NOT FOR PUBLIC RELEASE

SMR Channelized BDA

Designed to improve coverage in buildings or outdoor areas, the C-BDA-SMR800 is a channelized SMR800 band repeater.
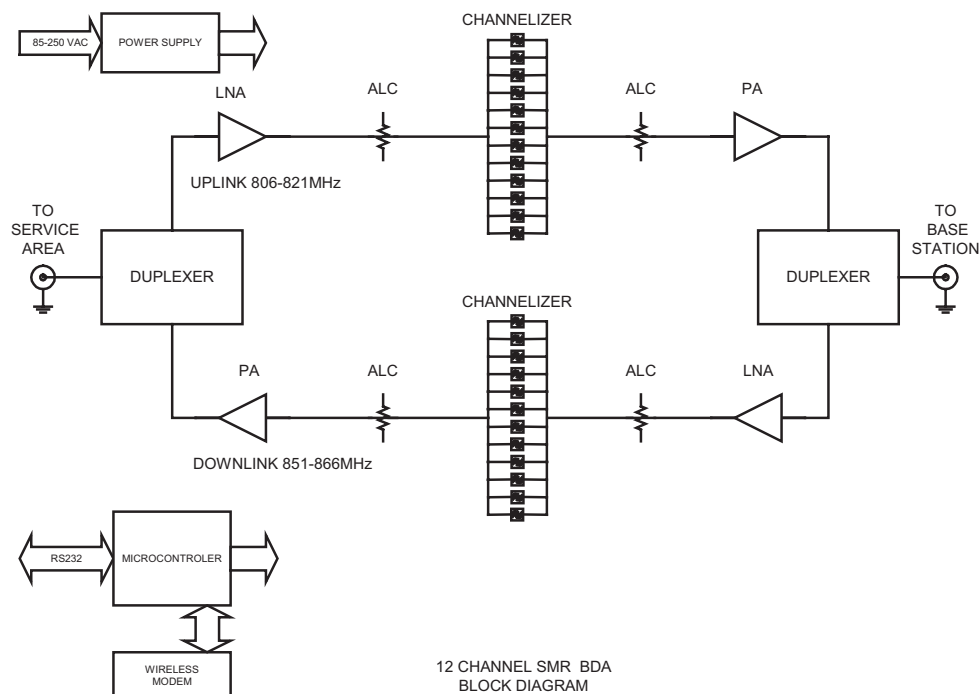
This unit has not yet received FCC Certification and, as such, cannot be offered for sale in the United States.

ORDERING INFORMATION

C-BDA-SMR800   SMR Channelized BDA

- **Channel Selective from 1 to 12 Channels**

- **Digital Filtering -** for flexible bandwidth requirements

- **Wide Dynamic Range** - low noise-high gain

- **Dual Automatic Level Control** - to limit intermodulation

- **Wireless Control and Alarms Via Internet Browser**

- **Highly Stable** - phase locked to crystal oscillator

- **Small Size** - lightweight, reliable fanless design

- **Patent Pending Digital Design**

BLOCK DIAGRAM

85-250 VAC — POWER SUPPLY

CHANNELIZER

LNA ALC ALC PA

UPLINK 806-821MHz

TO SERVICE AREA — DUPLEXER

TO BASE STATION — DUPLEXER

CHANNELIZER

PA ALC ALC LNA

DOWNLINK 851-866MHz

RS232 — MICROCONTROLER

WIRELESS MODEM

12 CHANNEL SMR BDA BLOCK DIAGRAM

SMR Channelized BDA Preliminary Specifications

ELECTRICAL SPECIFICATIONS

Uplink Frequency Band:		806 - 821 MHz
Downlink Frequency Band:		851 - 866 MHz
Channel Bandwidth:		25 KHz
Ripple:	In a channel:	+/- 0.5dB
Selectivity:		>36 dB +/- 25 KHz
Gain:	Adjustable from	36 dB to 119 dB
	Steps:	1 dB
Noise figure:	at Max gain:	6 dB
	at max gain minus 30 dB	12 dB
Spurious and intermodulation levels:		-13 dBm (max)
Propagation delay time:		150 µs
Variation of propagation delay in any channel:		500 ns (typ)
Input/output impedance::		50 Ohms
VSWR (in/out):		1.5:1
Output Power per channel	- for 2 channels:	+29 dBm PEP
	- for 4 channels:	+27 dBm PEP
	- for 8 channels:	+23 dBm PEP
	- for 12 channels:	+21 dBm PEP
Maximum Input power		+10 dBm PEP

ENVIRONMENTAL AND MECHANICAL SPECIFICATIONS

Temperature range:	Storage:	-40 to +60°C
	Operating:	-30 to +50°C
Mains supply:	Voltage:	115/230 VAC, 50/60 Hz
Power consumption:		250 W (max)
Connectors:		
	Antenna	Type N male
	Modem	9 pin male filtered D-subminiature
Ground connection:		Grounding Bolt
Weight:		Approx 65 lbs
Size:		Approx 24"H x 20"W x 8"D
Waterproof level:		NEMA 4
Mount:		Pole or Wall Mount

DIAGNOSTICS

Remote Status

BDA Status

Serial number of the BDA
IP address of the BDA

Status of the Uplink and Downlink
Central frequency
Uplink output power
Downlink output power
Status of the BDA (on/off) when called.

Alarms
Temperature failure
Uplink output power failure
Downlink output power failure
Power supply failure
Uplink VSWR failure
Downlink VSWR failure
Door open alarm
Uplink phase lock loop failure
Downlink phase lock loop failure
Clock phase lock loop failure

Remote Controls

Channel uplink/downlink frequency
Front End uplink/downlink input power setting
Front End uplink/downlink attenuator setting
Front End uplink/downlink Automatic
Level Control on/off setting
Channelizer uplink/downlink attenuator setting
Power Amplifier uplink/downlink attenuator setting
Power Amplifier uplink/downlink Automatic Level Control on/off setting
Power Amplifier uplink/downlink output power setting
Power Amplifier uplink/downlink gain setting

Name	Pin	I/O
Shield Ground	1	Chassis ground connection between DTE and DCE.
Transmitted Data	2	Data send by the DTE.
Received Data	3	Data received by the DTE.
Request To Send	4	Originated by the DTE to initiate transmission by the DCE.
Clear To Send	5	Send by the DCE as a reply on the RTS
DCE Ready	6	Originated by the DCE indicating that it is basically operating (power on, and in functional mode).
Signal Ground	7	The reference ground between a DTE and a DCE
RX Line Signal Detector	8	A signal send from DCE to its DTE to indicate that it has received a basic carrier signal from a (remote) DCE.
Unassigned	9	

9-pin D-sub connector pin connections

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Theory of Operation

The 12 Channel Bi-Directional Amplifier (BDA) operates in the iDEN Specialized Mobile Radio (SMR) band. The Downlink Band is 851-866 MHz and the Uplink is 806-821 MHz. Each iDEN Channel is 25KHz wide and the Transmit and Receive Frequencies are offset by 45MHz.

Unlike a Broadband BDA, which would amplify the entire band, the user can select up to 12 individual 25 KHz channels to be amplified. This increases the repeater's performance by eliminating power sharing with undesired SMR signals and also prevents unwanted amplification of competitor's iDEN channels.

The unit is divided into two basic sections-An RF Section (2 Duplexer Filters, RF Board, Two Power Amplifier boards) and a Digital Section (Digital Channelizer Board)

The 15 MHz wideband RF from the Base Station Antenna (851-866MHz) is directed by the duplexer to the DL input of the RF board. It is then down converted to an IF of 63.5-77.5 MHz using a LO of 788.5 MHz. A wideband Automatic Level Control (ALC) keeps the signal at the required level.

The 15MHz wideband IF input from 63.5-77.5 MHz is sent to the digital board where it is Sub-sampled by an A/D converter operating at 56 MHz.

This 6.5 -21.5 MHz Digital Signal is then sent to three 4-Channel Digital Down Converter (DDC) Chips. Each channel on the chip is comprised of a Digital Mixer, Numerically controlled Oscillator (NCO) and a Digital Filter. A individual Channel is selected by setting the NCO to the Channel Frequency mixing the signal down to base band were it is filtered.

This Filtered Digital output now goes to three 4-Channel Digital Up converter Chips (DUC). The Baseband signal is now mixed up to 6.5 -21.5 MHz by selecting the corresponding NCO frequency. This Digital output is converted to analog by a D/A converter.

This Signal is sent back to the RF Board for Up-conversion. The 6.5 -21.5 MHz is mixed with 56 MHz LO and filtered yielding 63.5-77.5 MHz, which is then mixed with the 788.5 MHz LO producing the 851-866MHz.

The 851-866MHz output from the RF board goes to the RF Power Amplifier and then is sent back out through the duplexer to the Service Antenna. The Power Amplifier incorporates ALC preventing unwanted intermodulation in case of excessive signal levels.

The Uplink path hardware is identical to Downlinks the with the exception of the filter frequencies and the RF LO's.

The RS232 is used for initial configuration only and troubleshooting if required.