

CCR-3000 Router User Guide

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	NAME	TITLE	APPROVAL
Prepared By:	Emmie D. Woods	Preparer	N/A
Reviewed By:	Jaya karthikeyan Thirumalai kolunthu	Project Engineer	N/A
Approved By:	Jennifer L. Chase	DAC Engineer	On File
Approved By:	Oluwole A. Amosu	Technical Project Manager	On File

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1 Introduction

1.1 Purpose

The CCR-3000 Router User Guide, Collins Document Number 946-3EM4-002, provides guidance information for the CCR-3000 Maintenance GUI users as applicable to the Bombardier Smart Router (BSR), Collins Part Number (CPN) 822-3742-002, referred to as the router or the Router in this document.

The intended audience for this document is integration and support teams. The [Maintenance users](#) are assumed to be familiar with the SystemX operating system from CCX.

1.2 Scope

The guidance information outlined in this document is applicable to SystemX Version 1.9.0.2; it covers the following configurations:

- Global 5000/6000 Aircraft
- ARINC 429 checked for all designated aircraft types

Note about Default Configuration:

Default configuration is applicable to the current Version: 1.9.0.2; the below configured selections may be changed by the user either by manual GUI entries or by means of Overlays or Templates. Refer to the appendix for detailed steps regarding Overlay or Template Loading:

- Default Ethernet Ports Configuration
- Configured Wi-Fi Radio
- Default Configured Mobile Broadband
- Default Configuration of WANs
- Default Configuration of WAN Groups
- Default configuration of Device Manager
- Default configuration of Per-Device NAT
- Default configuration of Routing Firewall - Routes
- Default configuration for Open Services
- Default configuration of Ports
- Default configuration of Bridges
- Table 18: Default configuration of VRRP Instance
- Table 19: Default configuration of TCP/UDP Forwarding
- Table 20: Default configuration for DHCP Server

- Table 21: Default configuration of Local DNS Server
- Table 22: Default configuration of Forwarding DNS Server
- Table 23: Default Configuration of Containers
- Table 27: Default Users (except admin)

See appendix for a list of Abbreviations & Acronyms.

1.3 Reference Documents

The following are baseline reference documents for the initial release of this document.

Table 1: List of Reference Documents

Document Number	Title
SXG-052.a	AP-151 System Training Manual for Technical Support (CCX Technologies Inc.)
BAS00025001 Rev C	BOMBARDIER SMART ROUTER IDD CL600, BD100 & BD700

1.4 System Description

The Router provides wireless data and voice connectivity for the aircraft cabin through secure onboard networking to attached devices through Gigabit Ethernet and Wi-Fi Interfaces and off-aircraft communication systems.

The Router provides security features designed to prevent unauthorized network access, including a firewall, configurable data monitoring, ARINC-429 traffic monitoring, and the ability to connect to an off-board SystemX Secure Ground Server.

The customizable Router is powered by the SystemX Cybersecurity Software platform.

The Router's LTE/5G and Wi-Fi connectivity enables network services while the aircraft is on the ground, and its Satcom connectivity provides a user-friendly interface to Satcom terminals and routers when in flight.

The Router's PBX functionality provides encrypted voice communication services onboard the aircraft. The Router interfaces with onboard Satcom systems to route calls between handsets and softphones within the aircraft, and to and from external parties.

The hardware features of the router are:

- LTE/5G GSM Radio
- 2x Wi-Fi 6 802.11ax 2.4GHz/5GHz radios
- 6x 10/100/1000 BASE-T Ethernet ports
- Integrated Ethernet Switch
- 2x ARINC-429 Rx Channels
- 4x General Purpose Discretes
- 2x Wi-Fi Radio Discretes

- 1x 5G/LTE Radio Discretes
- One SIM Card
- ARM Cortex A72 Quad-core 64-bit processor
- 8GB DDR4 RAM
- 1TB SATA III - NAND storage
- PBX/VoIP Calling

The Router interfaces to the CMS (Cabin Management System) for certain controls and configurations and to receive cabin systems maintenance data.

The Router interfaces to the AHMS (Aircraft Health Monitoring System) to provide cabin systems reports.

System interfaces include wired ethernet and discrete inputs.

The SystemX Maintenance GUI is accessible through Ethernet 1 (for Global Airplanes).

20 Appendix

20.1 Setting up an Upgrade Server for OTA via RGAS

Implementing an "upgrade server" for the cabin router SystemX software is as simple as serving a json file from a known path (/feeds/erouter_rootfs.json) with the following fields:

- file - string - the url of where the .upgrade release file will be served from
- bytes - integer - size of the .upgrade release file in bytes
- build - string - an ISO8601 time for the build
- version - string - semver style version number for upgrade release.
- checksum - string - sha256 checksum of the .upgrade release file.
- notes - string - url for release notes file (typically .pdf)

The "build" timestamp field is used by the SystemX system to determine if the upgrade file is "newer" than the currently loaded version.

The "version" string is display only - it is not checked against the file, nor used for determining if the version is already installed.

This service only supports having one "live" version at a time - it is not possible to have multiple .upgrade files available at the same time. For testing purposes, it is recommended to set up a separate server (on a separate hostname, as the url path is not changeable) and update a single router to point at this new "testing" server.

Example:

From https://ccx.support/feeds/erouter_rootfs.json

```
{
  "file": "https://ccx.support/upgrades/systemx-erouter_rootfs-1.8.1.2-APR11-06.57.50-2023.upgrade",
  "bytes": 259573883,
  "build": "2023-04-11T06:57:50",
  "version": "1.8.1.2",
  "checksum": "3192d5df1cda02381b3e49b866526d78c8fb57642e2a71a04b652d3fa7f07193",
  "notes": "https://ccx.support/notes/CRN-0054.a.pdf"
}
```

20.2 Multipath

Multipath is the use of multiple WANs to enhance off-aircraft connectivity through various features and techniques. For detailed information on Multipath and how to configure it, refer to CCR-3000 Multipath Configuration Guide, CPN 946-3A35-001.

20.3 Regulatory Statements

NOTICE:

This device complies with Part 15 of the FCC Rules [and contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS standard(s)].

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.

Changes or modifications made to this equipment not expressly approved by CCX may void the FCC authorization to operate this equipment.

This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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.

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20.320.4 List of Abbreviations & Acronyms

AHMS	Aircraft Health Monitoring System
API	Application Programming Interface
APN	Access Point Name
ARINC	Aeronautical Radio Incorporated
ARP	Address Resolution Protocol
ATG	Air-To-Ground
BSR	Bombardier Smart Router
CES	Cabin Electronics System
CIFS	Common Internet File System
CMGR	Cabin Connect Communications Manager
CMS	Cabin Management System
CoS	Class of Service
CPU	Central Processing Unit
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DSCP	Differentiated Services Code Point
GHz	Gigahertz
GUI	Graphical User Interface
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICAO	International Civil Aviation Organization
ICMP	Internet Control Message Protocol
IDS	Intrusion Detection System
IP	Internet Protocol
IPv4	Internet Protocol Version 4
ISDN	Integrated Services Digital Network
JSON	JavaScript Object Notation
LAN	Local Area Network
LRU	Line Replaceable Unit
LTE	Long Term Evolution (a 4G communications standard)

LXC	Linux Containers
Mbps	Megabits per second
MAC	Media Access Control
MSISDN	Mobile Station Integrated Services Digital Network
MTU	Maximum Transmission Unit
NAT	Network Address Translation
NTP	Network Time Protocol
OEM	Original Equipment Manufacturer
OTA	Over-The-Air
PBX	Private Branch Exchange
PABX	Private Automated Branch Exchange
PED	Personal Electronic Device
PPPoE	Point-to-Point Protocol over Ethernet
PTT	Push To Talk
QoS	Quality of Service
REST	Representational State Transfer
RFC	Request for Comments (RFC) (a type of publication from the IETF and the ISOC, the principal technical development and standards-setting bodies for the Internet)
RGAS	Router Ground Administration Server (also referred to as the Ground Server, or Public Upgrade Server)
RNG	Random Number Generation
ROIN	Requirement Of Identification Number
RPC	Remote Procedure Call
RSSI	Received Signal Strength Indicator
RSTP	Rapid Spanning Tree Protocol
RTT	Real Time Traffic
Rx	Receive
SBB	Swift Broadband
SCDU	Satcom Control/Display Unit
SCM	Satellite Configuration Module
SDU	Satellite Data Unit
SIEM	Security Information and Event Management

SIM	Subscriber Identity Module
SIP	Session Initiation Protocol
SNMP	Simple Network Management Protocol
SSID	Service Set Identifier
SSH	Secure Shell
SSM	Sign/Status Matrix
STP	Spanning Tree Protocol
TCP	Transmission Control Protocol
TLS	Transport Layer Security
TOTP	Time-based One-Time Password
TTL	Time to Live
Tx	Transmit
UDP	User Datagram Protocol
UTC	Coordinated Universal Time
VLAN	Virtual LAN
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network
VRRP	Virtual Router Redundancy Protocol
WAN	Wide Area Network
WAP	Wireless Access Point
Wi-Fi	Wireless-Fidelity
WOW	Weight on Wheels
WPA	Wi-Fi Protected Access
XML	Extensible Markup Language