SUMMARY

The magnet feature allows the use of a magnet to control certain device functions. This reference describes how to use a magnet to activate these functions and provides a summary of the expected behavior when a magnet is detected by a Boston Scientific cardiac implantable electronic device (pacemakers, cardiac resynchronization therapy devices, transvenous and subcutaneous implantable cardioverter defibrillators).

Products Referenced

All Boston Scientific products referenced in Table 1 of this article.

For comprehensive information on device operation, reference the full instructions for use found at: **www.bostonscientific-elabeling.com**.

CAUTION: The law restricts this device to sale by or on the order of a physician. Indications, contraindications, warnings and instructions for use can be found in the product labeling supplied with each device. Products shown for INFORMATION purposes only and may not be approved or for sale in certain countries.

All graphics produced by Boston Scientific Corporation, unless otherwise noted.

CRT-D: Cardiac Resynchronization Therapy Defibrillator
CRT-P: Cardiac Resynchronization Therapy Pacemaker
ICD: Implantable Cardioverter Defibrillator
S-ICD: Subcutaneous Implantable Defibrillator

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Magnet Response of Boston Scientific Cardiac Implantable Electronic Devices

The magnet feature allows certain device functions to be modified when a donut magnet is placed over the pulse generator. When using nominal programming, all products listed in Table 1 are designed to respond to magnet application and return to normal function once the magnet is removed.

Table 1. Boston Scientific Cardiac Implantable Electronic Devices[1]

Product Type	Product Family Names	Model Numbers Beginning with:
Pacemakers	ACCOLADE™, ACCOLADE MRI, PROPONENT™, PROPONENT MRI, ESSENTIO™, ESSENTIO MRI, ALTRUA™ 2, FORMIO™, FORMIO MRI, VITALIO™, VITALIO MRI, INGENIO™, INGENIO MRI, ADVANTIO™, ADVANTIO MRI, EQUIO™, ALTRUA (20, 40, 50, 60)	J, K, L, S
	INSIGNIA™/NEXUS™	11xx, 12xx, 13xx, 14xx
Cardiac Resynchronization Therapy Pacemakers (CRT-P)	VISIONIST™, VISIONIST X4, VALITUDE™, VALITUDE X4, INLIVEN™, INTUA™, INVIVE™, CONTAK RENEWAL TR/TR2	U, V, W, H
Implantable Cardioverter Defibrillators (ICD)	RESONATE™ HF, RESONATE EL, PERCIVA™ HF, PERCIVA, CHARISMA™ EL, VIGILANT™ EL, MOMENTUM™ EL, AUTOGEN™, DYNAGEN™, INOGEN™, ORIGEN™, INCEPTA™, ENERGEN™, PUNCTUA™, TELIGEN™	D, E, F
Cardiac Resynchronization Therapy Defibrillators (CRT-D)	RESONATE HF, RESONATE, RESONATE X4, CHARISMA, CHARISMA X4, VIGILANT, VIGILANT X4, MOMENTUM, MOMENTUM X4, AUTOGEN, DYNAGEN, INOGEN, ORIGEN, INCEPTA, ENERGEN, PUNCTUA, COGNIS™	G, N, P
Subcutaneous Implantable Cardioverter Defibrillators (S-ICD)	EMBLEM™	A
	SQ-RX™	1010

[1]Please note that not all products and models are approved in all geographies.

Note that magnet application will elicit a different response for each of the product types listed in Table 1 above. Table 2 provides a summary of the nominal magnet feature programming and associated device functions that will be modified when a donut magnet remains in place over the pulse generator. As noted above, all devices will return to normal function once the magnet is removed. Please refer to each product's Physician Technical Manual and Reference Guide for additional magnet-related information, including other magnet feature programming options and complete magnet use instructions. If the expected magnet response is not observed upon magnet application, reposition the magnet as recommended in Table 3 below. If the expected magnet response is still not observed, contact a Boston Scientific representative or Boston Scientific's Technical Services for assistance.

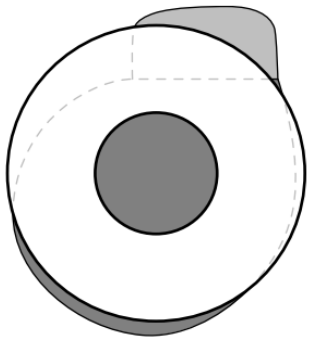
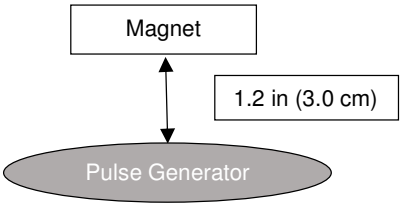
Table 2: Nominal Magnet Feature Programming and Expected Magnet Response

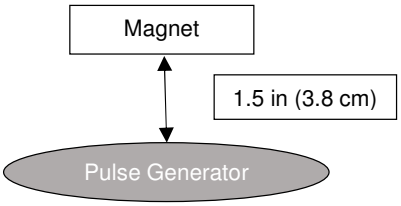
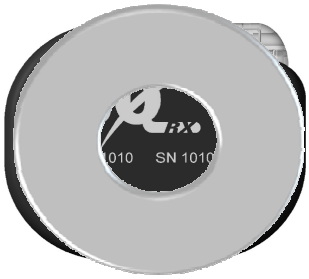
Product Type	Nominal Programming	Expected Magnet Response
Pacemakers	Pace Async	• Asynchronous pacing at 100, 90, or 85 ppm (depending on current battery status) with an AV Delay of 100 ms. • 85 ppm indicates device has reached the replacement battery status. Consider contacting patient's device-following physician. • The third pulse during the Pace Async Magnet Response will be issued at 50% of the programmed Pulse Width. If loss of capture is observed at the third beat after magnet application, consider re-assessing the pacing energy safety margin.
Cardiac Resynchronization Therapy Pacemakers (CRT-P)	Pace Async	• Asynchronous pacing at 100, 90, or 85 ppm[1] (depending on current battery status) with an AV Delay of 100 ms. • 85 ppm indicates device has reached the replacement battery status. Consider contacting patient's device-following physician. • The third pulse during the Pace Async Magnet Response will be issued at 50% of the programmed Pulse Width. If loss of capture is observed at the third beat after magnet application, consider re-assessing the pacing energy safety margin.
Implantable Cardioverter Defibrillators (ICD)	Inhibit Therapy	• Device is in a temporary *Monitor Only* mode. No shocks or anti-tachycardia pacing will be delivered as long as the magnet remains in place. • Beeping tones will be emitted once per second[2]. • There is no change to pacing therapy.
Cardiac Resynchronization Therapy Defibrillators (CRT-D)	Inhibit Therapy	• Device is in a temporary *Monitor Only* mode. No shocks or anti-tachycardia pacing will be delivered as long as the magnet remains in place. • Beeping tones will be emitted once per second[2]. • There is no change to pacing therapy.
Subcutaneous Implantable Cardioverter Defibrillators (S-ICD)	Not programmable	• Arrhythmia detection is suspended, and shock therapy is inhibited. No shocks will be delivered as long as the magnet remains in place. • R-wave synchronous tones will be emitted for each sensed event for up to 60 seconds[2]. After 60 seconds, the beeping will stop, but therapy will continue to be inhibited as long as the magnet remains in place.

[1]CONTAK RENEWAL TR/TR2 CRT-P devices will deliver asynchronous pacing at 100 or 85 bpm only.
[2]Note that the beeper will no longer be usable following an MRI scan. Please refer to each product's IMAGEREADY™ MR Conditional labeling for additional information regarding beeper function and associated patient management recommendations following an MRI scan.

To active the magnet feature in Boston Scientific devices, position the donut magnet as described in Table 3.

Table 3: Proper Magnet Position and Proximity to Activate the Magnet Feature

Product Type	Proper Magnet Position to Activate the Magnet Feature	Recommended Proximity Between Magnet and Pulse Generator[1]
Pacemaker, CRT-P, ICD, CRT-D		

Product Type	Proper Magnet Position to Activate the Magnet Feature	Recommended Proximity Between Magnet and Pulse Generator[1]
Subcutaneous Implantable Cardioverter Defibrillators (S-ICD)	Model Numbers Beginning with the Letter "A": 	
	Model Number 1010: 	

[1]Boston Scientific's donut magnet has a minimum field strength of 90 gauss when measured at 1.5 inches (3.8 cm) from the magnet surface.
[2]Advise patients that extended exposure to strong (greater than 10 gauss or 1 m Tesla) magnetic fields may trigger the magnet feature.