BIRD®
TECHNOLOGIES GROUP

Receiver Multicouplers
Tower Top Amplifiers

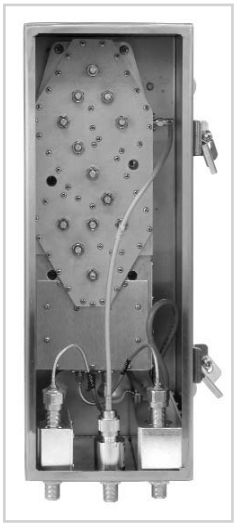
BIRD Electronic Corporation

TX RX Systems

RF Measurement and Management in Your World

Tower Top Amplifier System

429-83H-01-T & 429-83H-01-M

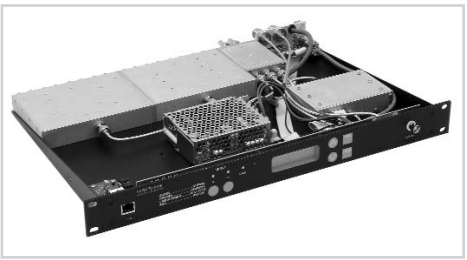


The new compact Tower-Top Amplifier (TTA) system is a high performance, quadrature-coupled low noise amplifier (LNA) designed to increase the performance of a Base Transceiver Station (BTS) while ensuring reliable communications for critical Public Safety applications. This increase in sensitivity can make up for the imbalance between mobile and handheld users in critical systems.

The TTA system consists of two components: the Tower-Top Amplifier mounted close to the antenna and the Receiver Multicoupler base unit. To reduce the size of the TTA and simultaneously provide 120 dB of isolation of a TX carrier, filtering has been split between the TTA and the base unit.

Two independent LNA's, each powered by separate bias circuits, provides component redundancy as well as excellent intermodulation (IM) performance. Microprocessor-controlled fault detection circuitry provides continuous monitoring and switching of each quad-LNA while sending operational data to the base unit for at-a-glance status reporting and form C contact alarm switching.

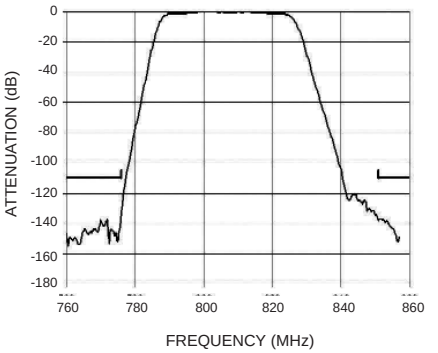
For AISG/EIA-485 data communications between the TTA and base control unit, a custom PolyPhaser™ lightning protector and a CAT-5 cable are installed at the transmission line entry bulkhead/grounding plate. The surge protector not only passes the DC current that powers the TTA but also generates the low frequency subcarrier for AISG/EIA-485. If the data cable is damaged, removed or not installed, the TTA will continue to operate however, the status and alarm functions will not be available at the base. For testing and diagnosing problems on the main receive line, a test transmission line is required. The system will continue to operate if the test line is damaged or not installed however, an alarm will be continuously set.



Features:

- Redundant quadrature LNA's and automatic solid-state back-up switching ensures reliable communications
- PolyPhaser™ impulse suppressors provide protection from lightning damage on all I/O ports
- AISG/EIA-485 compatible for data communications between TTA and Receiver Multicoupler
- RF test port enables gain, sensitivity and desensitization measurements from ground level
- Compact, weather-resistant stainless steel modified NEMA 4X enclosure
- Webpage user interface available for controlling and monitoring of amplifier currents, alarms and attenuators
- One rack-unit high Receiver Multicoupler (MCU)
- Multifunction LCD readout with multicolored LEDs for status reporting
- Form C contacts for fault reporting through a supervisory system
- Ethernet connector for fast ATP mode switching and alarm details

Combined Tower Top and Base Deck Filter Response



A steep skirted TEM bandpass filter in the tower box augmented by a ceramic filter in the base unit provide a selective 32 MHz system window.

System Specifications	
13 dB net gain and maximum 6 dB transmission line loss assumed	
Bandwidth	792-824 MHz
System Noise Figure	2.9 dB Typ, 3.5dB Max
3rd Order IIP	> 15 dBm
TTA Net Gain	Fully settable by electronic attenuator
Rejection	110 dB min, 120 dB nominal at 776 and 851 MHz
Net Weight	30.5 lbs for TTA + MCU
Ship Weight	42 lbs

Product Description	Part Number
TTA, 792-824 MHz, tower top box only	429-83H-01-T
Receiver Multicoupler for TTA, 16-port, 792-824 MHz, to be used in conjunction with 429-83H-01-T, 90-240 VAC	429-83H-01-M
Receiver Multicoupler for TTA, 16-port, 792-824 MHz, 48 VDC	429-83H-01-M-48

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Tower Top Amplifier System

429-83H-01-T & 429-83H-01-M

RF Test Port

Provides a path from the base control unit to an isolated 42 dB port at the input to the LNA. Operated via membrane switches on the front panel, the base control unit provides two test modes:

1. Systems test - connects to 42 dB port on LNA while coupled to the preselector and receive antenna
2. Desense test - LNA is switched to a 50-ohm load. Allows testing for external interference desensitization with minimal disruption to the system.

Test modes automatically time out back to Default mode after 5 minutes unless conducting ATP tests via the Ethernet interface.

Electronic Programmable Attenuators

To optimize performance two attenuators are incorporated into the Receiver Multicoupler Unit and are accessible via membrane switches on the front panel. One attenuator is used to set the TTA System Net Gain. The second attenuator is used to compensate for multicoupler-to-receiver cable loss (zero multi-coupler gain.)

Available Options:

- Rack-mounted narrow band filters to further limit the multi-coupler bandwidth
- -48 Volt DC power operation

Optional Filters

Optional filters are available to provide a narrower window ahead of the receiver multicoupler in order to achieve better selectivity for the system.

Model Numbers	Description
89-83F-02-03	792-806 MHz frequency range, 3 MHz Bandwidth
89-83F-02-06	792-806 MHz frequency range, 6 MHz Bandwidth
89-83F-02-09	792-806 MHz frequency range, 9 MHz Bandwidth
89-83F-02-14	792-806 MHz frequency range, 14 MHz Bandwidth
89-86A-02-03	806-824 MHz frequency range, 3 MHz Bandwidth
89-86A-02-05	806-824 MHz frequency range, 5 MHz Bandwidth
89-86A-02-10	806-824 MHz frequency range, 10 MHz Bandwidth
89-86A-02-15	806-824 MHz frequency range, 15 MHz Bandwidth

* Please specify sub-band frequency when ordering

Tower Top Amplifier Specifications	
ELECTRICAL (All numbers are Typical unless stated otherwise)	
Frequency Range:	792 - 824 MHz
Net Gain:	23 dB
Noise Figure: (Typ. / Max)	2.7 dB / 3.0 dB
Backup Amplifier Switching:	Solid State RF Switch
Integrated Test Port Isolation	42 dB
Preselector Type Loss Rejection	7-pole TEM bandpass with cross-coupling < 0.8 dB > 60 dB @ 776 and 851MHz
LNA Type Gain Noise Figure 3rd Order Input IP:	2-stage Quadrature integrated into filter 26 dB 1.2 dB +18 dBm
Impedance:	50 ohms
Antenna Port VSWR:	2 :1
Power Requirements:	12 VDC @ 1.25 A
Lightning Protection:	Impulse suppressor on all external connectors
Operating Temperature Range:	-30°C to +60°C
MECHANICAL	
Enclosure:	Modified NEMA 4X: Stainless Steel Weather Resistant
Connectors:	N - female
Dimensions (HWD): not including mounting tabs or connectors	18" x 6" x 6" (457 x 152 x 152 mm)
Net Weight:	20 lbs (9.1 kg)

Receiver Multicoupler / Control Unit Specifications	
ELECTRICAL	
Frequency Range:	792-824 MHz
Multicoupler Net Gain:	+1 dB typ; 0 dB min
Distribution Amp Type: Gain: Noise Figure: 1 dB Compression Point: 3rd Order Output IP:	Quadrature-Coupled Dual Stage 23 dB 4 dB +27 dBm +46 dBm
Number of outputs / Split Loss	16 or 32 / 18 dB
Impedence:	50 ohms
VSWR:	< 2:1
Connectors: To TTA: To BTS: Test Port Input:	N - female BNC-female BNC - female
Net Gain Electronic Attenuator:	0-15.5 dB in 0.5 dB steps
Distribution Amp Electronic Attenuator:	0~3 dB in 0.5 dB steps
Alarm and Warning Contacts:	Two Form C Contacts (Nominal 2A @ 30 VDC or 0.5A @ 125 VAC)
I/O	Ethernet
Power Requirements:	90-240 VAC 50/60 Hz 180 mA @ 120 V (current draw is for base deck only, not including the power needed to run the tower top box).
Operating Temperature Range: at non-condensing humidity	0°C to +50°C
MECHANICAL	
Enclosure:	Standard EIA 19" Rack Mounting
Dimensions (HWD):	1 RU x 19" x 14" (38 x 483 x 356 mm)
Net Weight:	10.5 lbs (4.8 kg)

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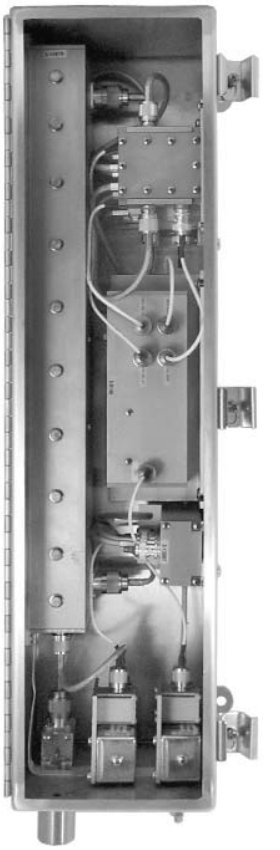
Tower Top Amplifiers

792-901 MHz

- Low noise figure, high intercept point LNA design.
- Typically provides 10 dB receiver sensitivity improvement.
- Wide choice of preselector filtering.
- 700 MHz versions available, consult factory.

421-FFF-10-18-16



Tower Top Amplifier Systems

A Tower-Top Amplifier (TTA) is an important system component in systems above 700 MHz. As the frequency rises, so does the loss of the coaxial cable feedline which connects the receive antenna to the system. A TTA places a high-performance Low-Noise Amplifier (LNA) as close to the receive antenna as practically possible to minimize feedline loss before amplification. This increase in sensitivity, often in excess of 10 dB, can make up for the imbalance between mobile and handheld users in critical systems. TX RX TTA's are designed with an integrated power source/controller, high-performance distribution amplifier and expandable 16-32 channel multi-coupler, all in a 1-rack unit package. TX RX also manufactures various preselectors that are used with the TTA systems to protect your receivers from transmitter overload.

421 - Series Model Number Matrix

421	-86A	806-824 MHz	-09	without Test Port	-18	806-824 MHz	-12N	12-output with N-connectors
	-94C	896-901 MHz	-10	with Test Port	-5	896-901 MHz	-16	16-output with BNC-connectors

TTA Specifications

Noise Figure	3 dB typical, 4 dB max.
Net Gai	13 dB
3rd Order Input Intercept Point	+18 dBm min.
3rd Order Output Intercept Pt.	+35 dBm typ.
Bypass Insertion Loss	3 dB
Test Port Isolation	30 dB
Return Loss	12 dB
Operating Temperature	-30 to +60 C
Lightning Protection	Impulse suppression all ports
Connectors	N
Enclosure	NEMA 4X (Stainless Steel)
Dimensions	24"H x 6"W x 6"D
Net Weight	30 lbs.

Multicoupler/Controller Specifications

Noise Figure		3 dB
Distribution Amp 3rd order OIP		+44 dBm min.
Net Gain		2 dB typ.
Return Loss		14 dB
Operating Temperature		-10 to +50 C
Power Requirements		85-264 VAC, 0.5A, 47-63 Hz.
RF Connections to TTA		N
RF Test Port Input	-10	BNC
Mounting		Standard 19" EIA Rack
Dimensions	-9	1.75"H x 19"W x 14"D
	-10	3.5"H x 19"W x 14"D
Net Weight		15 lbs.

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Receiver Multicouplers
118-901 MHz

- Space-saving 19", 1 RU rack-mount design.
- TX RX-designed and manufactured high-performance LNA.
- Auto-Ranging AC and DC power:
  - 85 - 264 VAC 50/60 Hz
  - 22 - 30 VDC

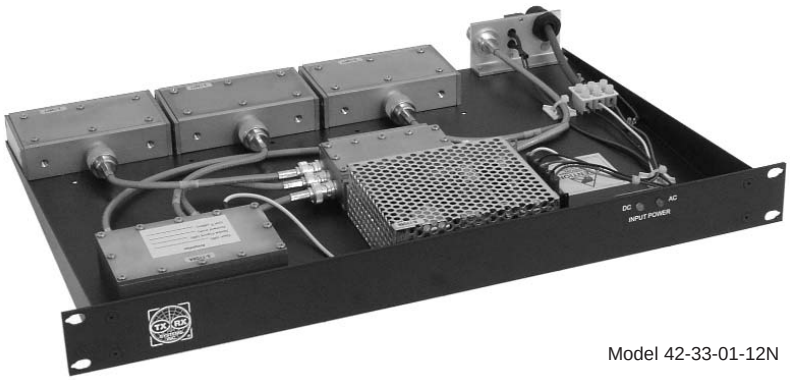
Model 42-83A-01

Compact Receiver Multicouplers

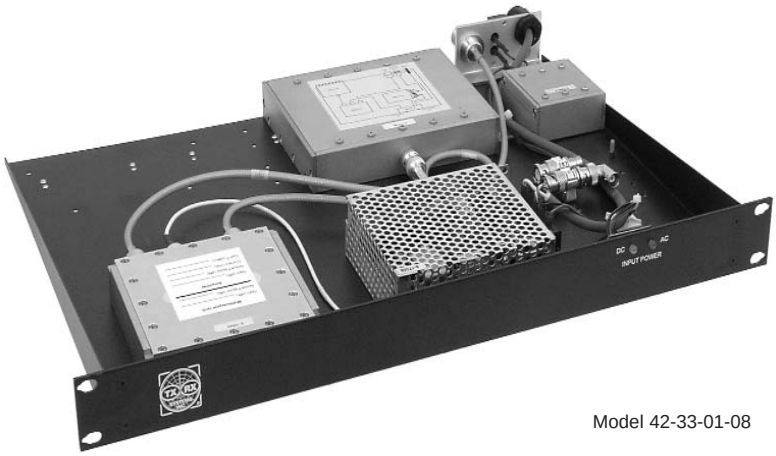
TX RX's new generation of broadband receiver multicouplers provide unequalled performance in a 1-rack unit (1-3/4 inch) space-saving package. The high-performance LNA's exhibit a very low noise figure while providing a (100% measured) 3rd order output intercept point in excess of +40 dBm. The multicouplers are designed with a minimum excess gain of 10 dB which gives maximum sensitivity in rural applications. All the units are designed for ease of expansion, with no change in system gain in most cases. Three basic models cover the most popular applications from 118 - 901 MHz.

Consult our comprehensive RF component and accessories catalog for receiver multicoupler systems components such as LNA's and power dividers for special needs you may have.

All TX RX Receiver multicouplers are easily expandable by either adding additional power dividers to the existing chassis or by addition of a 1-rack unit deck. The 16-channel BNC models have 2 terminated BNC connectors for non-invasive expansion of up to 16 additional outputs in 8-output blocks, with no change in performance or specifications. All necessary cables with attached connectors are included in each kit.



Model 42-33-01-12N



Model 42-33-01-08

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Receiver Multicouplers

Technical Specifications

118-901 MHz

MODEL NUMBER	NUMBER OF CHANNELS	BANDWIDTH	SYSTEM GAIN (MAXI-MUM)*	PREAMP NOISE FIGURE	PREAMP 3RD ORDER OUTPUT INTERCEPT POINT	POWER REQUIREMENT	DC BACKUP	CONNECTORS (IN/OUT)	DIMENSIONS	TEMP RANGE
42-33-01-04N	4	118-174 MHz	12 dB	2.0 dB	+41 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / N	1.75”H x 19”W x 14”D	0 -50 C
42-33-01-08N	8	118-174 MHz	15 dB	2.0 dB	+41 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / N	1.75”H x 19”W x 14”D	0 -50 C
42-33-01-12N	12	118-174 MHz	15 dB	2.0 dB	+41 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / N	1.75”H x 19”W x 14”D	0 -50 C
42-33-01-08	8	118-174 MHz	13 dB	2.0 dB	+41 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / BNC	1.75”H x 19”W x 14”D	0 -50 C
42-33-01	16	118-174 MHz	12 dB	2.0 dB	+41 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / BNC	1.75”H x 19”W x 14”D	0 -50 C
42-57-01-04N	4	380-520 MHz	12 dB	2.2 dB	41 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / N	1.75”H x 19”W x 14”D	0 -50 C
42-57-01-08N	8	380-520 MHz	15 dB	2.2 dB	41 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / N	1.75”H x 19”W x 14”D	0 -50 C
42-57-01-12N	12	380-520 MHz	15 dB	2.2 dB	41 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / N	1.75”H x 19”W x 14”D	0 -50 C
42-57-01-08	8	380-520 MHz	13 dB	2.2 dB	41 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / BNC	1.75”H x 19”W x 14”D	0 -50 C
42-57-01	16	380-520 MHz	12 dB	2.2 dB	41 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / BNC	1.75”H x 19”W x 14”D	0 -50 C
42-83A-01-04N	4	746-901 MHz	22 dB	0.8 dB	39 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / N	1.75”H x 19”W x 14”D	0 -50 C
42-83A-01-08N	8	746-901 MHz	19 dB	0.8 dB	39 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / N	1.75”H x 19”W x 14”D	0 -50 C
42-83A-01-12N	12	746-901 MHz	16 dB	0.8 dB	39 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / N	1.75”H x 19”W x 14”D	0 -50 C
42-83A-01-08	8	746-901 MHz	19 dB	0.8 dB	39 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / BNC	1.75”H x 19”W x 14”D	0 -50 C
42-83A-01	16	746-901 MHz	16 dB	0.8 dB	39 dBm	85-264 VAC, 47-63 Hz	22-30 V	N / BNC	1.75”H x 19”W x 14”D	0 -50 C

* Attenuator pads are provided to reduce system gain for performance optimization

Receiver Multicouplers

Accessories

Model Number	Description	Connector
83-01-01	1/4 W Termination	N male
83-01-05	1/4 W Termination	BNC male
87-01-01	3 dB Fixed Attenuator	BNC
87-01-02	6 dB Fixed Attenuator	BNC
87-01-03	10 dB Fixed Attenuator	BNC

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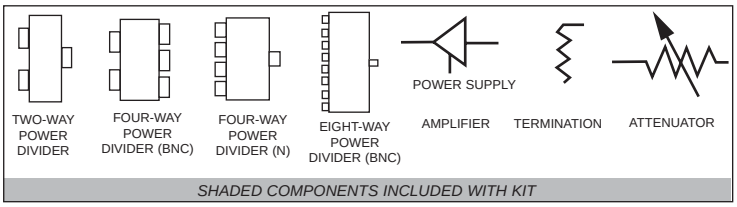
Receiver Multicouplers

Expansion Kits
100-1000 MHz

EXPANSION KIT MODELS

	Frequency (MHz)	Model No.	Expansion From	Expansion To	Shipping Weight (lbs)	Figure No.
2nd Generation	100-512	75-01-14	4	8	3	1
	100-512	75-01-15	8	12	3	2
	100-512	75-01-16	12	16	3	3
	100-512	75-05-02	8	16	3	4
	100-512	75-05-01	16	32	7	5
	746-901	75-83A-02	4	8	3	1
	746-901	75-83A-03	8	12	3	2
	746-901	75-83A-04	12	16	3	3
	746-901	75-83A-05	8	16	3	4
	746-901	75-83A-01	16	32	7	5
Legacy	132-512	75-01-10	4	8	3	6 or 7
	132-512	75-01-11	8	12	5	8
	132-512	75-01-12	12	16	3	10
	132-512	75-01-13	16	20	6	11
	132-512	75-01-12	20-28	+4	3	12
	406-512	75-67-01*	8	12	5	9
	800-1000	75-90-01	4	8	3	6 or 7
	800-1000	75-90-02*	8	12	6	9
	800-1000	75-90-03	8	12	5	8
	800-1000	75-90-04	12	16	3	10
	800-1000	75-90-05	16	20	6	11
	800-1000	75-90-04	20-28	+4	3	12

SYMBOL KEY



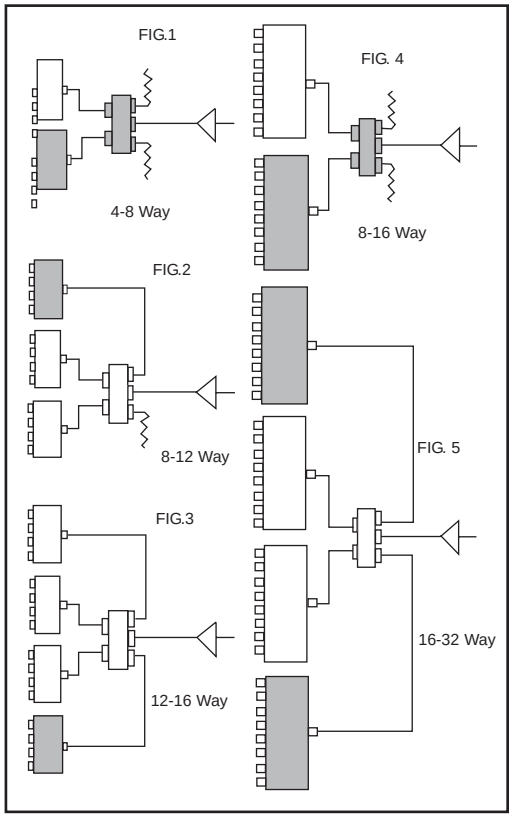
SHADED COMPONENTS INCLUDED WITH KIT

Notes: *Receiver multicouplers may be ordered with single stage or dual stage amplifiers. Expansion kit model number with asterisk indicates second preamplifier stage is included. As per table below, second stage peramplifiers may be ordered separately.

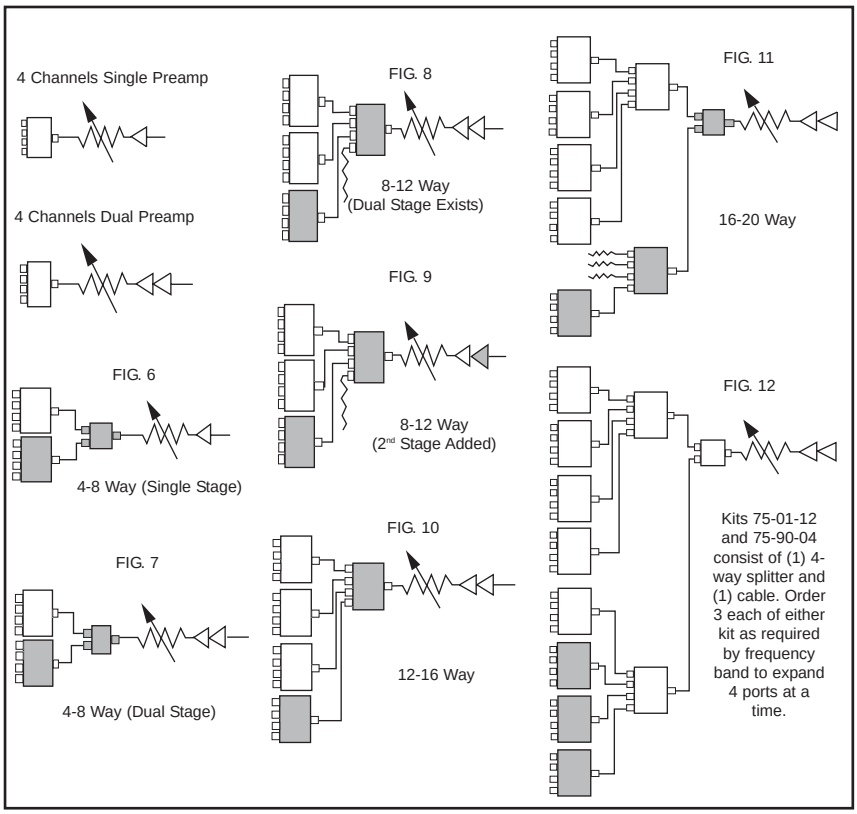
Model 42-67-22

Single to Dual Stage Amp Kit		
Range	**Model No.**	**Tuned Sub-band**
132-174	86-38-12-E	20 MHz
406-512	86-67-12-E	60 MHz
800-1000	86-85-11-E	800-900 or 900-1000 MHz

Expansion Kits for 2nd Generation Rx Multicouplers



Expansion Kits for Legacy Rx Multicouplers



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Our portfolio includes hardware, software, components and services. We offer these innovative products and services through our industry leading product line brands, Bird Electronic Corp and TX RX Systems. We provide test instruments that are highly accurate, rugged and easy to use. Industry leading components and products such as site analyzers, wattmeters, digital sensors, samplers, antennas, signal boosters, and tower mounted amplifiers. Furthermore, we offer dependable engineering, calibration and educational services for land mobile radio, cellular, semiconductor, broadcast, medical, military and government applications.

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In-Building Coverage Catalog
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