mCerberus™ User Guide
MCB-100 Series

CONTACT INFORMATION

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TABLE OF CONTENTS

I. Introduction

Welcome to the mCerberus™ User Guide.

This guide will provide you basic instructions on how to implement and use the mCerberus™ system (hereafter referred to as the SYSTEM). The SYSTEM may be utilized by the User to monitor equipment and other processes. The following schematic illustrates the overall function of the mCerberus™ product. The following are the major process steps of the SYSTEM:

- A current probe is utilized to monitor a piece of equipment
- When the measured current exceeds or drops below a programmed trigger level for a period of thirty (30) seconds, a text message is generated.
- The text message (via email) is transmitted via the local WiFi network via Port 2525 to our SMTP relay server.
- The relay server transmits the text message to the appropriate phone company SMS server.
- The phone company SMS server transmits the text message to your phone.
- Your cell phone typically will receive the text message within one minute after it is sent.
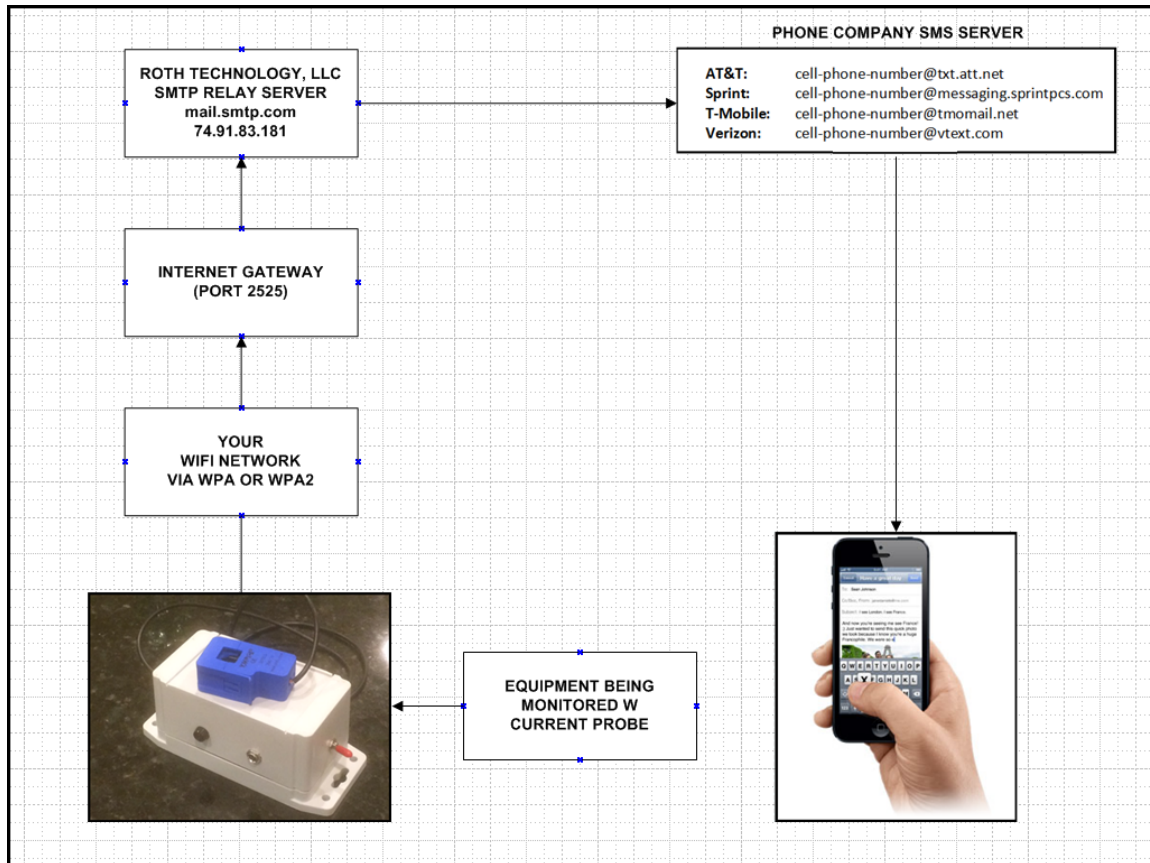
II. Safety Summary

The following safety precautions apply to both operating and maintenance personnel and must be observed during all phases of operation, service, and installation of the SYSTEM. Before applying power, follow the installation instructions and become familiar with the operating instructions for this instrument. If this device is damaged or something is missing, contact US immediately. This manual contains information and warnings that must be followed to ensure safe operation as well as maintain the SYSTEM in a safe condition.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the SYSTEM in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a safety hazard.

KEEP AWAY FROM LIVE CIRCUITS

Monitored equipment covers must not be removed by operating personnel. Installation of the mCerberus™ unit must be made by qualified maintenance/electrical personnel. Disconnect the power cord before removing the monitored equipment covers and installing the mCerberus™ current probe. Under certain conditions, even with the power cable removed, dangerous voltages may exist. To avoid injuries, always disconnect power, and then discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt any internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY THE INSTRUMENT

Do not install substitute parts or perform any unauthorized modifications to the mCerberus™ product. Return the instrument to Roth Technologies, LLC for service and repair to ensure that safety features are maintained.

WARNINGS AND CAUTIONS

WARNING and CAUTION statements, such as the following examples, denote a hazard and appear throughout this manual. Follow all instructions contained in these statements.

A WARNING statement calls attention to an operating procedure, practice, or condition, which, if not followed correctly, could result in injury or death to personnel.

A CAUTION statement calls attention to an operating procedure, practice, or condition, which, if not followed correctly, could result in damage to or destruction of part or all of the product.

WARNING: Do not alter the ground connection. Without the protective ground connection, all accessible conductive parts (including control knobs) can render an electric shock.

WARNING: To avoid electrical shock hazard, disconnect power cord before removing covers. Refer servicing to qualified personnel.

CAUTION: Before connecting the line cord to the AC mains, check the rear panel AC line voltage indicator. Applying a line voltage other than the indicated voltage can destroy the AC line fuses. For continued fire protection, replace fuses only with those of the specified voltage and current ratings.

III. Key Features of the mCerberus™ Product

The following figure provides information with regards to key features of the mCerberus™ supplied hardware.
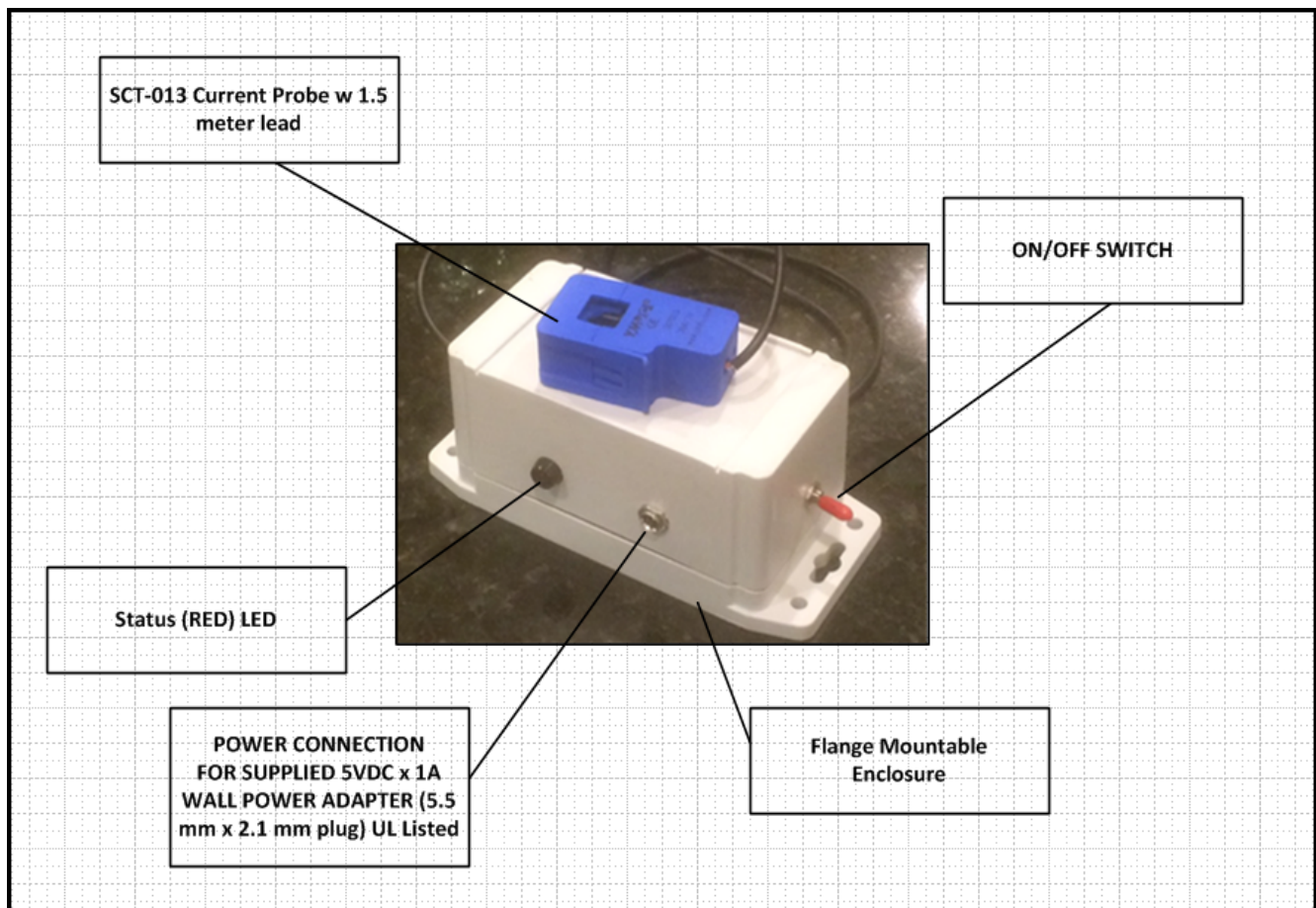
IV.   Necessary Components

The following components are necessary in order to run the SYSTEM:

1. The mCerberus™ hardware unit which includes a current probe

2. Power Supply: We provide a 5VDC 1 Amp UL Listed wall power supply with the SYSTEM. We recommend a 5VDC power input but the SYSTEM will run on 3.3 - 6VDC 0.5 Amp input.

3. The SYSTEM requires access to your WiFi. If you do not have access to WiFi coverage where the SYSTEM is to be placed -- the SYSTEM will not operate.

4. Equipment or process: You must have (electrical) access to the piece of equipment or process that you wish to monitor. In order to monitor the process, you must be able to place (or clamp) the current probe around one (1) of the Equipment's power lines.

- Note: Working with high voltage electrical service is potential hazardous. The installation of the current probe must be completed by qualified personal (see Section II Safety Summary).
- The current probe (that we provide) must be sized properly to the equipment being monitored. Standard sizes provided at the time this document was written are 20A, 30A, and 50A. Using too small or large of a current probe can lead to the SYSTEM not operating correctly and/or the SYSTEM being permanently damaged.
- The SYSTEM only works with detecting Alternating Current levels (AC) -- not DC.

V.   Networking Requirements

1. The SYSTEM requires access to your WiFi.

- If you do not have access to WiFi coverage where the SYSTEM is to be placed -- the SYSTEM will not operate.
- If there is no WiFi coverage where the SYSTEM is to be placed -- the SYSTEM will not operate.
- If the WiFi signal strength is less than -75 dB, then the SYSTEM reliability and performance in sending text messages may be derated significantly.
- SYSTEM supports 802.11 b/g/n, 2.4GHz, supports WPA and WPA2 encryption

2. Ports 80 and 2525 on your WIFI gateway must be open. These Ports are utilized by the SYSTEM in order to transmit emails and/or text messages.

3. If you do NOT program the SYSTEM -- the system will not operate.

4. We have contracted with SMTP.COM to provide our SMTP relay service. The SMTP server is located at mail.smtp.com (74.91.83.181). This IP address must NOT be blocked by your gateway.

VI.   Programming/Configuring

The mCerberus™ product allows for "in the field" configuration which requires following a very specific "power-on" sequence of steps. This section provides this information so you can setup your mCerberus™ for use in your facility. After configuration -- we advise VERIFYING proper operation of the unit in terms of recognizing equipment state changes and send/receipt of text messages.

1. **Make sure that the device is OFF** (i.e. power to the unit must be completely removed). The AC current probe does NOT have to be connected to the monitored equipment.

2. **Place the ON/OFF switch to the OFF state** (power to the unit is still disconnected at this point)

3. **Connect 5VDC power to the unit.** The LED will blink ON (this is very quick!) and then turn OFF. You now have five (5) seconds to complete Step 4 or the system will boot up to RUN mode.

4. **Switch the ON/OFF switch to the ON state.**

5. Wait. After five (5) seconds after Step 3 -- the LED will now turn ON (solid/non-blinking). You now have five (5) seconds to complete Step 6 or the system will boot up to RUN mode.

6. **Switch the ON/OFF switch from the ON state to the OFF state**

7. Wait. After five (5) seconds after step 5 -- the LED will flash rapidly (ON/OFF/ON) for two seconds and then remain ON. This LED flashing is the SYSTEM acknowledgement that you wish to enter program mode.

8. User: Log into the SYSTEM using your Smart Phone. The Network name of the SYSTEM is called **mCerberus** (as illustrated).

- If you are using an iPhone -- simply click on this Network name to gain access to the unit. After you click on this Network name -- your web browser will automatically open up to the Access Point menu

- If you are using something other than an iPhone (like a laptop with WiFi capability) -- configure your laptop to gain access to the mCerberus WiFi Network. Then open a web browser on your laptop and type in "194.168.1.1" into the web browser address bar and press ENTER.

9. User: The following screen should appear on your browser screen. Select the **mCerberus™ Configurator** link to enter the SYSTEM configuration screen.
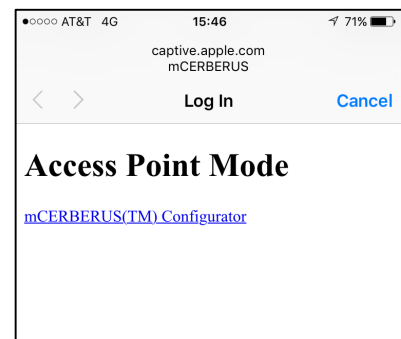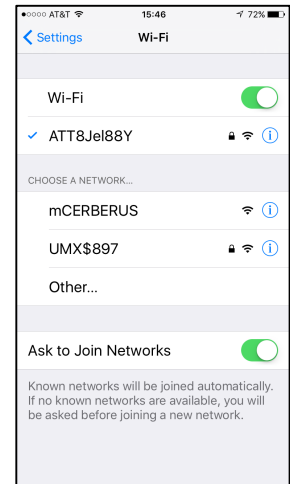
10. User: The **mCerberus™ Config** screen will appear.

SSID: Select the SSID from the drop down dialog box. The SYSTEM polls and records all current available WiFi Networks in the vicinity. The SYSTEM must be in the area where your designated WiFi Network is operating AND the WiFi Network must be actively broadcasting its name.

Password: Enter the WiFi Network Password. Note: If you enter the WiFi password into the system wrong -- the SYSTEM will NOT function correctly.

Email: This is the equivalent phone number email address that the text message is sent. The following are the following Short Message System (SMS) phone number to EMAIL equivalents for the Major USA carriers:

AT&T:	cell-phone-number@txt.att.net
Sprint:	cell-phone-number@messaging.sprintpcs.com
T-Mobile:	cell-phone-number@tmomail.net
Verizon:	cell-phone-number@vtext.com

Machine Name: Enter the (unique) name of your piece of equipment in this dialog box.

Notification: Sets the notification method. OFF = Unit will send a text message when the unit turns OFF, ON = Unit will send a text message when the unit turns ON, OFF AND ON = Unit will send a text message when the unit turns OFF and when it turns ON

Trigger Level (percent): This the trigger level percentage of the current probe supplied with your unit. The max current draw of the monitored equipment should not exceed the current rating of the SCT-013 current probe. The trigger level should be approximately (25 - 50%) * (nominal current draw / SCT current probe rating). Contact us at sales@mcerberus.com if you want help in setting this item.

When you have configured the system -- select the **SUBMIT** button. Wait approximately ten (10) seconds for the information to be written to EEPROM.

11. User: **Cycle Power to the SYSTEM by unplugging the 5VDC power to the unit**. Wait a minimum of five (5) seconds and then reconnect the 5VDC power to the unit. You are done!

NOTE: **This step is VERY important if you happened or plan to have multiple mCerberus™ units in your manufacturing plant.** If you do not complete this step, the SYSTEM will/may continue to broadcast the mCerberus™ as an available Network Access Point when in fact it is NOT available. The only way to remove this AP Name Broadcast is by completely removing power to the Unit after configuring it.

VII.   Unit Installation

This section provides necessary instructions for proper installation of your mCerberus™ unit. This installation should be completed AFTER you have configured the unit.

WARNING: The following steps should be completed by someone experienced with electrical systems. If these steps are not followed -- the installation may not be successfully, the installer may be electrically shocked/harmed/killed, and the mCerberus™ unit may be damaged.

WARNING: Do NOT clamp the SCT013 current probe onto circuits where voltages exceed 480 VAC. Personal injury or damage to the mCerberus™ unit may result.

1. Mount the Main Unit. The flange mountable case allows for installation of the SYSTEM to the floor and/or wall.

> NOTE: The SYSTEM is a sensitive piece of electrical equipment. Do not drop, shake, rattle, or roll. Do NOT mount the SYSTEM directly to vibrating piece of equipment (like a Braider). Failure of the SYSTEM due to induced vibration(s) is not covered by our warranty.

2. Turn OFF the power to the piece of equipment that is to be monitored by the mCerberus™ system.

NOTE: The mCerberus™ system utilizes a SCT013 current probe to determine the machine state. A current clamp or current probe is an electrical device having two jaws which open to allow clamping around an electrical conductor. This allows properties of the electric current in the conductor to be measured, without having to make physical contact with it, or to disconnect it for insertion through the probe. The SYSTEM only works with detecting alternating currents (not DC).

3. Place the SCT013 current probe around only one conductor of the monitored equipment's electrical power supply wiring as shown. Ensure that the SCT013 jaws are completely CLOSED.
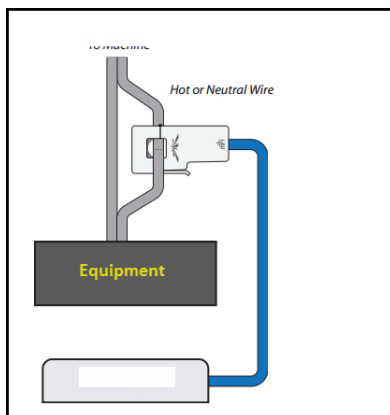
WARNING: If the SCT013 current probe jaws are not completely closed -- then the current measurement by the SYSTEM will be adversely affected. The SYSTEM will not operate and/or will operate inconsistently.

NOTE: Clamping the SCT013 current probe around both wires may give you a zero reading and the mCerberus™ unit will not operate correctly.

4. Restore power to the piece of equipment to be monitored

5. Plug in the 5VDC Wall Power Supply to a 120VAC 60 Hz power outlet

6. Connect the 5VDC power supply plug to your mCerberus™ unit

7. If you wish to ENGAGE the mCerberus™ (i.e. turn on equipment monitoring) -- flip the ON/OFF switch on the SYSTEM to ON/ENGAGE. At this point, the mCerberus™ system is active.

8. You should verify proper operation (Installation Qualification/Operational Qualification) of the mCerberus™ unit when first installing it on your monitored equipment including the proper sending and receiving of the required text message.

VIII.   Run Mode

When the SYSTEM is first powered up (and assuming the User is not attempting to program or configure it via Section VI), the first operational step that the SYSTEM takes is to login to your WiFi system. The SYSTEM will indicate to the User that it is trying to log into the WiFi system by flashing the LED for a few seconds (typically 2 to 6 seconds) during the login process.

- If the LED flashes quickly for more than 15 seconds continuously, that is an indication that the SYSTEM was UNABLE to login to your WiFi system. Failure modes are the following:
    - Incorrect WiFi information entered (typically the password)
    - Your WiFi system does not support WPA or WPA2
    - The WiFi signal strength is too low

After completing the WiFi login process was successful the ON/OFF switch determines the current mode of the SYSTEM.

- When the ON/OFF switch on the (powered) mCerberus™ unit is set to OFF mode, the mCerberus™ is placed in "stand-by" mode. The RED LED light will be ON for one second and OFF for one second (and then repeats indefinitely)

When the ON/OFF switch is set to ON, the SYSTEM will enter one of three modes (depending on the Notification process that was specified)

- If the SYSTEM was programmed to send a text when the machine turns OFF, the SYSTEM will initialize **assuming that the equipment is ON**. The Red LED light will be ON for 1.9 seconds and OFF for 0.1 seconds (i.e. mostly ON).

    NOTE: When the Red LED light is "mostly" ON indicates that the mCerberus™ believes that the piece of equipment is ON

- If the SYSTEM was programmed to send a text message when the machine turns ON, the SYSTEM will initialize **assuming that the equipment is OFF**. The Red LED light will be ON for 0.1 seconds and OFF for 1.9 seconds and then repeat itself (i.e. mostly OFF). NOTE: When the Red LED light is "mostly" OFF indicates that the mCerberus™ believes that the piece of equipment is OFF

- If the SYSTEM was programmed to send a text message when the machine turns OFF or ON, the SYSTEM will **initialize in a neutral state, that is, the SYSTEM does not assume that the equipment is OFF or ON.** The Red LED light will be ON for 1.0 seconds and OFF for 0.1 seconds and then repeat itself.

Typically the SYSTEM will take thirty (30) seconds to recognize that the monitored equipment has changed states.

IX.   Troubleshooting

FAULT CONDITION	CORRECTIVE ACTION
The LED light never comes on	Ensure that the 5V Power Adapter is plugged into power (120VAC 60 Hz outlet. Ensure that the 5V Power Adapter plug is plugged into the hardware box
The LED light just flashes somewhat rapidly	System was unable to login to your WiFI network. Ensure the WiFI Network is ON. Ensure the WiFI Signal Strength is at least -70 dBm. If these are good -- then you need to make sure that the system is configured properly to access your WiFi Network (see Section VI of the User's Guide)
The LED light flashes somewhat slowly	The ON/OFF system is set to OFF. System is in standby mode. Set the switch to ON to ENGAGE the System
The SYSTEM never detects a machine change (ON or OFF)	Make sure the current clamp is properly installed. Adjust the trigger level in the System Configuration Make sure the SYSTEM is ON (engaged mode) SYSTEM only detects (triggers) on AC Current (not DC)
I am unable to configure the unit	See Section VI of the User's Guide
A TEXT message was never received by the intended designee	Ensure that the SYSTEM was properly setup with the proper phone number (See Section VI) Ensure that the SYSTEM is connected to the WiFi Network. Ensure that Port 2525 is open on your Network. Ensure that the SMTP relay server at 74.91.83.181 is not blocked by your network. Contact us if your text messages are not being received. We have auditing capabilities as our SMTP relay server records all data with respect to email and text messages sent

X.   Product Summary

Main Unit Size:	151 mm L x 66 mm W x 62 mm H (flange mountable)
Weight:	approximately 0.4 lbs
Electrical Requirements:	5VDC 1 Amp wall power adapter is provided (5.5mm x 2.1 mm plug) UL Listed
WiFi	802.11 b/g/n, 2.4GHz, supports WPA and WPA2.
WiFi Network Signal Strength:	-80 dBm minimum
Network Requirements:	Ports 80 and 2525 must be open on your network. The SMTP relay server located at mail.smtp.com (74.91.83.181) must not be blocked.
Current Detection	SYSTEM only works with detecting alternating current levels (not DC or direct current)
Temperature:	0 - 40 degrees C
Humidity:	5 - 95% RH (non-condensing)
Vibration:	Not rated. Item is a sensitive piece of electrical equipment. Do not drop, shake, rattle, or roll. Do NOT mount the SYSTEM directly to vibrating piece of equipment (like a Braider)
State Change Time:	The mCerberus™ product takes approximately thirty (30) seconds to recognize a machine state change (i.e. from OFF to ON or ON to OFF). This is a hardcoded value. If you need faster or slower response -- please contact us.
Warranty:	Twelve months from date of shipment. We retain the right to repair or replace failed units. See Section XIV.

XI. FCC Test Results

The following test report summary provides the FCC Test Results Certification for the WiFi Module used in the SYSTEM. This SYSTEM complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Page 2 of 56   Report No.: BCTC-141211251E

TEST RESULT CERTIFICATION

Applicant's name .... : Shenzhen Anxinke technology co., LTD

Address .... : 5A,B Building,Gushu WanLiHua Industrial,XiXiang Town, BaoAn District,ShenZhen,China

Manufacture's Name .... : Shenzhen Anxinke technology co., LTD

Address .... : 5A,B Building,Gushu WanLiHua Industrial,XiXiang Town, BaoAn District,ShenZhen,China

Product description

Product name .... : WIFI Module

Model and/or type reference : ESP-12

Serial Model .... : ESP

Standards .... : FCC Part15.247

Test procedure .... ANSI C63.4-2003

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of BCTC, this document may be altered or revised by BCTC, personal only, and shall be noted in the revision of the document.

Test Result ....: **Pass**

Prepared by(Engineer):   *Eric Yang*

Reviewer(Quality Manager):   *Sophie Lu*

Approved & Authorized Signer(Manager):   *Casey Wang*   APPROVED

XII. Service Information

Warranty Service: Please contact us obtain an RMA #. Return the product in the original packaging with proof of purchase to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device.

Non-Warranty Service: Please contact us to obtain an RMA #. Return the product in the original packaging to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device.

Return all merchandise to us with pre-paid shipping. The flat-rate repair charge for Non-Warranty Service does not include return shipping. Return shipping to locations in North America is included for Warranty Service.

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Include with the returned instrument your complete return shipping address, contact name, phone number and description of problem.

XIII. Customization

We pride ourselves on customer service. If you want your SYSTEM customized -- please contact us. We typically do this at no charge (but we are not making any promises).

XIV. Warranty

RT Automation warrants to the original purchaser that its products and the component parts thereof, will be free from defects in workmanship and materials for a period of twelve months from date of purchase. We will, without charge, repair or replace (at OUR option) defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form of a sales receipt.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. The warranty is void if the serial number is altered, defaced or removed. We shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. If this exclusion provision is not acceptable then we require that you return the unit to us for a full refund within the first 30 days of purchase.

This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

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