

CRC32 calculation (C language)

uavnavigation.com/support/kb/icd/uav-navigation-public-icd/crc32-calculation-c-language

Use the following function to calculate the CRC32 checksum of an **uint8_t** array from a starting character **start** to an ending character **end**.

```
/**
 * \brief Table of constants used for CRC calculation.
 */
const uint32_t crc32_table[] = \
{ 0x00000000, 0x77073096, 0xEE0E612C, 0x990951BA, 0x076DC419, 0x706AF48F,
  0xE963A535, 0x9E6495A3, 0x0EDB8832, 0x79DCB8A4, 0xE0D5E91E, 0x97D2D988,
  0x09B64C2B, 0x7EB17CBD, 0xE7B82D07, 0x90BF1D91, 0x1DB71064, 0x6AB020F2,
  0xF3B97148, 0x84BE41DE, 0x1ADAD47D, 0x6DDDE4EB, 0xF4D4B551, 0x83D385C7,
  0x136C9856, 0x646BA8C0, 0xFD62F97A, 0x8A65C9EC, 0x14015C4F, 0x63066CD9,
  0xFA0F3D63, 0x8D080DF5, 0x3B6E20C8, 0x4C69105E, 0xD56041E4, 0xA2677172,
  0x3C03E4D1, 0x4B04D447, 0xD20D85FD, 0xA50AB56B, 0x35B5A8FA, 0x42B2986C,
  0xDBBBC9D6, 0xACBCF940, 0x32D86CE3, 0x45DF5C75, 0xDCD60DCF, 0xABD13D59,
  0x26D930AC, 0x51DE003A, 0xC8D75180, 0xBFDD06116, 0x21B4F4B5, 0x56B3C423,
  0xCFBA9599, 0xB8BDA50F, 0x2802B89E, 0x5F058808, 0xC60CD9B2, 0xB10BE924,
  0x2F6F7C87, 0x58684C11, 0xC1611DAB, 0xB6662D3D, 0x76DC4190, 0x01DB7106,
  0x98D220BC, 0xEFD5102A, 0x71B18589, 0x06B6B51F, 0x9FBFE4A5, 0xE8B8D433,
  0x7807C9A2, 0x0F00F934, 0x9609A88E, 0xE10E9818, 0x7F6A0DBB, 0x086D3D2D,
  0x91646C97, 0xE6635C01, 0x6B6B51F4, 0x1C6C6162, 0x856530D8, 0xF262004E,
  0x6C0695ED, 0x1B01A57B, 0x8208F4C1, 0xF50FC457, 0x65B0D9C6, 0x12B7E950,
  0x8BBEB8EA, 0xFCB9887C, 0x62DD1DDF, 0x15DA2D49, 0x8CD37CF3, 0xFBD44C65,
  0x4DB26158, 0x3AB551CE, 0xA3BC0074, 0xD4BB30E2, 0x4ADFA541, 0x3DD895D7,
  0xA4D1C46D, 0xD3D6F4FB, 0x4369E96A, 0x346ED9FC, 0xAD678846, 0xDA60B8D0,
  0x44042D73, 0x33031DE5, 0xAA0A4C5F, 0xDD0D7CC9, 0x5005713C, 0x270241AA,
  0xBE0B1010, 0xC90C2086, 0x5768B525, 0x206F85B3, 0xB966D409, 0xCE61E49F,
  0x5EDEF90E, 0x29D9C998, 0xB0D09822, 0xC7D7A8B4, 0x59B33D17, 0x2EB40D81,
  0xB7BD5C3B, 0xC0BA6CAD, 0xEDB88320, 0x9ABFB3B6, 0x03B6E20C, 0x74B1D29A,
  0xEAD54739, 0x9DD277AF, 0x04DB2615, 0x73DC1683, 0xE3630B12, 0x94643B84,
  0x0D6D6A3E, 0x7A6A5AA8, 0xEA40ECF0B, 0x9309FF9D, 0x0A00AE27, 0x7D079EB1,
  0xF00F9344, 0x8708A3D2, 0x1E01F268, 0x6906C2FE, 0xF762575D, 0x806567CB,
  0x196C3671, 0x6E6B06E7, 0xFED41B76, 0x89D32BE0, 0x10DA7A5A, 0x67DD4ACC,
  0xF9B9DF6F, 0x8EBEEFF9, 0x17B7BE43, 0x60B08ED5, 0xD6D6A3E8, 0xA1D1937E,
  0x38D8C2C4, 0x4FDFF252, 0xD1BB67F1, 0xA6BC5767, 0x3FB506DD, 0x48B2364B,
  0xD80D2BDA, 0xAF0A1B4C, 0x36034AF6, 0x41047A60, 0xDF60EFC3, 0xA867DF55,
  0x316E8EEF, 0x4669BE79, 0xCB61B38C, 0xBC66831A, 0x256FD2A0, 0x5268E236,
  0xCC0C7795, 0xBB0B4703, 0x220216B9, 0x5505262F, 0xC5BA3BBE, 0xB2BD0B28,
  0x2BB45A92, 0x5CB36A04, 0xC2D7FFA7, 0xB5D0CF31, 0x2CD99E8B, 0x5BDEAE1D,
  0x9B64C2B0, 0xEC63F226, 0x756AA39C, 0x026D930A, 0x9C0906A9, 0xEB0E363F,
  0x72076785, 0x05005713, 0x95BF4A82, 0xE2B87A14, 0x7BB12BAE, 0x0CB61B38,
  0x92D28E9B, 0xE5D5BE0D, 0x7CDCEFB7, 0x0BDBDF21, 0x86D3D2D4, 0xF1D4E242,
  0x68DDDB3F8, 0x1FDA836E, 0x81BE16CD, 0xF6B9265B, 0x6FB077E1, 0x18B74777,
  0x88085AE6, 0xFF0F6A70, 0x66063BCA, 0x11010B5C, 0x8F659EFF, 0xF862AE69,
  0x616BFFD3, 0x166CCF45, 0xA00AE278, 0xD70DD2EE, 0x4E048354, 0x3903B3C2,
  0xA7672661, 0xD06016F7, 0x4969474D, 0x3E6E77DB, 0xAED16A4A, 0xD9D65ADC,
```

```
0x40DF0B66, 0x37D83BF0, 0xA9BCAE53, 0xDEBB9EC5, 0x47B2CF7F, 0x30B5FFE9,  
0xBDBDF21C, 0xCABAC28A, 0x53B39330, 0x24B4A3A6, 0xBAD03605, 0xCDD70693,  
0x54DE5729, 0x23D967BF, 0xB3667A2E, 0xC4614AB8, 0x5D681B02, 0x2A6F2B94,  
0xB40BBE37, 0xC30C8EA1, 0x5A05DF1B, 0x2D02EF8D };
```

```
/**  
 * \brief CRC calculation for TSIP packets.  
 *  
 * \param buf    Pointer to buffer containing data to process.  
 * \param start  Offset value of first data byte (within buf) to be processed.  
 * \param end    Offset value of last data byte (within buf) to be processed.  
 * \return       Calculated CRC value.  
 */
```

```
uint32_t crc32(uint8_t *buf, uint32_t start, uint32_t end)  
{  
    uint32_t crc = 0xFFFFFFFF;  
  
    for(uint32_t i = start; i < end; i++)  
    {  
        const uint32_t tblindex = (crc ^ buf[i]) & 0xFF;  
        crc = (crc >> 8) ^ crc32_table[tblindex];  
    }  
  
    return (crc ^ 0xFFFFFFFF);  
}
```