Profibus protocol

◆ *links MTL8000 node to Profibus-DP host LAN*

◆ *supports up to 24 I/O modules*

◆ *HART process & status variables over Profibus-DP*

◆ *extended diagnostics for module and channel status*

◆ *LAN speeds of up to 6 Mbaud*

◆ *non-volatile memory for configuration*

◆ *software configurable via local port or Profibus host*

◆ *HART® maintenance via Comms adaptor*

The 8502-BI-DP Bus Interface Module (BIM) provides the communications link between the 8000 series I/O modules and a Profibus-DP host. Its high speed acquisition of data from the modules and LAN operation speeds of up to 6 Mbaud allows the host to respond rapidly to conditions in the control process.

The BIM gathers the data from the I/O modules and makes it available to the host upon request. It is a slave to the Profibus master.

As well as cyclic data exchange, which is required for reading input and writing output data, the BIM supports Profibus Extended Diagnostics for status information. It also supports a number of special features which have been implemented to allow high integrity system operation and in-situ maintenance.

PARAMETERISATION

The 8502 supports parameterisation from the Profibus master. This configures on a "per module" basis, i.e. all the channels on a single module carry the same configuration. The configuration is created in a Profibus configurator using details provided in a GSD file.

This method is fast and enables a configuration to be built based upon "logical" modules which represent the physical modules. Modules are added one at a time to the configuration and parameters are chosen to apply to all the channels of the module.

Logical modules can be selected to provide HART status and process variables in the Profibus-DP cyclic input telegram. In addition, for applications where access to many HART variables is required, the HART "mailbox" can be used. This technique collects HART variable as they are required; saving space in telegrams that are sometimes overworked with data. This method is available only when using parameterisation.

The configuration is passed down from the Profibus master to the BIM at the start of the session. If the system is stopped and re-started, the configuration file is re-transmitted to the BIM.

CONFIGURATION

The alternative to parameterisation is the use of the 8455-SW-CF configuration software. This enables the user to configure individual channels and alarms and store the configuration in the BIM. The configuration can also be saved to the 8510-MO-NS Node Services Module for instant recovery if a BIM has to be replaced.

Configuration by this method uses a different GSD file to the one used for parameterisation and the data frame is based on "data blocks" rather than on a "by module" approach. The 8455 software automatically provides a map of the data created in the telegram to enable host programmers to identify the data passed.

HART status and process variables can be communicated to the Profibus-DP host in the cyclic input telegram.

I/O & HART data requires space in the DP data frame as shown in the table below.

Data type	Input words	Output Words
Analog data	1 per input channel	1 per output channel
Digital data	1 per input module	1 per output module
HART variable	2 per variable	Not applicable
HART status	1 per channel	Not applicable

The Profibus BIM supports both Standard and Extended Diagnostics. While the Standard Diagnostics provide standard PROFIBUS status information, the Extended Diagnostics provide detailed information relating to the status of the BIM, the health of the modules and the status of I/O channels. Depending on the I/O module type, events such as high and low alarm, open circuit and line fault are detected. Extended Diagnostic messages are generated on detection of an anomaly and also when it is cleared. Use of the diagnostic capability requires suitable support in the host application.

For hosts unable to use diagnostic data in the control algorithm, it is possible to map the diagnostic data into the input dataframe.

HART DEVICE MAINTENANCE

Pass through messaging to HART devices is available via the local configuration port and the 8512 HART Comms interface. This allows multi-dropping of a number of BIMs on an RS485 link to a PC running a wide range of instrument management software.

Profibus protocol

MODULE SPECIFICATION
See also System Specification

LAN INTERFACE
LAN protocol...............................PROFIBUS-DP (to EN50170)
Transmission rates ....9.6, 19.2, 93.75, 187.5, 500 kbaud
....and 1.5 and 6 Mbaud
Maximum bus segment length (metres) depends upon speed..........

Speed (kbaud)	9.6	19.2	93.75	187.5	500	1500	6000
Max. length	1200	1200	1200	1000	400	200	100

(Note: Table applies to cables with an impedance of 135 -165 Ω and a capacitance per unit length that does not exceed 30 pF/m.)

Transmission standard...RS 485
Isolation
(LAN to Railbus to Power Supply) ....500 V
Action on software malfunction ....modules go to failsafe

I/O & DIAGNOSTIC DATA
DP Data frame.................... Size configurable up to 244 bytes
Input data, including Status word (2 bytes) ....
....244 bytes max
Output data, including Control word (2 bytes) ....
....244 bytes max
Total Input plus Output data ....296 bytes max
Diagnostic telegram ....78 bytes

CONFIGURATION
The BIM can be configured using MTL's 8455-SW-CF software running on a PC, by parameterisation from a Profibus configurator or by transfer of a configuration from the 8510-NS-MO Node Services Module. The 8510 also has an autoconfiguration option.
Address setting.................................Software settable in BIM,
..................................by Profibus "Set Slave Address" command
.............................or by switch setting on 8510-NS–MO module

POWER SUPPLIES
Railbus (12V) current ....420 mA (typ.)
....520 mA (max.@ -40 °C)

MECHANICAL
Module width...63 mm
Weight (approx.)...350 g

LED INDICATORS

Power (green)

OFF	ON	Flashing
Power fail	Power OK	–

Fault (red)

OFF	ON	Flashing
Normal	Failsafe or fault	–

Comm (yellow)

OFF	ON	Flashing
Internal Comms. Failure	Internal Comms. OK	On power up

LAN A (yellow)

OFF	ON	Flashing
Power OFF	LAN activity	Slow flash = no LAN active

Config, (yellow)

OFF	ON	Flashing
Not defined (i.e. error)	Configurator connected	Configurator not connected

Railbus (yellow)

OFF	ON	Flashing
Railbus Fault	Railbus OK	–