Installation Guide

Preliminary
cbrsys6800ig8001 1.01
2021-04-19
Proprietary & Confidential

PRELIMINARY

CBRSYS6800

Wide Band Vehicular System
US Installation Guide

octasic

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Confidentiality

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WARNING! This is not a consumer device. It is designed for installation by FCC licensees and qualified installers. You must have an FCC license or express consent of an FCC licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

CBRSYS6800 complies with the requirements for Federal Communications Commission (FCC) Code Federal Regulation (CFR).

FCC Interference Statement (Part 15.105 (b))

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC RF Exposure Guidance Statement (for mobile equipment)

To comply with FCC RF Exposure requirements, this device must be installed to provide at least 170 cm (67 inches) separation from the human body at all times.

Safety Precautions

Read and understand the entire manual and follow all safety instructions.

The following safety precautions must be observed during all phases of the operation, usage, service, or repair of the CBRSYS6800.

1. Operate the CBRSYS6800 at only the voltages described in the technical documentation.
2. The CBRSYS6800 must not be mechanically or electrically changed or modified. Use of all connectors must follow the guidance of the CBRSYS6800 technical documentation.
3. The CBRSYS6800 is a Radio Frequency (RF) generating device. **Do not operate the unit with anyone closer than 170 cm (67 inches) from the antenna,** as noted in the Antenna Installation section of this guide. This could result in personal injury.

Disclaimer

Octasic reserves the right to modify the design, characteristics, and products at any time without notification or obligation and shall not be held liable for any error or damage of any kind resulting from the use of this document.

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1 About This Document

The CBRSYS6800 is a complete system comprised of a CBRSYS6200 Wide Band Portable Base station Unit (WB-PBU) and a CBRRFE6600 Wide Band Transportable Amplification Unit (WB-TAU). This installation guide describes how to mount the units in a rack or ruggedized case, how to connect the WB-PBU to the WB-TAU, and how to connect and position the antenna(s).

1.1 How this document is organized

This document is organized into the following sections:

Chapter	Description
1 About this Document	*(This section)* Describes the purpose and organization of this document.
2 Safety	Contains important information to ensure that you understand and follow all safety requirements.
3 Overview	Provides a summary overview of the CBRSYS6800 components required for installation.
4 Mechanical – case and rack mounting	Provides the dimensions and mechanical specifications for mounting the WB-TAU and WB-PBU in their respective ruggedized case and/or 3U rack.
5 Connecting the units	Identifies all interface elements, including connectors and ports on the WB-PBU and WB-TAU, along with instructions for connecting the WB-TAU and WB-PBU together to form a complete system.
6 Antenna installation	Identifies the antennas that can be attached to the system and provides antenna mounting requirements and guidelines.

1.2 Typographical conventions

The following typographic conventions are used in this guide:

Font	Description
Italic	Paths and filenames.
bold colored	Hyperlinks.

1.3 Terminology

Familiarity with these terms is necessary for the comprehension of this document.

AC	Alternating Current	PPS	Pulse Per Second
BNC	Bayonet Neill–Concelman (connector)	RF	Radio Frequency
DC	Direct Current	RFFE	RF Front End
LED	Light Emitting Diode	SMA	Sub-Miniature version A (connector)
PBU	Portable Base station Unit	TAU	Transportable Amplification Unit
PIM	Passive Intermodulation	WB	Wide Band

1.4 Feedback

Octasic makes every effort to ensure that the information contained in this document is accurate and complete at the time of release. Please contact Octasic if you find any errors, inconsistencies, omissions, or have trouble understanding any part of this document.

When providing feedback always include the following information:

- Title: Wide Band Vehicular System US Installation Guide
- Document ID: cbrsys6800ig8001 1.01 2021-04-19
- Page number(s), if applicable
- Detailed comments

Your comments or corrections are greatly valued in our effort for excellence and continued improvement.

1.5 Release history

The release history is a summary of the updates made to this document for the current revision.

Rev.	Date	Changes
1.01	2021-04-19	Changed labels on the equipment (Figures 1 and 2).
1.00	2021-03-31	First preliminary release.

1.6 References

The following references are related to this document.

[1] *CBRRFE6600 Wide Band Transportable Amplification Unit (WB-TAU) Datasheet, cbrrfe6600ds8000*

[2] *CBRSYS6200 Wide Band Portable Base station Unit (WB-PBU) Datasheet, cbrsys6200ds8000*

[3] *HUBER+SUHNER® SENCITY®RAIL Antenna for Wireless Communication Mounting Instruction, Doc. No. 0000295392*

[4] *HUBER+SUHNER® SENCITY®RAIL Grounding Kit for Wireless Communication Mounting Instruction, Doc. No. 0000295412*

[5] *IEC 62368 Audio/video, information and communication technology equipment – Part 1: Safety requirements*

2 Safety

Read and comply with all requirements in this section and observe the cautions and warnings on the labels affixed to the equipment to prevent possible physical injury and/or damaging the equipment.

2.1 Symbols and markings

The symbols below are on labels affixed to the equipment and in the documentation. They are present to warn you of potential hazards or to certify that the equipment has been tested and has met the requirements to bear the compliance symbol.

Table 1 Symbol definitions

Symbol	Meaning	Description
	**WARNING!**	**General–**Pay extra attention to avoid possible physical injury or damage to the equipment.
	**WARNING!**	**High RF power–**Disconnect power before servicing.
	**WARNING!**	**Sharp edges**–watch your fingers.
	**Information**	Refer to the documentation for important safety and operating information concerning this equipment.
	**Conformité Européenne**	This equipment has been tested for compliance by with the European certification requirements to bear this symbol.
	**FCC-compliant**	This equipment has been tested for compliance by the FCC for use United States and meets the certification requirements to bear this symbol.
	**Not universal waste**	This equipment contains hazardous materials that must be appropriately recycled. Do not dispose of this equipment with regular trash.

2.2 Access by qualified persons

In compliance with the definitions of Persons, as per IEC 62368, Part 1, section 02 [5]:

- **Installation and servicing** of this equipment shall be performed only by persons who meet the IEC definition of **0.2.4 Skilled Person**.
- **Operation** of this equipment shall be performed only by persons who meet the IEC definition of **0.2.3 Skilled Person** and **0.2.3 Instructed person**.
- **No access** to this equipment shall be given to persons who meet the IEC definition of **0.2.2 Ordinary person**.

2.3 Safety precautions

Read and understand the entire manual and follow all safety instructions.
The following safety precautions must be observed during all phases of the operation, usage, service, or repair of the CBRSYS6800.

1. Operate the CBRSYS6800 at only the voltages described in the technical documentation.
2. The CBRSYS6800 must not be mechanically or electrically changed or modified. Use of all connectors must follow the guidance of the CBRSYS6800 technical documentation.
3. The CBRSYS6800 is a Radio Frequency (RF) generating device.

   To avoid personal injury do not operate the unit with anyone closer than 170 cm (67 inches) from the antenna.

   Pour éviter les blessures, maintenir une distance minimum de 170 cm de l'antenne lorsque le système est en fonctionnement.

2.4 Operational and environmental considerations

WARNING! This is not a consumer device. This equipment may only be installed and operated in a restricted-access area by licensed and qualified persons. Modifications not expressly approved by Octasic. may void the user's authority to operate this equipment.

The following operational and environmental considerations apply to the CBRSYS6800 vehicular system.

Table 2 Operational and environmental considerations

	Use	Indoor only
	Altitude	< 2000m
	Pollution degree	2
	Power supply	110/220V AC
Power consumption	RF off, no PBU	80W
	RF off, PBU on Auxiliary power	170W
	RF active at maximum capacity	1300W
	Operating temperature	-10ºC to +45ºC
Relative humidity (non-condensing)	Minimum	10%
	Maximum	80%

2.4.1 Markings on the CBRSYS6200 WB-PBU

This label is affixed to the CBRSYS6200 WB-PBU.

Figure 1 Safety and standards compliance label on WB-PBU

2.4.2 Markings on the CBRRFE6600 WB-TAU

This label is affixed to the CBRRFE6600 WB-TAU.

Figure 2 Safety and standards compliance label on WB-TAU

This label is affixed to the WB-TAU next to the antenna port.

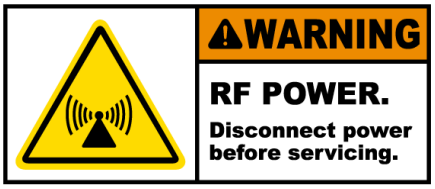

Figure 3 RF Safety label on WB-TAU

3 Overview

This installation guide identifies the connectors on the WB-TAU and WB-PBU and provides instructions for mounting, for connecting them to each other, and for connecting and placing antennas.

3.1 Main components

Table 3 identifies the main components required for connecting the WB-TAU and WB-PBU. Images are to assist with identification and are not to scale.

Table 3 Main components, cables, and accessories

	CBRSYS6200 Wide Band Portable Base station Unit (WB-PBU).
	CBRRFE6600 Wide Band Transportable Amplification Unit (WB-TAU)
	TAU-to-PBU DC power cable
	Hybrid cable
	M12 to RJ45 Ethernet cable
	M12 to M12 Ethernet cable

Note Antennas are described separately in chapter 6.

4 Mechanical – case and rack mounting

4.1 PBU mounting holes and clearance

The PBU can be enclosed in a ruggedized case or rack-mounted in a standard 19 inch (482.6 mm) 3U rack. Figure 5 indicates the mounting point locations on the front of the PBU to attach to the face-plate.

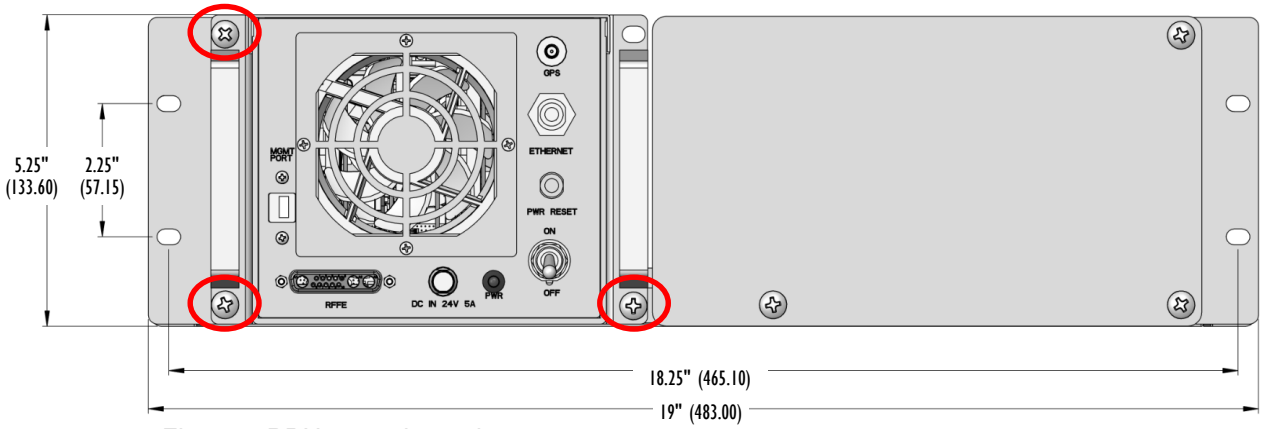

Figure 4 PBU mounting points

- Two PBUs can fit side-by-side in a 3U rack or in the ruggedized case.
- Systems with one PBU include a face-plate to fill the opening.

4.1.1 PBU inlet and outlet clearance and temperature

Allow 5" (127 mm) clearance for the WB-PBU ventilation inlet and outlet (same as for the WB-TAU.

The WB-PBU can operate at ambient temperatures up to 131°F (55°C); however, when used together with the WB-TAU, the WB-TAU's 113°F (45°C) maximum operating temperature must be respected.

4.2 WB-TAU mounting holes and clearance

The WB-TAU weighs approximately 43 kg (95 lbs) with the case.
Due to the weight of the unit, two persons shall handle it at all times.

The WB-TAU unit is provided with two handles on the front for ease of lifting, carrying, and installation. Handles maximum static load: 775 N (175 lbf),

The WB-TAU can be enclosed in a ruggedized case or rack-mounted in a standard 19 inch (482 mm) 3U rack. Figure 5 indicates the location of the mounting holes on the front of the WB-TAU for mounting. Dimensions are in inches (mm).

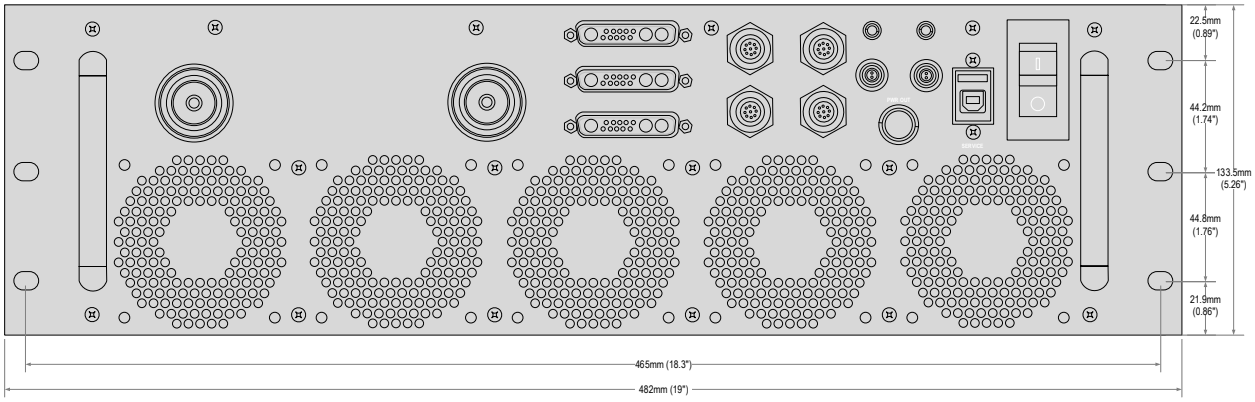

Figure 5 WB-TAU mounting points

4.2.1 WB-TAU inlet and outlet clearance and temperature

Ensure a minimum of 127 mm (5 inches) of clearance in front of all vents and openings.
Never obstruct vents and openings.

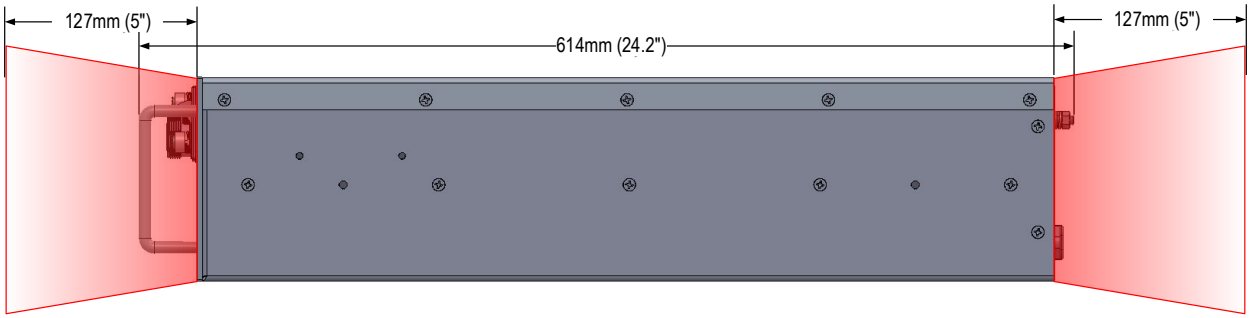

Figure 6 Side view: measurements and required front and back clearance

104°F (40°C) Maximum ambient temperature

4.3 Ruggedized case installation

Note If ordered with the ruggedized case, the system ships pre-installed in the cases; no further installation is necessary.

Installing the units in the ruggedized cases

The ruggedized cases have pre-drilled mounting holes in the correct locations.

1. Carefully slide the WB-TAU into its case and secure with screws.
2. Carefully slide the WB-PBU into the case and secure with screws.
3. Tie securely to vehicular body before connecting the units.
4. Connect the units to each other. See chapter 5 Connecting the units.

Ensure a minimum of 5" (127 mm) of clearance in front of all vents and openings. Never obstruct vents and openings.

4.4 Rack installation

- The WB-TAU is 3U-rack-mountable.
- The WB-PBU comes by default in a 3U rack. A 3U rack can accommodate two PBUs. A faceplate is provided to cover the opening for one PBU systems.
- Accessories: installation rail, shelf, mounting screws.
- Ensure that the unit is securely fastened and supported before connecting the units.

Ensure a minimum of 5" (127 mm) of clearance in front of all vents and openings. Never obstruct vents and openings.

5 Connecting the units

Prior to connecting, ensure that both units are securely mounted in their respective ruggedized cases (see 4.3) or in a 19" rack (see 4.4).

5.1 WB-PBU interface connectors

Management side (front-facing)

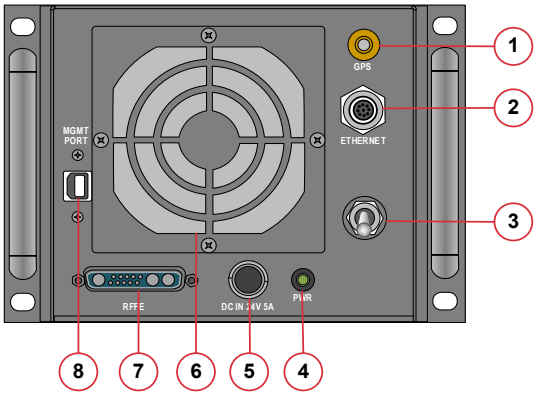

Figure 7 WB-PBU front-facing panel

#	Type	Description
(1)	SMA	GPS antenna port
(2)	M12	Ethernet port
(3)	toggle	Power ON/OFF
(4)	LED	Power status
(5)	custom	DC power IN
(6)		Ventilation inlet
(7)	hybrid	RF Front End (RFFE) connector port
(8)	USB-B	Management port

Antennas side (back-facing)

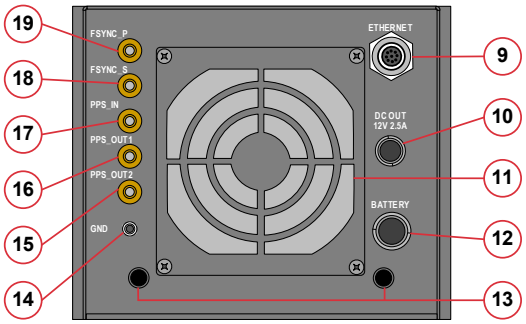

Figure 8 WB-PBU rear-facing panel

#	Type	Description
(9)	M12	Rear Ethernet port
(10)	custom	Power OUT to DF
(11)		Ventilation outlet
(12)	custom	Battery IN/OUT
(13)		Holes for aligning pins/GND in tray
(14)	SMA	Chassis GND
(15)	SMA	1PPS OUT 2
(16)	SMA	1PPS OUT 1
(17)	SMA	1PPS IN
(18)	BNC	FSYNC-S
(19)	BNC	FSYNC-P

5.2 WB-TAU interface connectors

Front-facing

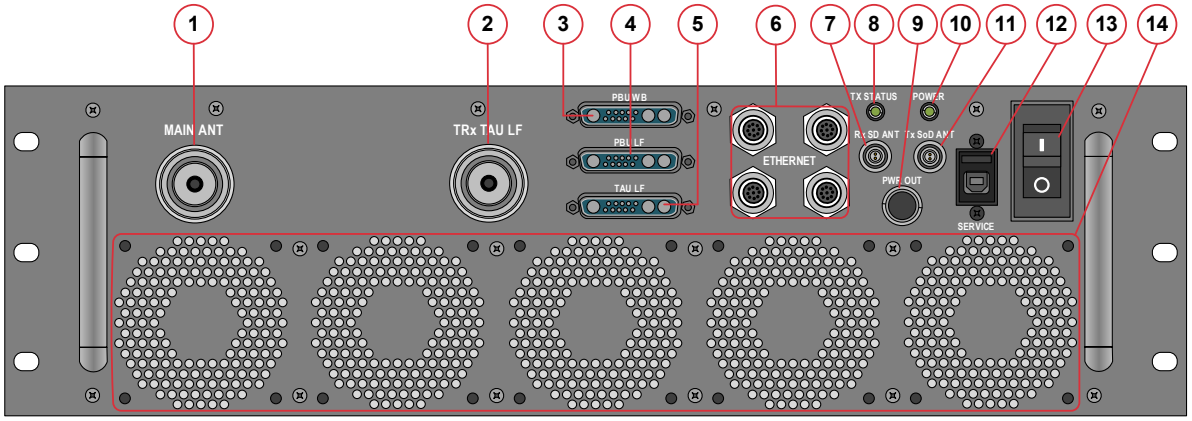

Figure 9 WB-TAU front-facing connectors

#	Type	Description
(1)	DIN 7/16	Main antenna
(2)	DIN 7/16	TRx LF TAU (port terminated)
(3)	hybrid	WB PBU (CBRSYS6200)
(4)	hybrid	LF PBU (port terminated)
(5)	hybrid	LF TAU (port terminated)
(6)	M12	4x Ethernet ports
(7)	SMA	Rx Scan/Diversity antenna

#	Type	Description
(8)	LED	Tx status
(9)	custom	Power out to PBU
(10)	LED	Power ready
(11)	SMA	Tx SiB-on-Demand (port terminated)
(12)	USB-B	Service port
(13)	switch	Power ON/OFF
(14)	vent	Ventilation openings

Back-facing

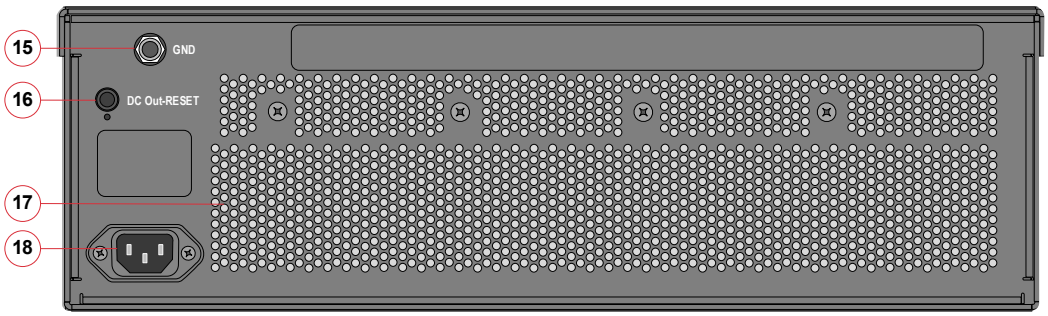

Figure 10 WB-TAU back-facing connectors

#	Type	Description
(15)	pin	Chassis Ground
(16)	push button	DC reset

#	Type	Description
(17)	vent	Heat dissipation exhaust vent
(18)	IEC C13	AC power inlet

5.3 Connecting the WB-TAU to the WB-PBU

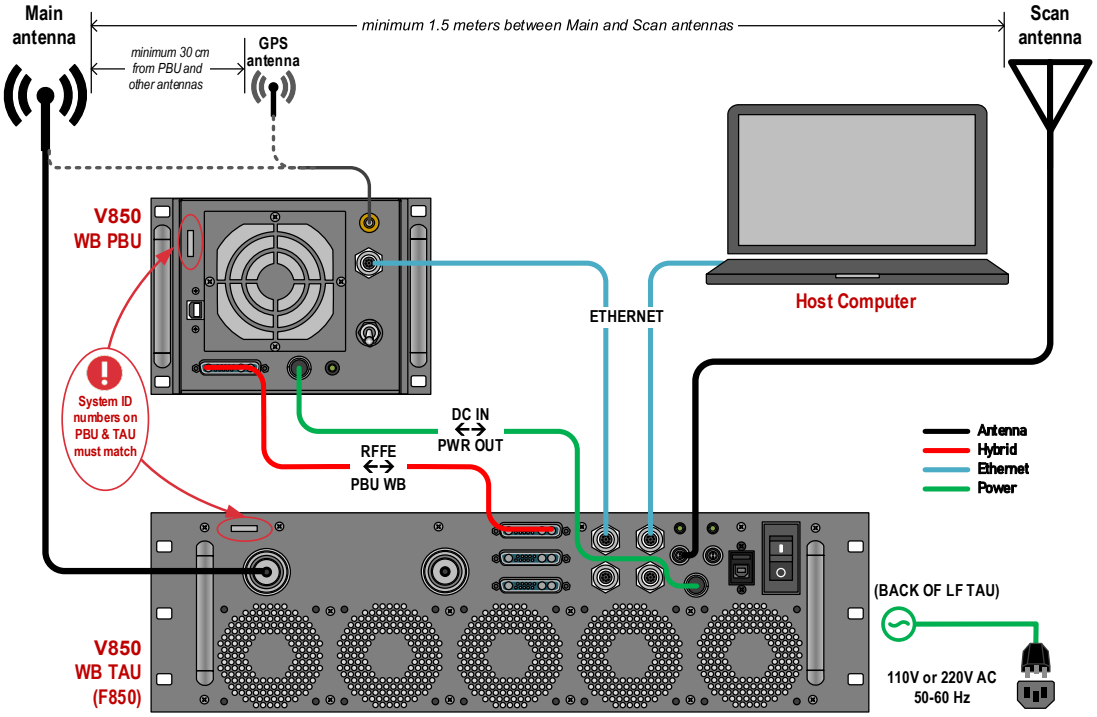

Figure 11 WB TAU-PBU interconnections

1. Connect the RF ports to each other: **TAU (5)** ←→ **PBU (8)**
   - Align the **hybrid cable** connectors parallel to the RF port on each unit's face plate.
     - To connect: Insert and secure connection by tightening the screws on the connector housing.
     - To disconnect: Unscrew and pull gently on the housing. Do not pull the cable.
2. Connect the Ethernet ports on each unit: **TAU (3)** ←→ **PBU (2)**
   - Plug the **M12 to M12 Ethernet cable** into any of the four **TAU (3)** Ethernet ports.
3. Connect the power ports between units: **TAU (4)** ←→ **PBU (6)**

   WARNING! The port marked PWR OUT on the WB-TAU is OUTPUT ONLY. Never connect an input power source to this port.

   - The **TAU-to-PBU power cable** is a locking connector.
     - To connect: Align the red dot to the top and push gently until it clicks.
     - To disconnect: Pull on the connector housing.

5.4 Making the other connections

1. Connect the system to a computer: **TAU (3)** ←→ computer's Ethernet port
   - The **M12 to RJ45 Ethernet cable** can use any of the four **TAU (3)** Ethernet ports.
2. Connect the AC power: AC power source → **TAU (13)** on the back of the unit.
   - AC power inlet accepts 110V AC 50-60 Hz power supply.
   - Use an inverter generating AC 110 VRMS pure sinewave rated 3000W or more.
3. Connect antennas:
   - Detailed information is provided in chapter 6 Antenna installation.

6 Antenna installation

Table 4 identifies the different antennas. Images are to assist with identification and are not to scale.

Table 4 Antenna connection quick reference

Antenna	Connect to	See section
 Magnetic mount antenna	**TAU (1)** Main antenna port	6.1.1 Magnetic mount antenna (temporary installation)
 Permanent mount anntenna	**TAU (1)** Main antenna port	6.1.2 Permanent antenna
 Scan antenna	**TAU (7)** Scan antenna port	6.2 Scan antenna
 External GPS antenna	**PBU (1)** GPS antenna port	6.3 GPS antenna

6.1 Main antenna

This section provides information for both temporary antenna installation (magnetic mount antenna) and permanent antenna installation (with grounding kit).

6.1.1 Magnetic mount antenna (temporary installation)

The magnetic mount antenna can be used to test the system and to help find the best location for mounting the permanent antenna on the vehicle.

150 cm (59 inches) MINIMUM distance between main antenna and scan antenna.

Note When using this antenna, the external GPS antenna is mandatory. See 6.3.

Antenna includes antenna, magnetic mount, and coaxial cable with TNC end

Safety warnings

To avoid personal injury, maintain a MINIMUM distance of 170 cm (67 inches) from the main antenna when it is operating.

Magnets can cause painful pinching injuries. Handle the magnetic mount antenna with care.

In the event of a collision, a magnetically mounted antenna could separate from the vehicle even at moderate speeds. The properly tightened feeder cable can serve as a secondary retention system to prevent unintentional detachment or loss of the device.

Installation

1. For maximum adhesion, ensure that the bottom of the magnet is clean and that the mounting surface on the vehicle is dry and free of dirt, snow, and ice.
2. Attach the adapter to the antenna cable.
   - Ensure that the feeder cable is properly tightened (serves as a secondary retention system if the magnetic mount separates from the surface in a collision).
3. Connect the antenna to **TAU (1)**.
   - Mount the magnetic antenna a minimum of 59 inches (150 cm) from the TAU/PBU and from the scan antenna.

6.1.2 Permanent antenna

Mount the permanent antenna in a location that ensures a minimum of 59" (150 cm) distance from the scan antenna.

59 inches (150 cm) MINIMUM distance between main antenna and scan antenna.

Note This antenna has an integrated GPS antenna. When using this antenna, a GPS must still be connected to the PBU's GPS port. It can be this antenna's GPS connector or the external GPS antenna (see 6.3). It is not possible to connect both.

- Omnidirectional 150W antenna (N connector)
- Right angle adapter: N -M to N -F
- Low PIM RF cable: 7/16 to N (3.6576m / 12 feet)

- Grounding kit for permanent antenna

Safety warnings

To avoid personal injury, maintain a MINIMUM distance of 170 cm (67 inches) from the main antenna when it is operating.

Installation

For installer and operator safety, a grounding kit is supplied for the permanent antenna. Install the grounding as per the manufacturer's mounting instructions. [4]

Mount the permanent antenna as per the manufacturer's mounting instructions; refer to 0.

1. Attach the cable end with the N adapter to the permanent mount antenna.
2. Attach the cable end with the DIN adapter to **TAU (1)**.
   - DIN Torque 7/16, torque to 2.0N-m (1.48lb-ft).
3. If using this antenna's integrated GPS antenna, connect the GPS antenna connector to **PBU (1)** as described in 0; otherwise see 6.3 to connect the external GPS antenna.

6.2 Scan antenna

59 inches (150 cm) MINIMUM distance between main antenna and scan antenna.

Note An outdoor antenna can be used to improve scanning sensitivity.

Antenna with cable (SMA connector)

- Connect the direct mount antenna provided to **TAU (8)**.
  - SMA torque 1.0N-m (0.74lb-ft)

6.3 GPS antenna

A GPS antenna is mandatory for proper system operation.

- If using the Magnetic mount (temporary) antenna (see 6.1.1), installation of this GPS antenna is mandatory.
- If using the Permanent antenna (see 6.1.2), either this antenna or the permanent antenna's integrated GPS antenna must be connected to the GPS port on the PBU.

12 inches (30 cm) minimum distance between GPS antenna and main antenna.

Magnetic mount active antenna.

- Connect the GPS antenna to **PBU (1)**
  - SMA torque 1.0N-m (0.74lb-ft)

IMPORTANT: A clear and unobstructed view of the sky is required to obtain a good GPS fix. For optimal operation, position the GPS antenna **at least 12 inches (30 cm)** from the radio RF ports and oriented towards the sky as shown below.