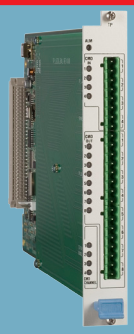
Data Sheet

Megaplex-4

TP

Distance Teleprotection Module



- Four inputs with soft-selectable or fixed DC voltage and eight outputs, galvanically isolated with high EMC immunity for harsh environments
- Ultralow end-to-end propagation delay for commands and automation
- 1+1 path protection with less than 10 msec recovery time
- Built-in pseudowire engine
- Unidirectional broadcast for Automation commands
- T-line support
- Selected options certified for IEEE 1613

The TP module offers ultralow end-to-end propagation delay for immediate delivery of teleprotection commands and automation, from protective relay/contact transfer to remote-end substations.

Megaplex-4 with its TP modules delivers teleprotection commands and automation with mission critical accuracy over dedicated fiber, TDM or PSN, to help central control better manage the power grid load and to protect termination and transformation equipment from severe damages resulting from faulty high-voltage lines.

The TP module supports up to 4 command/automation inputs and 8 outputs, enabling teleprotection equipment to utilize the advanced transport capabilities offered by Megaplex.

Teleprotection commands can be locally output or be carried to a peer card/ Megaplex unit over TDM/SDH or packet switch network. Up to 4 commands can be carried over a single DS0.

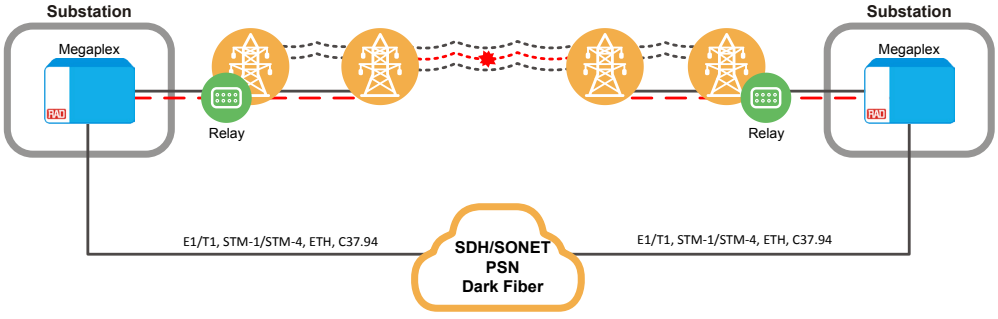
The teleprotection commands and automation are triggered by the following options of the input signal to the TP module:

- 110 VDC
- 220 VDC
- Soft-selectable nominal input control voltage, selectable per port: ±24, ±48, ±110, ±125, ±220 or ±250 VDC.

The module is also used for the automation processes by exchange of data between the relay protection devices and the control center, thus allowing for uninterruptable power supply throughout the grid when fault occurs.

T-Line application allows broadcast of a trip event to several nodes via drop and insert on Trip level.

Megaplex's advanced carrier Ethernet and pseudowire capabilities guarantee the performance levels required when migrating to packet networks with hard QoS, as well as robust latency and jitter protection.



RAD
Your Network's Edge

The module operates in conjunction with other Megaplex modules catering for a variety of interfaces, such as voice, high speed, low speed and others, to provide any possible service needed in a substation.

PSEUDOWIRE

A powerful pseudowire engine saves the need of two additional MPW-1 modules and can act as a server card to other I/O modules. The engine provides up to 4 protected PWs per module with up to 32 timeslots per each PW port.

***Note**: In cases involving adaptive clock recovery and high differential delays, an MPW-1 module is required.*

Specifications

TELEPROTECTION INTERFACES

Compliance

IEC 60834-1

Input

Connector: Terminal block, 8-pin
Number of command inputs: 4
Nominal input control voltage:

- ± 110 VDC
- ± 220 VDC
- Soft-selectable: ±24, ±48, ±110, ±125, ±220 or ±250 VDC

Configurable Debounce for noise filtering

Output

Connectors: 2 terminal blocks, 8-pins each
Total number of outputs: 8 (4 primary + 4 secondary):

- For each secondary output one primary command can be selected.
- More than one secondary output can be bound to one primary command

Independent Rx/Tx processing
Switching: up to 250 VDC, 0.25A on inductive load
Wire diameter: up to 2.5 sq. mm
Command-configurable prolongation time

Optimization

Security- or speed-optimized according to application

Isolation

2500 VRMS between protection circuits and chassis

Table 1. Teleprotection Indicators

Indicator	Quantity per Module	Color	Function
CMD CHANNEL	4 (2 per port)	Red/green	Green On: Port synchronized Red On: RAI/LOF/Add mismatch Red Blinking: CRC Errors Off: Shutdown
CMD IN	4	Red/green	Green: No alarms Red On: Alarm state Off: Shutdown
CMD OUT	8	Red/green	Green: Steady State Red On: Alarm State Off: Shutdown
ALM	1	Red	Red Blinking: Events detected Off: No events

TP
Distance Teleprotection Module

PSEUDOWIRE

Standard Compliance
IETF: RFC 5086 (CESoPSN)

MFA Forum: IA 8.0.0

MEF 8

Packet Switched Network Types

UDP over IP

MEF-8 Ethernet

Number of PW Connections
Up to 640 pseudowires per chassis

Up to 8 pseudowires (4 working + 4 protection) per module

Jitter Buffer Size
250 µsec to 8000 µsec, in 1-µsec steps (the value entered by the user is rounded upward to the closest n*125 µsec value).

RESILIENCY

Protection

Equipment protection
On-board CMD Channel protection
Megaplex TDM traffic protection

Protection Recovery

Less than 10 msec

MONITORING AND DIAGNOSTICS

Local loopback per command
Remote loopback per command
End-to-end delay measurements
Events time stamping with 1 msec accuracy
Accepting GPS time via IEC-60870-5-104 or SNTP

GENERAL

Indicators
See *Table 1*

Environment

Operating temperature:
- Regular: -10°C to 55°C (14°F to 131°F)
- IEEE-1613 certified options: -20°C to 55°C (-4°F to 131°F)

Storage temperature: -20°C to +70°C (-4°F to +158°F)
Humidity: up to 95%, non-condensing

Power Consumption
6.5W max

Ordering

RECOMMENDED CONFIGURATIONS

MP-4100M-TP/110/EMR

Teleprotection module with ± 110 VDC input control voltage and electro-mechanical relay

MP-4100M-TP/220/EMR

Teleprotection module with ± 220 VDC input control voltage and electro-mechanical relay

MP-4100M-TP/CV/EMR

Teleprotection module with soft-selectable input control voltage and electro-mechanical relay

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options.

Table 1. Typical Ranges over 2W@26 AWG Cable

Data Rate [kbps]	Ranges [km]	[mi]
192	6.6	4.1
1536	4.9	3.0
2048	4.5	2.8
4096	3.2	2.0
4608	3.0	1.9
5696	2.6	1.6
15296	0.70	0.43

***Notes**: The SHDSL data rate depends on the distance, number of wires and far-end device.*

The typical ranges are based on error-free lab tests without noise and obtained on a 26 AWG cable line simulator (DLS-6100, DLS-6300).

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