Bluechiip® Cryogenic Delta Tag

bluechiip
TRACKING SOLUTIONS

PRODUCT NAME

Bluechiip® Cryogenic Delta Tag

GENERAL DESCRIPTION

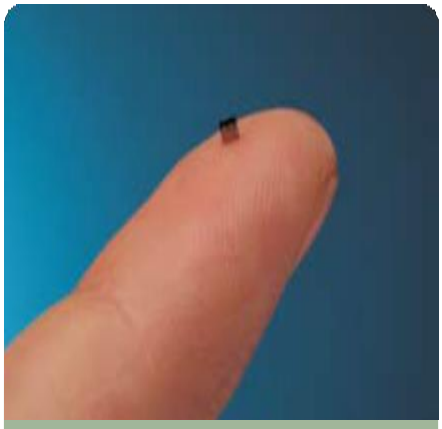
Bluechiip® offers a passive chain-of-custody and identification solution for wireless tracking and management of cryogenic storage equipment such as samples, cassettes, racks, freezers and tanks in biobanks. The Bluechiip® Cryogenic Delta Tag is a patented and highly miniaturised device that enables the Bluechiip® chain-of-custody system. The tag features instantaneous measurement of the tag's temperature and ID. The tag is immune to extreme environments such as gamma radiation and storage and operation in cryogenic environments making it suitable for biobank applications. It is designed for use in conjunction with the Bluechiip® Matchbox™ Reader and the Bluechiip® Stream™ sample and inventory management software.

Each tag is made of a MEMS-based microchip mounted on a printed circuit board antenna. The microchip contains Lorentz force resonators tuned to frequencies between 1.3MHz and 4.1MHz. The device is passive, in that it does not require power but obtains its energy via a read signal from the Matchbox™ Reader. The resonators in the chip are stimulated via the antenna by the Matchbox™ Reader and subsequently return a signal indicating the unique identifier and temperature of the tag. Each chip is programmed during the manufacturing process with a unique identification number and every read of the tag is checked by an internal BCH error detection and correction code.

The Bluechiip® Cryogenic Delta Tag is designed to be compatible with most plastic sample tubes, vials, racks and cassettes typically used in cryogenic applications for which both very high reliability and resistance to gamma irradiation are required.

PERFORMANCE

1. Operating temperature: from -196°C to +100°C
2. Instantaneous temperature measurement
3. Storage temperature from -196°C to +100°C
4. Immune to gamma irradiation sterilization
5. Survives autoclaving
6. Frost resistant
7. RoHS compliant lead-free solder paste
8. Unique ID with BCH error checking
9. Disposable device
10. Compatible with moulding into plastic cryogenic vials used in pharmaceutical and medical fields



The Bluechiip® Cryogenic Delta Tag uses micro-electro-mechanical systems (MEMS), a relatively new technology that does not necessarily require electronic devices, transistors, capacitors etc., for operation. The tag communicates to the reader in the radio frequency spectrum but not the same way as typical RFID systems.

WHAT ARE MEMS?

MEMS bring together many diverse techniques to fabricate electronics, miniaturized sensors,actuators, as well as systems made up from these elements. It is primarily focused on the miniaturization of mechanical systems and the exploitation of the unique attributes of silicon in these miniature systems. Examples of other common MEMS devices include accelerometers used in air bag systems and hand held games. Other examples include inkjet printer heads and micro-mirrors used for digital projection displays.

UNIQUE IDENTIFICATION SECURITY

All Bluechiip® tags have a unique ID for your security. Every ID is checked at manufacture and every time the tag is read. The Bluechiip® Cryogenic Delta Tag is encoded using the Bose, Chaudhuri, and Hocquenghem (BCH) algorithm to correct multiple random error patterns. The Matchbox™ Reader uses this code to detect and correct errors during the reading of the tag.

TEMPERATURE MEASUREMENT

Every time a tag is read, the instantaneous temperature is measured, time stamped and recorded. This allows a temperature history to be recorded, giving you peace of mind with no extra effort. This temperature profile can be retrieved at any time through the Stream™ web application software.

SAFE AND STERILE

All encapsulated products are supplied pre-sterilized. The tag can be sterilized by autoclaving or gamma irradiation, the tag will survive both operations with no degradation or loss of function.

MATCHBOX AND STREAM

Inherent to the Bluechiip® solution are the key components: Bluechiip® tagged devices, the Matchbox™ reader and the Stream™ chain of custody sample management software. Stream™ is a web server application and is ready to go out-of-the box run directly from the reader, or if you prefer the software can be installed on your own server. In concert, these components deliver benchmark level consistency, reliability, efficacy and robustness for ensuring conservation of consistent cryogenic integrity from the time of collection, transport, processing, storage and retrieval - a “cradle to grave” approach. Bluechiip’s innovative technology was conceived and devised as a result of historical and firsthand observation and corresponding lessons learned via disparities and impediments evident in current methodologies in sample preservation, identification and retrieval.
The importance of retrieving the correct sample every time whilst minimizing disturbances and prevention of unnecessary thaw cycles of stored frozen samples was considered a fundamental impetus for creation.

APPLICATIONS

- Biobanks, bio-repositories and cryo-preservation facilities
- Cryogenic stored samples
- Stem cell storage
- Clinical trials
- Cell lines
- In Vitro Fertilization (IVF)
- Genera laboratory use
- Pharmaceuticals
- Blood products

TYPICAL CONFIGURATIONS AND APPLICATIONS

The Bluechiip® Delta Cryogenic Tag can be embedded or over-moulded into most commonly available plastic sample tubes and vials and permanently attached to the base of sample tubes or fitted to the tops of blood and other sample bags. Currently available off-the-shelf configurations include:

Component	Manufacturer	Part Number	Size	Description
Cryogenic vial	Bluechiip*	VBE-001	2.0ml	External threaded, self standing, conical bottom
Cryotag	Bluechiip*	CRY-201	-	Chain-of-custody tag for cassettes, racks and towers

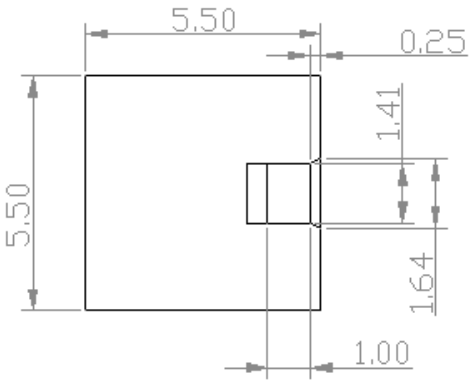
PARAMETERS	TYPICAL VALUE	UNITS	MINIMUM	MAXIMUM
CHIP				
Chip Dimensions (W x L x T)	1.41 x 1.36 x 1.0	mm	1.40x1.34x1.0	1.42x1.38x1.0
Chip Resistance	125	Ohm	120	130
First Frequency (@R.T.)	1.3 - 3.8	MHz	1.28	4.10
ANTENNA				
LGA PCB dimensions (W x L x T)	5.5 x 5.5 x 0.28	mm	5.4 x 5.4 x 0.24	5.6x5.6x0.32
LGA PCB Resistance	33	Ohms	31	35
LGA PCB Inductance @ 1MHz	11.5	uH	11.45	11.55
LGA PCB Inductance @ 4MHz	11.8	uH	11.75	11.85
TAG				
Read Time	<1	sec	0.3	0.8
Tag Storage Temperature	-196	°C	-196	100
Tag Operating Temperature	- 196	°C	-196	100
Gamma Irradiation Survivability	100	kGy	-	100
Temperature accuracy to -150°C	+/- 2.0	°C	+/-2.0	+/- 5.0
Number of bits	52			
Read Range	1	mm	0	3
Interrogator Frequency Range	1.3 - 4.2	MHz		

CUSTOMIZED PACKAGES

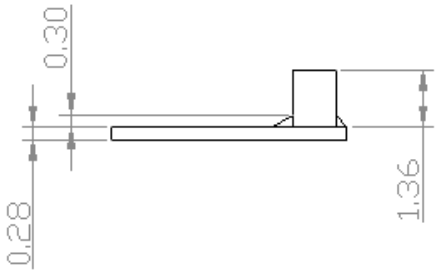
The Bluechiip® Cryogenic Delta Tag is available as a discrete assembly for user specific applications. Contact a Bluechiip representative for more information on discrete tags and packaging options. We will work with you to integrate Bluechiip® into your system.

TAG DIMENSIONS

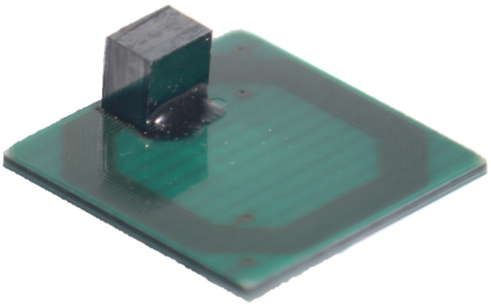
TOP VIEW

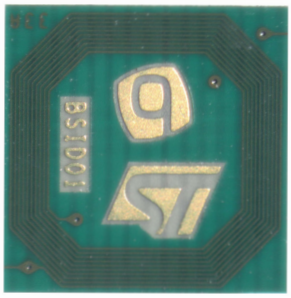


SIDE VIEW



Not to scale. All dimensions in millimetres





HOW DO I KNOW IF AN ITEM HAS A BLUECHIIP®?

Look for this symbol:

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