

## Features

- **Industrial Intrinsically Safe Remote Console**
  - Exia / ATEX / MSHA Approved (Pending)
  - 16 Dual Function Mil-STD Toggle Switches
  - Up to 56 Multi-Purpose Functions
  - Integral LED Matrix Display
  - Integral Rechargeable Battery
- **Embedded Industrial Microcontroller**
  - Low Power PIC Controller
  - Integral Flash / RAM
  - Advanced Monitoring Software
- **Narrow Band UHF**
  - 8/16 Channels @ 25KHz Spacing
  - CCITT CRC Data Protection
  - FSK Frequency Modulated
  - Up to 100m line-of-sight range.
- **Operates Minus 10°C to +55°C**
  - All industrial components
- **Heavy Duty Enclosure**
  - Fully Self Contained IP67 Rating
  - Stainless Steel Engraved Facia
  - Stainless Steel Switch Guard
  - Internal Antenna
  - Leather Bound Protective Case
  - Rugged Construction

## Description

The L0Q9 Series Radio Remote Console is an AS4240 compliant device designed for the most rigorous of environments. Fully waterproof and impact resistant, the L0Q9 Series of remote consoles can be used for a variety of industrial remote control applications where safety critical control is required.



## Obelix

Intrinsically Safe  
Radio Remote Console  
Type L0Q9

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## Typical Applications

- Continuous Bolter/Miners
- Continuous Haulage
- Mobile Bolters
- Mobile Roof Supports
- Remote Control Scoops
- Remote Control Loaders
- Any intrinsically safe industrial remote control application

## Ordering Information

Part Number	Description
L0Q90101	Remote Console UHF (VAB ABM12 458MHz)
L0Q90201	Remote Console UHF (Generic 458MHz)



## Electrical Characteristics

Supply	
Voltage	Internal Battery
Battery Type	NiCd 5-Cell 1.2V Matched
Battery Capacity	2.3AH
Battery Current	Actively Limited to 275mA, Fuse / Diode Protected.*
Wattage <sup>MIN</sup>	690mW
Wattage <sup>MAX</sup>	750mW

Radio Module	
Supply	6.0VDC @ 90mA
Frequency	UHF (458MHz / 472MHz) PLL Synthesised
Deviation	±2.6KHz
Power	17dBm (±2dBm)
Channels	32 (25KHz Spacing)
Modulation	Frequency Shift Keyed FM (Narrow Band)
Range <sup>MIN</sup>	100 metres† "Line of Sight"
Range <sup>MAX</sup>	500 metres "Line of Sight"
Data Integrity	CCITT CRC (16 Bit)
Bandwidth	25KHz @ 1200bps
Antenna	Internal Passive Patch Antenna
Classification	Transmitter

Communications	
Baud	1200bps
Format	8N1
CRC	CCITT 16-bit
Frame	Packet Oriented, Bit Masks
Throughput	10Hz

Environmental	
Operating Temperature	Minus 10°C to +55°C
IP Rating	IP67
Humidity	T.B.A.
MTBF	5000 hours‡

Certification	
Australia	T.B.A.
Europe	T.B.A.
USA	T.B.A.

\* Under fault conditions, the actively limiting supply within the battery pack will trip and remain isolated until such time the trip load is removed.

† Figure cited when matched with L0Q9 Remote Consoles.

‡ Figure cited on usage rate equally 16 hours per day, 6 days per week, 52 weeks per year where failures are due to manufacturing.



## Protocol Definition

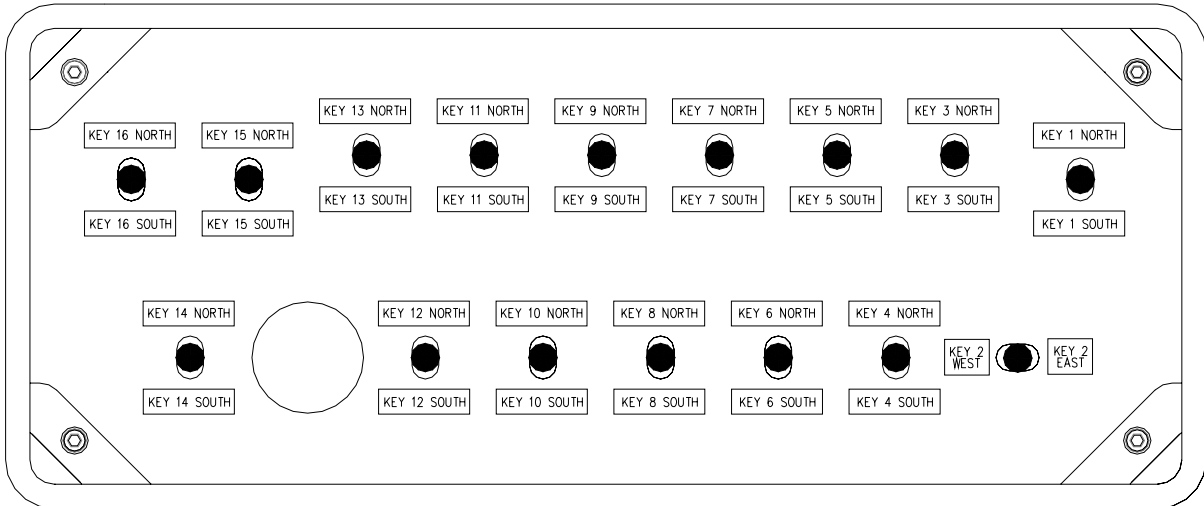
Byte	Type	Mask	Description
1	UINT8	N/A	Start Flag (Value = 0x70..0x77)
2	UINT8	N/A	Serial ID (Value = 0..99)
3	UINT8	N/A	Serial ID (Value = 0..99)
4	UINT8	N/A	Serial ID (Value = 0..99)
5	UINT8	0x80	Key 16 South
		0x40	Key 16 North
		0x20	Key 15 South
		0x10	Key 15 North
		0x08	-
		0x04	Key 14 North
		0x02	-
		0x01	-
		6	UINT8
0x40	Key 12 North		
0x20	Key 11 South		
0x10	Key 11 North		
0x08	Key 10 South		
0x04	Key 10 North		
0x02	Key 9 South		
0x01	Key 9 North		
7	UINT8		
		0x40	Key 8 North
		0x20	Key 7 South
		0x10	Key 7 North
		0x08	Key 6 South
		0x04	Key 6 North
		0x02	Key 5 South
		0x01	Key 5 North
		8	UINT8
0x40	Key 4 North		
0x20	Key 3 South		
0x10	Key 3 North		
0x08	Key 2 South		
0x04	Key 2 North		
0x02	Key 1 South		
0x01	Key 1 North		
9	UINT8		
		0x40	-
		0x20	-
		0x10	Serial ID Not Programmed
		0x08	Select / ON
		0x04	Radio STOP
		0x02	Power Low
0x01	Power Up (1 <sup>st</sup> 60 seconds ONLY)		
10	UINT8	N/A	CRC <sup>MSB</sup>
11	UINT8	N/A	CRC <sup>LSB</sup>



# Key Layout

The following illustration shows the logical key assignment relative to throw. These key positions are reflected in the protocol definition previously defined.

- north = forward
- south = reverse
- east = right
- west = left





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## UHF Transmitter Abstract

The L0Q9 Remote Console incorporates a shielded UHF Narrow Band FM transmitter module which can be programmed to operate in the 458/472MHz (UHF) spectrums. Transmitter power levels are factory tuned to specification (17dBm nominal) along with voltage controlled oscillator levels to generate wanted frequency.

A dedicated onboard microcontroller directly interfaces with a PLL synthesiser to generate the exact wanted frequency which is selected via dynamic high level UART programming. An NRZ signal is transferred directly from the host processor into the onboard modem which works to modulate the data in the radio frequency carrier.



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# Mechanical Characteristics

Dimension	Measurement	Description
A	T.B.A.	Height
B	T.B.A.	Depth
C	T.B.A.	Width

## Notes

- All dimensions are in millimetres.
- AS4240 layout compliant.

## Material

- Enclosure is Nylon.
- Facia is stainless steel.

## Switches

- Long Lever Stainless Steel Toggle
- Dual Pole Cross Over Contacts
- MIL-S-3950-G

## Fasteners

- M3 x 10mm x 4

## Mass

- 4.6kg (10.12lb)