11 Manual configuration 1 1S 3 3S

The AIS AtoN transceiver and Sensor Interface can be configured using standardised NMEA0183 (IEC61162-1/2) sentences developed for configuration of AIS Aids to Navigation transceivers.

11.1 Basic Type 1 AIS AtoN configuration (FATDMA operation)

The following information is the minimum required configuration for a Type 1 AIS AtoN reporting message #21 only.

- The AIS AtoN station must be configured with the 'real' AtoN MMSI using the AID command.
- The AIS AtoN station must be configured with an Name, charted position, operating radio channels and dimensions using the ACF and ACE commands.
- The AIS AtoN should be configured to broadcast message 21 using the AAR command. Note that the slots selected for the AIS AtoN transmissions in FATDMA mode must be reserved by a base station operating in the area in which the AIS AtoN will be deployed.

11.2 NMEA0183 / IEC61162 configuration sentences

The following section documents the standardised NMEA0183/IEC61162 sentences used for AIS AtoN configuration and control.

Please refer to IEC61162-1 (Edition 4) for complete details of the configuration sentence structure.

The configuration sentence formats described in this section are used to both configure the device and as the response format from the device when queried for current status. The query command format is as follows:

$--AIQ,ccc*hh<CR><LF>

└ Sentence formatter of data being requested (e.g.,AAR)

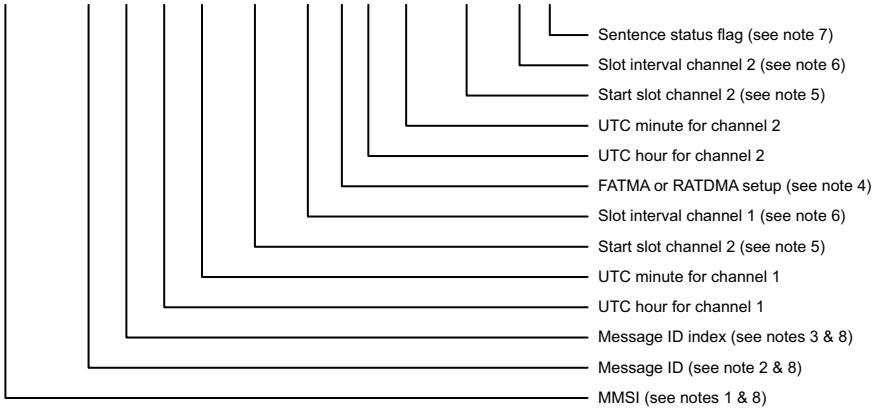
For example the query command $ECAIQ,AAR*21 requests the transceiver output an AAR sentence containing the currently configured broadcast rates for the AIS AtoN station.

Configuration sentences are communicated using the transceiver USB interface.

11.2.1 AAR - Configure broadcast rates for AtoN station

This sentence assigns the schedule of slots that will be used to broadcast Message 21 and other allowed AIS AtoN Station messages. It provides the start slot and interval between the slots used for consecutive transmissions for the message. The AIS AtoN Station should apply the information provided by this sentence to autonomously and continuously transmit the messages until revised by a new AAR sentence. The AIS AtoN Station, upon receipt of an AAR Query for this information, will generate sentences for configured messages providing the current broadcast schedule. New AAR assignments will override existing AAR assignments.

$--AAR,xxxxxxxxx,xx,xx,xx,xx,xxxx,x.x,x,xx,xx,xxxx,x.x,a*hh<CR><LF>



Note 1 The MMSI is defined in the AID sentence. This field contains the linkage between the MMSI definition (AID), Message 21 configuration (ACF, and ACE) and scheduling (AAR) of Message 21 transmissions.

Note 2 Message ID is the message identification of the message being scheduled. When Message ID is 0 this indicates that the slots being defined will be used for chaining messages. These slots are not reserved on the VDL via a Message 20 until the competent authority requires their use and will reserve the slots at that time for the proper duration. These slots can be used for chaining or for MPR single transmission.

Note 3 Message ID Index is used when there are multiple versions of a Message ID. This index value should start at 1.

Note 4 Used to select whether the AAR is configuring an FATDMA schedule or RATDMA/CSTDMA schedule (0 indicates FATDMA, 1 indicates RATDMA)

Note 5 For all messages which need to be transmitted in FATDMA mode, starting slot ranging from −1 to 2249 should be used. A value of –1 discontinues broadcasts of the message when the AAR sentence is sent to the AtoN Station, and indicates that no message has been broadcast if the AAR sentence is received from the AtoN Station. A null field indicates no change to the current start slot setting when sent to the AtoN Station, and indicates that the start slot has not been set, i.e. is unavailable, when the AAR sentence is received from the AtoN Station. For an RATDMA transmission schedule, this field will be Null.

Note 6 For all messages which need to be transmitted, in FATDMA mode slot Interval ranging from 0 to (24*60*2250;once per day) and in RATDMA/CSTDMA mode, time interval ranges from 0 to (24*60*60) s. A null field indicates no change to the current slot interval setting when sent to the AtoN Station, and indicates that the slot interval has not been set, i.e. is unavailable, when the AAR sentence is received from the AtoN Station.

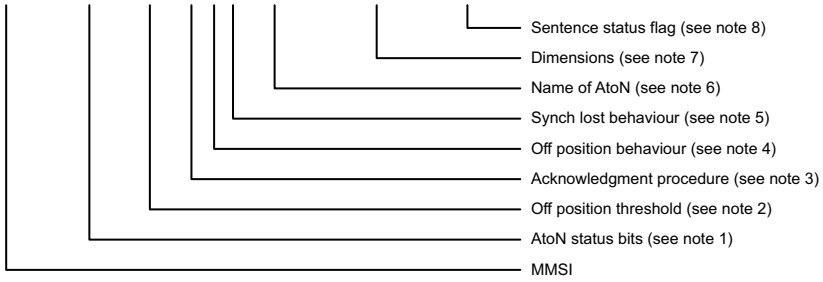
Note 7 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
“R’ = sentence is a query response
“C” = sentence is a configuration command to change settings.

Note 8 The MMSI/Message ID/Message ID index are used to reference a table of messages loaded using MPR, ACF/ACE; this sentence defines the broadcast schedule for each message. Each message in this table is referenced by the combination of MMSI, Message ID, and Message ID index.

11.2.2 ACE - Extended general AtoN Station configuration

This sentence and the ACF sentence are used to configure the AIS AtoN Station parameters when it is initially installed, and later in order to make changes to the way it operates. This sentence supports system administration of the AIS AtoN Station operation.

$--ACE,xxxxxxxxx,hh,xxxx,x,x,x,c--c,xxxxxxxxxx,a,*hh<CR><LF>



Note 1 AtoN status bits, indication of the AtoN status, default “00hex”: for a Virtual AtoN, this field should be 00hex. The three most significant bits represent the page ID.

Note 2 The off-position indicator is generated when this threshold is exceeded (distance in metres).

Note 3 Determines the behaviour of AtoN for message acknowledgement (Message 7 and 13):
0 will provide acknowledgement as defined by manufacturer,
1 will not provide acknowledgement.

Note 4 Off-position behaviour:
0 – maintain current transmission schedule,
1 – use new reporting interval configured by AAR using message ID index.

Note 5 Synch lost behaviour:
0 – silent,
1 – continue as before.

Note 6 Name of the AtoN: maximum 34 characters.

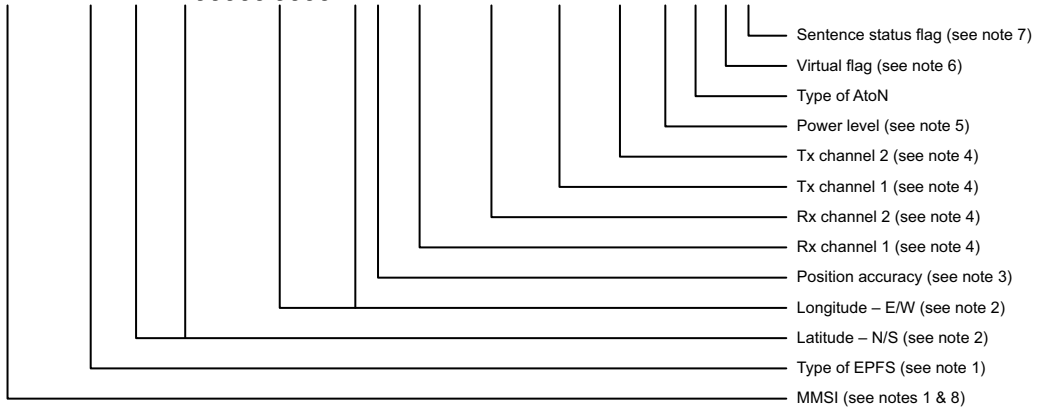
Note 7 Reference point of reported position; should be given as dimension (aaabbbccdd) of the buoy. (See IALA A-126)

Note 8 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
"R' = sentence is a query response,
"C" = sentence is a configuration command to change settings.

11.2.3 ACF - General AtoN Station configuration

This sentence and the ACE sentence are used to configure Message 21 content for the AtoN Station and all of the Synthetic/Virtual AtoN Stations associated with the AtoN Station.

$--ACF,xxxxxxxxx,x,llll.llll,a,yyyyy.yyyy,a,x,xxxx,xxxx,xxxx,xxxx,x,xx,x,a*hh<CR><LF>



Note 1 Identifies the source of the position, see ITU-R M.1371 Message 21 parameter (type of electronic position fixing device).

Note 2 Nominal or charted position.

Note 3 0 = low > 10 m,
1 = high < 10 m; differential mode of DGNSS. VHF channel number, see ITU-R M.1084.

Note 4 VHF channel number, see ITU-R M.1084.

Note 5 0 = default manufacturer power level (nominally 12,5 W),
1 to 9 as defined by the manufacturer.

Note 6 Virtual AtoN flag
0 = Real AtoN at indicated position (default),
1 = Virtual AtoN,
2 = Synthetic AtoN (flag remains 0 in message 21 but the repeat indicator must be > than 0).

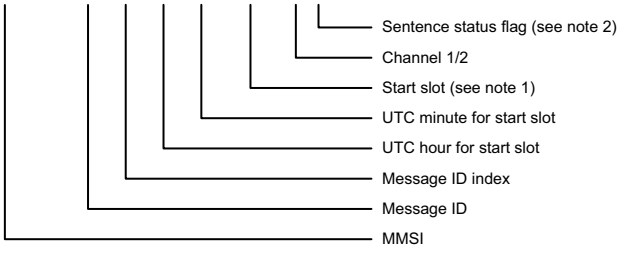
Note 7 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
"R' = sentence is a query response,
"C" = sentence is a configuration command to change settings.

Note 8 The MMSI/Message ID/Message ID Index are used to reference a table of messages loaded using MPR/ACF/ACE. This sentence defines the broadcast schedule for each message. Each message in this table is referenced by the combination of MMSI, Message ID and Message ID Index.

11.2.4 AFB - Forced broadcast

This sentence is used to force a transmission of the indicated VDL message, this message is already known to the AIS AtoN Station through AAR/MPR or ACE/ACF/AAR configuration commands.

$--AFB,xxxxxxxxx,xx,xx,xx,xx,xxxx,x,a*hh<CR><LF>



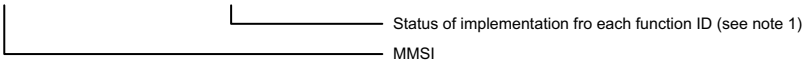
Note 1 If the start slot is null, the AtoN Station will use RATDMA for transmission.

Note 2 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
"R' = sentence is a query response
"C" = sentence is a configuration command to change settings.

11.2.5 AFC - AtoN function ID capability

This sentence is used to provide the capability information of implemented function ID by the EUT. This sentence is initiated with a QAFC and the response is the AFC.

$--AFC,xxxxxxxxx, hhhhhhhhhhhhhhhh*hh<CR><LF>

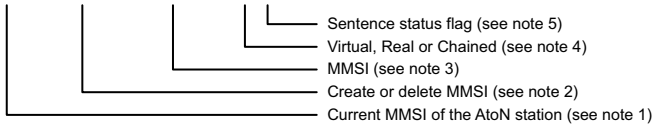


Note 1 Each bit corresponds to the function ID number and the bit value "0" indicates the function ID number is not supported and "1" indicates supported. The most significant bit is function ID "0".

11.2.6 AID - MMSI configuration

This sentence is used to load, for an AtoN Station, its Real, Virtual and chained MMSI(s). The MMSI from the factory shall be as defined by the manufacturer. Each AtoN Station will maintain a table of its MMSI(s) and the messages associated with these MMSI(s). This sentence is also user to load the destination MMSI for addressed messages. To set the destination MMSI using this sentence set the 'Virtual, Real or Chained' field to 0. Note that only one destination MMSI can be configured

$--AID,xxxxxxxxx,x,xxxxxxxxx,a,a*hh<CR><LF>



Note 1 The MMSI of the station being addressed. The initial factory setting should be defined by the manufacturer, for example 000000000.

Note 2 The indicator to define if the MMSI is being created/changed (1) or deleted (0). If own station MMSI is deleted it should revert to the factory setting. If a Virtual AtoN is deleted, then all associated messages for that Virtual AtoN are also deleted.

Note 3 The current MMSI to be created/changed/or deleted.

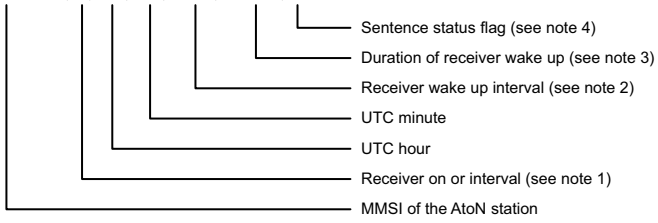
Note 4 Real AtoN, chained, or Virtual AtoN – Real is own station, chained indicates an MMSI that this station is responsible for relaying messages to and from, a Virtual AtoN indicates an MMSI that this station is responsible for generating at least a Message 21.
"R" – Real AtoN;
"V" = Virtual/Synthetic AtoN;
"P" = parent AtoN in the chain;
"C" = child AtoN in the chain.
"0" = Set destination MMSI for addressed messages.

Note 5 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
"R' = sentence is a query response,
"C" = sentence is a configuration command to change settings.

11.2.7 ARW -Configure the receiver turn-on times

This sentence defines the operational period for the receivers. When chaining the duration of receiver wake up time must be sufficient to allow correct operation of a chain.

$--ARW,xxxxxxxxx,x,xx,xx,xxx,xxxx,a*hh<CR><LF>



Note 1 0 = use interval setting as defined below;
1 = turn receiver on.

Note 2 Interval between receiver activation:
1 – 60 min if UTC hour is set to 24;
1 – 256 h if UTC hour is 0- 23;
(Note: 168 h is once per week).

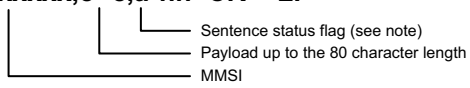
Note 3 Maximum awake time (1 440 min is 24 h).

Note 4 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
“R’ = sentence is a query response,
“C” = sentence is a configuration command to change settings.

11.2.8 MCR - Configure proprietary AtoN control

The payload of this sentence will be proprietary information used to control the AtoN Station.

$--MCR,xxxxxxxxx,c--c,a*hh<CR><LF>

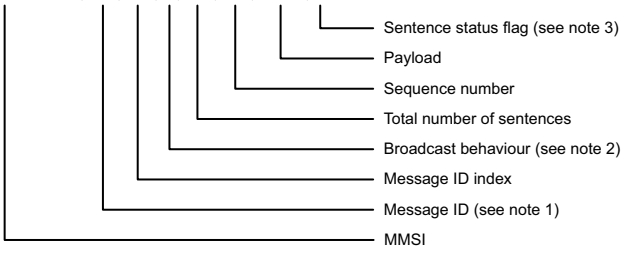


Note 1 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
“R’ = sentence is a query response,
“C” = sentence is a configuration command to change settings.

11.2.9 MPR - Message configuration of payload re-broadcast

This message will be used to command the AIS AtoN Station to rebroadcast the payload or to define a new message for autonomous, continuous transmission. The AAR configuration with message ID/message ID index for a specific MPR must precede the MPR to identify it as autonomous continuous transmission. If it is a single transmission, this payload will be broadcast using the slots reserved by the AAR with message ID/message ID Index = 0, or it will use the next available slot.

$--MPR,xxxxxxxxx,xx,xx,x,xx,xx,c--c,a*hh<CR><LF>



Note 1 The following messages are supported by ITU-R M.1371 Messages 6, 8, 12, 14, 25, 26 and other appropriate messages.

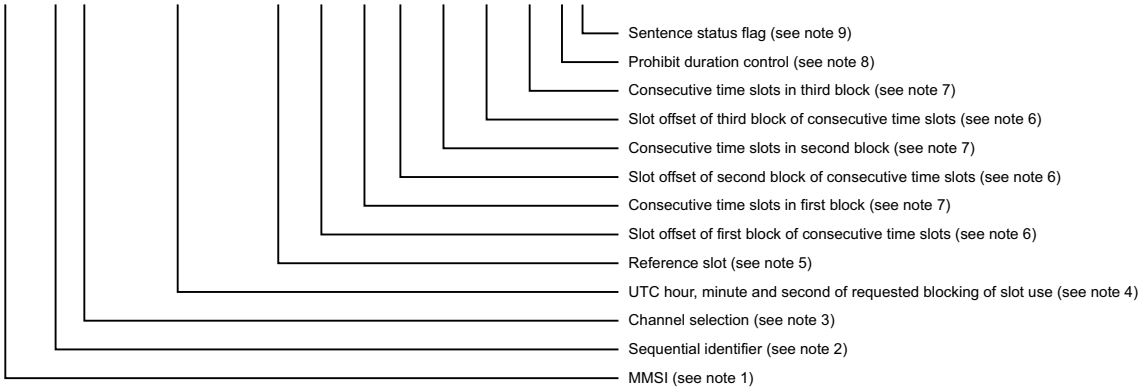
Note 2 0 = use AAR definition,
1 = use next available slot.

Note 3 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
“R’ = sentence is a query response,
“C” = sentence is a configuration command to change settings.

11.2.10 TSP - Transmit slot prohibit

This sentence is used to prohibit an AIS station from transmitting in the specified slots. The AIS Station receiving this sentence should not use the next occurrence of the indicated slots. This sentence is designed to be used to protect interrogation responses from interference from Base Station transmissions and for use with AtoN Stations. For an AtoN Station the Unique Identifier is the AtoN Station Real MMSI.

$--TSP,c--c,x.x,x,HHMMSS.SS,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x,a,a*hh<CR><LF>



Note 1 The MMSI is defined in the AID sentence and is the MMSI of the Real AtoN.

Note 2 The sequential identifier provides an identification number from 0 to 99 that is sequentially assigned and is incremented for each new TSP sentence. The count resets to 0 after 99 is used. This sequential identifier is used to identify the Base Station’s response to this TSP-sentence when it replies with a slot prohibit status report (see TSR-sentence).

Note 3 1 = Channel 1,
2 = Channel 2.

Note 4 This is for record keeping. It contains the hour, minute, and second of this request.

Note 5 This is the slot from which the following slot offsets are referenced.

Note 6 Slot offset of the first slot in the block of slots to be blocked from use by the Base Station.
0 indicates no prohibited slots.

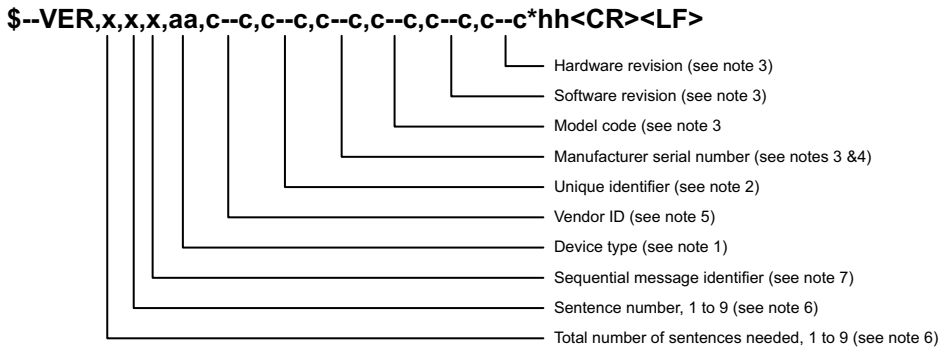
Note 7 Total number of consecutive slots to be blocked from use by the Base Station. The first slot of the block is also part of the count. Therefore, the minimum value is 1.
1-5 = number of prohibited slots.

Note 8 This field is used to control the prohibited slots. This field should not be null.
C = immediately restore for use all slots currently prohibited from use,
E = the slot prohibition expires for the slots identified in this sentence after their next occurrence,
P = prohibit the use of slots identified in this sentence. Slots are restored for use using “C” or “R”,
R = restore the use of slots identified in this sentence.

Note 9 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
“R’ = sentence is a query response,
“C” = sentence is a configuration command to change settings.

11.2.11 VER - Version

This sentence is used to provide identification and version information about a talker device. This sentence is produced either as a reply to a query sentence. The contents of the data fields, except for the unique identifier, should be manufactured into the talker device. The unique identifier is the AtoN Station Real MMSI. In order to meet the 79-character requirement, a "multi-sentence message" may be needed to convey all the data fields.



Note 1 The device type is used to identify the manufactured purpose of the device. Choice of the device type identifier is based upon the designed purpose of the device. It is set into the equipment based upon the primary design of the device and remains constant even if the user defined talker identifier feature is used (see BCF-sentence). For AIS device types, use one of the following talker identifier mnemonics:
AB: independent AIS Base Station;
AD: dependent AIS Base Station;
AI: mobile class A or B (see IEC 61993-2 and IEC 62287-1) AIS station;
AL: limited AIS Base Station;
AN: AIS aids to navigation station;
AR: AIS receiving station;
AS: AIS physical shore station;
AT: AIS transmitting station;
AX: AIS simplex repeater station;
DU: duplex repeater station;
UP: microprocessor controller;
U#: (0 ≤ # ≤ 9) user configured talker identifier.

Note 2 The unique identifier is used for system level identification of a station, 15 alphanumeric character maximum. For an AtoN Station, this is the Real AtoN MMSI number.

Note 3 The data field length may be 32 characters maximum. The length of 32 characters is chosen in order to be consistent with similar data field lengths in the IEC 61162 standard. When large character lengths are used and the 80 character sentence limit would be exceeded for a single sentence, a series of successive VER sentences should be used to avoid the problem (using data fields 1 and 2 to ensure the multiple VER sentences are properly associated by the listener). Null fields can be used for data fields contained in other sentences of the series. Every VER sentence shall contain the unique identifier.

Note 4 The manufacturer's serial number for the unit. Note, this "internal" manufacturer's serial number may or may not match the physical serial number of the device.

Note 5 Vendor identification.

Note 6 Depending on the number of characters in each data field, it may be necessary to use a "multi-sentence message" to convey a "VER reply." The first data field specifies the total number of sentences needed, minimum value 1. The second data field identifies the sentence number, minimum value 1.

Note 7 The third data field provides the sequential message identifier. The sequential message identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new multi-sentence message. The count resets to 0 after 9 is used. For a VER reply requiring multiple sentences, each sentence of the message contains the same sequential message identification number. It is used to identify the sentences containing portions of the same VER reply. This allows for the possibility that other sentences might be interleaved with the VER reply that, taken collectively, contain a single VER reply. This data field may be a null field for VER replies that fit into one sentence.

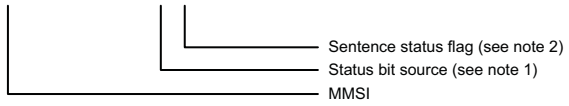
11.3 Proprietary configuration sentences

The following section documents the proprietary NMEA0183/IEC61162 sentences used for AIS AtoN configuration and control. These sentence relate mainly to configuration of data capture and integration with external equipment.

11.3.1 Status Bit Source

The MCR SBS command is used to set the source for the AtoN status bits which are transmitted in AIS AtoN position reports (message #21). Refer to sections 6.1.3 and 7.1.4 for further information on the available interfaces for status information.

$--MCR,xxxxxxxxx,SBS,x,a*hh<CR><LF>



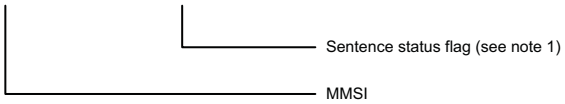
Note 1 Status bit source is either:
0 = ACE sentence provides status bits
1 = Transceiver basic IO connections provide status bits
2 = Sensor Interface provides status bits (applies only to variants including the Sensor Interface)

Note 2 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
"R' = sentence is a query response,
"C" = sentence is a configuration command to change settings.

11.3.2 Status Bit Source Query

This command issued to query the transceiver for the current Status Bit Source configuration. The response will be in the format described in 11.3.1.

$--MCR,xxxxxxxxx,Q,SBS,a*hh<CR><LF>

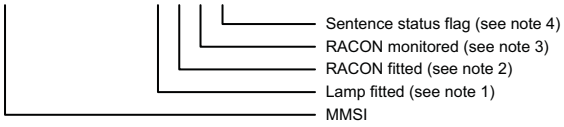


Note 1 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
"R' = sentence is a query response,
"C" = sentence is a configuration command to change settings.

11.3.3 Light / RACON configuration

The MCR LRC command is used to configure the fixed status of a connected Light and / or RACON. This affects the setting of the related status bits transmitted in message #21.

$--MCR,xxxxxxxxx,LRC,x,x,x,a*hh<CR><LF>



Note 1 Set the light fitted status, 1 = light fitted, 0 = light not fitted

Note 2 Set the RACON fitted status, 1 = RACON fitted, 0 = RACON not fitted

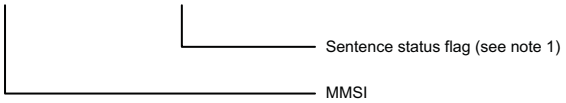
Note 3 Set the RACON monitored status, 1 = RACON monitored, 0 = RACON not monitored

Note 4 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
"R' = sentence is a query response,
"C" = sentence is a configuration command to change settings.

11.3.4 Light / RACON configuration query

This command issued to query the transceiver for the current Light / RACON configuration. The response will be in the format described in 11.3.3.

$--MCR,xxxxxxxxx,Q,LRC,a*hh<CR><LF>



Note 1 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings. This field should not be null.
"R' = sentence is a query response,
"C" = sentence is a configuration command to change settings.

11.3.5 General MCR query

$----Q,MCR*hh

This query command will return all the MCR commands as used for direct transceiver configuration.

A general query for MCR using $--Q,MCR will also return ACQ (Acquisition Configuration) information for all messages. This is used as part of the configuration of an AIS AtoN transceiver connected to a Sensor Interface; the information within the ACQ details the acquisition time the Sensor Interface needs from the AIS AtoN transceiver before a transmission is going to take place, thus allowing the Sensor Interface sufficient time to collect and average data as required for a transmission.

When the AIS AtoN transceiver is not connected to a Sensor Interface the ACQ data is not required but will still get displayed when queried.