**SCADA\_SYS\_MSG**

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| **Version** | **Release Notes** |
| 1.0 | Initial Release |

**Description**: This UDT is used to standardize message reads from other device PLCs.

**Naming Convention**: Tags using this UDT shall be named MSG\_BYX1\_1, where BYX1 is the remote PLC that is the target of the message read, and \_1 is incremented sequentially if additional message blocks are needed.

Additionally, within each local PLC BXX a tag of this type should be created with the name MSG\_BXX1\_1. This tag will be used to implement the PLC heartbeat and should also be used as a holding array for data to be read by other PLCs.

**UDT Members**

| **UDT Member** | **Datatype** | **Description** | **Usage** |
| --- | --- | --- | --- |
| ADDON | Message\_Read\_v1 | Message Read AOI | Used in Main Routine of COMMS\_MSG Program |
| Data | SYS\_MESSAGE\_DATA\_1\_0 | Message Array | Consists of an array of 20 DINTS and 20 REALs for 40 total registers. |
| ERR | BOOL | Message Error | For display on HMI |
| PB\_EN | BOOL | Message Enable | Allows Individual Message blocks to be enabled/disabled |

**AOI**

| **AOI Parameter** | **Requirement** | **Default Value** | **Description** | **Implementation Guideline** |
| --- | --- | --- | --- | --- |
| Message\_Read\_v1 | Mandatory | *Tagname.*ADDON | Message Read AOI | N/A |
| MSG | Mandatory | N/A | Message Instruction | Message Instruction must be created independently in the form MSG\_READ\_BYX1\_1, to align with AOI name |
| MSG\_Enable | Mandatory | *Tagname.*ADDON.MSG\_Enable | Enable Message Instruction | Program outside of the AOI with message enable conditions |
| Continuous\_Execution | Mandatory | 0 | Message to be executed continuously | Set to 1 to allow the block to continuously execute without any dwell time |
| Message\_Sequence\_Counter | Mandatory | MSG\_SEQ\_COUNTER | Message execution Sequence Number | Value increments by 1 on each execution of the COMMS\_MSG task. When this value is equal to Message\_Sequence and the message is not configured for continuous execution, a read is triggered |
| Message\_Sequence | Mandatory | Hard Code to Rung Number | Message Sequence ID | Message is executed when this value is equal to Message\_Sequence\_Counter |
| Heartbeat | Mandatory | *Tagname*.Data.DINT[19].31 | Heartbeat bit from target PLC | Program to use the heartbeat bit from the PLC |
| Communication\_Error | Mandatory | *Tagname*.ERR | Communication Error due to heartbeat timeout | N/A |

**AOI Operation Description**

The message block will execute based on the programmed enable and trigger conditions. A diagnostic counter is provided to track the number of times an execution attempt is made.

If the message block is enabled the heartbeat from the target PLC will be evaluated. By default if the heartbeat signal does not change for five minutes, an alarm will be generated.

**Programming Examples**

Message blocks are to be deployed in the Main Routine of the COMMS\_MSG program. This is part of a timed task that executes every second by default. The sequence counter logic is implemented on rung 0 of the routine. Whenever a message block is added or removed this rung must be modified so that the counter resets to 1 after reaching the maximum message block count.

One message block should be deployed on each subsequent rung. Each rung should consist of two branches. The first branch should implement the message enable conditions, at minimum these are the global message enable tag SYS\_MSG\_ENB and the .PB\_EN tag of the UDT. The second branch should implement the AOI. The Message\_Sequence should be equal to the rung number, even if the block is configured for continuous execution.

Continuous messaging should be avoided unless the application requires near real-time data from the target PLC. If the delay between message block execution becomes excessive (approximately more than 30 seconds or 30 message blocks) then, with the approval of Halton Region, the period of the timed task should be decreased to accommodate for faster execution.

Message Blocks cannot be members of UDTs and so must be created separate from the UDT. The default configuration of the message block is as follows

Message Type: CIP Data Table Read

Source Element: MSG\_BYX1\_1.Data

Number of Elements: 1

Destination Element MSG\_BYX1\_1.Data

Path: A valid Communication Path from the source to destination controller

Connected: Unchecked

It is generally recommended to name the source and destination elements the same, and configure them as the same data type, to simplify troubleshooting. As the Default .Data array accommodates up to 20 DINTS (or 20\*32 BOOLs) and 20 REALs there should be enough storage for a single .Data array in a PLC to hold all the necessary data to be read by other PLCs. If additional addresses are needed a second .Data block can be created.

**HMI Integration**

There are no specific HMI programming requirements for this UDT.