

# INSTALLATION INSTRUCTIONS

## EXP9 NINE ZONE EXPANDER

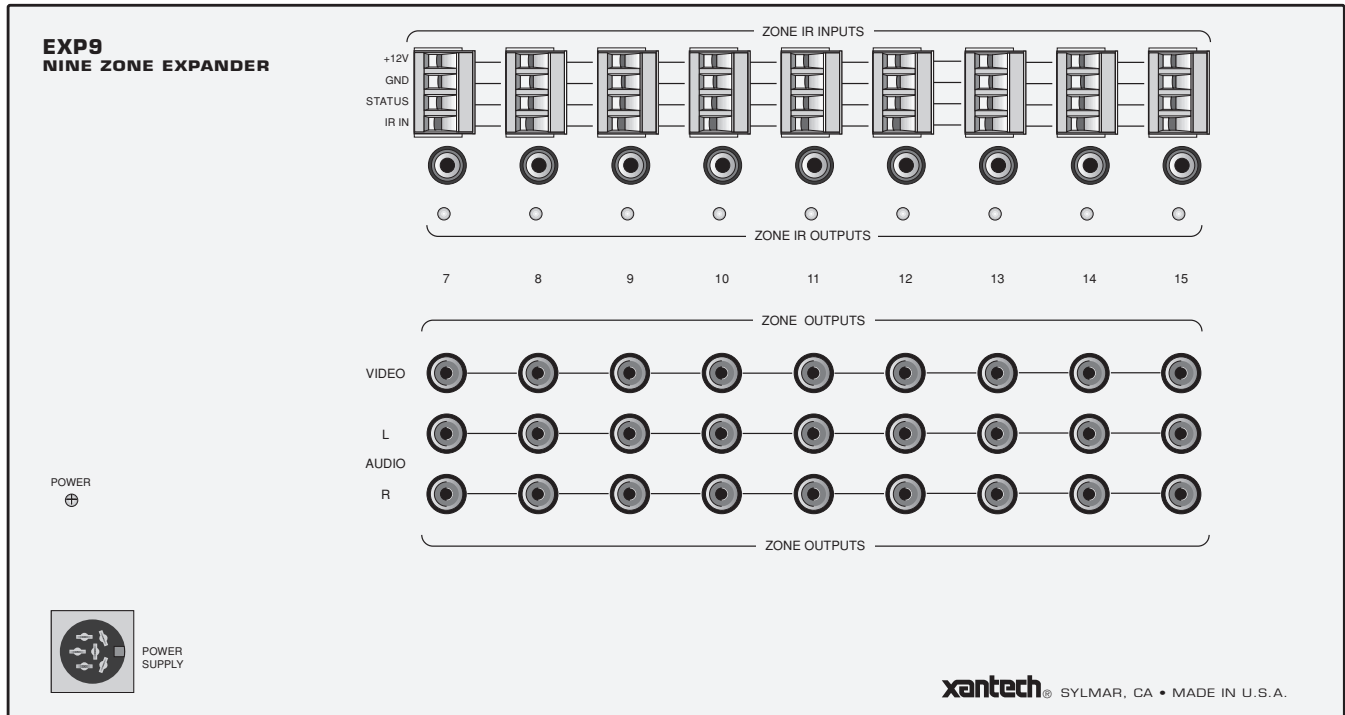


Fig.1 Model EXP9 (shown with all nine zones installed)

### GENERAL

The EXP9 is a Nine Zone Expansion unit designed to work exclusively with the ZPR68-10 Six Zone Eight Source Remote Preamp. When connected to the ZPR68-10, it allows expansion up to a total of 15 zones.

- The features, functions and performance of the zones on the EXP9 are identical in every way to those of the ZPR68-10.
- The EXP9 is available with one to nine "XCARDS" (zone expansion PCB's) pre-loaded and tested at the factory, or, individual XCARDS may be purchased for in-field expansion.
- When received from the factory, unused zone openings are covered from underneath with individual cover plates. These are removed, as needed, when additional zone XCARDS are installed in the field.
- **CAUTION:** The EXP9 cannot operate by itself. It **must** be connected to a ZPR68-10. Also, it **will not** operate with the original ZPR68 (older version).
- The EXP9 connects to the ZPR68-10 via two multiconductor ribbon cables (included). One is a 26-conductor cable, the other 50.
- As with the ZPR68-10, the EXP9 uses a multi-voltage high-current AC power supply (included).
- Control of all zones is also possible via the COM PORT (RS232 data signal compatible) on the connected ZPR68-10.
- As with the ZPR68-10, the EXP9 operates with IR commands from the Xantech RC68 IR Remote/Programmer (available separately). As received from the factory, each zone (as well as the XCARDS) is set to IR Code Group number 68.

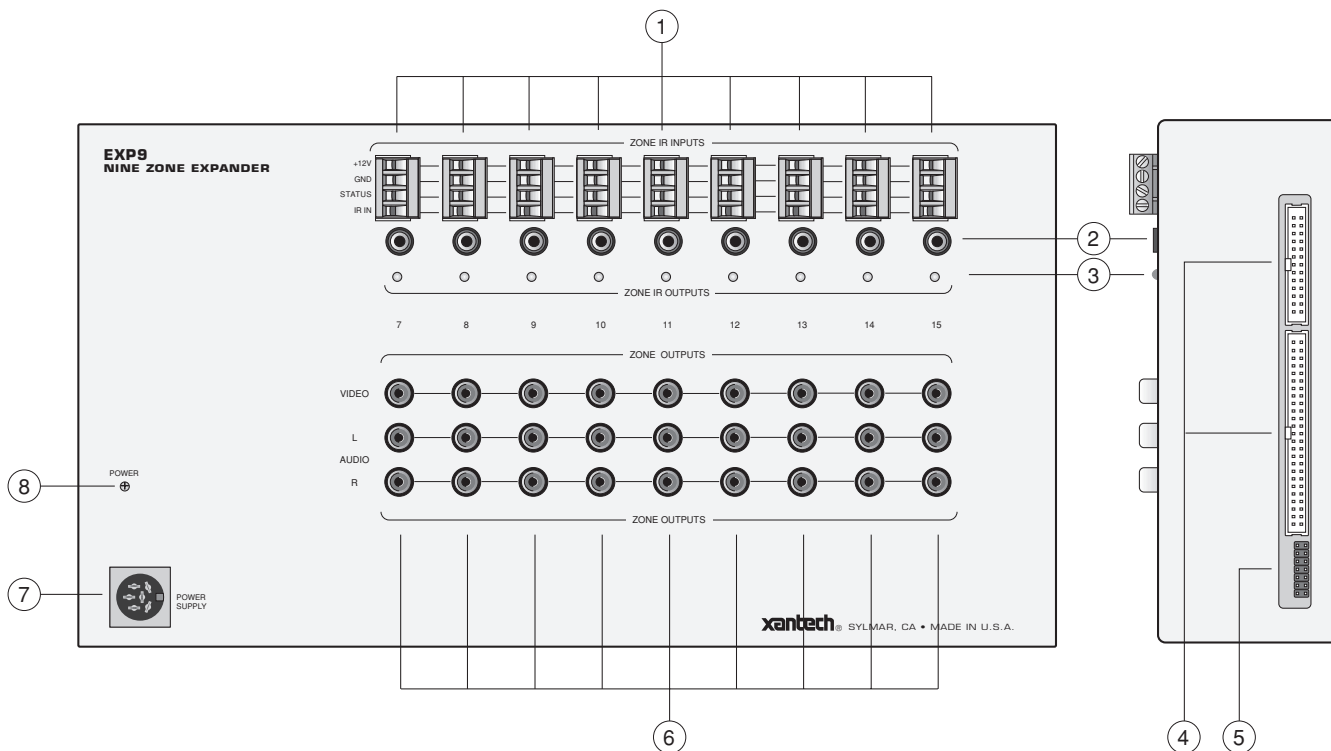


Fig. 2 EXP9 Panel Features and Functions (shown with all nine zones installed)

## EXP9 PANEL DESCRIPTIONS

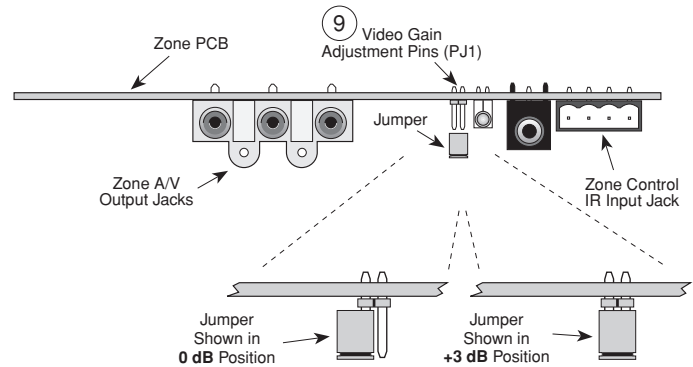
1. **ZONE IR INPUTS.** Each zone of the EXP9 is individually controlled through these ports. As with the ZPR68-10, three of the four screw terminals on each plug-in connector are for connection, via the standard Xantech 3-wire bus, to any Xantech IR receiver, keypad (except Model 598), or controller. The remaining terminal, STATUS, provides a control output of +12 volts that turns on and off with a zone INPUT (ON) and OFF commands to drive status indicators and/or the voltage sensing ports of power amplifiers or AC power strips. The connector markings are defined as follows: **+12 V**, **GND**, **STATUS** and **IR IN**.
2. **ZONE IR OUTPUTS.** These nine 3.5mm mono mini jacks are for the connection of emitters to control components dedicated to any zone.
3. **Zone IR Indicator LED's.** These nine LED's, one for each zone, flash to indicate when a zone is receiving IR commands from an IR receiver, keypad, etc.
4. **I/O PORT.** These multi-pin connector jacks provide an input/output port. This allows the EXP9 to be linked with a ZPR68-10, via two large ribbon cables (included), to provide up to 15 zones of operation. The EXP9 includes 9 slots, allowing zone XCARDs (expansion PCB cards) to be added, one by one in the field, or purchased already installed from the factory, for zones 7 through 15.
5. **STATUS DRIVER PINS.** These pins allow connection to STATUS LED's located in an optional rack mount panel. The LED's are driven from the individual status lines of each zone (9 total for the EXP9), allowing visual indication of zone ON/OFF condition at the front of the rack panel.
6. **ZONE OUTPUTS.** The ZONE OUTPUTS consist of up to nine sets of audio/video RCA type jacks - one set for each zone. The **L** and **R AUDIO** jacks are connected to the appropriate Left & Right input jacks on a main power amplifier for the zone and the **VIDEO** jack to the composite Video input on a zone TV monitor or modulator. Any source connected to the SOURCE INPUTS on a connected ZPR68-10 can be switched to these ZONE OUTPUTS when the zone receives an RC68 INPUT command at the ZONE IR INPUTS.
7. **POWER SUPPLY Connector.** 6-Pin DIN jack permits connection of a high current multi-voltage AC power supply (included with each EXP9).

8. **POWER** Indicator LED. Indicates when power is applied to the EXP9. It stays on continuously even when all zones are turned off (as long as AC power is applied to the plug-in power supply).
9. **Video Gain Adjustment Jumpers** (Internal. Refer to **Fig. 3**). As with the ZPR68-10, the video gain of each zone on the EXP9 can be set to two levels, by the use of an internal jumper. With the jumper on one pin only of PJ1, the video gain is unity (0 dB). When the jumper is inserted onto both pins of PJ1, the video gain is increased by +3 dB.

You should use the +3 dB position only if you notice a reduction in picture contrast and brightness when running long cable lengths (usually in excess of 150 feet).

Since the majority of applications will not require additional gain, all EXP9's are shipped from the factory with the jumper installed on one pin only (0 dB).

To gain access to the jumpers you will need to remove the top cover. Remove the five screws on each end and the screw just under the Video jacks of the Zone Outputs. **Do not** remove the screws that secure the cover plates of unused zone slots. Carefully lift the cover off. When reassembling, be sure to carefully align the holes in the top cover with the jacks and the LEDs on all the PCB's before pressing it down into place and replacing the screws.



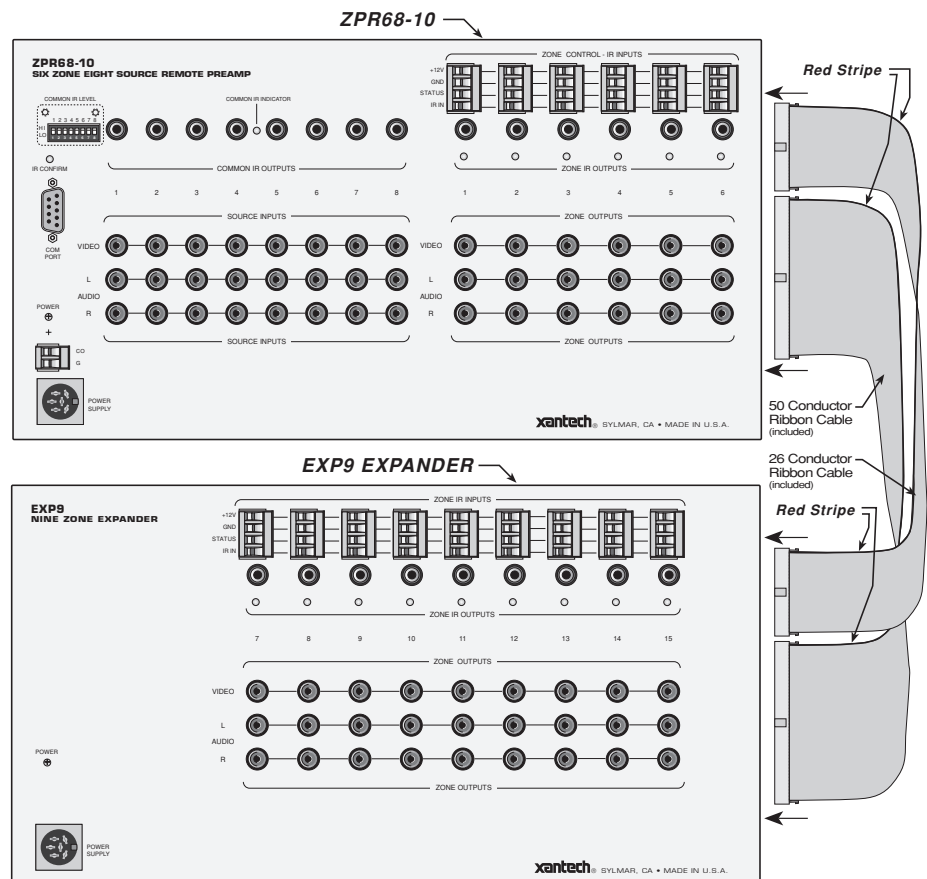
**Fig. 3** Video Gain Adjustment - Jumper Locations

## CONNECTING THE EXP9 TO A ZPR68-10

To make the necessary connections between the EXP9 Expander and a ZPR68-10, refer to **Fig. 4** and proceed as follows:

1. Be sure the power supply for each unit is unplugged when making connections.
2. If you are adding "XCARDs" to an existing EXP9, add them first.
3. Locate the 26 and the 50-conductor ribbon cables supplied with the EXP9.
4. Plug the connectors of each cable into the mating connectors on the ZPR68-10 and the EXP9.

**CAUTION:** The connectors are keyed and will mate in only one orientation. DO NOT FORCE. Be sure the red stripe is to the right when plugging in, as shown in **Fig.4**.



**Fig. 4** Connecting the 26 & 50-Conductor Interface Ribbon Cables

## ADDING XCARDs TO THE EXP9

Normally you would purchase the EXP9 from Xantech with the correct number of zone cards pre-loaded at the factory to match the requirements of the installation. To install additional XCARD(s), however, when a client later requests more zones, proceed as follows:

1. If the EXP9 is connected to a ZPR68-10 with the ribbon cables, unplug them at the EXP9 end.
2. Be sure the EXP9 is **not** powered (unplug the power supply from the EXP9).
3. Remove the top cover by removing the five screws on each end of the EXP9 and the screw just under the Video jacks on each of the existing Zone Outputs. Carefully lift the cover off.
4. Remove the screws that secure the cover plates of the unused zone slots where you desire to install the zone XCARD(s). Discard the unused plates.

**CAUTION:** The zone XCARD(s) can be damaged by electrostatic discharge. It is recommended that you use a grounded antistatic wrist band when you are handling and inserting the XCARD(s).

**WARNING:** Damage caused by electrostatic discharge is not covered under the Xantech warranty!

5. Remove the new XCARD(s) from their packaging and carefully insert them into the desired slots on the main PCB.

Be sure to accurately align the pins on the XCARD(s) to the pin holes on the slot connector. Refer to a previously installed card for orientation and placement.

Exert an even downward pressure until the card(s) are fully seated.

6. Reassemble the top cover onto the unit.

Be sure to carefully align the holes in the top cover with the jacks and the LEDs on all the PCB's before pressing it down into place and replacing the screws.

## INSTALLATION

To install the ZPR68-10/EXP9 combination into the application, use the same INSTALLATION procedures as given in the ZPR68-10 INSTALLATION INSTRUCTIONS manual. You can treat the installation exactly the same, the only difference is that you are now dealing with more zones. The following additional items, however, may apply to your installation:

### Adding an EXP9 to an Existing ZPR68-10 Installation.

In this case, it will be necessary to redo the **Input Level TRIM** adjustments. Proceed as follows:

1. Connect a Xantech IR receiver to one of the zones **on the EXP9**.
2. Be sure all system components are connected and operating and that the provided power supplies are plugged into the ZPR68-10 and the EXP9 and the red POWER LED's are ON.
3. Aim the RC68 at the IR receiver and perform the TRIM adjustments as given in the ZPR68-10 instructions under "SETUP PROCEDURES" and "**Adjusting Input Level TRIM**".

The redone adjustments affect all zones, including those on the ZPR68-10.

### Unplugging the Power Supply to the EXP9

The custom trim and zone adjustments you perform on the EXP9 will default to factory settings if the EXP9 power supply is unplugged before the power supply of the ZPR68-10 is unplugged. To avoid this, when powering the system down, proceed as follows:

1. Unplug the ZPR68-10 power supply **before** unplugging the EXP9 power supply.
2. When powering up, plug the ZPR68-10 in first, then the EXP9.

When the units are powered down and up simultaneously, as when a power failure occurs, loss of trim or zone adjustment settings **will not** occur.

## POWER SUPPLY CONSIDERATIONS

The total current available from the **+12V** and **STATUS** terminals on the EXP9 to power keypads, infrared receivers, switching devices, etc., is **1.8 A**. In addition, each of the zone **STATUS** terminals have a current limit of **90 mA** each max. These currents are enough to power all but the most unusual installations. **However, if you have a system where the total current demand exceeds 1.8 A, then an external power supply(s) must be used to power the extra devices to prevent overheating and shutdown of the EXP9.**

The following list shows the current required by Xantech devices typically used with EXP9's (and ZPR68-10's) in multi-zone systems:

<u>DEVICE</u>	<u>CURRENT DEMAND</u>
<b>IR Receiver Models</b>	
291-10, 480 series, 490/495 series, 780-10	10 mA
291P, 291-455, 780P, 780-455(hi-frequency types)	15 mA
291-80, 780-80 (CFL types)	20 mA
780-80 CFL Status LED	10 mA

Chart continued on next page

<u>DEVICE</u>	<u>CURRENT DEMAND</u>
<b>Keypad Models</b>	
730 Smart Pad	65 mA
Smart Pad <sub>2</sub> (PM1, LM1, WPK series)	85 mA
Smart Pad <sub>2</sub> Status line (PM1, LM1 & WPK series)	5 mA
<b>Models With Control Inputs</b>	
PA640 Six Channel Power Amplifier	11 mA
599 Pulsed Switching Module	11 mA
CC12 and SR21 Relay Modules	1 mA

### Procedure

Add up the current demands for the devices used in the system. If the total current exceeds **1.8 A**, it is then necessary to use a 782-00 power supply to separately power the **V** or **+12V** terminals of the additional devices that cause the over-current condition. See typical connection diagram, **Fig. 5**.

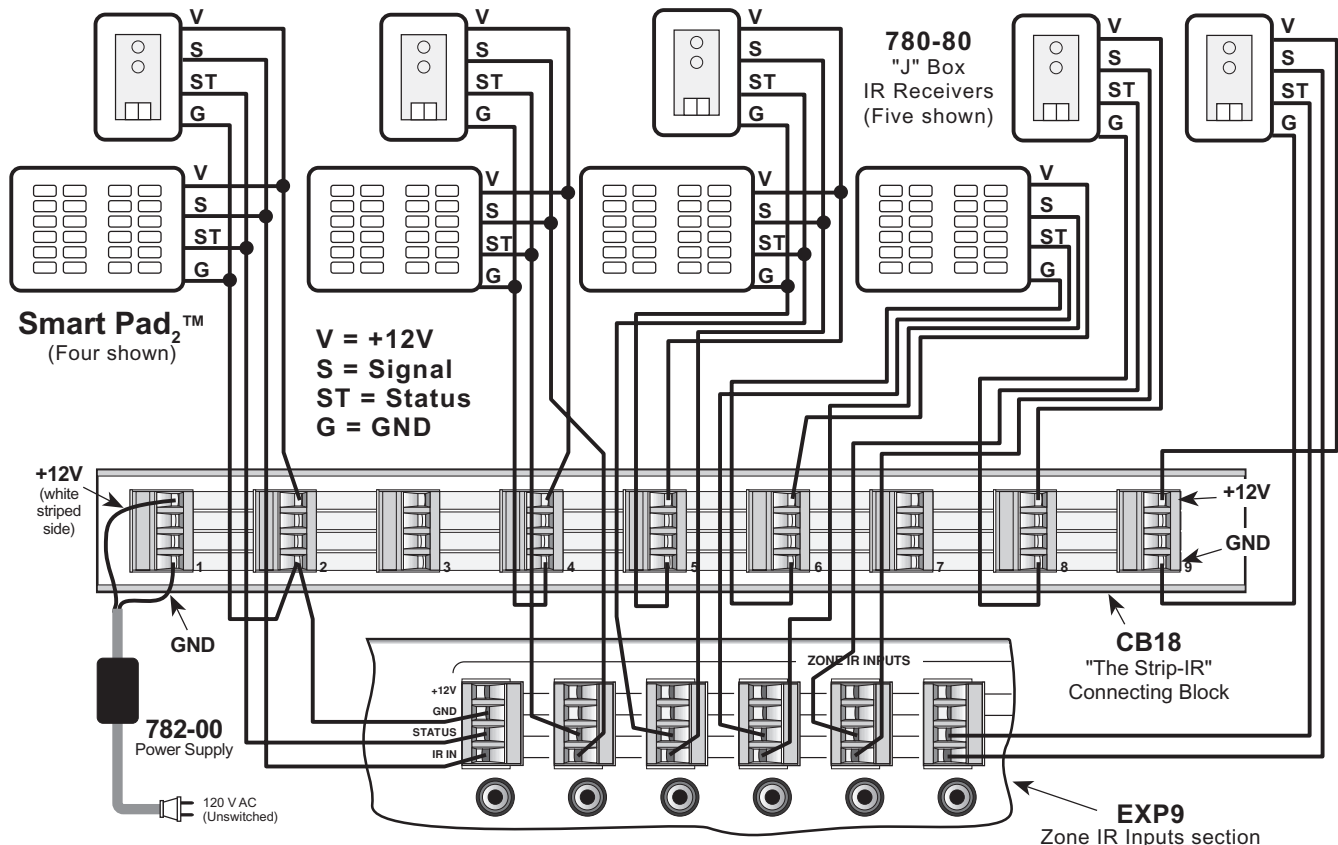
**Note:** The **STATUS** or Control Inputs of the devices must remain connected to the respective zone **STATUS** terminals on the EXP9, where used. Also, if you exceed **90 mA** on any one of the **STATUS** terminals, use a Xantech **CC12** Remote Relay Module to reduce the current demand. Refer to the CC12 Installation Instructions, Fig. 6, for details.

#### Example 1

Four Smart Pad<sub>2</sub>'s (with Status) and five 780-80's (with Status), are connected to the zones on the EXP9. Add up the currents:  $(4 \times 90 \text{ mA}) + (5 \times 30 \text{ mA}) = 510 \text{ mA}$  total. This is well within the **1.8 A** (1800 mA) limit. Therefore, no external power supply is needed.

#### Example 2

24 Smart Pad<sub>2</sub>'s (2 in some zones, 3 in others, with Status) and eighteen 780-80's (2 per zone, with Status), are connected to the zones on the EXP9. Add up the currents:  $(24 \times 90 \text{ mA}) + (18 \times 30 \text{ mA}) = 2700 \text{ mA}$  total current. This exceeds the **1.8 A** limit by 900 mA. Therefore, a 782-00 external power supply is needed to power the extra Smart Pad<sub>2</sub>'s and IR receivers that cause the **1.8 A** limit to be exceeded. In this case, you could power eleven Smart Pad<sub>2</sub>'s externally ( $11 \times 85 \text{ mA} = 935 \text{ mA}$ ) to ease the load sufficiently.



**Fig. 5** Using a CB18 to provide a +12V DC rail to externally power extra keypads and IR receivers to prevent overload of the internal power supply of the EXP9.

[Remember, the Status lines (5 mA ea.) of these 11 Smart Pad<sub>2</sub>'s remain connected to the STATUS terminals on the EXP9 zones].

**Fig. 5** illustrates how a CB18 "Strip-IR" Parallel Connecting Block can be used to provide a separate +12V DC rail. This powers the additional keypads (and IR receivers, if needed) independent of the +12V of the EXP9.

**NOTE:** The 782-00 Power Supply has a capacity of 1000 mA. If you have a system that is so extensive that the total current exceeds the **1.8 A** limit of the EXP9 by more than 1000 mA, use two 782-00's connected so that **two separate +12V DC rails** are created. Connect two groups of the extra devices so that the total excess load is shared equally between the two 782-00's.

**CAUTION:** To prevent current "hogging" and power supply shutdown, never connect a 782-00 in parallel with the +12V terminal of the EXP9 or in parallel with another 782-00!

**TROUBLESHOOTING**

If you encounter problems with the setup or operation of the EXP9, review each of the following items and take corrective action as described. If problems persist, contact Xantech Technical Support.

1. **I have connected sources, zone amplifiers, IR receivers or keypads and the power supply. The POWER LED comes on but the EXP9 does not respond to any IR commands from the RC68 Handheld Programmer.**
  - a) The most frequent reason for this problem is that the RC68 Handheld Programmer is not set to the correct IR Code Group. It must be set to **68** to work with the EXP9 (unless you have intentionally changed the EXP9 to a different Code Group number).



Refer to the INSTALLER INSTRUCTIONS that come with the RC68 for Code Group Setting Procedures.

- b) IR noise may be entering one or more of the IR receivers in the zones. This would interfere with the proper recognition of the IR codes. Take steps to remove the IR noise or use Xantech IR Receivers with high noise immunity (the CFL types).
- c) Check to be sure the source components, amplifiers and speakers are connected and operating correctly. Connect a source directly to one of the power amplifiers (bypassing the EXP9 completely) to verify operation of these components.

**2. Most of the zones operate correctly, but one or two do not respond to the RC68 commands.**

- a) You may have inadvertently changed the IR Group Code on one or two of the zones during setup procedures, or it was set incorrectly at the factory. Using the Code Group Setting Procedures that come with the RC68, set the Code Group to **68** on the inoperative zone(s).
- b) IR noise may be interfering with a particular zone. To correct, refer to 1. b) above.

**3. Commands (such as Mute, Volume, etc.) sent to one zone will sometimes operate another zone as well (IR signal crosstalk).**

This may occur if you are running the IR bus leads of IR receivers or keypads for more than one zone through a common shielded cable to the EXP9 Zone Control IR-Inputs. Capacitive coupling between the signal conductors in the multiconductor shielded cable may be causing the crosstalk.

- a) To correct this, you will need to run completely separate cables (home runs) for each room.
- b) If it is not possible to run completely separate cables, or the source of the crosstalk cannot be determined, you could change the IR Code Group of one or more of the zones to a different number. The drawback to this solution is that you would need dedicated learning remotes (if used) for the rooms having the different IR Code Groups.

**4. I have two (or more) zone dedicated same-brand CD players (or other source components). However, when I send commands to one of them, it operates the other(s) in the other zone(s) as well. (Zone-to-zone IR crosstalk).**

The IR output from the emitters connected to the Common IR Outputs (attached to the common components, e.g. tape, VCR, tuner, etc.), may be radiating into the IR sensors of the zone dedicated source components, if such components are placed in close proximity to each other. Crosstalk can also occur if there is close proximity between the zone dedicated source components themselves.

- a) Troubleshoot by unplugging the emitters one at a time. If you are using 282 emitters, be sure to use the opaque shells and window masks that come packaged with them. This should stop stray IR signals from bleeding over into the zones that have dedicated source components.
- b) Use 283 emitters instead of the 282's. These have less output than the 282's and have been found to be more effective even though opaque shells and window masks are not used with them.

**5. The volume UP/DOWN commands must be repeatedly pressed to effect large changes in volume level (will not ramp continuously).**

- a) IR noise may be entering one or more of the IR receivers in the zones. To correct, refer to 1. b) above.

**6. It seems that Global commands do not always affect all zones.**

You may have allowed more than 5 seconds to elapse between commands after Global was initiated.

- a) Be sure to execute the desired commands within 5 seconds of each other after the GLOBAL button is pressed.
- b) A good rule of thumb is to press GLOBAL each time just before executing global commands rather than trying to guess whether 5 seconds has elapsed or not.

Note: See additional items under "INSTALLATION".

# BLOCK DIAGRAM

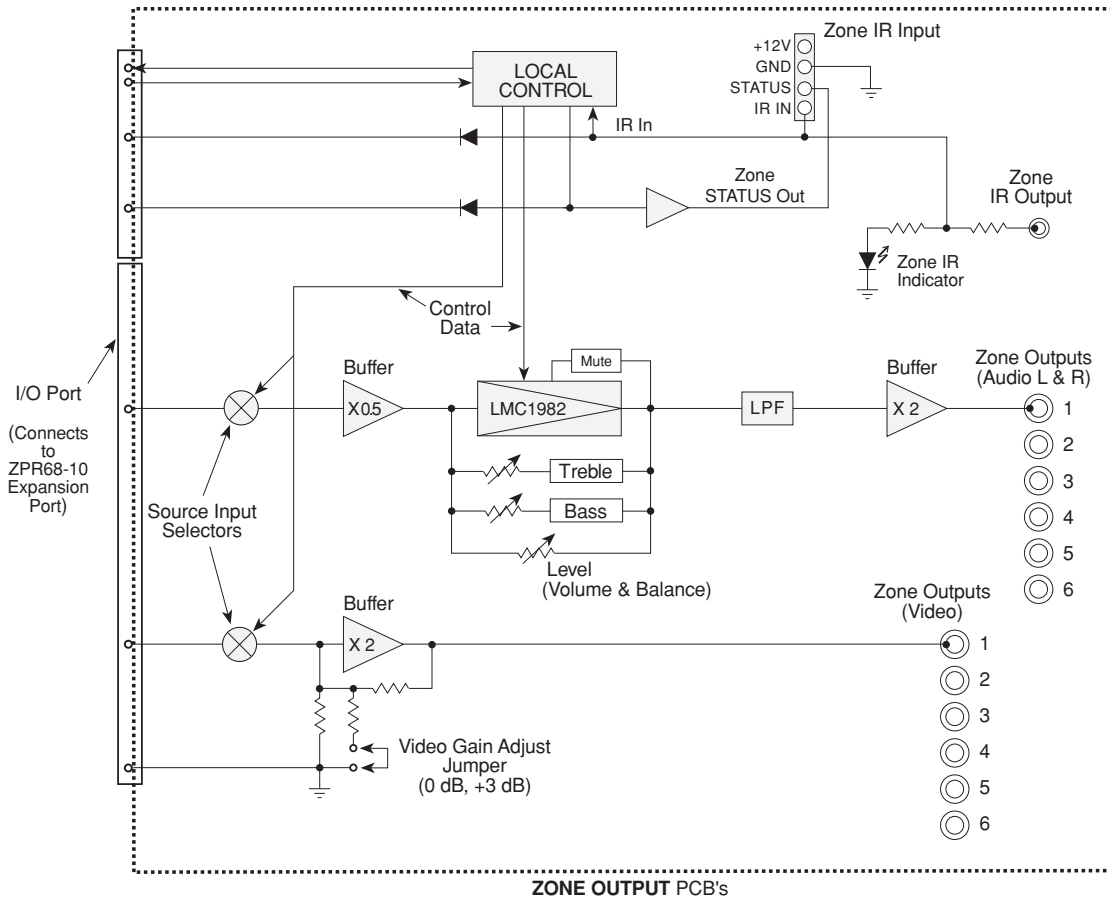


Fig 6.

## SPECIFICATIONS (With the EXP9 connected to a ZPR68-10)

### AUDIO (ea. channel)

Gain (@ max VC): .....	Unity
Input Overload: .....	> 4 V RMS (@ max VC)
Input Impedance: .....	> 40 k Ohms
Output Impedance: .....	470 Ohms
Signal to Noise: .....	96 dB (re 2V out)
THD: (VC -10 dB) .....	0.01% at 2V input level
Frequency Response ( $\pm 3$ dB): .....	5 Hz to 70 kHz
Bass Control Range (@ 100 Hz): .....	$\pm 12$ dB (in 2 dB steps)
Treble Control Range (@ 10 kHz): .....	$\pm 12$ dB (in 2 dB steps)

### VIDEO

Input/Output Impedance: .....	75 Ohms
Video Insertion Loss: .....	< 1.0 dB (50 Hz to 10 MHz)

### GENERAL

RC68 Code Group Number assigned to the EXP9 (each zone) .....	68
STATUS Output (each zone) .....	12 V @ 10 mA, 9 V @ 90 mA (90 mA is max. current)
Max. Total Current Available From +12V & STATUS Terminals .....	1.8 A
Power Requirements: .....	14V-0-14V AC @ 2.7 A, 8V-0-8V AC @ 0.7 A
(Multi-Voltage Power supply included)	
Gold Plated RCA type phono jacks .....	All A/V inputs/outputs
Dimensions: .....	14" W x 7" H x 2.5" D
Weight: .....	4 lbs, 3 oz.

Note: VC = Volume Control setting