Time Sync

1756-TIME Migration

Application Note

A-TSM

A-TSM/B

Document No. D107-022
01/2023
Revision 1.1

aparian

CONTENTS

1. Preface 3
1.1. Purpose of this document 3
1.2. Additional Information 3
1.3. Support 3
2. Legacy Module Comparison 4
3. Migration 6
3.1. A-TSM/B Configuration and Operation 6
3.1.1. A-TSM/B IP Address Change 6
3.1.2. A-TSM/B Time Services Configuration 10
3.1.3. A-TSM/B CIPSync Parameters 12
3.1.4. A-TSM/B Logix Connection 13
3.2. Applications 17
3.2.1. GPS Time Source with PTP and NTP over Ethernet 17
3.2.2. GPS Time Source with PTP over ControlBus 24
3.2.3. NTP Time Source with PTP Output 24
3.2.4. Logix Wallclock Sync using I/O Assembly 30
3.2.5. Logix Positioning 32
3.2.6. GPS Time Source with IRIG-B Output 35
3.2.7. GPS Time Source with CST over ControlBus 35

Revision History

Revision	Date	Comment
1.0	22 July 2022	Initial document
1.1	17 Jan 2023	Update support contact details

1. PREFACE

1.1. PURPOSE OF THIS DOCUMENT

This document will assist the user to migrate from the discontinued Rockwell Automation 1756-TIME module to the Aparian Time Sync Module (A-TSM/B).

1.2. ADDITIONAL INFORMATION

The following documents contain additional information that can assist the user with the module installation and operation.

Resource	Link
Slate Installation	http://www.aparian.com/software/slate
Time Sync User Manual Time Sync Datasheet Example Code & UDTs	http://www.aparian.com/products/timesync
Ethernet wiring standard	www.cisco.com/c/en/us/td/docs/video/cds/cde/cde205_220_420/installation/guide/cde205_220_420_hig/Connectors.html
GPS information	https://www.u-blox.com/images/stories/the_gps_dictionary.pdf
1588 Precision Time Protocol (PTP)	http://www.ieee1588.com/
Network Time Protocol (NTP)	http://www.ntp.org/documentation.html
CIPSync	https://www.odva.org/Home/ODVATECHNOLOGIES/CIP/CIPTechnologyOverview/CIPSync.aspx

Table 1.1 - Additional Information

1.3. SUPPORT

Technical support is provided via the Web (in the form of user manuals, FAQ, datasheets etc.) to assist with installation, operation, and diagnostics.

For additional support the user can use either of the following:

Resource	Link
Contact Us web link	https://www.prosoft-technology.com/Services-Support/Customer-Support
Support email	support@prosoft-technology.com

Table 1.2 – Support Details

2. LEGACY MODULE COMPARISON

Below is a table with the functional and environmental comparison between the legacy 1756-TIME module and the A-TSM/B.

	1756-TIME	A-TSM/B
GPS Receiver		
Channels	12	72
Constellations	GPS L1 C/A	GPS L1 C/A, SBAS, QZSS L1 C/A, GLONASS L1OF, BeiDou B1
Update Rate	1 Hz	10 Hz
Electrically Isolated	No	Yes
Antenna (LNA) Voltage	3.3 V	3.3 V
Antenna Connector	SMA (F)	SMA (F)
Antenna Provided	Bullet	Puck
Time Functions		
Time Source	Internal GPS PPS NTP IRIG-B	Internal GPS / PPS NTP
PTP Output	Yes	Yes
PTP Network Transport	IPv4 UDP	IPv4 UDP, or IEEE802.3
PTP Delay Mechanism	End-to-End	End-to-End, or Peer-to-Peer
PTP Precision (architecture dependent)	Sub 100 ns	Sub 100 ns
NTP Source	NTP Client	NTP Client NTP Symmetric
NTP Output	Yes	Yes
IRIG-B122 Source/Output	Yes	No
PLC5 / SLC500 Support	No	Yes
Modbus-TCP Master	No	Yes
Modbus-TCP Slave	No	Yes
Support GPS Holdover	No	Yes
Hardware		
Form Factor	ControlLogix Module - Single slot	Standalone - DIN Rail mount
Ethernet Port/s	Dual 10/100 Mbps (DLR capable)	10/100 Mbps
Power		
Voltage	5V (1756 backplane)	10-32 V dc
Current	1010 mA @ 5Vdc	80 mA @ 24Vdc

Environmental		
Operating Temperature	0 - 60 °C	-20 - 70 °C
Certifications		
CE	Yes	Yes
UL	Yes	Yes
Hazardous (Class 1 Div 2)	No	Yes
ODVA CIP-Sync Compliant	?	Yes
RCM	Yes	Yes
KC	Yes	No

Table 2.1 – A-TSM/B and 1756-TIME comparison

3. MIGRATION

The 1756-TIME module uses the Logix Add-On Profile (AOP) to configure the module while the A-TSM/B is configured using the Aparian Slate application. This program can be downloaded from www.aparian.com free of charge.

It is important to understand the A-TSM/B basic configuration and operation before the application migration can be done (as shown in the section below).

3.1. A-TSM/B CONFIGURATION AND OPERATION

3.1.1. A-TSM/B IP ADDRESS CHANGE

If the existing 1756-TIME module was providing 1588 PTP or NTP on Ethernet, then the A-TSM/B module will require the same IP address or an IP address in the same subnet to ensure it can be used as a drop in replacement.

The module will have DHCP (Dynamic Host Configuration Protocol) enabled as factory default. Thus, a DHCP server must be used to provide the module with the required network parameters (IP address, subnet mask, etc.). There are a number of DHCP utilities available, however it is recommended that the DHCP server in Slate be used.

Within the Slate environment, the DHCP server can be found under the Tools menu.

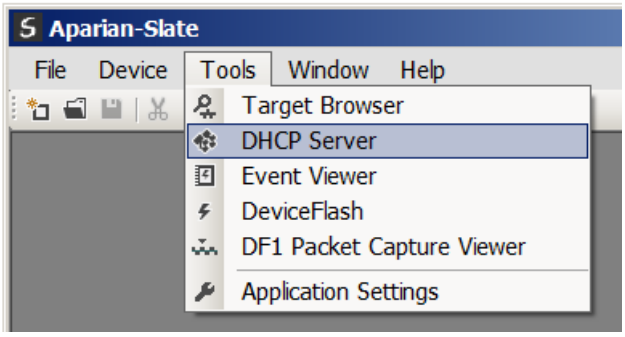

Figure 3.1 - Selecting DHCP Server

Once opened, the DHCP server will listen on all available network adapters for DHCP requests and display their corresponding MAC addresses.

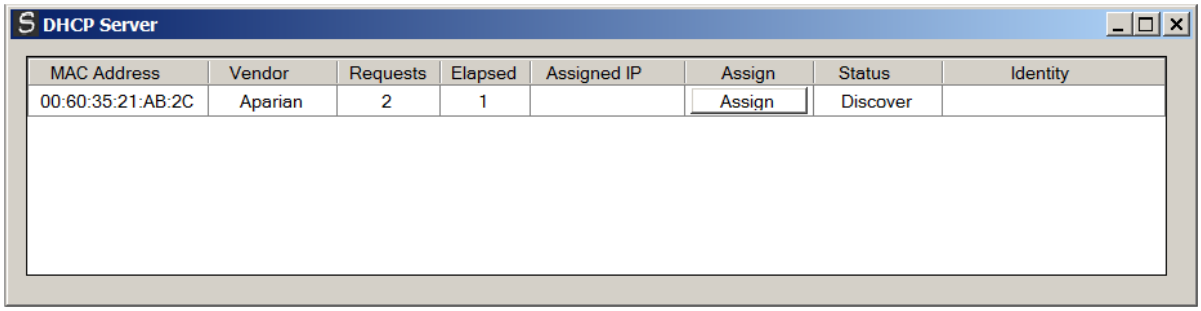

Figure 3.2 - DHCP Server

NOTE: If the DHCP requests are not displayed in the DHCP Server it may be due to the local PC's firewall. During installation the necessary firewall rules are automatically created for the Windows firewall. Another possibility is that another DHCP Server is operational on the network and it has assigned the IP address.

To assign an IP address, click on the corresponding ***Assign*** button. The IP Address Assignment window will open.

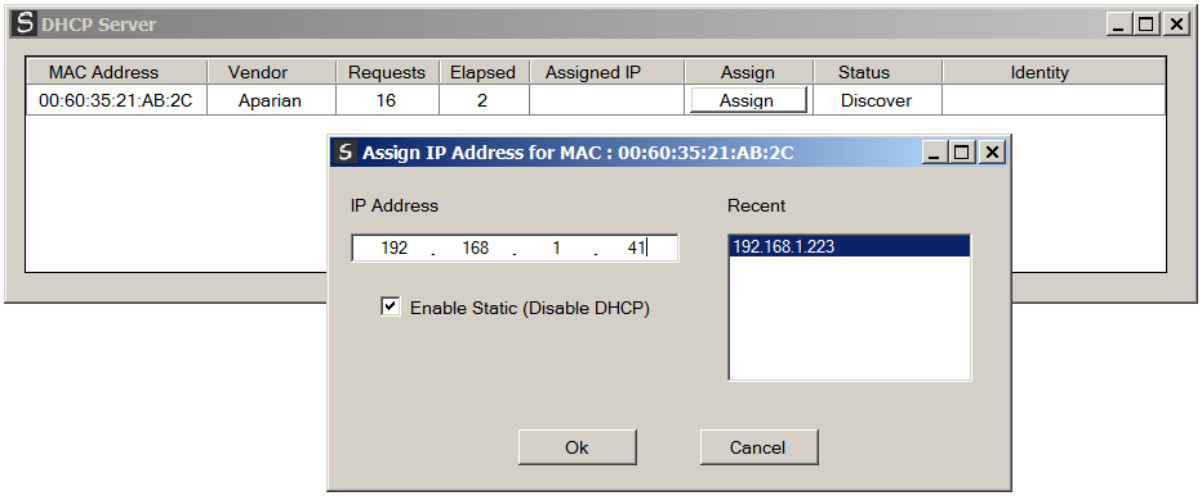

Figure 3.3 - Assigning IP Address

The required IP address can then be either entered, or a recently used IP address can be selected by clicking on an item in the Recent List. If the ***Enable Static*** checkbox is checked, then the IP address will be set to static after the IP assignment, thereby disabling future DHCP requests.

Once the IP address window has been accepted, the DHCP server will automatically assign the IP address to the module and then read the Identity object Product name from the device. The successful assignment of the IP address by the device is indicated by the green background of the associated row.

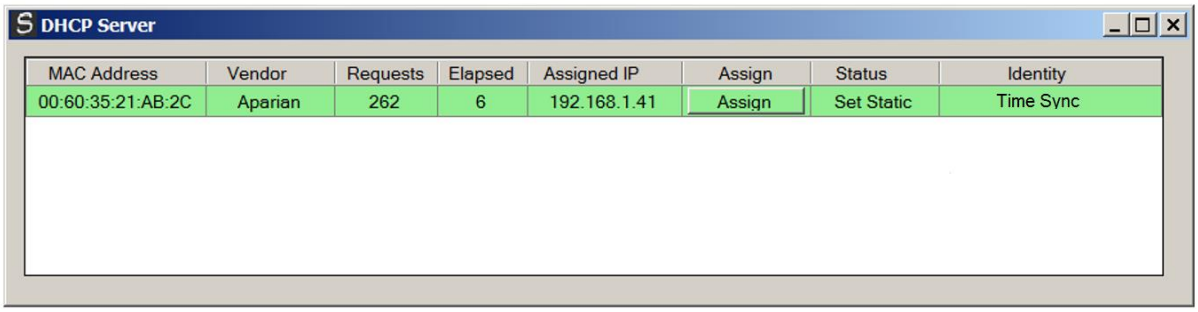

Figure 3.4 - Successful IP address assignment

Once the DHCP process has been completed, the network settings can be set using the ***Ethernet Port Configuration*** via the ***Target Browser***.

The ***Target Browser*** can be accessed under the ***Tools*** menu.

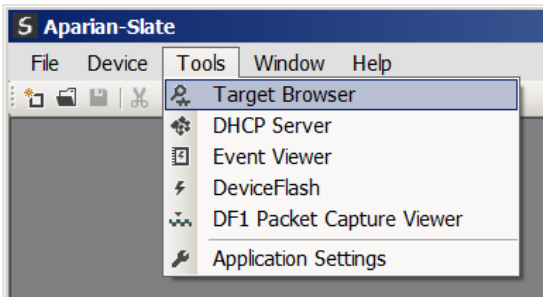

Figure 3.5 - Selecting the Target Browser

The ***Target Browser*** automatically scans the Ethernet network for EtherNet/IP devices.

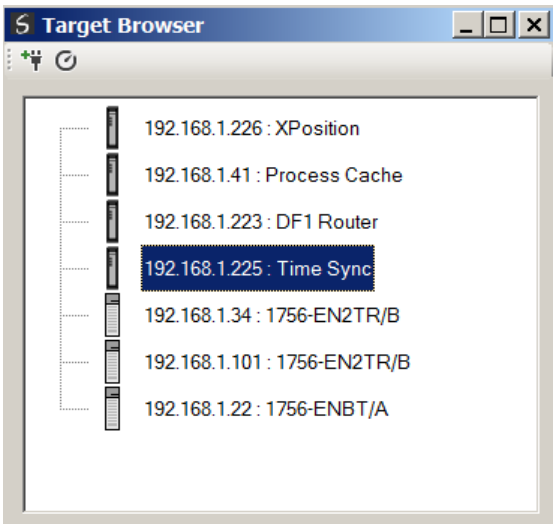

Figure 3.6 - Target Browser

Right-clicking on a device, reveals the context menu, including the ***Port Configuration*** option.

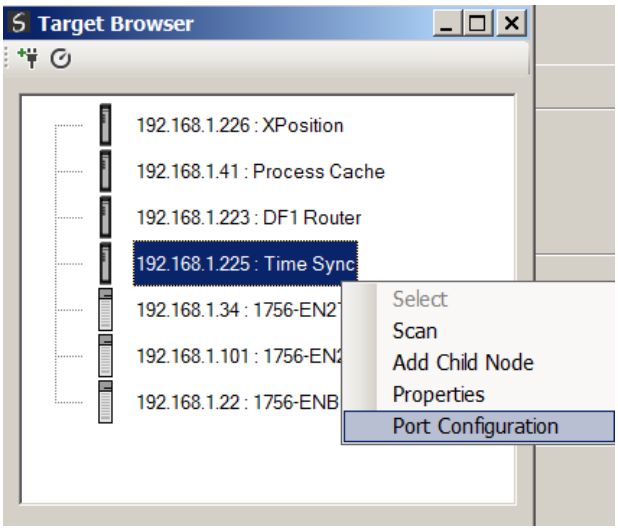

Figure 3.7 - Selecting Port Configuration

All the relevant Ethernet port configuration parameters can be modified using the ***Port Configuration*** window.

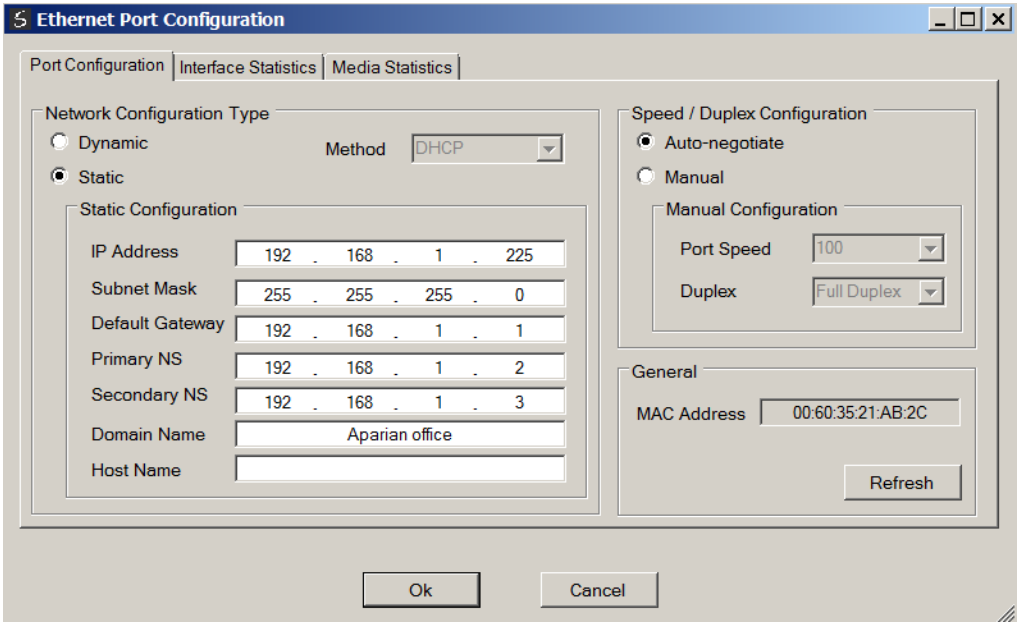

Figure 3.8 - Port Configuration

Alternatively, these parameters can be modified using Rockwell Automation's RSLinx software.

3.1.2. A-TSM/B Time Services Configuration

The Time Services configuration page in the A-TSM/B configuration will be used to configure the A-TSM/B such that it can serve as a direct replacement for the 1756-TIME module. Once the Slate software has been installed, launch the software and add a A-TSM/B module.

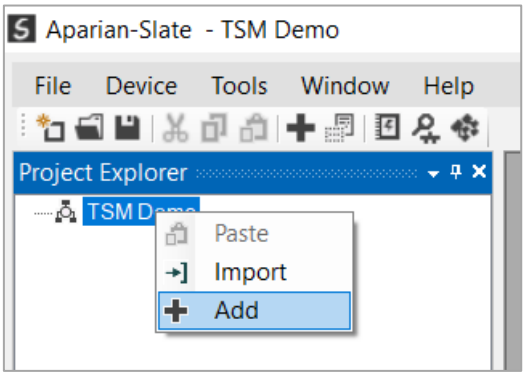

Figure 3.9 – Slate module add

Select the ***Time Sync*** module from the list and press ***Ok***.

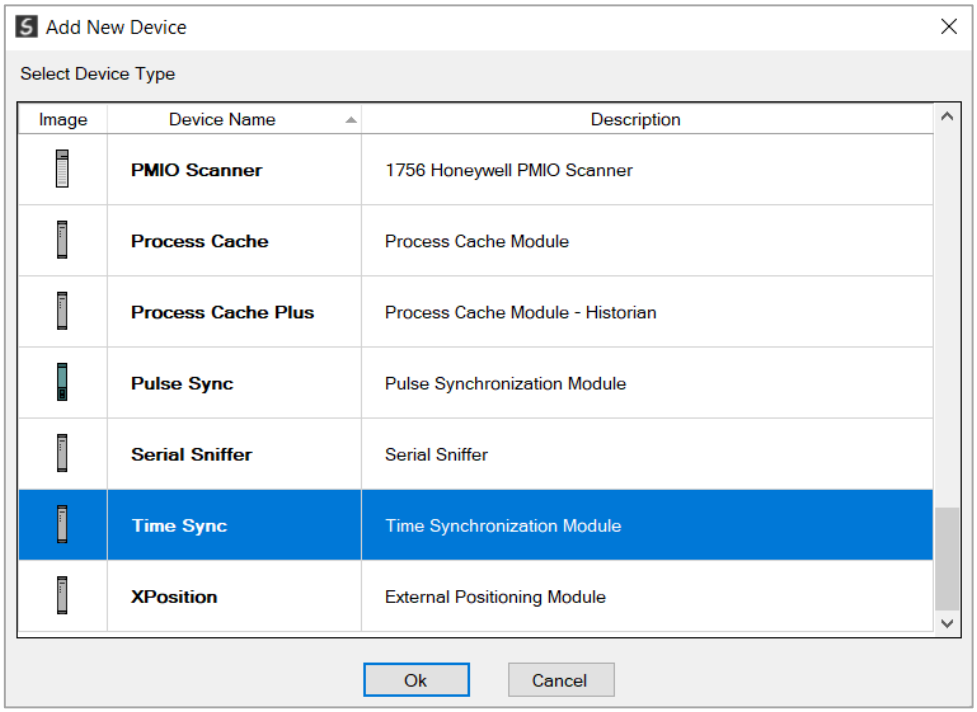

Figure 3.10 – Time Sync Module selection

Once the module has been added, open the configuration by right-clicking on the module and selecting ***Configuration***.

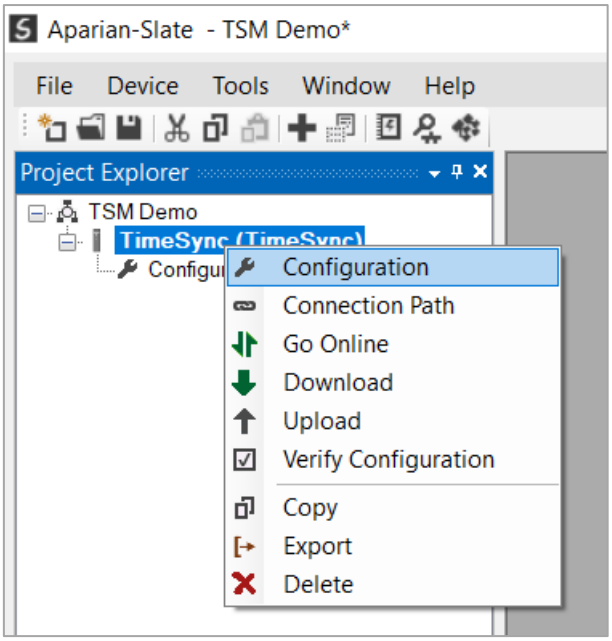

Figure 3.11 – TSM configuration selection

Once the configuration has been opened, select the ***Time Services*** tab (as shown below) to access the configuration that will need to match that of the 1756-TIME module.

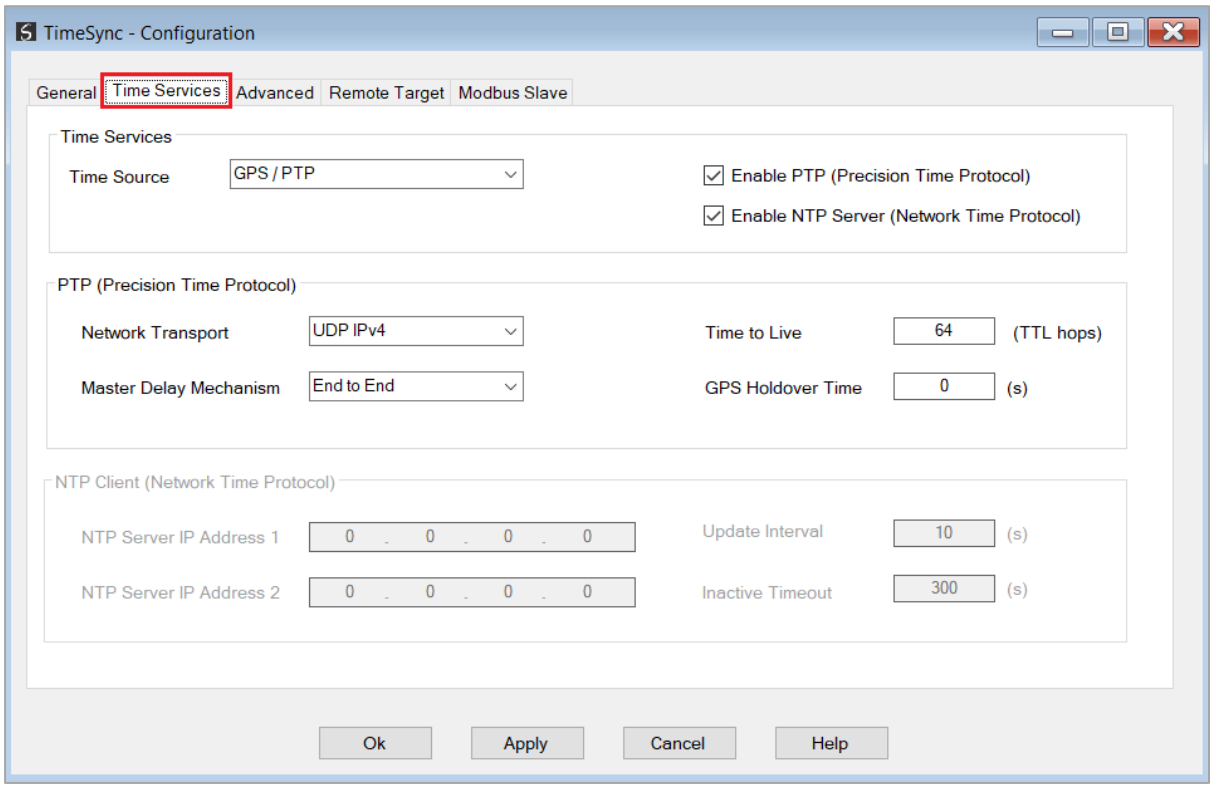

Figure 3.12 – TSM Time Services selection

3.1.3. A-TSM/B CIPSYNC PARAMETERS

The CIPSync parameters can be access in the online parameters of the A-TSM/B. The user will need to go online with the module to access these parameters. In Slate, right-click on the module and select ***Go Online***.

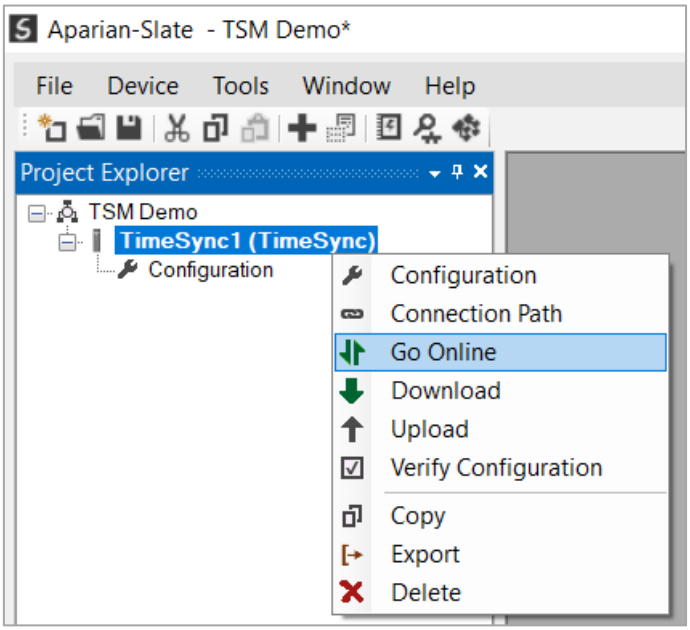

Figure 3.13 – TSM Go Online

Once online with the module, right-click on the module and select ***Status***.

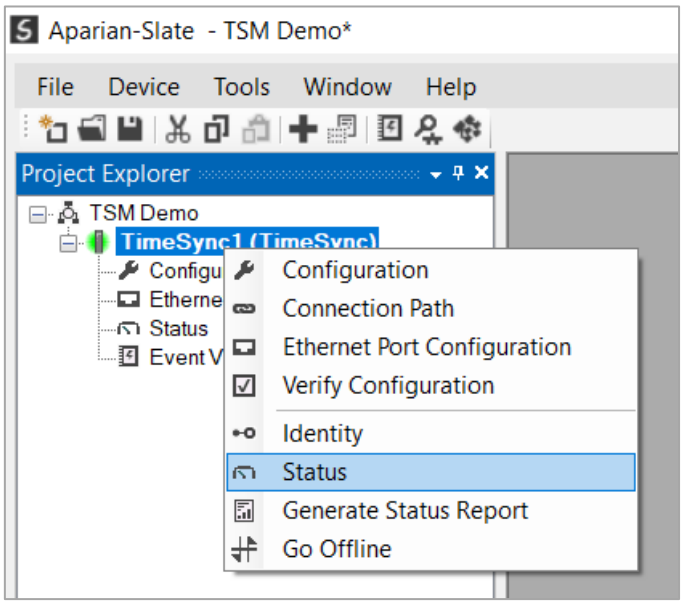

Figure 3.14 – TSM Status Window

In the status form select the ***CIPSync*** tab to access the needed parameters.

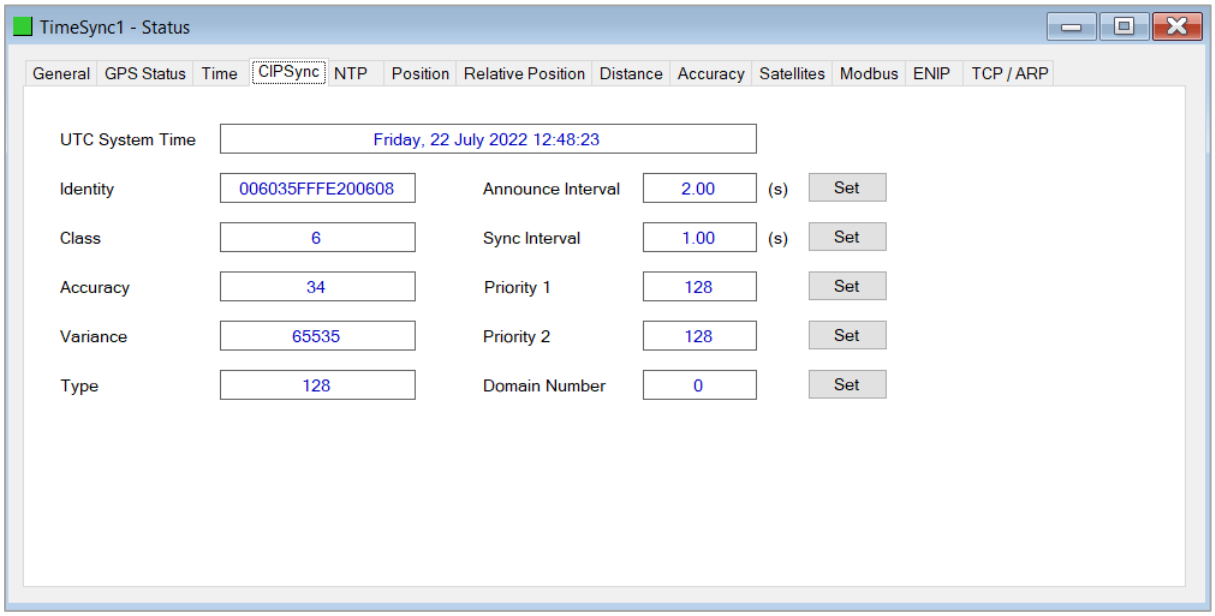

Figure 3.15 – TSM CIPSync parameters

3.1.4. A-TSM/B LOGIX CONNECTION

3.1.4.1. ADD MODULE TO I/O CONFIGURATION

When the module operates in a Logix "owned" mode the Time Sync module will need to be added to the Logix I/O tree. The module will need to be added as a generic Ethernet module. This is achieved by right clicking on the Ethernet Bridge in the Logix and selecting *New Module* after which the ***ETHERNET-MODULE*** is selected to be added as shown in the figure below.

NOTE: See the next section for importing the configuration (L5X).

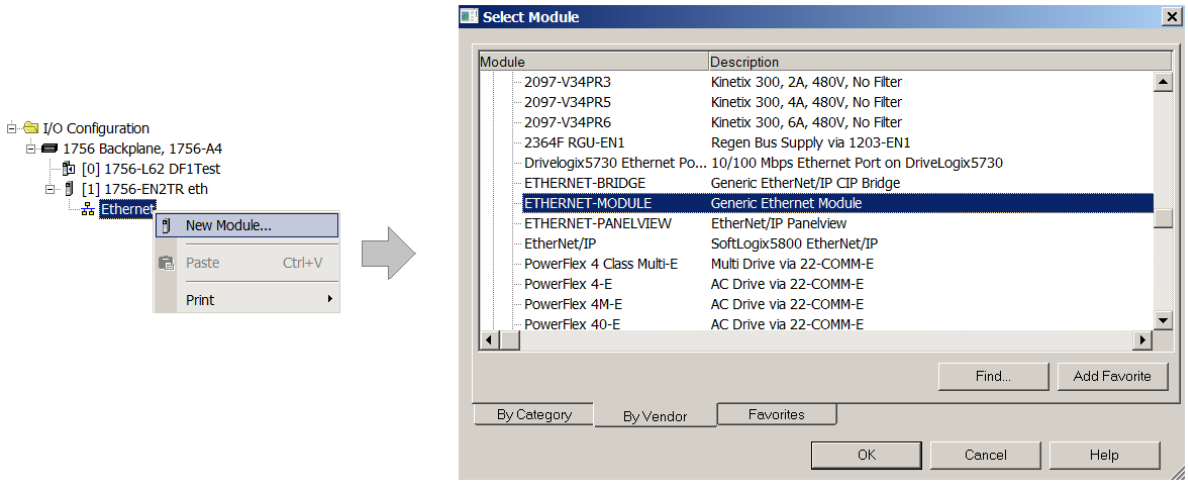

Figure 3.16 - Add a Generic Ethernet Module in Logix

The user must enter the ***IP address*** of the Time Sync module that will be used. The assembly instance and size must also be added for the input, output, and configuration in the connection parameters section. Below are the required connection parameters.

Connection Parameter	Assembly Instance	Size
Input	105	53 (32-bit)
Output	106	3 (32-bit)
Configuration	102	0 (8-bit)

Table 3.1 - Logix class 1 connection parameters for the Time Sync module

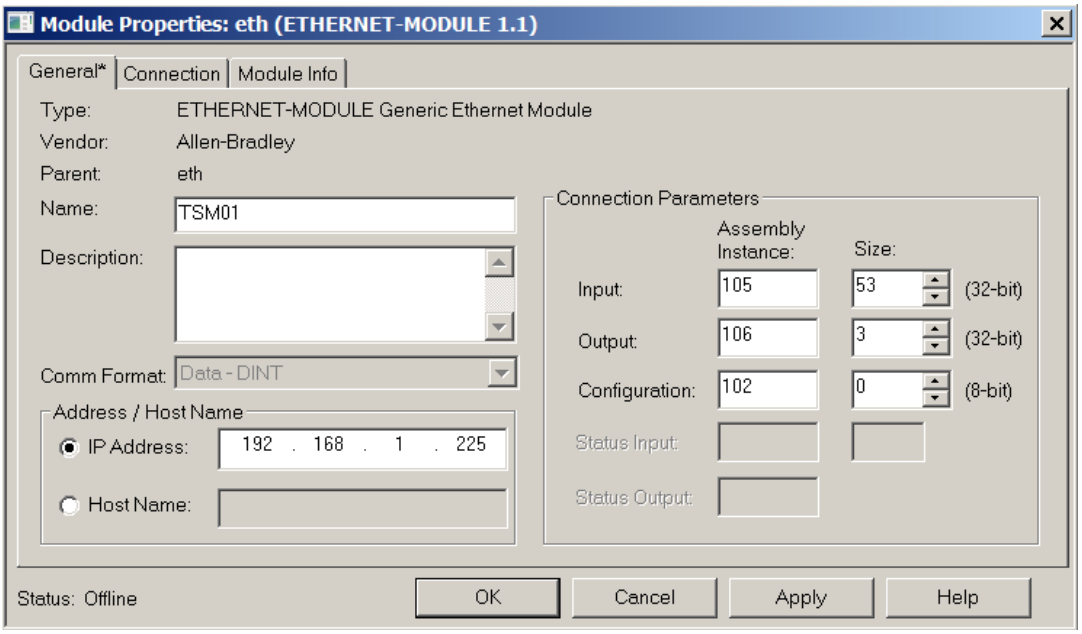

Figure 3.17 - Logix General module properties in Logix

NOTE: The user will need to enter the exact connection parameters before the module will establish a class 1 connection with the Logix controller.

Next the user needs to add the connection requested packet interval (***RPI***). This is the rate at which the input and output assemblies are exchanged. The recommended value is 200ms. Refer to the technical specification section in this document for further details on the limits of the RPI.

NOTE: Although the module is capable of running with an RPI of 1ms, it is recommended to set the RPI to 200ms, to avoid unnecessary loading of the module processor.

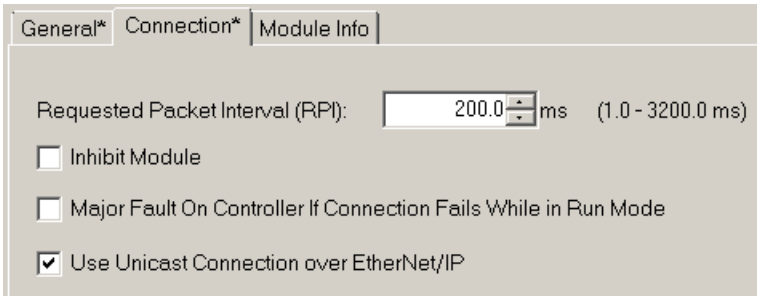

Figure 3.18 - Connection module properties in Logix

Once the module has been added to the Logix I/O tree, the user must assign the User Defined Types (UDTs) to the input and output assemblies. The user can import the required UDTs by right-clicking on *User-Defined* sub-folder in the *Data Types* folder of the I/O tree and selecting *Import Data Type*. The assemblies are then assigned to the UDTs with a ladder copy instruction (COP) as shown in the figure below.

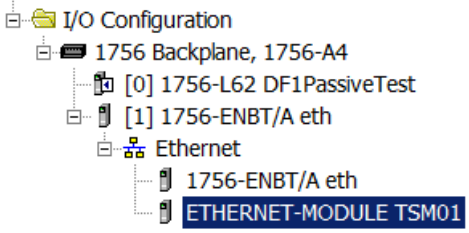

Figure 3.19 – Logix I/O Module Tree

3.1.4.2. IMPORTING UDTS AND MAPPING ROUTINES

To simplify the mapping of the input image, a Logix Routine Partial Import (L5X) file is provided.

This file can be imported by right-clicking on the required Program and selecting the ***Import Routine*** option.

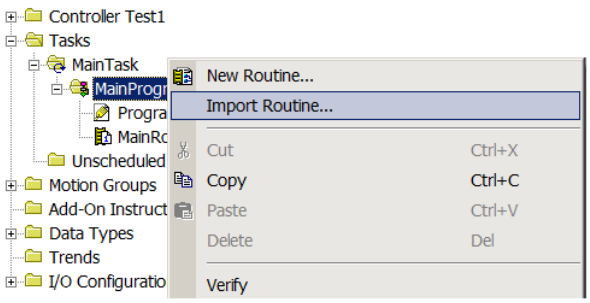

Figure 3.20. – Logix Importing Time Sync specific routine and UDTs

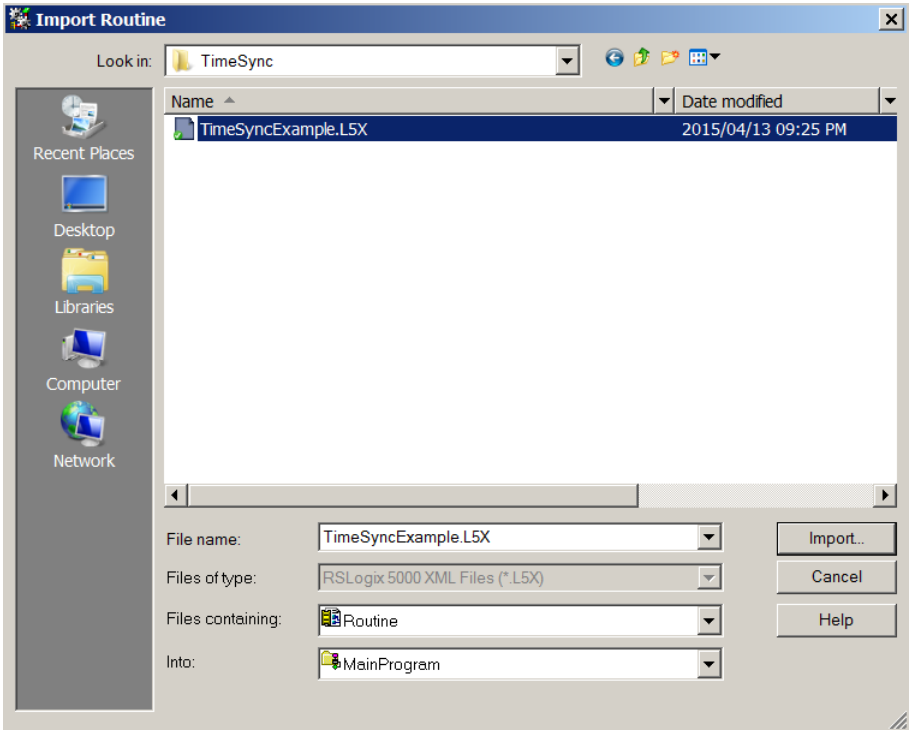

Figure 3.21 - Selecting partial import file

The import will create the following:

- The required UDTs (user defined data types)
- Two controller tags representing the Input and Output assemblies.
- A routine mapping the Time Sync module to the aforementioned tags.
- An example of how to reset the odometer.

The user may need to change the routine to map to the correct Time Sync module instance name, and make sure that the mapping routine is called by the Program's Main Routine.

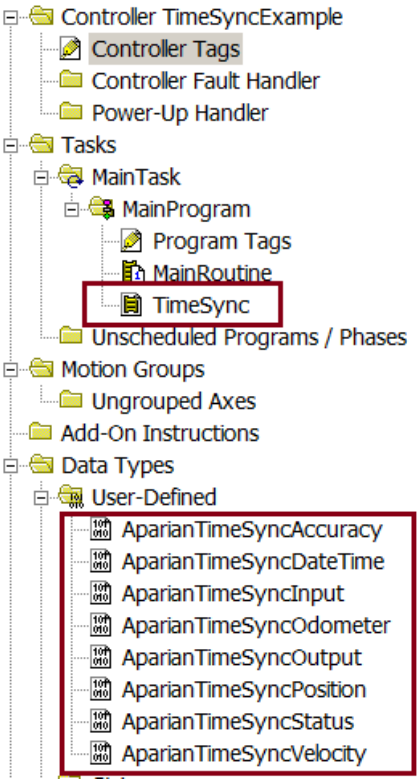

Figure 3.22 - Imported Logix objects

Refer to the additional information section of this document for an example Logix project as well as the required UDTs.

3.2. APPLICATIONS

The required migration steps for each application are described below:
The required migration steps for each application are described below:

3.2.1. GPS TIME SOURCE WITH PTP AND NTP OVER ETHERNET

The following application has the 1756-TIME module using ***GPS*** as its time source and synchronizing devices on Ethernet using 1588-PTP and NTP.

NOTE: In this application the 1756-TIME module does not need to be in the Logix IO tree as the time synchronization will be on Ethernet using PTP and NTP.

The following parameters in the A-TSM/B configuration will need to match that of the 1756-TIME module.

3.2.1.1. TIME SOURCE

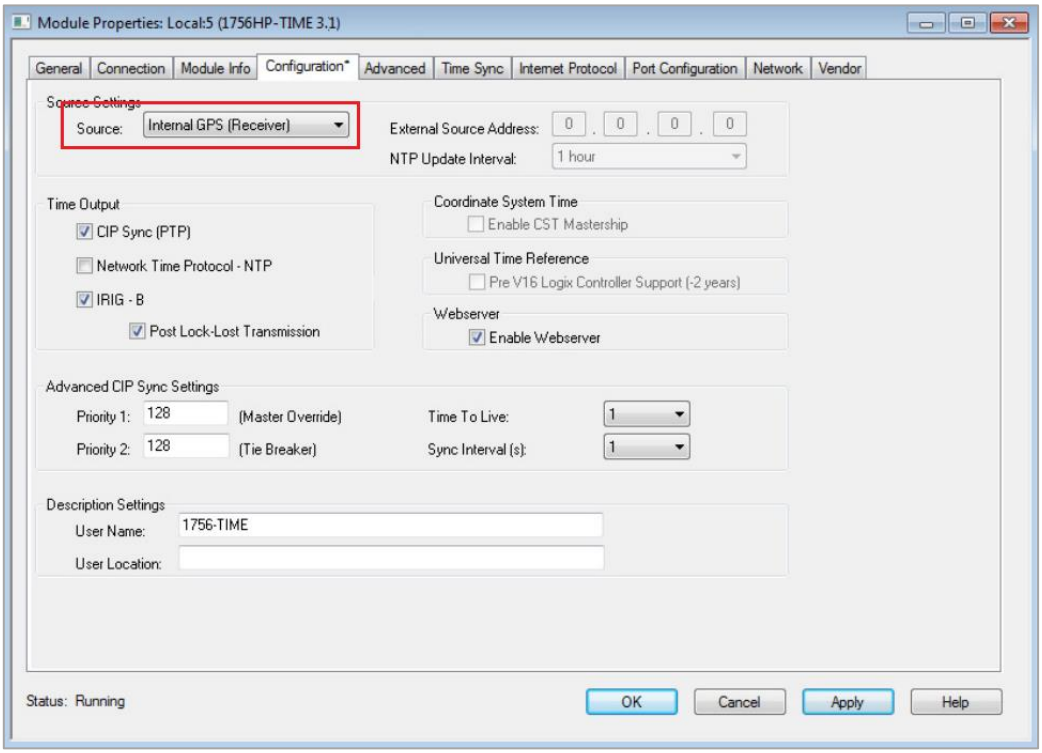

Figure 3.23 – 1756-TIME Source

The user will need to open the ***Time Services*** tab of the A-TSM/B in the Configuration to access the ***Time Source*** parameter.

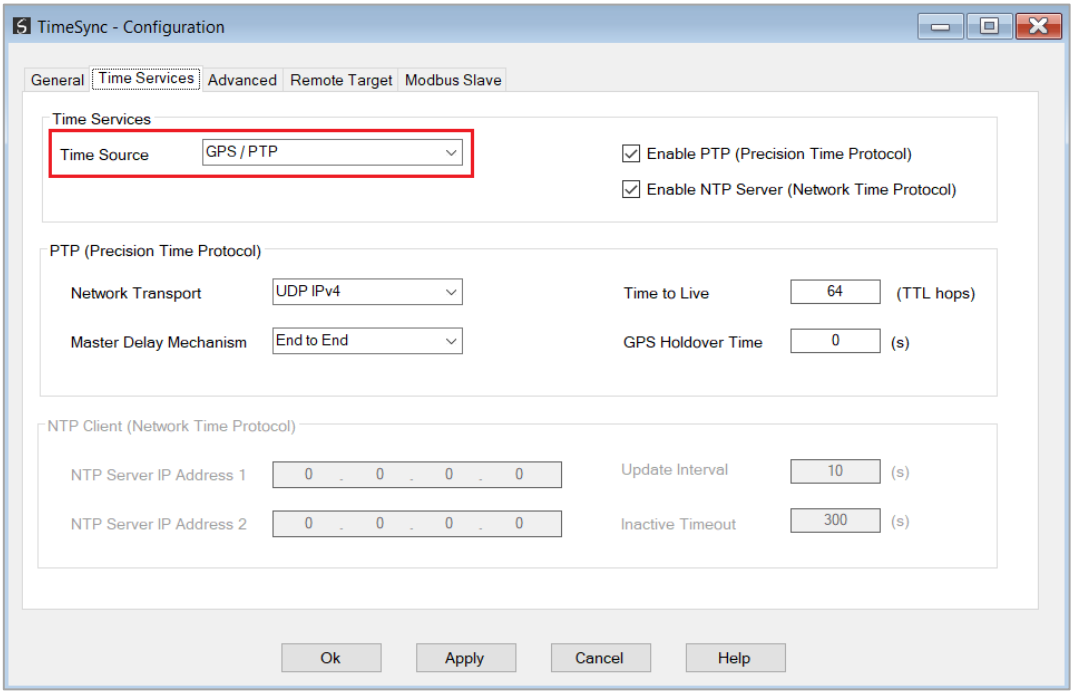

Figure 3.24 – A-TSM/B Time Source

3.2.1.2. TIME OUTPUT

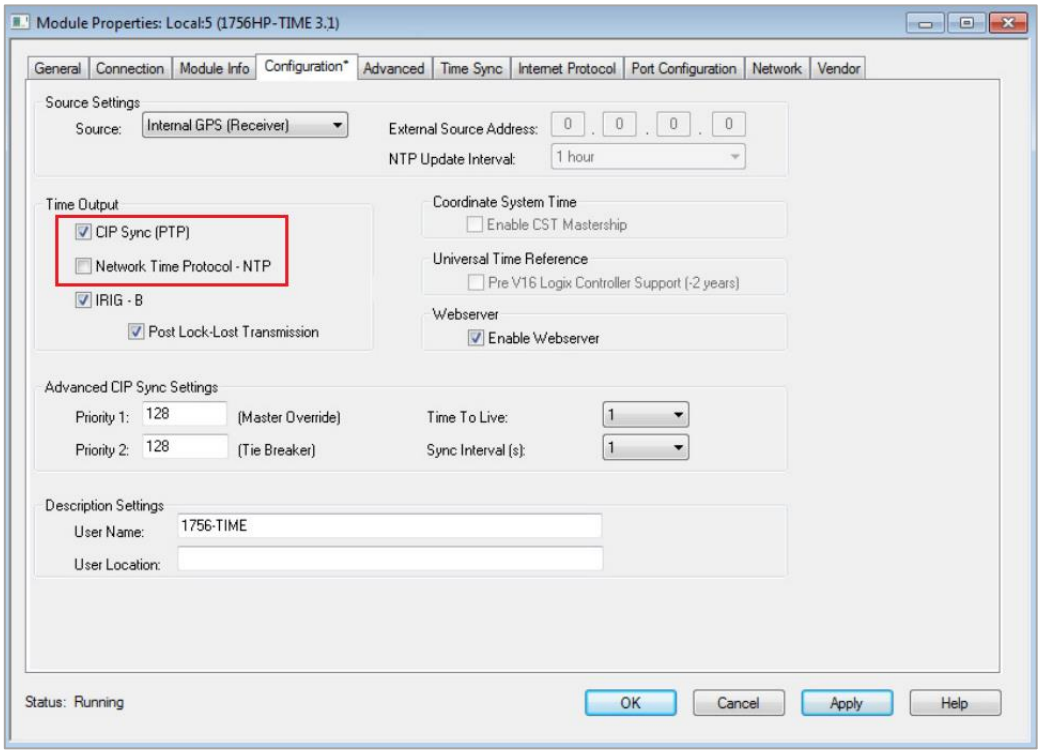

Figure 3.25 – 1756-TIME Time Output

The user will need to open the ***Time Services*** tab of the A-TSM/B in the Configuration to access the ***Enable PTP*** and ***Enable NTP*** (output) options.

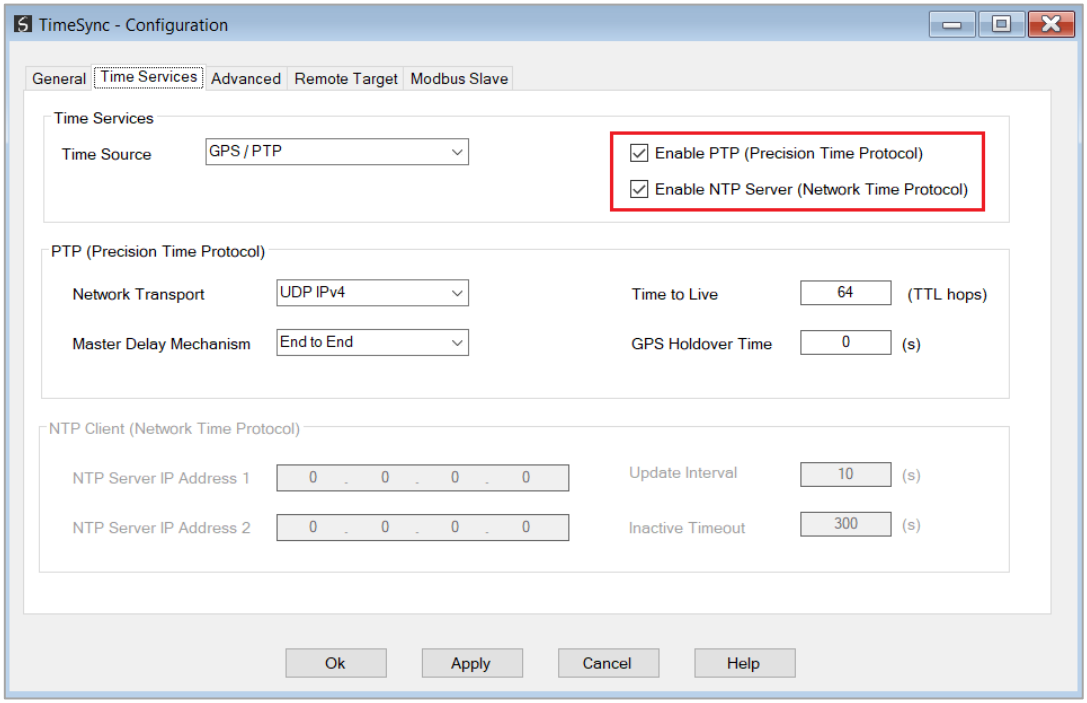

Figure 3.26 – A-TSM/B Enable PTP / NTP

3.2.1.3. PTP PRIORITY

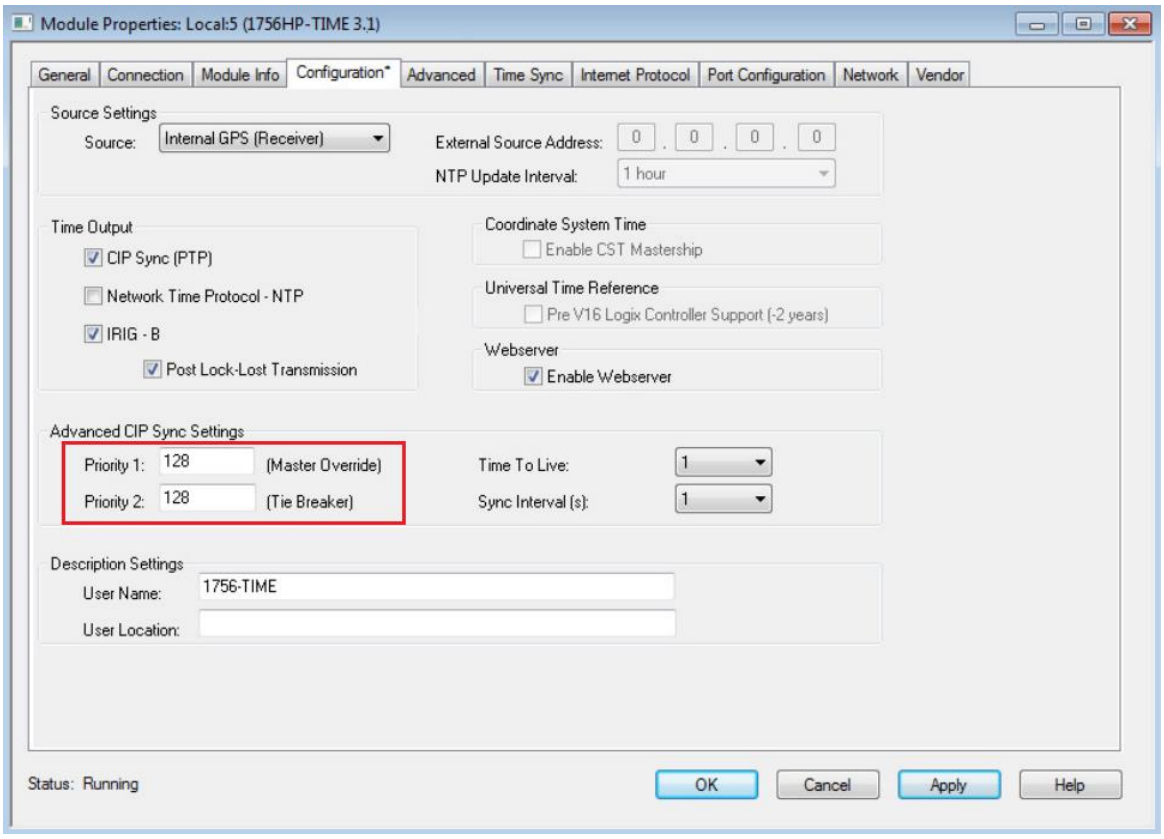

Figure 3.27 – 1756-TIME PTP Priority

The user will need to open the ***CIPSync*** tab in the module ***Status*** window when online with the A-TSM/B to access the CIPSync ***Priority*** parameters

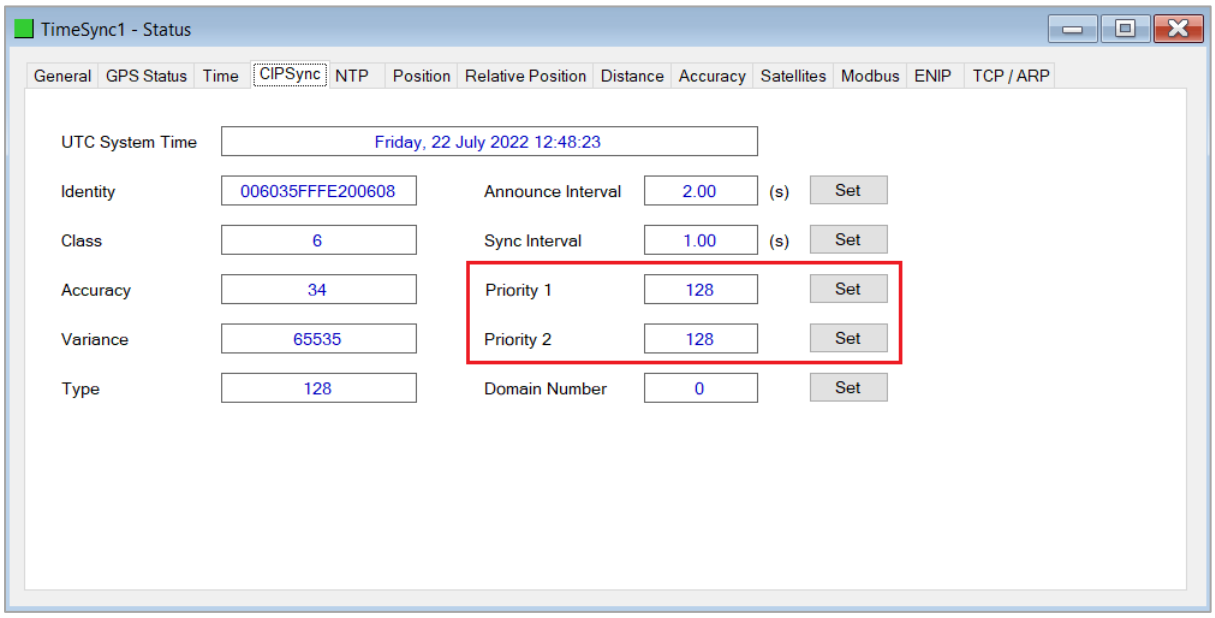

Figure 3.28 – A-TSM/B PTP Priority

3.2.1.4. TIME TO LIVE

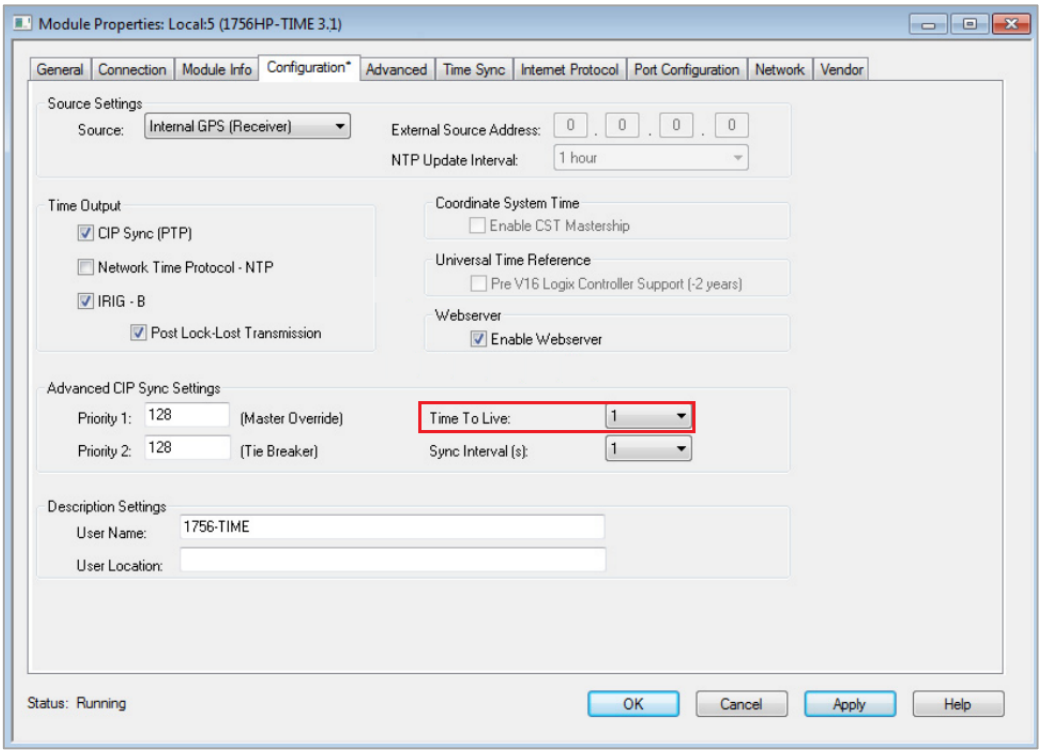

Figure 3.29 – 1756-TIME TTL

The user will need to open the ***Time Services*** tab of the A-TSM/B in the Configuration to access the ***Time To Live*** parameter.

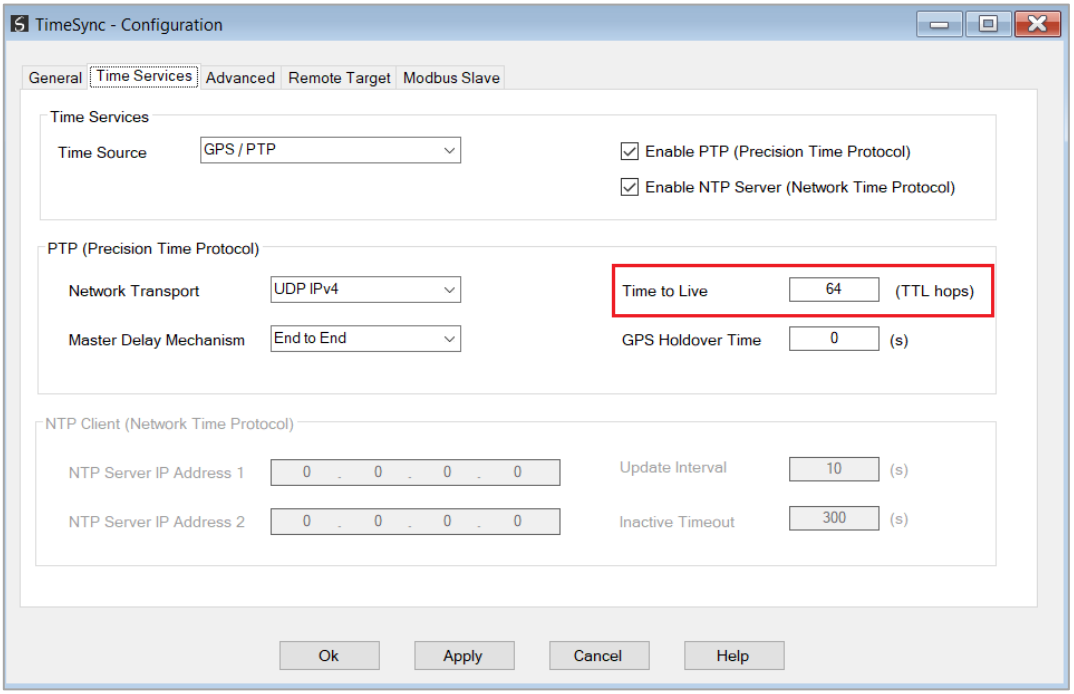

Figure 3.30 – A-TSM/B TTL

3.2.1.5. SYNC INTERVAL

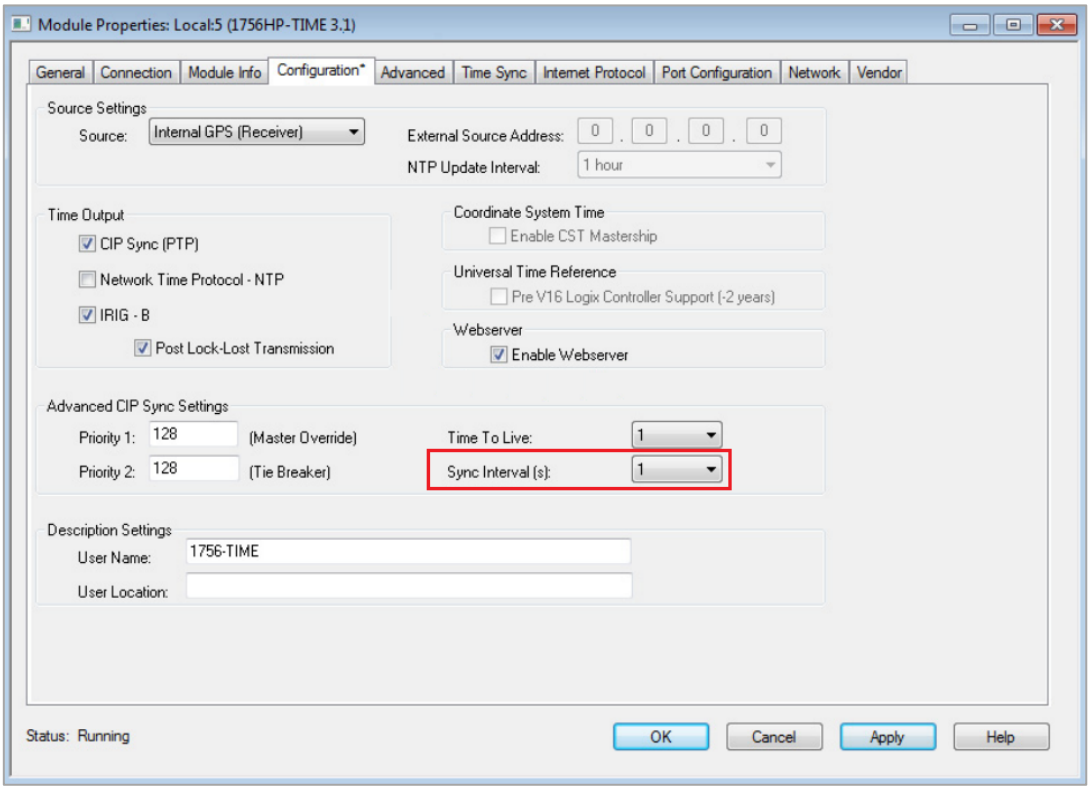

Figure 3.31 – 1756-TIME PTP Sync Interval

The user will need to open the ***CIPSync*** tab in the module ***Status*** window when online with the A-TSM/B to access the ***Sync Interval*** parameter.

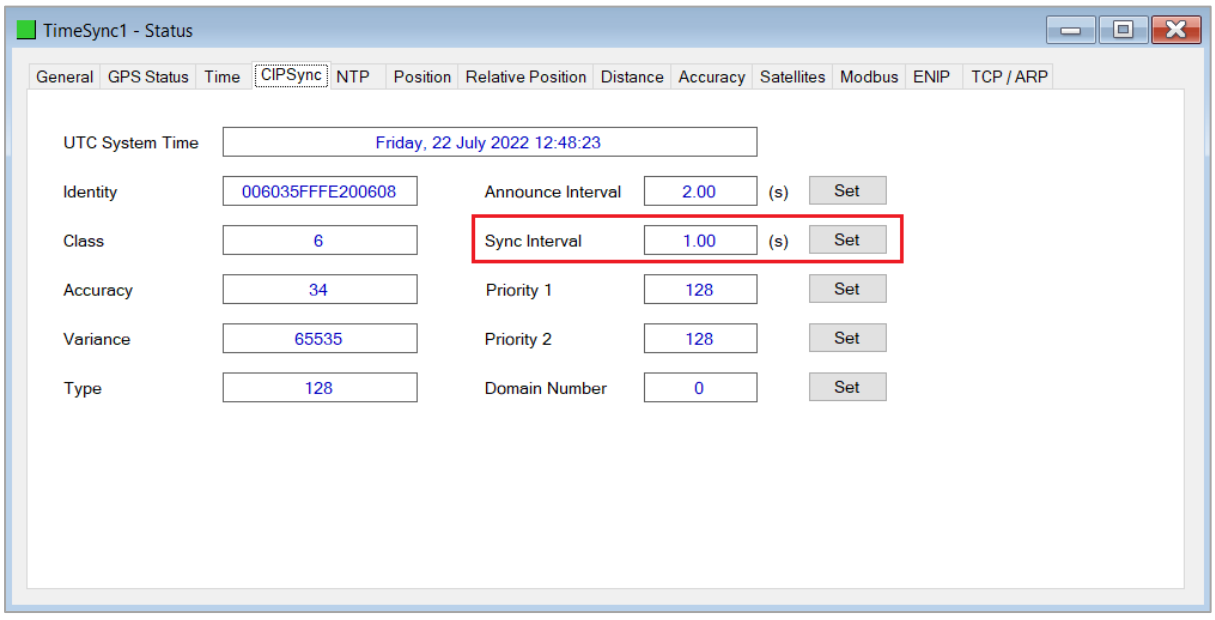

Figure 3.32 – A-TSM/B PTP Sync Interval

3.2.1.6. DESCRIPTION SETTINGS

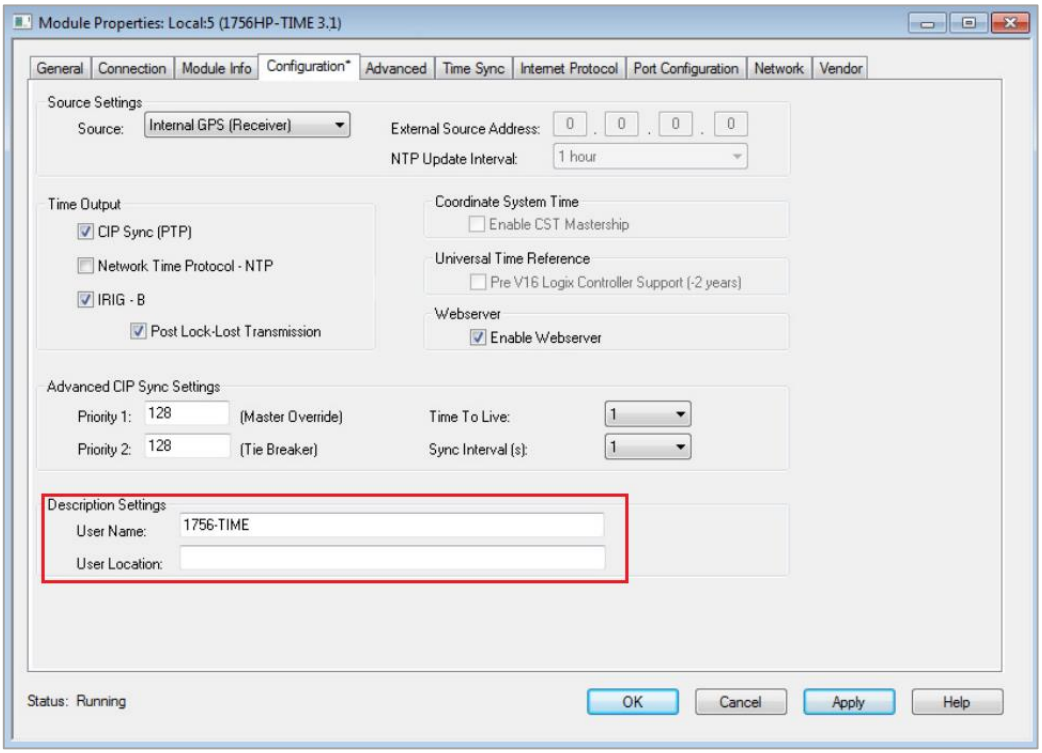

Figure 3.33 – 1756-TIME Description Settings

The user will need to open the ***General*** tab of the A-TSM/B in the Configuration to access the ***Name*** and ***Description*** parameters.

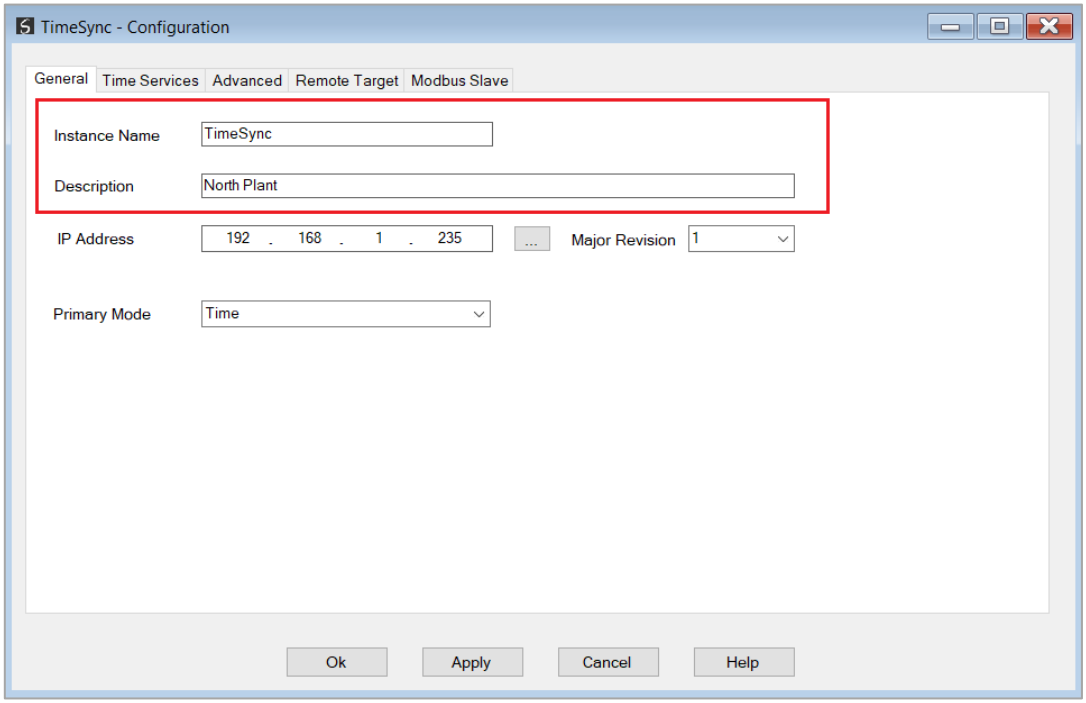

Figure 3.34 – A-TSM/B Instance Name and Description

3.2.2. GPS TIME SOURCE WITH PTP OVER CONTROLBUS

The A-TSM/B does not communicate directly on ControlBus. If the Logix controller or Logix IO needs to be synchronized then follow the procedure in section 3.1 and use a Logix Ethernet bridge (e.g., 1756-EN2TR) to act as a boundary clock for the backplane.

3.2.3. NTP TIME SOURCE WITH PTP OUTPUT

The following application has the 1756-TIME module using NTP as its time source and synchronizing devices on Ethernet using 1588-PTP.

NOTE: In this application the 1756-TIME module does not need to be in the Logix IO tree as the time synchronization will be on Ethernet using PTP and NTP.

The following parameters in the A-TSM/B configuration will need to match that of the 1756-TIME module.

3.2.3.1. TIME SOURCE

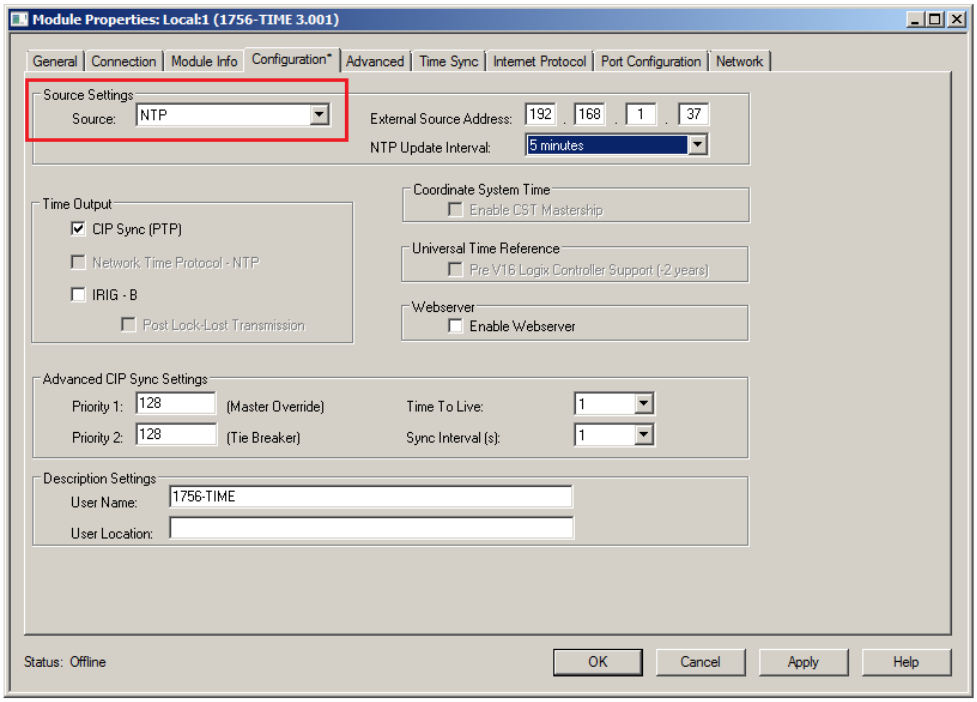

Figure 3.35 – 1756-TIME Source

The user will need to open the ***Time Services*** page of the A-TSM/B in the Configuration to access the ***Time Source***.

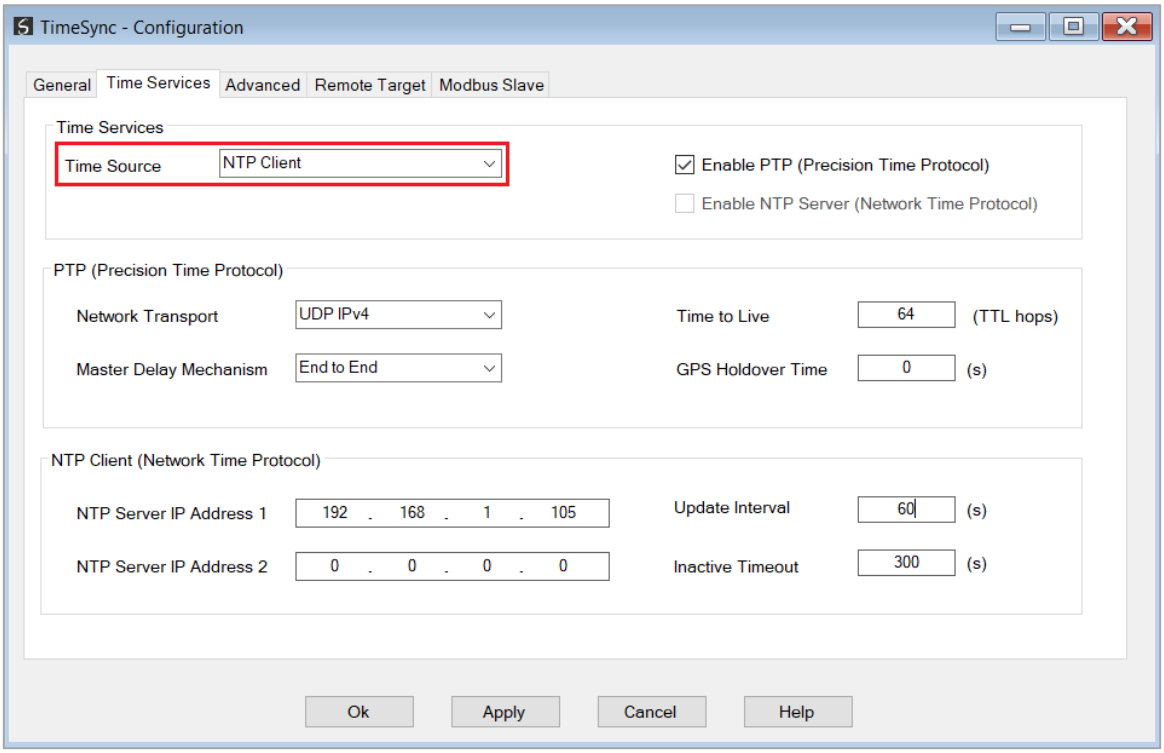

Figure 3.36 – A-TSM/B Time Source

3.2.3.2. TIME OUTPUT

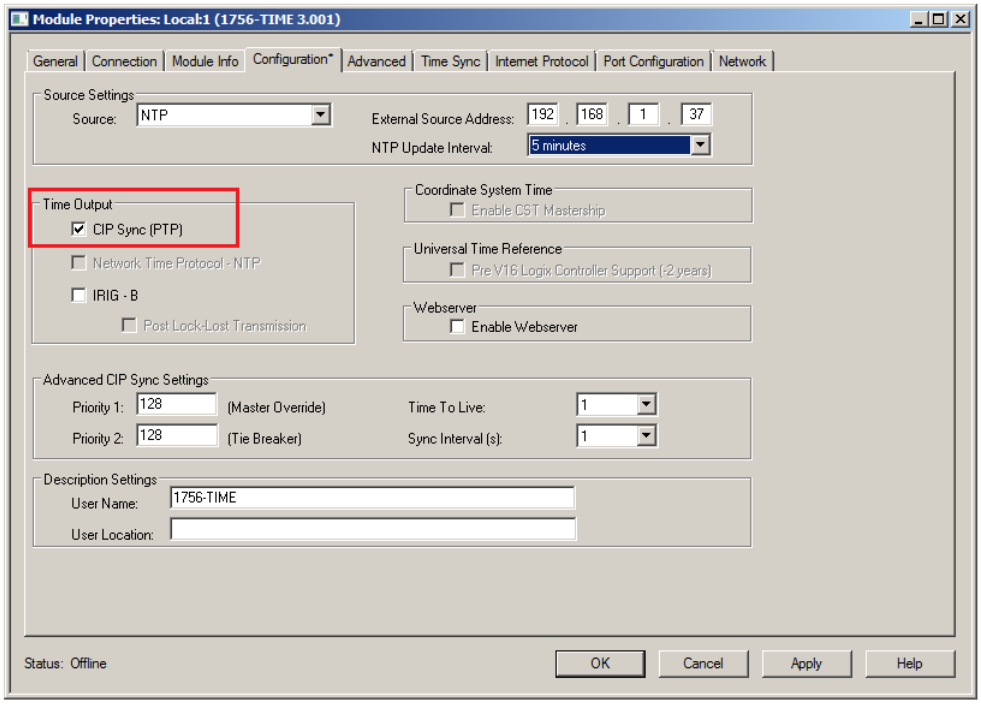

Figure 3.37 – 1756-TIME Time Output

The user will need to open the ***Time Services*** tab of the A-TSM/B in the Configuration to access the ***Enable PTP*** (output) option.

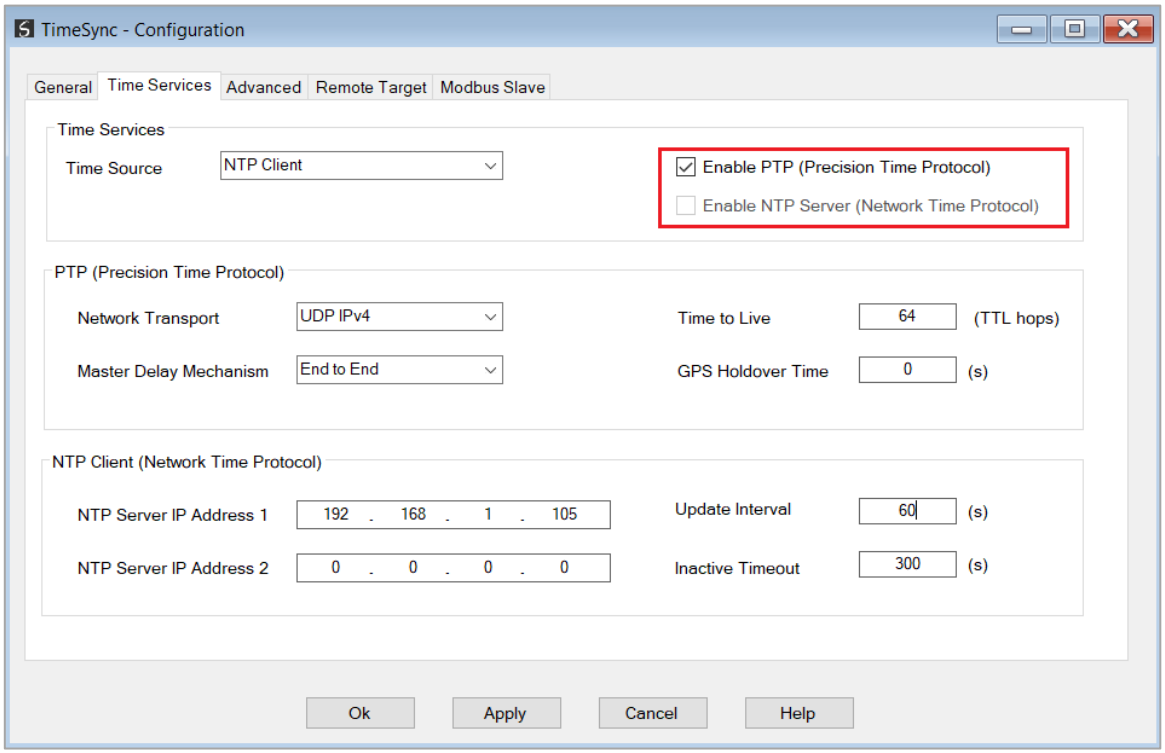

Figure 3.38 – A-TSM/B Enable PTP

3.2.3.3. PTP PRIORITY

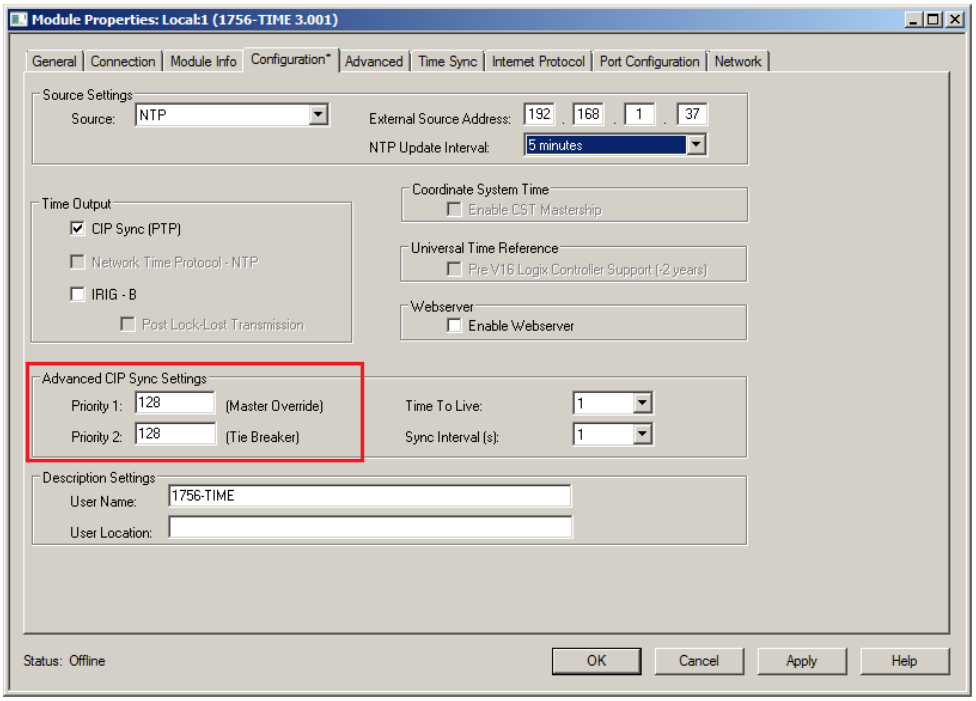

Figure 3.39 – 1756-TIME PTP Priority

The user will need to open the ***CIPSync*** parameter page when online with the A-TSM/B to access the CIPSync ***Priority*** parameter.

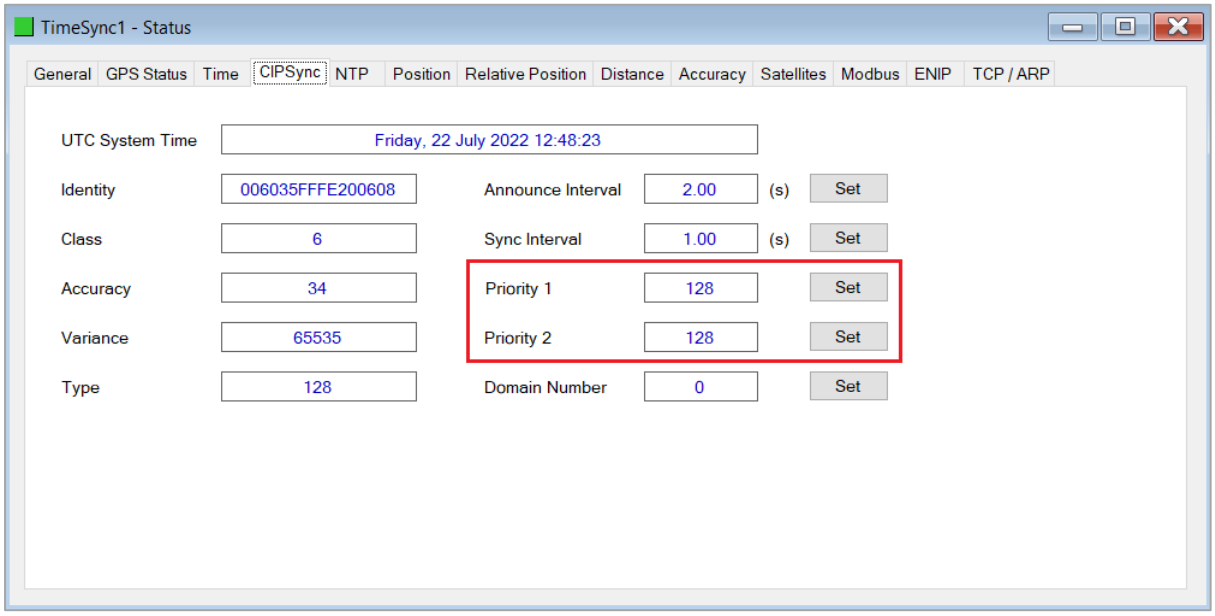

Figure 3.40 – A-TSM/B PTP Priority

3.2.3.4. TIME TO LIVE

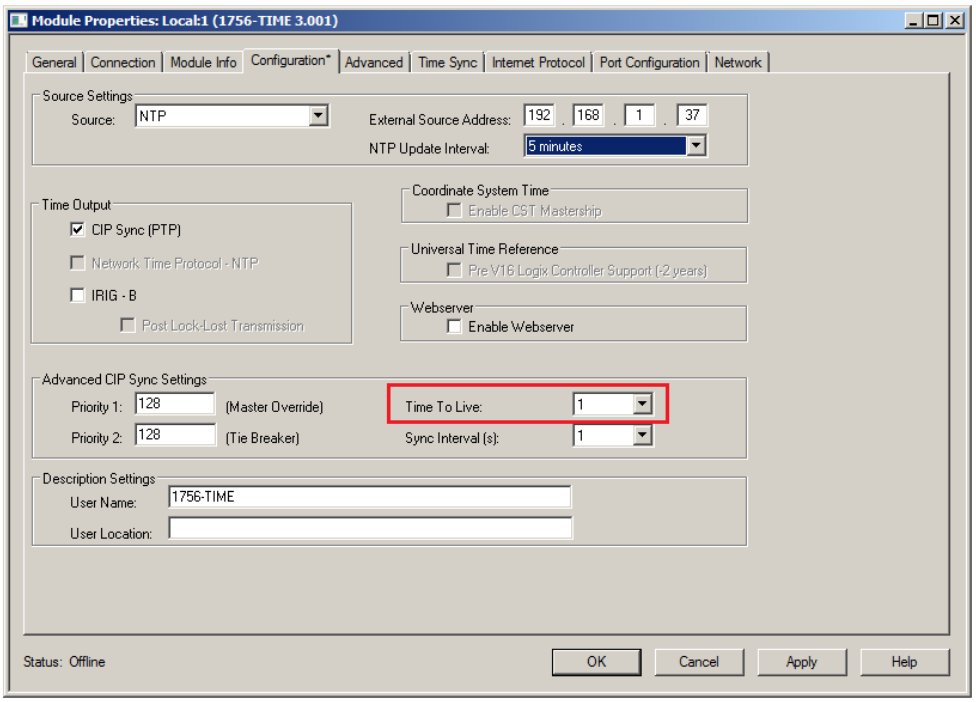

Figure 3.41 – 1756-TIME TTL

The user will need to open the ***Time Services*** tab of the A-TSM/B in the Configuration to access the ***Time To Live*** parameter.

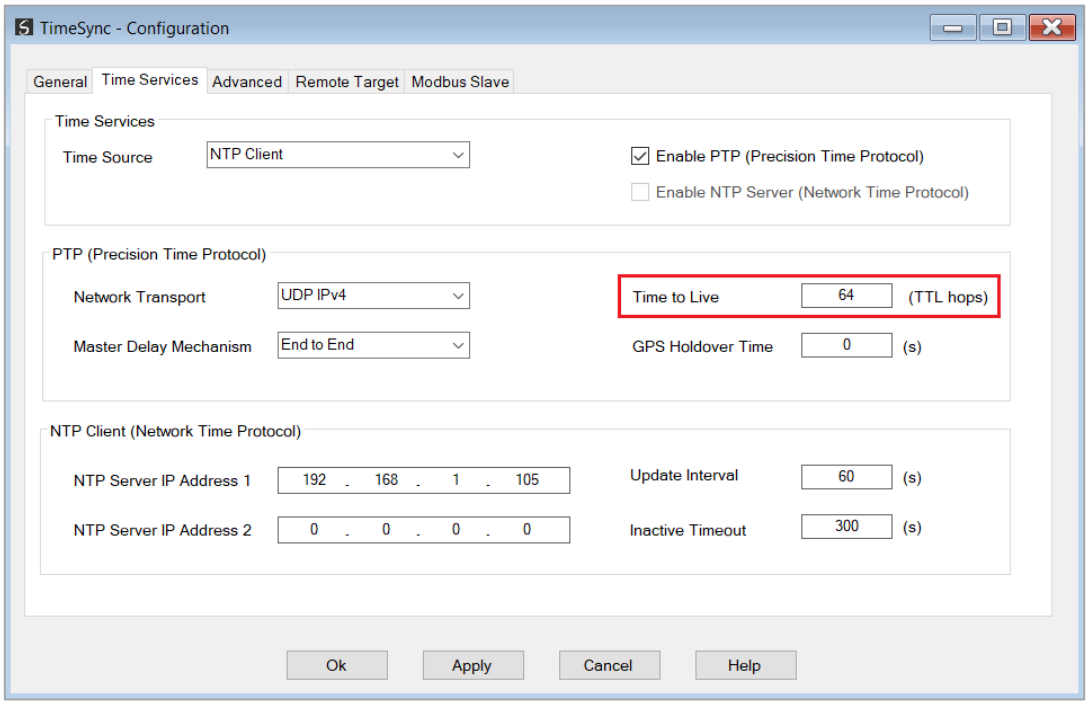

Figure 3.42 – A-TSM/B TTL

3.2.3.5. SYNC INTERVAL

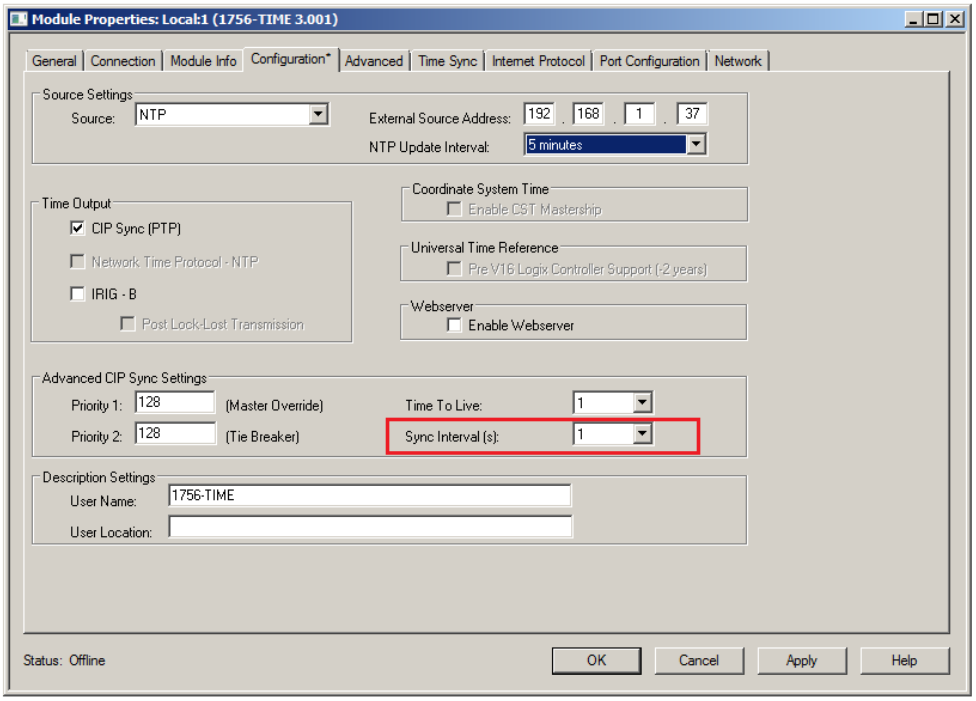

Figure 3.43 – 1756-TIME PTP Sync Interval

The user will need to open the ***CIPSync*** tab in the Status window when online with the A-TSM/B to set the ***Sync Interval*** parameter.

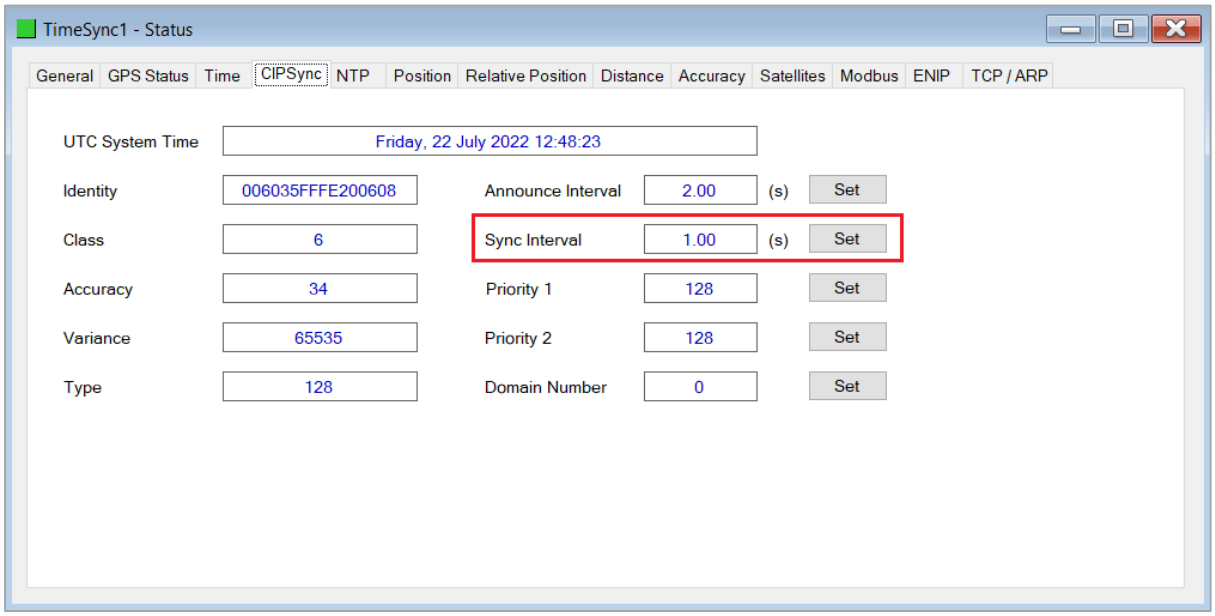

Figure 3.44 – A-TSM/B PTP Sync Interval

3.2.3.6. DESCRIPTION SETTINGS

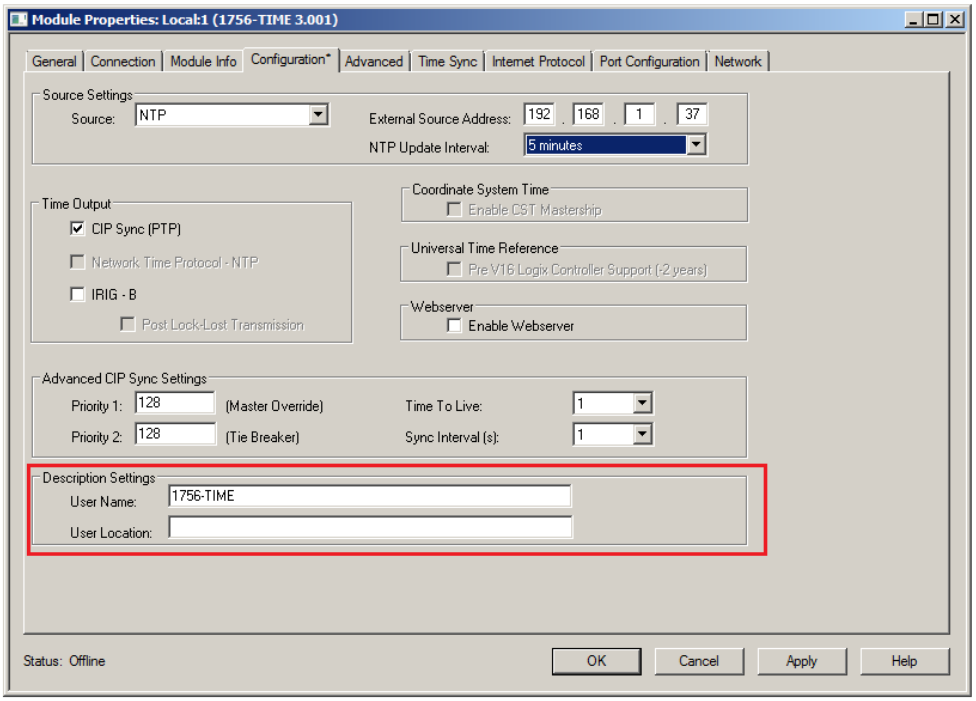

Figure 3.45 – 1756-TIME Description Settings

The user will need to open the ***General*** page of the A-TSM/B in the Configuration to access the ***Name and Description*** parameters.

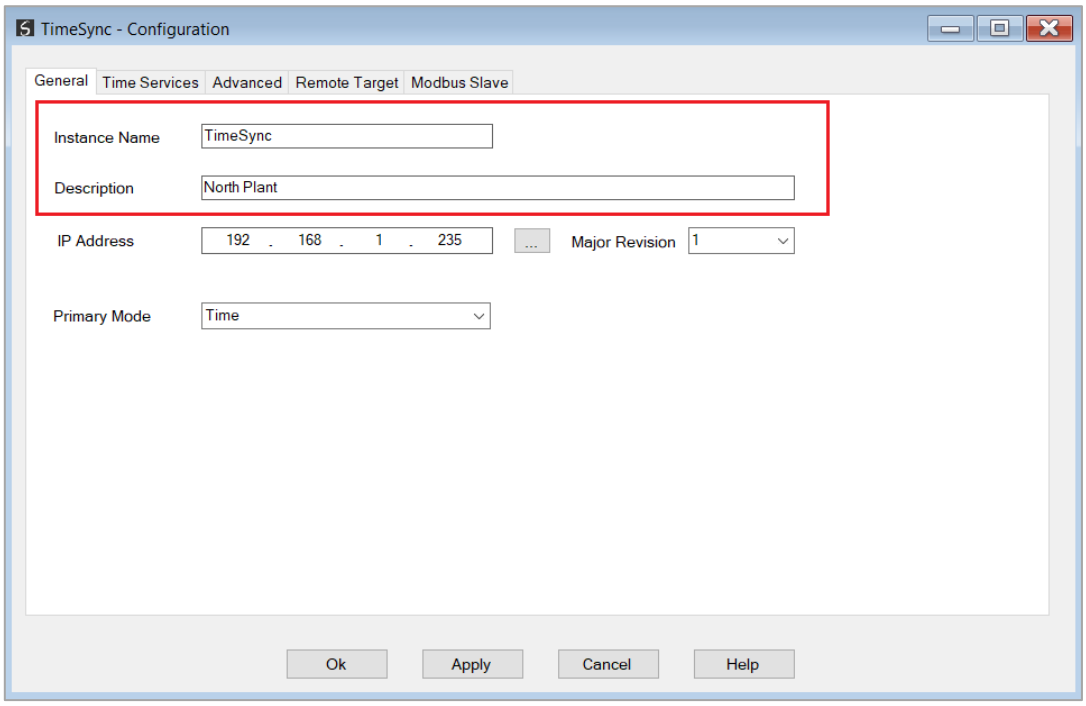

Figure 3.46 – A-TSM/B Instance Name and Description

3.2.4. LOGIX WALLCLOCK SYNC USING I/O ASSEMBLY

When using the time provided in the input assembly of the 1756-TIME module in Logix, the user will need to remap the Logix application code to use the new A-TSM/B assembly. The A-TSM/B will need to be added to an Ethernet bridge (e.g., 1756-EN2TR) tree in Logix as shown below. See the Logix Connection section for details regarding the Logix Class 1 connection parameters.

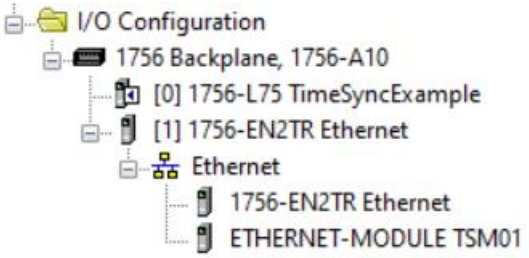

Figure 3.47 – A-TSM/B Instance Name and Description

The user can import the provided UDTs and mapping routines to map the input and output assemblies to User Defined Types (UDTs). See the Importing UDTs section for more information.

The following tags will need to be remapped in Logix.

3.2.4.1. MODULE FLAGS

Name	Value	Force Mask	Style	Data Type
Local:5:I	{...}	{...}		HT:1756_TIME_rev3:I:0
Local:5:I.CommStatus	0		Decimal	DINT
Local:5:I.Source	1		Decimal	DINT
Local:5:I.ModuleStatus	0		Decimal	DINT
Local:5:I.WebserverEnabled	0		Decimal	BOOL
Local:5:I.Time	{...}	{...}		HT:1756_CLOCK rev3:I:0
Local:5:I.Time.Status	2#0000_000...		Binary	DINT
Local:5:I.Time.TimeValid	1		Decimal	BOOL
Local:5:I.Time.CIPSyncOutputEnabled	1		Decimal	BOOL
Local:5:I.Time.NTPOutputEnabled	0		Decimal	BOOL
Local:5:I.Time.IRIGBOutputEnabled	1		Decimal	BOOL
Local:5:I.Time.CSTMasterEnabled	0		Decimal	BOOL
Local:5:I.Time.CSTMastership	0		Decimal	BOOL

Figure 3.48 – 1756-TIME Logix Assembly – Module Flags

TSM01Input	{...}	{..		AparianTimeSyncInput
TSM01Input.Instance	''	{..		STRING
TSM01Input.Status	{...}	{..		AparianTimeSyncStatusR...
TSM01Input.Status.ConfigurationValid	0		Decimal	BOOL
TSM01Input.Status.PTPEnabled	0		Decimal	BOOL
TSM01Input.Status.NTPEnabled	0		Decimal	BOOL
TSM01Input.Status.AntennaShort	0		Decimal	BOOL
TSM01Input.Status.Fix2D	0		Decimal	BOOL

Figure 3.49 – A-TSM/B Logix Assembly – Module Flags

3.2.4.2. GPS FLAGS AND STATUS

Local:5:I.GPS	{...}	{...}		HT:1756_CLOCK rev3:I:0
Local:5:I.GPS.GPSStatus	2#0000_000...		Binary	INT
Local:5:I.GPS.GPSLock	1		Decimal	BOOL
Local:5:I.GPS.AntennaOK	1		Decimal	BOOL
Local:5:I.GPS.HDOPOk	1		Decimal	BOOL
Local:5:I.GPS.PPS	0		Decimal	BOOL
Local:5:I.GPS.FaultCode	0		Decimal	INT
Local:5:I.GPS.Mode	0		Decimal	INT
Local:5:I.GPS.SVCount	8		Decimal	INT
Local:5:I.GPS.Latitude	-26.088095		Float	REAL
Local:5:I.GPS.Longitude	28.005533		Float	REAL
Local:5:I.GPS.Altitude	1569.2		Float	REAL

Figure 3.50 – 1756-TIME Logix Assembly – GPS Flags and Status

TSM01Input	{...}	{..		AparianTimeSyncInput
TSM01Input.Instance	''	{..		STRING
TSM01Input.Status	{...}	{..		AparianTimeSyncStatusR...
TSM01Input.Status.ConfigurationValid	0		Decimal	BOOL
TSM01Input.Status.PTPEnabled	0		Decimal	BOOL
TSM01Input.Status.NTPEnabled	0		Decimal	BOOL
TSM01Input.Status.AntennaShort	0		Decimal	BOOL
TSM01Input.Status.Fix2D	0		Decimal	BOOL
TSM01Input.Status.Fix3D	0		Decimal	BOOL
TSM01Input.Status.FixAutonomous	0		Decimal	BOOL
TSM01Input.Status.FixDifferential	0		Decimal	BOOL
TSM01Input.Status.NTPSource1Connected	0		Decimal	BOOL
TSM01Input.Status.NTPSource2Connected	0		Decimal	BOOL
TSM01Input.InterferenceIndication	0.0		Float	REAL
TSM01Input.SatelliteCount	0		Decimal	SINT

Figure 3.51 – A-TSM/B Logix Assembly – GPS Flags and Status

3.2.4.3. TIME

Local:5:I.Time	{...}	{...}		HT:1756_CLOCK rev3:I:
Local:5:I.Time.Status	2#0000_000...		Binary	DINT
Local:5:I.Time.TimeValid	1		Decimal	BOOL
Local:5:I.Time.CIPSyncOutputEnabled	1		Decimal	BOOL
Local:5:I.Time.NTPOutputEnabled	0		Decimal	BOOL
Local:5:I.Time.IRIGBOutputEnabled	1		Decimal	BOOL
Local:5:I.Time.CSTMasterEnabled	0		Decimal	BOOL
Local:5:I.Time.CSTMastership	0		Decimal	BOOL
Local:5:I.Time.CSTDuplicateDetect	0		Decimal	BOOL
Local:5:I.Time.SimulationModeActive	0		Decimal	BOOL
Local:5:I.Time.Year	2014		Decimal	DINT
Local:5:I.Time.Month	5		Decimal	DINT
Local:5:I.Time.Day	6		Decimal	DINT
Local:5:I.Time.Hour	8		Decimal	DINT
Local:5:I.Time.Minute	41		Decimal	DINT
Local:5:I.Time.Second	10		Decimal	DINT
Local:5:I.Time.MicroSecond	778800		Decimal	DINT
Local:5:I.UTC	{...}	{...}	Decimal	DINT[2]

Figure 3.52 – 1756-TIME Logix Assembly – Time

TSM01Input.DateTime	{...}	{..		AparianTimeSyncDateTime
TSM01Input.DateTime.UTC	DT#1970-01-01-02:00:00.000000(GMT+02:00)		Date/Time	LINT
TSM01Input.DateTime.Year	0		Decimal	INT
TSM01Input.DateTime.Month	0		Decimal	SINT
TSM01Input.DateTime.Day	0		Decimal	SINT
TSM01Input.DateTime.Hour	0		Decimal	SINT
TSM01Input.DateTime.Minute	0		Decimal	SINT
TSM01Input.DateTime.Second	0		Decimal	SINT
TSM01Input.DateTime.Nanosecond	0		Decimal	DINT

Figure 3.53 – A-TSM/B Logix Assembly – Time

3.2.5. LOGIX POSITIONING

When using the time provided in the input assembly of the 1756-TIME module in Logix, the user will need to remap the Logix application code to use the new A-TSM/B assembly. The A-TSM/B will need to be added to an Ethernet bridge (e.g., 1756-EN2TR) tree in Logix as shown below. See the Logix Connection section for details regarding the Logix Class 1 connection parameters.

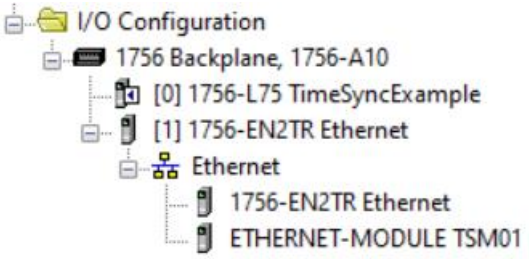

Figure 3.54 – A-TSM/B Instance Name and Description

The user can import the provided UDTs and mapping routines to map the input and output assemblies to User Defined Types (UDTs). See the Importing UDTs section for more information.

NOTE: When using relative and positioning, the 1756-TIME module uses PositionX, Y, and Z while the A-TSM/B uses relative Latitude, Longitude, and Altitude as well as relative North and East.

The following tags will need to be remapped in Logix.

3.2.5.1. GPS FLAGS AND STATUS

Local:5:I.GPS	{...}	{...}		HT:1756_CLOCK rev3:I:0
Local:5:I.GPS.GPSStatus	2#0000_000...		Binary	INT
Local:5:I.GPS.GPSLock	1		Decimal	BOOL
Local:5:I.GPS.AntennaOK	1		Decimal	BOOL
Local:5:I.GPS.HDOPOk	1		Decimal	BOOL
Local:5:I.GPS.PPS	0		Decimal	BOOL
Local:5:I.GPS.FaultCode	0		Decimal	INT
Local:5:I.GPS.Mode	0		Decimal	INT
Local:5:I.GPS.SVCount	8		Decimal	INT
Local:5:I.GPS.Latitude	-26.088095		Float	REAL
Local:5:I.GPS.Longitude	28.005533		Float	REAL
Local:5:I.GPS.Altitude	1569.2		Float	REAL

Figure 3.55 – 1756-TIME Logix Assembly – GPS Flags and Status

TSM01Input	{...}	{..		ApatianTimeSyncInput
TSM01Input.Instance	''	{..		STRING
TSM01Input.Status	{...}	{..		ApatianTimeSyncStatusR..
TSM01Input.Status.ConfigurationValid	0		Decimal	BOOL
TSM01Input.Status.PTPEnabled	0		Decimal	BOOL
TSM01Input.Status.NTPEnabled	0		Decimal	BOOL
TSM01Input.Status.AntennaShort	0		Decimal	BOOL
TSM01Input.Status.Fix2D	0		Decimal	BOOL
TSM01Input.Status.Fix3D	0		Decimal	BOOL
TSM01Input.Status.FixAutonomous	0		Decimal	BOOL
TSM01Input.Status.FixDifferential	0		Decimal	BOOL
TSM01Input.Status.NTPSource1Connected	0		Decimal	BOOL
TSM01Input.Status.NTPSource2Connected	0		Decimal	BOOL
TSM01Input.InterferenceIndication	0.0		Float	REAL
TSM01Input.SatelliteCount	0		Decimal	SINT

Figure 3.56 – A-TSM/B Logix Assembly – GPS Flags and Status

3.2.5.2. POSITION AND SPEED

Local:5:I.GPS	{...}	{...}		HT:1756_CLOCK rev3:I:0
Local:5:I.GPS.GPSStatus	2#0000_000...		Binary	INT
Local:5:I.GPS.GPSLock	1		Decimal	BOOL
Local:5:I.GPS.AntennaOK	1		Decimal	BOOL
Local:5:I.GPS.HDOPOk	1		Decimal	BOOL
Local:5:I.GPS.PPS	0		Decimal	BOOL
Local:5:I.GPS.FaultCode	0		Decimal	INT
Local:5:I.GPS.Mode	0		Decimal	INT
Local:5:I.GPS.SVCount	8		Decimal	INT
Local:5:I.GPS.Latitude	-26.088095		Float	REAL
Local:5:I.GPS.Longitude	28.005533		Float	REAL
Local:5:I.GPS.Altitude	1569.2		Float	REAL
Local:5:I.GPS.GroundSpeed	0.0		Float	REAL
Local:5:I.GPS.DegreeFromTrueNorth	0.0		Float	REAL
Local:5:I.GPS.MagneticVariationFromTrueNorth	0.0		Float	REAL
Local:5:I.GPS.RelativePositionX	0.0		Float	REAL
Local:5:I.GPS.RelativePositionY	0.0		Float	REAL
Local:5:I.GPS.RelativePositionZ	0.0		Float	REAL

Figure 3.57 – 1756-TIME Logix Assembly – Position and Speed

TSM01Input	{...}	{..		AparianTimeSyncInput
TSM01Input.Instance	''	{..		STRING
TSM01Input.Status	{...}	{..		AparianTimeSyncStatusR...
TSM01Input.InterferenceIndication	0.0		Float	REAL
TSM01Input.SatelliteCount	0		Decimal	SINT
TSM01Input.DateTime	{...}	{..		AparianTimeSyncDateTime
TSM01Input.Velocity	{...}	{..		AparianTimeSyncVelocity
TSM01Input.Velocity.TrueCourseOverGround	0.0		Float	REAL
TSM01Input.Velocity.SpeedOverGroundKnots	0.0		Float	REAL
TSM01Input.Velocity.SpeedOverGroundKmh	0.0		Float	REAL
TSM01Input.Position	{...}	{..		AparianTimeSyncPosition
TSM01Input.Position.Latitude	0.0		Float	REAL
TSM01Input.Position.Longtitude	0.0		Float	REAL
TSM01Input.Position.Altitude	0.0		Float	REAL
TSM01Input.Position.ReferenceLatitude	0.0		Float	REAL

Figure 3.58 – A-TSM/B Logix Assembly – Position and Speed

3.2.6. GPS Time Source with IRIG-B Output

The A-TSM/B does not support legacy IRIG-B.

3.2.7. GPS Time Source with CST over ControlBus

The A-TSM/B does not support legacy CST.