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.

**RangeMaster5™ Benefits**

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<th>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.</th>
<th>Chipset can be dynamically controlled, from Host or System controller, to produce a truly intelligent and fully flexible UNIVERSAL card reader.</th>
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<td>Standardize around a single PCB to support multiple end products and markets.</td>
<td>Adjust the gain and filter frequency of the base-band filter in real time to optimize for read range.</td>
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<tr>
<td>Reduce the total number of system components and lower your bill of materials.</td>
<td>Calibrate the reader at customer site to account for background interference.</td>
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Universal (WIDE) Baseband Analog Signal Processing Circuit

- Software selectable switch between UHF and HF baseband 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 baseband 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 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, 160, 212, 256, 320, 640, 848.

Contact 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-QFNSP and 1 x AN238C08-SSOSP)
- Volume Chipset: AN238K08-SETTY (contains 2 x AN238E04-QFNTY and 1 x AN238C08-SSOTU)

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