

## Logix Protocol Options

### Protocol Mode

The protocol mode determines how Logix Tag data is read from the controller. This option should only be changed by advanced users who are looking to increase Client/Server Tag update performance. There are three options, Symbolic mode, Physical Non-Blocking mode, and Physical Blocking mode. Your server project is interchangeable between these three modes.

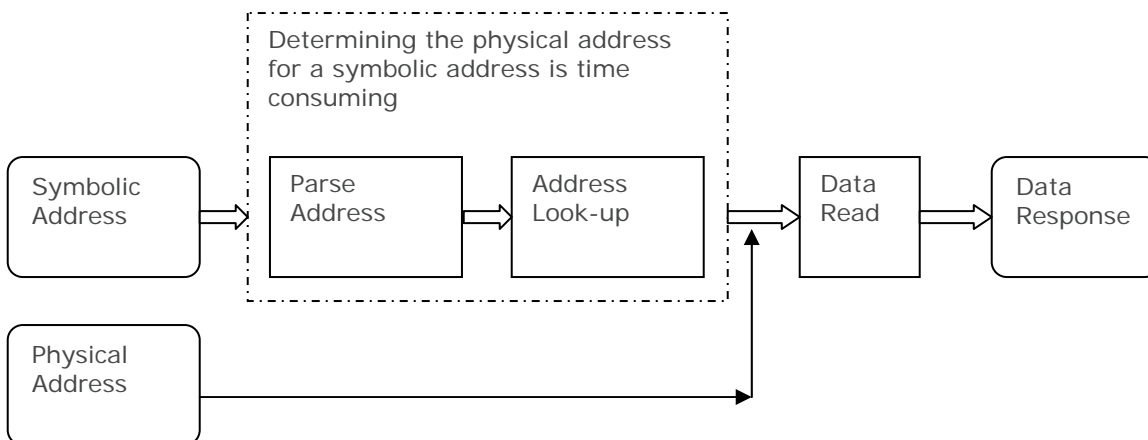
### Symbolic Mode

Each Client/Server Tag address is represented in the packet by its ASCII character name. Prior to ControlLogix Ethernet Driver Version 4.6.0.xx, the driver was using Symbolic mode. Symbolic mode is convenient in that all the information needed to make a data request lies in the Client/Server Tag's address. To take advantage of the Multi-Request Packet optimization, you want as many tags represented in a single packet as possible. Since tag addresses are represented by their ASCII character name in the packet, this implies tag addresses should be made as short as possible. For example, MyTag is preferred over MyVeryLongTagNameThatContains36Chars.

Pros	Cons
<ul style="list-style-type: none"> <li>- Low initialization overhead. All information needed lies in Client/Server Tag's address.</li> <li>- Only the data being accessed in Client/Server tags is requested from the PLC.</li> <li>- Backward compatibility.</li> </ul>	<ul style="list-style-type: none"> <li>- High device turnaround time to process symbolic address.</li> <li>- Less requests per Multi Request Packet since each request is of variable size.</li> </ul>

### Physical Modes

In the physical protocol modes, the physical address in the controller for each Client/Server Tag (member for structures / element for arrays) is retrieved in a controller project upload sequence performed automatically by the driver. For large projects, this upload sequence can be timely when performed but quickly pays off as transactions are processed much faster than its symbolic mode counterpart. The reason is that the physical modes avoid the timely address parsing and lookups required upon every symbolic request. There are two physical protocol modes, non-blocking and blocking.





### Physical Non-Blocking Mode

Non-blocking physical is identical to symbolic in that all Client/Server tags are requested individually, utilizing the Multi-Request Packet. They differ in that the Client/Server tags are specified in the packet with their physical address, not their symbolic address. This is considerably faster than symbolic mode as the device turnaround time is diminished.

Pros	Cons
<ul style="list-style-type: none"> <li>- Low device turnaround time to process physical address.</li> <li>- Maximum request per Multi-Request Packet since each request is a fixed size.</li> <li>- Only the data being accessed in Client/Server tags is requested from the PLC.</li> </ul>	<ul style="list-style-type: none"> <li>- Initialization overhead uploading project to determine physical addresses.</li> </ul>

### Physical Blocking Mode

In Physical Blocking, all data for a Logix tag is retrieved in a single request. It takes only one Client/Server tag to initiate this request. When the data block is received, it is placed in a cache in the driver and time stamped. Successive Client/Server tags that belong to the given Logix tag then get their data from this cache. When all tags are updated, a new request is initiated provided that the cache is not old. The cache is old when the current time > cache timestamp + tag scan rate. If this case holds, another block request is made to the device, the cache is refreshed and the cycle repeats.

Blocking is possible because each Logix tag has a base physical address from which to work with. The data for each Client/Server tag for the given Logix tag is located at a specific offset from the base address. Recall that each Logix tag (member for structures / element for arrays) has a physical address assigned during the initialization upload sequence. The offset for each Client/Server tag is simply the Client/Server tag physical address - Logix tag base physical address.

Physical Blocking mode is ideal when most or all members/elements for a given Logix tag are being referenced by a client. Regardless of how many Client/Server tags are referencing the given Logix tag, the entire contents of the Logix tag is retrieved on every read. Performance may not be optimal if there are not enough Client/Server tags referencing the given Logix tag. Studies have shown that if 1/3 or less of tags belonging to a Logix tag are being referenced at any given time then Physical Blocking should not be used. This would be a better case for Physical Non-Blocking mode. Otherwise, Physical Blocking is preferred.

Pros	Cons
<ul style="list-style-type: none"> <li>- If majority (1/3 or greater) of Logix tags are referenced, faster than Physical Non-Blocking.</li> <li>- Low device turnaround time to process physical address.</li> <li>- Maximum request per Multi-Request Packet since each request is a fixed size.</li> </ul>	<ul style="list-style-type: none"> <li>- Initialization overhead uploading project to determine physical addresses.</li> <li>- If minority (1/3 or less) of Logix tags are referenced, slower than Physical Non-Blocking; more data being accessed from PLC than referenced in Client/Server tags.</li> </ul>

