

TECHNICAL NOTE 13: SMART COMMUNICATIONS

The user can improve communications efficiency by parsing data-link layer messages in the COMM, instead of the GPT.

How the GPT Parses Incoming Messages

For most protocols, an incoming message is variable in length. The GPT does not know the length of an incoming message. In order to parse a protocol message, the GPT issues one or more reads through the COMM layer. From the result of the read, the GPT determines if another read is required and the number of bytes needed. The GPT performs the following steps when parsing a data link message:

1. **Sync Byte.** If the protocol supports a sync byte, the GPT issues one-byte reads until it detects the sync byte.
2. **Data Link Header.** Next, the GPT reads the header of the data link message. The header usually contains the length of the entire message.
3. **Message Body.** The GPT uses the length in the header to read the remainder of the data link message, that is, the message body.
4. **Security and Addressing.** The GPT checks the security and addressing in the assembled message to determine if the data link message is addressed to the local device.

If the line contains noise there could be significant overhead when locating the sync byte.

Moving Data-link Parsing into the COMM

Performing Steps 1—3 (above) in the COMM layer allows the GPT to obtain a complete data link message in a single read. The user can further improve efficiency by performing Step 4 in the COMM layer and discarding messages that are not addressed to the local device. This would ensure that each COMM read returns a single data link message addressed to the local device. Note that the GPT always performs step 4, whether or not the COMM layer is performing this step. To move data-link parsing to the COMM layer, the user must support the following:

- **IOC_SMART.** Setting this property to true tells the GPT that the COMM will parse data link messages. Note that this property is currently only supported for the DNP 3.0 protocol, although its extension to other protocols is straightforward.
- **Read Length.** When the GPT calls ReadComm it passes the user application a length. The meaning of the length argument is dependent on the setting of IOC_SMART, as described in the following table

IOC_SMART Setting	Read Length Meaning
True	The maximum size of a single data link message.
False	The number of bytes of data that the COMM layer must read before the read can complete successfully.

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- **IOC_RXLEN.** This property is set to the number of bytes read by the COMM layer. This property is used by the GPT as follows:

IOC_SMART Setting	IOC_RXLEN Value
True	The actual size of the data link message parsed by COMM. IOC_RXLEN must be less than or equal to the length specified on the ReadComm call.
False	If IOC_RXSTATUS is success, then IOC_RXLEN must be equal to the length specified on the ReadComm call.