

**Generic CAN Protocol - bf1systems 1SYSTEM IRTPMS - ECU Firmware v2.17 - F1-XXX-1799-00X - STD**

Protocol	CAN 2.0A	ID (Format)	CAN Standard / 11 bit Identifiers	Note - For all Error, Warning & Timeout signals
CAN Bus BitRate	1Mbit	DLC Byte Length	8	0 False
Termination	None - Unit is connected as a node into an existing network	Byte Order	Motorola	1 True

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment
CAR DATA	0x500	100ms	RX	-	ATMOS PRES	8	16	Unsigned	1	0	0	65535	mbar	Atmospheric Pressure sent by CAR to TPMS ECUs
					VEHICLE SPEED	24	16	Unsigned	0.1	0	0	327.6	km/h	Vehicle Speed sent by CAR to TPMS ECUs
					VEHICLE ODOMETER	40	16	Unsigned	2	0	0	131070	km	Vehicle Odometer sent by CAR to TPMS ECUs Not currently used - future use only

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment
TPM1S FL WS DATA	0x600	1000ms	TX	-	TPM1S XX WS ACCEL ERR	0	1	Unsigned	1	0	0	1	-	Wheel Sensor Accelerometer Error
TPM1S FR WS DATA	0x601				TPM1S XX WS BATTERY ERR	1	1	Unsigned	1	0	0	1	-	Wheel Sensor Battery Error
TPM1S RL WS DATA	0x602				TPM1S XX WS TEMP ERR	2	1	Unsigned	1	0	0	1	-	Wheel Sensor Temperature Measurement Error
TPM1S RR WS DATA	0x603				TPM1S XX WS PRESS ERR	3	1	Unsigned	1	0	0	1	-	Wheel Sensor Pressure Measurement Error
					TPM1S XX WS FAULT GROUP	4	3	Unsigned	1	0	0	7	-	Wheel Sensor Fault Code

0	No Fault
1	TPMS Subsystem
2	IR Subsystem
3	Core
4	Firmware Fault
5	Unknown Fault
6	Abnormal Reset
7	Reserved

TPM1S XX WS TEMP	8	8	Unsigned	1	-40	-39	198	°C	Wheel Sensor Temperature
TPM1S XX WS PRESS	24	16	Unsigned	0.625	0	0.625	20459.4	mbar	Wheel Sensor Gauge Pressure
TPM1S XX WS P REF	40	8	Unsigned	25	0	25	5950	mbar	Wheel Sensor Reference Gauge Pressure
TPM1S XX WS P COMP	48	8	Unsigned	25	0	25	5950	mbar	Wheel Sensor Compensated Gauge Pressure
TPM1S XX WS MISMATCH	57	1	Unsigned	1	0	0	1	-	Wheel Sensor Security Code Mismatch Warning
TPM1S XX WS HIGH TEMP WRN	59	1	Unsigned	1	0	0	1	-	Wheel Sensor High Temperature Warning
TPM1S XX WS UNDER PRESS HARD WRN	60	1	Unsigned	1	0	0	1	-	Wheel Sensor Low Pressure Hard Warning
TPM1S XX WS UNDER PRESS SOFT WRN	61	1	Unsigned	1	0	0	1	-	Wheel Sensor Low Pressure Soft Warning
TPM1S XX WS GAS LOSS WRN	62	1	Unsigned	1	0	0	1	-	Wheel Sensor Rapid Gas Loss Warning
TPM1S XX WS RUN FLAT WRN	63	1	Unsigned	1	0	0	1	-	Wheel Sensor Tyre Flat Warning

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment	
TPM1S FL WS INFO	0x604	1000ms	TX	-	TPM1S XX WS SENSOR TYPE	2	3	Unsigned	1	0	0	7	-	Wheel Sensor Type	
TPM1S FR WS INFO	0x605				0	Unavailable									
TPM1S RL WS INFO	0x606				1	TPMS									
TPM1S RR WS INFO	0x607				2	IR									
					TPM1S XX WS RX TIMEOUT	5	1	Unsigned	1	0	0	1	-	Wheel Sensor Receive Timeout	
					TPM1S XX WS NOT CONFIRMED	6	1	Unsigned	1	0	0	1	-	Wheel Sensor Position Not Confirmed	
														0	Wheel Sensor has been confirmed OK
														1	Wheel Sensor has not been confirmed
					TPM1S XX WS NOT DETECTED	7	1	Unsigned	1	0	0	1	-	Wheel Sensor Signal Not Detected	
														0	Wheel Sensor is being detected OK
														1	Wheel Sensor is not being detected
					TPM1S XX WS ID	24	16	Unsigned	1	0	0	65535	-	Wheel Sensor ID	
					TPM1S XX WS RX DETECT CNT	32	8	Unsigned	1	0	0	255	-	Wheel Sensor Receive Counter	
					TPM1S XX WS BATTERY LOW	40	1	Unsigned	1	0	0	1	-	Wheel Sensor Battery Voltage Low Warning	
					TPM1S XX WS RX RSSI	41	7	Unsigned	1	-127	-127	0	dBm	Wheel Sensor Received Signal RSSI	
					TPM1S XX WS FW MINOR	48	4	Unsigned	1	0	0	15	-	Wheel Sensor Firmware Minor Version	
					TPM1S XX WS FW MAJOR	52	4	Unsigned	1	0	0	15	-	Wheel Sensor Firmware Major Version	
					TPM1S XX WS RBL	56	7	Unsigned	1	0	0	100	%	Wheel Sensor Remaining Battery Life Estimate	
					TPM1S XX WS RBL LOW	63	1	Unsigned	1	0	0	1	-	Wheel Sensor Remaining Battery Life Low Warning	

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Termination	None - Unit is connected as a node into an existing network	Byte Order	Motorola	1	True

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment	
TPM1S FL WS IR DATA	0x608	100ms	TX	Multiplexor	TPM1S XX WS IR GROUP ID	0	3	Unsigned	1	0	0	7	-	Wheel Sensor IR Data Multiplexor	
TPM1S FR WS IR DATA	0x609														
TPM1S RL WS IR DATA	0x60A			0x0	TPM1S XX WS IR CORE TEMP 2	8	8	Unsigned	1	-40	-39	198	°C	Wheel Sensor IR Core Ambient Temperature 2	
TPM1S RR WS IR DATA	0x60B			0x0	TPM1S XX WS IR CORE TEMP 1	16	8	Unsigned	1	-40	-39	198	°C	Wheel Sensor IR Core Ambient Temperature 1	
					0x1	TPM1S XX WS IR TEMP 1	20	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 1
					0x1	TPM1S XX WS IR TEMP 2	24	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 2
					0x1	TPM1S XX WS IR TEMP 3	44	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 3
					0x1	TPM1S XX WS IR TEMP 4	48	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 4
					0x2	TPM1S XX WS IR TEMP 5	20	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 5
					0x2	TPM1S XX WS IR TEMP 6	24	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 6
					0x2	TPM1S XX WS IR TEMP 7	44	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 7
					0x2	TPM1S XX WS IR TEMP 8	48	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 8
					0x3	TPM1S XX WS IR TEMP 9	20	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 9
					0x3	TPM1S XX WS IR TEMP 10	24	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 10
					0x3	TPM1S XX WS IR TEMP 11	44	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 11
					0x3	TPM1S XX WS IR TEMP 12	48	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 12
					0x4	TPM1S XX WS IR TEMP 13	20	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 13
					0x4	TPM1S XX WS IR TEMP 14	24	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 14
					0x4	TPM1S XX WS IR TEMP 15	44	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 15
					0x4	TPM1S XX WS IR TEMP 16	48	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 16
					0x5	TPM1S XX WS IR TEMP 17	20	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 17
					0x5	TPM1S XX WS IR TEMP 18	24	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 18
					0x5	TPM1S XX WS IR TEMP 19	44	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 19
					0x5	TPM1S XX WS IR TEMP 20	48	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 20
					0x6	TPM1S XX WS IR TEMP 21	20	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 21
					0x6	TPM1S XX WS IR TEMP 22	24	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 22
					0x6	TPM1S XX WS IR TEMP 23	44	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 23
					0x6	TPM1S XX WS IR TEMP 24	48	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 24
					0x7	TPM1S XX WS IR TEMP 25	20	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 25
					0x7	TPM1S XX WS IR TEMP 26	24	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 26
					0x7	TPM1S XX WS IR TEMP 27	44	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 27
					0x7	TPM1S XX WS IR TEMP 28	48	12	Unsigned	0.1	-40	-39.9	367.9	°C	Wheel Sensor IR Pixel Temperature 28

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment
TPM1S FL ECU INFO 2	0x626	1000ms	TX	-	TPM1S XX WS TYRE SET	8	8	Unsigned	1	0	0	127	-	Wheel Sensor Tyre Set
TPM1S FR ECU INFO 2	0x627				TPM1S XX WS TYRE TYPE	16	8	Unsigned	1	0	0	15	-	Wheel Sensor Tyre Type
TPM1S RL ECU INFO 2	0x628				TPM1S XX WS FAULT CODE	40	16	Unsigned	1	0	0	65535	-	Wheel Sensor Diagnostic Fault Code
TPM1S RR ECU INFO 2	0x629													

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment
TPM1S CFGNTRL	0x700	1000ms	RX	-	TPM1S CFGNTRL	56	64	Unsigned	1	0	0	4.29E+09	-	Message reserved No requirement to log this signal

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment
TPM1S XCP BCAST	0x7BF	1000ms	TX/RX	-	TPM1S XX XCP RES	56	64	Unsigned	1	0	0	4.29E+09	-	Message reserved No requirement to log this signal

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CAN Bus BitRate	1Mbit	DLC Byte Length	8	0	False
Termination	None - Unit is connected as a node into an existing network	Byte Order	Motorola	1	True

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment
TPM1S FL ECU INFO	0x704	1000ms	TX	-	TPM1S XX ECU FW MAJOR	0	8	Unsigned	1	0	0	255	-	ECU Firmware Major Version
TPM1S FR ECU INFO	0x705				TPM1S XX ECU FW MINOR	8	8	Unsigned	1	0	0	255	-	ECU Firmware Minor Version
TPM1S RL ECU INFO	0x706				TPM1S XX ECU HEARTBEAT	16	8	Unsigned	1	0	0	255	-	ECU Heartbeat
TPM1S RR ECU INFO	0x707				TPM1S XX ECU HIGH TEMP	29	1	Unsigned	1	0	0	1	-	ECU High Temperature Warning
					TPM1S XX ECU HIGH VOLTAGE	30	1	Unsigned	1	0	0	1	-	ECU High Voltage Warning
					TPM1S XX ECU LOW VOLTAGE	31	1	Unsigned	1	0	0	1	-	ECU Low Voltage Warning
					TPM1S XX ATM PRESS RX TIMEOUT	38	1	Unsigned	1	0	0	1	-	ECU Vehicle Speed Signal Receive Timeout
					TPM1S XX VEH SPEED RX TIMEOUT	39	1	Unsigned	1	0	0	1	-	ECU Atmospheric Pressure Signal Receive Timeout
					TPM1S XX ECU FW PATCH	56	24	Unsigned	1	0	0	16777215	-	ECU FW Patch Version

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment
TPM1S FL XCP CMD	0x708	1000ms	RX	-	TPM1S XX XCP CMD	56	64	Unsigned	1	0	0	4.29E+09	-	Messages reserved for PC to ECU CAN Comms
TPM1S FR XCP CMD	0x709					No requirement to log these signals								
TPM1S RL XCP CMD	0x70A													
TPM1S RR XCP CMD	0x70B													

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment
TPM1S FL XCP RES	0x70C	1000ms	TX	-	TPM1S XX XCP RES	56	64	Unsigned	1	0	0	4.29E+09	-	Messages reserved for PC to ECU CAN Comms
TPM1S FR XCP RES	0x70D					No requirement to log these signals								
TPM1S RL XCP RES	0x70E													
TPM1S RR XCP RES	0x70F													

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment
TPM1S FL CFGSTAT	0x710	1000ms	TX	-	TPM1S XX CFGSTAT	56	64	Unsigned	1	0	0	4.29E+09	-	Messages reserved
TPM1S FR CFGSTAT	0x711					No requirement to log these signals								
TPM1S RL CFGSTAT	0x712													
TPM1S RR CFGSTAT	0x713													

Messages	ID	Rate	Direction	MUX	Signal Name	Startbit	Length	Type	Factor	Offset	Minimum	Maximum	Unit	Comment	
TPM1S FL DIAG	0x714	200ms	TX	Multiplexor	TPM1S XX DIAG MUX ID	0	8	Unsigned	1	0	0	255	-	Diagnostics Multiplexor	
TPM1S FR DIAG	0x715														
TPM1S RL DIAG	0x716														
TPM1S RR DIAG	0x717														
					0x0	TPM1S XX DIAG ADV POSN 1	14	2	Unsigned	1	0	0	3	-	Wheel Sensor Position in Buffer 1 (Posn Config Only)
					0x0	TPM1S XX DIAG ADV ID 1	32	16	Unsigned	1	0	0	65535	-	Wheel Sensor ID in Buffer 1
					0x0	TPM1S XX DIAG ADV RSSI 1	40	8	Signed	1	0	-127	0	dBm	Wheel Sensor Signal RSSI in Buffer 1
					0x1	TPM1S XX DIAG ADV POSN 2	14	2	Unsigned	1	0	0	3	-	Wheel Sensor Position in Buffer 2 (Posn Config Only)
					0x1	TPM1S XX DIAG ADV ID 2	32	16	Unsigned	1	0	0	65535	-	Wheel Sensor ID in Buffer 2
					0x1	TPM1S XX DIAG ADV RSSI 2	40	8	Signed	1	0	-127	0	dBm	Wheel Sensor Signal RSSI in Buffer 2
					0x2	TPM1S XX DIAG ADV POSN 3	14	2	Unsigned	1	0	0	3	-	Wheel Sensor Position in Buffer 3 (Posn Config Only)
					0x2	TPM1S XX DIAG ADV ID 3	32	16	Unsigned	1	0	0	65535	-	Wheel Sensor ID in Buffer 3
					0x2	TPM1S XX DIAG ADV RSSI 3	40	8	Signed	1	0	-127	0	dBm	Wheel Sensor Signal RSSI in Buffer 3
					0x3	TPM1S XX DIAG ADV POSN 4	14	2	Unsigned	1	0	0	3	-	Wheel Sensor Position in Buffer 4 (Posn Config Only)
					0x3	TPM1S XX DIAG ADV ID 4	32	16	Unsigned	1	0	0	65535	-	Wheel Sensor ID in Buffer 4
					0x3	TPM1S XX DIAG ADV RSSI 4	40	8	Signed	1	0	-127	0	dBm	Wheel Sensor Signal RSSI in Buffer 4
					0x8	TPM1S XX DIAG VEH SPEED	16	16	Unsigned	1	0	0	65535	km/h	Vehicle Speed received from CAR by TPMS ECU
		0x8	TPM1S XX DIAG VEH ATM P	32	16	Unsigned	1	0	0	65535	mbar	Atmospheric Pressure received from CAR by TPMS ECU			
		0x8	TPM1S XX DIAG VEH ODOMETER	48	16	Unsigned	1	0	0	131070	km/h	Vehicle Odometer sent by CAR to TPMS ECUs (optional)			
		0x8	TPM1S XX DIAG VEH MOVING	56	1	Unsigned	1	0	0	1	-	ECU in moving mode			
		0x9	TPM1S XX DIAG ECU HEALTH	32	32	Unsigned	1	0	0	4.29E+09	-	ECU Health Diagnostic Code			
		0x9	TPM1S XX DIAG CORE TEMP	40	8	Unsigned	1	-40	-39	198	°C	ECU Internal Temperature			