Peer to Peer Communications

Peer to peer communications allows up to 40 Trusted controllers to communicate and share information. Communications between systems is accomplished using communications interface modules housed in the controller assembly. Each controller must be fitted with a Processor Interface Adapter (T812X or T813X). Peer to peer communications employs Ethernet and User Datagram Protocol (UDP) in a multi-drop bus structure. Communications are on a deterministic master/slave basis with a single master per network. Peer to peer communications are TÜV approved for SIL 3 applications.

The software required for peer to peer is provided on a separate CD (Peer to Peer Communications Software Package - T8017).

A peer network consists of one or more Ethernet networks. A network can use up to eight physical Ethernet networks to provide redundant data paths via up to eight separate physical routes (four communications interface modules each with two Ethernet ports). The communications interface module may be configured as master or slave per network, but not both simultaneously. The network will automatically handle routing and selection of redundant data, avoiding the need to handle data selection and voting in the application.

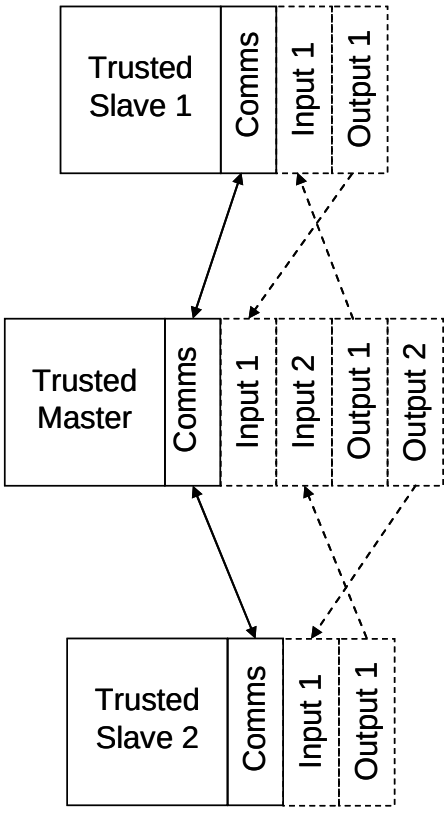

Figure 13-1: Peer to Peer

Variables to be communicated between systems (Boolean or analog) must be defined in the dictionary as inputs or outputs. These variables are then configured on 16 or 128 channel peer to peer I/O boards in the I/O configuration editor. These are virtual boards configured in software, not actual physical modules.

Peer output boards are assigned unique identifiers in the I/O configuration. Input boards receive data from output boards using the board identifiers. Data may be passed between board pairs or multicast to several input boards on different controllers. Figure 13-1 shows the basic concept.

Two Boolean control variables are provided on the Dual Peer to Peer Net Control Board to define the board as master or slave and to give an application program control over the starting and stopping of the Peer to Peer communications.

The communications interface module supports external communications using Modbus over serial and Ethernet links. Using the module to support both external Modbus communications and Peer to Peer simultaneously may slow the performance of Peer to Peer communications.

Software Configuration

Peer to Peer information is exchanged between systems via communications interface modules. However, you select Peer to Peer modules (Net Control, Input and Output) in the I/O Configuration Editor, as shown in Figure 13-2. Figure 13-6 (on page 199) will aid in understanding the following descriptions.

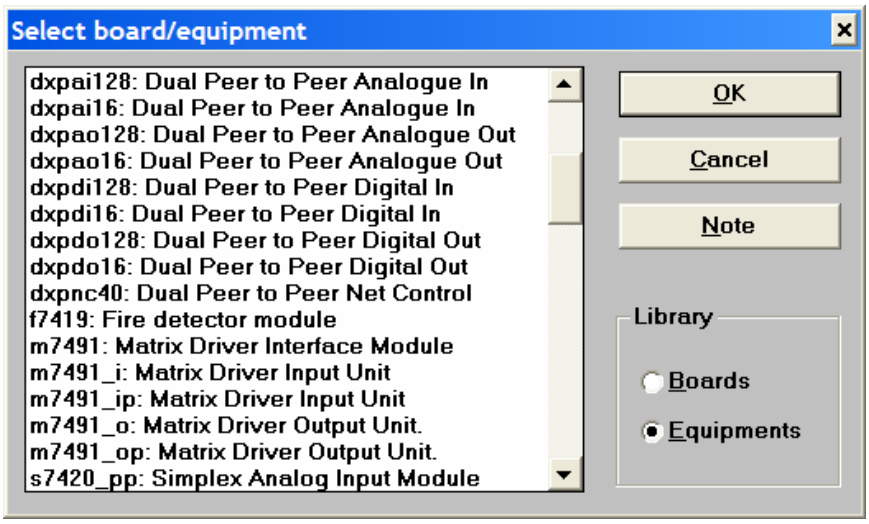

Figure 13-2: Selecting a Peer to Peer Modules

Peer Boards

The peer net control board is used to configure and control a network for transferring data between peer I/O boards. This board must be defined before the I/O boards.

There are eight different peer I/O boards (input and output, digital and analog, 16 and 128 channels). Each input board has a corresponding output board that must be of the same type and channel quantity. In order for I/O boards to communicate with each other, they must share the same network, peer and data identities. The combination of these three identities should be considered as a global data identifier which must be uniquely defined across the entire peer network for each I/O board pair.

Think of it as wiring multicore cables between systems. Each multicore cable is placed in a tray (network). Different multicore cables (subnets) may be routed in one tray. Each controller on the network has a unique identity (peer ID). Wires at each end must match up with similar devices (analog / digital) with the same quantity of channels (16 or 128).

Net Control

The Dual Peer to Peer Net Control board definition configures and controls a network controller for transferring data between dual peer I/O boards. Figure 13-3 shows an installed Dual Peer to Peer Net Control board.

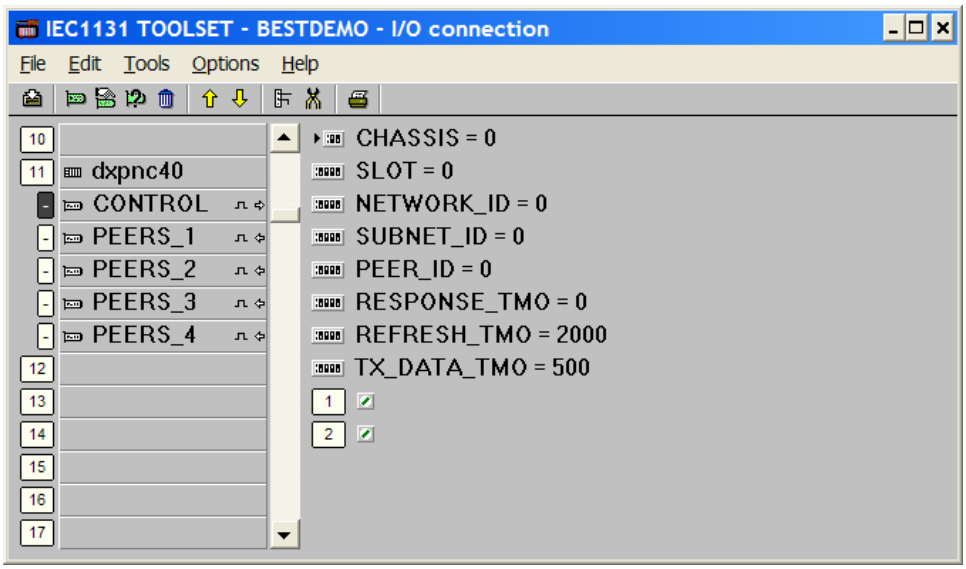

Figure 13-3: Dual Peer to Peer Net Control Board – Control Rack

CHASSIS – Chassis of the Communication Interface module. This will always be 1.

SLOT – The slot number of the associated Communications Interface module.

NETWORD_ID – Network group supported by this controller. Range 1-8.

SUBNET_ID – The subnet within the network to which this controller is connected. Range 1-8.

PEER_ID – Peer identity of this controller. Range 1-40.

RESPONSE_TMO – Time (in milliseconds) for a peer to acknowledge a data packet. If set to 0, no acknowledgement is required. Range 0-10,000.

REFRESH_TMO – Time (in milliseconds) that a network controller will wait for a token from the master before declaring the network inoperable and discarding any data awaiting transmission. This time must be configured for both master and slave modes. Range 1-10,000.

TX_DATA_TMO – Time (in milliseconds) that a network master controller will wait for a slave to complete transmission of its data and return the token before declaring the slave absent. This parameter will be ignored during slave mode. Range 1-10,000.

Boolean output variable 1 – Peer to Peer communications is started/stopped using this variable name, which may be controlled in an application program. TRUE = Controller enabled.

Boolean output variable 2 – Master/Slave setting for the controller. TRUE = Master, FALSE = Slave.

Net Control Peer IP and Status Rack

Figure 13-4 shows an installed Dual Peer to Peer Net Control Peer IP and Status Rack. This rack contains ten IP addresses and ten status bits which indicate the status of the peers on the network.

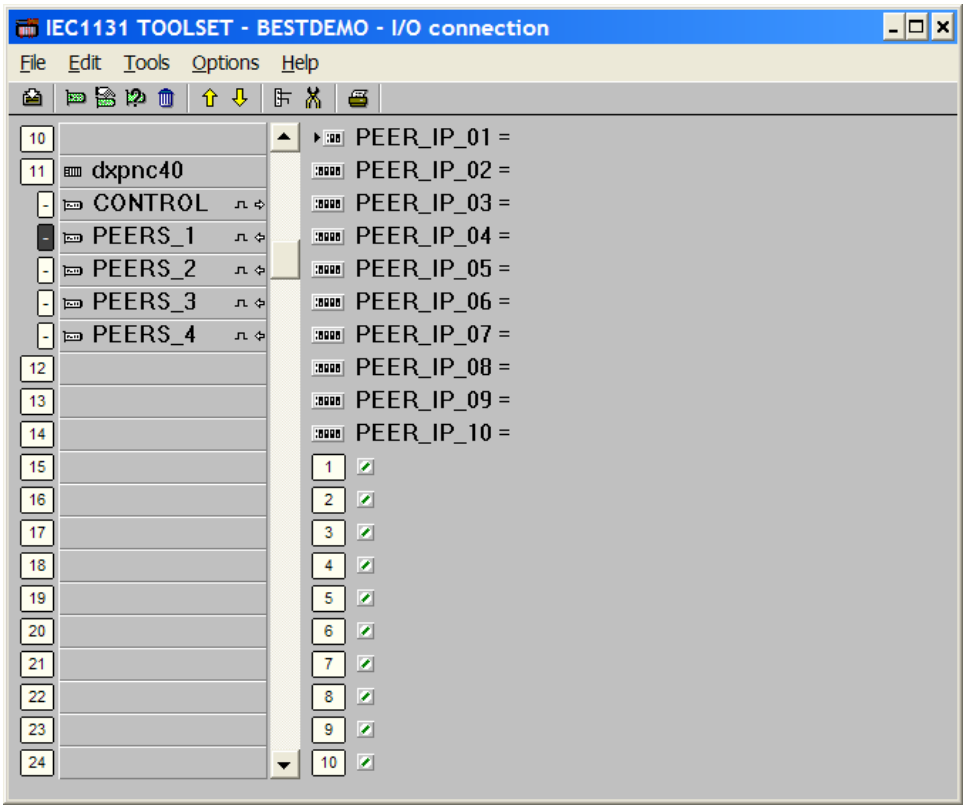

Figure 13-4: Dual Peer to Peer Net Control Board – Peer IP and Status Rack

PEER_IP_01 to 10 – IP address of peers 1 to 10 in the subnet.

Boolean Inputs 1 to 10 – Each bit is set to TRUE when the node associated with the IP address (1 to 10) are active, and FALSE when inactive.

Racks PEERS_2 to PEERS_4 are for nodes 11 to 40 in groups of 10.