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IRXP User Manual
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www.cpatflex.com

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1. General Information

1.1 About this Manual
This manual describes the components, installation and operation of the CPAT FLEX IRXP unit.
You will find important safety information in this manual. We strongly recommend that all users read this manual. Use of this product other than for its intended application may compromise the unit’s safety features.

1.2 Certifications
This section describes the certifications the IRXP complies with.

1.2.1 EMC Compliance
FCC part 15 subpart B (2019)
ICES-001 - Issue 5(2020)
EN61326-1(2013)

1.2.2 Safety Compliance
5,2 Classification of Electrical Energy Sources
UL/CSA/IEC 62368-1 EN 62368-1

1.2.3 Note
This device may not cause harmful interference.
This device must accept any interference received, including interference that may cause undesired operation.

NOTE
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.
**Modifications:** Any modifications made to this device that are not approved by Effigis Geo-Solutions Inc., may void the authority granted to the user by the FCC to operate this equipment.

1.3 Technical Support

Effigis Technical Support Service is available from Monday through Friday from 9:00 AM to 5:00 PM Eastern Time.

Toll free from U.S. and Canada: +1 888 495-6577

International: +1 514 495-6500

Fax questions anytime to: +1 514 495-4191
cpat@effigis.com

1.4 Calibration

Your IRXP unit has been calibrated and tested in the factory, and does not need further calibration before use.

However, if the unit suffers damage and needs repair, it is recommended that the unit be return to an authorized Effigis service center there it will be properly re-calibrated.

As well, if your company requires regular calibration of all equipment, or requires a calibration certificate for the IRXP, a calibration service is available through Effigis.

For more information on calibration services, please contact your Effigis representative.

1.5 Explanation of Symbols Used

The following symbols are used in this Manual:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>Direct current. (DC)</td>
</tr>
<tr>
<td>!</td>
<td>Caution. Indicates that operations or procedures, if carried out without caution, may cause personal injury or damage to the unit.</td>
</tr>
<tr>
<td>!</td>
<td>Note. Indicates additional information about the product.</td>
</tr>
</tbody>
</table>

1.6 Effigis Website

Effigis’ website contains product specifications, information, press releases, brochure download and Frequently Asked Questions (FAQs). Please visit our website at:

www.cpatflex.com

2. Ingress detection in the field

The strand-mounted Portable Ingress Receiver IRXP detects, measures and localizes ingress event data on a continuous basis from ITX2 field devices. The IRXP transmits the identified capture points to the CPAT WEB cloud application via an integrated cellular data connection. Readings are also available remotely in real time through the RIM service (see section 8-RIM). The IRXP enables the cable operator to reduce deployment time and focus on the find-and-fix equation immediately, diminishing subscriber downtime and hardening the HFC Outside Plant.

Once identified, the signal is decoded and measured by the IRXP, and the information is forwarded to the CPAT WEB Cloud application, which in turn will precisely logs the geographical location of capture points in post processing. Readings are also available remotely in real time through the RIM service (see section 8-RIM).

3. System Components

The IRXP is the receiver part of a find-and-fix ingress and monitoring solution for broadband operators. It detects signal transmitted over the air via the ITX2 that enters the cable network. The IRXP RF entry is fed via a test point in the field. The main operating status is displayed on the Button-LED on the front panel. Once installed, it requires no further intervention to monitor and transmit results via the CPAT WEB Cloud application.
This section describes the IRXP unit in details including its accessories, and helps you get started by explaining the features, the powering and data interface of the unit.

### 3.1 Initial Verification

Your IRXP unit is validated, and ready to use right out of the box. Upon reception, visually inspect each item for any damage that may have occurred during shipping. If you see any signs of physical damage, please contact Effigis:

- Callers from the U.S. and Canada can dial +1 888 495-6577 (toll-free number).
- International callers can dial +1 514 495-0018.

Make sure no items are missing. Your package should contain all the standard items as well as any accessories you may have ordered. The IRXP - Ingress receiver digital, the following items are included:

- IRXP.
- AC Adapter.
- Cellular Antenna.
- User manual—downloadable via our CPAT WEB application resource centre.

If any of the standard accessories are lost or damaged, you can order a replacement for the IRXP. Please quote the following part numbers when placing an order:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Accessory Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) 110-00005-001</td>
<td>12V AC Adapter</td>
</tr>
<tr>
<td>(2) 111-00017-001</td>
<td>Cellular Antenna</td>
</tr>
<tr>
<td>(3) 008-00010-001</td>
<td>Battery pack</td>
</tr>
<tr>
<td>(4) 100-00012-001</td>
<td>IRXP Operation Manual (This guide)</td>
</tr>
</tbody>
</table>

To place an order, please call Effigis at +1 888 495-6577 or +1 514 495-6500 or via email cpat@effigis.com

### 4. Physical Overview

- **USB** Host USB port (Type A)
- **ETHERNET** RJ45 connector
- **12 VDC** Power barrel connector jack 0.7x2.35mm (28x93 mils)
- **POWER** Button with LED
- **ANTENNA** Cellular antenna connector
- **INPUT** Coaxial RF Input
5. Setup

5.1 Installation

Being light-weight, the IRXP can be installed almost anywhere along the outside plant. It is strand-mountable, and can safely be left without surveillance. the IRXP is non service affecting when connected to a test point: on an optical node, an amplifier test point or a tap entry port.

The IRXP can be used in multiple scenarios: along the outside plant, within a Multi-Dwelling unit (MDU) or as a home wiring certification tool.

Here is an example of IRXP connected in the node test point

Potential IRXP connections
1. Node test point
2. Tap on outside plant
3. Before the drop
4. Customer Premise entrance

IRXP applications and connection points on the outside plant and in-home certification
1. Node test point (if any available)
2. Within the basement wiring closet/tap
3. Along the vertical (riser)
4. Along the horizontal (floor)
In some portions of the network, the coaxial cable is electrified and powers the active devices located on that segment. In order to avoid electrical signal reflections, it is strongly recommended to isolate the IRXP from the network using a test probe. The model illustrated below operates in the 5 MHz to 1 GHz range, and introduces a -20 dB attenuation.

The maximum RF level entry is 35dBmV in the RF input. This is however the total RF level between 5~45 MHz.

If you want to combine nodes on the same RF entry, be aware that the IRXP sensitivity performance might be affected: since the IRXP tries to detect ingress, the incoming digital ingress signal is not always at the same level

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5.2 Ingress frequency
IRXP supports three ingress frequencies: 6.78MHz, 27.12MHz and 40.68MHz. The frequency is selected through the CPAT Web interface. IRXP checks for a new configuration only once after booting.

5.3 Electrical
The AC/DC adapter is supplied with the equipment. It is compatible 110V/220V voltages and 50/60Hz.

6. System Operation

6.1 Power On
To power on the unit, press the ON/OFF button on the front panel. You should see the button LED on the front panel turns yellow solid.

6.2 LED Information
The button LED indicates the status of the unit.

**Power ON:**
- When YELLOW solid, the system is booting (takes about 15 seconds to boot).
- When GREEN LED flashes three times per second, the FPGA is programming.
- When GREEN LED flashes twice per second, the cellular modem attempts to connect to network.
- When GREEN LED flashes once per second, the system is ready to detect ingress.

**Warning:**
- When YELLOW LED flashed once per second, temperature is too cold (<-10°C) or too hot (>55°C).
- When YELLOW LED flashed twice per second, battery is too low (<15% of charge).
- When YELLOW LED flashed three times per second, there are problems with files transfer (SFTP).

**Error:**
- When RED LED flashes once per second, SIM card is missing.
- When RED LED flashes twice per second, battery voltage is lower than 6.95V and IRXP is in shutdown process.
- When RED LED flashes three times per second, FPGA is not responding.

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7. System Maintenance

7.1 Cleaning of the Equipment

Your IRXP unit can be wiped clean with a damp cloth. Do not immerse the unit in water. Avoid solvents and commercial cleaners.

8. Real-time Ingress Monitor (RIM)

The RIM service is available through our CPAT Mobile Application and our RIM web site. It gives remote access, in real-time, to the ingress measurement captured by IRXP. It provides field technicians visual readings to locate with precision the source of Ingress entering the cable network. Furthermore, the RIM web site gives the IRXP status.

8.1 Login the RIM

To consult data on the RIM the user must have a smart phone or a laptop with at least an access to the internet. The user must have a CPAT profile, which consist of a username and a password to login on the application or website www.cpat-solution.com/RIM.
NOTE

The RIM is also available as a mobile application for iOS and Android. To download it, connect to the Apple App store (iTunes) or the Android App store (Google Play), and download the “CPAT” app. The first module within this app is an enhanced version of the RIM software on the web.

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1 Chrome Browser was used as an example for the RIM website.

8.2 Choose the Proper ITX and IRX

Once the user is logged in the application or web site he must choose his ITX from the list and then he will be able to view all the data available from his ITX. Remember that the higher the value, the closer the ingress data point.

Figure 2: Chose an ITX from the list

Then, it is possible to view the IRXP status: mobile signal strength, battery level and minutes while last IRXP status update. Furthermore, IRXP logs are available at the bottom. IRXP information is updated every 5 minutes.

Figure 3: Ingress level displayed from the web site

Figure 4: Ingress level displayed and IRXP status from the application
9. Updates and Recovery

The IRXP device can be updated automatically. Usually the system will update its firmware when needed via provided updates from our FTP website.

9.1 Automatic Update

The IRXP device is usually automatically updated when needed. The updates are distributed from our FTP server to the device. All firmware updates are tested to ensure high quality and efficiency with our product. There is no need for external intervention with automatic updates.

Appendix A – Specifications

A.1 System

<table>
<thead>
<tr>
<th>Module type</th>
<th>Client determined frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Input type</td>
<td>Single “F” 75 ohm female connector</td>
</tr>
<tr>
<td>Operating frequency selection</td>
<td>6.78MHz, 27.12MHz, 40.68MHz or customizable band</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>30kHz</td>
</tr>
<tr>
<td>Measurement range</td>
<td>-50 to 30 dBmV</td>
</tr>
<tr>
<td>Level accuracy</td>
<td>±2 dB on signal pulses</td>
</tr>
<tr>
<td>Maximum input level</td>
<td>35 dBmV per RF input (integration in the 5 to 45 MHz band)</td>
</tr>
<tr>
<td>Recommended input level</td>
<td></td>
</tr>
<tr>
<td>Continuous ingress detection capability</td>
<td>30 events/sec</td>
</tr>
<tr>
<td>Mobile communication</td>
<td>LTE User Equipment (UE) Category M1/NB1 Require Internet of Things (IoT) data plan</td>
</tr>
<tr>
<td>Mobile data usage</td>
<td>Minimum: 375kB/hrs and Maximum 850kB/hrs Ingress 20% of time: 565kB/hrs Usage 10hrs/day, 5days/week: 110MB/month</td>
</tr>
</tbody>
</table>

A.2 Electrical Specifications

<table>
<thead>
<tr>
<th>Power</th>
<th>12VDC, 1A max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time (at 25°C/77°F)</td>
<td>10 hrs</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20°C to 45°C (-4°F – 113°F)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-20°C to 40°C (-4°F – 104°F)</td>
</tr>
<tr>
<td>Charging temperature</td>
<td>0°C to 45°C ( 32°C – 113°F)</td>
</tr>
<tr>
<td>Battery charging time (0% to 100% charge)</td>
<td>7 hrs</td>
</tr>
</tbody>
</table>

A.3 Physical

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>1.3” x 4.4” x 8.8” [H x W x D] / 3.3 cm x 11.2 cm x 22.3 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>925g / 33 oz</td>
</tr>
<tr>
<td>Maximum relative humidity</td>
<td>80% for temperatures up to 31°C (88°F) decreasing linearly to 50% relative humidity at 40°C (104°F)</td>
</tr>
</tbody>
</table>
Appendix B – Our Services

Effigis offers a portfolio of services to deploy and support purchased equipment through its Customer Support organization. Customer Support is standard with every product sale and consists of a phone technical support during business hours, repair and calibration center.

B.1 Customer Support

Customer Support is available with the sale of every Effigis product. Customer Support services includes:

- Product and Service Literature
- Technical Assistance (business hours)
- Equipment Repair (under Warranty Repair and Calibration Services)
- Equipment Return Authorizations

Contact a Customer Support representative through your local distributor or by accessing the http://effigis.com/cpat-flex-support/ for information on calibration and warranty policies.

B.1.1 Equipment Return Instructions

Please contact your local Customer Support location via telephone for Return Authorization to accompany your equipment. For each piece of equipment returned for repair, attach a tag that includes the following information:

- Owner’s name, address and telephone number
- Serial number, product type and model
- Warranty status (if you are unsure of the warranty status of your instrument, contact Effigis’s Customer Support)
- A detailed description of the problem or service requested
- The name and telephone number of the person to contact regarding questions about the repair
- The return authorization (RA) number

If possible, return the equipment using the original shipping container and materials. If the original container is not available, the unit should be carefully packed so that it will not be damaged in transit; when needed, appropriate packing materials can be obtained by contacting Effigis’s Customer Support. Effigis is not liable for any damage that may occur during shipping. The customer should clearly mark the Effigis’s issued RA or reference number on the outside of the package and ship it prepaid and insured to Effigis.

Equipment repaired or replaced under warranty will be returned at Effigis’s expense to Customer (Canada/USA) or Effigis’s representative (all other countries).

All other non-warranty repairs will be returned at Customer’s expense to Customer (Canada/USA) or Effigis’s representative (all other countries).

B.2 Limited Product Warranty

B.2.1 Hardware

Effigis warrants to the original end user (Customer) that the new Effigis branded products will be free from defects in workmanship and materials, under normal use, for one (1) year from the date of original shipment.

Effigis warrants repaired products for ninety (90) days from the date of shipment. Any Product repaired or replaced under warranty is only warranted for the period of time remaining in the original warranty for the Product.

Any third party products, including software, included with Effigis products are not covered by this Effigis warranty, and Effigis makes no representations or warranties on behalf of such third parties. Any warranty on such products is from the supplier or licensor of the Product.

B.2.2 Software

Effigis warrants to the Customer that new Effigis branded software and firmware will perform in substantial conformance to program specifications for a period of ninety (90) days from the date of original shipment. Effigis warrants the media containing software against failure during the warranty period.

Effigis makes no warranty or representation that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected.

B.2.3 Exclusions

This warranty excludes:

- Damage to the physical surface of the Product, including cracks or scratches to any part.
- Damage caused by misuse, neglect, improper installation or testing, unauthorized attempts to open, repair, or modify the Product, or any other cause beyond the range of the intended use.
• Use of the Product with any non-recommended device or service if such device or service causes the problem.
• Installation or maintenance of Product by someone other than Effigis or persons certified by Effigis.
• Changes to the Customer environment in which Product was installed.
• Damage caused by accident, fire, power changes, other hazards, or acts of nature.
• Consumable Product or parts thereof (e.g., parts with an expected useful life of less than ninety (90) days, such as certain batteries).
• Product not returned in accordance with Effigis’ RA procedure.

B.2.4 Refurbished Parts and Prior Testing

The Product may incorporate reconditioned or refurbished parts or subassemblies and may have been used in testing prior to sale.

B.2.5 Exclusive Remedies

If any Product materially fails to conform to the limited warranty set forth in this Section (Limited Warranty), and actually fails during the applicable warranty period and under normal use, Effigis shall, at its sole discretion, (i) repair or replace the non-conforming Product to remedy the nonconformity identified by the Customer in accordance with this Section (Limited Product Warranty); or (ii) issue a credit to the Customer for the amounts paid for the Product in exchange for return of the non-conforming Product, in which case Customer’s licences to any firmware shall be automatically revoked. The Customer hereby transfers to Effigis title and ownership of any parts that Effigis replaces.

B.2.6 Disclaimer

THE REMEDIES EXPRESSLY PROVIDED IN THIS SECTION WILL BE THE CUSTOMER’S SOLE AND EXCLUSIVE REMEDIES AND SHALL BE IN LIEU OF ANY OTHER RIGHTS OR REMEDIES THE CUSTOMER MAY HAVE AGAINST EFFIGIS WITH RESPECT TO ANY NON-COMFORMANCE OF PRODUCTS. EXCEPT AS SPECIFIED IN THIS LIMITED PRODUCT WARRANTY, EFFIGIS MAKES NO EXPRESS REPRESENTATIONS OR WARRANTIES WITH REGARD TO ANY PRODUCT.

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