OpenLCB MTI Definitions

This is for reference only, and the definitive definitions are in the Standards

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Full MTI Format

		Reserved	Reserved	Special	Stream or Datagram	Priority	Type within priority (decimal)	Simple Protocol	Address present	Event# present	Modifier within Priority/Type	Full MTI (Hex)
		0	1	2	3	4 5	6 7 8 9 10	11	12	13	14 15	
		15	14	13	12	11 10	9 8 7 6 5	4	3	2	1 0	
	Number of bits in field:	1	1	1	1	2	5	1	1	1	2	16
Basic	Initialization Complete	0	0	0	0	0	8	0	0	0		0100
	Verify Node ID Number Addressed	0	0	0	0	1	4	0	1	0		0488
	Verify Node ID Number Global	0	0	0	0	1	4	1	0	0		0490
	Verified Node ID Number	0	0	0	0	0	11	1	0	0		0170
	Optional Interaction Rejected	0	0	0	0	0	3	0	1	0		0068
	Terminate Due to Error	0	0	0	0	0	5	0	1	0		00A8
Protocol Support	Protocol Support Inquiry	0	0	0	0	2	1	0	1	0		0828
	Protocol Support Reply	0	0	0	0	1	19	0	1	0		0668
Event Exchange	Identify Consumer	0	0	0	0	2	7	1	0	1		08F4
	Consumer Range Identified	0	0	0	0	1	5	0	0	1		04A4
	Consumer Identified w validity unknown	0	0	0	0	1	6	0	0	1	3	04C7
	Consumer Identified as currently valid	0	0	0	0	1	6	0	0	1	0	04C4
	Consumer Identified as currently invalid	0	0	0	0	1	6	0	0	1	1	04C5
	Consumer Identified (reserved)	0	0	0	0	1	6	0	0	1	2	04C6
	Identify Producer	0	0	0	0	2	8	1	0	1		0914
	Producer Range Identified	0	0	0	0	1	9	0	0	1		0524
	Producer Identified w validity unknown	0	0	0	0	1	10	0	0	1	3	0547
	Producer Identified as currently valid	0	0	0	0	1	10	0	0	1	0	0544
	Producer Identified as currently invalid	0	0	0	0	1	10	0	0	1	1	0545
	Producer Identified (reserved)	0	0	0	0	1	10	0	0	1	2	0546
	Identify Events Addressed	0	0	0	0	2	11	0	1	0		0968
	Identify Events Global	0	0	0	0	2	11	1	0	0		0970
	Learn Event	0	0	0	0	1	12	1	0	1		0594
	Producer/Consumer Event Report	0	0	0	0	1	13	1	0	1		05B4
Traction Control	Traction Control Command	0	0	0	0	1	15	0	1	0		05E8
	Traction Control Reply	0	0	0	0	1	7	0	1	0		04E8
Other	Xpressnet	0	0	0	0	2	1	0	0	0		0820
Remote Button	Remote Button Request	0	0	0	0	2	10	0	1	0	0	0948
	Remote Button Reply	0	0	0	0	2	10	0	1	0	1	0949
Ident	Simple Node Ident Info Request	0	0	0	0	3	15	0	1	0		0DE8
	Simple Node Ident Info Reply	0	0	0	0	2	16	0	1	0		0A08
Datagram	Datagram	0	0	0	1	3	2	0	1	0		1C48
	→ CAN-Datagram Content (one frame)						“					
	→ CAN-Datagram Content (first frame)						“					
	→ CAN-Datagram Content (middle frame)						“					
	→ CAN-Datagram Content (last frame)						“					
	Datagram Received OK	0	0	0	0	2	17	0	1	0		0A28
	Datagram Rejected	0	0	0	0	2	18	0	1	0		0A48
Stream	Stream Initiate Request	0	0	0	0	3	6	0	1	0		0CC8
	Stream Initiate Reply	0	0	0	0	2	3	0	1	0		0868
	Stream Data Send	0	0	0	1	3	28	0	1	0		1F88
	Stream Data Proceed	0	0	0	0	2	4	0	1	0		0888
	Stream Data Complete	0	0	0	0	2	5	0	1	0		08A8
Extra	Node number Allocate	0	0	1	0	0	0	0	0	0		2000
	No Filtering	0	0	1	0	0	1	0	0	0		2020
	Reserved for MTI Expansion					0	0					
	Reserved for MTI Expansion					1	0					
	Reserved for MTI Expansion					2	0					
	Reserved for MTI Expansion					3	0					

CAN

		Priority	Frame-type	CAN Frame Type	CAN-MTI or Destination-alias ("Variable Part") (hex)	Source-alias	CAN Header (hex)	Data-Part { } = optional
		28	27	26 25 24	23 22 21 20 19 18 17 16 15 14 13 12	11 10 9 8 7 6 5 4 3 2 1 0		
		0	1	2 3 4	5 6 7 8 9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24 25 26 27 28		
	Number of bits in field:	1	1	3	12	12	29	64
Basic	Initialization Complete	1	1	1	100	sss	[19100sss]	Full Source Node ID
	Verify Node ID Number Addressed	1	1	1	488	sss	[19488sss]	fddd
	Verify Node ID Number Global	1	1	1	490	sss	[19490sss]	
	Verified Node ID Number	1	1	1	170	sss	[19170sss]	{Full Source Node ID}
	Optional Interaction Rejected	1	1	1	068	sss	[19068sss]	fddd, error, optional info
	Terminate Due to Error	1	1	1	0A8	sss	[190A8sss]	fddd, error, optional info
Protocol Support	Protocol Support Inquiry	1	1	1	828	sss	[19828sss]	fddd
	Protocol Support Reply	1	1	1	668	sss	[19668sss]	fddd, Protocol flags
Event Exchange	Identify Consumer	1	1	1	8F4	sss	[198F4sss]	EventID
	Consumer Range Identified	1	1	1	4A4	sss	[194A4sss]	EventID with mask
	Consumer Identified w validity unknown	1	1	1	4C7	sss	[194C7sss]	EventID
	Consumer Identified as currently valid	1	1	1	4C4	sss	[194C4sss]	EventID
	Consumer Identified as currently invalid	1	1	1	4C5	sss	[194C5sss]	EventID
	Consumer Identified (reserved)	1	1	1	4C6	sss	[194C6sss]	EventID
	Identify Producer	1	1	1	914	sss	[19914sss]	EventID
	Producer Range Identified	1	1	1	524	sss	[19524sss]	EventID with mask
	Producer Identified w validity unknown	1	1	1	547	sss	[19547sss]	EventID
	Producer Identified as currently valid	1	1	1	544	sss	[19544sss]	EventID
	Producer Identified as currently invalid	1	1	1	545	sss	[19545sss]	EventID
	Producer Identified (reserved)	1	1	1	546	sss	[19546sss]	EventID
	Identify Events Addressed	1	1	1	968	sss	[19968sss]	fddd
	Identify Events Global	1	1	1	970	sss	[19970sss]	
	Learn Event	1	1	1	594	sss	[19594sss]	EventID
	Producer/Consumer Event Report	1	1	1	5B4	sss	[195B4sss]	EventID
Traction Control	Traction Control Command	1	1	1	5E8	sss	[195E8sss]	fddd, data bytes
	Traction Control Reply	1	1	1	4E8	sss	[194E8sss]	fddd, data bytes
Other	Xpressnet	1	1	1	820	sss	[19820sss]	Xpressnet packet
Remote Button	Remote Button Request	1	1	1	948	sss	[19948sss]	fddd, data bytes
	Remote Button Reply	1	1	1	949	sss	[19949sss]	fddd, data bytes
Ident	Simple Node Ident Info Request	1	1	1	DE8	sss	[19DE8sss]	fddd
	Simple Node Ident Info Reply	1	1	1	A08	sss	[19A08sss]	fddd, data bytes
Datagram	Datagram							
	→ CAN-Datagram Content (one frame)	1	1	2	ddd	sss	[1Adddsss]	Data (0-8 bytes)
	→ CAN-Datagram Content (first frame)	1	1	3	ddd	sss	[1Bdddsss]	Data (0-8 bytes)
	→ CAN-Datagram Content (middle frame)	1	1	4	ddd	sss	[1Cdddsss]	Data (0-8 bytes)
	→ CAN-Datagram Content (last frame)	1	1	5	ddd	sss	[1Ddddsss]	Data (0-8 bytes)
	Datagram Received OK	1	1	1	A28	sss	[19A28sss]	fddd
	Datagram Rejected	1	1	1	A48	sss	[19A48sss]	fddd, error code
Stream	Stream Initiate Request	1	1	1	CC8	sss	[19CC8sss]	fddd, buffer size, srcSID
	Stream Initiate Reply	1	1	1	868	sss	[19868sss]	fddd, buffer size, srcSID
	Stream Data Send	1	1	7	ddd	sss	[1Fdddsss]	Data (0-8 bytes)
	Stream Data Proceed	1	1	1	888	sss	[19888sss]	fddd, srcSID, dstSID
	Stream Data Complete	1	1	1	8A8	sss	[198A8sss]	fddd, srcSID, dstSID, { len }
Extra	Node number Allocate	~~1~~	~~1~~	~~1~~	~~000~~	~~sss~~	~~[19000sss]~~	*not carried on CAN*
	No Filtering	~~1~~	~~1~~	~~1~~	~~020~~	~~sss~~	~~[19020sss]~~	~~(Still under discussion)~~
	Reserved for MTI Expansion							
	Reserved for MTI Expansion							
	Reserved for MTI Expansion							
	Reserved for MTI Expansion							

General Datagrams need to be fragmented and defragmented into multiple CAN frames.

A Red value in these columns means that it is identical to another value, and should be checked.

f = Flags					Frame
r	r	0	0		Only
r	r	0	1		First
r	r	1	0		Last
r	r	1	1		Middle

r = Send 0, don't check.

Priority Classes

Description	Priority
Initialization; Error handling	**0**
Event transfer; Operation responses	**1**
Operation requests; Bulk data transfer responses	**2**
Bulk data transfer requests	**3**

CAN Message Types

Title		R	R	Type	Variable Part (binary)	Source-alias (hex)
Reserved		1	1	0	0bxxxx xxxx xxxx	sss
Global		1	1	1	0bmmmm mmmm **0**mmm	sss
Addressed		1	1	1	0bmmmm mmmm **1**mmm	sss
Datagram Only		1	1	2	0bdddd dddd dddd	sss
Datagram First		1	1	3	0bdddd dddd dddd	sss
Datagram Middle		1	1	4	0bdddd dddd dddd	sss
Datagram Last		1	1	5	0bdddd dddd dddd	sss
Reserved		1	1	6	0bxxxx xxxx xxxx	sss
Stream		1	1	7	0bdddd dddd dddd	sss

Bit Descriptions

Full-MTI bit	Description
14-15	Reserved
13	Special – Operationally special
12	Stream or Datagram – used by Gateways as indication to fragment.
10-11	Priority – indicates gross priority of message.
5-9	Type within priority

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4	Simple protocol – (unaddressed) messages to be received by 'simple' nodes.
3	Address present – this message has an address.
2	Event present – this message has an event#.
0-1	Modifier within modifier type – message specific extra information

KEY	r, R – reserved
	s, sss, ssss ssss ssss – source alias
	d, ddd, dddd dddd dddd – destination alias
	x, xxx, xxxx xxxx xxxx – undefinied field

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	General			CAN		
		Full MTI (Hex)	**Data**		**CAN Header (hex)**	**Data-Part { } = optional**
	Number of bits in field:	16	many		29	64
Basic	Initialization Complete	0100	Source	Initialization Complete	[19100sss]	Full Source Node ID
	Verify Node ID Number Addressed	0488	Destination, Source	Verify Node ID Number Addressed	[19488sss]	fddd
	Verify Node ID Number Global	0490	Source	Verify Node ID Number Global	[19490sss]	
	Verified Node ID Number	0170	Source	Verified Node ID Number	[19170sss]	{Full Source Node ID}
	Optional Interaction Rejected	0068	Destination, Source, error, optional	Optional Interaction Rejected	[19068sss]	fddd, error, optional info
	Terminate Due to Error	00A8	Destination, Source, error, optional	Terminate Due to Error	[190A8sss]	fddd, error, optional info
Protocol Support	Protocol Support Inquiry	0828	Destination, Source	Protocol Support Inquiry	[19828sss]	fddd
	Protocol Support Reply	0668	Destination, Source, Protocol flags	Protocol Support Reply	[19668sss]	fddd, Protocol flags
Event Exchange	Identify Consumer	08F4	EventID, Source	Identify Consumer	[198F4sss]	EventID
	Consumer Identify Range	04A4	EventID with Mask, Source	Consumer Identify Range	[194A4sss]	EventID with mask
	Consumer Identified w validity unknown	04C7	EventID, Source	Consumer Identified w validity unknown	[194C7sss]	EventID
	Consumer Identified as currently valid	04C4	EventID, Source	Consumer Identified as currently valid	[194C4sss]	EventID
	Consumer Identified as currently invalid	04C5	EventID, Source	Consumer Identified as currently invalid	[194C5sss]	EventID
	Consumer Identified (reserved)	04C6	EventID, Source	Consumer Identified (reserved)	[194C6sss]	EventID
	Identify Producer	0914	EventID, Source	Identify Producer	[19914sss]	EventID
	Producer Identify Range	0524	EventID with Mask, Source	Producer Identify Range	[19524sss]	EventID with mask
	Producer Identified w validity unknown	0547	EventID, Source	Producer Identified w validity unknown	[19547sss]	EventID
	Producer Identified as currently valid	0544	EventID, Source	Producer Identified as currently valid	[19544sss]	EventID
	Producer Identified as currently invalid	0545	EventID, Source	Producer Identified as currently invalid	[19545sss]	EventID
	Producer Identified (reserved)	0546	EventID, Source	Producer Identified (reserved)	[19546sss]	EventID
	Identify Events Addressed	0968	Destination, Source	Identify Events Addressed	[19968sss]	fddd
	Identify Events Global	0970	Source	Identify Events Global	[19970sss]	
	Learn Event	0594	EventID, Source	Learn Event	[19594sss]	EventID
	Producer/Consumer Event Report	05B4	EventID, Source	Producer/Consumer Event Report	[195B4sss]	EventID
Other	Xpressnet	0820	Source, Xpressnet packet	Xpressnet	[19820sss]	Xpressnet packet
Ident	Simple Node Ident Info Request	0DE8	Destination, Source	Simple Node Ident Info Request	[19DE8sss]	fddd
	Simple Node Ident Info Reply	0A08	Destination, Source, Data bytes	Simple Node Ident Info Reply	[19A08sss]	fddd, data bytes
Datagram	Datagram Content	1C48	Destination, Source, Data bytes	CAN-Datagram Content (one frame)	[1Adddsss]	Data (0-8 bytes)
				CAN-Datagram Content (first frame)	[1Bdddsss]	Data (0-8 bytes)
				CAN-Datagram Content (middle frame	[1Cdddsss]	Data (0-8 bytes)
				CAN-Datagram Content (last frame)	[1Ddddsss]	Data (0-8 bytes)
	Datagram Received OK	0A28	Destination, Source	Datagram Received OK	[19A28sss]	fddd
	Datagram Rejected	0A48	Destination, Source, Error code	Datagram Rejected	[19A48sss]	fddd, error code
Stream	Stream Initiate Request	0CC8	Destination, Source, Buffer size	Stream Initiate Request	[19CC8sss]	fddd, buffer size, srcSID
	Stream Initiate Reply	0868	Destination, Source, Buffer size	Stream Initiate Reply	[19868sss]	fddd, buffer size, srcSID
	Stream Data Send	1F88	Destination, Source, Data bytes	Stream Data Send	[1Fdddsss]	Data (0-8 bytes)
	Stream Data Proceed	0888	Destination, Source, ID	Stream Data Proceed	[19888sss]	fddd, srcSID, dstSID
	Stream Data Complete	08A8	Destination, Source, ID, {len}	Stream Data Complete	[198A8sss]	fddd, srcSID, dstSID, { len }
Extra	Node number Allocate	2000	Source			
	No Filtering	2020	Source			