ProLinx COMMUNICATION GATEWAYS

DEM

Honeywell DE
Protocol Driver Manual

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Document Revision History

Revision	Description	Date
2.20	First public release	02/11/02

Related Documents & Reference Materials

Several resources are available to assist with the configuration and support of the ProLinx Communication Gateways, Inc. modules. The following files are available off the web site:

Startup Guide	www.prolinxgateways.com	
	Startup_guide_2.20.pdf	ProLinx Communication Gateways, Inc. Startup Guide

1 Functional Overview

The DEM protocol driver is designed to provide a tightly integrated communications interface between other protocols of the ProLinx platform and the Honeywell DE instruments. Compatible DE devices include a large array of field devices including pressure, temperature, metering, and many other instruments.

1.1 DEM Driver Overview

The DEM driver is responsible for overall operation of the of the DEM board including:

- Transfer of data from DE processor to module's database
- Transfer of write commands from the module's database to the DE processor
- Database mismatch comparisons
- LED status indicators

The DE CPU provides:

- Eight data receivers which provide input signal conditioning (noise filtering, surge limiting, etc.) for serial data inputs
- An output channel selector and driver circuitry allowing the DE processor to output database write commands to any channel

Both Single and/or Multivariable Honeywell Transmitters operating in the DE mode are supported by the module. Supported Honeywell instruments include:

- ST 3000 Smart Pressure Transmitter
- STT 3000 Smart Temperature Transmitter
- SMV 3000 Smart Multivariable Transmitter
- MagneW 300 Smart Magnetic Flow meter
- SCM 3000 Smart Coriolis Mass Flow meter
- SGC 3000 Smart Gas Chromatograph

There can be Single and Multi Variable instruments connected to the DEM module, in any mix totaling 8 logical DE Channels. An example configuration could be as follows:

DE Channel	Physical Type	Instrument
1	SV	ST 3000 Pressure
2	SV	STT 3000 Temperature
3	MV	PV 1 - SMV 3000
4		PV 2
5		PV 3
6		PV 4
7	MV	PV 1 - SMV 3000
8		PV 2

Multivariable Considerations

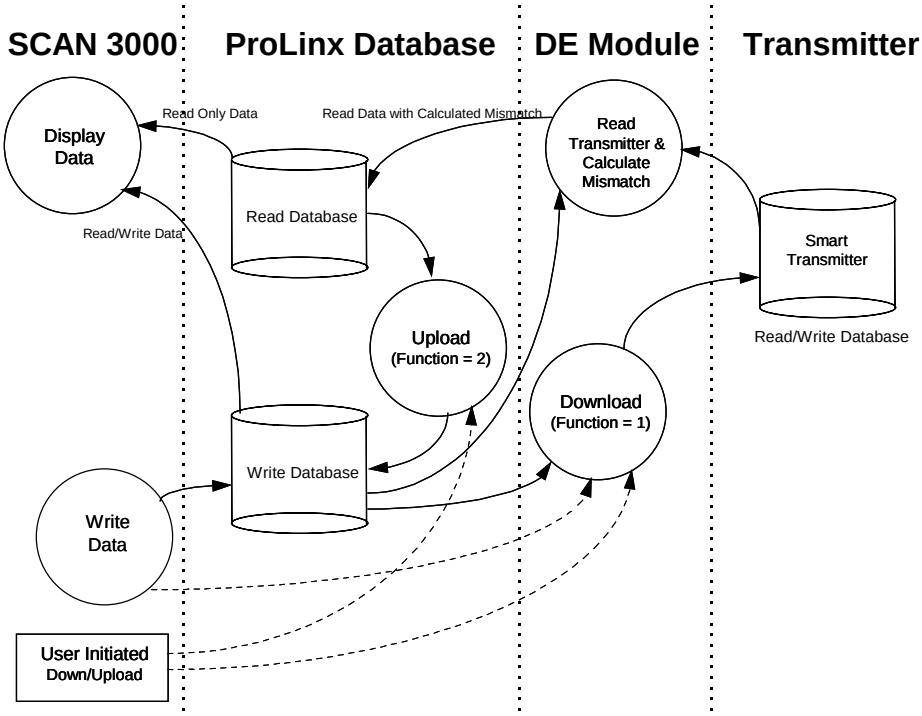
The following 'rules' must be followed when integrating multivariable devices:

1. No instrument can be physically wired to the FTA terminals within the logical limits of another instrument
2. The Tag ID must be identical and non-blank across all logical channels configured for use by a multivariable device
3. You must perform a Download Command on the physical channel in order to change the number of PV's being transmitted (DECONFIG can only be written to the first slot of a multivariable transmitters

1.2 DEM Driver Data Flow

The following diagram shows data movement paths supported by this application (the diagram shows a SCAN 3000 implementation, however functionality would be similar for other interfaces.

Note: It is important to note that the ProLinx module is considered the "owner" of the data. Therefore, the contents of the module's database, in particular the Write Data space, are the data to which all other data is compared.



Step	Description
1	**Power Up** – The read database is populated by DEM from the Smart Transmitter, and the write database remains unchanged. The user can then choose to upload or download.
2	**Read DE Transmitter and Calculate Mismatch –** The module continuously transfers from the Smart Transmitter database to the read database, comparing the write and read files in the processor for mismatch. A mismatch comparison occurs between the two and sets the status in the read database accordingly.
3	**Upload (FC2) –** Populates write database with that of the Smart Transmitter (via the read database in the processor). Upload may be a continuous loop if the module is to be configured in an unsecured mode. Otherwise, the Upload should only be initiated by a user.
4	**Download –** Download populates the Smart Transmitter with the values in the write database from the processor.

1.3 Module Internal Database

Central to the functionality of the module is the internal database. This database is shared between all the ports on the module and is used as a conduit to pass information from one device on the network to one or more devices on another network. This permits data from devices on one communication port to be viewed and controlled by devices on another port.

1.3.1 Using the Module Data

Read Data, Write Data, and Real Time Data are stored in the ProLinx internal database. Appendix A, B, and C show the word locations in the module's internal database. If you want to use a different offset, it is necessary to set the offset parameter in the module configuration file (see Appendix E).

For example, the LRV value for Channel 1 is defined as word 48 in the database. If the offset parameter is defined as 1000, the LRV value will be located in word 1048 in the internal database.

1.4 Reading from Honeywell Smart Transmitters

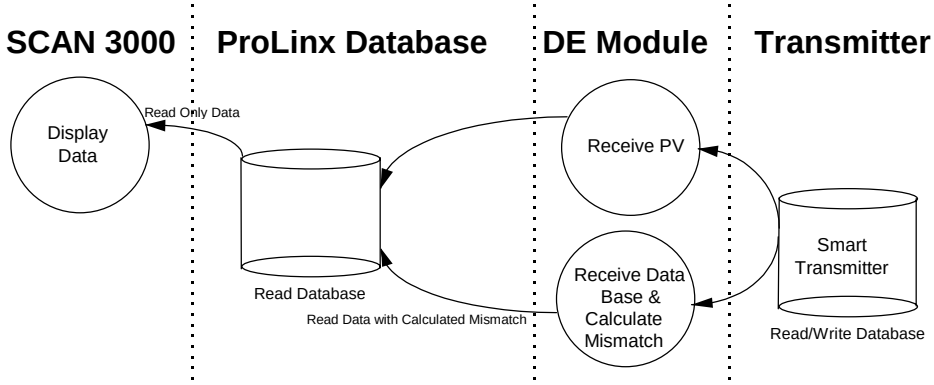
The DEM protocol driver allows a processor to read real time data, status data, and configuration parameters from the Smart Transmitter's database. An overview of the data that is available from a transmitter is as follows:

Type	Description
Real Time	PV Valve (Last Good Value and NaN value)
	SV Valve (Last Good Value and NaN value)
Status	Module Status – Health indication
	Database Mismatch Status flags
	PV Update Counter
	SV Update Counter
	Communication Error Counter
	Status Messages – ASCII
	Device Status Flags 1
	Device Status Flags 2
	Special DB Byte
	Status Bits 1
	Status Bits 2
	Status Bits 3
	PV Value 0 to 16383
	Cfg Database Update Counter
Configuration	Function – Download/Upload

Type	Description
	Tag Name – ASCII
	Serial Number – ASCII
	DE Configuration – Database mode
	Damping Valve
	PV Characterization
	Sensor Type
	PV Number (channel # on MV transmitter)
	Number of PVs – (Number of channels on MV transmitter
	Upper Range Value – URV
	Lower Range Value – LRV
	Upper Range Limit – URL
	Lower Range Limit - LRL

Please refer to Appendix D for more details about the data listed in this table.
The Status and Configuration values are being received from the Smart Transmitter on a continuous basis to the DEM. The DEM will not actually receive these values until a complete database has been acquired from the instrument. This cycle can take anywhere from 15 to 90 seconds, depending on the instrument type. Once the database is read, the cycle automatically starts again.

The flow from the instrument to the operator display is shown in the following diagram:



1.5 Writing to Honeywell Smart Transmitters

The ProLinx DEM protocol driver allows the application to change some of the configuration values in the Honeywell Smart Transmitter. Values are written to the instrument by pre-loading the appropriate database register locations in the module and initiating a download (Function = 1) cycle.

The module executes the download command and returns the completion status in the Device Status word.

IMPORTANT: Upon receipt of the completion bit, the download write register should be cleared to prevent continuous execution of the operation.

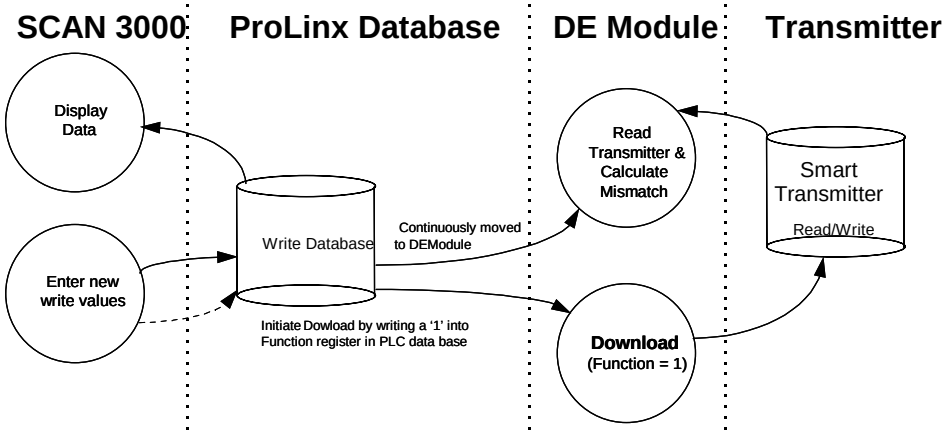
The configuration parameters that can be written to the instrument are as follows:

Type	Description	Write to Transmitter	Mismatch Tested
Configuration	Function - Download/Upload	N	N
	Tag Name - ASCII	Y	Y
	DE Configuration	Y	Y(1)
	Damping Value	Y	Y
	PV Characterization	Y	Y
	Sensor Type	Y	Y
	Upper Range Value - URV	Y	Y
	Lower Range Value - LRV	Y	Y
	Upper Range Limit - URL	N	Y(2)
	PV Num -	N	Y(2)
	Number of PV	N	Y(2)

(1) DE Configuration modes which disable the database read also disable Mismatch testing
(2) These values are written to the module for Mismatch testing purposes

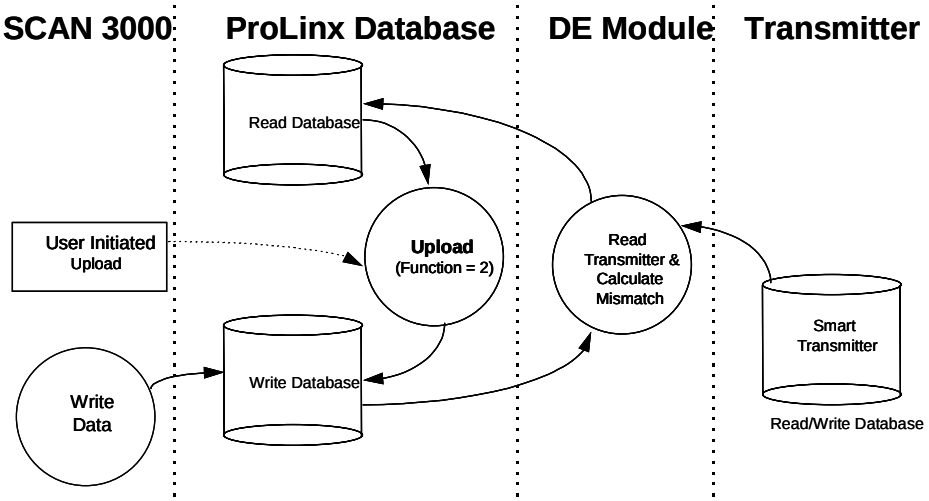
1.5.1 Performing a Download – Function 1

The download function performs the step of writing the new data to the instrument. Until the function is set to 1, the write database is not moved to the instrument. The flow of write data from the operator interface station to the instrument is shown in the following diagram. The write database image in the module is being moved to the DEM module for mismatch comparison purposes:



1.5.2 Performing an Upload

The upload function performs the step of moving data that has been read from the instrument database from the module's read database area into the module's write database area. This function is useful for initializing the write database when the read database is known to contain good data. Performing this step will clear any mismatch conditions that exist. The flow of write data during the upload function is shown in the following diagram:



1.6 PV Valve Integrity

A great deal of effort is put into the task of assuring the integrity of the PV value presented to the database. Two forms of the PV and SV variables are made available to the database.

1.6.1 PV – Last Good Value

This value is the PV value unconditioned by the Database Mismatch. Care should be exercised when using this PV value as the scaling, which is based on the URV/URL/LRV parameters may not be accurate.

During normal operation, the DEM module performs integrity checks of the health of the PV valve. Should a condition be detected which could affect the integrity, the Bad PV Flag is set (Device Status Word 1/13). The four conditions that would cause the Bad PV Flag to be set are:

PV Update Timeout	If the PV value has not been updated within 6 seconds (24 PV update cycles), the flag will be set.
Database Mismatch	If any database mismatch condition is detected, the flag will be set.
SFC Write Detected	If an SFC write to the instrument database is detected, the flag will be set. Note that in a redundant application, the SFC Write Detected condition will be detected when a Download command is executed from the other module or from the SFC unit.
FTA Not Present	If the FTA connector or the 24 VDC power

	supply is disconnected, the flag will be set.

In order to clear the Bad PV Flag, the offending condition must be cleared, and under most circumstances, will have to wait until a new database has been received from the instrument.

1.7 Database Mismatch

Database mismatch testing is performed by the DEM module on the write parameters present in the module's database. This mismatch status is returned to the database via the Data Mismatch Active Flag in Device Status Word #1.

Bit	Description
0	Mismatch - URL
1	Mismatch - LRV
2	Mismatch - URV
3	Mismatch - Damping
4	Mismatch - DE Configuration
5	Mismatch - PV Characterization
6	Mismatch - Sensor Type
7	Mismatch - Tag ID
8	Mismatch - PV Number
9	Mismatch - Number of PV Values
10	Mismatch - Cold Junction Reference
11	Mismatch - Open Thermo Couple Detection
12	Mismatch - Freq 50

Clearing the database mismatch condition is executed in one of several ways:

1. Wait for the mismatch condition to clear. If the mismatch was generated as the result of a download command, the mismatch will be cleared when the next database is fully read from the instrument.

2. Perform a download command to the instrument. If the write data is known to be correct, executing a download will move the new values to the instrument. If the download is successful, the mismatch condition will clear when the next database is fully read from the instrument.

3. Perform an upload command.

2 Port Physical and Protocol Specifications

2.1 General Specifications

The ProLinx DEM Protocol Driver is designed to interface with up to 8 DE devices. Data is exchanged between the DE instruments and the driver using the internal database contained in the DEM module.

DE Communications

- Built in accordance with the Honeywell DE specification
- Supports up to 8 single PV transmitters, 2 multivariable transmitters with 4 PVs each, or a mix of single and multivariable equaling 8 input channels
- Instrument database mismatch verification
- Interfaces directly to Honeywell Field Terminal Assembly (FTA) with ProSoft-supplied cable
- Supports redundant and non-redundant FTA implementations
- Single cable connection from DEM module to FTA

Physical

- External 24 VDC source connection on the front of the DEM module provides instrument loop power
- LEDs for visual module status:
    - DE Active
    - DE Error

3 DEM Protocol Specific Configuration

This section contains the configuration parameters required to utilized the DEM driver. If the parameters are not found in the module's configuration file, the default values will be utilized. When only one DEM board is present on a unit, the following configuration section should be present:

Variable Name	Data Range	Description	IF Error	Config. Value
[DEM BOARD 0]		DEM section header for board 0		
DEM Database Offset:	0 to (Max DB size - 928)	This is the start register in the module's internal database for the DEM interface data. The module requires a data area of 928 registers.	0	

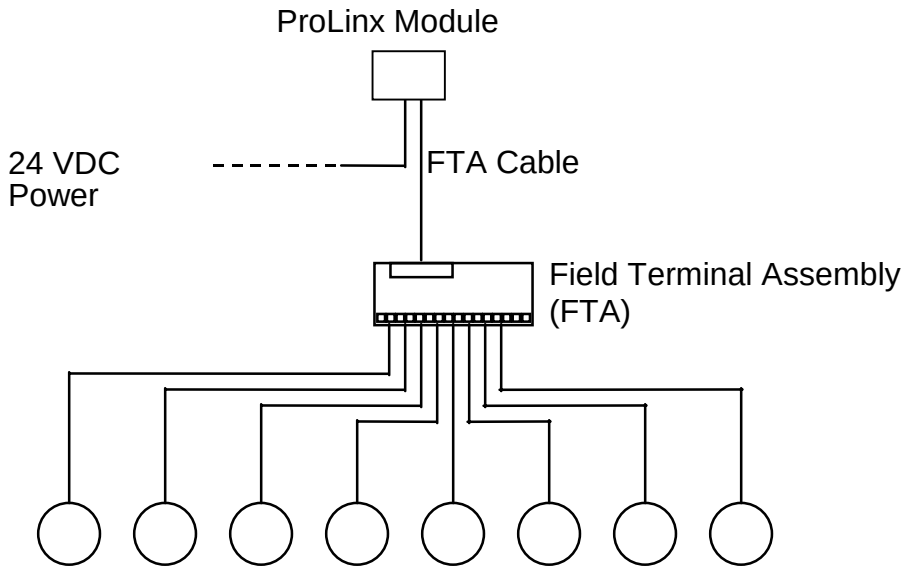
If two DEM modules are present on a ProLinx device, another section of data is required to configure the other board. This following is a listing of the configuration parameters required:

Variable Name	Data Range	Description	IF Error	Config. Value
[DEM BOARD 1]		DEM section header for board 1		
DEM Database Offset:	0 to (Max DB size - 928)	This is the start register in the module's internal database for the DEM interface data. The module requires a data area of 928 registers.	1000	

If two boards are present on a unit, 16 DE channels are available. The first 8 channels are present on board one with their data placed at the database offset specified. The second board (board 1) contains channels 9 to 16 with its data at the location specified.

4 Connecting to the FTA

The module is shipped with a cable and FTA to attach the DE field devices. The following diagram displays how to terminate devices to the FTA:



Honeywell Smart
Individually terminated to FTA

5 LED Indicators

Two LED's are present on the module. The following table defines the meaning of the individual LEDs on the module.

DEM Module	Color	Status	Indication
Active	Green	On	The module has received data on a channel. Under normal operation, this LED should blink rapidly.
		Off	The module is waiting to receive data on a channel.
Error	Green	On	The module is in error or the FTA is not connected. This LED will blink when the module is being initialized to indicate module activity. Module errors include communication timeout on a channel, bad commands, mismatch conditions or hardware failure.
		Off	The module is not in error.

Appendix A – Real Time Data

Word	Channel	Description
0		PV Update Flags and PV Timeout Flags
1		Module Status
2-3	Channel 1	PV Value (Floating-point format)
4-5	Channel 2	PV Value (Floating-point format)
6-7	Channel 3	PV Value (Floating-point format)
8-9	Channel 4	PV Value (Floating-point format)
10-11	Channel 5	PV Value (Floating-point format)
12-13	Channel 6	PV Value (Floating-point format)
14-15	Channel 7	PV Value (Floating-point format)
16-17	Channel 8	PV Value (Floating-point format)
18	Channel 1	PV Value (Integer format 0 – 16383)
19	Channel 2	PV Value (Integer format 0 – 16383)
20	Channel 3	PV Value (Integer format 0 – 16383)
21	Channel 4	PV Value (Integer format 0 – 16383)
22	Channel 5	PV Value (Integer format 0 – 16383)
23	Channel 6	PV Value (Integer format 0 – 16383)
24	Channel 7	PV Value (Integer format 0 – 16383)
25	Channel 8	PV Value (Integer format 0 – 16383)
26-31		Spare

Appendix B – Read Data

Read Data

Word	Channel	Description
32	Channel 1	Last good SV value (Float format)
34	Channel 2	Last good SV value (Float format)
36	Channel 3	Last good SV value (Float format)
38	Channel 4	Last good SV value (Float format)
40	Channel 5	Last good SV value (Float format)
42	Channel 6	Last good SV value (Float format)
44	Channel 7	Last good SV value (Float format)
46	Channel 8	Last good SV value (Float format)
48	Channel 1	LRV - lower range value (Float format)
50		URV - upper range value (Float format)
52		URL - upper range limit (Float format)
54		Damping (Float format)
56		LRL - lower range limit (Float format)
58		Spare (Float format)
60		Spare (Float format)
62	Channel 2	LRV - lower range value (Float format)
64		URV - upper range value (Float format)
66		URL - upper range limit (Float format)
68		Damping (Float format)
70		LRL - lower range limit (Float format)
72		Spare (Float format)
74		Spare (Float format)
76	Channel 3	LRV - lower range value (Float format)
78		URV - upper range value (Float format)
80		URL - upper range limit (Float format)
82		Damping (Float format)
84		LRL - lower range limit (Float format)
86		Spare (Float format)
88		Spare (Float format)
90	Channel 4	LRV - lower range value (Float format)
92		URV - upper range value (Float format)
94		URL - upper range limit (Float format)
96		Damping (Float format)
98		LRL - lower range limit (Float format)
100		Spare (Float format)
102		Spare (Float format)
104	Channel 5	LRV - lower range value (Float format)
106		URV - upper range value (Float format)
108		URL - upper range limit (Float format)
110		Damping (Float format)

Read Data

Word	Channel	Description
112		LRL - lower range limit (Float format)
114		Spare (Float format)
116		Spare (Float format)
118	Channel 6	LRV - lower range value (Float format)
120		URV - upper range value (Float format)
122		URL - upper range limit (Float format)
124		Damping (Float format)
126		LRL - lower range limit (Float format)
128		Spare (Float format)
130		Spare (Float format)
132	Channel 7	LRV - lower range value (Float format)
134		URV - upper range value (Float format)
136		URL - upper range limit (Float format)
138		Damping (Float format)
140		LRL - lower range limit (Float format)
142		Spare (Float format)
144		Spare (Float format)
146	Channel 8	LRV - lower range value (Float format)
148		URV - upper range value (Float format)
150		URL - upper range limit (Float format)
152		Damping (Float format)
154		LRL - lower range limit (Float format)
156		Spare (Float format)
158		Spare (Float format)
160		Spare Register
161		Spare Register
162	Channel 1	Device Status Flags 1
163		Device Status Flags 2
164H		Special DB Byte
164L		Status Bits 1
165H		Status Bits 2
165L		Status Bits 3
166		Spare
167		PV Value 0 to 16383
168H		Cfg Database update counter
168L		Communication error counter
169H		PV update counter
169L		SV update counter
170H		Spare
170L		Function
171H		DE CFG - Operational Mode
171L		Damping
172H		PV Characterization
172L		Sensor Type

Read Data

Word	Channel	Description
173H		PV Number
173L		Number of PV's
174		Spare
175		Spare
176		Spare
177	Channel 2	Device Status Flags 1
178		Device Status Flags 2
179H		Special DB Byte
179L		Status Bits 1
180H		Status Bits 2
180L		Status Bits 3
181		Spare
182		PV Value 0 to 16383
183H		Cfg Database update counter
183L		Communication error counter
184H		PV update counter
184L		SV update counter
185H		Spare
185L		Function
186H		DE CFG - Operational Mode
186L		Damping
187H		PV Characterization
187L		Sensor Type
188H		PV Number
188L		Number of PV's
189		Spare
190		Spare
191		Spare
192	Channel 3	Device Status Flags 1
193		Device Status Flags 2
194H		Special DB Byte
194L		Status Bits 1
195H		Status Bits 2
195L		Status Bits 3
196		Spare
197		PV Value 0 to 16383
198H		Cfg Database update counter
198L		Communication error counter
199H		PV update counter
199L		SV update counter
200H		Spare
200L		Function
201H		DE CFG - Operational Mode
201L		Damping

Read Data

Word	Channel	Description
202H		PV Characterization
202L		Sensor Type
203H		PV Number
203L		Number of PV's
204		Spare
205		Spare
206		Spare
207	Channel 4	Device Status Flags 1
208		Device Status Flags 2
209H		Special DB Byte
209L		Status Bits 1
210H		Status Bits 2
210L		Status Bits 3
211		Spare
212		PV Value 0 to 16383
213H		Cfg Database update counter
213L		Communication error counter
214H		PV update counter
214L		SV update counter
215H		Spare
215L		Function
216H		DE CFG - Operational Mode
216L		Damping
217H		PV Characterization
217L		Sensor Type
218H		PV Number
218L		Number of PV's
219		Spare
220		Spare
221		Spare
222	Channel 5	Device Status Flags 1
223		Device Status Flags 2
224H		Special DB Byte
224L		Status Bits 1
225H		Status Bits 2
225L		Status Bits 3
226		Spare
227		PV Value 0 to 16383
228H		Cfg Database update counter
228L		Communication error counter
229H		PV update counter
229L		SV update counter
230H		Spare
230L		Function

Read Data

Word	Channel	Description
231H		DE CFG - Operational Mode
231L		Damping
232H		PV Characterization
232L		Sensor Type
233H		PV Number
233L		Number of PV's
234		Spare
235		Spare
236		Spare
237	Channel 6	Device Status Flags 1
238		Device Status Flags 2
239H		Special DB Byte
239L		Status Bits 1
240H		Status Bits 2
240L		Status Bits 3
241		Spare
242		PV Value 0 to 16383
243H		Cfg Database update counter
243L		Communication error counter
244H		PV update counter
244L		SV update counter
245H		Spare
245L		Function
246H		DE CFG - Operational Mode
246L		Damping
247H		PV Characterization
247L		Sensor Type
248H		PV Number
248L		Number of PV's
249		Spare
250		Spare
251		Spare
252	Channel 7	Device Status Flags 1
253		Device Status Flags 2
254H		Special DB Byte
254L		Status Bits 1
255H		Status Bits 2
255L		Status Bits 3
256		Spare
257		PV Value 0 to 16383
258H		Cfg Database update counter
258L		Communication error counter
259H		PV update counter
259L		SV update counter

Read Data

Word	Channel	Description
260H		Spare
260L		Function
261H		DE CFG - Operational Mode
261L		Damping
262H		PV Characterization
262L		Sensor Type
263H		PV Number
263L		Number of PV's
264		Spare
265		Spare
266		Spare
267	Channel 8	Device Status Flags 1
268		Device Status Flags 2
269H		Special DB Byte
269L		Status Bits 1
270H		Status Bits 2
270L		Status Bits 3
271		Spare
272		PV Value 0 to 16383
273H		Cfg Database update counter
273L		Communication error counter
274H		PV update counter
274L		SV update counter
275H		Spare
275L		Function
276H		DE CFG - Operational Mode
276L		Damping
277H		PV Characterization
277L		Sensor Type
278H		PV Number
278L		Number of PV's
279		Spare
280		Spare
281		Spare
282-285	Channel 1	Tag Name
286-289		Serial Number
290-293		Software Revision
294-309		Scratch Pad
310-341		Transmitter Status
342-345	Channel 2	Tag Name
346-349		Serial Number
350-353		Software Revision
354-369		Scratch Pad
370-401		Transmitter Status

Read Data

Word	Channel	Description
402-405	Channel 3	Tag Name
406-409		Serial Number
410-413		Software Revision
414-429		Scratch Pad
430-462		Transmitter Status
462-465	Channel 4	Tag Name
466-469		Serial Number
470-473		Software Revision
474-489		Scratch Pad
490-521		Transmitter Status
522-525	Channel 5	Tag Name
526-529		Serial Number
530-533		Software Revision
534-549		Scratch Pad
550-581		Transmitter Status
582-585	Channel 6	Tag Name
586-589		Serial Number
590-593		Software Revision
594-609		Scratch Pad
610-641		Transmitter Status
642-645	Channel 7	Tag Name
646-649		Serial Number
650-653		Software Revision
654-669		Scratch Pad
670-701		Transmitter Status
702-705	Channel 8	Tag Name
706-709		Serial Number
710-713		Software Revision
714-729		Scratch Pad
730-761		Transmitter Status
762-763		Product Name
764-765		Product Revision
766		Product Operating System
767		Product Run Number

Appendix C – Write Data

Write Data

Word	Channel	Description
768	Channel 1	LRV (LRV/URL) (Float format)
770		URV ((URV-LRV)/URL) (Float format)
772		URL (Float format)
774		Damping (Float format)
776		Spare (Float Format)
778	Channel 2	LRV (LRV/URL) (Float format)
780		URV ((URV-LRV)/URL) (Float format)
782		URL (Float format)
784		Damping (Float format)
786		Spare (Float Format)
788	Channel 3	LRV (LRV/URL) (Float format)
790		URV ((URV-LRV)/URL) (Float format)
792		URL (Float format)
794		Damping (Float format)
796		Spare (Float Format)
798	Channel 4	LRV (LRV/URL) (Float format)
800		URV ((URV-LRV)/URL) (Float format)
802		URL (Float format)
804		Damping (Float format)
806		Spare (Float Format)
808	Channel 5	LRV (LRV/URL) (Float format)
810		URV ((URV-LRV)/URL) (Float format)
812		URL (Float format)
814		Damping (Float format)
816		Spare (Float Format)
818	Channel 6	LRV (LRV/URL) (Float format)
820		URV ((URV-LRV)/URL) (Float format)
822		URL (Float format)
824		Damping (Float format)
826		Spare (Float Format)
828	Channel 7	LRV (LRV/URL) (Float format)
830		URV ((URV-LRV)/URL) (Float format)
832		URL (Float format)
834		Damping (Float format)
836		Spare (Float Format)
838	Channel 8	LRV (LRV/URL) (Float format)
840		URV ((URV-LRV)/URL) (Float format)
842		URL (Float format)
844		Damping (Float format)
846		Spare (Float Format)
848	Channel 1	Command Bits

Write Data

Word	Channel	Description
849		Function
850H		DE Configuration
850L		Damping
851H		PV Characterization
851L		Sensor Type
852H		PV Number
852L		Number of PV's
853-856		Tag Name
857		Spare
858	Channel 2	Command Bits
859		Function
860H		DE Configuration
860L		Damping
861H		PV Characterization
861L		Sensor Type
862H		PV Number
862L		Number of PV's
863-866		Tag Name
867		Spare
868	Channel 3	Command Bits
869		Function
870H		DE Configuration
870L		Damping
871H		PV Characterization
871L		Sensor Type
872H		PV Number
872L		Number of PV's
873-876		Tag Name
877		Spare
878	Channel 4	Command Bits
879		Function
880H		DE Configuration
880L		Damping
881H		PV Characterization
881L		Sensor Type
882H		PV Number
882L		Number of PV's
883-886		Tag Name
887		Spare
888	Channel 5	Command Bits
889		Function
890H		DE Configuration
890L		Damping
891H		PV Characterization

Write Data

Word	Channel	Description
891L		Sensor Type
892H		PV Number
892L		Number of PV's
893-896		Tag Name
897		Spare
898	Channel 6	Command Bits
899		Function
900H		DE Configuration
900L		Damping
901H		PV Characterization
901L		Sensor Type
902H		PV Number
902L		Number of PV's
903-906		Tag Name
907		Spare
908	Channel 7	Command Bits
909		Function
910H		DE Configuration
910L		Damping
911H		PV Characterization
911L		Sensor Type
912H		PV Number
912L		Number of PV's
913-916		Tag Name
917		Spare
918	Channel 8	Command Bits
919		Function
920H		DE Configuration
920L		Damping
921H		PV Characterization
921L		Sensor Type
922H		PV Number
922L		Number of PV's
923-926		Tag Name
927		Spare

Appendix D – DE Parameter Descriptions

This appendix contains a detailed listing of the Honeywell DE parameters.

Device Status Flags #1

Bit	Name	Description
0	Function Done	0 = Not complete, 1 = Complete Status Flag associated with the function parameter. When the Function parameter is set to one(1) to initiate a database write to the instrument, this bit may be monitored to determine completion
1	Function Passed	0 = Function Failed, 1 = Function Passed Flag to be used in conjunction with Function Done Flag. When the Function Command is set to anything besides Imaging PV, the Function Done Flag is set False, When the requested Function Command is completed, the MVI will return to the Imaging PV mode, set the Function Done Flag to 1 and set the Function Passed depending on the outcome of the command. Note that if a Download to an Instrument is initiated and no parameters have been changed in the database, the Function Passed Flag will not be set.
2	PV Update Flag (Toggles)	This flag indicates that the DEM has received a new PV value from the instrument in this DE Channel. This flag will be toggled during the next Block Transfer with the current block read number, unless a new PV value is received again.
3	PV Output	This flag indicates that the PV is in Output Mode. In this implementation the instrument can only be placed in Output Mode by the SFC (hand held) In this mode, the PV is forced to a value which overrides the transmitter PV. This is a read only value
4	SFC Detected	This flag indicates that the DE CPU has detected that the SFC has changed transmitter parameters. This bit is for status indication only in the PLC but is used by the DEM as part of the parameter mismatch logic.
5	SV Updated Flag (Toggles)	This flag indicates that the DEM has received a new SV value from the instrument in this DE Channel. This flag will be toggled during the next Block Transfer with the current BTR Block ID number, unless a new SV value is received again.
6	Config Data Base Update (Toggles)	This flag indicates that the DEM has received a new Configuration Data Base from the DE CPU. This flag will only be updated by the DE CPU when the complete data base has been received from the instrument. be toggled during the next Block Transfer with the current BTR Block ID number.
7	Spare	
8	Cold Junction Ref	A flag indicating if cold junction reference is being used by the transmitter. This value may be changed in the instrument by the PLC via the Download Function. 0 External reference used 1 Internal (to transmitter) reference is used
9	Open Thermocouple Detect	A flag indicating if Open Thermocouple Detection is enabled in the transmitter. This value may be changed in the instrument by the PLC via the Download Function. 0 Detection Not Enabled 1 Detection Enabled
10	Freq 50	A flag indicating if 50 or 60 Hertz filtering is being used in the transmitter. This value may be changed in the instrument by the PLC via the Download Function(VERIFY THIS). 0 60 Hz 1 50 Hz
11	Data Mismatch Active Flag	A flag set by the DEM whenever an active data base mismatch condition exists. The exact mismatched parameters can be determined by checking Device Status Flags #2. The Data Mismatch flag will be cleared by the DEM whenever the condition

		causing the mismatch is cleared. 0 No mismatch condition 1 Mismatch condition
12	Spare	
13	Bad PV Flag	A flag set by the DEM whenever the PV value is suspected or known to be bad. Once the PV value is good again, this flag will be cleared by the DEM. Conditions causing this flag to be set include: PV Update Timeout : If the PV value has not been updated within the timeout period, the flag is set FTA Not Present : If the FTA connector or the 24 VDC power supply is disconnected, the flag will be set SFC Write Detected : If and SFC write to the instrument data base is detected, the flag will be set. Note that in a redundant application, the SFC Write Detected condition will be detected when a Download command is executed from the other module or from the SFC unit. Database Mismatch : If the data base mismatch condition is detected, the flag will be set
14	PV Under Range Flag	This flag is set whenever the PV value is under 0%.
15	PV Over Range Flag	This flag is set whenever the PV value is over 100%.

Device Status Flags #2

The bits is this word are used to indicate the current mismatch status for each data variable which is verified. When the bit is set (1) the variable is in a mismatched condition. The mismatch may be cleared by performing a download to the instrument or by performing an upload (copying the read data base to the write data base). If the PLC data base is downloaded to the instrument, the mismatch condition will not clear until the complete data base has been read back from the instrument.

Bit	Description
0	URL – Mismatch
1	LRV – Mismatch
2	URV – Mismatch
3	Damping – Mismatch
4	DE Config – Mismatch
5	PV Char – Mismatch
6	Sensor Type - Mismatch
7	Tag ID – Mismatch
8	PV Number - Mismatch
9	Number of PV Values - Mismatch
10	Cold Junction Ref - Mismatch
11	Open Thermocouple Detect - Mismatch
12	Freq 50 - Mismatch
13	Spare
14	Spare
15	Spare

Special DB byte

Bit	Description
0	Initial Power-up Data base
1	1st DB Capture in progress
2	4 Byte Data Base
3	No DE Data Available
4	SFC Write Detected
5	Output Mode
6	Not Used
7	Not Used

Status Bits 1

Bit	Description
0	
1	
2	
3	

4	
5	
6	
7	

Status Bits 2

Bit	Description
0	
1	
2	
3	
4	
5	
6	
7	

Status Bits 3

Bit	Description
0	
1	
2	
3	
4	
5	
6	
7	

PV Number

In a multi-variable transmitter, this value indicates the relative number of the PV value coming from the instrument. Used in combination with Number of PV value in low byte. In a single variable instrument, this will have a value of 1.

Number of PVs

Indicates the total number of PV values being returned from the instrument. This value will be 1 in a single variable instrument

PV Value - 0 to 4095

A 12-bit representation of the value being returned in the PV - Last Good Value field. This value is intended to be used for PID logic and other applications which would require that the Floating Point value be de-scaled. This value is initialized to 0 during power up.

Config database update counter

Updated by the DE CPU, for debug purposes, every time the instrument data base has been completely received. The counter increments from 0 to 0ffh and then wraps around to 0.

Communication error counter

Updated by the DE CPU, for debug purposes, to indicate the number of DE communication errors which have occurred since reset. The counter increments from 0 to 0ffh and then wraps around to 0.

PV updated counter

Updated by the DE CPU every time the PV value is received from an instrument. Note also that the COMM LED on the module will also toggle on when a PV is received.

SV updated counter

Updated by the DE CPU every time the SV variable is received from an instrument

Function

This value describes the operating mode of the DEM for the DE Channel and the corresponding transmitter. The following modes are defined and/or supported:

Fctn	Description
0	Imaging PV (Default)
1	Download Transmitter Parameters to Instrument
2	Upload Transmitter Parameters Performed in ladder logic. Copies data base read back from instrument into write registers
3	Set LRL (Not supported, use mode #1)
4	Set URL (Not supported, use mode #1)
5	Correct LRL (Not supported, use mode #1)
6	Correct URL (Not supported, use mode #1)
7	Correct Zero Point (Not supported, use mode #1)
8	Restore Calib (Not supported)

DE CFG - Operational Mode

Indicates the DE operational mode for the transmitter configuration and the data which will be returned from the instrument. The available values are as follows:

0	Analog Mode
1	PV value only
2	PV and SV only
3	PV and Configuration Data Base (6 Byte mode)
4	PV, SV and Configuration Data Base (6 Byte Mode)

Note that the DE CFG value must be at least a 3 (instrument must be in 6 byte mode) in order for the database to be read from the instrument

Damping

This is the damping value correspond to the particular damping value in the transmitter. These values are based on a lookup table which is a function of the type of transmitter.

Damping	SPT	STT	SFM
0	0.0	0.0	0.0
1	0.16	0.30	0.5
2	0.32	0.70	1.0
3	0.48	1.5	2.0
4	1.0	3.1	3.0
5	2.0	6.3	4.0
6	4.0	12.7	5.0
7	8.0	25.5	10.0
8	16.0	51.1	50.0
9	32.0	102.3	100.0

PV Characterization

This parameter defines the algorithm used in the transmitter for process variable characterization. The correct PV Characterization parameter chosen when downloading the database must be in the set that is supported by the transmitter installed in the DE Channel.

> The PV Characterization value is not checked by the DEM module against the transmitter type. The User must be cautious when writing the value to be sure that the correct value is selected

Sensor Type

Value indicates the type of instrument that is connected to the DE Channel. Possible values are:

Value	Hex	Description
8	8	SPT DP
9	9	SPT GP
10	A	SPT AP
11	B	STT
12	C	SFM
13	D	SCM
14	E	SGC
15	F	SVP
16	10	MTT
17	11	STP
18	12	SLV
19	13	SDU
20	14	Generic

Appendix E – Sample 4106-DFCM-DEM Configuration File

```
# DFCMDEM.CFG
#
# Example configuration file for the 4106-DFCM-DEM communication
module.
#
# COMPANY  :
# LOCATION :
# DATE     :
#

# This information sets up the database.

[Module]
Module Name : 4106-DFCM-DEM (ProLinx Communication Gateways, Inc.)


# This section is used to define the configuration parameters for the
DEM
# interface module.

[DEM BOARD 0]
DEM Database Offset     : 0      #Start register for DEM data
```

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