



Date: Tue, 5 Sep 2000 13:24:24 +0530 (IST)  
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 Subject: Reg. RFI Tx At colony

R00201

Dear Pravin,

Shri MRS suggested that you will be helping and coordinating the RFI experiment planned by Prof. Swarup tomorrow from 1100 hrs. In continuation with this Prof. Swarup wanted one Transmitting antenna to be mounted at some convenient location in the housing colony facing GMRT site. For this you may use any available LPDA, mount, Sig gen (old wavetek - pl. ensure that it works at 150MHz and avoid taking Marconi), Power board and if possible a stabiliser also. If you dont find any LPDA at 150 MHz, Shri MRS suggested you can take the new broadband antenna, Pl. check up with Ajit whether it covers 150 MHz.

Will it be possible for you to get this going by tomorrow and in case of any difficulty could you please inform MRS/ me.

Since Prof. swarup is planning to return back same day he would like to finish as much survey as possible by tomorrow itself. I will be there tomorrow and day after.

Thanks

som

*Feeds 150MHz to the dish when there may be no RFI*  
 Freq 153.3 MHz or 152.5 "

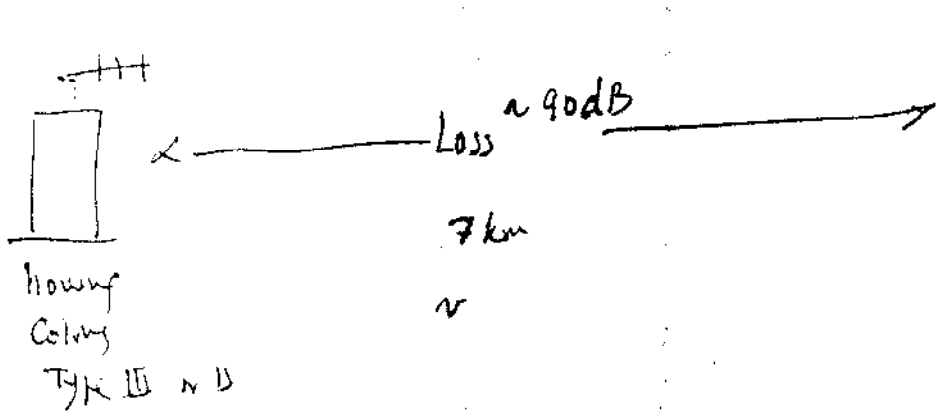
*-90  
 -5  
 -50  
 -145 dBW/m<sup>2</sup>*

*Should be detectable Sp. Acc.*

=====  
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 =====

*Redrite -30dBm = -50dBm  
 -30 " -60 "  
 -40 " -70 "*

*side lobe ~ -5dB*



*Some antennas tracking with or blank jnt. any source need. transmit (±) hr*

## RFI Meas at 235 MHz

### Expt A

- ① El = Antennas to zenith  
A2 = Point one antenna to ~~E~~ 2 each other  
and one of center to E  
simultaneously to W, N, S.
- ② RF 235 MHz (feed to horizon)  
IF BW ~~5.6~~ 5.6 MHz  
LO = 233 + 70
- ③ No default settings  
Spectrum Analyz  
(a) Sweep 5 MHz
- ④ Retard for ~ 1 hour  
(b) AND ~~15~~ 15 MHz  
later

### Expt. B

- Redrite from the housing  
colony (see enclosure)
- observe at 152 - 154 MHz band  
Track a source
  - RF ~~153~~ solar atten.  
LO = 153 + 70  
IF filter = 5.6 MHz  
(a) IF atten default

This is a Receive and Periodic Transmit message. This format is used by the host to send user's position estimates to the receiver. This format is also used by the receiver to periodically transmit position to the host. This message can be switched ON/OFF.

### Extended Altitude - AB02

??AB021CL

- 1 4 bytes altitude, in units of 0.01 meters
- C Checksum
- L Line feed

| Byte number | Message Field Name | Description            | Status                  |
|-------------|--------------------|------------------------|-------------------------|
| 1           | ?                  | Accord's custom binary |                         |
| 2           | ?                  | Accord's custom binary |                         |
| 3           | 0x02               | Message id             | Lower byte              |
| 4           | 0xAB               | Message id             | Upper byte              |
| 5           | 1                  | Altitude               | Least significant byte  |
| 6           | 1                  | Altitude               | Second significant byte |
| 7           | 1                  | Altitude               | Third significant byte  |
| 8           | 1                  | Altitude               | Most significant byte   |
| 9           | C                  | Checksum               |                         |
| 10          | L                  | Linefeed               |                         |

This is a Receive message. Using this format, the user can send his/her estimate of constant altitude to be considered during 2D-solution mode. The receiver accepts this message only when the prevailing solution mode in the receiver is 2D. The receiver does not accept this message if it has not computed position.



**ECEF Position - AC00**

??AC001234CL

- 1 4 bytes, Time tag unsigned integer, Time tag is the offset from the beginning of GPS week (00:00:00 Sunday GMT) in seconds.
- 2 4 bytes ECEF x position - X Co-ordinate, in units of 0.01 meters
- 3 4 bytes ECEF y position - Y Co-ordinate, in units of 0.01 meters
- 4 4 bytes ECEF z position - Z Co-ordinate, in units of 0.01 meters
- C Checksum
- L Line feed

| Byte number | Message Field Name | Description            | Status                  |
|-------------|--------------------|------------------------|-------------------------|
| 1           | ?                  | Accord's custom binary |                         |
| 2           | ?                  | Accord's custom binary |                         |
| 3           | 0x00               | Message id             | Lower byte              |
| 4           | 0xAC               | Message id             | Upper byte              |
| 5           | 1                  | Time tag               | Least significant byte  |
| 6           | 1                  | Time tag               | Second significant byte |
| 7           | 1                  | Time tag               | Third significant byte  |
| 8           | 1                  | Time tag               | Most significant byte   |
| 9           | 2                  | ECEF X-Coordinate      | Least significant byte  |
| 10          | 2                  | ECEF X-Coordinate      | Second significant byte |
| 11          | 2                  | ECEF X-Coordinate      | Third significant byte  |
| 12          | 2                  | ECEF X-Coordinate      | Most significant byte   |
| 13          | 3                  | ECEF Y-Coordinate      | Least significant byte  |
| 14          | 3                  | ECEF Y-Coordinate      | Second significant byte |

|    |   |                   |                         |
|----|---|-------------------|-------------------------|
| 15 | 3 | ECEF Y-Coordinate | Third significant byte  |
| 16 | 3 | ECEF Y-Coordinate | Most significant byte   |
| 17 | 4 | ECEF Z-Coordinate | Least significant byte  |
| 18 | 4 | ECEF Z-Coordinate | Second significant byte |
| 19 | 4 | ECEF Z-Coordinate | Third significant byte  |
| 20 | 4 | ECEF Z-Coordinate | Most significant byte   |
| 21 | C | Checksum          |                         |
| 22 | L | Linefeed          |                         |

This is a Transmit message whose period can be configured by the host. This message is transmitted only when GPS is available. This message can be switched off or on. By default, this message is switched off.

#### Ground Course and Heading - AE00

??AE0012CL

- 1 2 bytes Ground Course, in units of 0.01 Kmph
- 2 2 bytes True Heading, in units of 0.01 degrees
- C Checksum
- L Line feed

| Byte number | Message Field Name | Description            | Status                 |
|-------------|--------------------|------------------------|------------------------|
| 1           | ?                  | Accord's custom binary |                        |
| 2           | ?                  | Accord's custom binary |                        |
| 3           | 0x00               | Message id             | Lower byte             |
| 4           | 0xAE               | Message id             | Upper byte             |
| 5           | 1                  | Ground Course          | Least significant byte |
| 6           | 1                  | Ground Course          | Most significant byte  |
| 7           | 2                  | True Heading           | Least significant byte |
| 8           | 2                  | True Heading           | Most significant byte  |

|    |   |          |  |
|----|---|----------|--|
| 9  | C | Checksum |  |
| 10 | L | Linefeed |  |

This is a Transmit message whose period can be configured by the host. The speed and heading information is transmitted from the receiver to the host. This message is transmitted only when GPS is available. This message can be switched off or on.

**Receiver Status - AF06**

??AF061A1B1C1D1E1F1G1H1I1J1K1L2A2B2C2D2E2F2G2H2I2J2K2L3A3B3C3  
 D3E3F3G3H3I3J3K3L4A4B4C4D4E4F4G4H4I4J4K4L5A5B5C5D5E5F5G5H5I5J  
 5K5L5M5N5O5P5Q5R5S5T5U5V5W5X5Y5Z5AA6A6B6C6L

- 1A 1 byte Sv id – Satellite Vehicle number assigned to Channel 1
- 1B 1 byte Sv id – Satellite Vehicle number assigned to Channel 2
- 1C 1 byte Sv id – Satellite Vehicle number assigned to Channel 3
- 1D 1 byte Sv id – Satellite Vehicle number assigned to Channel 4
- 1E 1 byte Sv id – Satellite Vehicle number assigned to Channel 5
- 1F 1 byte Sv id – Satellite Vehicle number assigned to Channel 6
- 1G 1 byte Sv id – Satellite Vehicle number assigned to Channel 7
- 1H 1 byte Sv id – Satellite Vehicle number assigned to Channel 8
- 1I 1 byte Sv id – Satellite Vehicle number assigned to Channel 9
- 1J 1 byte Sv id – Satellite Vehicle number assigned to Channel 10
- 1K 1 byte Sv id – Satellite Vehicle number assigned to Channel 11
- 1L 1 byte Sv id – Satellite Vehicle number assigned to Channel 12
- 2A 2 bits Status - Status of Channel 1
- 2B 2 bits Status - Status of Channel 2
- 2C 2 bits Status - Status of Channel 3
- 2D 2 bits Status - Status of Channel 4
- 2E 2 bits Status - Status of Channel 5

|    |   |
|----|---|
| 2F | 2 bits Status - Status of Channel 6   |
| 2G | 2 bits Status - Status of Channel 7   |
| 2H | 2 bits Status - Status of Channel 8   |
| 2I | 2 bits Status - Status of Channel 9   |
| 2J | 2 bits Status - Status of Channel 10  |
| 2K | 2 bits Status - Status of Channel 11  |
| 2L | 2 bits Status - Status of Channel 12 (01 = "ACQ", 02 = "TRACK")                     |
| 3A | 1bit Constel - Indicates whether the SV on Channel 1 is used for position solution  |
| 3B | 1bit Constel - Indicates whether the SV on Channel 2 is used for position solution  |
| 3C | 1bit Constel - Indicates whether the SV on Channel 3 is used for position solution  |
| 3D | 1bit Constel - Indicates whether the SV on Channel 4 is used for position solution  |
| 3E | 1bit Constel - Indicates whether the SV on Channel 5 is used for position solution  |
| 3F | 1bit Constel - Indicates whether the SV on Channel 6 is used for position solution  |
| 3G | 1bit Constel - Indicates whether the SV on Channel 7 is used for position solution  |
| 3H | 1bit Constel - Indicates whether the SV on Channel 8 is used for position solution  |
| 3I | 1bit Constel - Indicates whether the SV on Channel 9 is used for position solution  |
| 3J | 1bit Constel - Indicates whether the SV on Channel 10 is used for position solution |

- 3K 1bit Constel - Indicates whether the SV on Channel 11 is used for position solution
- 3L 1bit Constel - Indicates whether the SV on Channel 12 is used for position solution  
(0 = "Not used for position solution", 1 = "Used for position solution" )
- 4A 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 1
- 4B 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 2
- 4C 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 3
- 4D 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 4
- 4E 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 5
- 4F 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 6
- 4G 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 7
- 4H 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 8
- 4I 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 9
- 4J 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 10
- 4K 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 11
- 4L 1bit Ephemeris - Availability of ephemeris data for the SV assigned to Channel 12
- 5A 1 bit Almanac status - Almanac data for SV on Channel 1 is available



|    |  |
|----|--|
| 5B | 1 bit Almanac status - Almanac data for SV on Channel 2 is available   |
| 5C | 1 bit Almanac status - Almanac data for SV on Channel 3 is available   |
| 5D | 1 bit Almanac status - Almanac data for SV on Channel 4 is available   |
| 5E | 1 bit Almanac status - Almanac data for SV on Channel 5 is available   |
| 5F | 1 bit Almanac status - Almanac data for SV on Channel 6 is available   |
| 5G | 1 bit Almanac status - Almanac data for SV on Channel 7 is available   |
| 5H | 1 bit Almanac status - Almanac data for SV on Channel 8 is available   |
| 5I | 1 bit Almanac status - Almanac data for SV on Channel 9 is available   |
| 5J | 1 bit Almanac status - Almanac data for SV on Channel 10 is available  |
| 5K | 1 bit Almanac status - Almanac data for SV on Channel 11 is available  |
| 5L | 1 bit Almanac status - Almanac data for SV on Channel 12 is available  |
| 5M | 2 bits Almanac status<br>(00 = "Almanac data is available and OK"<br>01 = "Almanac data is not available",<br>10 = "Almanac data is available but older than six months"<br>11 = "Almanac data is available but its age is not known") |
| 5N | 1 bit Position estimate available<br>(1 = "The receiver has an estimate of its position", 0 = "Has no estimate")   |
| 5O | 1 bit GPS available<br>(1 = "Computing position fixes", 0 = "Not Computing position fixes")  |
| 5P | 1 bit Dead Reckon<br>(1 = "Propagating position", 0 = "Not propagating position")  |
| 5Q | 1 bit RTCM ON  |
| 5R | 1 bit Osc OK   |
| 5S | 2 bits Solution mode   |

- (0 = "3D", 1 = "2D")
- 5T 3 bits Receiver Operational Mode  
(000 = "Search mode", 001 = "Position solution mode", 010 = "Idle mode")
- 5U 1 bit Time  
(1 = "Receiver has computed time" 0 = "Not computed time")
- 5V 1 bit Antenna Detection  
(1 = "Antenna connected" 0 = "Antenna not connected")
- 5W 1 bit Low Battery  
(1 = "Battery low" 0 = "Battery OK")
- 5X 1 bit PTTI reference  
(1 = "UTC" 0 = "GMT")
- 5Y 1 bit Velocity filter  
(1 = "Velocity filter enabled" 0 = "Velocity filter disabled")
- 5Z 2 bits DGPS mode  
(00 = "OFF" 01 = "ON" 10 = "AUTO")
- 5AA 1 bit unused
- 6A 1 byte Firmware Version Number  
(version number scaled up by 10)
- 6B 1 byte Datum Index
- C Checksum
- L Line feed

| Byte number | Message Field Name | Description                        | Status     |
|-------------|--------------------|------------------------------------|------------|
| 1           | ?                  | Accord's custom binary             |            |
| 2           | ?                  | Accord's custom binary             |            |
| 3           | 0x06               | Message id _                       | Lower byte |
| 4           | 0xAF               | Message id                         | Upper byte |
| 5           | 1A                 | Sv id of Sv assigned to channel 1  |            |
| 6           | 1B                 | Sv id of Sv assigned to channel 2  | --         |
| 7           | 1C                 | Sv id of Sv assigned to channel 3  |            |
| 8           | 1D                 | Sv id of Sv assigned to channel 4  |            |
| 9           | 1E                 | Sv id of Sv assigned to channel 5  |            |
| 10          | 1F                 | Sv id of Sv assigned to channel 6  |            |
| 11          | 1G                 | Sv id of Sv assigned to channel 7  |            |
| 12          | 1H                 | Sv id of Sv assigned to channel 8  |            |
| 13          | 1I                 | Sv id of Sv assigned to channel 9  |            |
| 14          | 1J                 | Sv id of Sv assigned to channel 10 |            |
| 15          | 1K                 | Sv id of Sv assigned to channel 11 |            |
| 16          | 1L                 | Sv id of Sv assigned to channel 12 |            |

|    |    |                        |              |
|----|----|------------------------|--------------|
| 17 | 2A | Status of Channel 1    | Bits 0 and 1 |
| 17 | 2B | Status of channel 2    | Bits 2 and 3 |
| 17 | 2C | Status of channel 3    | Bits 4 and 5 |
| 17 | 2D | Status of channel 4    | Bits 6 and 7 |
| 18 | 2E | Status of channel 5    | Bits 0 and 1 |
| 18 | 2F | Status of channel 6    | Bits 2 and 3 |
| 18 | 2G | Status of channel 7    | Bits 4 and 5 |
| 18 | 2H | Status of channel 8    | Bits 6 and 7 |
| 19 | 2I | Status of channel 9    | Bits 0 and 1 |
| 19 | 2J | Status of channel 10   | Bits 2 and 3 |
| 19 | 2K | Status of channel 11   | Bits 4 and 5 |
| 19 | 2L | Status of channel 12   | Bits 6 and 7 |
| 20 | 3A | Constel for channel 1  | Bit 0        |
| 20 | 3B | Constel for channel 2  | Bit 1        |
| 20 | 3C | Constel for channel 3  | Bit 2        |
| 20 | 3D | Constel for channel 4  | Bit 3        |
| 20 | 3E | Constel for channel 5  | Bit 4        |
| 20 | 3F | Constel for channel 6  | Bit 5        |
| 20 | 3G | Constel for channel 7  | Bit 6        |
| 20 | 3H | Constel for channel 8  | Bit 7        |
| 21 | 3I | Constel for channel 9  | Bit 0        |
| 21 | 3J | Constel for channel 10 | Bit 1        |
| 21 | 3K | Constel for channel 11 | Bit 2        |
| 21 | 3L | Constel for channel 12 | Bit 3        |
| 21 | 4A | Ephemeris of Channel 1 | Bit 4        |
| 21 | 4B | Ephemeris of channel 2 | Bit 5        |
| 21 | 4C | Ephemeris of channel 3 | Bit 6        |
| 21 | 4D | Ephemeris of channel 4 | Bit 7        |
| 22 | 4E | Ephemeris of channel 5 | Bit 0        |

|    |    |                             |                 |
|----|----|-----------------------------|-----------------|
| 22 | 4F | Ephemeris of channel 6      | Bit 1           |
| 22 | 4G | Ephemeris of channel 7      | Bit 2           |
| 22 | 4H | Ephemeris of channel 8      | Bit 3           |
| 22 | 4I | Ephemeris of channel 9      | Bit 4           |
| 22 | 4J | Ephemeris of channel 10     | Bit 5           |
| 22 | 4K | Ephemeris of channel 11     | Bit 6           |
| 22 | 4L | Ephemeris of channel 12     | Bit 7           |
| 23 | 5A | Almanac of channel 1        | Bit 0           |
| 23 | 5B | Almanac of channel 2        | Bit 1           |
| 23 | 5C | Almanac of channel 3        | Bit 2           |
| 23 | 5D | Almanac of channel 4        | Bit 3           |
| 23 | 5E | Almanac of channel 5        | Bit 4           |
| 23 | 5F | Almanac of channel 6        | Bit 5           |
| 23 | 5G | Almanac of channel 7        | Bit 6           |
| 23 | 5H | Almanac of channel 8        | Bit 7           |
| 24 | 5I | Almanac of channel 9        | Bit 0           |
| 24 | 5J | Almanac of channel 10       | Bit 1           |
| 24 | 5K | Almanac of channel 11       | Bit 2           |
| 24 | 5L | Almanac of channel 12       | Bit 3           |
| 24 | 5M | Almanac status              | Bits 4 and 5    |
| 24 | 5N | Position estimate available | Bit 6           |
| 24 | 5O | GPS available               | Bit 7           |
| 25 | 5P | Dead Reckon                 | Bit 0           |
| 25 | 5Q | RTCM ON                     | Bit 1           |
| 25 | 5R | Oscillator OK               | Bit 2           |
| 25 | 5S | Solution mode               | Bits 3 and 4    |
| 25 | 5T | Receiver Operational Mode   | Bits 5, 6 and 7 |

|    |     |                   |              |
|----|-----|-------------------|--------------|
| 26 | 5U  | Time              | Bit 0        |
| 26 | 5V  | Antenna detection | Bit 1        |
| 26 | 5W  | Low battery       | Bit 2        |
| 26 | 5X  | PTTI reference    | Bit 3        |
| 26 | 5Y  | Velocity filter   | Bit 4        |
| 26 | 5Z  | DGPS mode         | Bits 5 and 6 |
| 26 | 5AA | Unused            | Bit 7        |
| 27 | 6A  | Firmware version  |              |
| 28 | 6B  | Datum index       |              |
| 29 | C   | Checksum          |              |
| 30 | L   | Linefeed          |              |

Receiver status is a Periodic Transmit message. This message gives complete information about satellites in different channels and the status of each channel. The message includes availability status of ephemeris, almanac and GPS. This message can be switched off or on and its periodicity can be configured.

**Dop Estimate - A000**

??A0001234CL

- 1 2 bytes PDOP, in units of 0.01
- 2 2 bytes HDOP, in units of 0.01
- 3 2 bytes GDOP, in units of 0.01
- 4 2 bytes Error estimate, in units of 0.1 meters
- C Checksum
- L Line feed

| Byte number | Message Field Name | Description            | Status |
|-------------|--------------------|------------------------|--------|
| 1           | ?                  | Accord's custom binary |        |
| 2           | ?                  | Accord's custom binary |        |

|    |      |                |                        |
|----|------|----------------|------------------------|
| 3  | 0x00 | Message id     | Lower byte             |
| 4  | 0xA0 | Message id     | Upper byte             |
| 5  | 1    | PDOP           | Least significant byte |
| 6  | 1    | PDOP           | Most significant byte  |
| 7  | 2    | HDOP           | Least significant byte |
| 8  | 2    | HDOP           | Most significant byte  |
| 9  | 3    | GDOP           | Least significant byte |
| 10 | 3    | GDOP           | Most significant byte  |
| 11 | 4    | Error Estimate | Least significant byte |
| 12 | 4    | Error Estimate | Most significant byte  |
| 13 | C    | Checksum       |                        |
| 14 | L    | Linefeed       |                        |

This is a transmit message which gives information about the geometry of the satellites used for position solution. In 2D mode only HDOP is transmitted and in 3D mode both HDOP and PDOP are transmitted. This message can be switched on or off from the host.

**Message Datum Setup - A001**

??A001123456CL

- 1 1 byte Datum
- 2 2 bits Terrain (0 = "Clear" 1 = "Interrupted" 2 = "Obstructed")
- 3 2 bits Distance Units (0 = "Feet" 1 = "Meters")
- 4 1 bit Altitude Units (0 = "Feet" 1 = "Meters")
- 5 1 bit Magnetic variation model (0 = "Manual" 1 = "Auto")
- 6 2 bits Unused
- C Checksum
- L Line feed

| Byte number | Message Field Name | Description              | Status       |
|-------------|--------------------|--------------------------|--------------|
| 1           | ?                  | Accord's custom binary   |              |
| 2           | ?                  | Accord's custom binary   |              |
| 3           | 0x01               | Message id               | Lower byte   |
| 4           | 0xA0               | Message id               | Upper byte   |
| 5           | 1                  | Datum                    |              |
| 6           | 2                  | Terrain                  | Bits 0 and 1 |
| 6           | 3                  | Distance units           | Bits 2 and 3 |
| 6           | 4                  | Altitude units           | Bit 4        |
| 6           | 5                  | Magnetic Variation Model | Bit 5        |
| 6           | 6                  | Unused                   | Bits 6 and 7 |
| 7           | C                  | Checksum                 |              |
| 8           | L                  | Linefeed                 |              |

This is a receive message which gives information about the local datum chosen by the user. The datum ID is transmitted from the host to the receiver. By default, the unit for altitude is meters and that for distance is kmph. The magnetic variation parameter is currently unused.

**Almanac Data page - A002**

??A00212CL

- 1 24 bytes Almanac, One complete page of almanac data (words 3 through 10 of the raw almanac data broadcast by the satellite with parity bits omitted).
- 2 2 bytes GPS Ref\_week, Almanac Reference Week
- C Checksum
- L Line feed



| Byte number | Message Field Name | Description                                | Status     |
|-------------|--------------------|--|------------|
| 1           | ?                  | Accord's custom binary                     |            |
| 2           | ?                  | Accord's custom binary                     |            |
| 3           | 0x02               | Lower byte of message id                   | Lower byte |
| 4           | 0xA0               | Upper byte of message id                   | Upper byte |
| 5 - 28      | 1                  | One complete page of almanac               | 24 bytes   |
| 29          | 2                  | GPS reference week, Almanac reference week | Lower byte |
| 30          | 2                  | GPS reference week, Almanac Reference week | Upper byte |
| 31          | C                  | Checksum                                   |            |
| 32          | L                  | Linefeed                                   |            |

This is a Bi-directional message. This format is used for upload/download of almanac from/to the host.

**Satellite Data - A006**

??A006123456CL

- 1 2 bytes Azimuth angle, azimuth angle of the SV from the user's position in degrees
- 2 15 bits Elevation angle, elevation angle of the SV from the user's position in degrees
- 3 1 bit Valid, (0 = "Satellite not in the orbit or unhealthy", 1 = "Satellite in orbit and healthy")
- 4 7 bits Unused
- 5 1 bit Ascending, (1 = "Ascending", 0 = "Descending")
- 6 1 byte SV, Satellite number whose elevation and azimuth are being sent
- C Checksum