Bus interface modules

LAN connection

An MTL8000 node uses a Bus Interface Module (BIM) to communicate with the host controller via a local area network (LAN). Different BIMs can be chosen to operate with a range of popular fieldbus protocols. The BIM mounts on a carrier and receives all of its communication and power links from it.

The BIM uses the RS485 communications standard. Other alternatives are RS422, by changing switches (where available) on the carrier, or RS232 by fitting an in-line converter. Switch options sometimes offer alternative methods for terminating the LAN.

Some BIMs also have a second LAN connection to maintain communications in the event of damage occurring to the main communications link. This technique is illustrated (right) for a Modbus host where a second master is shown.

HART management interface

An interface module is available, to link HART devices with the instrument management software. One 8512-IF-HA module is required per BIM. One port connects to the BIM and the other connects, via a daisy-chained RS485 link, to the PC running the software.

Internal 'Railbus' connection

The BIM communicates with the individual I/O modules via 'Railbus' - a proprietary, MTL serial bus. I/O information from the modules is gathered and stored in the BIM for reporting to the host. Similarly, all host commands are interpreted by the BIM and the relevant messages relayed to the I/O modules. In addition to the I/O data, status and diagnostic data is relayed over the same route, to monitor and maintain the health of the I/O system.

Failsafe mode

Under certain abnormal or fault conditions, the BIM will adopt a state known as "failsafe" which, in turn, forces the I/O modules into a similar failsafe state. (See I/O module section). This condition ensures that outputs are put into known states that have been predefined by the user.

Failsafe mode can be induced by a direct instruction from the host or if the BIM receives no communication from the host for a predefined length of time.

Failsafe recovery

The BIM is forced out of failsafe mode by the Master but, before exiting the failsafe state, the BIM will wait until all the I/O modules have been polled, to enable output values to be preconditioned by the Master before the BIM leaves the failsafe state.

Heartbeat

The BIM is capable of detecting a failed application on the host by using a "heartbeat" status signal. The application is expected to supply a signal which toggles between 0 and 1. The Master includes this value with every message to indicate that the application is still in control. This value is echoed by the BIM back to the Master, which must then send a new, opposite, value from the application within a defined period, otherwise the BIM adopts a failsafe state.
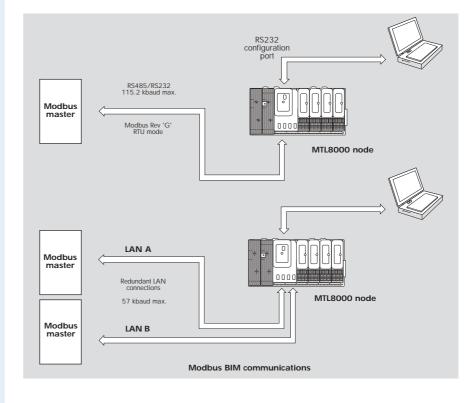
Configuration

When power is first applied to a BIM, it has no information about the system to which it is connected and must therefore be configured. This is achieved using dedicated software (Part No. 8455-SW-CF) that operates on a PC running Windows 95, 98 or NT.

After configuration, the user can store the information in the BIM's non-volatile memory (NVM). At future start-ups, the BIM will recall the configuration data from the NVM.

The configuring PC can be linked to the BIM by one of three methods:

a) via an RS232 link to the sub-D connector on the BIM or

b) via the secondary LAN - if available

c) via "pass-through" messaging over the primary LAN, if available

Modbus BIM communications

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