



RangeMaster5 Solution For RFID Tag Readers

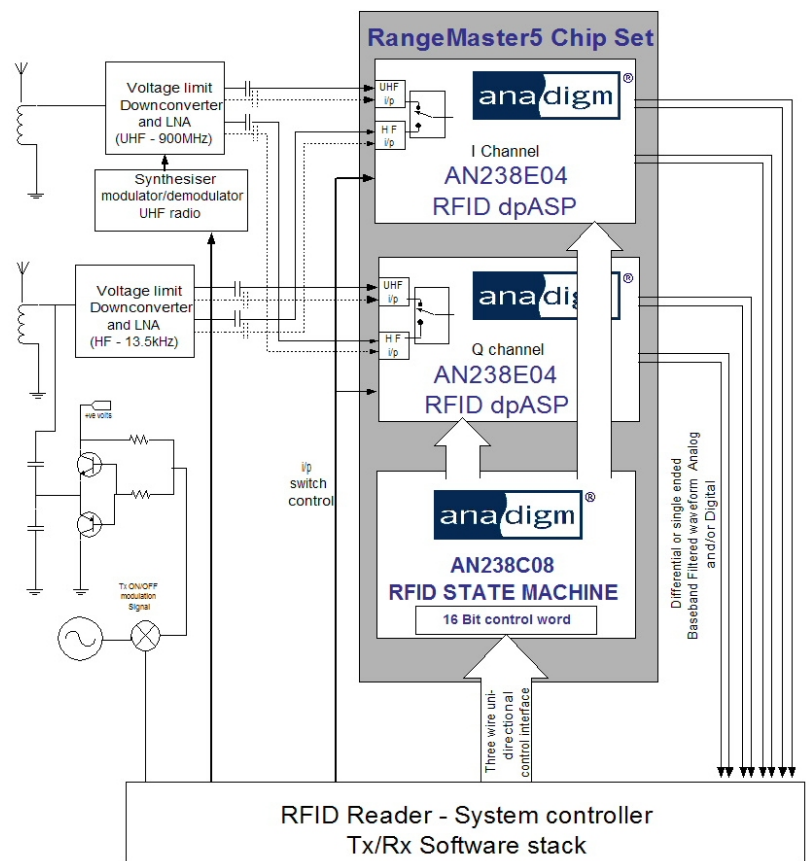
Anadigm's RangeMaster5™ is the third in a family of RFID reader solutions for Universal RFID Tag Reader Systems. The RangeMaster™ chipset family provides the industry's first solution that allows system vendors to design and maintain a single "universal" reader that can be customized to read different radio frequency identification (RFID) tag types, with different modulation schemes and frequencies. RangeMaster5™ base band signal processor supports UHF and HF signal for UHF; EPC Global Gen 1 and Gen 2 (class 0, 1, 2), ISO18000-6, "class0 and HF; 14443, 15693 standards.

RangeMaster5™ is a 3.3volt 3-chip solution that uses Anadigm's dynamically programmable Analog Signal Processor (dpASP) in conjunction with an RFID State Machine, enabling system designers to develop a universal RFID quadrature IQ type tag reader, multiple protocols and frequencies for Universal Fixed Readers, Portable/Handheld Readers, Combination Bar Code and RFID Reader/Scanners. By allowing standardization around a single printed circuit board to support multiple end products and markets, RangeMaster5™ simplifies and improves product development. This allows customers building RFID tag readers to greatly reduce their time to market, and offer a lower total cost of ownership.

RangeMaster5™ Features

- Base band signal processing for both I and Q channels for a Universal UHF/HF RFID tag reader system .
- Full support for EPC Global Gen 1/Gen 2 (Class 0, 1, 2) and ISO 18000-6 protocols.
- Full support for 14443, 15693 protocols.
- Software selectable UHF/HF sub-carrier frequency.
- Read range and sensitivity optimization with variable gain.
- Ability to calibrate reader to filter out background interference (i.e. fluorescent lighting).
- Programmable Standby Power Mode.
- User-customizable signal processing.
- Choice of four different baseband analog signal processing circuits, Universal, EPC Gen 2 (Twin or Triple) or Class 0.
- Select from 3 predefined background frequency filter values.
- Select the gain of the analog circuit to optimize the range and sensitivity of your reader.
- Select from 16 predefined values of the upper and the lower sub-carrier frequencies.

System-Level Overview



RangeMaster5™ Benefits

Design and maintain ONE reader that can be customized to read different tag types, with different modulation schemes and frequencies - both in HF and UHF protocols.

Chipset can be dynamically controlled, from Host or System controller, to produce a truly intelligent and fully flexible UNIVERSAL card reader.

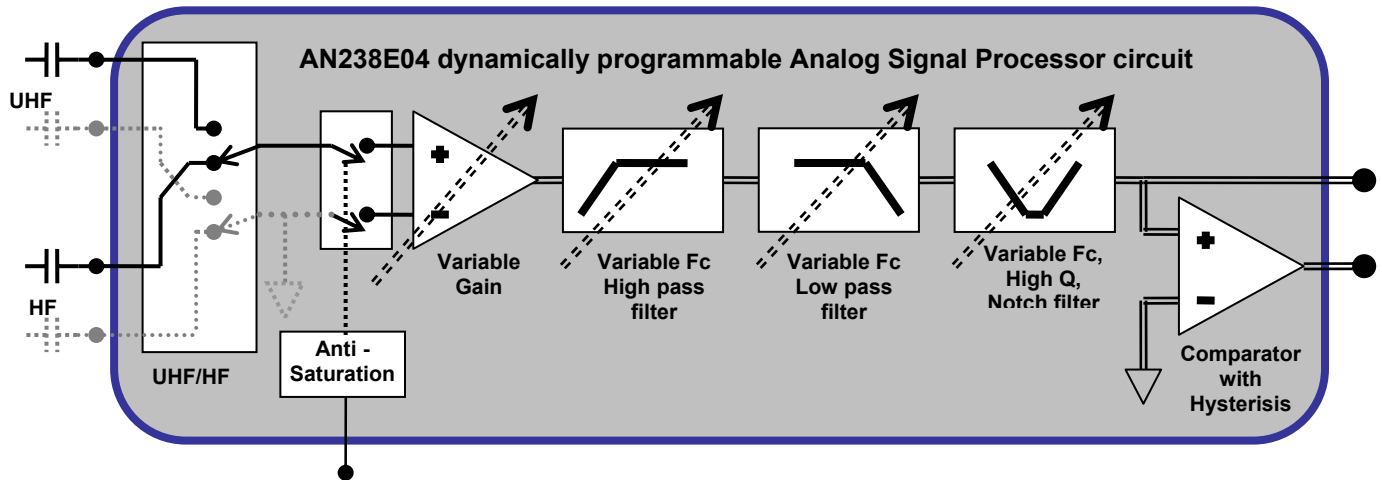
Standardize around a single PCB to support multiple end products and markets.

Adjust the gain and filter frequency of the base-band filter in real time to optimize for read range.

Reduce the total number of system components and lower your bill of materials.

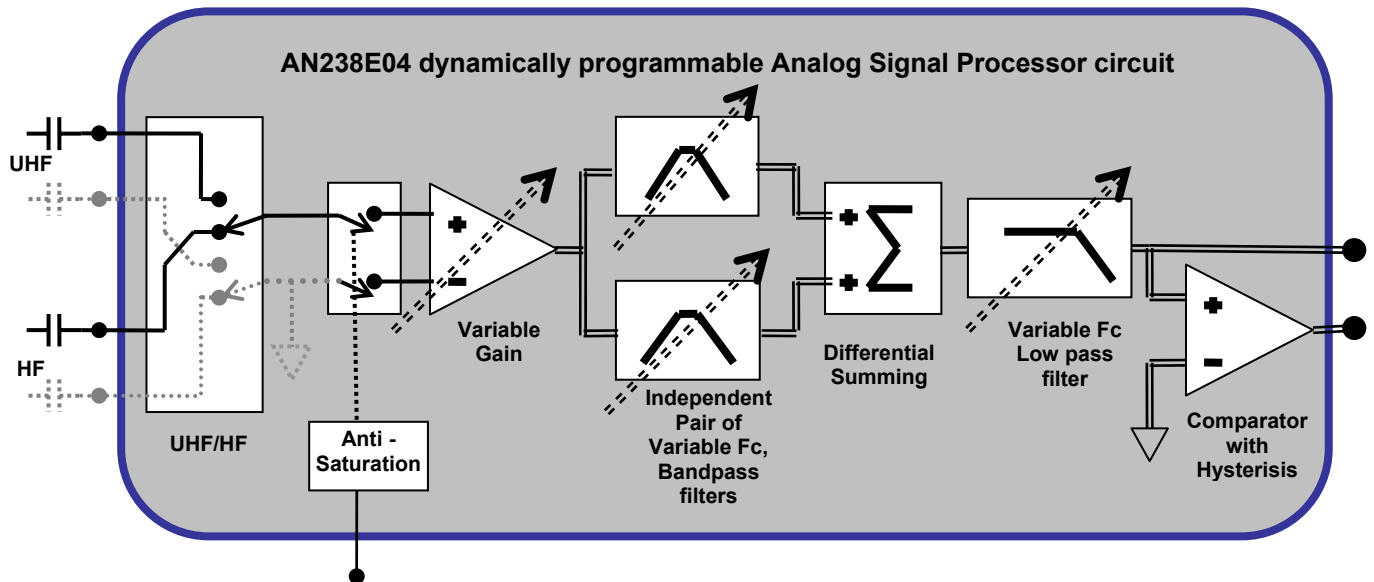
Calibrate the reader at customer site to account for background interference.

Universal (WIDE) Baseband Analog Signal Processing Circuit



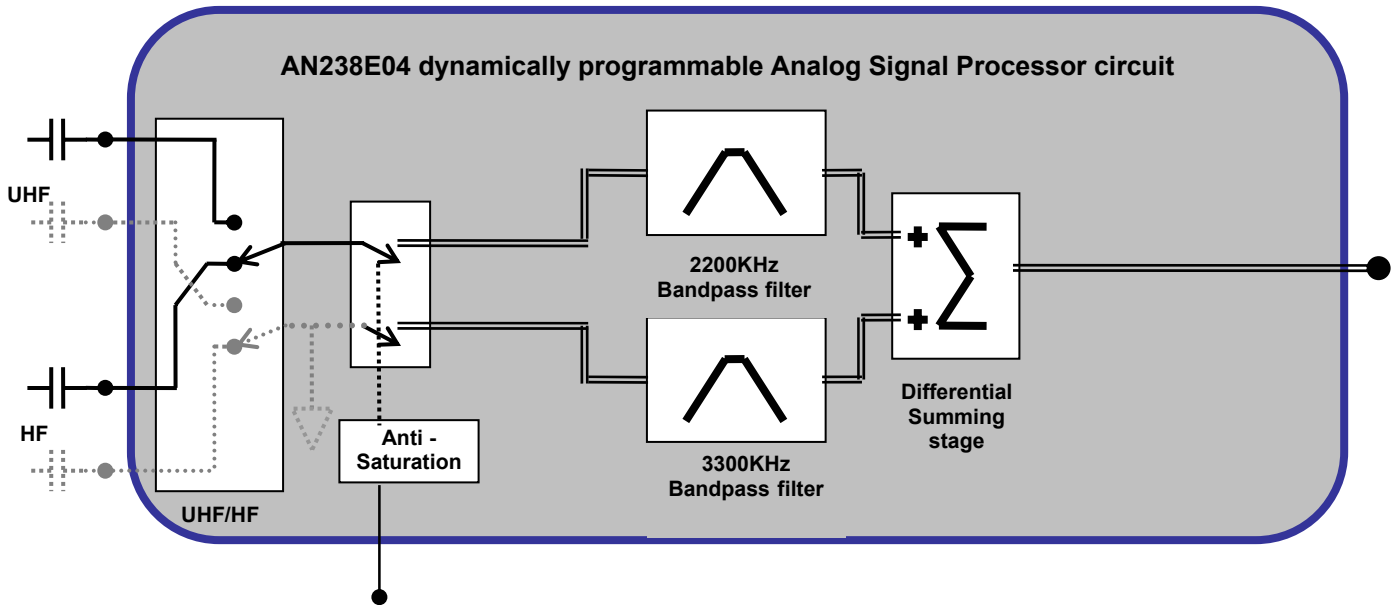
- Software selectable switch between UHF and HF base band signal inputs.
- Software selectable filters frequencies – enables extraction of all data frequencies (DC to 848 kHz).
- Variable gain to adjust for reader range/sensitivity.
- Differential input allows easy interface to 900 MHz down converter, Single-ended as option.
- User-selectable analog or digital output.
- Input signal to control (anti-saturation) switch.
- User-selectable notch filter for rejecting background interference (i.e. fluorescent lighting).

EPC Gen 2 (TWIN) Baseband Analog Signal Processing Circuit



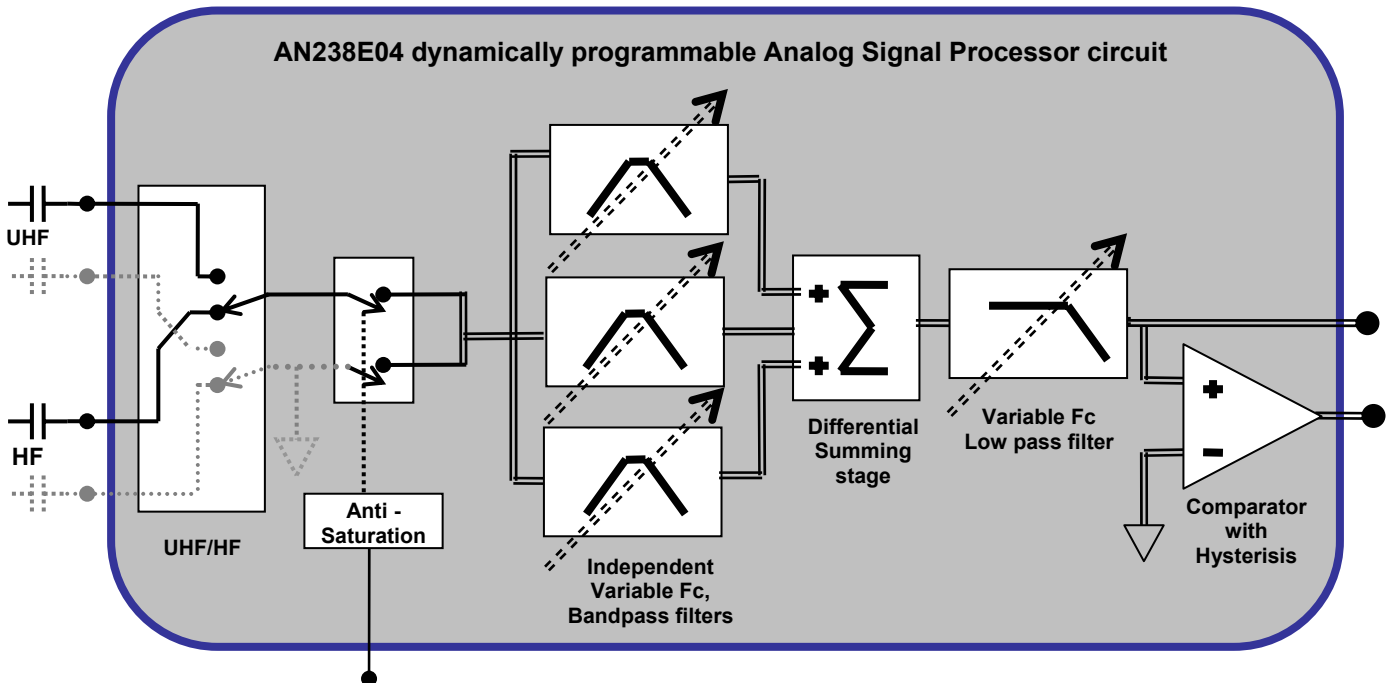
- Software selectable switch between UHF and HF base band signal inputs.
- Software selectable filters frequencies – Enables extraction of all data frequency pairs - e.g. 2 kHz & 4 kHz, 32 kHz & 64 kHz, 312 kHz & 625 kHz (All other frequency pairs possible).
- Variable gain to adjust for reader range/sensitivity.
- Variable gain within the summing stage to balance amplitude between extracted frequencies.
- User-selectable analog or digital output.
- Differential input allows easy interface to 900 MHz down converter, Single-ended as option.
- Input signal to control (anti-saturation) switch.

“Class 0” Analog Signal Processing Circuit



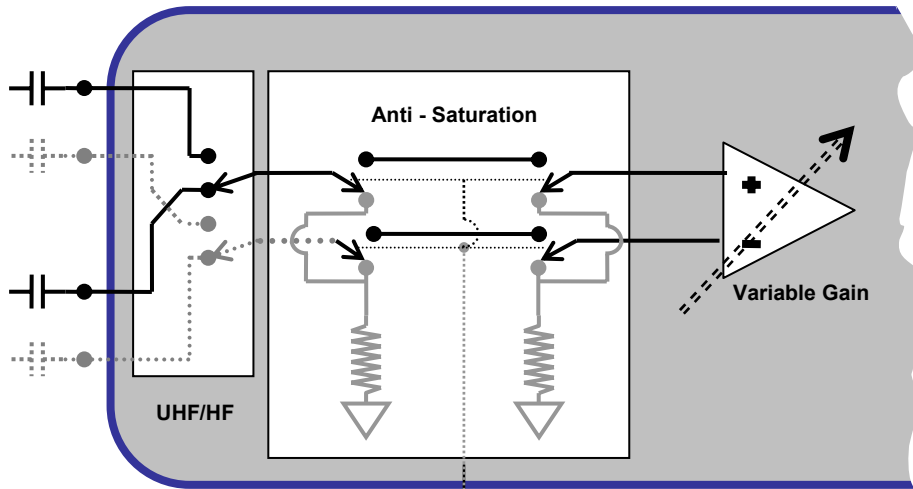
- Software selectable switch between UHF and HF base band signal inputs.
- Enables direct extraction of 2.2 MHz and 3.3 MHz sub-carrier signals.
- User-selectable analog or digital output.
- Differential input allows easy interface to 900 MHz down converter, Single-ended as option.
- Input signal to control (anti-saturation) switch.

TRIPLE band Analog Signal Processing Circuit



- This circuit is the same as the TWIN but has three band-pass filters and no variable gain.
- Enables extraction of three parallel sub-carrier signals without circuit modification - e.g. Synchronization frequency and data frequency pair – 42 kHz & 64 kHz, 128 kHz (Many other frequency combinations possible).
- Input signal to control (anti-saturation) switch.

Anti-Saturation Analog Signal Processing Circuit



Anti-saturation switch control.

ASAT

Note that the input and output wires are connected to Analog ground when the switch is open.

- Anti-saturation feature enables isolation of the RFID dpASP filter input stage from the input signal while maintaining all circuit bias points.
- Faster performance by direct hardware control of the anti-saturation switch through the ASAT connection.

RangeMaster5™ User-Selectable Parameters

HARDWARE CONTROLLED, (via ASAT connection)

Anti-Saturation Switch

Logic level, low = switch closed to normal signal path.

SOFTWARE CONTROLLED, (via 16 bit control word)

UHF/HF input select

choice between two pairs of input pins connected to the signal processing path.

select one of four circuits

WIDE, TWIN, TRIPLE or CLASS0.

Center frequency of the notch filter (in KHz):

0, 48, 50, 52.

Variable gain settings:

0dB, 6dB, 12dB, 18dB, 24dB, 30dB.

Balance Variable gain (either branch):

0dB, +3dB, +6dB, +12dB.

Lower sub-carrier frequency (in KHz):

2, 4, 8, 16, 20, 32, 40, 64, 80, 106, 128, 160, 212, 256, 320, 424.

Upper sub-carrier frequency (in KHz):

4, 8, 16, 20, 32, 40, 64, 80, 106, 128, 160, 212, 256, 320, 640, 848.

¹Contact Anadigm if you need further customization to fit your system needs.

Product codes

Evaluation Kit

AN238K08-EVAL5

Sample Chipset

AN238K08-SETSP (contains 2 x AN238E04-QFN5P and 1 x AN238C08-SSOSP)

Volume Chipset

AN238K08-SETTY (contains 2 x AN238E04-QFN5T and 1 x AN238C08-SSOTU)



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