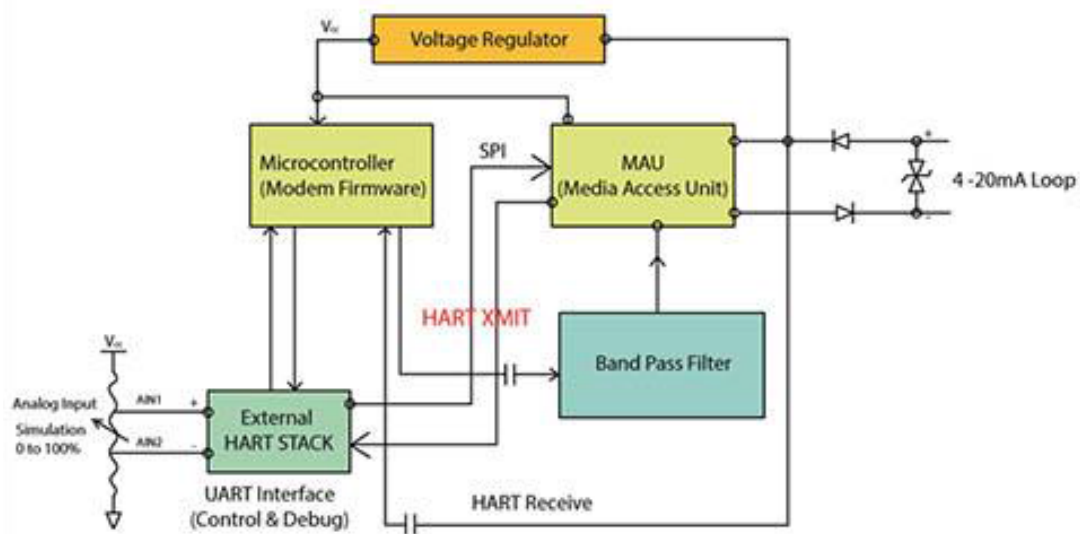


1200 BPS HART[®] MODEM

Smart Embedded Systems (SES), Inc., Silicon Valley Company, is offering 1200 bps modem capability using System on a Chip (SoC) and SES is the first company for having developed a very compelling and cost effective Patented Soft Modem technology (strictly firmware based) solution for Industrial Automation applications. Our modem design enables compliance with HART "FSK Physical Layer Specifications". We support the Industry standard HART Communication Protocol (HART Stack 7.0).

OUR SOLUTION:

System on a chip (SoC) Based 1200 BPS (FSK)MODEM:



Our 1200 BPS modem is firmware based; implemented with Texas Instruments (TI) MS430 microcontroller. Besides modem functionality, we also offer the following on the same microcontroller:

HART Soft Modem

Benefits

- Lower cost
- Lower power 400 uA FSK mode at VCC of 2.7V
- Works with any third party HART stack
- Low power table lookup based modulator using SES patented methods
- Smart Phase and Timing detection of incoming signals using SES patented methods
- High reliability
- Smaller footprint

System on a Chip (SOC) Based Solution

- Uses off-the-shelf microcontroller
- Uses Low voltage FRAM based microcontroller for low power
- SES HART 7.0 Stack can run on the same microcontroller
- Sensor Interface

HART FSK Modem Characteristics

Binary Frequency Shift Keying

Bits per symbol : 1

Mark = 1200Hz; Space = 2200Hz $\pm 1\%$

Carrier Frequency : 1700Hz.

Data Rate : 1200 Bits Per Second $\pm 1\%$

Supports Normal Analog Wiring

Modulator Characteristics

Carrier Startup : Less than 3 symbols

Carrier Stop : Less than 3 symbols

Demodulator Characteristics

Dynamic Range : 15 dB minimum
(150mV – 900mV)

Receive Filtering for Analog signal Interference
rejection: 20 dB minimum

RX Signal CD On : 80mV - 120mV

CD On time : 1ms - 4ms

CD off time : 5ms - 10ms

Rx Signal Level : 120mV - 1000mV

Applications:

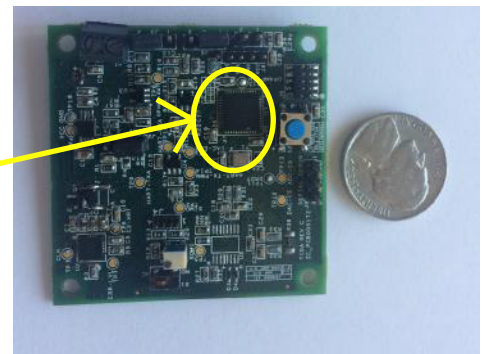
- A. Process control and factory automation
- B. Temperature sensors
- C. Flow transmitters
- D. Level transmitters
- E. Pressure transmitters

Board Support Package for Evaluation includes:

- A. Board
- B. Schematic
- C. BOM (Bill Of Materials)
- D. HART Stack Binary code
- E. SOFT Modem Binary code

SES has been awarded four patents related to its soft modem technology for HART devices: 9106488, 9184965, 9203665, 9281978 and additional patents pending.

Modem and/or
Stack circuitry



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