# Introduction

## Purpose

This manual provides instructions to install the FlexPay™ Connect Distribution Box (D-Box).

The FlexPay Connect system allows high-speed data flow to the dispensers for applications such as Applause™ Media System. The high-speed data can be on the same wiring as existing twisted-pair wiring used for two-wire.

| IMPORTANT INFORMATION |
| --- |
| • The FlexPay Connect system must be installed by qualified service personnel only.<br>• The Back Room Communication Module [BRCM (PA0408XXXX)] and Two-wire Buffer Module 2 D-Box [TBM2 D-Box (PA0409XXXXXXX)] are NOT for use over hazardous locations. |

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## Intended Users

This manual is intended for Gilbarco®-trained and certified Authorized Service Contractors (ASCs).

## Required Tools

- Drill
- Megger® Tester
- Phillips® and Flat-blade Screwdriver
- Category 5 (CAT-5) Crimpers
- Set of mm Nut Drivers
- Wire Strippers
- Wire Nuts
- Laptop and Standard CAT-5 Cable

**⚠ WARNING**

Electric drill cannot be used on the island. The components must be moved to a non-hazardous location before drilling.

## Related Documents

Following document(s) are referred in the safety information and/or installation procedures in this manual. Ensure that you have these documents available before you begin the installation.

- National Fire Protection Association (NFPA) 30A: The Automotive and Marine Service Station Code
- NFPA 70®: The National Electric Code (NEC®)

| Document Number | Title | GOLD℠ Library |
|---|---|---|
| FE-321 | Gilbarco STP Isolation Relay Box PA0287 | Engineering Diagrams |
| FE-363 | Field Wiring Diagram Encore® 500/700 (M07555 Power Supply Only) | • Encore and Eclipse®<br>• Encore and Eclipse Installers<br>• Engineering Diagrams |
| FE-364 | Field Wiring Diagram Encore 300 | • Encore and Eclipse<br>• Encore and Eclipse Installers<br>• Engineering Diagrams |
| MDE-2530 | Pump and Dispenser Installation Manual | Footprint and Elevation |
| MDE-2531 | Pump and Dispenser Startup and Service | • Pump and Dispenser Start-Up and Service Manual<br>• Service Manual |
| MDE-2755 | STP Control and Dispenser Isolation Relay Box (PA0287) | • Advantage® and Legacy® Models<br>• Encore and Eclipse<br>• Encore and Eclipse Installers |
| MDE-3620 | Point of Sale (POS) Systems Site Preparation Manual | Site Prep |
| MDE-3816 | Passport® Hardware Start-up and Service Manual | • Passport<br>• Service Manual |
| MDE-4699 | Applause Media System Installation, Service, and Parts Manual | • Encore and Eclipse<br>• SMART Connect |

# Abbreviations and Acronyms

| Term | Description |
|---|---|
| ASC | Authorized Service Contractor |
| AWG | American Wire Gauge |
| BRCM | Back Room Communication Module |
| CAT-5 | Category 5 |
| CRIND® | Card Reader in Dispenser |
| CSA | Canadian Standards Association |
| D-Box | Distribution Box |
| DCM | Dispenser Communication Module |
| DSL | Digital Subscriber Line |
| GDSL | Gilbarco Digital Subscriber Line |
| HIP | Hub Interface PCA |
| ITE | Information Technology Equipment |
| LAN | Local Area Network |
| LED | Light Emitting Diode |
| MTA | Mass Terminal Assembly |
| NEC | National Electrical Code |
| NFPA | National Fire Protection Association |
| PCB | Printed Circuit Board |
| POS | Point of Sale |
| RFI | Radio Frequency Interference |
| STP | Submersible Turbine Pump |
| TBM2 | Two-wire Buffer Module 2 |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| TWI | Two-wire Interface |
| UL® | Underwriters Laboratories |

# Important Safety Information

***Notes: 1) Save this Important Safety Information section in a readily accessible location.***

***2) The BRCM (PA0408XXXX) and TBM2 D-Box (PA0409XXXXXXX) contain potentially hazardous voltages and must be opened by trained service personnel only.***

***3) Although DEF is non-flammable, Diesel is flammable. Therefore, for DEF cabinets that are attached to Diesel dispensers, follow all the notes in this section that pertain to flammable fuels.***

This section introduces the hazards and safety precautions associated with installing, inspecting, maintaining, or servicing this product. Before performing any task on this product, read this safety information and the applicable sections in this manual, where additional hazards and safety precautions for your task will be found. Fire, explosion, electrical shock, or pressure release could occur and cause death or serious injury, if these safe service procedures are not followed.

**Preliminary Precautions**
You are working in a potentially dangerous environment of flammable fuels, vapors, and high voltage or pressures. Only trained or authorized individuals knowledgeable in the related procedures should install, inspect, maintain, or service this equipment.

**Emergency Total Electrical Shut-Off**
The first and most important information you must know is how to stop all fuel flow to the pump/dispenser and island. Locate the switch or circuit breakers that shut off all power to all fueling equipment, dispensing devices, and Submerged Turbine Pumps (STPs).

**⚠ WARNING**

The EMERGENCY STOP, ALL STOP, and PUMP STOP buttons at the cashier's station WILL NOT shut off electrical power to the pump/dispenser. This means that even if you activate these stops, fuel may continue to flow uncontrolled.

You must use the TOTAL ELECTRICAL SHUT-OFF in the case of an emergency and not the console's ALL STOP and PUMP STOP or similar keys.

**Total Electrical Shut-Off Before Access**
Any procedure that requires access to electrical components or the electronics of the dispenser requires total electrical shut off of that unit. Understand the function and location of this switch or circuit breaker before inspecting, installing, maintaining, or servicing Gilbarco equipment.

**Evacuating, Barricading, and Shutting Off**
Any procedure that requires access to the pump/dispenser or STPs requires the following actions:

- An evacuation of all unauthorized persons and vehicles from the work area
- Use of safety tape, cones, or barricades at the affected unit(s)
- A total electrical shut-off of the affected unit(s)

**Read the Manual**
Read, understand, and follow this manual and any other labels or related materials supplied with this equipment. If you do not understand a procedure, call the Gilbarco Technical Assistance Center (TAC) at 1-800-743-7501. It is imperative to your safety and the safety of others to understand the procedures before beginning work.

**Follow the Regulations**
Applicable information is available in National Fire Protection Association (NFPA) 30A; *Code for Motor Fuel Dispensing Facilities and Repair Garages*, NFPA 70; *National Electrical Code (NEC)*, Occupational Safety and Health Administration (OSHA) regulations and federal, state, and local codes. All these regulations must be followed. Failure to install, inspect, maintain, or service this equipment in accordance with these codes, regulations and standards may lead to legal citations with penalties or affect the safe use and operation of the equipment.

**Replacement Parts**
Use only genuine Gilbarco replacement parts and retrofit kits on your pump/dispenser. Using parts other than genuine Gilbarco replacement parts could create a safety hazard and violate local regulations.

## Safety Symbols and Warning Words

This section provides important information about warning symbols and boxes.

**Alert Symbol**

This safety alert symbol is used in this manual and on warning labels to alert you to a precaution which must be followed to prevent potential personal safety hazards. Obey safety directives that follow this symbol to avoid possible injury or death.

**Signal Words**
These signal words used in this manual and on warning labels tell you the seriousness of particular safety hazards. The precautions below must be followed to prevent death, injury, or damage to the equipment:

**DANGER**: Alerts you to a hazard or unsafe practice which will result in death or serious injury.

**WARNING**: Alerts you to a hazard or unsafe practice that could result in death or serious injury.

**CAUTION** with Alert symbol: Designates a hazard or unsafe practice which may result in minor injury.

**CAUTION** without Alert symbol: Designates a hazard or unsafe practice which may result in property or equipment damage.

## Working With Fuels and Electrical Energy

**Prevent Explosions and Fires**
Fuels and their vapors will explode or burn, if ignited. Spilled or leaking fuels cause vapors. Even filling customer tanks will cause potentially dangerous vapors in the vicinity of the dispenser or island.

DEF is non-flammable. Therefore, explosion and fire safety warnings do not apply to DEF fluid lines.

**No Open Fire**

Open flames from matches, lighters, welding torches, or other sources can ignite fuels and their vapors.

**No Sparks - No Smoking**

Sparks from starting vehicles, starting, or using power tools, burning cigarettes, cigars, or pipes can also ignite fuels and their vapors. Static electricity, including an electrostatic charge on your body, can cause a spark sufficient to ignite fuel vapors. Every time you get out of a vehicle, touch the metal of your vehicle, to discharge any electrostatic charge before you approach the dispenser island.

**Working Alone**

It is highly recommended that someone who is capable of rendering first aid be present during servicing. Familiarize yourself with Cardiopulmonary Resuscitation (CPR) methods, if you work with or around high voltages. This information is available from the American Red Cross. Always advise the station personnel about where you will be working, and caution them not to activate power while you are working on the equipment. Use the OSHA Lockout/Tagout procedures. If you are not familiar with this requirement, refer to this information in the service manual and OSHA documentation.

**Working With Electricity Safely**

Ensure that you use safe and established practices in working with electrical devices. Poorly wired devices may cause a fire, explosion, or electrical shock. Ensure that grounding connections are properly made. Take care that sealing devices and compounds are in place. Ensure that you do not pinch wires when replacing covers. Follow OSHA Lockout/Tagout requirements. Station employees and service contractors need to understand and comply with this program completely to ensure safety while the equipment is down.

**Hazardous Materials**

Some materials present inside electronic enclosures may present a health hazard if not handled correctly. Ensure that you clean hands after handling equipment. Do not place any equipment in the mouth.

**⚠ WARNING**

The pump/dispenser contains a chemical known to the State of California to cause cancer.

**⚠ WARNING**

The pump/dispenser contains a chemical known to the State of California to cause birth defects or other reproductive harm.

## In an Emergency

**Inform Emergency Personnel**

Compile the following information and inform emergency personnel:

- Location of accident (for example, address, front/back of building, and so on)
- Nature of accident (for example, possible heart attack, run over by car, burns, and so on)
- Age of victim (for example, baby, teenager, middle-age, elderly)
- Whether or not victim has received first aid (for example, stopped bleeding by pressure, and so on)
- Whether or not a victim has vomited (for example, if swallowed or inhaled something, and so on)

**⚠ WARNING**

Gasoline/DEF ingested may cause unconsciousness and burns to internal organs. Do not induce vomiting. Keep airway open. Oxygen may be needed at scene. Seek medical advice immediately.

**⚠ WARNING**

DEF generates ammonia gas at higher temperatures. When opening enclosed panels, allow the unit to air out to avoid breathing vapors.
If respiratory difficulties develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention.

**⚠ WARNING**

Gasoline inhaled may cause unconsciousness and burns to lips, mouth, and lungs. Keep airway open. Seek medical advice immediately.

**⚠ WARNING**

Gasoline/DEF spilled in eyes may cause burns to eye tissue. Irrigate eyes with water for approximately 15 minutes. Seek medical advice immediately.

**⚠ WARNING**

Gasoline/DEF spilled on skin may cause burns. Wash area thoroughly with clear water. Seek medical advice immediately.

**⚠ WARNING**

DEF is mildly corrosive. Avoid contact with eyes, skin, and clothing. Ensure that eyewash stations and safety showers are close to the work location. Seek medical advice/recommended treatment if DEF spills into eyes.

**IMPORTANT**: Oxygen may be needed at scene if gasoline has been ingested or inhaled. Seek medical advice immediately.

**Lockout/Tagout**

Lockout/Tagout covers servicing and maintenance of machines and equipment in which the unexpected energization or start-up of the machine(s) or equipment or release of stored energy could cause injury to employees or personnel. Lockout/Tagout applies to all mechanical, hydraulic, chemical, or other energy, but does not cover electrical hazards. Subpart S of 29 CFR Part 1910 - Electrical Hazards, 29 CFR Part 1910.333 contains specific Lockout/Tagout provision for electrical hazards.

## ⚠ WARNING

The BRCM and TBM2 D-Box contain potentially hazardous voltages and must be opened by trained service personnel only.

*Note: The warning is not applicable to the user-accessible compartment that contains the air intake filter. Refer to "Filter Maintenance" on page 7.*

Installation of the TBM2 D-Box and BRCM must be in accordance with NFPA 70 and NEC paying attention to article 725.136 as it relates to connection of the wiring communication, the Automotive and Marine Service Station Code NFPA 30A, and any state or local electrical requirements.

For Canadian installations, use the Canadian Electrical Code CSA C22.2 and follow all applicable wiring requirements for the geographic location where the installation is performed.

# Maintenance Information

## Filter Maintenance

The BRCM has an air intake filter. The filter can become clogged and cause unit shutdown due to overheating. A clogged filter can also cause the fan to run loudly. The BRCM has an access cover that allows the user to replace the filter. The replacement Gilbarco part number is M12186B001.

*Note: This is the ONLY customer-accessible compartment in the BRCM or TBM2 D-Box.*

# Overview

The FlexPay Connect System converts Transmission Control Protocol/Internet Protocol (TCP/IP) information from Ethernet® into twisted-pair cabling to a dispenser. Inside the dispenser, the twisted-pair signal is converted back into Ethernet, creating a transparent transport of the data. It has been tested to operate at 2000 feet, far beyond the range of Ethernet. Also, the twisted-pair wiring can carry legacy two-wire information with the use of a new D-Box (PA0409XXXX).

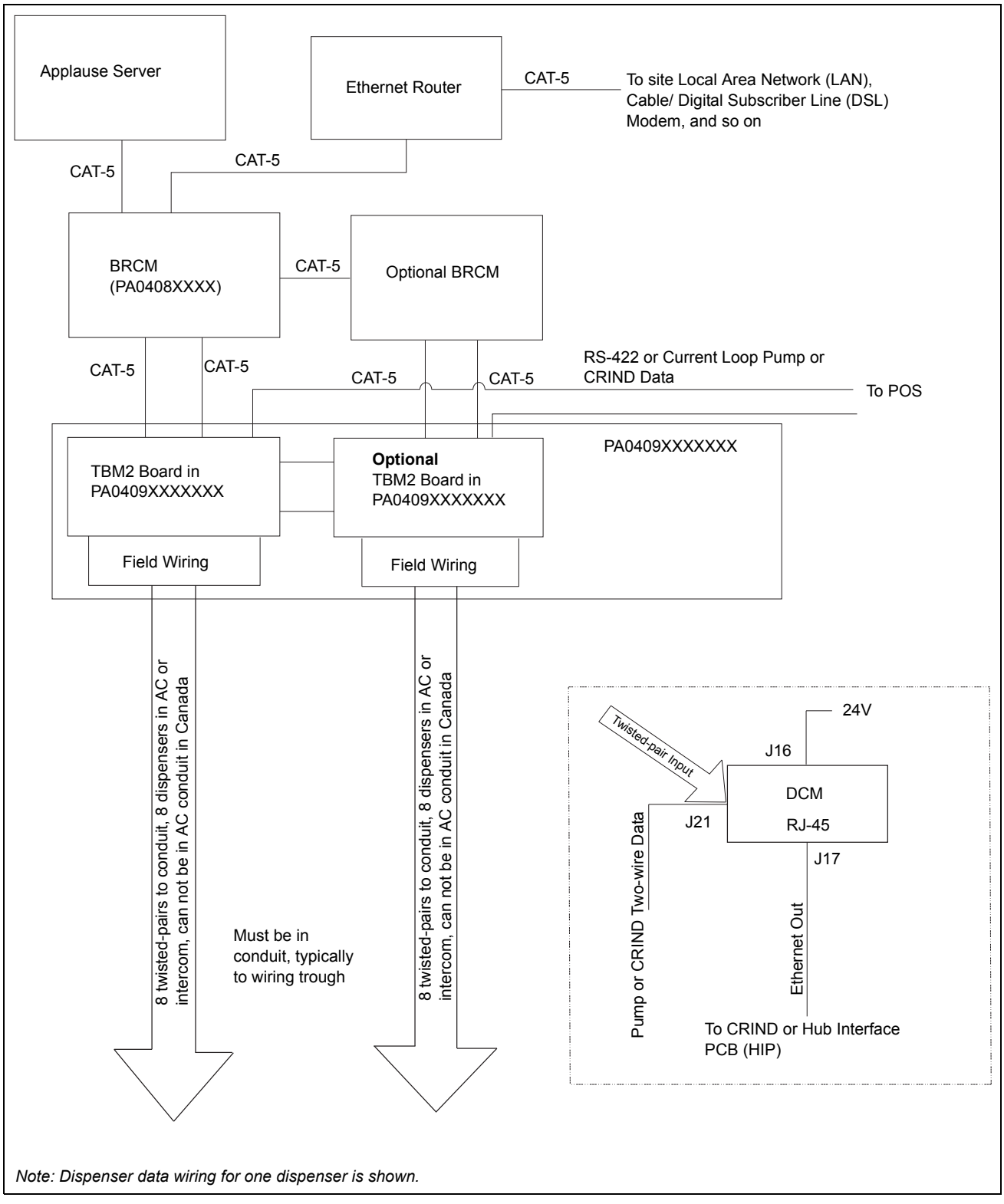
This creates following four typical use cases for the FlexPay Connect System:

- Mode One (typically used in US) - The TCP/IP information is Applause Media System advertising data. The D-Box is used to allow one pair of wires to carry CRIND or pump data plus the high-speed signal. This is very useful in retrofit situations.
- Mode Two (typically used in US) - The TCP/IP information is Applause Media System advertising data. The two-wire information is sent to the pump over dedicated wiring.
- Mode Three (typically used outside US) - The TCP/IP information is used to communicate to the CRIND. The D-Box is used to allow one pair of wires to carry CRIND or pump data plus the high-speed signal. This is very useful in retrofit situations.
- Mode Four (typically used outside US) - The TCP/IP information is used to communicate to the CRIND. The two-wire information is sent to the pump over dedicated wiring.

These solutions are illustrated in the block diagrams on page 8 through page 11.

Block diagram for mode one, where high-speed connection is used for Applause Media System and is made over pump or CRIND data wiring through the new D-Box, which replaces the existing D-Box is shown in Figure 1.

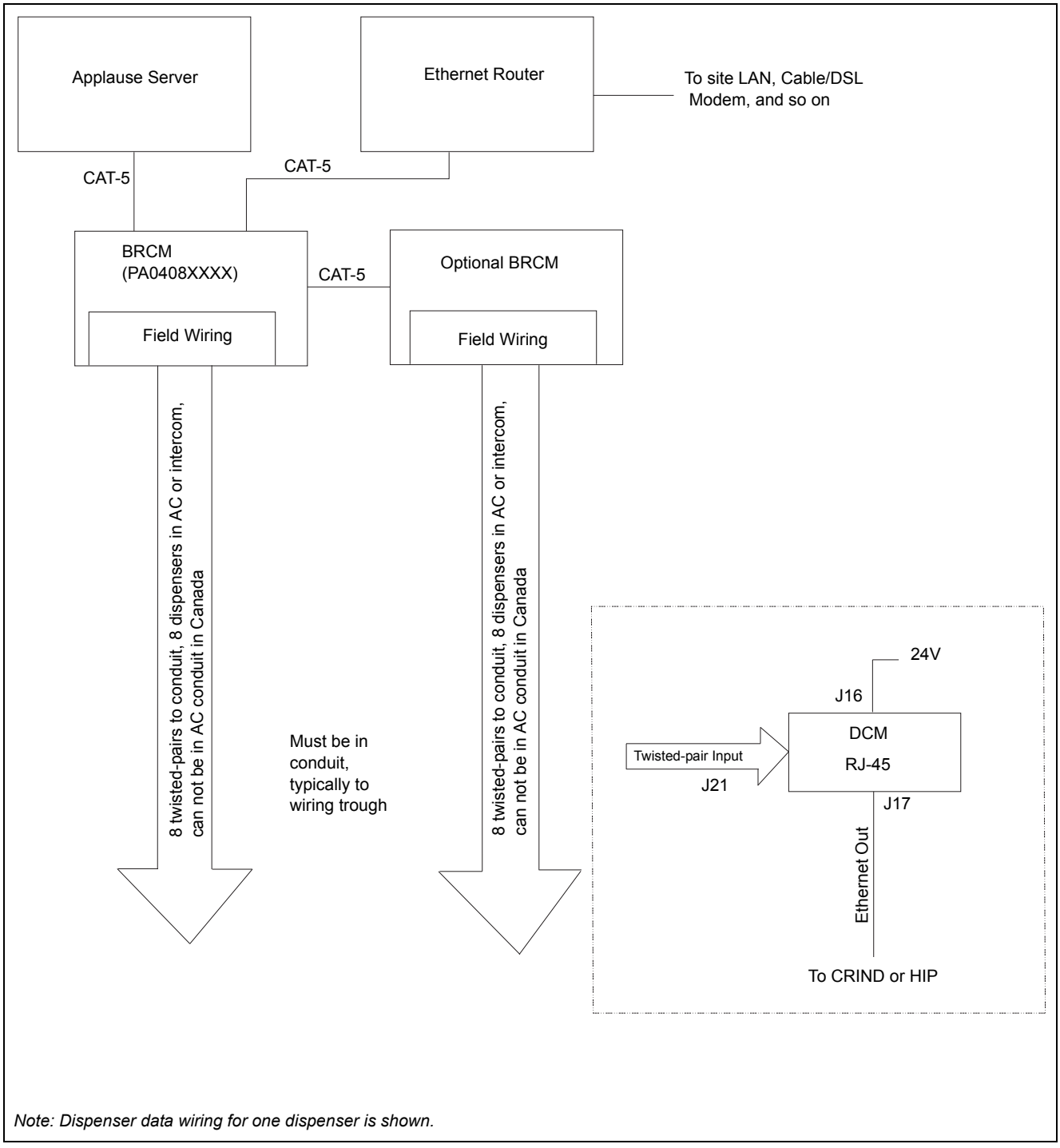
**Figure 1: Block Diagram - Mode One**




*Note: Dispenser data wiring for one dispenser is shown.*

Block diagram for mode two, where high-speed connection is used for Applause Media System and is routed to dispenser through dedicated wiring is shown in Figure 2.

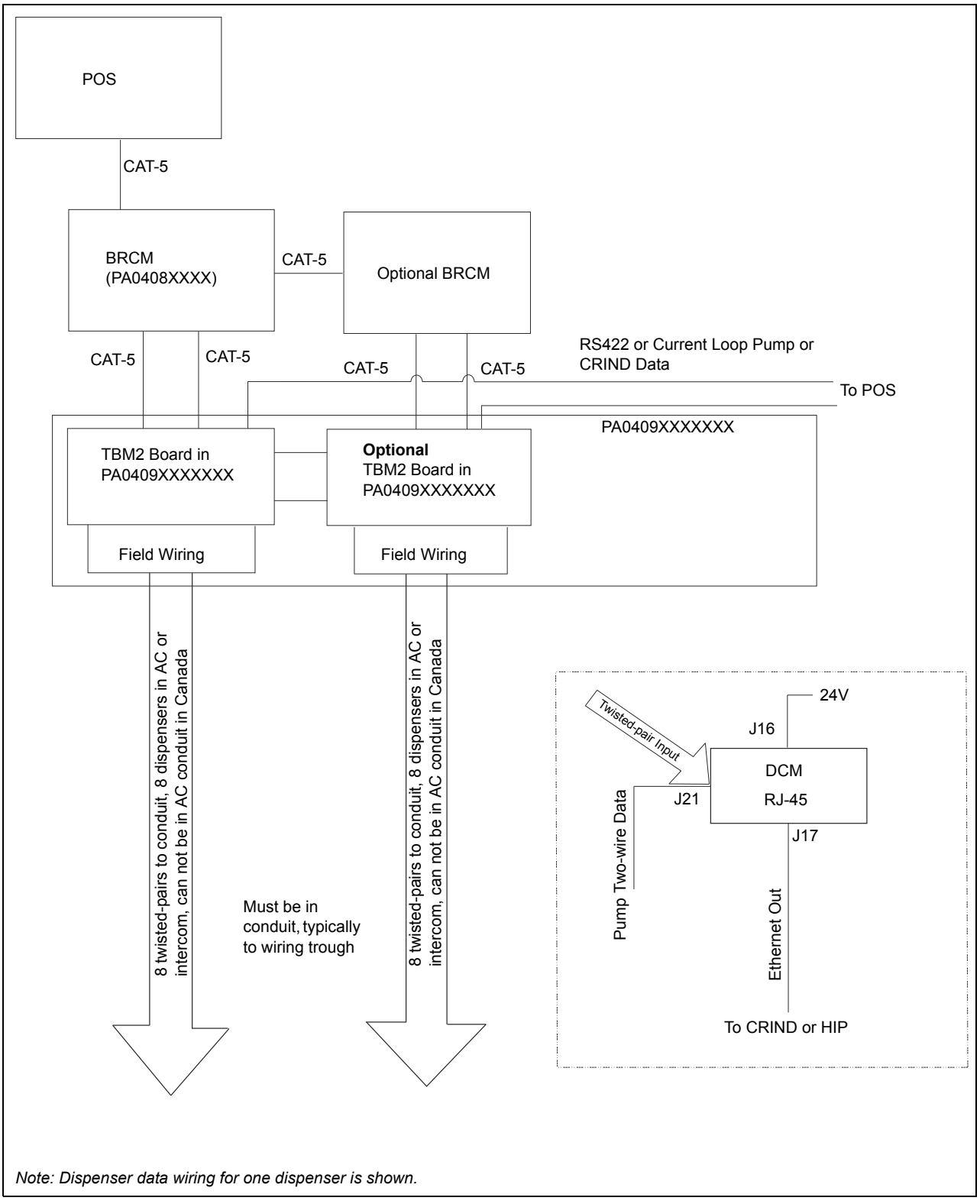
**Figure 2: Block Diagram - Mode Two**




*Note: Dispenser data wiring for one dispenser is shown.*

Block diagram for mode three, where the POS communicates to the CRIND through TCP/IP and the same pair of wires carries pump data is shown in Figure 3.

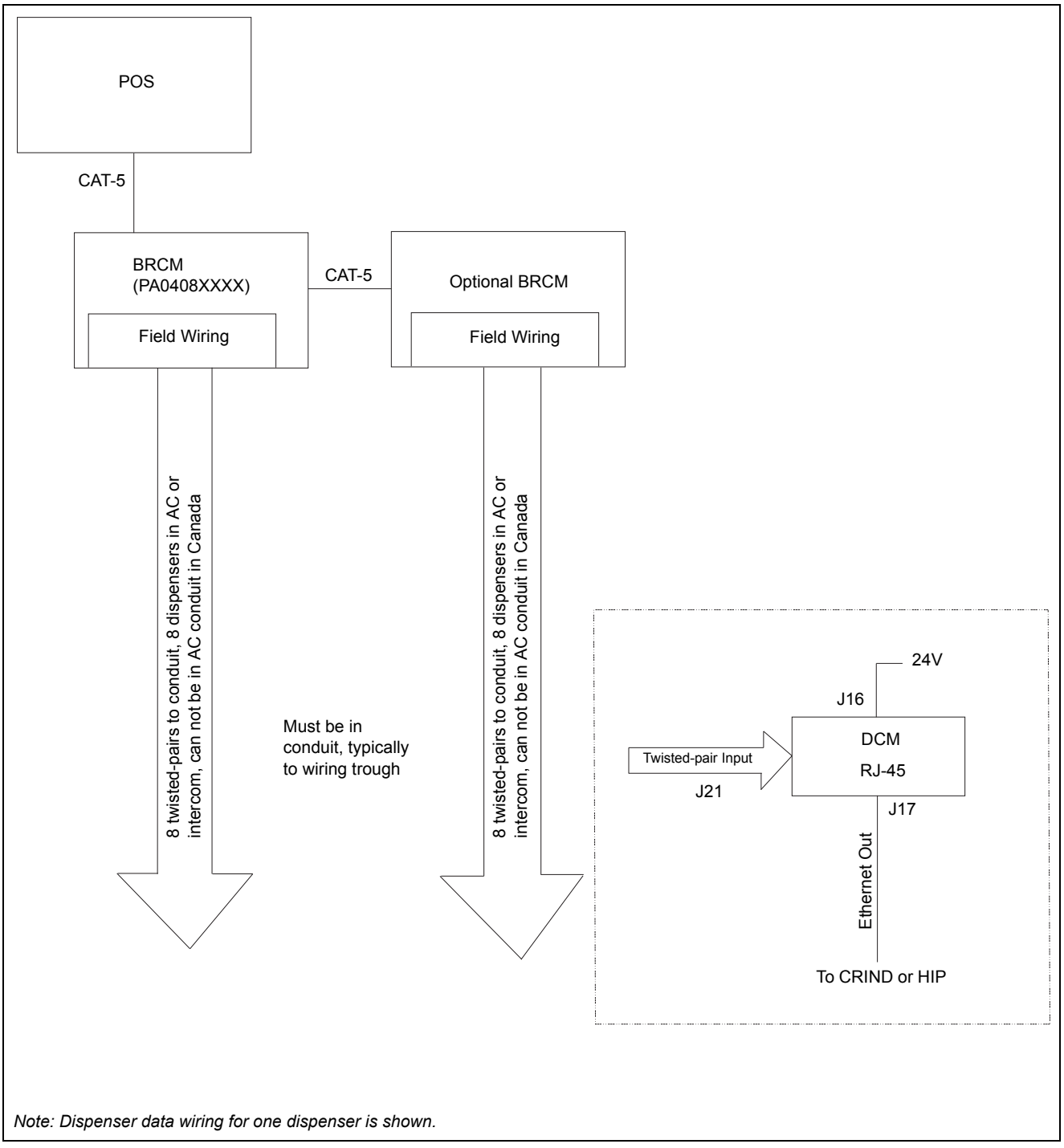
**Figure 3: Block Diagram - Mode Three**




*Note: Dispenser data wiring for one dispenser is shown.*

Block diagram for mode four, where the POS communicates to the POS over TCP/IP is shown in Figure 4.

**Figure 4: Block Diagram - Mode Four**




*Note: Dispenser data wiring for one dispenser is shown.*

# Wiring Requirements

## Safety Wiring Information

Installation of the units must be in accordance with NEC NFPA 70, and article 725.136 of the NEC as it relates to connection of the communication wiring.

Ensure that the power cord for the units is not attached to the building surface. Also, ensure that it is not running through walls, ceilings, floors, and similar openings in the building structure.

To run the high-speed data connection through dedicated wiring, refer to the wiring plan shown in Figure 4 on page 11. To run the high-speed data connection through the pump or CRIND two-wire, refer to the wiring plan shown in Figure 3 on page 10.

**Isolated Receptacle:** User must supply proper receptacle to meet local electrical code requirements. The receptacle providing power to the TBM2 D-Box must be a properly isolated ground receptacle (Hubbell® #IG 5261 or the equivalent). The green grounding screw must be attached to the grounding conductor.

The TBM2 D-Box and BRCM must be on the same isolated circuit as the POS.

## General Wiring Information

### Data Cabling Requirements

For the correct Controller for all CAT-5 cables, refer to "Gilbarco CAT-5 Cable Part Numbers" on page 35.

Neatly install all cables to avoid damage or accidental disconnection. Route the cables along a wall or under a counter, and secure with cable ties or suitable cable clamps.

Do not route the data wires over fluorescent light, compressor wiring, and so on. Also, ensure that the data wires are not routed within 12 inches of electronically noisy devices such as variable speed Submersible Turbine Pump (STP) controllers or associated wiring.

## Forecourt Wiring

### No TBM2 D-Box

If the TBM2 D-Box is not used, then the BRCM must be connected to the wiring trough through conduit.

### BRCM and TBM2 D-Box to Forecourt Wiring Information

**Safety Requirement** - 400 V, Gas/Oil-resistant, unshielded, and unjacketed wire. Ensure that the field wiring connections are in accordance with Class 1 wiring and associated methods.

For new wire installations, the Gilbarco part number for 200 feet of twisted pair is Q13221-02. It is available direct from C&M Corporation as their part number 27525. This wire is 18 gauge, twisted 10-12 twists per foot, unshielded and unjacketed (30-40 twists per meter, 0.90-0.96 square mm). Wires from an alternate source may be used, but they must meet the stated safety and construction requirements.

*Notes: 1) Unused forecourt connections on the BRCM and TBM2 D-Box must remain open and capped individually.*

*2) Plug any unused RJ-45 Ports on the BRCM with a CAT-5 Connector after installation and start-up, to prevent connecting something into any unused CAT-5 connections in the BRCM. The CAT-5 Connector must be crimped before inserting into the BRCM.*

In the main conduit, use only twisted-pair and two-wire data pairs for communications. **Do not use shielded wire**.

### TBM2 D-Box

A wiring trough is required in the vicinity of the TBM2 D-Box for terminating the conduit runs from the dispensers. Three 1-inch knockouts are provided on the bottom of the TBM2 D-Box for running conduit between the box and wiring trough. Previously wired stations may continue to use existing non-twisted-pair wiring that has been tested and passed for short circuits and continuity. However, twisted-pair wiring is recommended for existing wired stations known to have communication problems between the console and dispensers.

*Note: When pulling wires, ensure that you avoid damage to the insulation.*

# Installation Sequence

The installation sequence varies slightly depending on whether or not a TBM2 D-Box is used.

## Unpacking Equipment

When the equipment arrives at the installation site, each unit must be unpacked and inspected for possible shipping damage. If damage is evident, it must be reported to the carrier. Shipping damage is not covered under Gilbarco's warranty policy. After visual inspection, place the unit back in its shipping carton to prevent undue exposure to the elements and store indoors until ready for installation.

Ensure that all equipment is readily available to perform the installation.

# Installation Using Pump or CRIND Two-wire for High-speed Data

## Preliminary Preparation for Installing the TBM2 D-Box and BRCM

### Basic Site Criteria

The site must be equipped with electric service allowing compliance with all installation requirements of a complete fueling system.

An enclosed weather-protected structure must be located on the site for housing the TBM2 D-Box. Room ambient temperature or weather-protected containment structure temperature must not exceed 122 °F (50 °C). This maximum temperature is allowed only if the equipment is allowed free air flow.

Megger testing of field wiring must be completed before connecting wires to the TBM2 D-Box and both ends must be in a disconnected state during Megger testing.

The data cabling between the TBM2 D-Box and system controller must be kept separate from all other power and control lines.

### Physical Placement and Electrical Requirements

Locate the TBM2 D-Box in an area that is not subjected to extreme temperature variations (the TBM2 D-Box is not weather proof). Refer to "Operating Environment" on page 35. The ambient temperature must remain relatively constant. Do not install the TBM2 D-Box in a position that is exposed to direct sunlight. If conditions so dictate, provide a suitable sunscreen.

The TBM2 D-Box is **NOT** rated for use over hazardous locations. The TBM2 D-Box must be installed at least 18 inches above the floor. Locate the TBM2 D-Box in an area which minimizes the possibility of liquids being spilled onto it.

Allow several inches clearance on the left side of the TBM2 D-Box for the AC power cord. Allow clearance of two inches above the box for removing the cover.

The receptacle providing power to the TBM2 D-Box must be a properly installed isolated ground receptacle (Hubbell #IG5261 or equivalent). This type of receptacle is easily identified by its bright orange color and triangle embossed into the face of the outlet. The green grounding screw must be attached to the grounding conductor.

- All electrical wiring must conform to NEC and local wiring codes, as well as the criteria in this manual and *MDE-3620 Point of Sale (POS) Systems Site Preparation Manual*.
- The minimum voltage, wire gauge, and wire type suitable for twisted-pair circuits must be in accordance with Class 1 wiring and associated methods.
- One conduit from the breaker panel to the TBM2 D-Box location is required. The conduit must contain three 14 American Wire Gauge (AWG) wires: 115 VAC Hot, Neutral, and Ground, or 230 VAC L1, L2, and Ground. Do not use the electrical conduit to provide earth ground.
- The circuit powering the TBM2 D-Box must not power unassociated devices. This circuit must not share a conduit with wiring for devices drawing high amperage (compressor, freezer, and so on) or devices that are sources of Radio Frequency Interference [RFI (TV, microwave, intercom, and so on)].

- The AC outlet must be within 6 feet of the TBM2 D-Box (see Figure 6 on page 18). Do not use extension cords.
  *Note: The TBM2 D-Box and associated wiring must not be located closer than 12 inches to an electronically noisy device such as a variable speed STP controller or associated wiring.*
- The receptacle must be installed in accordance with *MDE-3620 Point of Sale (POS) Systems Site Preparation Manual.*
  *Note: For 115 V, a line cord is provided. For 220-240 V, the customer will supply the cord.*

If you are performing the installation using pump or CRIND two-wire for high-speed data, then proceed as follows:

**1** Install the TBM2 D-Box including connecting to the POS. For details, refer to "Installing TBM2 D-Box" on page 16.

**2** If the DCMs are not factory-installed in the dispensers, then install the DCMs (refer to "Installing Dispenser Communication Module [DCM (M11356A001)]" on page 29). The TBM2 D-Box functions as a normal D-Box and you must have normal twisted-pair wiring communication.

**3** Install the BRCM. For mounting information, refer to "Mounting the BRCM" on page 23.
*Note: YOU CANNOT USE THE CONDUIT CONNECTION ON THE BRCM.*

There are two Gilbarco Digital Subscriber Line (GDSL) Ports on the TBM2 D-Box and BRCM. On each unit, they are labeled as GDSL 1-4 and GDSL 5-8.

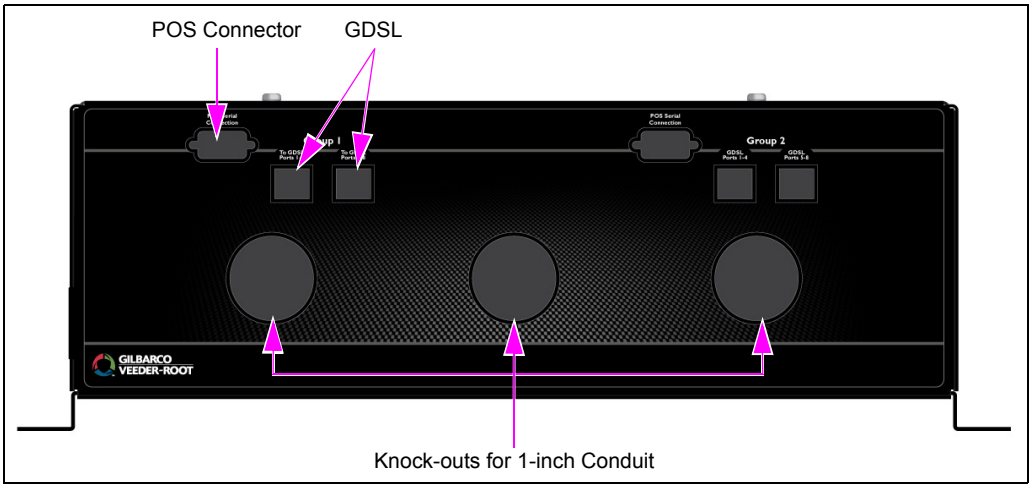
- Connect the GDSL 1-4 Port on the TBM2 D-Box to GDSL 1-4 Port on the BRCM.
- Connect the GDSL 5-8 Port on the TBM2 D-Box to GDSL 5-8 Port on the BRCM.

Always install both CAT-5 cables.
*Note: These ports are specific to GDSL. Do not plug laptops, Applause Media System Server, or site LAN into any of these ports.*

For complete details on how to connect with laptop and verify communication after installation and start-up is complete, refer to "High-speed Data Connections" on page 31.

# Installing TBM2 D-Box

**Figure 5: TBM2 D-Box - Bottom View**




| IMPORTANT INFORMATION |
| --- |
| • The TBM2 D-Box must be installed by qualified service personnel only.<br>• The TBM2 D-Box must be installed over a non-hazardous location only. |

To correctly install the TBM2 D-Box, proceed as follows:

*Note: If replacing an existing D-Box, power down and dismount the D-Box. Ensure that you properly label and protect the existing field wiring as you remove the box.*

**1** Loosen the two screws on bottom front of the TBM2 D-Box and lift the lid.
*Notes: 1) The TBM2 D-Box cover must be opened by service personnel only.*

*2) The lid also contains a detailed graphic illustration of the circuit boards, jump jack settings, Light Emitting Diode (LED)s, and so on.*

**2** Carefully remove and discard any packing material from the TBM2 D-Box.

**3** Disconnect the transformer power cable from the distribution board(s) at P101A and P101B. Disconnect the wiring pigtails from P106 and P107.

| CAUTION |
| --- |
| Working on Printed Circuit Boards (PCBs) without connecting to a ground or discharging static can damage electronic parts. Use a wrist strap and store parts in antistatic storage bags. |

**4** Loosen the two screws, slide the distribution board mounting plate up and out of the TBM2 D-Box, and remove the boards avoiding unnecessary damage to components when mounting the box.

5 Mount the TBM2 D-Box to the wall surface using hardware specific to wall type construction rated at minimum 60 lbs each and per local building codes.
- Allow clearance on left side to connect the AC cable.
- Allow clearance above the TBM2 D-Box so that the cover can be removed.
- Ensure that the TBM2 D-Box is mounted within 6-feet of the AC outlet.
- Ensure that mounting instructions for fastening the TBM2 D-Box [Information Technology Equipment (ITE)] to the building surface, including information on mounting hardware, required tools, and special installation considerations/concerns are followed.

  *Note: ITE is a generic abbreviation for Information Technology Equipment. In this case, it means the BRCM and TBM2 D-Box.*
- Ensure that the Power Cord is neither attached to the building surface, nor it runs through walls, ceilings, floors, and similar openings in the building structure.

6 Install conduit for data wires between the wiring trough and TBM2 D-Box. Pull the data wires up into the TBM2 D-Box leaving 16 inches of wire inside the TBM2 D-Box. This allows easy installation of wiring pigtails.

7 Connect the data wires to pigtails (see Figure 9 on page 20).

8 Replace the distribution board mounting plate and retain the screws. Reconnect the transformer power wiring to P101A and P101B. Also, connect the forecourt wiring on P106 and P107 to the board(s), as required.
*Note: If a second board is available, reconnect wiring on both the boards.*

9 For each board, verify if the POS connection is through two-wire or RS-422. Ensure that the appropriate adapter is used in the “D” shell chassis.

On the board, two-wire connects to the 3-pin connector at P102. RS-422 connects to the 10-pin connector at P103.

10 Connect each TBM2 Board to a BRCM using two CAT-5 cables.

11 On the BRCM, remove the cover plate on the edge (with the LED indicators). Each device has a RJ-45 connection labeled GDSL 1-4 and GDSL 5-8. Connect the similarly labeled ports using CAT-5 cables.
*Note: Do not plug laptops, Applause Media System Server, site LAN, or any other Ethernet cables to these ports.*

12 Ensure that the jumper settings are set correctly for your configuration.

13 Plug in the AC power cord.

14 Change the two sets of jump jacks (JP+ and JP-, JP1 through JP8) one at a time for used positions. Verify operation of card readers and/or dispensing units.

15 Replace the TBM2 D-Box cover and secure with screws.
*Note: The TBM2 D-Box cover must be opened by service personnel only.*

## TBM2 D-Box Connection to POS

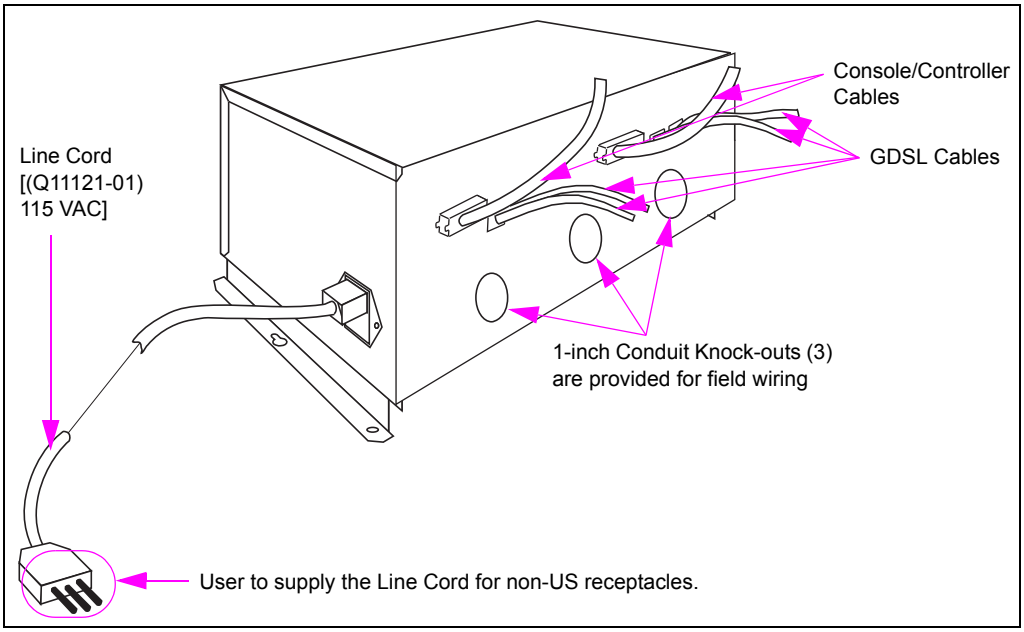
The TBM2 D-Box can accommodate either a Two-wire Receptacle (Q13180-11B) current loop or RS-422 (Q13180-13B) connection to the POS.
*Note: The two-wire receptacle and RS-422 are available in the shipment.*

For two-wire current loop, the POS connection position has a 2-pin D-shell connector available on the TBM2 Board. If a CAT-5 cable is used to connect to the POS, a two-wire receptacle adapter is required to adapt the CAT-5 cable to the 2-pin D-shell connector.

For RS-422, the POS connection position must have a 5-pin D-shell connector. Depending on the POS, a RS-422 D-shell to CAT-5 Adapter may be required.

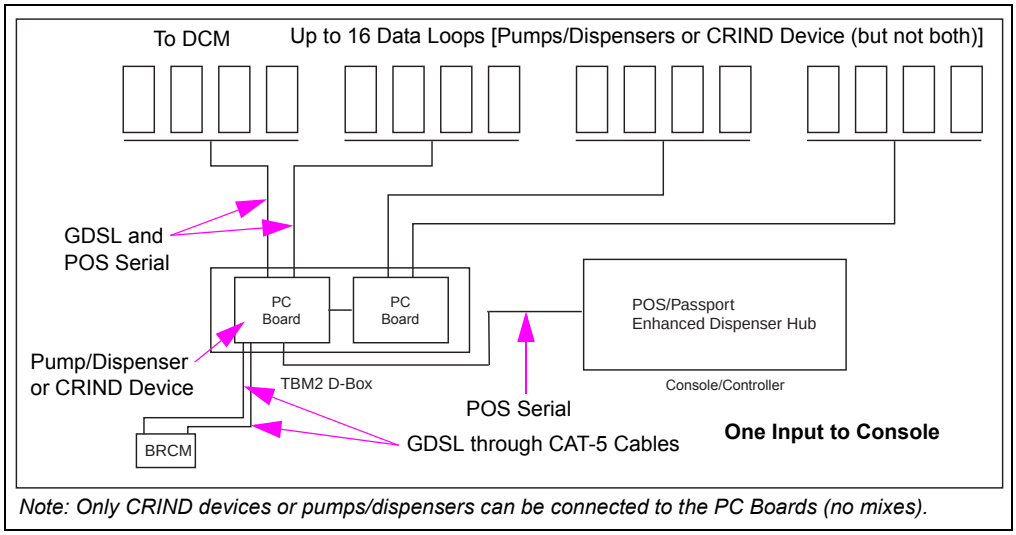
For internal connections to the TBM2 Board and required jumper selections, see Figure 10 on page 21.

**Figure 6: Interface Cabling between TBM2 D-Box and Controller**



## Configuring TBM2 D-Box

### Figure 7: System with Pumps/Dispensers or CR



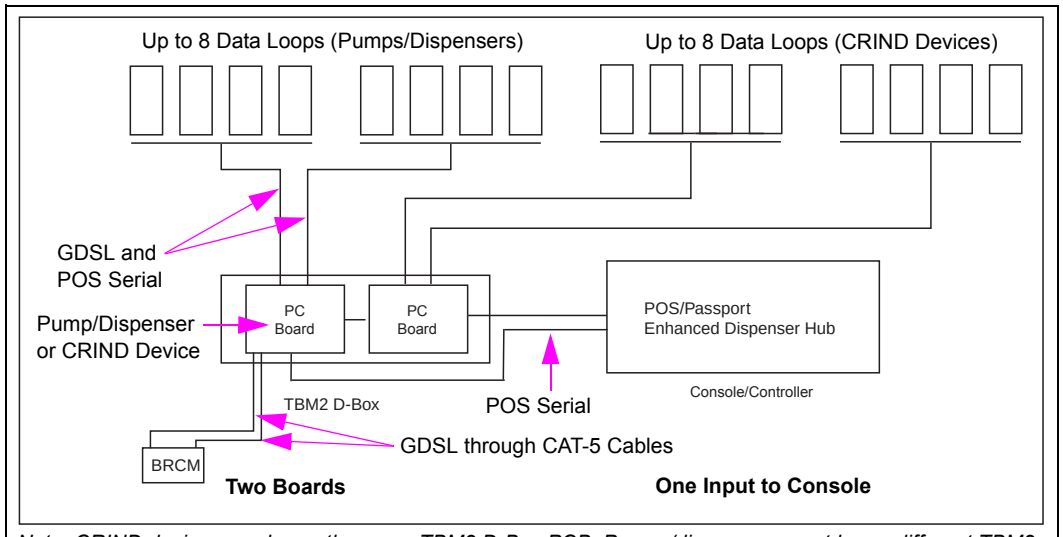

*Note: Only CRIND devices or pumps/dispensers can be connected to the PC Boards (no mixes).*

| Description | Board 1* Jumper Settings | Board 2 Jumper Settings |
|---|---|---|
| 2 boards, 1 input, 16 loops Interface to all Two-wire Interface (TWI) consoles/controllers. | JP18-A<br>JP916-IN | JP18-B<br>JP916-NC |

**Only board 1 has transformer connections.*

Figure 8 shows the default factory configuration for dual-board systems.

### Figure 8: System with Pumps/Dispensers and CRIND Devices

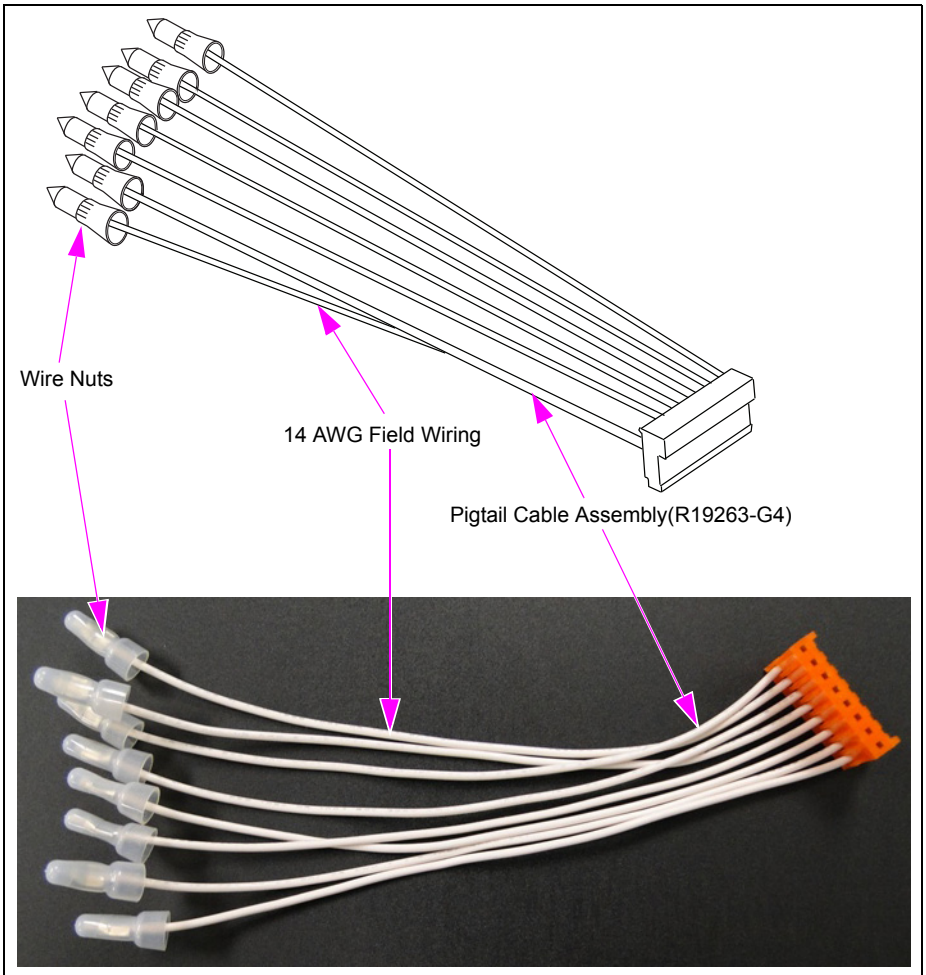



*Note: CRIND devices can be on the same TBM2 D-Box PCB. Pumps/dispensers must be on different TBM2 PCB than CRIND devices.*

| Description | Board 1* Jumper Settings | Board 2 Jumper Settings |
|---|---|---|
| 2 boards, 2 inputs, 8 loops Interface to all TWI consoles/controllers. | JP18-B<br>JP916-NC | JP18-B<br>JP916-NC |

**Only board 1 has transformer connections.*

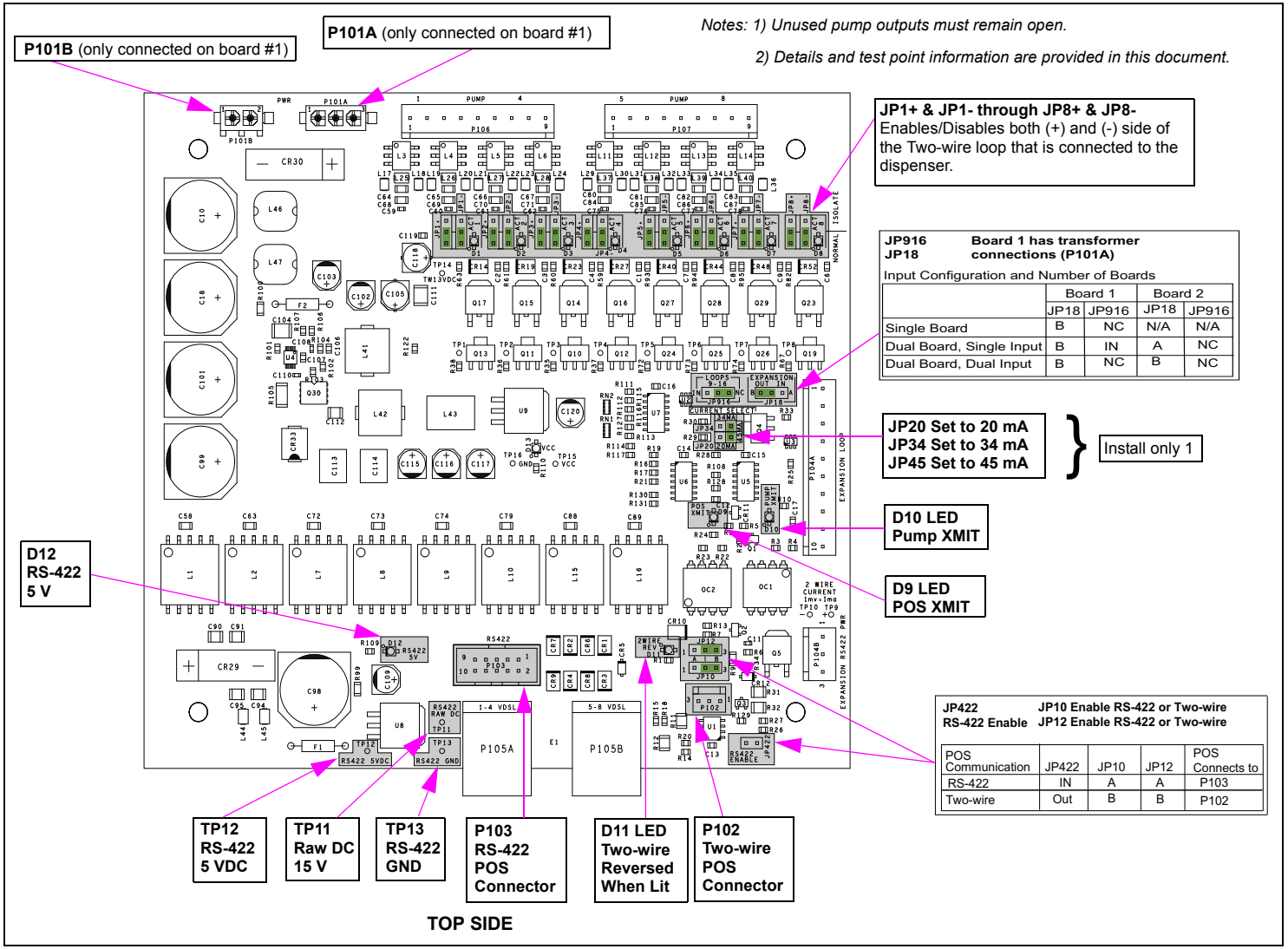
**Figure 9: Field Wiring to Mass Terminal Assembly (MTA) Pigtails**




*Note: Unused pairs must remain open (non-shorted) and individually capped.*

*Note: The condensed version of this Decal is placed on the inside lid of the TBM2 D-Box.*

**Figure 10: TBM2 D-Box Decal**



## Installing FlexPay Connect Using Dedicated Wiring

If you are performing the installation using dedicated wiring, then proceed as follows:

*Note: Dedicated wiring implies that the BRCM is used without a TBM2 D-Box and is running Applause Media System only.*

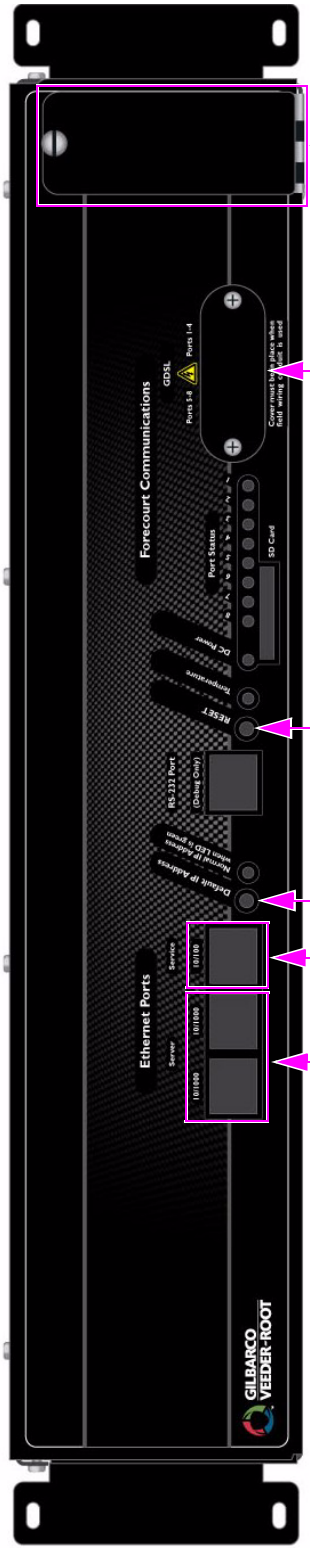
1. Install the pump and CRIND wiring normally, if not installed already.

2. Install and complete the wiring of the BRCM in the back room. For details, refer to "Mounting the BRCM" on page 23 and "BRCM Used Without TBM2 D-Box" on page 26.
   *Note: Dedicated twisted-pair wiring must be pulled to the dispensers.*

3. Install and complete the wiring of the DCMs in the dispenser. Proceed to "High-speed Data Connections" on page 31.

## Mounting the BRCM

### Figure 11: BRCM - Front View



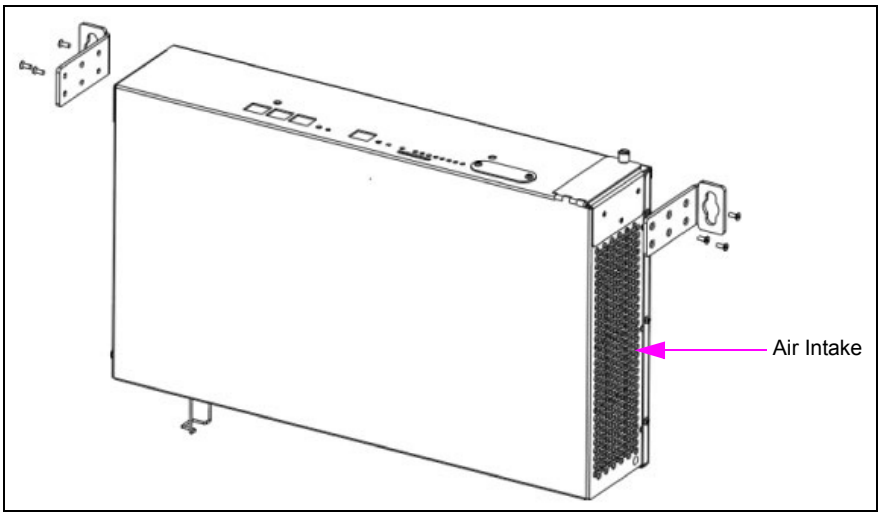

*Notes: 1) Remove the cover plate only if the TBM2 D-Box is used.*
*2) Air Filter Vent is the only user-accessible section. It may be opened to replace the air filter. The air filter will require occasional replacement. Refer to "Filter Maintenance" on page 7.*
*3) If the TBM2 D-Box is used, remove ONLY the cover plate.*

The BRCM may be wall-mounted or rack-mounted.

When wall-mounted (see Figure 12), the unit must have a space of at least two inches on the fan and vent opening sides of the unit.

| IMPORTANT INFORMATION |
| --- |
| Mount the BRCM to the wall surface using hardware specified for the wall type construction, rated at minimum 60 lbs each and per local building codes. Mount the BRCM with ports and LEDs facing upward as shown in Figure 12. |

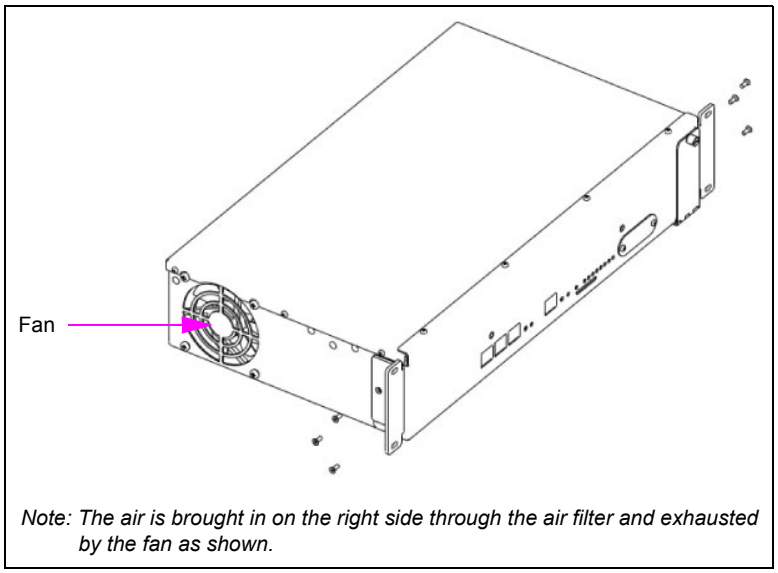
**Figure 12: Wall-mounting the BRCM (Wall-mounting into a Wall Stud)**



When rack-mounted, following or similar rack-mounting instructions are included with the installation instructions:

- **Elevated Operating Ambient** - If installed in a closed or multi-unit rack assembly, then the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, consideration must be given to install the equipment in an environment compatible with the maximum ambient temperature ($T_{ma}$) specified by the manufacturer.
- **Reduced Air Flow** - Installation of the equipment in a rack must be such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical Loading** - Mounting of the equipment in a rack must be such that a hazardous condition is not achieved due to uneven mechanical loading.
- **Circuit Overloading** - Consideration must be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of the equipment nameplate ratings must be used when addressing this concern.
- **Reliable Earthing** - Reliable earthing of the rack-mounted equipment must be maintained. Attention must be given to supply connections other than direct connections to the branch circuit (for example, use of power strips).

**Figure 13: Rack-mounting the BRCM**




*Note: The air is brought in on the right side through the air filter and exhausted by the fan as shown.*

## BRCM Used Without TBM2 D-Box

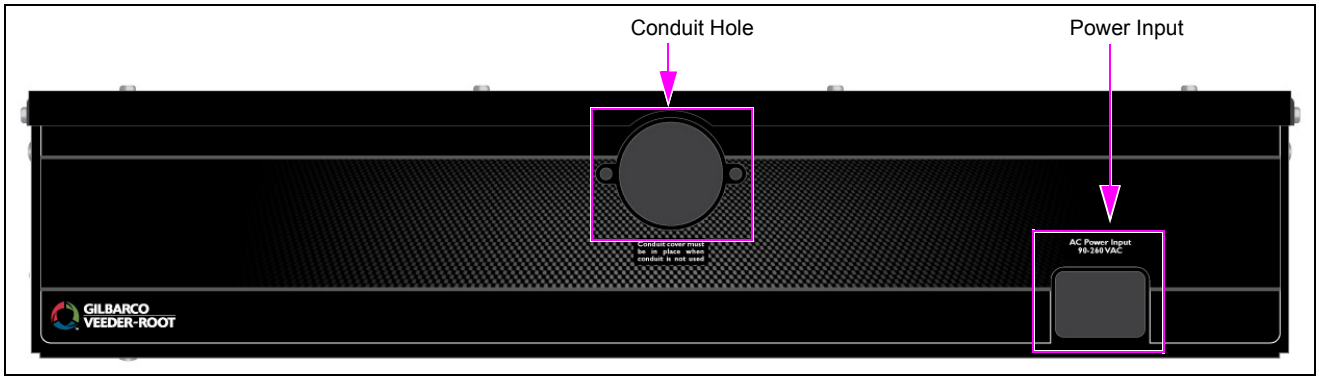
If the BRCM is used without a TBM2 D-Box, then it must be mounted on a wall with the LED indicators facing upwards and wire conduit plumbed to the wire trough. Ensure that the unit is securely mounted to a surface. The installer must supply appropriate fasteners, washers, and so on.

To mount the BRCM, proceed as follows:

1 Remove the top lid of the BRCM to see the wiring area and conduit connection.

2 Remove the conduit cover plate and complete the mechanical mounting.

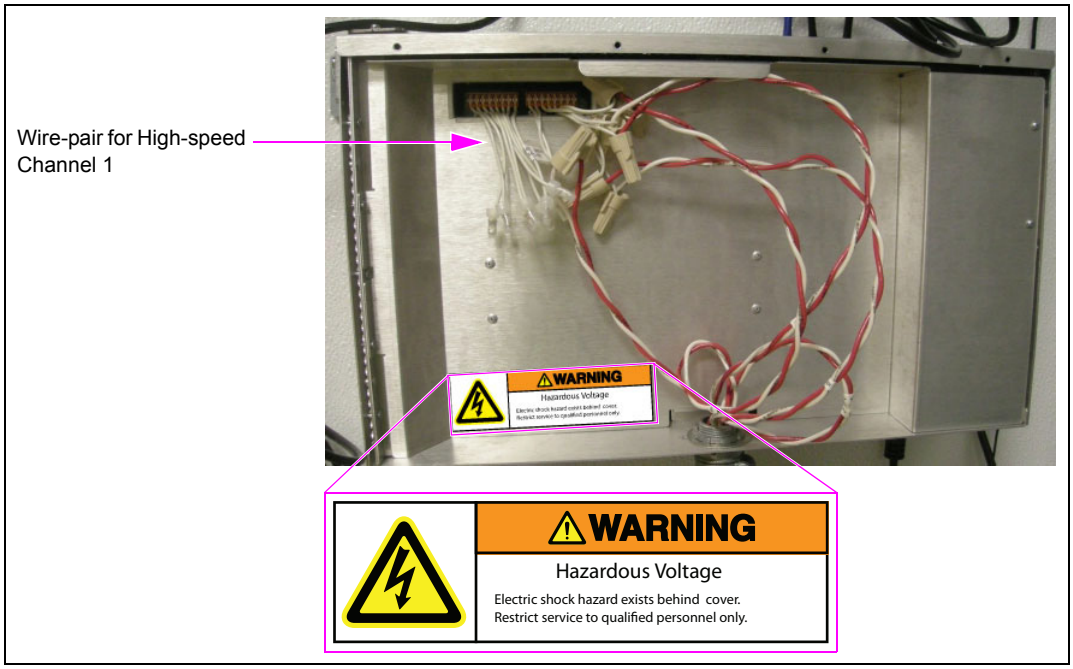
**Figure 14: BRCM - Rear View**




3 Securely mount the BRCM to the wall (see Figure 15 on page 27) so that the conduit enters the provided opening. Secure the unit in position. Secure the conduit with nuts.
*Note: The opening is designed for a 1-inch conduit. If a smaller conduit is used, then the installer must provide the required reducers or adapters.*

4 Connect the supplied wiring pigtail pairs to the forecourt wire pairs using wire nuts (see Figure 15).

**Figure 15: BRCM Wiring**




## BRCM Used with TBM2 D-Box

The BRCM can be mounted in a communications rack. Ensure that the heat rise and air flow in the rack does not exceed the environmental range.

Use the CAT-5 cables to connect the ports labeled “GDSL” on the TBM2 D-Box and BRCM. There are two GDSL ports on the TBM2 D-Box and BRCM. On each unit, they are labeled as GDSL 1-4 and GDSL 5-8.

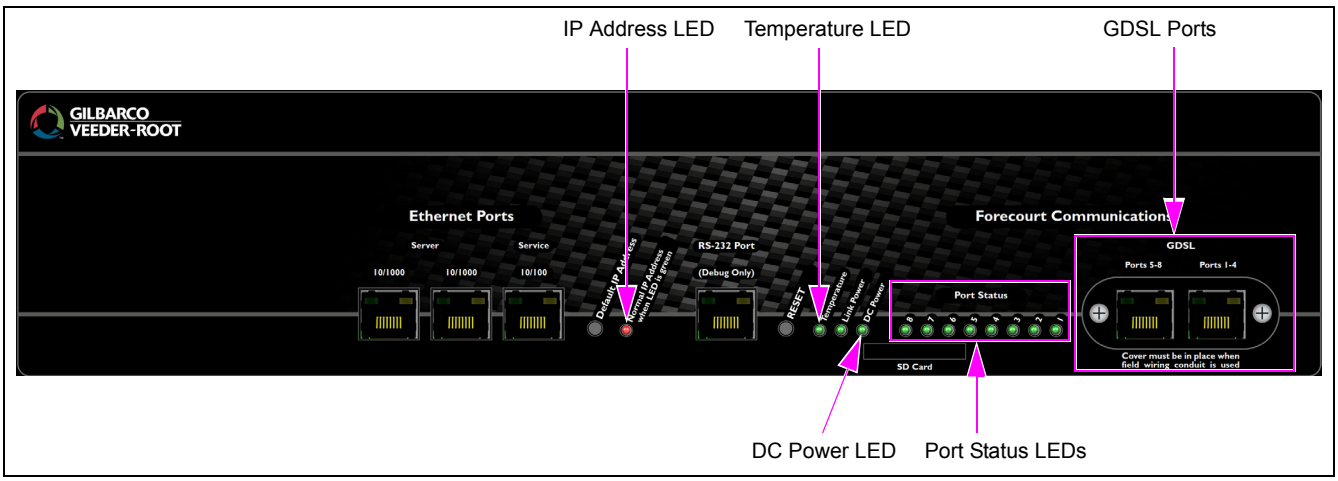
- Connect the GDSL 1-4 Port on the TBM2 D-Box to GDSL 1-4 Port on the BRCM.
- Connect the GDSL 5-8 Port on the TBM2 D-Box to GDSL 5-8 Port on the BRCM.

*Notes: 1) Do not connect laptops, Applause Media System Server, site LAN, or any other non-GDSL signal to the GDSL ports.*

*2) Ensure that the mounting instructions for fastening the D-Box (ITE) to the building surface, including information on mounting hardware, required tools, and special installation considerations/concerns are followed.*

# Troubleshooting BRCM LEDs

**Figure 16: BRCM LEDs**




## BRCM LEDs and Ports

| LEDs/Ports | Description |
|---|---|
| IP Address | • Blinking Red = factory default 10.5.48.135<br>• Green if changed |
| Temperature | Temperature and power supply alarm status.<br>BRCM < 70 ºC, no alarm, TEMP LED Green<br>BRCM > 70 ºC but < 85 ºC, overtemp alarm, TEMP LED Amber<br>BRCM > 85 ºC, critical alarm, VDSL ports being reset. TEMP LED Red<br>DCM > 85 ºC, critical alarm, VDSL port being reset. TEMP LED Flashing Red<br>A channel will be powered down if it has a temperature more than 85 ºC. If more than one channel is over 85 ºC, power to all channels is turned off (the box itself is still on, but power to VDSL channels is off). |
| Port Status | One LED per dispenser. After the BRCM trains with the dispenser, the LED will be “ON GREEN” and flicker Yellow to signal communication. |
| DC Power | • Amber = good<br>• Red or Green = problem with power supply |
| GDSL Ports | Never plug a laptop, Applause Media System Server, or site LAN into the GDSL ports. This can cause damage to laptop and so on. These ports are dedicated to the Applause DSL that connects to the TBM2. |

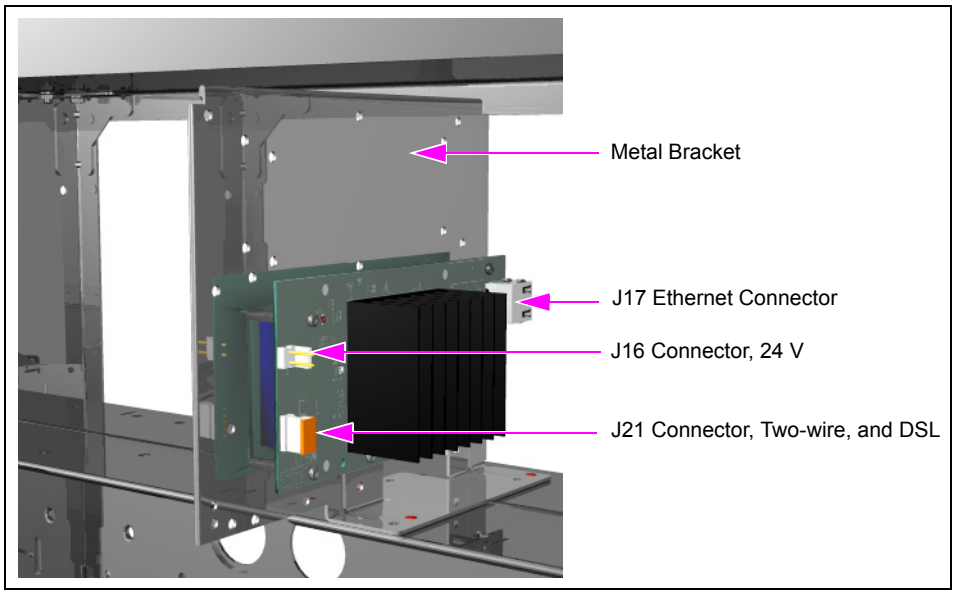
## Installing Dispenser Communication Module [DCM (M11356A001)]

For factory-installed DCMs, proceed to "Field Wiring Instructions" on page 30.

To install the DCM, proceed as follows:

1 Mount the DCM Assembly (M11356A001) on the "T" rail in the upper area of the dispenser, where the monochrome CRIND or HIP Board (M07895) is mounted (see Figure 17).

**Figure 17: Mounting the DCM Assembly**




2 Connect the J17 connector (top RJ-45 connector on the DCM) to J412C connector (bottom-left RJ-45 connector) on the HIP board using the supplied CAT-5 cable.
*Note: The J412C connector may be relocated to the other end of the board in later revisions.*

3 Connect the J16 connector power cable (24 V power input) to the HIP board.

If the board is on opposite side of the metal bracket, use the provided M00746A003 Cable to connect J16 connector on the DCM to P402A or P402B on the HIP board.

~OR~

If M00746A004 Cable is provided, connect the 2-pin connector to J16 connector on the DCM. Remove the J1300 connector from the M07121 Board on the main power supply. Plug the 3-pin connector into P1300 port and then plug the two 3-pin cable connectors.

## Field Wiring Instructions

The field wiring instructions are as follows:

1. The bottom J21 connector is the field wiring connection and also is the existing twisted-pair wiring data output. The pigtail connection on J21's harness must be connected to the communication wiring from the back room.

2. There are two existing twisted-pair wiring connectors, a 2-pin 0.1-inch MTA and a 3-pin 0.1-inch MTA. If the existing twisted-pair wiring communication is CRIND data, then connect the 3-pin connector to the CRIND or HIP board. If the existing twisted-pair wiring communication is pump data, then connect the 2-pin connector to the pump board.

   If the dispenser includes factory-installed conduit, you must cut the two-wire input and route those signals to the DCM.

# Initial Power On

Power on the dispensers and BRCM. The 8 link lights will blink red and green as the BRCM attempts to connect to the corresponding DCM(s). When the link is established or when the data is sent, the link light(s) will go solid green and yellow light will blink every few seconds.

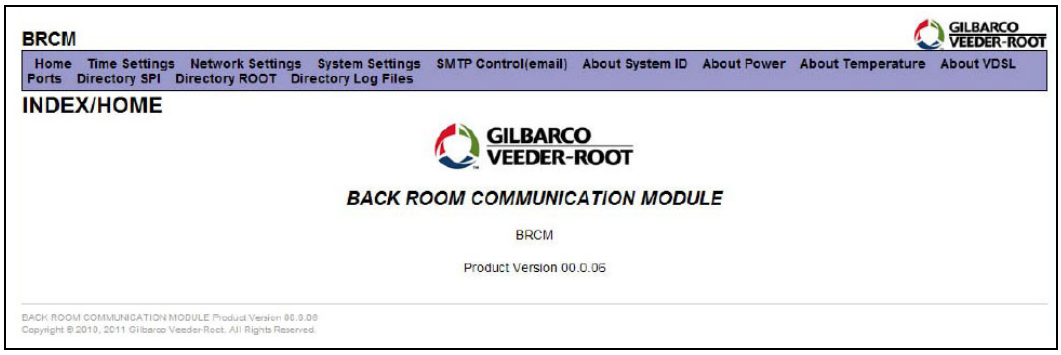
# High-speed Data Connections

For high-speed data connections, proceed as follows:

1 Connect the laptop to Service Port of the BRCM (see Figure 11 on page 23) using a standard (non-crossover) Ethernet cable. Type **10.5.48.135** in the web browser (see Figure 18). The factory default username is **admin** and password is **test**. If a problem occurs while connecting, refer to step 3 on page 32.

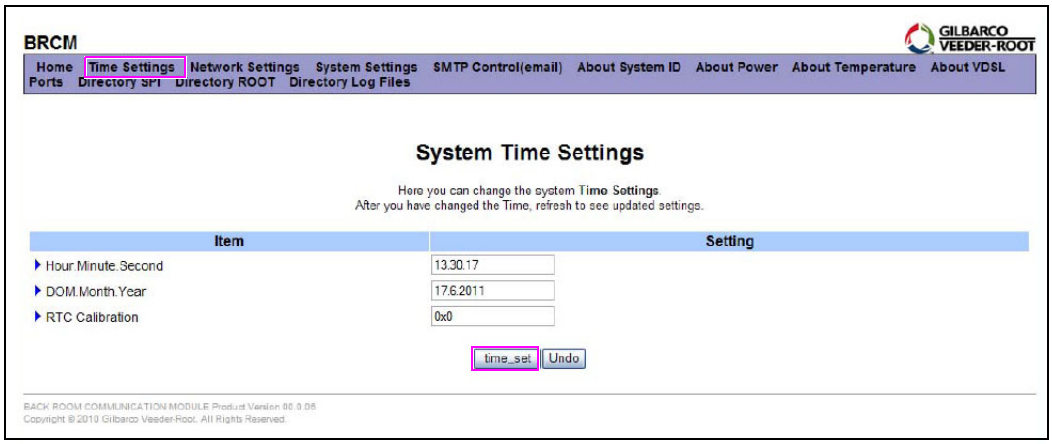
*Note: The service laptop must have a static IP address that is different from the BRCM. You may have to set the laptop static IP address to communicate with the BRCM.*

**Figure 18: BRCM Web Interface**




2 Click **Time Settings** on the menu bar. Set the time in HH:MM:SS format for the local time and press **time_set** (see Figure 19).

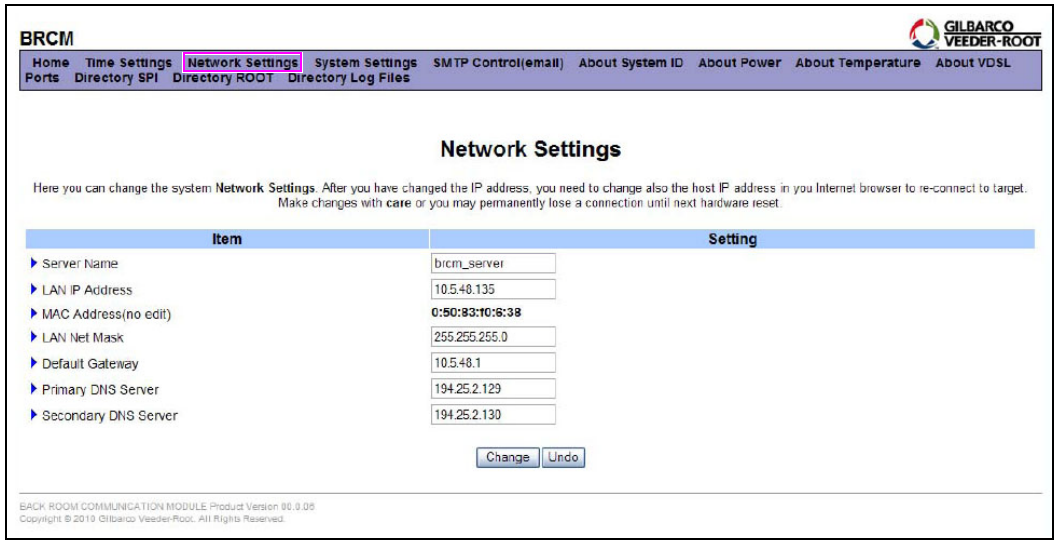
**Figure 19: Time Settings Option**



3 If the IP address must be changed to the local LAN numbering scheme or to give a different IP address to the second BRCM at the site, click **Network Settings** on the menu bar (see Figure 20). For the second BRCM, the recommended IP address is 10.5.48.136.

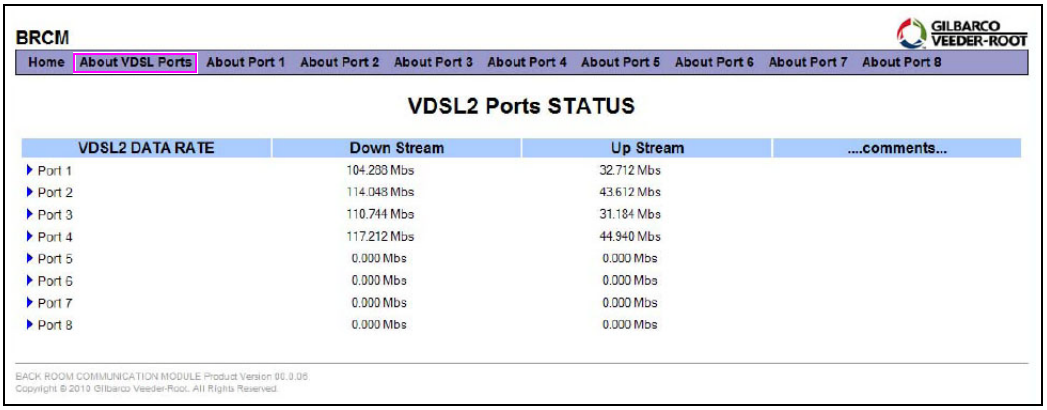
The Reset IP Address button resets the IP address to the default value of 10.5.48.135. If you press this button and the required IP address is different from the default IP address, then you **MUST** re-enter the IP address.

**Figure 20: Network Settings Option**



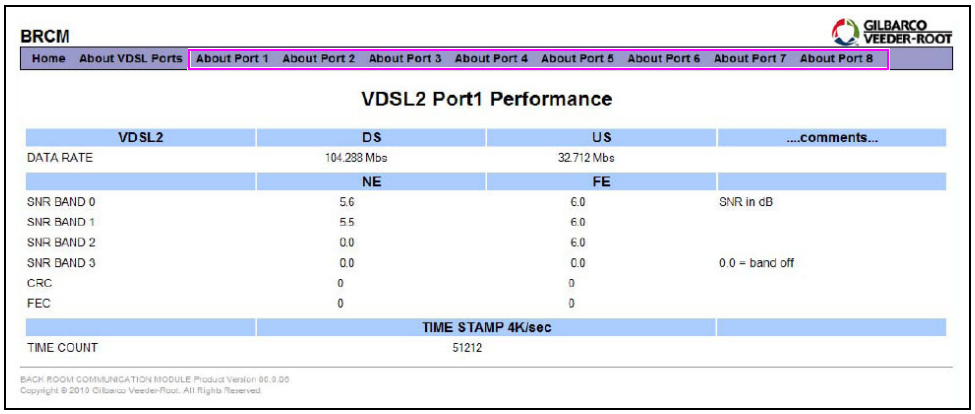

4 Click **About VDSL Ports** on the menu bar to inspect the port status and data rates. An overview screen of all the ports is displayed as shown in Figure 21.

**Figure 21: About VDSL Ports Option**



5 For additional information on each port, click **About Port *x*** on the menu bar (where ***x*** is the port number). The screen appears as shown in Figure 22.

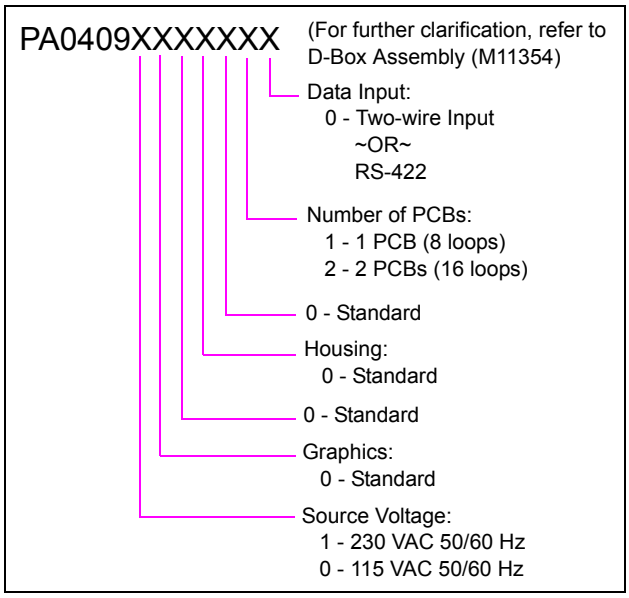
**Figure 22: About Port *x* Option**



# Appendix A: Specifications

## Model Number Breakdown and Unit Ratings

**Figure 23: TBM2 D-Box - Model Number Breakdown**




*Note: The 115 V model is supplied with a molded line cord. If it is used with other voltages or receptacle types, then the installer must provide a molded power cable that meets the local electrical codes and Underwriters Laboratories (UL) requirements.*

## TBM2 D-Box and BRCM Specifications

### Model Number - TBM2 D-Box

| Dimensions | |
|---|---|
| Height | 7-13/16” |
| Width | 16-9/32” |
| Depth | 5-15/32” |
| Weight | 6 lbs |

| Dedicated Isolated Ground Receptacle | |
|---|---|
| USA/Canada | 115 VAC nominal, 50/60 Hz |
| International | 230 VAC nominal, 50/60 Hz |

*Note: For 115 V range, use 98 to 127 VAC. For 230 V range, use 196 to 253 VAC. Either voltage mode accepts 47 to 63 Hz.*

| Current |
|---|
| 0.25 A @ 115 VAC |
| 0.125 A @ 230 VAC |

| Operating Environment | |
|---|---|
| Minimum Temperature | +32 °F (0 °C) |
| Maximum Temperature | +122 °F (+50 °C) |
| Humidity | 5-95% Rh (non-condensing) |

### Model Number - BRCM

| Current |
|---|
| 1 A @ 115 VAC |
| 0.5 A @ 240 VAC |

*Note: Input Voltage range is 90-264 VAC, 47-63 Hz.*

| Operating Environment | |
|---|---|
| **BRCM** | |
| Minimum Temperature | +32 °F (0 °C) |
| Maximum Temperature | +122 °F (+50 °C) |
| Humidity | 5-95% Rh (non-condensing) |
| **DCM** | |
| Minimum Temperature | -30 °C |
| Maximum Temperature | +158 °F (+70 °C) |
| Humidity | 5-95% Rh (non-condensing) |

## Gilbarco CAT-5 Cable Part Numbers

Following table lists the cables to connect the POS Data Port to the TBM2 D-Box two-wire or RS-422 Port:

| Cable Part Number | Cable Length (in feet) |
|---|---|
| Q13850-03 | 3 |
| Q13850-06 | 6 |
| Q13850-10 | 10 |
| Q13850-15 | 15 |
| Q13850-25 | 25 |
| Q13850-50 | 50 |
| Q13850-100 | 100 |
| Q13850-150 | 150 |
| Q13850-200 | 200 |

# Appendix B: Wiring Block Diagrams

**Figure 24: FlexPay Connect Block Diagram for FlexPay UPT**

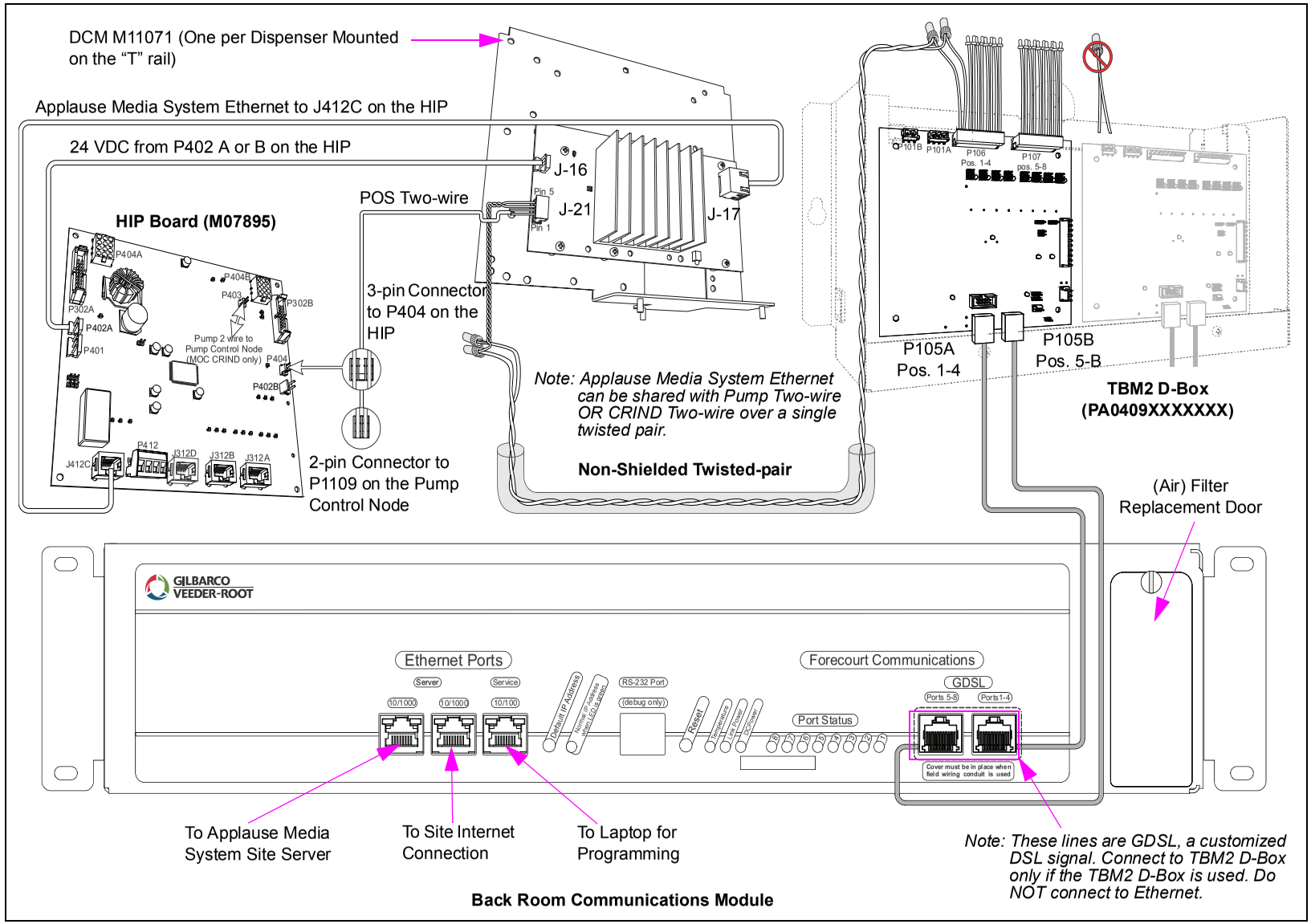
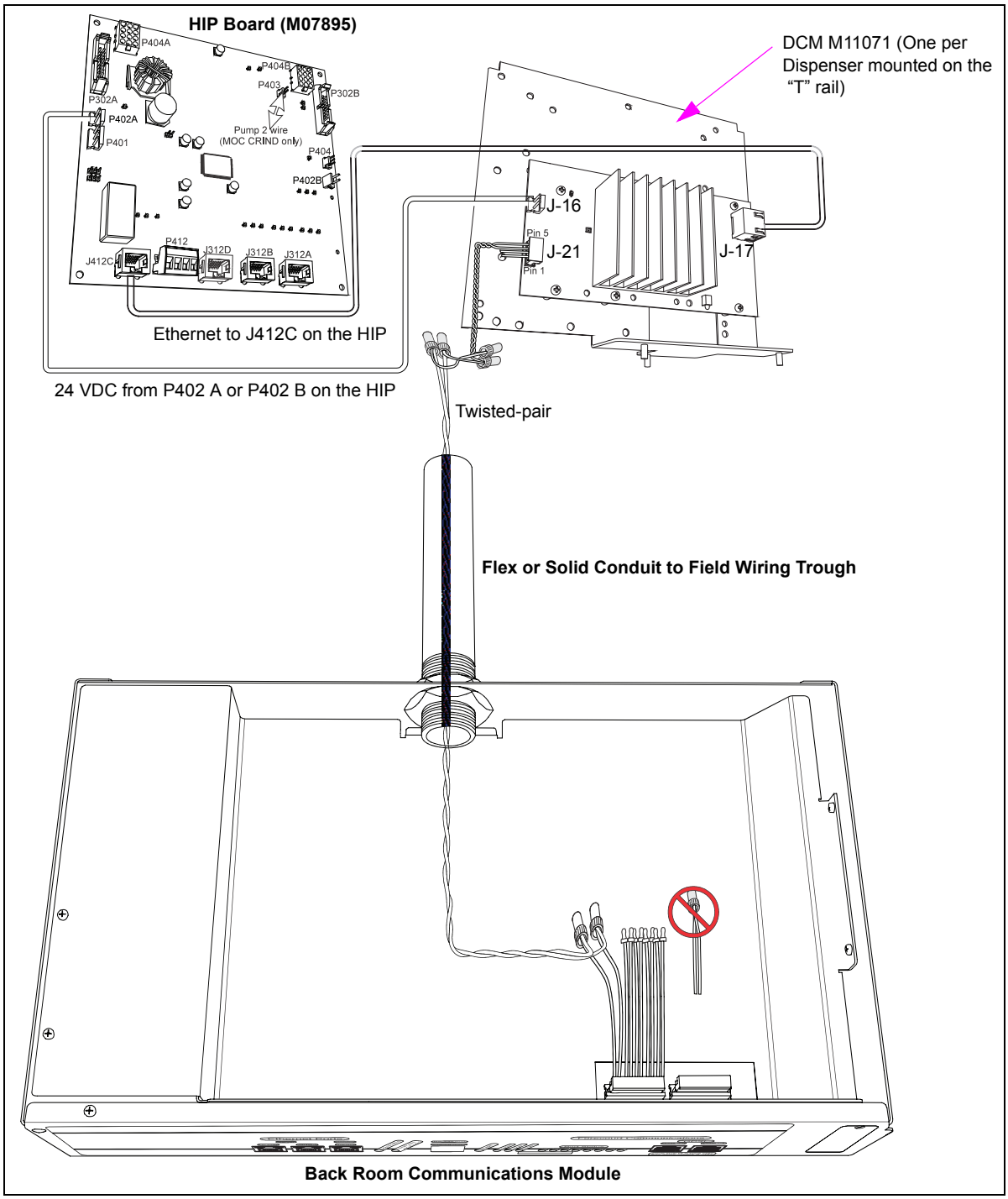


**Figure 25: FlexPay Connect Over Dedicated Wiring Block Diagram (for Applause Media System Data Only)**



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