WESTERN SCALE CO. LIMITED

OPERATION MANUAL

MODEL WRD4

4" SCOREBOARD

Revision B

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SECTION 1 - GENERAL INFORMATION

1.1 INTRODUCTION

The WRD4 4" Scoreboard displays any asynchronous serial string sent continuous or on command. This manual will lead you through all the steps required to set up and operate the scoreboard.

1.2 FEATURES

The WRD4 features include:

- **extra-super bright LEDs**
- **full ASCII character set**
- **RS-232 receiver interface**
- **displays weight from any scale string**
- **4, 5 and 6 digits standard; up to 32 digits custom**
- **21 segment digit including decimal point**
- **computer running and data receiving indication**
- **units of measure and weighing mode indication**

1.3 SPECIFICATIONS

WRD4 SPECIFICATIONS	
CHARACTERISTIC	**SPECIFICATION**
Number of Digits	4, 5 or 6 standard, up to 32 digits custom
LED Colour Brightness	 Red (660nm peak wavelength) 30mcd typical
Viewing Angle Distance	 120 degree up to 150 feet
Serial Port Connection Baud Rate Character Format String Length	 2 wire 1200 Baud 9600 Baud 7 bit, even or odd parity, 1 or 2 stop bits 8 bit, no parity, 1 or 2 stop bits up to 32 characters
Distance RS-232 Pseudo RS-232	 up to 250 feet (+/- 12V levels) up to 50 feet (0 and 5V levels)
Temperature Operating Storage	 -20 to +40°C -65 to +150°C
Relative Humidity	0 to 90% non-condensing
Power Requirement	500mA @ 120VAC
Dimensions Width Length Height	 4 inches (10.2 cm) 26.5 inches (67.3 cm) 8 inches (20.3 cm)

TABLE 1-1

1.4 GENERAL DESCRIPTION

The WRD4 4" Scoreboard displays any ASCII character string up to 32 characters in length. Control characters 0 through 1F hex terminate the string while the start position and display length are determined by configuration switches.

The standard package contains 4, 5 or 6 digits with a decimal point included in each 21 segment display. The negative sign 2C hex is detected anywhere in the string and displayed in the most significant digit.

Flashing indicators determine if the micro controller unit is running (MCU RUN) and if data is being received (RCV DTA). These lamps are visible from outside the box on 4" SCOREBOARD MCU 110496 REV.A boards.

The RS-232 interface runs at 1200 or 9600 Baud rate in either of the following character formats:

7 bits, even or odd parity, 1 or 2 stop bits
8 bits, no parity, 1 or 2 stop bits.

1.5 EQUIPMENT REQUIRED

EQUIPMENT REQUIREMENTS	
External Equipment	120VAC Power Source RS-232 compatible data source e.g. DF1000 with 110439 (100-151) or 100-166 DF1500 with 110877-1 DF2000 standard or with 100-174 DF2500 standard DF3000 standard DT1200 standard PC compatible
Optional Equipment	RS-422 line driver/receiver pair for distances over 250 feet
Test Equipment	Digital Multimeter Terminal (RS-232 interface)

TABLE 1-2

SECTION 2 - INSTALLATION GUIDE

2.1 LOCATION

The WRD4 scoreboard should not be exposed to direct sunlight, excessive mechanical abuse, vibration or moisture.

2.2 POWER SUPPLY

The WRD4 scoreboard comes with the AC adapters prewired for a 120VAC power source. See figure 2-1 for connection of power.

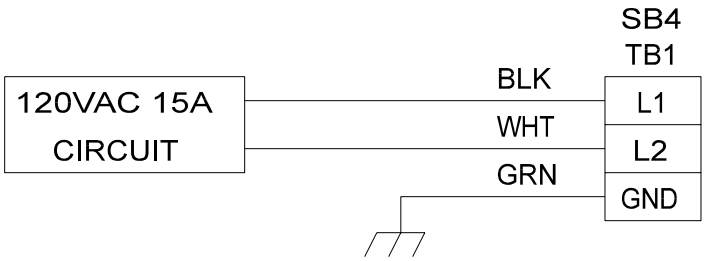

FIGURE 2-1. POWER SUPPLY CONNECTION

2.3 SERIAL PORT

A two wire cable from the data source is required and must be connected to terminal block TB1 on the 4" SCOREBOARD MCU 110496 board - see Figure 2-2. Table 2-2 gives common hook up examples.

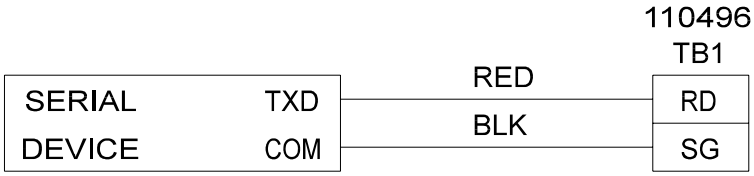

FIGURE 2-2. SERIAL INTERFACE

SERIAL CABLE CHART			
Device	**RX**	**SG**	**Tie Together**
DF1000	37	20	
DF2000	3	1	
DF2500	3	5	
DF3000	TXD	COM	
DT1200	3	5	
PC-DB25	2	7	4, 5, 6, 8
PC-DE9	3	5	1, 6, 7, 8

TABLE 2-2.

2.4 SERIAL MODE

The scoreboard's receive baud rate is 1200 or 9600 Baud.

The word format may be any one of the following:

7 bit, even parity, 1 stop
7 bit, odd parity, 1 stop
7 bit, even parity, 2 stop
7 bit, odd parity, 2 stop
8 bit, no parity, 1 stop
8 bit, no parity, 2 stop.

SECTION 3 - OPERATING INSTRUCTIONS

3.1 POWER UP

The WRD4 scoreboard may be left powered continuously. However, on power up:
- **'SB4' is displayed**
- **segment test is run**
- **character generator is tested**
- **display clears.**

If the acronym 'COP'(Computer Operating Properly) appears, the MCU's watchdog timer or clock monitor have reset the processor.

After Power-Up the WRD4 scoreboard will be running in "continuos update" mode. Unless serial strings are received continuously, the display will show a row of dashes after about 3 seconds. (See section 5.2 - control characters)

3.2 INDICATORS

The WRD4 scoreboard has six indicators visible from outside the box. Figure 3-1 shows their location. MCU RUN flashes approximately once per second telling that the microcontroller unit is running. The RCV DTA indicator flashes every time a serial string is received and is being processed for display.

If the serial string contained a letter "K", the KILOGRAMS indicator will light up. A letter 'L' in the serial string will activate the POUNDS indicator.

If either one of the units indicators is lit up, then the weighing mode is also indicated. The NET indicator will be on, if the serial string contained an "N". If no "N" was in the serial string, then the GROSS indicator will be lit up. If neither a "K" nor an "L" were in the serial string, then both NET and GROSS indicator will also remain dark. (See section 5.2 - control characters)

FIGURE 3-1. SCOREBOARD DISPLAY

SECTION 4 - SETUP INSTRUCTIONS

4.1 DIP SWITCHES

On the 4" SCOREBOARD MCU 110496, S1 the dual inline package (DIP) switch is used to configure the scoreboard. Figure 4-1 gives the switch definitions and an example setting for a DF series indicator running 5 digits at 9600 baud with no decimal point.

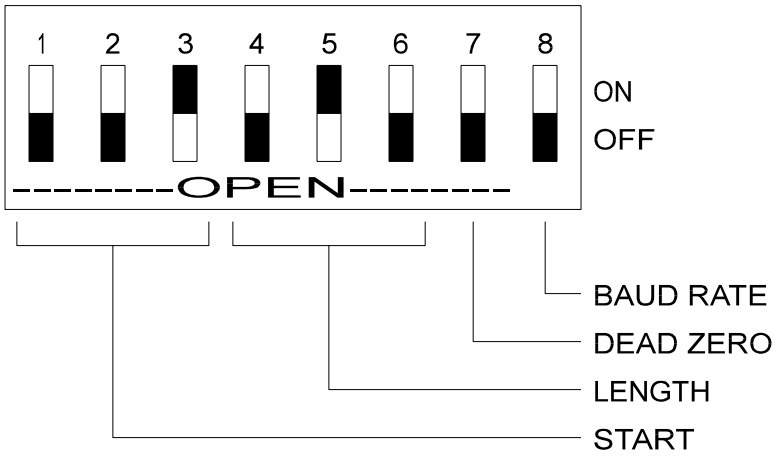

FIGURE 4-1. DIP SWITCH SETTING

The first three switches determine the start position and the next three determine the number of digits displayed. Table 4-1 lists these switch settings.

1	2	3	START POSITION	
4	5	6		NO. OF DIGITS
on	on	on	0	up to 32
off	on	on	1	1
on	off	on	2	2
off	off	on	3	3
on	on	off	4	4
off	on	off	5	5
on	off	off	6	6
off	off	off	7	7

TABLE 4-1

For the DF series of indicators outputting the standard scale string, the switch settings are given in Table 4-2.

SWITCH NUMBER	1	2	3	4	5	6
NUMBER OF DIGITS						
4 4+DP	on off	on off	off on	on off	on on	off off
5 5+DP	off on	off off	on on	off on	on off	off off
6 6+DP	on off	off on	on on	on off	off off	off off

TABLE 4-2

A dead zero may be displayed in the right most digit by turning switch 7 on.

The baud rate is set using switch 8 as follows:

off - 9600 Baud
on - 1200 Baud.

SECTION 5 - SUPPORT INFORMATION

5.1 TROUBLESHOOTING

Table 5-1 describes possible difficulties encountered when installing or operating the scoreboard.

TROUBLESHOOTING GUIDE	
SYMPTOM	**SOLUTION/CAUSE**
Scoreboard not turned on - MCU RUN not flashing	1. Check AC power source. 2. Check power connection - see Section 2.2.
Scoreboard not receiving - RCV DTA not flashing	1. Interface cable disconnected. 2. Serial interface not wired correctly - see Section 2.3. 3. Baud rate incorrectly set - see Section 4.1.
Display unstable - digits do not stay in one place.	1. Character format not setup correctly at source - see Section 2.4.
Display offset - cannot see all the digits.	1. DIP switches are not set correctly - see Section 4.1.

TABLE 5-1

5.2 CONTROL CHARACTERS

The WRD4 scoreboard recognizes the following control characters within a serial string to turn some features on or off:

control char.	name	decimal value	hex value	function	default
^F	acknowledge (ACK)	06	06	continuous update ON	*
^U	neg. acknowledge (NAK)	21	15	continuous update OFF	
^N	shift out (SO)	14	0E	units, mode LEDs ON	*
^O	shift in (SI)	15	0F	units, mode LEDs OFF	

APPENDIX A - ASCII CONVERSION TABLE

HEX	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	,	L	\	l	|
D	CR	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL