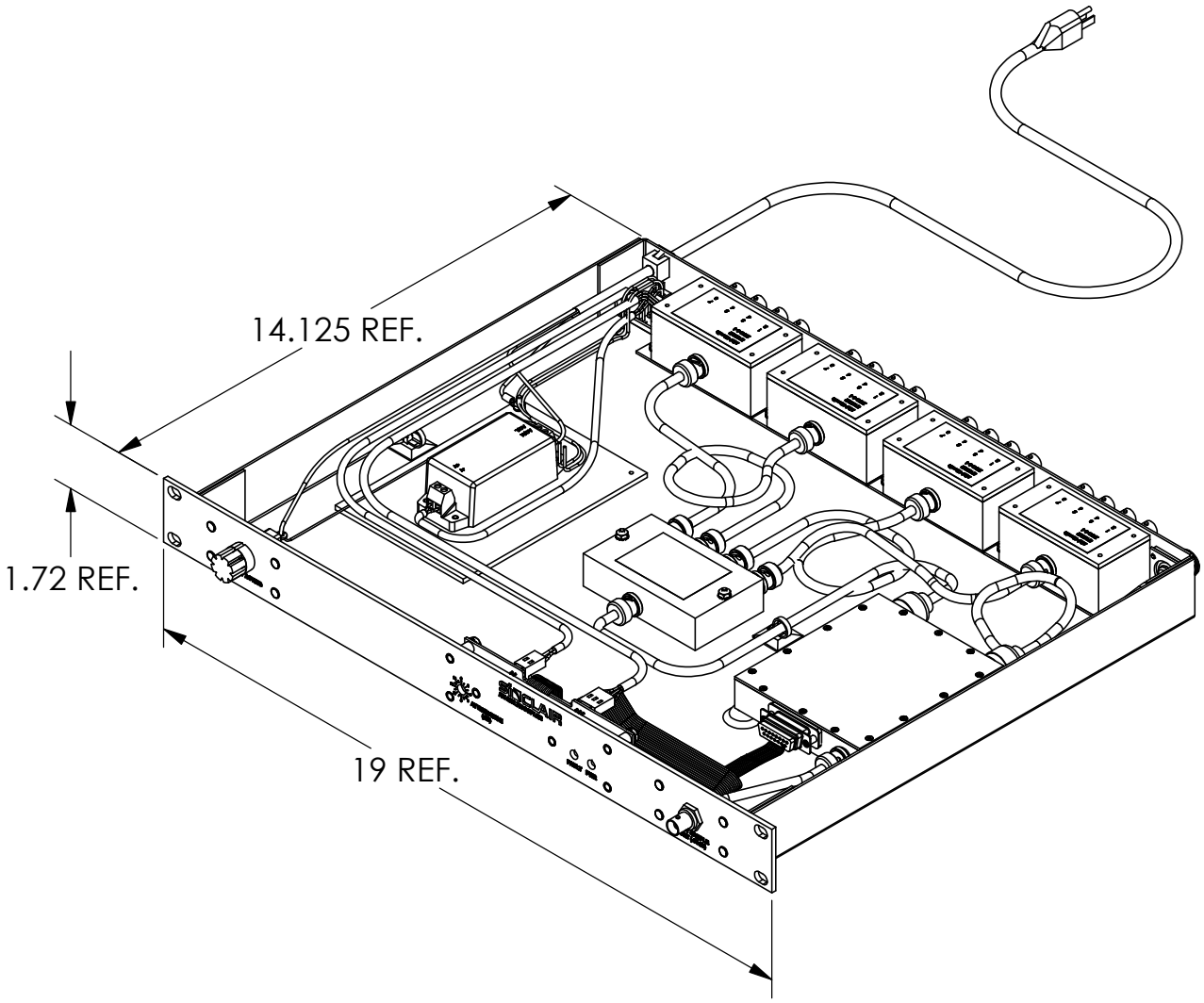
OUTLINE DRAWING
RECEIVER MULTICOUPLER

MODEL No.	PART No.
RM300-008X11B	359556-8
RM300-016X11B	359556-16
RM300-024X11B	359556-24
RM300-032X11B	359556-32



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Sinclair Receiver Multicoupler Models

RM300-0XXX11B

General Description:

Sinclair Receiver Multi-coupler models RM300-0XXX11B is designed to enhance receive system performance in situations where high overall multi-coupler gain and very low distortion is desired to feed many receivers from a single antenna.

The Sinclair RM product occupies 1U high space in a standard 19 inch rack. Up to 32 receivers can be fed from the multi-coupler – all 32 splitter output ports can be accommodated on the single 1U high tray. Key features of the multi-coupler are: front panel accessible variable attenuator for overall gain adjustment, input sampler port and LED and relay indicators for amplifier failure.

Main power is provided to the multi-coupler via 115-230 volts AC. To maintain operation in event that the AC power is interrupted, the Sinclair RM deck will allow feeding from a backup DC power supply (15 – 18 vdc) provided by the customer. The system will sense an AC power failure and automatically switch over to the DC power input to keep the multi-coupler in operation. When the AC power is restored the multi-coupler will switch back to using the AC input.

A typical receive system will take the output from the receive antenna cable and feed the signal through a preselector filter before entering the Sinclair multi-coupler. Sinclair can provide a number of preselector filters depending upon the customer requirements. A preselector filter is not provided with the RM deck, it must be ordered separately from Sinclair.

The number of channels is specified during the time of ordering by substituting the digits 08, 16, 24 or 32 for the XX in the model number below.

RM300-0XXX11B 350-512 MHz

Multi-coupler Layout:

The input port is connected to the amplifier module and a -30 dB +/- 2 dB sample of the input signal is fed to the sample port on the front panel of the unit. After sampling, the input signal passes to the amplifier. The amplifier is a low-noise, high gain and high third-order intercept point design.

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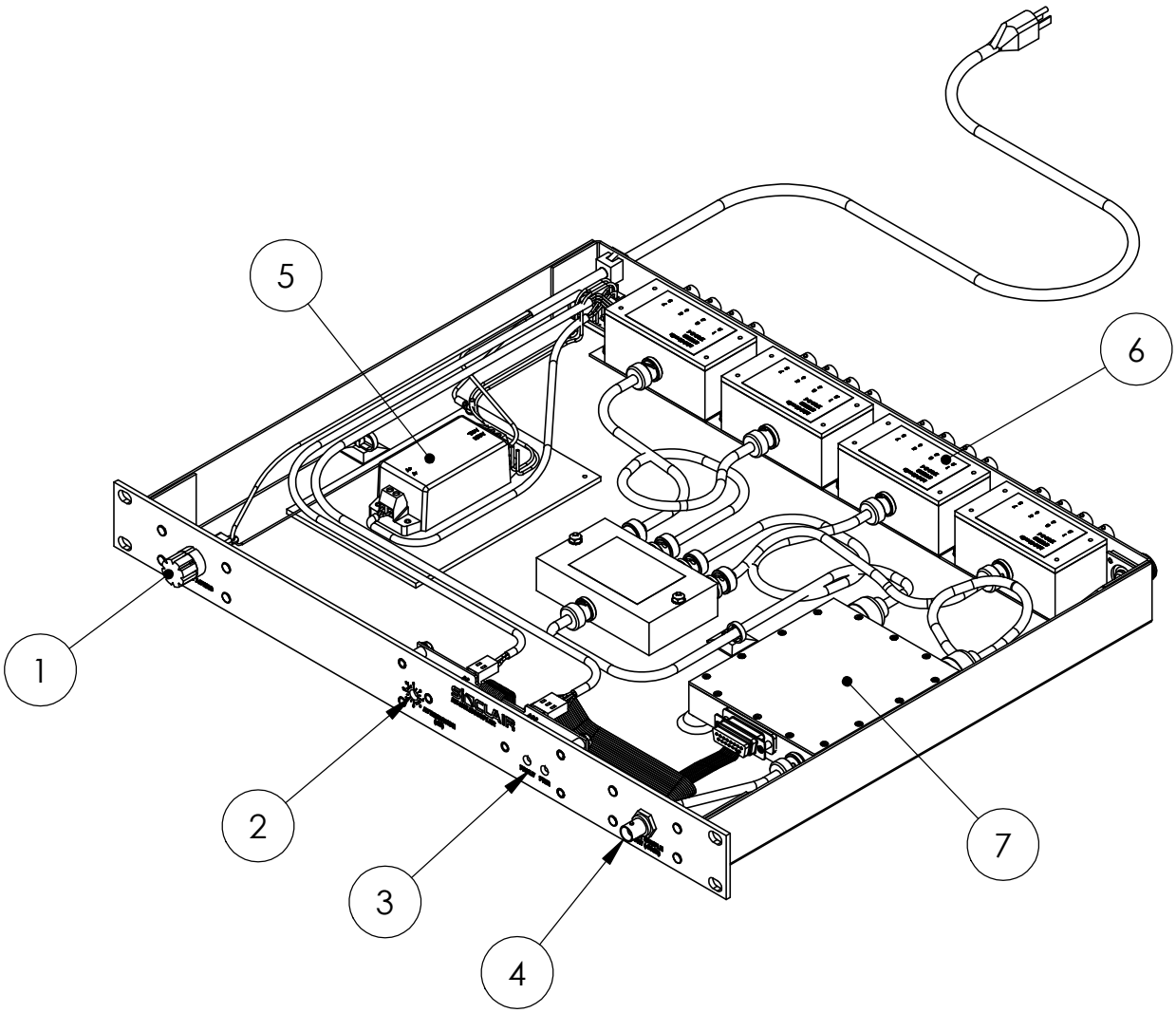
Following amplification, a front panel (digital) controlled attenuator allows downward adjustment of the signal level in 1 dB steps from 0 – 15dB. This signal is then return to the multi-coupler and sent to the input of a 4 way splitter. The output of the four-way splitter can directly feed up to 4, 8-way splitters. The default version of the product includes one 8-way splitter for feeding 8 receivers.

The physical layout of a 32 port version of the multi-coupler is shown in the diagrams below.



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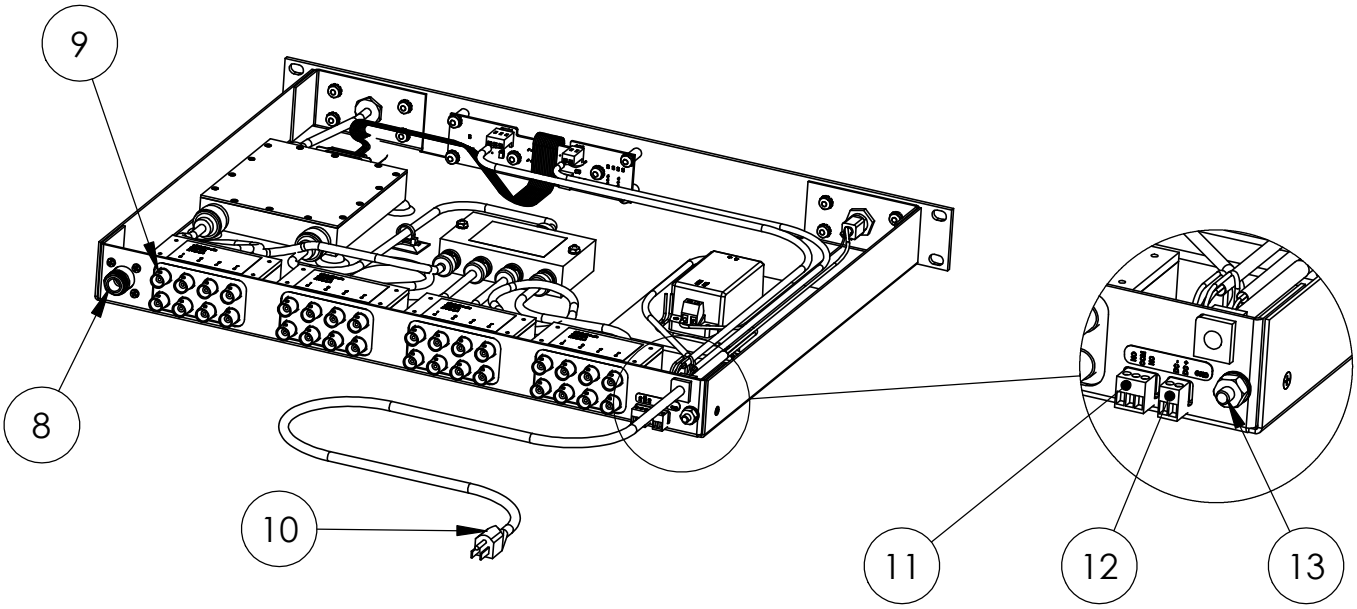

Diagram item descriptions:

1. A protective 1A fast acting fuse is provided on the front panel. The fuse is for protection of the ac main power line.

2. The overall multi-coupler gain is set using the front panel attenuator actuator switch. This is used to change the value of the built-in attenuator that follows the low-noise amplifier. To change the attenuator setting, use a small flat blade screwdriver and reach into the recessed access hole. There is a small arrow molded into the end of the shaft of the switch – line up the arrow direction with the desired value of attenuation. The attenuation value increases while turning the switch in the clockwise direction. After reaching the full value of 15 dB, the switch 'starts over' at 0 dB attenuation and attenuation increases in the clockwise direction.

3. The LED indicators designate the status of the multi-coupler. If the Red LED is in the 'on' state it means that there is main power but the amplifier module has a problem and should be replaced. The Green LED in the 'on' state indicates that the unit has main power (either AC or dc backup) and the amplifier module is functioning correctly in terms of 'normal' current draw. If neither LED indicator is lit, check for a) complete power failure (both ac and dc backup) to the unit, b) internal ac/dc power supply failure or c) a defective 'interface' circuit board.

4. The front panel BNC female connector allows a test signal to be injected into the system. This signal will be attenuated by 30 dB before it is amplified.

5. Replaceable DC Power Supply. This provides conversion from the AC input main power to the required internal DC voltage.

6. The power splitters take the amplifier signal output and divide it into the appropriate number of parts for distribution to the station receivers. Up to four eight-way splitters can be accommodated on the 1U high multi-coupler tray.

7. The RF Amplifier Module contains a high-performance, low-noise amplifier with very high gain and third-order intercept point.

8. The type-N female rf input connector is used to input the low-level antenna signal to the multi-coupler.

9. The multi-coupler output signal(s) is coupled to the station receivers via cables connected to the set of BNC female output connectors. The receiver cables are not provided with the multi-coupler. Best performance is achieved with 50 ohm terminations on the unused ports.

10. The ac power cord is used to connect the main multi-coupler power to the unit. A 115 V, 60 Hz ac power source is the default value of the ac input voltage. The internal power supply can also be connected to 230 V ac if required.

11. A set of 'Form C' relay terminals is provided to connect an external alarm circuit to the multi-coupler. The alarm relay circuit in the 'failed' state indicates amplifier module failure or total power failure.

12. A set of terminals is provided to connect the external dc backup power supply to the multi-coupler. A small flat blade screwdriver is used to actuate the wire clamps in the dc backup terminal strip.

13. Grounding of the multi-coupler chassis is accomplished by connecting a ground wire to the 10-32 ground stud.

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Installation Procedure:

1) Carefully unpack the Sinclair Receiver Multi-coupler unit from the shipping carton.

2) Although the multi-coupler unit was thoroughly tested before leaving the Sinclair factory, perform a cursory inspection of the components mounted inside the tray including the r.f. and dc connectors mounted to the front and back panels of the unit. If anything is loose, *carefully* tighten the associated mounting screws/nuts. (In the event of obvious damage to anything in the multi-coupler, contact both Sinclair Technologies and the transport company to file a damage claim. Many freight carriers require reporting of shipping damaged goods within a few days of receiving the package.)

3) Mount the multi-coupler unit into the desired rack or cabinet using all four mounting holes in front panel.

4) Connect the cable from the receiving antenna to the r.f. input connector on the back of the unit. If a preselector filter is used in line with the receiving antenna, connect the cable from the output of the preselector to the r.f. input of the multi-coupler. It is always recommended that a preselector be used.

5) Connect the dc backup power supply cables to the appropriate terminals on the back panel of the unit. The polarity of the external dc supply terminals is clearly labeled. The dc backup supply voltage must NOT exceed the maximum rated input voltage (18 vdc). It is recommended that a protective fuse (3 amp) be placed in the backup dc supply line that feeds the multi-coupler.

6) If external 'alarm detection' is being used, attach the appropriate alarm circuit wires to the alarm relay terminals on the back of the multi-coupler unit. The unit features both normally open and normally closed relay contacts with a current rating of 0.5 amps dc max. The relay contacts change state in the event of amplifier failure or complete power failure (including the dc backup supply).

7) Connect the radio receivers to the BNC female output ports on the rear of the multi-coupler. Use a quality double-shielded, flexible cable between each receiver input and one of the power divider outputs on the multi-coupler.

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Gain Setup:

The Sinclair model RM300-0XXX811B receiver multi-coupler has a very high gain amplifier for use in situations when very high net multi-coupler gain is desired. The net gain can be adjusted using the variable attenuator feature.

In the standard configuration where the amplifier module drives a 4-way splitter followed by 1 – 4, 8-way splitters, the splitting loss will be about 17 dB. Knowing that the amplifier gain is about 40 dB, the maximum net gain will be approximately 40 – 17 = 23 dB. Using the 0 – 15 dB variable attenuator, the net multi-coupler gain can be set from 23 dB down to 8 dB in 1 dB increments.

Adjustment of the variable attenuator is accomplished via a small recessed, front-panel mounted 16 position rotary switch. The switch is actually a digital encoded device that presents the proper bit sequence to the digital controlled attenuator located in the amplifier module.

The net multi-coupler gain can be verified by the following procedure:

1) Choose an r.f. power measurement device such as a Network Analyzer with which to measure the net gain. Before connecting any equipment to the multi-coupler, find the warning label on the measurement instrument that indicates the maximum allowed input level. Subtract 5 dBm and use this as the maximum allowed input level to the Analyzer/instrument.

2) Compute the maximum safe test input level to the multi-coupler. This can be obtained by taking the previously determined maximum Analyzer/instrument input level from step 1 above and subtracting 23 dB. (23 dB is the maximum possible gain of the Sinclair multi-coupler.) For example, if the signal level determined in step 1 was -15 dBm, then the maximum allowable input level to the multi-coupler is -15dBm - 23dB = - 38dBm. In the case of a Network Analyzer, the output power level must be manually set to a level not exceeding the computed maximum input level. If the instrument won't allow setting the level low enough, then attenuator pad(s) preceding the input to the multi-coupler must be used to assure that the maximum input level to the multi-coupler is not exceeded. Note that in this case, the attenuator is put in place for test purposes only.

3) Connect a small signal source such as the 'r.f. out' port of a Network Analyzer to the input port of the Sinclair multi-coupler. The signal should not exceed the level determined in step 2 above.

4) Using an accurate r.f. power measurement device such as a Network Analyzer, connect one of the multi-coupler output ports to the input port of the Analyzer. Be extremely careful that the amplified signal emanating from the multi-coupler output port does not exceed the maximum allowed input level of the Analyzer (or equivalent). The net gain of the multi-coupler will be displayed on the analyzer/instrument.

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5) If the measured net gain is more than desired, rotate the attenuator switch clockwise to increase the attenuation. In the event that the maximum attenuation setting of 15 dB is not enough for the system, insert external attenuators between the internal 4-way and 8-way splitters or between the multi-coupler output ports and the receiver lines. Thes external attenuators will be left in place for normal system operation. As a word of caution, if external attenuation is permanently placed in line *before* the multi-coupler input, it will degrade the receive system performance by directly adding the attenuation value to the noise figure of the receive system.

Sinclair High Performance Series Receiver Multi-coupler Typical Specifications

Model #	Frequency
RM300-0XXX11B	350 - 512 MHz

Parameter	Value	Notes		
Amp Gain	40 dB	typ.	(not incl. splitter loss)	
Amp OIP3	+43 dBm	typ.		
OIP3 w/ atten.	+14 dBm	typ.	at 15 dB attenuation	
Noise Figure	1 dB	max.		
RF In Monitor	-30 dB	typ.		
Attenuator	0-15 dB	1 dB steps		
In R.L.	15 dB	min.	Type N-f	conn.
Out R.L.	20 dB	typ.	BNC-f	conn.
Out P-P Isolation	20 dB	typ. - any ports	BNC-f	conn.
Relay Output	NC / NO	* Form C terminals: O, G, C – rear panel 0.5 amp contacts		
Power Supply	100-240 VAC +15 - +18 VDC	Rear panel switch: AC / DC Rear panel located terminal block.		
Front Panel		Red LED: "on" = Amp fault Green LED: "on" = Power 'on'		

**Attenuator:* *Rotate clockwise to increase from 0 dB. 16 position rotary switch.*

*** Relay Output:* *O=NO, G=common, C=NC, where normal state = unit 'on' w/ no fault. Fault condition: O-G shorted, G-C open*

Best performance w/ all BNC splitter outputs terminated w/ 50 Ohms.

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