

User Manual

RAVE Access Point (RaveAP) 00-5098-01

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Revision **2**

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1.0 PURPOSE

This document provides basic usage and setup information for the Rave Access Point (RaveAP) (P/N: 00-5098-01).

2.0 ACRONYMS AND DEFINITIONS

2.1 Acronyms

Table 2-1 Acronyms

Acronyms	Expansion
ARINC	Aeronautical Radio, Incorporated
ATP	Acceptance Test Procedure
BIOS	Basic Input / Output System
BT	Bluetooth
CL	CabinLink
COTS	Components Off-The-Shelf
CPU	Central Processing Unit
DMF	Date of Manufacture
EUT	Equipment Under Test
EEPROM	Electrically Erasable Programmable Read-Only Memory
EIRP	Equivalent Isotropic Radiated Power
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
ENV	Environmental
ETH	Ethernet
GbE	Gigabit Ethernet
GND	Ground
GPIO	General-Purpose Input / Output
GUI	Graphical User Interface
HDMI	High-Definition Multimedia Interface
I2C	Inter-Integrated Circuit
IFE	In-Flight Entertainment
IP	Internet Protocol
LED	Light-Emitting Diode
LRU	Line Replaceable Unit
MCB	Main Carrier Board
MDIO	Management Data Input / Output
NEMA	National Electrical Manufacturers Association

Acronyms	Expansion
NOK	Not OK
OEM	Original Equipment Manufacturer
PC	Personal Computer
PEB	Panel and Ethernet Board
PF	Power Factor
PHY	Physical Layer
PIC	Peripheral Interface Controller
PN	Part Number
PSB	Power Supply Board
PVT	Performance Verification Test
RAM	Random Access Memory
RAVE	Reliable, Affordable and Very Easy
RaveAP	RAVE Access Point
Rev	Revision
RF	Radio Frequency
SN	Serial Number
SNMP	Simple Network Management Protocol
SPI	Serial Peripheral Interface (bus)
SSH	Secure Shell
SW	Software
TCP	Transmission Control Protocol
TTL	Transistor–Transistor Logic
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
UUT	Unit Under Test
WAIC	Wireless Avionic Intra-Communications
WAN	Wide Area Network
WAP	Wireless Access Point

3.0 APPLICABILITY AND REFERENCES

Table 3-1 Applicability and References

Document Number	Document Name	Source
28-5098-50	Operational Description, RAVE Access Point (RaveAP)	SPI

4.0 OVERVIEW

The RaveAP (Figure 1) is a Wireless Access Point (WAP) designed exclusively for usage in aircraft. Airworthiness approvals are typically required for installation and operation of the RaveAP in aircrafts.

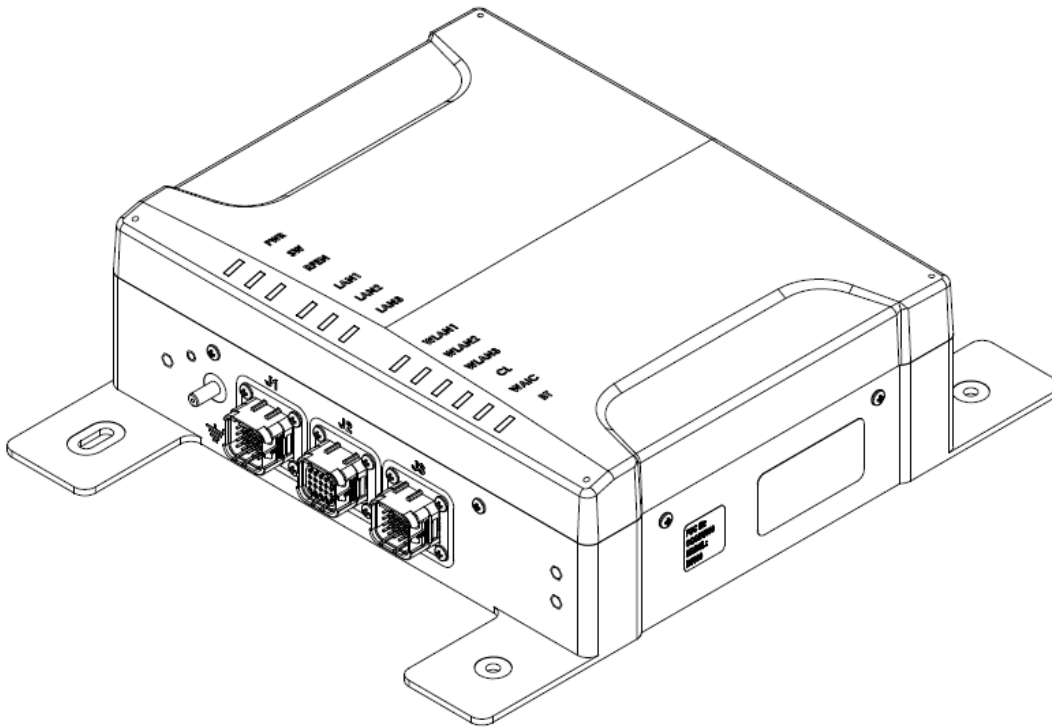


Figure 1. RaveAP

4.1 Regulatory Compliance

A. USA - Federal Communications Commission (FCC)

This device complies with part 15 of the 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: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

When using the product, maintain a distance of 20cm from the body to ensure compliance with RF exposure requirements.

B. CANADA - Industry Canada (IC)

English

This device complies with ISSED Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Exposure to radio frequency energy: The radiated output power of this device meets the limits of FCC/ISED Canada radio frequency exposure limits. This device should be operated with a minimum separation distance of 20 cm (8 inches) between the equipment and a person's body.

Français

Le présent appareil est conforme aux CNR d'ISDE Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

L'exposition à l'énergie radiofréquence: La puissance de sortie rayonnée de cet appareil est conforme aux limites de la FCC/ISDE Canada limites d'exposition aux fréquences radio. Cet appareil doit être utilisé avec une distance minimale de séparation de 20 cm entre l'appareil et le corps d'une personne.

CAN ICES-003(A) / NMB-003(A)

5.0 PRODUCT FEATURES

The RaveAP features multiple radios to enable wireless on-board communication.

Radio	Technology	Intended Usage
1 – Wi-Fi 1	2.4 GHz Wi-Fi	Passenger/Crew Wi-Fi Communication
2 – Wi-Fi 2	5 GHz Wi-Fi	Passenger/Crew Wi-Fi Communication
3 – Wi-Fi 3	Dual Band 2.4/5 GHz Wi-Fi	Scanning & Monitoring
4 – Cabin Link (CL)	2.4 GHz - 802.15.4	Machine-to-Machine Communication
5 – Bluetooth (BT)	2.4 GHz Bluetooth	Bluetooth Beacons

6.0 INTERFACES

6.1 Ethernet

The RaveAP has three GigE-capable (10/100/1000 Base-T Ethernet) data ports available via connectors J1, J2, and J3.

6.2 Power

The RaveAP is powered by 115V AC, 350-800 Hz on J1 or J2.

6.3 Discrete Interfaces

The RaveAP features two (2) discrete inputs to enable power (POWER_ON) and to enable radios (RF_ENABLE) on J1 and J2. The discretes are active when connected to ground (GND).

6.4 IP Configuration

The RaveAP features four (4) IP Pin straps on J3 to assign IP addresses to a RaveAP based on physical aircraft location. The configuration of these straps is aircraft specific.

6.5 LEDs

The RaveAP features twelve (12) status LEDs.

LED	Status
PWR	Power status of RaveAP
SW	Software Status of RaveAP
RFEN	RF status of radios (LED lit = radios enabled)
LAN1	Link/activity status of Ethernet interface ETH1
LAN2	Link/activity status of Ethernet interface ETH2
LAN3	Link/activity status of Ethernet interface ETH3
WLAN1	Radio status of Wi-Fi radio 1
WLAN2	Radio status of Wi-Fi radio 2
WLAN3	Radio status of Wi-Fi radio 3
CL	Radio status of Cabin Link radio
WAIC	Not used (permanently OFF)
BT	Radio status of Bluetooth radio

6.6 Pinout

Table 2 shows the pinout of the RaveAP.

J1			J2			J3		
POS	ASSIGNMENT	DIRECTION	POS	ASSIGNMENT	DIRECTION	POS	ASSIGNMENT	DIRECTION
1	ETH 1 BI_DB+	BIDIRECTIONAL	1	ETH 2 BI_DA+	BIDIRECTIONAL	1	DISC IN CONF_STRAP_0	IN
2	ETH 1 BI_DA+	BIDIRECTIONAL	2	ETH 2 BI_DB+	BIDIRECTIONAL	2	DISC IN CONF_STRAP_1	IN
3	SHIELD QUAD 1	GROUND	3	SHIELD QUAD 1	GROUND	3	DISC IN CONF_STRAP_2	IN
4	ETH 1 BI_DD+	BIDIRECTIONAL	4	ETH 2 BI_DC+	BIDIRECTIONAL	4	DISC IN CONF_STRAP_3	IN
5	ETH 1 BI_DC+	BIDIRECTIONAL	5	ETH 2 BI_DD+	BIDIRECTIONAL	5	N/C	N/A
6	ETH 1 BI_DA-	BIDIRECTIONAL	6	ETH 2 BI_DB-	BIDIRECTIONAL	6	DISC IN CONF_STRAP_GND_0	GROUND
7	ETH 1 BI_DB-	BIDIRECTIONAL	7	ETH 2 BI_DA-	BIDIRECTIONAL	7	DISC IN CONF_STRAP_GND_1	GROUND
8	SHIELD QUAD 2	GROUND	8	SHIELD QUAD 2	GROUND	8	DISC IN CONF_STRAP_GND_2	GROUND
9	ETH 1 BI_DC-	BIDIRECTIONAL	9	ETH 2 BI_DD-	BIDIRECTIONAL	9	DISC IN CONF_STRAP_GND_3	GROUND
10	ETH 1 BI_DD-	BIDIRECTIONAL	10	ETH 2 BI_DC-	BIDIRECTIONAL	10	N/C	N/A
11	N/C	N/A	11	N/C	N/A	11	ETH 3 BI_DB+	BIDIRECTIONAL
12	POWER ON	IN	12	POWER ON	OUT	12	ETH 3 BI_DA+	BIDIRECTIONAL
13	N/C	N/A	13	N/C	N/A	13	SHIELD QUAD 1	GROUND
14	SIGNAL GND	GROUND	14	SIGNAL GND	GROUND	14	ETH 3 BI_DD+	BIDIRECTIONAL
15	RF ENABLE	IN	15	RF ENABLE	OUT	15	ETH 3 BI_DC+	BIDIRECTIONAL
16	115V AC RETURN	GROUND	16	115V AC RETURN	GROUND	16	ETH 3 BI_DA-	BIDIRECTIONAL
17	CH GND	GROUND	17	CH GND	GROUND	17	ETH 3 BI_DB-	BIDIRECTIONAL
18	115V AC	IN	18	115V AC	OUT	18	SHIELD QUAD 2	GROUND
19	N/C	N/A	19	N/C	N/A	19	ETH 3 BI_DC-	BIDIRECTIONAL
20	N/C	N/A	20	N/C	N/A	20	ETH 3 BI_DD-	BIDIRECTIONAL

Table 2. RaveAP Pinout.

7.0 SETUP

The RaveAP is typically part of a larger aircraft installation with control and management server and aircraft-specific configurations. To facilitate a laboratory test setup, a RaveAP Tester (P/N: 00-0150-01) is available. Figure 2 shows how to setup the RaveAP with the RaveAP Tester.

A 115V AC/400 Hz power supply is required to power the RaveAP. The RaveAP Tester can be powered from the standard mains power.

To access and control the RaveAP Tester, commercially available USB keyboard and mouse as well as a HDMI or DisplayPort-capable monitor are required.

The RaveAP Tester contains the necessary software to control the RaveAP and execute standard test cases. Refer to document 28-5098-50 for more details.

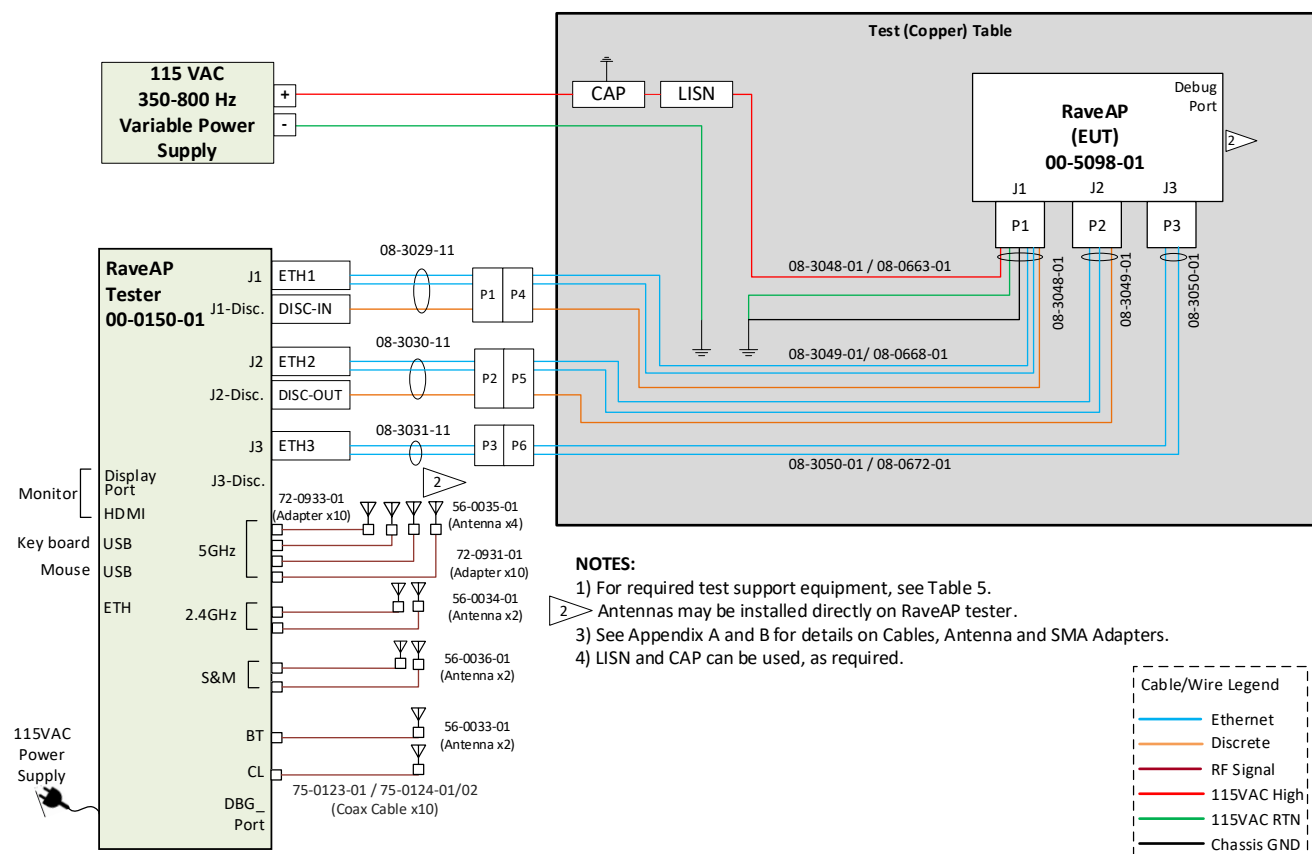


Figure 2. RaveAP Tester Setup.

As the RaveAP supports multiple radios, the operating frequencies must be chosen such that the frequencies do not interfere with each other for optimal performance.

Radio	Channel (Bandwidth)	Centre Frequency
1 – Wi-Fi 1	6 (20 MHz)	2437 MHz
2 – Wi-Fi 2	46 (40 MHz)	5230 MHz
3 – Wi-Fi 3	159 (40 MHz)	5795 MHz
4 – Cabin Link (CL)	25, 26 (2 MHz)	2475, 2480 MHz
5 – Bluetooth (BT)	37, 38, 39 (2 MHz)	2402, 2426, 2480 MHz

Table 3. Typical Radio Channel Configuration.