

DigiSHOT System

Energy Source Synchronizer, Controller and Acquisition System

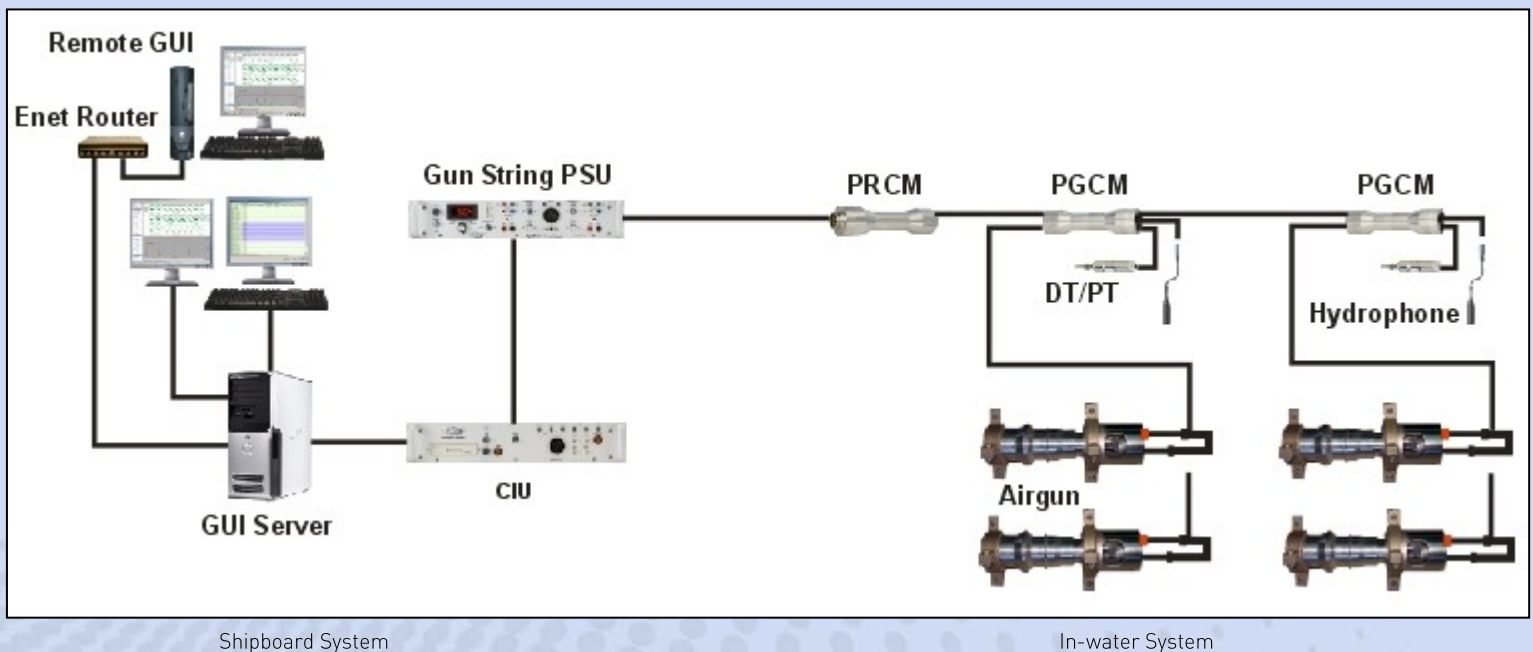
THE DigiSHOT® SYSTEM

The DigiSHOT system is a digital distributed air gun array source synchronizer with multiple array sensor acquisition capability. It gathers, digitizes and delivers data from multiple sensors within a source array to the shipboard system for managing, displaying, diagnostics, recording, modeling and archiving.

DigiSHOT provides accurate, repeatable air gun timing, improving operational efficiency and dramatically enhancing sub-surface seismic imaging.

FEATURES AND BENEFITS

- Accurate and repeatable 4D source signature
- Enhanced timing accuracy
- Greater operational reliability
- Scalability using plug-and-play concept
- Increased high frequency content
- Consistent high power output
- Optional long umbilical support



Specifications

Progressive Power-Up Gun Control Module (PGCM)



APG Model



APG Mini-Model



Conventional Model

Physical Characteristics

Length	16.26" (AG 19.51")	13.38" (AG 14.83")	14.65" (AG 16.57")
Height	6.07" (AG 6.16")	2.20" (AG 2.20")	
Width	3.06" (AG 3.23")		
Diameter	1.85" (AG 1.85")	1.85" (AG 1.85")	3.5" (AG 4")
Weight	19.8 lbs (AG 22.5 lbs)	5.1 lbs (AG 6.2 lbs)	16 lbs (AG 19.9 lbs)
Connectors	6xRM4M (3 per side)	2xRM4M (1 per side)	6xRM4M (3 per side) 5xAG-4-F, 1xAG-4-M
Max operating depth	300 meters		
Temperature range	-20°C to +60°C (-4°F to +140°F)		

Electrical Characteristics

Power requirement (per string)	50 volts at 500 Watts (for nominal 2 sec. capacitor recharge of 16 guns)
Solenoid output voltage	60/90 volts @ 10 amps for up to 35 milliseconds (APG is 60 volts only)
Solenoid pulse width	1 ms to 35 ms (input by operator)
Short circuit	Short circuit protection
Timing sensor	BOLT PCB, Sleeve Gun timing coil & G-Gun timing coil/near field sensor
Timing sensor polarity	Software polarity invert (input by operator)
Timing sensor threshold setting	0.1v to 2.4v (input by operator)
Communication	RS485 over 120 ohm terminated wire pair. Auto-baud up to 57.6K
Timing control (multiple units)	Synchronized to 0.5-1 msec by PRCM
Fire / No-fire / Array select control	Operator selectable

Digitization Capabilities

Sensor signal	.10 msec sample rate for up to 50 msec (shot triggered)
Near field hydrophone (optional)	.5 msec sample rate for up to 512 msec 16 bit resolution (shot triggered)
Depth / Pressure (optional)	1 second sample rate, latched at fire time

Air Gun Control Capabilities

Minimum cycle time	Configuration dependent (range 5-15 seconds)
Auto fire detect capability	Sensor signals constantly monitored for spiking over Auto fire threshold
No. of guns per single gun PGCM	One gun station with DT or PT and hydrophone, fully digitized
No. of guns per dual gun PGCM	Cluster gun station w/ 2 x DT or DT & PT or 2 x PT/ 2 x hydrophone, fully digitized
No. of single gun PGCM per string	Up to 16 Single Gun PGCM
No. of dual gun PGCM per string	Up to 8 Dual Gun PGCM
Timing control	0.10 msec resolution with automatic and manual aim point delay
Fire modes	Automatic, manual and offset firing supported
Number of arrays supported	Up to 4 sequenced arrays with overlapped gun assignments supported
Marine mammal protection	User selectable soft start and ramp-up capability
Disable / Enable / Offset / Delay	Full control of individual guns on every shot
Depth / Pressure calibration	Default calibration slope/intercept as well as field calibration facility

Recommended Umbilical



32 wire pair DigiSHOT umbilical	65.5 mm OD Min bend radius: 605 mm (static), Min bend radius: 810 mm (dynamic) Min breaking load: 280 kN, support other peripheral, 1" air hose
32 channel slip ring	Uses a 32 channel slip ring

Specifications

Progressive Power-Up Remote Control Module (PRCM)



APG Model

Conventional Model

Physical Characteristics

Length	14.4" (AG 15.06")	15.5" (AG 16.23")
Height	3" (AG 3")	
Width	3" (AG 3")	
Diameter	3.0"	3.5" (AG 3.5")
Weight	6.8lbs (AG 7.2lbs)	17 lbs (AG 17.3 lbs)
Connectors	1 x RM4M, 1 x DynaCon 12	1 x RM4M, 1 x DynaCon 12, 1 x AG-4F
Power/Communication redundancy	Auto monitors line activity and switches to user-selected umbilical pair	
Communication	RS485 communication to shipboard and RS485 to downstream PGCMs	
Timing control (multiple units)	Synchronized to 0.10 msec by shipboard controller	
Array control	Receives trigger input from shipboard controller. Provides downstream array selection and aim-point delay information to PGCM.	
Max operating depth	300 meters	
Temperature range	-20°C to +60°C (-4°F to +140°F)	

Gun String Power Supply Unit



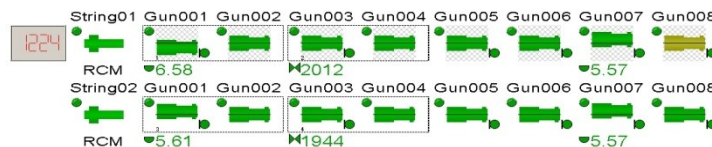
Mechanical housing	19 inch rack mount 2U high module
System requirement	One per 2 gun strings. Supports 2 x (1 PRCM + 8/16 PGCM)
Electrical requirements	120 / 240 volt 60 / 50 Hz with minimum 20 amp breaker
Power output	Supplies 50 VDC to PRCM, PGCM on each gun string
Communication	Opto-isolated TTL to shipboard controller & RS485 to PRCM
Redundancy control	Front panel switches to select power and communication lines to downstream PRCM
Test points	Breakout test points on front panel for umbilical leakage testing
Operating temperature	-20°C to +60°C (-4°F to +140°F)
Compensated temperature	-6°C to +49°C (+21.2°F to +120.2°F)

Shipboard Control Module



Mechanical housing	19 inch rack mount 2U high module
Electrical requirements	120 / 240 volt 60 / 50 Hz with minimum 20 amp breaker
Recording system interface	RS232 serial data for tape header
Gun string communication	TTL interface to gun string power supply units
Recording room timing signals	Clock time break output and programmable TTL and closure inputs
GUI interface	Ethernet 10BaseT
Control capability	Up to 8 gun strings w/ up to 16 guns, 16 hydrophones & 16 DT/PT per string

DigiSHOT GUI



Computer / Processor	Microsoft Windows XP PRO application, 2.8 GHz or higher P4 CPU (req)
Memory	At least 1 GB of RAM min.
Hard disk	120 GB with 20 GB free space
Drive	CD-ROM DVD combo drive
Display	Dual 1280 x 1024 or higher resolution monitor
Network / Port	2 Ethernet ports, 4 USB ports, 1 serial port

Order Information

Shipboard Equipment

Rack-mounted multi-gun controller includes:	AL9000-823
CIU	AL75512-4 (also available separately)
GUI Software	AL8000-1360 (also available separately)
User's Manual (GUI)	AL4200-060 (also available separately)
Kit spares controller	AL75513-4
Rack-mounted power supply	
Power Supply	AL75514
Kit Spares Power Supply	AL75510
Tester	
Assembly DigiTESTER	AL9000-830 (PGCM/PRCM)
User's Manual DigiTESTER	AL4200-066 (PGCM/PRCM)
Operator Interface Computer	AL9000-824 Multi-client system:certified PC w/ 2 19" monitors

Back Deck Equipment

Slip Ring 32 Channels	AL8000-1383
Slip Ring 32 Channels Reduced DIA	AL8000-1755
Assembly Deck Cable	AL5650017-125 (Additional lengths available in feet)

In-water Cabling Equipment

Umbilicals	
Cable assembly umbilical digital 1" air line with full redundancy	AL3300-104-100 (Additional lengths from 100-350m)
Cable assembly umbilical digital 1" air line with ancillary redundancy	AL3300-201-350 (Additional lengths from 350-500m) (No redundancy > 500)
Umbilical termination kit	
HEAD - Kit hardware umbilical digital 1" air	AL6500-097HH
HEAD - Kit chemical umbilical digital 1" air	AL6500-097HC
TAIL - Kit hardware umbilical digital 1" air	AL6500-097TH
TAIL - Kit chemical umbilical digital 1" air	AL6500-097TC
Umbilical jumpers	
Cable jump umbilical RCM SU-16M DYN PRCM	AL3300-076-40 Additional lengths available in inches)
Splitter umbilical to CTX 1 to 2 58"	ALRCA-2124-1
RCA-SU-16M to 4/TSP-RM-4F	ALRCA-1005-1 (Additional lengths available)
Jumper PGCM to PGCM	AL3300-082-XXX

Module Connectors

	PRCM	PGCM	PGCM Mini
Conventional with HLT	AL9000-8204	AL9000-8013	n/a
Conventional with AG Connectors	AL9000-8304	AL9000-8305	n/a
APG Array with HLT	AL9000-8202	AL9000-8086	AL9000-8101
APG Array with AG Connectors	AL9000-8301	AL9000-8302	AL9000-8303
Repair Kit MILMAX 12 AWG extraction / insertion (HLT only)	AL8200-203		
Dummy Plugs	Connector TSP-RM-4F Dummy Non-Short ALB-4491 -1-4		
Sensors (optional)			
Indicator Pressure Hi Precision	AL0700155		
Transducer Depth Sensor	AL0700205		
Hydrophone 2540-RM-4F SHOT	AL3300-081-30 (for hanger plate, available in 12", 30", 36")		