

Programming a CRT Device When an LV Lead is Not Used

SUMMARY

This article summarizes helpful 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

CONTAK RENEWAL
CRT-D and CRT-P families, LIVIAN

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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 temporarily use the CRT device without an LV lead, plugging the unused LV header port.
- If the implanted LV lead dislodges to a sub-optimal position, the physician may leave the lead implanted and connected to the LV header port, but electronically deactivate the lead.

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:

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

¹Some 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.

²If the LV lead is not used, and no programming changes are made, device longevity will be equal to a device using an LV lead.

Reference Table 1 for specific programming steps. If these steps are performed in a different sequence certain steps may not be available.

Table 1. Programming Considerations When an LV Lead is Not Used in the LIVIAN and CONTAK RENEWAL Families of CRT-D and CRT-P Devices

Normal: DDD		Post-shock: DDDR		Temporary	
Present	Change	Sensor		AV Delay	
Mode	DDD	Tachy Response		Refractory	
A-Tachy Response	On	Rate Enhancements		Noise Response	
Lower Rate Limit	60 ppm	Lead Configuration			
Max Tracking Rate	120 ppm	*ATR Trigger Rate		170 bpm	
Max Sensor Rate	120 ppm	*ATR Fallback		*Mode UDI	
AV Delay (Paced)	250 ms	*Time		1:00 m:s	
*Pacing Chamber	BiV	*ATR/VIR Fallback LRL		70 ppm	
*LV Offset	0 ms	*Ventricular Rate Reg		Med	
Atrial Pulse Width	0.4 ms	*BiV Trigger		On	
Amplitude	3.5 V	Max Pacing Rate		120 ppm	
Right Vent Pulse Width	0.4 ms	Atrial Flutter Response		Off	
Amplitude	3.5 V	PMT Termination		On	
Left Vent Pulse Width	0.06 ms				
Amplitude	0.2 V				
*Post-shock Delay	3.0 sec				

*Affects Normal and Post-shock

Buttons: Cancel Changes, Copy..., SmartDelay optimization...

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

STEP 1: Bi-V Trigger³ for Normal Parameters

A. HR / Brady Parameters tab > Normal tab > (proceed to Step 2 if BiV Trigger is not a device feature³).

- For devices programmed DDD(R) / VDD(R), select the Tachy Response button.

- For devices programmed DDI(R) / VVI(R), select the Rate Enhancements button.

B. Change BiV Trigger to Off.

STEP 2: LV Amplitude for Normal Therapy

A. Change the LV Amplitude to Off.

Normal: DDD		Post-shock: DDDR		Temporary	
Present	Change	Sensor		AV Delay	
Mode	DDDR	Tachy Response		Refractory	
A-Tachy Response	On	Rate Enhancements		Noise Response	
Lower Rate Limit	40 ppm	Lead Configuration			
Max Tracking Rate	120 ppm	*ATR Trigger Rate		170 bpm	
Max Sensor Rate	120 ppm	*ATR Fallback		*Mode UDI	
AV Delay (Paced)	100 ms	*Time		1:00 m:s	
*Pacing Chamber	BiV	*ATR/VIR Fallback LRL		70 ppm	
*LV Offset	0 ms	*Ventricular Rate Reg		Med	
Atrial Pulse Width	0.4 ms	*BiV Trigger		Off	
Amplitude	3.5 V	Max Pacing Rate		120 ppm	
Right Vent Pulse Width	1.0 ms	Atrial Flutter Response		Off	
Amplitude	7.5 V	PMT Termination		On	
Left Vent Pulse Width	0.4 ms				
Amplitude	3.5 V				
*Post-shock Delay	3.0 sec				
Post-shock Period	0:30 m:s				

*Affects Normal and Post-shock

Buttons: Cancel Changes, Copy...

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

STEP 3: Bi-V Trigger³ for Post-Shock Parameters

A. Post-shock therapy tab > (proceed to Step 4 if BiV Trigger is not a device feature³).

- For devices with a Post-shock mode of DDD(R) / VDD(R), select the Tachy Response button.

- For devices with a Post-shock mode of DDI(R) / VVI(R), select the Rate Enhancements button.

B. Change BiV Trigger to Off. If BiV Trigger is already Off, proceed to Step 4.

STEP 4: LV Amplitude for Post-Shock Therapy

A. Change the LV Amplitude to Off.

B. Press the Program button.

Normal: DDD		Post-shock: DDDR		Temporary	
Present	Change	Sensor		AV Delay	
Mode	DDD	Tachy Response		Refractory	
A-Tachy Response	On	Rate Enhancements		Noise Response	
Lower Rate Limit	60 ppm	Lead Configuration			
Max Tracking Rate	120 ppm	Left Ventricle		Present Change	
Max Sensor Rate	120 ppm	Ensure appropriate configuration for lead			
AV Delay (Paced)	250 ms	*Electrode Config		Dual	
*Pacing Chamber	BiV	*Pace		Tip»Ring	
*LV Offset	0 ms	*Sense		Tip»Ring	
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

Buttons: Cancel Changes, Copy..., SmartDelay optimization...

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

STEP 5: RV Only Pacing Chamber

A. Normal tab > change the Pacing Chamber to RV.

STEP 6: LV Lead Configuration

A. Lead Configuration button > change the Left Ventricle Electrode Config to None.

B. Press the Program button.

³BiV Trigger is only available in LIVIAN, CONTAK RENEWAL 4 / 4 AVT / 3 AVT & CONTAK RENEWAL TR^{®2}.

NOTES:

- 1) *Following Steps 5 and 6 automatically programs LV Daily Measurements to Off. 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 tests.*