



**WRK-109128RX-ES-02**

**1:1 Ku-Band**

**Downlink Redundant System**

**Operation & Maintenance Manual**



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**mitec telecom inc.***Designers and manufacturers of telecom and wireless products*

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**OPERATION AND MAINTENANCE MANUAL**

Preliminary

☐

Released

☒**REVISION RECORD**

| Revision | ECN # | Description          | Date      | Approved |
|----------|-------|----------------------|-----------|----------|
| 1        |       | Preliminary Release. | 24 Aug 06 |          |

**CM Approval****TITLE:****Ku-Band 1:1 Downlink Redundant System**

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**Designer: Marina Lissianskaia      Date: 24 Aug 06****Technical Writer: C. Strunga      Date: 24 Aug 06****DOCUMENT NO.  
212281-001MA****REV 0****PAGE 1 OF 13**

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# Preface

## Scope

This document covers the installation of the Ku-Band 1:1 Downlink Redundant System. It contains information intended for engineers, technicians and operators working with the redundant system.

To make inquiries, or to report errors of fact or omission in this document, please contact **mitec telecom inc** at (514) 694-9000.

## ***IMPORTANT***

Important information concerning the operation and care of this product, as well as safety of authorized operators is highlighted throughout this document by one of the following labels:

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### **NOTE**

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*Indicates a reminder, a special consideration, or additional information that is important to know.*

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### **CAUTION!**

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*Identifies situations that have the potential to cause equipment damage.*

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### **WARNING!!**

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*Identifies hazardous situations that have the potential to cause equipment damage as well as serious personal injury.*

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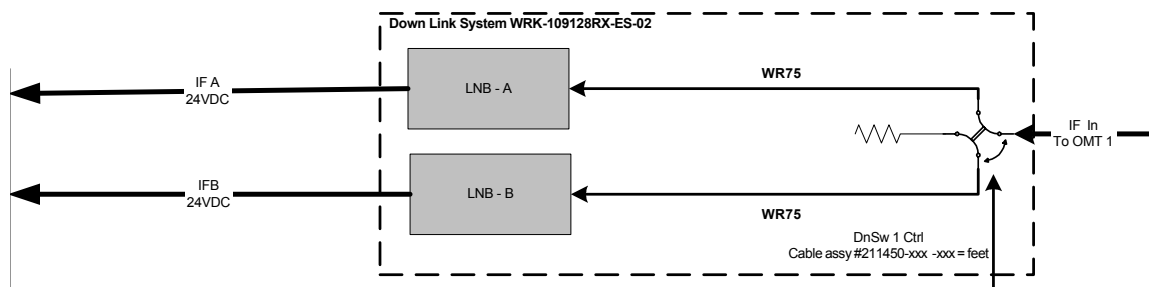
# 1 Introduction

## 1.1 General Description

The 1:1 Downlink Redundant Kit is part of the outdoor unit (ODU) of mitec's 1:1 Uplink/Downlink Redundant System. It includes two Ku-Band to L-Band Block-Downconverters (LNB) and a WR 229 waveguide switch assembly.

The system junction box, assembled on the mitec Uplink Redundant System mounting plate combines the Uplink and Downlink Monitoring and Control interfaces, and links the outdoor unit components (ODU) to the indoor controller (IDU) in the 1:1 Uplink/Downlink System. The junction box executes the commands for switching between the redundant systems.

For the component interconnections and module definitions, refer to the System Block Diagram in the System portion of the 1:1 Uplink/Downlink Redundant System Documentation Package.



### 1.1.1 Abbreviations

Table 1 lists the abbreviations that may appear within this manual.

**Table 1 – Abbreviations and Definitions**

| Abbreviation | Description                           |
|--------------|---------------------------------------|
| A            | Ampere                                |
| AC           | Alternating Current                   |
| BUC          | Block Up Converter                    |
| °C           | Degrees Celsius                       |
| dB           | Decibel                               |
| dBm          | Decibel referenced to mW              |
| DC           | Direct Current                        |
| GHz          | Gigahertz ( $10^6$ cycles per second) |
| IDU          | In Door Unit                          |
| IF           | Intermediate Frequency                |
| LNB          | Low Noise Block                       |
| M&C          | Monitor and Control                   |
| MHz          | Megahertz ( $10^3$ cycles per second) |

| Abbreviation | Description     |
|--------------|-----------------|
| N/A          | Not Applicable  |
| ODU          | Out Door Unit   |
| RF           | Radio Frequency |
| V            | Volt            |
| W            | Watt            |
| W/G          | Wave Guide      |

## 1.2 Receiving and Inspection

The redundant kit will arrive in a standard shipping container. Immediately upon receipt of the Redundant Kit, check the Bill of Lading against the actual equipment you have received. Inspect the shipping container exterior for visible damage incurred during shipping.

Refer to the WRK-109128RX-ES-02 assembly drawing and parts list in Appendix A.

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### CAUTION!

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*Handle the redundancy kit with extreme care. Excessive shock may damage the redundancy kit's delicate internal components.*

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### NOTE

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*Before unpacking the shipping container, move them near to the site where it will be mounted.*

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Verify that all items have been received and undamaged during shipment. Verify that all items are complete. If there are any omissions or evidence of improper packaging, please notify **mitec telecom inc.** immediately.

### 1.2.1 Equipment Damage or Loss

**mitec telecom inc.** is not responsible for damage or loss of equipment during transit. For further information, contact the responsible transport carrier.

When declaring equipment as damaged during transit, preserve the original shipping cartons to facilitate inspection reporting.

### 1.2.2 Return of Equipment

When returning equipment to **mitec** for repair or replacement:

1. Identify, in writing, the condition of the equipment,
2. Refer to the sales order, Purchase Order and the date the equipment was received,

Notify **mitec** Sales Administration Department of the equipment condition and obtain a Return Material Authorization (RMA) number and shipping instructions. **mitec** will pay for the cost of shipping the product to the customer after the repairs are completed.

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## NOTE

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*Do not return any equipment without an RMA number. This is important for prompt, efficient handling of the returned equipment and of the associated complaint.*

## 1.3 Preparing for Installation

Before attempting to install or use the Ku-Band 1:1 Downlink Redundant System, we recommend that you first familiarize yourself with the kit by reading through this manual. Understanding the operation of the redundant kit will reduce the possibility of incorrect installation, thereby causing damage or injury to yourself or others.

*The redundant kit **must** be installed in accordance with the conditions and recommendations contained in the following sections.*

When you are ready to begin your installation, use the information in Chapter 2 (Installation) as a guide for making all the required electrical connections.

### 1.3.1 Safety Precautions

Carelessness or mishandling of the redundant kit may damage the unit causing serious injury to yourself or others. Please adhere to the following:

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## WARNING!!

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*This unit is equipped with power cords and plugs. Do not tamper with, or attempt to reconfigure, the cords or plugs supplied with the unit, as this can:*

- ◆ *result in personal injury*
- ◆ *void the warranty*
- ◆ *cause damage to the units or related equipment*

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# 2 *Installation*

Use the information in this section as a guide to assemble and install the redundant kit. The system is designed to function outdoors with the specified humidity up to 100% during operation. However, installation should be carried out in dry conditions, free of salt spray or excessive humidity. This will eliminate the possibility of moisture and other foreign substances from entering the output waveguide flange.

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## NOTE

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*A gasket shall be used to seal each waveguide connection.*

### 2.1 **Assembly of WRK-109128RX-ES-02**

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## CAUTION!

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*Only authorized technical personnel should perform the Installation and proper electrical hookups of the redundant system.*

The parts list in Appendix A details the parts of the WRK-109128RX-ES-02. Hardware and gaskets are included to complete the assembly. Refer to the assembly drawing in Appendix A for further details.

With reference to the assembly drawing, WRK-109128RX-ES-02AD, in Appendix A, complete the following steps.

1. If not already assembled and as per the assembly drawing, in Appendix A, assemble the waveguide switch sub-assembly, connecting the waveguide termination and waveguide bends to the switch. Use the hardware and gaskets specified on the assembly drawing.
2. With reference to the assembly drawing in Appendix A, assemble the LNBs, to the waveguide flanges. Use the hardware and gaskets specified in the assembly drawing.
3. Complete the connections between the customer downlink waveguide port and the switch sub-assembly. Use gasket and hardware as specified.
4. Assemble the downlink system control cable to the junction box, as shown in **system wiring diagram** in the System section of the 1:1 Uplink/Downlink Redundant System Documentation Package.

## 2.2 Operation

The Downlink kit contains two Ku-Band to L-Band LNBs that are standard purchased components, and the input WR75 redundancy switch. For LNB technical information, refer to the LNB manufacturer user manual.

As already stated, the monitoring and control for the WRK-109128RX-ES-02 switch is located on the junction box on the mounting plate of the 1:1 Uplink Redundant System. It provides the M&C interface between the system and the IDU controller. For system interface information, refer to the 1:1 Uplink Redundant section in the 1:1 Uplink/Downlink Redundant System Documentation Package.

### 2.2.1 Downlink Waveguide Switch Connections

Table 2 details the connections from the downlink waveguide switch assembly to the WR75 waveguide ports and the junction box.

**Table 2: RF Ports and Control Interface for Downlink Switch**

| Connector Name | Type           | Pin # | Signal Name | Description            |
|----------------|----------------|-------|-------------|------------------------|
| Port1          | WR75           | N/A   | RF Input    | RF Input (from LNB-A)  |
| Port2          | WR75           | N/A   | RF Output   | RF Output (to antenna) |
| Port3          | WR75           | N/A   | RF Input    | RF Input (from LNB-B)  |
| Port4          | WR75           | N/A   | RF Output   | Terminated (50Ω Load)  |
| J1             | MS3112E-14-15P | A     | DRV_A       |                        |
|                |                | B     | DRV_RTN     |                        |
|                |                | C     | DRV_B       |                        |
|                |                | D     | IND_A       |                        |
|                |                | E     | IND_RTN     |                        |
|                |                | F     | IND_B       |                        |

## 2.3 Maintenance

### WARNING!!

*Shut down the LNBs before any maintenance is attempted. Failure to do so will result in personal injury. This includes removal of any RF power originating from other system components.*

The WRK-109128RX-ES-02 requires very little preventive maintenance or repair.

### 2.3.1 LNB Maintenance

For preventive maintenance of the LNBs, refer to the *LNB User Manual*.

### **2.3.2 Waveguide Switch Maintenance**

Toggle the switching system at least once every three months to ensure proper switch operation.

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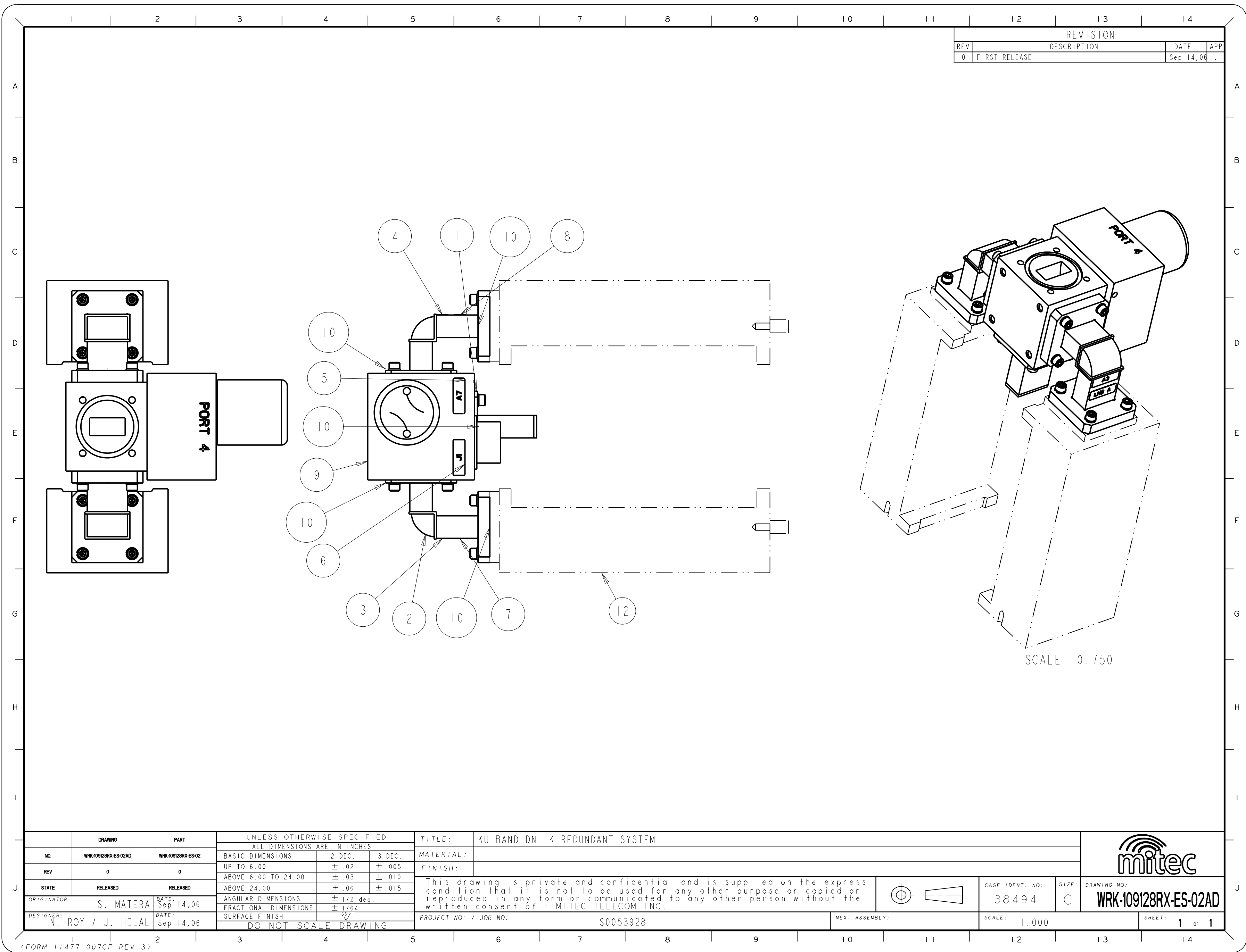
# ***Appendix A***

## ***Drawings & Schematic Diagrams***

WRK-109128RX-ES-02AD - Assembly Drawing

WRK-109128RX-ES-02PL - Parts List

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|------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------|----------------------|----------------------------------------------|----------|----------------------------------------------|--|
| <br>Mitec PART LIST |          | 1.) MITEC SHALL APPROVE ALL ALTERNATE PARTS.<br>2.) CHANGES FROM PREVIOUS ISSUES. THE ICI COLUMN ON THIS DOCUMENT IS MARKED WITH AN "X" TO INDICATE WHERE CHANGES (ADDITIONS, MODIFICATIONS, CORRECTIONS, DELETIONS) FROM THE PREVIOUS ISSUE WERE MADE. THIS WAS DONE AS A CONVENIENCE ONLY, AND MITEC ASSUMES NO LIABILITY WHATSOEVER FOR ANY INACCURACIES IN THESE NOTATIONS. BIDDERS AND CONTRACTORS ARE CAUTIONED TO EVALUATE THE REQUIREMENTS OF THIS DOCUMENT BASED ON THE ENTIRE CONTENT, AS WRITTEN, IRRESPECTIVE OF THE ICI NOTATION AND RELATIONSHIP TO THE LAST PREVIOUS ISSUE. 3.) EXCEPT AS MAY BE OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS CONTAIN PROPRIETARY INFORMATION AND ARE THE PROPERTY OF MITEC. AND ARE ISSUED IN STRICT CONFIDENCE AND SHALL NOT BE TRANSMITTED, REPRODUCED, COPIED OR USED AS THE BASIS FOR MANUFACTURE OR SALE OF APPARATUS WITHOUT PRIOR WRITTEN PERMISSION. |       | CADM Release Date                                |                      | Drawing/CADM Office No;                      |          | 30/08/2006<br>REV                            |  |
|                                                                                                      |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                  |                      | WRK-109128RX-ES-02PL                         |          | 0                                            |  |
|                                                                                                      |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | CM Approval;                                     |                      | Title                                        |          |                                              |  |
|                                                                                                      |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                  |                      | PART LIST FOR KU Band Dn Lk redundant system |          |                                              |  |
| ECN HISTORY                                                                                          |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | FIRST APPROVAL                                   |                      |                                              | ASSEMBLY |                                              |  |
| DATE                                                                                                 | REV      | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | BY:   | SIGNATURES                                       | DATE                 | NEXT ASSY.                                   | USED ON  |                                              |  |
|                                                                                                      |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | ORIGINATOR; N.R.                                 | 08/08/2005           |                                              |          |                                              |  |
|                                                                                                      |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | ENG. N ROY                                       |                      |                                              |          |                                              |  |
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| ICI                                                                                                  | Item no. | Component Designation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Value | Description                                      | Mitec Part No.       | QTY                                          | REV      | Comments and Alternate P/N                   |  |
|                                                                                                      |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | Assy drawing                                     | WRK-109128RX-ES-02AD | REF                                          |          |                                              |  |
|                                                                                                      |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                  |                      |                                              |          |                                              |  |
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|                                                                                                      | 1        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | W/G SWITCH WR75 SEALED MOTORIZED                 | 017-0186             | 1                                            |          |                                              |  |
|                                                                                                      | 2        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | WR75 LP TERMINATION                              | 2523292-08-06        | 1                                            |          |                                              |  |
|                                                                                                      | 3        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | WR 75 E BEND W/G ASSY AL PT                      | 2937095-06           | 2                                            |          |                                              |  |
|                                                                                                      | 4        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | WR75 cover flange W/G switch hardware kit (RoHS) | 212222-001           | 5                                            |          |                                              |  |
|                                                                                                      | 5        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | WR75 cover flange W/G switch hardware kit (RoHS) | 212222-001           | 1                                            |          | Ship Loose                                   |  |
|                                                                                                      | 6        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | LNB                                              | Referance only       | ref                                          |          | Could ship with or without. Sales to advise. |  |
|                                                                                                      | 7        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                  |                      |                                              |          |                                              |  |
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# ***Appendix B***

## ***Spare Parts***

Appendix B contains a table of recommended spare parts for on-hand replacement. The following sheet can be copied and used as a fax form to order the required spare parts. Please make sure to include all identifying information to facilitate the processing of your order. The order may also be sent via email or regular mail delivery, at the following address.

**mitec telecom inc.**

9000 Trans Canada Blvd.  
Pointe Claire, Quebec, Canada  
H9R 5Z8

Fax: (514)694-3814

Email: [rmitch@mitectelecom.com](mailto:rmitch@mitectelecom.com)

For additional information, please contact our customer service department at:  
(514)694-9000 or 1-800-724-3911

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**mitec telecom inc.**

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ISO 9001 Certified*

**Spare Parts Order Form****WRK-109128RX-ES-02****From:****Place By:****Signature:****Telephone:****Fax****Email:**

| Part Description                      | Part Number            | Quantity | Unit Price* | Line Total* |
|---------------------------------------|------------------------|----------|-------------|-------------|
| WR75 WG Switch motorized              | 017-0186               |          |             |             |
| Waveguide Assembly                    | 2937542-02             |          |             |             |
| WG termination                        | 2980014-01             |          |             |             |
| Amplifier with BUC - Std Ku-Band      | WTX-14014546X-70-ES-36 |          |             |             |
| Amplifier with BUC - Extended Ku-Band | WTX-13714546X-70-ES-35 |          |             |             |
| Uplink Switch Cable Assembly          | 211449-xxx xxx = feet  |          |             |             |
| BUC A M&C Cable Assembly              | 211457-xxx xxx = feet  |          |             |             |
| BUC B M&C Cable Assembly              | 211458-xxx xxx = feet  |          |             |             |
|                                       |                        |          |             |             |
|                                       |                        |          |             |             |
|                                       |                        |          |             |             |
|                                       |                        |          |             |             |
|                                       |                        |          |             |             |

\* To be completed by **mitec** Sales Department