



# CWAP – Quick Start Guide

Document Revision: Release 1.0



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# 1 User Information

## 1.1 About This Document

This document provides information about products from Kontron and/or its subsidiaries. No warranty of suitability, purpose, or fitness is implied. While every attempt has been made to ensure that the information in this document is accurate, the information contained within is supplied “as-is” and is subject to change without notice.

## 1.2 Copyright Notice

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## 1.3 Trademark Notice

This document may include names, company logos and trademarks, which are registered trademarks and, therefore, proprietary to their respective owners.

## 1.4 Standards

| Standard         | Description                                                                                                                                                                                                                                                                                                               |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ARINC 763-3      | Network Server System                                                                                                                                                                                                                                                                                                     |
| D6-36440         | Boeing Standard Cabin Systems Requirement Document FED-STD-595 Colors Used in Federal Procurement                                                                                                                                                                                                                         |
| IEEE 802.11a     | Wireless LAN Media Access Control (MAC) and Physical Layer (PHY) Specifications – High-speed Physical Layer in the 5 GHz Band.                                                                                                                                                                                            |
| IEEE 802.11b     | Physical and Media Access Control (MAC) layer definition for ISO 7 stack communications devices.                                                                                                                                                                                                                          |
| IEEE 802.11g     | IEEE Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Media Access Control (MAC) and Physical Layer (PHY) Specifications: Further Higher Data Rate Extension in the 2.4 GHz Band. |
| IEEE 802.11n     | IEEE Standard for Information Technology - Telecommunications and information exchange between systems-Local and metropolitan area networks-Specific requirements-Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications. IEEE 802.1x Port-Based Network Access Control                |
| IEEE 802.3       | Information Exchange Between Systems—Local and Metropolitan Area Networks—Specific Requirements—Part 3: Carrier Sense Multiple Access With Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications. RTCA/DO-254 Design Assurance Guidance For Airborne Electronic Hardware                          |
| RTCA/DO-160F     | Environmental Conditions and Test Procedures For Airborne Equipment RTCA/DO-178B Software Considerations in Airborne Systems and Equipment                                                                                                                                                                                |
| FAR-25.853a Cert | Federal Aviation Regulations for Flammability ISO 9001/2008 International Organization for Standardization, Quality Management ANSI/IPC-A-620 Acceptability of Electronic Assemblies ANSI/J-STD-002 Solderability Tests for Component Leads MIL-C-5542 Chemical Conversion Coatings on Aluminum and Aluminum Alloys       |

## 1.5 Warranty

This Kontron product is warranted against defects in material and workmanship for the warranty period from the date of shipment. During the warranty period, Kontron will at its discretion decide to repair or replace defective products.

Within the warranty period, the repair of products is free of charge as long as warranty conditions are observed.

The warranty does not apply to defects resulting from improper or inadequate maintenance or handling by the buyer, unauthorized modification or misuse, operation outside of the product's environmental specifications or improper installation or maintenance.

Kontron will not be responsible for any defects or damages to other products not supplied by Kontron that are caused by a faulty Kontron product.

## 1.6 Referenced Documents

Kontron Document # 73001000-FAT, Factory Acceptance Test Procedure, CWAP

Kontron Document # 73001000-CMM Component Maintenance Manual (CMM), CWAP

Kontron Document # 73001000-ESS Environmental Stress Screen Procedure, CWAP

Kontron Document # 730010000-FMEA, Rev A, CWAP

Motorola AP-7131 Series Access Point Product Reference Guide

## 1.7 Technical Support

Technicians and engineers from Kontron and/or its subsidiaries are available for technical support. We are committed to making our product easy to use and will help you use our products in your systems.

Please consult our Web site at <http://www.kontron.com/support> for the latest product documentation, utilities, drivers and support contacts.

## 1.8 Important Instructions

The following general instructions should always be followed in order to assure the proper operation of the COBALT unit, the safety of operators and the preservation of warranty coverage.



### **Warning!**

All precautions, procedures, and safeguards to prevent damage due to ESD, and promote the safe handling of electronic components must be followed.

It is assumed that a competent technician familiar with electro-mechanical assemblies will be performing any testing or troubleshooting of the unit. For detailed interconnection of power and signal wiring refer to the sections on [Physical I/O](#) and [Starting Up](#).

**IMPORTANT:** Avoid removing any identification plates, serial numbers or warning labels unless specifically authorized by the manufacturer.

## 1.9 Exclusion of liability notice

### **Exemption from Liability for Accidents**

Should the user disregard the instructions (specifically the safety instructions) in this manual and possibly on the device, Kontron will be exempt from legal liability for accidents.

### **Limitation of Liability / Warranty Obligations**

In the event of damage to the device, which is caused by a failure to observe the instructions (specifically the safety instructions) in this manual and possibly on the device, Kontron will not be required to honor the warranty, including during the warranty period, and will be exempt from legal liability for accidents.

## 2 Safety instructions

### 2.1 Electrostatic Discharge (ESD)



Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times. Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.



A sudden electrostatic discharge can destroy sensitive components. Proper packaging and grounding rules must be observed. Always take the following precautions.



1. Transport boards and cards in electrostatically secure containers or bags.
2. Keep electrostatically sensitive components in their containers, until they arrive at an electrostatically protected workplace.
3. Only touch electrostatically sensitive components when you are properly earthed.
4. Store electrostatically sensitive components in protective packaging or on anti-static mats.

### 2.2 Precautions for Installing the System

#### Important Instructions!

Please follow the corresponding instructions in this manual when installing/mounting the CWAP platform.

Please observe all specified dimensions required for mounting included in the drawing with outline dimensions

When installing the CWAP, there must be at least 40 mm (approximately 1.575") free space around the cooling fins to prevent the system overheating.

Leave approximately 4.0" (100 mm) of free space to the front and rear of the unit in order to have access to the connector interfaces to properly connect the peripherals.

The cooling fins of the chassis must not be obstructed.

The platform must be firmly attached to a clean flat and solid mounting surface. Use proper fastening materials suitable for the mounting surface. Ensure that the mounting surface type and the used mounting solution safely support the load of the cobalt and the attached components.

Follow the local/national regulations for grounding. A ground bonding measurement (between CWAP chassis ground and the mounting surface) should be conducted to ensure proper safety and EMI characteristics are maintained.

The voltage feeds must not be overloaded. Adjust the cabling and the external overcharge protection to correspond with the electrical data indicated on the type label.

## 3 Introduction

### 3.1 Product Description

The Cabin Wireless Access Point (CWAP) is a network distribution system designed specifically for commercial airborne applications. The CWAP complies with IEEE 802.11a/b/g/n wireless standards utilizing a Commercial-Off-The-Shelf (COTS) wireless access point in the appropriately assigned radio frequency spectrum to facilitate wireless communications to other personal and aircraft devices. The CWAP provides a bridge between IEEE 802.3 wired Ethernet LANs and IEEE 802.11a/b/g/n compliant wireless networks.

The CWAP is provided with aircraft level discrete inputs and outputs to facilitate event notification and equipment status to and from other aircraft systems, including remote control ON/OFF. The product is equipped with an avionics wide frequency (360-800Hz) power supply unit with a 200msec holdup capability for power interruptions. The CWAP requires no active cooling system, and has capabilities for built-in diagnostics reporting. The CWAP is designed to comply with the general requirements identified in Section 8 (Cabin Wireless LAN Unit) of the ARINC 763-3 Specification. The unit communicates to a host server by physical connection over wired 10/100/1000Base-T interfaces.

### 3.2 Functional Block Diagram

Figure 1 contains an overview of the CWAP functional structure and interfaces

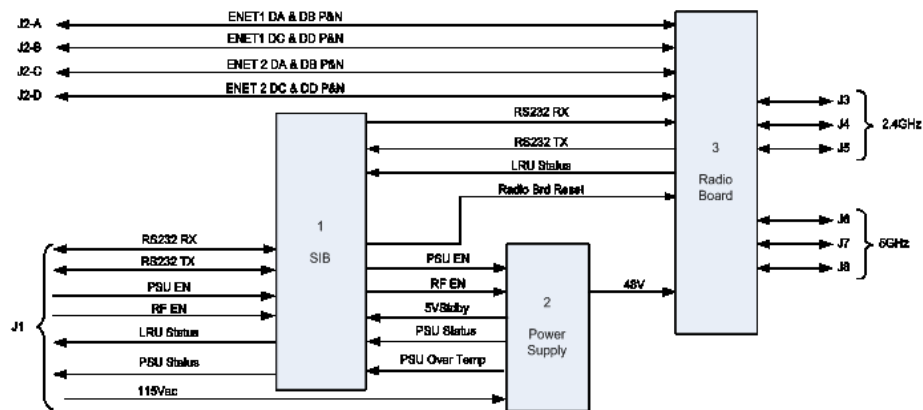


Figure 1 - Functional Block Diagram

| Block ID | Functional Block             | Description                                                                                                                                                |
|----------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Signal Interface Board (SIB) | Provides the interface for the four discrete external I/O signals; 115Vac, and RS232 signals. Also includes under temperature turn-off circuitry.          |
| 2        | Power Supply (PSU)           | Converts 115Vac input power to the proper DC voltages required by the I/O and Radio Boards. Provides power supply and radio power status to the I/O Board. |
| 3        | Radio Board                  | Provides the access point interface between the 2.4 and 5 GHz antenna interfaces,                                                                          |

Table 1 - Functional Block Diagram Table

### 3.3 Equipment Definition

The CWAP leverages state-of-the-art COTS hardware to establish a rugged, versatile, high performance wireless network access product. The minimal overall size and weight facilitates a variety of installation options. Figure 1 depicts the general block diagram of the unit.

The standard features of the CWAP include:

- COTS architecture based on 802.11a/b/g/n standards for wireless communications
- Discrete inputs to control remote On/Off and RF Enable/Disable
- Discrete Outputs for RF Status and Power Supply Status
- Internal (AC/DC) power with interruption holdup capability
- Dual Ethernet 10/100/1000BaseT ports interface to Airborne Network Server Unit and/or additional CWAP
- Lightweight and compact electro-mechanical packaging
- Mil Circular connector for signal/power interfaces
- Mil Circular connector with Quadrax inserts for Ethernet interfaces
- Six (6) RF SMA-RP coaxial connectors for remote antenna attachment

### 3.4 Major Hardware Components

The CWAP major hardware assemblies are:

- COTS Wireless Access Point Assembly
- Power Supply Unit (PSU) with build-in hold-up (200msec)
- Signal Interface Board (SIB) circuit card assembly for aircraft discrete input/output
- Status Indicators, LEDs
- External connection points for power and I/O, Ethernet, and external antenna

### 3.5 CWAP Orderable Part Numbers

| Model Number | Description                    |
|--------------|--------------------------------|
| 73001000-001 | LRU, CWAP ASSY, (INTL VERSION) |
| 73001000-002 | LRU, CWAP ASSY, (US VERSION)   |
| 73001001-001 | LRU, KIT, FLAG ANTENNAS, CWAP  |
| 5007120-1    | KIT, EXTERNAL CWAP CABLES      |

Table 2 - CWAP Orderable Part Numbers

# 4 Starting Up

The CWAP system is ready to use out-of-the-box. Evaluation units come with a complete interface cable set as shown in the following table. For production units, cable harness assemblies can be ordered separately. If you are building your own cable harness, see [Section 5](#) for signal pin out and mating connector information.

The CWAP is a conduction cooled system and requires no additional fan assist if operated in the defined environmental conditions. Note that the unit may get warm and/or hot to the touch and should be handled with caution during use.

Note, there is a temperature sensor that prevents the CWAP from turning on below -20°C (+/-2°C).

## 4.1 CWAP Equipment

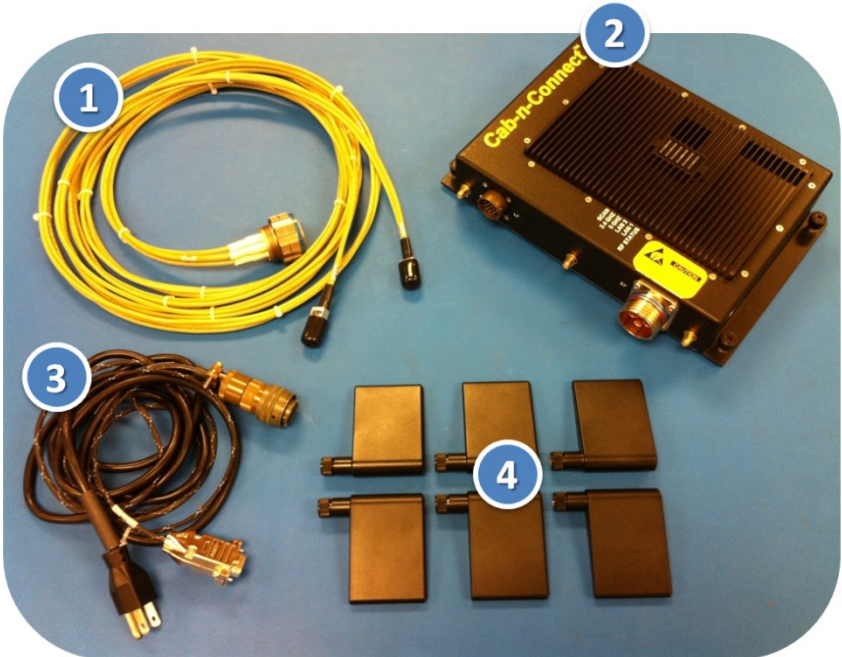
| Label | Description                                                                            | Equipment                                                                           |
|-------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1     | Cable Assembly with 2x GbE RJ45 connectors<br>PN: 5006862-1                            |  |
| 2     | CWAP<br>PN: 73001000-00x                                                               |                                                                                     |
| 3     | Cable Assembly with AC 3-prong power plug and DB-9 console connector.<br>PN: 5006863-1 |                                                                                     |
| 4     | Flag Antennas (6), bracket not shown.<br>PN: 73001001-001                              |                                                                                     |

Table 3 - CWAP Equipment

## 4.2 Power Up and Log In

At a minimum, the P1 power/signal cable assembly (Reference Label 3 in the above table) is required to be connected to the CWAP system, part number 5006863-1. Note, the 5006863-1 cable assembly has the two discrete inputs bypassed (loop-back) in order for the CWAP to turn on when AC power is applied.

|                                                                                   |                                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
|  | <b>Warning!</b>                                                                                     |
|                                                                                   | The specified voltage input range is from 97 to 134 VAC, 47 - 800 Hz, single-phase power.           |
|                                                                                   | <b>DO NOT connect to 220 VAC</b>                                                                    |
|                                                                                   | The power source must supply a minimum of 25 W.                                                     |
|                                                                                   | The power source must be switched off via a 2-pole disconnect device and must be easily accessible. |
|                                                                                   | Ambient temperature must be above -20°C for the CWAP to turn on.                                    |
|                                                                                   | Power is not switched internally and the unit will boot up as soon as power is applied.             |

Properly install the P1 (MIL J1) circular cable assembly connector to the mating connector on the CWAP Location J1. The AC power source must be switched off via a 2-pole disconnect device to make sure that no voltage is present at the terminal during the connecting procedure. Connect the other end of the AC power cord to the power source (not provided). Switch on the AC power source via the disconnect device.

To log into the system use the following:

**User:** admin

**Password:** motorola

|                                                                                     |                                                                             |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
|  | If you reset the CWAP to factory defaults, the password will be “motorola”. |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|

## 4.3 Connecting using the Console Port

Ensure that the P2 connector (DB9) of 5006863-1 cable assembly is installed correctly and secured to the serial port on a PC. Open a terminal application and set the console port settings as follows:

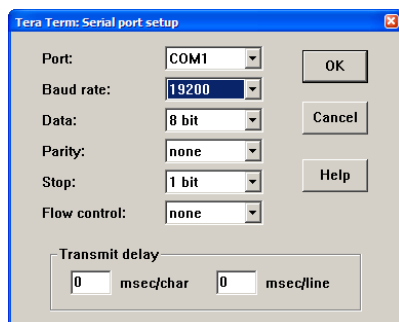


Figure 2 - Console Port Setting

After logging into the console, review or edit the configuration by using the “?” command to see the list of options. Use “..” to go back to the previous menu level. Refer to the Motorola AP-7131 Series Access Point Product Reference Guide for additional information CWAP utilities/commands.

Example: `admin>summary`

This displays a summary of the CWAP configuration. Note, the CWAP’s IP address is displayed.

```

admin>summary
AP-713x firmware version      : 4.0.0.0-057R
country code                  : us
ap-node                       : independent
serial number                 : 9204520900098
model                         : AP-7131N

WLAN 1:
WLAN name                    : WLAN1
ESS ID                       : 101
Radio Band(s)                : 2.4 and 5.0 GHz
WLAN                         : <none>
Security Policy              : Default
QoS Policy                   : Default
Rate Limiting                : disabled

WLAN 2:
WLAN name                    : cab-n-connect-2n
ESS ID                       : cab-n-connect-2n
Radio Band(s)                : 2.4 GHz
WLAN                         : <none>
Security Policy              : Default
QoS Policy                   : Default
Rate Limiting                : disabled

WLAN 3:
WLAN name                    : cab-n-connect-5n
ESS ID                       : cab-n-connect-5n
Radio Band(s)                : 5.0 GHz
WLAN                         : <none>
Security Policy              : Default
QoS Policy                   : Default
Rate Limiting                : disabled

LAN1 Name: LAN1
LAN1 Mode: enable
LAN1 IP: 192.168.1.1
LAN1 Mask: 255.255.255.0
LAN1 DHCP Mode: server

LAN2 Name: LAN2
LAN2 Mode: disable
LAN2 IP: 192.168.1.1
LAN2 Mask: 255.255.255.0
LAN2 DHCP Mode: server

WAN Interface  IP Address      Network Mask    Default Gateway  DHCP Client
-----
enable         192.254.32.229  255.255.255.0   192.254.32.1    enable
admin>
  
```

Figure 3 - CWAP Summary Configuration

### 4.3.1 Reset CWAP to factory default settings

If needed, to reset the CWAP to the original factor default settings type in the command “default” and then “yes” as prompted.

```

AP-713x Access Point 4.0.0.0-057R
Copyright (c) Motorola, Inc. 2009. All rights reserved.

(none)> login: admin
Password:

admin>system
admin(system)>config
admin(system.config)>?

default                : restore system default configuration
partial                : restore sys partial default configuration
show                   : show config file import/export parameters
set                    : set config file import/export parameters
export                 : export config file to the system
import                 : import config file from the system
..                     : go to parent menu
/                      : go to root menu
save                   : save cfg to system flash
quit                   : quit cli

admin(system.config)>default
Are you sure you want to default the configuration? (yes/no): yes
  
```

Figure 4 - Reset CWAP to Factory Default Settings

For additional common CLI commands and examples, see [Section 6](#), or consult the Motorola AP-7131 Series Access Point Product Reference Guide.

## 4.4 Web-based GUI

The following procedures described below assume this is the first time you are connecting to the CWAP.

### 4.4.1 Connecting using the WAN Port

The GigE2 port is the WAN port. Start a web browser and enter the access point's static IP address (10.1.1.1).

### 4.4.2 Connecting using the LAN Port

The GigE1 port is the LAN port, which is on the same subnet as any clients that connect over WIFI. The LAN port generally has a DHCP server configured, although this is not the default factory configuration.

Connect the CWAP cable assembly 5006862-1 (Enet cable assembly) to J2 and GigE1 RJ45 connector to a PC configured as a DHCP client, and if the CWAP LAN port is setup as a DHCP server, then the PC should get assigned an IP address on the 192.168.1.x subnet. Start a web browser and enter the IP address: 192.168.1.1

## 4.5 GUI Login Screen

Once connected you will see the AP-7131N GUI login screen as shown below. Login using the following:

**User:** admin

**Password:** motorola



Figure 5 - GUI Login

Once logged in, the Change Admin Password window displays. Change the password by entering the current password and a new admin password in the fields provided, then click Apply. Once the admin password has been updated, a warning displays stating the access point must be set to a country. See [Section 7.14](#), Country Codes, for a list of appropriate country codes to use.



Figure 6 - Change Admin Password

## 4.6 GUI Quick Setup Configuration

The Quick Setup screen allows you to configure a set of minimum required device settings.

### 4.6.1 System Configuration

Under **Quick Setup** select **System Configuration** from the menu tree to define the access point's system, WIPS server and radio configuration

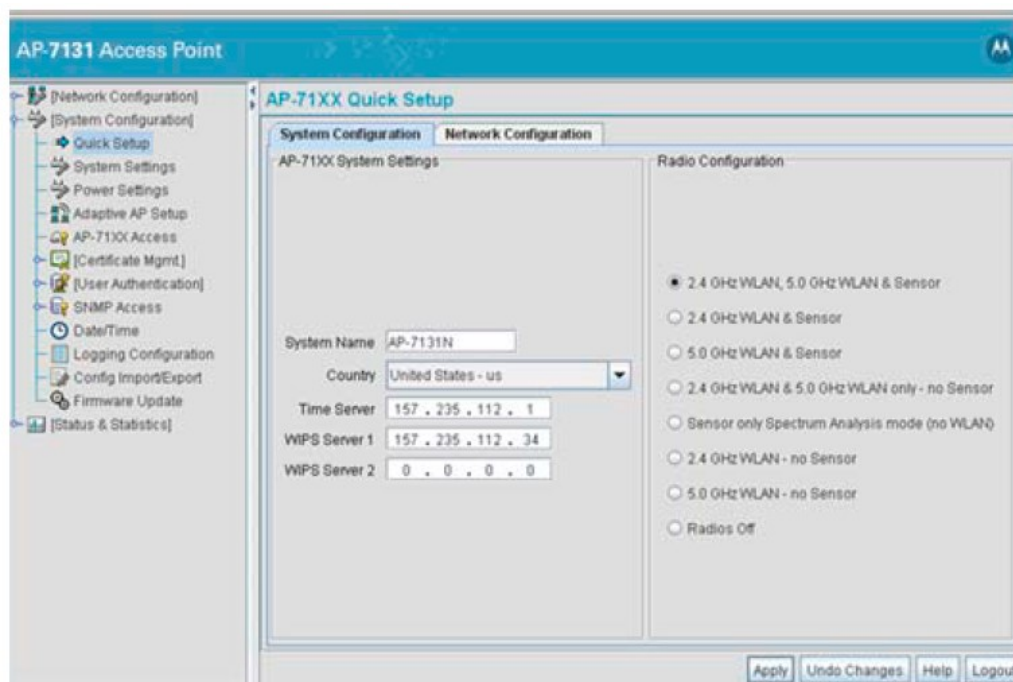


Figure 7 - Quick Setup System Configuration

| Name                | Description                                                                                                                                                                                                                                                          |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System Name         | Assign a System Name to define a title for this CWAP. This is useful if multiple devices are being administered.                                                                                                                                                     |
| Country             | Selecting the correct country allows for legal operation of the CWAP. Each country has its own regulatory restrictions concerning electromagnetic emissions and the maximum RF signal strength. See <a href="#">Section 7.14</a> for the two character country codes |
| Time Server         | Optionally enter the IP Address of the server used to provide system time to the CWAP                                                                                                                                                                                |
| WIPS Servers        | Not used                                                                                                                                                                                                                                                             |
| Radio Configuration | Select 2.4 GHz WLAN & 5.0 GHz WLAN (only – no Sensor)                                                                                                                                                                                                                |

**Table 4 - System Configuration Definitions**

## 4.7 Flag Antennas and Bracket Assembly Installation

### Installation Procedure:

1. Install all six (6) of Item 2 (Flag Antenna, PN 14699) onto SMA connectors J3 through J8 of CWAP
2. Torque each of the captive Antenna knurled nuts to 7-10 inch pounds.
3. Align all six (6) of the Flag Antennas vertically as shown
4. Turn CWAP upside-down so that all six (6) Flag Antennas are now pointed vertically down.
  - a. Note, at this stage, the upside-down CWAP can be rested upon an elevated (ESD controlled) surface for ease of assembly.
5. Align and carefully slip Item 1 (Antenna Bracket Assembly, PN 5140443-1) over the top of the six (6) Flag Antennas in one motion.
  - a. Ensure that each of the quantity 6 captive 4-40 screws of the Antenna Bracket assembly are backed-out enough to allow smooth insertion of the plastic inserts (below).
  - b. Ensure the Antenna Bracket assembly is installed uniformly and evenly amongst all six (6) Flag Antennas and the CWAP itself
  - c. The four (4) thumb-screws of the CWAP will feed-through the four (4) through-holes of the metal bracket.
6. One at a time, install six (6) of Item 3 (Insert, Flag Antenna) onto each Antenna by slipping the u-shaped channel over each Flag Antenna from outboard-to-inboard.
  - a. Install each insert up until it becomes flush with the outer edge of the outer-metal edge. This acts to ensure proper alignment for the captive screws.
7. Carefully begin to thread in each of the six (6) captive screws and then torque to 5-6 inch pounds.
8. After Bracket Assembly has been confirmed for proper fit and alignment, the CWAP Antenna Bracket Assembly can be fixed to its mounting location.

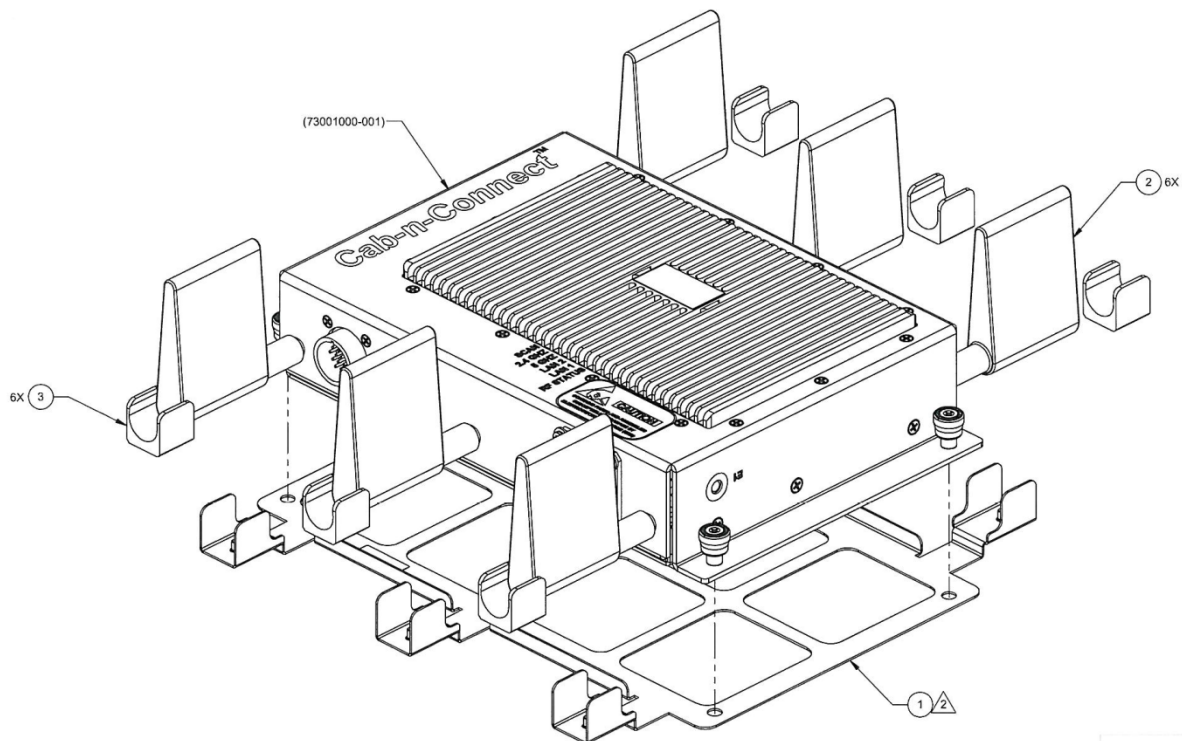


Figure 8 - Flag Antenna & Bracket Assembly Installation

## 5 Support and Service

### 5.1 Technical Support

Technicians and engineers from Kontron Embedded Modules GmbH and/or its subsidiaries are available for technical support. We are committed to making our product easy to use and will help you use our products in your systems.

Please consult our Web site at <http://www.kontron.com/support> for the latest product documentation, utilities, drivers.

### 5.2 Returning Defective Merchandise

Please use the website to obtain latest information on returning merchandise.

<http://us.kontron.com/support/rma-information/>

All equipment returned to Kontron must have a Return Material Authorization (RMA) number assigned exclusively by Kontron. Kontron cannot be held responsible for any loss or damage caused to the equipment received without an RMA number. The Buyer accepts responsibility for all freight charges for the return of goods to Kontron's designated facility. Kontron will pay return freight charges back to the Buyer's location in the event that the equipment is repaired or replaced within the warranty period stipulated herewith.

#### To request a Return Material Authorization (RMA) number

Be prepared to supply the unit serial number, reason for return and original ship date  
Place call to 800-480-0044 to receive RMA number (toll free in the US and Canada) "OR"  
E-mail the information to [support@us.kontron.com](mailto:support@us.kontron.com) to receive RMA number  
RMA Request Form (found on website)  
Return defective material (unless instructed otherwise with issuance of RMA) to:

#### Contact and Delivery Address

Kontron America  
14118 Stowe Dr  
Poway, CA 92064  
Attn: RMA number

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## 8 Appendix C: Document Revision History

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|----------|--------|-----|-----------------|
| 1.0      | 8/4/12 | RJM | Initial Release |
|          |        |     |                 |
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