INTEGRATION MANUAL - DOS048-004

AMG Microwave

Document : DOC0682-V1

Date : 09/22/2016

Version : 1

Important Instructions and Notices:

Note 1: OEM integrators shall not provide installation and/or removal instructions to end-users.

Note 2: End-user's operating manual delivered with final products shall include the following information:

This device complies with part 15 of FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation

NOTE 3: This transmitter module is authorized to be used in other devices only by OEM integrators under the following conditions:

The antenna(s) must be installed such that a minimum separation distance of 20cm is maintained between the radiator (antenna) & user's/nearby person's body at all times.

The transmitter module must not be co-located with any other antenna or transmitter.

NOTE 4: Finished products integrating this RF module shall bear the following label:

"This device contains RF module FCC ID: 2AI5Y-DOS048004"

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1.1 Warnings and cautions

Handling precautions

Damage to the radar can occur as the result of careless handling or electrostatic discharge (ESD). Always handle the radar with care to avoid damage to electrostatic-sensitive components. Prior to making any connections, ensure the power supply or circuit breaker is switched off.

Environment

Removing shielding or operating the radar outside of the specified input voltage range or the specified operating temperature range can cause permanent damage.

The device is sensitive to moisture and dust. It must be protected by a plastic casing adapted to the end use.

Sensitivity

The target reflectivity depends of its surface size and composition.

Metallic surfaces are greatly reflective.

The target shape can degrade their detection.

Radar waves do not cross water films and metallic sheets. But they can cross some walls or plastic sheets.

Radar waves are slightly weakened by the rain and the dirt

Only the waves reflected by moving target are detected by Doppler radar

Thin antenna beam width are more sensitive.

Radar detect movement, and it it does not recognize the nature of the target.

1.2 Reference

This document provide for DOS048-004 only.

2. Installation

2.1 Overview

The radar operates in the 24 GHz ISM band. Four independent radars can be connected in series by a web of multi-wire planar cables/ribbon cables with 12 points. Each radar monitors an area of 90 degrees over a distance of 0 to 35m. The distance detection area can be programmed by the user.

In the 8-pin HARWIN connector we have: the 12v power supply, 4 TOR/digital outputs and a UART communication bus.

A digital/TOR (on-off control) output is short-circuited if its corresponding radar detects the movement of a pedestrian in his beam.

The link is used to program or to receive all information of speed and distance.

2.2 Radar connections

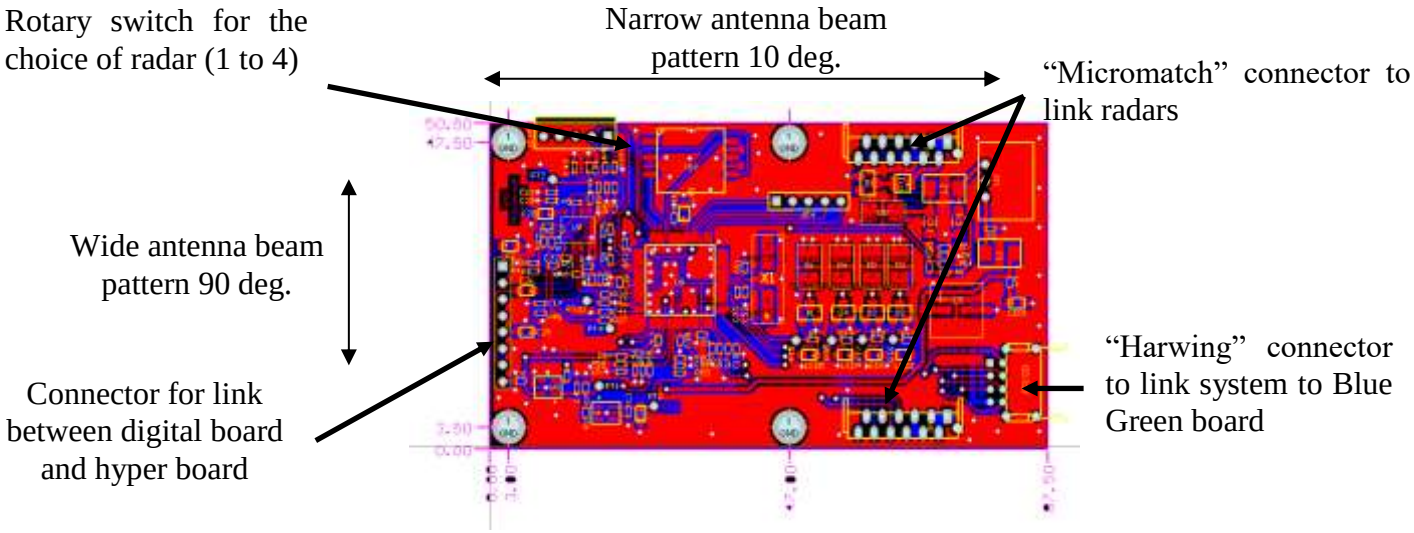

Figure 1. Radar and connectors diagram

All 4 radars detect simultaneously. Each radar can trigger an alarm. The customer PC board can read the characteristics of the target: speed, distance, power.

2.3 Mechanical Outline

All dimensions are in mm

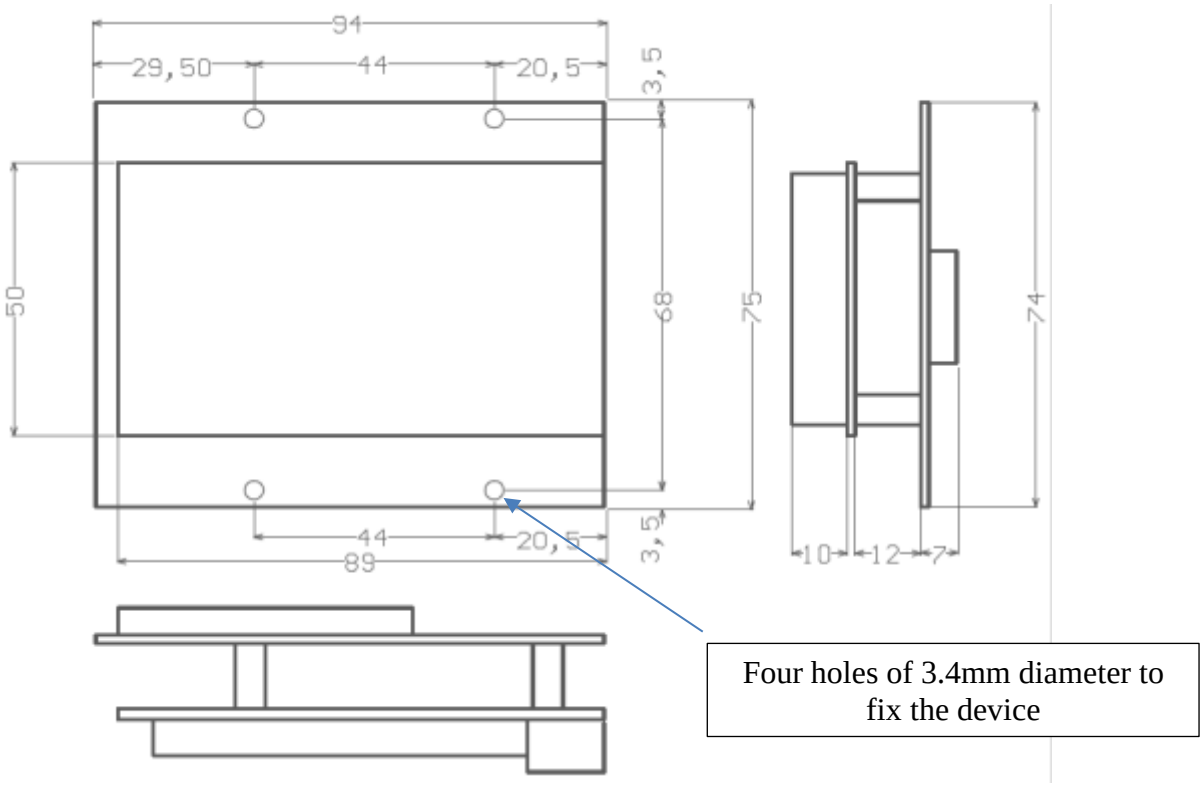

Figure 2. DOS048-004 Mechanical Outline (front, top and lateral)

2.4 Data interfaces and connectors

The “Micromatch” radar connectors link each radar to the next.

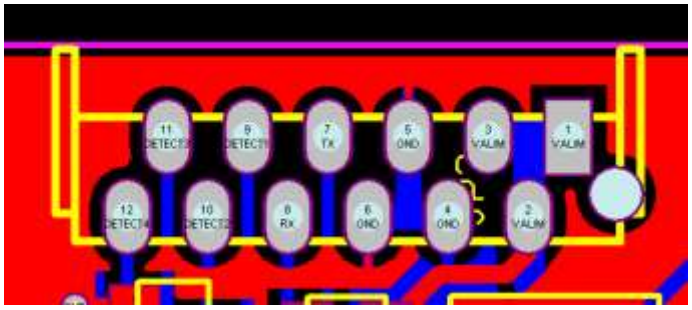

Figure 3 : "Micromatch” connector broaching

Table 1: "Micromatch" connector broaching

Pin	**Signal**
1, 2, 3	Valim: Supply voltage +12V
4, 5, 6	GND : 0V
7	TX: Data transmission to Blue Green board. LVTTL level.
8	RX: Data reception from Blue Green plan. LVTT level.
9	DETECT1
10	DETECT2
11	DETECT3
12	DETECT4

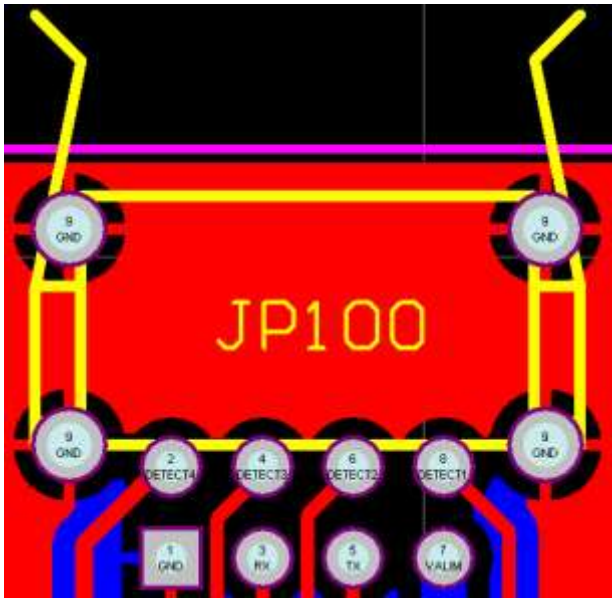

Figure 4 : “Harwin” connector broaching

Table 1 : “Harwin” connector broaching

Pin	**Signal**
1	GND
2	DETECT4
3	RX: Data reception from Blue Green plan. LVTTL level
4	DETECT3
5	TX: Data transmission to Blue Green plan. LVTTL level
6	DETECT2
7	Valim: Supply voltage +12V
8	DETECT1

2.5 Serial links

Each radar is equipped with 2 “Micromatch” connectors of 12 points. The radars are linked to their neighbours by two multi-wire planar cables.

The radars function in slave mode: a “response frame” is returned after the reception of a “command frame”.

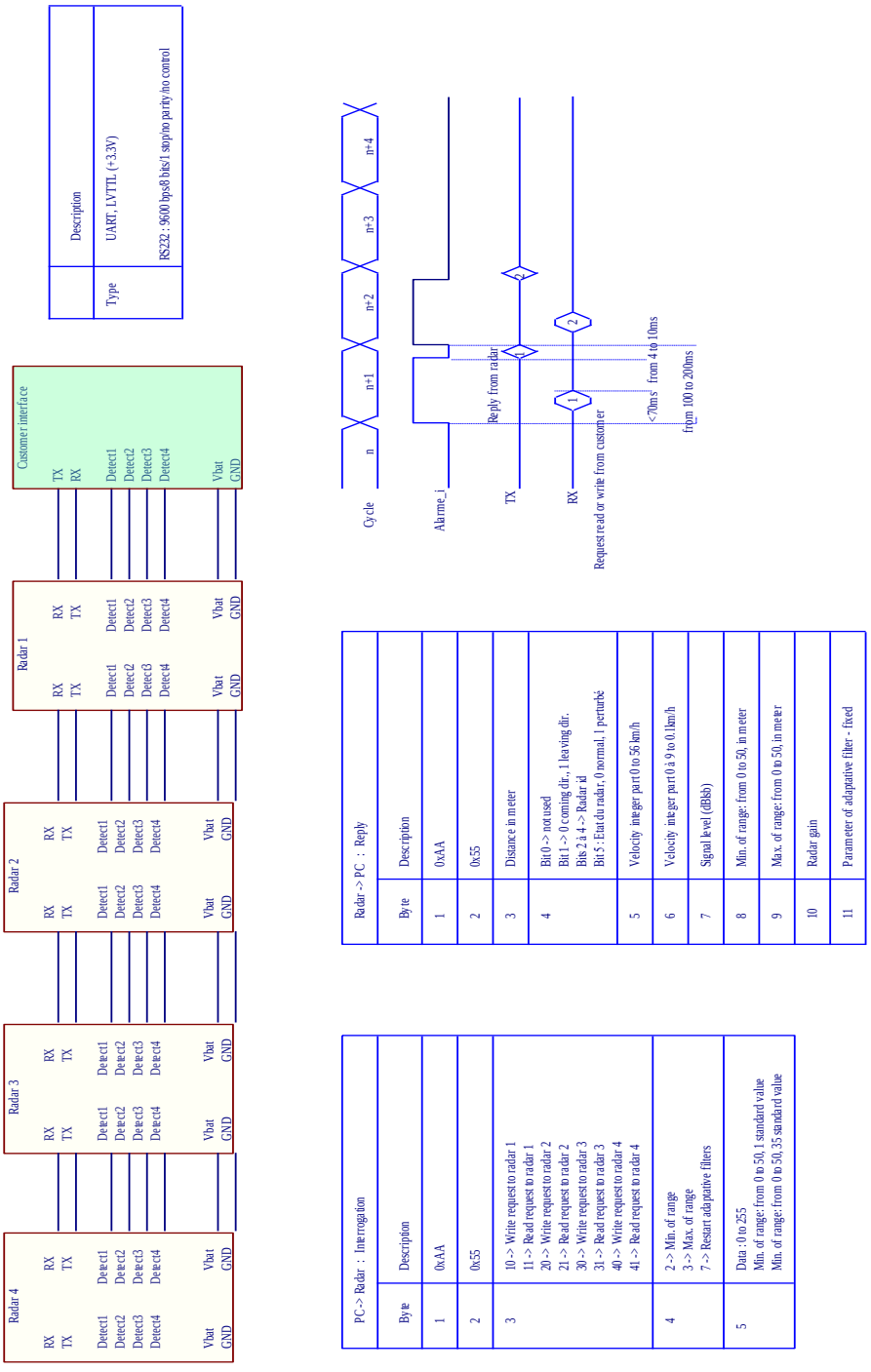

Figure 5. Serial link diagram

2.6 Power supply

Voltage Typ. : +12V dc

Curent Typ. : 12 mA

The power supply is protected with 350mA polyswitch fuse and polarity error.

2.7 Casing and radome

Distance between antennas and radome : 6mm

Radome thickness: less than 1mm or lambda/2

Material: Plastic, plastic (plastic with fibber glass is not recommended)

For others mountings contact AMG Microwave

Casing: IP 55 or upper level

In the case of a metal case provided to isolate the radar from enclosure and place a plastic window in front of antennas.

3. Operation

The beam width must cover the detection area. The figure below show the shape of radar beam.

Select the correct radar number for the desired output. The device is active as soon as the power is on.

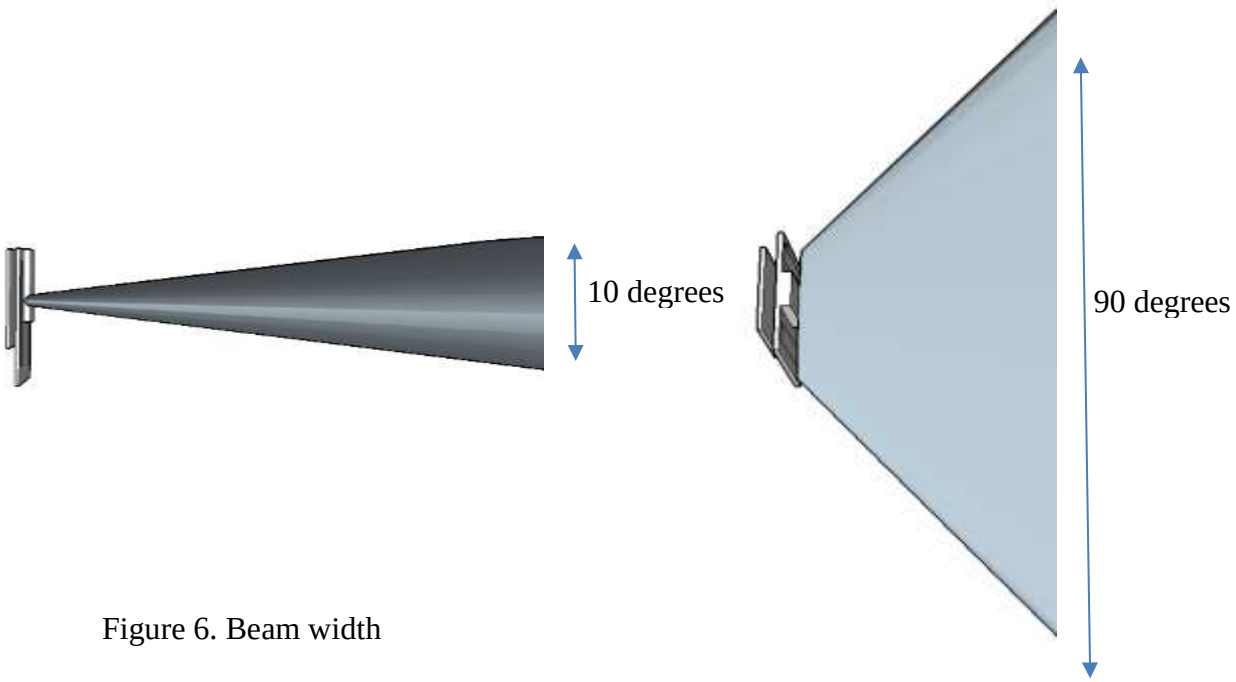

Figure 6. Beam width

4. Troubleshooting tips

No alarm or low sensitivity

Verify the cable if no green led is on.

Change the radar number.

Verify the range of the detection.

Clean the radome or see if the beam is not masked.

Remove moving objects that are in the beam.

Looking parasitic radio emissions.

No alarm during tests

The software has been adapted to the movements of realistic targets. Operating tests must reproduce real life situations.

False alarms

Verify power supply.

Remove moving objects that are in the beam.

Looking parasitic radio emissions.

Others cases

Contact AMG Microwave