



**SUBJECT:** DATA IDENTITIES FOR THE A1700 METER

**TITLE:** TIM SOFTWARE DATA IDENTITIES

A handwritten signature in purple ink that reads "A. Watters". The signature is stylized with a large, sweeping "A" and a long horizontal line extending from the end.

A. Watters  
**SENIOR ENGINEER**

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## ENERGY QUADRANT REFERENCING

In order to maintain consistency, the nomenclature of the metered energy quadrants will be as follows (and is as defined in IEC:1268). Where quadrants are referred to in this specification, they are defined as follows:

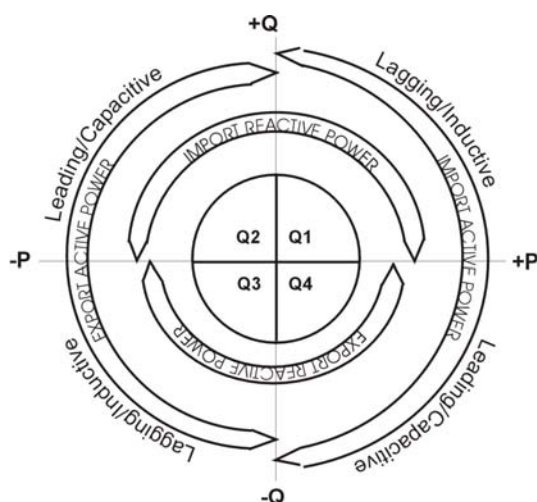


FIGURE 1

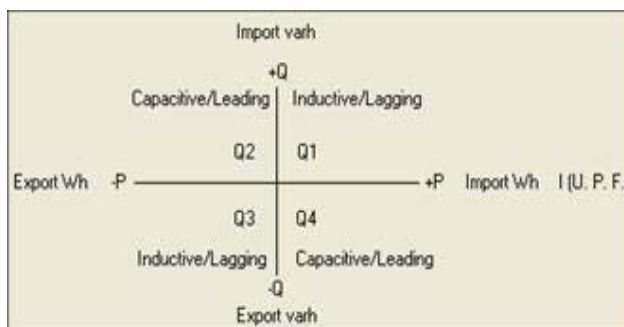


FIGURE 2

### Cross Reference:

<b>Q1</b>	=	<b>varh Import Inductive Lagging Energy</b>
<b>Q2</b>	=	<b>varh Import Capacitive Leading Energy</b>
<b>Q3</b>	=	<b>varh Export Inductive Lagging Energy</b>
<b>Q4</b>	=	<b>varh Export Capacitive Leading Energy</b>

### NOTES WHEN REFERRING TO THE ABOVE DIAGRAMS

- The reference to this diagram is the current vector (fixed on the right hand line).
- The voltage vector  $V$  varies its direction according to the phase angle  $\phi$ .
- The phase angle  $\phi$  between the voltage  $V$  and the current  $I$  is taken positive in the counter-clockwise direction.

## 500 CUMULATIVE & DEMAND REGISTERS

### DESCRIPTION

The live cumulative total registers, a concatenation of:

- Cumulative Registers (ID 507)
- Multi Utility Registers (ID 516)
- TOU Registers (ID 508)
- Maximum Demand Registers (ID 510)
- Cumulative Maximum Demands (ID 509)
- Coincident Demand Registers (ID 511)

### SIZE

#### Data Stream Mode ONLY

848 bytes in total.

Packeted as follows:

Packet No.1	-	ID 507, 80 bytes
Packet No.2	-	ID 516, 32 bytes
Packet No.3	-	ID 508, 256 bytes
Packet No.4	-	ID 510, 256 bytes (1 <sup>st</sup> of two packets)
Packet No.5	-	ID 510, 32 bytes (2 <sup>nd</sup> of two packets)
Packet No 6	-	ID 509, 72 bytes.
Packet No 7	-	ID 511, 120 bytes.

### FORMAT

#### Cumulative Registers (ID 507)

LSB	Import Wh - Cumulative main register #1 ( 8 bytes, BCD )
MSB	

8 bytes	Export Wh - Cumulative main register #2
8 bytes	Q1 - Cumulative main register #3
8 bytes	Q2 - Cumulative main register #4
8 bytes	Q3 - Cumulative main register #5
8 bytes	Q4 - Cumulative main register #6
8 bytes	VAh - Cumulative main register #7

8 bytes	Customer Defined 1 - Cumulative main register #8
8 bytes	Customer Defined 2 - Cumulative main register #9
8 bytes	Customer Defined 3 - Cumulative main register #10

## Multi Utility Registers (ID 516)

LSB	Multi Utility Register #1
	( 8 bytes, BCD )
MSB	

8 bytes	Multi Utility Register #2
8 bytes	Multi Utility Register #3
8 bytes	Multi Utility Register #4

## Cumulative TOU Registers. (ID 508)

LSB	TOU Register # 1
	( 8 bytes, BCD )
MSB	

8 bytes	TOU Register # 2
8 bytes	TOU Register # 3
8 bytes	TOU Register # 4
8 bytes	TOU Register # 5
8 bytes	TOU Register # 6
8 bytes	TOU Register # 7
8 bytes	TOU Register # 8
8 bytes	TOU Register # 9
8 bytes	TOU Register # 10
8 bytes	TOU Register # 11
8 bytes	TOU Register # 12
8 bytes	TOU Register # 13
8 bytes	TOU Register # 14
8 bytes	TOU Register # 15
8 bytes	TOU Register # 16
8 bytes	TOU Register # 17
8 bytes	TOU Register # 18
8 bytes	TOU Register # 19

8 bytes	TOU Register # 20
8 bytes	TOU Register # 21
8 bytes	TOU Register # 22
8 bytes	TOU Register # 23
8 bytes	TOU Register # 24
8 bytes	TOU Register # 25
8 bytes	TOU Register # 26
8 bytes	TOU Register # 27
8 bytes	TOU Register # 28
8 bytes	TOU Register # 29
8 bytes	TOU Register # 30
8 bytes	TOU Register # 31
8 bytes	TOU Register # 32

## Maximum Demand Registers (ID 510)

Maximum Demand Channel	Maximum Demand Register	Field	Number format	Offset
0	0	Timestamp	<i>binary</i>	0
				1
				2
				3
		Register Source	<i>binary</i>	4
		Max Demand Value	<i>BCD</i>	5
				6
				7
				8
				9
				10
				11
	1			12
	2			24
1	0			36
	1			48
	2			60
2	0			72
	1			84
	2			96
3	0			108
....	1			120
	2			132
4	0			144
	1			156
	2			168
5	0			180
	1			192



	2	204
6	0	216
	1	228
	2	240
7	0	252
	1	264
	2	276

Example:

- Channel 0, Max demand 0,  
value = 12345678901234,  
register source was 2 (export W)  
timestamp = 0x367FA4B0 UTC, Tue Dec 22 13:54:56 1998

Cumulative MD registers. (ID 509)

LSB	Cumulative maximum demand register #1
	( 8 bytes, BCD )
MSB	

1 Byte	Cumulative maximum demand register source #1
--------	--

9 bytes	Cumulative maximum demand #2
9 bytes	Cumulative maximum demand #3
9 bytes	Cumulative maximum demand #4
9 bytes	Cumulative maximum demand #5
9 bytes	Cumulative maximum demand #6
9 bytes	Cumulative maximum demand #7
9 bytes	Cumulative maximum demand #8



Coincident Demand Registers (ID 511)

Coincident Demand Channel	Coincident Demand Register	Field	Number format	Offset
0	0	Register Source	<i>binary</i>	0
		Coi Demand Value	<i>BCD</i>	1
				2
				3
				4
				5
				6
				7
	1			8
	2			16
1	0			24
	1			32
	2			40
2	0			48
	1			56
	2			64
3	0			72
	1			80
	2			88
4	0			96
	1			104
	2			112

0x02
0x34
0x12
0x90
0x78
0x56
0x34
0x12

Example:

- Channel 0, Coincident demand register 0,  
Value = 12345678901.234  
Register source was 2 (export W)

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Link Required

## 507 CUMULATIVE REGISTERS

This stores the live cumulative registers main meter registers.  
These registers hold the basic metered quantities.

**NOTE: When the 2<sup>nd</sup> VAh Register mode is enabled (see ID 602), customer defined register 3 operates as an additional VAh register and any control configuration for customer defined register 3 is overridden.**

### SIZE

80 bytes / 160 digits  
1 packet of 64 bytes and  
1 packet of 16 bytes.

### FORMAT

Cumulative main registers.

LSB	Import Wh - Cumulative main register #1
	( 8 bytes, BCD )
MSB	

8 bytes	Export Wh - Cumulative main register #2
8 bytes	Q1 - Cumulative main register #3
8 bytes	Q2 - Cumulative main register #4
8 bytes	Q3 - Cumulative main register #5
8 bytes	Q4 - Cumulative main register #6
8 bytes	VAh - Cumulative main register #7
8 bytes	Customer Defined 1 - Cumulative main register #8
8 bytes	Customer Defined 2 - Cumulative main register #9
8 bytes	Customer Defined 3 - Cumulative main register #10
	<b>(Or 2<sup>nd</sup> VAh Register depending upon data identity 602)</b>

### ACCESS

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Link Required



508      TOU REGISTERS (16)

This stores the Time of Use registers.

SIZE

128 bytes / 256 digits  
2 packets of 64 bytes.

FORMAT

Cumulative TOU registers.

LSB	TOU Register #1
	( 8 bytes, BCD )
MSB	

8 bytes	TOU Register #2
8 bytes	TOU Register #3
8 bytes	TOU Register #4
8 bytes	TOU Register #5
8 bytes	TOU Register #6
8 bytes	TOU Register #7
8 bytes	TOU Register #8
8 bytes	TOU Register #9
8 bytes	TOU Register #10
8 bytes	TOU Register #11
8 bytes	TOU Register #12
8 bytes	TOU Register #13
8 bytes	TOU Register #14
8 bytes	TOU Register #15
8 bytes	TOU Register #16

ACCESS

Port:            Via either port.  
Read: Via level 1 or higher password.  
Write: Link Required

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**508 TOU REGISTERS (32)**

This stores the Time of Use registers.

**SIZE**

256 bytes / 512 digits  
4 packets of 64 bytes.

**FORMAT**

Cumulative TOU registers.

LSB	TOU Register #1
	( 8 bytes, BCD )
MSB	

8 bytes	TOU Register #2
8 bytes	TOU Register #3
8 bytes	TOU Register #4
8 bytes	TOU Register #5
8 bytes	TOU Register #6
8 bytes	TOU Register #7
8 bytes	TOU Register #8
8 bytes	TOU Register #9
8 bytes	TOU Register #10
8 bytes	TOU Register #11
8 bytes	TOU Register #12
8 bytes	TOU Register #13
8 bytes	TOU Register #14
8 bytes	TOU Register #15
8 bytes	TOU Register #16

8 bytes	TOU Register #17
8 bytes	TOU Register #18
8 bytes	TOU Register #19
8 bytes	TOU Register #20
8 bytes	TOU Register #21
8 bytes	TOU Register #22
8 bytes	TOU Register #23
8 bytes	TOU Register #24
8 bytes	TOU Register #25
8 bytes	TOU Register #26
8 bytes	TOU Register #27
8 bytes	TOU Register #28
8 bytes	TOU Register #29
8 bytes	TOU Register #30
8 bytes	TOU Register #31
8 bytes	TOU Register #32

**ACCESS**

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Link Required

**509 CUMULATIVE MAXIMUM DEMANDS**

This stores the live cumulative maximum demands.

**SIZE**

72 bytes / 144 digits  
1 packet of 64 bytes and  
1 packet of 8 bytes.

**FORMAT**

Cumulative MD registers.

LSB	Cumulative maximum demand register #1 ( 8 bytes, BCD )
MSB	

1 Byte	Cumulative maximum demand register source #1
--------	--

9 bytes	Cumulative maximum demand #2
9 bytes	Cumulative maximum demand #3
9 bytes	Cumulative maximum demand #4
9 bytes	Cumulative maximum demand #5
9 bytes	Cumulative maximum demand #6
9 bytes	Cumulative maximum demand #7
9 bytes	Cumulative maximum demand #8

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Link Required



510      MAXIMUM DEMAND REGISTERS

DESCRIPTION

Each maximum demand register comprises a 4-byte UTC timestamp, a 1-byte register source, with a 7-byte BCD register value.  
Each maximum demand channel has 3 maximum demand registers, to store the 3 most recent qualifying values.  
There are 8 maximum demand channels.

Therefore, the total size is  $(4 + 1 + 7) \times 3 \times 8 = 288$  bytes, requiring 5 packets.

SIZE

288 bytes / 576 digits  
4 packet of 64 bytes +1 packet of 32 bytes

FORMAT

- Data format for Maximum Demand Data:  
Value = 12345678901.234
  - ID = 0xXX
  - Value = 0x34 0x12 0x90 0x78 0x56 0x34 0x12

Maximum Demand Channel	Maximum Demand Register	Field	Number format	Offset	
0	0	Timestamp	binary	0	0xB0
				1	0xA4
				2	0x7F
				3	0x36
		Register Source	binary	4	0x02
		Max Demand Value	BCD	5	0x34
				6	0x12
				7	0x90
				8	0x78
				9	0x56
				10	0x34
				11	0x12
				12	
1	1			24	
	2			36	
	0				



	1	48
	2	60
2	0	72
	1	84
	2	96
3	0	108
....	1	120
	2	132
4	0	144
	1	156
	2	168
5	0	180
	1	192
	2	204
6	0	216
	1	228
	2	240
7	0	252
	1	264
	2	276

Channel 0, Max demand 0,  
 value = 12345678901.234  
 register source was 2 (export W)  
 timestamp = 0x367FA4B0 UTC, Tue Dec 22 13:54:56 1998

## ACCESS

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Link Required



511 COINCIDENT DEMAND REGISTERS

DESCRIPTION

Each coincident demand register comprises a 1-byte register source with a 7-byte BCD register value. This BCD register value can be a demand value or the system power factor. Each coincident demand channel has 3 maximum demand registers, to store the 3 most recent values, qualified by the maximum demands. The timestamp of these recordings are the timestamps of the belonging maximum registers

There are 5 coincident demand channels.  
Therefore, the total size is  $(1 + 7) \times 3 \times 5 = 120$  bytes.

SIZE

120 bytes / 240 digits  
1 packet of 64 bytes + 1 packet of 56 bytes

FORMAT

- Data format for Coincident Demand Data:  
(Maximum Data Format)  
Value = 12345678901.234
  - ID = 0xXX
  - Value = 0x34 0x12 0x90 0x78 0x56 0x34 0x12

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Coincident Demand Channel	Coincident Demand Register	Field	Number format	Offset	
0	0	Register Source	<i>binary</i>	0	0x02
		Coi Demand Value	<i>BCD</i>	1	0x34
				2	0x12
				3	0x90
				4	0x78
				5	0x56
				6	0x34
				7	0x12
	1			8	
	2			16	
1	0			24	
	1			32	
	2			40	
2	0			48	
	1			56	
	2			64	
3	0			72	
	1			80	
	2			88	
4	0			96	
	1			104	
	2			112	

Example:

- Channel 0, Coincident demand register 0, value = 12345678901.234 register source was 2 (export W)

## ACCESS

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Link Required



514 ACTIVE REGISTERS (16-TOU)

Indicates the register sources for TOU registers and Maximum Demand registers. This array shows which TOU and MD registers are both sourced AND currently active; the TOU and MD registers may have sources but are only active if the associated tariff switch is 'on'. Effectively, this array can be used to see which tariff switches are on (providing that the TOU/MD register has a source).

SIZE

24 bytes: 1 packet

FORMAT

Register Source Type	Register Source	Number format	Offset	
Time of Use	0	binary	0	
	1		1	
	2		2	
	3		3	
	4		4	
	5		5	
	6		6	
	7		7	
	8		8	
	9		9	
	10		10	
	11		11	
	12		12	
	13		13	
	14		14	
	15		15	
Maximum demand	1	binary	16	
	2		17	
	3		18	
	4		19	
	5		20	
	6		21	
	7		22	
	8		23	

...

ACCESS

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Not available.



514      ACTIVE REGISTERS (32-TOU)

ACTIVE REGISTERS

Indicates the register sources for TOU registers and Maximum Demand registers. This array shows which TOU and MD registers are both sourced AND currently active; the TOU and MD registers may have sources but are only active if the associated tariff switch is 'on'. Effectively, this array can be used to see which tariff switches are on (providing that the TOU/MD register has a source).

SIZE

40 bytes: 1 packet

FORMAT

Register Source Type	Register Source	Number format	Offset	
Time of Use	1	<i>binary</i>	0	
	2		1	
	3		2	
	4		3	
	5		4	
	6		5	
	7		6	
	8		7	
	9		8	
	10		9	
	11		10	
	12		11	
	13		12	
	14		13	
	15		14	
	16		15	

Time of Use	17	<i>binary</i>	16	
	18		17	
	19		19	
	20		19	
	21		20	
	22		21	
	23		22	
	24		23	
	25		24	
	26		25	
	27		26	
	28		27	
	29		28	
	30		29	
	31		30	
	32		31	

Maximum demand	1	<i>binary</i>	32	
	2		33	
	3		34	
	4		35	
	5		36	
	6		37	
	7		38	
	8		39	

...

## ACCESS

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Not available.



514 ACTIVE REGISTERS (32-TOU & COINCIDENT DEMAND)

ACTIVE REGISTERS

Indicates the register sources for TOU registers and Maximum Demand registers. This array shows which TOU and MD registers are both sourced AND currently active; the TOU and MD registers may have sources but are only active if the associated tariff switch is 'on'. Effectively, this array can be used to see which tariff switches are on (providing that the TOU/MD register has a source).

SIZE

45 bytes: 1 packet

FORMAT

Register Source Type	Register Source	Number format	Offset	
Time of Use	1	<i>binary</i>	0	
	2		1	
	3		2	
	4		3	
	5		4	
	6		5	
	7		6	
	8		7	
	9		8	
	10		9	
	11		10	
	12		11	
	13		12	
	14		13	
	15		14	
	16		15	



Time of Use	17	<i>binary</i>	16	
	18		17	
	19		19	
	20		19	
	21		20	
	22		21	
	23		22	
	24		23	
	25		24	
	26		25	
	27		26	
	28		27	
	29		28	
	30		29	
	31		30	
	32		31	
Maximum demand	1	<i>binary</i>	32	
	2		33	
	3		34	
	4		35	
	5		36	
	6		37	
	7		38	
	8		39	
Coincident demand	1	<i>binary</i>	40	
	2		41	
	3		42	
	4		43	
	5		44	

## ACCESS

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Not available.



**516 MULTI UTILITY REGISTERS**

The multi-utility registers. These are the cumulative registers for pulses acquired from external sources via the input module. Note that initial offsets may be written (at password level 3) to individual multi-utility registers via data identities 530, 531, 532 and 533.

**SIZE**

32 bytes / 64 digits

1 packet of 32 bytes.

**FORMAT**

Multi Utility Registers

LSB	Multi Utility Register #1 ( 8 bytes, BCD )
MSB	
8 bytes	Multi Utility Register #2
8 bytes	Multi Utility Register #3
8 bytes	Multi Utility Register #4

**ACCESS**

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Link required.

**543 HISTORICAL VALUES (16-TOU)**

This is a snapshot of all of the cumulative and demand register data, plus the current set of billing statistics.

**SIZE**

7380 bytes / 14760 digits

10 packets access each set,  
9 packets of 64 bytes and  
1 packet of 39 bytes.

All sets are accessed in this manner.

There are 12 sets, 120 packets in total.

**FORMAT**

Cumulative total registers. ( 10 Off )

LSB	Total import Wh
	( 8 bytes, BCD )
MSB	

8 bytes	Total export Wh
8 bytes	Total import lagging varh
8 bytes	Total import leading varh
8 bytes	Total export lagging varh
8 bytes	Total export leading varh
8 bytes	Total VAh
8 bytes	Customer defined #1
8 bytes	Customer defined #2
8 bytes	Customer defined #3

## Cumulative TOU registers. ( 16 Off )

LSB	Cumulative time of use #1 ( 8 bytes, BCD )
MSB	

8 bytes	Cumulative time of use #2
8 bytes	Cumulative time of use #3
8 bytes	Cumulative time of use #4
8 bytes	Cumulative time of use #5
8 bytes	Cumulative time of use #6
8 bytes	Cumulative time of use #7
8 bytes	Cumulative time of use #8
8 bytes	Cumulative time of use #9
8 bytes	Cumulative time of use #10
8 bytes	Cumulative time of use #11
8 bytes	Cumulative time of use #12
8 bytes	Cumulative time of use #13
8 bytes	Cumulative time of use #14
8 bytes	Cumulative time of use #15
8 bytes	Cumulative time of use #16

## Multi-utility cumulative total registers. ( 4 Off )

LSB	Multi-utility #1 ( 8 bytes, BCD )
MSB	

8 bytes	Multi-utility #2
8 bytes	Multi-utility #3
8 bytes	Multi-utility #4

## Cumulative MD registers. ( 8 Off )

LSB	Cumulative maximum demand register #1 ( 8 bytes, BCD )
MSB	

1 Byte	Cumulative maximum demand register source #1
--------	--

9 bytes	Cumulative maximum demand #2
9 bytes	Cumulative maximum demand #3
9 bytes	Cumulative maximum demand #4
9 bytes	Cumulative maximum demand #5
9 bytes	Cumulative maximum demand #6
9 bytes	Cumulative maximum demand #7
9 bytes	Cumulative maximum demand #8

## Maximum demands. ( 8 Off )

LSB	Maximum demand record timestamp #1 ( 4 bytes, UTC )
MSB	

1 Byte	Maximum demand record register source #1
--------	--

LSB	Maximum demand record register #1  Highest maximum demand ( 7 bytes, BCD )
MSB	

LSB	Maximum demand record timestamp #1 ( 4 bytes, UTC )
MSB	

1 Byte	Maximum demand record register source #1
--------	--

LSB	Maximum demand record #1
	Level 2 maximum demand
	( 7 bytes, BCD )
MSB	

LSB	Maximum demand record timestamp #1
	( 4 bytes, UTC )
MSB	

1 Byte	Maximum demand record register source #1
--------	--

LSB	Maximum demand record #1
	Level 3 maximum demand
	( 7 bytes, BCD )
MSB	

36 bytes	Maximum demand record #2
36 bytes	Maximum demand record #3
36 bytes	Maximum demand record #4
36 bytes	Maximum demand record #5
36 bytes	Maximum demand record #6
36 bytes	Maximum demand record #7
36 bytes	Maximum demand record #8

## Billing reset events.

LSB	Cumulative billing count
MSB	( 2 bytes, Binary )

LSB	Start of billing period timestamp
	( 4 bytes, UTC )
MSB	

LSB	End of billing period timestamp
-----	---------------------------------



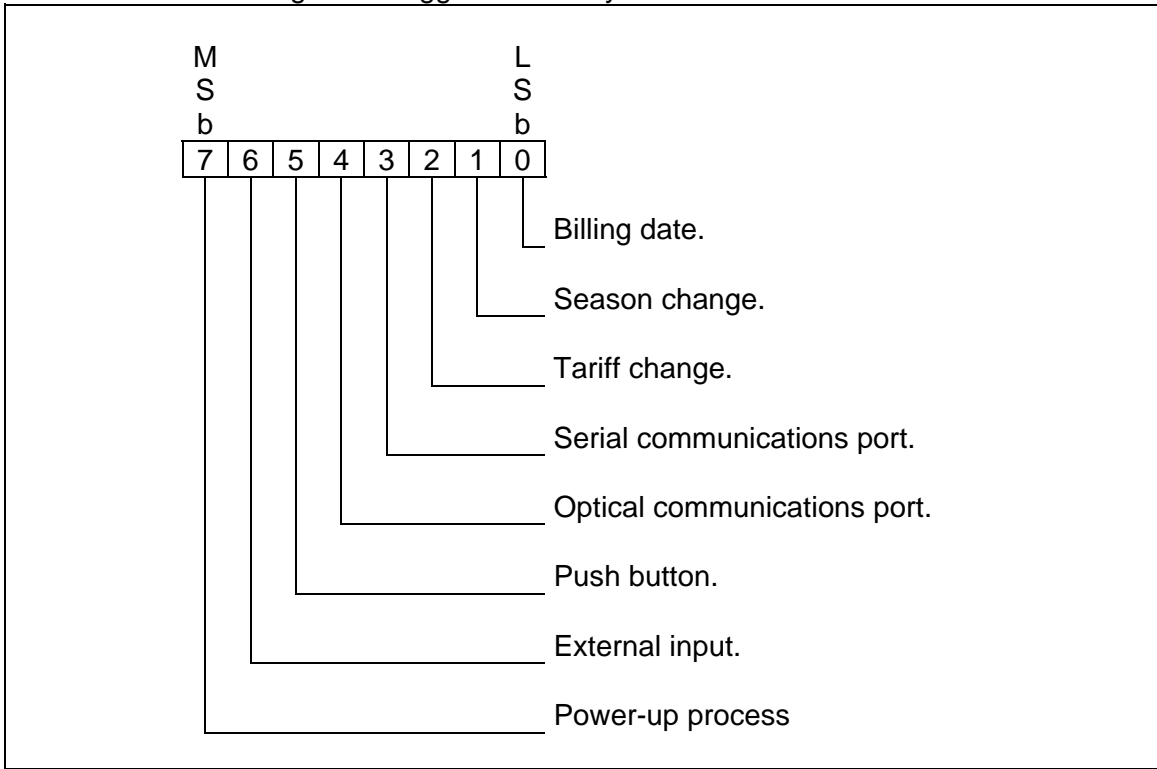
MSB

( 4 bytes, UTC )

1 byte
--------

Billing event trigger source. ( Binary )

Structure of 'Billing event trigger source' byte.



LSB
MSB

Billing period reset trigger event timestamp  
( 4 bytes, UTC )

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Link Required

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**543 HISTORICAL VALUES (32-TOU)**

This is a snapshot of all of the cumulative and demand register data, plus the current set of billing statistics.

**SIZE****Normal Mode**

8916 bytes / 17832 digits  
 12 packets access each set,  
 11 packets of 64 bytes and  
 1 packet of 39 bytes.  
 All sets are accessed in this manner.  
 There are 12 sets, 144 packets in total.

**Data Stream Mode**

8916 bytes  
 3 packets access each set,  
 2 packets of 256 bytes and  
 1 packet of 231 bytes.  
 All sets are accessed in this manner.  
 There are 12 sets, 36 packets in total.

**FORMAT**

Cumulative total registers. (10 Off)

LSB	Total import Wh
	( 8 bytes, BCD )
MSB	

8 bytes	Total export Wh
8 bytes	Total import lagging varh
8 bytes	Total import leading varh
8 bytes	Total export lagging varh
8 bytes	Total export leading varh
8 bytes	Total VAh
8 bytes	Customer defined #1
8 bytes	Customer defined #2
8 bytes	Customer defined #3

## Cumulative TOU registers. ( 32 Off )

LSB	Cumulative time of use #1 ( 8 bytes, BCD )
MSB	

8 bytes	Cumulative time of use #2
8 bytes	Cumulative time of use #3
8 bytes	Cumulative time of use #4
8 bytes	Cumulative time of use #5
8 bytes	Cumulative time of use #6
8 bytes	Cumulative time of use #7
8 bytes	Cumulative time of use #8
8 bytes	Cumulative time of use #9
8 bytes	Cumulative time of use #10
8 bytes	Cumulative time of use #11
8 bytes	Cumulative time of use #12
8 bytes	Cumulative time of use #13
8 bytes	Cumulative time of use #14
8 bytes	Cumulative time of use #15
8 bytes	Cumulative time of use #16
8 bytes	Cumulative time of use #17
8 bytes	Cumulative time of use #18
8 bytes	Cumulative time of use #19
8 bytes	Cumulative time of use #20
8 bytes	Cumulative time of use #21
8 bytes	Cumulative time of use #22
8 bytes	Cumulative time of use #23
8 bytes	Cumulative time of use #24
8 bytes	Cumulative time of use #25
8 bytes	Cumulative time of use #26
8 bytes	Cumulative time of use #27
8 bytes	Cumulative time of use #28
8 bytes	Cumulative time of use #29
8 bytes	Cumulative time of use #30
8 bytes	Cumulative time of use #31
8 bytes	Cumulative time of use #32



Multi-utility cumulative total registers. ( 4 Off )

LSB	Multi-utility #1 ( 8 bytes, BCD )
MSB	

8 bytes	Multi-utility #2
8 bytes	Multi-utility #3
8 bytes	Multi-utility #4

Cumulative MD registers. ( 8 Off )

LSB	Cumulative maximum demand register #1 ( 8 bytes, BCD )
MSB	

1 Byte	Cumulative maximum demand register source #1
--------	--

9 bytes	Cumulative maximum demand #2
9 bytes	Cumulative maximum demand #3
9 bytes	Cumulative maximum demand #4
9 bytes	Cumulative maximum demand #5
9 bytes	Cumulative maximum demand #6
9 bytes	Cumulative maximum demand #7
9 bytes	Cumulative maximum demand #8

Maximum demands. ( 8 Off )

LSB	Maximum demand record timestamp #1 ( 4 bytes, UTC )
MSB	

1 Byte	Maximum demand record register source #1
--------	--

LSB	Maximum demand record register #1

	Highest maximum demand ( 7 bytes, BCD )
MSB	
LSB	Maximum demand record timestamp #1 ( 4 bytes, UTC )
MSB	
1 Byte	Maximum demand record register source #1
LSB	Maximum demand record #1
	Level 2 maximum demand ( 7 bytes, BCD )
MSB	
LSB	Maximum demand record timestamp #1 ( 4 bytes, UTC )
MSB	
1 Byte	Maximum demand record register source #1
LSB	Maximum demand record #1
	Level 3 maximum demand ( 7 bytes, BCD )
MSB	
36 bytes	Maximum demand record #2
36 bytes	Maximum demand record #3
36 bytes	Maximum demand record #4
36 bytes	Maximum demand record #5
36 bytes	Maximum demand record #6
36 bytes	Maximum demand record #7
36 bytes	Maximum demand record #8



Billing reset events.

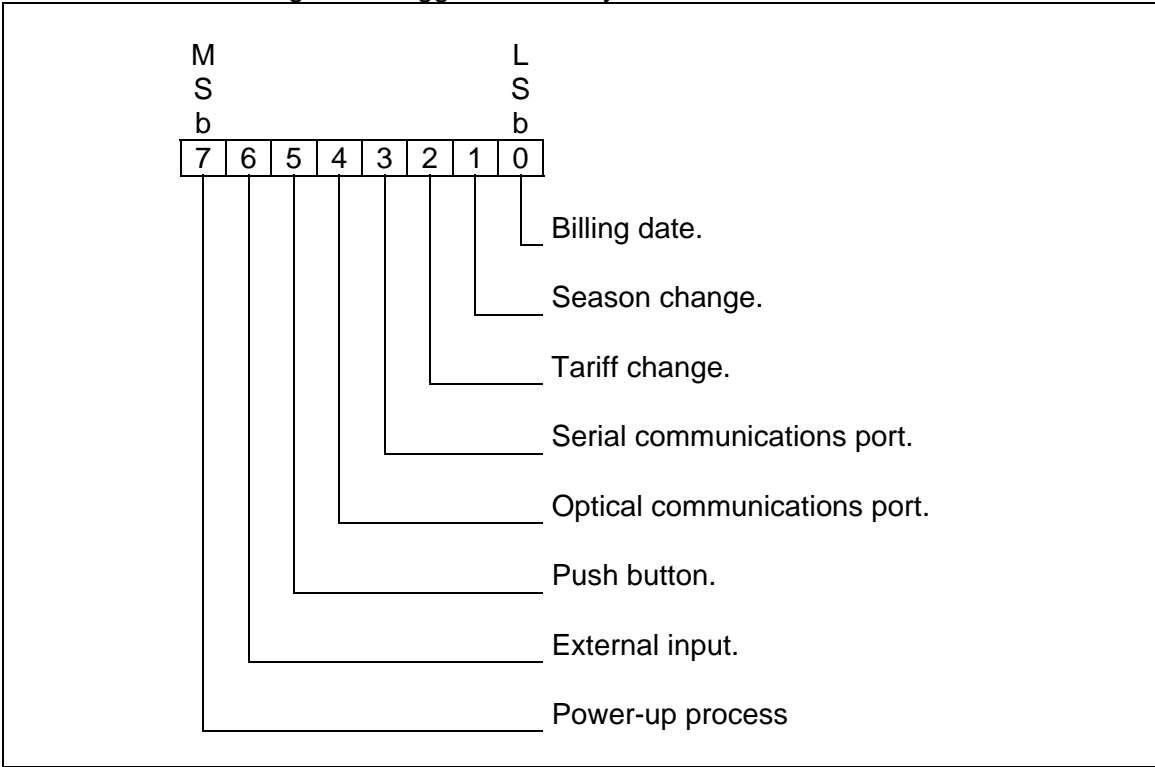
LSB	Cumulative billing count ( 2 bytes, Binary )
MSB	

LSB	Start of billing period timestamp ( 4 bytes, UTC )
MSB	

LSB	End of billing period timestamp ( 4 bytes, UTC )
MSB	

1 byte	Billing event trigger source. ( Binary )
--------	--

Structure of 'Billing event trigger source' byte.



LSB	Billing period reset trigger event timestamp ( 4 bytes, UTC )
MSB	



**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Link Required

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**543 HISTORICAL VALUES (32-TOU & COINCIDENT DEMAND)****DESCRIPTION**

This is a snapshot of all of the cumulative and demand register data, plus the current set of billing statistics.

**SIZE****Normal Mode**

31068 bytes / 62136 digits  
 863 bytes each set,  
 14 packets access each set,  
 13 packets of 64 bytes and  
 1 packet of 31 bytes.  
 All sets are accessed in this manner.  
 There are 36 sets, 504 packets in total.

**Data Stream Mode**

31068 bytes / 62136 digits  
 863 bytes each set,  
 4 packets access each set,  
 3 packets of 256 bytes and  
 1 packet of 95 bytes.  
 All sets are accessed in this manner.  
 There are 36 sets, 144 packets in total.

**FORMAT**

Cumulative total registers. ( 10 Off )	
LSB	Total import Wh
	( 8 bytes, BCD )
MSB	
8 bytes	Total export Wh
8 bytes	Total import lagging varh
8 bytes	Total import leading varh
8 bytes	Total export lagging varh
8 bytes	Total export leading varh

8 bytes	Total VAh
8 bytes	Customer defined #1
8 bytes	Customer defined #2
8 bytes	Customer defined #3
Cumulative TOU registers. ( 32 Off )	
LSB	Cumulative time of use #1
	( 8 bytes, BCD )
MSB	
8 bytes	Cumulative time of use #2
8 bytes	Cumulative time of use #3
8 bytes	Cumulative time of use #4
8 bytes	Cumulative time of use #5
8 bytes	Cumulative time of use #6
8 bytes	Cumulative time of use #7
8 bytes	Cumulative time of use #8
8 bytes	Cumulative time of use #9
8 bytes	Cumulative time of use #10
8 bytes	Cumulative time of use #11
8 bytes	Cumulative time of use #12
8 bytes	Cumulative time of use #13
8 bytes	Cumulative time of use #14
8 bytes	Cumulative time of use #15
8 bytes	Cumulative time of use #16
8 bytes	Cumulative time of use #17
8 bytes	Cumulative time of use #18
8 bytes	Cumulative time of use #19
8 bytes	Cumulative time of use #20
8 bytes	Cumulative time of use #21
8 bytes	Cumulative time of use #22
8 bytes	Cumulative time of use #23
8 bytes	Cumulative time of use #24
8 bytes	Cumulative time of use #25
8 bytes	Cumulative time of use #26
8 bytes	Cumulative time of use #27
8 bytes	Cumulative time of use #28
8 bytes	Cumulative time of use #29
8 bytes	Cumulative time of use #30
8 bytes	Cumulative time of use #31
8 bytes	Cumulative time of use #32

## Multi-utility cumulative total registers. ( 4 Off )

LSB	Multi-utility #1 ( 8 bytes, BCD )
MSB	Multi-utility #2
8 bytes	
8 bytes	
8 bytes	Multi-utility #3
8 bytes	Multi-utility #4

## Cumulative MD registers. ( 8 Off )

LSB	Cumulative maximum demand register #1 ( 8 bytes, BCD )
MSB	Cumulative maximum demand register source #1
1 Byte	
9 bytes	
9 bytes	
9 bytes	
9 bytes	
9 bytes	
9 bytes	
9 bytes	Cumulative maximum demand #8

## Maximum demands. ( 8 Off )

LSB	Maximum demand record timestamp #1 ( 4 bytes, UTC )
MSB	Maximum demand record register source #1
1 Byte	
LSB	Maximum demand record register #1
	Highest maximum demand ( 7 bytes, BCD )

MSB	
LSB	Maximum demand record timestamp #1
	( 4 bytes, UTC )
MSB	
1 Byte	Maximum demand record register source #1
LSB	Maximum demand record #1
	Level 2 maximum demand
	( 7 bytes, BCD )
MSB	
LSB	Maximum demand record timestamp #1
	( 4 bytes, UTC )
MSB	
1 Byte	Maximum demand record register source #1
LSB	Maximum demand record #1
	Level 3 maximum demand
	( 7 bytes, BCD )
MSB	
36 bytes	Maximum demand record #2
36 bytes	Maximum demand record #3
36 bytes	Maximum demand record #4
36 bytes	Maximum demand record #5
36 bytes	Maximum demand record #6
36 bytes	Maximum demand record #7
36 bytes	Maximum demand record #8
Coincident demands. ( 5 Off )	
1 Byte	Coincident demand record register source #1
LSB	Coincident demand record register #1
	Coincident demand, belonging to highest maximum
	demand
	( 7 bytes, BCD )
MSB	



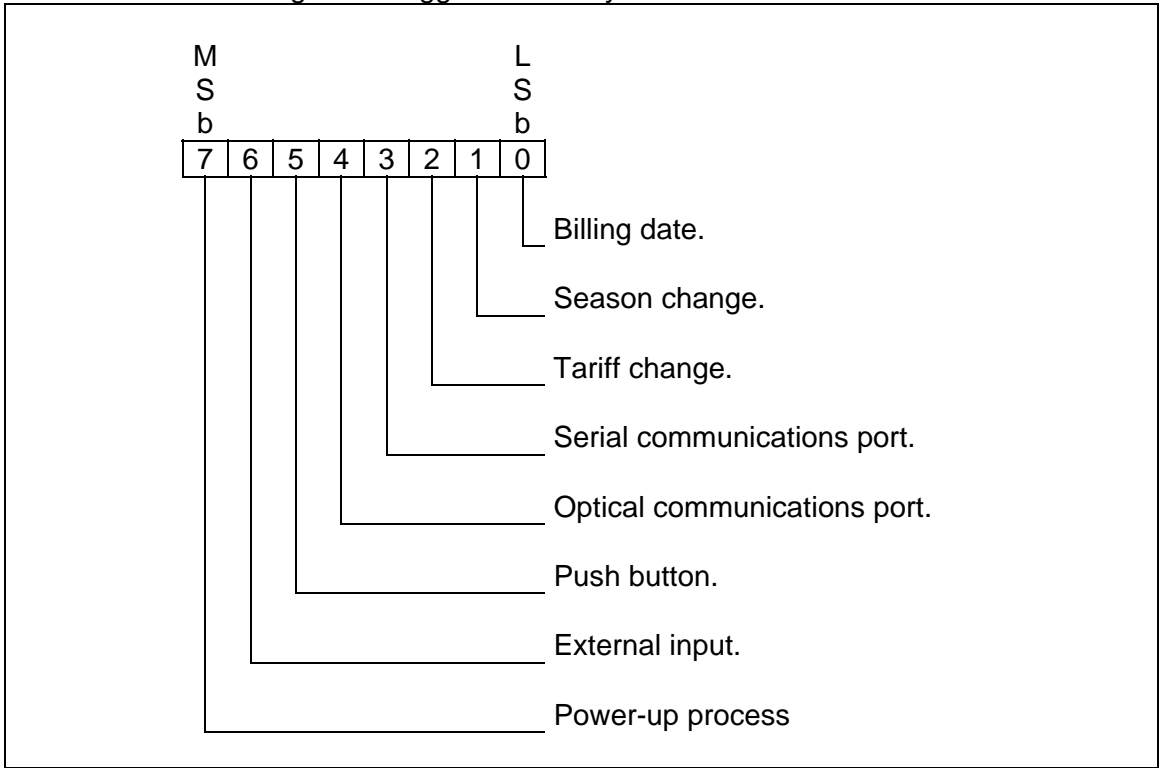
1 Byte	Coincident demand record register source #1
LSB	Coincident demand record register #1
	Coincident demand, belonging to level 2 maximum demand
	( 7 bytes, BCD )
MSB	
1 Byte	Coincident demand record register source #1
LSB	Coincident demand record register #1
	Coincident demand, belonging to level 3 maximum demand
	( 7 bytes, BCD )
MSB	
24 bytes	Coincident demand record #2
24 bytes	Coincident demand record #3
24 bytes	Coincident demand record #4
24 bytes	Coincident demand record #5

## Billing reset events.

LSB	Cumulative billing count
MSB	( 2 bytes, Binary )
LSB	Start of billing period timestamp
	( 4 bytes, UTC )
MSB	
LSB	End of billing period timestamp
	( 4 bytes, UTC )
MSB	
1 byte	Billing event trigger source. ( Binary )



Structure of 'Billing event trigger source' byte.



LSB	Billing period reset trigger event timestamp ( 4 bytes, UTC )
MSB	

ACCESS

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Link Required

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**544 HISTORICAL EVENTS (16/32-TOU)****DISCRIPTION**

This is a snapshot of all of the event logs.

**SIZE**

## Normal Mode

792 bytes / 1584 digits  
 2 packets access each set,  
 1 packets of 64 bytes and  
 1 packet of 2 bytes.  
 All sets are accessed in this manner.  
 There are 12 sets, 24 packets in total.

## Data Stream Mode

792 bytes  
 1 packet access each set,  
 1 packet of 66 bytes.  
 All sets are accessed in this manner.  
 There are 12 sets, 12 packets in total.

**FORMAT**

## Phase failure log.

LSB	Cumulative event count ( 2 bytes, HEX )
MSB	

LSB	Timestamp, Last ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 1 ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 2 ( 4 bytes, UTC )
MSB	

1 byte	Failed phase, Last ( HEX )
--------	----------------------------

1 byte	Failed phase, Last – 1 ( HEX )
1 byte	Failed phase, Last – 2 ( HEX )

( Note: Phase reference, 01 : Phase 'A' ONLY, 02 : Phase 'B' ONLY, 03 : Phase 'C' ONLY )

Power failure log, Last.

LSB	Cumulative event count
MSB	( 2 bytes, HEX )

LSB	Timestamp, Last
	( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 1
	( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 2
	( 4 bytes, UTC )
MSB	

Reverse run log, Last.

LSB	Cumulative event count
MSB	( 2 bytes, HEX )

LSB	Timestamp, Last
	( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 1
	( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 2
	( 4 bytes, UTC )

MSB

Phase over current log, Last.

LSB	Cumulative event count
MSB	( 2 bytes, HEX )

LSB	Timestamp, Last
	( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 1
	( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 2
	( 4 bytes, UTC )
MSB	

1 byte	Failed phase, Last ( HEX )
--------	----------------------------

1 byte	Failed phase, Last – 1 ( HEX )
--------	--------------------------------

1 byte	Failed phase, Last – 2 ( HEX )
--------	--------------------------------

( Note: Phase reference, 01 : Phase 'A' ONLY, 02 : Phase 'B' ONLY, 03 : Phase 'C' ONLY )

Remaining battery support time (in seconds)

LSB	( 4 bytes, HEX )
MSB	

**ACCESS**

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Link Required

**544 HISTORICAL EVENTS (32-TOU & FINAL A1700)****DISCRIPTION**

This is a snapshot of some event logs.

**SIZE**

## Normal Mode

4860 bytes / 9720 digits  
 135 bytes each set,  
 3 packets access each set,  
 2 packets of 64 bytes  
 1 packet of 7 bytes  
 All sets are accessed in this manner.  
 There are 36sets, 108 packets in total.

## Data Stream Mode

4860 bytes / 9720 digits  
 135 bytes each set,  
 1 packet access each set,  
 1 packet of 135 bytes  
 All sets are accessed in this manner.  
 There are 36 sets, 36 packets in total.

**FORMAT**

## Phase failure log. (63 bytes)

LSB	Cumulative event count Phase A (Offset 0)
MSB	( 2 bytes, HEX )
LSB	Cumulative event count Phase B (Offset 2)
MSB	( 2 bytes, HEX )
LSB	Cumulative event count Phase C (Offset 4)
MSB	( 2 bytes, HEX )

LSB	Cumulative event time count Phase A (Off 6)
	( 4 bytes, HEX )
MSB	
LSB	Cumulative event time count Phase B (Off 10)
	( 4 bytes, HEX )
MSB	

LSB	Cumulative event time count Phase C (Off 14)
	( 4 bytes, HEX )
MSB	
LSB	Start Timestamp, Last (Offset 18)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 1 (Offset 22)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 2 (Offset 26)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 3 (Offset 30)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 4 (Offset 34)
	( 4 bytes, UTC )
MSB	

LSB	End Timestamp, Last (Offset 38)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 1 (Offset 42)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 2 (Offset 46)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 3 (Offset 50)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 4 (Offset 54)
	( 4 bytes, UTC )

MSB

1 byte	Failed phase, Last ( HEX ) (Offset 58)
1 byte	Failed phase, Last – 1 ( HEX ) (Offset 59)
1 byte	Failed phase, Last – 2 ( HEX ) (Offset 60)
1 byte	Failed phase, Last – 3 ( HEX ) (Offset 61)
1 byte	Failed phase, Last – 4 ( HEX ) (Offset 62)

( Note: Phase reference, 01 : Phase 'A' ONLY, 02 : Phase 'B' ONLY, 03 : Phase 'C' ON

Power failure log, Last. (22 bytes)

LSB	Cumulative event count
MSB	( 2 bytes, HEX )

LSB	Timestamp, Last
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last –1
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last –2
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last –3
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last –4
	( 4 bytes, UTC )
MSB	

Reverse run log, Last. (46 bytes)

LSB	Cumulative event count (Offset 0)
MSB	( 2 bytes, HEX )

LSB	Cumulative event time count (Offset 2)
	( 4 bytes, HEX)
MSB	



LSB	Start Timestamp, Last (Offset 6)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 1 (Offset 10)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 2 (Offset 14)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 3 (Offset 18)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 4 (Offset 22)
	( 4 bytes, UTC )
MSB	

LSB	End Timestamp, Last (Offset 26)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 1 (Offset 30)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 2 (Offset 34)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 3 (Offset 38)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 4 (Offset 42)
	( 4 bytes, UTC )
MSB	



Remaining battery support time (in seconds)

LSB	( 4 bytes, HEX )
MSB	

## ACCESS

Port: Via either port  
 Read: Via level 1 or higher password  
 Write: Link Required

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**548 HISTORICAL DISPLAY SCALING (16-TOU)**

A snapshot of the current register scaling parameters and register sources for the TOU and MD registers.

**SIZE**

Each set is accessed by 1 packet,  
1 packets of 46 bytes.

All sets are accessed in this manner.  
There are 12 sets, 12 packets in total.

**FORMAT**

Historical display scaling set 1

2 bytes	Cumulative scaling set
2 bytes	Demand scaling set
2 bytes	Multi-utility 1 scaling set
2 bytes	Multi-utility 2 scaling set
2 bytes	Multi-utility 3 scaling set
2 bytes	Multi-utility 4 scaling set
2 bytes	Auxiliary 1 scaling set
2 bytes	Auxiliary 2 scaling set

1 byte	CD1 source 1
1 byte	CD1 source 2
1 byte	CD2 source 1
1 byte	CD2 source 2
1 byte	CD3 source 1
1 byte	CD3 source 2

16 byte	TOU register sources
---------	----------------------

8 byte	MD register sources
--------	---------------------

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Link Required

**548 HISTORICAL DISPLAY SCALING (32-TOU)****DESCRIPTION**

A snapshot of the current register scaling parameters and register sources for the TOU and MD registers and scaling values of the MU registers.

**SIZE**

## Normal Mode

1704 bytes / 3408 digits  
 142 bytes each set,  
 3 packet access each set,  
 2 packet of 64 bytes and  
 1 packer of 14 bytes  
 All sets are accessed in this manner.  
 There are 12 sets, 36 packets in total.

## Data Stream Mode

1704 bytes  
 142 bytes each set,  
 1 packet access each set,  
 1 packet of 142 bytes  
 All sets are accessed in this manner.  
 There are 12 sets, 12 packets in total.

**FORMAT**

## Historical display scaling set 1

2 bytes	Cumulative scaling set
2 bytes	Demand scaling set
2 bytes	Auxiliary 1 scaling set
2 bytes	Auxiliary 2 scaling set
2 bytes	Auxiliary 3 scaling set
2 bytes	Auxiliary 4 scaling set
2 bytes	Auxiliary 5 scaling set
2 bytes	Auxiliary 6 scaling set

1 byte	CD1 source 1
1 byte	CD1 source 2
1 byte	CD2 source 1
1 byte	CD2 source 2
1 byte	CD3 source 1
1 byte	CD3 source 2

32 byte	TOU register sources
8 byte	MD register sources
2 bytes	MU Cumulative Register 1 Scaling Data
2 bytes	MU Cumulative Register 2 Scaling Data
2 bytes	MU Cumulative Register 3 Scaling Data
2 bytes	MU Cumulative Register 4 Scaling Data
2 bytes	Undefined (future MU Cumulative Register 5 Scaling Data)
2 bytes	Undefined (future MU Cumulative Register 6 Scaling Data)
2 bytes	Undefined (future MU Cumulative Register 7 Scaling Data)
2 bytes	Undefined (future MU Cumulative Register 8 Scaling Data)
2 bytes	MU Demand Register 1 Scaling Data
2 bytes	MU Demand Register 2 Scaling Data
2 bytes	MU Demand Register 3 Scaling Data
2 bytes	MU Demand Register 4 Scaling Data
2 bytes	Undefined (future MU Demand Register 5 Scaling Data)
2 bytes	Undefined (future MU Demand Register 6 Scaling Data)
2 bytes	Undefined (future MU Demand Register 7 Scaling Data)
2 bytes	Undefined (future MU Demand Register 8 Scaling Data)
48 bytes	MU Display units

**ACCESS**

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Link Required

**548 HISTORICAL DISPLAY SCALING (32-TOU & FINAL A1700)****DESCRIPTION**

A snapshot of the current register scaling parameters and register sources for the TOU, MD and CoiD registers, scaling values of the MU registers and sources for customer defined registers.

**SIZE**

## Normal Mode

5688bytes / 11376digits  
 158 bytes each set,  
 3 packet access each set,  
 2 packet of 64 bytes and  
 1 packer of 28 bytes  
 All sets are accessed in this manner.  
 There are 36 sets, 72 packets in total.

## Data Stream Mode

5688bytes / 11376digits  
 158 bytes each set,  
 1 packet access each set,  
 1 packet of 158 bytes  
 All sets are accessed in this manner.  
 There are 36 sets, 36 packets in total.

**FORMAT**

## Historical display scaling set 1

2 bytes	Cumulative scaling set
2 bytes	Demand scaling set
2 bytes	Auxiliary 1 scaling set
2 bytes	Auxiliary 2 scaling set
2 bytes	Auxiliary 3 scaling set
2 bytes	Auxiliary 4 scaling set
2 bytes	Auxiliary 5 scaling set
2 bytes	Auxiliary 6 scaling set

1 byte	CD1 source 1
1 byte	CD1 source 2
1 byte	CD1 source 3
1 byte	CD1 source 4

1 byte	CD1 source 5
1 byte	CD2 source 1
1 byte	CD2 source 2
1 byte	CD2 source 3
1 byte	CD2 source 4
1 byte	CD2 source 5
1 byte	CD3 source 1
1 byte	CD3 source 2
1 byte	CD3 source 3
1 byte	CD3 source 4
1 byte	CD3 source 5

32 byte	TOU register sources
---------	----------------------

8 byte	MD register sources
--------	---------------------

5 byte	CoiD register sources
--------	-----------------------

2 bytes	MU Cumulative Register 1 Scaling Data
2 bytes	MU Cumulative Register 2 Scaling Data
2 bytes	MU Cumulative Register 3 Scaling Data
2 bytes	MU Cumulative Register 4 Scaling Data
2 bytes	Undefined (future MU Cumulative Register 5 Scaling Data)
2 bytes	Undefined (future MU Cumulative Register 6 Scaling Data)
2 bytes	Undefined (future MU Cumulative Register 7 Scaling Data)
2 bytes	Undefined (future MU Cumulative Register 8 Scaling Data)

2 bytes	MU Demand Register 1 Scaling Data
2 bytes	MU Demand Register 2 Scaling Data
2 bytes	MU Demand Register 3 Scaling Data
2 bytes	MU Demand Register 4 Scaling Data
2 bytes	Undefined (future MU Demand Register 5 Scaling Data)
2 bytes	Undefined (future MU Demand Register 6 Scaling Data)
2 bytes	Undefined (future MU Demand Register 7 Scaling Data)
2 bytes	Undefined (future MU Demand Register 8 Scaling Data)
48 bytes	MU Display units



ACCESS

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Link Required

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**550 LOAD PROFILE - READ DATA****DESCRIPTION**

Used in conjunction with data identity 551, the data can be read on a day basis - i.e. reading back the last five days (includes the current day) of load profile data in terms of the number of packets, where the first packet of data read, 001, will be the oldest data requested.

Note that the load profile record is updated at the end of a demand period and as such the current period will not be retrieved.

A Standard Load Profile Meter configured for 1 channel and half hour periods can store up to 450 days of past data.

Meters with Extended Load Profile can store up to 900 days.

Data can be retrieved in either of two modes:- Standard Mode and Data Stream Mode.

**SIZE**

Standard Load Profile : 90112 bytes.

Extended Load Profile : 180224 bytes.

Standard Mode : 1408 or 2816 (64 byte) packets (max.)

Data Stream Mode : 352 or 704 (256 byte) packets (max.)

**FORMAT**

Refer to document Load Profile Format for the Vision Meter for interpretation of the data.

**NOTE**

**Writing to data identity 550, causes the load profile to be reset.**

**ACCESS**

Port: Via either port  
 Read: Via level 1 or higher password  
 Write: Via level 3 or higher password

**551 LOAD PROFILE - CONFIGURE READ**

This data identity is used to set up the load profile for reading back based on numbers of days stamped within it.

The identity is used two fold:

- 1) To set up the number of days of past load profile to be retrieved, and
- 2) Read the number of packets of data for the requested days

Refer to document Load Profile Format for the A1700 Meter for interpretation of the data.

**SIZE**

4 bytes / 1 packet

**FORMAT****Must be used in the following sequence**

- 1) Setting the number of days (**WRITE**)

Byte 1	Number of days of load profile to be retrieved.
Byte 2	2 bytes HEX LSB first (i.e. 0802 => 208h or 520 days)
Byte 3	Ignored
Byte 4	Ignored

- 2) Read the number of packets (**READ**)

Byte 1	Number of 64 byte packets of load profile data available for the previously requested number of days.
Byte 2	2 bytes HEX MSB first (i.e. 01A5 => 421 packets)
Byte 3	Number of 256 byte packets of load profile data available for the previously requested number of days.
Byte 4	2 bytes HEX MSB first (i.e. 01A5 => 421 packets)

**ACCESS**

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Via level 1 or higher password

## 555 INSTRUMENTATION PROFILE - READ DATA

### DESCRIPTION

The instrumentation profile record is updated at the end of the instrumentation integration period.

Used in conjunction with data identity 556, the data can be read on a day basis (i.e. reading back the last five days of instrumentation profile data).

### SIZE

Depends on profile size configuration:

Size of Profile =  
 $((\text{Days Inst. Profile} * \text{Bytes per LP Day}) + 0x00007F) \& 0xFFFF80$

Standard mode:  
 (Size of Profile) bytes / (Size of Profile\*2) digits  
 (Size of Profile/64) packets

Data stream mode:  
 (Size of Profile) bytes / (Size of Profile\*2) digits  
 (Size of Profile/256) packets

### FORMAT

Refer to document 'Firmware Design Specification - Instrumentation Profile' for interpretation of the data.

### NOTES

A try to read out to a higher address than the read out limit will reply an error message.  
 If the load profile is deactivated, a read or write command will cause a 'ERR 8' – Invalid Meter Function message.

**Writing to data identity 555, causes the instrumentation profile to be reset.**

### ACCESS

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Via level 3 or higher password

**556 INSTRUMENTATION PROFILE - CONFIGURE READ****DESCRIPTION**

This data identity is used to set up the instrumentation profile for reading back based on numbers of days stamped within it.

The identity is used two fold:

1. To set up the number of days of past instrumentation profile to be retrieved, and
2. Read the number of packets of data for the requested days for readout by flag and DSM

Refer to document 'Firmware Design Specification - Instrumentation Profile' for interpretation of the data.

**SIZE**

4 bytes / 8 digits

1 packet to read

**FORMAT****Must be used in the following sequence**

- 1) Setting the number of days (**WRITE**)

Byte 1	Number of days of instrumentation profile to be retrieved.
Byte 2	2 bytes HEX LSB first (i.e. 0802 => 208h or 520 days)
Byte 3	Ignored
Byte 4	Ignored

- 3) Read the number of packets (**READ**)

Byte 1	Number of 64 byte packets of instrumentation profile data available for the previously requested number of days.
Byte 2	2 bytes HEX MSB first (i.e. 01A5 => 421 packets)
Byte 3	Number of 256 byte packets of instrumentation profile data available for the previously requested number of days.
Byte 4	2 bytes HEX MSB first (i.e. 01A5 => 421 packets)



---

## NOTES

If the load profile is deactivated, a read or write command will cause a 'ERR 7' – Invalid Meter Function message.

## ACCESS

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 1 or higher password

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**601 CUSTOMER DEFINED REGISTER 1,2 & 3 CONFIGURATION**

The customer defined registers provide the feature of being able to add up to two of the cumulative registers to give additional information such as total watthours, total varhourss etc.

The Power Master Unit software will determine whether the chosen configurations are valid. For example, it would not be normal to add watthours registers to varhours registers and so this configuration would be inhibited.

**NOTE: When the additional VAh register is enabled (see IDs 602 and 603), customer defined register 3 will cease to operate and its resource allocation will be used for the second VAh register.**

**SIZE**

1 byte = 2 digits  
6 bytes / 1 packet

**FORMAT**

LSB	Customer Defined Register 1, Source 1
	Customer Defined Register 1, Source 2
	Customer Defined Register 2, Source 1
	Customer Defined Register 2, Source 2
	Customer Defined Register 3, Source 1
MSB	Customer Defined Register 3, Source 2

Possible Source Values

VALUE	COMMENT
0	No Source
1	Import Wh – Main Register Source
2	Export Wh – Main Register Source
3	Q1 – Main Register Source
4	Q2 – Main Register Source
5	Q3 – Main Register Source
6	Q4 – Main Register Source
7	VAh
11	Multi-Utility Register 1
12	Multi Utility Register 2
13	Multi Utility Register 3
14	Multi Utility Register 4



## ACCESS

Port: Via either port  
Read: Via level 1 or higher password  
Write: Via level 3 or higher password

## MODEL CODE PB\*\*\*\*\*-1/2/3/4/5

Customer defined register sources describe up to five primary registration quantities to sum for each customer-defined register. Power Master Unit enforces permitted configurations of the customer-defined sources.

**Note: When the second VAh register functionality is enabled, customer-defined register 3 is not updated according to the sources defined in this data identity.**

## SIZE

15 bytes / 30 digits  
1 packet of 15 bytes.

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**FORMAT****Control Array**

<b><u>Size</u></b>	<b><u>Description</u></b>
1 byte	Customer defined register 1 source 1
1 byte	Customer defined register 1 source 2
1 byte	Customer defined register 1 source 3
1 byte	Customer defined register 1 source 4
1 byte	Customer defined register 1 source 5
1 byte	Customer defined register 2 source 1
1 byte	Customer defined register 2 source 2
1 byte	Customer defined register 2 source 3
1 byte	Customer defined register 2 source 4
1 byte	Customer defined register 2 source 5
1 byte	Customer defined register 3 source 1
1 byte	Customer defined register 3 source 2
1 byte	Customer defined register 3 source 3
1 byte	Customer defined register 3 source 4
1 byte	Customer defined register 3 source 5

**Permitted source values**

<b><u>Value</u></b>	<b><u>Description</u></b>
0x00	No source (source disabled)
0x01	Import Wh
0x02	Export Wh
0x03	Quadrant 1 varh
0x04	Quadrant 2 varh
0x05	Quadrant 3 varh
0x06	Quadrant 4 varh
0x07	VAh
*	
0x0B	Multi Utility input 1
0x0C	Multi Utility input 2
0x0D	Multi Utility input 3
0x0E	Multi Utility input 4

**ACCESS**

Port	Via either port.
Read	Via level 1 or higher password.
Write	Via level 3 or higher password.



**EXAMPLES**

Communication	Action	Comment
<SOH>R1<STX>548001 (40)<ETX> <STX>(01020304000B0 C0D0E030102000000)< ETX>	Read Configuration	Meter CD sources are set to: CD1: Q1+Q2+Q3+Q4 CD2: MU1+MU2+MU3+MU4+Q1 CD3: IW+EW
<SOH>W1<STX>60100 1(010203040506070B0 C0D0E01020304) <ETX>	Write Configuration	Set meter CD sources to: CD1: IW+EW+Q1+Q2+Q3 CD2: Q4+VA+MU1+MU2+MU3 CD3: MU4+IW+EW+Q1+Q2



605      INSTANTANEOUS READINGS REQUEST / STATUS

DESCRIPTION

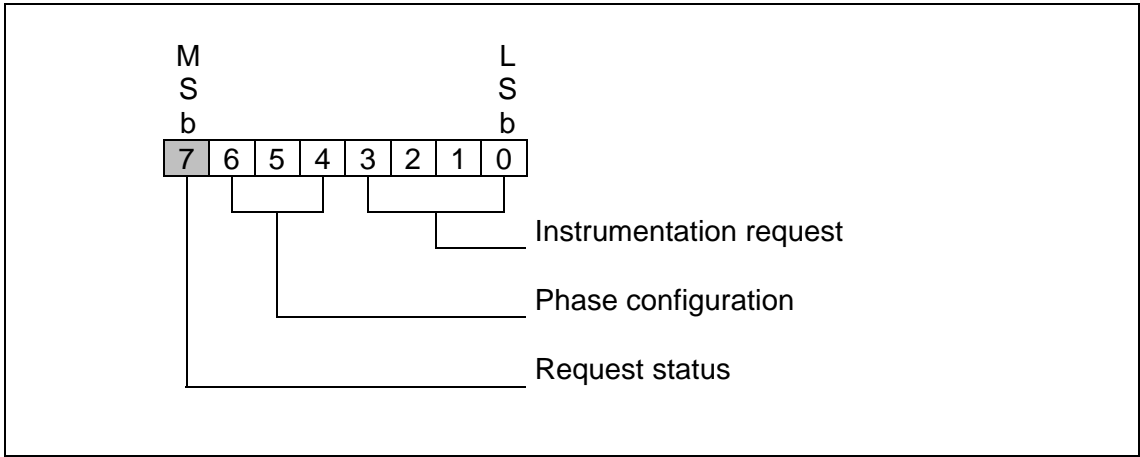
This ID is used to request instantaneous readings and to indicate whether the requested readings are complete and are available to be read.  
When requesting, the values to be calculated have their respective bits set in the request area. The ID is then polled to confirm that the calculations are complete. When they are complete, the values can be read from the **INSTANTANEOUS READINGS RESULTS** data ID (606).

SIZE

6 bytes / 1 packet

FORMAT

Each byte defines a separate request.  
Within each byte, the following format exists:  
Bit 7 (MSB) - Instantaneous parameter request status - this bit holds a zero while the request is active and a one when the request is complete. When the request is made, it should be set to zero and then polled until it becomes one.



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**Instrumentation requests:**

xxxx0000	(00)	No request	
xxxx0001	(01)	RMS current	( P Only )
xxxx0010	(02)	RMS voltage	( P Only )
xxxx0011	(03)	Power factor	( T/P )
xxxx0100	(04)	Active power	( T/P )
xxxx0101	(05)	Reactive power	( T/P )
xxxx0110	(06)	Apparent power	( T/P )
xxxx0111	(07)	Phase rotation	( T ONLY )
xxxx1000	(08)	Frequency	( P Only )
xxxx1001	(09)	Phase Angle	( P Only )
xxxx1010	(10)	RMS current scaled	( P Only )
xxxx1011	(11)	RMS voltage scaled	( P Only )
xxxx1100	(12)	Active power scaled	( T/P )
xxxx1101	(13)	Reactive power scaled	( T/P )
xxxx1110	(14)	Apparent power scaled	( T/P )
xxxx1111	(15)	<i>not allocated</i>	

( P – Phase request permitted )

( T – Total request permitted )

**Phase configuration:**

x000xxxx	(00)	Total
x001xxxx	(10)	Phase 'A'
x010xxxx	(20)	Phase 'B'
x100xxxx	(40)	Phase 'C'

Scaled values are those produced where Current and Voltage Transformers are used, being the results on the Primary side (System). Non Scaled values are those produced on the Secondary side (Metered). Where transformers are not used, then these values will be the same.

**ACCESS**

Port: Via either port  
 Read: Via level 1 or higher password  
 Write: Via level 1 or higher password



606 INSTANTANEOUS READINGS RESULTS

DESCRIPTION

Up to 6 values may be read by defining which parameters are required using the **INSTANTANEOUS READINGS REQUEST / STATUS** data ID (605). The values will be returned in the same order of as requested.

SIZE

42 bytes (6 off 7 byte BCD numbers) / 1 packet

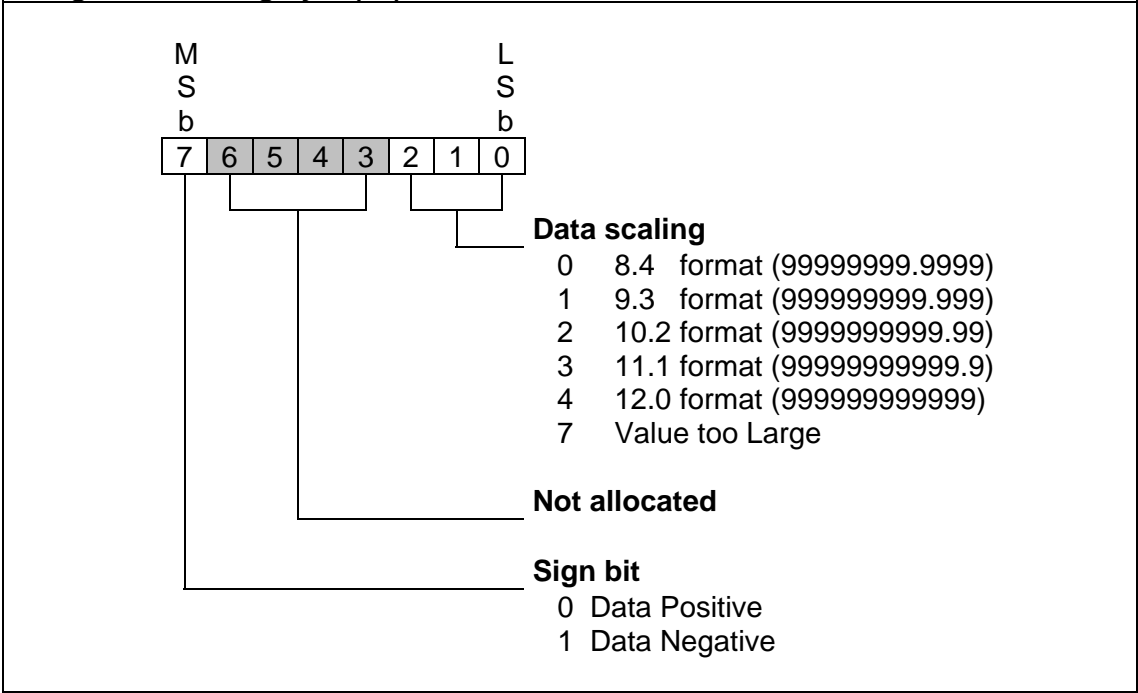
FORMAT

The format is 7 byte BCD with the decimal point between bytes 4 and 5 within the word. The MSB is used for scaling and sign information.

For example:  
**00 12 34 56 78 91 20** represents the value **12345678.9120**

Byte index	0	1	2	3	4	.	5	6
Voltage, current and power	ss	rr	rr	rr	rr		rr	rr

Sign and scaling byte (ss):



ACCESS

Port: Via either port  
Read: Via level 1 or higher password  
Write: Via level 3 or higher password

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**614 VT PRIMARY & SECONDARY VOLTAGE**

Allows the transformer primary and secondary values to be written to and read from the meter.

**SIZE**

7 bytes / 1 packet

**FORMAT**

Number Format: BCD: Comprises the VT Primary Voltage value, which is a 4-byte BCD value, and the VT Secondary Voltage value, which is a 3-byte BCD value

LSB	VT Primary: BCD digit1(MSD) digit0(LSD)
	VT Primary: BCD digit3(MSD) digit2(LSD)
	VT Primary: BCD digit5(MSD) digit4(LSD)
	VT Primary: BCD digit7(MSD) digit6(LSD)
	VT Secondary: BCD digit1(MSD) digit0(LSD)
	VT Secondary: BCD digit3(MSD) digit2(LSD)
MSB	VT Secondary: BCD digit5(MSD) digit4(LSD)

The Primary voltage is a 4-byte BCD value, in which the position of the decimal point is as follows:

digit 7 digit 6 digit 5 digit 4 digit 3 digit 2 • digit 1 digit 0 (default 000001.00)

The Secondary voltage is a 3-byte BCD value, in which the position of the decimal point is as follows:

digit 5 digit 4 digit 3 digit 2 • digit 1 digit 0 (default 0001.00)

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

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**616 CT PRIMARY & SECONDARY CURRENT**

Allows the transformer primary and secondary values to be written to and read from the meter.

**SIZE**

6 bytes / 1 packet

**FORMAT**

Number Format: BCD: Comprises the CT Primary Current value, which is a 4-byte BCD value, and the CT Secondary Current value, which is a 2-byte BCD value.

LSB	CT Primary: BCD digit1(MSD) digit0(LSD)
	CT Primary: BCD digit3(MSD) digit2(LSD)
	CT Primary: BCD digit5(MSD) digit4(LSD)
	CT Primary: BCD digit7(MSD) digit6(LSD)
	CT Secondary: BCD digit1(MSD) digit0(LSD)
MSB	CT Secondary: BCD digit3(MSD) digit2(LSD)

The Primary current is a 4-byte BCD value, in which the position of the decimal point is as follows:

digit 7 digit 6 digit 5 digit 4 digit 3 digit 2 • digit 1 digit 0 (default 000001.00)

The Secondary current is a 2-byte BCD value, in which the position of the decimal point is as follows:

digit 3 digit 2 • digit 1 digit 0 (default 01.00)

**ACCESS**

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Via level 3 or higher password.

**667 ACTIVE TARIFF TOU REGISTER SOURCES (16-TOU)**

This is an array defining the sources for the currently active TOU registers. The source information is used in conjunction with the tariff switches to determine which TOU registers are active at any one time (a TOU may well be sourced but not active).

Important Note: This array does not always contain the “active” tariff so the name is misleading. For example, if the meter is programmed with an active tariff, the meter will use this set of sources. At the deferred tariff changeover date, the meter will revert to the information in ID677 (deferred tariff TOU sources). Programming the meter with a deferred tariff while in the deferred tariff will actually program this array (as this is now deemed to be the deferred).

This is also true for the MD sources, ID668.

**SIZE**

16 Bytes – 32 digits.  
1 packet of 16 bytes.

**FORMAT**

Sources are stored in an array in the following format:

1 byte	Active TOU Source 1
1 byte	Active TOU Source 2
1 byte	Active TOU Source 3
1 byte	Active TOU Source 4
1 byte	Active TOU Source 5
1 byte	Active TOU Source 6
1 byte	Active TOU Source 7
1 byte	Active TOU Source 8
1 byte	Active TOU Source 9
1 byte	Active TOU Source 10
1 byte	Active TOU Source 11
1 byte	Active TOU Source 12
1 byte	Active TOU Source 13
1 byte	Active TOU Source 14
1 byte	Active TOU Source 15
1 byte	Active TOU Source 16

Values allowed in these bytes indicate which registers which may be sourced and are described as follows:

VALUE	COMMENT
0	No Source
1	Import W – Main Register Source
2	Export W – Main Register Source
3	Q1 – Main Register Source
4	Q2 – Main Register Source
5	Q3 – Main Register Source
6	Q4 – Main Register Source
7	VA – Main Register Source
8	Customer Defined 1 – Main Register Source
9	Customer Defined 2 – Main Register Source
10	Customer Defined 3 – Main Register Source
11	Multi-Utility 1 Register Source
12	Multi-Utility 2 Register Source
13	Multi-Utility 3 Register Source
14	Multi-Utility 4 Register Source

## ACCESS

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Via level 3 or higher password.



**667 ACTIVE TARIFF TOU REGISTER SOURCES (32-TOU)**

This is an array defining the sources for the currently active TOU registers. The source information is used in conjunction with the tariff switches to determine which TOU registers are active at any one time (a TOU may well be sourced but not active).

Important Note: This array does not always contain the “active” tariff so the name is misleading. For example; if the meter is programmed with an active tariff, the meter will use this set of sources. At the deferred tariff changeover date, the meter will revert to the information in ID677 (deferred tariff TOU sources). Programming the meter with a deferred tariff while in the deferred tariff will actually program this array (as this is now deemed to be the deferred).

This is also true for the MD sources, ID668.

**SIZE**

32 Bytes – 64 digits.  
1 packet of 32 bytes.

**FORMAT**

Sources are stored in an array in the following format:

1 byte	Active TOU Source 1
1 byte	Active TOU Source 2
1 byte	Active TOU Source 3
1 byte	Active TOU Source 4
1 byte	Active TOU Source 5
1 byte	Active TOU Source 6
1 byte	Active TOU Source 7
1 byte	Active TOU Source 8
1 byte	Active TOU Source 9
1 byte	Active TOU Source 10
1 byte	Active TOU Source 11
1 byte	Active TOU Source 12
1 byte	Active TOU Source 13
1 byte	Active TOU Source 14
1 byte	Active TOU Source 15
1 byte	Active TOU Source 16

1 byte	Active TOU Source 17
1 byte	Active TOU Source 18
1 byte	Active TOU Source 19
1 byte	Active TOU Source 20
1 byte	Active TOU Source 21
1 byte	Active TOU Source 22
1 byte	Active TOU Source 23
1 byte	Active TOU Source 24
1 byte	Active TOU Source 25
1 byte	Active TOU Source 26
1 byte	Active TOU Source 27
1 byte	Active TOU Source 28
1 byte	Active TOU Source 29
1 byte	Active TOU Source 30
1 byte	Active TOU Source 31
1 byte	Active TOU Source 32

Values allowed in these bytes indicate which registers which may be sourced and are described as follows:

VALUE	COMMENT
0	No Source
1	Import W – Main Register Source
2	Export W – Main Register Source
3	Q1 – Main Register Source
4	Q2 – Main Register Source
5	Q3 – Main Register Source
6	Q4 – Main Register Source
7	VA – Main Register Source
8	Customer Defined 1 – Main Register Source
9	Customer Defined 2 – Main Register Source
10	Customer Defined 3 – Main Register Source
11	Multi-Utility 1 Register Source
12	Multi-Utility 2 Register Source
13	Multi-Utility 3 Register Source
14	Multi-Utility 4 Register Source

## ACCESS

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Via level 3 or higher password.



## NOTES

For firmware variant(s)

- 2-011XX-X (A1700R variant for South Africa)

The number of programmable TOU sources remains the same but writing source configuration for TOUs 9-16 will always:

- Cause sources to have a zero value.
- Cause an ERR7 to be generated.

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**668 ACTIVE TARIFF MD SOURCES**

Array defining the sources for the currently active Maximum Demand registers.

See ID 667 for more information regarding active and deferred tariff sources.

**SIZE**

8 Bytes – 16 digits.

1 packet of 8 bytes.

**FORMAT**

Sources are stored in an array in the following format:

1 byte	Active MD Source 1
1 byte	Active MD Source 2
1 byte	Active MD Source 3
1 byte	Active MD Source 4
1 byte	Active MD Source 5
1 byte	Active MD Source 6
1 byte	Active MD Source 7
1 byte	Active MD Source 8

Values allowed in these bytes indicate which registers which may be sourced and are described as follows:

VALUE	COMMENT
0	No Source
1	Import W – Main Register Source
2	Export W – Main Register Source
3	Q1 – Main Register Source
4	Q2 – Main Register Source
5	Q3 – Main Register Source
6	Q4 – Main Register Source
7	VA – Main Register Source
8	Customer Defined 1 – Main Register Source
9	Customer Defined 2 – Main Register Source
10	Customer Defined 3 – Main Register Source
11	Multi-Utility 1 Register Source
12	Multi-Utility 2 Register Source
13	Multi-Utility 3 Register Source
14	Multi-Utility 4 Register Source
15	Sliding demand register 1 source*
16	Sliding demand register 2 source*

\* Only for 'Final Vision' variant. See ID 657, also.



## ACCESS

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

## NOTES

For firmware variant(s)

- 2-011XX-X (A1700R variant for South Africa)

The number of programmable TOU MD sources remains the same but writing source configuration for TOUs 5-8 will always:

- Cause sources to have a zero value.
- Cause an ERR7 to be generated.

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**680 PROGRAMMING LOG****DESCRIPTION**

Event log, in the format of counter and last 3 timestamps, retaining information pertaining to last 3 communication sessions where a successful write to a [configuration] data ID took place. Some identities do not cause an event to be recorded, such as requests to instrumentation (requests incur a write but no configuration change).

The counter, on reaching 65535 (0xFFFF), will not roll over.

**SIZE**

14 bytes / 28 digits  
1 packet of 14 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0) ( 2 bytes, HEX )
MSB	

LSB	Timestamp, Last (Offset 2) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 1 (Offset 6) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 2 (Offset 10) ( 4 bytes, UTC )
MSB	

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

**680 PROGRAMMING LOG****RELEASE 2-01170-A and 2-01173-A****DESCRIPTION**

Event log, in the format of counter and last 5 timestamps, retaining information pertaining to last 5 communication sessions where a successful write to a [configuration] data ID took place. Some identities do not cause an event to be recorded, such as requests to instrumentation (requests incur a write but no configuration change).

The counter, on reaching 65535 (0xFFFF), will not roll over.

**SIZE**

22 bytes / 44 digits  
1 packet of 22 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0)
MSB	( 2 bytes, HEX )
LSB	Timestamp, Last (Offset 2)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 1 (Offset 6)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 2 (Offset 10)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 3 (Offset 14)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 4 (Offset 18)
	( 4 bytes, UTC )
MSB	

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

**691 METER HISTORICAL SYSTEM STATUS****DESCRIPTION**

Bit field, 32 bits wide, describing the **historical** (what has happened) status of the meter. Once set, the flags remain set until manually cleared by an external process.

Bits are mostly grouped by category and are set in the manner described under data ID 724 (current status word).

Bits (flags) set in this word may **ONLY** be cleared via data ID write if the associated current status flag is not set.

NB: Please refer to flag description for correct version of meter code.

**SIZE**

4 bytes / 8 digits  
1 packet of 4 bytes.

**FORMAT**

LSB	General Events
	Instrumentation flags
	Meter devices
MSB	Misc

Furthermore:

There are a number of structures of this status information.



## Standard firmware build – PRIOR TO 2-01148-G

Hex (as read via COMMS.)	Bit offset	Bit offset	Name
0x00000000	32	31	BACKUP REGISTER SET CORRUPT
0x00000040	30	30	MASTER REGISTER SET RESTORED
0x00000020	29	29	IM BATTERY FAIL
0x00000010	28	28	IM TRANSIENT RESET
0x00000008	27	27	IM DEVICE FAILURE
0x00000004	26	26	METER POWER DOWN
0x00000002	25	25	LAST POWER DOWN INCOMPLETE
0x00000001	24	24	BILLING RESET
0x00008000	23	23	POWER UP BATTERY FAIL
0x00004000	22	22	ELAPSED BATTERY FAIL
0x00002000	21	21	DSP INT B EVENT
0x00001000	20	20	DSP DEVICE FAILURE
0x00000800	19	19	RTC NOT INCREMENTING
0x00000400	18	18	RTC DEVICE FAILURE
0x00000200	17	17	MODULE A HOT SWAP DETECTED
0x00000100	16	16	MODULE B HOT SWAP DETECTED
0x00800000	15	15	METER COMMS SESSION
0x00400000	14	14	PHASE C OVER CURRENT
0x00200000	13	13	PHASE B OVER CURRENT
0x00100000	12	12	PHASE A OVER CURRENT
0x00080000	11	11	SPARE
0x00040000	10	10	SPARE
0x00020000	09	09	SPARE
0x00010000	08	08	SPARE
0x00008000	07	07	SPARE
0x00004000	06	06	SPARE
0x00002000	05	05	SPARE
0x00001000	04	04	SPARE
0x00000800	03	03	SPARE
0x00000400	02	02	METER COMMS WRITE EVENT
0x00000200	01	01	TIME SYNCHRONISATION
0x00000100	00	00	METER TRANSIENT RESET

## TLC firmware build: 2-01156-x

Hex (as read via COMMS.)	Bit offset	Bit offset	Name
0x00000000	32	31	BACKUP REGISTER SET CORRUPT
0x00000040	30	30	MASTER REGISTER SET RESTORED
0x00000020	29	29	IM BATTERY FAIL
0x00000010	28	28	IM TRANSIENT RESET
0x00000008	27	27	IM DEVICE FAILURE
0x00000004	26	26	METER POWER DOWN
0x00000002	25	25	LAST POWER DOWN INCOMPLETE
0x00000001	24	24	BILLING RESET
0x00008000	23	23	POWER UP BATTERY FAIL
0x00004000	22	22	ELAPSED BATTERY FAIL
0x00002000	21	21	DSP INT B EVENT
0x00001000	20	20	DSP DEVICE FAILURE
0x00000800	19	19	RTC NOT INCREMENTING
0x00000400	18	18	RTC DEVICE FAILURE
0x00000200	17	17	MODULE A HOT SWAP DETECTED
0x00000100	16	16	MODULE B HOT SWAP DETECTED
0x00800000	15	15	METER COMMS SESSION
0x00400000	14	14	PHASE C OVER CURRENT
0x00200000	13	13	PHASE B OVER CURRENT
0x00100000	12	12	PHASE A OVER CURRENT
0x00080000	11	11	SPARE
0x00040000	10	10	SPARE
0x00020000	09	09	SPARE
0x00010000	08	08	SPARE
0x00008000	07	07	SPARE
0x00004000	06	06	SPARE
0x00002000	05	05	SPARE
0x00001000	04	04	SPARE
0x00000800	03	03	SPARE
0x00000400	02	02	METER COMMS WRITE EVENT
0x00000200	01	01	TIME SYNCHRONISATION
0x00000100	00	00	METER TRANSIENT RESET

## Vietnam firmware build: 2-01146-x and later

Hex (as read via COMMS.)	Bit offset	Bit offset	Name
0x00000000	32	31	BACKUP REGISTER SET CORRUPT
0x00000040	30	30	MASTER REGISTER SET RESTORED
0x00000020	29	29	IM BATTERY FAIL
0x00000010	28	28	IM TRANSIENT RESET
0x00000008	27	27	IM DEVICE FAILURE
0x00000004	26	26	METER POWER DOWN
0x00000002	25	25	LAST POWER DOWN INCOMPLETE
0x00000001	24	24	BILLING RESET
0x00008000	23	23	POWER UP BATTERY FAIL
0x00004000	22	22	ELAPSED BATTERY FAIL
0x00002000	21	21	DSP INT B EVENT
0x00001000	20	20	DSP DEVICE FAILURE
0x00000800	19	19	RTC NOT INCREMENTING
0x00000400	18	18	RTC DEVICE FAILURE
0x00000200	17	17	MODULE A HOT SWAP DETECTED
0x00000100	16	16	MODULE B HOT SWAP DETECTED
0x00800000	15	15	METER COMMS SESSION
0x00400000	14	14	PHASE C OVER CURRENT
0x00200000	13	13	PHASE B OVER CURRENT
0x00100000	12	12	PHASE A OVER CURRENT
0x00080000	11	11	SPARE
0x00040000	10	10	SPARE
0x00020000	09	09	SPARE
0x00010000	08	08	SPARE
0x00008000	07	07	SPARE
0x00004000	06	06	SPARE
0x00002000	05	05	SPARE
0x00001000	04	04	SPARE
0x00000800	03	03	SPARE
0x00000400	02	02	METER COMMS WRITE EVENT
0x00000200	01	01	TIME SYNCHRONISATION
0x00000100	00	00	METER TRANSIENT RESET

**2-01148-G (Input module and subsequent input module-derived builds)**

Hex (as read via COMMS.)	Bit offset	Bit offset	Name
0x00000080	32	31	BACKUP REGISTER SET CORRUPT
0x00000040	31	30	MASTER REGISTER SET RESTORED
0x00000020	30	29	INPUT MODULE BATTERY EXPIRED
0x00000010	29	28	INPUT MODULE BATTERY EXPIRED
0x00000008	28	27	INPUT MODULE BATTERY EXPIRED
0x00000004	27	26	INPUT MODULE BATTERY EXPIRED
0x00000002	26	25	INPUT MODULE BATTERY EXPIRED
0x00000001	25	24	INPUT MODULE BATTERY EXPIRED
0x00000800	24	23	LAST POWER DOWN EVENT
0x00004000	23	22	BILLING RESET
0x00002000	22	21	POWER UP BATTERY FAIL
0x00001000	21	20	ELAPSED BATTERY FAIL
0x00000800	20	19	DSP INT B EVENT
0x00000400	19	18	RTC DEVICE FAILURE
0x00000200	18	17	RTC NOT INCREMENTING
0x00000100	17	16	MODULE A HOT SWAP DETECTED
0x00800000	16	15	METER COMM SESSION
0x00400000	15	14	SYSTEM REVERSE RUN
0x00200000	14	13	PHASE C OVER CURRENT
0x00100000	13	12	PHASE B OVER CURRENT
0x00080000	12	11	PHASE A OVER CURRENT
0x00040000	11	10	PHASE C FAILURE
0x00020000	10	09	PHASE B FAILURE
0x00010000	09	08	PHASE A FAILURE
0x80000000	08	07	SPARE
0x40000000	07	06	SPARE
0x20000000	06	05	SPARE
0x10000000	05	04	SPARE
0x08000000	04	03	SPARE
0x04000000	03	02	SPARE
0x02000000	02	01	METER COMM WRITE EVENT
0x01000000	01	00	METER TRANSPARENT RESET

**Release label TBA : (IEC60870 module supported builds)**

Hex (as read via COMMS.)	Bit offset	Bit offset	Name
0x00000080	32	31	BACKUP REGISTER SET CORRUPT
0x00000040	31	30	MASTER REGISTER SET RESTORED
0x00000020	30	29	INPUT MODULE BATTERY EXPIRED
0x00000010	29	28	INPUT MODULE BATTERY EXPIRED
0x00000008	28	27	INPUT MODULE BATTERY EXPIRED
0x00000004	27	26	INPUT MODULE BATTERY EXPIRED
0x00000002	26	25	INPUT MODULE BATTERY EXPIRED
0x00000001	25	24	INPUT MODULE BATTERY EXPIRED
0x00000800	24	23	LAST POWER DOWN EVENT
0x00004000	23	22	BILLING RESET
0x00002000	22	21	POWER UP BATTERY FAIL
0x00001000	21	20	ELAPSED BATTERY FAIL
0x00000800	20	19	DSP INT B EVENT
0x00000400	19	18	RTC DEVICE FAILURE
0x00000200	18	17	RTC NOT INCREMENTING
0x00000100	17	16	MODULE A HOT SWAP DETECTED
0x00800000	16	15	METER COMM SESSION
0x00400000	15	14	SYSTEM REVERSE RUN
0x00200000	14	13	PHASE C OVER CURRENT
0x00100000	13	12	PHASE B OVER CURRENT
0x00080000	12	11	PHASE A OVER CURRENT
0x00040000	11	10	PHASE C FAILURE
0x00020000	10	09	PHASE B FAILURE
0x00010000	09	08	PHASE A FAILURE
0x80000000	08	07	SPARE
0x40000000	07	06	SPARE
0x20000000	06	05	SPARE
0x10000000	05	04	SPARE
0x08000000	04	03	SPARE
0x04000000	03	02	SPARE
0x02000000	02	01	METER COMM WRITE EVENT
0x01000000	01	00	METER TRANSPARENT RESET

**Release Label 2-01170-A and 2-01173-A: (Instrumentation logging, per phase reverse run, 2xVA registers, voltage imbalance, wrong password)**

Hex (as read via COMMS.)	Bit offset	Bit offset	Name
0x00000080	32	31	BACKUP REGISTER SET CORRUPT
0x00000040	31	30	MASTER REGISTER SET RESTORED
0x00000020	30	29	INPUT MODULE BATTERY EXPIRED
0x00000010	29	28	INPUT MODULE BATTERY EXPIRED
0x00000008	28	27	INPUT MODULE BATTERY EXPIRED
0x00000004	27	26	INPUT MODULE BATTERY EXPIRED
0x00000002	26	25	INPUT MODULE BATTERY EXPIRED
0x00000001	25	24	INPUT MODULE BATTERY EXPIRED
0x00000800	24	23	LAST POWER DOWN EVENT
0x00004000	23	22	BILLING RESET
0x00002000	22	21	POWER UP BATTERY FAIL
0x00001000	21	20	ELAPSED BATTERY FAIL
0x00000800	20	19	DSP INT B EVENT
0x00000400	19	18	RTC DEVICE FAILURE
0x00000200	18	17	RTC NOT INCREMENTING
0x00000100	17	16	MODULE A HOT SWAP DETECTED
0x00800000	16	15	METER COMM SESSION
0x00400000	15	14	SYSTEM REVERSE RUN
0x00200000	14	13	PHASE C OVER CURRENT
0x00100000	13	12	PHASE B OVER CURRENT
0x00080000	12	11	PHASE A OVER CURRENT
0x00040000	11	10	PHASE C FAILURE
0x00020000	10	09	PHASE B FAILURE
0x00010000	09	08	PHASE A FAILURE
0x80000000	08	07	SPARE
0x40000000	07	06	SPARE
0x20000000	06	05	SPARE
0x10000000	05	04	SPARE
0x08000000	04	03	SPARE
0x04000000	03	02	SPARE
0x02000000	02	01	METER COMM WRITE EVENT
0x01000000	01	00	METER TRANSPARENT RESET



**ACCESS**

Port: Via either port  
Read: Via level 1 or higher password  
Write: Via level 3 or higher password

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**693 PHASE FAILURE EVENT LOG****DESCRIPTION**

Event log, in the format of counter, last 3 timestamps and associated phase for per-phase phase failure recording. New events cause the counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position. A corresponding phase indication is also provided.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

17 bytes / 34 digits  
1 packet of 17 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0) ( 2 bytes, HEX )
MSB	

LSB	Timestamp, Last (Offset 2) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 1 (Offset 6) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 2 (Offset 10) ( 4 bytes, UTC )
MSB	

1 byte	Failed phase, Last ( HEX ) (Offset 14)
--------	--

1 byte	Failed phase, Last – 1 ( HEX ) (Offset 15)
--------	--

1 byte	Failed phase, Last – 2 ( HEX ) (Offset 16)
--------	--

( Note: Phase reference, 01 : Phase 'A' ONLY, 02 : Phase 'B' ONLY, 03 : Phase 'C' ON

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

**693 PHASE FAILURE EVENT LOG**

- **RELEASE 2-01170-A and 2-01173-A**

**DESCRIPTION**

Event log, in the format of per phase counter, per phase cumulative time and last 5 start timestamps, end timestamps and associated phase for per-phase phase failure recording. New phase events cause the associated counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position. A corresponding phase indication is also provided. The end timestamp and the phase associated cumulative time counter is updated when the phase is detected as present again.

The counters, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

63 bytes / 126 digits  
1 packet of 63 bytes.

**FORMAT**

LSB	Cumulative event count Phase A (Offset 0)
MSB	( 2 bytes, HEX )
LSB	Cumulative event count Phase B (Offset 2)
MSB	( 2 bytes, HEX )
LSB	Cumulative event count Phase C (Offset 4)
MSB	( 2 bytes, HEX )
LSB	Cumulative event time count Phase A (Off 6)
	( 4 bytes, HEX )
MSB	
LSB	Cumulative event time count Phase B (Off 10)
	( 4 bytes, HEX )
MSB	
LSB	Cumulative event time count Phase C (Off 14)
	( 4 bytes, HEX )
MSB	
LSB	Start Timestamp, Last (Offset 18)
	( 4 bytes, UTC )

MSB	
LSB	Start Timestamp, Last – 1 (Offset 22)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 2 (Offset 26)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 3 (Offset 30)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 4 (Offset 34)
	( 4 bytes, UTC )
MSB	

LSB	End Timestamp, Last (Offset 38)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 1 (Offset 42)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 2 (Offset 46)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 3 (Offset 50)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 4 (Offset 54)
	( 4 bytes, UTC )
MSB	

1 byte	Failed phase, Last ( HEX ) (Offset 58)
1 byte	Failed phase, Last – 1 ( HEX ) (Offset 59)
1 byte	Failed phase, Last – 2 ( HEX ) (Offset 60)
1 byte	Failed phase, Last – 3 ( HEX ) (Offset 61)
1 byte	Failed phase, Last – 4 ( HEX ) (Offset 62)

( Note: Phase reference, 01 : Phase 'A' ONLY, 02 : Phase 'B' ONLY, 03 : Phase 'C' ON



ACCESS

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

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**694 REVERSE RUNNING LOG****DESCRIPTION**

Event log, in the format of counter and last 3 timestamps, retaining information pertaining to reverse run activity. The recording of this information may be inhibited via data ID. New events cause the counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

14 bytes / 28 digits  
1 packet of 14 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0) ( 2 bytes, HEX )
MSB	

LSB	Timestamp, Last (Offset 2) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 1 (Offset 6) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 2 (Offset 10) ( 4 bytes, UTC )
MSB	

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.



**694 REVERSE RUNNING LOG**

- **RELEASE 2-01170-A and 2-01173-A**

**DESCRIPTION**

Event log, in the format of counter, cumulative time and last 5 start timestamps and end timestamps, retaining information pertaining to reverse run activity. The recording of this information may be inhibited via data ID. New events cause the counter to be incremented, the start timestamps shuffled 'down' with the oldest discarded and inserting the new event start timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

46 bytes / 92 digits  
1 packet of 46 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0)
MSB	( 2 bytes, HEX )
LSB	Cumulative event time count (Offset 2)
	( 4 bytes, HEX)
MSB	
LSB	Start Timestamp, Last (Offset 6)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 1 (Offset 10)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 2 (Offset 14)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 3 (Offset 18)
	( 4 bytes, UTC )

MSB	
LSB	Start Timestamp, Last – 4 (Offset 22)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last (Offset 26)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 1 (Offset 30)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 2 (Offset 34)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 3 (Offset 38)
	( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 4 (Offset 42)
	( 4 bytes, UTC )
MSB	

## ACCESS

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Via level 3 or higher password.

**695 POWER-DOWN EVENT LOG****DESCRIPTION**

Event log, in the format of counter and last 3 timestamps, retaining information pertaining to meter power down events. The log is written each time a meter power down is successfully completed. New events cause the counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

14 bytes / 28 digits  
1 packet of 14 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0) ( 2 bytes, HEX )
MSB	

LSB	Timestamp, Last (Offset 2) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 1 (Offset 6) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 2 (Offset 10) ( 4 bytes, UTC )
MSB	

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

**695 POWER-DOWN EVENT LOG****DESCRIPTION**

Event log, in the format of counter and last 5 timestamps, retaining information pertaining to meter power down events. The log is written each time a meter power down is successfully completed. New events cause the counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

22 bytes / 44 digits  
1 packet of 22 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0)
MSB	( 2 bytes, HEX )
LSB	Timestamp, Last (Offset 2)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 1 (Offset 6)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 2 (Offset 10)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 3 (Offset 14)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 4 (Offset 18)
	( 4 bytes, UTC )
MSB	

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.



696      TRANSIENT RESET EVENT LOG

DESCRIPTION

Event log, in the format of counter and last 3 timestamps, retaining information pertaining to meter transient reset events. The log is written each time a meter power up decides that a transient reset was responsible for the current power up. New events cause the counter to be incremented, the timestamps shuffled ‘down’ with the oldest discarded and inserting the new event timestamp at the “last” position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

SIZE

14 bytes / 28 digits  
1 packet of 14 bytes.

FORMAT

LSB	Cumulative event count (Offset 0) ( 2 bytes, HEX )
MSB	
LSB	Timestamp, Last (Offset 2) ( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 1 (Offset 6) ( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 2 (Offset 10) ( 4 bytes, UTC )
MSB	

ACCESS

Port:            Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

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**696 TRANSIENT RESET EVENT LOG****DESCRIPTION**

Event log, in the format of counter and last 5 timestamps, retaining information pertaining to meter transient reset events. The log is written each time a meter power up decides that a transient reset was responsible for the current power up. New events cause the counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

22 bytes / 44 digits  
1 packet of 22 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0)
MSB	( 2 bytes, HEX )
LSB	Timestamp, Last (Offset 2)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 1 (Offset 6)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 2 (Offset 10)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 3 (Offset 14)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 4 (Offset 18)
	( 4 bytes, UTC )
MSB	

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

**697 ASIC EVENT LOG****DESCRIPTION**

Event log, in the format of counter and last 3 timestamps, retaining information pertaining to Alpha ASIC INTB events. The log is written each time that an ASIC INTB is detected. New events cause the counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

14 bytes / 28 digits  
1 packet of 14 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0) ( 2 bytes, HEX )
MSB	

LSB	Timestamp, Last (Offset 2) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 1 (Offset 6) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 2 (Offset 10) ( 4 bytes, UTC )
MSB	

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

**697     ASIC EVENT LOG**

- RELEASE 2-01170-A and 2-01173-A

**DESCRIPTION**

Event log, in the format of counter and last 5 timestamps, retaining information pertaining to Alpha ASIC INTB events. The log is written each time that an ASIC INTB is detected. New events cause the counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

22 bytes / 44 digits  
1 packet of 22 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0) ( 2 bytes, HEX )
MSB	
LSB	Timestamp, Last (Offset 2) ( 4 bytes, UTC )
MSB	Timestamp, Last – 1 (Offset 6) ( 4 bytes, UTC )
LSB	
	Timestamp, Last – 2 (Offset 10) ( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 3 (Offset 14) ( 4 bytes, UTC )
MSB	Timestamp, Last – 4 (Offset 18) ( 4 bytes, UTC )
LSB	
MSB	





**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

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**699 BILLING RESET EVENT LOG****DESCRIPTION**

Event log, in the format of counter and last 3 timestamps, retaining information pertaining to billing reset events. The log is written each time that a billing reset occurs. This log is used in addition to the log retained by billing which has a greater number of timestamps. New events cause the counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

14 bytes / 28 digits  
1 packet of 14 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0) ( 2 bytes, HEX )
MSB	

LSB	Timestamp, Last (Offset 2) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 1 (Offset 6) ( 4 bytes, UTC )
MSB	

LSB	Timestamp, Last – 2 (Offset 10) ( 4 bytes, UTC )
MSB	

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

**699 BILLING RESET EVENT LOG**

- **RELEASE 2-01170-A and 2-01173-A**

**DESCRIPTION**

Event log, in the format of counter and last 5 timestamps, retaining information pertaining to billing reset events. The log is written each time that a billing reset occurs. This log is used in addition to the log retained by billing which has a greater number of timestamps. New events cause the counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

22 bytes / 44 digits  
1 packet of 22 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0)
MSB	( 2 bytes, HEX )
LSB	Timestamp, Last (Offset 2)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 1 (Offset 6)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 2 (Offset 10)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 3 (Offset 14)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 4 (Offset 18)
	( 4 bytes, UTC )
MSB	

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

**RELEASE 2-01173-x AND LATER****700      PASSWORD CHANGE LOG****DESCRIPTION**

Event log, in the format of counter and last 5 timestamps, retaining information pertaining to communication changing a password. The log is written each time that a password is changed. This log is used in addition to the log retained by billing which has a greater number of timestamps. New events cause the counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

22 bytes / 44 digits  
1 packet of 22 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0)
MSB	( 2 bytes, HEX )

LSB	Timestamp, Last (Offset 2)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 1 (Offset 6)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 2 (Offset 10)
	( 4 bytes, UTC )
MSB	
LSB	Timestamp, Last – 3 (Offset 14)
	( 4 bytes, UTC )
MSB	

(continued)



LSB	Timestamp, Last – 4 (Offset 18) ( 4 bytes, UTC )
MSB	

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write: Via level 3 or higher password.

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**701 POWER FAIL LOG**

- **RELEASE 2-01170-A and 2-01173-A**

**DESCRIPTION**

Event log, in the format of counter, cumulative time and last 5 start timestamps and end timestamps, retaining information pertaining to a power fail. The recording of this information may be inhibited via data ID. New events cause the counter to be incremented, the start timestamps shuffled 'down' with the oldest discarded and inserting the new event start timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

46 bytes / 92 digits  
1 packet of 46 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0)
MSB	( 2 bytes, HEX )
LSB	Cumulative event time count (Offset 2)
	( 4 bytes, HEX)
MSB	
LSB	Start Timestamp, Last (Offset 6)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 1 (Offset 10)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 2 (Offset 14)
	( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 3 (Offset 18)
	( 4 bytes, UTC )
MSB	

LSB	Start Timestamp, Last – 4 (Offset 22) ( 4 bytes, UTC )
MSB	

LSB	End Timestamp, Last (Offset 26) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 1 (Offset 30) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 2 (Offset 34) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 3 (Offset 38) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 4 (Offset 42) ( 4 bytes, UTC )
MSB	

## ACCESS

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Via level 3 or higher password.

**702 TIME AND DATE CHANGE LOG**

- **RELEASE 2-01170-A and 2-01173-A**

**DESCRIPTION**

Event log, in the format of counter, cumulative time and last 5 start timestamps and end timestamps, retaining information pertaining to a time and date change. The recording of this information may be inhibited via data ID. New events cause the counter to be incremented, the start timestamps shuffled 'down' with the oldest discarded and inserting the new event start timestamp at the "last" position.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue. The cumulative time in this log is not used and will be always 0.

**SIZE**

46 bytes / 92 digits  
1 packet of 46 bytes.

**FORMAT**

LSB	Cumulative event count (Offset 0) ( 2 bytes, HEX )
MSB	
LSB	Cumulative event time count (Offset 2) ( 4 bytes, HEX)
MSB	
LSB	Start Timestamp, Last (Offset 6) ( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 1 (Offset 10) ( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 2 (Offset 14) ( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 3 (Offset 18) ( 4 bytes, UTC )
MSB	



LSB	Start Timestamp, Last – 4 (Offset 22) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last (Offset 26) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 1 (Offset 30) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 2 (Offset 34) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 3 (Offset 38) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 4 (Offset 42) ( 4 bytes, UTC )
MSB	

## ACCESS

Port: Via either port.  
 Read: Via level 1 or higher password.  
 Write: Via level 3 or higher password.

## 724 METER CURRENT SYSTEM STATUS

### DESCRIPTION

**There are a number of structures of this status information. Refer to data identity 691 for the structure of the event reporting flags.**

Bit field, 32 bits wide, describing the **current** status of the meter; certain events may be viewed as 'currently occurring' and these can be observed here (see current event list below).

When an event occurs in the meter, it is automatically recorded in this current status word as a flag being set. The 'type' of event determines the actions that follow but effectively, once the flag is set in the current word, it is immediately logically OR'd with the historical status word. Hence, we now have a flag set in the current status word to say the event is occurring now plus the associated flag set in the historical to indicate that the event 'has' occurred. For "call/clear" events, the current flag (only) is cleared at the end of the event; for "set/reset" events, the current flag (only) is automatically cleared as the event is deemed to have no real time duration.

Set/Reset event types are:

Meter Transient Reset

Time Synchronisation

Meter Comms Write Event

RTC Not Incrementing

Power Up Battery Fail

Billing Reset

Last Powerdown Incomplete

Meter Powerdown Event

(OB failures not decided yet)

Master Register Backup Used

Backup Register Set Corrupted

Occurrence of these events will not be visible in the current status word.

The current event word is now read only.

**SIZE**

4 bytes / 8 digits  
1 packet of 4 bytes.

**FORMAT**

LSB	General Events
	Instrumentation flags
	Meter devices
MSB	Misc.

Furthermore:

There are a number of structures of this status information. Refer to data identity 691 for the structure of the event reporting flags.

**ACCESS**

Port: Via either port.  
Read: Via level 1 or higher password.  
Write Read Only – no write access.

**755 INSTRUMENTATION EVENT LOG 1**

- **RELEASE 2-01170-A and 2-01173-A**

**DESCRIPTION**

Event log, in the format of per phase counter, per phase cumulative time and last 5 start timestamps, end timestamps and associated phase for per-phase phase failure recording. New phase events cause the associated counter to be incremented, the timestamps shuffled 'down' with the oldest discarded and inserting the new event timestamp at the "last" position. A corresponding phase indication is also provided. The end timestamp and the phase associated cumulative time counter is updated when the phase event is detected as normal again.

For Instrumentation Events configured as system events, the counter and cumulative time counter of phase A will be incremented.

The counter, on reaching 65535 (0xFFFF), will not roll over but logging will continue.

**SIZE**

63 bytes / 126 digits  
1 packet of 63 bytes.

**FORMAT**

LSB	Cumulative event count Phase A (Offset 0)
MSB	( 2 bytes, HEX )
LSB	Cumulative event count Phase B (Offset 2)
MSB	( 2 bytes, HEX )
LSB	Cumulative event count Phase C (Offset 4)
MSB	( 2 bytes, HEX )

LSB	Cumulative event time count Phase A (Off 6)
	( 4 bytes, HEX )
MSB	
LSB	Cumulative event time count Phase B (Off 10)
	( 4 bytes, HEX )
MSB	

LSB	Cumulative event time count Phase C (Off 14) ( 4 bytes, HEX )
MSB	

LSB	Start Timestamp, Last (Offset 18) ( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 1 (Offset 22) ( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 2 (Offset 26) ( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 3 (Offset 30) ( 4 bytes, UTC )
MSB	
LSB	Start Timestamp, Last – 4 (Offset 34) ( 4 bytes, UTC )
MSB	

LSB	End Timestamp, Last (Offset 38) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 1 (Offset 42) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 2 (Offset 46) ( 4 bytes, UTC )
MSB	
LSB	End Timestamp, Last – 3 (Offset 50) ( 4 bytes, UTC )
MSB	

LSB	End Timestamp, Last – 4 (Offset 54) ( 4 bytes, UTC )
MSB	

1 byte	Failed phase, Last ( HEX ) (Offset 58)
1 byte	Failed phase, Last – 1 ( HEX ) (Offset 59)
1 byte	Failed phase, Last – 2 ( HEX ) (Offset 60)
1 byte	Failed phase, Last – 3 ( HEX ) (Offset 61)
1 byte	Failed phase, Last – 4 ( HEX ) (Offset 62)

*Note: Phase reference,    00 : NO Phase reference,  
                                   01 : Phase 'A' ONLY,  
                                   02 : Phase 'B' ONLY,  
                                   03 : Phase 'C' ONLY*

## ACCESS

Port:                Via either port  
 Read: Via level 1 or higher password  
 Write: Via level 3 or higher password

As for identity 755.

As for identity 755.

As for identity 755.

As for identity 755.

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**760 CURRENT INSTRUMENTATION EVENT STATUS**

- **RELEASE 2-01170-A and 2-01173-A**

**DESCRIPTION**

Bit field, 32 bits wide, describing the **current** status of the instrumentation events; certain events may be viewed as 'currently occurring' and these can be observed here (see current event list below).

When an event occurs in the meter, it is automatically recorded in this current status word as a flag being set. The 'type' of event determines the actions that follow but effectively, once the flag is set in the current word, it is immediately logically OR'd with the historical status word. Hence, we now have a flag set in the current status word to say the event is occurring now plus the associated flag set in the historical to indicate that the event 'has' occurred. The current flag is cleared at the end of the event.

We have 5 per phase or system events that signal a broken upper or lower limit.

A system event will be signalled as phase A event.

**SIZE**

4 bytes / 8 digits  
1 packet of 4 bytes.

**FORMAT**

LSB	Instrumentation Events
	Instrumentation Events
	Instrumentation Events
MSB	Instrumentation Events



<= 32 bit wode meter status word =>

**761 HISTORICAL INSTRUMENTATION EVENT STATUS**

- **RELEASE 2-01170-A and 2-01173-A**

**DESCRIPTION**

Bit field, 32 bits wide, describing the **historical** (what has happened) status of the meter. Once set, the flags remain set until manually cleared by an external process.

Bits are set in the manner described under data ID 793 (current instrumentation status word).

Bits (flags) set in this word may **ONLY** be cleared via data ID write if the associated current status flag is not set.

**SIZE**

4 bytes / 8 digits  
1 packet of 4 bytes

**FORMAT**

LSB	Instrumentation Events
	Instrumentation Events
	Instrumentation Events
MSB	Instrumentation Events

**NOTES**

Current / Historical Instrumentation Status Word																																		
<= 32 bit wode meter status word =>																																		
				LOWER	LIMIT	BROKEN	UPPER	LIMIT	BROKEN	LOWER	LIMIT	BROKEN	UPPER	LIMIT	BROKEN	LOWER	LIMIT	BROKEN	UPPER	LIMIT	BROKEN	LOWER	LIMIT	BROKEN	UPPER	LIMIT	BROKEN	LOWER	LIMIT	BROKEN	UPPER	LIMIT	BROKEN	
				Phase			Phase			Phase			Phase			Phase			Phase			Phase			Phase			Phase			Phase			
				C			B			A			C			B			A			C			B			A			C			
				Event 5				Event 4				Event 3				Event 2				Event 1														
8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2

**ACCESS**

Port: Via either port  
Read: Via level 1 or higher password  
Write: Via level 3 or higher password



**775      INSTRUMENTATION PROFILE CONFIGURATION**

**DESCRIPTION**

This data identity sets the configuration data of the Instrumentation Profile Channels. It tells the profile what has to be calculated (kind of data like voltage, current ... / phase value or a total value / scaled or not scaled) and how it must be stored (maximum, minimum, average).

**SIZE**

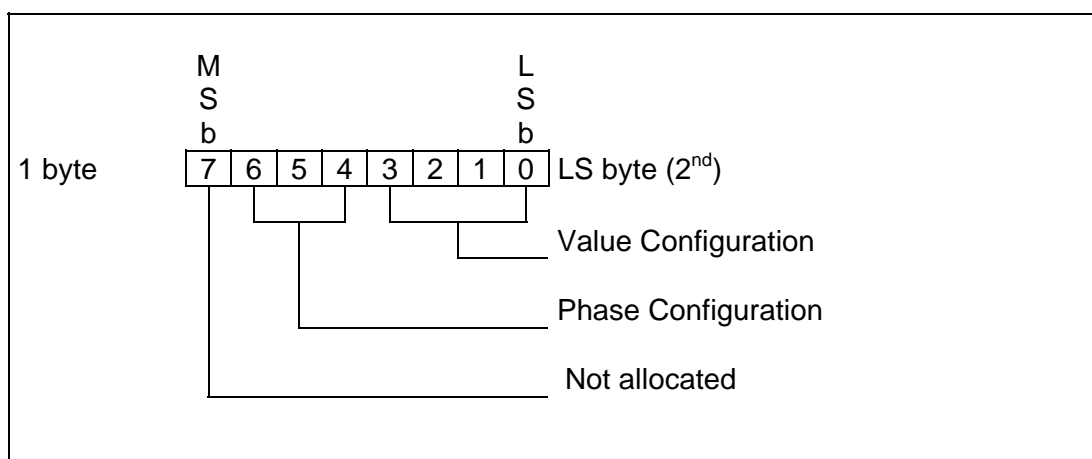
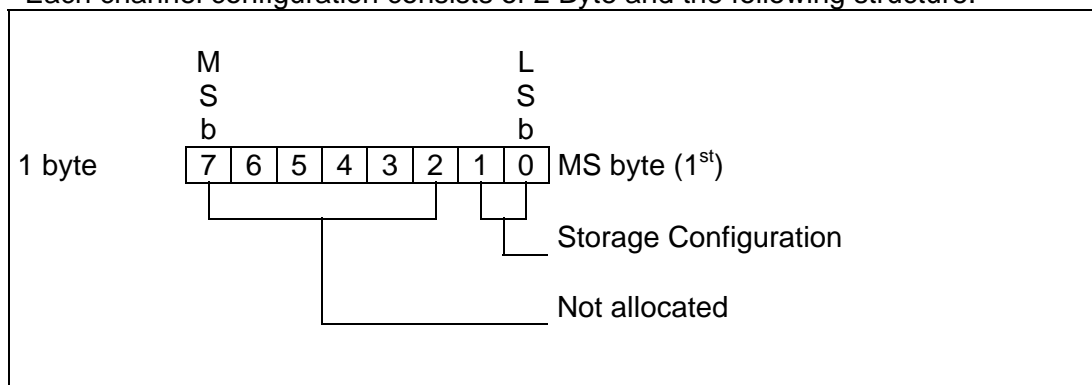
16 bytes / 32 digits  
1 packet of 16 bytes

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**FORMAT**

Packet Index	Byte Index	Data element / size	Data Description
1	0	LSB [0]	(Channel 1) Instrumentation Profile Configuration
	1	MSB [1]	
	3	LSB [0]	(Channel 2) Instrumentation Profile Configuration
	4	MSB [1]	
	5	LSB [0]	(Channel 3) Instrumentation Profile Configuration
	6	MSB [1]	
	7	LSB [0]	(Channel 4) Instrumentation Profile Configuration
	8	MSB [1]	
	9	LSB [0]	(Channel 5) Instrumentation Profile Configuration
	10	MSB [1]	
	11	LSB [0]	(Channel 6) Instrumentation Profile Configuration
	12	MSB [1]	
	13	LSB [0]	(Channel 7) Instrumentation Profile Configuration
	14	MSB [1]	
	15	LSB [0]	(Channel 8) Instrumentation Profile Configuration
	16	MSB [1]	

Each channel configuration consists of 2 Byte and the following structure:



With:

- Storage Configuration
  - 0 = storage of AVERAGE value
  - 1 = storage of MAXIMUM value
  - 2 = storage of MINIMUM value
  - 3 = storage of LAST measured value
- Phase Configuration
  - 1 = phase 1
  - 2 = phase 2
  - 4 = phase 3
  - 0 = all phases (for Total Watts etc.)
- Value Configuration
  - 1 = RMS Current
  - 2 = RMS Volts
  - 3 = Power Factor
  - 4 = Active Power



- 5 = Reactive Power
- 6 = Apparent Power
- 8 = Frequency
- 9 = Phase Angle of the current relative to volts A = Scaled Current
- B = Scaled Voltage
- C = Scaled Active Power
- D = Scaled Reactive Power
- E = Scaled Apparent Power

## ACCESS

Port: Via either port  
 Read: Via level 1 or higher password  
 Write: Via level 3 or higher password

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776      INSTRUMENTATION PROFILE SETUP

DESCRIPTION

This data identity sets Instrumentation Profile parameters like integration period time and the storage mode.

Currently there are 3 different storage modes available.

- Continuously Storage of the instrumentation profile channel values at the end of an integration period.
- Continuously Storage of the instrumentation profile channel values at the end of an integration period ONLY if a qualified Instrumentation Event is active
- Snapshot of the actual the instrumentation profile channel values at the occurrence of a qualified Instrumentation Event (Set and Reset)

SIZE

6 byte / 12 digits

1 packet of 6 bytes

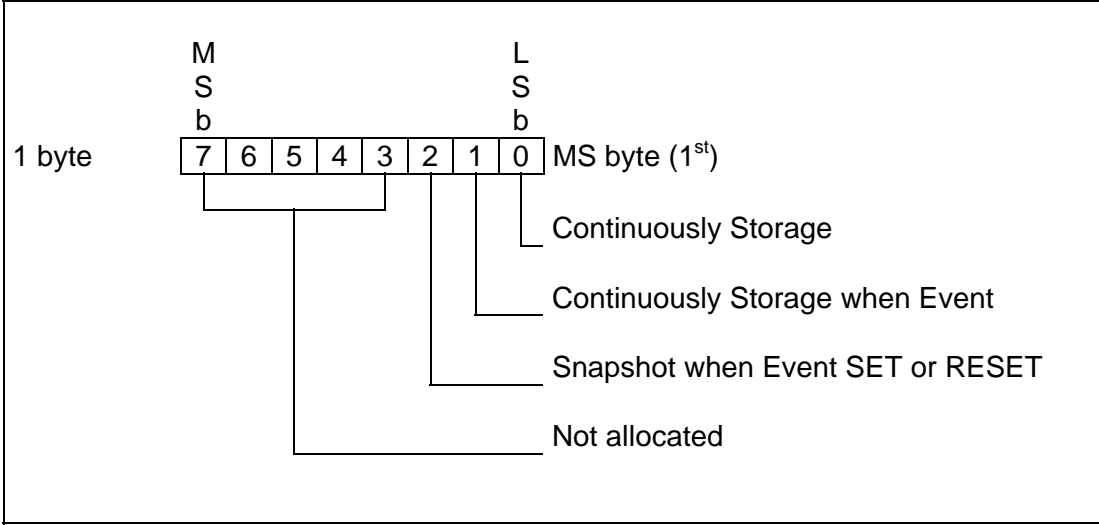
FORMAT

Packet Index	Byte Index	Data element / size	Data Description
1	0		Instrumentation Profile Integration Period ( BCD 01 -60 )
	1		Instrumentation Profile Storage Mode
	2	LSB	Instrumentation Event Status Mask  (Data ID 760 - CURRENT INSTRUMENTATION EVENT STATUS)
	3		
	4		
	5	MSB	

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The Instrumentation Storage Mode configuration has the following structure:



ACCESS

Port: Via either port  
Read: Via level 1 or higher password  
Write: Via level 3 or higher password

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**795      SCHEME IDENTIFICATION**

This data identity provides access to the meter's scheme identification.  
The scheme identification can be up to 8 ASCII characters (0...8). If it is fewer than 8 characters, it **MUST** be terminated with a NULL character.  
(Valid characters, 20h to FFh)

**SIZE**

8 bytes / 16 digits  
  
1 packet of 8 bytes.

**FORMAT**

8 characters
--------------

 Scheme identification.

**ACCESS**

Port:            Via either port.  
Read: Via level 0 or higher password.  
Write: Via level 3 or higher password.

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**797      DEVICE ADDRESS (OUTSTATION ADDRESS)**

**DESCRIPTION**

Device Address used for identifying the Meter when used in multidrop mode.

**SIZE**

Up to 32 bytes: 1 packet

**FORMAT**

Data format: ASCIIZ (if fewer than 32 characters) or ASCII (if 32 characters exactly)

Offset

0	first character
1	second character
2	
...	
...	
29	
30	
31	

Valid characters for the Device Address consist of A-Z, a-z, 0-9 and space ' '.  
Up to 32 characters may be specified as the Device Address.  
If fewer than 32 characters are specified, unused positions are filled with a zero byte (0x00),  
and are not matched as part of Device Address recognition during Signon.

Leading ASCII zeros (code 0x30) in the Device Address are ignored during Address Recognition, unless the Address consists solely of ASCII zeros, when the address string to be matched is taken to be one ASCII zero character.

**ACCESS**

- Port:            Via either port.
- Read:           Via level 1 or higher password.
- Write:           Via level 3 or higher password.

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**798      METER IDENTIFICATION (SERIAL NUMBER)**

This data identity provides access to the meter's serial number.  
The serial number can be up to 16 ASCII characters (0...16)  
Valid characters, 0x20 to 0xFF.  
If it is fewer than 16 characters, it MUST be terminated with a NUL character (0x00).

**SIZE**

16 bytes / 32 digits  
1 packet of 16 bytes.

**FORMAT**

Data format: ASCIIZ (if fewer than 16 characters) or ASCII (if 16 characters exactly)

Offset

0	first character
1	second character
2	
...	
...	
13	
14	
15	

**ACCESS**

Port:            Via either port.  
Read: Via level 0 or higher password.  
Write: Via level 3 or higher password.

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861      TIME AND DATE

This identity allows the time and date to be written to and read from the meter.

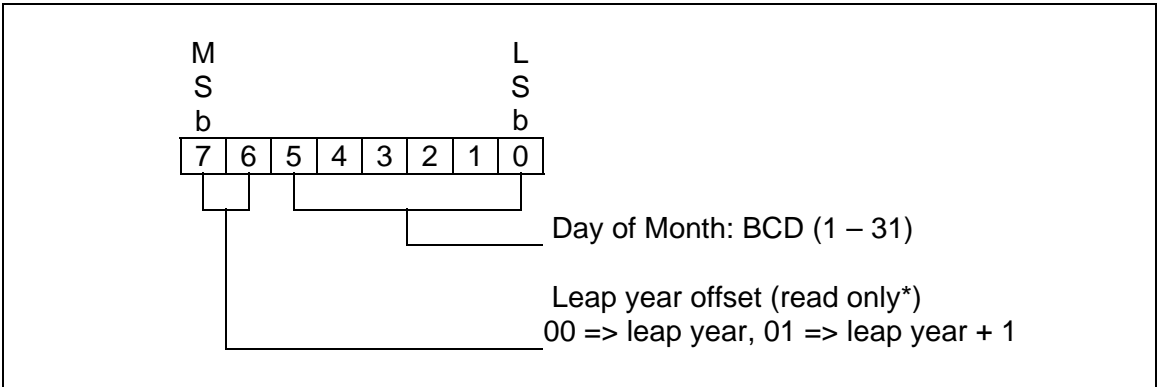
SIZE

7 bytes, 1 packet

FORMAT

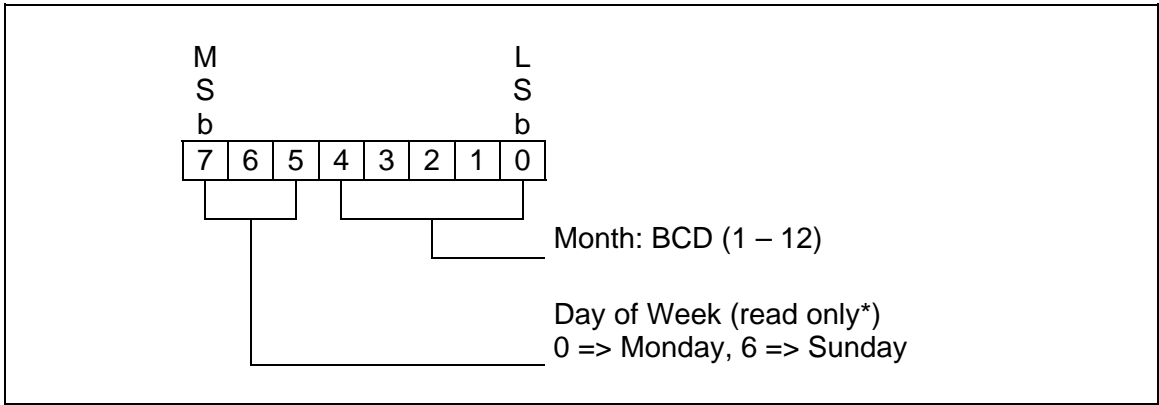
1 byte	Seconds(Tens and Units): BCD MSD first, LSD last
1 byte	Minutes(Tens and Units): BCD MSD first, LSD last
1 byte	Hours(Tens and Units): BCD MSD first, LSD last
1 byte	Day of Month/Leap year offset: BCD/Binary <b>(1)</b>
1 byte	Month/Day of Week: BCD/Binary <b>(2)</b>
1 byte	Not Used
1 byte	Year (99 = 1999, 00 = 2000): BCD MSD first, LSD last

(1) Day of Month/Leap year offset detail:





(2) Month/Day of Week detail:



\* Don't care when written, valid when read

**NOTE**

The Time and Date programmed into the meter is processed according to the current daylight saving state of the meter. If the meter is currently in daylight saving mode, the Time and Date programmed into the meter is adjusted in the opposite direction to the daylight saving adjustment before the Time and Date is stored in the real time clock. Thereafter, any Time and Date value used is adjusted depending upon the daylight saving mode controls for the relevant processes.

**ACCESS**

Port: Via either port  
Read: Via level 1 or higher password  
Write: Via level 2 or higher password

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862 TIME ADJUSTMENT CONTROL

DESCRIPTION

The time adjustment control allows a gradual offset to be applied to the internal time at a fixed rate which is small compared to the typical integration period. This will change the time smoothly over a number of integration periods. The data identity specifies the total time change required as a signed integer number of seconds. The time adjustment will be performed at a maximum rate of 5 seconds per integration period.

The valid range of adjustment is plus or minus 7 minutes and 30 seconds ( $\pm 450$  seconds).

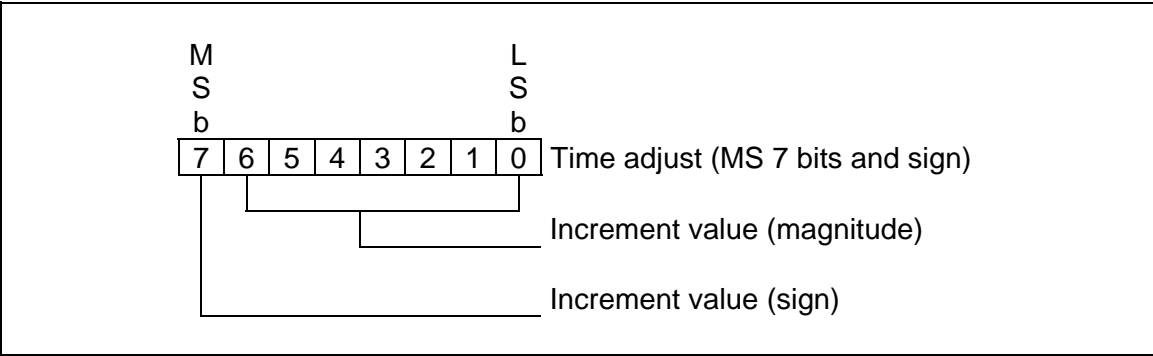
SIZE

2 bytes / 4 digits.  
1 packet of 2 bytes.

FORMAT

LSB	Time adjust (LS byte)
MSB	Time adjust (MS 7 bits and sign)

MSB structure



ACCESS

Port: Via either port  
Read: Via level 1 or higher password  
Write: Via level 2 or higher password

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