

# Sensor Network CAN Protocol

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## Message ID calculation method

ID: Base address + node offset + message offset

### Critical message Base Address: 0x600

### Critical message node offset: 0x001 \* Node\_ID

## Critical Messages

#### Critical message address offset: 0x000 - Error signal

Parameter	Value
Direction	Node -> Master
Transmission Rate	Aperiodically
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
SENSOR_NUMBER	39	1			Bit that tells, whether the error is for sensor 0 or 1
N/A	0	0			Indicates that that open or short circuit error has occurred

### Non-critical message Base Address: 0x610

### Non-critical message node offset: 0x00E \* Node\_ID

## Non-critical messages

#### Message address offset: 0x000 - Select sensor

Parameter	Value
Direction	Master -> Node
Transmission Rate	Initial
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
SENSOR_SELECT_0	0	1	BOOL		Boolean to activate sensor 0
SENSOR_SELECT_1	1	1	BOOL		Boolean to activate sensor 1

Message address offset: 0x001 - IIR filter coefficient

Parameter	Value
Direction	Master -> Node
Transmission Rate	Initial
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
FILTER_COEFFICIENT	0	32	float (union)		IIR filter coefficient
COEFFICIENT_NUMBER	32	2	UINT		Placement of coefficient in cascaded filter
NUM_DEN	34	1	UINT		Bit that tells, whether coefficient is in numerator (0) or denominator(1)
CASC_FILTER_NUMBER	35	2	UINT		Indicates which cascade coefficient should be in
SENSOR_NUMBER	39	1	UINT		Bit that tells, whether the value is for sensor 0 or 1

Message address offset: 0x002 - IIR gain value

Parameter	Value
Direction	Master -> Node
Transmission Rate	Initial
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
FILTER_GAIN	0	32	float (union)		IIR filter gain
SENSOR_NUMBER	39	1	UINT		Bit that tells, whether the value is for sensor 0 or 1

Message address offset: 0x003 - Window value

Parameter	Value
Direction	Master -> Node
Transmission Rate	Initial
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
WINDOW_FLOOR	0	16	UINT		Value for window floor. Value between 0 and 4095
WINDOW_CEILING	16	16	UINT		Value for window ceiling. Value between 0 and 4095
SENSOR_NUMBER	39	1	UINT		Bit that tells, whether the value is for sensor 0 or 1

Message address offset: 0x004 - Window delay

Parameter	Value
Direction	Master -> Node
Transmission Rate	Initial
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
WINDOW_DELAY	0	16	UINT		Value for window delay in millisec. Highest allowed is 200
SENSOR_NUMBER	39	1	UINT		Bit that tells, whether the value is for sensor 0 or 1

Message address offset: 0x005 - Polynomial value

Parameter	Value
Direction	Master -> Node
Transmission Rate	Initial
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
POLYNOMIAL_COEFFICIENT	0	32	float (union)		Coefficient for polynomial conversion
COEFFICIENT_NUMBER	32	3	UINT		Placement of coefficent in polynomial conversion, the power of the polynomial rises with this value
SENSOR_NUMBER	39	1	UINT		Bit that tells, whether the value is for sensor 0 or 1

Message address offset: 0x006 - Transmit rate

Parameter	Value
Direction	Master -> Node
Transmission Rate	Initial
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
TRANSMIT_RATE	0	16	UINT		Transmit rate in Hz. Must be a divisor of 8000 for precise results
SENSOR_NUMBER	39	1	UINT		Bit that tells, whether the value is for sensor 0 or 1

Message address offset: 0x007 - Use default config

Parameter	Value
Direction	Master -> Node
Transmission Rate	Initial
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
N/A	0	0			Use default values on node for DSP config, primarily used for testing

### Message address offset: 0x008 - Start sampling

Parameter	Value
Direction	Master -> Node
Transmission Rate	Aperiodically
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
N/A	0	0			Start the sampling from the sensor

### Message address offset: 0x009 - Stop sampling

Parameter	Value
Direction	Master -> Node
Transmission Rate	Aperiodically
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
N/A	0	0			Temporarily stop the sampling from the sensor

### Message address offset: 0x00A - Initialization request

Parameter	Value
Direction	Node -> Master
Transmission Rate	Initial
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
N/A	0	0			Request a new initialization. Either because the node just powered up, or it did not get all needed information

### Message address offset: 0x00B - Node ready

Parameter	Value
Direction	Node -> Master
Transmission Rate	Initial
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
N/A	0	0			Signal, that the node has received all necessary config info, and is ready for sampling

Message address offset: 0x00C - Signal value

Parameter	Value
Direction	Node -> Master
Transmission Rate	Periodically: 10-200ms
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
SIGNAL_VALUE	0	32	float (union)		Converted value from sensor
SENSOR_NUMBER	39	1	UINT		Bit that tells, whether the value is from sensor 0 or 1

Message address offset: 0x00D - Test message

Parameter	Value
Direction	Node -> Master
Transmission Rate	Aperiodically
Size [bits : bytes]	40 : 5

Variable Name	Offset	Length in bits	Value Type	Unit	Description
INFO	0	32	UINT		Test message used for debugging

Messages with absolute address ID's

ID: 0x6FE - Master awake

Parameter	Value
Direction	Master -> All nodes
Transmission Rate	Initial
Size [bits : bytes]	8 : 1

Variable Name	Offset	Length in bits	Value Type	Unit	Description
N/A	0	0			Message that the master controller has started and is ready for configuration of the nodes.

ID: 0x6FF - Node ID's display

Parameter	Value
Direction	Master -> All nodes

Parameter	Value
Transmission Rate	Aperiodically
Size [bits : bytes]	8 : 1

Variable Name	Offset	Length in bits	Value Type	Unit	Description
N/A	0	0			Request for all nodes to show their ID's though the RGBLED

## Template

### ID: 0xXXX -

Parameter	Value
Direction	->
Transmission Rate	Periocially: 100ms/Aperiodically

Variable Name	Offset	Length in bits	Value Type	Unit	Description