Telegesis ZigBee Communications Gateway

Product Manual

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## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PoE</td>
<td>Power over Ethernet</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>HTTP</td>
<td>Hyper Text Transfer Protocol</td>
</tr>
<tr>
<td>UPnP</td>
<td>Universal Plug and Play</td>
</tr>
<tr>
<td>UDP</td>
<td>User Datagram Protocol</td>
</tr>
<tr>
<td>TCP</td>
<td>Transmission Control Protocol</td>
</tr>
<tr>
<td>SSL</td>
<td>Secure Socket Layer</td>
</tr>
<tr>
<td>DNS</td>
<td>Domain Name System</td>
</tr>
<tr>
<td>SNTP</td>
<td>Simple Network Time Protocol</td>
</tr>
<tr>
<td>DHCP</td>
<td>Dynamic Host Control Protocol</td>
</tr>
<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>MAC</td>
<td>Media Access Control</td>
</tr>
</tbody>
</table>
Package Contents
The package contains the following items,

Figure 1: Package contents

a. ZigBee Communications Gateway
b. Micro USB power cable
c. Mounting screws
Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Number</td>
<td>GW357</td>
</tr>
<tr>
<td>RF Interface</td>
<td>ZigBee Pro</td>
</tr>
<tr>
<td>RF Output Power</td>
<td>+8dBm</td>
</tr>
<tr>
<td>Antenna</td>
<td>Half-wave Dipole Antenna 2dBi Gain or Integrated Antenna</td>
</tr>
<tr>
<td>Battery</td>
<td>1x 3V 220mAh Sony CR2032 Battery</td>
</tr>
<tr>
<td>Power Source</td>
<td>5Volts @ 500mA via USB Micro Connector</td>
</tr>
<tr>
<td>Charging source should be current limited</td>
<td></td>
</tr>
<tr>
<td>Ethernet</td>
<td>RJ45 10/100Mbps</td>
</tr>
<tr>
<td>Power Over Ethernet (optional)</td>
<td>802.3af Compliant Class 1 Device</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-20 to 70C</td>
</tr>
<tr>
<td>Humidity</td>
<td>95% TH Non-condensing</td>
</tr>
<tr>
<td>IP Rating</td>
<td>IP20 (subject to testing)</td>
</tr>
<tr>
<td>Net Weight</td>
<td>110g</td>
</tr>
</tbody>
</table>

Order Codes

<table>
<thead>
<tr>
<th>GW-</th>
<th>Gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td>GW-357</td>
<td>Core Silabs IC</td>
</tr>
<tr>
<td>GW-357-X</td>
<td>1st module 1 = ETRX357</td>
</tr>
<tr>
<td>GW-357-0X</td>
<td>2nd module 2 = ETRX357HR</td>
</tr>
<tr>
<td>GW-357-00-X</td>
<td>Power of Ethernet (P) 3 = ETRX357-LRS</td>
</tr>
<tr>
<td>GW-357-00-0-X</td>
<td>WiFi or GSM (W or G) 4 = ETRX357-HR-LRS</td>
</tr>
<tr>
<td>GW-357-00-0-0-X</td>
<td>RS232/RS485 (1=yes 0=No) 5 = ETRX357-HR-LRS</td>
</tr>
<tr>
<td>GW-357-00-0-0-0-X</td>
<td>SD Memory Card size i.e. 4, 8 etc.</td>
</tr>
</tbody>
</table>

Examples

GW-357-11-P-W-1-8 Gateway with 2xETRX357 module, Power-over-Ethernet, WiFi, RS232/RS485 and an 8MB SD Memory Card

GW-357-1 Basic Gateway with 1xETRX357 module

GW-357-30-0-0-1 Gateway with 1xETRX357-LRS and RS232/RS485
Layout

Figure 2: Gateway front view

Figure 3: Gateway back view
Figure 4: Gateway bottom view

- Anti-slip pads
- Mounting holes
- Button-1 (B1)
- Button-3 (B3)
- Opening for battery and SD card holder
- Anti-slip pads

Figure 5: Top label

- Power supply ratings
- Gateway MAC address
Power

The Gateway can be powered ON by plugging in the micro USB cable in the socket provided as shown in figure-3 with power source as specified in the Specifications. Selected models of gateway incorporating Power over Ethernet (PoE) can be powered on using the PoE injector through RJ45 cable.
## LED Indicators

<table>
<thead>
<tr>
<th>Sequence Number</th>
<th>Gateway State</th>
<th>1st ETRX3 Status LED</th>
<th>Link Status LED</th>
<th>Gateway Activity LED</th>
<th>Interface Active LED</th>
<th>2nd ETRX3 Status LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power UP Sequence</td>
<td>ON</td>
<td>Red + Green</td>
<td>Blinking Amber for 5 sec</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>All LEDs will turn ON and then following blink one after the other twice except for the ETRX3 Status LEDs which are controlled by ETRX3 ZigBee modules</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ethernet link inactive</td>
<td>-</td>
<td>Red</td>
<td>Blinking Amber</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Ethernet link active</td>
<td>-</td>
<td>Green</td>
<td>OFF</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Any socket connected to either ZigBee module OR Web Terminal connected</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Green</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Any communication with ZigBee modules OR Any communications on Ethernet lines</td>
<td>-</td>
<td>-</td>
<td>Blinking Amber</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2: LED Sequence table
**Buttons Actions**
The Gateway has three hardware buttons as shown in the [Layout](#) which can perform multiple functions as described in this section.

1. **Button 1 (B1)**
2. **Button 2 (B2)**
3. **Button 3 (B3)**

**Restore factory defaults**
Follow the following procedure with buttons in order to restore the factory default configuration settings on the Gateway using B1 and B3.

1. Press and hold **B1**
2. Then with **B1** pressed, press and hold **B3** for approximately 3 seconds after which the Gateway reboots and LED power up sequence is seen.

**Gateway reboot**
Press **B3** and hold for 5 seconds to reboot the Gateway.

**Gateway recovery mode**
Perform following procedure to put the Gateway in recovery mode:

1. Press and hold **B3** until gateway reboots.
2. At power up hold **B2** and wait for 3 seconds.
3. The Gateway will be in recovery mode now.

**Issue ZigBee command**
Button **B2** is used to issue custom ZigBee command to the 1st ETRX3 ZigBee module which can be configured in Button Command section of the [Gateway Configurations](#) as shown below.

```
Button Command: AT+PJOIN
```

So whenever the B2 is pressed the command ("AT+PJOIN" by default) is issued to the 1st ETRX3 ZigBee module.

---

1 Recovery mode not implemented in initial release but will be added in subsequent release soon.
Functionality

Start-up
Turn ON the ZigBee Communications Gateway by inserting the micro USB power cable into the socket shown in figure 3. The LEDs on the front panel will light up as described in the LED’s Sequence table. Once the Start-up LED sequence is complete the gateway will continuously look for an Ethernet link which is indicated by LED sequence-3. Insert the Ethernet cable in the RJ45 socket shown in figure 3. The gateway will try to obtain an IP address by using DCHP (by default DHCP is enabled but the user can also set static IP address for the Gateway). Once an IP address is allocated successfully the LED sequence-4 is displayed on the LED panel.

Gateway Discovery

Discovery on a windows-7 PC
Gateway implements UPnP discovery service so the user can directly go to “Network settings” and look for devices under “Network Infrastructure” category. The Gateway will show up as ZigBee Communications Gateway as shown below. Navigate to properties by right clicking on the device to view the device properties. Browse to the IP address shown in the device properties or alternatively double click on the device to navigate to the webpage hosted by Gateway.

![Figure 7: Device Discovery](image-url)
Discovery on other platforms:
On other platforms where UPnP services are not available, the device can be discovered using the following python script which basically listens to the UDP broadcast on port 14099 by the gateway once every minute.

```python
import socket, traceback, commands
host = '' # Bind to all interfaces
port = 14099

# start a udp socket server to listen on port 14099
s = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
s.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
s.setsockopt(socket.SOL_SOCKET, socket.SO_BROADCAST, 1)
s.bind((host, port))

print "Waiting for Telegesis Gateway:"
while 1:
    try:
        message, address = s.recvfrom(8192)
        print "Telegesis Gateway Found on IP Address: %r" % (address[0])
    except (KeyboardInterrupt, SystemExit):
        raise
```

Figure 8: Discovery Python Script

Run the above script from command line and the output window would show the IP addresses of the ZigBee Communications Gateways in the network as shown below.

Figure 9: Discovery Output
Gateway Webservice

ZigBee Communication Gateway hosts a http webserver to serve webpages which help the user to configure the Gateway and communicate with the ZigBee device via a simple web interface.

Authentication

The http webserver is protected by basic authentication hence a valid username “admin” and password “password” must be provided when prompted to access the webpages. The password can be changed through the GW357 Configuration webpage as explained in the later section.

![HTTP server authentication](image)

*Figure 10: HTTP server authentication*
Web Pages
Following web pages are served by the http web server on the ZigBee Communications Gateway

GW357 Configuration
The Gateway configuration page is the main page of the http webserver. This page provides access to the configuration parameters of the Gateway.

![Gateway Configuration Page](image)

Figure 11: Configurations Page

Gateway Configuration

a. Web Terminal

This option enables or disables the access to ZigBee module via the web terminal. The Gateway provides an access to the ZigBee module via Web Terminal page which can be used to issue commands to the ZigBee module and monitor the response of the module. The Web Terminal only supports communication in ASCII. Default value is enabled.
b. **Dialout TCP Sockets**

Enable
The Gateway can establish an outgoing TCP socket connections to a specified dialout addresses and port numbers. This option can enable or disable the outgoing socket connections for both the ZigBee modules. Default value is disabled.

**Out 1 Address**
The address specified in this option is used by the gateway to establish the outgoing socket connection for the 1\(^{st}\) ETRX3 ZigBee module. The dialout address can either be an IP address or a host name.

**Out 1 port**
This item specifies the port number for the dialout connection from 1\(^{st}\) ETRX3 ZigBee module.

**Out 2 Address**
The address specified in this option is used by the gateway to establish the outgoing socket connection from the 2\(^{nd}\) ETRX3 ZigBee module. The dialout address can either be an IP address or a host name.

**Out 2 port**
This item specifies the port number for the dialout connection from 2\(^{nd}\) ETRX3 ZigBee module.

**Secure Connection**
This option enables the SSL on the outgoing socket connection.\(^3\)

---

\(^2\) This option only available in Gateway models with two ZigBee modules on-board. Please refer order codes

\(^3\) The SSL is not implemented in current release.
c. **Dialin TCP Sockets**

<table>
<thead>
<tr>
<th>Dialin TCP Sockets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1 Enable</td>
</tr>
<tr>
<td>Module 1 Port</td>
</tr>
<tr>
<td>Module 2 Enable</td>
</tr>
<tr>
<td>Module 2 Port</td>
</tr>
</tbody>
</table>

**Module 1 Enable**
The Gateway also allows an incoming TCP socket connection on a specified port which enables access to the 1\textsuperscript{st} ETRX3 ZigBee module.

**Module 1 Port**
The IP port number to access the 1\textsuperscript{st} ETRX3 ZigBee module via incoming TCP socket.

**Module 2 Enable\textsuperscript{4}**
The Gateway also allows an incoming TCP socket connection on a specified port which enables access to the 2\textsuperscript{nd} ETRX3 ZigBee module.

**Module 2 Port\textsuperscript{4}**
The IP port number to access the 2\textsuperscript{nd} ETRX3 ZigBee module via incoming TCP socket.

d. **Discovery**

<table>
<thead>
<tr>
<th>Discovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
</tr>
</tbody>
</table>

This option is enables the Gateway to send discovery broadcasts by UDP on port 14099 once every minute. This option is enabled by default.

e. **Button Command**

<table>
<thead>
<tr>
<th>Button Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT+PJ0IN</td>
</tr>
</tbody>
</table>

This is a command string that will be sent to the 1\textsuperscript{st} ETRX3 ZigBee module each time the Button-2 (B2) is pressed.

\textsuperscript{4} This option only available in Gateway models with two ZigBee modules on-board. Please refer order codes
f. Gateway Time

Time Server
The Gateway implements SNTP client which can update Gateway time from a valid time server specified in time server field.

Current Time
The current time of the gateway is displayed in this field when the page is loaded or is clicked.

After changing any settings on the webpage must be clicked in order to apply the changes to Gateway configuration. Following message will be displayed to confirm the change.

Gateway configurations change successful
IP Configuration

a. Current IP Configurations

<table>
<thead>
<tr>
<th>Current Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
</tr>
<tr>
<td>MAC Address</td>
</tr>
</tbody>
</table>

**IP address**
The current IP address of the Gateway is displayed in this field.

**MAC address**
The MAC address of the Gateway is displayed in this field.

b. DHCP Configuration

<table>
<thead>
<tr>
<th>DHCP Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHCP Enable</td>
</tr>
</tbody>
</table>

**DHCP Enable**
If this option is enabled the Gateway can acquire IP configurations like IP address, subnet mask, default gateway and the DNS server dynamically by using DHCP protocol. If the DHCP option is not selected then stored Static IP configuration is used to setup the network interface.

c. Static IP Configurations

<table>
<thead>
<tr>
<th>Static IP Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
</tr>
<tr>
<td>Subnet Mask</td>
</tr>
<tr>
<td>Default Gateway</td>
</tr>
<tr>
<td>DNS Server</td>
</tr>
</tbody>
</table>

**IP Address**
The gateway uses the IP address specified in this field as static IP when DHCP option is not selected.

**Subnet Mask**
The gateway uses the subnet mask specified in this field as subnet mask when DHCP option is not selected.

**Default Gateway**
The gateway uses the default gateway specified in this field as default gateway when DHCP option is not selected.
DNS Server
The gateway uses the DNS server specified in this field as DNS server when DHCP option is not selected.

After changing any settings in the IP configuration must be clicked in order to apply the changes in Gateway. Following message will be displayed to confirm the change.

Click refresh to verify if the settings are changed successfully.

Restoring Factory Defaults
The factory settings can be restored by clicking . The factory defaults can also be restored by combination of hardware button presses as described in Buttons Actions section. Following are the factory defaults:

Default Gateway Configurations
1. Web Terminal : Enabled
2. Dialout : Disabled
3. Out 1 Address : 192.168.204.107
4. Out 1 Port : 4094
5. Out 1 Address : 192.168.204.107
6. Out 1 Port : 4095
7. Secure Connection : Disabled
8. Module 1 Enable : Enabled
9. Module 1 Port : 4096
10. Module 2 Enable : Enabled
11. Module 2 Port : 4097
12. Time Server : 0.uk.pool.ntp.org\0
13. Username : admin
14. Password : password

Default IP Configurations
1. DHCP Enable : Enabled
2. Static IP Address : 192.168.204.121
3. Subnet Mask : 255.255.255.0
4. Default Gateway : 192.168.204.10

The SSL is not implemented in current release.
Changing the Admin Password

User can change the Gateway's default password by clicking [Change Password] which will display following fields on the configurations page. Fill in all the fields and hit change to apply new password.

Once the password is changed successfully the following message will be displayed.

Password can also be reset to factory default by restoring factory default configurations mentioned in Buttons Actions.
ZigBee Interface Configurations

Figure 12: ZigBee Interface Configurations page

The Gateway comes with Telegesis ZigBee AT-commands\(^6\) Firmware programmed onto the assembled ETRX3 ZigBee module. This firmware communicates at baud rate settings of 19200-8N1. The ZigBee Interface Configurations page is useful to change\(^7\) the serial settings of the gateway serial ports connected to the ETRX3 ZigBee modules. This page also provides the options to reset the selected ETRX3 ZigBee module and to start the bootloader.

a. Select Module
   This field selects the ETRX3 ZigBee module to apply the settings to (there can be two module as per the model number of gateway).

b. Module Control
   - **Reset Module**
     Click **Reset Module** for gateway reset the selected ETRX3 module.

   **Start Bootloader**
   Click **Start Bootloader** to start the bootloader on selected ZigBee module. The standard AT-Command firmware has serial Bootloader which can be used to upgrade the ZigBee firmware in the selected module. Process of upgrading ETRX3 ZigBee firmware in standard Gateway is described in the Appendix A. The bootloader is initiated by holding down the PA5 pin of the EM35x and then issuing a hardware reset to the module

c. Serial Settings
   Select the serial settings for the selected module and click **Apply** to apply the settings

---

\(^6\) Please refer AT-commands documentation at Telegesis document centre

\(^7\) The Serial Port settings only apply to the Gateway. For correct operation, the Serial Port settings of the ETRX3 module must be changed to match the new Gateway setting before changing the Gateway parameters.
The Web Terminal is a simple web interface to communicate with the 1st ETRX3 ZigBee module on the Gateway. User can issue AT-Commands\(^8\) to the module in ZigBee input command box, click \(\text{Send}\) and monitor the response in the ZigBee output window.

The Terminal status shows the current status of the web terminal and the Gateway time is also displayed in the top right of the ZigBee output window.

**Terminal Disabled Status:**

<table>
<thead>
<tr>
<th>Terminal Disabled</th>
<th>Comms Failure</th>
<th>Time: 00:00:00</th>
</tr>
</thead>
</table>

If the Web Terminal option is disabled in the **Configurations page** Terminal status as shown above will be displayed. No commands can be issued to the ZigBee module via Web Terminal if this status is been displayed.

**Terminal Enabled Status:**

<table>
<thead>
<tr>
<th>Terminal Enabled</th>
<th>Comms Ok</th>
<th>Time: 21/01/2013 [01:15:07]</th>
</tr>
</thead>
</table>

When the Web Terminal connects successfully to the ZigBee module above status will be displayed. The Gateway time will also start updating once every second. Now, the user may enter an AT-Command in ZigBee input box and click \(\text{Send}\) issue the command\(^9\) to the ZigBee module and expect the response in approximately one sec.

---

\(^8\) Please refer AT-commands documentation at [Telegesis document centre](#).

\(^9\) Note: Pressing Enter Key on Keyboard will NOT send the command but will refresh the page.
**Firmware Upgrade**

The Gateway firmware can be updated over Ethernet. To perform Gateway firmware upgrade, navigate to “bootload.html” page which looks like below.

![Firmware Upgrade page](image)

**Figure 14: Firmware Upgrade page**

**Stored Image Info**

This section gives the information of the Gateway firmware image stored in the Gateway.

**Image Header**

Each image stored in the Gateway has an Image Header for identifying the type of image. This field displays the image header of selected Image type.

**Firmware Version**

This field displays the firmware version of image stored.

**Image Size**

This field displays the size of stored image in bytes.
Upload Images

Select Upload Image Type:
Select the type of image to be uploaded to the Gateway. Currently Gateway supports three types of images

a. Gateway Image
   This is the gateway upgrade image which will replace the current Gateway firmware when Update Gateway flag is enabled.

b. Bootloader Image
   This is the recovery bootloader\(^{10}\) upgrade image which will replace the current secondary bootloader when Update Bootloader flag is enabled.

c. Configuration Settings Image
   All the configurations settings mentioned in [Configurations page](#) can be updated by this image type.

Image Upload Process
Click [Choose File] which opens a dialogue box to navigate to the image, navigate to appropriate file and click open.

Now click [Upload New Image] a pop-up box will open to confirm correct file is uploaded. Click OK to proceed. Gateway activity LED will be blinking while the file is being transferred. If the image is uploaded and stored successfully in Gateway “**FW image sent successfully**” message is displayed in a new tab in the browser.

\(^{10}\) Recovery bootloader mechanism is not implemented in the initial release but will be implemented in subsequent release soon.
Update Flags and Reboot

Update Gateway
If this flag is enabled upon reboot the gateway will validate the Gateway Image stored by image upload process mentioned above and updates the gateway firmware if a valid image is present.

Update Bootloader
If this flag is enabled upon reboot the gateway will validate the Bootloader Image stored by the image upload process mentioned above and updates the recovery bootloader firmware if a valid image is present.

Wait for Serial Commands
The Gateway can accept some serial commands at start-up (available only on models with RS232-RS485 port present). If this flag is enabled the gateway will wait for 5 sec to accept any serial commands on the RS232 lines and then jump to the main gateway application.

Enable the appropriate flags and click [Update flags and Reboot] buttons to upgrade the gateway with stored image.
Upgrading may take few minutes, be patient and do not interrupt the upgrade process until power up sequence is indicated on the LED panel. The upgrade process will be indicated by blinking of gateway activity LED.
Support
Support link will redirect to Telegesis Support page on the internet http://www.telegesis.com/support/

Logout
Logout will end current session and “Logged out successfully” message will be displayed and the user will need to authenticate with username and password at the next login.

Figure 15: Logout page
Appendix A

Bootloading ETRX3 ZigBee module

The procedure to upgrade firmware on ETRX3 module over a TCP socket is as described below.

1. For this example assume the firmware of 1st ETRX3 ZigBee module is to be updated remotely over a TCP socket.
2. Make sure dialin socket is enabled for the 1st ETRX3 ZigBee module as shown below

3. Connect to the Gateway's dialin socket for the 1st ETRX3 ZigBee module using Telegesis terminal (Version 4 or higher) as shown below.

![Dialin TCP Sockets](image)

![Gateway's dialin socket connection](image)
4. The **LED sequence 4** should be indicated by LED panel.
5. Navigate to ZigBee Interface Configuration and Select Module 1 as shown below.

6. Click **Start Bootloader** to start the bootloader on selected ZigBee module.
7. Change the baudrate to 115200 and click **Apply**.
8. On Telegesis terminal hit Enter key to see following prompt

![Figure 17: ETRX3 Bootload prompt](image-url)
9. Press “1” to see character ‘C’ displayed periodically as shown which indicates the ZigBee module is ready to receive upgrade image file via XMODEM.

![Figure 18: Ready to receive upgrade image file via XMODEM](image)

10. Go to Tools->Transfer File (XMODEM) and send the appropriate upgrade image file.

11. Once successful change the baudrate of module according to upgraded firmware and the ZigBee module will communicate according to the new firmware. For Telegesis R3xx firmware the default baud rate is 19200-8N1.
Warranty

1. Telegesis warrants that at the date of delivery the Goods will conform in all material respects to any written specification published or provided by Telegesis and that for the periods set out below in respect of each product type the Goods will be free from defects in workmanship and materials under normal use and service. The Buyer must notify Telegesis of any defect in writing. Telegesis obligation under this warranty will not arise until the Buyer returns the defective Goods at its own expense and risk, to Telegesis. Telegesis sole obligation under this warranty shall be at its option to replace or repair without charge such defective Goods or component parts thereof. Any replacement of Goods or component parts under this warranty shall not extend the period of warranty beyond that of the goods or component parts so replaced.

2. All Hardware is supplied with one year return to base warranty unless indicated otherwise. All Software is supplied with a 90-day warranty period.

3. With respect to any computer software comprised in the Goods supplied by Telegesis any defects arising after expiry of the warranty period referred to above should be notified to Telegesis in writing. Telegesis may at its discretion endeavour to correct any such defects but Telegesis gives no warranty that any such defects can be corrected or that defects will be corrected within a particular time.

4. Telegesis shall not be liable hereunder:
   a) If the Goods alleged to be defective have been repaired or altered by any person other than Telegesis designated personnel or authorised representative or other person approved by Telegesis in writing; or
   b) Where testing or examination by Telegesis reveals any alleged defect in the goods to have been caused by the buyers misuse, neglect, improper installation, failure to follow instructions (whether oral or in writing), or the supply by the Buyer of incorrect or inadequate instructions or information with the regards to the design of any Goods or to have been caused by any similar equipment to which the Goods are attached or in which the Goods are incorporated or any cause beyond the range of intended use of the Goods or by accident, fire or other hazard; or
   c) Where component parts alleged to be defective were not manufactured by Telegesis but were included in the Goods at the request of the Buyer, in which case the Buyer shall only be entitled to the benefit of any such warranty or guarantee as is given by the manufacturer or supplier of such parts to Telegesis.
5. If the goods are to be manufactured or any process is to be applied to them by Telegesis in accordance with a specification submitted by the Buyer, the Buyer shall indemnify Telegesis against all loss, damages, costs and expenses awarded against or incurred by Telegesis in connection with or paid or agreed to be paid by Telegesis in settlement of any claim which results from Telegesis use of the Buyers specification, including but not limited to any claim for infringement of any patent, copyright, design, trade mark or other intellectual property rights of any other person.

6. Telegesis liability hereunder shall be in lieu of any other representation (unless fraudulent), warranty or condition, expressed or implied by law or otherwise with respect to the goods or any liability imposed by common law, statute or otherwise and Telegesis hereby excludes all such representations (unless fraudulent), warranties and conditions and shall not be liable to the Buyer for any loss or damage whatsoever (including without prejudice to generality of the foregoing any liability in contract, negligence, or any other tort for indirect consequential or economic loss or for loss of profit or opportunity of any kind) arising directly or indirectly in connection with the contract, the Goods or otherwise except insofar as any exclusion or limitations of Telegesis liability hereunder is prohibited, void or enforceable by law.

7. Telegesis shall not be responsible in any manner whatsoever for any software, information or memory data stored on or integrated with any of the Goods returned to Telegesis for repair or replacement under this warranty.

8. Without prejudice to any other provision in these Terms, in any event Telegesis total liability for any one claim or for the total of all claims arising from one act of default on Telegesis part (whether arising from Telegesis negligence or otherwise) shall not exceed the purchase price of the Goods the subject matter of any claim but nothing herein shall limit or exclude Telegesis liability for death or personal injury caused by Telegesis negligence or Telegesis liability for fraudulent representation.

9. Where the buyer deals as a consumer within the meaning of the unfair contract Terms Act 1977 nothing in these terms shall restrict or exclude any liability of Telegesis for breach of its implied undertakings as to conformity of the goods with description or sample or as to their quality or fitness for the purpose.

10. In the case of a consumer transaction nothing in these terms shall affect the statutory rights of the Buyer as defined in the Consumer Transaction (Restrictions on Statements) Order 1976 (as mentioned).

11. The period or terms of the warranty contained in this clause shall only be varied or extended where Telegesis has granted the Buyer an Extended Warranty.

Caution
The user must read through the user manual and learn to use the equipment appropriately. Telegesis (UK) Ltd will not accept any liability arising from using the equipment in the manner not specified by the documentation accompanied by the equipment.

Cleaning
Dust or wipe only with damp cloth; do not allow moisture to penetrate the enclosure. Do not use aggressive cleaning agents.
Compliance with Laws and Regulations

Any Buyer of Telegesis products (Goods) will not knowingly sell the Goods to any person where such sale may be or may result in a sale to an end user that may put Telegesis in breach of any laws, embargoes or regulations from time to time or any relevant jurisdiction. The Buyer hereby certifies that no Goods will be exported directly or indirectly outside the United Kingdom unless the appropriate prior authorisation to such export has been obtained from the Department of Trade and Industry, London, and/or (where applicable) the Office of Export Administration of the US Department of Commerce.

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This device should not be used without proper consideration and design of associated system architecture and redundant safety features in applications where failure may result in death or injury. The manufacturer accepts no responsibility for injury, death or loss human or material caused by the use or misuse of this device

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