Buffalo Computer Graphics (BCG) offers our PCS-4xx line of radar stimulators to drive real radar display systems for both testing and training. Each of the PCS-4xx units runs under a Windows operating system utilizing BCG's new RSGx board at its core. Four models make up the PCS-4xx product line -

- Model PCS-400: a desktop or rack mount computer integrated with BCG's custom radar hardware and software as a turn-key radar simulator
- Model PCS-401: a Hardware / Software Kit that can be installed on a user's own computer that meets BCG specifications
- Model PCS-420: Two sets of BCG's custom radar hardware and software that are integrated into a desktop or rack mount computer as a turn-key dual radar simulator
- Model PCS-450: BCG's custom radar hardware and software that is integrated into a portable package suited for a mobile training environment

Each of the PCS-4xx units produce the same real antenna/transceiver signals used by various radar display manufacturers to enable use of real shipboard equipment in a simulated environment. The output signals and simulated radar image are controlled using BCG simulation control software, or by a third party system using a simple network control interface.

PCS-4xx Features & Options:

- PC-based, using Windows 10 or Windows 11 operating system
- Uses custom BCG designed hardware, RSGx board (a single PCI-Express format module per antenna) assuring long product life
- Single plug-in module design requires minimal maintenance
- Uses custom BCG simulation software with long, tested history of performance
- Choice of computer packaging
- All scenarios and radar databases are compatible with BCG's older PCS-2xx and PCS-3xx simulators
- Compatible with existing BCGUDP remote network interface
- Single unit drives multiple radar displays from varying manufacturers, full ARPA support
- NMEA-0183 Support; RS232, RS422 or network
- Simulation utilizes object height data (ships, land and man-made structures) for the generation of the radar video providing realistic occultation of radar returns due to radar signal blockage

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- Supports Precipitation modeling with leading edge brightness and signal attenuation
- Enhanced Sea Clutter presentation with greater range and better density control
- Offers variable pixel resolution allowing for an extended video sweep length yet detailed display of nearby objects
- Can support optional BCG Dig-to-Synchro Convertor unit
- Support for Automatic Identification System (AIS); RS232, RS422 or network
- Supports various radar and sensor failures
- Easily expandable to support multiple simulators (radar platforms) on the same simulation network to allow for Team Training

Radar Interfaces Supported:

1. Sperry Marine BridgeMaster-E
2. Sperry Marine VisionMaster and military version NEXGEN
3. Furuno large boat radars, Master (radar is source of Trigger)
4. Furuno large boat radars, Slave (simulator is source of Trigger)
5. Furuno small boat radars, Master (radar is source of Trigger)
6. Furuno small boat radars, Slave (simulator is source of Trigger)
7. SSR Engineering PC-RP (various models)
8. SPS-73
9. SPS-67 (with separate Dig-to-Syn Converter Unit)
10. SPS-50
11. SPS-78
12. SPA-25x (RADDS, Trigger, Video)
13. SPQ-9B
14. TRS-3D
15. Generic Trigger/Video/ACP/ARP interface
16. Radar Signal Processors and Scan Converter Cards from multiple vendors
17. Custom radar interfaces upon request

PCS-4xx Specifications:

Physical, Electrical, Environmental:

Operating power: 115 - 220 VAC
50 - 60 Hz

Operating current:

Single RSGx Board Only	
+12 VDC (Power Cable)	+3.3 VDC (PCIe Slot)
0.400 A	0.300 A

Operating temperature: 0 degrees C - 70 degrees C
Operating humidity 20% - 80% Relative Humidity

Simulation:

Video types:
Stationary vessels / entities
Moving vessels
Landmass
Navaids
Sea Clutter
Precipitation Clutter
Receiver Noise
Radar Interference
Racons
SARTs

Optional Video Channels:
Composite (Raw)
Clear Plot (Processed)

Effects:
Multiple Echoes
False (indirect) Echoes
Signal Attenuation due to range (based on radar power)
Signal Attenuation due to precipitation
Radar Shadowing based on antenna & object height

Number of target vessels: 100 standard, 1000 optional

Video range resolution:

Targets*	4/8 yards for short range select
	16 yards for medium range select
	32 yards for long range select
	64 yards for very long range select
Land	4-32 yards

*Resolution is dependent upon the database area in use.

Antenna height resolution:	1 foot	
Antenna height range:	750 feet	
Bearing resolution:	0.17 Degrees	
Antenna scan rate (simulated):	5 - 60 RPM	
Trigger rate (simulated):	50 - 5000 Hz	
Trigger pulse width (simulated):	50 nSec - 6.25 μsec, 1 μSec nominal	
Video pulse width (simulated):	50 - 5000 nSec	
Horizontal Beamwidth:	0 – 90 degrees	
Vertical Beamwidth:	0 – 90 degrees	
Gyro Compass:	3 Phase Stepper, 6 steps per degree, +30VDC	
Speed Log:	Contact Closure, 200 pulses/NM, +15VDC max	
Simulated active area:	Up to 256 nautical miles X 256 nautical miles (Larger with Map Compounding)	
Weather:	Active area	32 NM X 32 NM or continuous
	Levels	0 – 7
	Speed	0 - 99 Knots
	Direction	0 - 360 Degrees
Sea Clutter:	Active area	Up to 10 nautical miles
	Levels	Sea State 0-12

Min. PC Specifications:	Windows 10/11 (64 bit) 8th Generation Intel Core i5 16GB memory Hard Drive ATA 7200 RPM, 100GB available DVD-RW Drive 2x Unused USB Ports ATX Power Supply (2x PCI-E +12V Connector, 6 pin) One (1) full height, 6.75 inch length PCI-Express slot for PCS-400 Two (2) full height, 6.75 inch length PCI-Express slot for PCS-420

Basic Signal Characteristics:

Many of the outputs from the PCS-4xx are software programmable, therefore the following signal definition provides basic signal characteristics. Contact BCG for special signal requirements.

TRIGGER

Input:	+8V DC, positive or negative going pulse
Output:	(1) 0V to +8V DC, positive or negative going pulse, 75 ohm (2) 0V to +5V DC, positive or negative going pulse, 75 ohm (3) RS422 Differential

VIDEO

(1) 0V to +4.5V DC, 75 ohm
(2) 0V to -4.5V DC, 75 ohm

ACP

Programmable pulses/rot
Two outputs
(1) 0V to +5V DC, positive or negative going pulses, 75 ohm
(2) Open Collector, 0V to +15VDC, positive or negative going pulses
(3) RS422 Differential

ARP

Single pulse/rot (bow crossing)
Two outputs
(1) 0V to +5V DC, positive or negative going pulses, 75 ohm
(2) Open Collector, 0V to +15VDC, positive or negative going pulses
(3) RS422 Differential

GYRO COMPASS

Three phase DC Step output, GND
(1) 0V to +30V DC (internal reference)
(2) Six steps per degree

SPEED LOG

Contact Closure, GND
(1) Open Collector, External DC Reference required, 0V to +15V DC, positive or negative going pulses
(2) 200 pulse/NM
(3) Pulse width 25nSec to 400mSec

SYNCHRO (Optional)

External unit
Up to three channels
5 wire configuration
60 Hz or 400Hz operation (customer provides Reference Voltage)
11.25V or 90V p-p

**Contact BCG for signal specifications not shown here