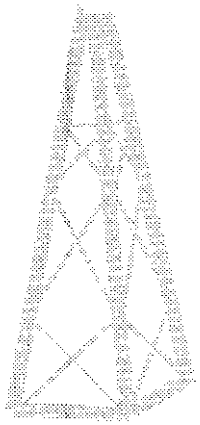
FCC ID: NT3BDA8087

Communication Components Inc.



Bi-directional Amplifiers

Communication
Components Inc.

299 Forest Avenue Paramus, NJ 07652

TEL: 201-265-8882 FAX: 201-265-8922

BDA System Specification

BDA Electrical Specification :

•Up-Link Frequency Range:	806 - 821 MHz
•Down-Link Frequency Range:	851 - 866 MHz
• System Gain @ 0 dB attenuation:	
Model BDA-8087-52	52 dB
Model BDA-8087-34	34 dB
System Noise Figure:	4 dB Max.
• System Group Delay:	180 nanosec. Max.
• Passband Ripple:	0.5 dB Max.
• Output Third Order Intercept Point:	+44 dBm Min.
• Normal Operating Output Power	+21 dBm
• 1 dB Compression Point:	+30 dBm Min.
• Input /Output VSWR:	1.5:1 Max.
• Up-Link-Down-Link Isolation	70 dB
• Digital Attenuator	
Attenuation Step Size:	1 dB
Attenuation Range:	15dB
•	
• Operating Voltage	+10 VDC

BDA Mechanical Specification :

• Dimensions	12"x10"x5"
• Enclosure	NEMA Weather Proof
• Connectors	N Type female or 7/16 DIN
• Weight	10 Lbs. Max.
• Mounting	Mounting Ears

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Bidirectional Amplifier (BDA)
System Specification

General Information:

Communication Components, Inc. Bi-Directional Amplifier (BDA) improves the sensitivity of base stations in indoor locations where there is a significant amount of cable loss in RF distribution systems. The BDA block is available with different maximum available gain and output power ratings.

Description:

The BDA was specifically designed for low system group delay to minimize Bit-Error-Rate (BER) of digital transmissions.
The BDA block consists of a single compact unit with two RF connectors. It is rugged and can be easily connected during cable installation. It has a moisture proof NEMA 4 enclosure with two low noise medium power amplifiers, independently controlled up-link and down-link attenuators, duplexers, and bias tee's.
DC voltage can be supplied to the BDA by one of two ways: via the external DC input connector or via the center conductor of the RF coax cable.

Ordering Information:

Model BDA-8087-34:	34 dB Gain
Model BDA-8087-52:	52 dB Gain

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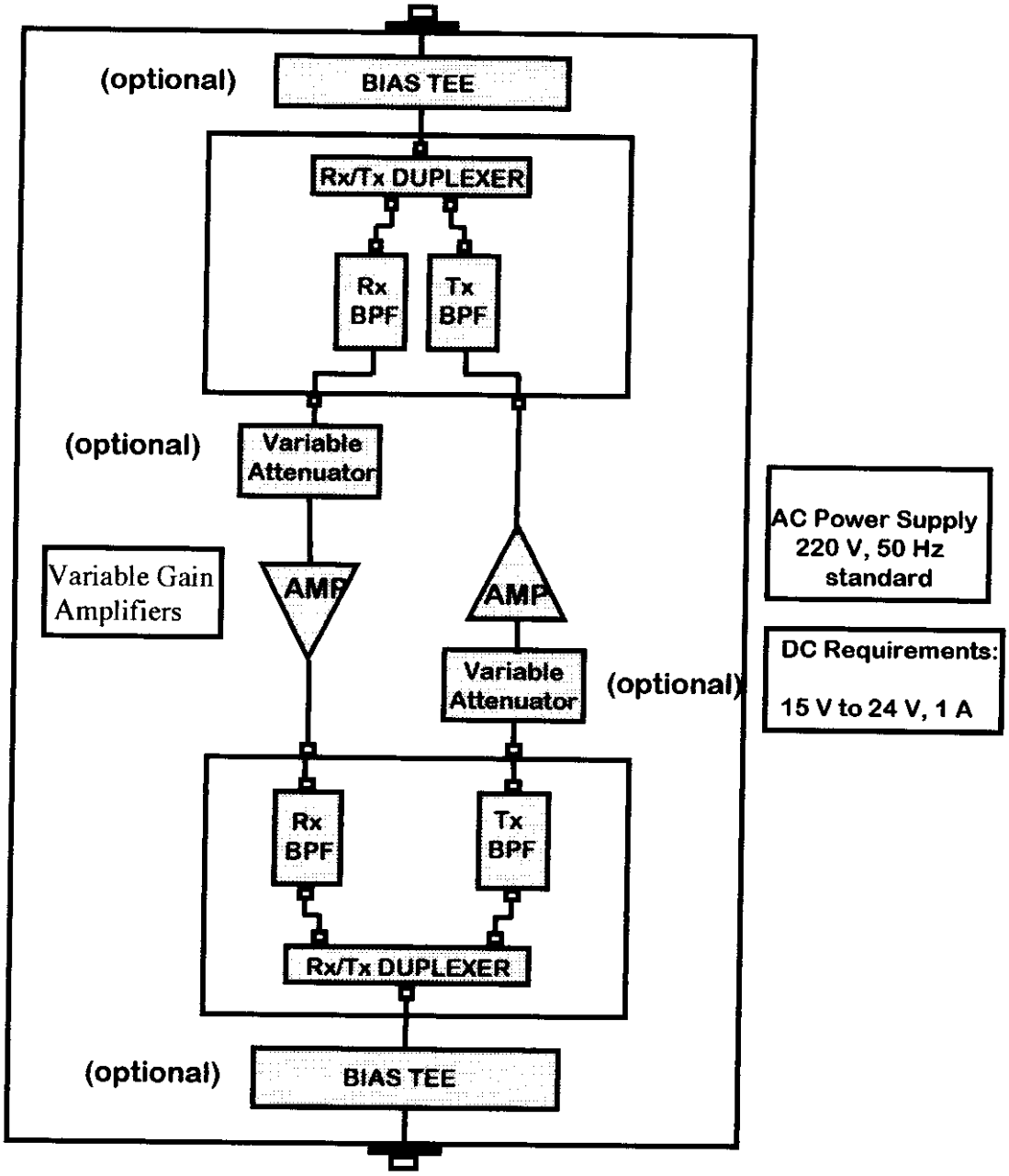
Line Bi-Directional Amplifier

BLOCK DIAGRAM



Communication Components Inc.

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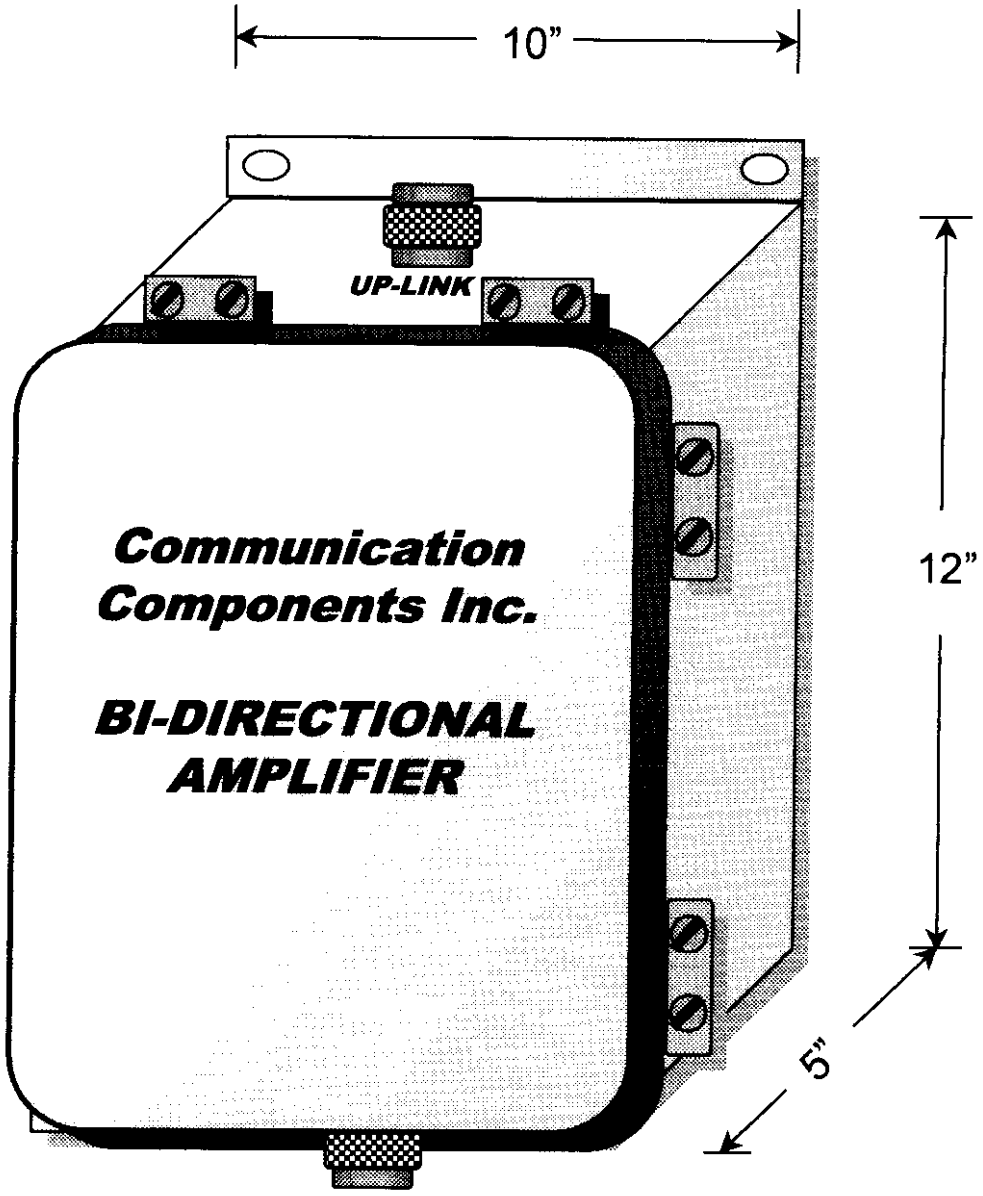
Bidirectional Amplifier
Indoor/Outdoor Unit



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COMMUNICATION COMPONENTS, Inc.
299 Forest Ave, Paramus, N.J. 07652 Tel: 201-265-8882, Fax: 201-265- 8922

Monday, February 16, 1998

Ruth Varley
Certelecom Laboratories, Inc.
820 Proctor Ave.
Ogdensburg, NY 13669

Dear Ruth:
Below are General Equipment Specifications for our BDA.

1. Power Input:	120 VAC, 60 Hz	
2. Frequency Range:	Up-Link	806 - 824 MHz
	Down-Link	851 - 866 MHz
3. Tunable Bands:	One	
4. Necessary Bandwidth:	20 KHz	
5. 20 dB Passband:	Up-link	26 MHz
	Down-link	25 MHz
6. Type of Modulation:	QAM16 (Motorola iDEN protocol)	
7. Data Rate:	N/A	
8. Internal/External Data Source:	N/A	
9. Emission Designator:	20K0D1W	
10. Output Impedance:	50 Ohm	
11. RF Power Output (rated):	Single:	+27 dBm
	Composite:	+21 dBm
12. Duty Cycle;	Continuous	
13. Channel Spacing:	N/A	
14. Power Output Adjustment:	N/A	
15. Operator Selection of Operating Frequency:	N/A	
16. Modulation Description: Multiplex method:	TDMA (6 voice channels per carrier)	
Tx/Rx Operation:	Two Frequency TDMA	
Modulation Type:	M-16 QAM (Multi-Channel QAM)	
Channel bit rate:	64 kbps	
Speech Coding:	VSELP	

Sincerely,

Victor Lander

THEORY OF OPERATION

The BDA-8087-52 is a bi-directional amplifier. The E.U.T. is designed to exchange radio communications in buildings, basements, tunnels and other RF shielded environments. It improves the sensitivity of base stations in indoor locations where there is a significant amount of cable loss in RF distribution systems.

It contains two amplifiers providing amplification of RF signals in Up-link and Down-link frequency bands. They are connected to the external cables via frequency selective duplexers in order to attenuate all signals that are not in the designated bands.

TECHNICAL DESCRIPTION

The BDA-8087-52 bi-directional amplifier provides signal amplification in two separated frequency bands in both directions between two coaxial connector terminals. It is achieved by utilization of two frequency selective duplexers, which direct signals at two frequency bands present at the common port in two outputs. These duplexers provide sufficiently high isolation between two paths to prevent self-oscillation of the system. Detailed block-diagram is shown in Figure 1.

The amplifier consists from several gain stages with the low noise stage at the input and medium power stage at the output. All amplifier stages operate at class A linear regime in order to provide the lowest possible intermodulation products.

The duplexer serves two purposes: it splits the signal from the common port to two different ports, and it provides frequency selectivity and isolation between two paths. The common port of the first duplexer is called "**BASE STATION**". The common port of the other duplexer is called "**SERVICE AREA**".
Only signals within the frequency range of 851-866 MHz band will be amplified coming from the **BASE STATION** port and only signals within the frequency range of 806-821 MHz band will be amplified from the **SERVICE AREA** port.

In this configuration the BDA amplifies signals in the Up-link band in one direction and signals in the Down-link band in the other direction.

Physically the BDA block consists of a single compact unit with two RF connectors. It is rugged and can be easily connected during cable installation. It has a moisture proof NEMA 4X enclosure suitable for indoor and outdoor installation with two low noise medium power amplifiers, optional independently controlled Up-link and Down-link attenuators, two duplexers, and optional bias tee's.

The BDA can be powered by a conventional 110/220 VAC source using a built-in power supply or alternatively DC voltage can be supplied to the BDA via an external DC input or via center conductor of the RF coax cable.

Communication Components Inc.

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STATEMENT OF QUANTITY

Communication Components, Inc. is planning quantity production (more than one) of Bi-directional Amplifiers.

Dennis Nathan

President

Victor Lander

Director of Marketing

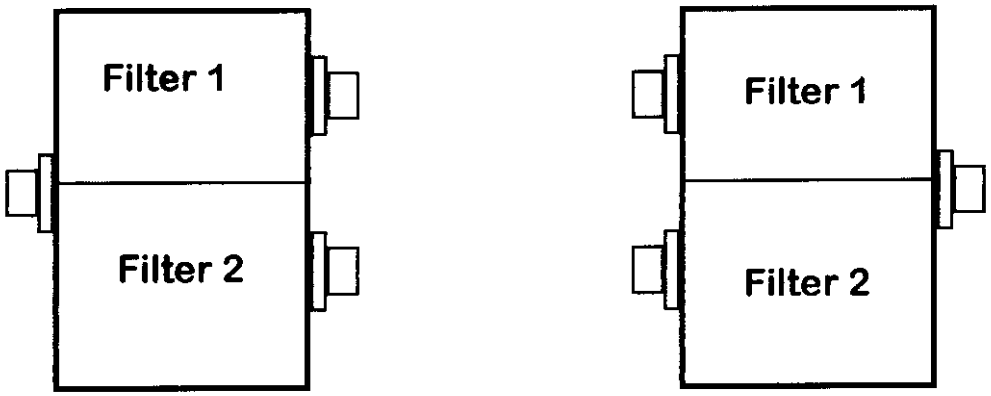
DUPLEXER D8068664

FCC ID: NT3BDA8087

Electrical Specifications

Pass Band 1, Frequency Range, MHz.....806-821
Pass Band 2 , Frequency Range, MHz.....851-866
Pass Band Ripple,dB, peak-to-peak.....0.5 max
Pass Band Insertion Loss, dB.....1.7 max
Filter 1 Frequency Response
Attenuation @ 10-772 MHz, dB.....40 min
@ 779 MHz, dB.....10 min
@ 828 MHz, dB..... .5 min
@ 851 - 866MHz, dB.....65 min
@ 880 to 2,000 MHz, dB.....50 min
Filter 2 Frequency Response
Attenuation @ 10-802 MHz, dB.....30 min
@ 806-821 MHz, dB.....65 min
@ 880-900 MHz, dB.....30 min
@ 900 to 2,000 MHz, dB.....50 min
Isolation between the bands, dB.....65 min
Pass Band VSWR.....1.3 max
Input/Output Impedance, Ohm.....50
Operating power, W
Average..... 5
Peak.....20
Operating Temperature, deg. C.....0 to +60
Dimensions, inches,approximate.....4.0x3.0x 3.0
Notes:
Unit must survive open/short circuit termination under operating power condition.

Pair of Duplexers



FCC ID: NT3BDA8087

AMPLIFIER p/n 201326

Electrical Specification :

•Frequency Range:	800 - 900 MHz
•Gain @ 0 dB attenuation:	
Model BDA-8087-52	54 dB
Model BDA-8087-34	36 dB
Noise Figure:	3 dB Max.
• Group Delay:	80 nanosec. Max.
• Passband Ripple:	0.2 dB Max.
• Output Third Order Intercept Point:	+45 dBm Min.
• Normal Operating Output Power	+22 dBm
• 1 dB Compression Point:	+31 dBm Min.
• Input /Output VSWR:	1.5:1 Max.
• Operating Voltage:	+10 VDC
• AGC (optional):	20 dB

Mechanical Specification:

• Dimensions (approximate)	5"x4"x1"
• Connectors	SMA Type female

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