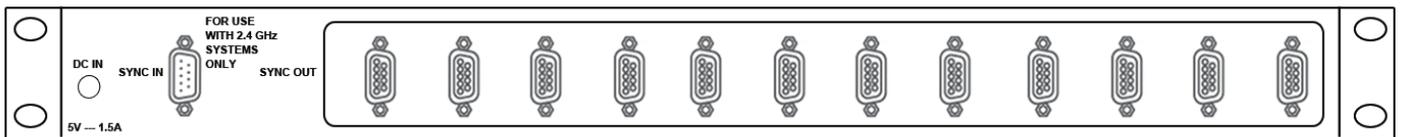
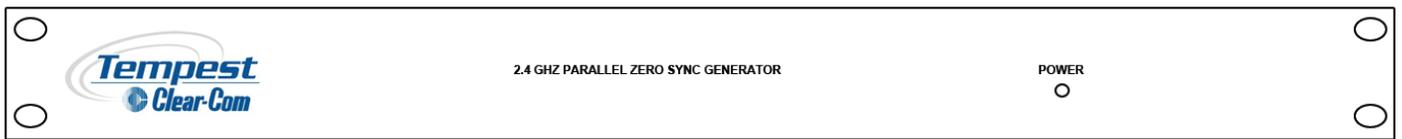




Tempest® Parallel Zero Sync Generator

Reference Manual



Document Reference

Tempest® Parallel Zero Sync Generator Reference Manual

Part Number 810595Z Rev A

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Table of Contents

Thank you from Tempest Wireless	1
Important Safety Instructions	2
Description	3
PSG Overview	4
Front	4
Back	4
Set-up and Installation	5
Select a Location	5
Connectivity	5
Technical Specifications	6
Electrical	6
Safety and Compliance	6
Physical	6
Limited Warranty	7
Technical Support	9

Thank you from Tempest Wireless

We at Tempest® Wireless want to thank you for purchasing a Tempest Parallel Zero Sync Generator. We have made every effort to build a reliable, quality product that easily interfaces with your existing equipment and that will enhance your overall system's performance.

One of our goals in the design of Tempest was that it should work the way you think it should work – that is, it should be intuitive and similar to other equipment that you may already use. You will be able to begin using your new Tempest Parallel Sync Generator with nothing more than the Quick Start Guide. However, to fully benefit from the available features, please read this manual carefully.

We want Tempest to make your job easier and your experience to be positive. We are committed to providing you with a high quality product that will deliver years of trouble-free service. Should you experience any problem with your equipment, whether it is a warranted problem or service after you have owned the system for several years, we will be there to take care of you.

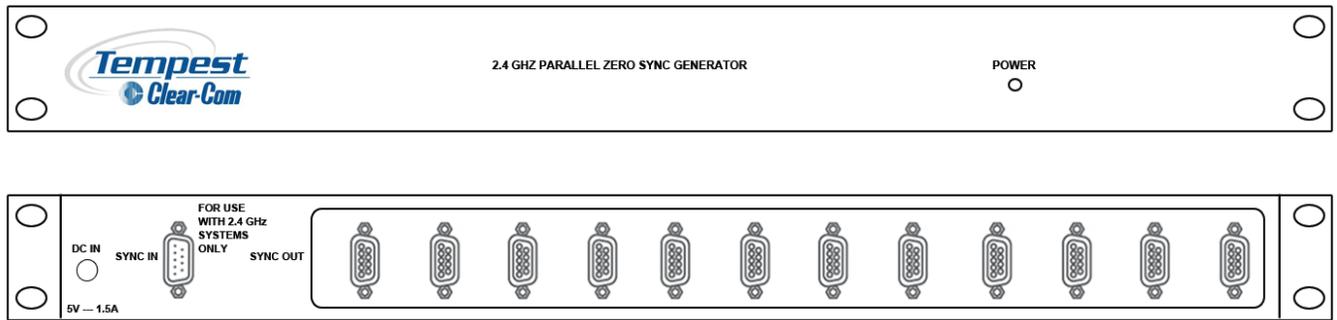
Thank you for choosing Tempest Wireless for your wireless intercom needs.

Important Safety Instructions

The word “Caution” is the lowest of the three signal words (Caution, Warning and Danger), with “Danger” being the highest. Therefore, whenever the word “Caution” is used, it may be replaced with either of the higher rated signal words: “Warning” or “Danger.”

- a) DANGER – indicates a situation which, when not avoided, results in death or severe injury;
 - b) WARNING – indicates a situation which, when not avoided, has the potential to result in death or severe injury;
 - c) CAUTION – indicates a situation which, when not avoided, results or has the potential to result in minor injury.
-
1. Read these instructions.
 2. Keep these instructions.
 3. Heed all warnings.
 4. Follow all instructions.
 5. Do not use this apparatus near water.
 6. Clean only with dry cloth.
 7. Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
 8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
 9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
 10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
 11. Only use attachments/accessories specified by the manufacturer.
 12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
 13. Unplug this apparatus during lightning storms or when unused for long periods of time.
 14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Description



The Tempest Parallel Zero Sync Generator (PSG) provides a precise, zero reference synchronization signal to each connected Tempest 2.4GHz BaseStation. This signal aligns the hopping patterns and transmit/receive times of all connected BaseStations to produce the best possible multi-base, collocated RF performance. BaseStations and Remote Transceivers must contain radios that are version 1.18 or higher to fully utilize the Zero Reference Sync (ZSync) signal.

The Zero Reference Sync signal that is generated by the PSG (or the ZSync Dongle, sold separately) is a more advanced synchronization signal than has by utilized previously in Tempest products. Because of this, older Tempest BaseStations and Remote Transceivers must have a radio upgrade to version 1.18 or higher to utilize the enhanced benefits of the Zero Reference Sync signal. BaseStations and Remote Transceivers with radios older than version 1.18 will still accept the new Zero Reference Sync signal, but they will not have their hopping patterns aligned as would be the case with radios that are at version 1.18 or higher. In this case, operation will be much better than not having any Sync signal, but will not be nearly as good as if the Zero Reference Sync signal was being fully utilized. To determine whether you have the proper version radio, refer to the Reference Manual and/or Tech Menu of your Tempest BaseStation.

A single Tempest Parallel Zero Sync Generator supports up to 12 Tempest 2.4GHz BaseStations using the 12 isolated Sync Out DE-9 connectors on the rear panel of the PSG. Each BaseStation is connected directly to the Parallel Zero Sync Generator via a DE-9 extension cable in a star configuration. The connection is made from a PSG Sync Out DE-9F to each BaseStation's Base Sync In DE-9M connector. This allows each BaseStation to receive the proper synchronization signal completely independent of the condition or presence of any of the other BaseStations.

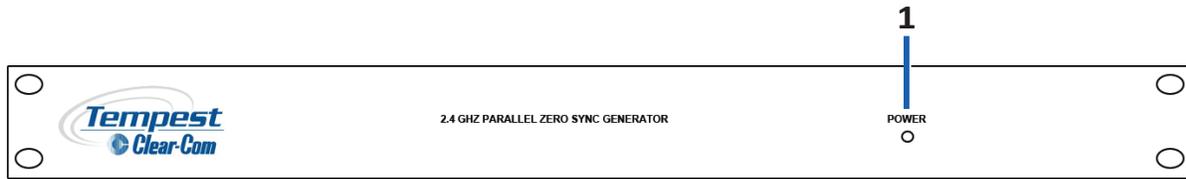
If more than 12 Tempest 2.4GHz BaseStations are required, a second Parallel Zero Sync Generator may be added. In this case the two PSGs must be connected together utilizing a Sync Out DE-9F connector on the first PSG to the Sync In DE-9M on the rear panel of the second PSG. This will allow the synchronization of up to 23 Tempest 2.4GHz BaseStations.



The Parallel Zero Sync Generator is for use with 2.4 GHz Tempest BaseStations only. This product does not apply to the 900 MHz Tempest model.

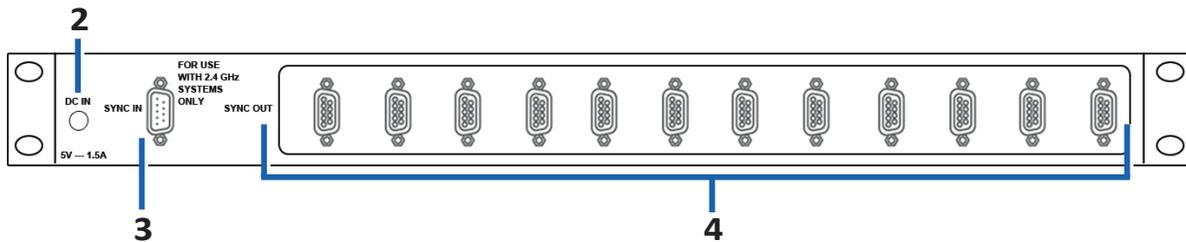
PSG Overview

Front



1 - **Power LED** - Indicates the unit is receiving power.

Back



2 - **DC In** - DC power outlet; 5V 1.5A

3 - **Sync In** - The Sync In DE-9M is used in configurations where multiple Parallel Zero Sync Generators are needed. The units themselves can be synced to one another.

4 - **Sync Out** - There are 12 Sync Out DE-9F connections for connecting to up to 12 Tempest BaseStations. The Sync Out connects into the "Base Sync In" port of the BaseStation.

Set-up and Installation

Select a Location

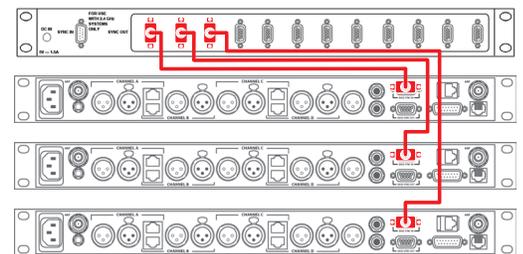
It is usually best to locate the Tempest Parallel Zero Sync Generator near the BaseStations with which it will be used. In the case where all of the BaseStations are together in a single rack, the PSG should be located in that rack. This would be the case if you are only covering one area or you are using Remote Transceivers connected to the BaseStations via CAT-5 cable. If the BaseStations to be ZSynced are in various locations, the PSG should be centrally located in respect to all of the BaseStations that are to be synchronized.

Connectivity

The PSG connects to each Tempest BaseStation via a DE-9 (male to female) cable. Up to 12 BaseStations are connected to the PSG in a star configuration. Cables may be a maximum length of 2500 feet (760m). It is extremely important that cable runs are kept to no more than 2500 feet (760m) or timing errors will occur that will cause BaseStations to have trouble connecting to other BaseStations in the group.

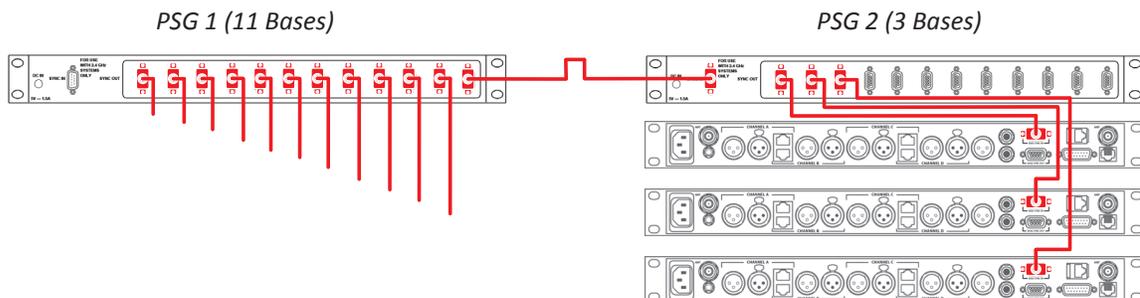
1. Turn power to PSG and Tempest BaseStations OFF.
2. Connect the male end of the DE-9 to one of the “Sync Out” ports on the rear of the PSG.
3. Connect the DE-9 female end to the “Base Sync In” port on the rear of the first BaseStation. Proceed in connecting all additional cables to additional BaseStations in this same manner.
4. Power ON the PSG and then power ON your BaseStations.

*Parallel Sync Generator
(Single Zone)*



If more than 12 Tempest 2.4GHz BaseStations are required, a second Parallel Zero Sync Generator may be added. In this case the two PSGs must be connected together utilizing a Sync Out DE-9M connector on the first PSG to the Sync In DE-9F on the rear panel of the second PSG. This will allow the synchronization of up to 23 Tempest 2.4GHz BaseStations.

Using Multiple Parallel Sync Generators



Technical Specifications

Electrical

DC Input Voltage Range.....	4.75-5.25 VDC
Input Frequency Range	47-63 Hz
AC Input Current.....	600mA max/ 500mA typ
In rush Current	30A max @ 115V/60A max @ 230V
AC Power Consumption Min/Max 1.5W/6W	
DC Power Consumption Min/Max.....	1.25W/5W

Safety and Compliance

Hi-Pot (10mA for 1min)	3000 VAC
Safety Approvals.....	UL, FCC, CB, CE
EMI standard	FCC class A, CE
RoHS Compliant.....	Yes
Leakage Current	0.25mA

Physical

Rack Space.....	1RU
Unit Weight	2 lbs 12 oz
Dimensions.....	19 in x 8.75 in x 1.75 in (L x D x H)

Limited Warranty

This document details the Clear-Com Standard Limited Warranty for all new products for sale within all regions with the exception of Military, Aerospace, and Government (MAG).

EXCEPT AS SET FORTH HEREIN (“LIMITED WARRANTY”), CLEAR-COM MAKES NO OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, NONINFRINGEMENT OF THIRD PARTY RIGHTS, OR FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH ARE EXPRESSLY DISCLAIMED.

- I. **Standard Limited Warranty.** Clear-Com warrants its products, including supplied accessories, against defects in material or workmanship for the time periods as set forth below provided it was purchased from an authorized Clear-Com dealer or distributor.
 - a) Pursuant to this Limited Warranty, Clear-Com will, at its option:
 - i) repair the product using new or refurbished parts, or;
 - ii) replace the product with a new or refurbished product.
 - b) Remedies: In the event of a defect, the rights detailed in 1 (a) are your exclusive remedies. For purposes of this Limited Warranty, “refurbished” means a product or part that has been returned to its original specifications.
 - c) Standard Warranty Period (by Product):
 - i) All Clear-Com brand systems and products, including belt packs, have a Limited Warranty of two years, with the exception of:
 - 1) Cables, accessories, components & consumable items have a Limited Warranty of 90 days.
 - 2) Any Clear-Com product that has been classified as obsolete at the time of sale has a Limited Warranty of 90 days from sales and will be replaced with the same product or a sales credit will be issued, at the sole discretion of Clear-Com.
 - 3) Headsets, handsets, microphones, and associated spare parts, as well as UHF wireless IFB products, have a Limited Warranty of one year.
 - 4) UHF WBS Analog wireless intercom systems have a Limited Warranty of three years.
 - 5) All software products, including Concert (Client and Server), ECS, Production Maestro and Logic Maestro are warranted for one year and shall substantially conform to published specifications. The media on which the Software is furnished is warranted to be free of defects in material and workmanship (under normal use) for a period of one year.
 - 6) Any Clear-Com products that are listed within the last time buy period have the same Limited Warranty for their type 1.i 1 - 1.i.5 as above.
 - d) Any Clear-Com product that is repaired or supplied as a replacement under the terms of this Limited Warranty shall inherit the remaining warranty period from the original product.
 - e) Standard Warranty Period Start Date
 - i) Dealer / Distributor Sales: In view of Dealer or Distributor stocking practices, the Standard Warranty Period for products sold through Dealers or Distributors will commence from the Clear-Com invoice date and will include an automatic extension of three months. Any valid warranty claim within the Standard Warranty Period as determined by the Clear-Com invoice date will be covered without further supporting evidence. All warranty claims after this date must be supported by the Customer’s proof of purchase that demonstrates the product is still within the Standard Warranty Period (as detailed in Section 1.c.i above, plus the automatic three month extension) from their purchase date.
 - ii) Direct Sales: The Standard Warranty Period will commence from the date the product was shipped from Clear-Com to the Customer. The Standard Warranty Period start date for contracts that include commissioning will be the date of the Site Acceptance Test (SAT) or one month from conclusion of the commissioning project, whichever is earlier.

- f) **Invalidation of Warranty**
 - i) This Limited Warranty shall be invalidated if the product's outer case has been opened and internal modifications have been made or damage has occurred, or upon the occurrence of other damage or failure not attributable to normal wear and tear. Authorized modifications with Clear-Com's express written permission will not invalidate the warranty.
 - g) **Software Updates**
 - i) Software Updates are released periodically to correct discovered program bugs. During the Warranty Period, software updates are available to Customers free of charge.
 - h) **Software Upgrades**
 - i) Software Upgrades include new Features and/or Functional Enhancements and are not included as part of the Standard Warranty but may be purchased at the published rates.
 - ii) Note: In the absence of a Software Update containing a program correction and no available workaround to mitigate the problem, at the discretion of Service, Sales, Engineering, or Product Management, the Customer may be provided a Software Upgrade under warranty.
- II. **Exclusions.** Services do not cover damage or failure caused by any occurrence beyond Clear-Com's reasonable control, including without limitation acts of God, fire, flooding, earthquake, lightning, failure of electric power or air conditioning, neglect, misuse, improper operation, war, government regulations, supply shortages, riots, sabotage, terrorism, unauthorized modifications or repair, strikes, labor disputes or any product failure that Clear-Com determines is not a result of failure in the Services provided by Clear-Com. Further Services excluded from this Agreement include: services required due to errors or omissions in Customer purchase orders; installation or maintenance of wiring, circuits, electrical conduits or devices external to the products; replacement or reconditioning of products which, in Clear-Com's opinion cannot be reliably maintained or properly serviced due to excessive wear or deterioration; Customer's failure to maintain the installation site in accordance with the environmental specifications of the products; or service on products removed from the location originally specified by Customer and/or reinstalled without the prior written approval of Clear-Com. Customer will pay Clear-Com's then current published charges to restore such Covered Products to a condition eligible for further service under this Agreement. Clear-Com shall be excused from and shall not be liable for any failure or delay in performance under this Agreement due to the foregoing or any causes beyond its reasonable control.
- III. **Limitation of Liability.** IN NO EVENT WILL CLEAR-COM BE LIABLE UNDER THIS AGREEMENT FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), REGARDLESS OF THE FORM OF ACTION, EVEN IF ADVISED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGES.
- IV. **Assignment.** Neither party may assign this Agreement or any portion thereof without the prior written consent of the other, except in the event of a merger, sale of all or substantially all of the assets or other corporate reorganization.
- V. **Ownership of replaced parts or product.** All replaced parts or products become the property of Clear-Com.
- VI. **Entire Agreement.** This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof, and supersedes all prior or contemporaneous proposals, oral or written, and all other communications between them relating to the subject matter of this Agreement.

Technical Support

In order to ensure that your experience with Clear-Com and our World Class products is as beneficial, effective and efficient as possible, we would like to define the policies and share some “best practices” that can accelerate any problem solving processes which we may find necessary and to enhance your customer service experience. Our Technical Support, Return Material Authorization, and Repair Policies are set forth below. These Policies are subject to revision and constantly evolve in order to address our Customers’ and the Market’s needs. Accordingly these are provided by way of guidance and for information only and may be changed at anytime with or without Notice.

TECHNICAL SUPPORT POLICY

- a) Telephone, online, and e-mail technical support will be provided by the Customer Service Center free of charge during the Warranty Period.
- b) Technical support will be provided free of charge for all software products under the following conditions:
 - i) The application, operating, and embedded software is installed on a product covered by Clear-Com’s Limited Warranty, and:
 - 1) The software is at the current release level; or,
 - 2) The software is one (1) version removed from current.
 - ii) Older versions of software will receive “best-effort” support, but will not be updated to correct reported bugs or add requested functionality.
- c) For Technical Support:
 - i) North and South America, (incl. Canada, Mexico, and the Caribbean) & US Military:
Hours: 0800 - 1700 Pacific Time
Days: Monday - Friday
Tel: +1 510 337 6600
Email: Support@Clearcom.com
 - ii) Europe, the Middle East and Africa:
Hours: 0800 - 2000 Central European Time
Days: Monday - Friday
Tel: +49 40 853 999 700
Email: TechnicalSupportEMEA@clearcom.com
 - iii) Asia-Pacific:
Hours: 0800 - 1700 Pacific Time
Days: Monday - Friday
Tel: +1 510 337 6600
Email: Support@Clearcom.com
- d) Email Technical Support is available for all Clear-Com branded products free of charge for the life of the product, or two years after a product has been classified as obsolete, whichever comes first. To log or update a request, send an email to: Support@Clearcom.com.
- e) Support for Distributor and Dealer Sales
 - i) Distributors and Dealers may utilize the Customer Service Centers once a system has been installed and commissioned. Clear-Com Systems and Applications Engineers will provide support to the Distributor from the pre-sales stage through to satisfactory installation for new system purchases. Customers will be encouraged to contact their Dealer or Distributor with their installation and technical support enquires rather than using the Customer Service Centers directly.

- f) Support for Direct Sales
 - i) Customers may utilize the Customer Service Centers once a system has been installed and commissioned by Clear-Com Systems and Applications Engineers, or in the case of project installations, once the Project Team has completed the hand-over to the Support Centers.

RETURN MATERIAL AUTHORIZATION POLICY

- a) Authorizations: All products returned to Clear-Com or a Clear-Com Authorized Service Partner must be identified by a Return Material Authorization (RMA) number.
- b) The Customer will be provided with an RMA number upon contacting Clear-Com Sales Support as instructed below.
- c) The RMA number must be obtained from Clear-Com via phone or email prior to returning product to the Service Center. Product received by the Service Center without a proper RMA number is subject to return to the Customer at the Customer’s expense.
- d) Damaged equipment will be repaired at the Customer’s expense.
- e) Returns are subject to a 15% restocking fee.
- f) Advance Warranty Replacements (AWRs);
 - i) During the first 30 days of the Standard Warranty Period: Once the equipment fault has been verified by Clear-Com or its authorized representative, Clear-Com will ship a new replacement product. The Customer will be provided with an RMA number and be required to return the faulty equipment within 14 days of receipt of the replacement or will be invoiced for the list price of a new product.
 - ii) During days 31-90 of the Standard Warranty Period: Once the equipment fault has been verified by Clear-Com or its authorized representative, Clear-Com will ship a like-new, fully refurbished replacement product. The Customer will be provided with an RMA number and be required to return the faulty equipment within 14 days of receipt of the replacement or will be invoiced for the list price of a new product.
 - iii) To obtain an RMA number or request an AWR:
 - 1) North and South America, Asia-Pacific, and US Military:

Hours: 0800 - 1700 Pacific Time

Days: Monday - Friday

Tel: +1 510 337 6600

Email: SalesSupportUS@Clearcom.com
 - 2) Europe, the Middle East and Africa:

Hours: 0800 - 1700 GMT + 1

Days: Monday - Friday

Tel: + 44 1223 815000

Email: SalesSupportEMEA@Clearcom.com
 - iv) Note: AWRs are not available for UHF WBS Analog wireless intercom systems. UHF WBS Analog wireless intercom systems out-of-box failures must be returned to Clear-Com for repair.
 - v) Note: Out-of-box failures returned after 90 days will be repaired and not replaced unless approved by Clear-Com Management.
 - vi) Note: AWRs are not available after 90 days of receipt of product unless an AWR Warranty Extension is purchased at the time of product purchase.
 - vii) Note: Shipping charges, including duties, taxes, and insurance (optional), to Clear-Com’s factory are the responsibility of the Customer.
 - viii) Note: Shipping AWRs from Clear-Com is at Clear-Com’s expense (normal ground or international economy delivery). Requests for expedited shipping (E.g. “Next-Day Air”), customs duties, and insurance are the responsibility of the Customer.

REPAIR POLICY

- a) Repair Authorizations: All products sent to Clear-Com or a Clear-Com Authorized Service Partner for repair must be identified by a Repair Authorization (RA) number.
- b) The Customer will be provided with an RA number upon contacting Clear-Com Customer Services as instructed below.
- c) The RA number must be obtained from Clear-Com via phone or email prior to returning product to the Service Center. Product received by the Service Center without a proper RA number is subject to return to the Customer at the Customer's expense.
- d) Return for Repair
 - i) Customers are required to ship equipment at their own cost (including transportation, packing, transit, insurance, taxes and duties) to Clear-Com's designated location for repair.
 - 1) Clear-Com will pay for the equipment to be returned to the Customer when it is repaired under warranty.
 - 2) Shipping from Clear-Com is normal ground delivery or international economy.
 - 3) Requests for expedited shipping (E.g. "Next-Day Air"), customs duties, and insurance are the responsibility of the Customer.
 - ii) Clear-Com does not provide temporary replacement equipment ("loaner") during the period the product is at the factory for repair. Customers should consider a potential prolonged outage during the repair cycle, and if required for continuous operations purchase minimum spare equipment required or purchase an AWR Warranty Extension.
 - iii) No individual parts or subassemblies will be provided under warranty, and warranty repairs will be completed only by Clear-Com or its Authorized Service Partners.



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