

SUMMARY

This article summarizes appropriate device programming steps when a left ventricular (LV) lead is implanted but not being used, or if an LV lead is not physically attached to the device and the unused LV header port is plugged.

Products Referenced

All referenced Boston Scientific CRT-Ds and CRT-Ps and the LATITUDE Patient Management System.

Products referenced herein may not be approved in all geographies. For comprehensive information on device operation, reference the full instructions for use found at: www.bostonscientific.com/cardiac-rhythm-resources/international-manuals.html.

CAUTION: Law restricts this device to sale by or on the order of a physician. Indications, contraindications, precautions and warnings can be found with product labeling.

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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Programming a CRT Device When a Left Ventricular Lead is Not Used

Cardiac resynchronization therapy (CRT) devices are intended to utilize a left ventricular (LV) lead to establish synchrony between the right and left ventricles. However, there may be clinical situations in which the LV lead is not used. For example:

- If the LV lead cannot be positioned, the physician may elect to use the CRT device without an LV lead temporarily, plugging the unused LV header port.
- If the implanted LV lead dislodges to a sub-optimal position, the lead may remain implanted and connected to the LV header port, but electronically deactivated.

If LV lead information will not be used, the programming adjustments described below may help to:

- Prevent reporting of invalid LV diagnostic information such as out-of-range LV lead impedance measurements, noise, or LATITUDE® yellow alerts/status indicators caused by invalid diagnostic information.
- Minimize¹ invalid accrual of LV counters, electrograms, markers, and intervals.
- Improve device longevity.²
- Minimize diaphragm stimulation if the LV lead is positioned near the phrenic nerve.

Device Programming

If the LV lead port is plugged, or if an implanted LV lead is not being used, consider reprogramming the following device parameters related to LV lead use:

- **Step 1:** Program BiV Trigger to Off (if feature is available).
- **Step 2:** Program LV Amplitude and LV Pulse Width to the minimum value for both normal brady therapy and post-shock therapy.
- **Step 3:** Program the pacing chamber to RV only.¹
- **Step 4:** Turn off LV sensing.
- **Step 5:** Turn off LV Daily Measurements.

Reference the following tables for programming steps specific to device type and family. If these steps are performed in a different sequence certain steps may not be available.

¹ Some device features will temporarily utilize BiV pacing, which may add LV data to the counters, electrograms, markers, and intervals regardless of LV lead configuration. Depending on device model and programming, these features may include ATR Mode Switch, ATP, and Electrocautery Protection mode.

² If the LV lead is not used, and no LV lead parameters are programmed to a minimum value or Off, device longevity will be equal to that of a device using an LV lead

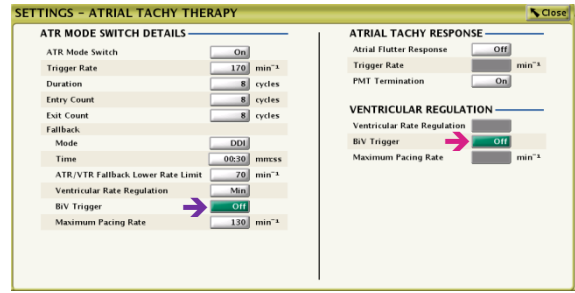
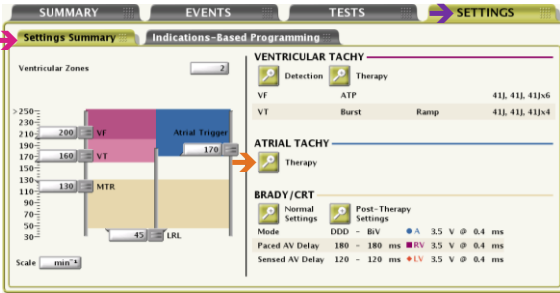
Programming for CRT-Ds

Table 1. Programming When an LV Lead is Not Used in COGNIS®, PUNCTUA™, INCEPTA™ and ENERGEN™ CRT-D Devices

Step 1: Turn ATR BiV Trigger and VENTRICULAR REGULATION BiV Trigger Off

Go to SETTINGS tab (➔), then
Go to SETTINGS SUMMARY tab (➔), then
Go to Therapy (➔) under Atrial Tachy

Change ATR BiV Trigger (➔) to OFF
Change VENTRICULAR REGULATION
BiV Trigger (➔) to OFF
Select the **Close** Button



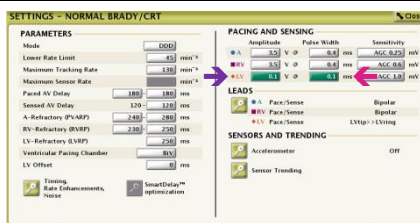
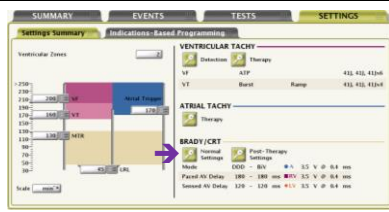
Step 2: Change LV Amplitude/Pulse Width

Step 3: Program Pacing Chamber to RV Only

Go To Normal Settings (➔),
under BRADY/CRT

Change LV Amplitude (➔) to 0.1 V
Change LV Pulse Width (➔) to 0.1 ms

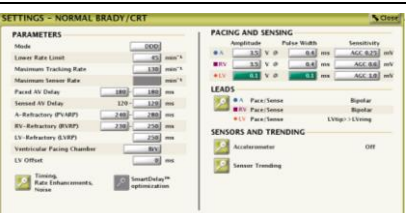
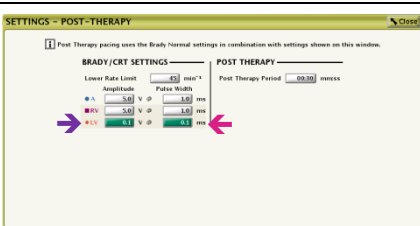
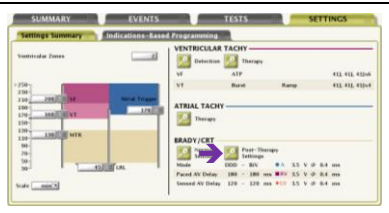
Change Ventricular Pacing
Chamber (➔) to RV Only



Go To Post-Therapy Settings
(➔) under BRADY/CRT

Change LV Amplitude (➔) to 0.1 V
Change LV Pulse Width (➔) to 0.1 ms
Select the **Close** Button

Return to Normal Settings on the
BRADY/CRT Screen

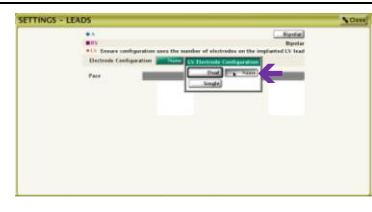
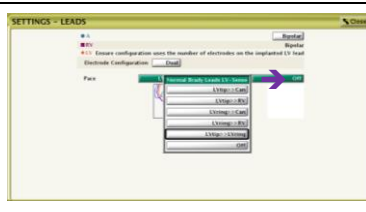
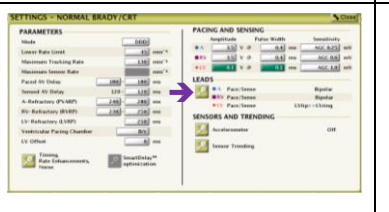


Step 4: Change LV Sense and Electrode Configuration

Go to LEADS icon (➔)

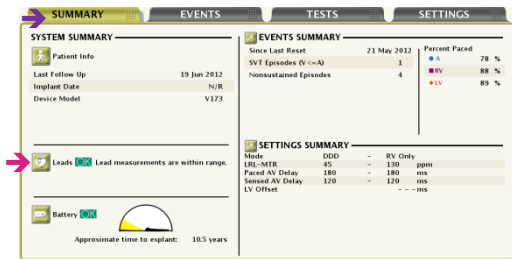
Change LV Sense (➔) to Off
(LV Electrode Configuration must be
Single or Dual)

Change LV Electrode Configuration
(➔) to None
Select the **Close** Button twice



Step 5: Turn LV Daily Measurements Off

Go to Main SUMMARY tab (➔), then
Go to Leads (➔)



From the Setup Tab,
Change LV Intrinsic Amplitude (➔) to Off
Change LV Pace Impedance (➔) to Off
Select the **Close** Button and **Program**

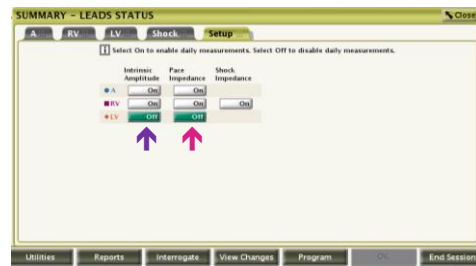
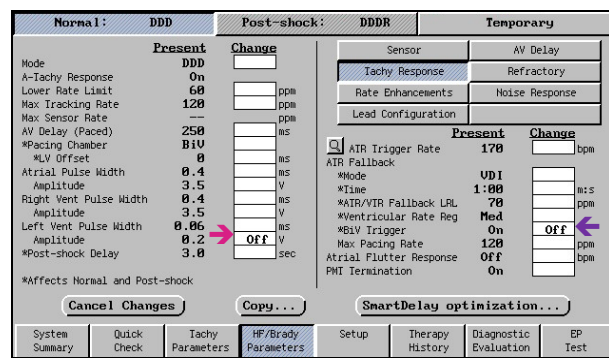
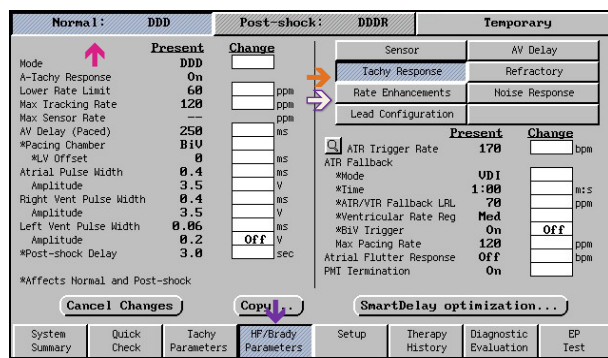


Table 2. Programming When an LV Lead is Not Used in LIVIAN® and CONTAK RENEWAL® CRT-D Devices (all models)³

Steps 1a/2a: Turn BiV Trigger⁴ and LV Amplitude Off under Normal Parameters (If BiV is not available, change LV Amplitude only)

Go to HF/Brady Parameters tab (➔), then
Go to Normal⁵ tab (➔), then
Go to Tachy⁵ Response (➔) (if DDD(R)/VDD(R)), or
Rate Enhancements (➔) (if DDI(R)/VVI(R))

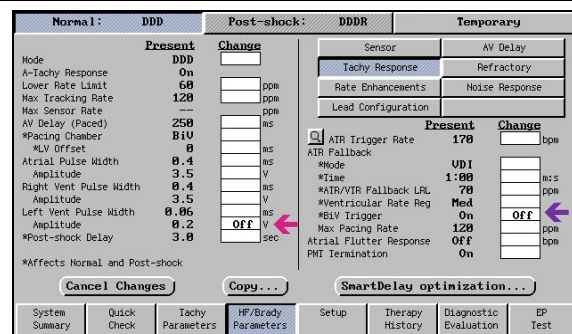
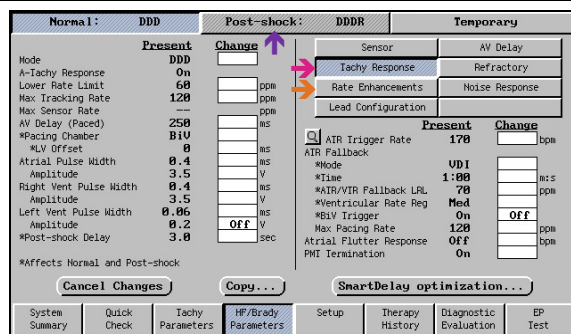
Change BiV Trigger (➔) to Off (if applicable)
Change LV Amplitude (➔) to Off (if applicable)



Step 1b/2b: Turn BiV Trigger³ and LV Amplitude Off under Post-Shock Parameters (If BiV is not available, change LV Amplitude only)

From HF/Brady Parameters tab
Go to Post-shock tab (➔), then
Go to Tachy Response (➔) (if DDD(R)/VDD(R)), or
Rate Enhancements (➔) (if DDI(R)/VVI(R))

Change BiV Trigger (➔) to Off (if applicable)
Change LV Amplitude (➔) to Off
Press the Program button



³ Steps 1a/2a, 3, 4 and 5 in this section also pertain to CONTAK RENEWAL TR CRT-P devices.

⁴ BiV Trigger is only available in LIVIAN and CONTAK RENEWAL 4/ 4 AVT/ 3 AVT

⁵ Specific to CONTAK RENEWAL TR devices: No Normal tab, proceed to next line; Tachy Response is called A-Tachy Response.

Steps 3 and 4: Change Pacing Chamber to RV and LV Lead Configuration to None

From HF/Brady Parameters tab
Go to Normal⁵ tab (→)
Go to Lead Configuration (→)

Change Pacing Chamber (→) to RV
Change Left Ventricle Electrode Config (→) to None
Press the Program button

Normal: DDD Post-shock: DDDR Temporary

Mode: DDD Present Change

A-Tachy Response: On

Lower Rate Limit: 60 ppm

Max Tracking Rate: 120 ppm

Max Sensor Rate: 250 ppm

AV Delay (Paced): 250 ms

*Pacing Chamber: BiV

*LV Offset: 0 ms

Atrial Pulse Width: 0.4 ms

Amplitude: 3.5 V

Right Vent Pulse Width: 0.4 ms

Amplitude: 3.5 V

Left Vent Pulse Width: 0.06 ms

Amplitude: 0.4 V

*Post-shock Delay: 3.0 sec

*Affects Normal and Post-shock

Lead Configuration: Present Change

Left Ventricle: None

*Electrode Config: Dual

*Pace: Tip>Ring

*Sense: Tip>Ring

Cancel Changes Copy... SmartDelay optimization...

System Quick Tachy HF/Brady Setup Therapy Diagnostic EP
Summary Check Parameters Parameters History History Evaluation Test

Normal: DDD Post-shock: DDDR Temporary

Mode: DDD Present Change

A-Tachy Response: On

Lower Rate Limit: 60 ppm

Max Tracking Rate: 120 ppm

Max Sensor Rate: 250 ppm

AV Delay (Paced): 250 ms

*Pacing Chamber: BiV

*LV Offset: 0 ms

Atrial Pulse Width: 0.4 ms

Amplitude: 3.5 V

Right Vent Pulse Width: 0.4 ms

Amplitude: 3.5 V

Left Vent Pulse Width: 0.06 ms

Amplitude: 0.4 V

*Post-shock Delay: 3.0 sec

*Affects Normal and Post-shock

Lead Configuration: Present Change

Left Ventricle: None

*Electrode Config: Dual

*Pace: Tip>Ring

*Sense: Tip>Ring

Cancel Changes Copy... SmartDelay optimization...

System Quick Tachy HF/Brady Setup Therapy Diagnostic EP
Summary Check Parameters Parameters History History Evaluation Test

Step 5: Turn LV Daily Measurements Off

From the Setup tab (→)

Select Daily Measurement (→)

Patient Name: Please Enter Patient Name LIVIAN

Rate: 60

Lead: I

Atrial

Right U

Daily Measurement Setup

Magnet/Beeper: Present Change

Episodes/EGM: Atrial Intrinsic Amplitude On

Right Ventricular Intrinsic Amplitude On

Left Ventricular Intrinsic Amplitude Off

Patient Triggered: Atrial Pace Impedance On

PG ZIP: Right Ventricular Pace Impedance On

Telemetry: Left Ventricular Pace Impedance Off

Trending: Shock Impedance On

Sensitivity Adjustment

Daily Measurement

Therapy Features

Cancel Changes Reset Daily Measurement...

System Quick Tachy HF/Brady Setup Therapy Diagnostic EP
Summary Check Parameters Parameters History History Evaluation Test

Patient Name: Please Enter Patient Name LIVIAN

Rate: 60

Lead: I

Atrial

Right U

Daily Measurement Setup

Magnet/Beeper: Present Change

Episodes/EGM: Atrial Intrinsic Amplitude On

Right Ventricular Intrinsic Amplitude On

Left Ventricular Intrinsic Amplitude Off

Patient Triggered: Atrial Pace Impedance On

PG ZIP: Right Ventricular Pace Impedance On

Telemetry: Left Ventricular Pace Impedance Off

Trending: Shock Impedance On

Sensitivity Adjustment

Daily Measurement

Therapy Features

Cancel Changes Reset Daily Measurement...

System Quick Tachy HF/Brady Setup Therapy Diagnostic EP
Summary Check Parameters Parameters History History Evaluation Test

Turn Left Ventricular Intrinsic Amplitude Off (→)

Turn Left Ventricular Pace Impedance Off (→)
Press the Program button

Patient Name: Please Enter Patient Name LIVIAN

Rate: 60

Lead: I

Atrial

Right U

Daily Measurement Setup

Magnet/Beeper: Present Change

Episodes/EGM: Atrial Intrinsic Amplitude On

Right Ventricular Intrinsic Amplitude On

Left Ventricular Intrinsic Amplitude Off

Patient Triggered: Atrial Pace Impedance On

PG ZIP: Right Ventricular Pace Impedance On

Telemetry: Left Ventricular Pace Impedance Off

Trending: Shock Impedance On

Sensitivity Adjustment

Daily Measurement

Therapy Features

Cancel Changes Reset Daily Measurement...

System Quick Tachy HF/Brady Setup Therapy Diagnostic EP
Summary Check Parameters Parameters History History Evaluation Test

Patient Name: Please Enter Patient Name LIVIAN

Rate: 60

Lead: I

Atrial

Right U

Daily Measurement Setup

Magnet/Beeper: Present Change

Episodes/EGM: Atrial Intrinsic Amplitude On

Right Ventricular Intrinsic Amplitude On

Left Ventricular Intrinsic Amplitude Off

Patient Triggered: Atrial Pace Impedance On

PG ZIP: Right Ventricular Pace Impedance On

Telemetry: Left Ventricular Pace Impedance Off

Trending: Shock Impedance On

Sensitivity Adjustment

Daily Measurement

Therapy Features

Cancel Changes Reset Daily Measurement...

System Quick Tachy HF/Brady Setup Therapy Diagnostic EP
Summary Check Parameters Parameters History History Evaluation Test

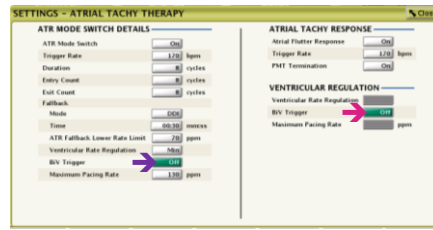
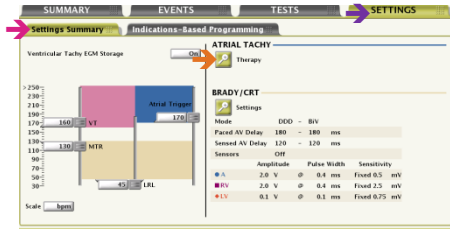
Programming for CRT-Ps⁶

Table 3. Programming When an LV Lead is Not Used in INVIVE™, INTUA™ and INLIVEN™ CRT-P Devices

Step 1: Turn ATR BiV Trigger and VENTRICULAR REGULATION BiV Trigger Off

Go to SETTINGS tab (➔), then
Go to SETTINGS SUMMARY tab (➔), then
Go to Therapy (➔) under Atrial Tachy

Change ATR BiV Trigger (➔) to OFF
Change VENTRICULAR REGULATION
BiV Trigger (➔) to OFF
Select the **Close** Button



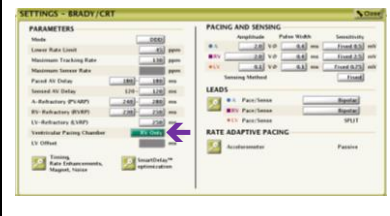
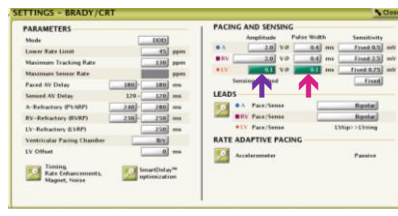
Step 2: Change LV Amplitude/
Pulse Width

Step 3: Change Ventricular Pacing
Chamber to RV only

Go to Settings icon (➔) under
BRADY/CRT

Change LV Amplitude (➔) to 0.1 V
Change LV Pulse Width (➔) to 0.1 ms

Change Ventricular Pacing
Chamber (➔) to RV Only

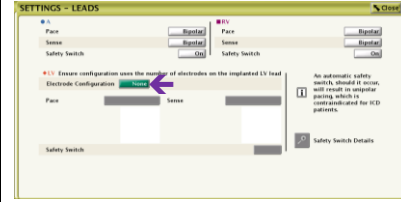
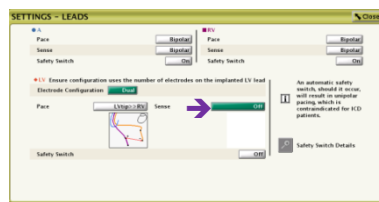
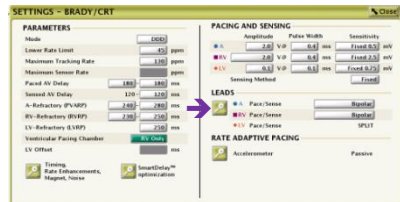


Step 4: Change LV Sense and Electrode Configuration

From current location
(SETTINGS – BRADY/CRT),
Go to LEADS (➔)

Change LV Sense (➔) to Off
(LV Electrode Configuration must be
Single or Dual)

Change LV Electrode Configuration
(➔) to None
Select the **Close** button twice

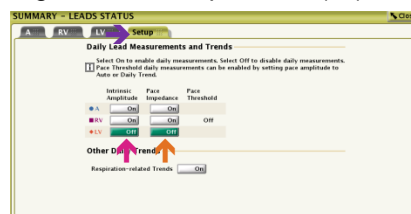
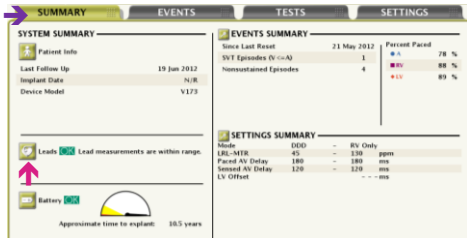


Step 5: Turn LV Daily Measurements Off

Go to main SUMMARY (➔) tab, then
Go to Leads (➔)

Go to the Setup (➔) tab, then
Change LV Intrinsic Amplitude (➔) to Off
Change LV Pace Impedance (➔) to Off

Select **Close**
and **Program**



⁶ For CONTACT RENEWAL TR, see Table 2, steps 1 and 2a, 3, 4, and 5

NOTES:

- 1) *Daily Measurements can be accessed through the Setup button > Daily Measurements button. CONTAK RENEWAL and CONTAK RENEWAL 2 do not have a Daily Measurement feature.*
- 2) *If an LV lead is implanted, but not being used:*
 - *During commanded Impedance and Threshold Tests performed through Quick Check or Diagnostic Evaluation, the patient may feel temporary diaphragm stimulation while the test is run.*
 - *During a commanded Threshold Test performed through Quick Check, when prompted to start the LV Threshold Test, select Cancel or consider de-selecting the LV Threshold Test prior to starting commanded test. If the LV threshold test commences, consider closing the LV Threshold window; this will cancel the test.*