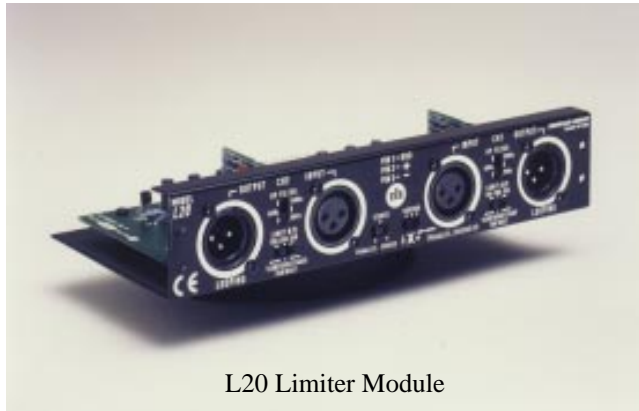


# OPERATION MANUAL

## C12 • C22 • L20 Plug-In Controller Modules



L20 Limiter Module



C12 Controller Module



C22 Controller Module



**RENKUS-HEINZ**

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**Introduction**

Congratulations on your purchase of a Renkus-Heinz loudspeaker controller module for your P2400 or P2700 dual-channel power amplifier.

Your Renkus-Heinz amplifier and controller module have been designed to provide years of trouble-free, high performance operation. We hope you enjoy them.

Your Renkus-Heinz controller module was completely tested and inspected before leaving our factory and should have arrived in perfect condition. Please carefully inspect the module and its shipping carton for any noticeable damage and immediately notify the shipping company if you see any noticeable damage. Only you (the consignee) may institute a claim with the carrier for any damage incurred during shipping. If you have a problem, be sure to save the carton and all packing materials for the carrier's inspection.

**Important**

Renkus-Heinz controller modules contain no user-serviceable parts and all service should be referred to qualified service personnel. We recommend that any module be returned to the factory in its original packing carton if factory service is required.

**Installation Procedure**

**Installation**

The installation procedure is the same for all loudspeaker controller modules.

1. Remove the existing module from the rear of the amplifier by taking out the 4 mounting screws that hold the module in place and gently pulling the module out of the amplifier chassis.

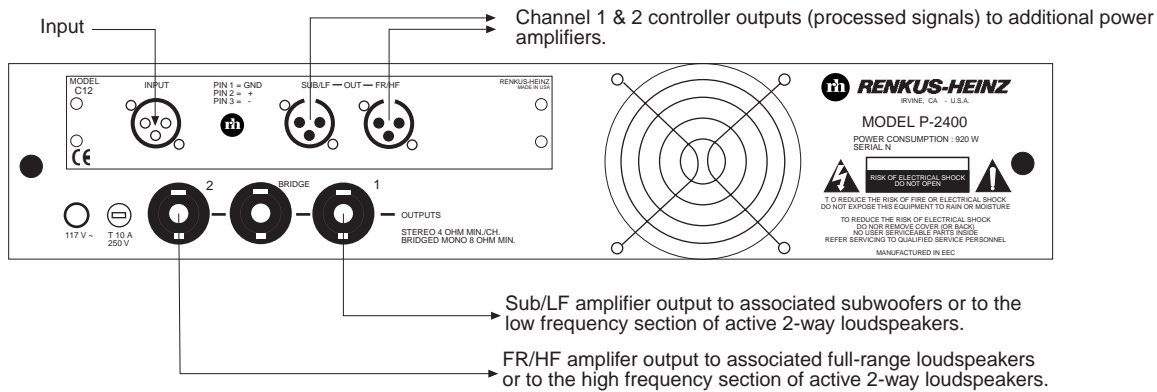
**Caution: Before removing the existing module from the amplifier, make sure the amplifier is disconnected from the main AC line.**

2. Remove (disconnect) the flat wire cable/connector that connects the existing module to the amplifier.
3. Connect the flat wire cable/connector to the new module you are installing. Then gently insert the new module into the amplifier and secure it into place with the 4 mounting screws you originally removed.

Note: The C12 controller module has 2 flat wire cable connectors on the PC board. The one to use is the one having the most pins. It is designated J12 on the PC board.

**Caution: C12 modules are configured for use with a particular loudspeaker and C22 modules are customized for use with particular loudspeakers by the proper setting of several control switches. Make sure the module is set up to operate with your loudspeaker(s) before connecting the loudspeaker(s) and turning on the system.**

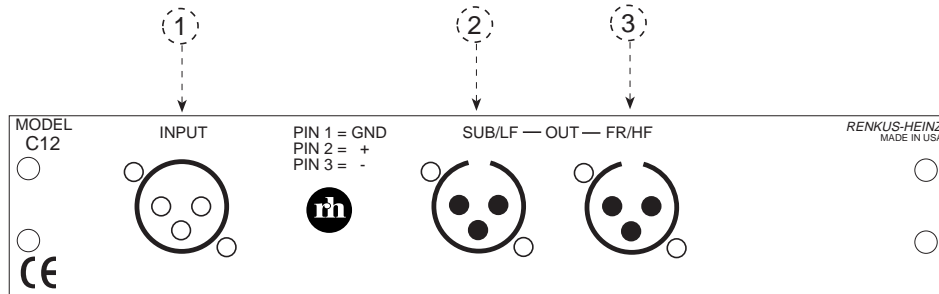
**C12 Controller Module**



The C12 loudspeaker controller module shown above is a single input input, dual output module used in single channel (mono) systems having either active 2-way loudspeakers (or 3-way loudspeakers set up for bi-amp operation) or in systems having full-range (passive) loudspeakers and subs (refer to the block diagrams show below.) It provides crossover circuitry, protection against overload damage, and frequency response smoothing.

The C12 is customized to match its associated loudspeakers with a PK-xxx kit that provides the necessary settings for the crossover, protection, and equalization circuitry. There is no need to adjust the C12 before installing it.

**C12 Controller Module (continued)**



**Input Connections**

**1. Audio Input Connector**

Female 3-pin XLR type input connector. The input is electronically balanced. We recommend the use of pin 2 as "hot" and pin 3 as "neutral". Pin 1 is chassis ground. When the amplifier is connected to a balanced source, the shield may either be lifted or connected at the source end. The choice should be made on the basis of minimum hum.

With an unbalanced source, connect the signal to pin 2 and source ground to pin 3 (connecting the signal to pin 3 is not recommended as this will cause a 180 phase inversion at the amplifier outputs). *Note: Improper operation results when only pin 2 or only pin 3 and pin 1 (ground) are used for an unbalanced input.*

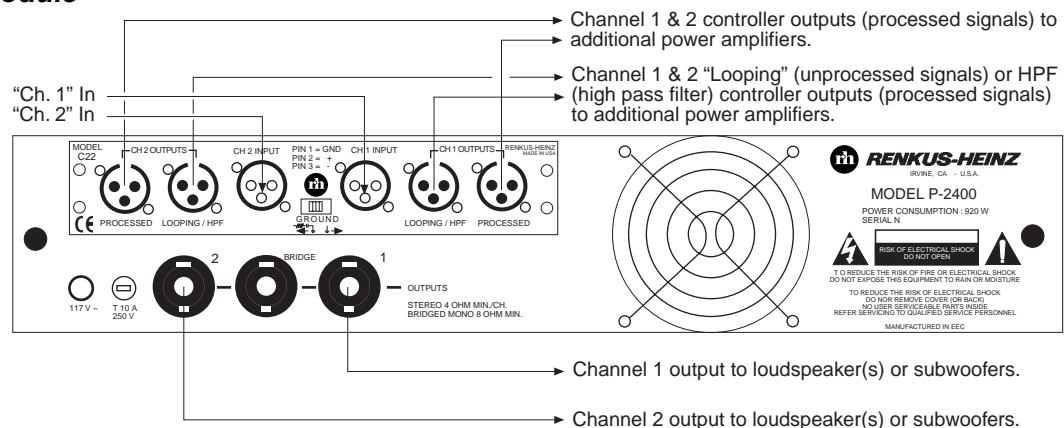
**Output Connections**

**2 & 3. SUB/LF and FR/HF "Output" Connectors**

Male 3-pin XLR type controller output connectors for the SUB/LF and FR/HF channels; used to drive additional amplifiers.

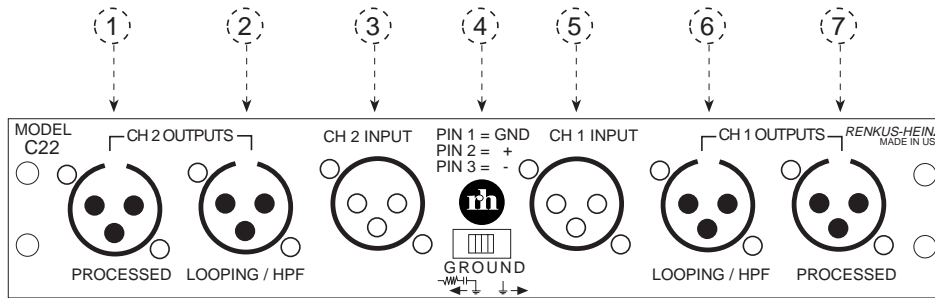
*Note: When the C12's controller outputs are used to drive additional amplifiers, it is imperative that the amplifier's level controls be set at the same or a higher level than the level of the amplifiers being driven. Otherwise, the protection feature is lost for the other amplifiers.*

**C22 Controller Module**



The C22 loudspeaker controller module shown above is a dual input, dual output controller designed for use in stereo systems having either passive loudspeakers or subwoofers. It provides protection against overload damage for the loudspeakers or subs, as well as high & low pass filters and response shaping.

C22 controller modules are customized to match an associated family of loudspeakers (for example, the TRC series) and must be programmed to match a specific loudspeaker by the proper setting of several control switches. Refer to Selector Switches on page 5 for further information.



**1 & 7. Channel 2 & 1 "Processed Output" Connector**

Male 3-pin XLR type controller "processed output" connectors for Channels 2 & 1; provide "looping" controller processed outputs for use in driving additional amplifiers.

**2 & 6. Channel 2 & 1 "FR/HPF Output" Connector**

Male 3-pin XLR type controller output connectors for the FR/HPF channels; used to drive additional amplifiers. An internal selector switch determines whether this connector provides a full-range "looping" output or a processed band-limited "high pass filter" output. Refer to Selector Switches below for further information.

**3 & 5. Channel 2 & 1 Audio Input Connectors**

Female 3-pin XLR type input connector for Channel 2 & 1. Refer to Audio Input Connector under the C12 for additional details.

**4. Ground Lift Switch.**

The Ground Lift switch is used to separate the signal ground circuit from the amplifier ground circuit and thus, eliminate hum induced by ground loops. In the right position, the input signal ground is electrically connected to the amplifier ground circuit (the chassis). In the left position, only an AC connection is provided between the signal ground and the amplifier ground circuit (the chassis).

*Note: When the processed controller outputs are used to drive additional amplifiers, it is imperative that the amplifier's level controls be set at the same or a higher level than the level of the amplifiers being driven. Otherwise, the protection feature is lost for the other amplifiers.*

**4. Selector Switches**

The C22 Loudspeaker Controller Module has several selector switches and a Stereo/Bridging Jumper plug that are accessible when the module is outside the amplifier. The location of these controls is shown in the outline drawing on the next page.

The Looping/HPF switches control the signals to the Looping/HPF output connectors. In the Filtered position, the associated output connector is connected to the output of that channel's high pass filter. In the other position, the connector parallels that channel's input connector and serves as a "looping" output. The HPF setting is used to deliver a band-limited signal to an additional amplifier for "non-overlap" operation (refer to the system wiring diagram on the previous page for further information.)

The Stereo/Bridging Jumper plug is used to "bridge" the two output channels together to provide a single output with twice the power capabilities of a single channel. Note that the Jumper Plug is located under the right PK22-xxx kit, which must be removed (unplugged) to gain access to the Jumper Plug.

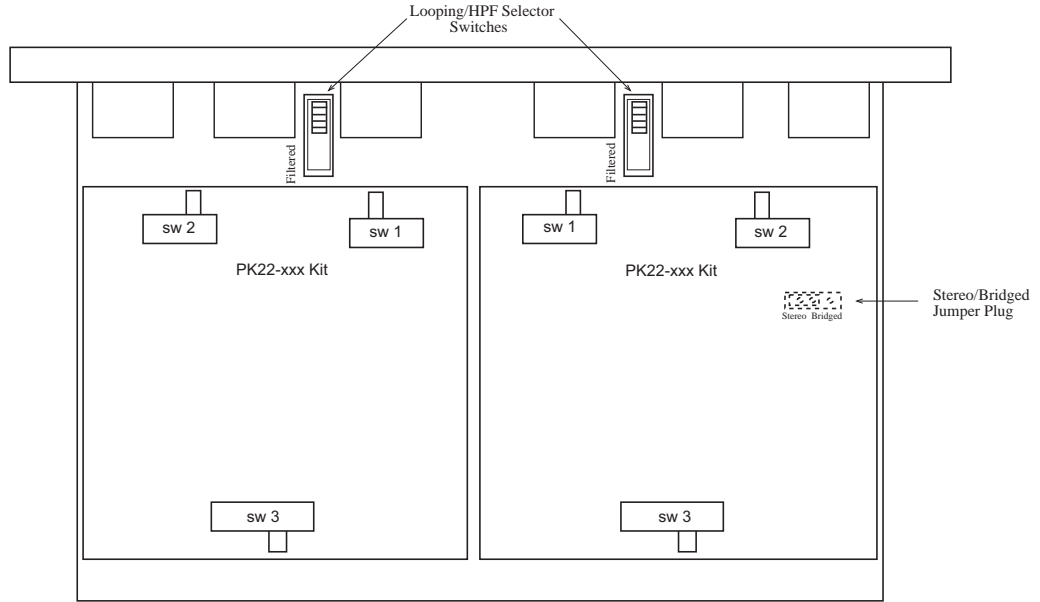
**Output Connections**

**Input Connections**

**Ground Lift Switch**

**Selector Switches**

**C22 Controller Module (continued)**

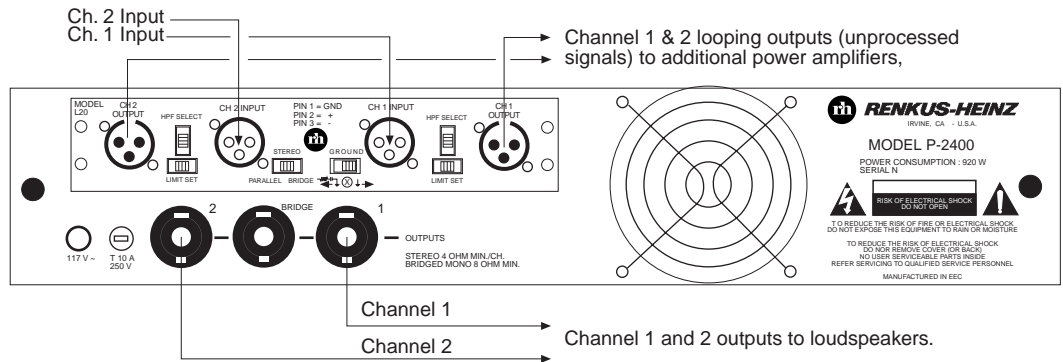


C22 Controller Module Physical Layout

**C22 Setup Switches**

The switches identified as sw 1, sw 2 and sw 3 are used to configure the C22 for specific loudspeakers. The proper settings for these switches are shown in the enclosed charts.

**L20 Limiter Module**



The L20 is a dual-channel limiter module. It is not loudspeaker specific and is provided with user adjustable limit and HPF (high pass filter) controls (refer to drawing on next page). It is used to provide limiting on both amplifier channels (loudspeaker protection) plus low frequency rolloff.

**1 & 6. "Looping" Audio Output Connectors**

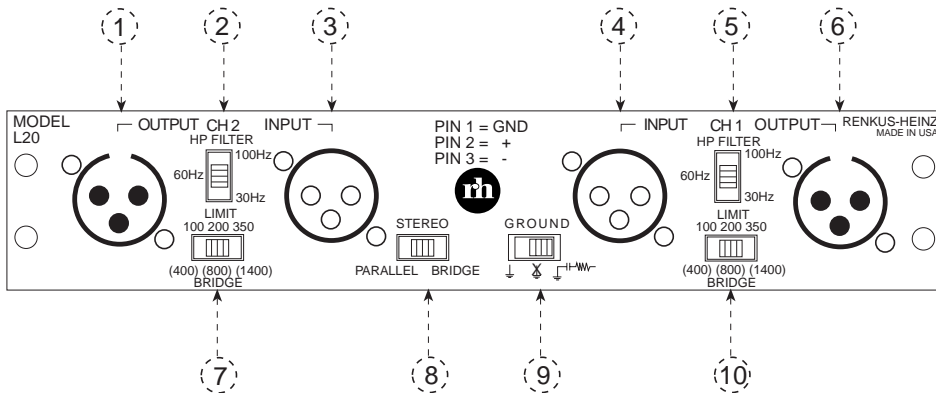
These male 3-pin XLR type connectors are wired in parallel with the input connectors and provide unprocessed "looping" Channels 1 and 2 outputs. They allow "looping" through to additional amplifiers.

**2 & 5. HPF Selector Switches**

Three position switches allow the Channel 1 and 2 low frequency rolloff points to be set at either 30 Hz, 60 Hz or 100 Hz to protect small loudspeakers from over excursion damage.

**Looping Outputs**

**HPF Selectors**



**3 & 4. Audio Input Connectors**

Female 3-pin XLR type input connectors for Channels 1 and 2. Refer to section 6 on page 9 for wiring details.

**7 & 10. Limit Set Switches**

Three position switches allow the Channel 1 and 2 maximum output levels to be set at either 100, 200 or 350 watts into 8 ohms (400, 800 or 1400 watts in bridge mode).

**8. Stereo - Parallel - Bridge Output Mode Selector**

The Output Mode Selector allows the amplifier to be operated in 3 different output modes.

In the Stereo mode, the two channels operate independently, just as they do in a stereo amplifier: signals fed into the two amplifier inputs are amplified separately and delivered in phase to outputs 1 & 2. The output levels are controlled separately by the front panel mounted attenuators.

In the Parallel mode, input 2 is disabled and the two amplifier channels operate in parallel from a single input signal fed into the Channel 1 input. This eliminates the need to install a jumper cable to operate the amplifier channels in parallel. The outputs are separate and in phase and both input attenuators are active to permit different level settings for each channel.

In the Bridge mode, a single signal fed into the Channel 1 input, drives both output channels in tandem and the output is delivered to the Bridge Output connector. This mode allows the two amplifier outputs to be strapped together ("bridged") to produce a single output with double the power capabilities of a single channel. Input #2 is disabled. Both input attenuators are active and must be set to the same level. Note that in bridge mode both sides of the output should be considered hot and should not be grounded and that the Limit and HPF switches should be set in the same position.

**9. Ground Lift Switch.**

The Ground Lift switch is used to separate the signal ground circuit from the amplifier ground circuit and thus, eliminate hum induced by ground loops.

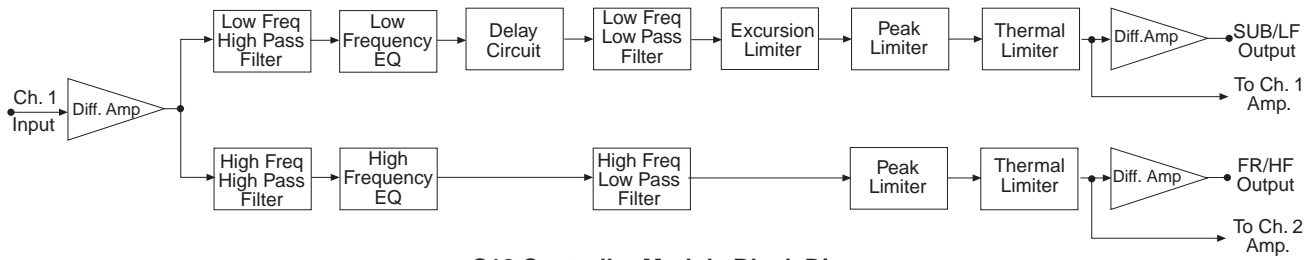
In the left position, the signal ground is electrically connected to the amplifier ground circuit (the chassis). In the center position, the input signal ground is electrically disconnected from the amplifier ground circuit (the chassis). In the right position, an AC only connection is provided between the signal ground and the amplifier ground circuit (the chassis).

***Input  
Connectors***

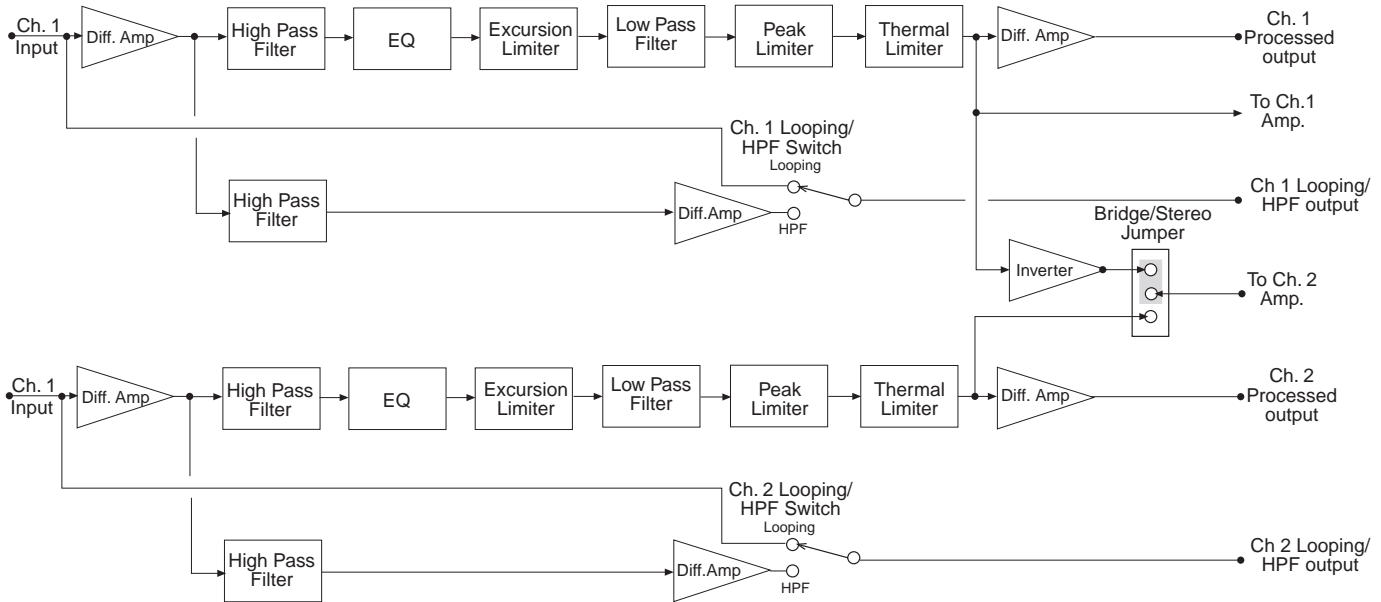
***Limit Set  
Switches***

***Output Mode  
Selector***

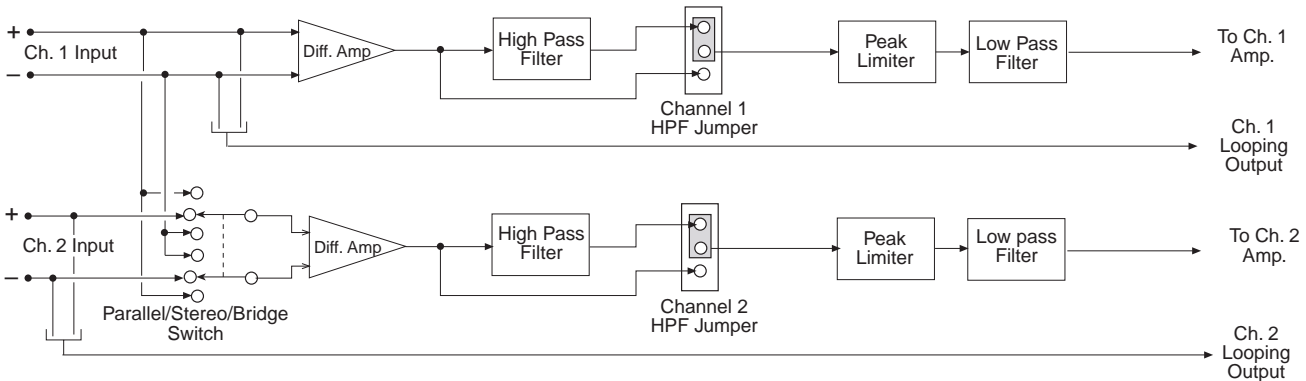
***Ground Lift  
Switch***



C12 Controller Module Block Diagram



C22 Controller Module Block Diagram



L20 Limiter Module Block Diagram