



**Abbott**

# ACTIVATE.

The next level of CRT.

Next-Level CRT

**PROGRAMMING GUIDANCE**



# PROGRAMMING SUMMARY



Program  
single-site  
CRT



Assess  
intrinsic  
rhythm



If applicable,  
optimize  
SyncAV™ CRT  
technology



If applicable,  
program  
MultiPoint™  
Pacing ON



**NEXT-  
LEVEL  
CRT**

# PATIENT SELECTION AND PROGRAMMING GUIDANCE

- Programming guidance is based on the latest clinical evidence, key opinion leader presentations and best practices from the field
- Programming can occur at implant for new patients and follow-up for existing patients



# PATIENT SELECTION AND PROGRAMMING GUIDANCE

The programming guidance has the goal of improving CRT response and narrowing the QRS in applicable patients with the unique tools offered by Abbott CRT systems, including

- Multiple LV lead options with  $\geq 30$  mm electrode spacing
- SyncAV™ CRT technology
- MultiPoint™ Pacing

The ideal programming for any patient may include both SyncAV™ CRT technology and MultiPoint™ Pacing, just one or neither, and this programming guide will help you tailor the therapies accordingly



# STEP 1: PROGRAM STANDARD SINGLE-SITE CRT

- Programming standard single-site quadripolar CRT
- Navigate to the CRT Toolkit tab in the Tests application
- Select Perform Auto VectSelect

Perform  
Auto VectSelect



# STEP 1: PROGRAM STANDARD SINGLE-SITE CRT

- Perform
  - RV-LV Conduction Time

The screenshot displays a medical device interface with ECG waveforms and a dialog box for measuring RV-LV conduction time. The ECG shows multiple leads (I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6) and a heart rate of 70 bpm. The dialog box contains the following information:

**Measure RV-LV conduction time**  
The lead line will be highlighted. You may then check the status to select a suitable lead.

LV Electrode	Measured Time
Proximal 4	---
Mid 8	---
Mid 2	---
Distal tip 1	---

**Additional Parameters**  
Test Method: RV Sense  
Rate Rate: 65 bpm  
Sensed AV Delay: 120 ms

Buttons: Close, Perform Measurements

# STEP 1: PROGRAM STANDARD SINGLE-SITE CRT

- Perform
  - RV-LV Conduction Time
  - Capture Tests

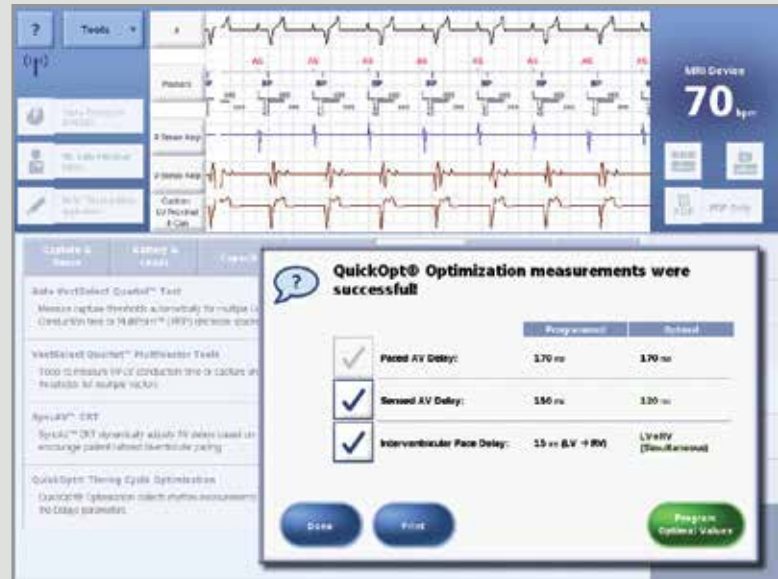


# STEP 1: PROGRAM STANDARD SINGLE-SITE CRT

- Perform
  - RV-LV Conduction Time
  - Capture Tests
  - **QuickOpt™**

Per the physician's protocol for Abbott CRT devices

- Program-preferred single-site CRT parameters





## STEP 2: ASSESS INTRINSIC RHYTHM

- Navigate to the CRT Toolkit tab in the Tests application
- Click on Perform SyncAV™ CRT technology

Perform  
SyncAV™ CRT



## STEP 2: ASSESS INTRINSIC RHYTHM

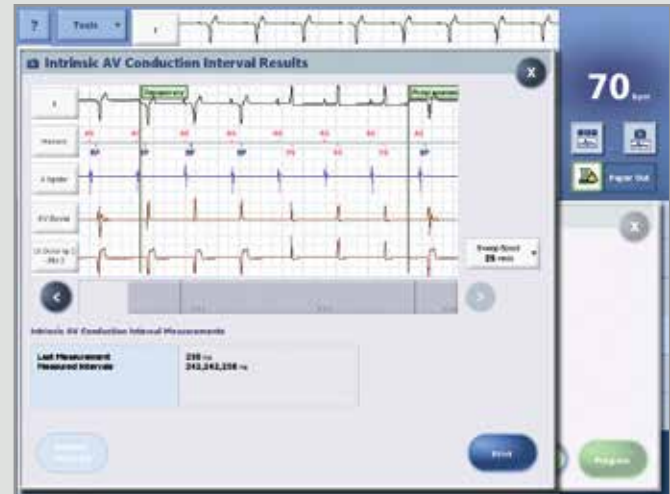
- Check intrinsic conduction
- Click on Intrinsic AV Conduction Interval to perform test



**REMINDER:** SyncAV™ CRT technology will automatically suggest programming AV delays longer than measured intrinsic conduction, as this is essential for appropriate function

## STEP 2: ASSESS INTRINSIC RHYTHM

- Using surface ECG, measure the QRS duration on the programmer, utilizing electronic calipers



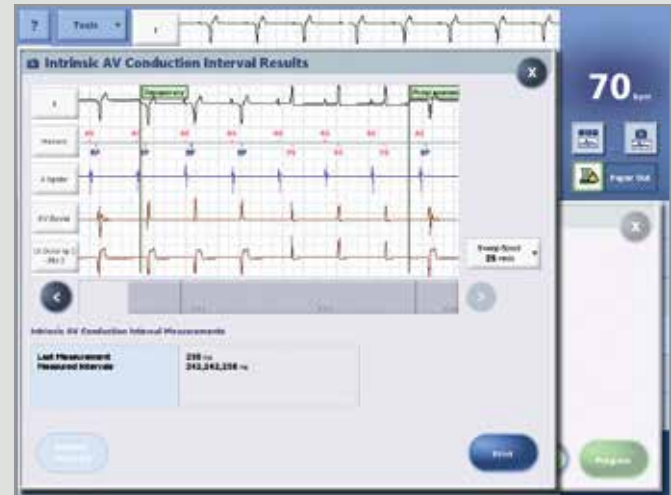
**REMINDER:** Before evaluating different SyncAV™ technology Deltas, measure intrinsic QRS duration and single-site CRT QRS duration to establish a baseline

## STEP 2: ASSESS INTRINSIC RHYTHM

SyncAV™ CRT technology patient selection criteria

- ✓ Intact AV conduction
- ✓ PR <300 ms
- ✓ Left Bundle Branch Block
- ✓ Minimal ventricular ectopy (PVCs)
- ✓ Low AT/AF burden

If above criteria are not met, go to STEP 4



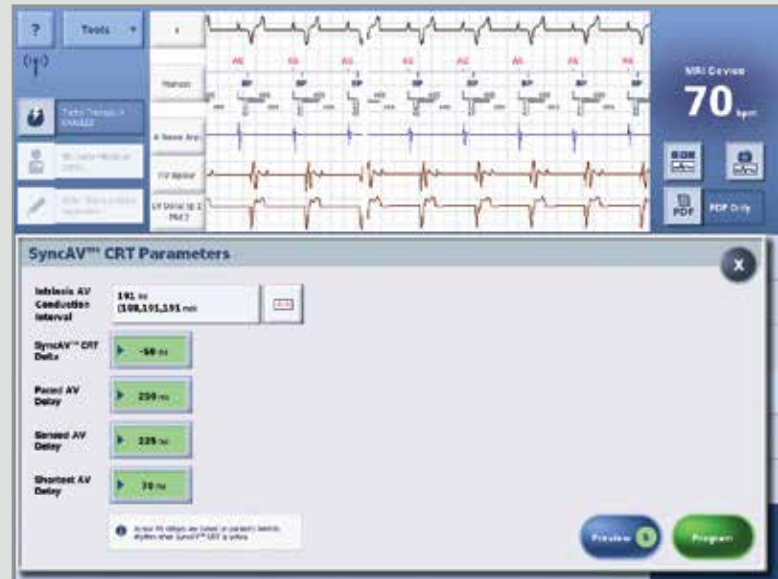
**SyncAV™ CRT technology is not intended for:** Patients with heart block where 1:1 conduction is not present all of the time

## STEP 3: PROGRAM SYNC-AV™ CRT TECHNOLOGY

- Program SyncAV™ CRT technology  
Delta ON
- Start at nominal value of -50 ms



- Measure and record (print, if necessary or desired to compare) QRS duration



## STEP 3:

# PROGRAM SYNC AV™ CRT TECHNOLOGY

## AV DELAYS WILL NOW ADJUST TO PATIENT

- 1 Every 256 cycles the AV delay is set to the programmed value for 3 cycles (in this example 225 ms)
- 2 AV conduction occurs intrinsically and SyncAV™ CRT technology measures the conduction time
- 3 SyncAV™ CRT technology adjusts the AV delay for the next 256 cycles using the following equation:  
$$AVD = (\text{Intrinsic Conduction Time}) - (\text{SyncAV™ CRT technology Delta})$$



## STEP 3: PROGRAM SYNC-AV™ CRT TECHNOLOGY

- Program different SyncAV™ CRT technology Deltas
- Measure (and print, if necessary or desired to compare) QRS durations



**RECOMMENDATION:** After -50 ms, go to -60 ms then to -40 ms and evaluate QRS duration versus -50 ms to determine directionality. Then step up or step down in 10 ms increments to find the narrowest QRS

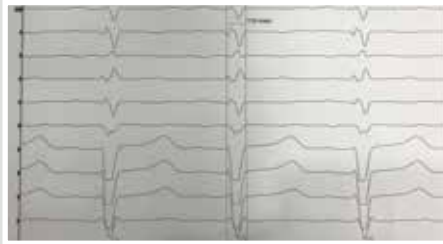
### STEP 3:

## PROGRAM SYNC AV™ CRT TECHNOLOGY

- Permanently program SyncAV™ CRT technology  
Delta to the value that yields the narrowest QRS.  
In the example pictured, a delta of -50 ms was  
selected based on this criteria



Intrinsic 157 ms



Single-site CRT 118 ms



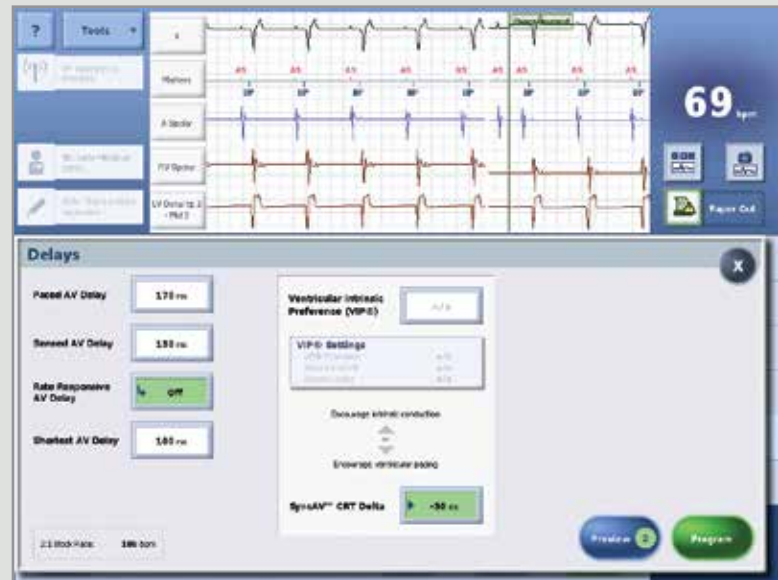
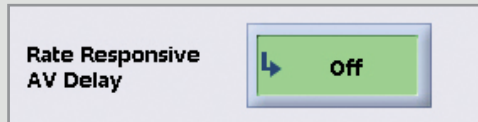
SyncAV™ CRT technology -50 ms 95 ms



### STEP 3:

## PROGRAM SYNC AV™ CRT TECHNOLOGY

- REMINDER: When programming SyncAV™ CRT technology ON, Rate-Responsive AV Delay (RRAVD) is automatically turned OFF. This should remain OFF and can be found on the Delays screen



## STEP 4: PROGRAM MULTIPOINT™ PACING

- If appropriate for the patient, evaluate MultiPoint™ Pacing options
- Navigate to the CRT Toolkit tab in the Tests application
- Click on Access MultiVector Tools



## STEP 4: PROGRAM MULTIPOINT™ PACING

- Based on Step 1, evaluate electrode options for MultiPoint™ Pacing
- Consider choosing electrodes with  $\geq 30$  mm anatomical spacing and an offset of 5 ms



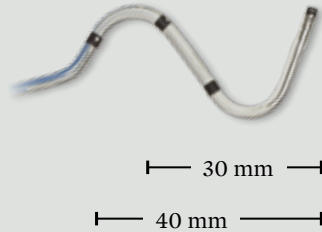
**REMINDER:** In the U.S. IDE, when  $\geq 30$  mm anatomical spacing and a 5 ms offset were selected, the patient response rate was 87%<sup>1</sup>

## STEP 4: PROGRAM MULTIPOINT™ PACING

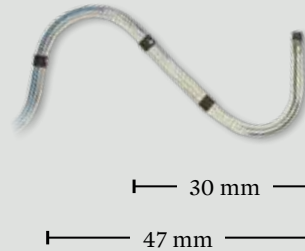
**Quartet™ 1457Q  
Double Bend**



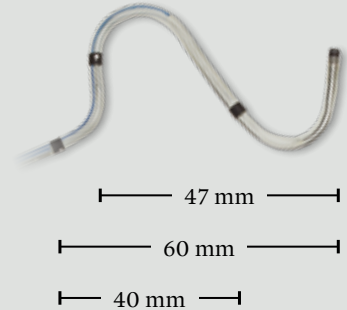
**Quartet™ 1456Q  
Small S-curve**



**Quartet™ 1458Q  
Traditional S-curve**



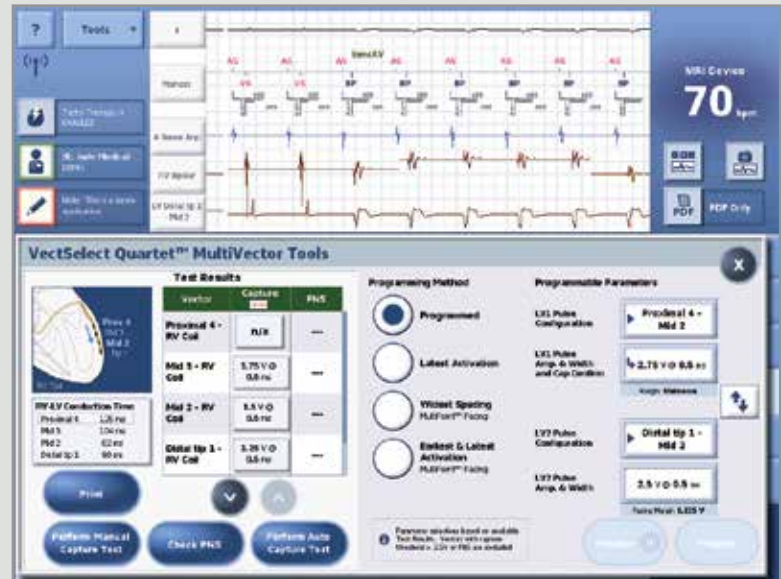
**Quartet™ 1458QL  
Large S-curve**



The Quartet Family of LV Leads was designed to enable more electrode spacing options  $\geq 30$  mm for MultiPoint™ Pacing to help **DO MORE FOR MORE CRT PATIENTS**

## STEP 4: PROGRAM MULTIPOINT™ PACING

- Program MultiPoint™ Pacing with the following criteria
  - $\geq 30$  mm electrode spacing
  - 5 ms LV1 – LV2 pulse separation (nominal)



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If applicable,  
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technology



If applicable,  
program  
MultiPoint™  
Pacing ON



**NEXT-  
LEVEL  
CRT**

1. Niazi, et al. Safety and efficacy of multipoint pacing in cardiac resynchronization therapy—the multipoint pacing trial. *JACC*. 2017. <http://dx.doi.org/10.1016/j.jacep.2017.06.022>.

**RX ONLY**  
**BRIEF SUMMARY:**

Please review the Instructions for Use prior to using these devices for a complete listing of indications, contraindications, warnings, precautions, potential adverse events and directions for use.

**Quartet™ LV lead**

**Indications and Usage:** The Quartet lead has application as part of an Abbott Biventricular system.

**Contraindications:** The use of the Quartet lead is contraindicated in patients who:

- Are expected to be hypersensitive to a single dose of 1.0 mg of dexamethasone sodium phosphate
- Are unable to undergo an emergency thoracotomy procedure
- Have coronary venous vasculature that is inadequate for lead placement, as indicated by venogram

**MultiPoint™ Pacing and SyncAV™ CRT Technology**

**Indications:** Abbott ICDs and CRT-Ds are intended to provide ventricular antitachycardia pacing and ventricular defibrillation for automated treatment of life-threatening ventricular arrhythmias. AF Suppression™ pacing is indicated for suppression of paroxysmal or persistent atrial fibrillation in patients with the above ICD indication and sinus node dysfunction. In patients indicated for an ICD, CRT-Ds are also intended to provide a reduction of the symptoms of moderate to severe heart failure (NYHA Functional Class III or IV) in those patients who remain symptomatic despite stable, optimal medical therapy (as defined in the clinical trials section included in the Merlin™ PCS on-screen help) and have a left ventricular ejection fraction less than or equal

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[www.sjm.com](http://www.sjm.com)  
St. Jude Medical is now Abbott.

**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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SJM-MLP-0918-0114(1) | Item approved for U.S. and OUS use.

to 35% and a prolonged QRS duration to maintain synchrony of the left and right ventricles in patients who have undergone an AV nodal ablation for chronic (permanent) atrial fibrillation and have NYHA Class II or III heart failure.

**Contraindications:** Contraindications for use of the pulse generator system include ventricular tachyarrhythmias resulting from transient or correctable factors such as drug toxicity, electrolyte imbalance or acute myocardial infarction.

**Adverse Events:** Implantation of the pulse generator system, like that of any other device, involves risks, some possibly life-threatening. These include but are not limited to the following: acute hemorrhage/bleeding, air emboli, arrhythmia acceleration, cardiac or venous perforation, cardiogenic shock, cyst formation, erosion, exacerbation of heart failure, extrusion, fibrotic tissue growth, fluid accumulation, hematoma formation, histotoxic reactions, infection, keloid formation, myocardial irritability, nerve damage, pneumothorax, thromboemboli, venous occlusion. Other possible adverse effects include mortality due to component failure, device programmer communication failure, lead abrasion, lead dislodgment or poor lead placement, lead fracture, inability to defibrillate, inhibited therapy for a ventricular tachycardia, interruption of function due to electrical or magnetic interference, shunting of energy from defibrillation paddles, system failure due to ionising radiation. Other possible adverse effects include mortality due to inappropriate delivery of therapy caused by multiple counting of cardiac events, including T waves, P waves or supplemental pacemaker stimuli. Among the psychological effects of device implantation are imagined pulsing, dependency, fear of inappropriate pulsing and fear of losing pulse capability.

Refer to the User's Manual for detailed indications, contraindications, warnings, precautions and potential adverse events.

