

YASHU

YellowJacket

Vehicle Management System

ZigBee Hive
Vehicle Access
Point



ZigBee Hive - Wireless Vehicle Access Point

- Retrieves Information from Vehicle's *YellowJacket* Device
- Rugged Extruded Aluminum Case in Space Saving Vertical Tower
- Full Speed USB 2.0 and 10 Mb/s Ethernet Connections to Host PC
- Internal 512 MB Flash Memory and up to 32 GB Removable Secure Digital High Capacity (SDHC) Memory Card store Vehicle Data
- Internal RF Power Amplifier provides Excellent Signal Reception
- Stand-Alone Operation - Host PC Not Required to be Running
- Bright Tri-Color LEDs indicate Operational Status and Health
- Outdoor Hive Unit(s) available for Extended RF Signal Range¹

ZigBee Indoor/Outdoor Hive Features

- Wireless ZigBee / IEEE 802.15.4 Compliant
- 1 Watt RF Transmit Power achieves up to 300' Urban Range²
- ReChargeable Battery Backed Internal Real-Time Clock
- Internal Backup Power prevents Data Corruption during Power Loss
- In-Field Firmware Upgrade Capability via USB, Ethernet or WiFi

¹ Contact YASHU for various Outdoor Hive options

² Contact YASHU for recommended external antennae

ZigBee Hive Vehicle Access Point Features

ZigBee Indoor/Outdoor Hive Extended Features

- Innovative “Drive-By” Technology dynamically gathers Mobile *YellowJacket* Data
- Ethernet DHCP Client Capability
- Hive Auto-Discovery (Plug-n-Play) Protocol
- ZigBee 128-Bit Advanced Encryption Standard
- Sleep Mode via RF Amplifier PowerDown
- Optional Wall Mount Endplates
- Multi-Hive Extended RF Cloud Support¹

Additional ZigBee Outdoor POE Hive Features

- Integrated Front Door 12 dBi : 35 Deg Sector Antenna
- Power-Over-Ethernet (POE) requires Single CAT5 Cable
- QuickConnect POE-RJ45 Connector w/Gasket
- Various Hi-Gain External Antennae Support
- Integrated Lightning Strike Protection
- Wall or Pole Mount Options

¹ Multi-Hive support via USB, Ethernet and WiFi



*YellowJacket ZigBee Indoor Hive Unit
Rear Panel shows Antenna RP-SMA,
USB 2.0 Full Speed Type-B and
10 Base-T Ethernet RJ45 Connectors*



*YellowJacket ZigBee Outdoor POE Hive Unit shows Pole Mount Capability and
Optional External 7 dBi - 20" Monopole TopMount Antenna*

ZigBee Hive Vehicle Access Point Features

Additional ZigBee Outdoor WiFi Hive Features

- Wireless 802.11b/g WiFi Compliant
- 0.5 Watt WiFi RF Transmit Power provides Inter-Hive Link Distances up to 1000' ¹
- Requires only 120VAC 60Hz AC Power
- Integrated Lightning Strike Protection
- Wall or Pole Mount Options
- Universal Mounting Bracket provides Robust Positional Orientation

Extended ZigBee Outdoor WiFi Hive Capabilities

- Optional Front Panel ZigBee 16 dBi : +/- 25 Deg Sector Antenna
- 802.11b/g WPA / WPA2 / Static & Dynamic WEP Encryption Support
- Multi-Hive "Repeater Tree" provides Extended RF Cloud Support using WiFi Backbone¹

¹ Contact YASHU for recommended external antennae



YellowJacket ZigBee Outdoor WiFi Hive Unit shows ZigBee 5 dBi - 12" and WiFi 5 dBi - 7" Monopole TopMount Antennae



YellowJacket ZigBee Indoor Hive Unit shows Optional Wall Mounting Flanged Brackets



YellowJacket ZigBee Outdoor WiFi Hive Unit rear view shows Universal Mounting Bracket

YellowJacket ZigBee Hive : Vehicle Access Point Technical Specifications

General

Power Requirements: Indoor: 12VDC @ 85mA typ (Idle - RF Amp Disabled)
(Quiescient) : 12VDC @ 285mA typ (Active - RF Amp Enabled)
POE: 48VDC @ 24mA typ (Idle - RF Amp Disabled)
: 48VDC @ 78mA typ (Active - RF Amp Enabled)
WiFi: 120VAC @ 93mA typ (Idle - RF Amp Disabled)
: 120VAC @ 126mA typ (Active - RF Amp Enabled)

Power Connector: Indoor: 2.1mm DC Power Jack : Tip + : Sleeve -

ZigBee Wireless: IEEE 802.15.4 Compliant : 2.4GHz : 250Kb/s raw
1W Transmit Power : x100 Receive Power Gain : 12 Channel

WiFi Wireless: IEEE 802.11b/g Compliant : 2.3GHz to 2.5GHz : 54Mbps max
500mW Transmit Power max

Antenna Connector: Indoor: RP-SMA Jack : Male Contact
POE: N Female
WiFi: N Female (ZigBee) : N Female (WiFi)

Enclosure: Indoor: Extruded Aluminum - Painted : Gray/Black colors
: ABS Endplates w/Lexan Graphic Overlays
POE: Die Cast Aluminum : NEMA 6 Rated
: Epoxy Powder Coat Paint : Yellow/Black colors
WiFi: Die Cast Aluminum : Light Gray color
: Epoxy Powder Coat Paint : Textured

User Interface: Power/Status, Host, Vehicle, SD Card LEDs ► Red/Yel/Grn
Ethernet Link LED ► Grn, Network LED ► Yel

USB Interface: v2.0 Compliant : Full Speed (12Mb/s)
Type-B (Peripheral) Connector : Self powered device

Ethernet Interface: IEEE 802.3 Compliant : 10Base-T : 10Mb/s
Half Duplex Operation : RJ45 Jack Connector

Firmware Upgrade Support: Flashable program memory via USB, Ethernet or WiFi

Enclosure Dimensions: Indoor: 1.8"W x 4.4"H x 4.3"D
POE: 7.2"W x 10.0"H x 3.6"D
WiFi: 8.6"W x 8.6"H x 3.2"D

Weight: Indoor: 15.5 oz (0.97 lb)
POE: 56.2 oz (3.51 lb)
WiFi: 56.3 oz (3.52 lb)

Environmental: -25C to +70C temp ambient
Indoor: 20% to 90% RH, Non-Condensing
POE: 10% to 95% RH, Condensing : Watertight Sealed
WiFi: 10% to 95% RH, Condensing : Watertight Sealed

Hive Logging Engine

Microcontroller: Microchip PIC18F97J60 @ 41.6MHz Fosc

Memory: Cypress 16Mb SRAM : Micron 4Gb SLC NAND Flash
SST 16Mb SPI Serial Flash
Up to 32GB SD/SDHC Memory Card Support : FAT32 Format

Real Time Clock: Accuracy: +/-2min/yr typ max (1st year)
: +/-10min/yr typ max (2nd-10th year)

Rechargeable Battery Backed
Manganese-Lithium @ 3V, 1mAh
Trickle charge @ 24hr full-charge time typ
1500hr full-charge duration typ

YellowJacket ZigBee Hive : Vehicle Access Point Technical Specifications (cont)

WiFi Communication Engine

Chipset: Atheros-Based
Operating System: Linux : Web-Based GUI
Operating Mode: Client, Client Router, WDS
Security: Password Protection, WPA/WPA2 Personal/Enterprise
MAC Filtering, Hidden SSID, 802.11i, 802.1x, Stat/Dyn WEP

ZigBee RF TX/RX Amplifier

TX Power/RX Gain: +30dBm TX Power : 20dB RX Gain
Bandwidth: 2.442GHz +/-50MHz
Noise Figure: 2.5dB
1dB Compression: +32.5dBm
TX to RX Switching: 2uS typ
Filtering: 3 Pole : TX & RX Path

WiFi RF TX/RX Amplifier

TX Power: +27dBm TX Power : Adjustable
Bandwidth: 2.3GHz to 2.5GHz : Country Dependent
RX Sensitivity: 802.11g: -93 +/-2dBm @ 6Mbps : -75 +/-2dBm @ 54Mbps
: 802.11b: -96 +/-2dBm @ 1Mbps : -90 +/-2dBm @ 11Mbps
Data Rate: 802.11g: 54/48/36/24/12/9/6Mbps
: 802.11b: 11/5.5/2/1Mbps
Radio Modems: 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)
: 802.11b: DSSS (CCK, DQPSK, DBPSK)

ESD/Transient Protection

Power: Transorb @ 600W peak pulse - 35Vbr nom - 48V @ 12A max clamp
USB D+/D-: ESD Suppressor - IEC 61000-4-2 Direct&Air Discharge
USB Power/Gnd: Varistor @ 0.1J non-repetitive surge - 17V @ 1A max clamp
Ethernet: Transformer Coupled : 1500Vbr : 2KV Shield Cap
POE: 500W max Data Line Surge
AC Mains: WiFi: 3KVAC Withstand Voltage
RF: POE/WiFi: Gas Discharged Lightning Arrestor : 20KAmp Discharge

YASHU

YellowJacket
Vehicle Management System

**ZigBee Vehicle
Data Logger**



YellowJacket ZigBee Wireless Vehicle Data Logging Device

- Mates to Vehicle's OnBoard Diagnostics Data Connector
- Small, Rugged Design with Flip-Out Handle for Easy Removal
- Cradle Connector allows for Maintenance and Configuration
- Data Retrieval via ZigBee Wireless or Cradle Connector
- Tri-Color LED and Buzzer indicate Operational Status
- Low Power Sleep Mode allows Long-Term Vehicle Installation
- Optional GPS & Gate Proximity Unit Versions Available¹

YellowJacket Features

- Wireless ZigBee / IEEE 802.15.4 Compliant
- 60 mWatt RF Transmit Power achieves up to 300' Urban Range
- 8 MByte Data Logging Flash Memory
- ReChargeable Battery Backed Real-Time Clock
- Wide Temperature Range Operation for Harsh Environments
- In-Field Firmware Upgrade Capability via Cradle Connector
- 12 Channel GPS Receiver Option with Power-Down Capability¹
- Low Frequency RFID Based Proximity and Gate Controller Options¹

¹ Contact YASHU for detailed information on optional versions and availability

ZigBee Vehicle Logger

Fleet Related Parameters

Basic Direct Parameters

- Emissions Status
- VIN (Vehicle Identification Number)¹
- Fuel Level¹
- Time when vehicle checked gate²
- GPS Latitude / Longitude / Altitude³
- 'Check Engine' DTCs (Diagnostic Trouble Codes)

Formulated Parameters

- Number of Trips
- Start Time / Stop Time / Duration of Trip
- Distance Travelled per Trip
- Max Acceleration G-Force
- Max Braking G-Force
- Max / Average Speed
- Max / Average RPM
- Max / Average Throttle Position
- Max / Average Engine Coolant Temperature
- Moving / Idling / Total Fuel Consumption^{4,6}
- DLC (Diagnostic Link Connector) Connect / Disconnect Timestamps

Additional Formulated Fleet Maintenance Parameters

- Engine Service Tracking / Scheduling
 - Engine Oil / Coolant Change
 - Air / Fuel Filter Change
 - Front & Rear Brake Inspection / Service
 - Tire Rotation
- Emissions & Safety Inspection Tracking / Scheduling
- Enhanced DTC Lookup based on VIN¹ Decoding to determine Make / Model / Year
- Moving / Idling / Average Fuel Efficiency^{4,5,6}

¹ Available if vehicle supports this generic parameter

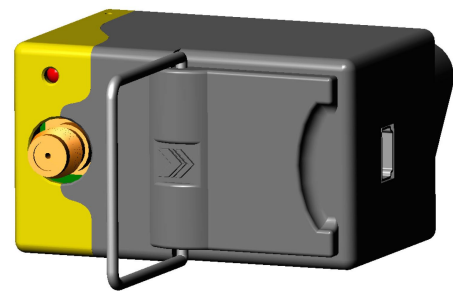
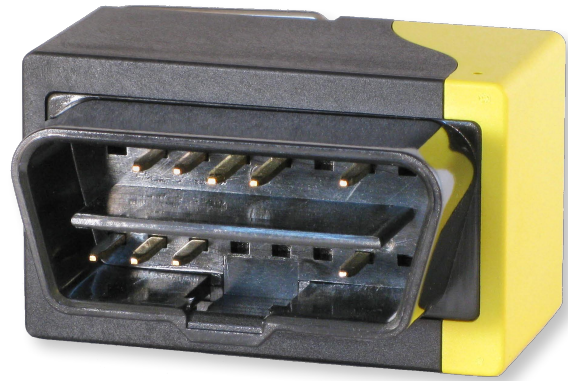
² Available with YellowJacket-GATE Unit version

³ Available with YellowJacket-GPS Unit version

⁴ Available if vehicle uses gasoline fuel

⁵ Available if vehicle is non-hybrid

⁶ If vehicle has MAP (Manifold Absolute Pressure) sensor, user-assisted calibration procedure is required



Shown Actual Size

YellowJacket-GPS Unit with Handle Deployed shows SMA Connector which mates to External Active GPS Antenna

YellowJacket ZigBee Vehicle Data Logger Technical Specifications

General

Power Requirements: 12VDC @ 3.7mA typ (Idle - Sleep)
12VDC @ 27mA avg typ (OBD Active - Logging)¹
Wireless: IEEE 802.15.4 Compliant : 2.4GHz : 250Kb/s Raw
60mW Transmit Power : 12 Channel : 2dBi Chip Antenna
Enclosure: ABS Plastic : Yellow/Black colors
User Interface: Power/Status LED ▶ Red/Yel/Grn
Buzzer ▶ Electro-Mech : 78dBA : 4KHz nom
USB Cradle Interface: v2.0 Compliant : Full Speed (12Mb/s)
Type-MiniB (Peripheral) Connector
Bus powered device @ 300mA peak
Firmware Upgrade Support: Flashable program memory via 802.15.4 or USB Cradle
Enclosure Dimensions: 1.8"W x 1.2"H x 1.4"D
Weight: 1.3 oz
Environmental: -25C to +70C temp ambient
20% to 90% RH, Non-Condensing

¹ Average power reqt based upon typ logging profile running CAN protocol

Scanning/Logging Engine

Microcontroller: Microchip PIC18LF4685 @ 16MHz Fosc
CPLD: Xilinx CoolRunner™ XCR3032XL
Real Time Clock: Accuracy: +/-2min/yr typ max (1st year)
: +/-10min/yr typ max (2nd-10th year)
Rechargeable Battery Backed
Manganese-Lithium @ 3V, 1mAh
Trickle charge @ 24hr full-charge time typ
1500hr full-charge duration typ
Flash Memory: Atmel 64Mb DataFlash

ESD/Transient Protection

DLC Pin 16: Transorb @ 600W peak pulse - 35Vbr nom - 48V @ 12A max clamp
In case of primary protection breach, 2nd stage protection is for
60V load dump [1mS pulse & <100mS time constant typ]
and will reset the processor to avoid irreparable unit damage
DLC Pins 2,10,7,15: Varistor @ 0.1J non-repetitive surge - 65V @ 2A max clamp
DLC Pins 6,14: Diode @ 6KV HBM ESD non-repetitive pulse
USB Cradle D+/D-: ESD Suppressor - IEC 61000-4-2 Direct&Air Discharge
USB Cradle Pwr/Gnd: Varistor @ 0.1J non-repetitive surge - 17V @ 1A max clamp

Vehicle Interface

Supported OBD2 Modulations: VPW,PWM (SAE J1850)
NRZ UART (ISO 9141, KWP 2000)
CAN (ISO 11898)
Supported OBD2 Protocols: ISO 9141-2 (ISO9141)
ISO 14230-4 (KWP2000)
ISO 15765-2 (FlowControl CAN)