

## **HC Series Control Station Combiners**

118-960 MHz, 4-32 Channels

### **Installation and Operation**

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## Section 1 Product Description

DBS-HC series control station combiners are rack mountable units, equipped with a built-in bypass relay to serve as a backup in case of a power or amplifier failure. Note that in order for the bypass relay to be enabled to operate, the amplifier must first be removed from the control station combiner system after the failure has occurred. See Figure 1–3 for amplifier location. dbSpectra offers a wide selection of control station combiners to provide flexibility for a variety of application requirements (Refer to Table 1–1).

Models offered for frequency bands below 700 MHz can be expanded from a 4 channel stand alone unit (Figure 1–1) to an 8, 12, or 16 channel system with the use of a combining module (\*Refer to Table 1-2). Models designed for 700, 800, and 900 MHz frequency bands can be expanded from either a 6 or 8 channel stand alone unit (Figure 1–2) to a 12, 16, 24, or 32 channel system with the use of a combining module (\*Refer to Table 1-2). Base radios are sequentially numbered for ease of installation. The combining module (HC2xx-xxF) is placed on top of the stacked control station combiners (HC1xx-xxF) to link the combiners in their sequential order (cables included).

Each unit provides an AC and/or a DC power connection. Where both power connections are used, one serves as an added back-up in case the other fails (See Section 2).

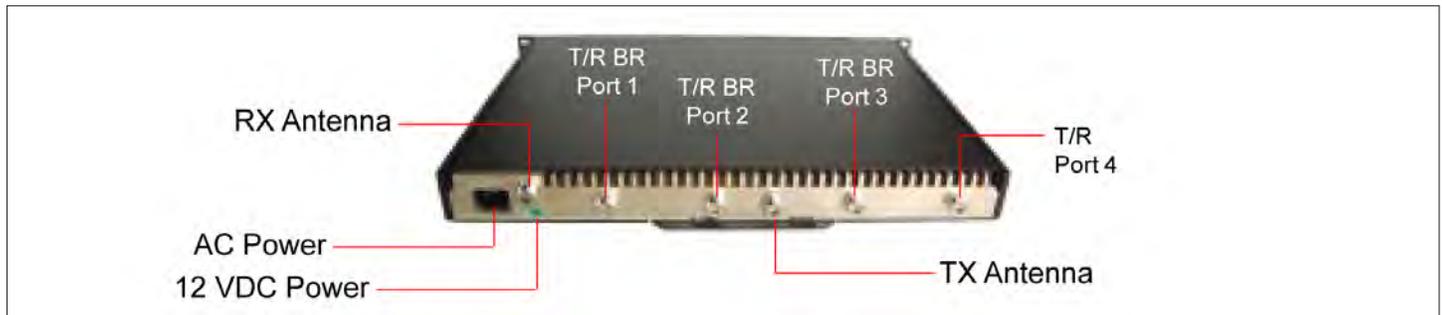


Figure 1-1. Below 700 MHz, 4-Channel Control Station Combiner.

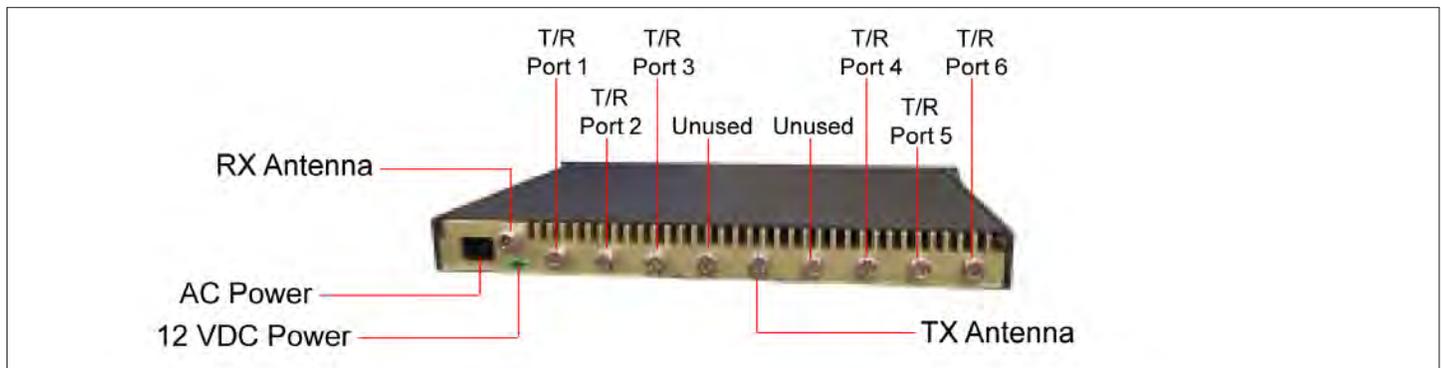


Figure 1-2. 700/800/900 MHz, 6-Channel Control Station Combiner.



Figure 1-3. Control Station Combiner with Amplifier.

\* See Table 1-2 Expansion Combining Module Selection Matrix to select appropriate combining modules.

**Table 1-1 Control Station Combiner Systems**

| <b>Combiner Model No.</b> | <b>Frequency</b> | <b>Combiner Description</b> |
|---------------------------|------------------|-----------------------------|
| HC115Q1-04F               | 150-174MHz,      | 4-CH Hybrid Combiner        |
| HC115Q1-08F               | 150-174MHz       | 8-CH Hybrid Combiner        |
| HC115Q1-12F               | 150-174MHz       | 12-CH Hybrid Combiner       |
| HC115Q1-16F               | 150-174MHz       | 16-CH Hybrid Combiner       |
| HC117M1-04F               | 380-420MHz       | 4-CH Hybrid Combiner        |
| HC117M1-08F               | 380-420MHz       | 8-CH Hybrid Combiner        |
| HC117M1-16F               | 380-420MHz       | 16-CH Hybrid Combiner       |
| HC114S1-04F               | 400-475MHz       | 4-CH Hybrid Combiner        |
| HC114S1-08F               | 400-475MHz       | 8-CH Hybrid Combiner        |
| HC114S1-12F               | 400-475MHz       | 12-CH Hybrid Combiner       |
| HC114S1-16F               | 400-475MHz       | 16-CH Hybrid Combiner       |
| HC116P1-04F               | 450-512MHz       | 4-CH Hybrid Combiner        |
| HC116P1-08F               | 450-512MHz       | 8-CH Hybrid Combiner        |
| HC116P1-12F               | 450-512MHz       | 12-CH Hybrid Combiner       |
| HC116P1-16F               | 450-512MHz       | 16-CH Hybrid Combiner       |
| HC111W1-06F               | 746-806MHz       | 6-CH Hybrid Combiner        |
| HC111W1-08F               | 746-806MHz       | 8-CH Hybrid Combiner        |
| HC111W1-12F               | 746-806MHz       | 12-CH Hybrid Combiner       |
| HC111W1-16F               | 746-806MHz       | 16-CH Hybrid Combiner       |
| HC111W1-24F               | 746-806MHz       | 24-CH Hybrid Combiner       |
| HC111W1-32F               | 746-806MHz       | 32-CH Hybrid Combiner       |
| HC113T1-06F               | 806-869MHz       | 6-CH Hybrid Combiner        |
| HC113T1-08F               | 806-869MHz       | 8-CH Hybrid Combiner        |
| HC113T1-12F               | 806-869MHz       | 12-CH Hybrid Combiner       |
| HC113T1-16F               | 806-869MHz       | 16-CH Hybrid Combiner       |
| HC113T1-24F               | 806-869MHz       | 24-CH Hybrid Combiner       |
| HC113T1-32F               | 806-869MHz       | 32-CH Hybrid Combiner       |
| HC112U1-06F               | 896-960MHz       | 6-CH Hybrid Combiner        |
| HC112U1-08F               | 896-960MHz       | 8-CH Hybrid Combiner        |
| HC112U1-12F               | 896-960MHz       | 12-CH Hybrid Combiner       |
| HC112U1-16F               | 896-960MHz       | 16-CH Hybrid Combiner       |
| HC112U1-24F               | 896-960MHz       | 24-CH Hybrid Combiner       |
| HC112U1-32F               | 896-960MHz       | 32-CH Hybrid Combiner       |
| HC110T1-06F               | 764-869MHz       | 6-CH Hybrid Combiner        |
| HC110T1-08F               | 764-869MHz       | 8-CH Hybrid Combiner        |
| HC110T1-12F               | 764-869MHz       | 12-CH Hybrid Combiner       |
| HC110T1-16F               | 764-869MHz       | 16-CH Hybrid Combiner       |
| HC110T1-24F               | 764-869MHz       | 24-CH Hybrid Combiner       |
| HC110T1-32F               | 764-869MHz       | 32-CH Hybrid Combiner       |
| HC118Q1-04F               | 138-150 MHz      | 4-CH Hybrid Combiner        |
| HC118Q1-08F               | 138-150 MHz      | 8-CH Hybrid Combiner        |
| HC118Q1-12F               | 138-150 MHz      | 12-CH Hybrid Combiner       |
| HC118Q1-16F               | 138-150 MHz      | 16-CH Hybrid Combiner       |
| HC119Q1-04F               | 118-128 MHz      | 4-CH Hybrid Combiner        |
| HC119Q1-08F               | 118-128 MHz      | 8-CH Hybrid Combiner        |
| HC119Q1-12F               | 118-128 MHz      | 12-CH Hybrid Combiner       |
| HC119Q1-16F               | 118-128 MHz      | 16-CH Hybrid Combiner       |

**Table 1-2 Expansion Combining Module Selection Matrix**

| EXPANSION COMBINING MODULES<br>MATRIX SELECTION |                   |                   | HC11900-04F | HC21900-02F | HC21900-04F | HC11800-04F | HC11500-04F | HC21500-02F | HC21500-04F | HC11700-04F | HC21400-02F | HC21400-04F | HC11400-04F | HC11600-04F | HC11100-06F | HC11100-08F | HC21300-02F | HC21300-04F | HC11300-06F | HC11300-08F | HC11000-06F | HC11000-08F | HC11200-06F | HC11200-08F | HC21200-02F | HC21200-04F |  |  |
|---|-------------------|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--|--|
| MODEL SERIES                                    | FREQ. RANGE (MHz) | EXPANSION CHANNEL |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
| HC119   | 118-128           | FROM 4 TO 8       | X           | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 8 TO 12      | X           |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 12 TO 16     | X           |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
| HC118   | 138-150           | FROM 4 TO 8       |             |             |             | X           |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 8 TO 12      |             |             |             | X           |             |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 12 TO 16     |             |             |             | X           |             |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
| HC115   | 150-174           | FROM 4 TO 8       |             |             |             |             | X           | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 8 TO 12      |             |             |             |             | X           |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 12 TO 16     |             |             |             |             | X           |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
| HC117   | 380-420           | FROM 4 TO 8       |             |             |             |             |             |             |             | X           | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 8 TO 12      |             |             |             |             |             |             |             |             | X           |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 12 TO 16     |             |             |             |             |             |             |             |             | X           |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
| HC114   | 400-475           | FROM 4 TO 8       |             |             |             |             |             |             |             |             | X           |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 8 TO 12      |             |             |             |             |             |             |             |             |             | X           | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 12 TO 16     |             |             |             |             |             |             |             |             |             |             | X           | X           |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
| HC116   | 450-512           | FROM 4 TO 8       |             |             |             |             |             |             |             |             | X           |             |             | X           |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 8 TO 12      |             |             |             |             |             |             |             |             |             | X           | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 12 TO 16     |             |             |             |             |             |             |             |             |             | X           | X           |             |             |             |             |             |             |             |             |             |             |             |             |             |  |  |
| HC111   | 746-806           | FROM 6 TO 12      |             |             |             |             |             |             |             |             |             |             |             |             | X           |             | X           |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 8 TO 16      |             |             |             |             |             |             |             |             |             |             |             |             |             | X           | X           |             |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 16 TO 24     |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           | X           |             |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 24 TO 32     |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           | X           |             |             |             |             |             |             |             |             |  |  |
| HC113   | 806-869           | FROM 6 TO 12      |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           |             | X           |             |             |             |             |             |             |             |  |  |
|   |                   | FROM 8 TO 16      |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           |             |             | X           |             |             |             |             |             |             |  |  |
|   |                   | FROM 16 TO 24     |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           |             |             | X           |             |             |             |             |             |  |  |
|   |                   | FROM 24 TO 32     |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           |             |             | X           |             |             |             |             |             |  |  |
| HC110   | 764-869           | FROM 6 TO 12      |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           |             |             |             | X           |             |             |             |             |  |  |
|   |                   | FROM 8 TO 16      |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           |             |             |             |             | X           |             |             |             |  |  |
|   |                   | FROM 16 TO 24     |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           |             |             |             |             | X           |             |             |  |  |
|   |                   | FROM 24 TO 32     |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           |             |             |             |             |             | X           |             |  |  |
| HC112   | 896-960           | FROM 6 TO 12      |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           |             | X           |  |  |
|   |                   | FROM 8 TO 16      |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           | X           |  |  |
|   |                   | FROM 16 TO 24     |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           | X           |  |  |
|   |                   | FROM 24 TO 32     |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | X           | X           |  |  |

## Section 2 Installing Power Connections

A power cord is supplied with the control station combiner for the AC power connection, as well as a DC adapter (terminal block) for the 12 VDC power connection. The 12 VDC power connection requires a small straight edge screwdriver to secure the positive (red wire on the right) and negative/ground (black wire on the left) connections to the terminal block. See Figures 2-1 and 2-2. Power need only be supplied to the top unit (combining module), where a control station system (expanded from a standalone control station combiner) is to be installed. Control station combiners should be placed in their sequential order from top to bottom, with the combining module seated on top of the assembly, before preparing any connections. Where both power connections are used, one serves as a backup in case the other fails.

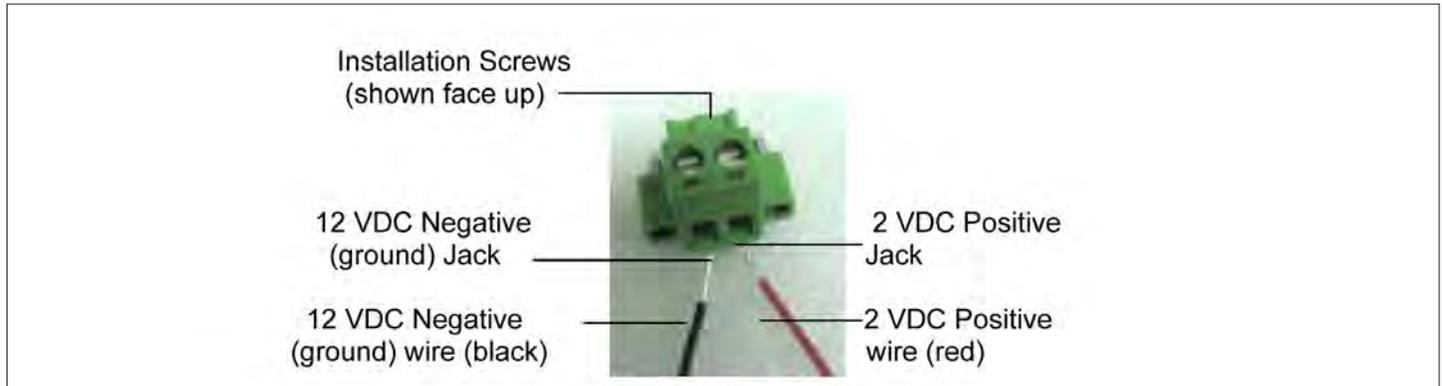


Figure 2-1. 12 VDC Power Connection Adapter (Terminal Block).

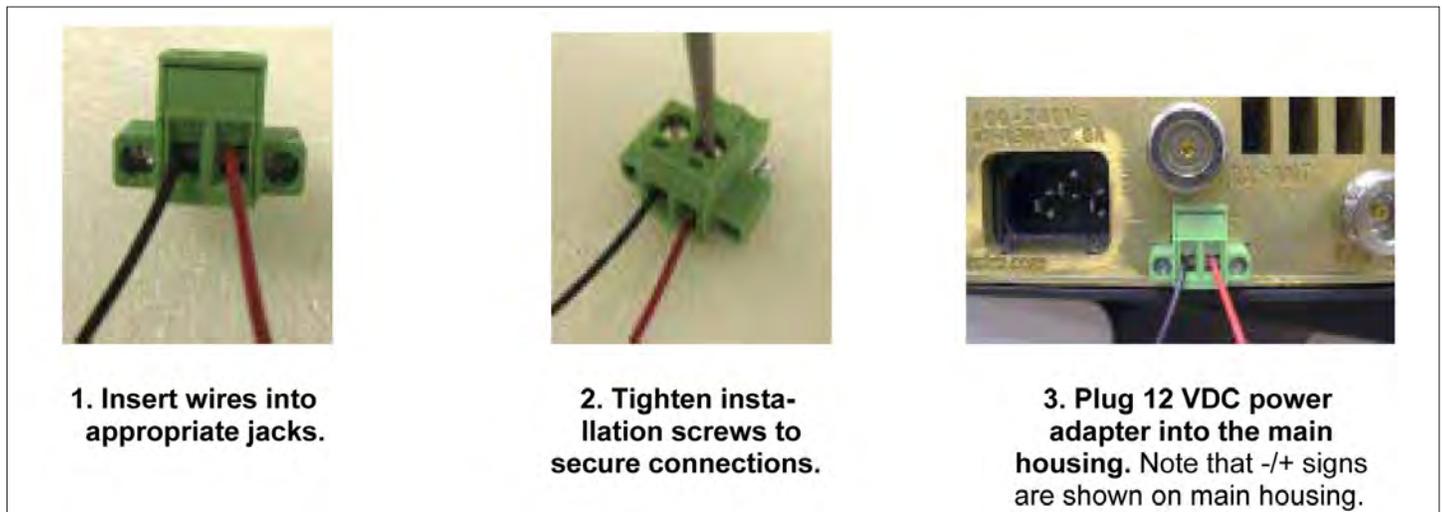


Figure 2-2. 12 VDC Power Connection Installation.

## Section 3 Installing the Amplifier

The amplifier is always placed in the combining module, where a control station combiner system (expanded from a stand alone control station combiner) is to be installed. The DSUB male connector on the amplifier is keyed to mate with the DSUB female connector located on the front of the main housing as shown in Figure 3-1. Both LEDs on the properly installed amplifier will be lit when power is applied to the control station combiner system. Newer systems use two red LEDs. These LEDs are used to indicate that power is available to the amp.

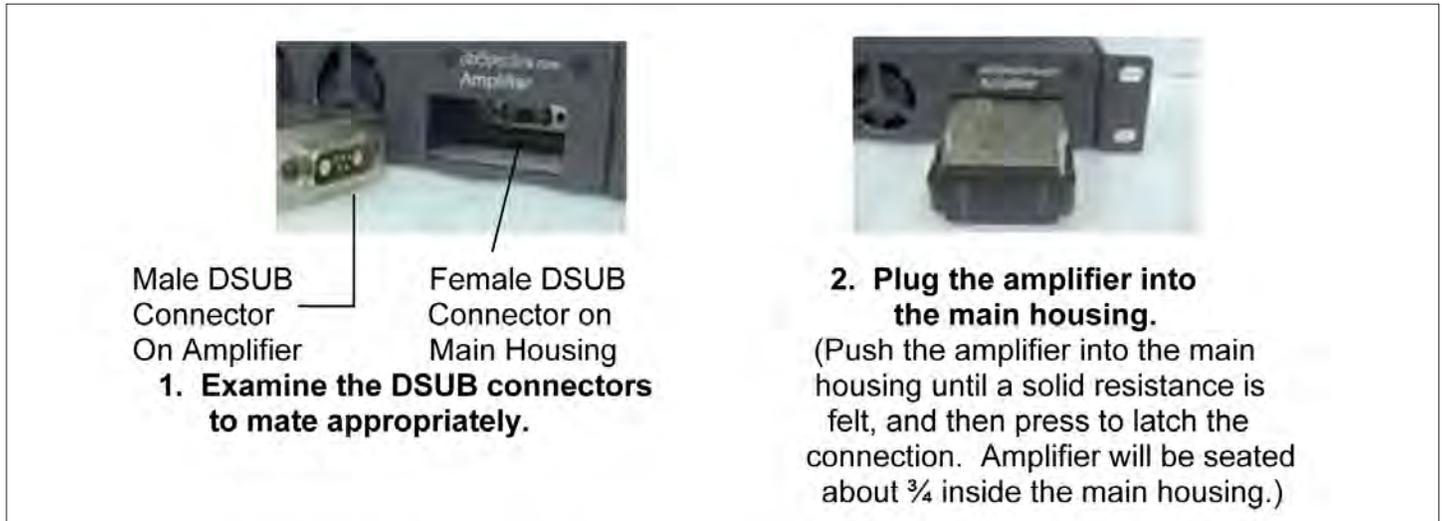


Figure 3-1. Mating the Amplifier Connectors.

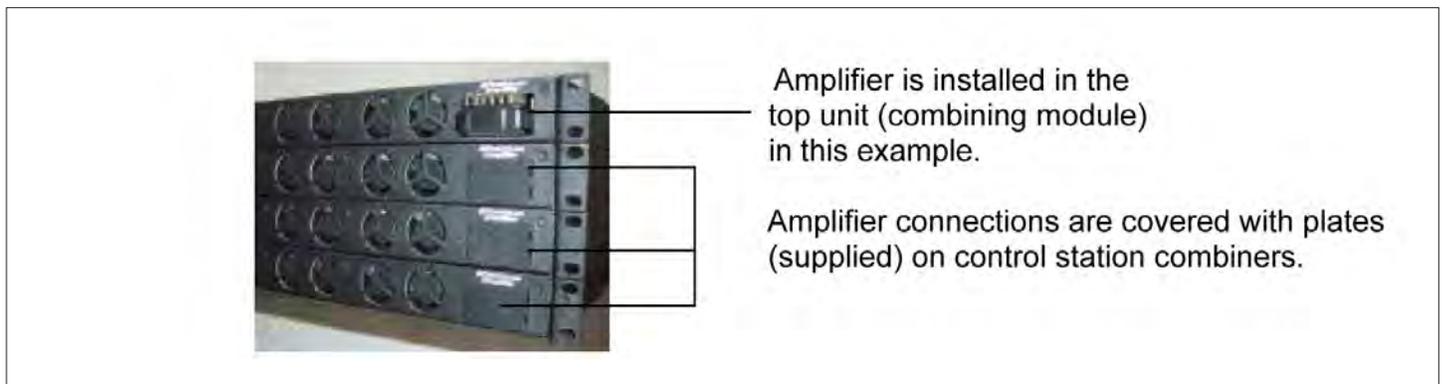


Figure 3-2. Amplifier Installation Complete.

## Section 4 Connecting to the Combining Module

The combining module (HC2xx-xxF) is seated on top of the stacked control station combiners. Place the control station combiners in their sequential order from top to bottom, before placing the combining module on top. (Note that the channels in the control station combiners are sequentially numbered.) Different lengths of cable are provided to enable connections to be made from the combining module to the stacked control station combiners.

Starting with the longest cables (provided) and the control station combiner farthest away from the combining module, connect the TX input ports on the combining module to the TX output ports on the control station combiners. Repeat this process for connecting the RX output ports on the combining module to the RX input ports on the control station combiners. See example shown in Figure 4–1.

When the combining module has been properly connected to the stacked control station combiners, connect the RX antenna cable (not supplied) to the RX antenna port on the combining module (top unit). Also, connect the TX antenna cable (not supplied) to the TX antenna port on the combining module (top unit). See ports identified in Figure 4–1. See Figure 4–2 and 4–3 for additional control station combiner systems.

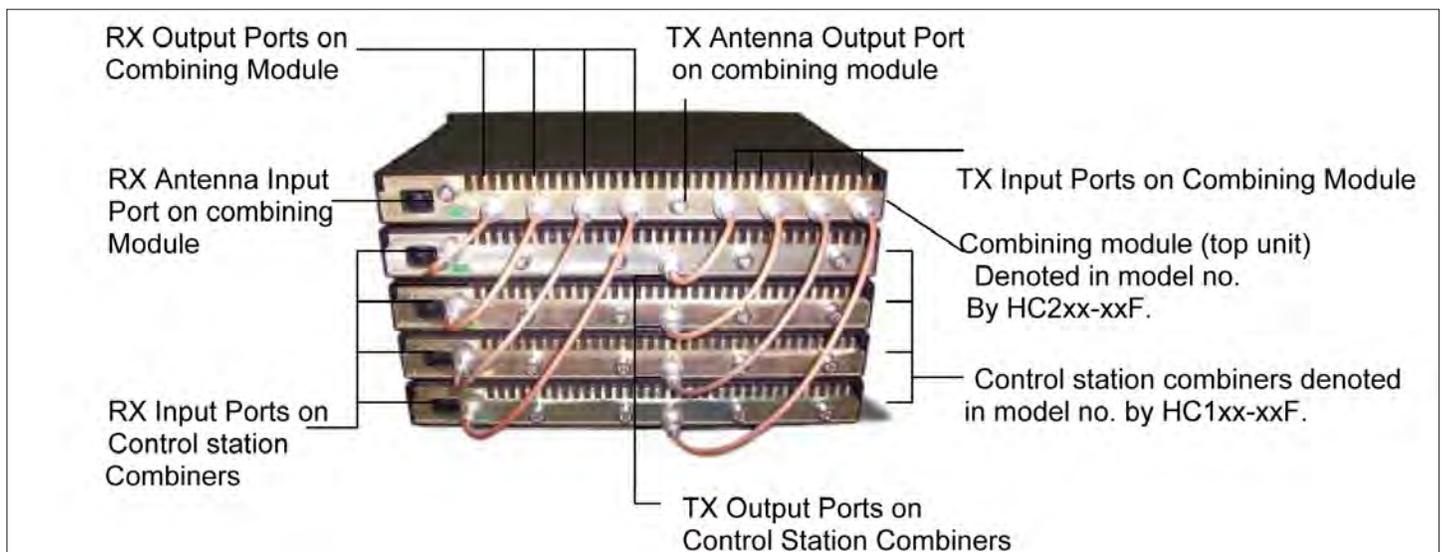


Figure 4-1. Connecting the Combining Module to the Control Station Combiners.

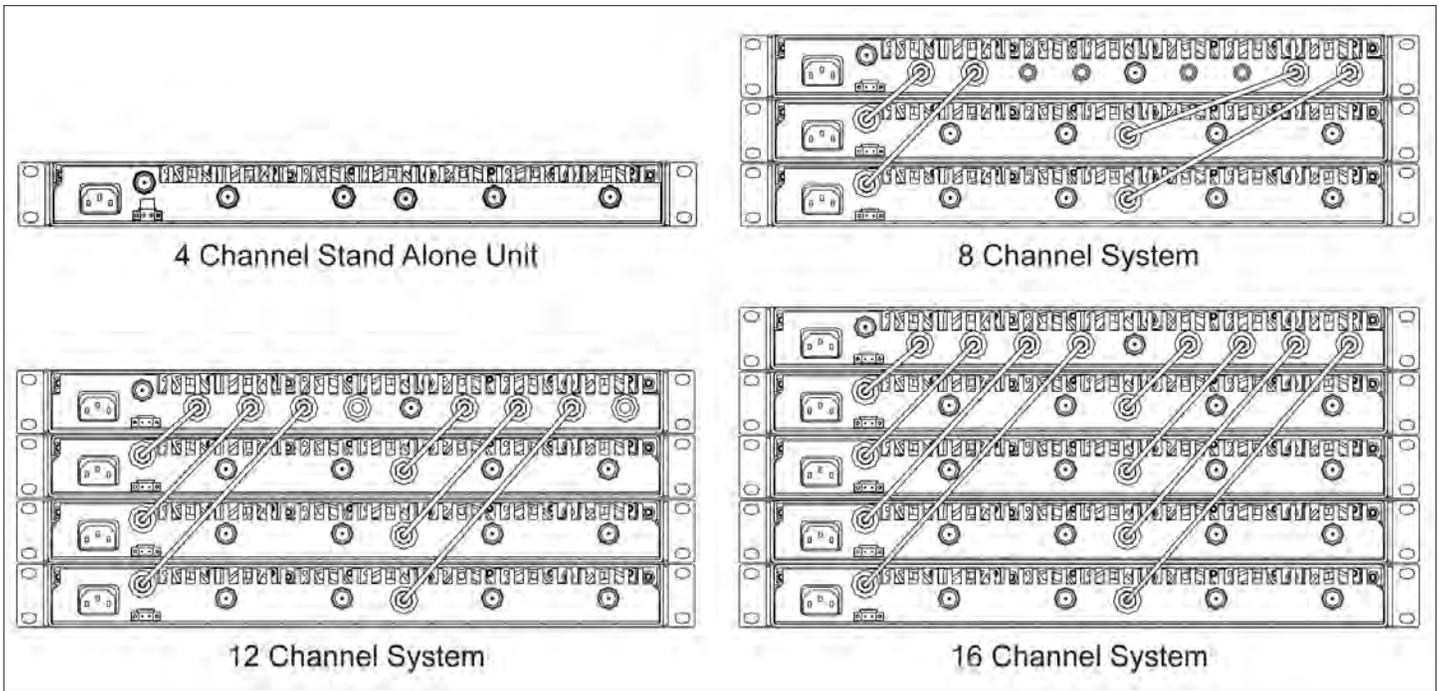


Figure 4-2. Control Station Combiners with 4 Channel Base Units.

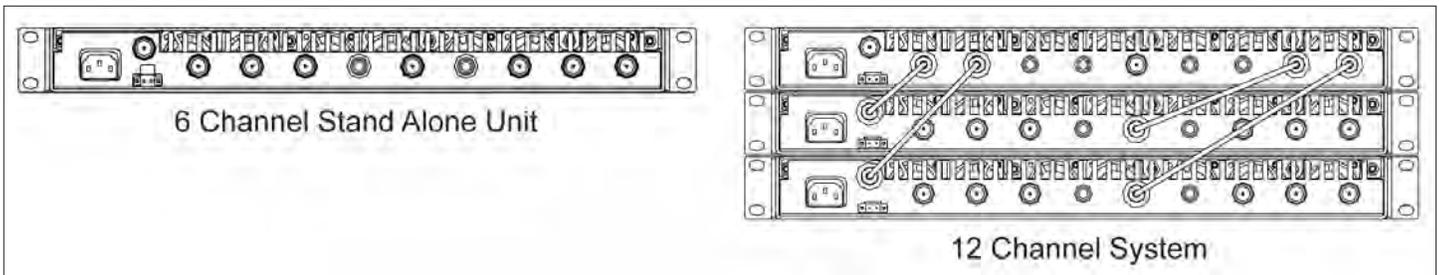


Figure 4-3. Control Station Combiners with 6 Channel Base Units.

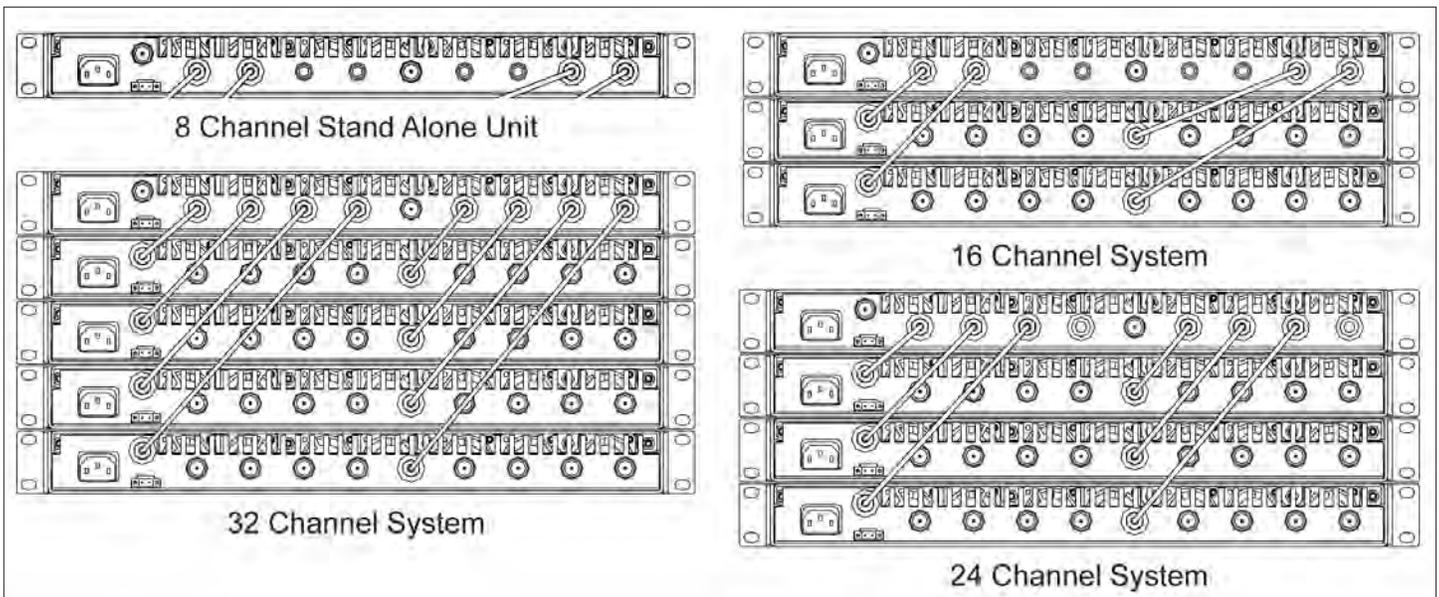


Figure 4-4. Control Station Combiners with 8 Channel Base Units.



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