CAN Protocol 정의

CAN_SPEED : 500kbps

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문서버전 1.0.0.

Revision History

날짜	Version	비고
17. 08. 16.	1.0.0.	First Revision

ROS_PACKAGE 사용법

pwd : ROS_DIR/src/

cmd : git clone https://github.com/JUSTGOM/sans_can

실행 : rosrun sans_can sans_can_node

Required : PCAN Library

Ublox C94-M8P
(1Hz)

▸ Position (1)

Identifier Type	Identifier	DLC
Standard ID	0x001	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
WGS84_Lat	위도	0	31	degree	uint32_t	1e-7
WGS84_Lon	경도	32	63	degree	uint32_t	1e-7

7	6	5	4	3	2	1	0	
WGS84_Lat(1)								0
WGS84_Lat(2)								8
WGS84_Lat(3)								16
WGS84_Lat(4)								24
WGS84_Lon(1)								32
WGS84_Lon(2)								40
WGS84_Lon(3)								48
WGS84_Lon(4)								56

▸ Position (2)

Identifier Type	Identifier	DLC
Standard ID	0x002	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
WGS84_Alt	고도	0	31	meter	uint32_t	1e-3
NED_N	X 좌표(North)	32	63	meter	float	-

7	6	5	4	3	2	1	0	
WGS84_Alt(1)								0
WGS84_Alt(2)								8
WGS84_Alt(3)								16
WGS84_Alt(4)								24
NED_N(1)								32
NED_N(2)								40
NED_N(3)								48
NED_N(4)								56

▸ Position (3)

Identifier Type	Identifier	DLC
Standard ID	0x003	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
NED_E	Y 좌표(East)	0	31	meter	float	-
NED_D	Z 좌표(Down)	32	63	meter	float	-

7	6	5	4	3	2	1	0	
NED_E(1)								0
NED_E(2)								8
NED_E(3)								16
NED_E(4)								24
NED_D(1)								32
NED_D(2)								40
NED_D(3)								48
NED_D(4)								56

▸ Position Variation (1) UBX-NAV-HPPOSLLH(hAcc, vAcc)

Identifier Type	Identifier	DLC
Standard ID	0x004	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
Hori_Accuracy	수평면 정확도	0	31	meter	uint32_t	1e-4
Vert_Accuracy	수직면 정확도	32	63	meter	uint32_t	1e-4

7	6	5	4	3	2	1	0	
Hori_Accuracy(1)								0
Hori_Accuracy(2)								8
Hori_Accuracy(3)								16
Hori_Accuracy(4)								24
Vert_Accuracy(1)								32
Vert_Accuracy(2)								40
Vert_Accuracy(3)								48
Vert_Accuracy(4)								56

▸ Flags

Identifier Type	Identifier	DLC
Standard ID	0x005	3

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
fixType	GNSS Fix Type	0	7	-	uint8_t	-
flags	Fix status flags	8	15	bit field	uint8_t	-
flags2	Additional flags	16	23	bit field	uint8_t	-

7	6	5	4	3	2	1	0	
fixType								0
flags								8
flags2								16

fixType

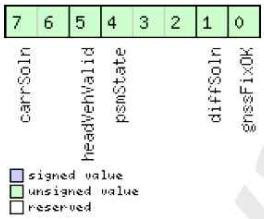
0 : no fix　　1 : DR only　　2 : 2D-fix

3 : 3D-fix　　4 : GNSS + DR Combined　　5 : Time Only Fix (RTK)

Flags

Bitfield flags

This graphic explains the bits of `flags`

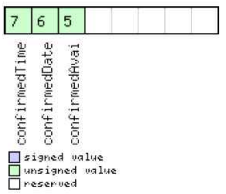


Name	*Description*
`gnssFixOK`	1 = valid fix (i.e within DOP & accuracy masks)
`diffSoln`	1 = differential corrections were applied
`psmState`	Power Save Mode state (see Power Management): 0: PSM is not active 1: Enabled (an intermediate state before Acquisition state 2: Acquisition 3: Tracking 4: Power Optimized Tracking 5: Inactive
`headVehValid`	1 = heading of vehicle is valid
`carrSoln`	Carrier phase range solution status: 0: no carrier phase range solution 1: float solution (no fixed integer carrier phase measurements have been used to calculate the solution) 2: fixed solution (one or more fixed integer carrier phase range measurements have been used to calculate the solution) (not supported in protocol versions less than 20)

Flags2

Bitfield flags2

This graphic explains the bits of `flags2`



Name	*Description*
`confirmedAvai`	1 = information about UTC Date and Time of Day validity confirmation is available (see Time Validity section for details) (This flag is always unset for in protocol versions less than 19)
`confirmedDate`	1 = UTC Date validity could be confirmed (see Time Validity section for details)
`confirmedTime`	1 = UTC Time of Day could be confirmed (see Time Validity section for details)

VectorNav VN-300 (100Hz)

▸ Attitude (1)

Identifier Type	Identifier	DLC
Standard ID	0x011	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
Roll	X축 회전각	0	31	Degree	float	-
Pitch	Y축 회전각	32	63	Degree	float	-

7	6	5	4	3	2	1	0	
Roll(1)								0
Roll(2)								8
Roll(3)								16
Roll(4)								24
Pitch(1)								32
Pitch(2)								40
Pitch(3)								48
Pitch(4)								56

▸ Attitude (2)

Identifier Type	Identifier	DLC
Standard ID	0x012	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
Yaw	Z축 회전각	0	31	Degree	float	-
U_Roll	1σ Uncertain Roll	32	63	Degree	float	-

7	6	5	4	3	2	1	0	
Yaw(1)								0
Yaw(2)								8
Yaw(3)								16
Yaw(4)								24
U_Roll(1)								32
U_Roll(1)								40
U_Roll(1)								48
U_Roll(1)								56

▸ Attitude (3)

Identifier Type	Identifier	DLC
Standard ID	0x013	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
U_Pitch	1σ Uncertain Pitch	0	31		float	-
U_Yaw	1σ Uncertain Yaw	32	63		float	-

7	6	5	4	3	2	1	0	
U_Pitch(1)								0
U_Pitch(2)								8
U_Pitch(3)								16
U_Pitch(4)								24
U_Yaw(1)								32
U_Yaw(2)								40
U_Yaw(3)								48
U_Yaw(4)								56

▸ Position (1)

Identifier Type	Identifier	DLC
Standard ID	0x014	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
WGS84_Lat	위도	0	31	Degree	float	-
WGS84_Lon	경도	32	63	Degree	float	-

7	6	5	4	3	2	1	0	
WGS84_Lat (1)								0
WGS84_Lat (2)								8
WGS84_Lat (3)								16
WGS84_Lat (4)								24
WGS84_Lon (1)								32
WGS84_Lon (2)								40
WGS84_Lon (3)								48
WGS84_Lon (4)								56

▸ Position (2)

Identifier Type	Identifier	DLC
Standard ID	0x015	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
WGS84_Alt	고도	0	31	Meter	float	-
NED_N	N축 위치	32	63	Meter	float	-

7	6	5	4	3	2	1	0	
WGS84_Alt (1)								0
WGS84_Alt (2)								8
WGS84_Alt (3)								16
WGS84_Alt (4)								24
NED_N (1)								32
NED_N (2)								40
NED_N (3)								48
NED_N (4)								56

▸ Position (3)

Identifier Type	Identifier	DLC
Standard ID	0x016	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
NED_E	E축 위치	0	31	Meter	float	-
NED_D	D축 위치	32	63	Meter	float	-

7	6	5	4	3	2	1	0	
NED_E (1)								0
NED_E (2)								8
NED_E (3)								16
NED_E (4)								24
NED_D (1)								32
NED_D (2)								40
NED_D (3)								48
NED_D (4)								56

▸ Velocity (1)

Identifier Type	Identifier	DLC
Standard ID	0x017	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
VEL_N	N축 속력	0	31	m/s	float	-
VEL_E	E축 속력	32	63	m/s	float	-

7	6	5	4	3	2	1	0	
VEL_N (1)								0
VEL_N (2)								8
VEL_N (3)								16
VEL_N (4)								24
VEL_E (1)								32
VEL_E (2)								40
VEL_E (3)								48
VEL_E (4)								56

▸ Velocity (2)

Identifier Type	Identifier	DLC
Standard ID	0x018	4

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
VEL_D	D축 속력	0	31	m/s	float	-

7	6	5	4	3	2	1	0	
VEL_D (1)								0
VEL_D (2)								8
VEL_D (3)								16
VEL_D (4)								24

▸ Compensated IMU Measurement (1)

Identifier Type	Identifier	DLC
Standard ID	0x019	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
COMP_ACC_X	Acceleration x	0	31	m/s^2	float	-
COMP_ACC_Y	Acceleration y	32	63	m/s^2	float	-

7	6	5	4	3	2	1	0	
COMP_ACC_X (1)								0
COMP_ACC_X (2)								8
COMP_ACC_X (3)								16
COMP_ACC_X (4)								24
COMP_ACC_Y (1)								32
COMP_ACC_Y (2)								40
COMP_ACC_Y (3)								48
COMP_ACC_Y (4)								56

▸ Compensated IMU Measurement (2)

Identifier Type	Identifier	DLC
Standard ID	0x01A	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
COMP_ACC_Z	Acceleration z	0	31	m/s^2	float	-
COMP_GYRO_X	angular rate x	32	63	rad/s	float	-

7	6	5	4	3	2	1	0	
COMP_ACC_Z (1)								0
COMP_ACC_Z (2)								8
COMP_ACC_Z (3)								16
COMP_ACC_Z (4)								24
COMP_GYRO_X (1)								32
COMP_GYRO_X (2)								40
COMP_GYRO_X (3)								48
COMP_GYRO_X (4)								56

▸ Compensated IMU Measurement (3)

Identifier Type	Identifier	DLC
Standard ID	0x01B	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
COMP_GYRO_Y	angular rate y	0	31	rad/s	float	-
COMP_GYRO_Z	angular rate z	32	63	rad/s	float	-

7	6	5	4	3	2	1	0	
COMP_GYRO_Y (1)								0
COMP_GYRO_Y (2)								8
COMP_GYRO_Y (3)								16
COMP_GYRO_Y (4)								24
COMP_GYRO_Z (1)								32
COMP_GYRO_Z (2)								40
COMP_GYRO_Z (3)								48
COMP_GYRO_Z (4)								56

▸ Uncompensated IMU Measurement (1)

Identifier Type	Identifier	DLC
Standard ID	0x01C	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
UNCOMP_ACC_X	Acceleration x	0	31	m/s^2	float	-
UNCOMP_ACC_Y	Acceleration y	32	63	m/s^2	float	-

7	6	5	4	3	2	1	0	
UNCOMP_ACC_X (1)								0
UNCOMP_ACC_X (2)								8
UNCOMP_ACC_X (3)								16
UNCOMP_ACC_X (4)								24
UNCOMP_ACC_Y (1)								32
UNCOMP_ACC_Y (2)								40
UNCOMP_ACC_Y (3)								48
UNCOMP_ACC_Y (4)								56

▸ Uncompensated IMU Measurement (2)

Identifier Type	Identifier	DLC
Standard ID	0x01D	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
UNCOMP_ACC_Z	Acceleration z	0	31	m/s^2	float	-
UNCOMP_GYRO_X	angular rate x	32	63	rad/s	float	-

7	6	5	4	3	2	1	0	
UNCOMP_ACC_Z (1)								0
UNCOMP_ACC_Z (2)								8
UNCOMP_ACC_Z (3)								16
UNCOMP_ACC_Z (4)								24
UNCOMP_GYRO_X (1)								32
UNCOMP_GYRO_X (2)								40
UNCOMP_GYRO_X (3)								48
UNCOMP_GYRO_X (4)								56

▸ Uncompensated IMU Measurement (3)

Identifier Type	Identifier	DLC
Standard ID	0x01E	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
UNCOMP_GYRO_Y	angular rate y	0	31	rad/s	float	-
UNCOMP_GYRO_Z	angular rate z	32	63	rad/s	float	-

7	6	5	4	3	2	1	0	
UNCOMP_GYRO_Y (1)								0
UNCOMP_GYRO_Y (2)								8
UNCOMP_GYRO_Y (3)								16
UNCOMP_GYRO_Y (4)								24
UNCOMP_GYRO_Z (1)								32
UNCOMP_GYRO_Z (2)								40
UNCOMP_GYRO_Z (3)								48
UNCOMP_GYRO_Z (4)								56

NovAtel PlexPak (20Hz)

▸ Position (1)

Identifier Type	Identifier	DLC
Standard ID	0x030	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
WGS84_Lat	위도	0	31	Degree	float	-
WGS84_Lon	경도	32	63	Degree	float	-

7	6	5	4	3	2	1	0	
WGS84_Lat (1)								0
WGS84_Lat (2)								8
WGS84_Lat (3)								16
WGS84_Lat (4)								24
WGS84_Lon (1)								32
WGS84_Lon (2)								40
WGS84_Lon (3)								48
WGS84_Lon (4)								56

▸ Position (2)

Identifier Type	Identifier	DLC
Standard ID	0x031	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
WGS84_Alt	고도	0	31	Meter	float	-
NED_N	N축 위치	32	63	Meter	float	-

7	6	5	4	3	2	1	0	
WGS84_Alt (1)								0
WGS84_Alt (2)								8
WGS84_Alt (3)								16
WGS84_Alt (4)								24
NED_N (1)								32
NED_N (2)								40
NED_N (3)								48
NED_N (4)								56

▸ Position (3)

Identifier Type	Identifier	DLC
Standard ID	0x032	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
NED_E	E축 위치	0	31	Meter	float	-
NED_D	D축 위치	32	63	Meter	float	-

7	6	5	4	3	2	1	0	
NED_E (1)								0
NED_E (2)								8
NED_E (3)								16
NED_E (4)								24
NED_D (1)								32
NED_D (2)								40
NED_D (3)								48
NED_D (4)								56

▸ Standard Deviation (1)

Identifier Type	Identifier	DLC
Standard ID	0x033	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
STD_DEV_LAT	경도 표준편차	0	31	Degree	float	-
STD_DEV_LON	위도 표준편차	32	63	Degree	float	-

7	6	5	4	3	2	1	0	
STD_DEV_LAT (1)								0
STD_DEV_LAT (2)								8
STD_DEV_LAT (3)								16
STD_DEV_LAT (4)								24
STD_DEV_LON (1)								32
STD_DEV_LON (2)								40
STD_DEV_LON (3)								48
STD_DEV_LON (4)								56

▸ Standard Deviation (2)

Identifier Type	Identifier	DLC
Standard ID	0x034	8

Label	Description	시작 Bit	종료 Bit	Unit	Data형	Scale
STD_DEV_ALT	고도 표준편차	0	31	Meter	float	-
POSTYPE	Position Type	32	63	-	float	-

7	6	5	4	3	2	1	0	
STD_DEV_ALT (1)								0
STD_DEV_ALT (2)								8
STD_DEV_ALT (3)								16
STD_DEV_ALT (4)								24
POSTYPE (1)								32
POSTYPE (2)								40
POSTYPE (3)								48
POSTYPE (4)								56

Table 44: Position or Velocity Type

Type (binary)	Type (ASCII)	Description
0	NONE	No solution
1	FIXEDPOS[a]	Position has been fixed by the FIX POSITION command
2	FIXEDHEIGHT[a]	Position has been fixed by the FIX HEIGHT/AUTO command
8	DOPPLER_VELOCITY	Velocity computed using instantaneous Doppler
16	SINGLE	Single point position
17	PSRDIFF	Pseudorange differential solution
18	WAAS	Solution calculated using corrections from an SBAS
19	PROPAGATED	Propagated by a Kalman filter without new observations

a. With default PDPFILTER ENABLE, the bestpos will no longer show that the position has been fixed, unless PDPFILTER is DISABLED.