RF Amplifiers

Index

Introduction

RF Amplifiers

Andrew offers a wide range of RF Amplifier products. The amplifiers range from 0.5 to 10 watts of output power, 806 to 1990 MHz, and broadband to channel selective. If you have a coverage problem, Andrew has a solution.

In-Building

Uninterrupted wireless communications in buildings is a necessity for essential services such as police and fire, and is now demanded by the rapidly expanding commercial services market. Andrew has a variety of products to extend coverage into hospitals, hotels, factories, convention centers, and other buildings. Our RF Amplifiers provide the power and gain required to overcome the losses in distributed RF systems installed in facilities of all sizes.

The RF Amplifier group offers four products for the in-building application, they are the RADIAMP 1200 series, ACE 1000 series, SelectAmp CDMA 1900-1, and the SelectAmp NBPCS series amplifiers.

Null Fill

Dense urban environments, man-made structures, foliage, and varying terrain often work together to create holes or nulls in RF coverage areas above ground. Andrew air interface amplifiers are ideally suited for extracting low level signals, amplifying them to a useable level and retransmitting them to cover null areas.

The air interface amplifier utilizes rugged materials and passive cooling to provide reliable operation under extreme environmental conditions.

The RF Amplifier group offers three products for the null fill application; they are the SelectAmp CDMA 1900-1 series, SelectAmp CDMA 1900-1H/1HD and the ACE 1300 Series amplifiers. Andrew offers these complete solutions in the form of Repeater Kits. These kits contain all the necessary equipment to solve your null fill problem.

Cell Extension

When coverage areas are exceedingly directional, such as highways or long corridors, the amplifier you need is the Cell Extender. The Cell Extender is higher in output power enabling it to provide coverage down a long, narrow area.

The RF Amplifier group offers two products for the cell extension application; they are the SelectAmp CDMA 1900-1H/1HD series and the ACE 1300 series amplifiers. Repeater Kits solve the coverage problem by supplying all the equipment necessary to install the system at the repeater site.

Reverse Link Limited

The RF Amplifier group offers the TMA 1900-DD amplifier system to support reverse link limited system problems.

As mobile telephones get smaller and their output power gets lower, the signal from the mobile may be too weak at the base station antenna. The Tower Mounted Amplifier system solves this problem by improving system sensitivity by as much as 5 dB, thus increasing the base station sector range by as much as 40%.

General

Andrew RF Amplifier Products consist of band selective and channelized RF repeaters, and supporting products such as mounting kits, filters, power supplies, and remote monitoring and control equipment.

The ACE and RADIAMP™ series amplifiers represent the band selective products in the RF Amplifier Group. These products are bidirectional amplifiers that provide coverage in the 800 MHz ESMR, Cellular, and 900 MHz Trunk/European GSM frequency ranges.

The SelectAmp series amplifiers represent the channelized products in the RF Amplifier group. These products are also bidirectional and provide channel selectivity in a variety of bandwidths ranging from 12.5 kHz for pagers to 1.25 MHz for CDMA in the 900 and 1900 MHz PCS frequency spectrums.

The TMA series amplifiers are low noise amplifiers that are mounted at the top of the base station tower in close proximity to the base station antenna. These products increase sensitivity of the reverse link to improve reception of weak signals.

Distribution Amplifiers

RADIAMP 1200 Series – 800 MHz ESMR, 800 MHz US Cellular, 900 MHz Trunk/European GSM, and UHF.

RADIAMPs are small, low power (0.5 watt), rugged, bidirectional and unidirectional distribution amplifiers designed to operate in virtually any environment. The low-cost RADIAMP is primarily used to make up for losses in distributed antenna systems. See pages 676 and 677.

ACE 1000 Series – 800 MHz ESMR, 800 MHz US Cellular, 900 MHz Trunk/European GSM

The low power (1 watt) and medium gain characteristics of the ACE 1000 series amplifier makes it a cost-effective solution for the small, in-building, null applications. This amplifier is primarily used to cover small, in-building areas. See pages 678 and 679.

Repeaters

ACE 1300 Series – 800 MHz ESMR, 800 MHz US Cellular, 900 MHz Trunk/European GSM

This line of air interface, bidirectional amplifiers provides high gain and output power with remote monitor and control options. Feed forward error correction techniques are used in the ACE 1300 series for low intermodulation products in the presence of multiple carriers. See page 681.

SelectAmp CDMA 1900 Series – 1900 MHz PCS Services

SelectAmp CDMA 1900 is a channel selective, bidirectional amplifier that provides signal level enhancement and increased coverage. It provides remote access and monitoring via wireline connection using the Andrew SMARTpc™ graphical user interface. See pages 682 and 683.

SelectAmp NBPCS 900 Series – 900 MHz Narrowband PCS Paging Bands

This bidirectional, channelized, paging receiver makes it possible for Narrowband PCS providers to provide service to subscribers in RF-obstructed areas that would otherwise be unreachable. See page 684.

Tower Mounted Amplifiers

TMA 1900-DD – 1900 MHz PCS Services

Tower mounted amplifiers extend cell sites and improve system coverage while lowering capital expenses. The TMA 1900-DD increases sensitivity of the base station and extends mobile battery life. See pages 686 and 687.

RADIAMP™ 1200 Series

Distribution Amplifiers

Band-Selective, Bidirectional Amplifier

General

The RADIAMP 1200 series is a broadband RF distribution amplifier designed to be small, rugged and easily utilized by system designers. It is suitable for use with in-building and tunnel environments.

RADIAMP 1210 Paging Amplifier

The 1210 series RADIAMP is a 10-20 dB gain unidirectional unit operating in the 172 or 280 MHz paging bands. The 1210 series can be used as a line amplifier to overcome HELIAX® cable attenuation losses for small RF distribution systems or as a booster amplifier to maintain signal coverage for small sections of a larger system utilizing RADIAX® radiating cable or point-source antennas.

RADIAMP 1212, 1213, and 1216

The 1212, 1213 and 1216 Series RADIAMPs are bidirectional band-selective distribution amplifiers with variable gain from 10 to 20 dB. Specific bands of operation include AMPS Cellular, 800 MHz ESMR and 900 MHz Mobile Radio/European ESM. Uses include line amplification to overcome attenuation losses in HELIAX® cable and as a booster amplifier to improve RF signal levels in RF distribution systems utilizing RADIAX or point source antennas. The unit is available with an option for automatic gain control, which limits output RF power to a customer-specified level.

Application Information

Supplying Power to the RADIAMP 1200 Series

DC Power can be supplied to the RADIAMP by one of two ways: via the external dc input connector or via the RF cable. If the external connector is used, the unit must be supplied with 1 amp (min) @ +15 Vdc by using a power supply such as the Andrew ac-dc Power Supply shown on page 690.

The alternative is to apply dc power to coaxial cable such as RADIAX or HELIAX. The RADIAMP will then draw its needed dc power from the RF connector. In this case, the following points must be addressed by the user:

- *The coaxial cable center conductor is dc positive (between +16 and +20 Vdc).*
- *Typically, a maximum of three RADIAMP series units can be cascaded.*
- *The user must determine the dc voltage drop along the coaxial cable to ensure that proper dc input voltages exist at the RF port of each RADIAMP.*
- *The user can use devices such as the Andrew Bias-Tee and dc block to apply and terminate direct current on the coaxial cable.*

Mounting the RADIAMP with RADIAMP Hangers

Although several options for mounting RADIAMP exist, many users find the Andrew RADIAMP mounting hanger (a variety of our self-locking hanger) ideal to provide reliable and easy installation of the amplifiers. Two RADIAMP mounting hangers, when properly mounted, secure a single RADIAMP to concrete, drywall or wood. Each RADIAMP mounting hanger requires two 1/4", 5/16" or 3/8" lag bolts and four flat washers for mounting. Anchors should be used when securing the hangers to concrete, masonry or drywall.

Typical Electrical Specifications and Ordering Information

Unidirectional Amplifiers - 1210 Paging Amplifiers

Description	Band 1	Band 2
Frequency of Operation, MHz	171 - 173	279 - 281
Model No., Basic Amplifier	**651210-32UU-001**	**651210-32UU-002**
Model No., With AGC	**651210-32UU-003**	**651210-32UU-004**
Gain, dB	10 - 20	10 - 20
3rd Order Intercept Point, dBm	≥37	≥37
1 dB Compression Point, dBm	≥27	≥27
Noise Figure, dB	≤ 9	≤ 9
Power Consumption, watts	< 10 @ +15 Vdc	< 10 @ +15 Vdc

Bidirectional Amplifiers - 1212, 1213, and 1216, Typical Specifications

	800 MHz Trunked Radio		AMPS Cellular		900 MHz Trunked Radio/GSM	
Description	Downlink	Uplink	Downlink	Uplink	Downlink	Uplink
Frequency of Operation, MHz	851 - 869	806 - 824	869 - 894	824 - 849	935 - 960	890 - 910
Model No., Basic Amplifier	**651212-3212-000**		**651213-3212-000**		**651216-3212-000**	
Model No., With AGC	**651212-3212-001**		**651213-3212-001**		**651216-3212-001**	
Gain, dB	10 - 20	10 - 20	10-20	10 - 20	10 - 20	10 - 20
3rd Order Intercept Point, dBm	≥35	≥26	≥35	≥26	≥35	≥26
1 dB Compression Point, dBm	≥27	≥17	≥27	≥17	≥27	≥17
Noise Figure, dB	≤ 12	≤ 9	≤ 12	≤ 9	≤ 12	≤ 9
Power Consumption, watts at 15+Vdc	< 15	< 15	< 15	< 15	< 15	< 15

RADIAMP Mechanical Specifications

Description	1210 Paging Amplifier	1212, 1213 and 1216 Amplifiers
Enclosure Type	**NEMA 4 (IP66)**	**NEMA 4 (IP66)**
Length, in (mm)	6 (152)	12 (305)
Diameter, in (mm)	3.5 (90)	3.5 (90)
Weight, lb (kg)	2.5 (1.1)	5.4 (2.5)
Max. Operating Temperature, °C (°F)	50 (122)	50 (122)
Min. Operating Temperature, °C (°F)	-20 (-4)	-20 (-4)
RF Connectors	Type N Female	
DC Input Connector	Switchcraft® 712A Series, center pin ground or Type N connector, center pin positive	
Input Voltage	+15 Vdc, center pin ground using 712A connector +16 Vdc to +21 Vdc, center pin positive using coax connector	

Accessories

Description	Type Number
Power Supplies	
Desk Top, 90 - 265 Vac, IEC receptacle	**EPWSP-00018**
Wall Mount, 120 Vac	**EPWSP-00019**
Desk Top, 90 - 265 Vac, with integral power cord	**EPWSP-00023**
Connector, dc Power, pack of five	**EJKPW-50004**
Bias Tee, Type N, female connectors	**EBAST-10001**
Hanger, Self-Locking, RADIAMP mounting, quantity 2	**ECLMP-70032**

ACE 1000 Series

Distribution Amplifiers

Band-Selective Bidirectional Amplifier

The ACE 1000 series amplifier is a bidirectional amplifier designed specifically for in-building RF coverage extension for cellular or two-way trunked radio services. The small package can mount almost anywhere. Each ACE amplifier provides 30 - 40 dB of gain in each direction. An ACE pair can be used in off-air interface or a single ACE in distribution applications, along with RADIAX® or HELIAX® cables.

Ordering Information

	Amplifier No. 1	Amplifier No. 2
800 MHz Trunked Radio		
Basic Amplifier	**651012-1444-100**	**651012-4414-200**
With AGC Only	**651012-1444-101**	**651012-4414-201**
With SMART Only	**651012-1444-102**	**651012-4414-202**
With SMART/AGC	**651012-1444-103**	**651012-4414-203**
800 MHz Cellular A&B Bands		
Basic Amplifier	**651013-1444-100**	**651013-4414-200**
With AGC Only	**651013-1444-101**	**651013-4414-201**
With SMART Only	**651013-1444-102**	**651013-4414-202**
With SMART/AGC	**651013-1444-103**	**651013-4414-203**
GSM/900 MHz Trunked Radio		
Basic Amplifier	**651016-1444-100**	**651016-4414-200**
With AGC Only	**651016-1444-101**	**651016-4414-201**
With SMART Only	**651016-1444-102**	**651016-4414-202**
With SMART/AGC	**651016-1444-103**	**651016-4414-203**

Electrical Specifications – Typical

	800 MHz Trunked Radio		AMPS Cellular		900 MHz Trunked Radio/GSM	
Description	**Downlink**	**Uplink**	**Downlink**	**Uplink**	**Downlink**	**Uplink**
Frequency of Operation, MHz	851 - 869	806 - 824	869 - 894	824 - 849	935 - 960	890 - 915
Gain, dB	30 - 40	30 - 40	30 - 40	30 - 40	30 - 40	30 - 40
Amplifier No. 1						
3rd Order Intercept, dBm	+27	+40	+27	+40	+27	+40
1 dB Compression Point, dBm	+17	+30	+17	+30	+17	+30
Noise Figure, dB	11	9	10	10	–	–
Amplifier No. 2						
3rd Order Intercept Point, dBm	+40	+27	+40	+27	+40	+27
1 dB Compression Point, dBm	+30	+17	+30	+17	+30	+17
Noise Figure, Amp No. 2, dB	9	11	–	–	10	10
Pass Band Ripple, dB	<4	<4	<4	<4	<4	<4
VSWR	2:1	2:1	2:1	2:1	2:1	2:1
Input Voltage, Vac, 47 - 70 Hz	90 - 260	90 - 260	90 - 260	90 - 260	90 - 260	90 - 260
Power Consumption, watts	50	50	50	50	50	50
Enclosure Type	NEMA4 (IP66)	NEMA4 (IP66)	NEMA4 (IP66)	NEMA4 (IP66)	NEMA4 (IP66)	NEMA4 (IP66)
Size, in (mm)	13 x 9.9 x 4.8 (330 x 251x 122)	13 x 9.9 x 4.8 (330 x 251x 122)	13 x 9.9 x 4.8 (330 x 251x 122)	13 x 9.9 x 4.8 (330 x 251x 122)	13 x 9.9 x 4.8 (330 x 251x 122)	13 x 9.9 x 4.8 (330 x 251x 122)
ac Power Inlet	TURCK® RSF30	TURCK® RSF30	TURCK® RSF30	TURCK® RSF30	TURCK® RSF30	TURCK® RSF30
RF Connectors	Type N Female	Type N Female	Type N Female	Type N Female	Type N Female	Type N Female
Operating Temperature Range, °C (°F)	-20 to 50 (-4 to 122)	-20 to 50 (-4 to 122)	-20 to 50 (-4 to 122)	-20 to 50 (-4 to 122)	-20 to 50 (-4 to 122)	-20 to 50 (-4 to 122)

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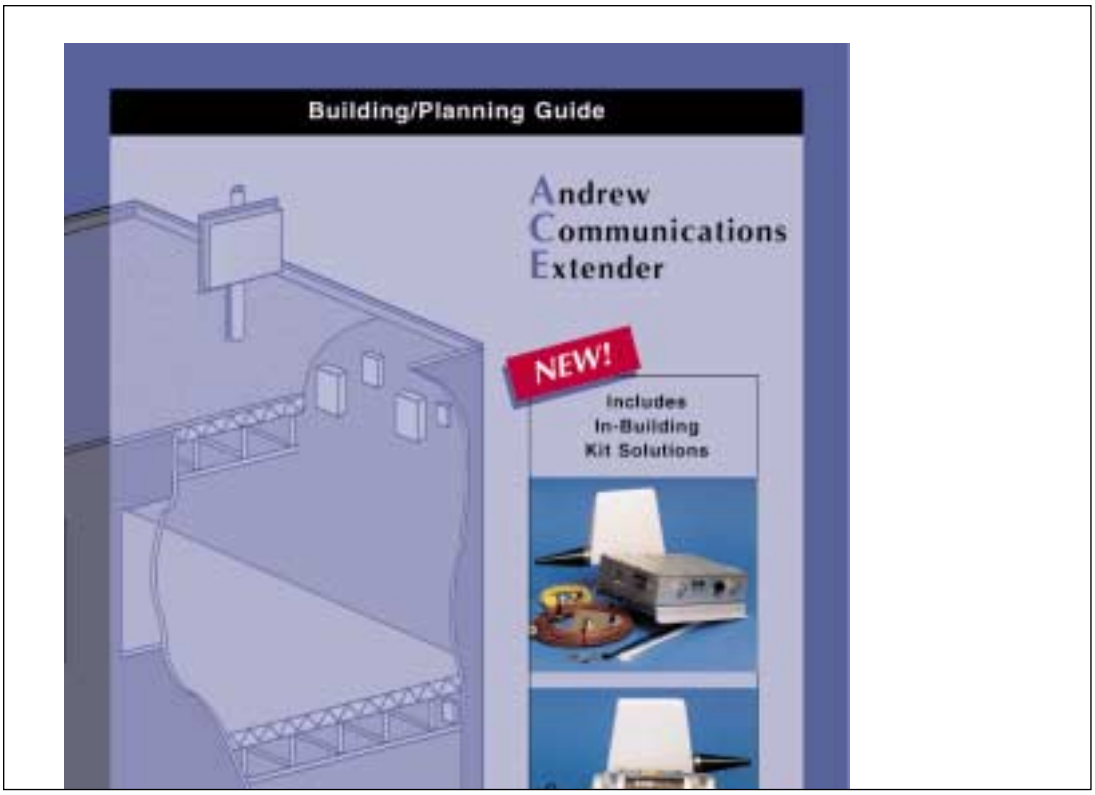

Application Information

ACE Amplifiers can be used as off-air interface or as line distribution amplifiers. When used as off-air, two ACE amplifiers in tandem can be used to provide 60-80 dB of gain. In the downlink path, ACE No. 1 provides pre-amplification and ACE No. 2 provides power amplification. In the uplink path, the opposite occurs, with ACE No. 2 providing pre-amplification and ACE No. 1 providing power amplification.

ACE No. 2 can also be used as a line distribution amplifier to continue coverage along a length of HELIAX® or RADIAX® as an alternative to RADIAMP™ when additional gain (> 20 dB) or output power is required over that of the RADIAMP.

The ACE amplifier can be provided with a variety of options, including automatic gain control and remote monitoring. The NEMA enclosure ensures operation in harsh environments.

Details on how to install your own ACE in-building system are provided in the Andrew Building Planning Guide. This guide provides system designers the information necessary to design, install, and operate an in-building system.

Ask for
Bulletin 1947

Null Kits

Distribution Amplifiers

Kiosk Kit

Moderate Building Kit

Fill in Shielded Pockets within Your Coverage Area

Null kits include all the material required to fill a coverage null in one easy kit. The kits extend wireless coverage inside kiosks and small buildings. Determining the need for a null kit is simple. If you can successfully communicate outside of a building, but not inside, you need an Andrew null kit.

Kits include an RF amplifier, HELIAX® coaxial cable assemblies, a small, directional antenna (for communication with the base station), an omnidirectional stub antenna (for within the null area), and mounting hardware.

Two Types of Null Kits Are Offered

Kiosk Kit

The Kiosk kit is designed for small areas, such as demonstration kiosks in shopping malls, guard booths, security personnel shelters, and industrial process control rooms. It utilizes a RADIAMP™ 1200 series RF amplifier.

Moderate Building Kit

The moderate building kit is for larger areas, such as restaurants, small office spaces, stores, and indoor parking areas. It utilizes an ACE 1000 series RF amplifier. Additional amplifiers and cables can be added to further extend the coverage.

Ordering Information

Description	RF Amplifier Type	Model No.
Kiosk Kit		
800 MHz AMPS Cellular	RADIAMP 1200 Series	**65NULL-AMP2-000**
800 MHz ESMR	RADIAMP 1200 Series	**65NULL-TRK2-000**
900 MHz Trunked Radio/GSM	RADIAMP 1200 Series	**65NULL-GSM2-000**
Moderate Building Kit		
800 MHz AMPS Cellular	ACE 1000 Series	**65NULL-AMP1-000**
800 MHz ESMR	ACE 1000 Series	**65NULL-TRK1-000**
900 MHz Trunked Radio/GSM	ACE 1000 Series	**65NULL-GSM1-000**

Band-Selective, Bidirectional Ampifier

The ACE 1300 series amplifiers are broadband bidirectional amplifiers that provide sufficient gain to overcome free space losses experienced by RF signals. These units provide high RF output power capabilities. The units are housed in rugged NEMA 4X enclosures for use in harsh outdoor environments.

Each unit provides 60 to 80 dB of gain, and adjustment for each path is independently controlled. Automatic gain control allows the unit to be easily used in systems requiring large dynamic ranges. Pass-band filters accommodate the standard AMPS US Cellular, GSM Cellular, 800 MHz Mobile Radio and 900 MHz Mobile Radio Bands.

The unit is equipped with visual indicators for local diagnostics and fault isolation. Remote monitoring and control is achieved with the SMART interface. Communication with the SMART interface is via two wire connection or the optional dial-up modem.

Frequency Bands, MHz

	Downlink	Uplink	Model No.
800 MHz Trunked Radio	851-869	806-824	**ACE1312**
AMPS Cellular, A Band	869-880	824-835	**ACE1314**
	890-892	845-847	–
AMPS Cellular, B Band	880-894	835-849	**ACE1315**
900 MHz Trunked Radio, GSM	935-960	890-915	**ACE1316**

Ordering Information

Model Number	Type No.
Basic Amplifier	
ACE1312	**651312-5858-000**
ACE1314	**651314-5858-000**
ACE1315	**651315-5858-000**
ACE1316	**651316-5858-000**
With SMART Monitoring and Hayes Compatible Modem	
ACE1312	**651312-5858-001**
ACE1314	**651314-5858-001**
ACE1315	**651315-5858-001**
ACE1316	**651316-5858-001**

Electrical Specifications

Gain (dB)	60 - 80 dB (Potentiometer Adjustable) with AGC
3rd Order Intercept Point, dBm	≥52
1 dB Compression Point, dBm	≥38
Pass-band Ripple, dB	≤4
Noise Figure, dB	≤9
Input/Output VSWR	≤2:
Power Dissipation, W	≤150

Mechanical Specifications

Enclosure Type	NEMA 4X
H x W x D, in (mm)	24 x 20 x 12 (610 x 508 x 305)
Weight, typical, lb (kg)	70 (32)
Operating Temperature Range, °C (°F)	-30 to 50 (-22 to 122)
RF Connectors	Type N
Power Input, Vac	110 (220 optional)

For applications information

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(91815)
See page 1

SelectAmp CDMA 1900 Series

Repeaters

SelectAmp CDMA 1900 with Battery Backup.

Channelized, Bidirectional Amplifier

PCS systems can now be enhanced, distributed and/or extended using a SelectAmp CDMA 1900 series repeater. The SelectAmp CDMA 1900 repeater is a channel selective, bidirectional amplifier that provides signal level enhancement in the 1900 MHz PCS frequency spectrum.

The SelectAmp CDMA 1900 repeater line is available in three basic configurations:

SelectAmp CDMA 1900-1 features 2 watts of output power in both the forward and reverse directions. This repeater has the gain and output power range required to boost RF signal levels in a variety of in-building and outdoor null fill applications.

SelectAmp CDMA 1900-1H provides 8 watts of output power in both the forward and reverse directions. This repeater has the gain and output power range necessary for large outdoor null fill sites as well as cell extension applications.

SelectAmp CDMA 1900-1HD combines the output power and performance of the SelectAmp CDMA 1900-1H with receive diversity.

Features and Advantages

Channel Selective:	Immunity to interfering signals
High Output Power:	Increased coverage and capacity
Low Group Delay:	Reduces PN search windows
Receive Diversity:	Increased uplink traffic capacity and call quality

Additional features include:

- *Remote access and monitoring via wireline connection is standard through use of the Andrew SMARTpc™ graphical user interface. A customer-supplied handset may be integrated for a wireless connectivity option.*
- *Battery back-up for service up to 2 hours (see photo).*
- *Complete solutions include the repeater, antennas, cable and all ancillary equipment required to install a repeater site.*

Specifications

Electrical	
Gain, dB	65 - 95, 2 dB step adjust
Noise Figure, dB Max	8
Input Power Requirements	90 - 260 Vac, 240 watts
Mechanical	
Enclosure	NEMA 4 (IP65)
Dimensions, H x W x D, in (mm)	16 x 12 x 12 (406 x 305 x 305)
Weight, lb (kg)	45 (20)
Temperature, Operating, °C (°F)	-40 to 60 (-40 to 140)

Ordering Information

Model	Frequency Band	Downlink Output Power, watts	Uplink Output Power, watts	Type No.
SelectAmp CDMA 1900-1	PCS Band A/D	2	2	**651931-4949-111**
SelectAmp CDMA 1900-1	PCS Band B/E	2	2	**651932-4949-111**
SelectAmp CDMA 1900-1	PCS Band C/F	2	2	**651933-4949-111**
SelectAmp CDMA 1900-1H	PCS Band A/D	8	8	**651931-6969-111**
SelectAmp CDMA 1900-1H	PCS Band B/E	8	8	**651932-6969-111**
SelectAmp CDMA 1900-1H	PCS Band C/F	8	8	**651933-6969-111**
SelectAmp CDMA 1900-1HD	PCS Band A/D	8	8	**651931-6969-113**
SelectAmp CDMA 1900-1HD	PCS Band B/E	8	8	**651932-6969-113**
SelectAmp CDMA 1900-1HD	PCS Band C/F	8	8	**651933-6969-113**

For applications information

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(50106)
See page 1

SelectAmp NBPCS 900 Series

Repeaters

Bidirectional, Channelized Paging Repeater

The SelectAmp NBPCS 900 paging repeater makes it possible for narrowband PCS providers to provide service to subscribers in RF-obstructed areas that were previously unreachable.

The SelectAmp NBPCS 900 is a bidirectional, channelized, paging repeater. It provides selective amplification of user specified frequencies in the 929-932, 940-941, and 901-902 MHz narrowband PCS paging bands. The unit can be configured with up to three channelizers in addition to the broadband reverse channel.

Andrew offers two versions of the channelizer. The 930 MHz unit supports the POCSAG/FLEX paging protocol; the 940 MHz unit supports the ReFLEX protocol. The 898-904 MHz reverse link provides an RF connection from the pager back to the base station.

Features

Channel Selective. *Eliminates competing and interfering signals.*

Repeater Output Power. *Linear power covers large interior areas.*

Adjustable Power Gain. *90-dB power gain allows use of small off-air antennas.*

Short Group Delay. *Compatible with tight simulcast delay spread and adjacent site constraints.*

Specifications

Electrical		
Forward Path	**930 MHz**	**940 MHz**
Frequency Range, MHz	929-932	939-941
Channel Bandwidth, kHz	12.5	50.0
Gain, dB	60 - 90	60 - 90
Noise Figure, dB Max	6.0	6.0
Output Power, watts, PEP	1	1
Group Delay, µs	<70	<30
Reverse Path		
Frequency Range, MHz		898-904
Channel Bandwidth, MHz		6
Gain, dB		60 - 90
Noise Figure, dB Max		6.0
Output Power, mW, PEP		500
Group Delay, µs		<2
Adjacent Channel Rejection, dB		>35
RF Connectors		Type N, Female
Input Power Requirements		90 - 260 Vac
Mechanical		
Enclosure		NEMA 2 (IP 30)
Dimensions, H x W x D, in (mm)		19 x 5.5 x 18 (483 x 140 x 458)
Weight, lb (kg)		40 (18)
Temperature, Operating, °C (°F)		0 to 60 (-32 to 140)
Temperature, Storage, °C (°F)		-40 to 85 (-40 to 185)
Mounting		19" Rack or Table Top

Ordering Information

Model	Number of Channels	Channel Configuration	Type No.
SelectAmp NBPCS 900	3	1, 930 MHz 2, 940 MHz	**650937-5949-310**
SelectAmp NBPCS 900	3	2, 930 MHz 1, 940 MHz	**650937-5949-320**
SelectAmp NBPCS 900	3	3, 930 MHz	**650937-5949-330**
SelectAmp NBPCS 900	3	3, 940 MHz	**650937-5949-340**
SelectAmp NBPCS 900	2	1, 930 MHz 1, 940 MHz	**650937-5949-350**
SelectAmp NBPCS 900	2	2, 930 MHz	**650937-5949-360**
SelectAmp NBPCS 900	2	2, 940 MHz	**650937-5949-370**
SelectAmp NBPCS 900	1	1, 930 MHz	**650937-5949-380**
SelectAmp NBPCS 900	1	1, 940 MHz	**650937-5949-390**

1900 MHz PCS CDMA
Repeater Kits

Andrew repeater kits are designed to take the worry out of antenna selection, cable options, connector compatibility, surge suppression, and grounding network design. Repeater kits utilize all Andrew products and provide you with a system that is pre-designed.

The major components of the repeater kits are:

- *Repeater*
- *Donor Antenna*
- *Null Antenna*
- *Interconnecting Cable*
- *Surge Arrestors*
- *Grounding Bars*
- *Mounting Hardware*

Ordering Information

For In-Building and Small Exterior Null Fill Applications		
Included Donor Antenna Type:	P2F-17-N7A	KP4F-18-NWM
Included Null Antenna Type:	PCS19SA-06316-0NG	PCS19SA-06316-0NG
Included LDF4-50A Cable Length:	150 ft (45 m)	300 ft (91 m)
A Band PCS 1900 MHz	**65KITC-5A12-111**	**65KITC-5A12-212**
B Band PCS 1900 MHz	**65KITC-5B12-111**	**65KITC-5B12-212**
C Band PCS 1900 MHz	**65KITC-5C12-111**	**65KITC-5C12-212**
D Band PCS 1900 MHz	**65KITC-5D12-111**	**65KITC-5D12-212**
E Band PCS 1900 MHz	**65KITC-5E12-111**	**65KITC-5E12-212**
F Band PCS 1900 MHz	**65KITC-5F12-111**	**65KITC-5F12-212**
For Large Exterior Null Fill and Cell Extension Applications		
Included Donor Antenna Type:	P2F-17-N7A	KP4F-18-NWM
Included Null Antenna Type:	PCS19SA-06316-0NG	PCS19SA-06316-0NG
Included LDF4-50A Cable Length:	150 ft (45 m)	300 ft (91 m)
A Band PCS 1900 MHz	**65KITC-5A18-111**	**65KITC-5A18-212**
B Band PCS 1900 MHz	**65KITC-5B18-111**	**65KITC-5B18-212**
C Band PCS 1900 MHz	**65KITC-5C18-111**	**65KITC-5C18-212**
D Band PCS 1900 MHz	**65KITC-5D18-111**	**65KITC-5D18-212**
E Band PCS 1900 MHz	**65KITC-5E18-111**	**65KITC-5E18-212**
F Band PCS 1900 MHz	**65KITC-5F18-111**	**65KITC-5F18-212**
For Large Exterior Null Fill and Cell Extension Applications with Diversity Receive		
Included Donor Antenna Type:	KP4F-18-NWM	KP4F-18-NWM
Included Null Antenna Type:	PCSD19SA-06516-0D	PCSD19-06516-0D
Included LDF4-50A Cable Length:	225 ft (69 m)	450 ft (137 m)
A Band PCS 1900 MHz	**65KITD-5A18-225**	**65KITD-5A18-226**
B Band PCS 1900 MHz	**65KITD-5B18-225**	**65KITD-5B18-226**
C Band PCS 1900 MHz	**65KITD-5C18-225**	**65KITD-5C18-226**
D Band PCS 1900 MHz	**65KITD-5D18-225**	**65KITD-5D18-226**
E Band PCS 1900 MHz	**65KITD-5E18-225**	**65KITD-5E18-226**
F Band PCS 1900 MHz	**65KITD-5F18-225**	**65KITD-5F18-226**

TMA 1900-DD

Tower Mounted Amplifiers

Tower Mounted Amplifier System for PCS Systems

The TMA 1900-DD improves the mobile to base station antenna link budget by as much as 5 dB and thus extends and improves system coverage. It can increase system sector range by as much as 40% and decrease the number of required base stations by as much as 50%. It also increases mobile battery life.

The Amplifier System Consists of Three Components

The Tower Mounted Amplifier (TMA) is a balanced LNA design. It mounts near the antenna and connects to the antenna using a jumper cable.

- *Band-selective, dual-duplexed filter for TX/RX or RX-only applications.*
- *15 MHz bandwidth.*
- *Failsafe bypass.*
- *Built-in status monitoring for installation flexibility.*
- *Comprehensive alarm circuitry functions with amplifier interface unit (AIU), existing bias-tee or bias-tee that is integral to the base station.*
- *Three levels of status indication: Normal, Minor, and Major.*
- *Three stage surge protection.*
- *Robust welded aluminum extruded housing.*
- *No seals directly exposed to falling water.*
- *RF connectors protected under drip lip.*
- *Power-up self test ensures correct hookup and operation.*

Amplifier Interface Unit (AIU) mounts at the bottom end of the antenna feeder run inside the base station enclosure. It provides three-stage surge suppression on the antenna port, alarm detection, alarm output, visual indicators of alarm status, and current injection. It can be used with or without the system status panel (SSP).

- *Functions as a Bias-Tee with full TMA alarm detection circuitry.*
- *Remote fault reporting via open collector or relay contacts.*
- *Does not require any additional mounting hardware.*
- *Compact Design.*

System Status Panel (SSP) provides central power distribution and alarm interfacing for up to six TMAs. It also provides visual status monitoring and one summary fault output for the TMAs.

- *Remote fault reporting via open collector or relay contacts.*
- *Flexible power requirements.*
- *Full site status at one convenient location.*
- *Compact 1RU height.*

TMA 1900-DD Component Specifications

Tower Mounted Amplifiers

TMA

Dynamic Range	Noise Figure, dB	Gain dB	3rd Order Intercept Input, dBm
High Intercept Point	2.2	15	+15
Low Noise Figure	1.8	13	+8

System Parameters	
TX Return Loss, dB	-18
TX Insertion Loss, dB	< 0.4
TX/RX Isolation, dB	85
TX Power Handling, watts	150 (Avg)
Failsafe Bypass Loss, dB	< 2

Protection and Monitoring	
Protection (Center Conductor)	2 kA 2/36 Pulse
Protection (Outer Conductor)	15 kA 2/36 Pulse
Alarming Levels	Normal, Minor, Major
Alarm Communications	Via Center Conductor

Mechanical Specifications	
H x W x D, in (mm)	9.2 x 6.5 x 3.1 (234 x 165 x 80)
Weight, lb (kg)	7.7 (3.7)
Mounting	Pole or Flat
RF Connectors	7-16 DIN (Female)
Power Connection	12 – 30 Vdc (BTS Port – Center Conductor)

Environmental Specifications	
Operating Temperature Range, °C (°F)	-40 to +60 (-40 to 140)
Storage Temperature Range, °C (°F)	-40 to +85 (-40 to 185)
Humidity, %	95, Non-Condensing
Enclosure	
NEMA	4
IP	65

Ordering Information

Operating Frequency	High Intercept Point	Low Noise Figure
A Band PCS 1900 MHz	**651951-0041-300**	**651951-0041-301**
B Band PCS 1900 MHz	**651952-0041-300**	**651952-0041-301**
C Band PCS 1900 MHz	**651953-0041-300**	**651953-0041-301**
D Band PCS 1900 MHz	**651954-0041-300**	**651954-0041-301**
E Band PCS 1900 MHz	**651955-0041-300**	**651955-0041-301**
F Band PCS 1900 MHz	**651956-0041-300**	**651956-0041-301**

AIU

System Parameters	
Frequency Range, MHz	PCS 1900 (1850-1910)/(1930-1990)
TX Insertion Loss, max. dB	0.1

Protection and Monitoring	
Protection Level – Outer to Center	2 kA 2/36 Pulse
Protection Level – Outer to Outer	15 kA 2/36 Pulse
TX Power Handling, watts	150 (Avg)
LED Alarm Indicators	Normal, Minor, Major 1, Major 2
Remote Status Signaling	Form C Relay and Open Collector (TTL)

Mechanical Specifications	
H x W x D, in (mm)	2 x 5 x 2 (50 x 125 x 50)
Weight, lb (kg)	1.0 (0.5)
Mounting	Independent or Rack
RF Connectors	7-16 DIN (Female)
Alarm Connection	DB25 Female
Power Connection	12 – 30 Vdc (4 Pos. Molex®)

Environmental Specifications	
Operating Temperature Range, °C (°F)	0 to +50 (32 to 122)
Storage Temperature Range, °C (°F)	-40 to +85 (-40 to 185)
Humidity, %	85, Non-Condensing
Enclosure	
NEMA	2
IP	30

Ordering Information

Amplifier Interface Unit	**651950-0000-010**

SSP

Monitoring and Protection	
Alarm Indicator LEDs (Individual TTA)	Power / OK / Minor / Major
Alarm Indicator LED (Site)	Power / OK / Minor / Major
Remote Status Signaling	Form C Relay & Open Collector (TTL)
Short Circuit Protection	1 Amp Fuse per TTA 6 Amp Fuse for System

Connectors	
DC/Alarm to AIU (6)	DB25 (Female)
System Alarm Output	DB25 (Female)
Power	Molex® Mini Fit™, 4 Conductor

Molex and Mini Fit are trademarks of Molex Incorporated.

Mechanical Specifications	
H x W x D, in (mm)	1.5 x 19 x 5.5 (38 x 483 x 140)
Weight, lb (kg)	1.0 (0.5)
Mounting	1U, 19" Rack Mount
Power Connection	12 – 30 Vdc

Environmental Specifications	
Operating Temperature Range, °C (°F)	0 to +50 (32 to 122)
Storage Temperature Range, °C (°F)	-40 to +85 (-40 to 185)
Humidity, %	85, Non-Condensing
Enclosure	
NEMA	2
IP	30

Ordering Information

System Status Panel	**651950-0000-020**

System Monitoring and Remote Tuning (SMART)

Supporting Products

SMARTpc Software

SMARTsentry

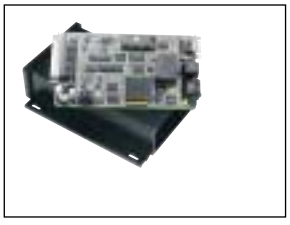
The Ultimate in Low-cost Flexibility

Description

SMART is the Andrew low-cost integrated solution to all your monitoring and control needs. It consists of SMARTpc control software that runs on any IBM-compatible PC capable of running Windows® 3.1 or subsequent upgrades, and a SMARTsentry™ in each monitored device. The SMARTsentry can be mounted internally or externally.
It is easy to add to the ACE and air interface families of boosters, as well as other devices.

Summary of Features

- *Can be configured and customized by user*
- *Uses standard telephone lines for status and control*
- *Automatic call-in from SMARTsentry upon fault occurrence*
- *Programmable call-out interval from SMARTpc*
- *SMARTpc automatically sends text paging messages to support personnel*
- *User-definable auxiliary monitoring points for entry alarm, room temperature, etc.*
- *Supports RADIAMP, ACE, and other devices*



IBM is a registered trademark of International Business Machines Corporation.
Windows is a registered trademark of Microsoft Corporation.

System Requirements

- *SMARTpc: any IBM®-compatible PC capable of running Windows® 3.1 or subsequent upgrades. A Hayes-compatible modem.*
- *SMARTsentry: 17.5 - 25 Vdc (supplied by all Andrew RF equipment) and ground. RJ-11 phone jack.*

SMARTsentry Interfaces

- *Digital: 16 inputs, 8 outputs (TTL)*
- *4 user-definable digital inputs (TTL)*
- *Analog: 4 inputs, 4 outputs (0-13V)*
- *RJ-11 modular connector for modem*
- *Optional RS-232/RS-422 interface*
- *RJ-45 modular connector for local connection*

Summary Status Display

- *Customized top-level status of all monitored devices or sites*
- *Automatically arranged from text configuration file*
- *User-definable intervals between outbound status phone calls*
- *User-initiated phone calls on demand for status or command initiation*

Detail Status Display

- *Displays all readable and set parameters in the device*
- *User ID and password protection for all changes to equipment*

Ordering Information

	Model Number
SMARTsentry™	**385615-8001-021**
SMARTpc™ Software	**385615-9001-001**

Antennas

Panel Antenna. The panel antenna is a highly directive antenna with 12 dB of gain that operates from 805 - 960 MHz. The unit offers a cost-effective solution for off-air applications ....**Type EANTT-00004**

Radiating Termination. This broadband stub antenna provides an omnidirectional radiation pattern in the 804 - 946 MHz range and is used in RADIAX® or HELIAX® applications to provide a launch for the signal from the end of the cable or through a RADIAX tap. ....**Type EANTT-00003**

Panel Antenna

Attenuators

The attenuators are used to adjust the signal level within the dynamic range of common test equipment. They operate from dc to 18 GHz at 50-ohms impedance and can handle up to 2 watts of input power. The connectors are Type N male/female.

Attenuation	Type Number
3 dB	**EATTN-09032**
6 dB	**EATTN-09062**
10 dB	**EATTN-09102**
20 dB	**EATTN-09202**

Radiating Termination

Attenuator

Bias-Tees

Used to add dc power to any coaxial cable. Ideal for use with RADIAMP™ to take advantage of using a single dc power supply to power several amplifiers. Has two RF connectors and one circular dc power connector. Direct current passes between the power connector and one RF connector while the other RF connector is isolated from the dc. The mating power cable connector is supplied with this product.

Frequency	Connectors	Type Number
200 MHz-1 GHz	7-16 DIN	**EBAST-10000**
200 MHz-1 GHz	Type N	**EBAST-10001**
1700-2000 MHz	Type N	**65ACCE-BIAS-190**

Bias-Tee

Power Dividers

The power dividers are used to separate a single signal path into multiple signal paths. The power dividers operate at 50-ohms impedance and utilize Type N female connectors.

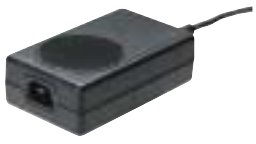
Frequency	Division	Type Number
2 - 2000 MHz	4 - Way	**EPWDV-22503**
10 - 1000 MHz	2 - Way	**EPWDV-22506**

Power Divider

RADIAMP™ Power Supplies

These small, cost-effective ac-dc power supplies accept a wide range of ac voltage inputs and provide suitable regulated dc power for RADIAMP™ amplifiers.

Description	Type Number
Desk Top, 120/220 Vac, IEC receptacle (no cord)	**EPWSP-00018**
Desk Top, 120/220 Vac, with ac power cord	**EPWSP-00023**
Wall Mount, 120 Vac	**EPWSP-00019**



Power Supply

Accessories

Filters

When broadband amplifiers are used in coverage solutions, filtering is often needed to prevent the unwanted signals from being distributed throughout the system. These band-pass filters are designed to pass certain frequency ranges in the cellular bands.

Frequency Range, MHz	Description	Type Number
870 - 880/825 - 835	A Band Cellular	**EFLTB-00400**
880 - 890/835 - 845	B Band Cellular	**EFLTB-00401**
866 - 869/821 - 824		**EFLTB-00410**
861 - 866/816 - 821		**EFLTB-00411**

Filter

dc Blocks

A high pass-filter that prevents the flow of dc on a coaxial cable. Operates from 200 MHz to 2 GHz.

Frequency Range	Connectors	Type Number
200 MHz - 2 GHz	Type N	**EBLOK-00005**
200 MHz - 2 GHz	7-16 DIN	**EBLOK-00003**

dc Block

Battery Back-up

To avoid the worry of supply power going down, extend your life with a battery back-up system. This battery back-up is for the SelectAmp CDMA family only and supplies up to 2 hours of continuous power over a wide temperature range. When a battery back-up is ordered, the power cables are supplied with the system.

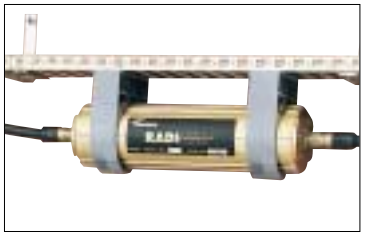
	Type Number
Battery Back-Up	**65ACCE-1800-000**
Cable	**AE02C-D3626-001**

Battery Back-up

RADIAMP™ Mounting Hangers

Two of these self-locking hangers securely mount a RADIAMP to walls and ceilings. Easily attached to concrete, drywall or wood using lag bolts and anchors for concrete or drywall. Each package contains two hangers.

Pair Self-Locking Hangers .....**Type ECLMP-70032**



RADIAMP™ Mounting Hangers

Power Cables

Power cables are supplied with each repeater or amplifier that you order, but if a replacement is needed, they are available.

Product	Type Number
RADIAMP Power Supply, SelectAmp NBPCS	**ECABL-31112**
ACE 1000	**AE02C-D0178-001**
SelectAmp CDMA, SelectAmp GSM	**AE02C-D3300-001**

Power Cables

RF Power by Andrew™

Single and Multi-Carrier Power Amplifiers

- Single Carrier Amplifiers for all wireless telecommunications and data systems.
- Low to Mid-Power Multi-Carrier Amplifiers for repeaters, microcells and wireless base stations.
- High Power Multi-Carrier Amplifiers for wireless telephony, WLL, and wireless IP systems.

Andrew offers a complete line of state-of-the-art, high performance, single and multi-carrier linear power amplifiers. These products are cost effective and meet the demanding requirements of the next generation wireless telecommunications and data system build-outs.

Low to Mid-Power Multi-Carrier Amplifiers

These amplifiers are designed to meet the most demanding modulation formats and offer versatile performance and cost savings that give system providers an added edge. Low-cost linearization techniques, such as pre-distortion, are utilized to insure optimum performance in applications where a limited number of carriers are needed.

High Power Multi-Carrier Amplifiers

These amplifiers incorporate feed forward loops to improve linearization. This approach provides a very cost competitive solution and maintains stringent system level performance criteria.

Innovative amplifier design and manufacturing is based on high power GaAs (Gallium Arsenide) and silicon power transistor technology for high performance and increased efficiency.

GaAs technology offers significant advantages for cellular, PCS, and GSM markets by allowing the design of high linearity, reliable, RF microwave amplifiers. It is the best technology for outdoor applications.

Wireless applications include: DCS, PCS, CELLULAR, WLL/WLAN, UMTS/IMT-2000, GSM, GSM/EDGE, TDMA, CDMA, and WCDMA.

Andrew Designs Provide:

- **Excellent reliability - fewer connectors, no thermal loading/expansion problems.**
- **Cost-effective installation - ease-of-use.**
- **Great linearity and efficiency - exceeds all comparable solutions in the market today.**