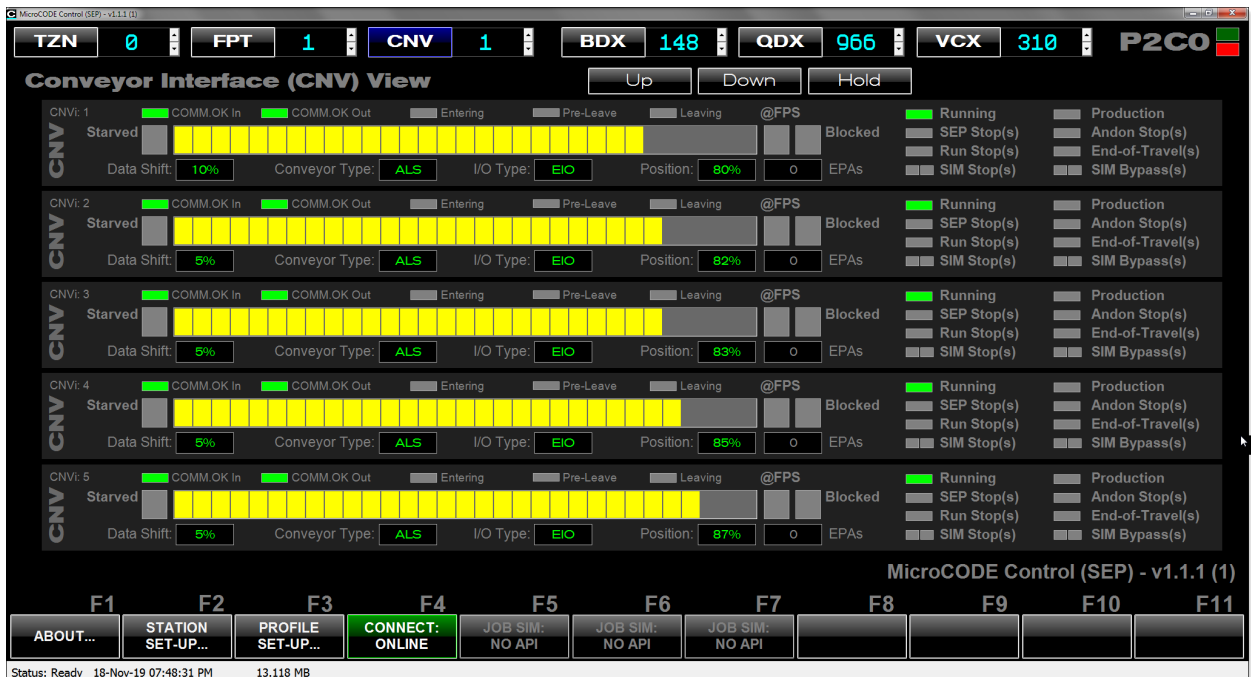
Stop Station Specific Features:

Clicking on the Stop Indicator changes the Conveyor Status displayed on the top of the TZN screen to that specific Conveyor Interface, i.e.: the one for the Stop Station position.



Examples of ALS Conveyor Interface displays:

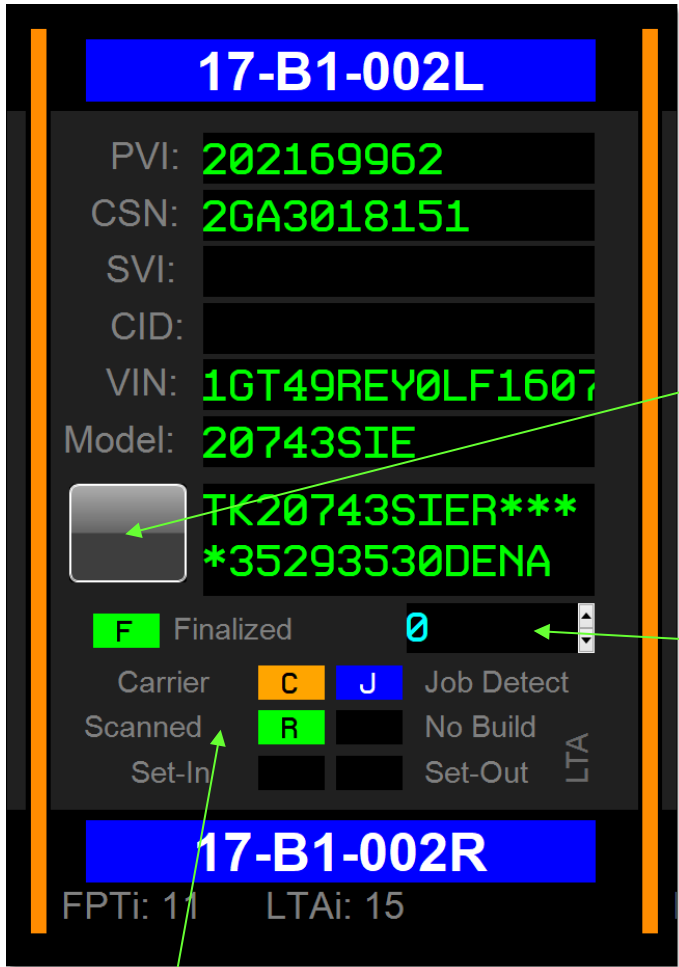
Note the Entering/Pre-Leave/Leaving interlocks and asynchronous Carrier movement.





FOOTPRINT View

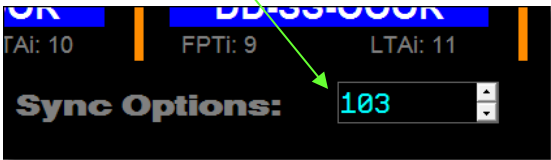
The main App Screen is used to both configure and monitor and control all GM SEP functions.



GEPICS Build Data Viewer
 Instant access to the GEPICS view of data in any Footprint.
See next page.

Build Data Index
 By Footprint, or Sync'ed across all Footprints on screen. Controls the quick view of 32 bytes of the GEPICS Build Data Packet.

Detailed Job Status
 A clear view of all the important tracking information.





CONVEYOR View

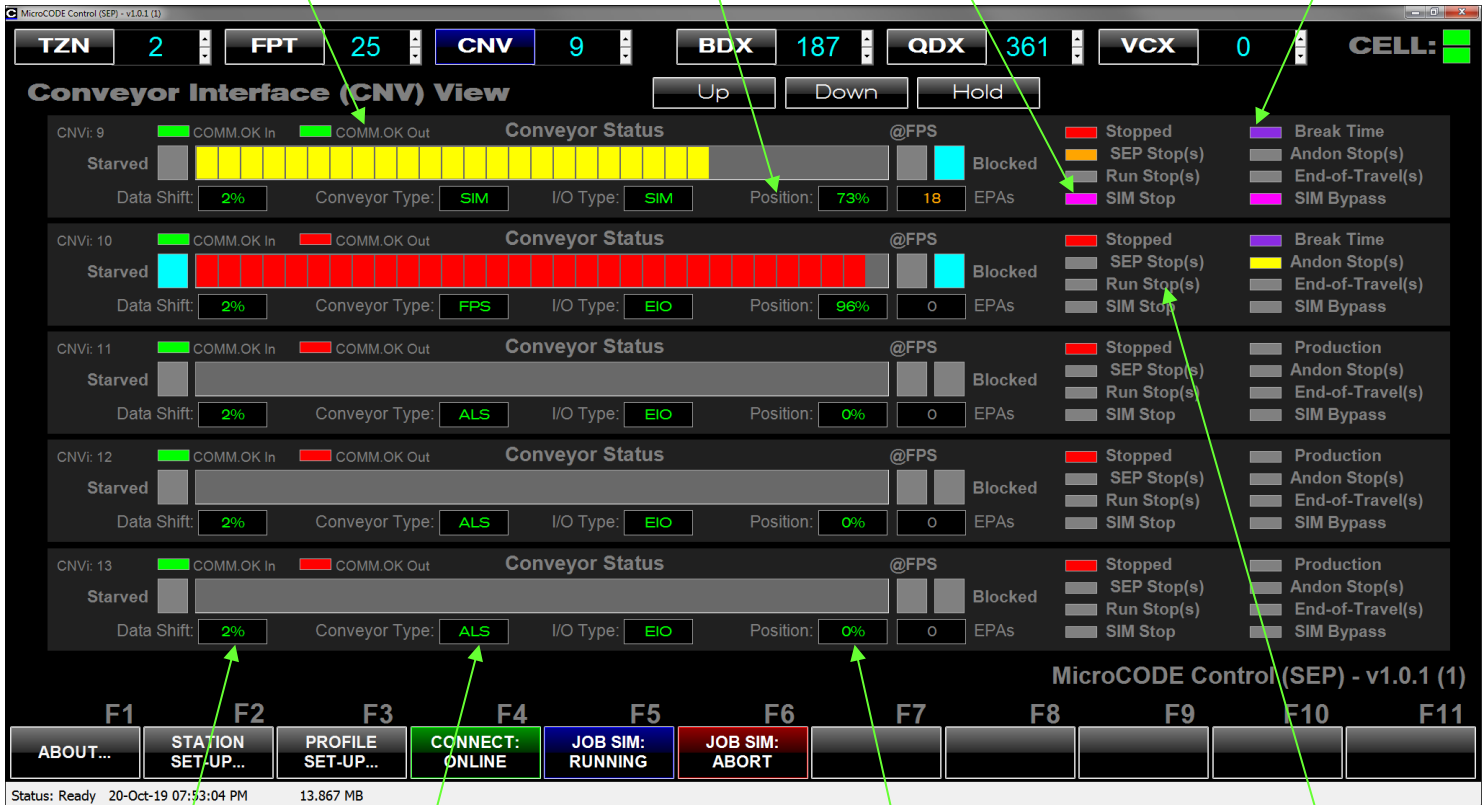
A screen to monitor multiple Conveyors in an Area all at the same time.

Five (5) Conveyors
Live view of a Conveyor group

Interface Status
Complete interface status at-a-glance

Live Count of SEP Holds
What's holding the Line?

Break Time
Production Status



Data Shift
Shift Point displayed and colored

Conveyor and Connection Type
Both report "SIM" during a simulation

% Travel
Graphically and as a direct value.

Blocked and Starved
What's holding the Line?

Scroll and Sync Controls

Common to all buffer/queue viewers, the user can scroll up/down thru the data and hold the view from synchronizing to the live PLC.





BDX Buffer View

A tool to allow users to examine the Build Data Buffer within the GXP PLC, with the goal of finding 'seed jobs' for running SAT simulations.

SEP Index
PLC Location in GXP PLC

JOB VIDs
Vehicle IDs

JOB Model
To help locate the 'seed' Job you need.

Buffer Position
Changed on-the-fly

Build Data Index
By Footprint, or Sync'ed across all Footprints on screen. Controls the quick view of 32 bytes of the GEPICS Build Data Packet.

BDXi	PVI	CSN	Model	Options
202	202169982	20A3018350	CK20743	* L5P 3149 179
203	202170160	20A3018349	TK20743	* L5P 2972 179
204	202170153	20A3018348	TK20743	* L5P 2972 179
205	202170154	20A3018347	TK20743	* L8T 2951 179
206	202170150	20A3018346	CK20743	* L5P 9753 179
207	202170145	20A3018345	CK30943	* L5P 9687 179
208	202170158	20A3018344	CK20943	* L8T 3144 179
209	202169894	20A3018343	TK20743	* L5P 2987 179
210	202170131	20A3018342	CK20943	* L8T 3144 179
211	202170142	20A3018341	CK20743	* L5P 9747 179
212	202170128	20A3018340	CC20943	* L8T 3144 179
213	202170146	20A3018339	TK20743	* L5P 2972 179

MicroCODE Control (SEP) - v1.0.12 (5)

F1 ABOUT... F2 STATION SET-UP... F3 PROFILE SET-UP... F4 CONNECT: ONLINE F5 JOB SIM: START F6 JOB SIM: STOPPED F7 JOB SIM: EMPTY F8 F9 F10 F11

Status: Ready 05-Nov-19 10:48:26 AM 4.798 MB

Filtering
This allows the user to filter by PVI, CSN, or MODEL.

End of Sequence
The Track Zone's current position is clearly visible.

Option Content
RPOs, Part Numbers, etc.

Detailed View
Opens the Vehicle Order Viewer on this Job.

Scroll and Sync Controls
Common to all buffer/queue viewers, the user can scroll up/down thru the data and hold the view from synchronizing to the live PLC.





FILTERING: BDX Buffer View

The BDX Buffer View can be filtered by:

- PVI
- CSN
- MODEL

2) Filter Data
Fill it the search data after

1) Filter Type
Click the item to filter by...

3) Apply Filter
Click to start search...

The filtered view is held until you click “Hold” to toggle it off again, and the search is visualized for the user while in progress.



GEPICS Build Data Viewer (BDV)

This Tool—available from the Track Zone (TZN), Footprint (FPT), and Build Data Buffer (BDX) screens—allows the User to examine the Build Data in the SEP PLCs thru the 'lens' of the GEPICS Format they select.

GEPICS and SEP Offsets
For easy communication with GM IT support.

GEPICS Format: **FSEPTRM2** Items: **314**

PVI: **202163498** CSN: **2GA3011958**

SEP	GEPICS	Length	Data Item	Description	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0	9	PVI	START OF DATA...	2	0	2	1	6	3	4	9	8							
0	9	1	CHARAC...	SPACE TO MAKE...																
0	10	15	CHARAC...	CAB TRIM SVI...																
0	25	1	CHARAC...	SPACE FOR SVI...																
0	26	11	CSN	CSN OR CURREN...	2	G	A	3	0	1	1	9	5	8						
0	37	1	CHARAC...	SPACE TO MAKE...																
0	38	17	VIN	VIN OR VEHICL...	1	G	C	4	V	V	E	Y	2	L	F	1	3			
0	55	3	CHARAC...	SPACE TO MAKE...																
0	58	7	MODEL7	MODEL	3	0	9	4	3	G	B									
0	65	1	CHARAC...	SPACE TO MAKE...	A															
0	66	2																		
0	68	6	CHARAC...	GA CSN PREFIX...	2	G	A													
0	74	7	MODEL7	START OF DATA...	C	K	3	0	9	4	3									
7	81	3	UPPER...	VEHICLE PRIM...	G	B	A													
10	84	1	CHARAC...																	
11	85	4	V13A	V13A-BACKGL AS...	0	1	3	8												

Buttons: Import... Seed... OK Cancel

Format Import
Direct import of a GEPICS Format file at any time.

Select Seed Job
Makes the current GEPICS Order the 'seed' for the next simulation.

GEPICS Format: **FSEPTRM2** Items: **314**

PVI: **202163498** CSN: **2GA3011958**

SEP	GEPICS	Length	Data Item	Description	0	1	2	3	4	5	6	7	8	9	10
317	391	4	H85	Flex Fuel Las...											
938	1012	4	J02A	GEAR ASM-HVD ...	5	4	3	7							
170	244	4	J07A	J07A-Steering...	6	0	0	2							
918	992	4	J11	POWER STEERIN...	3	3	0	8							
978	1052	4	K04D	COVER ASM	8	0	1	1							
922	996	4	M03	PLENUM BATTER...	5	0	4	7							
108	182	4	M03	M03 Last 4 PN...	5	0	4	7							
866	940	4	M17	RH REAR DOOR ...											
862	936	4	M17	LH REAR DOOR ...	4	3	0	2							
898	972	4	M22K	RH FRONT DOOR...	7	9	1	4							
894	968	4	M22L	LH FRONT DOOR...	7	9	0	1							
910	984	4	M34B	FRONT HEADLAM...	8	6	1	9							
224	298	4	M34F	RSE Part Number											
870	944	4	M35	LH FRONT DOOR...	4	4	9	8							
874	948	4	M35	RH FRONT DOOR...											
1034	1108	4	M37E	PARK ASST CON...	6	1	8	5							

Buttons: Import... Seed... OK Cancel

Flexible View
Format columns are resizable, and all columns are sortable.

Choose as 'Seed' Job
Make this Order the starting point for all simulated orders.



GEPICS Build Data Viewer (BDV) - details

This Tool—available from the Track Zone (TZN), Footprint (FPT), and Build Data Buffer (BDX) screens—allows the User to examine the Build Data in the SEP PLCs thru the ‘lens’ of the GEPICS Format they select.

GEPICS

Format: FSEPFINL

Items: 340

X

PVI: 202163498

CSN: 2GA3011958

SEP	GEPICS	Length	Data Item	Description	0	1	2	3	4	5	6	7	8	9	10	11	12
1026	1100	4	CHARACTER_SPACES	BODY WIRE HAR...													
1030	1104	4	CHARACTER_SPACES	ANTENNA													
1034	1108	4	M37E	PARK ASST CON...	6	1	8	5									
1038	1112	4	E24	ELEK BRK CONT...	5	1	7	6									
1042	1116	1	CHARACTER_SPACES														
1043	1117	4		VCVS TRACE DA...	V	C	V	S									
1047	1121	14		VPPS ID	0	0	0	0	0	0	0	0	0	0	0	0	0
1061	1135	8	CHARACTER_SPACES	PART NO. PLAC...													
1069	1143	14		VPPS ID	0	0	0	0	0	0	0	0	0	0	0	0	0
1083	1157	8	CHARACTER_SPACES	PART NO. PLAC...	9	1	3	8									
1091	1165	14		VPPS ID	0	0	0	0	0	0	0	0	0	0	0	0	0
1105	1179	8	CHARACTER_NULLS	PART NO. PLAC...													
1113	1187	14		VPPS ID	0	0	0	0	0	0	0	0	0	0	0	0	0
1127	1201	8	CHARACTER_SPACES	PART NO. PLAC...													
1135	1209	14		VPPS ID	0	0	0	0	0	0	0	0	0	0	0	0	0
1149	1223	8	CHARACTER_SPACES	PART NO. PLAC...													

Import...

Seed...

OK

Cancel

GEPICS Data Item name
Locates within GEPICS

GEPICS Data Item description
Details from GEPICS

Import GEPICS Format
Changes formats for the Viewer, at any time, with a persistent memory from session-to-session.

?

This will control the view of the GMP and GXP Build Data.

I

26

Import new Format?

Yes

No



QDX Defect Queue View

A tool to allow users to examine the Vehicle Defects Queue within the GMP PLC, with the goal of verifying Defects are generated during SAT simulations.

SEP Index
PLC Location in GMP PLC

Trigger ID
Used to communicate with QDI

JOB PVI
The Vehicle that will hold the Defect.

Buffer Position
Changed on-the-fly

Defect List (Numeric View)
The Defects that are being opened on the Vehicle.

Filtering
This allows the user to filter by PVI, or MACHINE CODE (EPA).

Machine Code
The tie to GSIP for this Process.

Detailed View
Opens the Vehicle Defects Viewer on this Job.

Scroll and Sync Controls
Common to all buffer/queue viewers, the user can scroll up/down thru the data and hold the view from synchronizing to the live PLC.

QDX#	Trigger ID	MC	PVI	Event	Defects
763	7759	30455	202169584	Bypass	001
764	7760	30455	202169680	Bypass	001
765	7761	30455	202169858	Bypass	001
766	7762	30455	202169925	Bypass	001
767	7763	30455	202169936	Release	002,101
768	7764	30455	202169939	Release	002,101
769	6765	30583	202116631	Release	002
770	6766	30616	202116661	Release	002,101
771	6767	30581	202124179	Release	002
772	6768	30526	202123985	Release	002,004
773	6769	30474	202124268	Bypass	001
774	6770	30546	202124246	Release	002,101



FILTERING: QDX Queue View

The QDX Defect Queue View can be filtered by:

- PVI
- Machine Code (EPA Identifier)

2) Filter Data
Fill it the search data after

1) Filter Type
Click the item to filter by...

The screenshot shows the 'DEFECTS Queue (QDX) View' with a list of defect entries. A 'SEP Viewer Filter' dialog box is overlaid, showing options for 'PVI' and 'Machine Code'. The 'Machine Code' field contains the value '15332'. An 'Apply' button is visible in the dialog. Callouts indicate the steps: 1) Filter Type (clicking the filter type), 2) Filter Data (entering the search data), and 3) Apply Filter (clicking the Apply button).

The filtered view is held until you click “Hold” to toggle it off again, and the search is visualized for the user while in progress.

The screenshot shows the 'DEFECTS Queue (QDX) View' after filtering. The 'Hold' button is highlighted with a red dotted circle. A callout box displays the number '417', indicating the number of filtered results. The interface shows a list of defect entries with filtered data.



CLEARING: QDX Queue

The QDX Defect Queue held within the GMP PLC can be cleared from this App as long as the prgAPI is been installed in the target Cell Controller.

Clear Command
Erases all Defect Data from the connected Cell Controller

QDX#	Trigger ID	MC	PVI	Event	Defects
427	3735	15164	202169862	Bypass	001
428	3736	15116	202169780	Bypass	001
429	3737	15123	202169772	Bypass	001
430	3738	15051	202169855	Bypass	001
431	3739	15052	202169855	Bypass	001
432	3740	15151	202169845	Bypass	001
433	2741	15101	202168822	Quality	000,777
434	2742	15101	202168841	Quality	000,777
435	2743	15101	202168842	Quality	000,777
436	2744	15101	202168772	Quality	000,777
437	2745	15072	202168791		
438	2746	15101	202168839		

? This will clear all Defects from the GMP PLC erasing the current SATs results for all Users.

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Clear the Defects Queue?

QDX#	Trigger ID	MC	PVI	Event	Defects
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

Class: Application
Object: App
Name: MicroCODE

Operator: The GSIP Defects Queue (QDX) was CLEARED for all Users in the Cell Controller. [14-Nov-19 10:05:47 AM]

CONNECT: ONLINE JOB SIM: START JOB SIM: ABORTED JOB SIM: EMPTY



GSIP Defect Data Viewer (DDV)

This Tool—available from the Quality Defects View (QDX) screen—allows the User to examine the Defect Data in the SEP PLCs thru the ‘lens’ of the standard SEP Defect definitions.

EPA Machine Code
Unique Part/Process Identifier.

Vehicle Ids
Identification of the Job holding these Defects.

PLC	GSIP RLN	Defect	Description
0	25403002	002	RELEASED
1	25403006	006	SC - DUPLICATE VID or PT.04 - CYCLE ABORTED
2	25403008	008	SC - INVALID S/N or PT.06 - TOOL SPECIFIC #2
3	25403009	009	SC - UNCOLLECTED or PT.07 - TOOL SPECIFIC #3
4	25403010	010	PT.08 - TOOL SPECIFIC #4
5	25403011	011	PT.09 - TOOL SPECIFIC #5
6	25403012	012	PT.10 - TOOL SPECIFIC #6

Defect Position in List
For checking against the GMP PLC.

GSIP RLNs
GSIP Defect Relationship ID for communication to GSIP Coordinator.

Defect Codes
The SEP Defect Codes generated on the Vehicle.

Defect Description
A human readable description of the Vehicle Defect.



Example 3 SEP EPA details in the App Defect Viewer

GSIP Defect

Machine Code: 25403 Defects: 7

PVI: 221999007 CSN: <Not Queued>

PT

C1-PT-002 ASFL012 TASK: 10340 O.I.: 129

AIR SUSPENSION FILL 25-C1-166L

PLC	GSIP RLN	Defect	Description
0	25403002	002	RELEASED
1	25403006	006	SC - DUPLICATE VID or PT.04 - CYCLE ABORTED
2	25403008	008	SC - INVALID S/N or PT.06 - TOOL SPECIFIC #2
3	25403009	009	SC - UNCOLLECTED or PT.07 - TOOL SPECIFIC #3
4	25403010	010	PT.08 - TOOL SPECIFIC #4
5	25403011	011	PT.09 - TOOL SPECIFIC #5
6	25403012	012	PT.10 - TOOL SPECIFIC #6

OK Cancel

EPA Type
PP, TT, SC, PT,
VC, CE, etc.

EPA Name
As entered in the error
proofing system.

EPA ID
As entered in the error
proofing system.

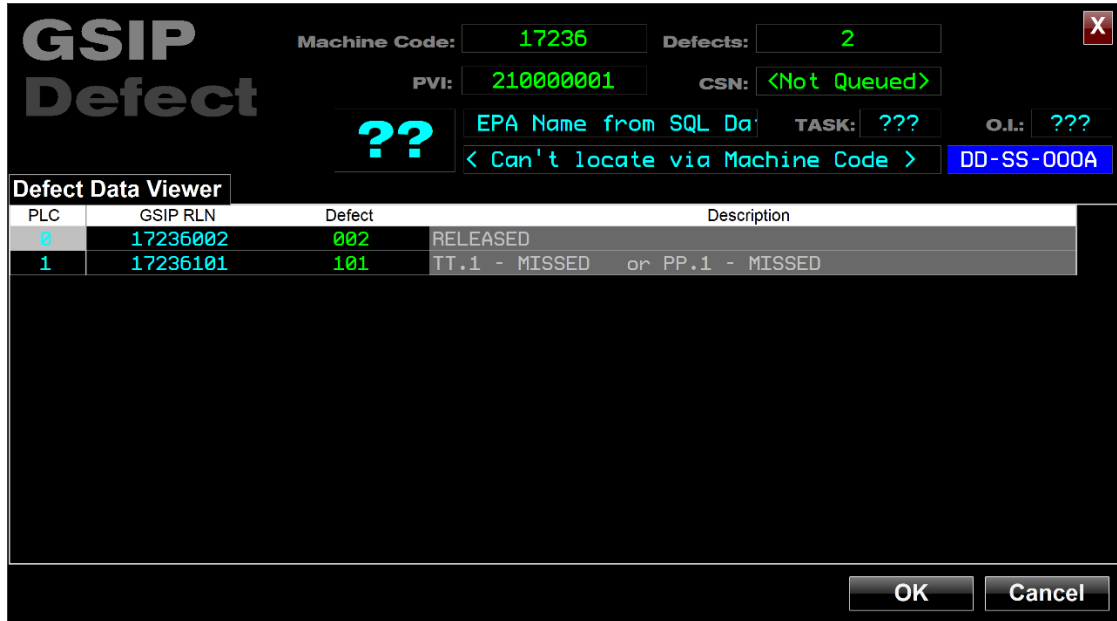
EPA O.I. (LSKS)
Unique ID within
this Cell Controller
for the Light Stack /
Keyswitch Device.

EPA Description
As entered in the error
proofing system.

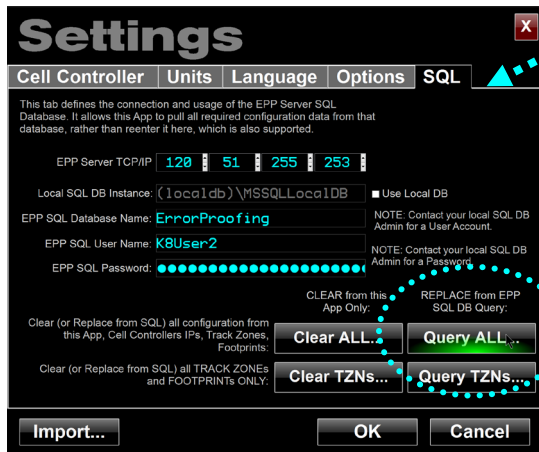
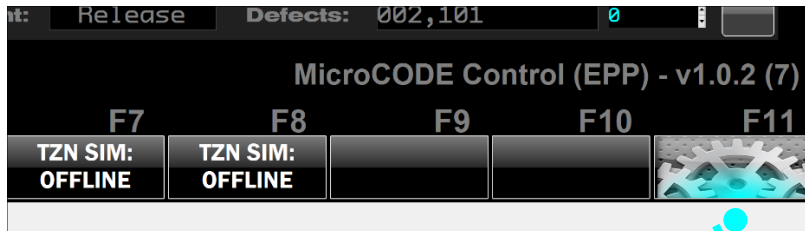
EPA Location
DD-SS-OOOA
Footprint Placard.



Example 4 EPP TASK details missing in Defect Viewer



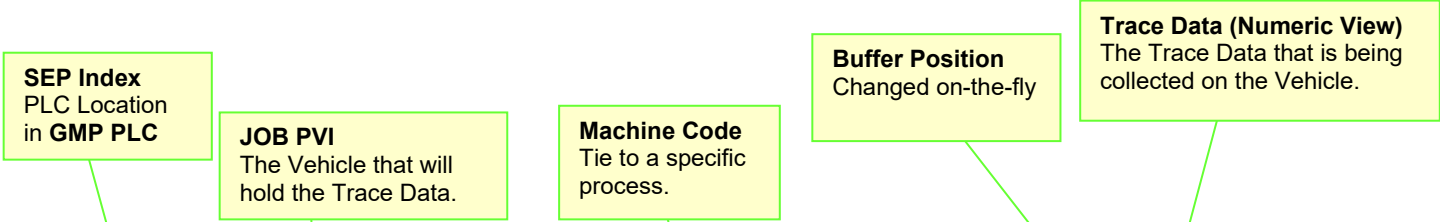
This display—“Can’t locate via Machine Code”—typically means you need to re-query the SEP SQL Database from the SETTINGS dialog box to get the current TASK definitions. The other possibility is that no one has assigned a GSIP Machine Code to the Task.





VCX Trace Queue View

A tool to allow users to examine the Vehicle Trace Queue within the GMP PLC, with the goal of verifying Trace Data are collected during SAT simulations.



VCXi	PVI	CSN	MC	Parts	Trace
108	202141943	<SEPActions>	31462	1	VPPS=<Y4620200000000S >
109	202137946	<SEPActions>	31462	1	VPPS=<Y4620200000000S >
110	202151812	<SEPActions>	31462	1	VPPS=<Y4620200000000S >
111	202155924	<SEPActions>	31462	1	VPPS=<Y4620200000000S >
112	202160008	<SEPActions>	31462	1	VPPS=<Y4620200000000S >
113	202167830	<SEPActions>	31462	1	VPPS=<Y4620200000000S >
114					
115					
116					
117					
118					
119					

Filtering
This allows the user to filter by PVI, CSN, or MACHINE CODE (EPA).

Part Count
Number of parts collected in this transaction.

Detailed View
Opens the Vehicle Trace Viewer on this Job.

Scroll and Sync Controls
Common to all buffer/queue viewers, the user can scroll up/down thru the data and hold the view from synchronizing to the live PLC.



GM-1737 Support in TRACE VIEW

The App now supports detecting and displaying GM-1737 Trace Data within the SEP GMP PLC in both the VCX Trace Queue View and Trace Data Examiner...

TRACE Queue (VCX) View

VCX	PVI	CSN	MC	Parts	Trace
274	201067528	<SEPActions>	14251	1	VPPS=<Y461980000000L >
275	201070531	<SEPActions>	14103	1	VPPS=<Y461140000000R >
276	201069686	<SEPActions>	14250	1	VPPS=<Y461980000000R >
277	201077437	<SEPActions>	15136	1	VPPS=<Y463020000000J >
278	201077437	<SEPActions>	15136	1	VPPS=<Y462020000000R >
279	201067528	<SEPActions>	14102	1	COMP.ID=<AB > VENDOR.I
280	201067528	<SEPActions>	14102	1	COMP.ID=<AB > VENDOR.I
281	201064026	<SEPActions>	14251	1	VPPS=<Y461980000000L >
282	201065633	<SEPActions>	14102	1	COMP.ID=<AB > VENDOR.I
283	201075831	<SEPActions>	15136	1	VPPS=<Y463020000000J >
284	201075831	<SEPActions>	15136	1	VPPS=<Y462020000000R >
285	201065290	<SEPActions>	14103	1	VPPS=<Y461140000000R >

MicroCODE Control (SEP) - v1.1.2 (2)

Status: Ready 29-Jan-20 05:04:09 PM 5.986 MB

GEPICS Trace

Station Name: 19T3050L System Code: FLEXVCVS

Machine Code: 14102 Record Key: DRVR_A-BAG

EPA Id: 255 Parts: 1

PVI: 201069978 CSN: <SEPActions>

SEP	VPPS / Component	Part No.	DUNS / Vendor	Trace Data	Payload Data
0	AB	0618	9	1345Q0230	

OK Cancel



FILTERING: VCX Trace Queue View

The VCX Trace Queue View can be filtered by:

- PVI
- CSN
- MODEL

2) Filter Data
Fill it the search data after

1) Filter Type
Click the item to filter by...

3) Apply Filter
Click to start search...

MicroCODE Control (SEP) - v1.0.12 (5)

TRACE Queue (VCX) View

Filter Up Down Hold Sync Parts: 0

VCX: 1557 PVI: 202167839 CSN: <SEPActions> MC: 31118 Parts: 1 Trace: VPPS=<Y4770201000000R > 0

VCX: 1558 PVI: 202167819 CSN: <SEPActions> MC: 31189 Parts: 1 Trace: VPPS=<Y4611900000000L > 0

VCX: 1559 PVI: 202167839 CSN: <SEPActions> MC: 31117 Parts: 1 Trace: VPPS=<Y4770201000000L > 0

VCX: 1560 PVI: 202167845 CSN: <SEPActions> MC: 31176 Parts: 1 Trace: VPPS=<Y4611900000000R > 0

VCX: 1561 PVI: 202169073 CSN: <SEPActions> MC: 31118 Parts: 1 Trace: VPPS=<Y4770201000000R > 0

VCX: 1562 PVI: 202169675 CSN: <SEPActions> MC: 31118 Parts: 1 Trace: VPPS=<Y4611400000000L > 0

VCX: 1563 PVI: 202100124 CSN: <SEPActions> MC: 31118 Parts: 1 Trace: VPPS=<Y4620300000000R > 0

VCX: 1564 PVI: 202100120 CSN: <SEPActions> MC: 31118 Parts: 1 Trace: VPPS=<Y4770201000000L > 0

VCX: 1565 PVI: 202100134 CSN: <SEPActions> MC: 31118 Parts: 1 Trace: VPPS=<Y4611900000000R > 0

VCX: 1566 PVI: 202100124 CSN: <SEPActions> MC: 31118 Parts: 1 Trace: VPPS=<Y4611400000000L > 0

VCX: 1567 PVI: 202100124 CSN: <SEPActions> MC: 31127 Parts: 1 Trace: VPPS=<Y4620300000000L > 0

VCX: 1568 PVI: 202100124 CSN: <SEPActions> MC: 31127 Parts: 1 Trace: VPPS=<Y4630300000000J > 0

SEP Viewer Filter

202167845 • PVI

3018431 • CSN ...without Prefix

15332 • Machine Code

Apply

MicroCODE Control (SEP) - v1.0.12 (5)

F1 ABOUT... F2 STATION SET-UP... F3 PROFILE SET-UP... F4 CONNECT: ONLINE F5 JOB SIM: START F6 JOB SIM: STOPPED F7 JOB SIM: EMPTY F8 F9 F10 F11

Status: Ready 05-Nov-19 12:35:17 PM 8.430 MB

The filtered view is held until you click “Hold” to toggle it off again, and the search is visualized for the user while in progress.

MicroCODE Control (SEP) - v1.0.12 (5)

TRACE Queue (VCX) View

Filter Up Down Hold Sync Parts: 0

VCX: 1560 PVI: 202167845 CSN: <SEPActions> MC: 31176 Parts: 1 Trace: VPPS=<Y4611900000000R > 0

VCX: 1 PVI: CSN: MC: Parts: Trace:

VCX: 2 PVI: CSN: MC: Parts: Trace:

VCX: 3 PVI: CSN: MC: Parts: Trace:

VCX: 4 PVI: CSN: MC: Parts: Trace:

VCX: 5 PVI: CSN: MC: Parts: Trace:

VCX: 6 PVI: CSN: MC: Parts: Trace:

VCX: 7 PVI: CSN: MC: Parts: Trace:

VCX: 8 PVI: CSN: MC: Parts: Trace:

VCX: 9 PVI: CSN: MC: Parts: Trace:

VCX: 10 PVI: CSN: MC: Parts: Trace:

VCX: 11 PVI: CSN: MC: Parts: Trace:

MicroCODE Control (SEP) - v1.0.12 (6)

F1 ABOUT... F2 STATION SET-UP... F3 PROFILE SET-UP... F4 CONNECT: ONLINE F5 JOB SIM: START F6 JOB SIM: STOPPED F7 JOB SIM: EMPTY F8 F9 F10 F11

Status: Ready 05-Nov-19 12:34:36 PM 5.589 MB

MicroCODE Control (SEP) - v1.0.12 (6)

TRACE Queue (VCX) View

Filter Up Down Hold Sync Parts: 0

VCX: 1561 PVI: 202169073 CSN: <SEPActions> MC: 31118 Parts: 1 Trace: VPPS=<Y4770201000000R > 0

VCX: 1 PVI: CSN: MC: Parts: Trace:

VCX: 2 PVI: CSN: MC: Parts: Trace:

VCX: 3 PVI: CSN: MC: Parts: Trace:

VCX: 4 PVI: CSN: MC: Parts: Trace:

VCX: 5 PVI: CSN: MC: Parts: Trace:

VCX: 6 PVI: CSN: MC: Parts: Trace:

VCX: 7 PVI: CSN: MC: Parts: Trace:

VCX: 8 PVI: CSN: MC: Parts: Trace:

VCX: 9 PVI: CSN: MC: Parts: Trace:

VCX: 10 PVI: CSN: MC: Parts: Trace:

VCX: 11 PVI: CSN: MC: Parts: Trace:

MicroCODE Control (SEP) - v1.0.12 (6)

F1 ABOUT... F2 STATION SET-UP... F3 PROFILE SET-UP... F4 CONNECT: ONLINE F5 JOB SIM: START F6 JOB SIM: STOPPED F7 JOB SIM: EMPTY F8 F9 F10 F11

Status: Ready 05-Nov-19 07:28:44 PM 5.842 MB



NEW in v2.0.1 (9) you can search the Trace Queue for specific data.

MicroCODE Control (SEP) - v2.0.1 (9)

← TZN v 0 | FPT v 0 | CNV v 0 | BDX v 69 | QDX v 858 | VCX v 52 | P8C0

TRACE Queue (VCX) View Filter Up Down Hold

VCXi: 46	PVI: 211152242	CSN: <SEPACTIONS>	MC: 18098	Parts: 1	Trace: VPPS=<Y121
VCXi: 47	PVI: 211152516	CSN: <SEPACTIONS>	MC: 18308	Parts: 1	Trace: VPPS=<Y941
VCXi: 48	PVI: 211152589	CSN: <SEPACTIONS>	MC: 18212	Parts: 1	Trace: VPPS=<Y945
VCXi: 49	PVI: 211152399	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y111
VCXi: 50	PVI: 211152449	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y121
VCXi: 51	PVI: 211152628	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y945
VCXi: 52	PVI: 211152316	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y111
VCXi: 53	PVI: 211152491	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y121
VCXi: 54	PVI: 211152453	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y941
VCXi: 55	PVI: 211152120	CSN: <SEPACTIONS>	MC: 18212	Parts: 1	Trace: VPPS=<Y945
VCXi: 56	PVI: 211151659	CSN: <SEPACTIONS>	MC: 18098	Parts: 1	Trace: VPPS=<Y121

EPx Viewer Filter Apply Cancel

- PVI
- CSN ...without Prefix
- Machine Code
- Queued Data

Y00000

MicroCODE Control (SEP) - v2.0.1 (9)

← TZN v 0 | FPT v 0 | CNV v 0 | BDX v 69 | QDX v 868 | VCX v 52 | P8C0

TRACE Queue (VCX) View Filter Up Down Hold

VCXi: 741	PVI: 211150619	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X
VCXi: 740	PVI: 211152080	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X
VCXi: 739	PVI: 211150916	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X
VCXi: 738	PVI: 211150965	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X
VCXi: 737	PVI: 211151291	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X
VCXi: 736	PVI: 211150618	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X
VCXi: 735	PVI: 211150929	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X
VCXi: 734	PVI: 211150673	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X
VCXi: 733	PVI: 211151805	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X
VCXi: 732	PVI: 211150962	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X
VCXi: 731	PVI: 211151354	CSN: <SEPACTIONS>	MC: 18099	Parts: 2	Trace: VPPS=<Y110000000000X

GEPICS Trace

Station Name: 25EN222L System Code: GEPTRACE

Machine Code: 18099 Record Key: Y111000000

PVI: 211153006 CSN: <SEPACTIONS> Parts: 2

Timestamp: August 17, 2021 09:18:24.569 AM

CE P8C0:CE011 EPA: 11

VCVS ALL ENGINES SCAN 25-EN-222L

Trace Data Viewer

SEP	VPPS / Component	Part No.	DUNS / Vendor	Trace Data	Payload Data
0	Y11100000000000X	P24000498	12V904553532	TF1211241MNMX1038	...
1	Y0000000000000X				...

← 2892 → PLC Queue Position OK Cancel



CLEARING: VCX Queue

The VCX Trace Queue held within the GMP PLC can be cleared from this App as long as the **prgAPI** is been installed in the target Cell Controller.

Clear Command
Erases all Trace Data from the connected Cell Controller

The screenshot shows the MicroCODE Control (SEP) v10.13.1 interface. At the top, there are status indicators for various components: TZN (0), FPT (0), CNV (0), BDX (113), QDX (0), VCX (17), and P2C0. Below this is the 'TRACE Queue (VCX) View' with buttons for Filter, Up, Down, Hold, and Clear... The 'Clear...' button is highlighted with a red box and a callout. The table below shows trace data for VCX: 11 through VCX: 22. A dialog box is open at the bottom right, asking 'Clear the Trace Queue?' with 'Yes' and 'No' buttons. A text box explains: 'This will clear all Trace Data from the GMP PLC erasing the current SATs results for all Users.'

The screenshot shows the MicroCODE Control (SEP) v10.13.1 interface after the VCX queue has been cleared. The 'TRACE Queue (VCX) View' now shows an empty table with VCX: 0 through VCX: 11. At the bottom, a status bar displays: 'Class: Application, Object: App, Name: MicroCODE, Operator: The GEPICS Trace Queue (VCX) was CLEARED for all Users in the Cell Controller. [14-Nov-19 10:32:53 AM]'. There is also a 'CLEAR EVENT' button. The bottom navigation bar shows 'CONNECT: ONLINE', 'JOB SIM: START', 'JOB SIM: ABORTED', and 'JOB SIM: EMPTY'.



GEPICS Trace Data Viewer (TDV)

This Tool—available from the Quality Defects View (VCX) screen—allows the User to examine the Defect Data in the SEP PLCs thru the ‘lens’ of the standard SEP Defect definitions.

The screenshot shows the GEPICS Trace Data Viewer (TDV) interface. At the top, it displays the Station Name (CP-019L), System Code (VCVS), Machine Code (17996), Record Key (NK_KNEAB), PVI (211068625), CSN (911922), and Parts (1). The Timestamp is January 19, 2021 07:25:12.949 AM. Below this, there is a section for SC (P7C0:SC008) and EPA (8). The main data table is titled 'Trace Data Viewer' and contains the following data:

SEP	VPPS / Component	Part No.	DUNS / Vendor	Trace Data	Payload Data
0	Y4750000000000L	P84039839	12V812481232	TG120351983991210	...

Callouts provide definitions for key fields:

- EPA ID + Machine Code:** Unique Part/Process Identifier.
- Vehicle Ids:** Identification of the Job holding these Parts.
- Part Position in List:** For checking against the GMP PLC.
- VPPS:** The Component ID (Vehicle Part Positioning System).
- Part Number:** Standard 8 Digit GM Part Number.
- Trace Data:** The data, like Serial Number, that uniquely identifies a specific part in a single Vehicle.



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5 Configuring the Simulated Vehicle Orders

The main purpose of this App is to be a ‘Generator’ of simulated GEPICS Vehicle Orders and provide a ‘Viewer’ to check the results of running SATs.

In order to generate Vehicle Orders the App and User needs three (3) things:

- A GEPICS Order from a GMP or GXP PLC* to act as a ‘Seed Job’.
- The corresponding GEPICS ‘Format’ Definition File.
- A Job Control Profile (JCP) configured into this App.

Selecting a GEPICS Seed Job

Any Job Order being viewed in the App’s GEPICS Viewer can be used as the new ‘Seed Job’ by simply clicking “Seed...”. This can even be changed while the simulation is running.

Sources of Jobs:

- GMP – Line Tracking Array (LTA)
- GXP – GEPICS Build Data Buffer (BDX)

The screenshot displays the MicroCODE Control (SEP) v1.0.12 (1) interface. At the top, there are status indicators for TZN (0), FPT (0), CNV (0), BDX (148), QDX (669), VCX (2524), and CELL (red). The main area is titled 'SEP Track Zone (TZN) View' and shows a 'Build Data Viewer' table. The table has columns for SEP, GEPICS, Length, Data Item, Description, and a grid of values. A 'Seed...' button is highlighted with a red dashed circle. A tooltip box is overlaid on the bottom right, containing a question mark icon and the text: 'This memorizes the current Job as the basis for all Jobs created during SAT simulations. This memory will persist regardless of the contents of the Cell Controllers going forward.' Below the tooltip are buttons for '27', 'Select this Job?', 'Yes', and 'No'.

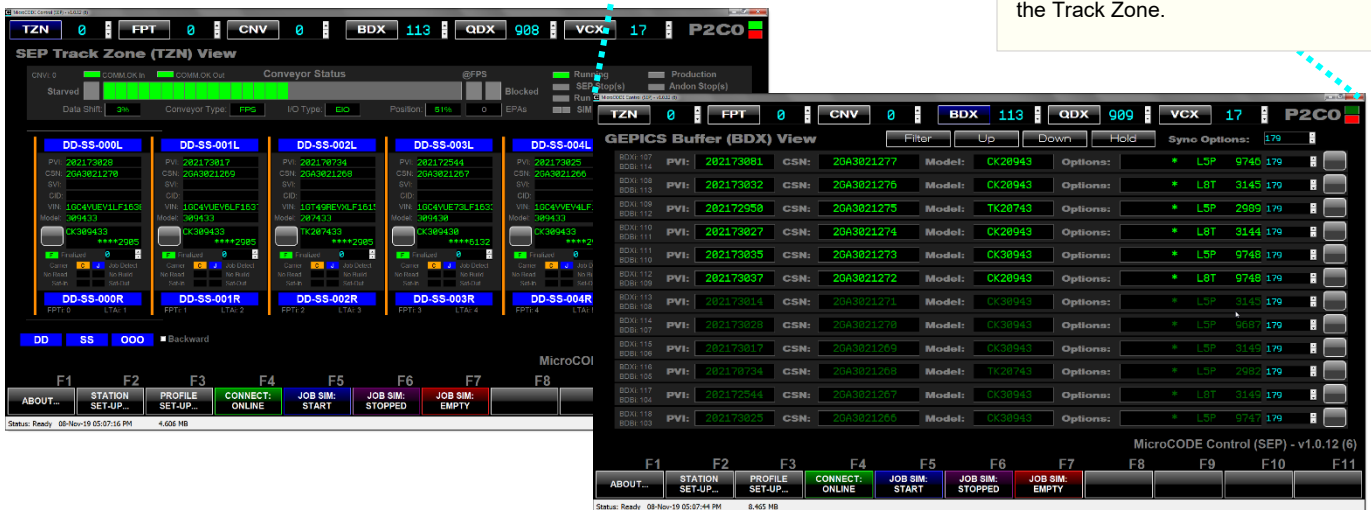
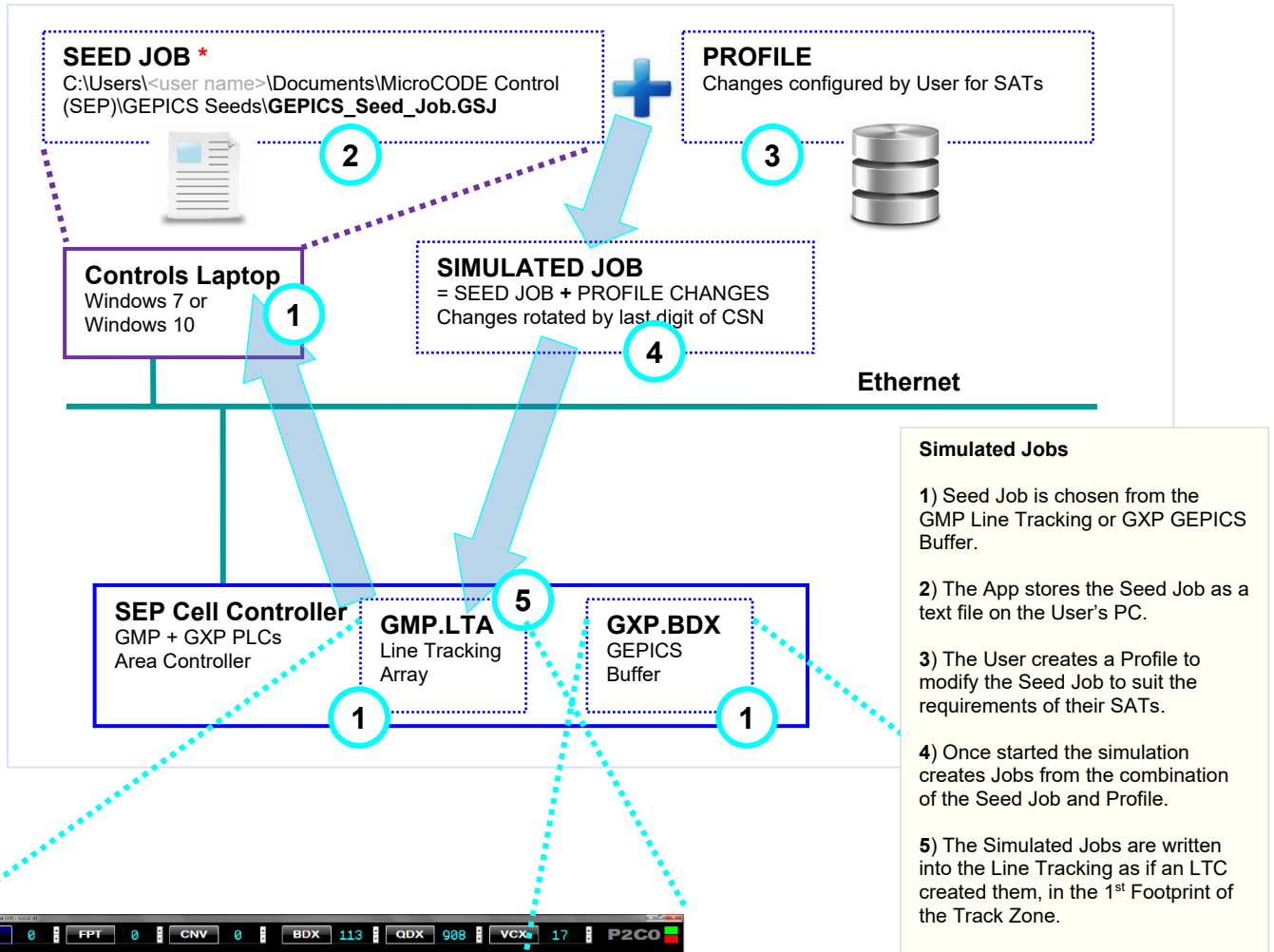
* Once a “Seed Job” has been selected it is stored as a text file, this text file can be emailed to other users who may not have access to a loaded a GMP or GXP PLC.



Figure 7 The SIMULATED JOB Process

This is an illustration of how the Seed Job Process works, showing data sources, data storage, and data flow.

* Once a “Seed Job” has been selected it is stored as a text file, this text file can be emailed to other users who may not have access to a loaded a GMP or GXP PLC.





Using a GEPICS FORMAT

A GEPICS FORMAT is a data definition file that describes the source and layout of a Vehicle Order for the SEP (or other) manufacturing systems.

The GEPICS Format file can be directly exported via email from GEPICS to a User's email address. This file is used by the Control (SEP) App to interpret all Job Build Data read from the SEP PLCs.

Example 5 A GEPICS Format File

```

1 |EXP_VERSION', '3'
2 |HOR', 'FSEFFINL', '97', '04/08/19 10:26:53', 'SEP T1XX P2C0 AND P9C0 Final', 'C', 'P', '04/08/19 10:26:53', 'zztzck', '04/08/19 10:26:53', 'Format Promotion',
3 |DET', 'FSEFFINL', '97', '1', '0', 'A', 'PRO', 'PVI', '0', '9', '0', '9', 'N', '0', '0', '0', 'START OF DATA PVI OR PRIMARY V', '0',
4 |DET', 'FSEFFINL', '97', '9001', '9', 'A', 'PRO', 'CHARACTER_SPACES', 'SC', '99', '0', '1', 'N', '0', '0', '0', 'SPACE TO MAKE FULL WORD IN PLC', '0',
5 |DET', 'FSEFFINL', '97', '10001', '10', 'A', 'PRO', 'CHARACTER_SPACES', 'SC', '99', '0', '15', 'N', '0', '0', '0', 'SVI', '0',
6 |DET', 'FSEFFINL', '97', '25001', '25', 'A', 'PRO', 'CHARACTER_SPACES', 'SC', '99', '0', '1', 'N', '0', '0', '0', 'SPACE FOR SVI TO ALLOW FOR FUL', '0',
7 |DET', 'FSEFFINL', '97', '26001', '26', 'A', 'PRO', 'CSN', 'SK', '11', '0', '11', 'N', '0', '0', '0', 'CSN OR CURRENT SEQUENCE NUMBER', '0',
8 |DET', 'FSEFFINL', '97', '37001', '37', 'A', 'PRO', 'CHARACTER_SPACES', 'SC', '99', '0', '1', 'N', '0', '0', '0', 'SPACE TO MAKE FULL WORD IN PLC', '0',
9 |DET', 'FSEFFINL', '97', '38001', '38', 'A', 'PRO', 'VIN', 'V', '17', '0', '17', 'N', '0', '0', '0', 'VIN OR VEHICLE ID NUMBER', '0',
10 |DET', 'FSEFFINL', '97', '55001', '55', 'A', 'PRO', 'CHARACTER_SPACES', 'SC', '99', '0', '3', 'N', '0', '0', '0', 'SPACE TO MAKE FULL WORD IN PLC', '0',
11 |DET', 'FSEFFINL', '97', '58001', '58', 'A', 'PRO', 'MODEL7', 'B', '7', '0', '7', 'N', '0', '0', '0', 'MODEL', '0',
12 |DET', 'FSEFFINL', '97', '65001', '65', 'A', 'PRO', 'CHARACTER_SPACES', 'SC', '99', '0', '1', 'N', '0', '0', '0', 'SPACE TO MAKE FULL WORD IN PLC', '0',
13 |DET', 'FSEFFINL', '97', '66001', '66', 'A', 'TXT', 'GA', '0', '2', 'N', '0', '0', '0', '0',
14 |DET', 'FSEFFINL', '97', '68001', '68', 'A', 'PRO', 'CHARACTER_SPACES', 'SC', '99', '0', '6', 'N', '0', '0', '0', 'GA CSN PREFIX FOR GENERAL ASSE', '0',
15 |DET', 'FSEFFINL', '97', '74001', '74', 'A', 'PRO', 'MODEL7', '0', '7', 'N', '0', '0', '0', 'FINAL LINE DATA PACKET MODEL', '0',
16 |DET', 'FSEFFINL', '97', '81001', '81', 'A', 'PRO', 'R06', 'P', '26', '0', '1', 'N', '0', '0', '0', 'FUEL FILL', '0',
17 |DET', 'FSEFFINL', '97', '82001', '82', 'A', 'PRO', 'R02', 'P', '26', '0', '1', 'N', '0', '0', '0', 'TRANS FILL', '0',
18 |DET', 'FSEFFINL', '97', '83001', '83', 'A', 'PRO', 'R03', 'P', '26', '0', '1', 'N', '0', '0', '0', 'POWER STEERING FILL', '0',
19 |DET', 'FSEFFINL', '97', '84001', '84', 'A', 'PRO', 'R05', 'P', '26', '0', '1', 'N', '0', '0', '0', 'RADIATOR FILL', '0',
20 |DET', 'FSEFFINL', '97', '85001', '85', 'A', 'PRO', 'R03', 'P', '26', '0', '1', 'N', '0', '0', '0', 'AIR CONDITIONING FILL', '0',
21 |DET', 'FSEFFINL', '97', '86001', '86', 'A', 'PRO', 'CHARACTER_SPACES', 'SC', '99', '0', '1', 'N', '0', '0', '0', 'TRANS FLUITO TOP-OFF', '0'
    
```

The screenshot shows the MicroCODE Control (SEP) application interface. At the top, there are status indicators for TZN (0), FPT (0), CNV (0), BDX (148), QDX (669), VCX (2524), and CELL (red). Below this is the 'SEP Track Zone (TZN) View' showing conveyor status and various stop reasons. The 'Build Data Viewer' is open, displaying a table of data items with columns for SEP, GEPICS, Length, Data Item, and Description. The table shows items like PVI, SVI, CID, VIN, Model, and various fill types (R06F, R02F, R01F). A dialog box is overlaid on the screen, asking 'Import new Format?' with 'Yes' and 'No' buttons. A red arrow points from the GEPICS Format file to the Build Data Viewer.



Job Control Profiles (JCP)

The App gives complete control over Model Code, RPO Codes, Process Tool Styles, anything in the GEPICS Build Data Packet.

Change Index
Up to **100** changes per CSN Sequence #

HEADER Changes
Vehicle ID and Model changes

OPTION Data
Autogenerated from the seed Job and this pattern

PROFILE Type, Name and Description
Up to **100** Profiles—each with a unique set of 10 Jobs (which of each can have 100 changes).

Change Index
Up to **100** changes per CSN Sequence #

HEADER (Fixed)
Header data location and size are not changeable

Add and Remove PROFILES
Up to **100** Profiles are available at any time.

Profiles

TRUCK

FLINT T1XX RAD3

9

Add

X

RAD FILL Pre-SATs

11

Delete

CSN 0	Changes		Simulation Control						
CSN 1	#	HEADER	Position	Length	Data	OPTIONS	Position	Length	Data
CSN 2	0	PVI	0	9	NNNNNNNN0	PVI	11	4	NNN0
CSN 3	1	SVI	10	16	NNNNNNNN0	SVI	21	4	NNN0
CSN 4	2	CSN	26	11	NNNNNNNN0	CSN	31	4	NNN0
CSN 5	3	VIN	38	17	NNNNNNNNN...	VIN	41	8	NNNNNNNN0
CSN 6	4	MODEL	58	8	MMMMMMMM	MODEL	51	8	MYMODEL !
CSN 7	5	SKIP	---	---	---	RPO	501	3	AAA
CSN 8	6	SKIP	---	---	---	RPO	502	3	BBB
CSN 9	7	SKIP	---	---	---	PART	503	8	11111111
CSN 9	8	SKIP	---	---	---	PART	504	5	22222
Copy	9	NONE	n/a	n/a	n/a	RPO	51	3	C44
Paste	10	NONE	n/a	n/a	n/a	STYLE	1733	1	2
Fill...	11	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a

Import...

Export...

Clear...

Seed...

OK

Cancel

CSN Sequence
Up to **10** unique Jobs in constant rotation

Import and Export PROFILES
Take any Profile out to a text file that can be shared with other Users

GEPICS Reference
Open a window into the GEPICS 'Seed Job' data for reference while configuring your simulation.

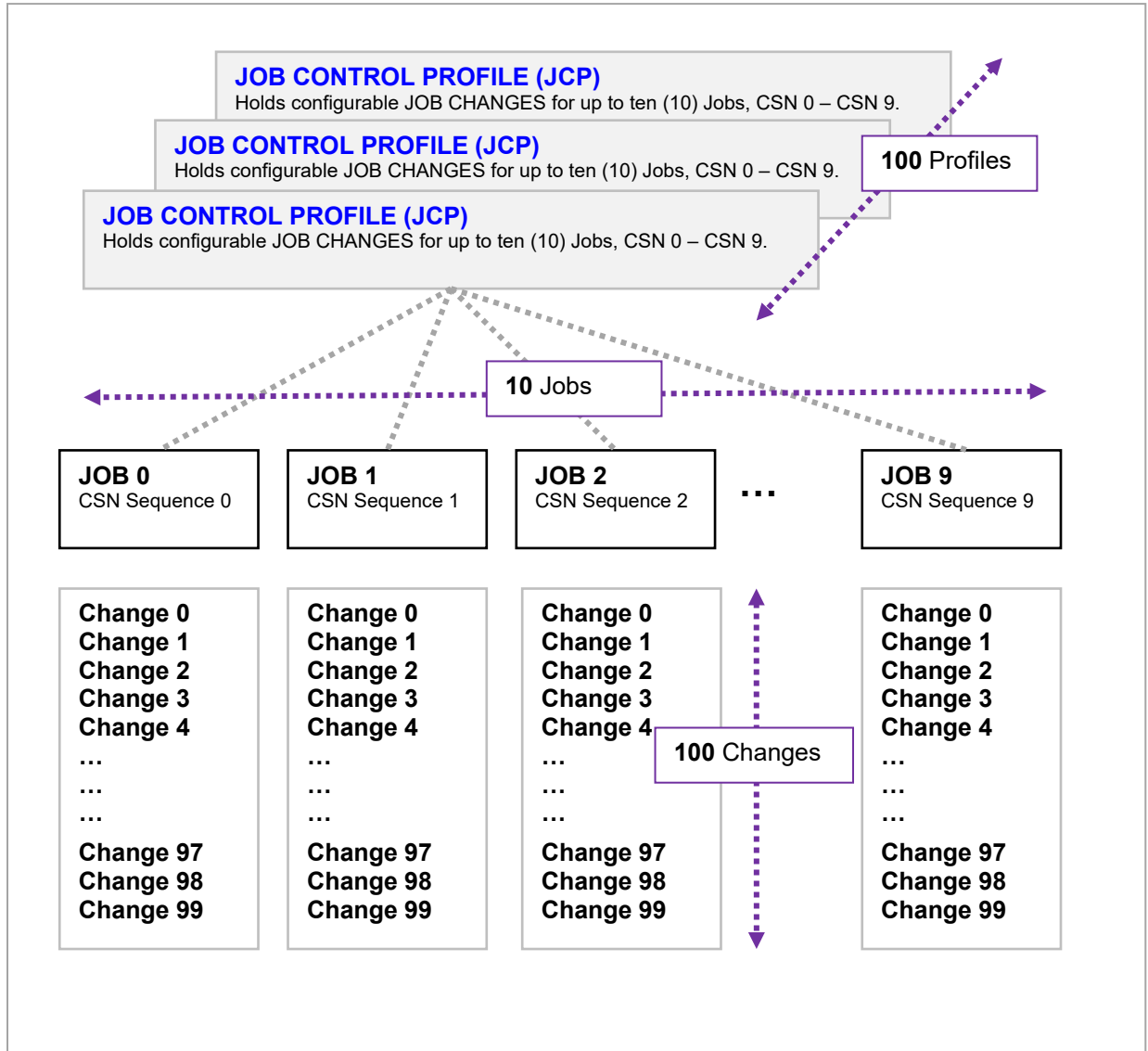


MicroCODE Control (SEP) – Job Control Profiles

Let's look at the configuration design underlying the Job Control Profiles.

The App is capable of holding 100 (Profiles) x 10 (Jobs) x 100 (Changes) = (100,000) Changes for generating simulated orders. Profiles can be imported and exported and are simple ASCII Text files.

Example 6 Job Profiles MicroCODE Control (SEP) App Architecture





Controlling Job Rotation

The App allows you to control the option content of a job generated during simulation based on the last digit of its CSN (0-9). The 'CSN' buttons down the left of the Job Control Profile (JCP) dialog box are used to configure the 'Changes' you want made to the Jobs. These changes will repeat, over and over, based on the ten (10) Jobs you configure in this dialog.

PROFILE Selection
Add, Delete, Edit

Profiles

CAR - Enter name... 1 Add
Enter description... 5 Delete

CSN 0	Changes	Simulation Control							
CSN #	HEADER	Position	Length	Data	OPTIONS	Position	Length	Data	
CSN 1	PVI	0	9	NNNNNNNN0	PVI	0	9	NNNNNNNN0	
CSN 2	SVI	10	16	NNNNNNNN0	SVI	0	9	NNNNNNNN0	
CSN 3	CSN	26	11	NNNNNNNN0	CSN	0	10	NNNNNNNN0	
CSN 4	VIN	38	17	NNNNNNNN...	VIN	0	17	NNNNNNNN...	
CSN 5	MODEL	58	8	MMMMMMMM	MODEL	0	8	????????	
CSN 6	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a	
CSN 7	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a	
CSN 8	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a	
CSN 9	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a	
Copy	9	n/a	n/a	n/a	NONE	n/a	n/a	n/a	
Paste	10	n/a	n/a	n/a	NONE	n/a	n/a	n/a	
Fill...	10	n/a	n/a	n/a	NONE	n/a	n/a	n/a	

Import... Export... Clear... Seed... OK Cancel

JOB Selection
With Copy, Paste, and Fill features

PROFILE Tools
Import, Export

JOB Reset
Clear changes

SEED Job
Open Viewer for reference while creating Profile



5.1 PROFILE Job Data Changes

These are the options that control the generation of simulated Jobs at the beginning of a Track Zone.

The changes are broken into two (2) sections: the HEADER and the OPTIONS.

The **HEADER** is everything in the standard GEPICS Header that identifies the Vehicle Order.

The **OPTIONS** is everything else below the HEADER, as known as the ‘Build Data’... these are the options ordered by the customer or generated automatically based on the customers options.

Profiles TRUCK 1
 Enter Description... 6

CSN #	Changes	Simulation Control							
CSN #	#	HEADER	Position	Length	Data	OPTIONS	Position	Length	Data
CSN 1	0	PVI	0	9	NNNNNNNN0	PVI	?	9	NNNNNNNN0
CSN 2	1	SVI	10	16	NNNNNNNN0	SVI	?	9	NNNNNNNN0
CSN 3	2	CSN	26	11	NNNNNNNN0	CSN	?	10	NNNNNNNN0
CSN 4	3	VIN	37	17	NNNNNNNN...	VIN	?	17	NNNNNNNN...
CSN 5	4	MODEL	58	7	NNMMMMM	MODEL	?	8	???
CSN 6	5	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
CSN 7	6	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
CSN 8	7	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
CSN 9	8	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
Copy	9	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
Paste	10	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
Fill...	11	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a

Import... Export... Clear... Seed...

GEPICS Format: Items:
 PVI: CSN:

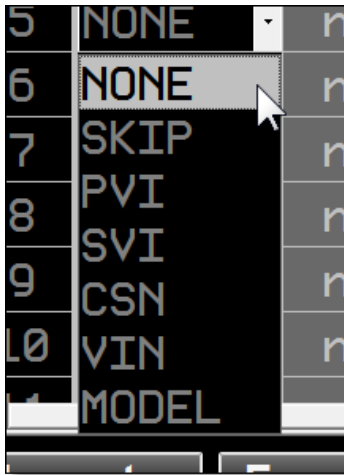
Build Data Viewer

SEP	GEPICS	Length	Data Item	Description	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0	9	PVI	START OF DATA...	2	0	2	1	6	4	6	6	0							
0	9	1	CHARAC...	SPACE TO MAKE...																
0	10	15	CHARAC...	SVI																
0	25	1	CHARAC...	SPACE FOR SVI...																
0	26	11	CSN	CSN OR CURREN...	2	G	A	3	0	1	2	9	7	7						
0	37	1	CHARAC...	SPACE TO MAKE...																
0	38	17	VIN	VIN WITH...	0	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4
0	55	3	CHARAC...	SPACE TO MAKE...																
0	58	7	MODEL7	MODEL	3	0	9	4	3	3										
0	65	1	CHARAC...	SPACE TO MAKE...																
0	66	2																		
0	68	6	CHARAC...	GA CSN PREFIX...	2	G	A													
0	74	7	MODEL7	DOOR DATA PAC...	C	K	3	0	9	4	3									
7	81	4	A07Z	DOOR LOCK...	3															
11	85	4	A07Y	FRONT DOOR...																
15	89	3	OF AU3...	AU3-LOCK STDE...																

Import... Seed...



Table 1 HEADER Changes



NONE

Makes no changes to the GEPICS HEADER, if coupled with NONE in OPTIONS, ends all changes to the packet. *

SKIP

Makes no changes to the HEADER, indicate OPTIONS changes are being made.

PVI

Automatic. Do not change, this controls the generation of a unique PVI in the HEADER, based on the CSN Sequence #.

SVI

Automatic. Do not change, this controls the generation of a unique SVI in the HEADER, based on the CSN Sequence #.

CSN

Automatic. Do not change, this controls the generation of a unique CSN in the HEADER, based on the CSN Sequence #.

VIN

Automatic. Do not change, this controls the generation of a unique VIN in the HEADER, based on the CSN Sequence #.

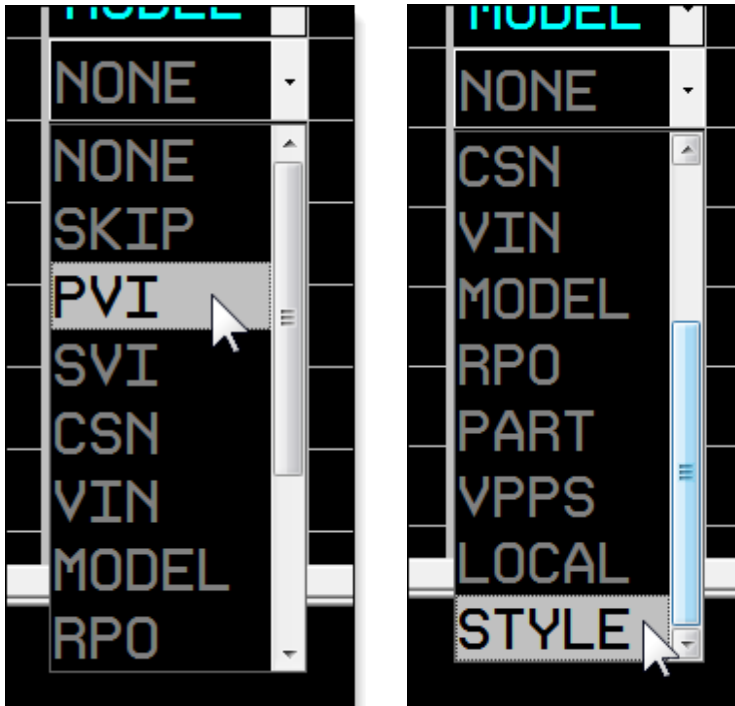
MODEL

Allows you to change the MODEL Number in the Header for testing.

* **Caution:** The App processes the changes from the top and the first row the has NONE for HEADER changes and NONE for OPTIONS changes is deemed the end of the entire change list.



Table 2 OPTION Changes



NONE

Makes no changes to the GEPICS OPTIONS, if coupled with NONE in HEADER, ends all changes to the packet.

SKIP

Makes no changes to the HEADER, indicate OPTIONS changes are being made.

PVI

Optional. If your SAT refers to PVI in the 'Build Data' area you need to edit this change to enter the SEP offset where it's needed, this will place a copy of the PVI there (based on the CSN Sequence #) and its length will be based on the length of the NNNN field you enter.

SVI

Optional. If your SAT refers to SVI in the 'Build Data' area you need to edit this change to enter the SEP offset where it's needed, this will place a copy of the SVI there (based on the CSN Sequence #) and its length will be based on the length of the NNNN field you enter.

CSN

Optional. If your SAT refers to CSN in the 'Build Data' area you need to edit this change to enter the SEP offset where it's needed, this will place a copy of the CSN there (based on the CSN Sequence #) and its length will be based on the length of the NNNN field you enter.

VIN

Optional. If your SAT refers to VIN in the 'Build Data' area you need to edit this change to enter the SEP offset where it's needed, this will place a copy of the VIN there (based on the CSN Sequence #) and its length will be based on the length of the NNNN field you enter.



MODEL

Optional. If your SAT refers to MODEL CODE in the 'Build Data' area you need to edit this change to enter the SEP offset where it's needed and enter the MODEL CODE, that you want to test.

RPO

Optional. If your SAT refers to RPO CODES in the 'Build Data' area you need to edit this change to enter the SEP offset where it's needed and enter the RPO CODE, you want to test. You can add as many of these as needed to create the Vehicle Order that you want to test. (The only limit is 100 Changes—of any type—to a particular Order).

PART

Optional. If your SAT refers to PART NUMBERS in the 'Build Data' area you need to edit this change to enter the SEP offset where it's needed and enter the PART NUMBER, you want to test. You can add as many of these as needed to create the Vehicle Order that you want to test. (The only limit is 100 Changes—of any type—to a particular Order).

VPPS

Optional. If your SAT refers to a VEHICLE PART POSITION SYSTEM (VPPS) value in the 'Build Data' area you need to edit this change to enter the SEP offset where it's needed and enter the VPPS value, that you want to test.

LOCAL

Optional. If your SAT refers to LOCAL BROADCAST CODES in the 'Build Data' area you need to edit this change to enter the SEP offset where it's needed and enter the LOCAL BROADCAST CODE, that you want to test.

STYLE

Optional. If your SAT refers to a PROCESS TOOL STYLE # in the 'Build Data' area you need to edit this change to enter the SEP offset where it's needed and enter the STYLE NUMBER, that you want to test.



Auto-Configuration of Vehicle ID positions within the Build Data Packet

The App now uses the GEPICS Format you have selected to ‘Auto-Complete’ the positions and Lengths of the Vehicle Identifiers if they are echoed into the OPTIONS area of your Build Data Packet.

Profiles

TRUCK

Rad Fill

4

Add

X

Raiadator Fill

5

Delete

CSN 0	Changes								
CSN 1	#	HEADER	Position	Length	Data	OPTIONS	Position	Length	Data
CSN 2	0	PVI	0	9	NNNNNNNN0	PVI	236	9	NNNNNNNN0
CSN 3	1	SVI	10	16	NNNNNNNN0	SKIP	---	---	---
CSN 4	2	CSN	26	11	NNNNNNNN0	CSN	110	4	NNN0
CSN 5	3	VIN	38	17	NNNNNNNN..	VIN	332	8	NNNNNNNN0
CSN 6	4	MODEL	58	8	MMMMMMMM	MODEL	165	2	MM
CSN 7	5	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
CSN 8	6	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
CSN 9	7	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
CSN 10	8	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
CSN 11	9	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
CSN 12	10	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
CSN 13	11	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a

Import...

Export...

Clear...

View Seed

OK

Cancel



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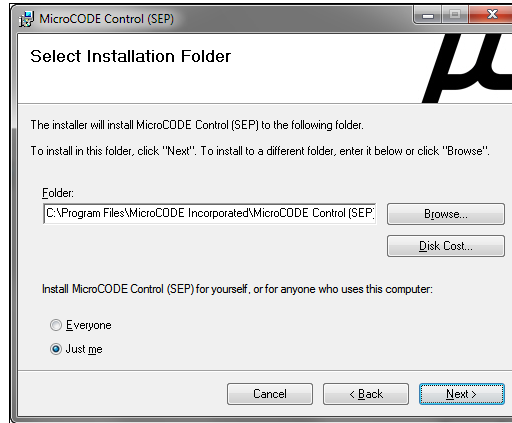


6 Running System Acceptance Tests (SATs)

Once you have the SEP Hardware environment set-up, and laptops available for the MicroCODE Control (SEP) App, you're ready to run a simulation of GEPICS Jobs to test your configured Actions.

Workflow

Step 1: Install the **MicroCODE Control for SEP App (MicroCODE Control (SEP).exe)** on the Windows PC that will control the SAT environment for each Track Zone.



Step 2: Import the **MicroCODE API for SEP Program (prgAPI)** into the SEP Cell Controller that controls the Zone where SATs are to be performed.

NOTE: Import the version that was installed with your Control App.

Name	Date modified	Type	Size
prgAPI_v1_0_0_1.L5X	10/16/2019 9:29 AM	L5X File	3,242 KB
prgAPI_v1_0_0_3.L5X	10/21/2019 8:58 AM	L5X File	3,258 KB
prgAPI_v1_0_0_4.L5X	10/22/2019 10:35 ...	L5X File	3,726 KB



Step 3: Using **[F2 SITE SET-UP]** Configure a connection from the App to the SEP SQL Database from within the App itself.

SEP Site

Cell Controller Units Language Options **SQL**

This tab defines the connection and usage of the SEP Server SQL Database. It allows this App to pull all required configuration data from that database, rather than reenter it here, which is also supported.

SEP Server TCP/IP: 120 . 12 . 243 . 47

Local SQL DB Instance: (localdb)\MSSQLLocalDB Use Local DB

SEP SQL Database Name: SEPDB

SEP SQL User Name: sepdb_ro

SEP SQL Password: ●●●●●●●●●●●●●●●●

NOTE: The User is locked to the common READ-ONLY account.

NOTE: The Password is changed by GM IT on a regular basis and must be acquired from them.

CLEAR from this App Only: **Clear ALL...** REPLACE from SEP SQL DB Query: **Query ALL...**

Clear (or Replace from SQL) all configuration from this App, Cell Controllers IPs, Track Zones, Footprints: **Clear TZNs...** **Query TZNs...**

Clear (or Replace from SQL) all TRACK ZONES and FOOTPRINTS ONLY: **Clear TZNs...** **Query TZNs...**

Import... **OK** **Cancel**

Step 3a: Using **[F2 SITE SET-UP]** select “Query All...” to pull all the Tracking and Cell Controller communication from the SEP SQL Database.

? This will clear all Cell Controllers: IPs, Names, Track Zones, Counts, Footprint names, Track Zone names, DD-SS-OOOs, and then query the SEP SQL Database to replace them all.

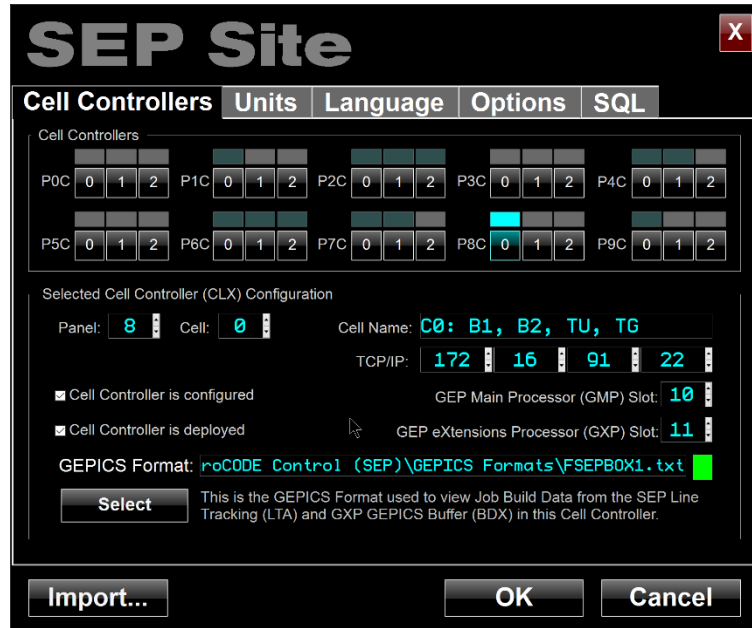
27

REPLACE all Controllers? **Yes** **No**

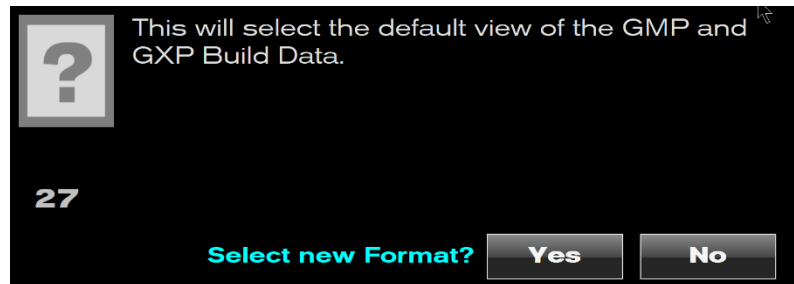


Step 3b: Using [F2 SITE SET-UP] on the “Cell Controllers” tab verify the Ethernet Card address matches your test environment and that the Cell is marked **Configured and Deployed**.

NOTE: The App will not connect to any PLC that is not marked ‘Deployed’.



Step 3c: While still in [F2 SITE SET-UP] select the GEPICS Format associated with this Cell Controller.



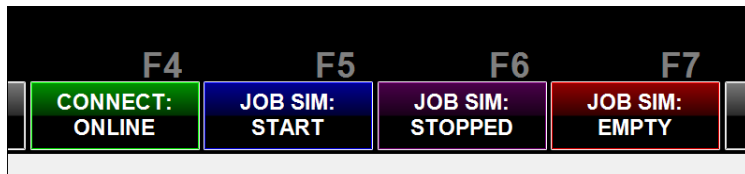


Step 4: Using [F3 PROFILE SET-UP] Configure—or import— Job Control Profile(s) (JCP) that represents the GEPICS Build Data changes you need in the Job rotation to exercise all EPAs and the Behaviors you are SAT'ing.

NOTE: It may be better to do this after you have been connected to the Cell Controller and selected a SEED JOB that you can refer to while creating your Profiles, unless you have very good documentation about what must be changed in the GEPICS Packet for your SATs.

CSN #	HEADER	Position	Length	Data	OPTIONS	Position	Length	Data
0	PVI	0	9	NNNNNNNN0	PVI	0	9	NNNNNNNN0
1	SVI	10	16	NNNNNNNN0	SVI	0	9	NNNNNNNN0
2	CSN	25	11	NNNNNNNN0	CSN	0	10	NNNNNNNN0
3	VIN	38	17	NNNNNNNN...	VIN	0	17	NNNNNNNN...
4	MODEL	58	8	MMMMMMMM	MODEL	0	8	???????
5	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
6	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
7	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
8	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
9	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a
10	NONE	n/a	n/a	n/a	NONE	n/a	n/a	n/a

Step 5: Using [F4 CONNECT:] Connect to the SEP Cell Controller.



Step 6: Using the [BDX] Screen Button, select a 'Seed' Job from the GXP PLC GEPICS Buffer by right-clicking on the Job in the Buffer and selecting "Make this the Seed Job".

GEPICS Build Data Viewer
 Format: FSEPBOX1 | Items: 278
 PVI: 202169962 | CSN: 2GA3018151 | Source: LTA

SEP	GE	?	This memorizes the current Job as the basis for all Jobs created during SAT simulations. This memory will persist regardless of the contents of the Cell Controllers going forward.														
0	0	0	9	6	2												
0	0	0	8	1	5	1											
0	0	0	E	V	0	L	F	1	6	0	7	8	0				
0	58	7	MODEL7	MODEL	2	0	7	4	3	S	I						
0	65	1	CHARA...	SPACE TO...	E												
0	66	2															
0	68	6	CHARA...	GA CSN P...	2	G	A										
0	74	7	MODEL7	BOX LINE...	T	K	2	0	7	4	3						
7	81	4	V04	END GATE...	S	I	E	R									
11	85	4	V15	boxside ...	*	*	*	*									
15	89	4	V12B	V12B-LH ...	3	5	2	9									
19	93	4	V12A	V12A-RH ...	3	5	3	0									
23	97	4	V04A	V04A- NA...	D	E	N	A									

Select this Job? [Yes] [No]

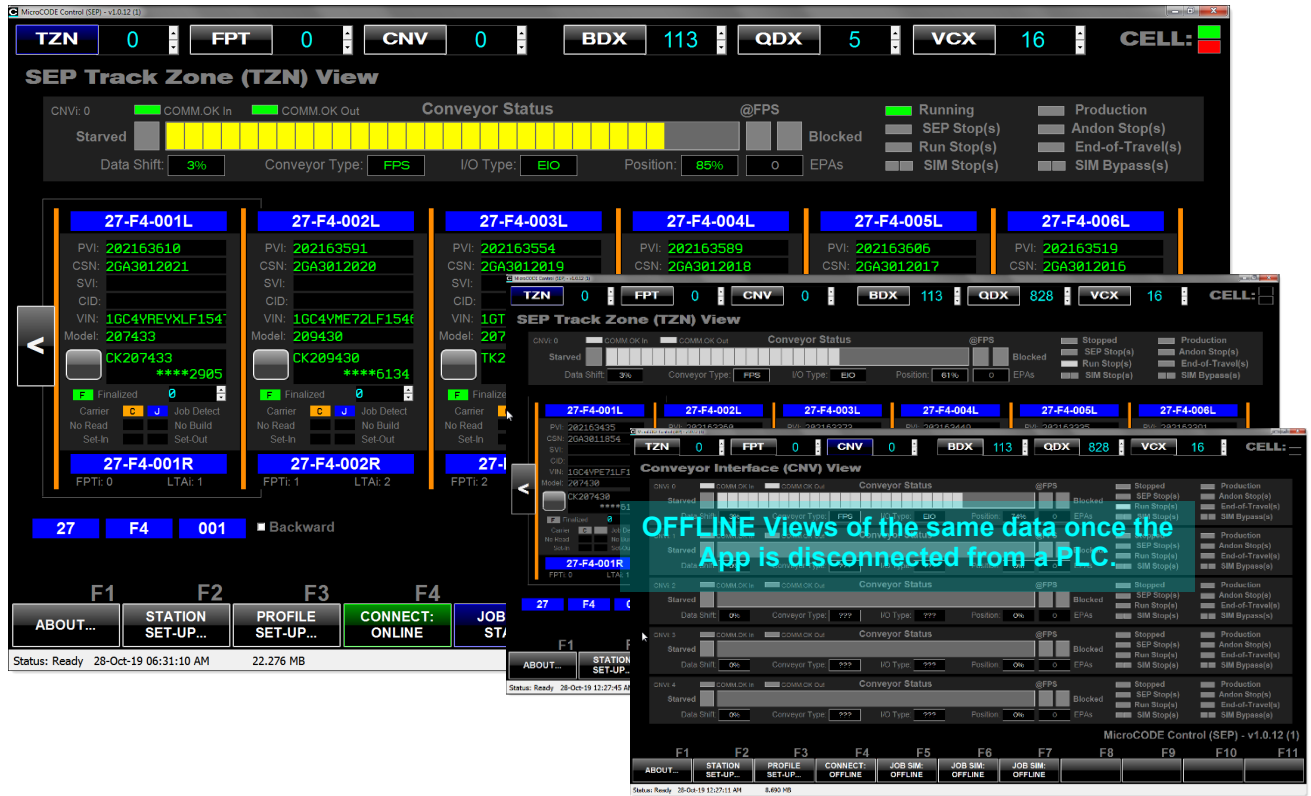
Operator: A new Seed Job was selected and activated, check your PROFILE configurations! [28-Oct-19 06:29:30 AM] CLEAR EVENT

Buttons: ABOUT... STATION SET-UP... PROFILE SET-UP... CONNECT: ONLINE JOB SIM: START JOB SIM: STOPPED JOB SIM: EMPTY

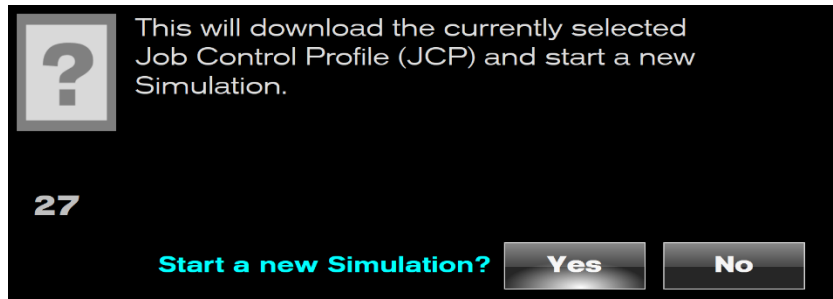
Status: Ready 28-Oct-19 06:30:15 AM 22.470 MB



Step 7: Using the [TZN] Screen Button, select the Track Zone within the GMP PLC that will receive the simulated Job Flow with the Conveyor simulation.



Step 8: Using [F5 SIM:] start the simulated Job Flow. This can be seen as long as the Screen in in the [TZN] View. You can return to the [TZN] view by clicking the [TZN] button at any time.



Step 9: Use [F5 SIM: ABORT] to end the simulation at any time.

Use the **Conveyor Control Buttons** to stop and start the simulated Conveyor.



Step 10: Perform your SAT with the actual hardware.
(See SAT Forms for detailed instructions).

Step 11: Use the QDX Defect Viewer to ensure all required Defects were generated and placed in the SEP PLC's queue.

MicroCODE Control (SEP) - v1.0.12 (1)

TZN 0 FPT 0 CNV 0 BDX 113 QDX 828 VCX 16 CELL: [Red]

DEFECTS Queue (QDX) View

Up Down Hold Sync Defects: 0

QDX#	Trigger ID	MC	PVI	Event	Defects
QDX# 822	7129	15001	20216333	Release	002,101
QDX# 823	7130	15101	20216339	Quality	000,777
QDX# 824	7131	15052	20216341	Release	002,005
QDX# 825	7132	15101	20216338	Quality	000,777
QDX# 826	7133	15101	20216335	Quality	000,777
QDX# 827	7134	15101	20216335	Quality	000,777
QDX# 828	6135	15101			
QDX# 829	6136	15101			
QDX# 830	6137	15101			
QDX# 831	6138	15101			
QDX# 832	6139	15101			
QDX# 833	6140	15101			

MicroCODE Control (SEP) - v1.0.12 (1)

Status: Ready 28-Oct-19 12:12:22 AM 12.521 MB

MicroCODE Control (SEP) - v1.0.12 (1)

TZN 0 FPT 0 CNV 0 BDX 113 QDX 828 VCX 16 CELL: [Red]

DEFECTS Queue (QDX) View

Up Down Hold Sync Defects: 0

GSIP Defect

Machine Code: 15052 Defects: 2

PVI: 20216341 CSN: <Not Queued>

Defect Data Viewer

SEP	GSIP RLN	Defect	Description
0	15052002	002	RELEASED
1	15052005	005	SC - MISSED SCAN or PT.03 - NO CYCLE

MicroCODE Control (SEP) - v1.0.12 (1)

Status: Ready 28-Oct-19 12:10:51 AM 8.918 MB



Step 12: Use the VCX Trace Viewer to ensure all required Trace data was generated and placed in the SEP PLC's queue.

MicroCODE Control (SEP) - v1.0.12 (1)

TZN 0 FPT 0 CNV 0 BDX 113 QDX 828 VCX 16 CELL: ■

TRACE Queue (VCX) View Up Down Hold Sync Parts: 0

VCXi: 10	PVI:	202138180	CSN:	<SEPActions>	MC:	15137	Parts:	1	Trace:	VPPS=<Y471000000000X >	0
VCXi: 11	PVI:	202142308	CSN:	<SEPActions>	MC:	15137	Parts:	1	Trace:	VPPS=<Y471000000000X >	0
VCXi: 12	PVI:	202146886	CSN:	<SEPActions>	MC:	15137	Parts:	1	Trace:	VPPS=<Y471000000000X >	0
VCXi: 13	PVI:	202152211	CSN:	<SEPActions>	MC:	15137	Parts:	1	Trace:	VPPS=<Y471000000000X >	0
VCXi: 14	PVI:	202156300	CSN:	<SEPActions>	MC:	15137	Parts:	1	Trace:	VPPS=<Y471000000000X >	0
VCXi: 15	PVI:	202160495	CSN:	<SEPActions>	MC:	15137	Parts:	1	Trace:	VPPS=<Y471000000000X >	0
VCXi: 16	PVI:		CSN:		MC:		Parts:		Trace:		0
VCXi: 17	PVI:		CSN:		MC:		Parts:		Trace:		0
VCXi: 18	PVI:		CSN:		MC:		Parts:		Trace:		0
VCXi: 19	PVI:		CSN:		MC:		Parts:		Trace:		0
VCXi: 20	PVI:		CSN:		MC:		Parts:		Trace:		0
VCXi: 21	PVI:		CSN:		MC:		Parts:		Trace:		0

F1 ABOUT... F2 STATION SET-UP... F3 PROFILE SET-UP... F4 CONNECT: ONLINE

Status: Ready 28-Oct-19 12:12:53 AM 12.236 MB

MicroCODE Control (SEP) - v1.0.12 (1)

F1 ABOUT... F2 STATION SET-UP... F3 PROFILE SET-UP... F4 CONNECT: OFFLINE F5 JOB SIM: OFFLINE F6 JOB SIM: OFFLINE F7 JOB SIM: OFFLINE F8 F9 F10 F11

Status: Ready 28-Oct-19 12:15:58 AM 7.986 MB

OFFLINE Views of the same data once the App is disconnected from a PLC.

MicroCODE Control (SEP) - v1.0.12 (1)

TZN 0 FPT 0 CNV 0 BDX 113 QDX 828 VCX 16 CELL: ■

TRACE Queue (VCX) View Up Down Hold Sync Parts: 0

VCXi: 10 PVI: 202138180 CSN: <SEPActions> MC: 15137 Parts: 1 Trace: VPPS=<Y471000000000X > 0

VCXi: 11 PVI: 202142308 CSN: <SEPActions> MC: 15137 Parts: 1 Trace: VPPS=<Y471000000000X > 0

VCXi: 12 PVI: 202146886 CSN: <SEPActions> MC: 15137 Parts: 1 Trace: VPPS=<Y471000000000X > 0

VCXi: 13 PVI: 202152211 CSN: <SEPActions> MC: 15137 Parts: 1 Trace: VPPS=<Y471000000000X > 0

VCXi: 14 PVI: 202156300 CSN: <SEPActions> MC: 15137 Parts: 1 Trace: VPPS=<Y471000000000X > 0

VCXi: 15 PVI: 202160495 CSN: <SEPActions> MC: 15137 Parts: 1 Trace: VPPS=<Y471000000000X > 0

VCXi: 16 PVI: CSN: MC: Parts: Trace: 0

VCXi: 17 PVI: CSN: MC: Parts: Trace: 0

VCXi: 18 PVI: CSN: MC: Parts: Trace: 0

VCXi: 19 PVI: CSN: MC: Parts: Trace: 0

VCXi: 20 PVI: CSN: MC: Parts: Trace: 0

VCXi: 21 PVI: CSN: MC: Parts: Trace: 0

F1 ABOUT... F2 STATION SET-UP... F3 PROFILE SET-UP... F4 CONNECT: ONLINE F5 JOB SIM: START F6 JOB SIM: STOPPED F7 JOB SIM: EMPTY F8 F9 F10 F11

Status: Ready 28-Oct-19 12:10:19 AM 6.933 MB

GEPICS Trace

Station Name: 27F4016L System Code: GEPTRACE

Machine Code: 15137 Record Key: Y471000000

EPA Id: 255 Parts: 1

PVI: 202146886 CSN: <SEPActions>

Trace Data Viewer

SEP	VPPS	Part No.	DUNS	Trace Data	Payload Data
0	Y4710000000000X	P84631413	12V602511248	T5U19213141351074	000X > 0

OK Cancel

MicroCODE Control (SEP) - v1.0.12 (1)



Step 13: Use the BDV Buffer View to double check the Seed Job configuration...

MicroCODE Control (SEP) - v1.0.12 (1)

TZN: 0 | FPT: 0 | CNV: 0 | **BDX: 113** | QDX: 828 | VCX: 16 | CELL: ■

GEPICS Buffer (BDV) View

Up | Down | Hold | Sync Options: 68

BDXi: 107 BDi: 13	PVI: 202163421	CSN: 2GA3011861	Model: TK20743	Options: 2886CJ2	SN: 2GA3	68
BDXi: 108 BDi: 12	PVI: 202163444	CSN: 2GA3011860	Model: TK20743	Options: 2886CJ2	SN: 2GA3	68
BDXi: 109 BDi: 11	PVI: 202163379	CSN: 2GA3011859	Model: TK20743	Options: 2886CJ2	SN: 2GA3	68
BDXi: 110 BDi: 10	PVI: 202163408	CSN: 2GA3011858	Model: CK30943	Options: 2886CJ2	SN: 2GA3	68
BDXi: 111 BDi: 9	PVI: 202163427	CSN: 2GA3011857	Model: CK20943	Options: 2886CJ2	SN: 2GA3	68
BDXi: 112 BDi: 8	PVI: 202163431	CSN: 2GA3011856	Model: CK20943	Options: 2886CJ2	SN: 2GA3	68
BDXi: 113 BDi: 7	PVI: 202163442	CSN: 2GA3011855	Model: CK20743	Options: 2886CJ2	SN: 2GA3	68
BDXi: 114 BDi: 6	PVI: 202163435	CSN: 2GA3011854	Model: CK20743	Options: 2886CJ2	SN: 2GA3	68
BDXi: 115 BDi: 5	PVI: 202163360	CSN: 2GA3011853	Model: CK20743	Options: 2886CJ2	SN: 2GA3	68
BDXi: 116 BDi: 4	PVI: 202163373	CSN: 2GA3011852	Model: CK20743	Options: 2886CJ2	SN: 2GA3	68
BDXi: 117 BDi: 3	PVI: 202163449	CSN: 2GA3011851	Model: CK20943	Options: 2886CJ2	SN: 2GA3	68
BDXi: 118 BDi: 2	PVI: 202163335	CSN: 2GA3011850	Model: TK20743	Options: 2886CJ2	SN: 2GA3	68

F1 ABOUT... F2 STATION SET-UP... F3 PROFILE SET-UP... F4 **CONNECT: ONLINE**

Status: Ready 28-Oct-19 12:11:53 AM 12.423 MB

MicroCODE Control (SEP) - v1.0.12 (1)

F1 ABOUT... F2 STATION SET-UP... F3 PROFILE SET-UP... F4 **CONNECT: OFFLINE** F5 JOB SIM: OFFLINE F6 JOB SIM: OFFLINE F7 JOB SIM: OFFLINE F8 F9 F10 F11

Status: Ready 28-Oct-19 12:17:25 AM 8.617 MB

MicroCODE Control (SEP) - v2.0.0 (0)

TZN: 4 | FPT: 19 | CNV: 7 | **BDX: 138** | QDX: 771 | VCX: 3 | **P8CO**

GEPICS Format: FSEPB0X1 Items: 278

PVI: 202110521 CSN: 2GA2968219 Source: PLC

SEP	GEPICS	Length	Data Item	Description	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	0	9	PVI	START OF...	2	0	2	1	1	0	5	2	1								
0	9	1	CHARA...	SPACE TO...																	
0	10	15	CHARA...	BOX SVI																	
0	25	1	CHARA...	SPACE FO...																	
0	26	11	CSN	CSN OR C...	2	G	A	2	9	6	8	2	1	9							
0	37	1	CHARA...	SPACE TO...																	
0	38	17	VIN	VIN OR V...	1	G	C	4	V	N	E	7	4	L	F	1	1	0	9	1	9
0	55	3	CHARA...	SPACE TO...																	
0	58	7	MODEL7	MODEL	C	K	2	0	7	4	3										
0	65	1	CHARA...	SPACE TO...																	
0	66	2																			
0	68	6	CHARA...	GA CSN P...	2	G	A														
0	74	7	MODEL7	BOX LINE...	C	K	2	0	7	4	3										
7	81	4	V04	END GATE...	L	T															
11	85	4	V15	boxside ...	*	*	*	*													
15	89	4	V12B	V12B-LH ...	3	5	3	3													
19	93	4	V12A	V12A-RH ...	3	5	3	4													
23	97	4	V04A	V04A- NA...	S	L	V	E													

Import... Seed... OK Cancel

F1 ABOUT... F2 SEP SITE SET-UP... F3 PROFILE SET-UP... F4 **CONNECT: ONLINE** F5 **TZN SIM: START** F6 **TZN SIM: ABORTED** F7 **TZN SIM: EMPTY** F8 **TZN SIM: SAVE** F9 **TZN SIM: RESTORE** F10 F11

Status: Ready 19-Oct-20 11:33:22 AM 75.736 MB

MicroCODE Control (SEP) - v2.0.0 (0)

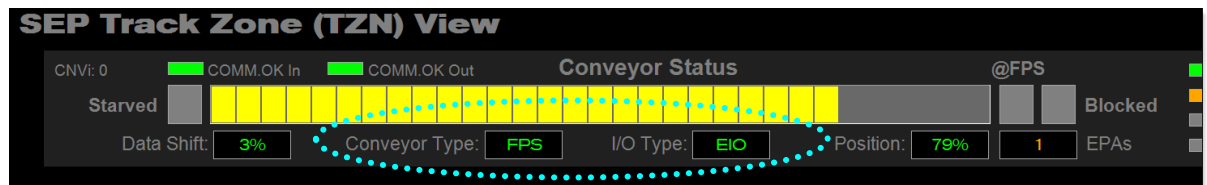


6.1 Handling the Simulated Conveyor

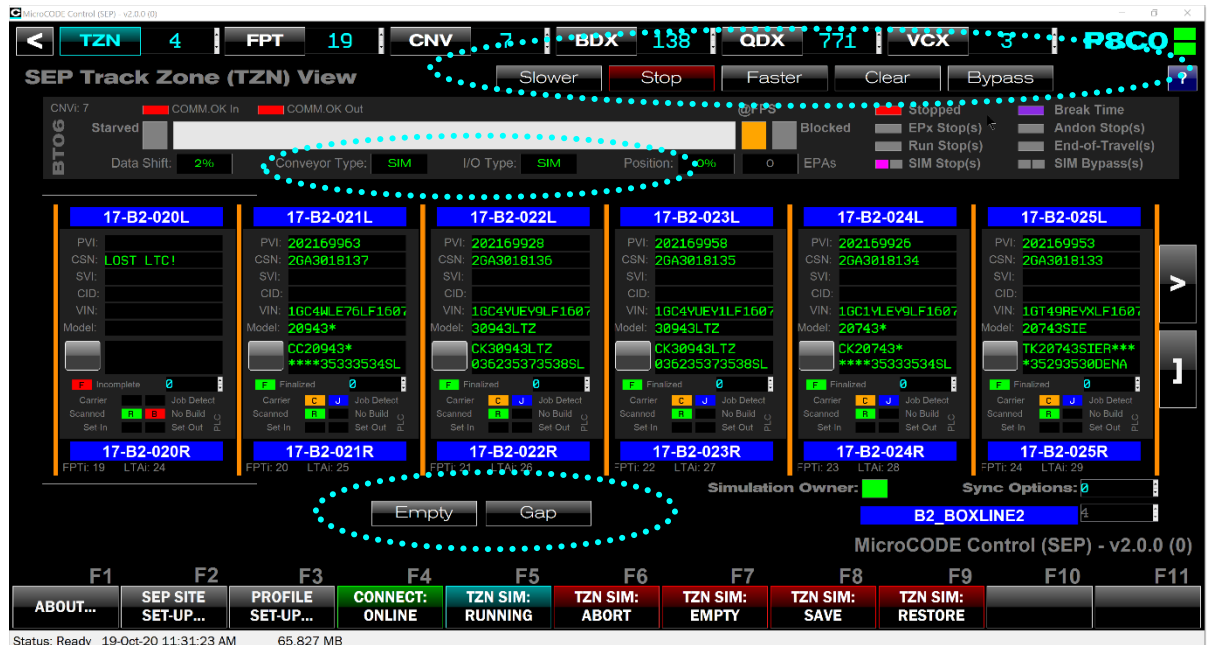
Once a Simulation is started on a Track Zone several things happen:

- 1) The Conveyor’s real-world communication set-up is saved.
- 2) The Conveyor is converted to a ‘Simulated Conveyor’.
- 3) The ‘Simulated Conveyor’ is set to a ‘Stopped’ condition, to allow the User to ‘Save’ the current Track Zone’s tracking image before any movement begins.
- 4) The active PROFILE is used to generate GEPICS JOBS at the start of the Track Zone, like an LTC.

You can see the conversion of the Conveyor by watching the TYPE and I/O indicators:



Once in SIMULATION MODE, the Type and I/O read SIM, and all the controls appear to control the simulated Conveyor. **NOTE: The Conveyor has a ‘SIM Stop’ on by default.**





6.2 Simulator Conveyor Commands

These are the commands that appear on the Track Zone Screen once a simulation is in process. They are hidden when in 'Viewer' mode.

Slower

Decreases Conveyor Speed

Faster

Increased Conveyor Speed

Run

Acts like a Production Run/Stop, this button changes state and acts as a toggle.

Stop

Clear

Removes all SEP Andon Stop Requests from the Conveyor, allowing it to proceed.

Bypass

Passed the Conveyor in 'Bypass SEP' mode, nothing will stop it.

Empty

Converts the Job in the first Footprint in the Track Zone display* into an EMPTY CARRIER.

Gap

Converts the Job in the first Footprint of the Track Zone display* into a GAP.

* **NOTE:** GAP and EMPTY commands are based on the current display **not** the beginning of the Track Zone. So, if you scroll down the Track Zone and select [**Empty**] you will get an empty where you are looking, not back at the beginning of the Track Zone, which would be off the screen.



6.3 App vs. SEP PLC – Span of Simulation Control

The MicroCODE Control (SEP) App is designed to work hand-in-hand with the existing Conveyor Simulation code in the GMP PLC.

- The **Simulated Jobs** are controlled by this App and are created only while it is connected to the SEP Cell Controller as the 'Owner/Generator'.
- The **Simulated Conveyor** is controlled by the GMP PLC code, and that code is fed commands from this App indirectly through the new **prgAPI** that is added to the standard SEP PLC code.

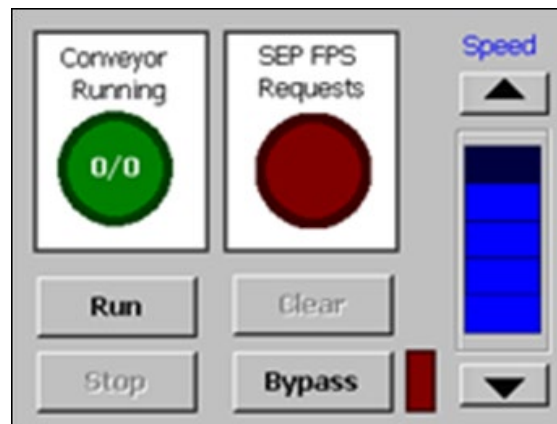
This has several implications that Users must be aware of:

- Once started the **Simulated Conveyor** runs until one of the following happen:
 - EPAs use Andon Requests to stop it
 - It is paused by the MicroCODE Control App controls
 - It is paused by the original SEP Control Simulator controls
 - It is paused by the MicroCODE Process Tool monitoring tool
- The Simulated Conveyor does **not** need this App to run, once started it continues even if the App that started it is disconnected.

The Simulated Conveyor can also be made to ignore all Stop Requests by being put in BYPASS Error Proofing Mode (similar to the real-world Conveyor systems). This is accomplished in several ways:

- The SIM BYPASS Command in this App
- The BYPASS Command in the original SEP Control Simulator controls
- By the SIM CLEAR Command in the App (Bypasses Stop Requests for one Job)
- By the CLEAR Command in the original SEP Control Simulator controls

Figure 8 The original Simulated Conveyor Controls (VB App)





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7 App Shortcuts and Special Features

This section covers some items that the App is capable of that are not obvious to first time users.

Finding an RPO Code or Part Number in a GEPICS Order

A command task when configuring new Error Proofing Actions and supporting Production is to locate a specific Vehicle Option (RPO or Part Number) within a GEPICS Order.

This can be accomplished very quickly using the Control App with a live SEP PLC connection.

STEP 1: Connect to a Cell Controller.

STEP 2: Get to the Vehicle Order you want to check, in GMP Tracking, or GXP BDX Buffer.

STEP 3: Open the Job in the GEPICS Viewer.

SEP	GEPICS	Length	Data Item	Description	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0	9	PVI	START OF DATA...	2	0	2	1	6	8	9	3	1							
0	9	1	CHARAC...																	
0	10	14	10_ENG...																	
0	24	2	CHARAC...																	
0	26	11	CSN		2	G	A	3	0	1	7	2	0	0						
0	37	1	CHARAC...																	
0	38	17	VIN		1	G	C	4	Y	P	E	Y	6	L	F	1	5	9	7	8
0	55	3	CHARAC...																	
0	58	5	MODEL		2	0	7	4	3											
0	63	3	CHARAC...		L	T	Z													
0	66	2	CHARAC...																	
0	68	6	CHARAC...		2	G	A													
0	74	2	CHARAC...		C	K														
2	76	5	MODEL	BEGINNING OF ...	2	0	7	4	3											
7	81	2	MODEL_...	OPTIONS	L	T														
9	83	1	CHARAC...		Z															



STEP 4: Sort the GEPICS Data Elements alphabetically by clicking on the first column.

Description	0	1	2	3	4	5	6	7
SWINF VPPS ID	D	T			C	N		
LH RR Caliper	D	S	R	W				
Steering Wheel	D	R	Z					
Fast Charge (...)	E	S	L					
Shifter	E	6	3					
Spare - Avail...	J	3	7					
Cluster	K	T						

PVI: 202168931 CSN: 2GA30172

Description	0	1	2	3	4	5	6	7
SWINF VPPS ID	D	T			C	N		
LH RR Caliper	D	S	R	W				
Steering Wheel	D	R	Z					
Fast Charge (...)	E	S	L					
Shifter	E	6	3					
Spare - Avail...	J	3	7					
Cluster	K	T						



Using the GEPICS Viewer to guide PROFILE Creation

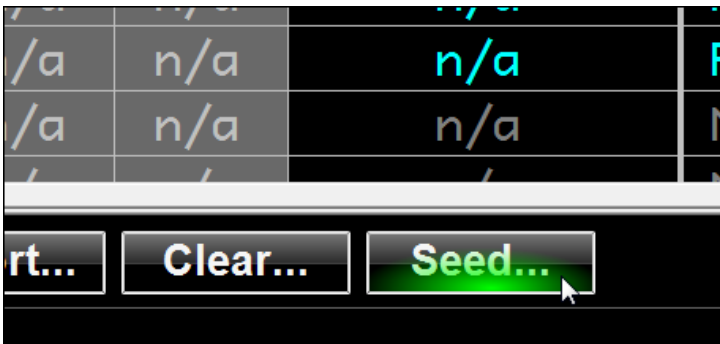
In order to build a good simulation Profile, you will need to refer back to the data layout of your ‘Seed Job’. For that reason, you can open the ‘Seed Job’ while you are editing a Profile and keep it on another monitor for reference.

We highly recommend you use two (2) monitors for this activity. One for editing the Profile and one for referring to the data layout of your ‘Seed Job’.

This can be accomplished very quickly using the Control App with a live SEP PLC connection.

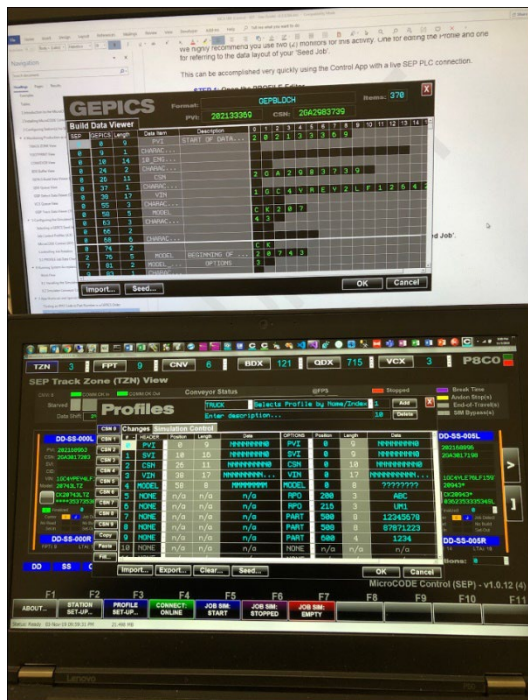
STEP 1: Open the PROFILE Editor.

STEP 2: Click on ‘Seed Job...’ to open a GEPICS Viewer.



STEP 3: Move the ‘Seed Job’ View to a second monitor.

STEP 4: Create your changes for ten (10) CSNs while referring to the ‘Seed Job’.





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8 Handling App Support and Issue Reporting

It is MicroCODE's intention to move the distribution and updates for the Control Series of Apps to our website. This will happen within the next 6 months as licensing issues are resolved. Until then the Microsoft Installation (.msi) file will be distributed via email to registered users.

If you encounter an issue while using a MicroCODE Control App, please follow this procedure:

For immediate assistance call: **855.421.1010**

STEP 1: Gather up the files associated with the issue.

If you are unsure which files to send call us and we'll help determine which will be needed.

- **GMP and GXP Programs** – uploaded with data saved.
- **Event Log Files (.LOG)** – located in...

C:\Users\

- **Configuration Files (.CFG)** – located in...

C:\Users\

We may require other files after the initial investigation.

STEP 2: Email MicroCODE with the files attached, as follows:

Attached these files to an email to: tmcquire@mcodes.com

Subject Line: CONTROL APP – DEFECT REPORT

Email Body:

ISSUE: <Brief Description of the problem including steps to reproduce if possible>

SEVERITY: Choose one, please classify honestly to best utilize our shared resources...

SEV.1 - System crash, complete loss of a major system component

Response Time: No longer than 24 hours.

SEV.2 - Function fails, no work-around is possible, or the App missed identifying a product defect

Response Time: No longer than 48 hours.

SEV.3 - Function fails, work-around is possible, or opening erroneous defects on products

Response Time: No longer than 5 days.

SEV.4 - Function fails, no impact to production, no work-around is necessary, or defect is caused by reconfiguring a Station during production

Response Time: No longer than 15 days.

SEV.5 - Display, Report or Tool problem - no impact on system operation

Response Time: No longer than 30 days.

SEV.6 - Annoyances

Response Time: No longer than 90 days.



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Appendix A: The MicroCODE API Logix Program

In order to ensure that this App can do no harm in a General Motors production environment MicroCODE has separated the communication to an SEP Cell Controller into two (2) distinct connections as mentioned in Chapter 4.

NOTE: This App is never supposed to be run within a GM Production Facility, but MicroCODE has still gone to great lengths to code it in such a way as to protect GM Production from a user accidentally or unknowingly running it in a GM Plant.

READ-ONLY Connection – i.e.: 'Viewer Mode'

The first is a connection to the 'SEP Cell Controller', this connection, at the CIP Driver Level, is creation as a 'read only' interface that cannot write to Tags in the Logix 5000.

This connection is used for:

- 1) Displaying Tracking Data from the GMP PLC.
- 2) Displaying Conveyor Status from the GMP PLC.
- 2) Displaying the GEPICS Build Data buffer from the GXP PLC.
- 3) Displaying the GSIP Defect Queue from the GMP PLC.
- 4) Displaying the GEPICS Trace Data Queue from the GMP PLC.

READ-WRITE Connection – i.e.: 'Generator Mode'

The second is a connection to the 'MicroCODE Application Programming Interface (API)' **only**. Which must be added to any SEP Cell Controller – before this is a READ/WRITE connection for giving the Cell Controller simulation commands will have control.

So, if a Plant has not imported the **MicroCODE prgAPI** program into their Cell Controllers, then the MicroCODE Control (SEP) App cannot write anything into the PLCs.

And, once **prgAPI** is installed (imported) into the GMP PLC, the App can only write to the Tags of that interface. Those tags are named **API_*** and are Controller Level Tags.

All the interaction between the Control App and the SEP PLC code is handled by the API Program. It receives command from the Windows App, executes them, and produces a status back to the App so it can verify execution.

A Cell Controller can have this interface removed at any time, see **A.2 Uninstalling the MicroCODE API**.

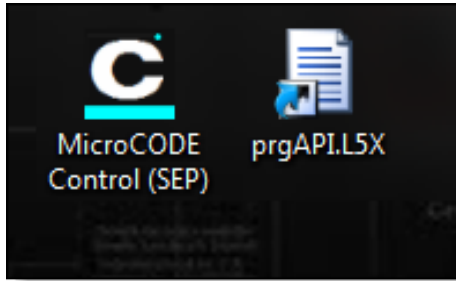


A.1: Installing MicroCODE API Logix Program

The MicroCODE API is installed in the **GMP PLC only**. It is not required in the GXP PLC.

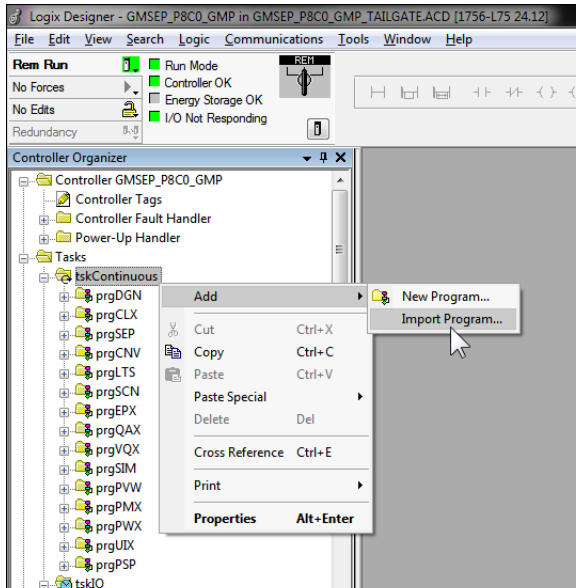
The API is provided as a standard Logix 5000. L5X Import/Export file, and a shortcut is left on the user's desktop after install:

NOTE: Always use the **prgAPI** that was provided with the App you installed. These program's version must match the version of the Windows App you are using.



STEP 1: Import the Program named “prgAPI” into the Continuous Task (tskContinuous).

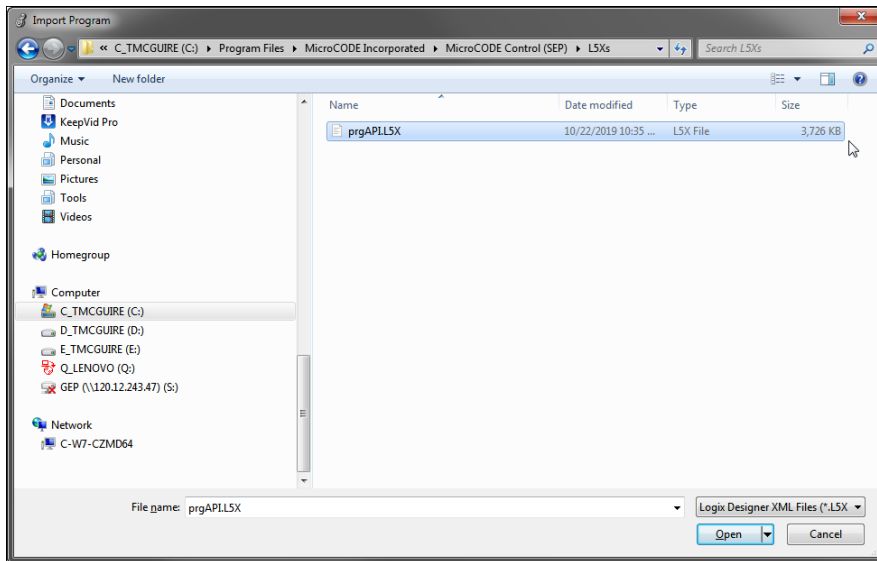
To import, Right-Click on **tskContinuous**, select **Add**, and the **Import Program....**



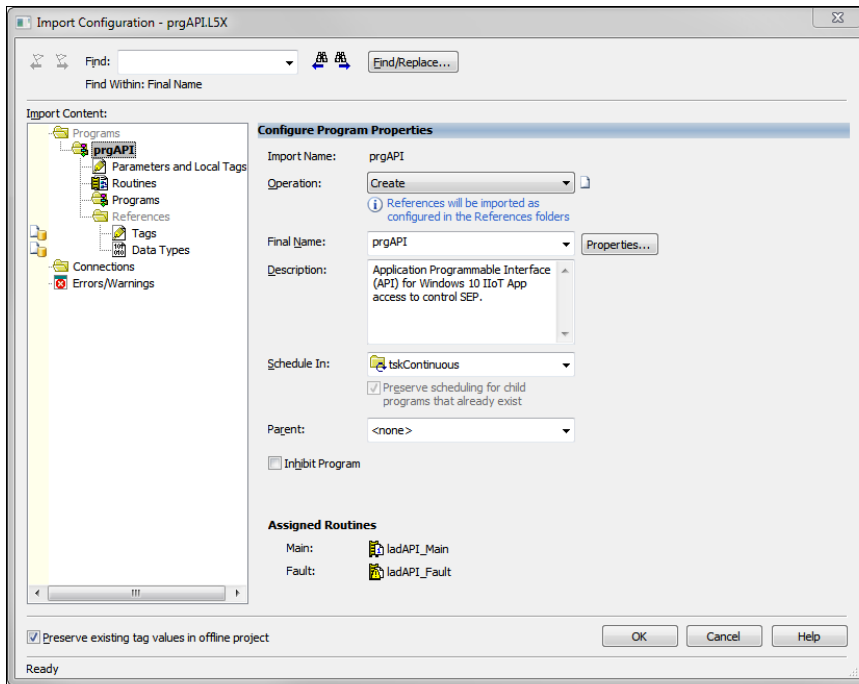


Select the API version that was distributed with you App release (they must match) and click **OK**.

C:\Program Files\MicroCODE Incorporated
 \MicroCODE Control (SEP)\L5Xs



After preparation Logix 500 will present the **Import Configuration** dialog box:



Just click **OK** and **Finalize all edits** in the next step, that's it.

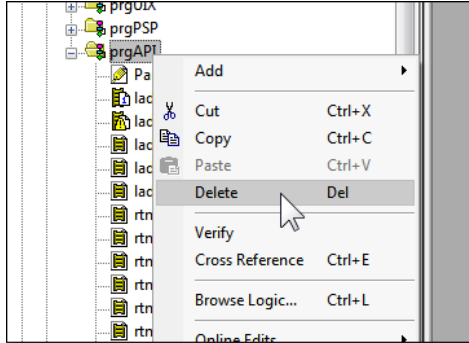
Because the is a completely independent program it does that alter any existing SEP User Defined Datatypes or Code.



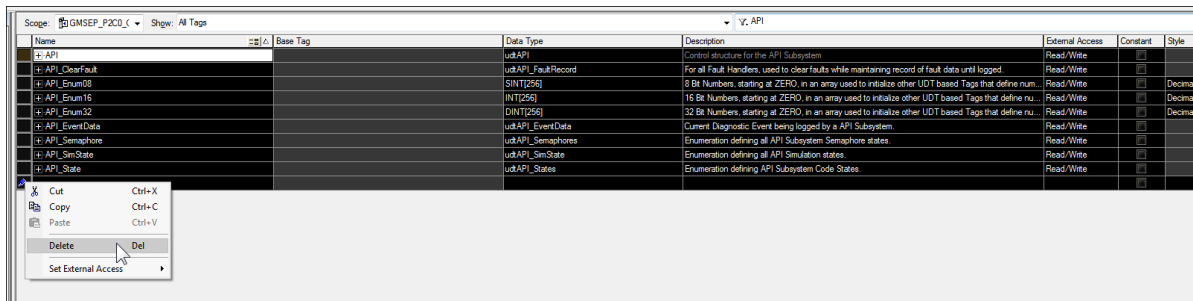
A.2: Uninstalling MicroCODE API Logix Program

Following these steps to uninstall the MicroCODE API from a GMP PLC:

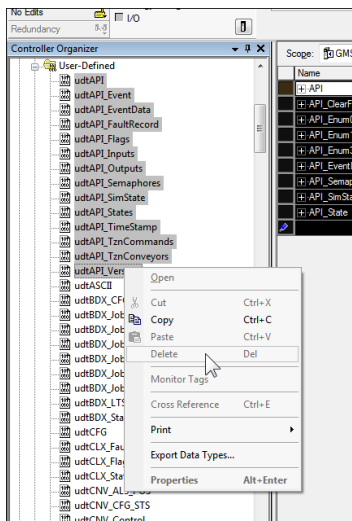
STEP 1: Delete the entire Program named “prgAPI”.



STEP 2: Delete all Controller Level Tags named “API*”.



STEP 3: Delete all User Defined Datatypes named “udtAPI*”.



NOTE: Step 1 and Step 2 can be done ONLINE. But Step 3 must be done OFFLINE and then the Logix 5000 program has to be downloaded back into the PLC.

And you must make several passes at deleting all the UDTs because you cannot delete a UDT if it is referenced by another.

Leaving these UDTs in the Controller has no affect on normal SEP operations.



Appendix B: Required SEP DHFs and DHEs for Control App

One of the stated requirements for the new Control SEP App was that it work with the SEP PLC code that is already in the field, without alteration.

The SEP PLC Code version supported are:

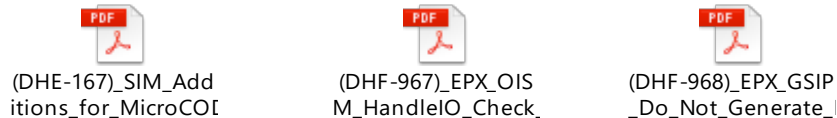
- **SEP v1.0.5 SP1** – 2009 thru 2017 (DeviceNet, Remote I/O, ControlNet)
- **SEP v2.3.0** – 2017 thru present releases (EtherNet/IP, G-16)

To a large degree this has been accomplished. However, several issues arose while testing the App's interaction with SEP v1.0.5 and SEP v.2.3.0 Cell Controllers that could only be resolved thru some minor PLC code changes.

For proper operations there are three (3) changes to be made:

- **{DHE#167}** – additions for MicroCODE Control (SEP) App
- **{DHF#967}** – OISM not handled properly, missing from IOC Check Routine
- **{DHF#968}** – Defects opening on blank Footprints (no PVI) and queue illegal Events

These DHFs and DHEs are installed on your PC along with the application:



The App also needs the current version of the Conveyor Simulation Code:

- **Conveyor Simulation Code** – the MicroCODE Control (SEP) App requires the current PLC simulation code be present in the GMP PLC, import these two (2) routines. **Note:** They are only used for simulation.

These L5Xs—and the API program—are also installed on your PC along with the application:



NOTE: the **ladCNV_ioXIO_Simulated** routine was updated in version v2.0.2b1.

NOTE: the **prgAPI** routine was updated in version v2.0.2b1.



These files are all installed in folders in:

C:\Program Files\MicroCODE Incorporated
\MicroCODE Control (SEP)

Name	Date modified	Type	Size
DHEs	11/14/2019 7:32 AM	File folder	
DHFs	11/14/2019 7:32 AM	File folder	
Fonts	11/14/2019 7:32 AM	File folder	
GFXs	11/14/2019 7:32 AM	File folder	
Images	11/14/2019 7:32 AM	File folder	
L5Xs	11/14/2019 7:32 AM	File folder	
PDFs	11/14/2019 7:32 AM	File folder	
Sounds	11/14/2019 7:32 AM	File folder	
Control (SEP).exe	11/14/2019 7:27 AM	Application	987 KB
Control.ico	10/24/2019 3:59 PM	Icon	67 KB
DeployLX.Licensing.v4.dll	10/6/2010 2:40 PM	Application extens...	809 KB
INGEAR.NET.Interfaces.dll	7/14/2010 12:10 PM	Application extens...	20 KB
INGEAR.NET.Logix.dll	10/20/2010 4:34 PM	Application extens...	160 KB
nBrt409947.lic	1/29/2019 3:42 PM	LIC File	2 KB



Appendix C: Memory and I/O Management in the App

One of the implied requirements for the new Control SEP App was that it minimize the communication load placed on the SEP PLCs and Ethernet Cards.

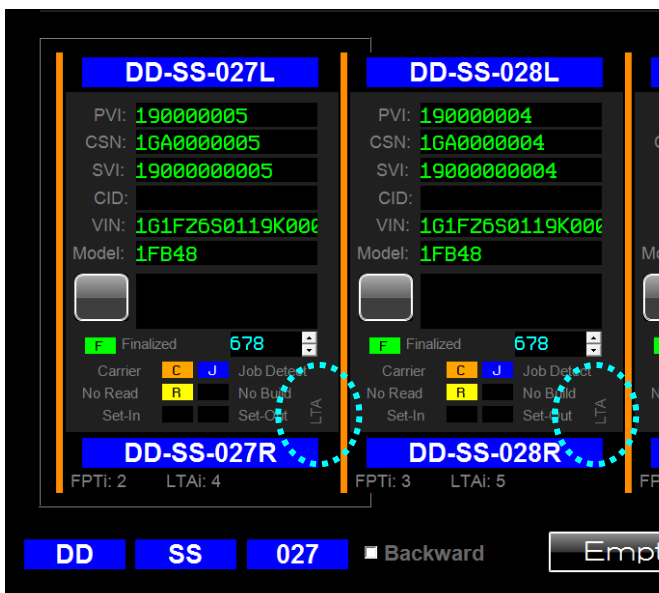
To support this—starting with Release **v1.1.1**—the App added an internal memory of the last (128) GEPICS Jobs it was read from a Controller. This is used to dramatically reduce the amount of data that must be read from the PLCs while the App is running.

This internal memory is cleared under the following conditions:

- On App exit, i.e.: it is not stored to disk.
- When the SITE SET-UP is changed, to prevent using data for a PVI from another Cell, which may have a different GEPICS Format.
- When a new SIMULATION is started to discard all memorized Jobs from a previous PROFILE SET-UP.
- Whenever the User issues the Simulation Command: EMPTY TRACK ZONE.

The App always shows where the Job data has come from with new indicators on all displays.

In the TZN Tracking display:

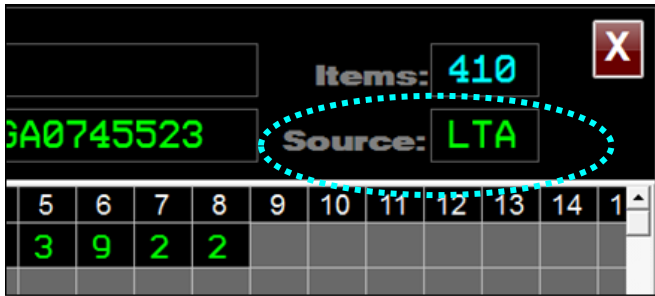


In the BDx Buffer display:





In the GEPICS Data Viewer:



Memory Indicators and meaning:

APP = generated by the App during initialization.

PLC = directing read from PLC memory.

LTA = recalled from App's internal memory, originally read from the GMP Line Tracking Array (LTA).

BDX = recalled from App's internal memory, originally read from the GXP Build Data Interface (BDX).

BDZ = recalled from App's internal memory, originally read from the GXP Build Data Interface (BDX), but with tracking status (Job, Carrier, No Build, etc.) updated from the GMP Track Zone in the PLC.

SIM = generated by the App during simulation, normally this is never seen on the User display.

UNK = unknown.



Appendix D: Allen-Bradley L8x Processor Support

Starting with v2.0.0 this App includes a new ControlNet Interface Protocol (CIP) Driver capable of communicating with the new line of L8x PLCs. The cost of this new driver is built into the App upgrade or purchase price and provides a site-wide license allows as many clients (running this App) as required.

These processors feature 5x – 20x scan time improvements and a built in 1GB Ethernet Port.

ControlLogix 5580 Controllers

Our ControlLogix® 5580 controllers provide increased performance, capacity, productivity, and security to help meet the growing demands of smart machines and equipment for manufacturing. All ControlLogix 5580 controllers use the Studio 5000® design environment as the standard framework that optimizes productivity, reduces time to commission. This framework manages Integrated Motion over EtherNet/IP for high-speed motion applications and SIL2/PLd and SIL3/PLe safety solutions. These controllers are ideal for applications that require high-performance communications, I/O, and motion control for up to 256 axes.



NOTE: This is a ‘Site’ license, not a ‘Company’ license. It is tied to a specific manufacturing site and is not allowed to be used elsewhere. If multiple Sites are to be supported each must have a ‘Site’ license copied of the App. The ‘Site’ location is visible in the **About...** box of the App itself.



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Document: MCX-U01 (Control - SEP - User Guide).doc

I rate this manual's:	Excellent		Good		Fair		Poor			
Accuracy (software works as manual says)	10	9	8	7	6	5	4	3	2	1
Completeness (enough information)	10	9	8	7	6	5	4	3	2	1
Clarity (easy to understand)	10	9	8	7	6	5	4	3	2	1
Organization (structure of subject matter)	10	9	8	7	6	5	4	3	2	1
Figures (useful)	10	9	8	7	6	5	4	3	2	1
Examples (useful)	10	9	8	7	6	5	4	3	2	1
Index (ability to find topic)	10	9	8	7	6	5	4	3	2	1
Page layout (easy to find information)	10	9	8	7	6	5	4	3	2	1

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tmcguire@mcode.com

The **MicroCODE Control (SEP)** App was created for General Motors Strategic Suppliers by:

MICROCODE INC

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