**TRIND™ MULTI 1**
**Transmitter/Receiver in Dispenser**
**Retrofit Kits C00012-001-XX**

# Installation

# Introduction

## Purpose of this Manual

This manual provides instruction for installing TRIND™ Multi 1 Retrofit Kits in The Advantage® Series wide frame and narrow frame units with InfoScreen®, monochrome CRIND®, or single-line CRIND.

The TRIND option allows customers to automatically authorize CRIND-equipped units using a hand-held transponder tag provided by a major oil company (MOC). Use this kit for one- or two-sided units.

## Prerequisites

Before installing the TRIND kit, ensure that the existing CRIND has the Z-180 logic board T17764-XX, which is not provided in TRIND retrofit kit.

## Important Notice

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

## Required Reading

Before installing the equipment, the installer must read, understand, and follow:

- this manual
- NFPA 30A, The Automotive and Marine Service Station Code
- NFPA 70, The National Electric Code
- applicable federal, state and local codes and regulations

Failure to do so may adversely effect the safe use and operation of the equipment.

*Note: This kit must be installed by a Gilbarco ASC (Authorized Service Contractor) to insure warranty.*

## Related Documents

| | |
|---|---|
| MDE-2531 | Pump & Dispenser Start-Up & Service Manual |
| MDE-2562 | CRIND Service Manual |
| MDE-2628 | Cash Acceptor Retrofit Assemblies for The Advantage Series with CRIND |
| MDE-2620 | Graphics Panel Application for The Advantage Series |
| PT-1728 | The Advantage Series Illustrated Parts Manual |
| PT-1736 | CRIND Card Reader Illustrated Parts Manual |

## Required Tools

**The following equipment is needed to install all TRIND™ Multi 1 kits**

- Allen wrench set, American standard
- clean cloth or rag
- chip extraction tool, e.g., IC extraction, Digikey Part No. K158-ND or equivalent
- isopropyl alcohol (part# END-1082)
- needle nose pliers
- nut driver, 1/4", 3/8"
- pocket knife
- Q12534 CRIND diagnostic card
- ratchet set, standard
- screwdrivers, flat and Phillips head
- static guard wrist strap

**The following additional tools are required if kit is to be installed on wide frame units with call or stop button on existing right options door.**

- center punch
- deburring tool or round file
- hand drill, battery electric or pneumatic
- light hammer
- pilot drill bit (between 3/32” and 1/4”) and 7/8” drill bit
- standard tape measure or rule

# Parts Lists

## Kits for Wide Frame Units, Dual- and Single-Sided

**Kits C00012-001-WF-D (dual-sided) and C00012-001-WF-S (single-sided) for The Advantage Wide Frames (48") contain the following parts.**

| Description | Part Number | Quantity WF-D Kit | Quantity WF-S Kit |
|---|---|---|---|
| cable clamp, gray | Q13558-04 | 12 | 12 |
| cable group | Q13781-01 | For components see table "Q13781-01 Cable Group" on page 3. | |
| cable tie | Q10178-02 | 8 | 8 |
| card cage assembly | T20538-G1 | 1 | 1 |
| door assembly, right options clear with TRIND | T20537-G1 | 2 | 1 |
| graphics, right option door | T50148-G1 | (see note) | (see note) |
| grommet strip, solid | Q10315-06 | .583 ft. | .583 ft. |
| jump jack | Q11011-01 | 10 | 10 |
| label plate, FCC | N23936-01 | 1 | 1 |
| manual, graphics installation instructions | MDE-2620 | 1 | 1 |
| manual, installation instructions | MDE-3801 | 1 | 1 |
| nut | Q12068-04 | 2 | 2 |
| software (firmware) CRIND® BIOS | K93744-01 | 2 | 1 |

*Note: Right Option Door Graphics T50148-G1 are an Order Entry Item.*

### Q13781-01 Cable Group

Cable group Q13781-01 for all kits contains the following cables:

| Cables | Part Number | Quantity per kit |
|---|---|---|
| Gateway to CRIND logic | R20437-G01 | 1 |
| AC power | R20580-G2 | 1 |
| Light/Multi-protocol Reader, A-Side | R20665-G1 | 1 |
| Light/Multi-protocol Reader, B-Side | R20665-G2 | 1 |
| Gateway to Light/MPR/Power Boards | R20724-G1 | 1 |

## Kits for Narrow Frame Units, Dual- and Single-Sided

### Kits C00012-001-NF-D (dual-sided) and C00012-001-NF-S (single-sided) for The Advantage Narrow Frames (36”) contain the following parts.

| Description | Part Number | Quantity WF-D Kit | Quantity NF-S Kit |
|---|---|---|---|
| cable clamp, gray | Q13558-04 | 12 | 12 |
| cable group | Q13781-01 | For components see table “Q13781-01 Cable Group” on page 3. | |
| cable tie | Q10178-02 | 8 | 8 |
| card cage assembly | T20538-G1 | 1 | 1 |
| door assembly, right options clear with TRIND | T20539-G1 | 2 | 1 |
| graphics, right option door | T50148-G1 | (see note) | (see note) |
| grommet strip, solid | Q10315-06 | .583 ft. | .583 ft. |
| jump jack | Q11011-01 | 10 | 10 |
| label plate, FCC | N23936-01 | 1 | 1 |
| manual, graphics installation instructions | MDE-2620 | 1 | 1 |
| manual, installation instructions | MDE-3801 | 1 | 1 |
| nut | Q12068-04 | 2 | 2 |
| software (firmware) CRIND® BIOS | K93744-01 | 2 | 1 |

*Note: Right Option Door Graphics T50149-G1 are an Order Entry Item.*

# Safety Information

## Alert Symbol and Signal Words

**Alert Symbol:**
This is a standard ANSI* approved alert symbol. When you see this symbol, be alert to the potential for a personal injury.
* Reference American National Standard Bulletins ANSI Z535.

**Signal Words:**
These signal words alert you to important safety hazards.

| WARNING | CAUTION | DANGER |
|---|---|---|
| The hazard or unsafe practice may result in severe injury or death. | The hazard or unsafe practice could result in minor injury. | The hazard or unsafe practice will result in severe injury or death. |

## Safety Symbols:

The following safety symbols are used throughout this manual to alert you to personal safety hazards and precautions.

Explosive

Flammable

Electrical hazard

Use safety barricades

No people in area

No vehicles in area

Use emergency power disconnect

No open flames

No smoking

No power tools

Wear eye protection

Read all related manuals

Clean up spills

Turn power off

## Before Beginning

**Do the following:**

**WARNING**

Dangerous Environment! Failure to install this equipment in accordance with NFPA 30A and NFPA 70 could result in severe injury or death. Read, understand and follow NFPA 30A and NFPA 70.

Read all instructions before beginning.

Follow all safety precautions, including:

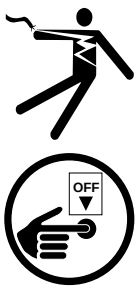
- Barricade work area.
- Do not allow vehicles or unauthorized people in work area.
- Do not use power tools in work area.
- Do not permit smoking or open flames in work area.
- Wear protective gear while performing this installation.

Record all mechanical and electronic totals.


Turn off all power to unit, unit lights and STPs.

- Use system circuit breakers.
- Multiple disconnects may be required.
- Isolate each pump at distribution box.
- Refer to MDE-2531, Pump and Dispenser Start-up and Service for OSHA lock-out/tag-out procedures.

**WARNING**




Working on dispenser electronics with power applied may result in electrocution and damage to electronic components.

Power down unit before beginning work.

When system battery is present, turn off system battery by pressing CLEAR then ENTER on manager keypad.

### Use Electrostatic Discharge Precautions

Place yourself at a neutral static-free potential by doing the following:

1. Touch an unpainted metal surface.
2. Use a wrist strap connected to a grounded metal frame or chassis.

*Note: Failure to use electrostatic discharge precautions may damage electronic components and void warranty.*


Make sure all power has been removed from unit and CRIND.

### Follow OSHA Lock-Out and Tag-Out Requirements

OSHA Standard 29 CFR 1910-147 Control of Hazardous Energy Sources (Lock-Out/Tag-Out) covers ways to avoid personal injury if power is turned on or fuel pressure is applied unexpectedly while servicing equipment. The rule requires that equipment power and fuel under pressure be turned off and the device (breaker, valve, etc.) locked or labeled with a warning tag.

Read OSHA Standard 29 CFR 1910-147 Control of Hazardous Energy Sources (Lock-Out/Tag-Out). Station employees and service contractors need to understand and comply with this program completely to ensure safety while the equipment is down.

**Tag-Out and Lock-Out Procedure**

Use plastic warning tags with signature/date blanks for Tag-Out. Sign and date them at shut down. Attach tags with plastic connectors.

Use metal screw-down lock clamps or plastic single or multi-pole devices for Lock-Out of breakers and switches. Always use a lock-out device whenever possible.

When working on electronics and electrical connections (junction box):

- Turn off unit power, light breakers, and all dispensers sharing the same isolation relay box.
- Install lock-out device and tag on breaker(s).

*Note: If station does not use STP control wire isolation relays, multiple disconnects may be required to shut off all power supplied to the unit.*

# Installation

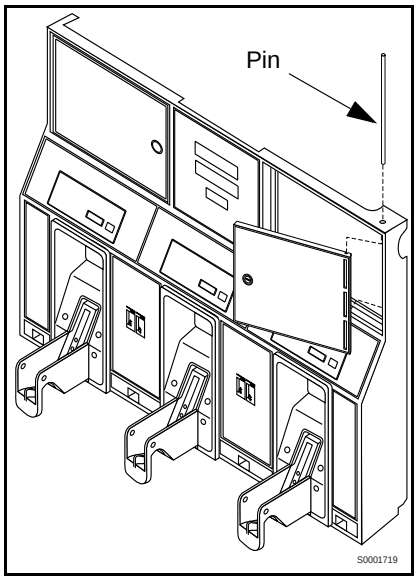
## Preparing for Installation

**1** Before proceeding read and follow all safety instructions and procedures.

**2** Open main access doors. Refer to MDE-2531, Pump and Dispenser Start-Up/Service Manual for access instructions.

**3** Disconnect and remove existing hardware according to the following:
- For wide frame units disconnect any cables and remove any call or stop buttons, or door alarm switch hardware from existing right options door. Save all removed hardware for reassembly.
- For narrow frame units disconnect cables to PPU and main display.

**4** Remove door mounting pin and right options door.

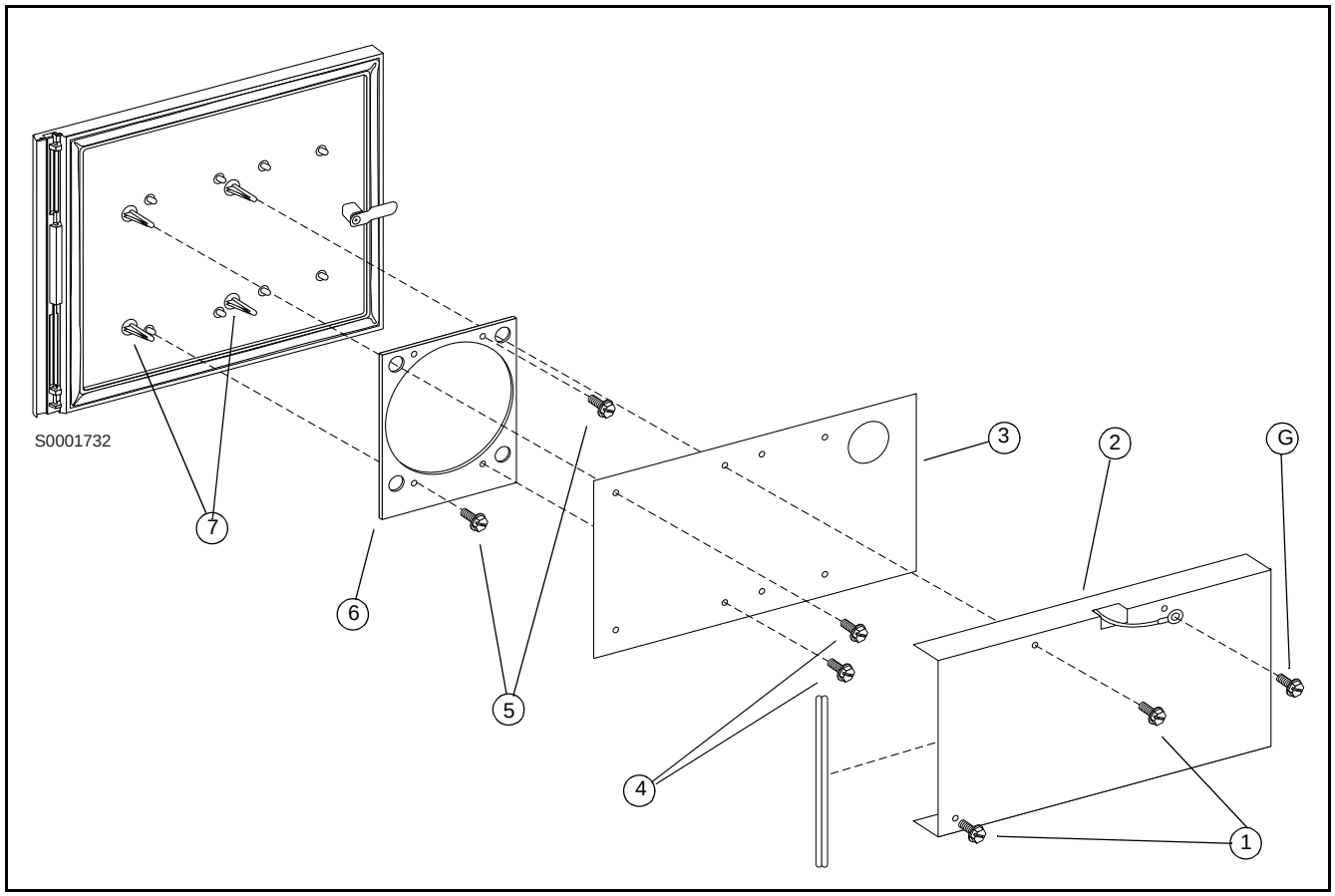



**5** If unit has Cash Acceptor, remove door alarm and all hardware from old door and save.

**6** Dispose of door. Save pin for reassembly.

## Modifying Right Options Door On Wide Frame Units

For all narrow frame units, or wide frame units without stop or call buttons or door alarm switches, proceed to "Installing Cables" on page 13. For wide or narrow frame units without stop or call units but with door alarm, proceed to "Re-installing Door Alarm Switches" on page 12. For wide frame units with stop or call button previously installed on right options door, do the following to relocate hardware to new TRIND Multi 1 options door.



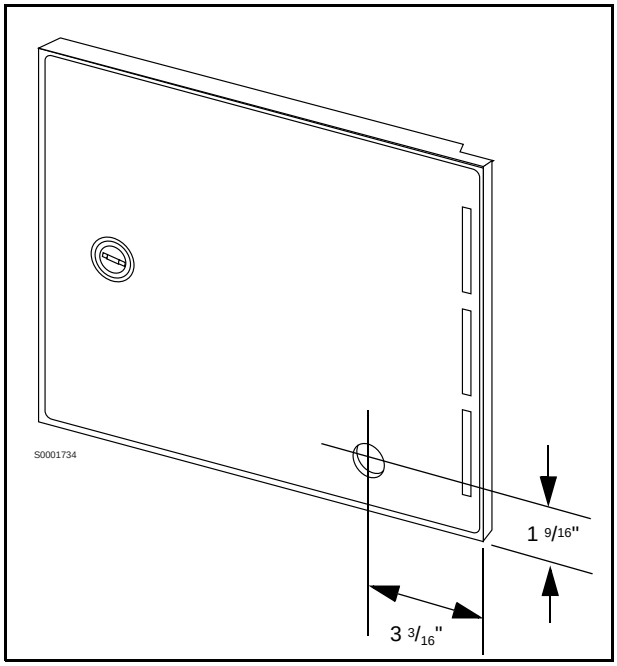

**1** Remove all hardware from new right options door according to the following steps and save all parts for reassembly.

- Remove two screws (1) mounting sheet metal antenna shield (2) on rear of door. Save shield and screws for reassembly.

*Note: Screw (G) fastening grounding wire on side of sheet metal shield does not need to be removed.*

- Disconnect cable R20718-G1 from light/microreader printed circuit board T20545-G1 (3) by disconnecting J191 on cable from P191 on board.
- Remove two standoff-screws (4) holding light/microreader board (3), and remove board. Save for reassembly.
- Remove two screws (5) and carefully pry antenna board T20551-G1 (6) off four standoffs (7) on door and save for reassembly.

**2** Use center punch and hammer to mark placement of pump stop or call button hole on new right options door by measuring from door edges as shown below.

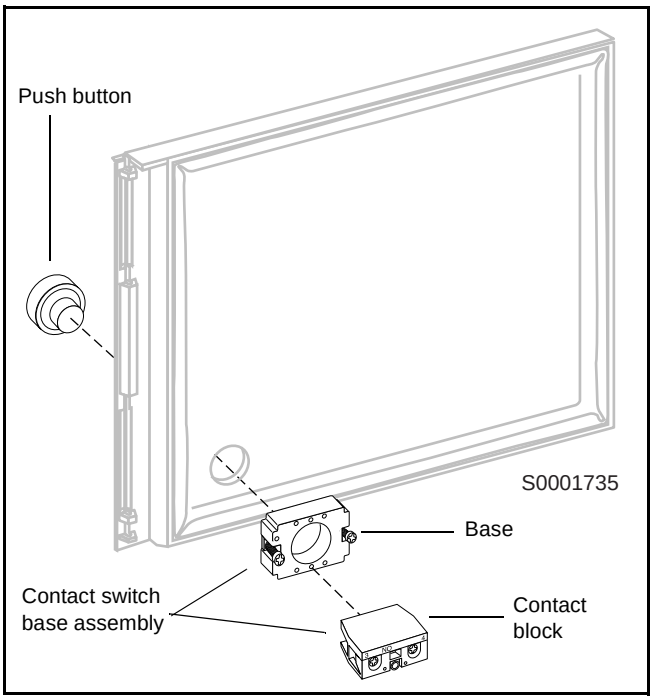



**3** Away from fuel island, drill a 7/8 inch diameter hole in location illustrated above.

**4** Remove any burrs around hole with deburring tool or rounded file.

## Re-installing Button

**1** Hold contact base on back of door and align with hole drilled earlier.




**2** Insert push button from front of door by aligning tabs with slots in base.

**3** Turn push button 45° clockwise to lock button to base.

**4** Tighten two screws on base to secure push button and base assembly to door.
*Note: Do not overtighten screws.*

**5** Attach contact block to base with center screw if not already installed.

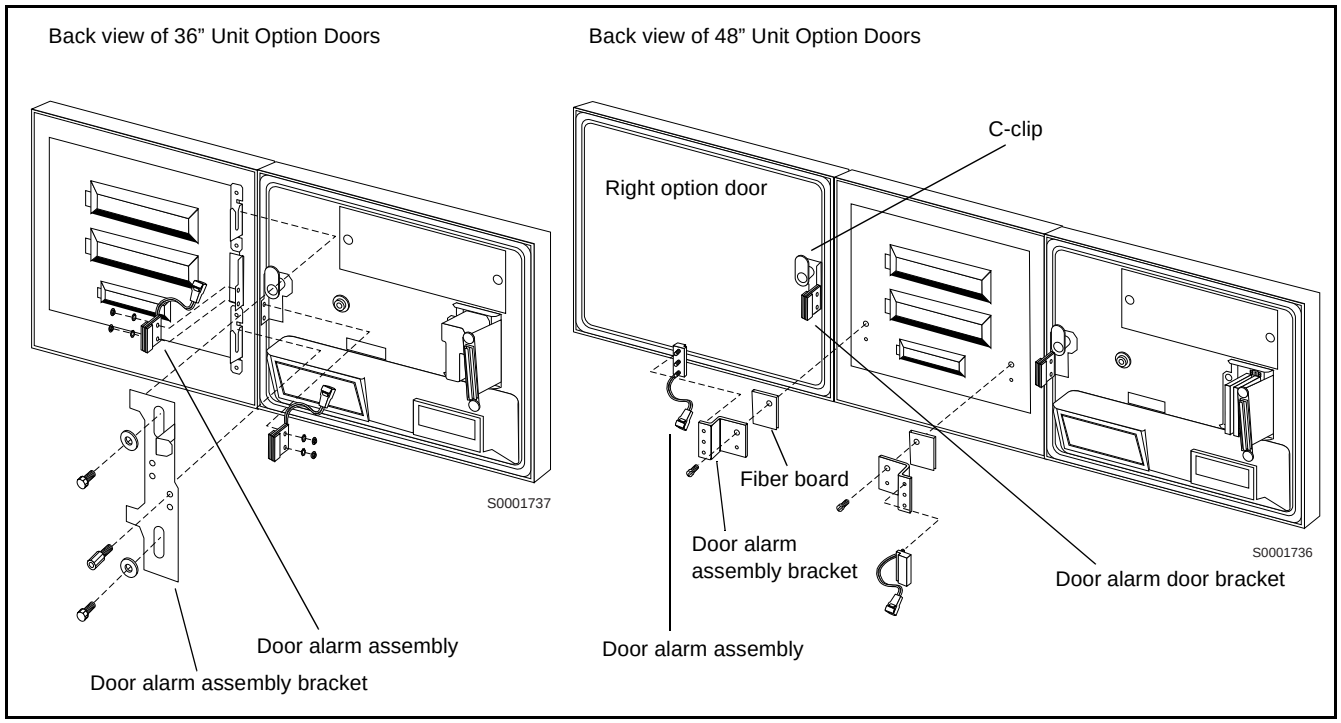
**6** If unit does not have door alarm, reinstall all new right options door hardware except sheet metal shield by reversing procedures in Step 1 of "Modifying Right Options Door On Wide Frame Units" on page 9 and proceed to "Installing Cables" on page 13. If unit has door alarm, proceed to "Re-installing Door Alarm Switches" on page 12.

## Re-installing Door Alarm Switches

For units with cash acceptors, follow these steps to re-install door alarm assemblies on TRIND™ right option doors. Refer to diagram on this page for more information. Perform each step for both 'A' and 'B' side right option doors.

**1** Remove lock hardware from new right options door.

**1** Re-install C-clips removed from old right side option doors on new door.




**2** Install door alarm assembly to door alarm assembly bracket with screw previously removed.

**3** Attach door alarm assembly bracket to display board with screw previously removed.
*Note: Replace the piece of fiberboard between door alarm bracket assembly and display board.*

**4** Be sure magnet does ***not*** touch door alarm door bracket. Slightly move door alarm door bracket away, if necessary.

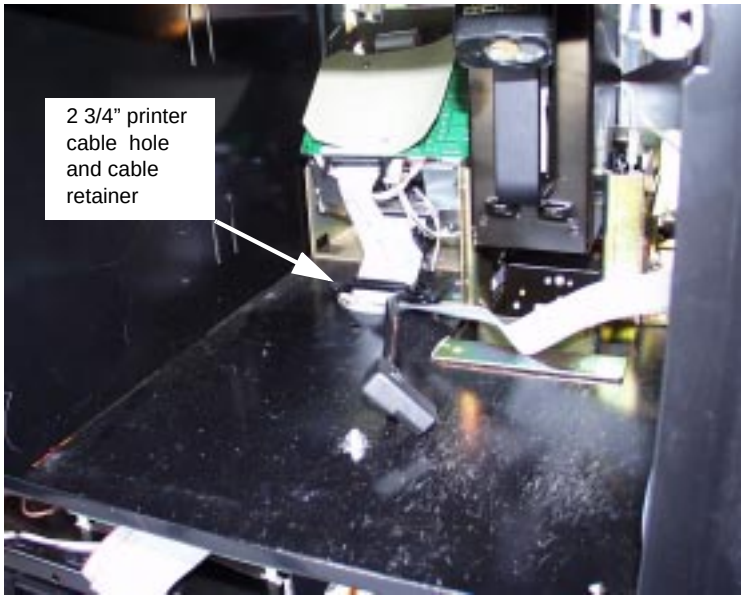
**5** Reinstall all new right options door TRIND hardware except sheet metal cover by reversing procedures in Step 1 of "Modifying Right Options Door On Wide Frame Units" on page 9.

## Installing Cables

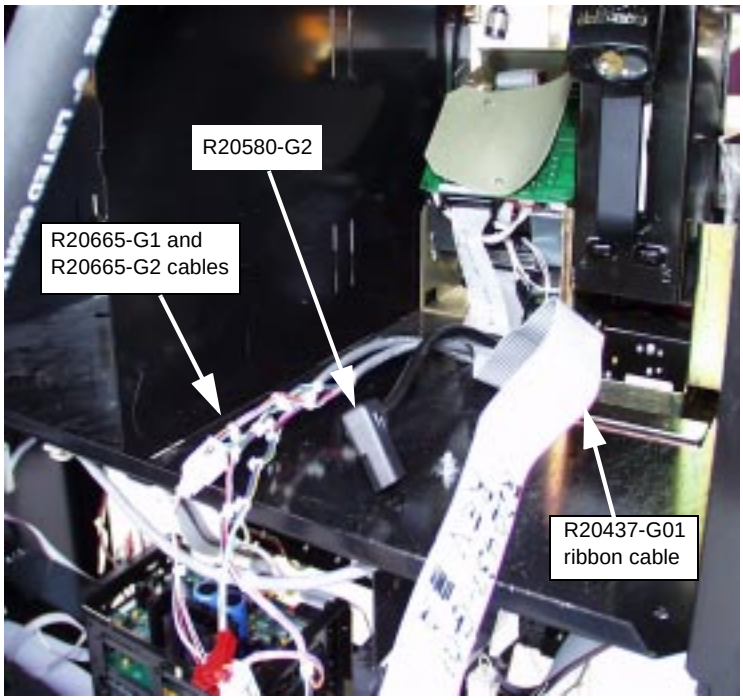
**Position kit cables according to the following steps:**

1. Carefully pry out printer cable retainer from underside of printer shelf.

2. Disconnect printer cable and pull cable out of 2 3/4" round hole from bottom, and install piece of strip grommet Q10315-06/B around perimeter of hole.




3. Feed three-prong end of power cable R20580-G2, J250 end of R20437-G01 ribbon cable and multiple connector ends of cables R20665-G1 and R20665-G2 up through hole and lay cable ends toward A side.




4. Reinstall printer cable and retainer disconnected and removed in step 2.

## Installing Card Cage

**Prepare T20538-G1 card cage for installation.**

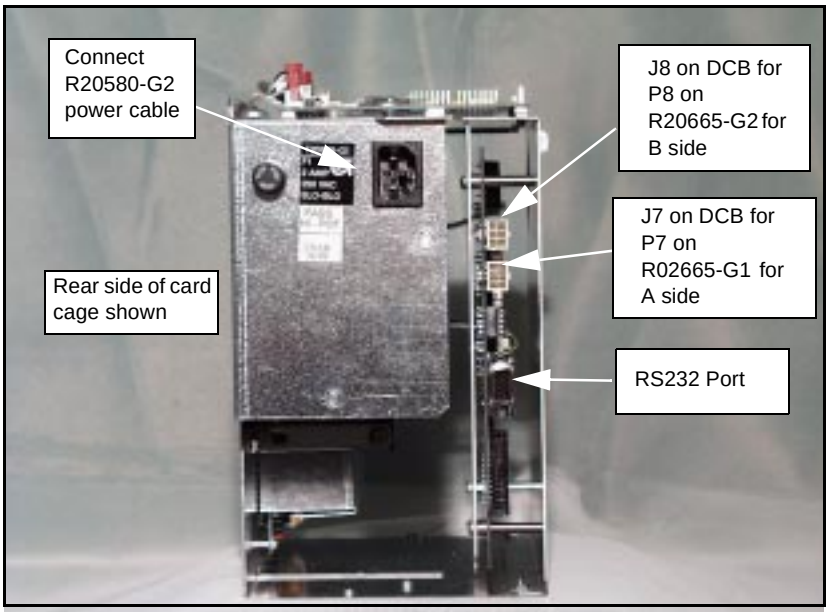
*Note: For more cable connection detail see "Cable Block Diagrams" on page 24.*

**1** Locate tab at left front top of card cage.

**2** From B side of unit, turning card cage sideways to unit, feed top and rear of card cage up and into shelf.
*Note: Front of card cage will face B side.*

**3** Position card cage so that tab fits over latch cutout for main door latch to secure card cage to shelf divider. Note position of two screws protruding from bottom of card cage:
- For newer units, both screws will pass through holes in printer shelf.
- For older units, holes will not align with holes in shelf. Remove both screws and save.

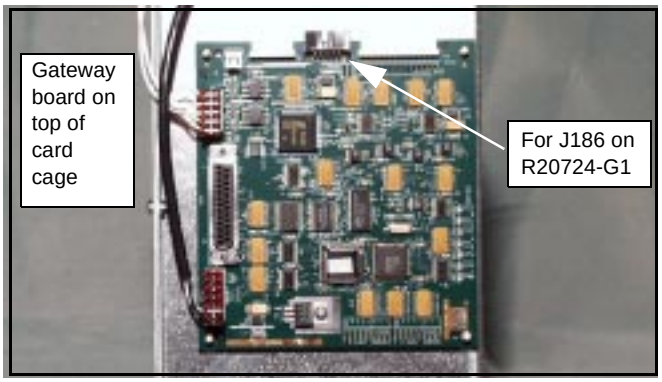
**4** Position rear of card cage on edge of cabinet shelf for easy cable connection.
*Note: Do not secure card cage at this time. Connecting cables and setting jump jacks are easier if card cage can be manipulated by installer.*




**5** Connect three prong female end of power cable R20580-G2 to card cage at location shown.

**6** Connect P7 on R20665-G1 to J7 and P8 on R20665-G2 to J8 on DCB at location shown.

**7** Connect J186 on R20724-G1 cable to P186 on Gateway Board on top of card cage.



### Address Gateway Board Before Installing Card Cage

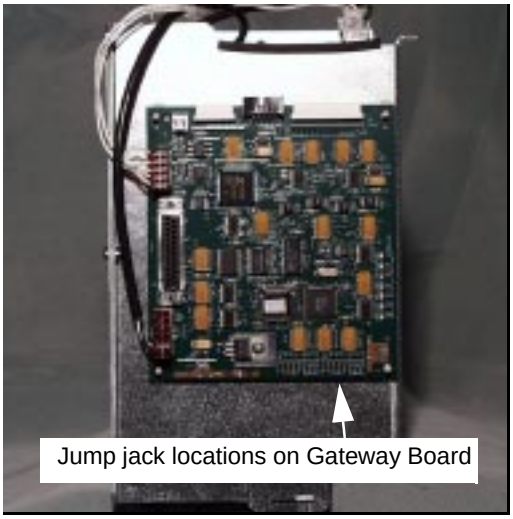
Address for TRIND™ must match address on CRIND® logic board. Follow these steps:

**1** From A side of unit lower CRIND tray. Refer to MDE-2562 CRIND Service Manual.

**2** Locate jump jacks on A and B side CRIND logic boards T17764-XX.

**3** Note position of jump jacks and set jump jacks on Gateway board T20128 to match address on CRIND logic boards for both A and B sides.

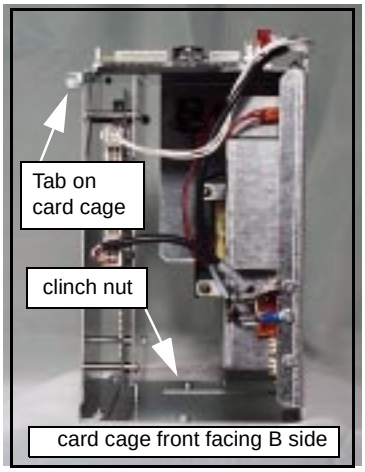
### MOC and Generic CRIND Addresses.




| Address On CRIND Logic Board T17764-XX | JP8 | JP7 | JP6 | JP5 | JP4 |
|---|---|---|---|---|---|
| = Address on Gateway Board T20128 'A' Side | JP6 | JP7 | JP8 | JP9 | JP10 |
| = Address on Gateway Board T20128 'B' Side | JP14 | JP15 | JP16 | JP17 | JP18 |
| 1 | IN | OUT | OUT | OUT | OUT |
| 2 | OUT | IN | OUT | OUT | OUT |
| 3 | IN | IN | OUT | OUT | OUT |
| 4 | OUT | OUT | IN | OUT | OUT |
| 5 | IN | OUT | IN | OUT | OUT |
| 6 | OUT | IN | IN | OUT | OUT |
| 7 | IN | IN | IN | OUT | OUT |
| 8 | OUT | OUT | OUT | IN | OUT |
| 9 | IN | OUT | OUT | IN | OUT |
| 10 | OUT | IN | OUT | IN | OUT |
| 11 | IN | IN | OUT | IN | OUT |
| 12 | OUT | OUT | IN | IN | OUT |
| 13 | IN | OUT | IN | IN | OUT |
| 14 | OUT | IN | IN | IN | OUT |
| 15 | IN | IN | IN | IN | OUT |
| 16 | OUT | OUT | OUT | OUT | IN |
| 17 | IN | OUT | OUT | OUT | IN |
| 18 | OUT | IN | OUT | OUT | IN |
| 19 | IN | IN | OUT | OUT | IN |
| 20 | OUT | OUT | IN | OUT | IN |
| 21 | IN | OUT | IN | OUT | IN |
| 22 | OUT | IN | IN | OUT | IN |
| 23 | IN | IN | IN | OUT | IN |
| 24 | OUT | OUT | OUT | IN | IN |
| 25 | IN | OUT | OUT | IN | IN |
| 26 | OUT | IN | OUT | IN | IN |
| 27 | IN | IN | OUT | IN | IN |
| 28 | OUT | OUT | IN | IN | IN |
| 29 | IN | OUT | IN | IN | IN |
| 30 | OUT | IN | IN | IN | IN |
| 31 | IN | IN | IN | IN | IN |
| 32 | OUT | OUT | OUT | OUT | OUT |

### Install card cage assembly.

Install card cage by doing the following:



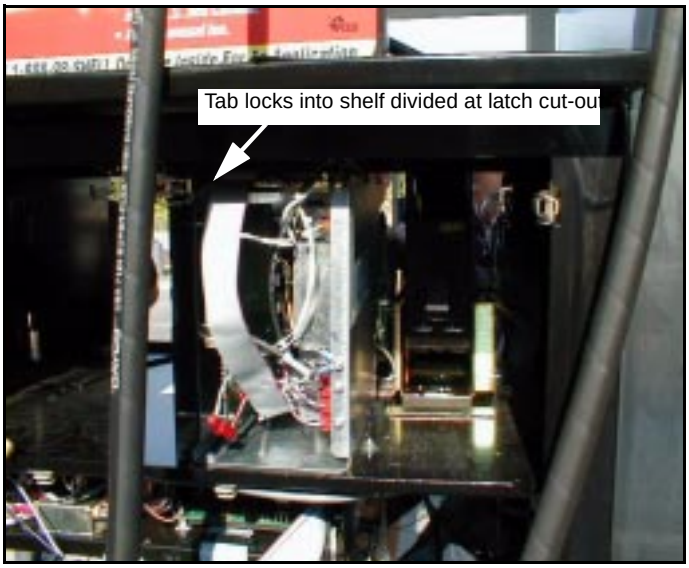

*Note: While it is not necessary to remove printer to install card cage you may find your initial installations easier if this is done. To do so, disconnect two cables and remove ground connector to A side printer. Remove printer and printer mounting hardware from unit and save for reinstallation.*

**1** Locate tab at left front top of card cage.

**2** From B side, turn card cage sideways to unit, feed top and rear of card cage up and into shelf.
*Note: Front of card cage will face B side.*

**3** Position card cage so that tab fits over latch cutout for main door latch, securing card cage to shelf divider.

- If two screws on card cage pass through shelf secure from underside of shelf with two nuts provided in kit.
- If screws were removed, secure card cage from underside of shelf by installing one screw removed in section “Prepare T20538-G1 card cage for installation.” on page 14 up through hole in shelf to clinch nut on card cage (see illustration above). Dispose of second screw and two nuts.



## Installing Right Option Door

### Mount New Right Options Door

Install new right options door according to the following steps.

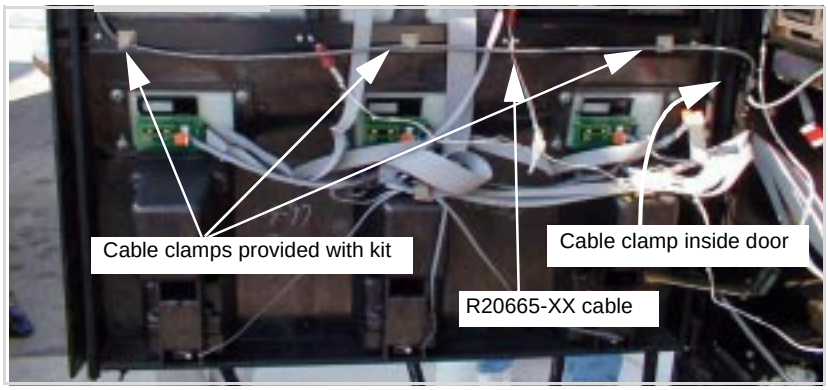
1. If sheet metal shield has not been previously removed, using 1/4" nut driver, remove sheet metal shield from back of door. Refer to illustration in "Modifying Right Options Door On Wide Frame Units" on page 9 for detail. Save cover and hardware.

2. Remove key taped to inside of new right options door and save.

3. Position new right options door and install with pin removed with old door and saved.
   *Note: If unit had stop or call button transferred from old door to new TRIND door, reconnect stop or call button wires to contact block.*

### Route cables to Right Option Doors

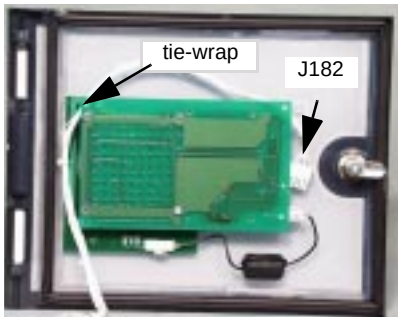
*Note: Cable R20665-G1 to A side is shorter than B side cable R20665-G2*




1. Route A side cable R20665-G1 through cable clamp inside door and secure along door with clamps provided with kit.

2. Route B side cable through clamps above CRIND tray to cable clamp inside door, and secure along door with clamps provided with kit.
   *Note: When routing from cabinet to main door, allow sufficient slack in cables to allow main door to open and close without pulling or crimping cables. Also check that cable is not crimped when door is closed.*

3. Route cables around board as shown for both wide and narrow frame units, securing cable to board with tie-wrap.

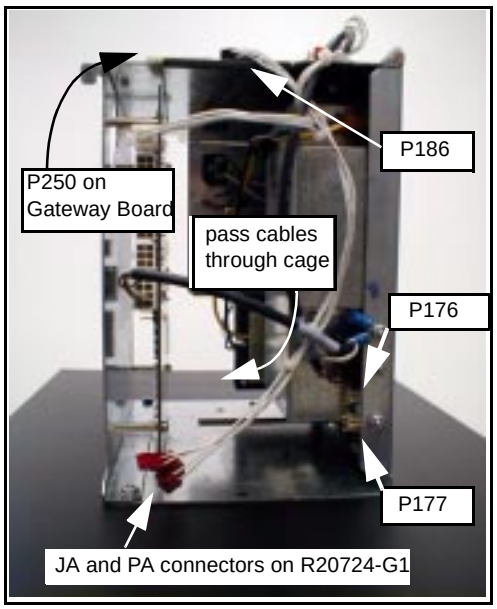



4. Connect J182 on each cable to P182 on PCB assembly on option door.

5. Reinstall sheet metal cover on door, being careful to avoid crimping cables.

## Connecting Remaining Cables

**1** From A side, pass J250 end of cable R20437-G01, J176 and JA ends of cable R20665-G1 and J177 and PA ends of cable R20665-G2 through card cage to B side.




**2** From B side, connect J176 on cable R20665-G1 to P176 on Power Supply PCB.
*Note: Detailed information provided on "Cable Block Diagrams" on page 24.*

**3** Connect J177 on cable R20665-G2 to P177.

**4** Connect JA on R20665-G1 to PA on R20724-G1 cable.

**5** Connect PA on R20665-G2 cable to JA on R20724-G1 cable.

**6** Connect J250 on ribbon cable R20437-G01 to P250 on Gateway board on top of card cage.

### From A side of unit make the following connections:

**1** On ribbon cable R20437-G01, connect J258A to P258 on A side CRIND Logic Board.
*Note: A side of split cable R20437-G01 has red wire.*

**2** On ribbon cable R20437-G01, connect J258B to P258 on B side CRIND Logic Board.

### Connect R20580-G2 power cable according to the following:

*Note: Connections are unit specific. Use appropriate connectors to intercept power by installing R20590-G1 inline.*

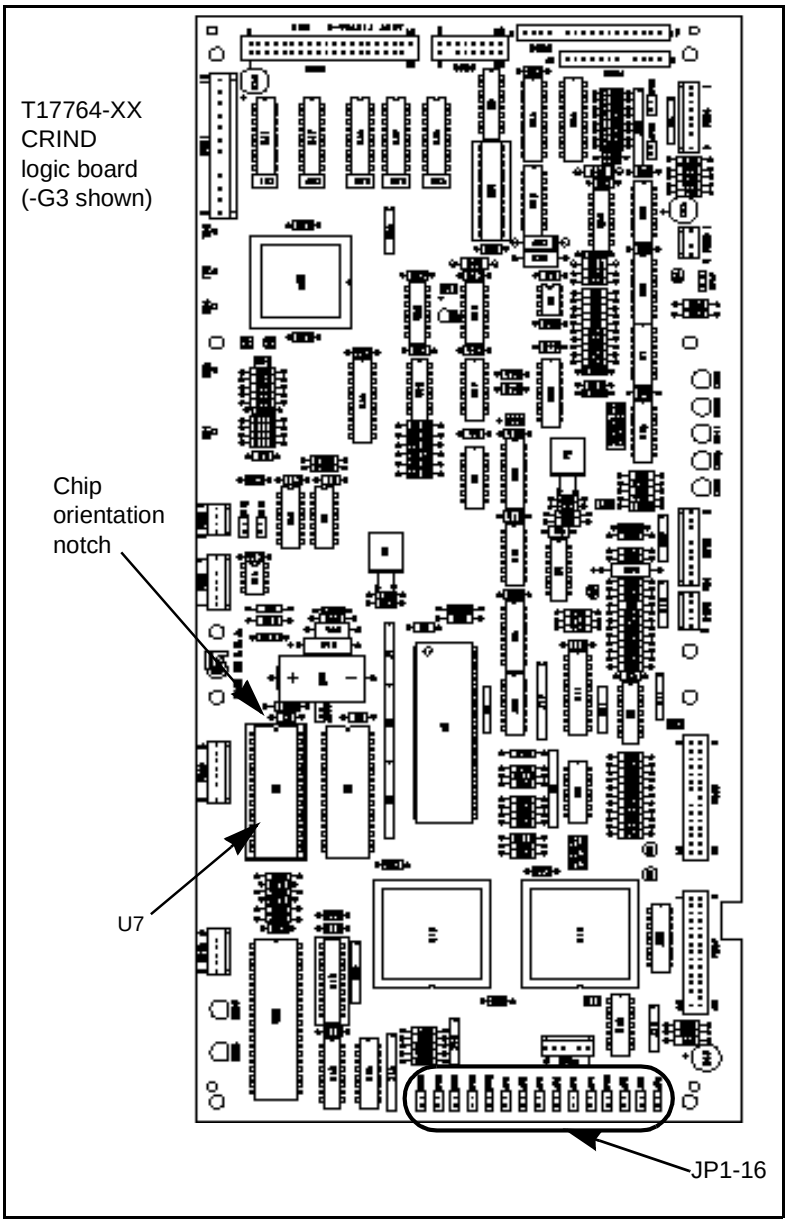
| For units with: | Do the following: |
|---|---|
| System cable W02468 | Install inline using 15 pin P601 and J601 connectors |
| System cable T19612 | Install inline using 3 pin connectors J601/J708 and P601/P708 |

# CRIND® BIOS TRIND™ Multi 1 Upgrade

Units must have current Z-180 CRIND logic board.

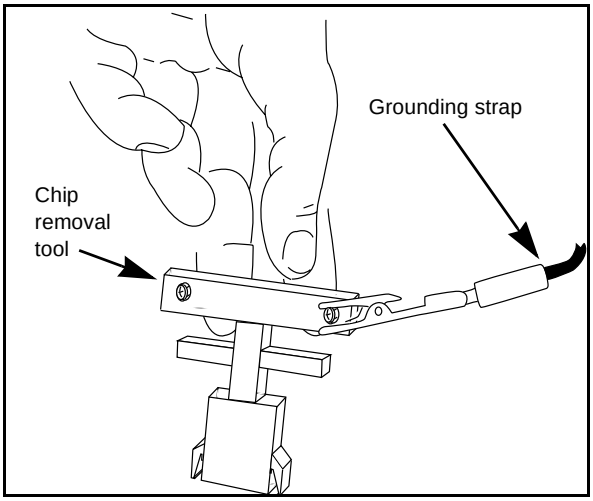
Install the CRIND Bios TRIND software K93744-01, one per logic board, on the T17764-XX CRIND logic board(s) according to the following steps.

*Note: A properly grounded electrostatic discharge wrist strap must be worn during this procedure.*



**1** Locate and remove existing BIOS at U7 on CRIND® logic board T17764-XX using a grounded chip removal tool.

.




**2** Install TRIND BIOS K93744-01 (one per logic board) at position U7, orienting notch on chip with indication mark on board as shown.

**3** Install jump jack on JP-16 for each side of unit.
*Note: Jumper on JP-16 informs the CRIND that a TRIND system is present.*

**4** Restore CRIND tray to operating position.

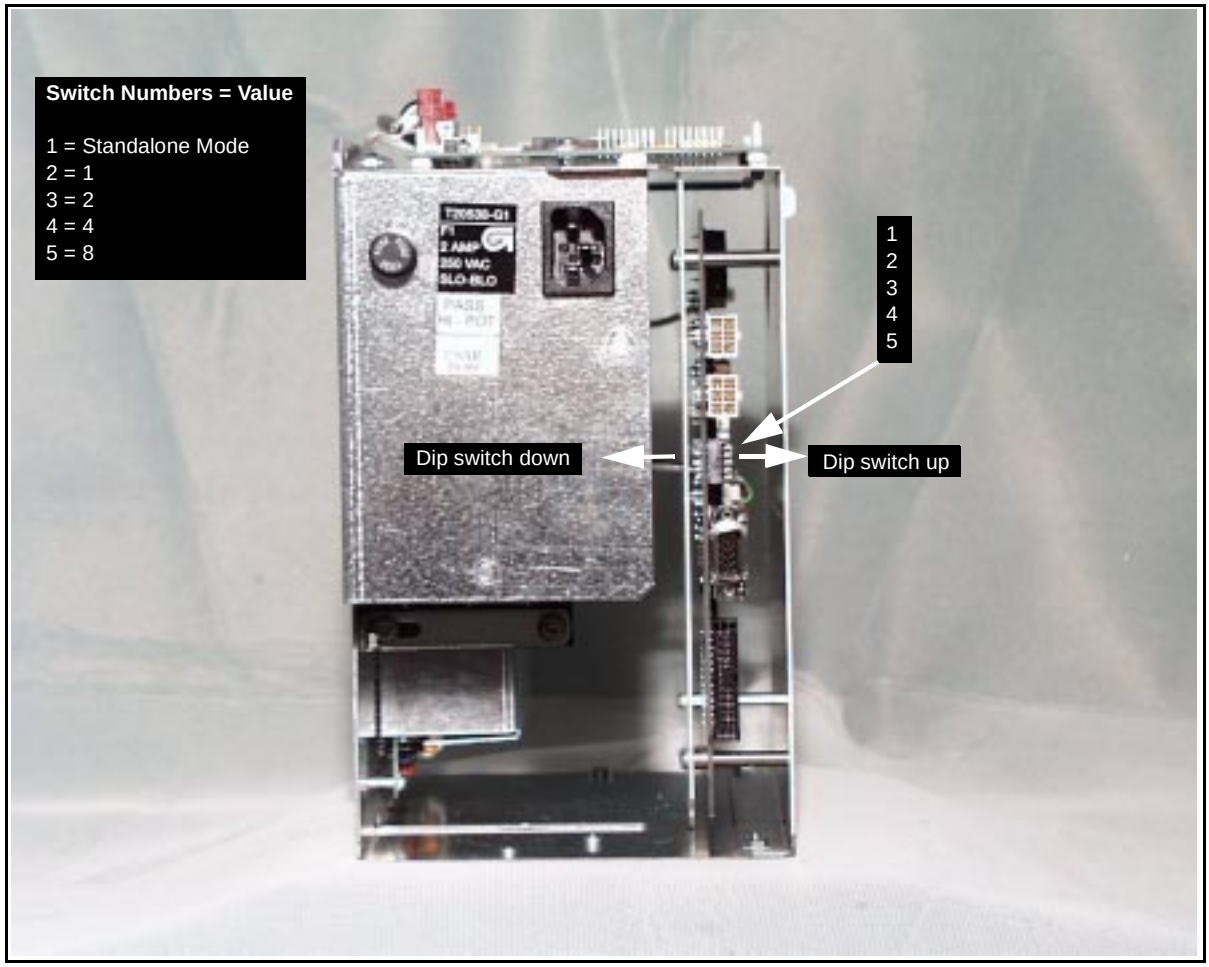
# Dispenser Set-Up

## Addressing Dispenser

Each dispenser on the G-Site controller must be addressed differently; no two dispensers may have the same address. Address is at discretion of the installer. Follow these steps:

**1** From A side of unit, locate dip switches on power supply board (PCB) T20314-G1 in card cage.

**2** Using switches 2, 3, 4 and 5 address each dispenser according to the following table:
*Note: Switch one in down position is standalone mode selected, used for service only.*




## Setting Baud Rate

For major oil company (MOC) TRIND™ installations there is no requirement to set or change baud rate.

## Testing TRIND™ Multi 1

1. If printer was removed, replace printer and reconnect two cables and ground.

2. Restore power to unit. Refer to Pump and Dispenser Service Manual MDE-2531.

3. Restoring power with new Bios will Cold Start the CRIND. Refer to CRIND Service Manual MDE-2562.
   *Note: Cold Start is required if TRIND equipment is installed or changed.*

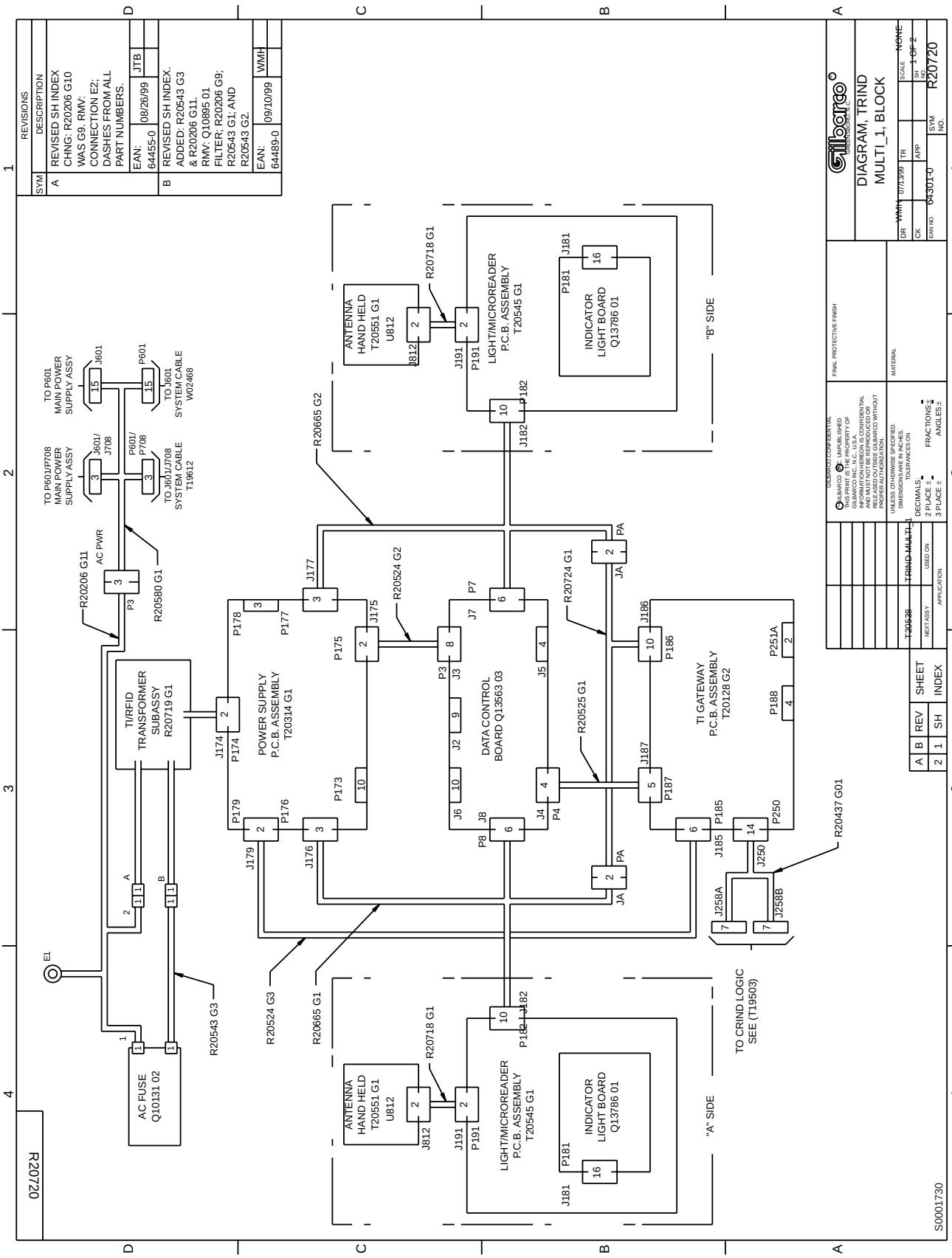
4. Present test tag at option door from a distance of 6" or less. Light board should light and flash sequentially and emit one beep. Screen prompt should appear as shown.
   *Note: If light does not function properly, check to see if opposite side of unit was activated, indicating a crossed cable.*


5. When using test tag, screen will show "Test Confirmed". In regular operation, screen will display the following.

## Completing Installation

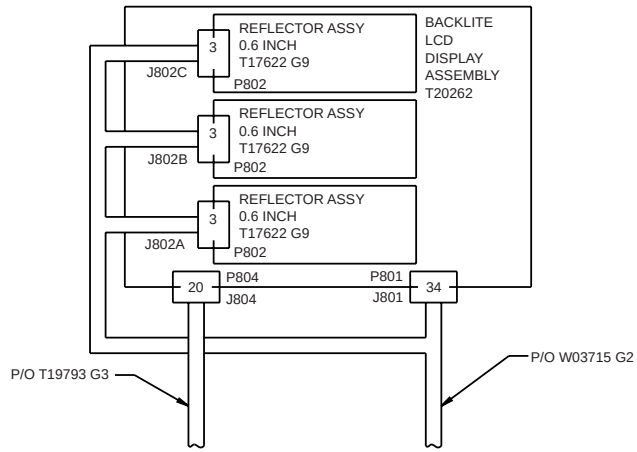
1. Close and secure option and maindoor.
2. Install graphics. Refer to MDE-2620 Graphics Installation for The Advantage Series.
3. Peel backing paper off FCC label pate provided in kit.
4. Affix FCC label plate to inside frame sheathing on column under existing FCC label.
5. Restore power to unit. Refer to Pump and Dispenser Service Manual MDE-2531.

# Cable Block Diagrams



R20720

| REVISIONS | | | | |
|---|---|---|---|---|
| SYM | DESCRIPTION | | | |
| A | RMV: DASHES FROM ALL PART NUMBERS | | | |
| | EAN: 64455-0 | 08/26/99 | JTB | |




NARROW FRAME DOOR ONLY

S0001731

GILBARCO CONFIDENTIAL



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES.
TOLERANCES ON
DECIMALS:
2 PLACE ±
3 PLACE ±
FRACTIONS:±
ANGLES:±

FINAL PROTECTIVE FINISH

MATERIAL

| T20538 | TRIND MULTI_1 |
|---|---|
| NEXT ASSY | USED ON |
| APPLICATION | |

Gilbarco
GREENSBORO, N.C.

DIAGRAM, TRIND
MULTI_1, BLOCK

| DR | WMH 07/13/99 | TR | | SCALE | NONE |
|---|---|---|---|---|---|
| CK | | APP | | SH NO. | 2 |
| EAN NO. | 64301-0 | SYM NO. | R20720 | | |

*MDE- 3801* *10/99* *Printed in the U.S.A.*