



PATIENT SIMULATOR REMOTE CONTROL



PSR-2200-DS

USER MANUAL

**BC BIOMEDICAL
PSR-2200-DS
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This User Manual covers the following units:

- PSR-2200-DS

WARNING - USERS

The PSR-2200-DS is for use by skilled technical personnel only.

WARNING - USE

The PSR-2200-DS is intended for testing only and should never be used in diagnostics, treatment or any other capacity where it would come in contact with a patient.

WARNING - CONNECTIONS

All connections to patients must be removed before connecting the DUT to the Patient Simulator and PSR-2200-DS. A serious hazard may occur if the patient is connected when testing with the Patient Simulator & PSR-2200-DS.

CAUTION - MODIFICATIONS

The PSR-2200-DS is intended for use within the published specifications. Any application beyond these specifications or any unauthorized user modifications may result in hazards or improper operation.

CAUTION - SERVICE

The PSR-2200-DS is intended to be serviced only by authorized service personnel. Troubleshooting and service procedures should only be performed by qualified technical personnel.

CAUTION - INSPECTION

The PSR-2200-DS should be inspected before each use for obvious signs of abuse or wear. The PSR-2200-DS should not be used and should be serviced if any parts are in question.

CAUTION - CLEANING

Do not immerse. The PSR-2200-DS should be cleaned by wiping gently with a damp, lint-free cloth. A mild detergent can be used if desired.

CAUTION - LIQUIDS

Do not submerge or spill liquids on the PSR-2200-DS. Do not operate the PSR-2200-DS if it may have been exposed to fluid.

CAUTION - ENVIRONMENT

Exposure to environmental conditions outside the specifications can adversely affect the performance of the PSR-2200-DS. Allow the PSR-2200-DS to acclimate to specified conditions for at least 30 minutes before attempting to operate it.

NOTICE – ABBREVIATIONS

ANSI	American National Standards Institute
BPM	Beats Per Minute
C	Celsius
°	degree(s)
DUT	Device Under Test
ECG	Electrocardiogram
F	Fahrenheit
Hz	hertz
IEC	International Electrotechnical Commission
Lbs	pounds
LED	Light Emitting Diode
mm	millimeter(s)
mV	millivolt(s)
NEDA	National Electronic Distributors Association
USA	United States of America
V	Volt(s)

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NOTICE – CONTACT INFORMATION

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**BC BIOMEDICAL
PSR-2200-DS
PATIENT SIMULATOR REMOTE CONTROL**

The Model PSR-2200-DS is a Microprocessor based remote control for use with DataSim 300 Patient Simulator . The remote allows the user to configure the patient simulator using pre-programmed configurations as well as codes.

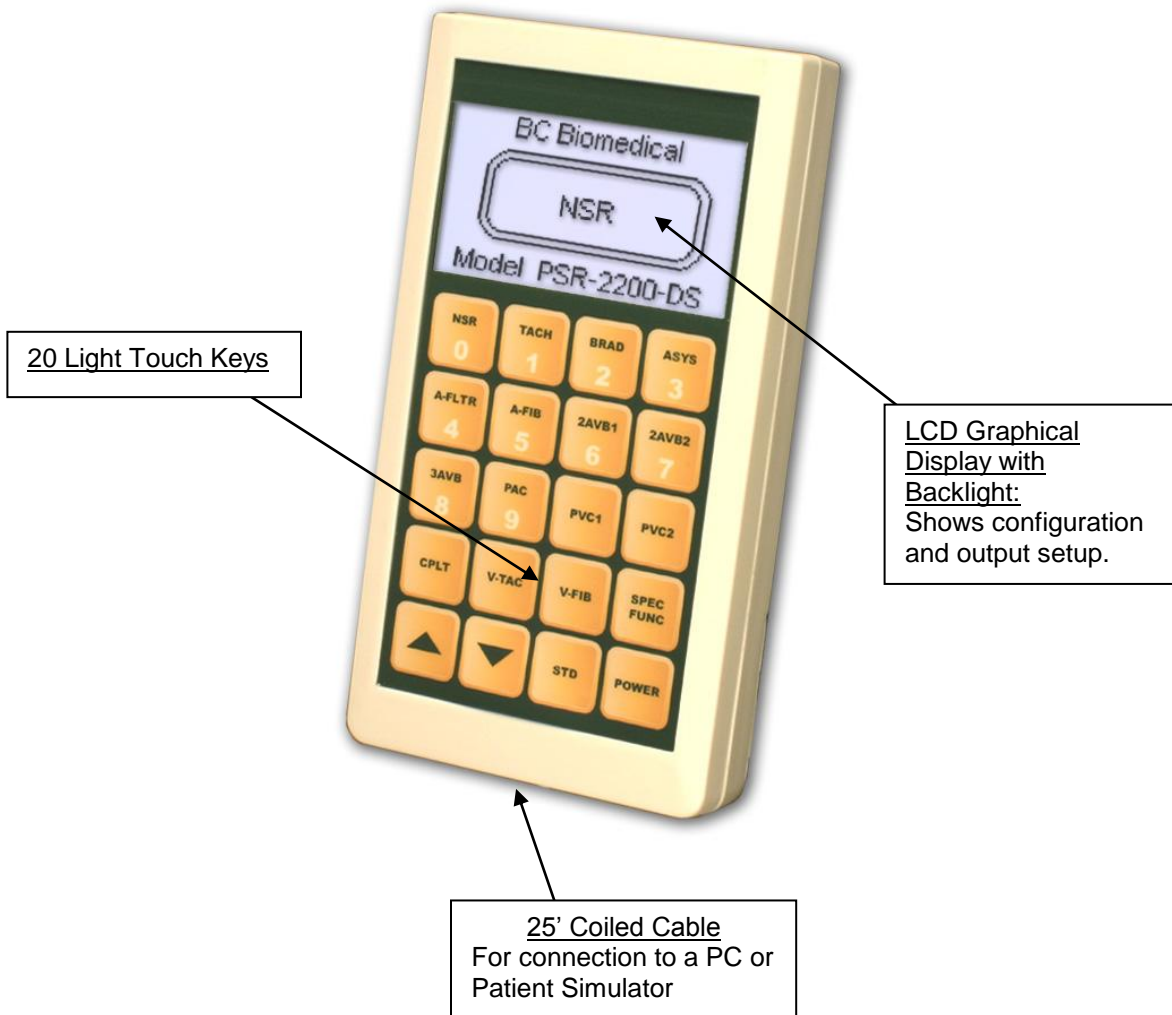
The following are highlights of some of the main features:

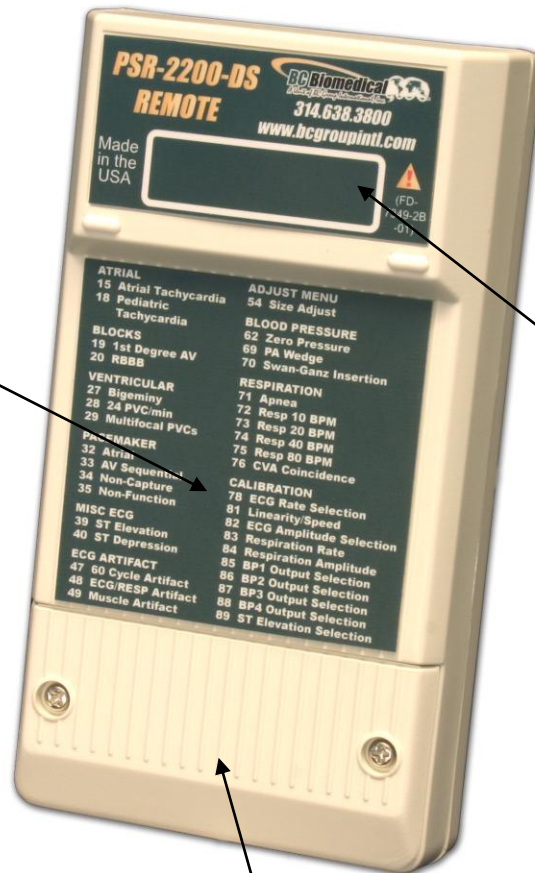
- 16 FIXED FUNCTION KEYS
- 36 CODES FOR PRE-PROGRAMMED CONFIGURATIONS AND ADJUSTMENTS
- LARGE GRAPHICS DISPLAY WITH BACKLIGHT
- DISPLAY BACKLIGHT WITH ADJUSTABLE TIMER
- PROGRAMMABLE AUTO SHUTDOWN TO CONSERVE BATTERY LIFE

NOTE: This remote contains a special program that has allowed it to be greatly simplified to perform in a similar manner to an older system. For a much more advanced, full-featured version, that uses drop down menus, has no codes, contains full graphic screen features, runs sequences and is programmable via a PC, see the standard Model PSR-2200.

LAYOUT

This section looks at the layout of the PSR-2200-DS and gives descriptions of the elements that are present.





List of Codes

Model and Serial Number Label

Battery Compartment
1 9V Battery

KEYS

20 soft touch keys are provided for system operation:



– Pressing and holding this key for 3 seconds will turn the unit off.



– This key allows the user to input pre-programmed codes using the number keys.



– This key returns parameters to their Standard settings.



– These keys are used to select the values of adjustable parameters as accessed through the  key and codes.

When not in the Special Function mode, these keys can be used to adjust the Backlight Off Timer.



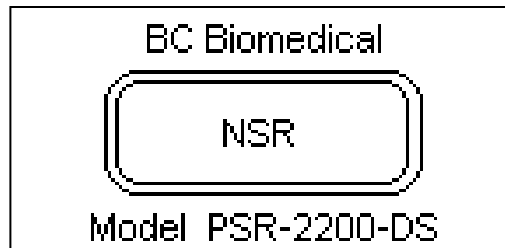
– These are 16 fixed function keys that configure the Patient Simulator for pre-defined output configuration.





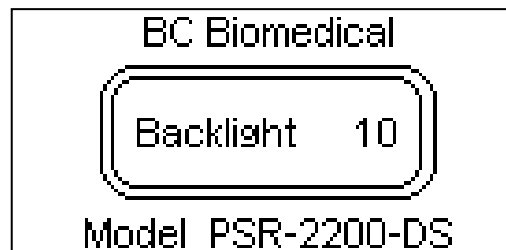
– These are the numeric keys 0 – 9 used to enter codes.

SCREENS

The Main Screen shows the current operating mode of the Patient Simulator.



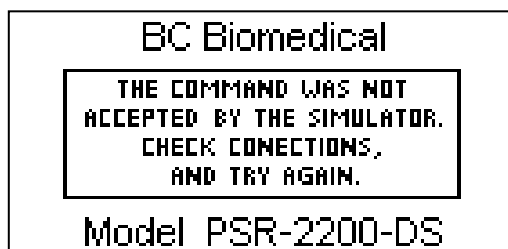
The Backlight Time Screen allows for the setting of the Backlight Off Timer. The Backlight can be Off, set to 1-20 seconds or On. The   keys are used to choose the desired setting. After 3 seconds of non-activity, the screen reverts to the Main Screen.



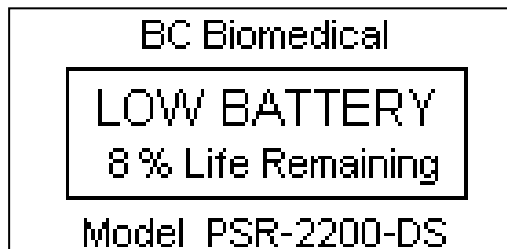
MESSAGES

Two status messages are available to indicate the present state of the system. The following is a brief description of the available messages:

COMMUNICATION ERROR – This message indicates that the simulator did not acknowledge a command that was sent to it. If the cables are connected properly, cycle power on the PSR-2200-DS and the Patient Simulator and try the command again.



LOW BATTERY – This message indicates that the batteries are low and should be replaced.







OPERATION


To control a patient simulator, the remote control is first plugged into the RS232 connector of the simulator. You must use the adapter provided to convert the PSR-2200-DS 7 pin Mini-Din connector to the RS232 DB9 connector on the simulator.





PRE-DEFINED FUNCTION KEYS: A fixed function can be loaded by pressing the



desired key. To make adjustments to the output selections,  and the Number Keys can be used to enter the code to select output settings. The   keys are used to modify to the desired output .Any changes made on the remote will be immediately made on the Patient Simulator. The  key returns the parameter to its Standard settings.

CODE	DISPLAY	FUNCTION	DESCRIPTION
00	NSR	Normal Sinus	NSR of 80 BPM
01	TACH	Sinus Tachycardia	NSR of 140 BPM
02	BRAD	Sinus Bradycardia	NSR of 30 BPM
03	ASYS	Asystole	Flat line signal
04	A-FLTR	Atrial Flutter	Repeating sequence of 5 atrial beats and 1 ventricular beat for twelve seconds, followed by a repeating sequence of 3 atrial beats and 1 ventricular beat for six seconds, followed by a repeating sequence of 2 atrial beats and 1 ventricular beat for six seconds
05	A-FIB	Atrial Fibrillation	Absence of P-wave, irregular P-R interval rate and a low level signal
06	2AVB1	2nd Degree AV Block I	80 BPM with increasing P-R interval for four beats (160, 220, 400, 470 ms) followed by a P wave without a QRS
07	2AVB2	2nd Degree AV Block II	80 BPM with Normal P-wave and P-R interval but wider QRS complexes
08	3AVB	3rd Degree AV Block	80 BPM with P wave rate of 80 BPM and QRS rate of 30 BPM
09	PAC	PAC Insert	NSR of 80 BPM with Periodic Abnormal 25 % early P waves (Single Insert, return to NSR)
10	PVC1	PVC1 Insert	NSR of 80 BPM with periodic left focus premature ventricular beats with 20% premature timing (Single Insert, return to NSR)
11	PVC2	PVC2 Insert	NSR of 80 BPM with periodic right focus premature ventricular beats with 20% premature timing (Single Insert, return to NSR)
12	CPLT	Couplet Insert	NSR of 80 BPM with 2 Type 1 PVCs (Single Insert, return to NSR)
13	V-TAC	Ventricular Tachycardia	160 BPM, No P-wave, Beats similar to Type 1 PVC
14	V-FIB	Ventricular Fibrillation	Irregular waveform with no real P-wave or clear R-R interval and a high signal level

PRE-DEFINED FUNCTION CODES: A fixed function can be loaded by entering the desired code. The  key is pressed and then the Number Keys are used to enter the code. The available codes are located on the label on the back of the remote.

To make adjustments to the output selections,  and the Number Keys can be used to enter the code to select output settings. The   keys are used to modify to the desired output. Any changes made on the remote will be immediately made on the Patient Simulator. The  key returns the parameter to its Standard settings.

CODE	DISPLAY	FUNCTION	DESCRIPTION
ATRIAL			
15	AT TACH	Atrial Tachycardia	NSR of 160 BPM
18	PED TACH	Pediatric Tachycardia	Pediatric NSR of 160 BPM
BLOCK			
19	1st AVB	1st Degree AV Block	80 BPM with a long P-R interval of 250 ms
20	RBBB	Right Bundle Branch Block	80 BPM with Normal P-wave and P-R interval but wider QRS complexes
VENTRICULAR			
27	BIGEMINY	Bigeminy	NSR of 80 BPM with every other beat a Type 1 PVC
28	U-PVC's	Unifocal PVCs	NSR of 80 BPM with 24 Type 1 PVC's per minute
29	M-PVC's	Multifocal PVCs	NSR of 80 BPM with Type 1 and Type 2 PVCs (PVC Type 1, 3 NSR, PVC Type 2, 3 NSR)

CODE	DISPLAY	FUNCTION	DESCRIPTION
PACEMAKER			
32	A-PACE	Atrial	80 BPM with Pacer Pulse at the start of each P wave
33	AV-PACE	AV Sequential	75 BPM with Pacer Pulse at the start of both the P and QRS waves
34	LOSS CAP	Sense & Capture Fail	75 BPM Ventricular Paced beats with every tenth beat not responding
35	CAP FAIL	Failure to Capture	75 BPM Ventricular Paced beats with no heart response
MISC ECG			
39	ST ELEV	ST Elevation	QRS Complex with 0.2mV ST Elevation
40	ST DEP	ST Depression	QRS Complex with -0.3 mV ST Depression
ECG ARTIFACT			
47	60 CYCLE	60 Cycle Artifact	60 Hz Noise added to ECG output
48	ECG RESP	ECG/RESP Artifact	Respiration Artifact added to ECG output
49	M ARTF	Muscle Artifact	Muscle Artifact added to ECG output
ADJUST			
54	SEL CHAN	Size Adjust Menu (See Table Below)	Allows for the adjustment of the waveform size up or down from the Standard for 8 Channels.

SIZE ADJUST MENU			
CHANNEL	(Direct Code) FUNCTION	DISPLAY	VALUES (* indicates Standard)
0	(78) ECG Rate Selection	HR	30, 40, 45, 60, 80*, 90, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300 BPM
1	(82) ECG Amplitude Selection	ECG	0.05, 0.10, 0.15, 0.20, 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 1.0*, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5 mV
2	(85) BP1 Output Selection	BP1	ART, LV, RV, RA, -10, 0*, 80, 160, 240, 320, 400 mmHg
3	(86) BP2 Output Selection	BP2	ART, LV, RV, LA, PA, RA, CVP, PAW, -10, 0*, 50, 100, 150, 200, 240 mmHg
4	(87) BP3 Output Selection	BP3	ART, LV, RV, LA, PA, RA, CVP, PAW, -5, 0*, 20, 40, 60, 80, 100 mmHg
5	(88) BP4 Output Selection	BP4	RV, PA, CVP, PAW, -5, 0*, 20, 40, 60, 80, 100 mmHg
6	(84) Respiration Amplitude	RA	0.2, 0.50, 1.0*, 3.0 Ω
7	(83) Respiration Rate	RR	0, 15, 20*, 30, 40, 60, 80, 100, 120 BrPM
8	(89) ST Elevation Selection	ST	-0.8, -0.7, -0.6, -0.5, -0.4, -0.3, -0.2, -0.1, -.05, 0.0*, .05, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8 mV

CODE	DISPLAY	FUNCTION	DESCRIPTION
BLOOD PRESSURE			
62	0 mmHg	Zero Pressure	Puts all BP Channels at 0 mmHg
69	PA WEDGE	PA Wedge	Pulmonary Artery Wedge 10/2 mmHg
70	SWANGANZ	Swan-Ganz Insertion	Right Atrium CVP 15/10 Insert Right Ventricular 25/0 Insert/Pull Back Pulmonary Artery 25/10 Insert/Pull Back Pulmonary –Arterial Wedge 10/2 Deflate
RESPIRATION			
71	APNEA	Apnea	No Respiration
72	RESP @ 10	Resp 10 BPM	Respiration at 10 BPM
73	RESP @ 20	Resp 20 BPM	Respiration at 20 BPM
74	RESP @ 40	Resp 40 BPM	Respiration at 40 BPM
75	RESP @ 80	Resp 80 BPM	Respiration at 80 BPM
76	RESP CVA	CVA Coincidence	NSR at 80 BPM, Respiration at 80 BPM
CALIBRATION			
78	ECG RATE	Heart Rate Calibration	30, 40, 45, 60, 80*, 90, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300 BPM
81	2.5 Hz	Linearity/Speed	2.5 Hz triangle waveform
82	ECG SIZE	ECG Size Calibration	0.05, 0.10, 0.15, 0.20, 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 1.0*, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5 mV
83	RR	Respiration Rate	0, 15, 20*, 30, 40, 60, 80, 100, 120 BrPM
84	RA	Respiration Amplitude	0.2, 0.50, 1.0*, 3.0 Ω
85	BP1	BP1 Output Selection	ART, LV, RV, RA, -10, 0*, 80, 160, 240, 320, 400 mmHg
86	BP2	BP2 Output Selection	ART, LV, RV, LA, PA, RA, CVP, PAW, -10, 0*, 50, 100, 150, 200, 240 mmHg
87	BP3	BP3 Output Selection	ART, LV, RV, LA, PA, RA, CVP, PAW, -5, 0*, 20, 40, 60, 80, 100 mmHg
88	BP4	BP4 Output Selection	RV, PA, CVP, PAW, -5, 0*, 20, 40, 60, 80, 100 mmHg
89	ST	ST Elevation Selection	-0.8, -0.7, -0.6, -0.5, -0.4, -0.3, -0.2, -0.1, -.05, 0.0*, 0.05, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8 mV

MANUAL REVISIONS

<u>Revision #</u>	<u>Program #</u>	<u>Revisions Made</u>
Rev 01	DT7349DSA	Origination
Rev 02	DT7349DSB	Misc. Edits
Rev 03	DT7349DSC	Format Updated

LIMITED WARRANTY

WARRANTY: BC GROUP INTERNATIONAL, INC. WARRANTS ITS NEW PRODUCTS TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP UNDER THE SERVICE FOR WHICH THEY ARE INTENDED. THIS WARRANTY IS EFFECTIVE FOR TWELVE MONTHS FROM THE DATE OF SHIPMENT.

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SPECIFICATIONS

PHYSICAL		
DISPLAY	LCD Graphical 128 X 64 Pixels, White LED Backlight	
CONSTRUCTION	ENCLOSURE	ABS Plastic
	FACE PLATE	Lexan, Back printed
SIZE	5.98 x 3.27 x 1.28 Inches (151.9 x 83.1 x 32.5 mm)	
WEIGHT	< 1 Lbs (0.45 kg)	
OPERATING RANGE	15 to 40 °C (59 to 104 °F)	
STORAGE RANGE	-20 to 65 °C (-4 to 149 °F)	
ELECTRICAL		
BATTERY	9V Alkaline Battery (1 required) (NEDA 1604A or equivalent)	

NOTES

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