DWG NO 1003905	SHT 1 OF 13

REVISION RECORD

DATE	REV	SH.REV'D	DESCRIPTION	DR	CK
24JAN00	1		PRELIMINARY RELEASE	DMR	
24JAN00	A		INITIAL RELEASE PER ECO 1003905_1A	DMR	

HEADWAY SENSOR
PRODUCT DEFINITION DOCUMENT

FOR

JAGUAR MY2001 ACC2
ADAPTIVE CRUISE CONTROL SYSTEM

Document No. HEM 1003905

9 January 2000

H E MICROWAVE PROPRIETARY

MICROWAVE

DR: D. RIX	DWG DATE: 24JAN00
CK	
APPVD:	
APPVD:	

UNLESS OTHERWISE SPECIFIED
TOLERANCES ON:
2 PLACE DIMENSIONS ±
3 PLACE DIMENSIONS ±
ANGLES ±
PART SHALL BE FREE OF BURRS
BROKEN EDGES
FILLET RADIUS
SURFACE ROUGHNESS

INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100 ANSI Y14.5M-1982

THIRD ANGLE PROJECTION

PROGRAM: ACC2

NEXT ASSY:

SCALE: N/A

NAME: HEADWAY SENSOR PDD ACC2

SIZE	DWG NO	SHT	REV
A	1003905	1 OF 13	A

HE MICROWAVE TUCSON, AZ.

ACC2 SENSOR

PRODUCT DEFINITION DOCUMENT

for

JAGUAR MY2001 ACC2
ADAPTIVE CRUISE CONTROL SYSTEM

Document No. HEM 1003905

9 January 2000

Delphi Delco Electronics
HE Microwave

1.0 INTRODUCTION

1.1 Background and Intent

The 2001 MY Jaguar ACC2 Adaptive Cruise Control (ACC) System consists of a Mech scanned antenna, actuator, millimeter wave (MMW) transceiver, radar control module (RCM) and angular rate sensor. This document provides the functional and performance requirements for the Sensor component of the ACC2 System.

The ACC2 System automatically adjusts host vehicle speed (via throttle and limited braking) to maintain a selected following interval to the closest moving vehicle within the projected path of the ACC vehicle. In special situations, the ACC2 system also invokes limited braking in response to stopped objects in the path of the host vehicle. The ACC function is intended for both straight and curved roadways in clear and adverse weather conditions.

The ACC2 Sensor is required to output track files on moving and stationary objects in the forward area. Discrimination capability is needed to track closely spaced vehicles and to distinguish valid vehicle targets from roadside clutter and other stationary objects.

Algorithms which execute within a micro-controller on board the RCM calculates vehicle path, selects the closest in-path vehicle from the sensor track file data, determines throttle and brake commands, and interfaces with the vehicle bus. In general, stationary objects and vehicles shall be rejected except that decelerating vehicles must be reported to a complete stop.

1.2 Sensor Functions

The primary Sensor functions are detection, parameter estimation, tracking and diagnostics. The Sensor scans a narrow beam to detect all targets within its specified field of view (FOV). A wide azimuth FOV is implemented to support ACC on curved roadways with overscan to accommodate misalignment. For each detection, the Sensor estimates target range, range rate, acceleration, and angle parameters. These parameters are input to the tracking function which maintains track files on all targets within the FOV.

Host vehicle yaw rate and speed is processed by the Sensor in the parameter estimation and tracking functions. Host vehicle speed is used to identify moving and stationary targets. Yaw rate (and speed) are used to estimate and smooth target offset from lane center.

1.3 Radar System Overview

The Sensor is a millimeter wave (MMW) frequency modulated continuous wave (FMCW) radar operating at 76.5 GHz frequency (midband). The radar system consists of a transmit/receive antenna, antenna actuator assembly, transceiver assembly, and Radar Control Module (RCM), as shown in Figure 1.3-1.

The antenna provides a narrow pencil beam which is mechanically scanned to cover the required azimuth region. The transceiver generates the FMCW transmit waveform and, on receive, performs direct conversion to baseband (I and Q). A multiple slope FM waveform is used to determine unambiguous target range and range rate data.

Baseband data from the transceiver is analog filtered and then digitized by the RCM which performs the radar signal and data processing functions from detection through target tracking. In addition, the RCM performs transceiver control and antenna scan control. A closed loop linearizer is implemented to control the frequency modulation of the transceiver. A closed loop controller is used to control antenna scanning based on position feedback from the actuator.

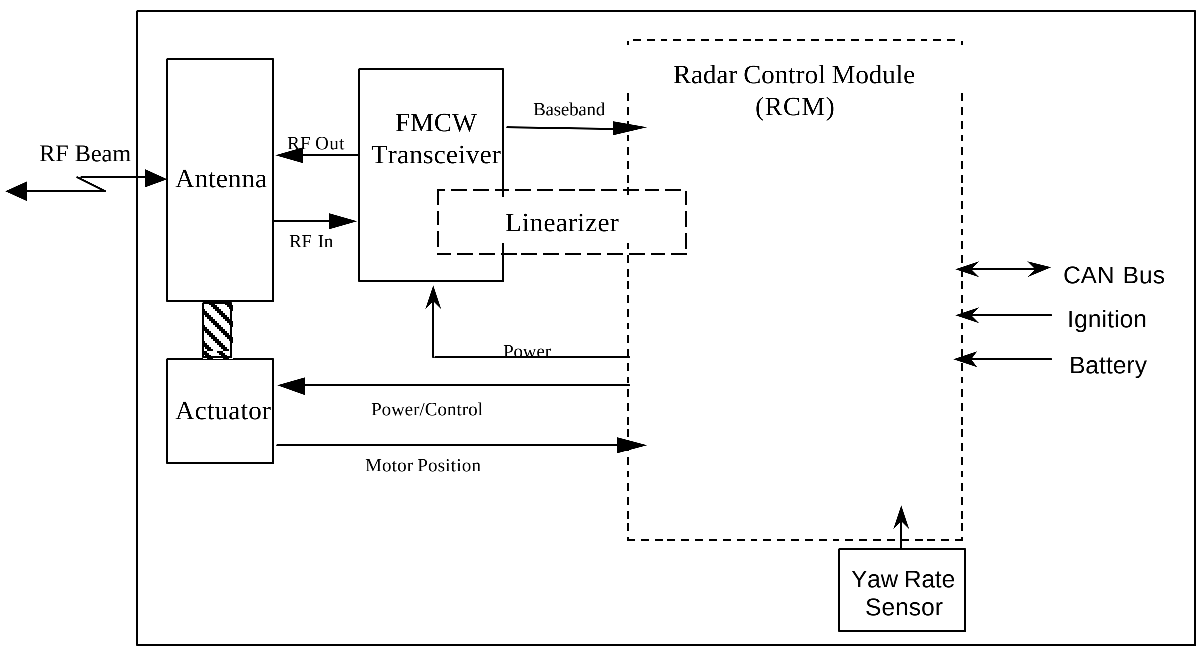

Figure 1.3-1 Sensor Block Diagram