



# RFID JOURNAL LIVE!

**SEPTEMBER 26 - 28, 2021**

PHOENIX CONVENTION CENTER | PHOENIX, AZ

## Linking RFID to PLCs to Automate Manufacturing

Kevin Berisso, Ph.D.  
University of Memphis





THE UNIVERSITY OF  
**MEMPHIS**<sup>®</sup>  
Automatic Identification Lab

# Education Advocation Tech Transfer



how much does a recall cost - Go × The Hidden Cost of a Product Re × BAIT - Home Page × UoM Login Service × | +

hbswk.hbs.edu/item/the-hidden-cost-of-a-product-recall

WORKING KNOWLEDGE

Topics Sections Browse All

# The Hidden Cost of a Product Recall

27 FEB 2019 by Danielle Kost

Product failures create managerial challenges for companies but market opportunities for competitors, says **Ariel Dora Stern**. The stakes have only grown higher.

Drivers on Interstate 25 in Colorado have been [speculating about the fate](#) of hundreds of Volkswagen cars sitting in a lot near Pikes Peak International Raceway. It's one of many in the United States where the automaker is storing [300,000 diesel cars](#) it no longer wants after admitting to cheating American emissions tests.

Volkswagen estimated that fines, repairs, and legal costs would total [more than \\$30 billion](#). And worse, the company ceded its command of America's diesel car market—producing [more than one-third \(pdf\)](#) of the models available in 2015—to companies such as General Motors, Ford and Mazda, which [expanded their diesel lineups \(pdf\)](#).

Large recalls are the ultimate nightmare for senior executives at companies with considerable research and development (R&D) operations. Beyond the staggering remediation and legal expenses that recalling companies incur, there are also costs to rework manufacturing processes and stem reputational damage. In one of the costliest recalls in history, Johnson & Johnson [spent more than \\$100 million in 1982](#) (more than \$260 million in today's dollars) to recall 31 million bottles of Tylenol capsules and re-establish the brand.

"PRODUCT RECALLS SLOW MANY TYPES OF INNOVATION"

Volkswagen:  
“more than \$30 billion”

12 MAY 2020 RESEARCH & IDEAS  
IT'S TIME TO RELAUNCH YOUR REMOTE TEAM

01 SEP 2021 WHAT DO YOU THINK?  
CAN WE TRAIN FOR TRUST?

16 JUL 2021 OP-ED  
FOR ENTREPRENEURS, THE BENEFITS OF SLOWING DOWN

31 AUG 2021 BOOK  
FEELING POWERLESS AT WORK?  
TIME TO AGITATE, INNOVATE,  
AND ORCHESTRATE

**WORKING KNOWLEDGE**

# The Hidden C

27 FEB 2019 | by Danielle Kost

Product failures create managerial challenges opportunities for competitors, says **Ariel D** higher.

Drivers on Interstate 25 in Colorado have Volkswagen cars sitting in a lot near Pikes Peak. It's the latest in a series of recalls.

## Average food recall upwards of \$10 million

\$260 million in today's dollars) to recall establish the brand.

"PRODUCT DETAILS SHOW"

How Much Can a Product Cost? | The Hidden Cost of a Product Recall | BAIT - Home Page | UofM Login Services

How Much Can a Product Cost? | The Hidden Cost of a Product Recall | BAIT - Home Page | UofM Login Services

Call Us: 425-408-9500 | [Support](#)

REQUEST A DEMO

space. The unpredictability of manufacturing means that most food processors will deal with a recall at some point, and the costs of such an event cannot always be measured in dollars and cents.

On average, a food recall causes direct costs to the manufacturer upwards of \$10 million. This is a huge number for any business, but it can be devastating to mid-sized or smaller companies that can struggle to survive through that much lost revenue. Along with having current product pulled from shelves at a loss, depending on how far up the recall issue runs into the supply chain, the processor may also face having to replace possibly defective product or raw materials in storage.

Things that can be lost in a recall that are just as devastating, and often, harder to replace are consumer trust: over half of consumers report that they cease buying a brand after it has been recalled, and studies have shown that a brand's stock price drops 2% following a recall. Trust is one of the hardest things to rebuild, once it's gone, impacting sales far into the future. On top of this, many of the standards for their suppliers, and if a recall happens and the supplier is at fault having their contract terminated. Once the effects of these losses add up, it can seem like a drop in the bucket.

How can you mitigate these risks? The most crucial step is to ensure that you have a solid system in place. Digitizing these processes is essential, as tracking on paper is efficient, but also introduces numerous chances for error into the process. By reacting to problems quickly, with accurate data, suffer far fewer losses.

Ready to automate your lot tracing and recall management? ParityFactory can help! [Reach out to us today](#) and we'll show you how our system can help take the fear out of recalls.

how much does a recall cost - Go x The Hidden Cost of a Product Re x BAIT - Home hbswk.hbs.edu/item/the-hidden-cost-of-a-product-recall How Much Can a The Hidden Cost x BAIT - parityfactory.com/what-does-a-recall-investopedia.com/articles/investing/010815/how-do-recalls-affect-company.asp BAIT - Home Page UoM UofM Login Service +

# WORKING KNOWLEDGE

## The Hidden C

### Ford: 6.5 million vehicles

Drivers on Interstate 25 in Colorado have

0

Drivers on Interstate 25 in Colorado have

rework manufacturing processes and stop recalls in history, Johnson & Johnson spent \$260 million in today's dollars) to recall establish the brand.

"PRODUCT RECALLS SLOW"

### Merck: Vioxx – \$4.85 billion

paper is not only slow and inefficient, but also Processors who can identify and react to problems faster than those who cannot.

Ready to automate your lot tracing and recall today and we'll show you how our system can

Ford ([F](#)) issued a recall of 6.5 million vehicles with Firestone tires in the early 2000s. [\[14\]](#) Defective tires resulted in 5,000 complaints, 800 injuries, and 271 deaths in the U.S. [\[15\]](#) [\[16\]](#) Toyota has issued a number of massive recalls beginning in 2009, ultimately recalling over 10 million vehicles due to numerous issues including sticky gas pedals and faulty airbags. [\[17\]](#) [\[18\]](#)

The drug industry has also suffered from devastating recalls. Drug manufacturer Merck ([MRK](#)) recalled its arthritis medication Vioxx, because of the increased risk it posed of heart attacks. [\[19\]](#) The drug cost Merck \$4.85 billion in claims and lawsuits. [\[20\]](#)

Coffee machine manufacturer Keurig [recalled](#) 7.2 million single-service brewing machines due to claims of overheating. [\[11\]](#) Regardless of the industry in which the recall occurs, it is evident that large companies are able to withstand both financial and reputation costs.

#### The Bottom Line

The effects of a product recall may be detrimental in the [short run](#), but there is no evidence to support long-lasting decreases in sales or stock prices. Toyota and Merck experienced brief financial consequences as a result of product recalls, but were able to rebound, with their brands and stock prices showing a strong recovery.

With the supervision of government agencies, product recalls seem to have become almost [weekly occurrences](#). This may be attributed to the increasing complexity of the global supply chain. To cut costs and remain competitive, modern merchandise incorporates manufactured parts from around the world, sometimes at the cost of reliability.

Develop Your Financial Strategy With an Advisor

SPONSORED

WE COULDN'T HAVE BEEN MORE DIFFERENT. THEN WE TALKED.



how much does a recall cost - Go X The H X Walmart kicks off automation of Contact X UofM Login Service X | +

hbswk.hbs.edu/item/th... kicks-automation-25-regional-distribution-centers eCourseware U Home | SSC Campus UM Apps Work order Ensemble Video Grad Programs Forge » Other bookmarks

# WORKING The

27 FEB 2019 by D

Product failures opportunities for higher.

Russell Redman 1 Jul 14, 2021

Dri Vol in t adr

Vol And mo Mo

Lan cor ren rew rec \$2 est

"D

## NEWS > TECHNOLOGY

# Walmart kicks off automation of 25 regional distribution centers

Symbotic's automation technology has been in test mode at Walmart's Brooksville, Fla., regional DC since 2017.

Supply chain EVP Joe Metzger says Symbotic partnership will 'fundamentally alter how products get to stores'

Following a multiyear pilot, Walmart plans to roll out warehouse automation from Symbotic to drive speed and efficiency at regional distribution centers (RDCs).

Plans call for Walmart to implement Symbotic's robotics technology in 25 of its 42 RDCs, Joe Metzger, executive vice president of supply chain operations at Walmart U.S., said in a blog post on Wednesday. The scalable system encompasses a

25 of 42 regional distribution centers

Advertisement

Investopedia

Advertisement

"WE COULDN'T HAVE BEEN MORE DIFFERENT. THEN WE TALKED."

25 of 42 regional distribution centers

Conversations with industry leaders and experts on what matters most to retailers... LISTEN NOW

equences as a result of product recalls, but s and stock prices showing a strong recovery.

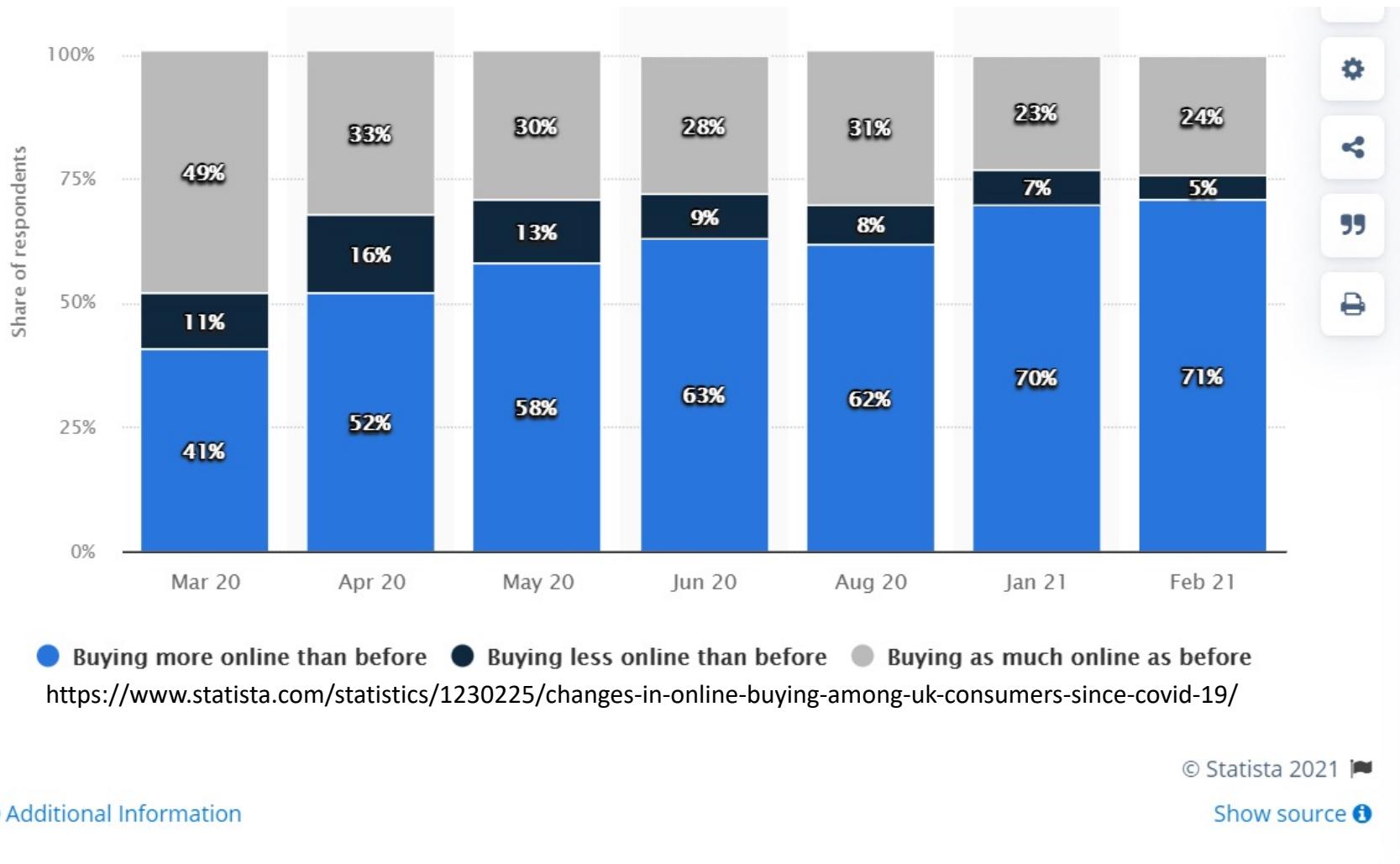
encies, product recalls seem to have become attributed to the increasing complexity of and remain competitive, modern merchandise around the world, sometimes at the cost of

egy With an Advisor SPONSORED

**RFID**  
JOURNAL  
**LIVE!**

**SEPTEMBER 26 - 28, 2021**

# Percentage change in online purchases due to the coronavirus (COVID-19) pandemic in the United Kingdom from March 2020 to February 2021



**RFID  
JOURNAL  
LIVE!**

**SEPTEMBER 26 - 28, 2021**



E-COMMERCE

HYTROL®

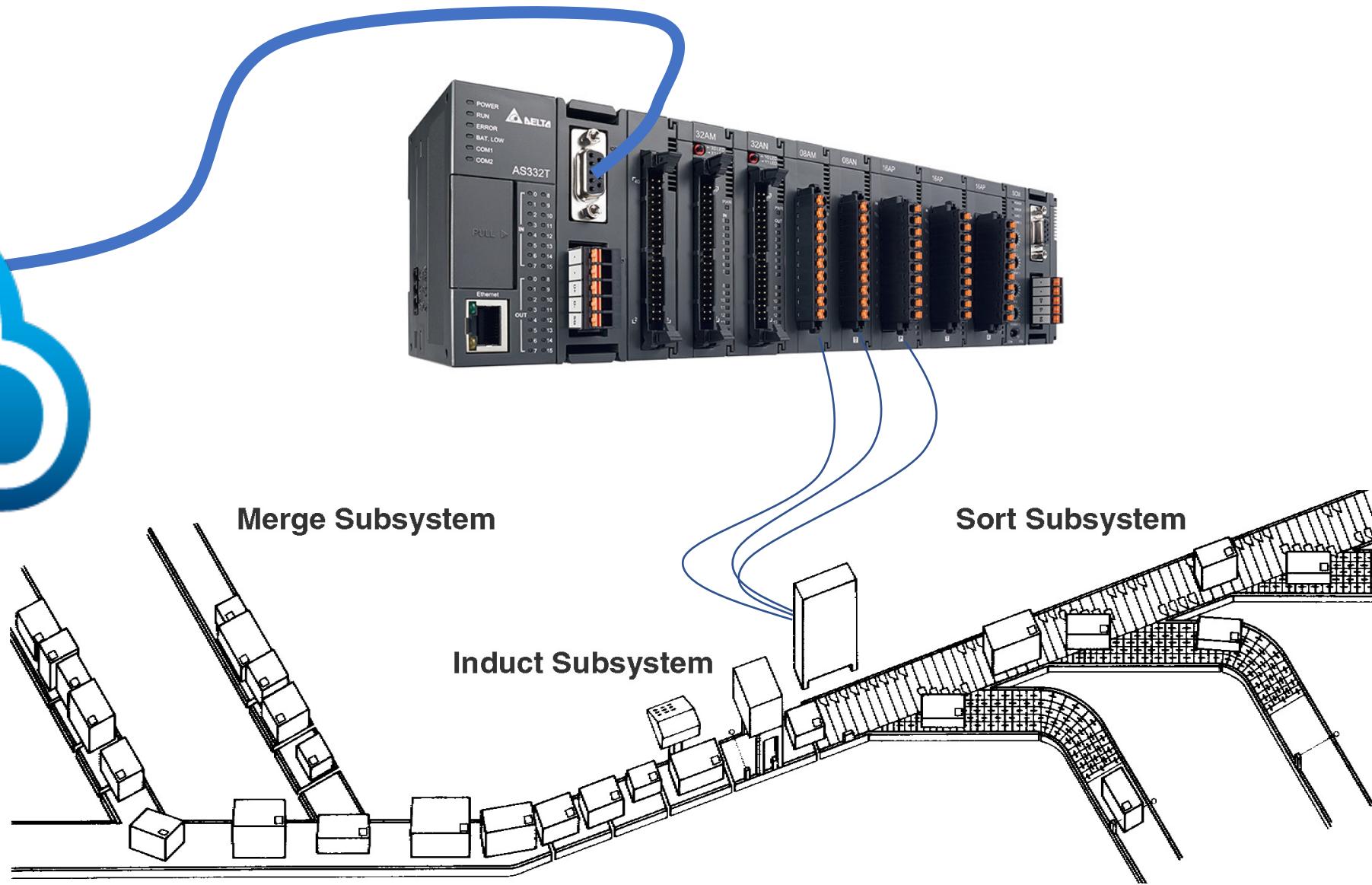


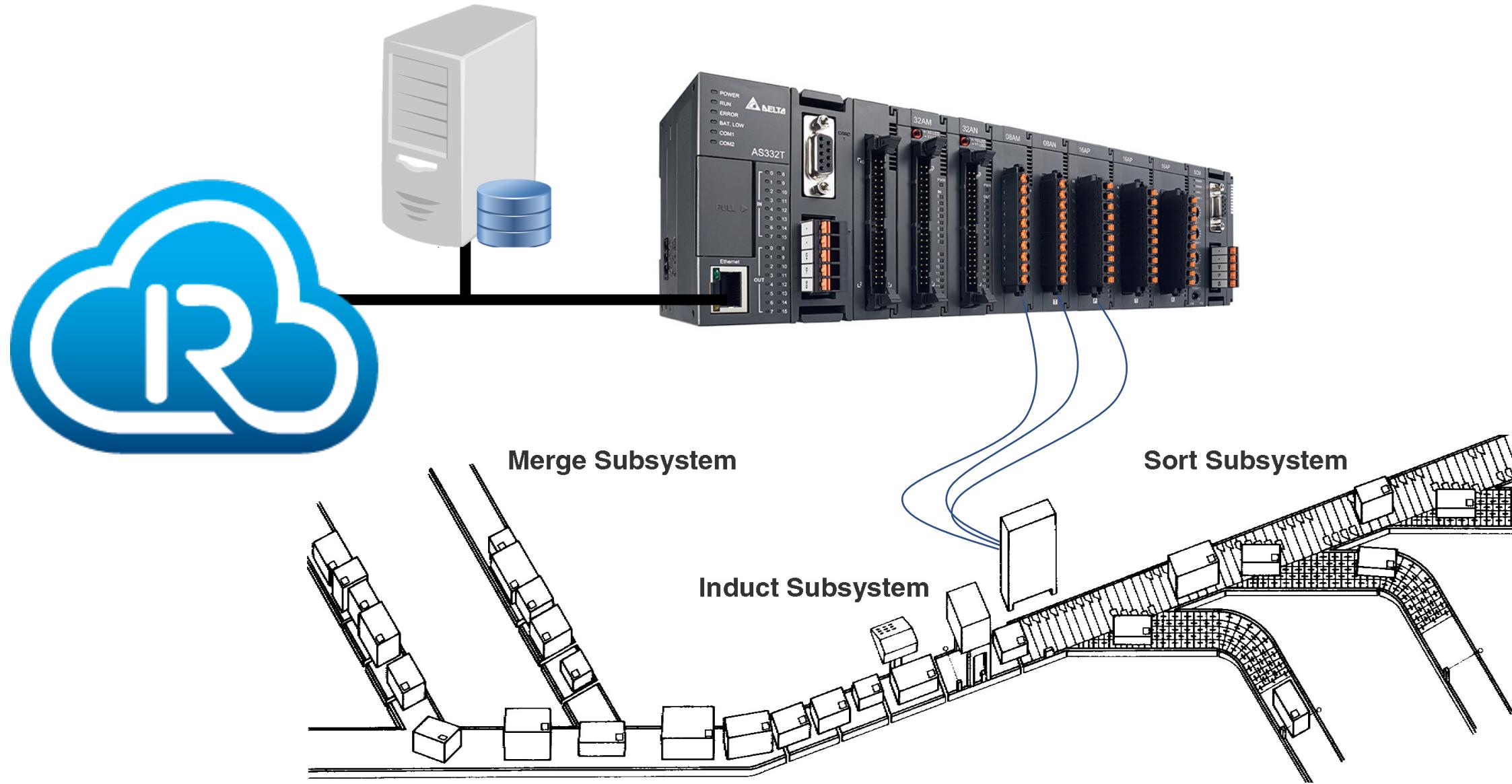
U  
M

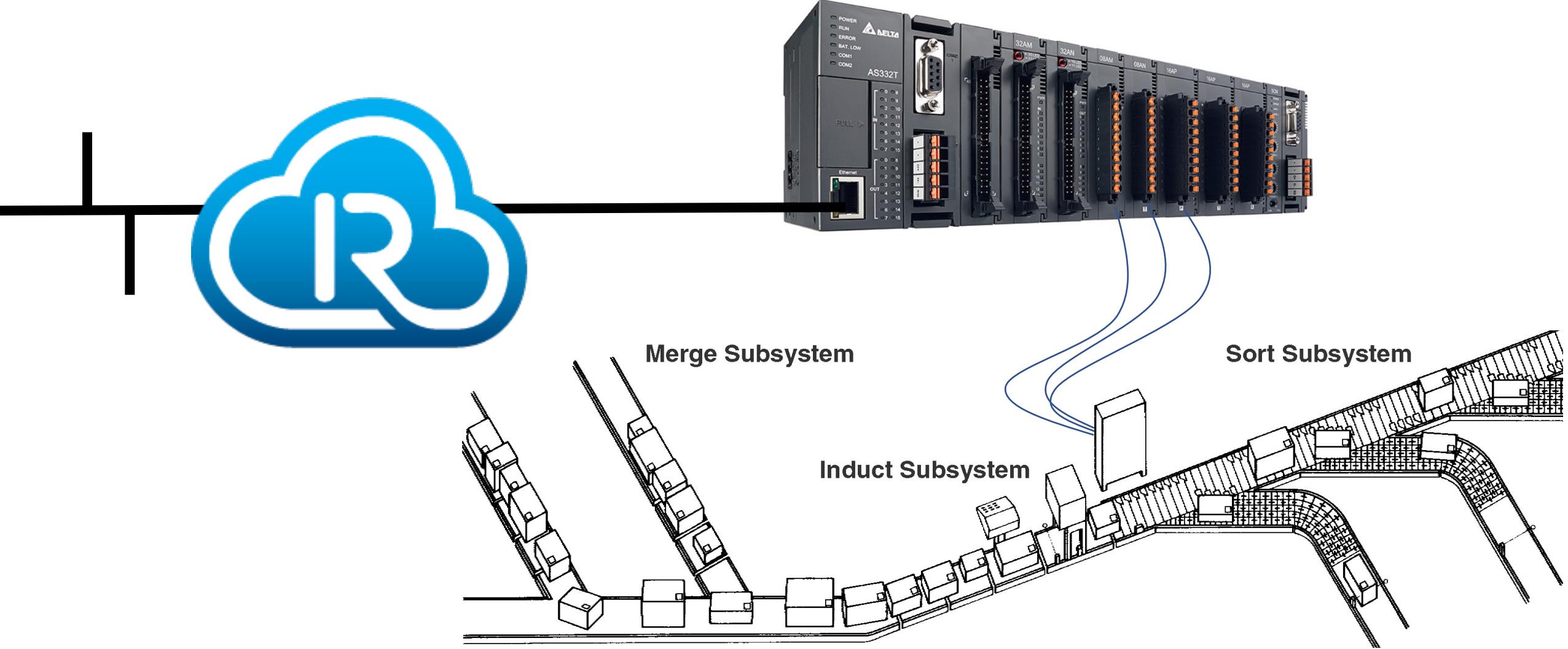
THE UNIVERSITY OF  
**MEMPHIS**<sup>®</sup>  
Automatic Identification Lab

**RFID**  
JOURNAL  
**LIVE!**

**SEPTEMBER 26 - 28, 2021**







OPC Router version 4 - Trial version

The Anybus Connection Server (ACS) is a software application that provides a central management interface for connecting various industrial protocols. It supports EtherCAT, Modbus, Profinet, and many others. It includes features like connection monitoring, configuration tools, and a graphical user interface.

As a .NET component, it allows developers to easily integrate industrial data into their applications. It's used for monitoring and controlling industrial processes, creating HMI interfaces, and performing data analysis.

Typical Industrial Applications:

- Machine Monitoring and Control
- Process Control Systems
- Automated Manufacturing
- Quality Control Systems
- Inventory Management

OPC Router started.

# GlobeRanger Product Stack

FUJITSU

LOG IN / REGISTER  
0 - \$0.00

## ADVANCED HMI

HMI Software and Hardware

Products ▾ Information ▾ Contact

Actual Values | Shuttle/Temper | Press Feeder | Magazine | Punches | Unload | Temp. Chart

Sub-Menus: Pressure Chart | Temp. Offsets

	SET POINT	MOLD 1	MOLD 2
CLOSE PLATE	0°C	0.0°C	0.0°C
DIE	0°C	0.0°C	0.0°C
PUNCH	0°C	0.0°C	0.0°C
PUNCH POSITION	0.0mm	0.0mm	
PART THICKNESS	0.0mm	0.0mm	

	SEQUENCE	TIME
Pressing	0	0s
Degassing	0	0s

	SET POINT	ACTUAL
PRESSURE	0.0bar	0.0bar
PEAK PRESSURE DURING CYCLE		0.0bar

3X FAULT RESET | LAMP CHECK

REMAINING CYCLES BEFORE CLEANING NEEDED: 0

Transport Messages: (0) CONTROL OFF | Press Messages: (0) CONTROL OFF

Clear Alarms | Clear Alarms

### POWERFUL SOFTWARE

The Industry's Most Flexible Software

AdvancedHMI is a PC based HMI package used to create fast and flexible applications.

Use it for absolutely no cost or restrictions.

Human machine interface (HMI) software gives an operator interface to the controller of a machine, such as a PLC. Software HMIs can



Sample Source

10:48



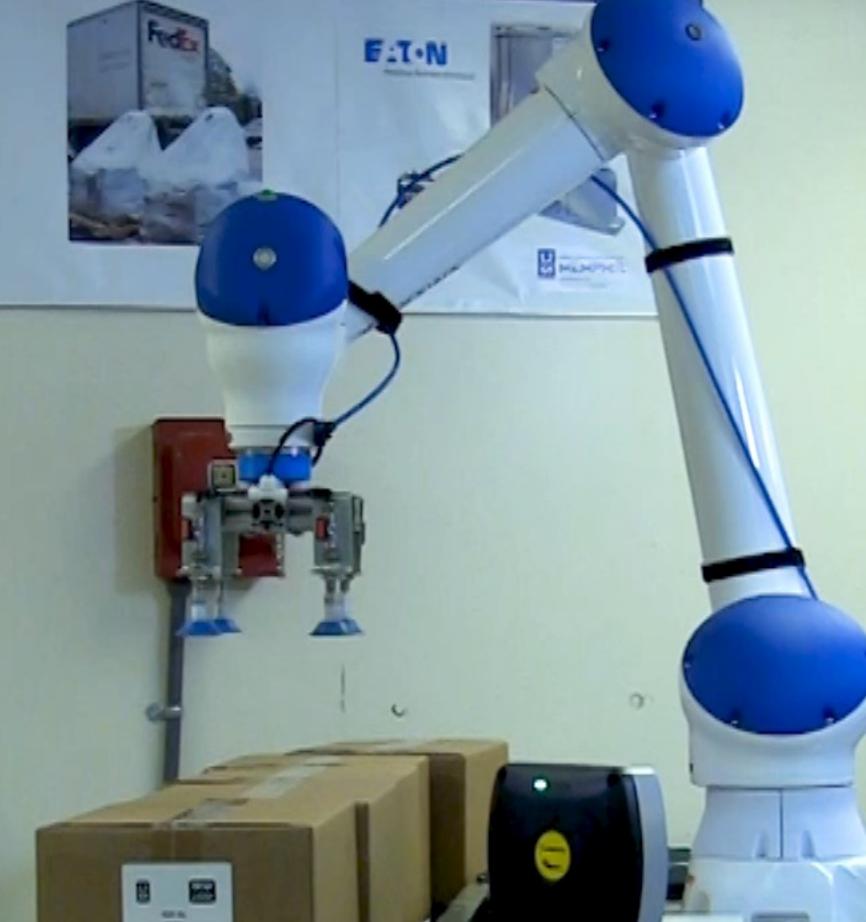
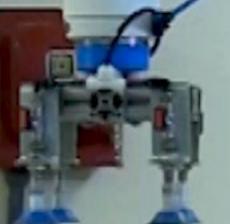
```
1 using System;
2
3 public class HelloWorld
4 {
5     static public void Main ()
6     {
7         Console.WriteLine ("Hello World");
8
9         Console.Write("Enter a string - ");
10        string inputString = Console.ReadLine();
11        Console.WriteLine("You entered '{0}'", inputString);
12
13        //Variable declaration
14        bool isValid = true;
15        int score = 51092;
16        float num = 43.27F;
17        char ch1 ='\u0042';
18        string firstName = "Richard";
19
20
21
```

MADE BY YASKAWA, SHIPPED BY FEDEX, POWERED BY EATON



EATON  
Protecting what's important

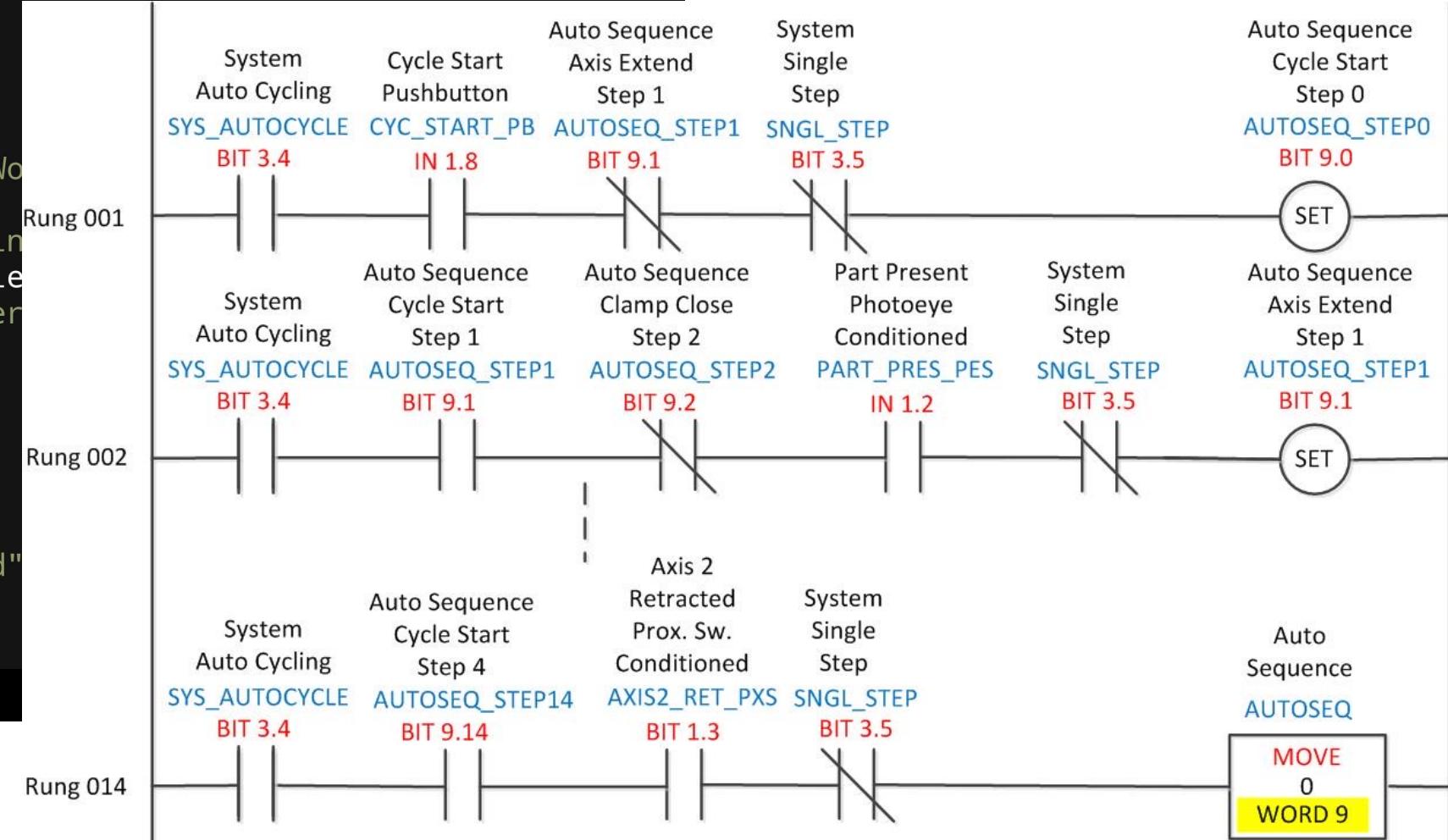
SI MACHINERY



```

1 using System;
2
3 public class HelloWorld
4 {
5     static public void Main ()
6     {
7         Console.WriteLine ("Hello World!");
8
9         Console.Write("Enter a string: ");
10        string inputString = Console.ReadLine();
11        Console.WriteLine("You entered: " + inputString);
12
13        //Variable declaration
14        bool isValid = true;
15        int score = 51092;
16        float num = 43.27F;
17        char ch1 = '\u0042';
18        string firstName = "Richard";
19
20
21

```

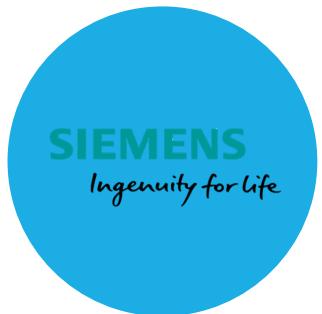




DATALOGIC



SICK



SIEMENS



TURCK



ZEBRA  
TECHNOLOGIES



Home  
Status  
▶ Operation Statistics  
▶ Configure Reader  
Read Tags  
▶ Communication  
Date Time  
IP Sec  
License Manager  
Change Password  
GPIO  
**Applications**  
Profiles  
▶ Firmware  
Commit/Discard  
▶ System Log  
Diagnostics  
Shutdown  
Logout

## User Application Page

Existing Packages:

List of Installed apps  
RFIDSample4App ▾

Start/Stop

AutoStart

Uninstall

### Meta Data

Package Name:RFIDSample4App  
Package Version: 1.0  
Status: install user installed  
architecture: all

Install New Package:

Current Status:  
package:

Select package from the browser button

Browser  
 Install



Offline     RUN     OK

Path: AB\_ETHIP-1\141.225.160.105\Backplane\0

Controller Organizer

- Motion Control
- Ungr.
- Add-On
- Data Types
  - User
  - String
  - Add
  - Pred
  - Mod
- Trends
- I/O Configuration
  - Com
  - 1
  - 1
  - 2
  - 3
  - 4
- C

Type  
Description  
Program  
Number of Rungs

## General

Type: FX9600 RFID Reader  
Vendor: Zebra Technologies  
Parent: LocalENB  
Name:   
Description:

Ethernet Address

Private Network: 192.168.1.

IP Address: 141 . 225 . 161 . 128

Host Name:

Module Definition

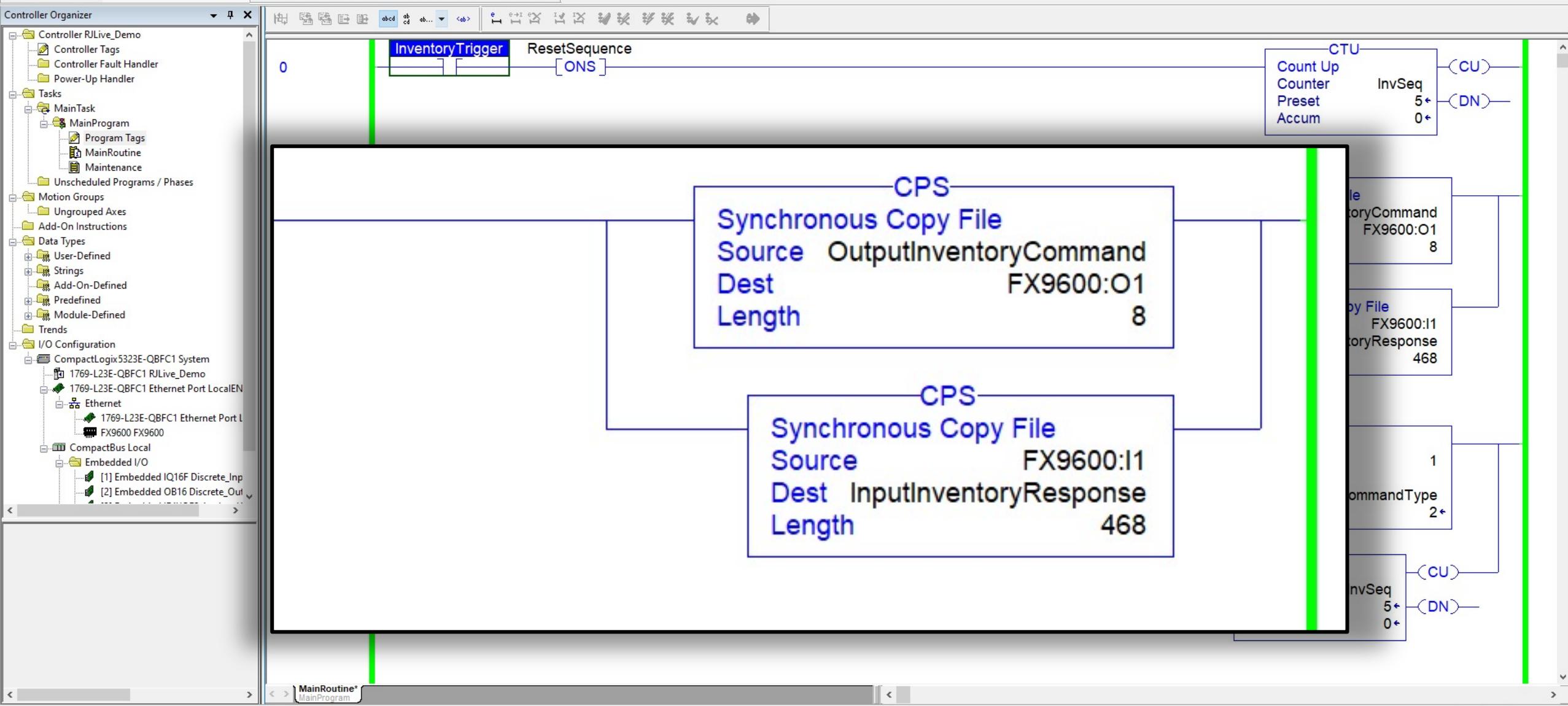
Revision: 2.001

Electronic Keying: Compatible Module

Connection: Inventory Response Extension

Length: 384

- FX9600:I1		{...}	{...}
- FX9600:I1.ConnectionFaulted		0	Decimal
+ FX9600:I1.StatusMask		{...}	{...}
+ FX9600:I1.PacketSequenceNumber		119	Decimal
+ FX9600:I1.NumberOfTagReports		0	Decimal
- FX9600:I1.TagReports		{...}	{...}
- FX9600:I1.TagReports[0]		{...}	{...}
+ FX9600:I1.TagReports[0].TagEPC		{...}	{...}
+ FX9600:I1.TagReports[0].TagPC		0	Decimal
+ FX9600:I1.TagReports[0].TagCRC		0	Decimal
+ FX9600:I1.TagReports[0].AntennaID		0	Decimal
+ FX9600:I1.TagReports[0].RSSI		0	Decimal
+ FX9600:I1.TagReports[0].ChannelIndex		0	Decimal
+ FX9600:I1.TagReports[0].SeenCount		0	Decimal
+ FX9600:I1.TagReports[0].PhaseInfo		0	Decimal
+ FX9600:I1.TagReports[0].FirstSeenTimeStamp		{...}	{...}
+ FX9600:I1.TagReports[0].LastSeenTimeStamp		{...}	{...}
+ FX9600:I1.TagReports[0].AccessStatus		0	Decimal





# TURCK



- TBEN1	{ ... }
TBEN1.EnableIn	1
TBEN1.EnableOut	1
TBEN1.READ	0
TBEN1.WRITE	0
TBEN1.TAG_ID	0
+ TBEN1.DOMAIN	1
+ TBEN1.LENGTH	12
+ TBEN1.START_ADDRESS	1
TBEN1.RESET	0
TBEN1.UHF_CONTINUOUS_MODE	0
+ TBEN1.NODE_ADDRESS	0
+ TBEN1.NODE_ADDRESS_TP	0
trigger	0

Name	Value
- RX_BUFFER	{ ... }
+ RX_BUFFER[0]	24
+ RX_BUFFER[1]	1
+ RX_BUFFER[2]	-30
+ RX_BUFFER[3]	0
+ RX_BUFFER[4]	-112
+ RX_BUFFER[5]	55
+ RX_BUFFER[6]	-119
+ RX_BUFFER[7]	2
+ RX_BUFFER[8]	2
+ RX_BUFFER[9]	24
+ RX_BUFFER[10]	8
+ RX_BUFFER[11]	0
+ RX_BUFFER[12]	-58
+ RX_BUFFER[13]	-14
+ RX_BUFFER[14]	24
+ RX_BUFFER[15]	-2
+ RX_BUFFER[16]	3
+ RX_BUFFER[17]	0
+ RX_BUFFER[18]	-45
+ RX_BUFFER[19]	-17

Type: ETHERNET-MODULE Generic Ethernet Module

Vendor: Rockwell Automation/Allen-Bradley

Parent: LocalENB

Name: TBEN

Description:

Comm Format: Data - INT

Address / Host Name

 IP Address: 141 . 225 . 160 . 108 Host Name:

## Connection Parameters

Assembly  
Instance:

103

191 (16-bit)

154 (16-bit)

Input:

Output:

Configuration:

0

(8-bit)

Status Input:

Status Output:

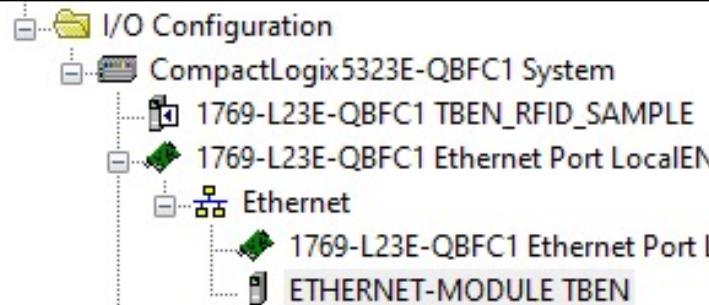
Status: Offline

OK

Cancel

Apply

Help



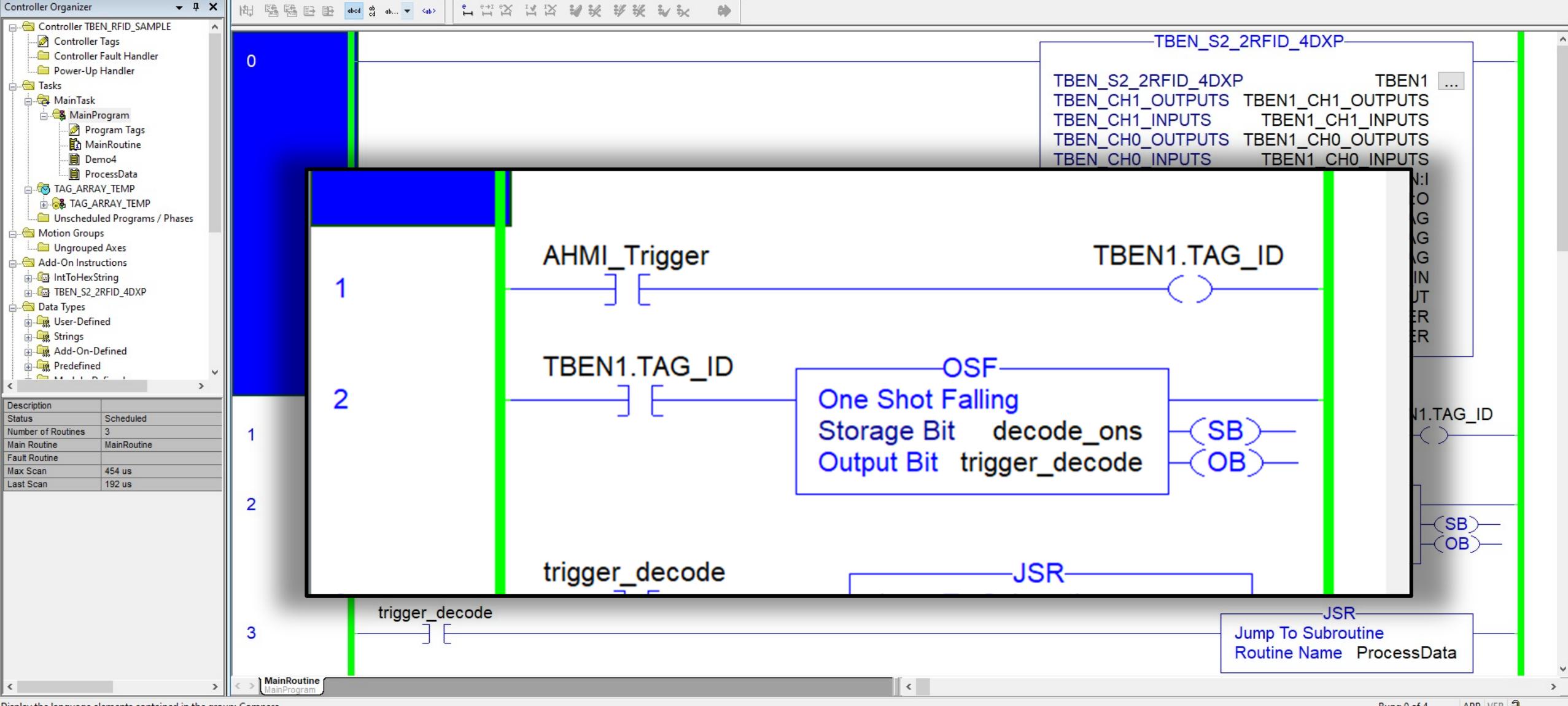
## TBEN\_S2\_2RFID\_4DXP

TBEN_S2_2RFID_4DXP	TBEN1	...
TBEN_CH1_OUTPUTS	TBEN1_CH1_OUTPUTS	
TBEN_CH1_INPUTS	TBEN1_CH1_INPUTS	
TBEN_CH0_OUTPUTS	TBEN1_CH0_OUTPUTS	
TBEN_CH0_INPUTS	TBEN1_CH0_INPUTS	
IO_TBEN_INPUTS		TBEN:I
IO_TBEN_OUTPUTS		TBEN:O
TBEN_CH1_DIAGNOSTICS	TBEN_CH1_DIAG	
TBEN_CH0_DIAGNOSTICS	TBEN_CH0_DIAG	
TBEN_DIAG	TBEN_DIAG	
TBEN_DXP_INPUTS	TBEN_DXP_IN	
TBEN_DXP_OUTPUTS	TBEN_DXP_OUT	
TX_BUFFER	TX_BUFFER	
RX_BUFFER	RX_BUFFER	

U	Motion Groups
U	Ungrouped Axes
-	Add-On Instructions
+	IntToString
+	TBEN_S2_2RFID_4DXP
-	Data Types
+	User-Defined
+	Strings
+	Add-On-Defined
+	Predefined
U	Motion Groups

Type	Ladder Diagram
Description	
Program	MainProgram
Number of Rungs	36

+ RX_BUFFER	{...}
+ RX_BUFFER_Count	{...}
+ TBEN:C	{...}
+ TBEN:I	{...}
+ TBEN:O	{...}
- TBEN1	{...}
TBEN1.EnableIn	1
TBEN1.EnableOut	1
TBEN1.READ	0
TBEN1.WRITE	0
TBEN1.TAG_ID	0
+ TBEN1.DOMAIN	1
+ TBEN1.LENGTH	12
+ TBEN1.START_ADDRESS	1
TBEN1.RESET	0
TBEN1.UHF_CONTINU...	0
+ TBEN1.NODE_ADDRESS	0
+ TBEN1.NODE_ADDRES...	0



**Controller Organizer**

**Controller Tags - TBEN\_RFID\_SAMPLE(controller)**

Scope: TBEN\_RFID\_SA Show: All Tags Enter Name

Name	Value
+ Local:2:I	{...}
+ Local:2:O	{...}
+ Local:3:C	{...}
+ Local:3:I	{...}
+ Local:3:O	{...}
+ Local:4:C	{...}
+ Local:4:I	{...}
+ Local:4:O	{...}
+ myConversion	{...}
+ myIndex	0
+ myString2	'226'
PETTrigger	0
PETTriggerFallingEdge	0
ProcessDataBit	0
reset_ons	0
- RX_BUFFER	{...}
+ RX_BUFFER[0]	14
+ RX_BUFFER[1]	1
+ RX_BUFFER[2]	-30
+ RX_BUFFER[3]	0
+ RX_BUFFER[4]	52
+ RX_BUFFER[5]	18
+ RX_BUFFER[6]	-36
+ RX_BUFFER[7]	3
+ RX_BUFFER[8]	1
+ RX_BUFFER[9]	24
+ RX_BUFFER[10]	40
+ RX_BUFFER[11]	5
+ RX_BUFFER[12]	-110
+ RX_BUFFER[13]	117
+ RX_BUFFER[14]	1
+ RX_BUFFER[15]	0
+ RX_BUFFER[16]	0
+ RX_BUFFER[17]	0

**I/O Configuration**

- CompactLogix5323E-QBFC1 System
  - 1769-L23E-QBFC1 TBEN\_RFID\_SAMPLE
  - 1769-L23E-QBFC1 Ethernet Port Local
    - Ethernet
      - 1769-L23E-QBFC1 Ethernet Port
      - ETHERNET-MODULE TBEN
- CompactBus Local
  - Embedded I/O
    - [1] Embedded IQ16F Discrete\_I

**Module Defined Tags**

- TBEN:I
- TBEN:O
- TBEN:C

Description Status Module Fault

Controller Tags - TBEN\_RFID\_SAMPLE(controller)

Scope: TBEN\_RFID\_SA Show: All Tags Enter Name

Name	Value
+ Local:2:I	{...}
+ Local:2:O	{...}
+ Local:3:C	{...}
+ Local:3:I	{...}
+ Local:3:O	{...}
+ Local:4:C	{...}
+ Local:4:I	{...}
+ Local:4:O	{...}
+ myConversion	{...}
+ myIndex	0
+ myString2	'226'
PETTrigger	0
PETTriggerFallingEdge	0
ProcessDataBit	0
reset_ons	0
- RX_BUFFER	{...}
+ RX_BUFFER[0]	14
+ RX_BUFFER[1]	1
+ RX_BUFFER[2]	-30
+ RX_BUFFER[3]	0
+ RX_BUFFER[4]	52
+ RX_BUFFER[5]	18
+ RX_BUFFER[6]	-36
+ RX_BUFFER[7]	3
+ RX_BUFFER[8]	1
+ RX_BUFFER[9]	24
+ RX_BUFFER[10]	40
+ RX_BUFFER[11]	5
+ RX_BUFFER[12]	-110
+ RX_BUFFER[13]	117
+ RX_BUFFER[14]	1
+ RX_BUFFER[15]	0
+ RX_BUFFER[16]	0
+ RX_BUFFER[17]	0

**Hardware View**

**Ladder Logic Diagram**

```

1   AHMI Trigger
2   TBEN1.TAG_ID
3   trigger_decode
(End)

```

The ladder logic diagram shows three rungs:

- Rung 1: An input labeled "AHMI Trigger" connected to coil "TBEN1.TAG\_ID".
- Rung 2: Input "TBEN1.TAG\_ID" connected to a "One Shot Falling Storage Bit decode\_ons Output Bit trigger\_decode" block.
- Rung 3: Input "trigger\_decode" connected to a "Jump To Subroutine Routine Name ProcessData" block.



Welcome  
The

Monday, September 27, 4:20 PM - 5:00 PM

for a Barcode

## Improving Visibility and Traceability in the Retail Grocery and Foodservice Industries: Encoding Attribute Data in EPC/RFID Tags



n



Room: N221 B

Share ▾

RFID technology offers many benefits relating to traceability and operational efficiencies for the retail grocery and foodservice industry. Effectively tracking food products at the carton and case-level helps ensure food safety, recall readiness, and supply chain visibility. Electronic Product Code/Radio Frequency Identification (EPC/RFID) technology does more than just encode the... [...read more...](#)

Speaker(s)



**Jonathan Gregory**

Director of Community Engagement, Apparel and General Merchandise  
GS1 US

As the Director of Community Engagement of Apparel and General Merchandise at GS1 US, Jonathan Gregory facilitates collaboration among brands, retailers, and their supply chain partners to optimize the use of GS1 Standards in the apparel and general merchandise industries.

Guidance

A GS1 US  
Extended A

Effectively tr  
case-level he  
supply chain  
Frequency Ic  
more than ju  
(GTIN) and S  
help you und

gs

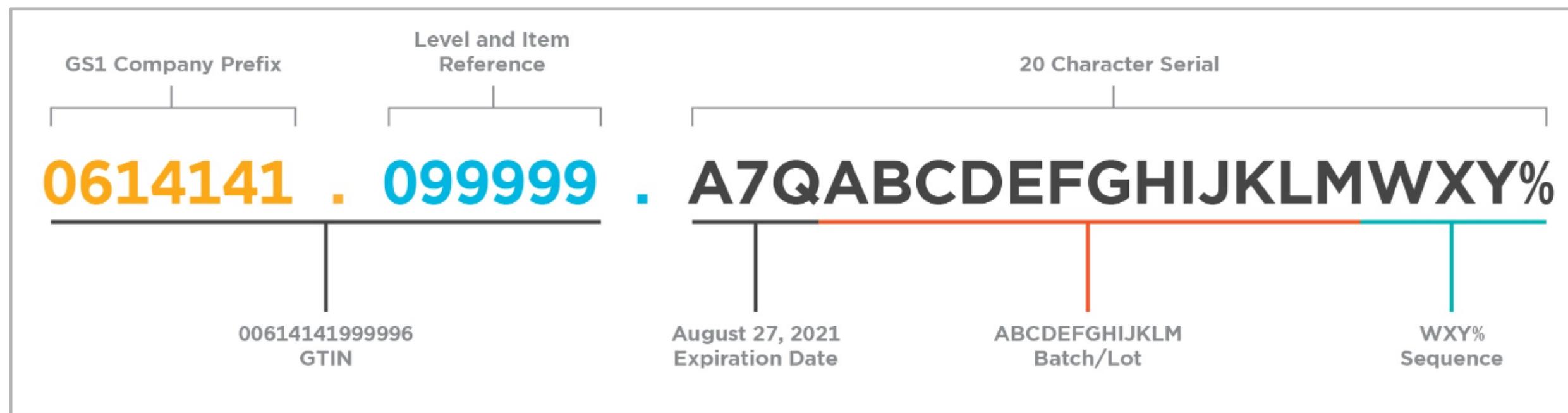
TM

Figure 6.2-1 The list of possible options

Option	1 <sup>st</sup> element	2 <sup>nd</sup> element	3 <sup>rd</sup> element	4 <sup>th</sup> element
1	Date	Batch/Lot	Sequence	
2		Net Weight	Batch/Lot	Sequence

<https://www.gs1us.org/industries/foodservice/implementation-resources/encoding-attribute-data-in-epc-rfid>

Figure 6-1, Example showing attribute data packed into serialization block (Option 1 from Figure 6.2-1)





THE UNIVERSITY OF  
**MEMPHIS**<sup>®</sup>  
Automatic Identification Lab

**RFID**  
JOURNAL  
**LIVE!**

**SEPTEMBER 26 - 28, 2021**

**Table 14-4 SGTIN-198 coding table**

<b>Scheme</b>	SGTIN-198					
<b>URI Template</b>	urn:epc:tag:sgtin-198: <i>F.C.I.S</i>					
<b>Total Bits</b>	198					
<b>Logical Segment</b>	EPC Header	Filter	Partition	GS1 Company Prefix (*)	Indicator (**)/Item Reference	Serial
<b>Logical Segment Bit Count</b>	8	3	3	20-40	24-4	140
<b>Coding Segment</b>	EPC Header	Filter	GTIN			Serial
<b>URI portion</b>		<i>F</i>	<i>C.I</i>			<i>S</i>
<b>Coding Segment Bit Count</b>	8	3	47			140
<b>Bit Position</b>	$b_{197}b_{196}\dots b_{190}$	$b_{189}b_{188}b_{187}$	$b_{186}b_{185}\dots b_{140}$			$b_{139}b_{138}\dots b_0$
<b>Coding Method</b>	00110110	Integer	Partition <a href="#">Table 14-2</a>			String

Figure 6.3-4 The format of Date

Name	Hex Value	URI Form	1st Date Char: YY	2nd Date Char: MM+Date Option	3rd Date Char: DD+What Follows
Digit Zero	30	0	N/A	01 - January + Expiration Date	01 + Batch/Lot Follows
Digit One	31	1	N/A	02 - February + Expiration Date	02 + Batch/Lot Follows
Digit Two	32	2	N/A	03 - March + Expiration Date	03 + Batch/Lot Follows
Digit Three	33	3	N/A	04 - April + Expiration date	04 + Batch/Lot Follows
Digit Four	34	4	N/A	05 - May + Expiration date	05 + Batch/Lot Follows
Digit Five	35	5	N/A	06 - June + Expiration date	06 + Batch/Lot Follows
Digit Six	36	6	N/A	07 - July + Expiration date	07 + Batch/Lot Follows
Digit Seven	37	7	N/A	08 - August + Expiration date	08 + Batch/Lot Follows
Digit Eight	38	8	N/A	09 - September + Expiration date	09 + Batch/Lot Follows
Digit Nine	39	9	N/A	10 - October + Expiration date	10 + Batch/Lot Follows
				11 - November + Expiration	

Parse out first 3 serial number "characters"

2

EQU

Source A

tag.LEN

26

Source B

26

BTD

Source

tag.DATA[7]

'\$A0'

Source Bit

0

Dest SerialNumber[0]

65

Dest Bit

1

Length

6

BTD

Source

tag.DATA[8]

'\$CB'

Source Bit

7

Dest SerialNumber[0]

65

Dest Bit

0

Length

1

BTD

Source

tag.DATA[8]

'\$CB'

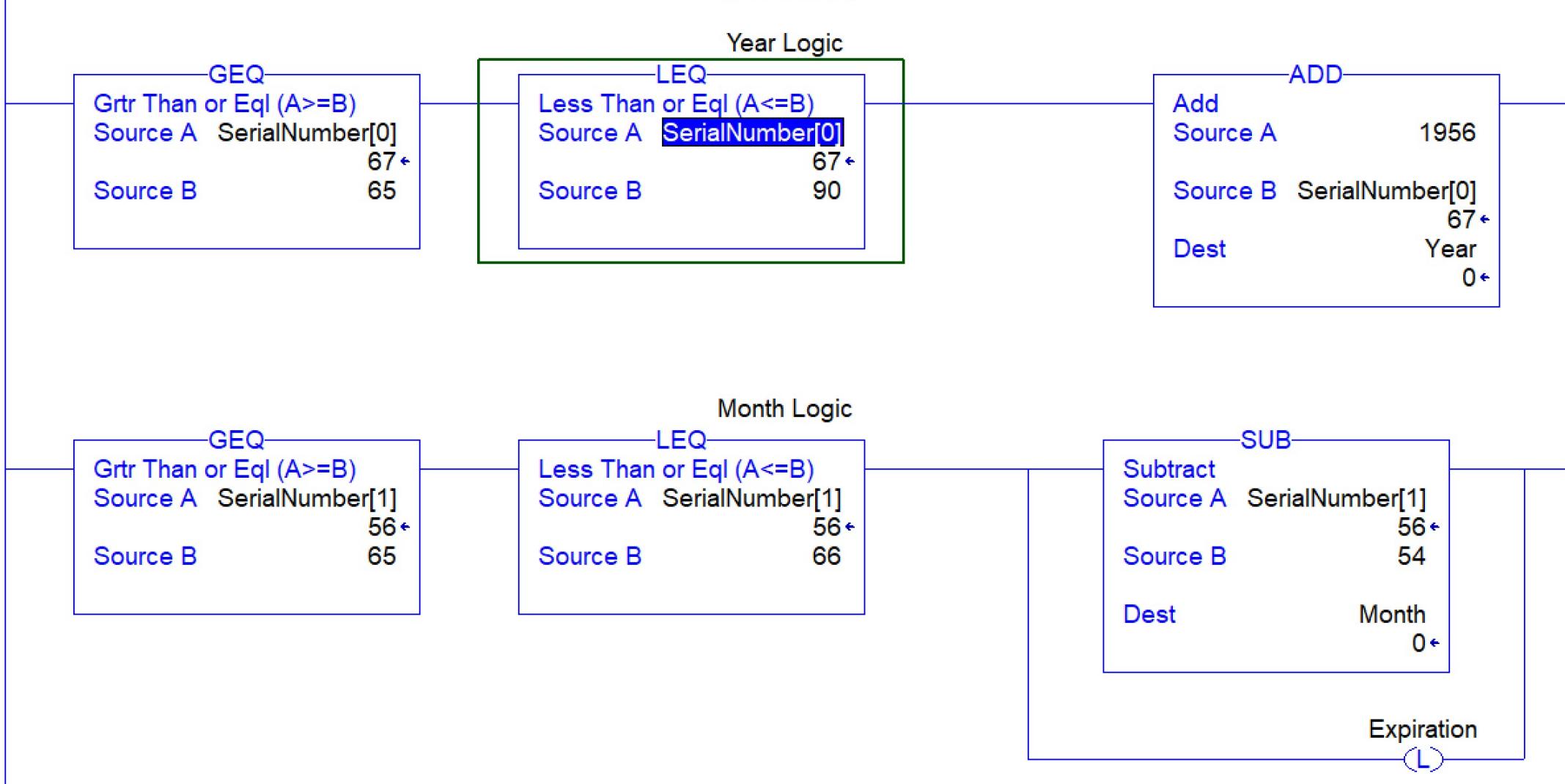
Source Bit

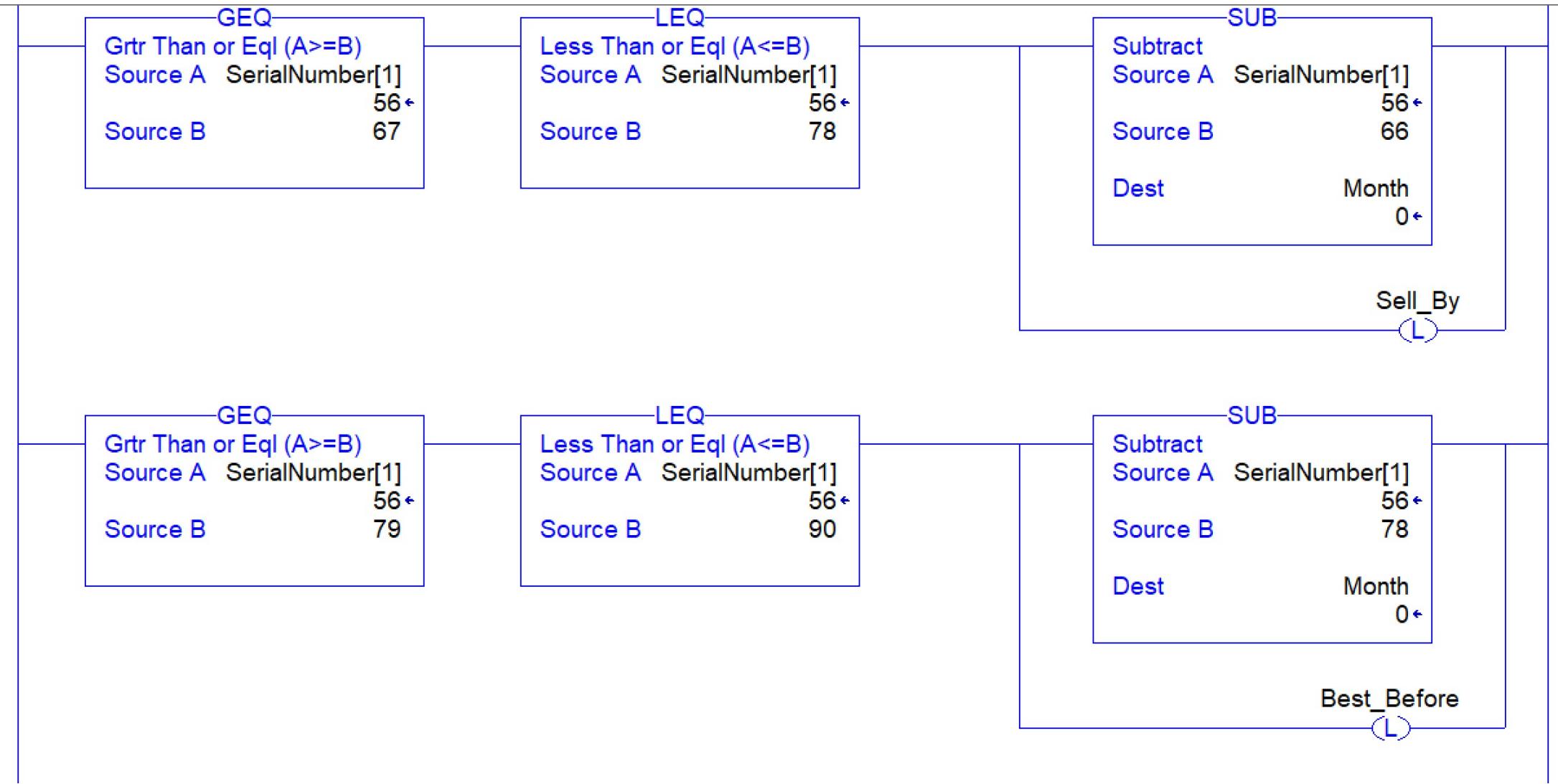
0

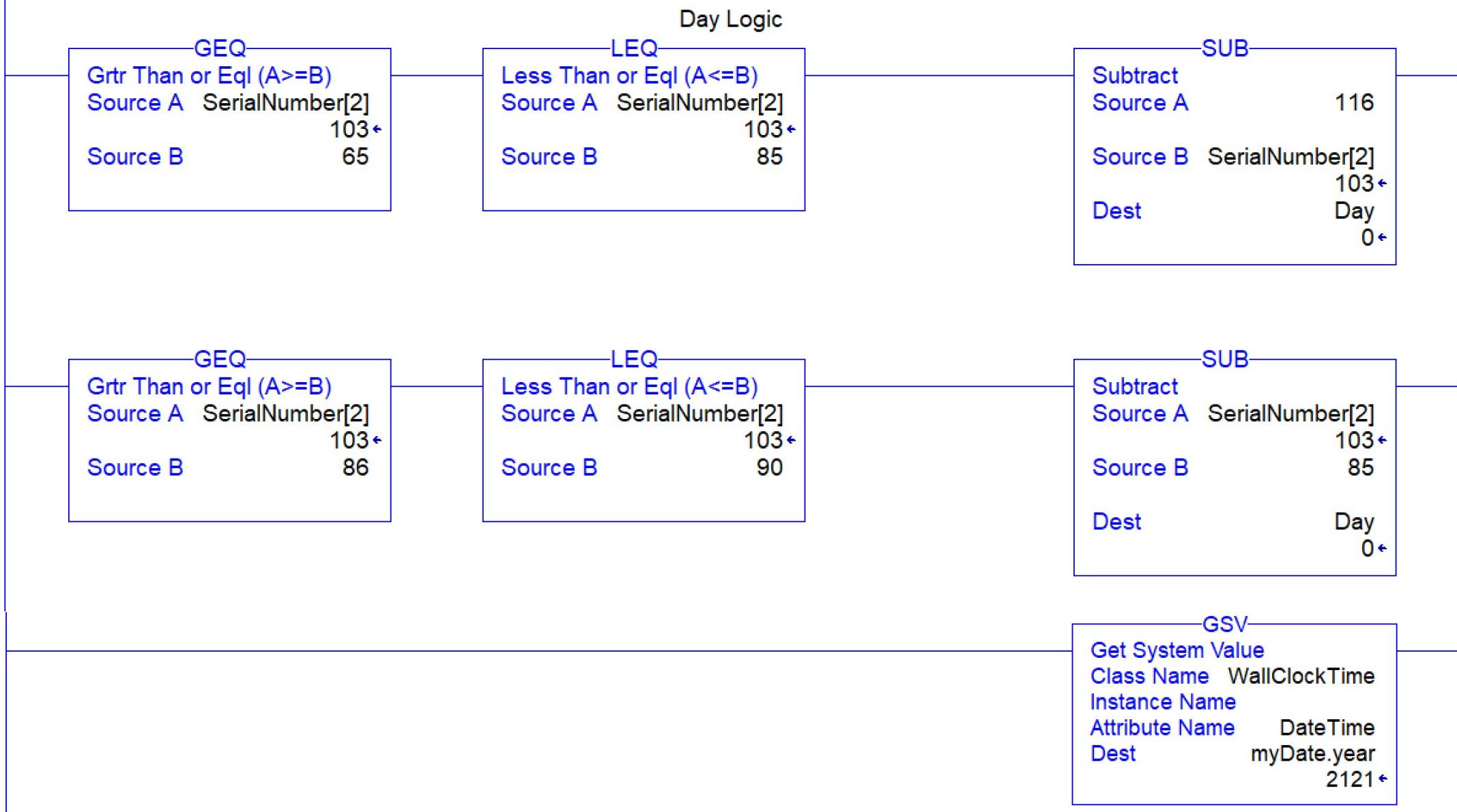
Dest SerialNumber[1]

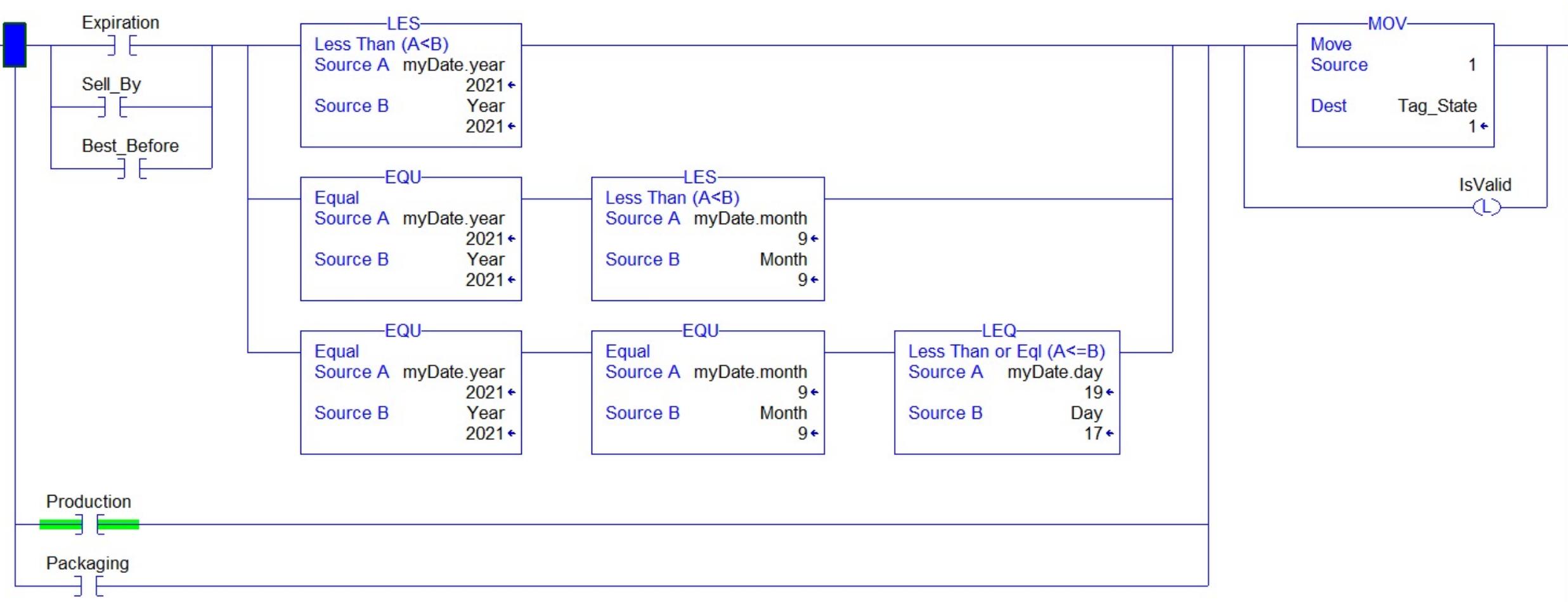
75

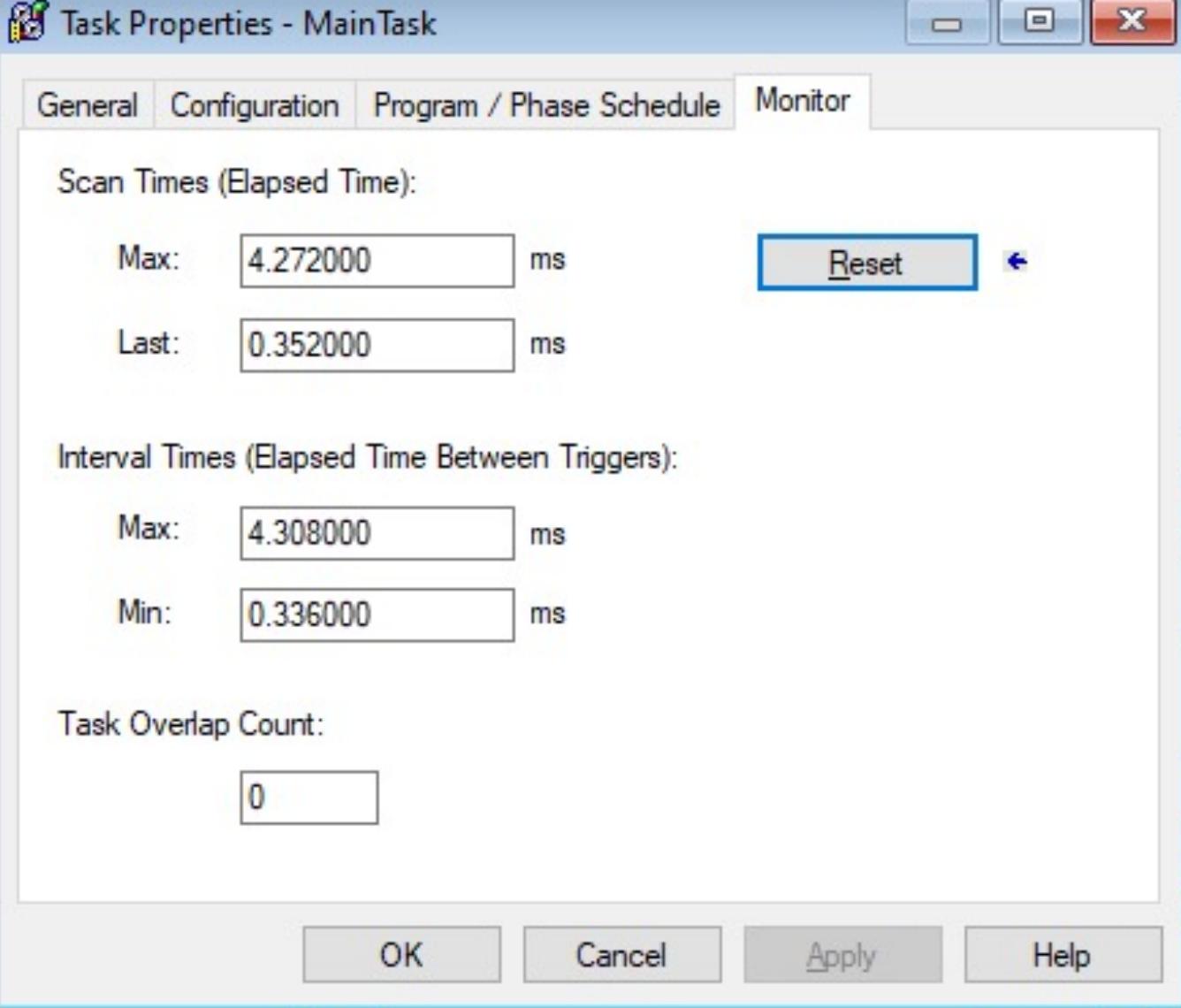
\*\*\*\*\* HEX 41-5A \*\*\*\*\*











# Closing thoughts...

- Demand better adoption
- Inherent conversion to ASCII
- Common reader control access
- PLCs are functionally capable



# Questions?

Kevin Berisso  
University of Memphis  
Automatic Identification Lab  
[kberisso@memphis.edu](mailto:kberisso@memphis.edu)



# THANK YOU



**RFID**  
**JOURNAL**  
**LIVE!**