

# **Gilbarco Interface Unit**

## **Installation Manual**

**Firmware Version 2.1**

**part number: C01745**

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# **Gasboy CFN Series**

## **Gilbarco Interface Unit Installation Manual**

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**Firmware Version 2.1**

**August 7, 2003**

**C01745**

**Gasboy International LLC  
Lansdale, Pennsylvania**

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C01745	April, 1996	Version 2.0 & above
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C01745	August 7, 2003	Version 2.3 and above

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# Site Controller II Related Publications

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## **Site Controller - versions 2.3 and 3.3 and above**

<i>Part No.</i>	<i>Title</i>
C09212	SC II Manager's Manual, version 2.3
C01918	SC II Installation Manual, version 2.3
C09213	SC II Configuration Manual, version 2.3
C09159	SC II Pocket Reference, version 2.3
C35920	CFN3 Manager's Manual for Windows NT, version 3.3
C09326	CFN3 Configuration Manual for Windows NT, version 3.3
C35921	CFN3 Pocket Reference
C09204	Check Point Reference Manual
C35745	Profit Point Clerk's Manual
C35746	Profit Point Reference Manual
C35923	Point of Sale and Shift Change, version 003

## **Credit and Debit Card Networks**

C35931	Amoco/DataCard	C35907	Gascard
C35901	Buypass	C35909	Generic Dial
C35914	ADS-Chicago (formerly SPS/Phillips)	C35908	PaymenTech (formerly Gensar)
C35902	ADS-CITGO	C35910	NaBANCO
C35906	ADS-FINA	C35911	NDC
C35919	ADS-ZION	C35913	Sinclair
C35904	EDS-CCIS	C35915	T-Chek
C35903	Comdata	C35916	UFDA
C35905	FDR	C35917	VDOT
C35930	Gasboy Dial	C35918	VisaNet

## **Pump Interface**

C09146	Pump Interface Manual
C01745	Gilbarco Interface Unit
C35849	SDI/Wayne CAT Interface
C35924	SDI/Unitec Interface
C35933	Insight Interface

## **Card Encoding and Miscellaneous**

C09136	CFN Series Clubcard Format
C01687	CFN Series Card Encoding Manual

## **Remote Communications**

C09141	PC/SiteControl User's Manual
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## **Technical Publications**

C01759	CFN Diagnostic Manual
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# 1 Introduction

This manual is for technicians and field engineers setting up Gilbarco pumps and CRINDs with Gasboy systems. The equipment discussed here is the Gasboy Gilbarco Interface Unit P/N C05688, with firmware version 2.1.

This *Introduction* chapter provides a brief description of the Gilbarco interface unit, and offers a few preliminary thoughts.

The *Installation* chapter is for setup. Some material here is covered from a different perspective than in chapter three.

The *Hardware* chapter describes the hardware, switch settings, and so on. This chapter is for reference. If you need to understand how to choose switch settings, go to chapter two.

The *Data monitor* chapter describes in part the data monitor program, which provides means to diagnose operation of the data ports.

## Caution

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Please read and understand the Gilbarco installation manuals for your pumps and CRINDs. If you install or service Gilbarco equipment, it is your responsibility to understand and follow Gilbarco's instructions.

Any information which might be provided by Gasboy concerning installation or service of Gilbarco equipment is provided without warranty. We would prefer that you obtain all such information from Gilbarco if possible.

## Terms

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**Dispenser:** one enclosure and its contents servicing one or two fueling positions. A single-sided dispenser has displays on only one side, or sometimes a hose on one side and identical displays on both sides, but it can serve only one customer at a time, and it appears to the operator as one pump. A dual dispenser has independent displays on two sides, and can serve two customers at the same time. Such a dispenser appears to the operator as two pumps.

**GSM:** Gilbarco Security Module. Provides DES encryption for up to 16 CRINDs.

**Pump:** equipment that provides fuel to one customer at a time. As used here, one dispenser may contain more than one pump. This varies from the standard use of pump. However, it is consistent with common usage in the fueling industry.

**Main price display:** the price display nearest the dollar and volume total displays. This display shows only the single price used in calculating dollar total from volume total. All retail pumps have a main price display.

**Price bar:** the row of price displays found on some multi-fuel or multi-hose pumps, located near the hoses or the grade selection buttons. Distinguished from the main price display by association with a single fuel grade or hose. Prices on the price bar may remain on display during a sale, or may be blanked, except for the price for one fuel or grade.

**Dual price bar:** a price bar that shows two different prices, for instance cash and credit, at the same time.

**Alternating price bar:** a price bar that shows two different prices, for instance cash and credit, alternately. A dual or alternating price bar may sometimes be required, but it restricts options for pricing at the site where it is used.

When we mention dual price bar in this manual, the remarks apply equally to alternating price bars.

**Price code:** a Gasboy code for a single set of prices, one price per method of payment, that may be applied to a fuel, grade, or product.

**Price level:** a Gasboy code that distinguishes between the different prices found in one price code set. Values of price level are associated with tender types as follows: price level 1 is for cash, price level 2 is for credit. Price level 3 is for debit, levels 4 and 5 for fleet or club cards, while level 0 is the standard fallback price that appears on the main price display when the pump is idle. Levels 0 to 5 will appear on the main price display. Additional price levels may also be used, but will not appear on any price display.

## The Gilbarco interface unit

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The Gasboy Gilbarco Interface Unit allows a Gasboy Site Controller II to control up to 8 dual or 16 single-sided Gilbarco dispensers. Cash/credit selection switches may be installed on the pumps, but not delivery selection switches. Each side of each dispenser may have a Generic CRIND attached. A GSM (Gilbarco Security Module) may be connected to provide DES encryption services for the CRINDS on an Interface Unit.

No provision is made to support the Major Oil Company (MOC) CRIND. This differs from the Generic CRIND, which we support, in the CRIND firmware and in the electrical connections to the rest of the system. If CRINDs are used, you must use the Gasboy CFN Site Controller II with software revision 2.0B or greater.

CRINDS must contain the Z-180 CPU board, Gilbarco part number T177-64-G1S, revision C or higher, with firmware K93744-02.

One or more Gilbarco Universal Distribution Boxes are required. Pumps are controlled from the interface box using a current loop connection to a distribution box, while CRINDs are controlled using an RS485/422 connection to a distribution box.

For installations with eight or fewer pumps, a single distribution box may be assembled from parts that controls both pumps and CRINDs. See the discussion near the end of the *Hardware* chapter.

An RS485/422 port connects the interface unit to the Gasboy Site Controller II. The Site Controller senses an array of pump control units, with one or two pumps on each unit, and an array of reader terminals. Switches inside the interface unit determine the pump control unit number and reader terminal number each array begins with.

If there are no cash/credit select buttons or dual price bars on any pumps on an interface box, you may use any number of price levels, subject to weights and measures constraints. Only levels 0 to 5 will appear at the pump displays.

If there are cash/credit select buttons or dual price bars on any pump, you may use, at most, price levels 0, 1, and 2, and in addition, level 0 (fallback) must be identical with either level 1 (cash) or level 2 (credit).

The Gilbarco interface unit contains battery backed up memory to store transaction information in the event of a power failure. Lamps visible through a window on the front of the unit indicate battery, power, and program status. Lamps in the Gilbarco distribution box indicate current loop port and RS485/422 port status. If more extensive indications of status are needed, an RS-232 port on the back of the interface unit allows connection of a terminal to run diagnostics. A switch and a fuse are located on the back of the cabinet.

## Differences between interface versions 1.2 and 2.0

In version 2.0, the MPD Pro Blender or other models with six fuels on a side are supported. CRINDs are supported, using the spare RS485/422 port. Current loop port #2 is not used.

Version 2.0 supports a maximum of sixteen fueling positions, while version 1.2 supports 32 fueling positions. In version 1.2 the spare RS485/422 port is not used, while current loop number 2 supports an extra sixteen fueling positions.

## Differences between interface versions 2.0 and 2.1

Version 2.1 supports the same equipment as version 2.0, and in addition, supports one GSM, connected to a serial port.

Version 2.1 supports the six-digit money option in gilbarco pumps. All pumps on an interface must be configured the same.

## Potential problems

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### Cash/credit buttons and more than two price levels

Pumps with cash/credit select buttons may be used only with price levels 0 through 2. The combination of cash/credit buttons and many price levels is not workable.

Level 0 must be the same as level 1 for all such pumps at a site, or it must be the same as level 2 for all such pumps.

### Many price levels on multiple hose units

Many price levels on multiple hose units may cause a few customer relations problems at the site, depending on the prices used. A customer awaiting activation will in some cases see a number of different prices in quick succession on the main price display, as the interface downloads new prices to the pump.

MPD, Pro Blender, Salesmaker IV, and so on, without cash/credit select buttons, may be used with price levels 0 through 5.

### Measured totals for blended products not available

Product totals for blended products are maintained as totals per blend, not as totals per blended primary fuel.

Reconciliation of these totals with tank inventory must be handled by manual methods, outside the system. A program named BLEND.BIN is part of the software for Site Controller II, versions 2.0b and later. BLEND.BIN produces a primary fuel report by allocating recorded amounts of blended fuels back to the primary fuels, based on the intended blend ratio. If you need BLEND.BIN and it is not in your Site Controller release, check with your sales representative.

### Cash/credit select and Site Controller I

Cash/credit select switches on the pump may not be used with the Site Controller I.

### Gallon cutoffs on multiple hose or fuel units

Gallon cutoffs and limits should be set with caution. These are allowed on single-hose pumps, but not on others. MPD cutoff limits must be made in dollars, as the Gasboy equipment cannot arrange for volume presets on Gilbarco multi-fuel pumps. The Site Controller uses dollar limits

internally. Since the hose is not known before fuel is pumped, price is not known, so a dollar limit cannot be calculated from a volume limit.

### **Large gallon limits**

If the activation dollar limit, calculated as activation price times gallons, exceeds \$994, the pump may not activate correctly. Sites that use Highlines with various presets, card limits, limitations, and so on, in gallons, have encountered this error condition shortly after price changes. The remedy here is to use a smaller gallon limit, so that the limit times the price gives less than \$999 pumped.

Site Controller II version 1.0 may also experience trouble at smaller limits, usually larger than \$500. Generally this is seen as sudden inability to activate pumps after a price increase. A PRINT DIAGNOSTICS command shows error counters NB4 incrementing several times per failed transaction. The remedy is to use smaller limits, or upgrade to Site Controller version 2.0.

### **Product restriction on multiple hose or fuel units**

Product restriction can be enforced when using newer Gilbarco multi-hose or multi-fuel units. If you cannot now use product restriction on your Gilbarco MPDs, see if you can upgrade your Gilbarco pumps.

For Gilbarco Highline pumps, product restriction can be enforced, because there is only one product on a pump.

### **Volume display at Check Point or Profit Point**

Volume to be pumped and price are not shown by Check Points or Profit Points at the time of a preset or a prepay on an MPD.

Only the ongoing dollar amount is available from Gilbarco pumps. Even this is unavailable from a few very old pumps. An ongoing transaction viewed on a Check Point or Profit Point will always show zero volume.

### **Advantage version 70.1 firmware**

Gasboy equipment is partially incompatible with Advantage version 70.1 firmware. Replace any Advantage version 70.1 firmware chips with current versions. Failure to do so may cause unexpected results when operating with multiple price levels.

### **MPD-2**

The only Gilbarco Electronic pump that does not interface to the Site Controller II is the Gilbarco MPD-2.

### **MPD Pro Blender**

The Site Controller I does not interface to the MPD Pro Blender or any Gilbarco Cash/Credit pumps.

### **Modular MPD-3 version 53.7 firmware**

Gasboy equipment is partially incompatible with Gilbarco Modular MPD-3 version 53.7 firmware. No upgrade is available for Modular version 53.7 firmware. The problem must be worked around.

- Use price level 1 or 1 and 2, with level 0 set the same as either level 1 or 2.
- Do not use price levels 3, 4, or 5.
- You may use price levels 6 and above.

Failure to follow these restrictions may cause unexpected results when operating with multiple price levels.

### Multiple price levels on other Gilbarco pumps

Because irregularities have been found in the interaction of Gilbarco pumps and Gasboy equipment with two different versions of Gilbarco firmware, and because other versions might be affected, a test for the problem has been added to the start-up procedure.

If your site will operate with price levels other than 1 and 2, perform the procedure indicated under *Test for multiprice incompatibility*, near the end of the next chapter. If your site is adding price levels and you do not know whether this incompatibility exists, you should also perform this procedure.

### Incompatible pump firmware releases

The following table lists various Gilbarco pump firmware versions that have potential problems with the Gasboy Gilbarco Interface and the release that corrects the problem.

Pump	Affected Versions	Corrected Versions
MPD	70.8.0 thru 70.8.2	70.8.3 released 8/96
MPDSH	72.1.7 thru 72.1.9	72.2.10
ASB	75.5.0 thru 75.5.1	75.5.2 released 7/96
AFB	77.4.0	77.4.1 released 7/96
ECAL	84.2.3 thru 84.2.5	84.2.6
B78	75.5.1	75.5.2 released in 7/96
B21	75.8.2	75.8.3 released in 8/96

### Loading Master Key

Master Key is factory programmed into Gilbarco GSM units. No field programming is available.

### Network Key Parity

Gilbarco GSM enforces DES working key parity. Not all networks provide working keys with correct parity. The GSM will refuse a working key with incorrect parity.

### Contract Prices

Recent versions of Gilbarco pumps incorporate changes that improve Weights and Measures compliance. A side effect of these changes makes it no longer feasible for us to blank contract prices from the main price display following a transaction.

If you use contract prices at Gasboy price levels 3, 4, or 5, be advised these prices will remain on the main display until the pump is started for the next transaction. The Gasboy "Blank after" parameter no longer has its previous effect.

### More than 16 CRINDs

Gasboy's interface supports only 16 CRINDs per interface. The GSM will support CRINDs only on the same interface connection. Hence, you will need two interfaces and two GSMs if you have more than 16 CRINDs.

**Blenders and Gascard Network**

Do not use blenders, including three-product fixed blenders, with the Gascard network. This network uses hose number and will not accept hose numbers greater than 4.

**Don't leave GSM powered down**

The GSM uses a non-rechargeable battery which will run down if the GSM is left in a power down state for an extended period. Immediately upon receipt of your GSM, power it up, and leave it that way.

**Broadcast messages**

Currently, Reader Terminal broadcast messages are not displayed on the CRINDS.

**Grade restrictions with pre-Advantage MPDs**

Grade restrictions, used with some club cards, will not work if you have MPDs older than Advantage MPDs. These will appear to activate under grade restriction, but will return only zero-quantity transactions.

**Six-digit money on some pumps, five-digit on others**

All pumps on an interface must be configured for five-digit money and interface SW3-6 must be OPEN, or else they must all be configured for six-digit money amounts and SW3-6 must be CLOSED. Failure to activate correctly or to complete with the proper amount will result if the interface DIP switch does not agree with a pump's configuration.

# 2 Installation

This chapter gives a step by step procedure for installing the Gilbarco interface unit. Switch settings, cables, and so on will be discussed here in a context of their interactions and decisions that must be made. Specific and systematic detail may be found in chapter three.

At the end of chapter two there is a short section on troubleshooting that pertains also to sites that may already be in operation.

## What to do first

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1. Read and understand the Gilbarco manuals that apply to your pumps and CRINDs.
2. Verify that all CRIND and dispenser wiring is in place and complies with Gilbarco standards.
3. Terminate two-wire loops from the pumps in a distribution box with a current loop connection for the Gasboy CFN Gilbarco interface unit. (The pump loop is part number C06691, and the Gilbarco interface unit is C05688.)
4. Terminate two-wire loops from the CRINDs in a distribution box with an RS485/422 connection for the interface unit. (The adaptor is C06692; the cable is C06242; both are C06326.)
5. For installations with CRINDS and eight or fewer pumps, you may build a dual distribution box with one current loop input and one RS485/422 input. This is an alternative to using two separate distribution boxes, one with current loop input, one with RS485/422 input. Information on building such a distribution box is found near the end of Chapter 3, page 34, Building a dual input mode distribution box.
6. Install GSM and its power supply, within six feet of the Gilbarco Interface. Use Gasboy cable C07248 to connect the GSM to Gilbarco Interface GSM port, adjacent to the RS485 connectors. This port may be marked "Unused port".
7. Set up and connect the Site Controller according to the its start-up manual. If you are using CRINDs, you must use a Site Controller II, and the software version must be 2.0B or greater.
8. Verify that the Gilbarco Interface Unit contains firmware version 2.0 or higher, in sockets U18 through U21.
9. Verify that the Gilbarco CRINDs have the Z-180 CPU board, Gilbarco part number T177-64-G1S, revision C or greater, available as an upgrade for older CRINDs.

## Things to watch out for

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### Correct the indicated CRIND two-wire address

For older CRINDs, CRIND jumper test diagnostic number 6, shows CRIND address applicable to Auto Gas systems only. For all other systems including Gilbarco and Gasboy systems, subtract one from the address shown there. See your CRIND manual for more information.

### **Don't use gallon limits on multi-fuel pumps**

Multiple hose/fuel pumps may use only dollar limits. The Gasboy equipment does not provide volume limits for Gilbarco multiple fuel pumps, such as MPDs or blenders. This implies that a site with any such pumps may not use gallon limits as card limits.

### **Use \$999 limits only with cash/credit select**

On pumps with five-digit money configuration, use \$999 as a limit only for pumps with cash/credit buttons. Cash/credit buttons are the flashing buttons located on the pump, not the tender keys on CRINDs. Never use \$995 and above as a card limit.

On pumps with six-digit money configuration, use \$9990 as a limit only for pumps with cash/credit buttons. Cash/credit buttons are the flashing buttons located on the pump, not the tender keys on CRINDs. Never use \$9950 and above as a card limit.

### **Use only grade 1 with Highlines**

Program the pump grade as a Gasboy hose number. Per pump, program the pump assigning grade 1 to hose 1, grade 2 to hose 2, etc.

### **Set correct level at price bars**

If there is cash/credit pricing, make price bars show price level 2. This rule has some exceptions. See Price level for price bars, below.

### **Use reader AUTO YES only with CRINDs**

Don't set READER.BIN program menu 3 Auto column (auto pump select) to YES for any reader that is not a CRIND, CAT, or a DPT. Auto pump select set to YES on an ICR may cause its representative pump to shut off almost immediately after activation.

### **Install K5 and K6**

Make sure interface unit CPU board K5 and K6 are installed. Everything will seem to work fine with these missing, until the lights flicker. At that time many unexpected things can happen.

### **Do memory reset before checkout**

Be sure to do a memory reset on the interface after you have all dispensers programmed and before you try to bring them up.

## **Starting up the site**

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Complete each of the following sections. You do not need to complete them in order, but you should make sure you have considered or performed each item mentioned.

### **Determine programming information**

In this phase you make decisions on programming, options, switch settings, and so on. Some issues here have consequences with respect to other issues, and you may find you have to backtrack and change earlier decisions, in order to make later ones work out.

You may need Gilbarco manuals and additional Gasboy manuals to help determine exactly how to program the things discussed here.

Here is a worksheet. Make copies, and fill out one line per fueling position.



## Worksheet Heading Description

### *Pump number*

Enter the number of a fueling position posted on the pump and shown at the Check Point or Profit Point terminal. You may assign the pump number in a way that makes sense to the customers and clerks, in terms of the physical layout of the site. Pumps are often numbered so that opposite sides of the same dispenser have consecutive numbers, but other arrangements are also practical. Or, using adjacent pump numbers on the opposite sides of the same dispenser may make other site configuration simpler.

### *Pump type*

The Gilbarco model name, such as Highline, Salesmaker II, Salesmaker IV, MPD, Advantage Blender, and so on.

### *Two-wire address*

The pump's two-wire address, from 01 to 16. Always assign two-wire addresses starting from number 01.

If you assign addresses 13 through 16, remember that you will need to use a non-default setting for one of the DIP switch bank 4 positions, below.

Sometimes the two-wire address is not the same as the pump number, though like the pump number there is one two-wire address per fueling position. Dual or double-sided units should always have consecutive two-wire address pairs, with the odd address smaller than the even address, for example 01 and 02 (not 02 and 03), or 09 and 10 (not 10 and 11).

If you can, reserve odd-even pairs of two-wire addresses for single-sided dispensers, using the odd address and skipping the even. For instance, you might give a single-side dispenser two-wire address 09, and skip address 10, assigning address 11 to the next pump. If this is not practical you may double up single units, giving one the odd address and the other unit the even address.

Avoid splitting dual dispensers across two pump control units. This happens if you assign even-odd pairs such as 10 and 11 to the opposite sides of the same dispenser, or if the two-wire addresses you assign to a dispenser are not consecutive—for instance 9 and 12.

If you need more than 16 addresses and you are using interface firmware version 2.0 or above, you need a second interface unit. With two units, put roughly half of the pumps on each interface unit, remembering not to split any dual dispenser. Start over at two-wire address 01 for the first side of the first pump on the second unit.

### *Pump control unit (PCU) number*

Pumps are paired onto PCUs to save line bandwidth on the Gasboy RS485/422 local loop. The two-wire address determines the PCU number, at least in part. Where all pumps at a site are Gilbarco and there are less than 16 fueling positions, pumps with the two-wire addresses 01 and 02 form PCU #1, two-wire 03 and 04 form PCU #2, and so on through the last pump found on an interface unit.

If you have a second interface unit, assign the next available PCU number as its starting PCU number. For instance, if you have PCU numbers 01 through 05 on the first interface unit, assign PCU 06 as the starting PCU for the second interface unit.

The starting\_PCUs is the starting PCU number set on DIP switch bank 2, position 8-4.

### *PCU slot*

Each PCU has two slots, numbered 1 and 2. Assign each pump a PCU slot. Assign the pump with the odd address to slot 1 on its PCU, the even address, slot 2.

### ***Number of hoses***

For Highlines, multi-hose MPDs, and so on, this is the same as the number of physical hoses. For pumps that dispense different kinds or blends of fuel at different times from the same hose, this is the number of distinct kinds of fuel dispensed from the unit.

Fixed blenders may appear to have five hoses, though they actually dispense only three products, two unblended and one blended.

### ***CRIND address***

For older CRINDs, regarding the two-wire CRIND address, you must subtract 1 from the CRIND address shown in CRIND diagnostic test number 6 to get the real CRIND two-wire address.

The real address is shown in the address jumper tables for MOC and generic CRINDs in Gilbarco publications MDE-2562 and MDE-2377. Ignore the Auto Gas Only tables you may find there.

CRINDs may be set to addresses from 1 to 32. Use addresses from 1 to 16 with Gasboy equipment.

If you can, use the pump number (the number painted on the pump, not the pump two-wire address, where they differ) as the two-wire address for the CRIND. For instance, give pump 1, CRIND 1. This will simplify maintenance later.

If you have more than sixteen fueling positions, this won't work. You will need a second interface unit, and you will have to start over at CRIND two-wire address #1 on the second interface unit.

This second interface unit will have DIP switch bank 2, positions 4-8 set to put its first two pumps, with pump two-wire addresses 01 and 02, on a PCU number other than PCU number 1. Usually you start with the next PCU number not used on the first interface box.

For example, if your first interface box uses PCUs 1 through 8, for sixteen fueling positions with two per PCU, then the second interface box will usually be switched to start at PCU 9.

To find the reader number of the CRIND addressed as 01 on the second interface unit:

- Begin with the interface unit's starting PCU number, as set in DIP switch bank 2, positions 4-8.
- Take that starting PCU number and double it.
- Then subtract one.

Supposing the first PCU on the second interface unit is PCU number 9. If you double that, you have 18. Then subtract one, leaving 17. From this, the CRIND addressed as two-wire address 01 on the second interface box will appear as reader terminal number 17.

Sometimes it is desired to offset the CRIND numbers to allow island reader terminals or indoor receipt printers to answer as low-numbered reader terminals. This works at sites with only a few readers, but can run into problems at sites with many.

It is better to assign the CRIND reader numbers first, and then to assign receipt printers and Gasboy Island Card Readers after that.

### ***Reader number***

This is the reader terminal number to be used by the Site Controller. As mentioned previously, this is determined by the CRIND two-wire address and the starting PCU number for the interface unit on which the CRIND is found.

The formula for determining the reader number is:

- Step 1: multiply the starting PCU number (which is set in DIP switch bank 2, positions 4-8) by 2.
- Step 2: subtract 2 from the real CRIND two-wire address (as pointed out elsewhere, the

real CRIND two-wire address is one smaller than the address reported by the CRIND self-test).

- Step 3: add the result of step 1 to the result of step 2. The resulting total is the reader number.

#### ***Price levels used at site***

Circle the levels used. Only the prices to be used with Gilbarco pumps, and only levels 0 through 5, count here.

#### ***Price at level 0 is same as price***

Circle Level 1 or Level 2 or Neither or Both according to the way the prices are set up at the site.

If you circle Neither you must determine whether your pumps will operate correctly in this mode. Perform the procedure under *Test for multiprice incompatibility*, page 23. If any level 1 price differs from the corresponding level 0 price the two levels must be treated as having different prices. Likewise for levels 0 and 2.

#### ***Price level for price bars***

Price bars are the displays over the hoses, as distinct from the main price display. MPDs, blenders, and so on may have price bars. Unless only one price is used at the site, all price bars must show the same price level.

If you have no price bars on any pumps, circle None.

If levels 1 and 2 are always the same, circle 2 even if you have dual level price bars.

If levels 1 and 2 are different and you have dual level price bars, circle Both.

### **Other configuration information**

There is some other configuration information that affects the setup of Gilbarco pumps and CRINDs with Gasboy equipment.

#### ***Fuel grade assignment for each hose***

Use Gilbarco fuel grade to indicate hose number to Gasboy equipment. Thus, any pump that has only one grade on a side gets grade 1 regardless of which fuel it really pumps.

Pumps with more than one grade on a side have their grades numbered consecutively, from 1 to whatever number of hoses or grades are located on a side.

Some pumps, such as blenders and single-hose MPDs, have more than one grade per hose. These pumps are treated by the Gasboy equipment as though they had one hose per grade. Thus, a five-product blender looks to the Gasboy equipment like a five-hose MPD.

Assign a grade number to each hose. For each pump, list the hoses, with the fuels pumped and the grade (hose) numbers assigned. You may use copies of the table on the following page.



## CRIND keypad programming

The keys on the CRIND keypad can be configured for different functions with the Tokheim DPT/Gilbarco CRIND keyboard layout item on page 4 of the SC II's SYS\_PAR program. The characters that select different functions are shown below. Note that these characters are case-sensitive:

Character	Function
0-9	Numeric digits 0 through 9
.	Decimal Point
E	ENTER
C	CLEAR
Y	yes
N	No
\$	Cash inside
c	Cash outside
D	Debit inside
d	debit outside
B	Credit (bank card) inside
b	Credit (bank card) outside
X	Cancel
x	CLEAR/CANCEL (CLEAR if data entry started; else CANCEL)
H	Help
h	Help/Decimal (Decimal if data started; else Help)
n	No/CANCEL (No if in yes/no state; else CANCEL)
S	Start
u	unused key

The numbers of the keypad keys on the CRIND are:

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

Note that keys on the left half of the keyboard—that is, 1, 2, 3, 6, 7, 8, 11, 12, 13, 16, 17, and 18—cannot be programmed.

The default function arrangement of the CRIND keypad is:

1	2	3	u	b
4	5	6	\$	B
7	8	9	N	Y
C	0	E	H	X

The string that would be typed into the *Tokheim DPT/Gilbarco CRIND keyboard layout item* in SYS\_PAR to give the CRIND keypad function arrangement shown above is:

123ub456\$B789NYC0EHX

## Switch settings for interface unit CPU board

The Hardware chapter lists all switches and jumpers but does not discuss details or interactions. Choose appropriate switch settings and write them down.

### DIP switch bank 2

Positions 1-3 are ordinarily all CLOSED. At certain times during startup you will be asked to open position 2 momentarily while you press RESET or cycle the power. This erases the memory in the interface unit. Positions 4-8 set the starting PCU number for the interface, as shown here:

Starting PCU Number	4	5	6	7	8
01	CL	CL	CL	CL	CL
02	CL	CL	CL	CL	OP
03	CL	CL	CL	OP	CL
04	CL	CL	CL	OP	OP
05	CL	CL	OP	CL	CL
06	CL	CL	OP	CL	OP
07	CL	CL	OP	OP	CL
08	CL	CL	OP	OP	OP
09	CL	OP	CL	CL	CL
10	CL	OP	CL	CL	OP
11	CL	OP	CL	OP	CL
12	CL	OP	CL	OP	OP
13	CL	OP	OP	CL	CL
14	CL	OP	OP	CL	OP
15	CL	OP	OP	OP	CL
16	CL	OP	OP	OP	OP
17	OP	CL	CL	CL	CL
18	OP	CL	CL	CL	OP
19	OP	CL	CL	OP	CL
20	OP	CL	CL	OP	OP
21	OP	CL	OP	CL	CL
22	OP	CL	OP	CL	OP
23	OP	CL	OP	OP	CL
24	OP	CL	OP	OP	OP
25	OP	OP	CL	CL	CL
26	OP	OP	CL	CL	OP
27	OP	OP	CL	OP	CL
28	OP	OP	CL	OP	OP
29	OP	OP	OP	CL	CL
30	OP	OP	OP	CL	OP
31	OP	OP	OP	OP	CL
32	OP	OP	OP	OP	OP

### DIP switch bank 3

Position	Function
1, 2	Debug port baud rate: OPEN, OPEN = 9600 OPEN, CLOSED = 2400 CLOSED, OPEN = 1200 CLOSED, CLOSED = 300
3	OPEN = CRINDs are on spare RS485/422 port. CLOSED = CRINDs are on second current loop: Requires board modifications in current loop box. Do not use.
4	OPEN = Report all events during activate. Use with SCII V 2.0B or later. CLOSED = Hide some events during activate. Use with SCI, SCII V 2.0A and earlier.
5	OPEN = No grade restrictions CLOSED = Restrict grades
6	OPEN = Money amounts are five digits CLOSED = Money amounts are six digits
7-8	Reserved.

All positions are normally OPEN.

Position 5 is CLOSED if you wish to enable grade restrictions for fleet or club cards. This option is available only at sites where all multi-fuel pumps are Advantage™.

Position 6 setting must agree with the configuration of every pump on an interface.

### DIP switch bank 4

Position 2 should be OPEN if you are using two-wire addresses 01 up to 12 or less on this unit, and CLOSED if you are using addresses from 01 to more than 12. The limit is 16. Positions 1 and 4 interact, and should be set according to the rules below. Apply the first rule that matches there, and skip the rest.

**Note:** if your site is operating with different prices loaded to levels 1 and 2, with level 0 the same as one of the others, and you are using any multihose or multigrade pumps, you should ascertain the compatibility of your pumps with this mode of operation. Perform the procedure under *Test for multiprice incompatibility*, page 23.

Here is the table for positions 1 and 4; use the first rule in the table that matches your situation:

Rule	Positions		NOTE
	1	4	
Only one price is used at the site	OP	OP	
There are no pump cash/credit select buttons or dual level price bars at the site, <i>and</i> :			(4)
Price level 0 is the same as price level 2	OP	OP	(1)
Price level 0 is the same as level 1	OP	CL	(2)
Price levels 0, 1, and 2 are all different, <i>and</i> :			
There are no price bars	CL	OP	
Level 2 is on price bars	CL	OP	
Level 1 is on price bars	CL	CL	
There are some pumps with cash/credit select buttons at the site or there are some pumps with dual level price bars, <i>and</i> :			(4)
Any price at price levels 3, 4, or 5 differs from price at level 0			(3)
Price levels 0, 1, and 2 all have different prices			(3)
Price level 0 is the same as level 2	OP	OP	(1)
Price level 0 is the same as level 1	OP	CL	(2)

Notes:

- (1) All price bars must show price level 2.
- (2) All price bars must show price level 1.
- (3) This won't work, change some previous choices.
- (4) Pump cash/credit select buttons are the lighted buttons on pumps, not to be confused with the payment buttons on CRINDs.

## Site Controller configuration

Certain data must be loaded into the Site Controller using the PUMP.BIN or READER.BIN programs, or the Site Controller commands.

- For Site Controller II version 2.0, the *Site Controller II Configuration Manual (2.0)*, Gasboy P/N C09213, and the *Site Controller II Manager's Manual*, P/N C09212, will be helpful.
- For Site Controller II version 1.0, see the *Site Controller II Configuration Manual (1.0)*, Gasboy P/N C09132, and the *Site Controller II System Administrator's Manual*.
- For Site Controller I, see manuals C09149, C01917, and C01900. As mentioned previously, you can use pumps with Site Controller II version 1.0 but not CRINDs, and likewise for Site Controller I.

## Prepare PUMP.BIN data

In PUMP.BIN program menu 3, pump options should be set according to the following chart. Some prepackaged sets of options may exist there, but many sites will have to add or subtract options to account for the many variations that may be found. You may have to create some new pump types to accommodate. Combine all options from this table that apply to give the set of options for a pump.

Pump, Model or Configuration	Set option(s)
Pump is MPD, Blender, or Salesmaker IV	1 and 5
Pump has cash/credit select buttons	3
Pump is Gilbarco electronic pump	9
Pump is single-sided	15
Pump has press-to-start kit	17
Alert beep is desired before customer presses payment type key on CRIND	18
Pump has grade select buttons	19

For an ordinary Highline, all you need is option 9. With cash/credit select buttons, you must add option 3, so that your list is 3 and 9.

For an ordinary MPD, the required options are 1, 5, and 9. With cash/credit select buttons, you must add option 3, so that your list is 1, 3, 5, and 9.

If you have cash/credit select options installed on any pumps, you must set their fill limits to \$999 and maximum limit to 0. This must be set in pump configuration, and also with the LOAD CUTOFF command.

Option 6 is also mentioned in PUMP.BIN. You will not need this option.

### Advantage Super High special settings

Advantage Super High (model BD1) has the following PUMP.BIN configuration requirements. Side 'B' of the pump must have 2 hoses assigned as illustrated.

In Pump type - submenu 1:

#	Pump type	C1	Slow	Fill	Max	Pulse	Hoses
1.	GILBARCO MPD	1	0.250	\$50	0	1000/G	1
2.	GILBARCO MPD	1	0.250	\$50	0	1000/G	2

In Pump Control Units - submenu 2:

1.	ELECTRONIC PCU	1:1	2:2
2.	ELECTRONIC PCU	1:3	2:4
3.	ELECTRONIC PCU	1:5	2:6

In Add Pump types - submenu 3:

#.	GILBARCO MPD	(2) 1,5,7,9
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## Prepare READER.BIN data

In READER.BIN Menu 3, you must set Rep-pump to the pump number associated with a CRIND. Set Auto to Yes for all CRINDS, to No for any ICR, printer, or anything else that is not a CRIND DPT, or a CAT. Setting Auto to Yes for an ICR will cause unexpected deactivation of the representative pump.

Also, set the device type.

## Program the Site Controller

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You will need to use the LOAD TANK, LOAD PRODUCT, LOAD PUMP, LOAD FUEL, LOAD PRICE, and LOAD CUTOFF commands, in addition to configuration programs PUMP and READER. You may examine the data you have loaded using PRINT TANK, PRINT PRODUCT, PRINT PUMP, and PRINT PRICE commands, and PUMP - P and READER -P.

When loading cutoff and other limits for Highlines, be sure that if you load a gallon cutoff, the cutoff limit times the highest price that could ever be used does not give a dollar amount greater than \$995, or \$9950 for pumps operating with six-digit money. The pump may not activate properly if you allow gallon limit times price to exceed this.

You may also need to load your encrypted network key, using the LOAD KEY command. Consult your network provider about this.

If you are using DES for debit, you must arrange for key management.

If the CRIND is the only unit at which you take debit, you will *not* need to load a master key. The master key is pre-injected into the GSM at the Gilbarco factory.

If you are using Gasboy Island Card Readers or Verifone PINpads, you will need to arrange for master key injection into these units. How you do this will depend on your bank and your bank card network.

Encrypted working (network) keys will be necessary in any case. How you load working keys will depend on your network. You may be required to use the Site Controller's LOAD KEY command, or the network may supply the keys directly to the Site Controller. Consult the specific manual for your network for more information.

## Program the dispensers and CRINDS

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Set fuel grades, two-wire addresses, and price levels for price bars, according to the determinations made previously. You may also need to set pump cutoff limits and other information not discussed here. See Gilbarco publication MDE-2531 *The Advantage Series Start-up/Service Manual*, among other manuals. CRINDS will need jumpers set according to the instructions in MDE-2377 CRIND Electronic CD Module Installation. The two-wire address should be set as determined previously, and all other settings will be according to the generic CRIND indications there.

Some jumpers found on the CRIND CPU board when you receive it may be documented as Spare. These may set CRIND two-wire loop baud rate. This must be 4800 baud. Consult your Gilbarco service manual for appropriate settings.

## Program the interface unit

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If you have not done so, take a moment now and browse through chapter three of this manual, then turn back here and continue reading. There you will find illustrations to go with many of the things we discuss here.

### **CPU board jumpers**

Make sure that K5 and K6 on the CPU board are inserted. An AC power failure will cause unexpected behavior if these jumpers are absent. Insert also K3, on the pair of K3 terminals closest and parallel to P9, and K7. CPU board jumpers K1, K2, K4, and K8 must be absent.

### **Current loop board jumpers**

On the current loop board, the lower of the two boards, K1 should be in position 1. K2 should be present. This is done at the factory, and does not need to be checked unless there are indications that this needs to be done. If you should remove the interface CPU board, when you replace the screws holding it on its standoffs, be sure that the insulated washer, if loose, is replaced on the screw at the front center of the board, near C36.

### **CPU board DIP switches**

DIP switches should be set as follows, except as noted previously. DIP switch bank 2, position — All switches CLOSED. DIP switch bank 3 and DIP switch bank 4 — All switches OPEN.

## **Connect and test the installation**

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### **Power wiring**

The interface unit power cord must be plugged into a grounded outlet referenced to the same earth ground as any RS485/422 junction boxes and all other RS485/422 equipment at the site, as described in the *Site Controller II Installation Manual*.

*The Gasboy warranty may be invalidated if wiring requirements described are not met.*

### **RS485/422 site wiring**

Make the RS485/422 wiring from the Gilbarco interface to the Site Controller ready, but do not insert the RS485/422 connector into the port on the interface unit at this time. Use cross cable C04500.

To connect two interface units to the Site Controller, use an extra Gasboy RS485/422 junction box. Connect its terminal block in parallel with the terminal block of the first junction box using a short piece of your field wiring cable. Also connect the external ground stud of the second box to the ground stud of the first or to the ground screw on the power protection unit.

### **RS485/422 CRIND wiring**

The Gilbarco interface unit is connected to the distribution box responsible for the CRINDs using Gasboy cable assembly C06242 and adaptor C06692, RJ-11 to DB-9P.

### **Current loop pump wiring**

The interface unit is connected to the distribution box responsible for the pumps using Gasboy cable assembly C06691. This cable connects to P1 at the back of the Gilbarco Interfact unit.

### **GSM Wiring**

Connect GSM to its power supply. Connect Gasboy cable P/N C07248 from the GSM to interface GSM port, which may be marked “Unused port” or “GSM port”.

## **Initial power-up and checkout**

Perform each step in order. If you get an incorrect result at any time, correct the cause before proceeding to the next step.

### ***Power up***

With the interface unit connected to the pumps and the pumps turned on, apply power to the interface unit and observe the lamps visible through the window on the front of the interface unit.

### ***Lamp check***

Two green lamps (DC and BOK) on the lower board in the interface unit should be lit. The red lamp (BAD) on the lower board should not be lit.

If no lamps are lit, the power supply is not delivering correct power. If the red lamp (BAD) is lit, wait about a minute.

If it does not go out, the battery on the lower board is bad, the battery jumper is out, or the battery fuse is blown. Correct the condition and try again.

Now the red light should be out, and the green light next to it should be on.

### ***DC power check***

The DC power OK lamp, to the left of the battery OK lamp, should also be lit. Even if it is, check the DC voltage at CPU board P9 pins 1 and 64. This should be 5.00 to 5.05 volts. If the voltage is not within these limits return to the factory.

If the leftmost green lamp still does not light, adjust the DC power fail potentiometer on the lower board. This adjustment may be facilitated by powering down the unit, removing the three screws on the bottom that secure the circuit boards, and raising the two boards as a unit until a screwdriver may be inserted into the adjusting shaft. Take care not to short the bottom of the current loop board to the case when you apply power. Alternately, you may use a small offset screwdriver.

Turn the potentiometer clockwise 1/4 turn then cycle power ten times using the switch on the back panel of the unit. The green LED should come on eight or nine out of ten tries. Repeat the adjustment until it does.

If the LED comes on at each of the ten tries, back the potentiometer off a little until you are able to get it to come on just eight or nine out of ten tries.

When you have completed the preceding, turn the screwdriver shaft 1/3 of a turn clockwise. Remove power and fasten the boards back into the unit, then apply power again.

### ***Remaining interface lamp check***

L9 to L12 should now all be off. If L12 alone of these is on, you have omitted K7 on the CPU board, or else U8, MID400, is burned out. Correct this. If lamps from L9 to L11 are on, the current loop interface needs repair. Note which of L9 to L12 were lit and report this to phone support. Chapter 3 Hardware, has some information about the meanings of lamps L9 to L12, under "Front panel CPU LEDs" on page 32.

At this point, you should see blinks on L1 and L5, nothing on L2-L4, L6 lit, and L7 and L8 indicating current loop status. A connected current loop will cause its associated lamp to blink.

### ***Universal distribution box lamp check***

Check the lamps in the Gilbarco distribution boxes according to Gilbarco instructions.

***GSM Lamp check***

Power lamp should be on. Status lamp should show either a steady on-off flash, or it should be on but interrupted at intervals by sequences of three or four flashes.

The GSM should NOT show a status lamp that is:

- Steady off
- Steady on
- On, interrupted at intervals by ten or more flashes
- On, interrupted at intervals by a single flash.

If any of these patterns are observed, contact Gilbarco.

***Erase interface unit memory***

All checks up to this point should have succeeded. If not, go back, find the error conditions, and correct them now.

The current loop wiring to the pumps and CRINDs should be connected and set to NORMAL at the distribution box or boxes.

Set interface unit CPU board DIP switch bank 2, position 2 OPEN and press the RESET button or cycle power off then on again. This will erase memory in the interface unit. Restore DIP switch bank 2, position 2 to CLOSED and allow the interface to operate for about three minutes with all pumps and CRINDs connected. It will then determine the arrangement of devices it is connected to. This information will ordinarily be retained indefinitely.

If it is necessary to re-address any pumps, repeat the erase interface unit memory procedure.

***Connect to Site Controller***

You are now ready to connect the interface unit to the RS485/422 loop. Insert the modular connector on cable C04500 into the site RS485/422 PORT jack on the interface unit, then observe the interface unit lamps. You should see some activity on lamps L3 and L4 within about thirty seconds.

If neither L3 nor L4 light, there is a Gasboy data loop RS485/422 problem. If L3 flashes but not L4, the Site Controller is talking on the loop but the interface is not answering. Check configuration, and re-check other things up to here.

You should now see some messages about pump control units and reader terminals on the logger. PRINT DIAGNOSTICS should indicate that the expected pump control units are up.

***Verify system operation***

If you have a Check Point or a Profit Point on the system, lift each pump handle in turn, and verify the offhook indication. Use the START key to activate each pump after you have verified switch detect for each hose on a pump.

Verify that each CRIND is up according to the diagnostics, and then verify that each CRIND keypad responds as appropriate.

A CRIND that has powered up successfully should say PLEASE PAY INSIDE on the CRIND display. When the interface successfully polls the CRIND, this message changes to <PLEASE PAY INSIDE> including the brackets. If the CRIND goes for fifteen seconds without communicating with the interface, the brackets disappear.

With all CRINDS programmed correctly and DES working key loaded, you should be able to swipe a card that requires DES encryption. The CRIND should say, "Enter your PIN" or something similar. If instead it goes back to its initial message, for example "Press payment key" or if it says "DES not ready", the GSM is not connected correctly or the working key is not loaded.

It may take up to several minutes after the CRINDs and the GSM are connected before the CRINDs are ready to perform DES encryption. Transactions that do not require DES may proceed during this time.

### ***Test for multiprice incompatibility***

You may skip this procedure at your site if:

- all pumps are either Highline or Salesmaker-2, or
- all pumps are Advantage with firmware 70.5 or greater, or
- every pump is one of the preceding types.

If you are changing over from single price or cash/credit pricing to additional prices at levels 3, 4, or 5, and you have not previously performed this procedure, you should perform it now.

If your site will operate with only one price level, or with cash and credit pricing and level 0 same as either cash or credit, you may skip this procedure. For this decision, prices at level 6 and above do not count.

***Do not perform this test while the site is open for business.***

1. On the interface CPU board note the settings of DIP switch bank 4, positions 1 and 4, then change them to position 1 CLOSED and position 4 OPEN. Press RESET on the interface unit.
2. For one pump of each multihose or multigrade variety, load price levels 0, 1, and 2 each with different and unique prices.
3. Select a pump under test and press START on the Check Point or Profit Point.
4. Raise the leftmost pump handle. Pump a very small amount of fuel. Lower the handle.
5. Press CASH then START on the Check Point or Profit Point.
6. Raise a *different* pump handle and pump a small amount of fuel. Note whether the price shown on the pump is the expected cash price for the fuel pumped. If not, you may not operate this pump in multiprice mode, except for cash and credit prices.
7. Lower the handle and print a receipt.
8. Determine whether the total amount shown on the receipt agrees with what was shown on the pump. If not, you may not operate this pump in multiprice mode, except for cash and credit prices.
9. Restore DIP switch bank 4, positions 1 and 4 to their previous settings and press RESET on the Current Loop Interface CPU board.

If you find a pump that does not operate correctly in this mode, please determine the pump model and firmware revision number, and report them to Gasboy Technical Service (by fax, if possible). We will attempt to maintain a list of models known not to work in this mode, for the benefit of our customers.

## **Troubleshooting**

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This section is a collection of known problems not necessarily discussed elsewhere in this manual. It pertains more to sites that have started successfully, but either fail to become fully functional, or develop subsequent problems. This section is not exhaustive, but instead attempts to mention some of the more common problems reported.

If you find a problem you think should be included, contact your Gasboy sales or service representative.

## If the system does not operate

One or more pump control units may fail to come up or stay up. Messages may print on the log about pump control units going up and down. You may see PUMP OUT OF SERVICE error messages when you hit START on the Check Point or Profit Point, or CAN'T ACTIVATE if you use the ACTIVATE PUMP command. PRINT DIAGNOSTICS may reveal that a pump control unit is down.

Try a memory loss at the interface. Setting DIP switch bank 2, position 2 to OPEN momentarily while you cycle the AC power or press the reset button. Disconnect the interface from its RS485/422 line to the Site Controller and wait for five minutes, then reconnect the line.

If there is still a problem, try putting all pumps in ISOLATE at the distribution box. Switch pumps back to NORMAL one at a time, waiting for the associated pump control unit to come up each time. Sometimes you will see a pump control unit that has been up for a while suddenly go down when you switch some pump to NORMAL.

- If a pump newly switched in always takes down the same other pump, the pump just switched in may be set to the wrong poll address.
- If a newly switched in pump takes down more than one other pump, it may have a faulty circuit board in it, or the current loop field wiring may be faulty. If there are still problems, go back and re-check all preceding parts of setup. If the problem still remains after that, you will need to obtain further technical assistance from Gasboy.

If CRINDs do not operate at all, first check the CRIND displays. They will say either PLEASE PAY INSIDE or <PLEASE PAY INSIDE>. In the first case, the CRIND is not seeing any communication with the interface unit. In the second case (the message with the brackets), the CRIND is communicating with the interface unit, but the Site Controller is not.

If the CRINDS operate but the keys on the keypad do not get the proper responses, check the CRIND keypad programming.

## Transferring from Gilbarco console to Gasboy interface

During setup it is sometimes useful to check out the pumps using a Gilbarco console, such as the Transac T-12. If you do this, make sure all pumps are deauthorized before disconnecting the current loop wiring from the Gilbarco console and connecting it to the Gasboy interface.

Failure to follow this precaution will cause the Gasboy unit to take an excessive amount of time before the pumps are fully operational. Unassigned transactions may also result, causing the Site Controller to disable pumps. The Site Controller command ENABLE PCU must be used to bring the pumps back to operating status if this happens.

## POS says PUMP BUSY on START key

This is a normal message if a transaction has gone payable due to pulser timeout or operator intervention, and the handle on the pump has not yet been lowered. Lowering the handle on the pump should restore normal operation.

Rarely, Gilbarco pumps in this condition do not respond to the handle. Remove power from the pump briefly. In most cases this cures the problem.

If the problem persists, and if you have a Site Controller II version 2.0B or greater, and Gilbarco interface firmware 1.2L or 2.0, or greater, you may use the Site Controller TEST PCU command to restore normal operation.

If the message results from a Site Controller malfunction, try the ENABLE PUMP;A command. Otherwise, a Gilbarco service representative must master reset and reprogram the pump, or a Gilbarco console must be connected to the pump and the START or AUTHORIZE key used.

This problem has been observed in several different models of Gilbarco pumps, including very old models, but appears to be more common in newer (The Advantage) models.

## Receipt lines wrap

Sometimes the CRIND receipt printer may stick in its normal typeface, which has characters too wide to allow the Gasboy receipt to print correctly. The Gilbarco interface sends the command to put the printer in narrow typeface mode at the beginning of each receipt. However, the CRIND may sometimes cease to respond to this. Remove power from the CRIND briefly.

## Pumps work but prices won't program correctly

Every instance of this problem observed to date has been due to incorrect grade programming, or incorrect price bar programming, or to the SYS\_PAR.BIN on page 9: Miscellany: "Blank pump display after" parameter being set longer than the time between sales.

Prices will not load while the Site Controller is waiting to blank the display after a sale, as loading the prices will blank the display. Set the wait to 30 seconds in the parameter.

If you have checked *Blank after* and that is not the problem, review the materials concerning grade and price bar programming earlier in this chapter, and if that does not help, call Gasboy service for assistance.

Some sites with nonstandard arrangements of multiple price levels may require more insight than we offer here to make the price programming work as desired, within the limits of what is possible with the equipment.

## Interface suddenly begins giving unexpected results

This includes sudden failure to function at all, or other serious misbehavior.

If K5 and K6 are out, replace them and do an interface memory clear by opening DIP switch bank 2, position 2 and pressing the reset button. Be sure to restore DIP switch bank 2, position 2 to the CLOSED position.

If the interface is entirely dead, check the lamps as in *Lamp check*, above, under *Initial power-up and checkout*.

## Messages on wrong CRIND or wrong pump activates

The CRINDs are not responding as the same reader terminal numbers the Site controller thinks they should be. Messages might change on the wrong CRIND when you raise a pump handle. Also, the wrong pump activates after a card approval.

Possibly the CRIND two-wire addresses are off by one. Did you take into account the discrepancy between actual two-wire address and the one reported by the CRIND in its diagnostic test number 6? As mentioned elsewhere, actual is one address less than the reported number.

Did you enter the wrong "representative pump" in the reader configuration menu 3?

If the site has two interface boxes, did you work out the starting reader number on the second box correctly? Power down the lowest-numbered reader on the second interface, and see if the Site Controller reports that the reader you expected went down.

## Single pump won't come up

If everything else works fine but a single pump will not come up, it is possible the interface needs a RAM clear.

While you are changing pump addresses, if the interface sees even a single poll response from the even-numbered two-wire address for a PCU, it will not bring up that PCU unless it is talking to a pump at the even-numbered address.

Singles are usually set up as an odd two-wire address with no matching even address. This leaves the interface waiting for a pump it will never see.

To solve this, make the interface forget about the even- numbered pump by clearing its memory. For the procedure see Erase interface unit memory under Connect and test the installation, earlier in this chapter.

### **Site reports wrong fuel or wrong dollar amount**

If a transaction or the receipt shows the wrong fuel or an incorrect dollar total, check the pump firmware version.

If your pump is an Advantage version 70.1, see *Advantage version 70.1 firmware* in the first chapter.

If your pump is a Modular MPD-3 version 53.7, see *Modular MPD-3 version 53.7 firmware* in the first chapter.

Also refer to other incompatible pump versions in “Incompatible pump firmware releases” on page 5.

If your pump is of any other type or has any other firmware version, contact Gasboy Technical Service immediately.

### **MPDs will pump only zero-quantity transactions**

Older (pre-Advantage) MPDs will pump only zero-quantity transactions if they are activated using grade restrictions. The grade restriction feature is enabled using SW3-5 CLOSED. See “DIP switch bank 3” on page 16, for more information.

### **Zero quantity transaction**

Pumps activate when START is pressed on POS but the transaction completes as a zero-quantity when handle is raised on pump.

Make sure you are not sending too large a money limit. Count the digits, including any fractional digits. Five-digit money pumps must have a money limit of five digits or less. Six-digit pumps accept money limits to six digits or less. In either case, the leading three digits of the money limit must be less than “995” and should not be “980” or “981” for five-digit money pumps.

Make sure interface SW3-6 agrees with the money digit setting for the pumps: OPEN for pumps configured for five-digit money, CLOSED for pumps that have six-digit money. All pumps on an interface must be configured the same way.

### **Unassigned Transactions**

Every reader configuration must have a “select pump” program step prior to the “activate pump” step. Failure to include the select pump step will cause warnings about unassigned transactions, with pumps becoming disabled after the transaction.

# 3 Hardware

This chapter is about the electrical parts of the interface. Ratings, jumper positions, and switch settings are described in detail. The purpose of this chapter is to give specific detail in a systematic fashion.

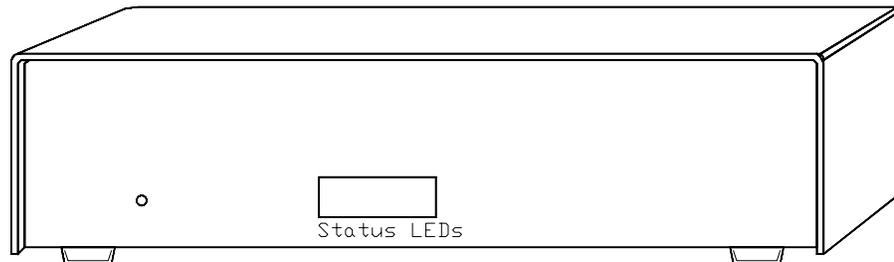
## Cabinet

The interface unit cabinet is shown in figure below. The cabinet is three inches high, 12 inches wide, and eight inches deep. It contains a power supply, the interface unit CPU board, and the current loop driver board.

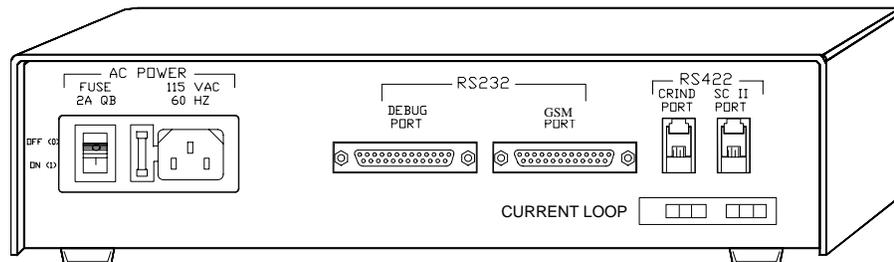
A short cable connects current loop driver board P1 to the upper two positions on a terminal block, which provides for connection to the pump port on a distribution box (also called a D-box).

The RS485/422 port on the right, shown in the figure with legend SC II Port above it, provides for connection to the Site Controller.

The RS485/422 port on the left in the figure below, labeled CRIND PORT, provides for connection to the CRIND port on a distribution box. A standard power entry module, labeled AC POWER, provides for an instrument cord to supply power to the interface.



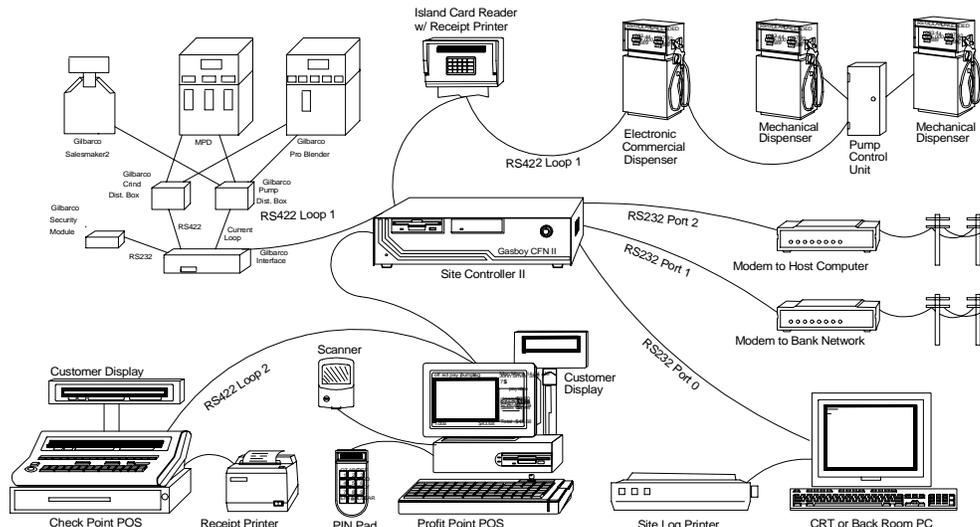
Front of Gilbarco Interface Unit



Back of Gilbarco Interface Unit

## External connections

The interface unit is connected to the power mains, the Site Controller, and to one or two Gilbarco distribution boxes.



Interconnection of Site Equipment with Interface Unit

### Interface to distribution box current loop wiring (pumps)

The current loop wiring for the pump loop from the Gilbarco interface to the distribution box is shown in figure below. Interface Terminal is the terminal on the current loop board.

#### Cable C06691, interface to D-box, pump

Interface Terminal	P1-1	P1-2
Wire color	black	red
DB-9S to D-box	pin 7	pin 6

This uses eight-foot cable, Gasboy P/N C06691, with wedge connector and a DB-9S, which may be extended by any 1:1 9-pin D connector extension cable with at least pins 6 and 7 connected.

### Interface to distribution box RS485/422 wiring (CRINDs)

The RS485/422 wiring for the CRIND loop from the interface to the distribution box is shown below.

#### Cable C06242/C06692, interface to D-box, CRIND

<i>Modular Connector</i>	<i>Interface to D-Box</i>	<i>DB-9P Signal Name</i>
Pin 1	Pin 2	Rx+
Pin 2	Pin 6	Rx-
Pin 3	Pin 3	Tx-
Pin 4	Pin 7	Tx+

This uses two Gasboy parts: an eight-foot cable, C06242, and adaptor C06692, RJ-11 to 9-pin DB-9P. (The combined part number for both C06242 and C06692 is C06326.) The cable may be extended using an RJ-11 or RJ-12 1:1 telephone extension cable.

### Site controller to interface RS485/422 wiring

The cable to the Gilbarco interface RS485/422 connection is a modular handset connector cross cable assembly with the transmit and receive pairs reversed, Gasboy part number C04500. The connections are:

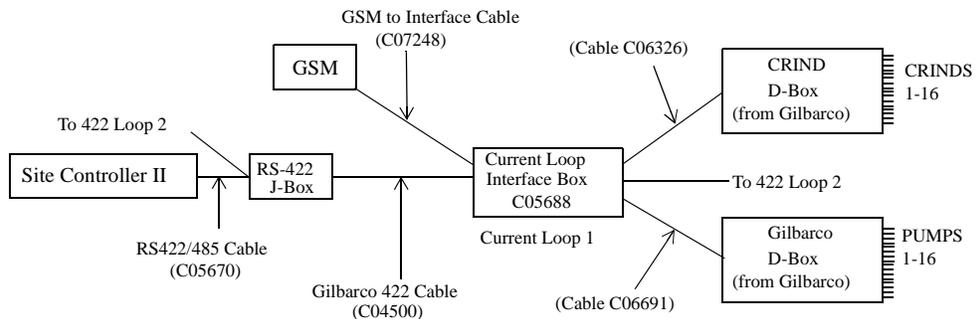
#### Cable C04500, RS-485/422 junction box to interface

Junction Box Pin	Current Loop Interface Pin
1 (Rx+)	3 (Tx+)
2 (Rx-)	4 (Tx-)
3 (Tx+)	1 (Rx+)
4 (Tx-)	2 (Rx-)

This cable runs from an RS485/422 junction box to the interface unit.

Should you need a second interface unit, use a second junction box connected in parallel with the first, using a short piece of field wiring cable connecting the terminal blocks of the two junction boxes in parallel. Also connect the external ground terminals together using approved grounding wire. The second interface box then uses another C04500 cross cable from the second junction box to its SC II Port.

This drawing shows two connected interface units:



### Interface to GSM RS232 wiring

The cable from Gilbarco Interface to GSM is a custom RS232 cable, Gasboy P/N C07248, with a 25-pin “D” connector on the Interface end and a 9-pin “D” connector for the GSM. The connections are:

#### Cable C07248, GSM to interface

GSM Pin	Interface Pin
2 (TxD)	3 (RxD)
3 (RxD)	2 (TxD)
7 (GND)	7 (GND)
9 (RESET)	4 (RTS)
	5 (CTS)
	6 (DSR)
	8 (DCD)
	20 (DTR)

Pins 5, 6, 8, and 20 on Gilbarco Interface end connected together

Do not substitute any other cable or you may damage the GSM.

## AC power inlet and fuse

The interface unit has the same power requirements as the Site Controller, as given in the Site Controller (I or II, as appropriate) installation manual.

## Jumpers

The CPU board (part number C04835) has jumpers and switches that must be set correctly. Some settings never change. The ones that do may also be discussed in chapter two of this manual. The jumper positions labeled K1 through K8 are below:

### CPU Board Jumpers K1 to K8

<i>Jumper</i>	<i>Function and/or normal setting</i>
K1	All K1 jumpers are absent.
K2	All K2 jumpers are absent.
K3	Position 1. Enables the dead man timer. K3-1 jumper must be installed. K3-1 is the pair of K3 terminals closest to P9, the long double-row offboard connector at the edge of the board. Position 2. K3-2 jumper is absent. K3-2 is the pair of K3 terminals farthest from P9.
K4	K4 does not exist.
K5, K6	Provide battery backup power to the devices in U31 and U32 respectively. <i>K5 and K6 jumpers must be installed.</i>
K7	Enables the AC power fail circuit. K7 jumper must be installed.
K8	K8 jumper is absent.

Jumpers K5 and K6 are normally present but not installed when the unit is shipped. They must be installed by the startup technician. Make sure the jumpers are set as shown here. The interface will seem to work well even though some of these jumpers are set wrong, until you get a momentary power failure. Transaction data can be lost and pumps can go out of service for extended periods.

## DIP switches

There are 24 DIP switches in the front right hand corner of the interface unit CPU board. When a switch is closed, it grounds the logic signal, which is then read as a 0. When the switch is open, the logic signal goes to +5 volts or logic 1. The normal setting of the switches is:

DIP switch bank 2, positions 1-8: all closed

DIP switch bank 3, positions 1-8: all open

DIP switch bank 4, positions 1-8: all open

Unless there is a specific reason, the switches should be set as described above. The individual switches and their settings are described below.

### *DIP switch bank 2*

DIP switch bank 2, position sets PCU poll address and allows clearing memory.

Position	Function
1	CLOSED = Normal mode. OPEN = Debug mode. Do not use.
2	OPEN = Erase all memory on reset. CLOSED = Do not erase memory on reset.
3-8	Interface unit base address: see chapter two.

In most cases, the unit base address is 1, so that positions 3 to 8 are all CLOSED.

### *DIP switch bank 3*

Position	Function
1, 2	Debug port baud rate: OPEN, OPEN = 9600 OPEN, CLOSED = 2400 CLOSED, OPEN = 1200 CLOSED, CLOSED = 300
3	OPEN = CRINDs are on spare RS485/422 port. CLOSED = CRINDs are on second current loop: Requires board modifications in current loop box. Do not use.
4	OPEN = Report all events during activate. Use with SCII V 2.0B or later. CLOSED = Hide some events during activate. Use with SCI, SCII V 2.0A and earlier.
5	OPEN = No grade restrictions CLOSED = Restrict grades
6	OPEN = Money amounts are five digits CLOSED = Money amounts are six digits
7-8	Reserved.

All positions are normally OPEN.

Position 5 is CLOSED if you wish to enable grade restrictions for fleet or club cards. This option is available only at sites where all multi-fuel pumps are Advantage™.

Position 6 setting must agree with the configuration of every pump on an interface.

### *DIP switch bank 4*

Position 4 selects certain price level options and allows either twelve or sixteen pumps (six or eight double-sided units) on a loop.

Position	Function
1	OPEN = Price level 0 same as either price level 1 or 2. CLOSED = Price level 0 not same as level 1 or 2.
2	OPEN = 12 fueling positions on this interface. CLOSED = 16 fueling positions on this interface.
3	OPEN = Site RS485/422 deadman timer enabled. CLOSED = Site RS485/422 deadman timer disabled.
4	OPEN = Map transient prices to level 1. CLOSED = Map transient prices to level 2.
5-8	Reserved

Positions 1 and 4 interact. See chapter two for discussion. Unless there is a reason to do otherwise, set all positions to OPEN.

## Front panel CPU LEDs

The two rows of LEDs visible through the front panel window are shown in figure and their functions are listed in the figure after that. The upper row LEDs, left to right, are named L1, L2, and so on through L12. The lower row LEDs, left to right, are named DC, BOK, and BAD.

Lamp	Indication
L1	CRIND RS485/422 Transmit data
L2	CRIND RS485/422 Receive data
L3	Site Controller RS485/422 transmit data
L4	Site Controller RS485/422 receive data
L5	Deadman timer refresh
L6	Current loop power enabled
L7	Current loop #1 active if flashing
L8	Current loop #2 active if flashing
L9	Program fail code bit 1
L10	Program fail code bit 2
L11	Program fail code bit 3
L12	Program fail code bit 4
DC	DC 5V power OK (green)
BOK	Battery OK (green)
BAD	Battery bad (red)

Examination of these lamps allows quick evaluation of the state of the interface. They are discussed in the Installation chapter.

Lamp					
L9	L10	L11	L12	Code	Meaning
OFF	OFF	OFF	OFF	0	Normal. Other lamps should blink.
OFF	OFF	OFF	ON	1	Power fail. Problem with AC power detect
OFF	OFF	ON	OFF	2	Internal program error.
OFF	OFF	ON	ON	3	Internal program error.
OFF	ON	OFF	OFF	4	ROM checksum bad. Pin bent on U18-U21?
OFF	ON	OFF	ON	5	RAM bad. Replace chips U31 and U32.
OFF	ON	ON	OFF	6	Program failure. Replace U18-U20.
OFF	ON	ON	ON	7	Internal program error.
ON	OFF	OFF	OFF	8	Internal program error

The "Internal program error" conditions indicate severe hardware failure or software defects which must be fixed by the developers. Note which lamps were on, and the circumstances such as what was being done and how often this is seen. If internal program error is not a frequent event, you may temporarily restore a site to operating condition by cycling power to the interface box after carefully gathering information. Report any internal program error conditions to Gasboy Development.

## Current loop driver board

---

The current loop driver board (part number C05374 or kit C07249) contains two current loop ports, a 5V to 40V dc-to-dc converter that supplies power for two of the current loops, a battery to back up CPU board RAM, battery trickle charger, battery fail detect, and DC power fail detect. The board draws 5V power for battery and control through P3, and 5V power for the current loop supply through P4. Signals are passed through P3. Current loops plug into P1 and P2. Board ratings are shown below:

Power:	+5v, .3A nominal, .6A Maximum at P3 5v, .9A nominal, 1.2A Maximum at P4
Current Loop Outputs:	40 mA nominal at idle, 45V maximum open loop voltage. Baud rate is 5800. Current loop will endure short circuit operation indefinitely with 40 degree C rise in current source transistor temperature.
Battery:	3.6V nominal, 110 mA-hours charge. Backup time at .1 mA nominal exceeds two weeks.
Battery fail:	Indicates failure if battery fails shorted, battery fuse is blown or battery jumper is missing.
Powerfail detect:	RESET asserted if DC power falls below 4.65V nominal. Trip level is screwdriver adjustable.
Status LEDs:	LED #1, red, on if battery low or fuse blown or jumper omitted. LED #2, green, on if battery OK. LED #3, green, on if 5V DC OK.

The interface board has undergone three revisions. The only boards that should be continued in service if difficulties are observed are the revision 3 boards.

### Jumpers

These are the functions and settings of current loop driver board jumper positions K1 and K2:

Jumper	Function
K1	Baud rate clock source. Must be installed in position 1.
K2	Battery backup enable. Boards should be stored with this jumper out. It should be installed at assembly time. The red battery fail lamp will light if K2 is omitted.

### Fuses

Fuses F1 and F2 protect the current loops. These are 1/8 amp picofuses. A blown F1 or F2 indicates a blown transistor Q12 or Q13, or other serious circuit malfunction.

Fuse F3 protects BATT1. A blown F3 usually indicates a momentary short from the positive side of the battery to ground. Lamp I1 will not go out while power is applied if fuse F3 is blown. F3 is a 1.25 amp Picofuse. Smaller values may be used, as maximum working current is less than 20 milliamps.

### P1 and P2 current loop connectors

These connectors each provide an active current loop port. The loops expect less than 20 milliamps for an active state, and up to 48 mA for an idle state. Current loop power and ground are fully isolated from logic power and ground. Transient suppressors prevent excessive voltages being generated across loops. This table shows the pinout on P1 and P2:

Pin #	Signal Name	Description
P1-1	1 +	Current loop sink
P1-2	1 -	Current loop source
P2-1	2 +	Current loop sink
P2-2	2 -	Current loop source

Note that the signal names are confusing. The signal P1-1 + is *negative*, and the P1-2 - is *positive*.

Interface unit with firmware version 2.0 uses only P1. Some early beta versions also used P2, as the CRIND interface loop. Released version 2.0 uses the spare RS485/422 port for CRIND communication. The later firmware is compatible with the earlier, modified, units. These may continue to use the second current loop port when they are upgraded, if switch DIP switch bank 3, position 3 is set to CLOSED.

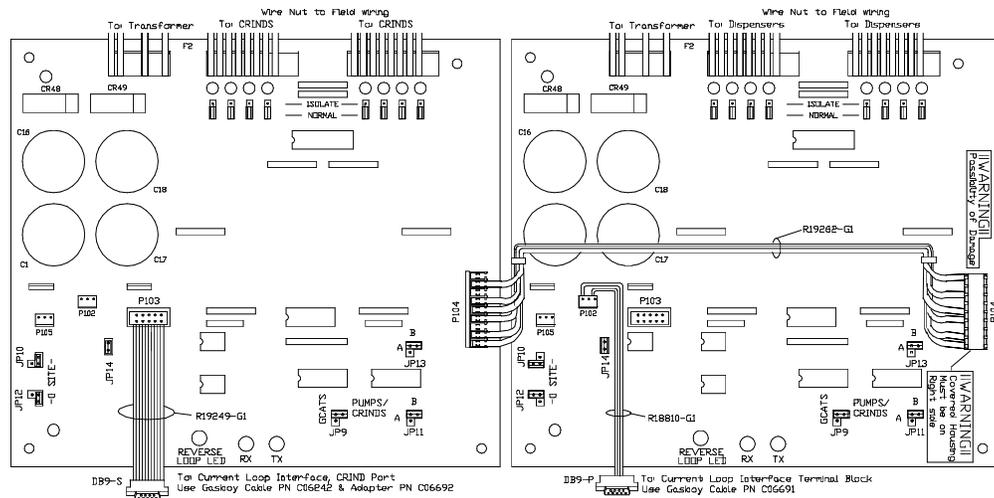
## Building a dual input mode distribution box

The dual input mode distribution box, with one input RS485/422 and one input current loop, is not a standard Gilbarco offering, nor do their installation manuals show any diagrams of such. However, it is easy to construct one of these, starting either with two distribution boxes, or with one box and a kit.

If you have two dual distribution boxes, one set up for current loop input, one for RS485/422 input, you can construct two dual input mode distribution boxes by swapping two cables and moving some jumpers.

You can also build a dual input mode distribution box from a single distribution box of either the current loop or RS485/422 input variety, and one K93717 expansion kit. The K93717 kit contains both input cables, a T17651 distribution box circuit board and some other cables.

The result in either case is the same, as illustrated in figure below. This is a dual RS485/422 input distribution box, except that the second input has been changed into a current loop input by moving the jumpers JP10 and JP12, and by exchanging the second R19249-G1 cable plugged into P103 for an R18810-G1 cable plugged into P102.



# 4 Data monitor

Once all connections have been made and all switches set correctly, the system still does not always function correctly. As an aid to diagnosing remaining problems, the interface unit is equipped with a data monitor program.

The monitor program is accessed by connecting a terminal to the local port. The baud rate must agree with the rate switched in on interface unit switches DIP switch bank 3, positions 1 and 2.

The data monitor command `m` or just ENTER is used to determine whether communication has been established.

## Data monitor commands

---

The monitor commands are discussed below:

### Monitor Commands

<i>Key</i>	<i>Modifier</i>	<i>Effect</i>
h	—	Show list of commands and status
w	—	Show monitor status
m	—	Monitor next data port
p	—	Monitor pump data port
c	—	Monitor CRIND data port
g	—	Monitor GSM data port
s	<space>	Monitor all devices on port
s	0-f	Monitor only one device
n	—	Toggle display all/new messages
<space>	—	Halt or restart display
?	—	Display device status and counters
*	—	Reset counters
r	—	Toggle display raw/cooked mode

### Command: h

Print help menu. The commands are listed, with a brief explanation of each. The `ENTER` key also elicits this.

### Command: w

Print status. The monitor shows its print mode (off or on), whether it is printing all messages or just new ones (verbose or terse), which data port it is watching (line 1 or line 2), and what device or devices it is watching.

**Command: m**

Monitor next data port. If monitoring pumps, monitor CRINDs; if CRINDs, monitor GSM; if GSM, monitor pumps.

**Command: sn**

Show device *n*, where *n* is a number from 0 to 9 or a letter from a to f to indicate a device from 0 to 15, or g to indicate all devices. When using a slow terminal, it will most likely be necessary to watch only one device at a time, unless the station is not very busy.

**Command: n**

New/all messages. If displaying only new messages, display all messages; if all, display new messages only.

**Command: <space>**

Toggle print. If printing, stop. If not, print. No scrolling is possible with the monitor, so you must stop anything you want to look at before it disappears off the top of the screen. There is a discussion of the print format below.

**Command: ?**

Print device status. Prints a table for all devices that have answered a data request since last time the interface unit cleared memory. Here is what the output of this command might look like:

pump	up	status	pcom	scom	CRND	up	status	ccom	scom
01	yes	61	21	CC	02	yes	95	94	WW
02	yes	62	22	CC	02	yes	95	94	EE
03	yes	63	23	CC					
04	yes	64	34	CC					
05	yes	65	25	CC					
06	yes	66	26	CC					
07	yes	67	27	CC					
08	yes	68	428	CC					
09	yes	69	29	CC					
0A	yes	6A	2A	CC					
0B	yes	6B	2B	CC					
0C	yes	6C	2C	CC					

The first line may also show:

GSM down

or

GSM up, no key

or

GSM up, key loaded

The columns are discussed on the next page. A pump and a CRIND on the same row does not mean they are connected in any way. Pump 16 appears in the table at address 00, while CRIND 16 appears at address 10, which is base 16 for decimal 16. Note that many of the numbers of the table are in base 16, with letters A through F used as digits having values of 10 through 15.

**Column    Meaning**

pump	Pump two-wire address.
up	If yes, the device is talking to the interface.
status	Last pump status.
pcom	Last command sent by interface to pump.
scom	Last command sent by Site Controller to interface.
CRND	CRIND two-wire address.
up	CRIND is talking to the interface.
status	Last CRIND status.
ccom	Last command from interface to CRIND.
scom	Last command from Site Controller to interface.



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