

# R90C or R95C Hub Process Data Function

---

January 12<sup>th</sup>, 2026

This document covers the installation and use of a function for Siemens's TIA Portal software package. This function handles cyclic IO-Link Process Data In from a Banner R90C or R95C Hub sensor via an IO-Link Master to a Siemens PLC. The function covers parsing and display of the R90C or R95C Hub sensor Process Data In.

## **Components**

Banner R90C R95 R130C Hubs v16.zal16

There are two methods for the process data. The first is used when creating a connection to Banner's IO-Link masters. The second set of instructions are for systems using other manufacturer's IO-Link masters.

### **Installation Instructions**

1. Open a project.
2. Go to the Open Global Library option in the Libraries tab in TIA Portal v16 or greater.



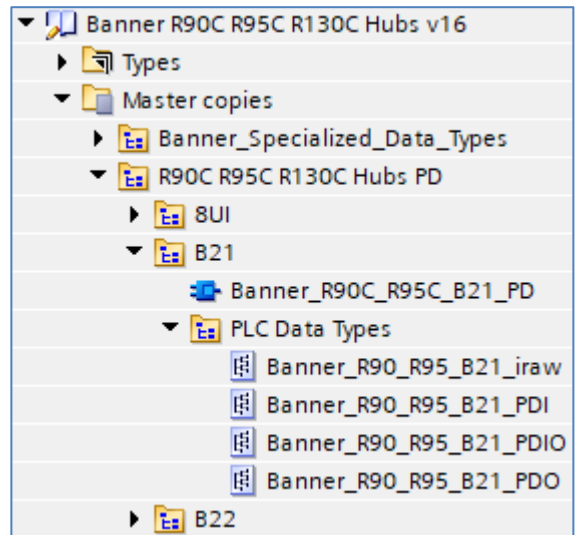
3. Switch the “Files of type” to Compressed libraries. Go to the location of the compressed library.
4. Press the Open button and the library will be uncompressed and opened.
5. The library is now accessible in the Libraries tab in v16 or greater.

**Setup of R90C or R95C Hubs with a Banner DXMR**

1. Go to Device and Networks to configure the DXMR. Add the DXMR if it has yet to be added to the system.
2. Open the IO-Link Generic Devices and select the proper module. The 32/32 byte option has been selected for port 1. Make note of the I address for the Slot 2 which represents Port 1. Slot 2 starts are 10. The other number needed is I14. The data for the port start at that point (I14). The previous four bytes represents Port Status, Process Data In Size, and Process Data Out Size.

Module	Rack	Slot	I address	Q address	Type
▼ dxm	0	0			1-port Device
▶ Interface	0	0 X1			dxm
Banner IO-Link Master Info_1	0	1	1...9		Banner IO-Link Master Info
IO-Link In/Out 32/32 Byte + Status_1	0	2	10...45	1...46	IO-Link In/Out 32/32 Byte + Status

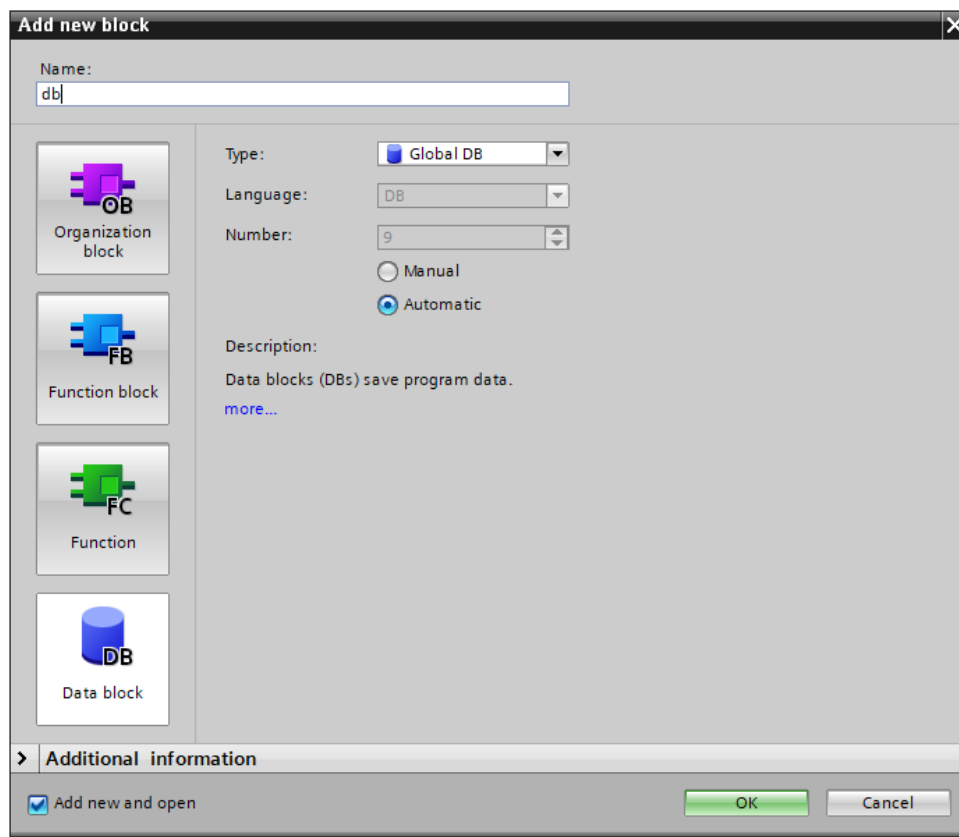
3. Open the B21 folder from the “R90C R95C R130C Hubs PD”.
4. Drag the Banner\_R90\_R95\_B21\_iraw, Banner\_R90\_R95\_B21\_PDI, Banner\_R90\_R95\_B21\_PDIO, and Banner\_R90\_R95\_B21\_PDO to the PLC Data Types area under your PLC.
5. Drag the Banner\_R90C\_R95C\_B21\_PD to the Program Blocks area.
6. Drag the necessary tags from Banner\_Specialized\_Data\_Types. The tags used in this example is “Banner\_32in” and “Banner\_32out”. These tags represent the full raw process data along with port status information.



7. Go to PLC Tags. Create four tags. Two of the tags are for the full data structure while the second set represents the raw Process Data from the IO-Link Master. In this example, Tag table\_1 was created, the tags “R90C 4B21 IOLM1 01 PDI” and “R90C 4B21 IOLM1 01 PDO” was created using a Data Type of “Banner\_32In” and “Banner\_32Out”. This naming convention calls out the type of sensor in question as well as the specific IO-Link Master and port number where the sensor is connected. A different IO-Link Master might be named IOLM2 or IOLM3, for instance, and other specific sensors may be connected to different port numbers. The “I” address found in step 2 is tied to this new tag. The second set of tags use “R90C” “R90C\_4B21\_IOLM1\_01\_outRaw” and “Byte”. These are the tags that will be used in the Function block. The tags are labeled as “R90C IOLM1 01 inRaw” and “R90C IOLM1 01 outRaw”.

Name	Data type	Address
▶ R90C 4B21 IOLM1 01 PDI	"Banner_32In"	%I10.0
▶ R90C 4B21 IOLM1 01 inRaw	"Banner_R90_R95_B21_iraw"	%I14.0
▶ R90C 4B21 IOLM1 01 PDO	"Banner_32Out"	%Q1.0
R90C 4B21 IOLM1 01 outRaw	Byte	%QB3

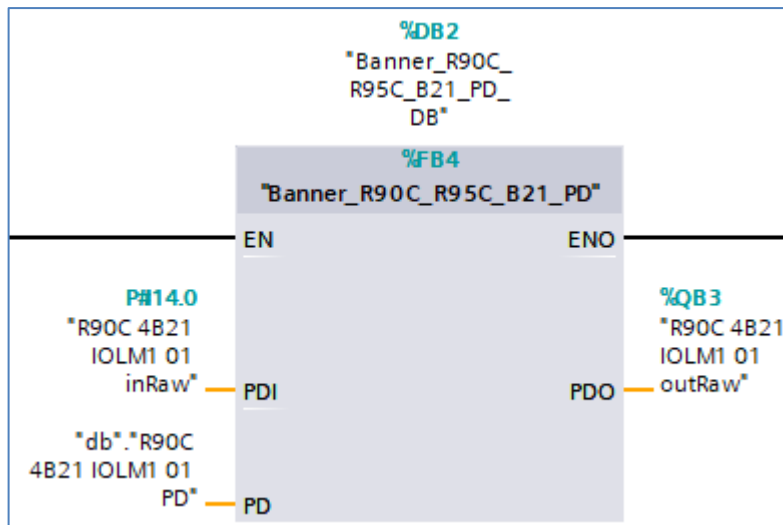
8. Go to Program blocks. Add a new Data block if necessary. In this example the new data block is named “db”.



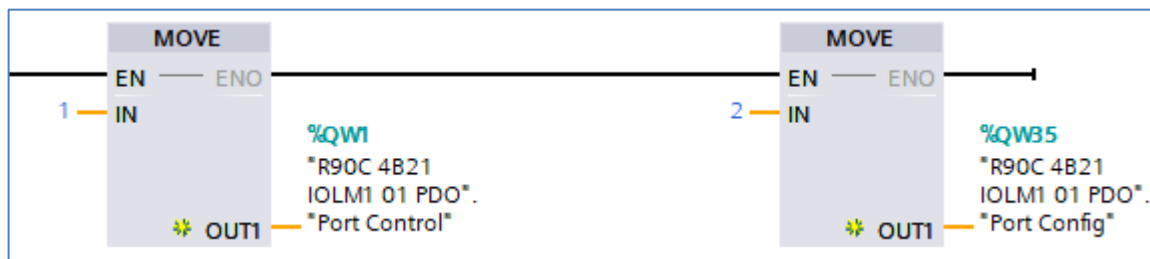
9. In the new data block, create a new tag to represent the parsed Process Data In for our LE. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type “Banner\_R90\_R95\_PDIO” for the new tag.

▼ R90C 4B21 IOLM1 01 PD	"Banner_R90_R95_B21_PDIO"
▀ Discrete In	"Banner_R90_R95_B21_PDI"
▀ Discrete Out	"Banner_R90_R95_B21_PDO"
▀ PD Measurement 1	UDInt
▀ PD Measurement 2	UDInt
▀ PD Measurement 3	UDInt
▀ PD Measurement 4	UDInt

10. Add the “Banner\_R90C\_R95C\_B21\_PD” function to an OB ladder. Link the “PDI” and “PDO” to the raw Process Data variable from step 5. Link the “PD” to the parsed Process Data variable from step 7.



11. The final step is to configure the IO-Link output control. This is done by sending a 1 to Port Control and a 2 to Port Config. Both parameters are part of the tag created in step 7 “R90C 4B21 IOLM1 01 PDO”.



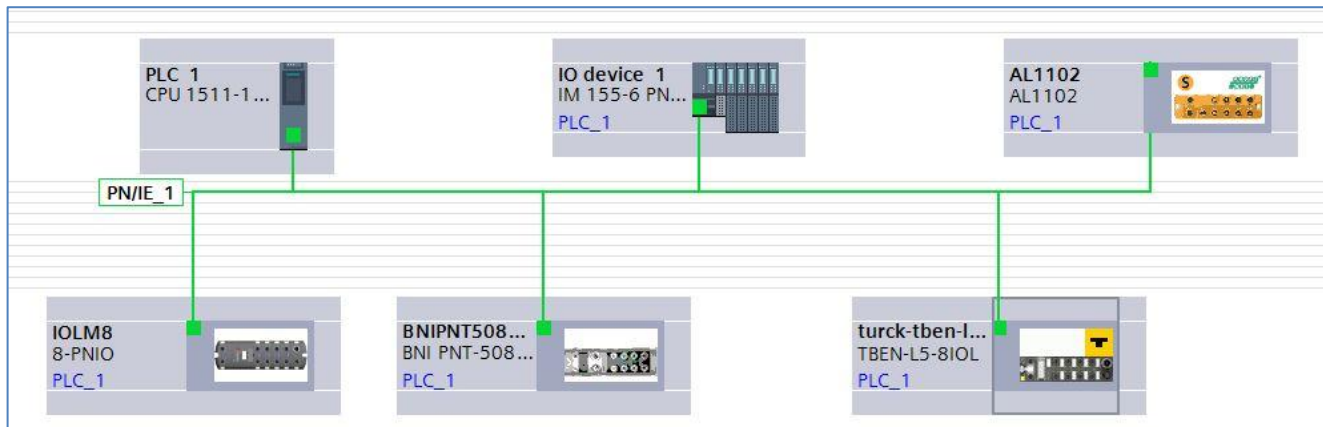
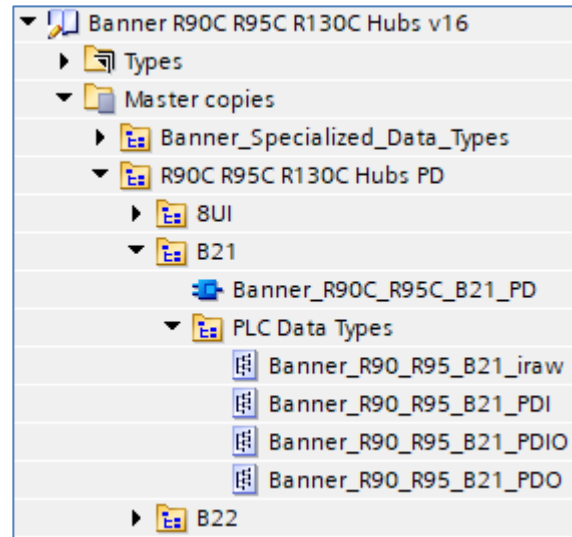
12. Process Data setup is complete.

13. Compile and download the configuration to the PLC, then go online. Open the “db” data block and click Monitor all. You should see parsed R90C 4B21 IOLM1 PD Process Data.

Name	Data type	Monitor value
▼ Static		
■ ► IOLM1	"Banner_IOLM"	
■ ▼ R90C 4B21 IOLM1 01 PD	"Banner_R90_R95_B21_PDIO"	
■ ▼ Discrete In	"Banner_R90_R95_B21_PDI"	
■ P1 Input 1	Bool	TRUE
■ P1 Input 2	Bool	FALSE
■ P2 Input 1	Bool	FALSE
■ P2 Input 2	Bool	FALSE
■ P3 Input 1	Bool	FALSE
■ P3 Input 2	Bool	FALSE
■ P4 Input 1	Bool	FALSE
■ P4 Input 2	Bool	FALSE
■ P5 Input 1	Bool	FALSE
■ P5 Input 2	Bool	FALSE
■ P6 Input 1	Bool	FALSE
■ P6 Input 2	Bool	FALSE
■ P7 Input 1	Bool	FALSE
■ P7 Input 2	Bool	FALSE
■ P8 Input 1	Bool	FALSE
■ P8 Input 2	Bool	FALSE
■ ► Discrete Out	"Banner_R90_R95_B21_PDO"	
■ PD Measurement 1	UDInt	34
■ PD Measurement 2	UDInt	0
■ PD Measurement 3	UDInt	0
■ PD Measurement 4	UDInt	0

### **Setup of R90C-4B21 OR R95C-8B21 with other IO-Link Masters**

1. The Banner IO-Link Library will now be in the Global Library List. Expand the Master copies section. The R90C R95C R130C Hubs PD folder contains elements for Process Data to a R90C-4B21 OR R95C-8B21 sensor.
2. Drag Banner\_R90C\_R95C\_B21\_PD to the Program Blocks area under your PLC.
3. Drag Banner\_R90C\_R95C\_B21\_iraw, Banner\_R90C\_R95C\_B21\_PDI, Banner\_R90C\_R95C\_B21\_PDIO, and Banner\_R90C\_R95C\_B21\_PDO to the PLC Data Types area under your PLC.
4. Go to Devices and Network to configure the system as necessary. Below is an example of what a configuration might look like. This example shows 5 different Io-Link Master connected to the same plc.

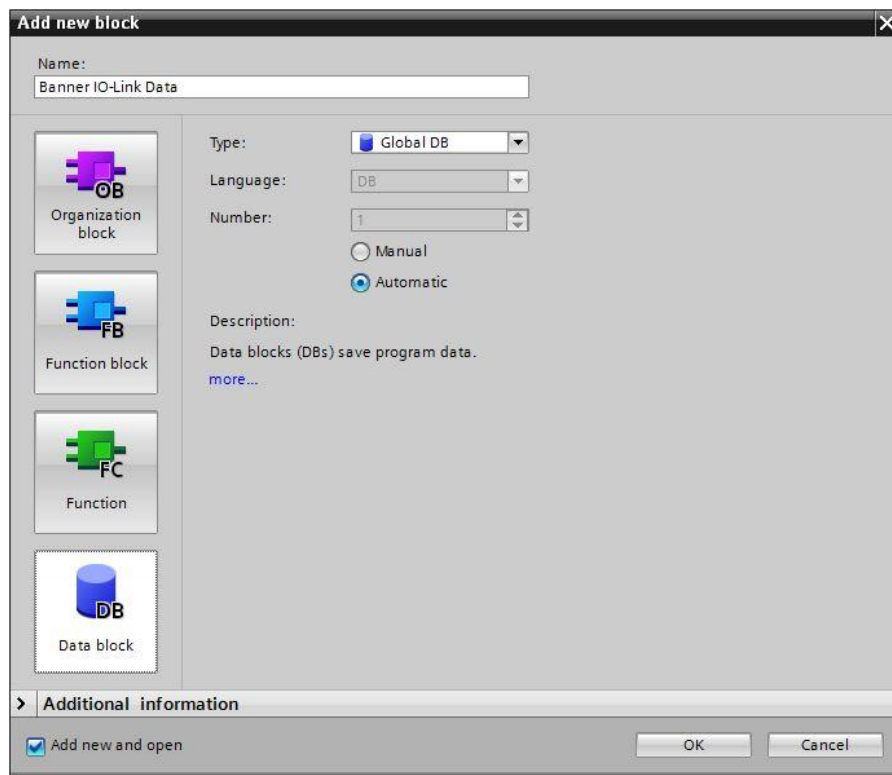


5. Click on the relevant device and configure the IO-Link Master as necessary. Refer to the documentation for the IO-Link Master. Recall that a R90C-4B21 OR R95C-8B21 requires 18 bytes of space for the Process Data In, and 1 byte of space for the Process Data Out.
6. Record the "I" address where this R90C-4B21 or R95C-8B21 Process Data In is to be stored, as the address will be required in the next step. In this example, 18 bytes of Process Data In for port 1 on the IO-Link Master. The IO-Link Master allows for various sizes. The one closest for this unit is 32 bytes IN and Out. The input starts at %I14 and output starts at %Q3.

7. Go to PLC Tags. Add a new tag table, if desired, then create a new tag to represent the raw Process Data from the IO-Link Master. In this example the tag “R90C 4B21 IOLM1 01 inRaw” was created using a Data Type of “Banner\_R90C\_R95C\_B21\_iraw”. This naming convention calls out the type of sensor in question as well as the specific IO-Link Master and port number where the sensor is connected. A different IO-Link Master might be named IOLM2 or IOLM3, for instance, and other specific sensors may be connected to different port numbers. The second tag uses “R90C 4B21 IOLM1 01 outRaw” was created using a Data Type of “Byte”. The “I” and “Q” addresses found in step 6 is tied to this new tag.

▶ R90C 4B21 IOLM1 01 inRaw	"Banner_R90_R95_B21_iraw"	%I14.0
R90C 4B21 IOLM1 01 outRaw	Byte	%QB3

8. Go to Program blocks. Add a new Data block if necessary. In this example the new data block is named “Banner IO-Link Data”.

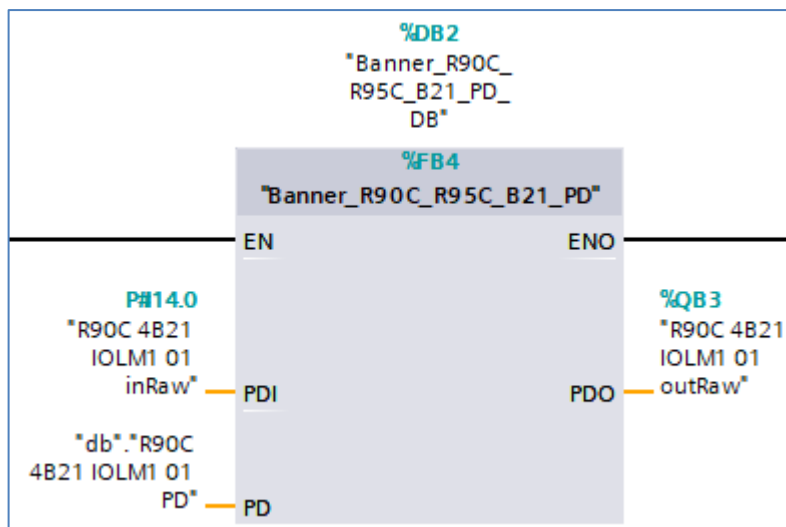




9. In the new data block, create a new tag to represent the parsed Process Data for our R90C-4B21. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type “Banner\_R90C\_R95C\_B21\_PDIO” for the new tag.

▼ R90C 4B21 IOLM1 01 PD	"Banner_R90_R95_B21_PDIO"
■ ▶ Discrete In	"Banner_R90_R95_B21_PDI"
■ ▶ Discrete Out	"Banner_R90_R95_B21_PDO"
■ PD Measurement 1	UDInt
■ PD Measurement 2	UDInt
■ PD Measurement 3	UDInt
■ PD Measurement 4	UDInt

10. Add the “Banner\_R90C\_R95C\_B21\_PD” function to an OB ladder. Link the “PDI” and “PDO” to the raw Process Data variables from step 7. Link the “PD” to the parsed Process Data variable from step 9.



11. Process Data setup is complete.

12. Compile and download the configuration to the PLC, then go online. Open the “Banner IO-Link Data” data block and click Monitor all. Expand “R90C 4B21 IOLM1 01 PD”.

Name	Data type	Monitor value
▼ Static		
■ ► IOLM1	"Banner_IOLM"	
■ ▼ R90C 4B21 IOLM1 01 PD	"Banner_R90_R95_B21_PDIO"	
■ ▼ Discrete In	"Banner_R90_R95_B21_PDI"	
■ P1 Input 1	Bool	TRUE
■ P1 Input 2	Bool	FALSE
■ P2 Input 1	Bool	FALSE
■ P2 Input 2	Bool	FALSE
■ P3 Input 1	Bool	FALSE
■ P3 Input 2	Bool	FALSE
■ P4 Input 1	Bool	FALSE
■ P4 Input 2	Bool	FALSE
■ P5 Input 1	Bool	FALSE
■ P5 Input 2	Bool	FALSE
■ P6 Input 1	Bool	FALSE
■ P6 Input 2	Bool	FALSE
■ P7 Input 1	Bool	FALSE
■ P7 Input 2	Bool	FALSE
■ P8 Input 1	Bool	FALSE
■ P8 Input 2	Bool	FALSE
■ ► Discrete Out	"Banner_R90_R95_B21_PDO"	
■ PD Measurement 1	UDInt	34
■ PD Measurement 2	UDInt	0
■ PD Measurement 3	UDInt	0
■ PD Measurement 4	UDInt	0

**Appendix A****R90C-4B21 OR R95C-8B21 Process Data**

The R90C-4B21 OR R95C-8B21 has 18 bytes of Process Data In and 1 byte of Process Data Out, as shown below.

**ProcessData id=PD\_ProcessData****ProcessDataIn "Process Data Input" id=PD\_ProcessDataIn**

bit length: 144

data type: 144-bit Record (subindex access not supported)

subindex	bit offset	data type	allowed values	default value	acc. restr.	mod. other var.	excl. from DS	name	description
1	0	Boolean	false = Inactive, true = Active					Discrete1 Input State	true (1) = Discrete1 Input Active
2	1	Boolean	false = Inactive, true = Active					Discrete2 Input State	true (1) = Discrete2 Input Active. Note - even if Discrete2 is configured as an output, the active state will be reflected at the input
3	16	32-bit Integer						Process Data Measurement 1	Process Data Measurement 1 Value
4	48	32-bit Integer						Process Data Measurement 2	Process Data Measurement 2 Value
5	80	32-bit Integer						Process Data Measurement 3	Process Data Measurement 3 Value
6	112	32-bit Integer						Process Data Measurement 4	Process Data Measurement 4 Value

**ProcessDataOut "Process Data Output" id=PD\_ProcessDataOut**

bit length: 8

data type: 8-bit Record (subindex access not supported)

subindex	bit offset	data type	allowed values	default value	acc. restr.	mod. other var.	excl. from DS	name	description
1	0	Boolean	false = Off, true = On					Discrete2 Output State	true (1) = Discrete2 Output Active

Octet 0

bit offset	7	6	5	4	3	2	1	0
subindex	/////	/////	/////	/////	/////	/////	/////	1

This function intelligently parses this Process Data into its component pieces.