॥ सा विद्या या विमुक्तये ॥

भारतीय प्रौद्योगिकी संस्थान धारवाड

Indian Institute of Technology Dharwad

Interfacing TM4C123GH6PM microcontroller with NEO-6 GPS Module

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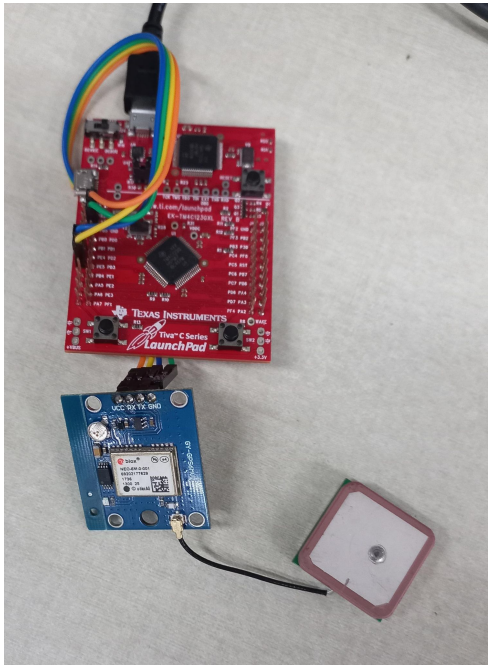
Initialisation

- Configure Port E corresponding to UART module 5 for interfacing with GPS module.
- From the NEO-6 GPS Module datasheet, it is seen that
  - By default, the module transmits through UART with 9600 Baud, 8 bits, no parity bit, 1 stop bit
  - On start-up, the module transmits data in a preset default configuration.
  - It follows NMEA protocol; sends data in GSV, RMC, GSA, GGA, GLL, VTG and TXT formats.
- Hence, UART Module 5 is configured at 9600 Baud, 8 bits, no parity bit, 1 stop bit.
- UART Module 0 is configured at 9600 Baud, 8 bits, no parity bit, 1 stop bit.
- CodeComposerStudio serial monitor is set to same parameters (9600 Baud, 8 bits, no parity bit, 1 stop bit).



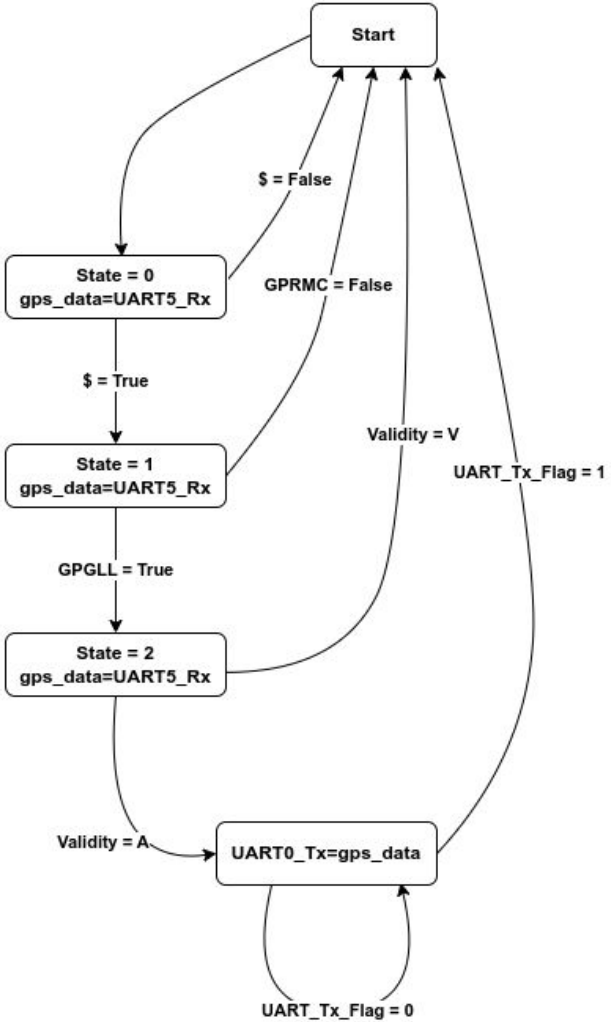
Using PE4, PE5; UART Module 5
PE4 = Rx; PE5 = Tx

Stateflow Diagram: GPGLL

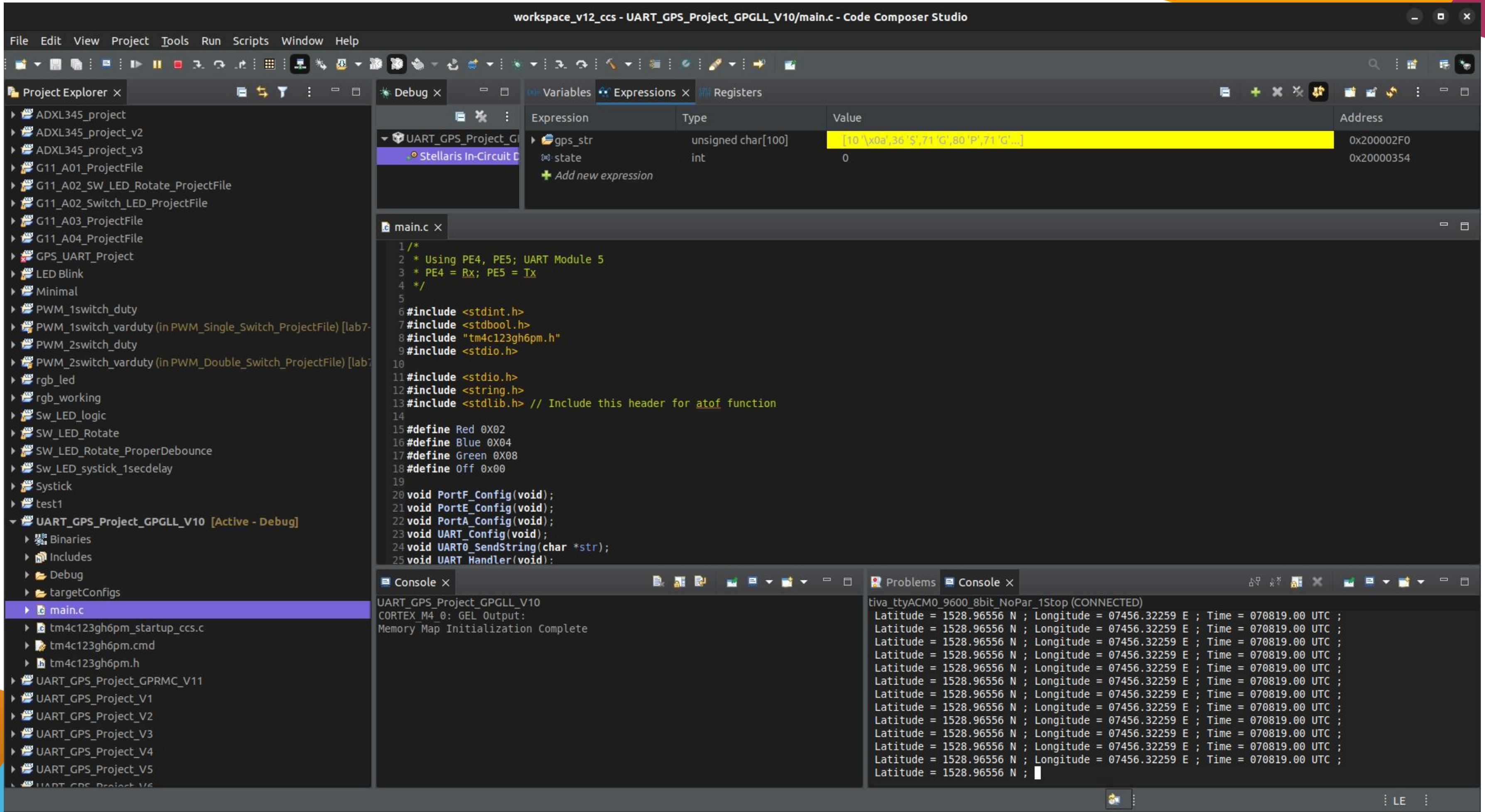
$GPGLL,3723.2475,N,12158.3416,W,161229.487,A,A*41

Table 1-5 GLL Data Format

Name	Example	Unit	Description
Message ID	$GPGLL		GLL protocol header
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
UTC Time	161229.487		hhmmss.sss
Status	A		A=data valid or V=data not valid
Mode	*A*		*A=Autonomous, D=DGPS, E=DR (Only present in NMEA v3.00)*
Checksum	*41		
<CR> <LF>			End of message termination



Output: GPGLL

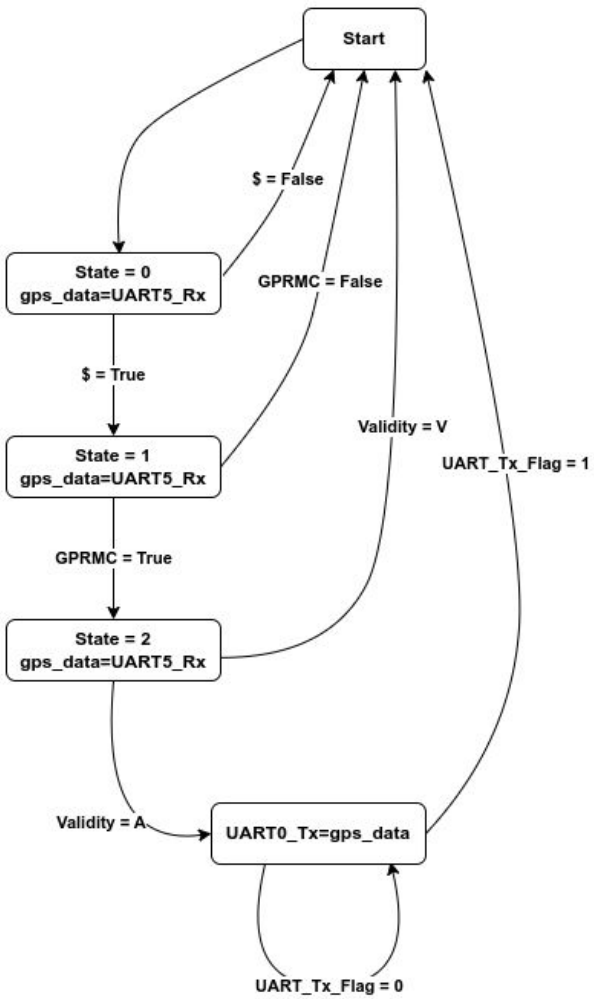


Stateflow Diagram: GPRMC

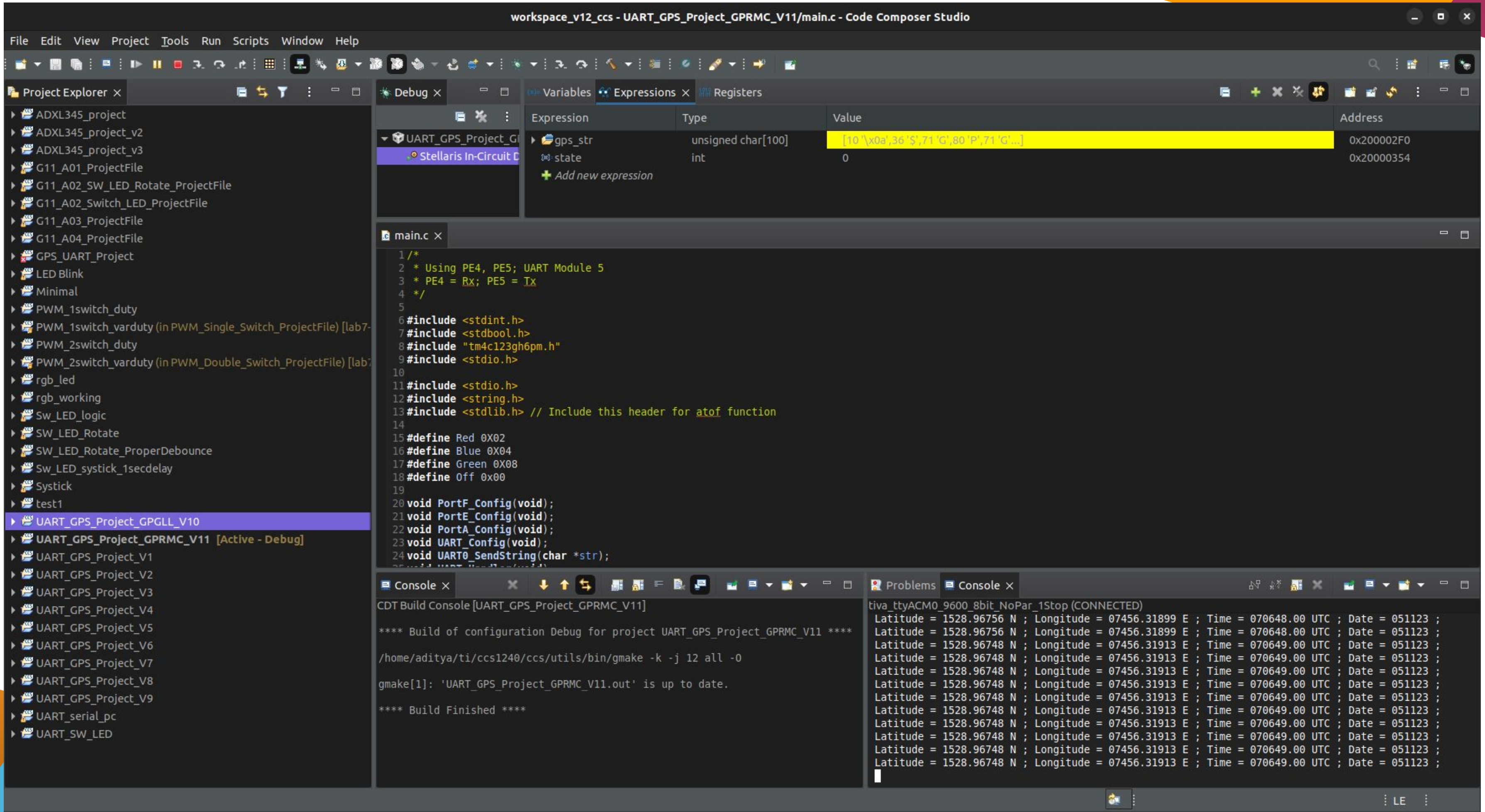
$GPRMC,161229.487,A,3723.2475,N,12158.3416,W,0.13,309.62,120598, ,*10

Table 1-11 RMC Data Format

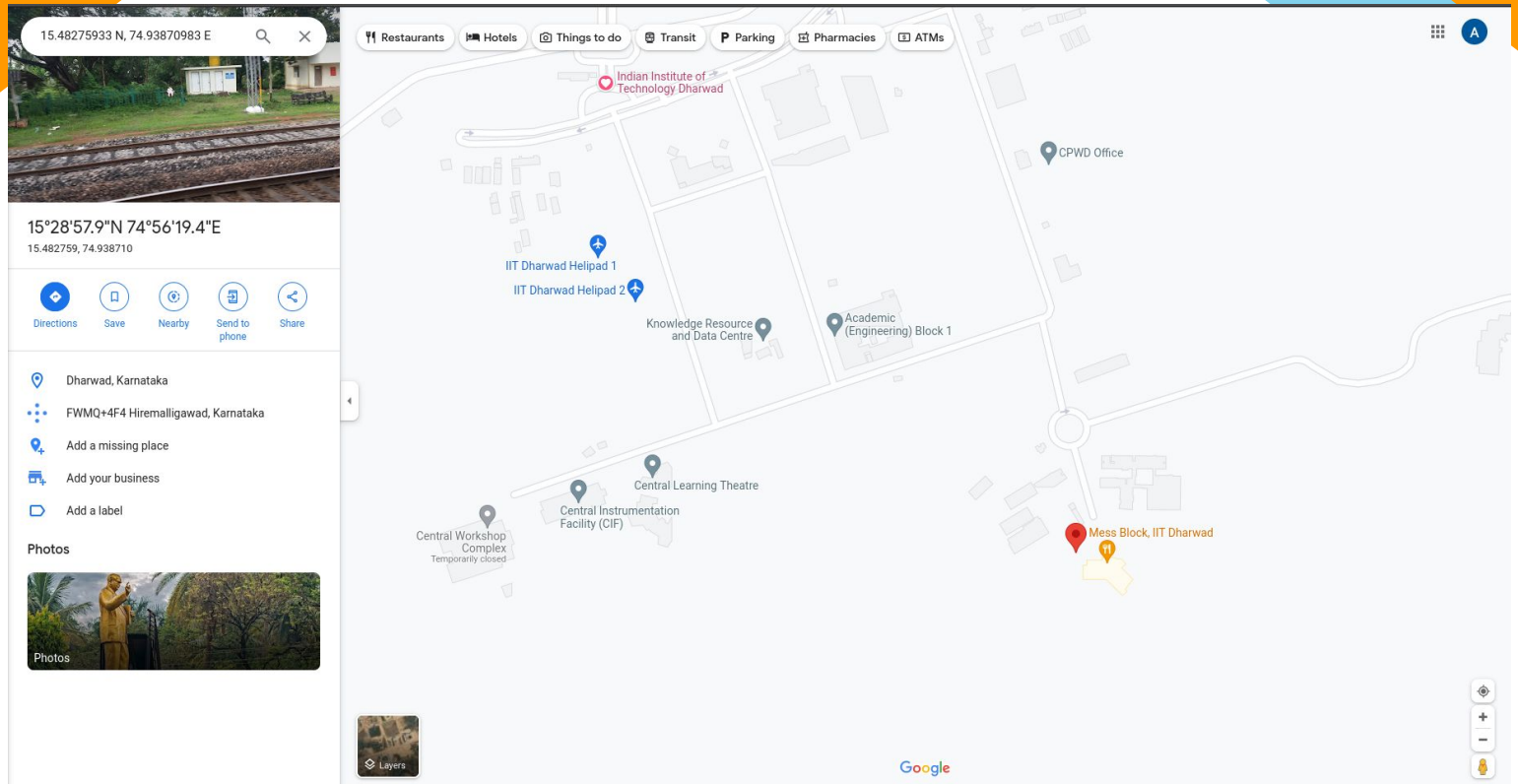
Name	Example	Unit	Description
Message ID	$GPRMC		RMC protocol header
UTC Time	161229.487		hhmmss.sss
Status[1]	A		A=data valid or V=data not valid
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
Speed Over Ground	0.13	knots	
Course Over Ground	309.62	degrees	True
Date	120598		ddmmyy
Magnetic Variation[2]		degrees	E=east or W=west
East/West Indicator[2]	E		E=east
Mode	*A*		*A=Autonomous, D=DGPS, E=DR*
Checksum	*10		
<CR> <LF>			End of message termination



Output: GPRMC



Output: Verification



The coordinates received from the GPS module in GPGLL as well as GPRMC format are "15.48275933 N; 74.93870983 E". The received latitude and longitude coordinates are fed into google maps; and the obtained data is verified.

Results and Conclusion

- Data is collected from the NEO-6 GPS Module successfully using UART communication protocol.
- The data is parsed and separated for individual use
- For GPGLL format, received Longitude, Latitude and UTC time is then sent to PC through UART based serial communication.
- For GPRMC format, received Longitude, Latitude, UTC time and Date is then sent to PC through UART based serial communication.

Thank You