**MTL4851 and MTL4852 HART® connection systems**

- Designed to mount directly to a range of general purpose HART® connection units and IS backplanes
- Provides a simple interface to smart devices in the field
- Connect up to 7936 HART® devices on a single RS485 network
- LED indication for fault diagnosis
- Auto baud rate detection
- Connectivity to HART® configuration and Instrument Management software (IMS)

The MTL4851 and MTL4852 HART connection system provides a simple interface between smart devices in the field, control systems and HART instrument management software run on a pc.

The system is based on 16-channel modularity to provide a compact, easily configurable and expandable system. Using a standard RS485 serial link up to 7936 HART devices can be connected on a single network.

For the optimum solution, choose from a range of general purpose and IS termination boards. For maximum flexibility the HMM64 HART backplane locates an MTL4851 master communications module and up to three MTL4852 secondary interface modules, with each module connecting to 16 field devices. General purpose HART connection units and IS backplanes are available fitted with an cable interface connection to the HMM64. This system can be extended with further HMS64 HART backplanes linked to the master, each carrying up to four MTL4852 secondary interface modules.

The MTL4851 and MTL4852 modules can also be located on HTP-SC16x termination boards for general purpose applications. HART loops are simply wired through these HART Termination Panels and may be grounded or floating circuits. The HTP boards offer a compact and cost-effective solution for general applications. CPH-SC16x backplanes are ideal for signal loops requiring intrinsic safety (IS) protection, combining multiplexer and IS isolator mounting. This offers considerable simplification in wiring when compared to DIN-rail based solutions.

The HCU16 HART units connect to 16 general purpose field instruments while maintaining channel to channel isolation. Resistor conditioning options are compatible with all types of I/O cards. It allows pass-through connections for transmitter power supply, input signal and common.

The HCU16AO unit includes HART filters for use with I/O cards that are incompatible with HART communication signals.

Customised backplanes and connection units are available to provide direct connection from DCS I/O cables, replacing the standard termination boards.

See also the MTL4850 datasheet for alternative HART solutions using a 32 channel multiplexer module ideally suited for use in conjunction with emergency shutdown and safety systems.

Connectivity to HART Configuration and Instrument Management Software:

The online access to the information contained within HART devices allows users to diagnose field device troubles before they lead to costly problems. Software can capture and use diagnostic data from HART field instruments via the MTL HART connection hardware. This allows users to realise the full potential of their field devices to optimise plant assets, which results in significant operations improvement and direct maintenance savings.

IMS products provide essential configuration, calibration, monitoring and maintenance history functions for conventional analogue (4-20 mA) and HART protocol compatible smart process instruments and field devices. They deliver powerful tools to meet the need for standardised instrument maintenance procedures and record keeping mandated by some quality standards and regulatory bodies.

The benefits of utilising these powerful software packages online include:

- Reduced commissioning time and costs
- Reduced maintenance costs
- Reduced documentation
- Reduced process downtime

The MTL485x offers connectivity to a comprehensive range of FDT based software packages via the comms Device Type Manager (DTM). The DTM can be downloaded from www.mtl-inst.com. Other software packages, such as AMS from Emerson, work with the MTL485x through custom software drivers or by the inclusion of the device description (DD) file for the MTL multiplexers.

HART® is a registered trademark of the HART Communication Foundation
SYSTEM OVERVIEW (TYPICAL INSTALLATION)

LED INDICATORS - MTL4851 module

<table>
<thead>
<tr>
<th>LED</th>
<th>Colour</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR</td>
<td>green</td>
<td>Off</td>
<td>Multiplexer is not receiving power</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On</td>
<td>Multiplexer is receiving power</td>
</tr>
<tr>
<td>FAULT</td>
<td>red</td>
<td>Off</td>
<td>Multiplexer is in the running state</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulsing</td>
<td>Multiplexer build/rebuild is in progress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blinking</td>
<td>No HART loops found</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On (steady)</td>
<td>A fault was detected and multiplexer operation has halted</td>
</tr>
<tr>
<td>HOST</td>
<td>yellow</td>
<td>Off</td>
<td>No communication on the RS485 channel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Short flash (0.25 sec)</td>
<td>Correctly framed message received by the multiplexer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long flash (1 sec)</td>
<td>Response transmitted—this is re-triggereable so repeated transmissions will leave the indicator permanently on</td>
</tr>
<tr>
<td>HART</td>
<td>yellow</td>
<td>Off</td>
<td>No communication on the channel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Short flash (0.25 sec)</td>
<td>Message transmitted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long flash (1 sec)</td>
<td>Response received - this is re-triggereable so repeated transmissions will leave the indicator permanently on</td>
</tr>
</tbody>
</table>

LED INDICATORS - MTL4852 module

<table>
<thead>
<tr>
<th>LED</th>
<th>Colour</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR</td>
<td>green</td>
<td>Off</td>
<td>Unit is not receiving power</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On</td>
<td>Unit is receiving power</td>
</tr>
<tr>
<td>HART</td>
<td>yellow</td>
<td>Pulsing</td>
<td>Indicating a channel is selected</td>
</tr>
<tr>
<td></td>
<td>On</td>
<td></td>
<td>Channel continuously selected</td>
</tr>
</tbody>
</table>

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.
**SPECIFICATION**

**MTL4851 Master Communications Module**

- Number of HART channels
  - 16 (ch1 to ch16)
- Channel device type
  - HART rev 5-7
- Channel interface
  - 2 connections to each channel
- Host system interface
  - RS485 2-wire multidrop
  - (up to 31 MTL4851 modules can be connected to one host)
  - RS485 baud rate
  - 38400, 19200, 9600, 1200 baud - auto detected
- Address selection
  - up to 31 addresses, set on backplane
- Alarm output
  - Open-collector transistor, referenced to 0V
  - $V_{max} = 35V, I_{max} = 5mA, P_{max} = 100mW$

**MTL4852 Secondary Interface Module**

- Number of HART channels
  - 16 (ch17 to ch256 in 16 channel groups)
- Channel device type
  - HART rev 5-7
- Channel interface
  - 2 connections to each channel
- MTL systems interface
  - Up to 15 off MTL4852 modules per MTL4851
  - Total length of interface bus, 4m max.
- Power requirements
  - Powered from MTL4851 module

**ENVIRONMENTAL**

- Temperature range
  - Operating: $-40°C$ to $+60°C$
  - Non-operating: $-40°C$ to $+85°C$
- Relative humidity
  - 5% to 95% - non-condensing

**MECHANICAL**

- Dimensions
  - See drawing
- Weight
  - MTL4851: 95gm
  - MTL4852: 75gm
- Approvals
  - Zone 2 mounting: ATEX & IECEx
  - Div 2 mounting: FM & FMc pending

**DIMENSIONS (mm)**

**INSTRUMENT MANAGEMENT SOFTWARE**

The MTL HART Connection System offers connectivity to a comprehensive range of both general instrument management software packages and dedicated software packages for optimising Valve positioner performance and maintenance including:

<table>
<thead>
<tr>
<th>Software Package</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMS Device Manager</td>
<td>Emerson Process Management</td>
</tr>
<tr>
<td>Cornerstone</td>
<td>ASTEC</td>
</tr>
<tr>
<td>DAT200 Asset Vision Basic</td>
<td>ABB</td>
</tr>
<tr>
<td>FDM</td>
<td>Honeywell</td>
</tr>
<tr>
<td>FDT Container</td>
<td>M&amp;M Software</td>
</tr>
<tr>
<td>FieldCare</td>
<td>Endress &amp; Hauser/Metso Automation</td>
</tr>
<tr>
<td>Fieldmate</td>
<td>Yokogawa</td>
</tr>
<tr>
<td>HART OPC Server</td>
<td>HART Communication Foundation</td>
</tr>
<tr>
<td>PACTware</td>
<td>PACTware Consortium</td>
</tr>
<tr>
<td>PDM</td>
<td>Siemens</td>
</tr>
<tr>
<td>SoftTools</td>
<td>Flowserve</td>
</tr>
<tr>
<td>ValveLink</td>
<td>Emerson Process Management</td>
</tr>
<tr>
<td>Valvue</td>
<td>Masoneilan</td>
</tr>
</tbody>
</table>

For software packages that are based on a FDT frame i.e FieldCare, PACTware etc communication with the MTL HART multiplexer system requires the MTL Generic Communications DTM. This can be downloaded Free of Charge from the MTL website.

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HMM64/HMS64 BACKPLANE

Capacity
- HMM64: 1xMTL4851, 3xMTL4852
- HMS64: 4xMTL4852
Max. 3xHMS64 connected to 1xHMM64

Maximum power requirements
1.9W for fully equipped HMM64, plus 3xHMS64 backplanes.

HART interface connectors
4xDIN41651 20-way HART signal cables
(16 HART signal connections + 4 common returns)
For use with HM64RIB20 cables

Backplane inter-connect
- HMM64: 1x DIN41651 16-way socket
- HMS64: 2x DIN41651 16-way socket
For use with HM64RIB16 cables

Weight (excl. modules)
215g approx.

Power requirements, Vs
21 to 35V dc through plug-in connectors, screw-secured
4 terminals for dual power supplies

RS485 port
2 terminals for bus, plus screen terminal
6 terminals in total to enable chained bus connection.
HART address switch, five poles active in six position switch

Alarm connectors
2 terminals for alarm output and alarm clear

Conductor terminals
Accept conductors of up to 2.5mm² stranded or single-core

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MTL4851 and MTL4852 HART® Connection Systems

January 2017

www.mtl-inst.com

BACKPLANES FOR MTL4851/MTL4852
GENERAL PURPOSE VERSIONS

HTP-SC16M/HTP-SC16S BACKPLANE *

Capacity

HTP-SC16M  1x MTL4851
HTP-SC16S  1x MTL4852
Max. 4x HTP-SC16S connected to 1x HTP-SC16M

Maximum power requirements

1.3W for HTP-SC16M, plus
4 HTP-SC16S backplanes.

Signal connectors

2.5mm² screw-clamp terminals
2 terminals per channel for field and system

Backplane inter-connect

HTP-SC16M  1x DIN41651 16-way socket
HTP-SC16S  2x DIN41651 16-way socket
For use with HMRIB16 cables

Weight (excl. modules)
300g approx.

Power requirements, Vs

21 to 35V dc through plug-in connectors, screw-secured
4 terminals for dual power supplies

RS485 port

2 terminals for bus, plus screen terminal
6 terminals in total to enable chained bus connection.
HART address switch, five poles active in six position switch

Alarm connectors

2 terminals for alarm output and alarm clear

Conductor terminals

Accept conductors of up to 2.5mm² stranded or single-core

* for further details of the model options refer to the Instruction Manual
INM4851 - available from the MTL website.

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HCU16 HART CONNECTION UNIT*

Accuracy (HCU16-P250 only)
250Ω ±0.05%

Connectors
2.5mm² screw-clamp terminals
3 terminals per channel
20-way HART signal cable (to HMM64/HMS64)

Weight
383g approx.

HCU16AO CONNECTION UNIT WITH FILTERS

Series impedance
dc < 2Ω
HART signal > 240Ω

Connectors
2.5mm² removable, screw-clamp terminals
2 terminals per channel in groups of 4 channels
20-way HART signal cable (to HMM64/HMS64)

Weight
768g approx.

COMMON SPECIFICATION HCU16 & HCU16AO

Capacity
16 channels

Isolation
Channel-to-channel 50V dc

Mounting
Supplied fitted in DIN-rail (T- or G- section) carrier

* for further details of the model options refer to the Instruction Manual INM4851 - available from the MTL website.

CUSTOMISED CONNECTION UNITS

Eaton offers a range of general purpose and IS interfaces providing direct connection with control system I/O cables as well as HART® connectivity. For general purpose signals, a number of custom HART® interface termination units are available for most DCS and PLC I/O cards. These replace the existing DCS termination units, saving space and allowing easy upgrading.

Typical system examples are:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>System Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerson</td>
<td>DeltaV and DeltaV SIS systems</td>
</tr>
<tr>
<td>HIMA</td>
<td>HiMax</td>
</tr>
<tr>
<td>Honeywell</td>
<td>Experion C300, Safety Manager, Process Manager I/O systems</td>
</tr>
<tr>
<td>Invensys</td>
<td>Foxboro FBM systems, Triconex Tricon &amp; Trident systems</td>
</tr>
<tr>
<td>Siemens</td>
<td>ET200M</td>
</tr>
<tr>
<td>Yokogawa</td>
<td>Centum R3, Prosafe RS systems</td>
</tr>
</tbody>
</table>

Contact Eaton's MTL product line with details of your specific requirements.

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MTL4851 and MTL4852 HART® Connection Systems
January 2017

BACKPLANES FOR MTL4851/MTL4852
INTRINSIC SAFETY VERSIONS

CPH-SC16M/CPH-SC16S BACKPLANES

Capacity
CPH-SC16M 1xMTL4851
CPH-SC16S 1xMTL4852
16 x MTL4541/A/S/AS, MTL4546/Y isolators
Max. 4xCPH-SC16S connected to 1xCPH-SC16M

Power requirements, Vs
21 to 35V dc through plug-in connectors,
2 x 4 terminals for dual power supplies and power chain
Dual 2.5A medium blow TE5 fuses

Maximum power requirements
CPH-SC16M 0.65A
CPH-SC16S 0.6A

Safe-area signal connectors
2.5mm² screw-clamp terminals
2 terminals per channel for system connections

Backplane inter-connect
CPH-SC16M 1x DIN41651 16-way socket
CPH-SC16S 2x DIN41651 16-way socket
For use with HMRIB16 cables

RS485 port
2 terminals for bus, plus screen terminal
6 terminals in total to enable chained bus connection.
HART address switch, five poles active in six position switch

Alarm connectors
2 terminals for alarm output and alarm clear

Accuracy
CPH-SC16xR: 250Ω ±0.05% conditioning resistors
(note: MTL4541/41A only)

Weight (excl. modules and accessories)
410g approx.

* for further details of the model options refer to the Instruction Manual INM4851 - available from the MTL website.
HART multiplexer

MTL4851  HART multiplexer primary module
MTL4852  HART multiplexer secondary module

Multiplexer accessories

TH5000  Tag holder (Pack of 20)
ET-485  Serial RS485 to Ethernet converter

General purpose connection units

HMM64  64ch HART backplane for 1xMTL4851 & 3xMTL4852
HMS64  64ch HART backplane for 4xMTL4852
HCU16 †  HART connection unit, 16ch
HCU16-P250 †  HART connection unit, 16ch
HCU16-S150 †  HART connection unit, 16ch
HCU16-S200 †  HART connection unit, 16ch
HCU16AO  HART connection unit, 16ch o/p (With HART filters)

Integrated connection units

HTP-SC16M  Integrated HART connection unit, primary, 16ch
HTP-SC16M-S240  Integrated HART connection unit, secondary, 16ch
HTP-SC16S  Integrated HART connection unit, 16ch, 2400 series resistor
HTP-SC16S-S240  Integrated HART connection unit, 16ch, 2400 series resistor

HART Backplane accessories

RIB-CLIP16  Retaining clip for ribbon cable connector (pack of 10)
HM64RIB20-xx  20-way HART signal cable xx = 0.5, 1.0, 1.5, 2.0, 3.0, 4.0, 4.5, 6.0 (metres)
HM64RIB16-xx  16-way backplane linking cable xx = 0.5, 1.0, 2.0 (metres)

† See Notes

MTL4500 range of backplanes

CPH-SC16M  16ch backplane, primary
CPH-SC16M-R  16ch backplane, (250Ω conditioning resistor)
CPH-SC16S  16ch backplane, secondary
CPH-SC16S-R  16ch backplane, (250Ω conditioning resistor)

Backplane accessories for MTL4500 range

DMK01  DIN-rail mounting kit, T- or G-section (pack of 40)
SMS01  Surface mounting kit (pack of 40)
16-way backplanes require 6
ERK18  Earth rail kit
TSK18  Tagging strip kit
FUS2.SATE5  Fuse kit, pack of 10, 2.5A

Literature

INM4851  MTL4851 Instruction manual
INA485x  ATEX safety instructions

Notes:

- no suffix  No parallel resistor, 0Ω link in series - for use with current inputs with 250Ω input impedance or HART compatible outputs
- P250  250Ω parallel resistor, 0Ω link in series - for use with 1-5V system inputs
- S150  150Ω series link, no parallel resistor - for use with current inputs with 100Ω input conditioning
- S200  200Ω series link, no parallel resistor - for use with current inputs with 50Ω or 63.5Ω input conditioning
- S240  240Ω series link, no parallel resistor - for use with isolators connected to field terminals.

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