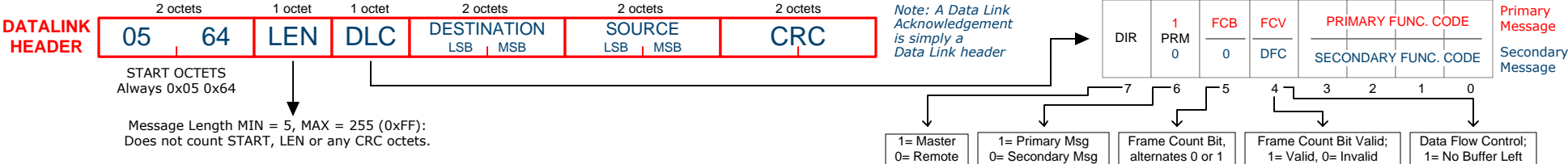


SUBNET SOLUTIONS INC. DNP3 MESSAGE STRUCTURE TEMPLATE



DATA LINK FUNCTION CODES

Primary Frames (PRM=1)			
Fn Code	Function	Frame Type	FCV
0x0 (0000)	RESET Link	SEND/CONFIRM	0
0x1 (0001)	Reset User Process	SEND/CONFIRM	0
0x2 (0010)	TEST link	SEND/CONFIRM	1
0x3 (0011)	User Data	SEND/CONFIRM	1
0x4 (0100)	User Data	SEND/NO REPLY	0
0x9 (1001)	Request Link Status	REQUEST/RESPOND	0

Secondary Frames (PRM=0)		
Fn Code	Function	Frame Type
0x0 (0000)	ACK	CONFIRM
0x1 (0001)	NACK	CONFIRM
0xB (1011)	Link Status	RESPOND
0xF (1111)	Not Supported	RESPOND



1 octet 1 octet 2 octets

APPL CTL APPL FUNC CODE INTERNAL INDICATIONS FIRST SECOND

Outstation Responses Only

7 6 5 4 3 2 1 0

F I R S T A L C O N F I R M

FRAGMENT SEQUENCE 0-15 (0xF)

Note: The unsolicited sequence numbers are independent of the solicited sequence numbers

Master Request Function Codes

7 6 5 4 3 2 1 0

F I N A S L

SEGMENT SEQUENCE 0-63 (0x3F)

Note: Any sequence number is valid when the First Bit is set.

APPLICATION FUNCTION CODES

- 0 (0x00): Confirm (ACK)
- 1 (0x01): Read
- 2 (0x02): Write
- 3 (0x03): Select
- 4 (0x04): Operate
- 5 (0x05): Direct Operate
- 6 (0x06): Direct Operate, No ACK
- 7 (0x07): Immediate Freeze
- 8 (0x08): Immediate Freeze, No ACK
- 9 (0x09): Freeze and Clear
- 10 (0x0A): Freeze and Clear, No ACK
- 11 (0x0B): Freeze with Time
- 12 (0x0C): Freeze with Time, No ACK
- 13 (0x0D): Cold Restart
- 14 (0x0E): Warm Restart
- 15 (0x0F): Initialize Data to Defaults
- 16 (0x10): Initialize Application
- 17 (0x11): Start Application
- 18 (0x12): Stop Application
- 19 (0x13): Save Configuration
- 20 (0x14): Enable Unsolicited Messages
- 21 (0x15): Disable Unsolicited Messages
- 22 (0x16): Assign to Class
- 23 (0x17): Delay Measurement
- 24 (0x18): Record Current Time
- 25 (0x19): Open File
- 26 (0x1A): Close File
- 27 (0x1B): Delete File
- 28 (0x1C): Get File Information
- 29 (0x1D): Authenticate File
- 30 (0x1E): Abort File
- 31 (0x1F): Activate Configuration
- 32 (0x20): Authentication Request
- 33 (0x21): Authentication Error

Outstation Response Function Codes

- 129 (0x81): Solicited Response
- 130 (0x82): Unsolicited Response
- 131 (0x83): Authentication Response

7 6 5 4 3 2 1 0

R E S T A R T T R O U B L E

7 6 5 4 3 2 1 0

R E S E R V E D

1 octet 1 octet 1 octet 0 to 8 octets

OBJECT GROUP OBJECT VARIATION QUALIFIER RANGE

Refer to Object Definition Summary Table

7 6 5 4 3 2 1 0

PREFIX RANGE CODE

PREFIX 0: No Index; Packed 1: 1-octet Index 2: 2-octet Index 3: 4-octet Index 4: 1-octet Object Size 5: 2-octet Object Size 6: 4-octet Object Size

Used to describe sequential points

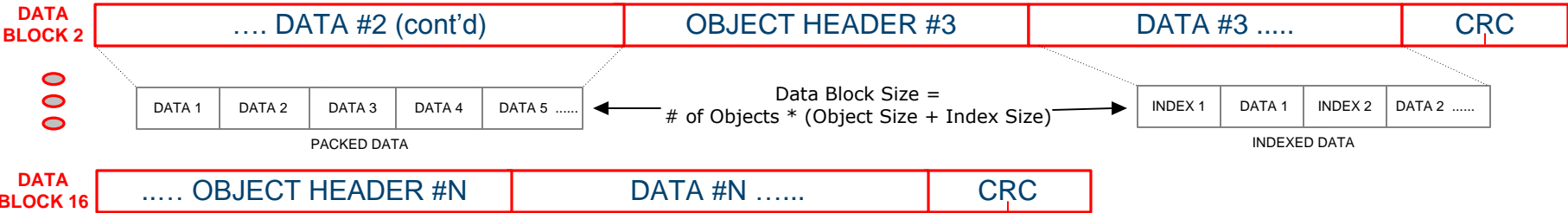
A count of unrelated points/objects

RANGE CODE 0: 1-octet Start and Stop Indices 2 1: 2-octet Start and Stop Indices 4 2: 4-octet Start and Stop Indices 8 3: 1-octet Absolute Address Identifiers . . . 2 4: 2-octet Absolute Address Identifiers . . 4 5: 4-octet Absolute Address Identifiers . . 8 6: All points/objects 0 7: 1-octet Quantity 1 8: 2-octet Quantity 2 9: 4-octet Quantity 4 11 (0xB): Variable Array 1

Range Code determines Range Size

DATA LINK CONTROL OCTET CHART					
		From Remote	From Master	FUNCTION	OTHER / NOTES
SECONDARY	DFC = 0	00	80	ACK	
		01	81	NACK	Failed Transaction
		0B	8B	Link Status Reply	No Flow Control
		0F	8F	Not Supported	Link Service Not Supported
	DFC = 1	10	90	ACK	No Buffers, Frame Accepted
		11	91	NACK	No Buffers, Frame Not Accepted
		1B	9B	Link Status Reply	No Buffers
		1F	9F	Not Supported	No Buffers, LS Not Supported
PRIMARY	FCV = 0	40	C0	RESET LINK	FCB=0 ignored
		41	C1	Reset User Process	OBSOLETE
		44	C4	Unconfirmed User Data	FCB=0 ignored
		49	C9	Link Status Request	FCB=0 ignored
		60	E0	RESET LINK	FCB=1 ignored
		61	E1	Reset User Process	OBSOLETE
		64	E4	Unconfirmed User Data	FCB=1 ignored
		69	E9	Link Status Request	FCB=1 ignored
	FCV = 1	52	D2	Test Link	FCB=0
		53	D3	Confirmed User Data	FCB=0
		72	F2	Test Link	FCB=1
		73	F3	Confirmed User Data	FCB=1

Qualifier (0x)	Range Size	Use in a Request	Use in a Response
00: No Index (Packed), 1-octet Start & Stop	2 octets	A range of static points, or A single point	Static objects
01: No Index (Packed), 2-octet Start & Stop	4 octets		
06: All, No Index	0 octets	All points/objects	Not Valid
07: No Index (Packed), 1-octet Quantity	1 octet	A limited quantity of events, or A single object with no index (e.g. Time and Date)	A single object with no index (e.g. Time and Date)
08: No Index (Packed), 2-octet Quantity	2 octets		
17: 1-octet Index, 1-octet Quantity	1 octet	Controls (usually one or more unrelated points)	Event objects (usually one or more unrelated points)
28: 2-octet Index, 2-octet Quantity	2 octets		



Binary Representation Table

0	0000	8	8	1000
1	0001	9	9	1001
2	0010	10	A	1010
3	0011	11	B	1011
4	0100	12	C	1100
5	0101	13	D	1101
6	0110	14	E	1110
7	0111	15	F	1111

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