

# ALL NEW Q330S

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# Q330 Brief Overview



**Q4120, Q680, Q720 – The Predecessors**

**Q330 ~5,000 in operation, > 700,000 hours MTBF – ISO 9001**



26 bits	67 108 864 counts	0.60 $\mu$ V/count	0.4 nm/s
24 bits	16 777 216 counts	2.38 $\mu$ V/count	1.5 nm/s
22 bits	4 194 304 counts	9.52 $\mu$ V/count	6.0 nm/s

**Q330HR – the ONLY 26 bit, now with 152 dB**



**Q330S Newest member, with a Baler inside**



# Selected Milestones

● Quanterra - First 24 Bits Recorder – early '80s

● First TCP/IP Implementation – early '90s

● First Ultra Low Power – less 0.5 W – '00

● Q330HR - First 26 Bits Recorder – '05

● Q330HRS - 151 dB on 6 channels - 2010

● With KMI - 55+ registered patents

# Q330S Types

## *What is a Q330S?*

- **Q330S:**  
a Q330 with an embedded Baler44
  
- **Q330HRS:**  
a Q330HR with an embedded Baler44

# Q330S – the New (5<sup>th</sup>) Generation

## Overview

- OS based application: manages power, media, and lib330 execution.
- Interface: dual 100Base-T and 10Base-T Ethernet ports
- Storage: 2 removable robust USB media
- Data Format & Retrieval: web, ftp, ssh access
- Maintenance: Simplified firmware upgrade



# Q330S – OS

- Single-board computer
- ARM processor
- Embedded Linux OS
- -40 to +85°C certified system
- Continuous power requirements ~1W, eliminates need for router
- Internal backup supply – power removal OK
- 1s data packets send, low overhead – low bandwidth



# Q330S – Interfaces



- Console port
- QNet port at 10Base-T speed
  - Includes power supply leads
- WAN Ethernet port at 100Base-T speed
  - RJ-45 connection with bayonet locking for watertight shell
  - TCP/IP, UDP/IP, and DHCP
  - IP routing between interfaces
  - forwarding UDP access to Q330
  - tunneling TCP access to Q330
  - single IP Q330 (static or dynamic)
  - direct WAN/cellular connection

# Q330S – Interfaces



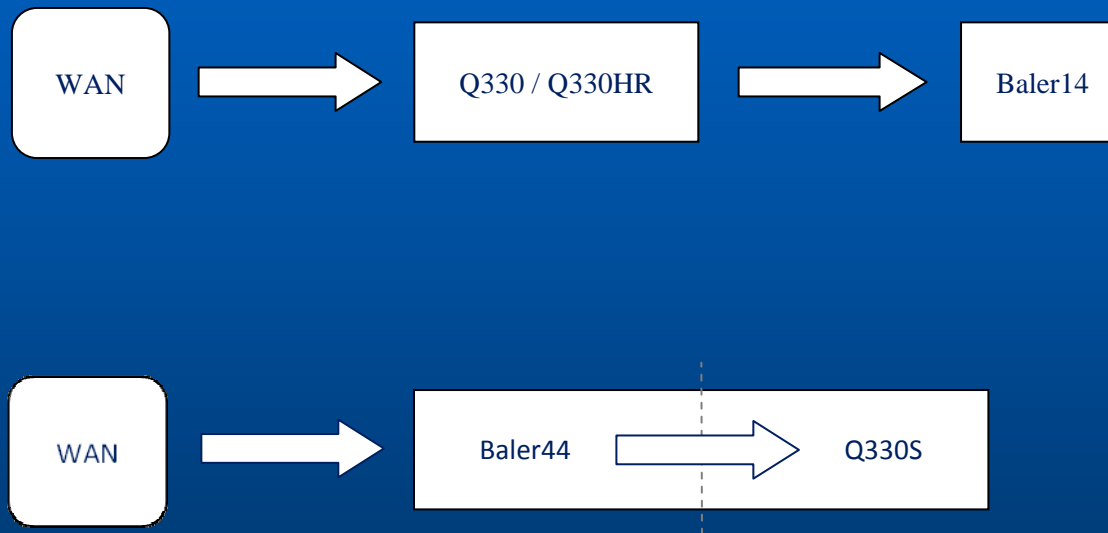


# Q330S – Interfaces

Interface	Q330	Q330S
Sensor A & B	yes	yes
GPS Antenna	yes	yes
Console	yes	yes
IrDA	yes	yes
QNET (10-BaseT)	yes	yes (I/O slightly different)
Media/WAN (100-BaseT)	no	yes
Power	yes	n/a (power via QNET)
External GPS	yes	n/a
AUXAD	yes (optional)	n/a
Serial	dual	no serial 1; serial 2 connects DP4 internally to embedded Baler44

# Q330S – Interfaces

## Access Model



# Q330S – Interfaces

Port (Speed)	Default Base Port	Q330	Q330S
QNET (10-BaseT)	5330	Willard, DP1 through DP4	Willard, DP1 through DP3
Media/WAN (100-BaseT)	6330	n/a	Willard, DP1 through DP4

The embedded Baler44 must be set to continuously powered to enable access to the Media/WAN port at all times.

# Q330S – Storage Media

- Hot swappable USB media
- Rugged 4-wire interface
- -40 to +85°C certified (2 x 4 GB)
- Up to 2 x 16 GB media for typical applications (-20 +65°C)
- Circular or Linear Buffer
- Collects data from the Q330 and stores it in the Baler44's RAM until written to the USB FLASH drive
- The USB drives are only powered during a read/write sequence, and are disabled after a 2 minute inactivity timeout



# Q330S – Data Format & Retrieval

- Flat file structure
- “Stateless” miniSEED files recording, like a tape, universally readable
- File servers (ftp, http, ssh), others automatic media power on access
- Media readable in any host: Win, Mac, Linux
- Write-protected program for security



# Q330S – Data Format & Retrieval

- Data can be collected from DP1 through DP3 using Antelope, Pecos, Mountainair, etc.
- DP4 data can be collected from the Baler44 using an http browser or ftp client
- periodic data collection to build a DP4 host data mirror can be automated using *wget* and scheduling



# Q330S – Data Format & Retrieval

- <http://balerIP:6381> - web browser
- <ftp://balerIP:6382> - anonymous FTP using public IP
- <ftp://balerIP:6383> - anonymous FTP using private IP
- ssh/scp at [balerIP:6385](http://balerIP:6385) without USB access
- ssh/scp at [balerIP:6386](http://balerIP:6386) with USB media access



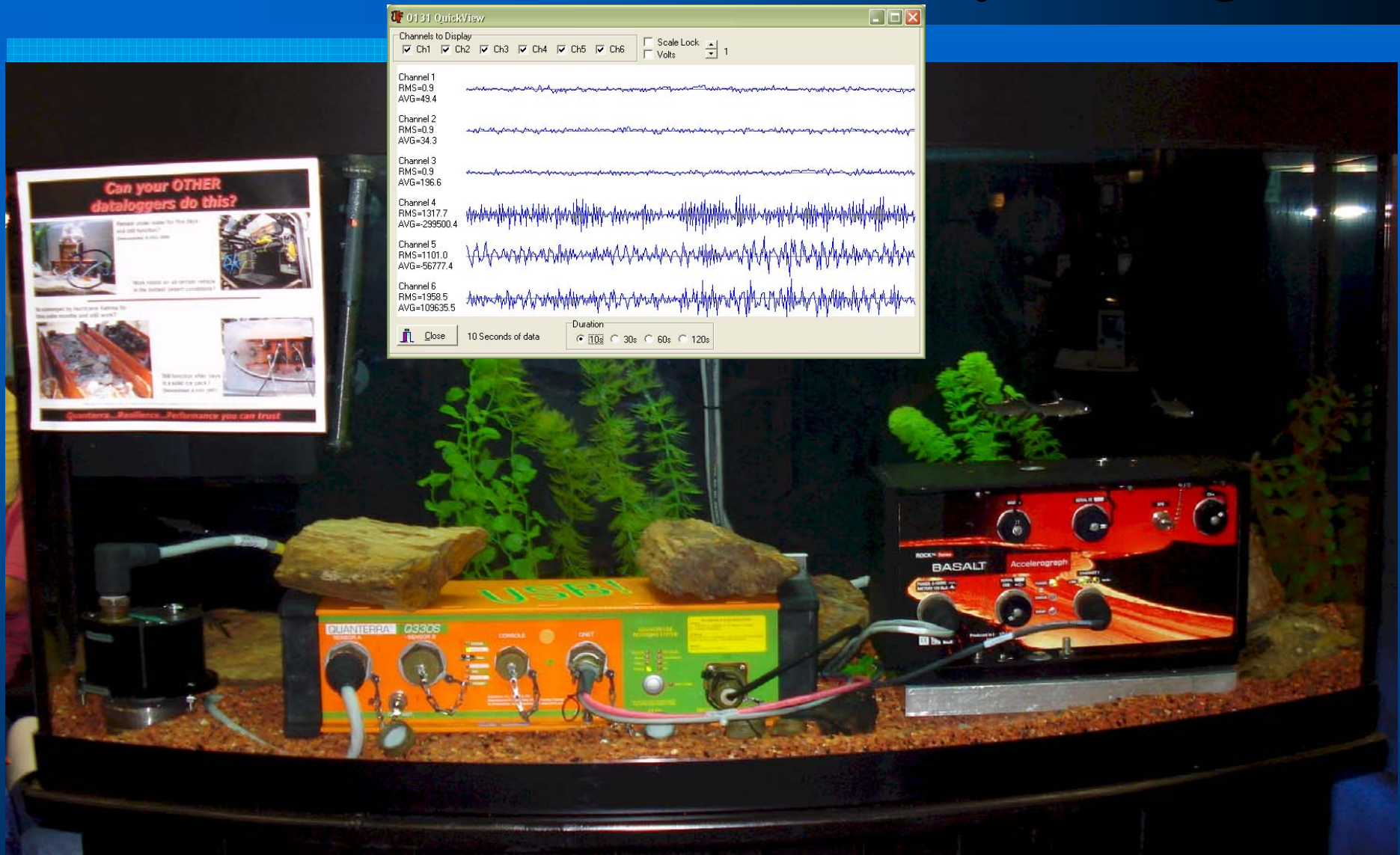
# Q330S – Maintainability

- Program update from media:
  - insert media containing update
  - process is automatic
- Simple User interface:
  - Run/Format selectable by switch
- Simple display of operational status:
  - “status” LED and “fault” LED – no bicolor
- No special configuration and support software tools (**NO** BaleAddr Reload, BalerAdmin...etc)
  - uses transparent standards





# AGU, December 2009 – 5 days & nights!



# Environmental Chamber Tests



Each and Every one of our instruments is passed through the Environmental Chamber for 7 days to pass the production test. 70 pages report of the digitizers' performance is generated and used to qualify if instrument is ready to go on the shelf/delivery. Rated from -30 to +75C.

# Can your OTHER dataloggers do that on the field?



Swim underwater with the fish for 5 days & still work?

All digitizers look good & work okay in a desk-top environment. What about harsh environment?



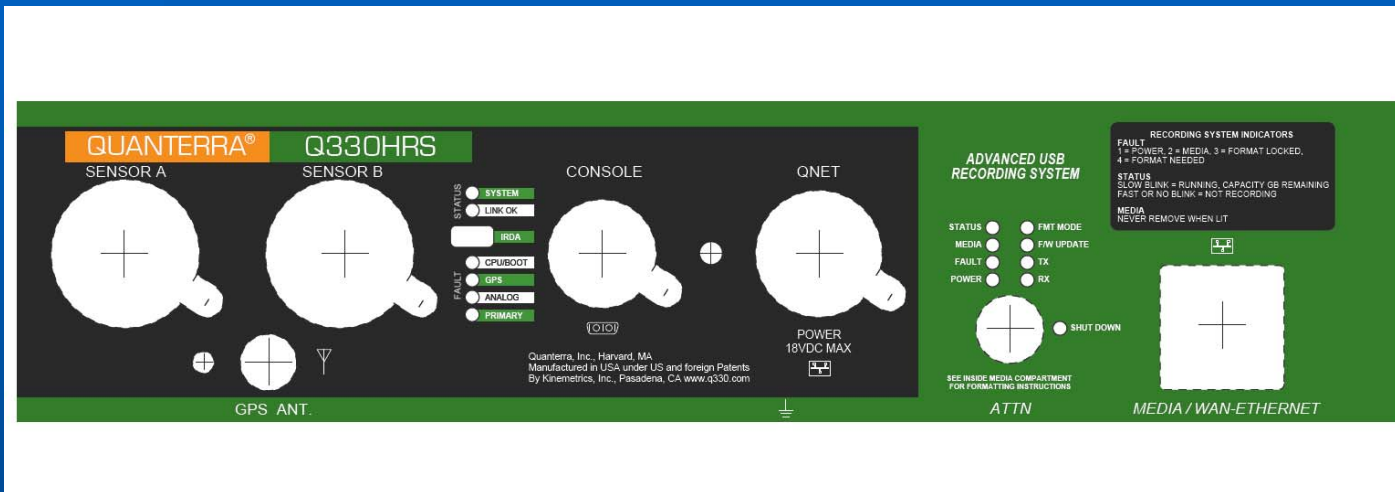
Being submerged by hurricane Katrina for 3 whole months and still working?



Remain for days in solid ice pack And still work?



# The Future is here now: Q330HRS - 26 bit, > 150 dB!



# Q330S+

**Q335P Global Programming** [X]

GPS Coldstart Timeout 360min	Clock Timeout 30sec	Deregistration Timeout 60sec	Initial VCO 2048
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Phase Tolerance 5000µs	Jump Filter 10	Jump Threshold 100µs
	<input type="text"/>	<input type="text"/>	<input type="text"/>

SP:   GPS Backup Power  
User Tag Number:

Q330 Web Server  
Port:   Auth. Baler Power  
 Show Serial Number  Auth. Baler Link

High Frequency  
 1000 Hz  
 500 Hz  
 250 Hz

Channel Enables  
 Chan 1  Chan 2  Chan 3  Chan 4  Chan 5  Chan 6

5V Input Range  
 Chan 1  Chan 2  Chan 3  Chan 4  Chan 5  Chan 6

Channels 1-3 Input Gain Select  
Amplifier Gain: 1   PGA Chopper On

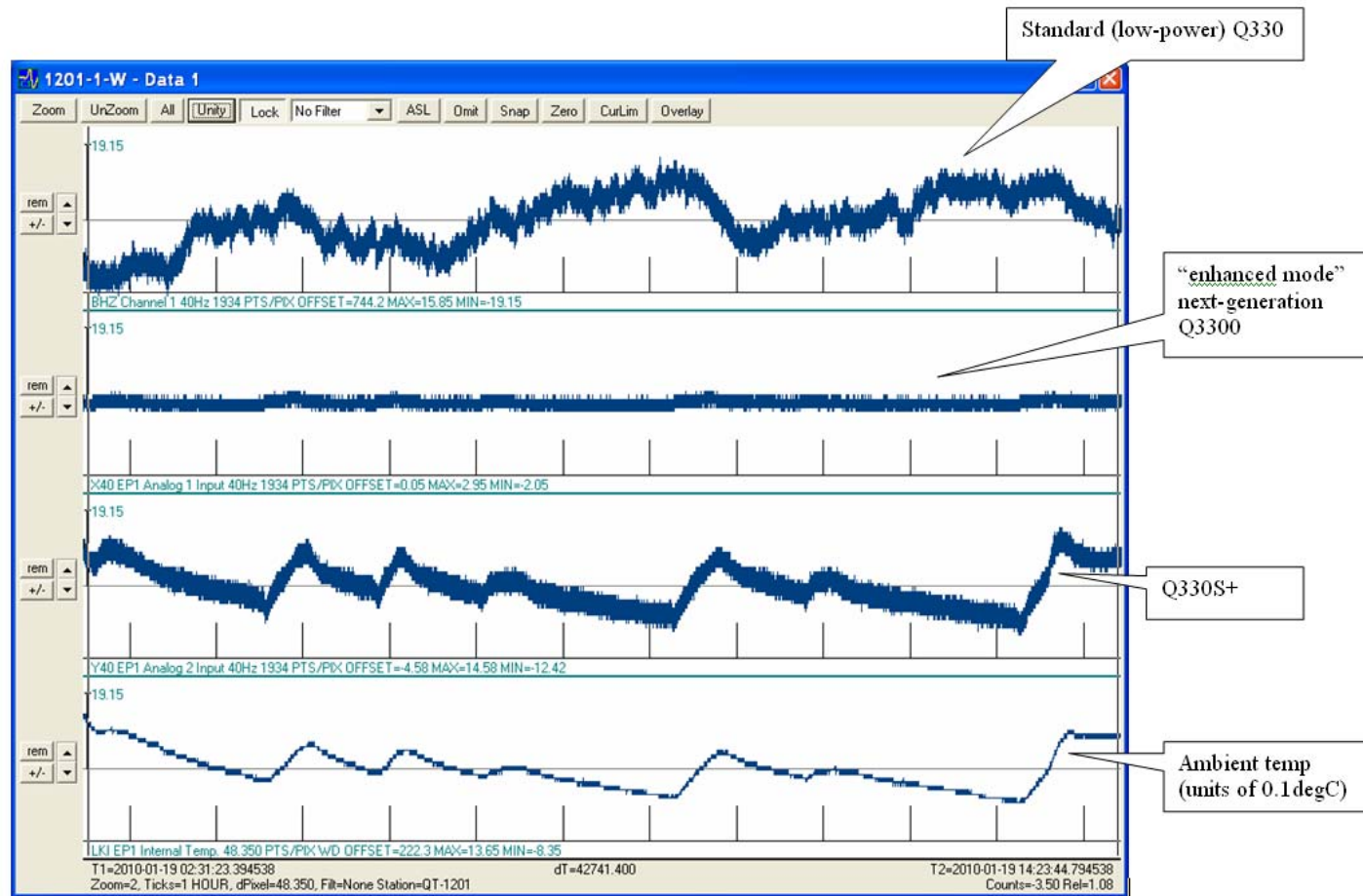
Channels 4-6 Input Gain Select  
Amplifier Gain: 4   PGA Chopper On

Channels 1-3 Linear Filters Below  
 All Frequencies  100Hz  
 40Hz  20Hz

Channels 4-6 Linear Filters Below  
 All Frequencies  100Hz  
 40Hz  20Hz

Apply  Cancel

# Q330S+ and Next-Gen



Q330S+ features similar resolution and temperature dependence as standard Q330. Next-gen system features a dramatic reduction in long-period temperature dependence, as low as 0.01 ppm/degC coefficient of offset.