BCD

Interface for the 520 Indicator

Installation and Configuration Manual

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76127 Rev A

Contents

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About This Manual

This manual is intended for use by service technicians responsible for installing the BCD option in *920i*® digital weight indicators.

This manual applies to indicators using Version 1.04 of the *920i* software.

WARNING ***Some procedures described in this manual require work inside the indicator enclosure. These procedures are to be performed by qualified service personnel only.***

1.0 Introduction

The BCD interface is used with 520 digital weight indicators to send weight and status information to remote displays, printers and other peripheral devices. The data is updated after each display update and continuously available for use.

The BCD interface option is CMOS, NMOS, and TTL compatible. BCD outputs are capable of sourcing/sinking 20mA.

The BCD option comes with a BCD interface option card and ribbon cable. An external port provides for connection of a DB-37 interface cable (which exits the back of the 520) for communication to a peripheral device. See the *520 Installation Manual* (PN 68973) for proper connections on the 520 CPU board.

The BCD (binary-coded decimal) option uses a straight assignment of the binary equivalent. The weights of the BCD code are 8, 4, 2, and 1. See Table 1-1 for decimal to binary conversion.

Decimal Digit	BCD			
	8	4	2	1
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

Table 1-1. Decimal to Binary Conversion

2.0 Installation

Figure 2-1 shows the BCD option card as installed in the 520 indicator. The indicator enclosure must be open to install the BCD card.

WARNING *The 520 has no on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.*

CAUTION *Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.*

These units use double pole/neutral fusing which could create an electric shock hazard. Procedures requiring work inside the indicators must be performed by qualified service personnel only.

2.1 BCD Option Card Installation

1. Disconnect the 520 indicator from power source.
2. Place the indicator on an antistatic work mat. Remove screws that hold the backplate or cover to the enclosure body, then lift the backplate or cover away from the enclosure and set it aside.
3. Use the 8-32 nuts in hardware kit to secure DB-37 connector plate to backplate of indicator.

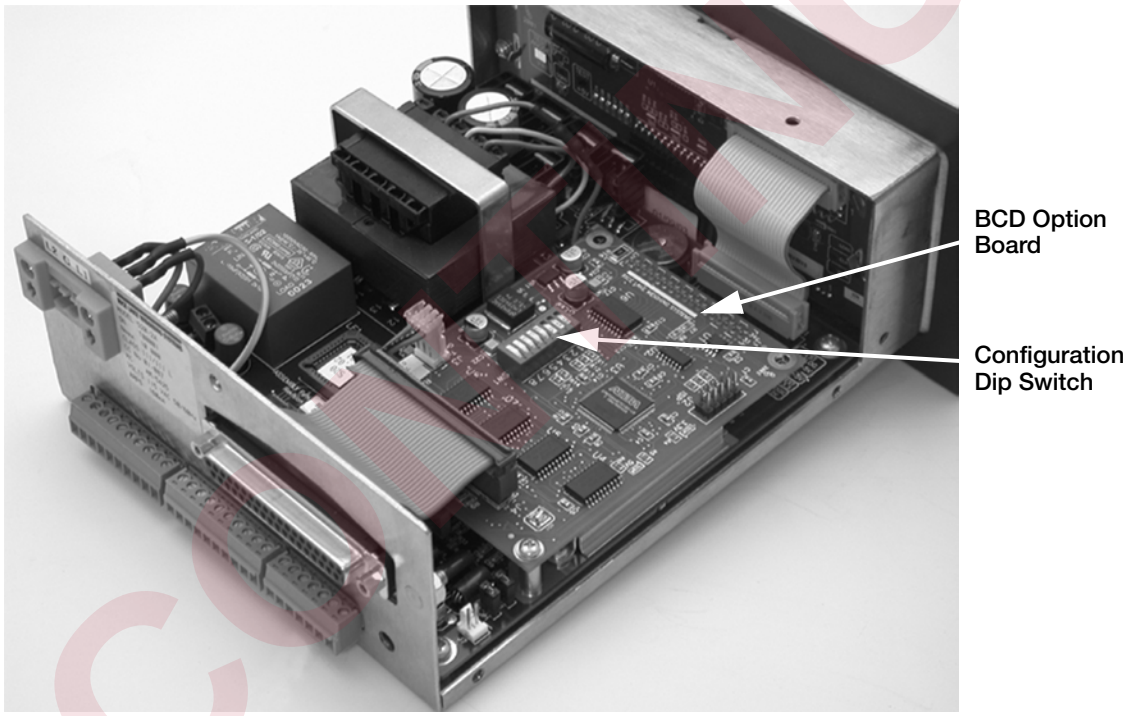


Figure 2-1. 520 Indicator with BCD Option Installed

4. Carefully align the large option card connector (J1) with connector J2 on the 520 CPU board. Press down to seat the option card in the CPU board connector.
5. Use the 4-40 screws provided in the option kit to secure the other end of the option card to the threaded standoffs on the 520 CPU board.
6. Plug 40-pin ribbon cable to J4 on BCD card.

WARNING *Do not connect communications to J3 if switch SW1-4 is in Units mode.*

7. Plug serial cable to J3 on BCD card. Plug other end of serial cable to J8 on 520 CPU board. Use the nylon tie in the parts kit to secure the serial cable to the mounting pem (see Figure 2-2 below).

Note *When connecting serial cable to J8 of 520 CPU board, be sure that red wire goes to TX (transmit), black wire to GND (ground), and green wire to RX (receive).*

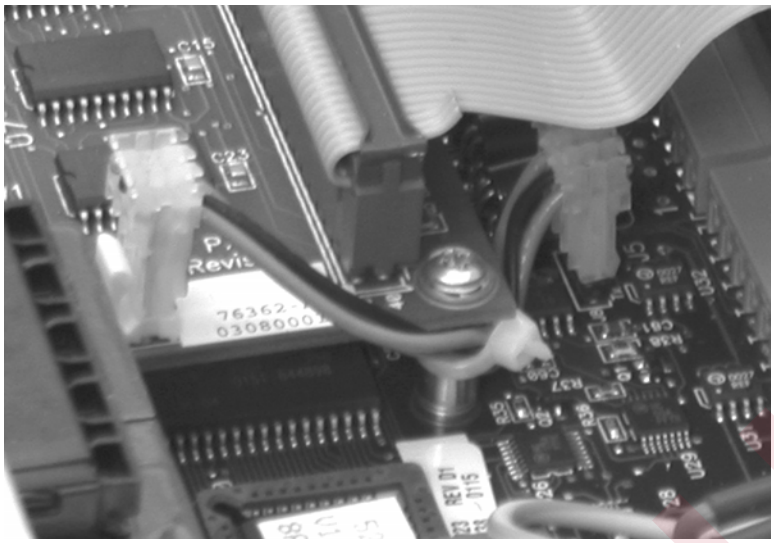


Figure 2-2. Serial Cable Tie

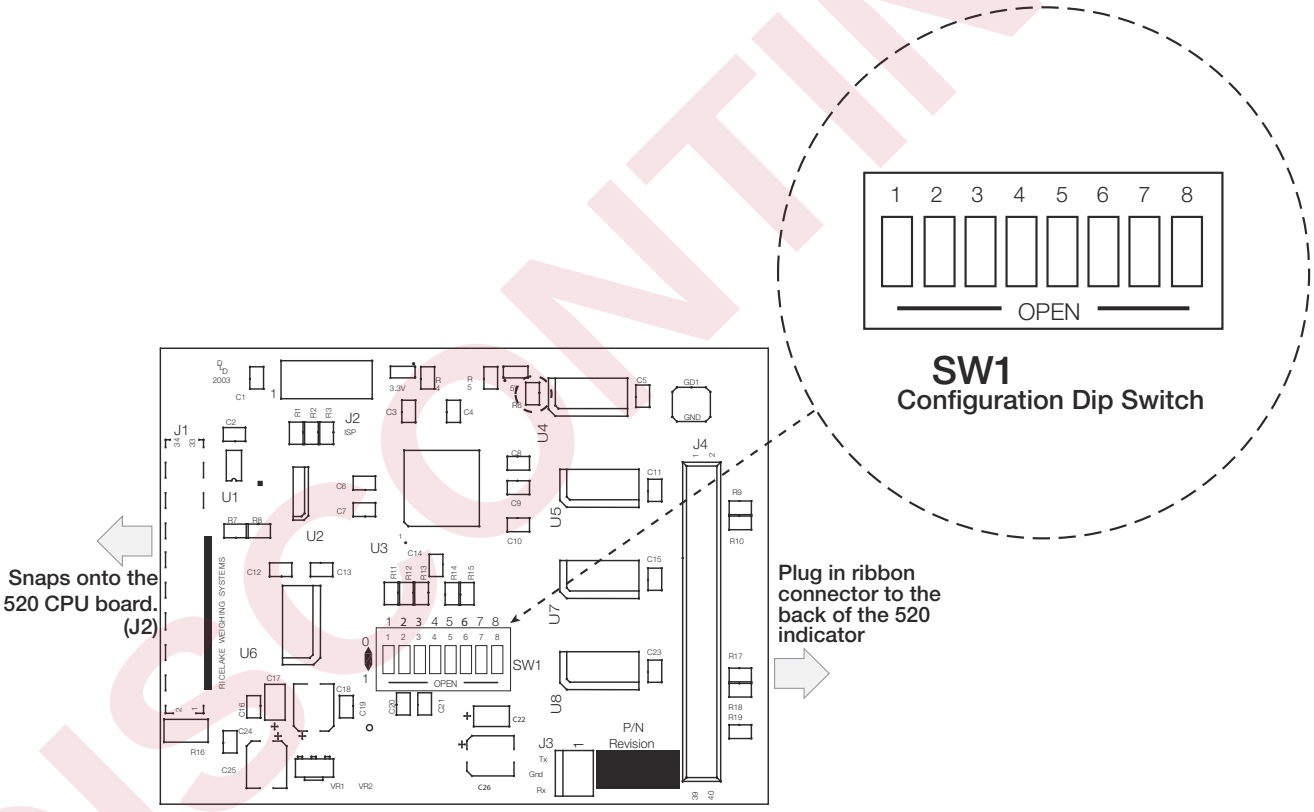


Figure 2-3. BCD Option Card

2.2 Dip Switch Configuration

The BCD option card contains dip switches (see Figure 2-3). Move the switches to configure BCD interface parameters (see Table 2-1).

SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	SW1-7	SW1-8
DEC_1	DEC_2	POL_SEL	Units/Com Select	Units Input Select	Tri-State Select	Reserved	Reserved

Table 2-1. Dip Switch Configuration Modes

Unit Status Bit/Communications Output Selection

See Table 2-2 for unit status bit/communications output select configuration.

SW1-4	Mode
0	Unit Status Bit mode – Indicates primary or secondary
1	Communications Select mode – RS-232

Table 2-2. Units Status Bit/Communications Select Mode Configuration

By connecting J3 on the BCD board to J8 on the 520 board, communications mode allows the throughput of connector J3 to be used as a wiring path for communications from the 520 indicator to an external device through the DB-37 connector. It is not a communications port, rather an alternative route for wiring a 520 communication port to an external device.

WARNING ***Do not connect communications to J3 if switch SW1-4 is in Units mode.***

BCD Option Card		520 Indicator	
J3-1	TX	J8-1	TX
J3-2	Gnd	J8-2	Gnd
J3-3	RX	J8-3	RX

Table 2-3. J3/J8 Connections

Units/Tri-State Input

See Table 2-4 below, for information on configuring units or tri-state input modes.

SW1-5	SW1-6	Mode
0	0	Not valid
0	1	Units enable
1	0	Tri-State enable
1	1	Off

Table 2-4. Units/Tri-State Input Configuration

Decimal Rotation Configuration

See Table 2-5 below for information on configuring dip switch for decimal rotation. See Section 3.2 on page 11 for more information on decimal rotation.

SW1-1	SW1-2	Parallel Output Format
0	0	No rotation
0	1	Rotate left enable
1	0	Rotate right enable (primary only)
1	1	Reserved

Table 2-5. Decimal Rotation Configuration

Polarity Bit Select

See Table 2-6 below, for information on configuring polarity bit select mode. See Section 3.3 on page 11 for more information on polarity switch.

SW1-3	State
1	+ Polarity (logic 1 = +5V) ; – Polarity (logic 0 = common)
0	+ Polarity (logic 0 = common); – Polarity (logic 1 = +5V)

Table 2-6. Polarity Bit Select Configuration

3.0 Data Information

The following sections provide information on BCD pin-outs, data information, and remote switches.

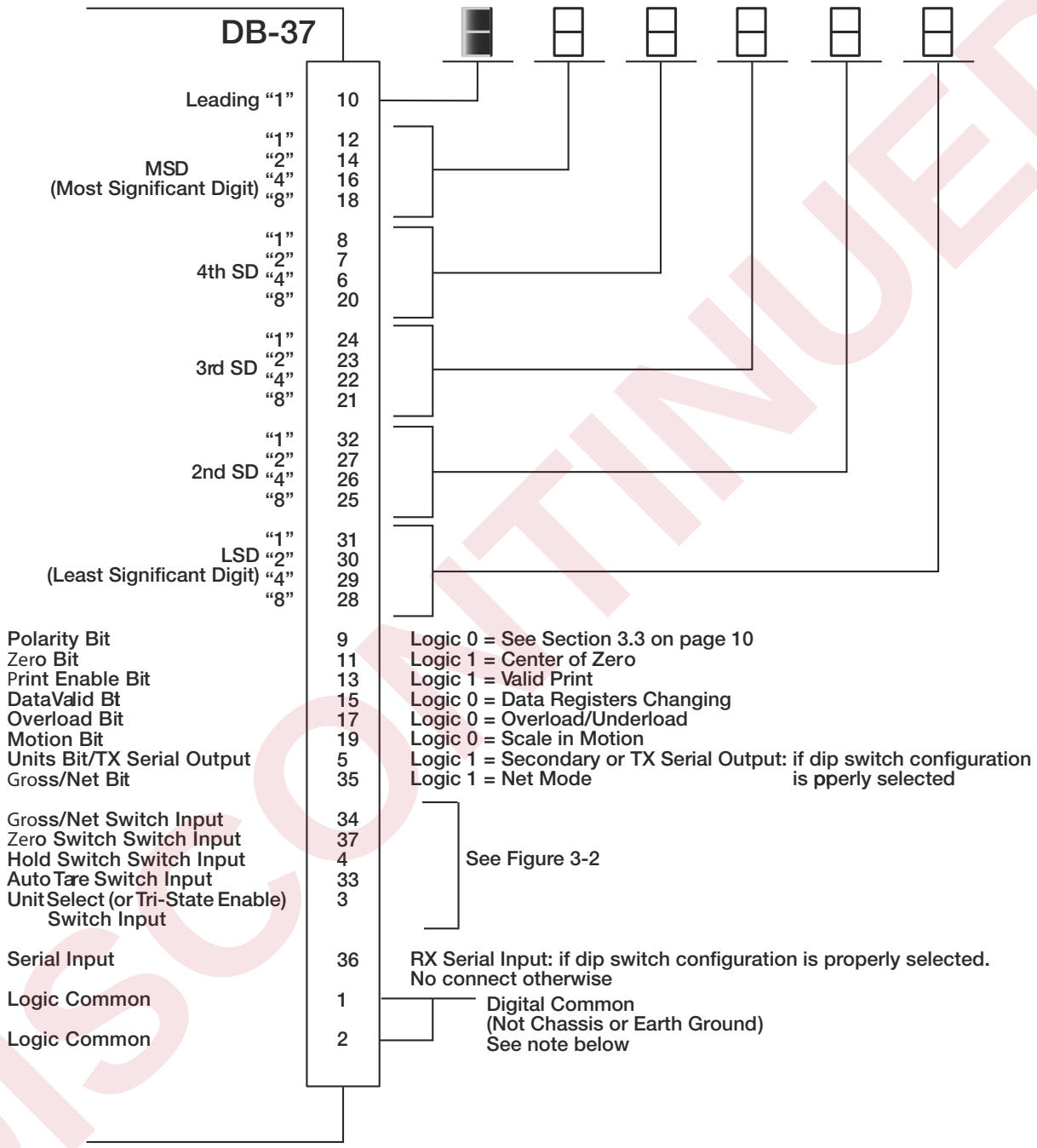


Figure 3-1. BCD External Connection

Note *The 520 parallel BCD option does not have a floating ground. For proper operation, it is necessary to connect Logic Common of the BCD peripheral device to Logic Common pins 1 and 2 of the BCD option.*

Pin	Description
1	Logic Common
2	Logic Common
3	Units (primary/secondary) Switch or Tri-State Enable Input. Serves as remote input switch for the Units or Tri-State function. Change of state toggles units between primary or secondary; or Logic 1 places output in Tri-State mode. See Section 2.2 for dip switch configuration
4	Hold Switch. Input freezes the BCD registers
5	Units Bit. Specifies the status of the units; Logic 1 = secondary units, or if enabled by dip switch configuration, accesses TX serial output
6	4th SD -4
7	4th SD -2
8	4th SD -1
9	Polarity Bit. Specifies the status of the polarity. See Section 3.3 on page 10
10	Leading One. Logic 1 if the sixth significant digit is odd; Logic 0 if it is even. See Figure 3-1 on page 6
11	Zero Bit. Specifies the status of zero. Logic 1 = center of zero
12	MSD 1
13	Print Enable Bit. Specifies data valid, no motion, no overload/underload and positive gross weight. Hold switch must be at logic 1 (OFF). Logic 1 = print enabled
14	MSD 2
15	Data Valid Bit. Informs the external device that the BCD output registers have been updated and the data is “true.” Data is not valid if the display shows other than numeric data, if the display is held (in regulatory modes), or if data integrity has been lost. This bit will toggle momentarily to Logic 0 each time the registers are updated. Logic 0 = data not valid
16	MSD 4
17	Overload Bit. Specifies the status of positive or negative scale overload. Logic 0 = overload/underload
18	MSD 8
19	Motion Bit. Specifies the status of motion on the scale. Logic 0 = scale in motion
20	4th SD 8
21	3rd SD 8
22	3rd SD 4
23	3rd SD 2
24	3rd SD 1
25	2nd SD 8
26	2nd SD 4
27	2nd SD 2
28	LSD 8
29	LSD 4
30	LSD 2
31	LSD 1
32	2nd SD 1
33	Auto Tare Switch Input. A remote switch for the auto tare function
34	Gross/Net Switch Input. A remote switch for the gross/net function. Signals the indicator to switch between gross and net modes
35	Gross/Net Bit. Specifies the status of the mode of the scale. Logic 1 = Net mode
36	RX serial output, if enabled by dip switch configuration for communication mode
37	Zero Switch Input. A remote switch for the zero function

Table 3-1. BCD Pin/Switches

3.1 Operation of Remote Switch Inputs

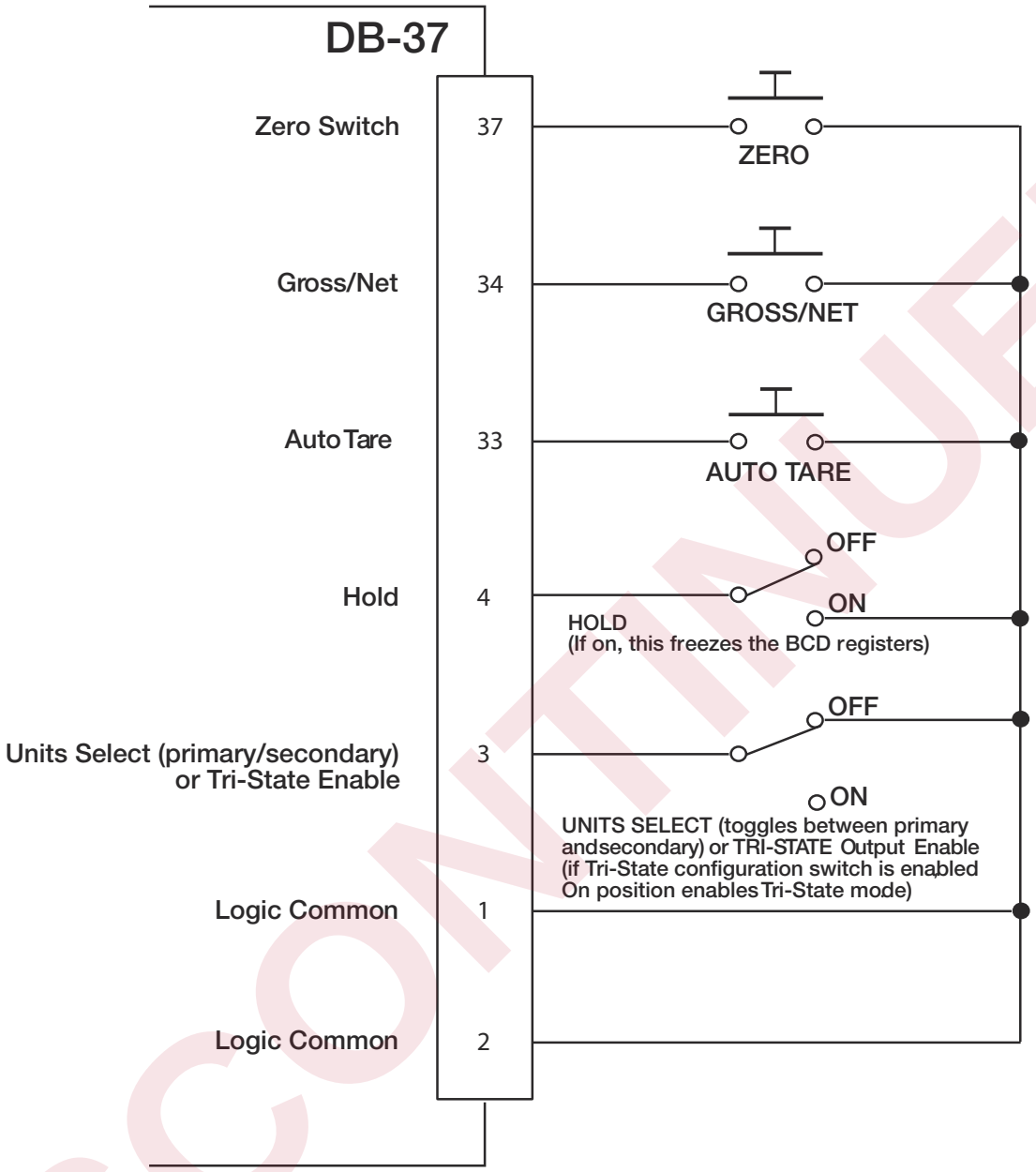


Figure 3-2. BCD Remote Switches

Three of the front panel switches (zero switch, gross/net switch, and auto tare switch), can be operated from a remote location using momentary-action pushbuttons. Note that each “push” of a remote switch activates the associated function once. The function of the gross/net switch is to change the state of output between gross and net mode.

An alternate action switch is suggested to operate the Hold and Units Select/Tri-State Enable. When using the BCD option in Units mode, the switch state is independent of the front panel and toggles between primary and secondary units if any change of state is detected.

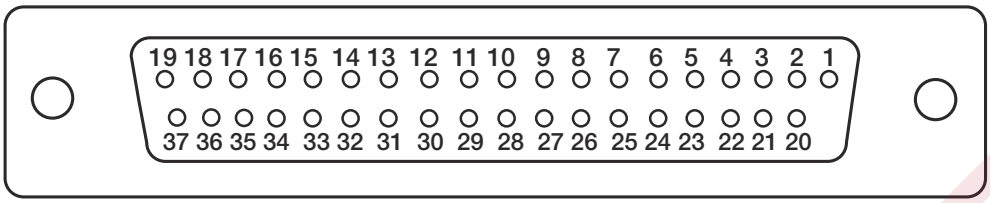
Tri-State output enable is used to allow other peripheral devices to use the same BCD output. To place the unit in Tri-State mode, set dip switches according to Table 2-4.

All switch inputs are tied to 5V through pull-up resistors on the BCD option card to ensure reliable operation.

Note ***Connect the pins/switches to Logic Common only, not case ground or other grounds.***

Good engineering practices suggest:

- Switches should be placed no more than six feet (two meters) from the indicator.
- Cables for low level digital signals should not be placed near high voltage sources or equipment that emits high levels of EMI/RFI.



1		1	DGND (Logic Common)
2		20	4SD MSB (8)
3		2	DGND (Logic Common)
4		21	3SD MSB (8)
5		3	Units/Tri-State enable
6		22	3SD (4)
7		4	Hold bit
8		23	3SD (2)
9		5	Units bit/TX serial output
10		24	3SD LSD (1)
11		6	4SD (4)
12		25	2SD MSB (8)
13		7	4SD (2)
14		26	2SD (4)
15		8	4SD (1)
16		27	2SD (2)
17		9	Polarity
18		28	LSD MSB (8)
19		10	LSD (1)
20		29	LSD (4)
21		11	Zero bit
22		30	LSD (2)
23		12	MSD LSB (1)
24		31	LSD LSB (1)
25		13	Print enable
26		32	2SD LSB (1)
27		14	MSD (2)
28		33	Auto tare
29		15	Valid data
30		34	Gross switch
31		16	MSD (4)
32		35	Net
33		17	Overload
34		36	No connect/RX serial
35		18	MSD MSB (8)
36		37	Zero switch
37		19	Motion bit

520 ribbon cable header on BCD option

DB-37 connector connects to the backplate of the 520 indicator

Figure 3-3. BCD Header to DB-37 Connector Pin-outs Option

3.2 Floating Decimal Point

A BCD receiving device must assume the decimal point in a single location for either units (no decimal point is actually sent on the BCD lines). The BCD offers several configurations for aligning the decimal point. Refer to Table 2-5 for dip switch settings.

With switch SW1-1 closed (logic 0), the decimal point is rotated left. The BCD option automatically adjusts for the floating decimal point to accommodate units-switching on fixed decimal point devices. It adjusts the decimal point of the units with fewer decimal digits, to match that of the units with the most decimal digits.

Example:

2721 lb — transmits as 27210 — is interpreted as 2721.0 lb

1234.5 kg— transmits as 12345 — is interpreted as 1234.5 kg

The receiving device interprets the decimal point at one place.

Switch SW1-2, when closed (logic 0), shifts the weight data of the primary units to the right one place (if it is configured with a fixed zero), dropping the least significant digit. This function is primarily used to condense the weight data to five and one-half digits by eliminating the fixed zero from the parallel output.

Example:

Displayed Weight	Parallel Output					
	5th SD	4th SD	3rd SD	2nd SD	LSD SD	Fixed Zero on Receiving Device
252350 lb	2	5	2	3	5	0

Table 3-2. Floating Decimal Point Example

Note *With both switches closed, no rotation is performed.*

3.3 Polarity Switch

The BCD option returns polarity on pin 9. The polarity logic may be reversed by setting switch SW1-3. See Table 2-6 below for information on polarity switch configuration.

4.0 Parts List

See Table 4-1 below for a list of parts for the BCD option for the 520 indicator.

Part Number	Part
75148	BCD plate
76155	Cable, 40 pin assembly
55947	37-pin mating connector
15497	Cable, 25-conductor 24AWG

Table 4-1. BCD Option Parts List

BCD Option Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for two years.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, *Protecting Your Components From Static Damage in Shipment*, available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

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