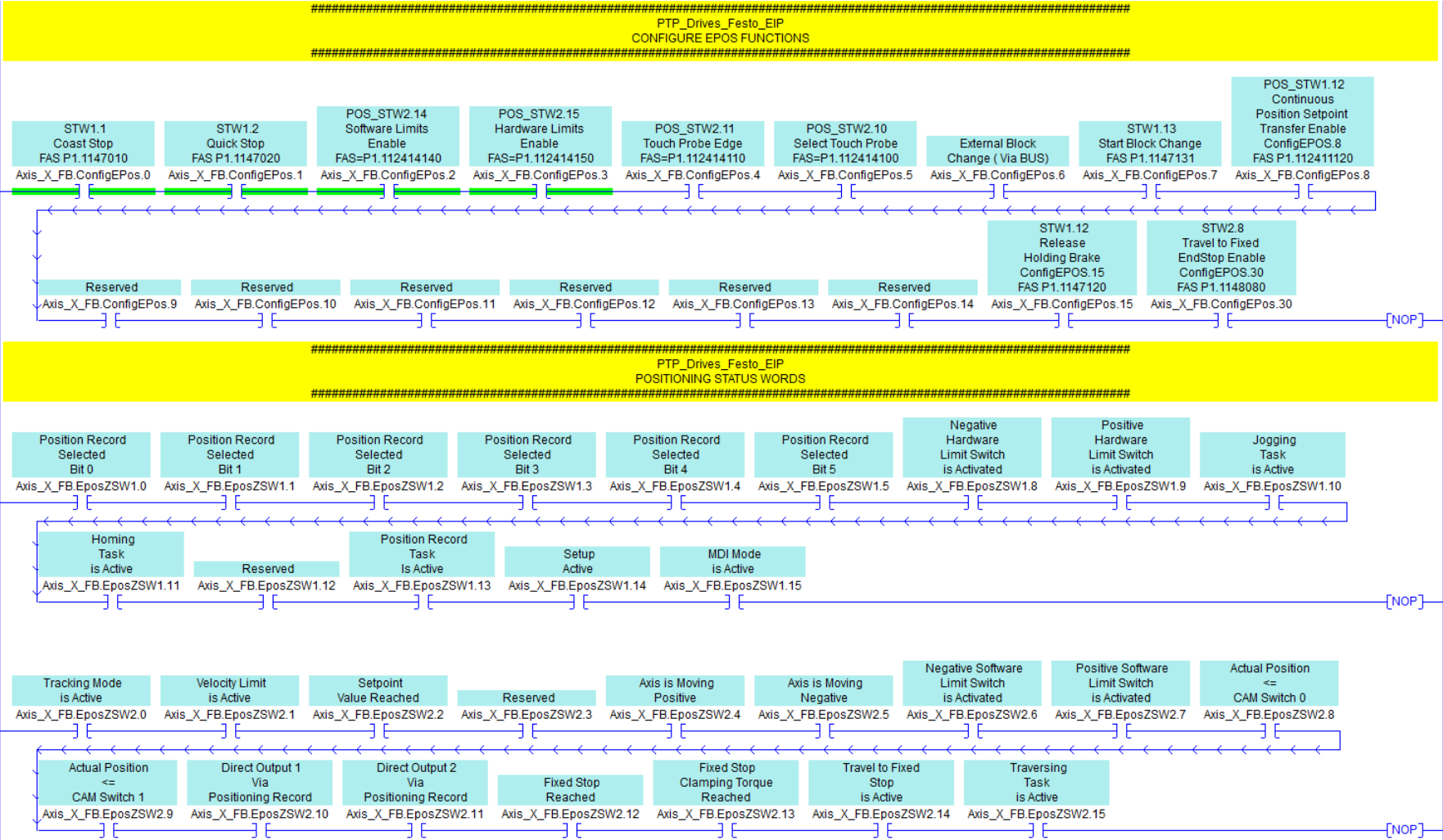


CMMT-xx-EP Sequencing Direct Mode

With the AOI's (Add-On Instructions) we have the following:

PTP_Drives_Festo_EIP		
PTP_Drives_Festo_EIP	Axis_X_FB	(AxisEnabled)
I_O_I_n_t_e_r_f_a_c_e	0	
DRV_Status	CMMT_AS_Axis_X:I1.Data	(AxisPosOk)
DRV_Control	CMMT_AS_Axis_X:O1.Data	
C_o_n_t_r_o_l_A_r_e_a	0	(AxisSpFixed)
ModePos	2	
EnableAxis	1	(AxisAckSetpoint)
CancelTraversing	1	
IntermediateStop	1	(AxisRef)
Positive	0	
Negative	0	(AxisWarn)
Jog1	0	
Jog2	0	(AxisError)
AckError	0	
ReleaseBrake	0	(Lockout)
TravelToFixStop	0	
ExecuteMode	0	(Error)
Position	10000	
Velocity	80	
OverV	100	
OverAcc	100	
OverDec	100	
ConfigEPos	15	
BaseSpeedValue	3000.0	
ConnectionFaulted	CMMT_AS_Axis_X:I1.ConnectionFaulted	
	0	
M_o_n_i_t_o_r_A_r_e_a	0	
ActVelocity	0.035628676	
ActPosition	9999	
ActMode	2	
EposZSW1	-32768	
EposZSW2	4	
ActWarn	0	
ActFault	0	
Status	16#7002	

Beyond the AOI (Add-On Instruction) graphic tags shown above, there are also additional configuration and status bits as shown here:



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The following IO (Inputs/Outputs) needs to be considered:

PnP MODE																		
NOTE: Telegram 111 is a SIEMENS specific extension of PROFIDrive. (Siemens telegram 111)																		
		B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0	
STATUS	WORD0	ZSW1	ZSW1.15 Device specific	ZSW1.14 Device specific	ZSW1.13 Drive Stopped AxisSpFixed	ZSW1.12 Traverse Task Acknowledge AxisAckSetpoint FAS P1.1145121	ZSW1.11 Home Position Set AxisRef	ZSW1.10 Traverse Task Motion Complete AxisPosOk FAS P1.1145101	ZSW1.9 PLC Control Requested	ZSW1.8 Following Error Within Tolerance Range	ZSW1.7 Warning Active AxisWarn	ZSW1.6 Switch On Inhibited Lockout	ZSW1.5 Quick Stop Not Active	ZSW1.4 Coast Stop Not Active	ZSW1.3 Fault Active AxisError	ZSW1.2 Operation Enabled AxisEnabled	ZSW1.1 Ready To Operate sbReady	ZSW1.0 Ready to Switch On
	WORD1	POS_ZSW1 or Epos_ZSW1	POS_ZSW1.15 MDI Active Selection 0=Record Mode 1=Direct Mode	POS_ZSW1.14 Setup Active	POS_ZSW1.13 Position Record Task Is Active	Reserved B12	POS_ZSW1.11 Homing Task Is Active	POS_ZSW1.10 Jogging Task Is Active	POS_ZSW1.9 Positive Hardware Limit Switch Is Activated	POS_ZSW1.8 Negative Hardware Limit Switch Is Activated	Reserved B7	POS_ZSW1.6 Position Record Selected Bit 6	POS_ZSW1.5 Position Record Selected Bit 5	POS_ZSW1.4 Position Record Selected Bit 4	POS_ZSW1.3 Position Record Selected Bit 3	POS_ZSW1.2 Position Record Selected Bit 2	POS_ZSW1.1 Position Record Selected Bit 1	POS_ZSW1.0 Position Record Selected Bit 0
	WORD2	POS_ZSW2 or Epos_ZSW2	POS_ZSW2.15 Traversing Task Is Active	POS_ZSW2.14 Fixed Stop Move Is Active	POS_ZSW2.13 Fixed Stop Clamping Torque Reached	POS_ZSW2.12 Fixed Stop Stroke Reached	POS_ZSW2.11 Direct Output 2 Via Positioning Record	POS_ZSW2.10 Direct Output 1 Via Positioning Record	POS_ZSW2.9 Actual Position = Cam Switch Position 1	POS_ZSW2.8 Actual Position = Cam Switch Position 0	POS_ZSW2.7 Positive Software Limit Switch Is Activated	POS_ZSW2.6 Negative Software Limit Switch Is Activated	POS_ZSW2.5 Axis Is Moving Negative	POS_ZSW2.4 Axis Is Moving Positive	Reserved B3	POS_ZSW2.2 Setpoint Value Reached	POS_ZSW2.1 Velocity Limit is Active	POS_ZSW2.0 Tracking Mode is Active
	WORD3	ZSW2	Sign-Of-Life				Device specific	Device specific	Device specific	ZSW2.8 Fixed Stop Move is Active (No Fielbus Mapping)	Device specific	Device specific	Device specific	Device specific	Device specific	Device specific	Device specific	Device specific
	WORD4	MELDW	Reserved B15	Reserved B14	Pulses Enabled	Drive Ready	Controller Enable	Reserved B10	Reserved B9	Speed Setpoint- Actual Deviation Within tolerance	No alarm, thermal overload, power unit	No motor over-temperature alarm	Variable signaling function	Reserved B4	Setpoint(n) < speed threshold value 2	Setpoint(n) < speed threshold value 3	Torque[%] < torque threshold value 2	0 = Ramping Active 1 = Ramping Completed
	WORD5	XIST_A	Actual Position Value															
	WORD6	XIST_A	ActPosition FAS P1.128															
	WORD7	XIST_B	Actual Velocity Value															
	WORD8	XIST_B	ActVelocity															
	WORD9	FAULT_CODE	Active Fault Number ActFault															
	WORD10	WARN_CODE	Active Warning Number ActWarn															
	WORD11	Reserved	Not Used															
CONTROL	WORD0	STW1	Device specific	Device specific	Device specific	STW1.12 Release Holding Brake ConfigEPOS.15 ReleaseBrake FAS P1.1147120	STW1.11 Home/Reference Task Start	STW1.10 Control By PLC FAS P1.1147100	STW1.9 Jog2 FAS P1.1147090	STW1.8 Jog1 FAS P1.1147080	STW1.7 Fault Acknowledge AckError	STW1.6 Traverse Task Activate ExecuteMode FAS P1.1147061	STW1.5 Intermediate Stop Disable Ramp Stop @ Current Decel Task=NOT Rejected IntermediateStop FAS P1.1147051	STW1.4 Traversing Task Enable Ramp Stop @ 100% Set Decel Task=Rejected CancelTraversing FAS P1.1147041	STW1.3 Enable Operation	STW1.2 Quick Stop Disable ConfigEPOS.1 FAS P1.1147020	STW1.1 Coast Stop Disable ConfigEPOS.0 FAS P1.1147010	STW1.0 Power Stage Pulses Enable EnableAxis FAS P1.1147000
	WORD1	POS_STW1 or Epos_STW1	POS_STW1.15 MDI Selection 0=Record Mode 1=Direct Mode	POS_STW1.14 signal Setup Selected	Reserved B13	POS_STW1.12 Continuous Position Setpoint Transfer Enable ConfigEPOS.8 FAS P1.112411120	Reserved B11	POS_STW1.10 and POS_STW1.9 0 = Modulo Position Mode - Shortest Path 1 = Modulo Position Mode - Only Positive Path 2 = Modulo Position Mode - Only Negative Path 3 = Modulo Position Mode - Shortest Path		POS_STW1.8 Direct Mode Absolute Positioning Active	Reserved B7	POS_STW1.6 Position Record Select Bit 6	POS_STW1.5 Position Record Select Bit 5	POS_STW1.4 Position Record Select Bit 4	POS_STW1.3 Position Record Select Bit 3	POS_STW1.2 Position Record Select Bit 2	POS_STW1.1 Position Record Select Bit 1	POS_STW1.0 Position Record Select Bit 0
	WORD2	POS_STW2 or Epos_STW2	POS_STW2.15 Hardware Limits Enable ConfigEPOS.3 FAS=P1.112414150	POS_STW2.14 Software Limits Enable ConfigEPOS.2 FAS=P1.112414140	Reserved B13	Reserved B12	POS_STW2.11 Touch Probe Edge 0 = Rising edge 1 = Falling edge ConfigEPOS.4 FAS=P1.112414110	POS_STW2.10 Select Touch Probe 0 = Probe 1 Active 1 = Probe 2 Active ConfigEPOS.5 FAS=P1.112414100	POS_STW2.9 Start Reference Search 0 = positive direction 1 = negative direction	POS_STW2.8 Reference Select 1 = Flying Reference 0 = Search Reference	Reserved B7	Reserved B6	POS_STW2.5 Jogging 1 = incremental 0 = velocity	Reserved B4	Reserved B3	POS_STW2.2 Reference Cam Active ConfigEPOS.6	POS_STW2.1 Set Reference Point	POS_STW2.0 Tracking Mode Active
	WORD3	STW2	Master Sign-Of-Life				Motor Switchover Completed	Reserved B10	Global Trigger Command	STW2.8 Travel to Fixed EndStop Enable ConfigEPOS.30 TravelToFixStop FAS P1.1148080	Parking Axis Enable	Reset I-Component	Global Start	DDS Bit 4	DDS Bit 3	DDS Bit 2	DDS Bit 1	DDS Bit 0
	WORD4	VERRIDE	Position Velocity Override															
	WORD5	MDI_TARPOS	MDI (Manual Data Input) Position Target															
	WORD6	MDI_TARPOS	Position FAS P1.11280604															
	WORD7	MDI_VELOCITY	MDI (Manual Data Input) Velocity Target															
	WORD8	MDI_VELOCITY	Velocity FAS P1.11280604															
	WORD9	MDI_ACC	MDI (Manual Data Input) Percent Acceleration															
	WORD10	MDI_DEC	MDI (Manual Data Input) Percent Deceleration															
	WORD11	Reserved	Not Used															

Absolute Positioning Mode - Configuration				
PLC Output	Value	PLC Input	Value	Description
		Lockout	0	Switch On NOT Inhibited (FAS released control)
		AxisRef	1	Axis Referenced
ModePos	2			Mode Select = Absolute Position
		EposZSW1.15	1	MDI Mode is Active
Position	xxxxx			Valid Position Target Selected
Velocity	xxxxx			Valid Velocity Selected
ConfigEPOS.0	1			No Coast Stop
ConfigEPOS.1	1			No Quick Stop
CancelTraversing	1			No Cancel Travel task with Ramp Stop @ 100% Set Deceleration and Reject Task
IntermediateStop	1			No Interrupt travel task with Ramp Stop @ Current Deceleration and Task is NOT Rejected
EnableAxis	1			Axis Enable

Absolute Positioning Mode – Move Pre-Conditions				
PLC Output	Value	PLC Input	Value	Description
		AxisEnabled	1	Axis Enabled
		AxisPosOk	1	Position Task Motion Completed NOTE: optional because a previous move could be intentionally interrupted
		AxisSpFixed	1	Setpoint is stationary feedback (1=SP stationary)
		AxisAckSetpoint	0	Start Record Task Acknowledge Cleared
		ClampTorqueReached	0	Axis reached Clamping Torque (1=Reached)
		AxisRef	1	Axis Referenced
		AxisWarn	0	No Controller Warnings
		AxisError	0	No Controller Errors
		Lockout	0	Switch On NOT Inhibited (FAS released control)
		Error	0	No AOI Errors

Absolute Positioning Mode – Move Execute Logic				
PLC Output	Value	PLC Input	Value	Description
OverAcc	1-100			Override Acceleration
OverDec	1-100			Override Deceleration
OverV	1-199			Override Velocity
Position	xxxxx			Valid Position Target Selected
Velocity	xxxxx			Valid Velocity Selected
ExecuteMode	1			Traverse Task Activate (Rising Edge)
		AxisAckSetpoint	1	Traverse Task Acknowledge Set
		ActMode	2	Mode Selected = Absolute Position NOTE: optional and only reflects ModePos status after motion started
ExecuteMode	0			Traverse Task Activate Clear
		AxisAckSetpoint	0	Traverse Task Acknowledge Cleared
		AxisPosOk	1	Traverse Task Motion Complete

NOTES:

- Axis can be reference by using mode 4 or 5.
- AxisPosOk (Traverse Task Motion Complete) signal status should only be considered after the handshake AxisAckSetpoint=1 has been received.
- A new task can be triggered while the existing task is being executed with a cycle of the ExecuteMode command tag (ExecuteMode=0 then ExecuteMode=1)
- If the task completed un-successfully with an error, then "AxisError" status variable will have relevant information.
- The Base Value Velocity in Festo Automation Suite (FAS) must match the BaseSpeedValue in the AOI in order to provide the correct feedback value in ActVelocity.

