



PREPARING FOR A PATIENT'S MRI SCAN

# How to set-up MRI Ready mode in Quadra Assura™ and Quadra Assura MP™ CRT-D devices

# Abbott CRT-D defibrillator

## **MRI Ready module objectives:**

- Aid the healthcare provider on how to correctly set up the MRI Ready parameters with the Merlin™ PCS programmer
- Aid the healthcare provider on how to correctly program Abbott's Quadra Assura™ and Quadra Assura MP™ CRT-D into the MRI Ready mode
- Aid the healthcare provider on how to correctly reprogram Abbott's Quadra Assura™ and Quadra Assura MP™ CRT-D out of the MRI Ready mode

# Approved Magnetic Resonance Imaging (MRI) Scan Conditions



1.5 Tesla<sup>1</sup>  
Full Body<sup>1</sup>

1. Abbott. MRI Ready Systems Manual. MRI procedure information for the St. Jude Medical MR Conditional System. October 2019. ARTEN100166732 B.

# Programming and reprogramming MRI Ready mode CRT-D MR conditional device

The MRI Ready mode needs to be programmed prior to the start of the MRI scan. At the completion of the MRI scan, the MRI Ready mode needs to be reprogrammed.

All programming needs to take place outside the MRI scanner room.

# Do not use the Merlin™ Patient Care System (PCS) programmer in the MRI scanner room



**MRI unsafe.  
Do not use  
Merlin  
programmer  
in MRI  
scanner room**

# CRT-D MRI Compatibility

The Quadra Assura™ CRT-D and Quadra Assura MP™ CRT-D devices are approved for use with closed bore 1.5T MRI systems.

Scan Parameters	Setting
Scanner Type	Cylindrical-bore magnet, horizontal field orientation
Magnet Strength	1.5 Tesla, 64 MHz excitation frequency, Spatial Gradient of 30 T/m maximum
Whole Body SAR (Specific Absorption Rate)	Varies by device/lead combination
Head SAR	$\leq 3.2$ W/kg
Gradient Slew Rate	$\leq 200$ T/m/s

# Nominal MRI CRT-D settings

Parameter	Setting
MRI Mode (dual-chamber devices)	DOO
MRI Base Rate	85 min <sup>-1</sup>
MRI Paced AV Delay	120 ms
MRI Pulse Amplitude	5.0 V
MRI Pulse Width	1.0 ms
MRI Pulse Configuration	Bipolar
MRI V Pacing Chamber	RV Only
Tachy Therapy	Disabled

The screenshot displays the MRI Settings menu with the following parameters and values:

- MRI Mode:** DOO
- MRI Base Rate:** 85 bpm
- MRI Paced AV Delay:** 120 ms
- MRI Pulse Amplitude:** 5.0 V (for both A and RV leads)
- MRI Pulse Width:** 1.0 ms (for both A and RV leads)
- MRI Pulse Configuration:** Bipolar (for both A and RV leads)
- MRI V. Pacing Chamber:** RV Only
- HV Lead Type:** Single Coil

Additional interface elements include:

- Buttons: Undo All, Test MRI Settings, Save MRI Settings, Setup for MRI Now, End Session
- Navigation sidebar: FastPath™ Summary, Episodes, Diagnostics, Tests, Parameters, Wrap-up™ Overview

# How to locate the MRI Settings menu

“MRI Settings” can be accessed through the “Parameters” workspace.

The screenshot displays the MRI Settings menu with the following sections:

- Basic Operation**
  - Mode: DDDR
  - Ventricular Pacing: LV1 → LV2 → RV
  - V. Triggering: Off
  - Sensor, Magnet, Special Mode Settings...
- Rates**
  - Base Rate: 65 bpm
  - Rest Rate: Off
  - Max Sensor Rate: 110 bpm
  - Max Track Rate: 110 bpm
  - Hysteresis, Additional Settings...
- Delays**
  - Paced AV Delay: 170 ms
  - Sensed AV Delay: 150 ms
  - Negative AV Hysteresis/Search: Off
  - Additional Delays...
- Capture & Sense**

	A	RV	LV1	LV2
Cap Confirm	On	On	On	n/a
Pulse Amplitude	2.0 V	2.0 V	2.0 V	2.5 V
Pulse Width	0.5 ms	0.5 ms	0.5 ms	0.5 ms
Sensitivity	Auto	Auto	n/a	n/a

Cap Confirm Settings, SenseAbility™ Settings...
- Leads**

	A	RV	LV1	LV2
Pulse Configuration	Bipolar	Bipolar	D1 - M2	M3 - RVc
Sense Configuration	Bipolar	RV Bipolar	n/a	n/a

Lead Type, Lead Monitoring...
- Refractories & Blanking**

PVARP	275 ms
Post-Vent. Atrial Blanking	70 ms
A Pace Refractory	190 ms
V Pace Refractory	250 ms

PVC, PMT, Additional Settings...
- AT/AF Detection & Response**

Auto Mode Switch	DDIR
Atrial Tachycardia Detection Rate	180 bpm
AF Suppression™	Off

Additional Settings...

At the bottom of the interface are buttons for **Undo Last**, **Print**, **Preview 0**, **Program**, and **End Session**.



# MRI Settings – Select MRI Pacing Mode

**Select appropriate MRI mode.**

Default MRI mode in CRT-D systems is “DOO.”

The screenshot displays the MRI Settings menu with the following configuration:

Category	Value
MRI Mode	DOO
MRI Base Rate	85 bpm
MRI Paced AV Delay	120 ms
MRI Pulse Amplitude	5.0 V
MRI Pulse Width	1.0 ms
MRI Pulse Configuration	Bipolar
MRI V. Pacing Chamber	RV Only
HV Lead Type	Single Coil

Navigation and Action Buttons:

- Brady
- Tachy (Selected)
- Alert Notification
- Episode Settings
- Diagnostic Settings
- Custom Sets
- MRI Settings
- FastPath™ Summary
- Episodes
- Diagnostics
- Tests
- Parameters
- Wrap-up™ Overview
- End Session
- Setup for MRI Now
- Undo All
- Test MRI Settings
- Save MRI Settings

# MRI Settings – Select Pacing Mode “Pacing Off”

You may select the **Test MRI Settings** button to ensure programmed settings are appropriate.

The screenshot displays the MRI Settings interface. At the top, there are tabs for Brady, Tachy, Alert Notification, Episode Settings, Diagnostic Settings, Custom Sets, and MRI Settings. The MRI Settings tab is active. On the left, there are three settings: MRI Mode (set to Pacing Off), MRI Base Rate (n/a), and MRI Paced AV Delay (n/a). In the center, there are two columns for A and RV, each with three settings: MRI Pulse Amplitude (n/a), MRI Pulse Width (n/a), and MRI Pulse Configuration (n/a). On the right, there are two buttons for HV Lead Type (Dual Coil and Single Coil) and one button for MRI V. Pacing Chamber (n/a). At the bottom left, there is an Undo All button. In the center, there is a large green arrow pointing to a Test MRI Settings button. To the right of the arrow is a Save MRI Settings button. At the bottom right, there is a Setup for MRI Now button and an End Session button. On the far right, there is a sidebar with icons for FastPath™ Summary, Episodes, Diagnostics, Tests, Parameters, and Wrap-up™ Overview.

# MRI Settings – Select Pacing Mode “PACING OFF”

To cancel the test, touch the **Cancel Test** button.

The screenshot displays the MRI Settings interface. At the top, there are tabs for Brady, Tachy, Alert Notification, Episode Settings, Diagnostic Settings, Custom Sets, and MRI Settings. The MRI Settings tab is active. Below the tabs, there are several settings sections:

- MRI Mode:** A dropdown menu showing "Pacing Off" selected.
- MRI Base Rate:** A dropdown menu showing "n/a".
- MRI Paced AV Delay:** A dropdown menu showing "n/a".
- MRI Pulse Amplitude:** A dropdown menu showing "n/a" for both A and RV leads.
- MRI Pulse Width:** A dropdown menu showing "n/a" for both A and RV leads.
- MRI Pulse Configuration:** A dropdown menu showing "n/a" for both A and RV leads.
- HV Lead Type:** Radio buttons for "Dual Coil" and "Single Coil", with "Single Coil" selected.
- MRI V. Pacing Chamber:** A dropdown menu showing "n/a".

At the bottom of the settings area, there are three buttons: "Undo All", "Cancel Test" (highlighted with a red arrow), and "Save MRI Settings". In the bottom right corner, there is a "Setup for MRI Now" button. On the right side of the screen, there is a vertical sidebar with several menu items: "FastPath™ Summary", "Episodes", "Diagnostics", "Tests", "Parameters", "Wrap-up™ Overview", and "End Session".

# MRI Settings – Select Pacing Mode “PACING ON”

Once the patient is set to the appropriate MRI settings and HV lead type have been selected, **select the Setup for MRI Now** button.

The screenshot displays the MRI Settings interface. At the top, there are tabs for Brady, Tachy, Alert Notification, Episode Settings, Diagnostic Settings, Custom Sets, and MRI Settings. The MRI Settings tab is active, showing a grid of parameters for A and RV leads. The MRI Mode is set to DDO, MRI Base Rate is 85 bpm, and MRI Paced AV Delay is 120 ms. MRI Pulse Amplitude is 5.0 V, MRI Pulse Width is 1.0 ms, and MRI Pulse Configuration is Bipolar. The HV Lead Type is set to Single Coil, and the MRI V. Pacing Chamber is set to RV Only. A green arrow points to the 'Setup for MRI Now' button, which is highlighted in green. Other buttons include 'Undo All', 'Test MRI Settings', 'Save MRI Settings', and 'End Session'. A sidebar on the right contains icons for FastPath Summary, Episodes, Diagnostics, Tests, Parameters, and Wrap-up Overview.

	A	RV	HV Lead Type	
MRI Mode	DOO	DOO	Dual Coil	Single Coil
MRI Base Rate	85 bpm	85 bpm		
MRI Paced AV Delay	120 ms	120 ms		
MRI Pulse Amplitude	5.0 V	5.0 V		
MRI Pulse Width	1.0 ms	1.0 ms		
MRI Pulse Configuration	Bipolar	Bipolar		
MRI V. Pacing Chamber				RV Only

# MRI Settings – Select HV Lead Type

Under **HV Lead Type**, patients implanted with a dual coil defibrillation lead, select **Dual Coil**. For patients implanted with a **single coil** defibrillation lead, select Single Coil.

The screenshot displays the MRI Settings interface. The 'MRI Settings' tab is active, and the 'HV Lead Type' section is highlighted with a green box. A green arrow points to the 'Dual Coil' option, which is selected. The interface includes various settings for MRI Mode, Base Rate, Paced AV Delay, Pulse Amplitude, Width, and Configuration for both A and RV leads. A 'Setup for MRI Now' button is visible at the bottom.

		A	RV	HV Lead Type	
MRI Mode	DOO	5.0 V	5.0 V	<input checked="" type="radio"/> Dual Coil	<input type="radio"/> Single Coil
MRI Base Rate	85 bpm	1.0 ms	1.0 ms		
MRI Paced AV Delay	120 ms	Bipolar	Bipolar		
				MRI V. Pacing Chamber	RV Only

Buttons: Undo All, Test MRI Settings, Save MRI Settings, Setup for MRI Now, End Session

Selecting the correct implanted HV lead type ensures proper testing during MRI setup.

# MRI Settings – Select HV Lead Type

**HV Lead Type:** user selectable (only retained in current session)

**MRI V Pacing Chamber:** not programmable – informs LV Pacing will be disabled when MRI settings are programmed

The screenshot displays the MRI Settings interface. The top navigation bar includes tabs for Brady, Tachy, Alert Notification, Episode Settings, Diagnostic Settings, Custom Sets, and MRI Settings. The MRI Settings tab is active, showing a grid of settings for A and RV leads. The HV Lead Type section is highlighted with a green box and a green arrow pointing to it. The HV Lead Type section includes options for Dual Coil and Single Coil, and MRI V. Pacing Chamber options for RV Only. A green button labeled 'Setup for MRI Now' is located at the bottom right of the interface.

	A	RV
MRI Mode	DOO	
MRI Pulse Amplitude	5.0 V	5.0 V
MRI Base Rate	85 bpm	
MRI Pulse Width	1.0 ms	1.0 ms
MRI Paced AV Delay	120 ms	
MRI Pulse Configuration	Bipolar	Bipolar

**HV Lead Type**

Dual Coil | Single Coil

MRI V. Pacing Chamber: RV Only

Buttons: Undo All, Test MRI Settings, Save MRI Settings, Setup for MRI Now, End Session

Right sidebar: FastPath™ Summary, Episodes, Diagnostics, Tests, Parameters, Wrap-up™ Overview

# MRI Settings – Setup for MRI Now

Once the patient-appropriate MRI settings and HV lead type have been selected, **select the Setup for MRI Now button.**

The screenshot displays the MRI Settings interface. At the top, there are tabs for Brady, Tachy, Alert Notification, Episode Settings, Diagnostic Settings, Custom Sets, and MRI Settings. The MRI Settings tab is active, showing a grid of parameters for A and RV leads. The parameters are:

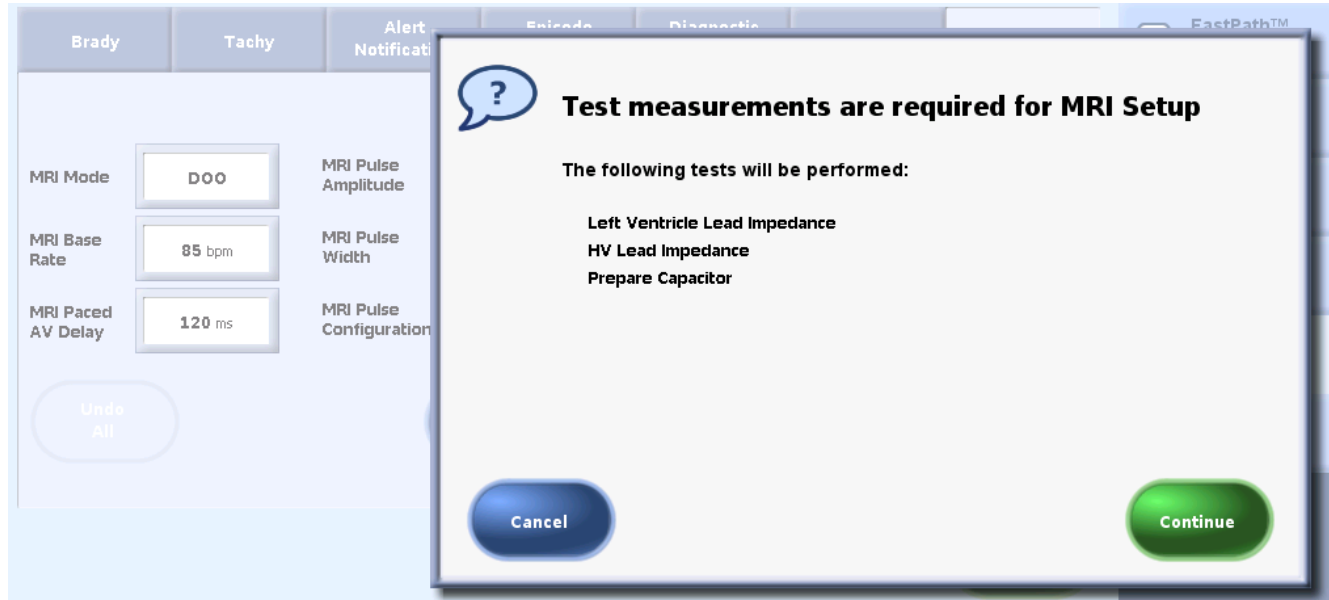
	A	RV
MRI Mode	DOO	DOO
MRI Base Rate	85 bpm	85 bpm
MRI Paced AV Delay	120 ms	120 ms
MRI Pulse Amplitude	5.0 V	5.0 V
MRI Pulse Width	1.0 ms	1.0 ms
MRI Pulse Configuration	Bipolar	Bipolar

Additional settings include HV Lead Type (Dual Coil, Single Coil) and MRI V. Pacing Chamber (RV Only). A green arrow points to the 'Setup for MRI Now' button at the bottom right. Other buttons include 'Undo All', 'Test MRI Settings', 'Save MRI Settings', 'End Session', and a sidebar with 'FastPath™ Summary', 'Episodes', 'Diagnostics', 'Tests', 'Parameters', and 'Wrap-up™ Overview'.

# Test measurements for MRI Setup

The MRI software provides automatic verification that no device or lead issues are detected that may compromise patient safety during an MRI scan.

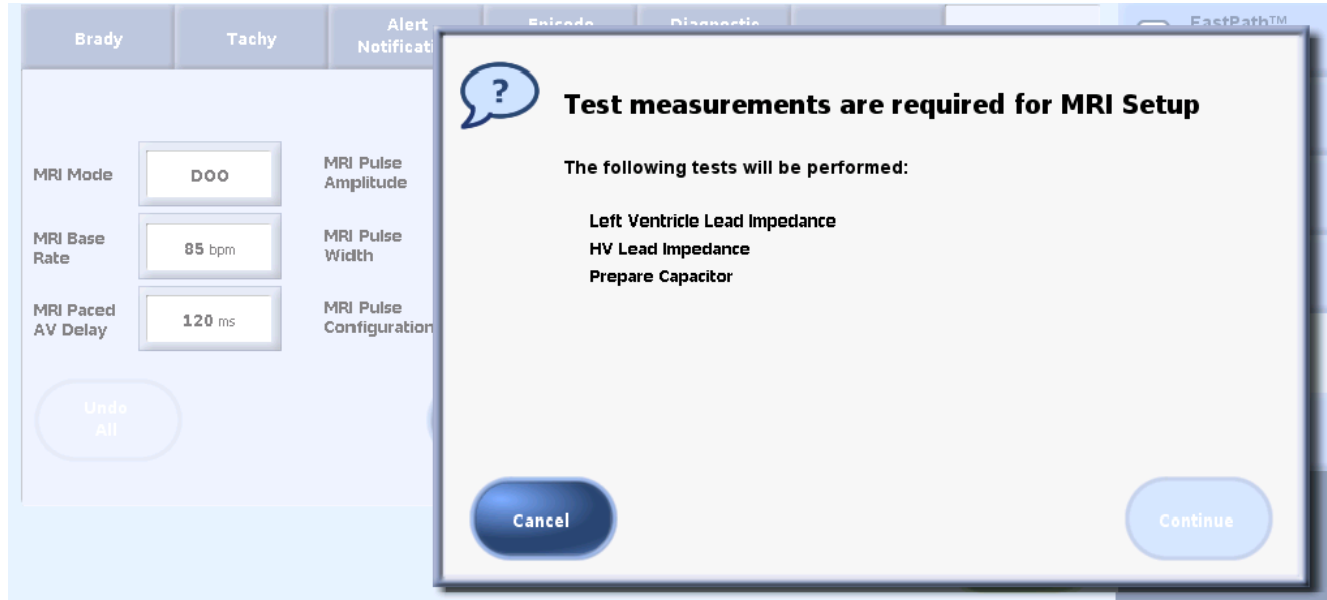
Select the **Continue** button to run the system integrity tests required for MRI setup.





# Test measurements for MRI Setup

- **Left Ventricular Lead Impedance:** Tests for open/shorts in all 4 electrodes on the Quartet™ LV lead
- **HV Lead Impedance:** Tests for open/shorts on the coil(s) of the implanted defibrillation lead
- **Prepare Capacitor:** Ensures capacitor maintenance is not initiated during the MRI scan



# MRI Checklist – Complete MRI Checklist

Upon completion of the test measurements, the MRI Checklist window is displayed. You will not be able to program MRI settings until checklist is completed.

## MRI Checklist

Verify these conditions before enabling MRI Settings:

	A	RV	LV
<input type="checkbox"/> Capture Thresholds are stable at $\leq 2.5V @ 0.5ms$	Today: <b>1.0V@0.5ms</b> (L) Apr 5, 2015: <b>0.87V@0.5...</b> (B)	Today: <b>1.0V@0.5ms</b> (L) Apr 5, 2015: <b>1.0V@0.5ms</b> (B)	
<input checked="" type="checkbox"/> Pacing Lead Impedances are within range	Within Range	Within Range	Within Range
<input checked="" type="checkbox"/> HV tests are performed and within range	HV Tests Passed		
<input type="checkbox"/> - SJM Leads are approved for MRI - No additional cardiac hardware (adapters, extenders, abandoned leads)			

Last Session: Apr 5, 2015

### MRI Settings

Tachy Therapy	<b>DISABLED</b>
MRI Mode	<b>DOO</b>
MRI Base Rate	<b>85 bpm</b>
MRI Paced AV Delay	<b>120 ms</b>
MRI A/RV Pulse Amp	<b>5.0 / 5.0 V</b>
MRI A/RV Pulse Width	<b>1.0 / 1.0 ms</b>
MRI A/RV Pulse Config	<b>Bipolar / Bipolar</b>
MRI V. Pacing Chamber	<b>RV Only</b>

*i* MRI Conditional for 1.5T scanner only  
*i* Brady diagnostics are cleared in MRI Settings

# MRI Checklist – Step 1, Capture thresholds

Confirm Capture Thresholds for RA and RV leads are stable at  $< 2.5 \text{ V @ } 0.5 \text{ ms}$ .  
Once confirmed, manually check the box.

### MRI Checklist

Verify these conditions before enabling MRI Settings:

	A	RV	LV
<input checked="" type="checkbox"/> Capture Thresholds are stable at $\leq 2.5\text{V @ } 0.5\text{ms}$	Today: <b>1.0V@0.5ms</b> (G) May 16, 2015: <b>0.87V@0...</b> (Bi)	Today: <b>1.0V@0.5ms</b> (G) May 16, 2015: <b>1.0V@0.5...</b> (Bi)	
<input checked="" type="checkbox"/> Pacing Lead Impedances are within range	Within Range	Within Range	Within Range
<input checked="" type="checkbox"/> HV tests are performed and within range	HV Tests Passed		
<input type="checkbox"/> - SJM Leads are approved for MRI - No additional cardiac hardware (adapters, extenders, abandoned leads)			

Last Session: May 16, 2015

**MRI Settings**

Tachy Therapy	<b>DISABLED</b>
MRI Mode	<b>DOO</b>
MRI Base Rate	<b>85 bpm</b>
MRI Paced AV Delay	<b>120 ms</b>
MRI A/RV Pulse Amp	<b>5.0 / 5.0 V</b>
MRI A/RV Pulse Width	<b>1.0 / 1.0 ms</b>
MRI A/RV Pulse Config	<b>Bipolar / Bipolar</b>
MRI V. Pacing Chamber	<b>RV Only</b>

i MRI Conditional for 1.5T scanner only  
i Brady diagnostics are cleared in MRI Settings

# MRI Checklist – Step 2, Pacing LEAD Impedances

Confirm Pacing Lead Impedances are within range.

Pressing the test panel displays the details overlay, which provides the results associated with the test.

The screenshot displays the 'MRI Checklist' interface. At the top, it says 'Verify these conditions before enabling MRI Settings:'. The checklist includes:

- Capture Thresholds are stable at  $\leq 2.5V @ 0.5ms$
- Pacing Lead Impedances are within range
- HV tests are performed and within range
- SJM Leads are approved for MRI
- No additional cardiac hardware (adapters, extenders, abandoned leads)

Test results for A, RV, and LV leads are shown in a table:

	A	RV	LV
Today: 1.0V@0.5ms (64)	Today: 1.0V@0.5ms (64)	Today: 1.0V@0.5ms (64)	
May 16, 2015: 0.87V@0... (61)	May 16, 2015: 1.0V@0.5... (61)	May 16, 2015: 1.0V@0.5... (61)	
	Within Range	Within Range	Within Range

Below the table, a 'HV Tests Passed' message is displayed with a green arrow pointing up. A large green arrow points to the 'Within Range' results for the LV lead.

**MRI Settings**

Tachy Therapy	DISABLED
MRI Mode	DOO
MRI Base Rate	85 bpm
MRI Paced AV Delay	120 ms
MRI A/RV Pulse Amp	5.0 / 5.0 V
MRI A/RV Pulse Width	1.0 / 1.0 ms
MRI A/RV Pulse Config	Bipolar / Bipolar
MRI V. Pacing Chamber	RV Only

At the bottom right, there is a 'Program MRI Settings' button with a right-pointing arrow. The text 'Last Session: May 16, 2015' is visible at the bottom center.

Information icons at the bottom left indicate: MRI Conditional for 1.5T scanner only and Brady diagnostics are cleared in MRI Settings.

# MRI Left ventricle lead impedance

## MRI Left Ventricle Lead Impedance

All Lead Impedance Measurements must be within range.

Left ventricle lead impedance measurements:

Mid 3 - Proximal 4:	530 $\Omega$
Mid 3 - Mid 2:	530 $\Omega$
Mid 2 - Proximal 4:	530 $\Omega$
Distal tip 1 - Prox 4:	530 $\Omega$
Distal tip 1 - Mid 2:	530 $\Omega$

**Update Values**

LV Lead Monitoring	<b>Monitor</b>
Lower Limit	<b>200 <math>\Omega</math></b>
Upper Limit	<b>2,000 <math>\Omega</math></b>

# MRI Checklist – Step 3, HV Tests

Confirm HV tests required for MRI setup are completed and within range.

HV test panel provides unified status for the Prepare Capacitor and HV Lead Impedance.

The screenshot displays the 'MRI Checklist' interface. At the top, it says 'Verify these conditions before enabling MRI Settings:'. The checklist items are:

- Capture Thresholds are stable at  $\leq 2.5V @ 0.5ms$ . This item has data for A and RV leads: 'Today: 1.0V@0.5ms (A)' and 'May 16, 2015: 0.87V@0... (Bi)'. The RV data also includes 'Today: 1.0V@0.5ms (A)' and 'May 16, 2015: 1.0V@0.5... (Bi)'.
- Pacing Lead Impedances are within range. This item has three buttons labeled 'Within Range' for A, RV, and LV leads.
- HV tests are performed and within range. This item has a large green box with the text 'HV Tests Passed' and a green arrow pointing to it from the right.
- SJM Leads are approved for MRI
- No additional cardiac hardware (adapters, extenders, abandoned leads)

At the bottom right, there is a button labeled 'Program MRI Settings' with a right-pointing arrow. Below the checklist, it says 'Last Session: May 16, 2015'. There are also two information icons (i) with text: 'MRI Conditional for 1.5T scanner only' and 'Brady diagnostics are cleared in MRI Settings'.

**MRI Settings**

Tachy Therapy	DISABLED
MRI Mode	DOO
MRI Base Rate	85 bpm
MRI Paced AV Delay	120 ms
MRI A/RV Pulse Amp	5.0 / 5.0 V
MRI A/RV Pulse Width	1.0 / 1.0 ms
MRI A/RV Pulse Config	Bipolar / Bipolar
MRI V. Pacing Chamber	RV Only

# MRI High voltage tests window

- The capacitor has been prepared for the MRI scan when the button is greyed out.
- In the example below, all HV Lead Impedance measurements are in range for a dual coil lead.

The screenshot displays the 'MRI High Voltage Tests' interface. It is divided into two main sections: 'Capacitor Preparation' and 'High Voltage Lead Impedance'.

**Capacitor Preparation:** This section contains the text 'The capacitor must be charged and discharged.' Below this, the status 'The capacitor is prepared' is shown. A button labeled 'Prepare Capacitor' is present, which is highlighted with a red oval and a red arrow pointing to it from the right. The button is greyed out, indicating that the capacitor is already prepared.

**High Voltage Lead Impedance:** This section contains the text 'Select the implanted lead type and update impedance values. All measurements must be within range.' Below this, there is a section for 'Impedance measurements:' with the following values:

RV-Can:	41 $\Omega$
RV-SVC:	54 $\Omega$
SVC-Can:	54 $\Omega$

Below the impedance measurements, there is a section for 'HV Lead Type' with two buttons: 'Dual Coil' (selected) and 'Single Coil'. Below this, there is a blue button labeled 'Update Values'. At the bottom, there is a box containing the monitoring limits: 'HWLI Monitoring Lower Limit 20  $\Omega$ ' and 'HWLI Monitoring Upper Limit 125  $\Omega$ '.

# MRI Checklist – Step 4, Complete MRI Checklist

Confirm all implanted leads are approved for MRI use and there is no additional cardiac hardware in the patient (examples: adapters, extenders, abandoned leads).

**MRI Checklist**

Verify these conditions before enabling MRI Settings:

	A	RV	LV
<input checked="" type="checkbox"/> Capture Thresholds are stable at $\leq 2.5V @ 0.5ms$	Today: <b>1.0V@0.5ms</b> (6) May 16, 2015: <b>0.87V@0...</b> (6)	Today: <b>1.0V@0.5ms</b> (6) May 16, 2015: <b>1.0V@0.5...</b> (6)	
<input checked="" type="checkbox"/> Pacing Lead Impedances are within range	Within Range	Within Range	Within Range
<input checked="" type="checkbox"/> HV tests are performed and within range		HV Tests Passed	
<input type="checkbox"/>	- SJM Leads are approved for MRI - No additional cardiac hardware (adapters, extenders, abandoned leads)		

**MRI Settings**

Tachy Therapy	<b>DISABLED</b>
MRI Mode	<b>DOO</b>
MRI Base Rate	<b>85 bpm</b>
MRI Paced AV Delay	<b>120 ms</b>
MRI A/RV Pulse Amp	<b>5.0 / 5.0 V</b>
MRI A/RV Pulse Width	<b>1.0 / 1.0 ms</b>
MRI A/RV Pulse Config	<b>Bipolar / Bipolar</b>
MRI V. Pacing Chamber	<b>RV Only</b>

Last Session: May 16, 2015

Program MRI Settings

**Notes:**

- MRI Conditional for 1.5T scanner only
- Brady diagnostics are cleared in MRI Settings



# Confirm MRI Conditionality of CRT-D System

- The St. Jude Medical™ MRI Ready Systems Manual lists devices and leads that are safe for use in the MRI environment.
- Implanted lead models and lengths can be retrieved from the patient records or on the Patient Data screen on the Merlin™ PCS programmer.
- Each implanted lead needs to be checked for MRI compatibility with the CRT device.
- Not all lead lengths are MRI conditional.
- Patients with abandoned cardiac hardware, including leads, lead extenders or lead adaptors should not be scanned.

# MRI Checklist – Step 4, Complete MRI Checklist, continued

Once you have completed the checklist, **press the Program MRI Settings** button.

Note: Tachy therapy and LV pacing will be disabled while MRI settings are programmed.

**MRI Checklist**

Verify these conditions before enabling MRI Settings:

	A	RV	LV
<input checked="" type="checkbox"/> Capture Thresholds are stable at $\geq 2.5V @ 0.5ms$	Today: <b>1.0V@0.5ms</b> (6%) Apr 5, 2015: <b>0.87V@0.5...</b> (8%)	Today: <b>1.0V@0.5ms</b> (6%) Apr 5, 2015: <b>1.0V@0.5ms</b> (6%)	
<input checked="" type="checkbox"/> Pacing Lead Impedances are within range	Within Range	Within Range	Within Range
<input checked="" type="checkbox"/> HV tests are performed and within range		HV Tests Passed	
<input checked="" type="checkbox"/> - SJM Leads are approved for MRI - No additional cardiac hardware (adapters, extenders, abandoned leads)			

Information icons:  
MRI Conditional for 1.5T scanner only  
Brady diagnostics are cleared in MRI Settings

Last Session: Apr 5, 2015

**MRI Settings**

- Tachy Therapy **DISABLED**
- MRI Mode **DOO**
- MRI Base Rate **85 bpm**
- MRI Paced AV Delay **120 ms**
- MRI A/RV Pulse Amp **5.0 / 5.0 V**
- MRI A/RV Pulse Width **1.0 / 1.0 ms**
- MRI A/RV Pulse Config **Bipolar / Bipolar**
- MRI V. Pacing Chamber **RV Only**

**Program MRI Settings**

# MRI Settings: Active

Press the **Print MRI Report button** to inform technician performing the MRI scan that all steps have been completed and to guide them on **allowable scan conditions** based on device/lead combinations found in the MRI Ready Systems Manual.

Press the **End Session button** to end communication with the device.

**MRI Settings: Active**

Programmed Changes

Parameters	Permanent Settings	MRI Settings
Tachy Therapy Mode	ENABLED	↳ DISABLED
Base Rate	DDDR	↳ DOO
Paced AV Delay	65 bpm	↳ 85 bpm
A/RV Pulse Amp	170 ms	↳ 120 ms
A/RV Pulse Width	2.0 / 2.0 V	↳ 5.0 / 5.0 V
A/RV Pulse Configuration	0.5 / 0.5 ms	↳ 1.0 / 1.0 ms
V. Pacing Chamber	Bipolar / Bipolar	↳ Bipolar / Bipolar
	LV1 -> LV2 -> RV	↳ RV Only

**Tachy Therapy is DISABLED.**

After scanning patient, re-interrogate device to return to permanent settings.

Brady diagnostics are cleared in MRI Settings.

Before MRI scan, press **End Session**.

Disable MRI Settings

Print MRI Report

End Session

# MRI Summary Report – MRI SETTINGS ENABLED

**Print the MRI Summary** report for patient records and to inform the radiologist that the patient's device has been programmed to a MRI conditional mode.

- You can **PRINT** the report and/or generate a PDF version via the programmer.

Leads	Manufacturer	Model	Serial	Implant Date
A	St. Jude Medical	OptSense™ 1099		Dec 11, 2013
RV	St. Jude Medical	Durata™ 7120Q		Dec 11, 2013
LV	St. Jude Medical	Quartet™ 1458Q		Dec 11, 2013

Parameter	Permanent	MRI (Currently programmed)
Tachy Therapy Mode	ENABLED	DISABLED
Base Rate	65 bpm	65 bpm
Paced AV Delay	170 ms	120 ms
AR/V Pulse Amplitude	2.0 / 2.0 V	5.0 / 5.0 V
AR/V Pulse Width	0.5 / 0.5 ms	1.0 / 1.0 ms
AR/V Pulse Configuration	Bipolar / Bipolar	Bipolar / Bipolar
HV Lead Type	Dual Coil	Dual Coil
Ventricular Pacing Chamber	LV1 -> LV2 -> RV	RV Only

MRI Checklist	A	RV	HV	LV
☑ Capture Thresholds are stable at $\leq 2.5V @ 0.5ms$	1.0 V @ 0.5 ms	1.0 V @ 0.5 ms		
☑ Lead Impedances are within range	600 $\Omega$	560 $\Omega$	41 $\Omega$ (RV-Can) 54 $\Omega$ (RV-SVC) 54 $\Omega$ (SVC-Can)	530 $\Omega$ (M3-P4) 530 $\Omega$ (M3-M2) 530 $\Omega$ (M2-P4) 530 $\Omega$ (D1-P4) 530 $\Omega$ (D1-M2)
☑ Capacitor is Prepared				
☑ SJM leads are approved for MRI No Additional Cardiac Hardware (adapters, extenders, abandoned leads)				

MRI Conditional for 1.5T scanner only  
MRI scanning conditions are determined by the combination of cardiac devices and lead(s).  
please refer to [www.sjmprofessional.com/mri](http://www.sjmprofessional.com/mri).

You can use the MRI Summary report to confirm that the MRI settings are enabled by looking for MRI Settings Enabled on the report header or Currently programmed next to the MRI parameter set.

# Disable MRI Settings

After the patient has completed the MRI scan, interrogate the device and disable MRI settings as soon as possible. Press the **Disable MRI Settings** button to restore the original permanently programmed settings.

**MRI Settings: Active**

Programming Changes

Parameters	MRI Settings	Permanent Settings
Tachy Therapy	DISABLED	↳ ENABLED
Mode	D00	↳ DDDR
Base Rate	85 bpm	↳ 65 bpm
Paced AV Delay	120 ms	↳ 170 ms
A/RV Pulse Amp	5.0 / 5.0 V	↳ 2.0 / 2.0 V
A/RV Pulse Width	1.0 / 1.0 ms	↳ 0.5 / 0.5 ms
A/RV Pulse Configuration	Bipolar / Bipolar	↳ Bipolar / Bipolar
V. Pacing Chamber	RV Only	↳ LV1 -> LV2 -> RV

**i** Tachy Therapy is DISABLED.

**i** Press Disable MRI Settings to return to permanent settings.

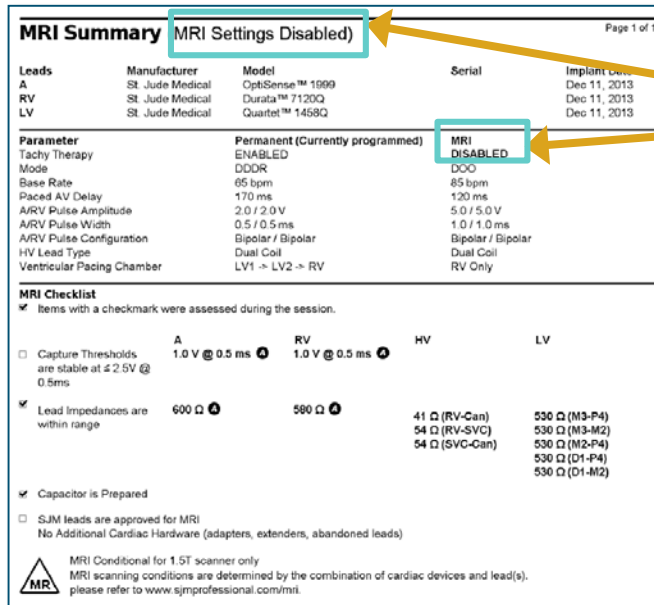
**i** Brady diagnostics are cleared in MRI Settings.


**Disable MRI Settings** **End Session**

# MRI Summary Report – MRI SETTINGS DISABLED

You will need to print the MRI Summary report for patient records and/or to inform the radiologist that the patient is cleared for an MRI.

- You can **PRINT** report and/or generate a PDF version via the programmer.



MRI Summary		MRI Settings Disabled)		Page 1 of 1
<b>Leads</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial</b>	<b>Implant Date</b>
A	St. Jude Medical	OptiSense™ 1999		Dec 11, 2013
RV	St. Jude Medical	Durata™ 7120Q		Dec 11, 2013
LV	St. Jude Medical	Quartet™ 1458Q		Dec 11, 2013
<b>Parameter</b>	<b>Permanent (Currently programmed)</b>	<b>MRI DISABLED</b>		
Tachy Therapy	ENABLED			
Mode	DDDR	DOO		
Base Rate	65 bpm	85 bpm		
Paced AV Delay	170 ms	120 ms		
A/RV Pulse Amplitude	2.0 / 2.0 V	5.0 / 5.0 V		
A/RV Pulse Width	0.5 / 0.5 ms	1.0 / 1.0 ms		
A/RV Pulse Configuration	Bipolar / Bipolar	Bipolar / Bipolar		
HV Lead Type	Dual Coil	Dual Coil		
Ventricular Pacing Chamber	LV1 -> LV2 -> RV	RV Only		
<b>MRI Checklist</b>				
<input checked="" type="checkbox"/> Items with a checkmark were assessed during the session.				
<input type="checkbox"/> Capture Thresholds are stable at $\pm 2.5V @ 0.5ms$	A 1.0 V @ 0.5 ms	RV 1.0 V @ 0.5 ms	HV	LV
<input checked="" type="checkbox"/> Lead Impedances are within range	600 $\Omega$	590 $\Omega$	41 $\Omega$ (RV-Can) 54 $\Omega$ (RV-SVC) 54 $\Omega$ (SVC-Can)	530 $\Omega$ (M3-P4) 530 $\Omega$ (M3-M2) 530 $\Omega$ (M2-P4) 530 $\Omega$ (D1-P4) 530 $\Omega$ (D1-M2)
<input checked="" type="checkbox"/> Capacitor is Prepared				
<input type="checkbox"/> SJM leads are approved for MRI No Additional Cardiac Hardware (adapters, extenders, abandoned leads)				
 MRI Conditional for 1.5T scanner only MRI scanning conditions are determined by the combination of cardiac devices and lead(s). please refer to <a href="http://www.sjmprofessional.com/mri">www.sjmprofessional.com/mri</a> .				

If the MRI Settings are not enabled, the “Permanent” settings will be in the Currently programmed state in the Parameter set and MRI Settings Disabled status will also be reflected on the Report Header.



**Rx Only**  
**Brief Summary:** Prior to using these devices, please review the Instructions for Use for a complete listing of indications, contraindications, warnings, precautions, potential adverse events and directions for use.

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<sup>‡</sup> Indicates a third party trademark, which is property of its respective owner.  
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