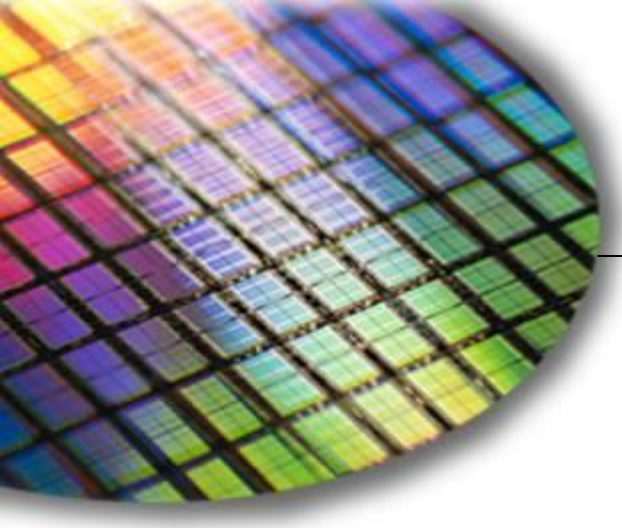

The World Leader in High Performance Signal Processing Solutions

ADuCM33x ADC Calibration

ANALOG DEVICES

Calibration of the ADuCM33x

- **I-ADC Channel**

- **General Method**

  Use the 2 point calibration method to calulcate the I-ADC offset and gain.
  ADC0CON is set to 0x080C03 // Gain 8, PGA Scale = 11b

  V1 = 20mV voltage input
  V2 = 100mV voltage input
  Code1 = 20mV ADC Output
  Code2 = 100mV ADC Output

  Y = m*X + C,
  X is the input voltage,
  Y is the ADC Output
  m is the slope of the line, i.e (change in output / change in input)
  C is the Offset

  m = (Code2 – Code1 / V2 – V1),
  C = Code1 – (m * V1)

Calibration of the ADuCM33x

- **I-ADC Channel**

- **Measurement Example**

  V1 = 19.94mV

  V2 = 99.900mV

  Code1 = 0x43E7EC, (4450284_d) => (1.2 * 4450284) / (2^{28} – 1) => 19.894mV

  Code2 = 0x154A214, (22323732_d) => (1.2 * 167433454) / (2^{28} – 1) => 99.797mV

  m = (99.797 – 19.894) / (99.900 – 19.94) => 0.99929

  C = 19.894mV – (0.99929 * 19.94mV) => -0.00003

  New I-ADC register settings

  Note :

  Before calibration ADC0GN = 0x556F, ADC0OF = 0x0000;

  ADC0GN = (1/m) * 0x556F => 0x557E

  ADC0OF = (C * 2^{19}/1.2) * (3/4) * (2^4)* 8 => 0xFFFACB // Consider Gain and 24bit ADC0OF

Calibration of the ADuCM33x

- **V-ADC Channel**

- **General Method**

  Use the 2 point calibration method to calulcate the V-ADC offset and gain.
  ADC1CON is set to 0x080200 // Unipolar

  V1 = 6V voltage input
  V2 = 18V voltage input
  Code1 = 6V ADC Output
  Code2 = 18V ADC Output

  Y = m*X + C,
  X is the input voltage,
  Y is the ADC Output
  m is the slope of the line, i.e (change in output / change in input)
  C is the Offset

  m = (Code2 – Code1 / V2 – V1),
  C = Code1 – (m * V1)

Calibration of the ADuCM33x

- **V-ADC Channel**

- **Measurement Example**

  V1 = 6.007V

  V2 = 17.999mV

  Code1 = 0x37FAD0A, (55736179_d) => (28.8 * 55736179) / (2^{28} – 1) => 5.9797V

  Code2 = 0x9FAD4EE, (167433454_d) => (28.8 * 167433454) / (2^{28} – 1) => 17.963V

  m = (17.963 – 5.9797) / (18.008 – 6.007) => 0.99927

  C = 5.9797 – (0.99927 * 6.007) => -0.0227

  New V-ADC register settings

  Note :

  Before calibration ADC1GN = 0x55B7, ADC1OF = 0x0000;

  ADC1GN = (1/m) * 0x55B7 => 0x55C7

  ADC1OF = (C * 2^{20}/2.4) * (3/4) * (2^4/24) => 0xFFEC8E // Consider attenuator and 24bit ADC1OF