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Subject: Converting 2 x 16 BIT integers to 32 BIT signed long

APPLICATION NOTE

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1. Introduction

When data is received from a source such as CANbus or Modbus, any 32 bit numbers sent by the remote device are often placed in 2 global VR variables as a high word and low word in 16 bit unsigned format. The routine shown in this application note combines the two 16 BIT values to one signed 32 BIT long word.

Note that when numbers above 24 BIT size are stored, they loose precision due to the DSP floating point format that is used for all variables. Therefore this example will store the true value within this range: -16777216 to +16777215. Larger numbers will be stored, but will have a power-of-2 lower precision for each additional power-of-2 increase in value.

2. Formula

The example program uses the following mathematical formula for calculating the signed value:

```
If Bit32=1 Then
    longword = -(NOT(longword)+1)
End If
```

3. Program

```
' VR definitions
  low_16=10
  high_16=11
  long_32=12

  IF READ_BIT(15,high_16)=1 THEN
    ' negative number
    Invlo = NOT(VR(low_16)) AND $ffff
    Invhi = NOT(VR(high_16)) AND $ffff
    long_result = -(invlo+invhi*65536+1)
  ELSE
    long_result = VR(lo16)+VR(hi16)*65536
  ENDIF
  VR(long_32)=long_result
```