The RS-485 standard defines a half-duplex serial protocol that ASI Controls uses on the system bus and local bus of our hardware lineup. This standard uses a twisted-pair communication wire. Half-duplex means that you can send or receive at any one time, but simultaneous communication is not possible. Communication traffic flows in one direction, than reverses in the other direction.

Half-duplex communication is typically used with controllers that function in a master/slave relationship. In this relationship, the master is the only one that can initiate communication. It does so by either requesting information from the slaves, or by directly sending them commands. When information is requested, the master will stop communicating while the slave device responds. The master should not be communicating at the same time as one of the slaves is answering. When this does happen, it is called a mis-communication, or a collision. One way to avoid collisions is to employ gap detection. In this method, devices do not start trying to communicate until they hear silence on the communication bus for a fixed time period, or a gap.

An ASIC/2 controller holding conversations with local bus controllers, whether they be ASI controllers or Modbus RTU devices, is an example of master/slave communication. The local bus devices will only speak when spoken to. If the master is silent, you should not see any traffic on the communication bus.

System bus communication is not just restricted to a single device that can initiate communication. Instead, there can be multiple masters. One example of this principle is Remote Point (REM-02) communication.

Any ASIC/2 device on the system bus can initiate a Remote Point, and any ASIC/2 device can listen to them. In addition, any ASIC/2 device can initiate Notify (NOT-37) messages on the system bus.

Another type of master on the system bus would be software applications. Software such as ASI Visual Expert and ASI WebLink via the Link/OPC server can initiate system bus communication. With all these different forms of masters, system bus traffic can resemble rush hour traffic in a major metropolitan area. Without proper traffic management, such as limiting unnecessary communication and using gap detection, communication will slow down as collisions occur on a regular basis.

The main part of system bus traffic management involves limiting excessive communication. When it comes to Remote Points, do not have them originate too frequently. If you are worried about fresh data not getting through, or that the data is changing before you send it again, use the COV feature. The COV feature, change of value, allows you to use a much less frequent update interval, while assuring that if the value does change, it will be sent out right away. You can also use the COV Hysteresis feature to qualify how big of a change has to occur before the Remote Point is sent out on COV.

For software applications, the biggest culprit of excessive system bus traffic is trending in ASI WebLink, which allows trending using either a fixed-time interval or on a change of value (COV). In this case, using COV is not the way to go.

Unlike Remote Points, which remain in the controller and off the system bus until sent, COV trending requires that ASI WebLink constantly updates the trended value so it can see if it has changed. This causes constant and never ending communication. Unless you absolutely need this kind of information tracking, it is recommend that you do your ASI WebLink trending using a fixed interval. This will eliminate the constant traffic just to see if a point has changed.

Using gap detection in your Link/OPC server is another way to make sure that system bus traffic flows as smoothly as possible, with a minimum of collisions. The gap setting enforces that a period of silence must be detected before system bus communication can be initiated.

This gives a much better chance for all masters on the system bus to say what they want to say, without stepping on the words of the other devices. A workable gap setting ranges from 25 to 75 ms, depending on how well your system communicates in general.

Smaller gap settings increase overall communication speed, but increase the likelihood of collisions. Larger gap settings decrease the overall communication speed, but reduce the likelihood of collisions. The overall effect of a larger gap setting may be smoother overall communications.

Figure 1 shows cars stopping and waiting for each other as they cross a one-lane bridge. This represents data packets on the system bus, looking for a gap in traffic before they proceed across the bridge, hoping to avoid collisions.

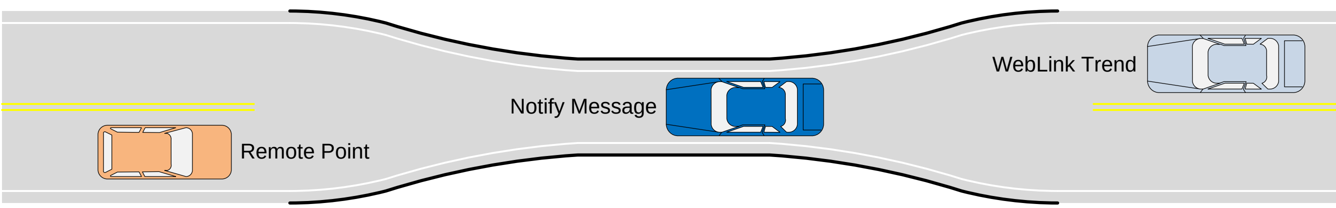

Figure 1. One-lane brige representing ASI system bus traffic negotiation

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Date	2008-DEC-07	Rev	None
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