

# RADAR SIGNAL PROCESSOR

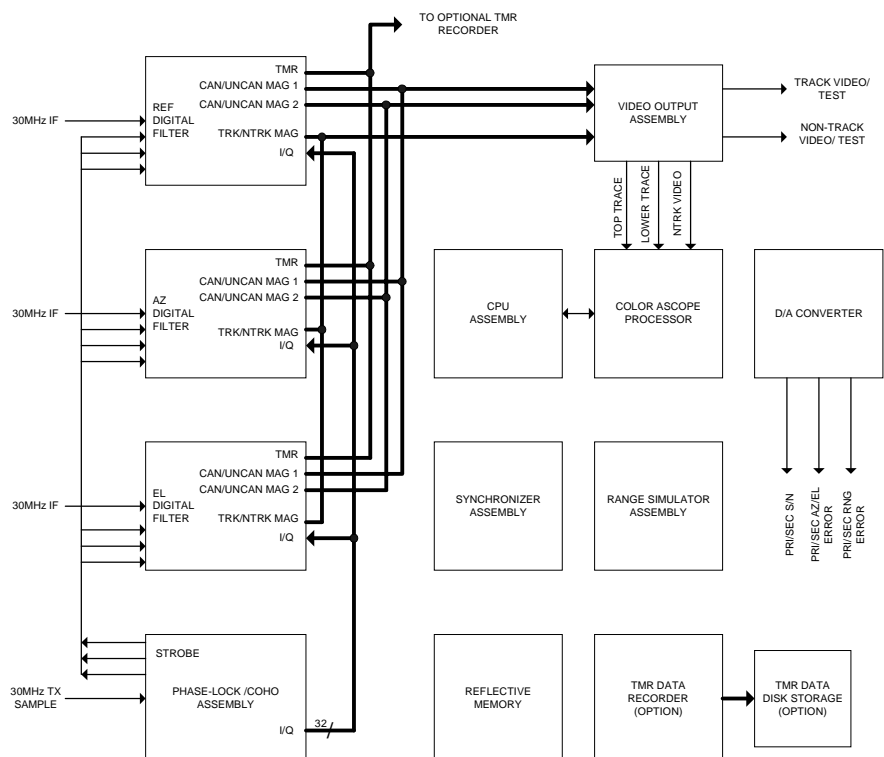
The Radar Signal Processor (RSP) combines the functions of an IF Receiver and Range Tracker. It accepts 3-channel monopulse IF inputs, digitally processes the signals, and produces filtered angle error and target range information. It additionally incorporates Doppler processing to reduce the effects of stationary clutter, provide improved target radial velocity measurements, and enable post-mission processing of recorded coherent data.

The RSP incorporates complex coherent demodulation (I and Q processing) performed digitally for improved orthogonality and provides digital filtering on all three channels. The digital filters can be programmed to match pulse widths up to 6.1  $\mu$ sec. The range tracker provides range track operation on two targets within the beam. The target position is computer based on centroid, lead-edge or trail-edge processing. The Type-II track loop operates in software using floating-point format to avoid data granularity problems frequently encountered in hardware track loops. Target acquisition is supported on gated video using a digital N out of M threshold processor for reduced false alarm rate.

### RSP Features ...

- Provides both IF Receiver and Range Tracking functions in a single VME solution
- Incorporates Digital Moving Target Indicator Signal Processing thereby reducing the effects of stationary ground clutter via Coherent-on-Receive signal processing
- AZ, EL and REF IF direct digitization coupled with digital complex coherent demodulation and bandwidth filtering with programmable pulse widths of 0.25 $\mu$ s to 6.1 $\mu$ s
- Simultaneous range tracking on two targets within the beam
- Single, 19-inch rack mount VME chassis: 19.5 inches high, 23 inches deep
- A-scope driver: four trace, RGB with alphanumeric overlay

The BAE SYSTEMS Radar Signal Processor (RSP) combines the functions of an IF Receiver and Range tracker in a single VME solution.



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### **IF Receiver Specifications ...**

- 3-channel receiver: AZ, EL, and REF
- IF Frequency: 30 MHz
- IF Dynamic Range: >90 dB at 5 $\mu$ s pulsewidth
- IF frequency Discrimination:  $\pm$ 5 MHz @ 20 dB S/N, Ref Channel
- Clutter Rejection: >35 dB 2 0.5 $\mu$ s pulsewidth
- Vector Canceller: 2, 3 or 4 pulse binomial
- Doppler Compensation: wid and cascade, adjustable  $\pm$ 25 KHz
- Coherent-on-Receive: Digital phase shifter <0.4 deg phase noise
- Receiver Dynamic Range: >80 dB
- Beacon and Skin AFC on Receive Capability

### **Range Tracker Specifications ...**

- Maximum Range: 65,536,000 yards
- Maximum Velocity: 20,000 yards/sec
- Maximum Acceleration: 2,000 yards/sec
- Track Noise: 0.43 meters RMS @ 1280 PRF, 20 dB S/N 1 Hz BW
- Dynamic Target Lag: 0.5 meters @ 160 meters/sec, 6 Hz BW
- Simultaneous range tracking of two targets within the beam
- Programmable PRF (IRIG default) and pulsewidth
- Nth Time Tracking to 64 intervals
- Skin and beacon capability
- Automatic Acquisition: CFAR controlled, 3 out of 4 correlation high processor
- Acquisition Windows: Four programmable, maximum of  $\pm$ 4 Kyds about the center of primary gate
- Transmitter Phasing: Manual (increment or slide), Automatic (1 PPS)
- Trigger Output Spare Capacity: Programmable start time and width, fixed (6 each), primary moving (9 each), and secondary moving (6 each)

### **Wide Gate Target Motion Resolution (TMR) Option ...**

- Maximum PRF Rate: 1280 Hz
- Maximum Channels Recorded: 3 (AZ, EL, Ref)
- Maximum Range Samples per Channel: 256
- Minimum Range Step Size: 8 yds
- Data Format: 16-bit 2's-complement integer data for I and Q
- Each PRF is time-tagged, granularity = 1  $\mu$ sec
- Pertinent RSP mode information recorded each PRF
- Sample-gate range position recorded each PRF
- Data recording to external RAID disk array via fiber channel