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XGEMLINK Driver Manual

General Electric M-LINK Protocol Driver

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[cpksoftengineering@
hotmail.com](mailto:cpksoftengineering@hotmail.com)

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XGEMLINK technical specifications

General information

XGEMLINK driver implements the MLINK protocol to communicate with General Electric DFP devices.

Command list

Clear Events

Description of this command:

This command clears events in the relay memory.

Methods used to run this command:

Digital Output (WriteBooleanValues)

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

2

Meaning of the DriverP2 parameter:

Optional data value

- If not given or 0, 7Bh is assumed by default.

- Use 256 to indicate a value of 0.

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Values that are sent:

Value in PointValue (0) = Ignored

Clear Faults

Description of this command:

This command clears faults in the relay memory.

Methods used to run this command:

Digital Output (WriteBooleanValues)

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

1

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Values that are sent:

Value in PointValue (0) = Ignored

Download Events

Description of this command:

This command reads all the events available in the relay memory. Events are stored in a specified file in the local machine. Events can be removed from the relay memory after download.

Methods used to run this command:

Analog Input (ReadNumericValues)

Number of points accepted by this command:

1

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Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

0=leave events in relay memory, 1=delete events after download

Meaning of the DriverP3 parameter:

Indicates the format for returned dates:

0 = Use English format (MM/DD/YYYY hh:mm:ss.000)

1 = Use Spanish format (DD/MM/YYYY hh:mm:ss.000)

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Meaning of the DriverP5 parameter:

Indicates if additional information must be included in the event records:

0 = No additional information

1 = Show event type codes

Meaning of the DriverP6 parameter:

Indicates the path where the event file will be generated. If this property is empty, the local driver folder is used by default.

Meaning of the DriverP9 parameter:

Filename for event file. If empty, 'XGEMLINK_Events.Relayxxx.txt' will be used, where xxx is the device unit address.

Values that are returned:

Value in PointValue (0) = Indicates how many events have been extracted.

Text in PointText (0) = Description of last event extracted (empty if no events extracted).

Get Time

Description of this command:

This command reads the current time.

Methods used to run this command:

Analog Input (ReadNumericValues)

Number of points accepted by this command:

1-7

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

3

Meaning of the DriverP3 parameter:

Indicates the format for returned dates:

0 = Use English format (MM/DD/YYYY hh:mm:ss.000)

1 = Use Spanish format (DD/MM/YYYY hh:mm:ss.000)

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Values that are returned:

Text in PointText (0) = Date (ASCII Text)

Value in PointValue (0) = Year (2000-2099)

Value in PointValue (1) = Month (1-12)

Value in PointValue (2) = Day (1-31)

Value in PointValue (3) = Hour (0-23)

Value in PointValue (4) = Minutes (0-59)

Value in PointValue (5) = Seconds (0-59)

Value in PointValue (6) = Milliseconds byte (0-255)

Read Fault Data

Description of this command:

This command reads a block of fault data values from a specific fault record.

Methods used to run this command:

Analog Input (ReadNumericValues)

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Number of points accepted by this command:

1-27

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

1

Meaning of the DriverP2 parameter:

Record to be read (1-8)

Meaning of the DriverP3 parameter:

Indicates the format for returned dates:

0 = Use English format (MM/DD/YYYY hh:mm:ss.000)

1 = Use Spanish format (DD/MM/YYYY hh:mm:ss.000)

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Meaning of the DriverP5 parameter:

Return additional text values (0=No, 1=Yes)

Values that are returned:

Text in PointText (0) = Date (ASCII Text)

Value in PointValue (0) = Year (2000-2099)

Value in PointValue (1) = Month (1-12)

Value in PointValue (2) = Day (1-31)

Value in PointValue (3) = Hour (0-23)

Value in PointValue (4) = Minutes (0-59)

Value in PointValue (5) = Seconds (0-59)

Value in PointValue (6) = Milliseconds byte (0-255)

Value in PointValue (7) = Pre-Fault Ia (AMPS)

Value in PointValue (8) = Pre-Fault Ib (AMPS)

Value in PointValue (9) = Pre-Fault Ic (AMPS)

Value in PointValue (10) = Pre-Fault In (AMPS)

Value in PointValue (11) = Pre-Fault Va or Vab (KV) (see Note below)

Value in PointValue (12) = Pre-Fault Vb or Vbc (KV) (see Note below)

Value in PointValue (13) = Pre-Fault Vc or Vca (KV) (see Note below)

Value in PointValue (14) = Fault Ia (AMPS)

Value in PointValue (15) = Fault Ib (AMPS)

Value in PointValue (16) = Fault Ic (AMPS)

Value in PointValue (17) = Fault In (AMPS)

Value in PointValue (18) = Fault Va or Vab (KV) (see Note below)

Value in PointValue (19) = Fault Vb or Vbc (KV) (see Note below)

Value in PointValue (20) = Fault Vc or Vca (KV) (see Note below)

Value in PointValue (21) = Distance (in Miles or KM)

Value in PointValue (22) = Distance Units (0=Miles, 1=KM)

Value in PointValue (23) = Status Type (0=Wye_Wye, 1=Open_Delta)

Value in PointValue (24) = Trip Type-L (CODE 9 table value)

Value in PointValue (25) = Trip Type-H (CODE 10 table value)

Value in PointValue (26) = Fault Type (CODE 11 table value)

Additional ASCII Text Values Returned:

Text in PointText (22) = Text for Distance Units ('Miles' or 'KM')

Text in PointText (23) = Text for Status Type ('Wye Wye' or 'Open Delta')

Text in PointText (24) = Text for Trip Type-L (see CODE 9 table below)

Text in PointText (25) = Text for Trip Type-H (see CODE 10 table below)

Text in PointText (26) = Text for Fault Type (see CODE 11 table below)

Important note:

Status Type in HMITalk1.PointValue(23) is used to determine between Open_Delta and Wye_Wye. The voltages in case of Open_Delta are the phase to phase voltages (Vab, Vbc, Vca in place of Va, Vb, Vc for both fault and pre_fault mentioned above).

CODE 9 TABLE:

0 = NOT VALID

1 = NOT VALID

2 = NOT VALID

3 = NOT VALID

4 = 51NT

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5 = 51PT_C
6 = 51PT_B
7 = 51PT_A
8 = 51ND2
9 = 51PD2_C
10 = 51PD2_B
11 = 51PD2_A
12 = 51ND1
13 = 51PD1_C
14 = 51PD1_B
15 = 51PD1_A

CODE 10 TABLE:

0 = 50NL
1 = 50PL_C
2 = 50PL_B
3 = 50PL_A
4 = 50NH
5 = 50PH_C
6 = 50PH_B
7 = 50PH_A
8 = NOT VALID
9 = NOT VALID
10 = 46PT
11 = 46PD1
12 = NOT VALID
13 = NOT VALID
14 = NOT VALID
15 = NOT VALID

CODE 11 TABLE:

1 = AG
2 = BG
3 = CG
4 = ABG
5 = BCG
6 = CAG
7 = AB
8 = BC
9 = CA
16 = 3 PHASE
255 = INVALID

Read Inputs and Outputs

Description of this command:

This command reads inputs and outputs bits.

Methods used to run this command:

Analog Input (ReadNumericValues)

Number of points accepted by this command:

1-38

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

6

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Values that are returned:

Value in PointValue (0) = INPUT 1
Value in PointValue (1) = INPUT 2
Value in PointValue (2) = INPUT 3
Value in PointValue (3) = INPUT 4

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Value in PointValue (4) = INPUT 5
Value in PointValue (5) = 52B
Value in PointValue (6) = PICKUP 51PT
Value in PointValue (7) = PICKUP 51PD1
Value in PointValue (8) = PICKUP 51PD2
Value in PointValue (9) = PICKUP 51NT
Value in PointValue (10) = PICKUP 51ND1
Value in PointValue (11) = PICKUP 51ND2
Value in PointValue (12) = PICKUP 50PH
Value in PointValue (13) = PICKUP 50PL
Value in PointValue (14) = PICKUP 50NH
Value in PointValue (15) = PICKUP 50NL
Value in PointValue (16) = PICKUP 46PT
Value in PointValue (17) = PICKUP 46PD1
Value in PointValue (18) = PICKUP 81UT1
Value in PointValue (19) = PICKUP 81UT2
Value in PointValue (20) = PICKUP 81OT1
Value in PointValue (21) = PICKUP 81OT2
Value in PointValue (22) = TRIP 51PT
Value in PointValue (23) = TRIP 51PD1
Value in PointValue (24) = TRIP 51PD2
Value in PointValue (25) = TRIP 51NT
Value in PointValue (26) = TRIP 51ND1
Value in PointValue (27) = TRIP 51ND2
Value in PointValue (28) = TRIP 50PH
Value in PointValue (29) = TRIP 50PL
Value in PointValue (30) = TRIP 50NH
Value in PointValue (31) = TRIP 50NL
Value in PointValue (32) = TRIP 46PT
Value in PointValue (33) = TRIP 46PD1
Value in PointValue (34) = TRIP 81UT1
Value in PointValue (35) = TRIP 81UT2
Value in PointValue (36) = TRIP 81OT1
Value in PointValue (37) = TRIP 81OT2

Read Metered Data

Description of this command:

This command reads a block of metered data values.

Methods used to run this command:

Analog Input (ReadNumericValues)

Number of points accepted by this command:

1-21

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

0

Meaning of the DriverP3 parameter:

Indicates the format for returned dates:

0 = Use English format (MM/DD/YYYY hh:mm:ss.000)

1 = Use Spanish format (DD/MM/YYYY hh:mm:ss.000)

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Values that are returned:

Text in PointText (0) = Date (ASCII Text)

Value in PointValue (0) = Year (2000-2099)

Value in PointValue (1) = Month (1-12)

Value in PointValue (2) = Day (1-31)

Value in PointValue (3) = Hour (0-23)

Value in PointValue (4) = Minutes (0-59)

Value in PointValue (5) = Seconds (0-59)

Value in PointValue (6) = Milliseconds byte (0-255)

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Value in PointValue (7) = Ia (AMPS)
Value in PointValue (8) = Ib (AMPS)
Value in PointValue (9) = Ic (AMPS)
Value in PointValue (10) = In (AMPS)
Value in PointValue (11) = Va (KV)
Value in PointValue (12) = Vb (KV)
Value in PointValue (13) = Vc (KV)
Value in PointValue (14) = Vab (KV)
Value in PointValue (15) = Vbc (KV)
Value in PointValue (16) = Vca (KV)
Value in PointValue (17) = I2 (AMPS)
Value in PointValue (18) = Power Active (MW)
Value in PointValue (19) = Power Reactive (MVAR)
Value in PointValue (20) = Frequency (Hz)

Read Model Number

Description of this command:

This command reads the model number field.

Methods used to run this command:

Analog Input (ReadNumericValues)

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

5

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Values that are returned:

Value in PointValue (0) = Length of Model Number field
- HMITalk1.PointText/PointText(0) = Text in Model Number field

Read Oscillography Report

Description of this command:

This command reads an oscillography report. This command automatically forces a minimum timeout of 3000 ms.

Methods used to run this command:

Analog Input (ReadNumericValues)

Number of points accepted by this command:

1-8

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

9

Meaning of the DriverP2 parameter:

Indicates the oscillography report number to be read (1 to 6).

Meaning of the DriverP3 parameter:

Indicates the format for returned dates:
0 = Use English format (MM/DD/YYYY hh:mm:ss.000)
1 = Use Spanish format (DD/MM/YYYY hh:mm:ss.000)

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Meaning of the DriverP6 parameter:

Indicates the path where the COMTRADE files will be generated. If this property is empty, the local driver folder is used by default.

Meaning of the DriverP7 parameter:

Indicates a TriggerTime that should not be downloaded if it happens to be the last TriggerTime available in the relay. If empty, the last TriggerTime available is downloaded. Format must be 'YYYY-MM-DD hh:mm:ss.uuuuuu000', where uuuuuu=microseconds.

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Meaning of the DriverP8 parameter:

Comma-separated list with additional information about the relay to be used in the .hdr and .inf files. Format: FieldName1=value1,FieldName2=value2,etc. Example: ID=123456,SerialNumber=A55GH77,Port=Ethernet

Meaning of the DriverP9 parameter:

Filename root for .hdr, .cfg, .dat and .inf files. If empty, 'XGEMLINK_DisturbanceRecord.Relayxxx.hdr', 'XGEMLINK_DisturbanceRecord.Relayxxx.cfg', 'XGEMLINK_DisturbanceRecord.Relayxxx.dat' and 'XGEMLINK_DisturbanceRecord.Relayxxx.inf' will be used, where xxx is the device unit address. Existing files with same name are overwritten.

Values that are returned:

Value in PointValue (0) = Number of channels downloaded
Value in PointValue (1) = Report number
Value in PointValue (2) = Frequency
Value in PointValue (3) = First sample (always 0)
Value in PointValue (4) = Trigger point
Value in PointValue (5) = Number of samples
Value in PointValue (6) = Number of analog channels
Value in PointValue (7) = Number of digital channels
Text in PointText (0) = Download status
Text in PointText (1) = Report number (text version, can be 'n/a' when report is not available))
Text in PointText (2) = Relay Identification
Text in PointText (3) = First sample time
Text in PointText (4) = Trigger time
Text in PointText (5) = Last sample time
Text in PointText (6) = Comma-separated list of analog channel names
Text in PointText (7) = Comma-separated list of digital channel names

Read Relay Identification

Description of this command:

This command reads the relay identification field. This command automatically forces a minimum timeout of 2000 ms.

Methods used to run this command:

Analog Input (ReadNumericValues)

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

4

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Values that are returned:

Value in PointValue (0) = Length of Relay Identification field
- HMITalk1.PointText/PointText(0) = Text in Relay Identification field

Read Single Event

Description of this command:

This command reads the date, time and codes of one single event available in the relay memory. Events are not erased from the relay memory once they are read.

Methods used to run this command:

Analog Input (ReadNumericValues)

Number of points accepted by this command:

1-2

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

2

Meaning of the DriverP2 parameter:

Index of event to be read (1-255)

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Meaning of the DriverP3 parameter:

Indicates the format for returned dates:

- 0 = Use English format (MM/DD/YYYY hh:mm:ss.000)
- 1 = Use Spanish format (DD/MM/YYYY hh:mm:ss.000)

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Meaning of the DriverP5 parameter:

Indicates if additional information must be included in the event records:

- 0 = No additional information
- 1 = Show event E1 and E2 codes

Values that are returned:

Text in PointText (0) = Description of event extracted (empty if no events extracted).

Value in PointValue (0) = Event Code 1 (0 if no events extracted).

Value in PointValue (1) = Event Code 2 (0 if no events extracted).

Important note:

When no more events are available, all values are returned as 0. Events should be read starting with index 1, then index 2, and so on. The reading loop should continue until an empty text is found in the event description or until the index 255 has been reached.

EVENTS DESCRIPTIONS:

Following is a list of event descriptions based on the returned Event Codes 1 and 2. E1 = Event Code 1 expressed as a hexadecimal number (00-FF) E2 = Event Code 2 expressed as a hexadecimal number (00-FF)

- E1E2 DESCRIPTION

- ----

- 0300 RECLOSER BLOCKED REMOTELY
- 0301 RECLOSER UNBLOCKED REMOTELY
- 0302 RECLOSER BLOCKED LOCALLY
- 0303 RECLOSER UNBLOCKED LOCALLY
- 0306 RECLOSER BLOCKED BY REPETITIVE TRIPS
- 030A RECLOSER TO LOCKOUT
- 030B RECLOSER OUT OF LOCKOUT
- 030E EXTERNALLY INITIATED RECLOSE
- 0310 REMOTE BLOCK COMMAND
- 0312 REMOTE UNBLOCK COMMAND
- 0314 RECLOSURE
- 0316 END OF FAULT
- 0400 DIGITAL INPUT 1 ON
- 0401 DIGITAL INPUT 1 OFF
- 0402 DIGITAL INPUT 2 ON
- 0403 DIGITAL INPUT 2 OFF
- 0404 DIGITAL INPUT 3 ON
- 0405 DIGITAL INPUT 3 OFF
- 0406 DIGITAL INPUT 4 ON
- 0407 DIGITAL INPUT 4 OFF
- 0408 DIGITAL INPUT 5 ON
- 0409 DIGITAL INPUT 5 OFF
- 0500 CHANGE OF SETTINGS
- 0502 DEFAULT SETTINGS
- 0506 GROUP CHANGED BY DIGITAL INPUTS
- 0508 CHANGE OF COUNTERS
- 050A COLD LOAD GROUP SELECTED
- 050C COLD LOAD GROUP DE-SELECTED
- 0600 PROGRAM START
- 0700 ADC VREF FAILURE
- 0701 ADC VREF RECOVERED
- 0702 POWER SUPPLY FAILURE
- 0703 EEPROM FAILURE
- 0800 DATE/TIME CHANGED
- 0802 EVENTS ERASED
- 0804 PASSWORDS RESET TO FACTORY VALUES
- 0806 EXT. EVENT TRIGGERED BY DIG.INPUT

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- 0A00 LOGIN FAILURE
- 0A02 EXT. EVENT TRIGGERED BY COMM
- 0B00 RELAY DISABLED
- 0B01 RELAY ENABLED
- 0B02 CLOCK STOPPED
- 0B04 TRIPS INHIBITED CONDITION PRESENT
- 0B05 END OF TRIPS INHIBITED CONDITION
- 0B06 CURRENT WITH BREAKER OPEN
- 0B08 BREAKER MAINTENANCE DUE
- 0C00 PICKUP 51P_P
- 0C12 PICKUP 51P1_P
- 0C14 PICKUP 51P2_P
- 0C02 PICKUP 51N_P
- 0C18 PICKUP 51D1_P
- 0C1A PICKUP 51D2_P
- 0C06 PICKUP 50PH_P
- 0C08 PICKUP 50PL_P
- 0C0C PICKUP 50NH_P
- 0C0E PICKUP 50NL_P
- 0C44 PICKUP 46T_P
- 0C46 PICKUP 46D_P
- 0C32 PICKUP 81U1_P
- 0C34 PICKUP 81U2_P
- 0C2A PICKUP 81O1_P
- 0C2C PICKUP 81O2_P
- 0D00 TRIP 51P_T
- 0D12 TRIP 51P1_T
- 0D14 TRIP 51P2_T
- 0D02 TRIP 51N_T
- 0D18 TRIP 51N1_T
- 0D1A TRIP 51N2_T
- 0D06 TRIP 50PH_T
- 0D08 TRIP 50PL_T
- 0D0C TRIP 50NH_T
- 0D0E TRIP 50NL_T
- 0D44 TRIP 46T_T
- 0D46 TRIP 46D_T
- 0D32 TRIP 81U1_T
- 0D34 TRIP 81U2_T
- 0D2A TRIP 81O1_T
- 0D2C TRIP 81O2_T

Read Status

Description of this command:

This command reads status bits.

Methods used to run this command:

Analog Input (ReadNumericValues)

Number of points accepted by this command:

1-26

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

3

Meaning of the DriverP3 parameter:

Indicates the format for returned dates:

0 = Use English format (MM/DD/YYYY hh:mm:ss.000)

1 = Use Spanish format (DD/MM/YYYY hh:mm:ss.000)

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Values that are returned:

Text in PointText (0) = Date (ASCII Text)

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Value in PointValue (0) = Year (2000-2099)
Value in PointValue (1) = Month (1-12)
Value in PointValue (2) = Day (1-31)
Value in PointValue (3) = Hour (0-23)
Value in PointValue (4) = Minutes (0-59)
Value in PointValue (5) = Seconds (0-59)
Value in PointValue (6) = Milliseconds byte (0-255)
Value in PointValue (7) = Recloser Pause
Value in PointValue (8) = Recloser Lockout
Value in PointValue (9) = Recloser Reset
Value in PointValue (10) = Recloser Block Remote
Value in PointValue (11) = Recloser Block Local
Value in PointValue (12) = Current Logs Present
Value in PointValue (13) = Events Present
Value in PointValue (14) = Faults Present
Value in PointValue (15) = Relay Protection Active
Value in PointValue (16) = AD Failure
Value in PointValue (17) = Power Supply Failure
Value in PointValue (18) = EEPROM Failure
Value in PointValue (19) = Alarm Relay Disable
Value in PointValue (20) = Alarm Trips Not Permitted
Value in PointValue (21) = Alarm Current 52b Open
Value in PointValue (22) = Alarm Breaker Maintenance
Value in PointValue (23) = Fail To Open
Value in PointValue (24) = Fail To Close
Value in PointValue (25) = Recloser Lockout

Send Generic Message

Description of this command:

This command sends a configurable message in order to analyze the device's reply.

Methods used to run this command:

Digital Output (WriteBooleanValues)

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Not used

Meaning of the DriverP1 parameter:

0

Meaning of the DriverP2 parameter:

If 1, these bytes are replaced before transmitting the message:

- 1) Message length in the eight byte according to P6 len.
- 2) XOR validation (X1) in the ninth byte.
- 3) XOR validation (X2) in the last byte. If left 0 or blank, no replacements are made and the message in P6 is transmitted unchanged.

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Meaning of the DriverP6 parameter:

Message to be sent in ascii-hexa format. Example: 010B010301414C050144FFFFFFFFE45

Values that are returned:

- Only the reply's length and checksum are validated.
- No data is caught from the reply.

Send Password

Description of this command:

Sends a numeric password to the relay to enable writing operations such as Set Time. This command does not expect a response from the relay.

Methods used to run this command:

Digital Output (WriteBooleanValues)

Number of points accepted by this command:

1

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cpksoftengineering@
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Meaning of the DriverP0 parameter:

Ignored

Meaning of the DriverP1 parameter:

3

Meaning of the DriverP2 parameter:

Password (numeric value)

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Values that are sent:

Value in PointValue (0) = Ignored

Set Time

Description of this command:

Sets a new time in the relay. Use the Send Password command before using this command.

Methods used to run this command:

Analog Output (WriteNumericValues)

Number of points accepted by this command:

7

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

0

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Meaning of the DriverP7 parameter:

Password (numeric value). If left empty, default is 1. If set to -1, no password is sent.

Meaning of the DriverP8 parameter:

Password delay (milliseconds between password is sent and datetime is sent)

Values that are sent:

Value in PointValue (0) = Year (2000-2099)

Value in PointValue (1) = Month (1-12)

Value in PointValue (2) = Day (1-31)

Value in PointValue (3) = Hour (0-23)

Value in PointValue (4) = Minutes (0-59)

Value in PointValue (5) = Seconds (0-59)

Value in PointValue (6) = Milliseconds byte (0-255) (Use 0 if milliseconds are not supported by relay)

Synchronize

Description of this command:

Sets a new time in the relay using the PC clock date and time.

This command follows this procedure:

- Reads the current date and time from the relay
- Compares the received relay date and time (plus the estimated reading delay indicated in DriverP5) to the current PC clock date and time.
- Based on the allowed time difference given in the P2 parameter, the driver determines if a synchronization is necessary,
- If a synchronization is required, the driver optionally sends a password the relay.
- After sending the password, the driver sends the current PC clock date and time (plus the estimated transmission delay indicated in DriverP6) to the relay.
- After synchronization, reads back the new date and time from the relay.
- Compares the received relay date and time (plus the estimated reading delay indicated in DriverP5) to the current PC clock date and time.
- Based on the allowed time difference given in the P2 parameter, the driver determines if the synchronization was successful or not.
- Returns status or error information about the synchronization result.

Methods used to run this command:

Analog Input (ReadNumericValues)

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hotmail.com

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Number of points accepted by this command:

1-9

Meaning of the DriverP0 parameter:

Relay Number (1-255).

Meaning of the DriverP1 parameter:

7

Meaning of the DriverP2 parameter:

Allowed difference, in milliseconds.

Meaning of the DriverP3 parameter:

Indicates the format for returned dates:

0 = Use English format (MM/DD/YYYY hh:mm:ss.000)

1 = Use Spanish format (DD/MM/YYYY hh:mm:ss.000)

Meaning of the DriverP4 parameter:

Indicates the device type. If left empty or 0, 0Bh is assumed. Use 100h for a 0 value. Known values are: 0Bh = DFP100 (class 1) 0Dh = DFP100 (class 2)

Meaning of the DriverP5 parameter:

Estimated communication delay when reading data from the relay, in milliseconds. This delay has to do with the communication link and compensates the elapsed time between the moment the relay transmits the telegram with its date and time and the moment the telegram is received and processed by the driver.

Meaning of the DriverP6 parameter:

Estimated communication delay when transmitting data to the relay, in milliseconds. This delay has to do with the communication link and compensates the elapsed time between the moment the driver transmits the telegram with the PC clock date and time to the relay and the moment the telegram is received and processed by the relay.

Meaning of the DriverP7 parameter:

Password (numeric value). If left empty, default is 1. If set to -1, no password is sent.

Meaning of the DriverP8 parameter:

Password delay in milliseconds between password is sent and datetime is sent (500 is recommended).

Meaning of the DriverP9 parameter:

PC clock milliseconds mark to start writing (0-999), or empty for no start mark.

Values that are returned:

Value in PointValue (0) = 0 if synchronization not needed, 1 if synchronized OK, 2 if error synchronizing.

Value in PointValue (3) = Time difference before synchronization in milliseconds.

Value in PointValue (7) = Time difference after synchronization in milliseconds (also returns previous difference if synchronization was not needed).

Text in PointText (0) = Returned status or error message.

Text in PointText (1) = PC clock date and time obtained when starting communication.

Text in PointText (2) = Relay date and time received when starting communication.

Text in PointText (3) = Relay date and time received when starting communication, corrected with reading delay.

Text in PointText (4) = PC clock date and time obtained before synchronization (empty if synchronization was not needed).

Text in PointText (5) = Actual PC clock date and time used for synchronization, corrected with transmitting delay (empty if synchronization was not needed).

Text in PointText (6) = PC clock date and time obtained after synchronization (empty if synchronization was not needed).

Text in PointText (7) = Relay date and time received after synchronization (empty if synchronization was not needed).

Text in PointText (8) = Relay date and time received after synchronization, corrected with reading delay (empty if synchronization was not needed).

Error messages

The following list shows the possible error messages that can be returned by the driver during a failed communication in the 'Status' property.

[1005] DRIVER (Internal): Invalid driver stage

[1201] DRIVER (System): Error closing %s

[1202] DRIVER (System): Error creating %s

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[1208] DRIVER (System): Error seeking end of %s
[1210] DRIVER (System): Error writing to %s
[1300] PROTOCOL (Timeout): No answer
[1316] PROTOCOL (Remote): Download sequence interrupted by relay
[1414] PROTOCOL (Format): Invalid received data length
[1416] PROTOCOL (Format): Invalid unit code received
[1433] PROTOCOL (Format): Validation error in device response
[1439] PROTOCOL (Format): Unknown code received
[1440] PROTOCOL (Format): Reported data is invalid
[1464] PROTOCOL (Format): Operation failed possibly due to invalid password
[2002] CONFIG (DataType): Digital inputs are not supported by this driver
[2130] CONFIG (NumValues): Invalid number of values (must be 7)
[2175] CONFIG (NumValues): Too many values (max=1)
[2197] CONFIG (NumValues): Too many values (max=21)
[2240] CONFIG (NumValues): Too many values (max=9)
[2245] CONFIG (NumValues): Too many values requested
[2291] CONFIG (NumValues): Too many values (max=27)
[3014] CONFIG (P0): Invalid device address (0-255)
[3508] CONFIG (P1): Invalid command
[4140] CONFIG (P2): Invalid record index (1-8)
[4141] CONFIG (P2): Invalid event index (1-255)
[4142] CONFIG (P2): Invalid data value (1-256)
[4157] CONFIG (P2): Invalid oscillography report number (1-6)
[6040] CONFIG (P6): Invalid message (minimum length is 10 bytes)
[9507] CONFIG (Value): Invalid year in PointValue (2000-2099)
[9508] CONFIG (Value): Invalid month in PointValue (1-12)
[9509] CONFIG (Value): Invalid day in PointValue (1-31)
[9510] CONFIG (Value): Invalid hour in PointValue (0-23)
[9511] CONFIG (Value): Invalid minutes in PointValue (0-59)
[9512] CONFIG (Value): Invalid milliseconds in PointValue (0-999)
[9515] CONFIG (Value): Invalid seconds in PointValue (0-59)

Supported devices

This driver can communicate with these devices, but is not necessarily limited to this list:

GENERAL ELECTRIC DFP-100 Relays

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[cpksoftengineering@
hotmail.com](mailto:cpksoftengineering@hotmail.com)

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