

STB NIP 2212

Setup Recommendations

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Version Information

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Purpose

The main purpose of this document is to provide recommendations when multiple numbers of connections must be opened with STBNIP2212 Ethernet Communication Module. This recommendation will result in an improved system performance of the STBNIP2212.

Setup Recommendations

Number of Connections The STBNIP2212 Network Interface Module (NIM) allows a maximum of 16 Modbus/TCP connections simultaneously. The NIM will not hang up or lose any data when the maximum number of connections has been opened. If a request for a new connection is received and the number of existing connections is at the connection limit, then the oldest unused connection will be dropped and the new one will be accepted.

Connections Setup The STBNIP2212 Network Interface Module (NIM) allows a maximum of 16 Modbus/TCP connections simultaneously. These connections can be opened by a single device like a PLC or by multiple devices. Each connection established using the I/O scanner is associated with a repetition rate (RR). The repetition rate determines the number of Modbus/TCP requests per second (RPS) issued for that connection. If you know the repetition rate, the corresponding RPS, given in units of Modbus/TCP requests per second (Mrps), can be calculated by:

$$RPS = \frac{1}{RR} \quad (1)$$

Equivalently, given RPS, the corresponding RR can be calculated by:

$$RR = \frac{1}{RPS} \quad (2)$$

For example, if RR for an I/O scanner entry is set to 10 ms, then the corresponding RPS for the connection is 100 Mrps.

If the PLC configuration software allows a value of "0" to be set for the repetition rate, then a value of 5 ms should be used in the calculation.

Under normal operating conditions, the STBNIP2212 can handle up to 200 Mrps. If multiple Modbus/TCP connections are to be used with an STBNIP2212, then RPS for each entry in the I/O scanner should be calculated using the formula (1) above and the sum for all such entries must be less than or equal to 200 Mrps for optimal performance.

PLC Scan Time Implications The PLC scan time also has an impact on the repetition rate determination. As a general rule, it is recommended that the repetition rate for an IO scanner connection should be equal to or greater than the PLC scan time.

Example 1

Let us assume that the application requires eight connections from a single STB NIP 2212. The desired repetition rates are presented as well. We want to make sure that this configuration results in achieving an optimal level of performance in the STBNIP2212.

Connection Number	Function Code	RR (ms)
1	Write	10
2	Write	50
3	Read / Write	15
4	Read	15
5	Read	100
6	Read	100
7	Read	200
8	Read	500

One must first calculate equivalent RPS for each entry in the I/O scanner connection using formula (1) above.

Connection Number	Function Code	RR (ms)	RPS (Mrps)
1	Write	10	100
2	Write	50	20
3	Read /Write	15	66.7
4	Read	15	66.7
5	Read	100	10
6	Read	100	10
7	Read	200	5
8	Read	500	2

Note that the sum of RPS's above is 280.4 Mrps. Using this I/O scanner configuration will result in severely degraded performance of the STBNIP2212. Increasing the repetition rates so that sum of RPS's is below 200 Mrps will result in improved performance.

Example 2

Let us assume that a PLC with a scan time of 15 ms wishes to control, i.e., read from and writes to, an STBNIP2212. There are three other controllers that wish to monitor the same STBNIP2212 for diagnostic purposes. We want to make sure that this configuration results in achieving an optimal level of performance in the STBNIP2212.

The I/O scanner connection from the PLC to the STBNIP2212 should use a repetition rate that is near the value of the PLC scan time. Thus, the repetition rate should be set to 15 ms. Note that this value is equivalent to RPS of 67 Mrps.

To achieve an optimal performance level in the STBNIP2212, the remaining connections may utilize upto 133 Mrps. If the same value of RR for the three connections is desired, then each connection may utilize 44 Mrps. This value is equivalent to repetition rate of:

$$RR = \frac{1}{RPS} = \frac{1}{44Mrps} = 22.7ms$$

Thus, if the repetition rate for each of the three remaining connections is set to a value greater than or equal to 23 ms, then the STBNIP2212 will perform at its best.