CROSSFIRE Bluetooth Accessories

Introduction

The LCO Technologies' Bluetooth accessory product line enables the CROSSFIRE Chemical Injection Pump and CROSSFIRE Instrument Air Compressor smart controller (Model LCOC-1000-B or LCOC-1000-A) to wirelessly communicate user interface data to a mobile device over Bluetooth Low Energy V4.0 Protocol (BLE4).

Features and Benefits:

- Simple installation and operation with minimal wire clutter
  - Mobile control for quick and simple adjustments of CROSSFIRE products
- Wireless operation range: line-of-sight
  - Standard: 60 ft
  - Maximum: 200 ft
- Minimal power consumption due to BLE4 technology
  - Idle standby mode: 2.40 mA
  - Active communications mode: 2.44 mA
- Temperature range: -40°C to +65°C
- Water resistant
  - Conformable coating on circuit boards to protect electronics from water and airborne contaminants
- Permanent and temporary installation options available

Products Available:

- Bluetooth Pole-Top Module (BT-PTM-01)
- Bluetooth Serial Adapter Dongle (BT-SAI-01)
- Bluetooth USB Dongle (BT-USB-01)

Bluetooth Pole-Top Module (BT-PTM-01)

The Bluetooth pole-top module (BT-PTM-01) is a Serial-to-Bluetooth communications module that enables the CROSSFIRE smart controller to wirelessly communicate user interface data to a computer or mobile device over BLE4. This module is designed for permanent installation outside the hazardous area. It can be installed up to 150 ft away from the CROSSFIRE Smart Controller, which can be installed in a Class 1 Division 2 area. BT-PTM-01 allows onsite users to communicate to the CROSSFIRE controller anytime without opening the controller panel and declassifying the area.

Features

- Electronic components housed and protected within an IP66 water tight enclosure
  - Suitable for outdoor installations
- Wireless range:

- o   200 ft when paired with BT-USB-01
  - o   60+ ft when paired with BLE4 compatible mobile devices
- Baud rate: 19,200 – No parity
- Working mode: Slave
- Single blue LED light for pairing indication
- RS232 wired communication range:
  - o   150 ft with twisted pair, 24 AWG solid copper wires inside armoured Cat 5e cable for transmission, receiver and ground wires
- External power supply: 12 VDC to 30 VDC
- External power supply wiring length:
  - o   150 ft with twisted pair, 24 AWG solid copper wires inside armoured Cat 5e cable for power and ground wires

Note: Please see below for wiring diagrams and installation requirements

Bluetooth Serial Adapter Dongle (BT-SAI-01)

The Bluetooth serial adapter dongle (BT-SAI-01) is a RS232 Serial-to-Bluetooth communications module that enables the CROSSFIRE smart controller to wirelessly communicate user interface data to a computer or mobile device over BLE4. This module is designed for temporary installation within a hazardous area once declassified. It can be directly inserted into the COM2 RS232 DB9 connector on the CROSSFIRE controller for plug and play usability.

Features:

- Water resistant
- Wireless range: 60 ft to 200 ft when in line-of-sight
- Baud rate: 115,200 – no parity
- Working mode: Slave
- Single blue LED light for pairing indication

Bluetooth USB Dongle (BT-USB-01)

The BT-USB-01 is a USB to Bluetooth Dongle that enables wireless communication between a laptop computer and the CROSSFIRE smart controller. This adapter transmits user interface data between the two devices and requires a Windows laptop or computer with an available USB port for use.

Features:

- Wireless range: 60 ft to 200 ft when in line-of-sight
- Baud rate: 115,200 – no parity
- Working mode: Master
- LED lights
  - o   Single blue LED light for pairing indication
  - o   Red and yellow LED lights for transmit and receive indication

Installation and Operations Instructions:

For successful communication, both a Master and Slave device must be actively paired over BLE4. A Master would be either the BT-USB-01 or a mobile device compatible with BLE4 protocol. A Slave would be either the BT-PTM-01 or the BT-SAI-01. Mobile devices with operating systems iOS5 and later or Android 4.3 and later are compatible, however all windows computers and laptops will not communicate successfully over BLE4 due to insufficient Windows driver support and therefore the BT-USB-01 dongle must be used as Master.

Install BT-PTM-01:

- Find suitable location for installation
  - Recommendation: Mount the BT-PTM-01 on the solar panel pole mast, fifteen feet above ground, facing the users onsite or in a non-hazardous general-purpose area.
  - No weather enclosure necessary, the pole top module is weather proof and water tight. Maximum of 150 ft away from the CROSSFIRE smart controller.
- Remove the top enclosure plate and wire the Tx, Rx, and Ground terminals from the BT-PTM-01 to the CROSSFIRE smart controller as dictated by the wiring diagram below.
  - Use 24 AWG solid copper wires inside an armoured Cat 5e cable
- Connect the BT-PTM-01 to a 12 VDC to 30 VDC power source. The same power supply for the smart controller may be used for the BT-PTM-01, or a separate power supply may also be used. Protect power lead with 0.5A or 1A fuse.
  - Refer to the wiring diagram
- Replace the top enclosure plate and ensure the O-ring edge seal is in place

Note: It is critical that the O-ring is in place and the top cover is tightened down to ensure a water tight seal. If the O-ring is missing or the top plate is not securely fastened, water and moisture may enter the module and damage internal components.

- Once all wiring is complete, tighten down the cable entry fitting with a wrench to cramp the rubber grommet inside tightly around the Cat 5e cable.

Note: It is critical that the entry fitting is tightened down sufficiently to ensure a water tight seal. If the fitting is not tightened down properly, water and moisture may enter the module and damage internal components.

Pole-Top Bluetooth Module Wiring Diagram

Pole-Top Bluetooth Module Circuit Board

TX RX GND — +

12 - 30 VDC — +   0.5A fuse

RS232 TX
RS232 RX
GROUND

COM1

CROSSFIRE Controller
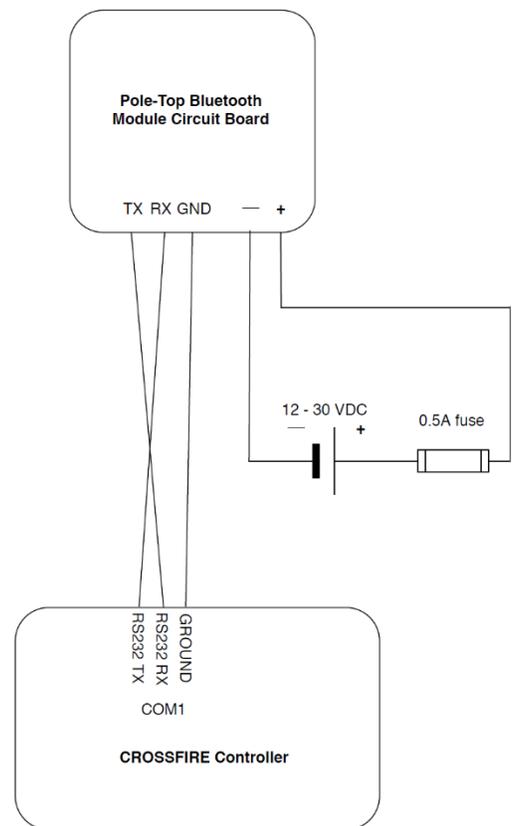
Install BT-SAI-01:

- Ensure you are in a non-hazardous general location or you have declassified the area
- Access the front panel of the CROSSFIRE smart controller and plug the BT-SAI-01 directly into the COM2 RS232 DB9 port on the controller
- Follow the instructions below to pair device

Note: Once any adjustments with the mobile software and Bluetooth connection are complete, remove the BT-SAI-01 from the CROSSFIRE smart controller if you are in a hazardous area. This dongle is not CSA approved for hazardous areas and cannot be left plugged in unless in general purpose area.

Install BT-USB-01:

- Go to www.lcotechnologies.com/resources.html and download the device driver for USB-Bluetooth Adaptor
  - No password required
- Unzip the file into CP210xWindows_Drivers folder with WinZip or WinRAR
- Install CP210xVCPInstaller_x64.exe or CP210xVCPInstallerx86.exe depending on Windows operating system
  - Choose CP210xVCPInstaller_x64.exe for 64-bit Windows 7, 8 and 10
  - Choose CP210xVCPInstallerx86.exe for 32-bit Windows XP and 32-bit Windows 7
- Once the installation is complete, plug the BT-USB-01 into a USB port on your laptop computer
- Open "Device Manager", go to "Ports" and determine the appropriate COM number
  - The Dongle should show up as "Silicon Labs CP210x USB to UART Bridge"
  - Keep note of this COM port for connection to the CROSSFIRE Software

Pairing:

- Ensure a Master and Slave Bluetooth system is installed
  - Master: BT-USB-01 or BLE4 Mobile Device
  - Slave: BT-PTM-01 or BT-SAI-01
- Plug the BT-SAI-01 directly onto the CROSSFIRE controller or power up BT-PTM-01
  - The Blue LED light should be blinking to indicate the device is powered on, but currently not paired to a master device

Two Options:
- If using a BT-USB-01:
  - Press and hold the button on the side of the dongle for 5 seconds
  - Watch the blue LED light on both the BT-USB-01 and the BT-PTM-01 or BT-SAI-01
  - The blue LED light on both devices should stop blinking and become solid to indicate successful pairing

- If using a mobile phone or tablet:
  - Ensure the blue LED light on the BT-SAI-01 or BT-PTM-01 is flashing, if not, double check installation and power supply
  - Open the CROSSFIRE Mobile App
    - Apple App Store: Search "CROSSFIRE" or "LCO CROSSFIRE"
    - Android Google Play Store: Search "CROSSFIRE" or "LCO CROSSFIRE"
  - Click "Scan for Bluetooth Devices"
  - A device should pop-up
  - Select device and login as "Operator", password: **Pristine**; or as "Technician", password: **Automatio**
  - The blue LED light on the BT-SAI-01 or BT-PTM-01 should now be solid to indicate a successful pairing and you will now see the home screen of the mobile app
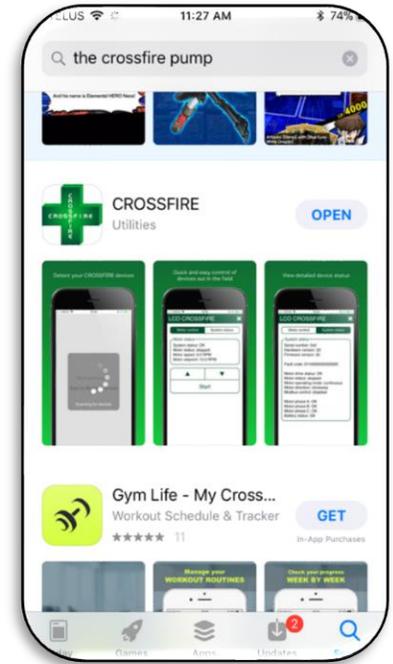
Note: Once a device is successfully paired, even in the even of a power cycle they will remain paired.