

The following is a preliminary User's Manual demonstrating the basic content included in the User's Manuals of all systems to be sold by Fidelity Comtech, Inc.

This particular manual relates specifically to the FCI-2401 system with an antenna of choice. The final page of the User's Manual is to be removed and posted by the Professional Installer at the location of installation, thus notifying the end user of Health Hazard and Professional Installation requirements.



FCI-2401 Intelligent Amp

**A 4 in 1 Bi-Directional Amplifier
with Automatic Gain Control**

Installation & Configuration Guide

NOTE: This Guide is intended for use by
Professional Installation personnel

**Copyright ©2003
by Fidelity Comtech, Inc.**

All Rights Reserved. No part or parts of this document may be reproduced, translated, stored in any electronic retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the copyright holder.

TABLE OF CONTENTS

PRODUCT DESCRIPTION	4
PACKAGE CONTENTS	4
TYPICAL INSTALLATION	5
DC Power Injector Connections and Indicators.	6
FCI-2405 Intelligent Amp Connections	
and Indicators	7
LED Settings: Selecting Signal Output Power..	7
OPERATION	9
SPECIFICATIONS	9
FUNCTIONAL BLOCK DIAGRAM	10
SAFETY NOTICE	10
LIMITED WARRANTY	11
WARRANTY NOTICE	11
INSTALLATION TIPS	12
APPENDIX A: Infrared (IR) Link	
Configuration Instruction	13
APPENDIX B: FCC Part 15 Certified Systems	15

PRODUCT DESCRIPTION:

The Fidelity Comtech FCI-2401 Intelligent Amp is a 4 in 1 bi-directional amplifier with Automatic Gain Control that allows the extension of operating range in 802.11(b) wireless environments. The FCI-2401 provides four (4) selectable output signal settings of 100 mW, 250 mW, 500 mW and 1 Watt configurable via an integrated IR link. The bi-directional amplifier incorporates integrated intelligence capabilities that sense the input power and automatically maintains the appropriate output power regardless of cable loss. This automatic gain adjustment minimizes the signal distortion so that the desired signal quality can be assured.

In wireless applications where longer operating range requires signal amplification the FCI-2401 Intelligent Amp will automatically adjust to accommodate for cable and connector loss regardless of length or configuration. With a ruggedized design the FCI-2401 will operate within a temperature range of -40°C to $+85^{\circ}\text{C}$ assuring the desired performance regardless of the installation environment.

PACKAGE CONTENTS:

An outdoor ready amplifier unit
DC power injector unit
AC power adapter
User Manual with Warranty information

PROFESSIONAL INSTALLATION REQUIRED

The FCI-2401 Intelligent Amp must be installed by experienced antenna installation professionals who are familiar with radio frequency (RF) issues such as gains and losses, as well as local building and safety codes. Failure to do so will void the product warranty and may expose the end user to excessive RF hazards. Regulations regarding maximum antenna gains, amplifier power gain and maximum permissible exposure vary from country to country. It is the responsibility of the end user to operate within the limits of these regulations and to ensure that the professional installers adhere to the antenna installation instructions contained in this manual and comply with RF exposure regulations for transmitter operating conditions. All antennas are intended to be installed outdoors.

TYPICAL INSTALLATION:

As shown in the diagram (**Diagram 1**) below, the FCI-2401 Intelligent Amp components are placed in line between the antenna and wireless equipment. The power for the FCI-2401 Intelligent Amp is carried to the amplifier from a DC Power Injector via RF cable. The DC Power injector is an indoor unit and requires weather protection. The amplifier is weatherproof and has been designed to withstand the outdoor environment ranging from -40°C to $+85^{\circ}\text{C}$. With the integrated lightning protection the amplifier unit must be grounded.

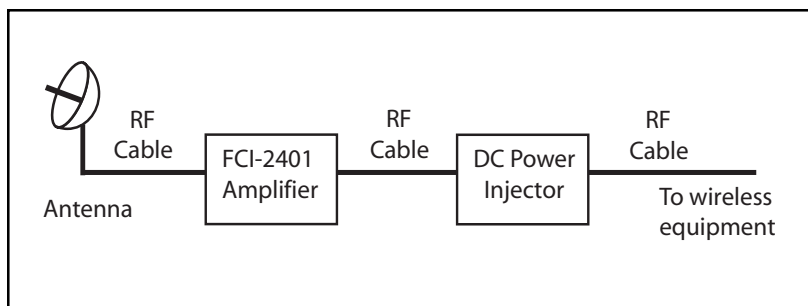


Diagram 1: Typical Installation

CAUTION:

The cable between the DC Power Injector and the Intelligent Amp carries 9 V DC power, make sure it is NOT shorted to ground. If the LED on the DC Power Injector does not light when power is connected (the transformer is connected) check for DC short in the RF cable.

DC Power Injector Connections and Indicators:

The DC injector injects DC power into the RF cable and the power is carried to the FCI-2401 Intelligent Amp with the RF signal. The power supply provided is a 110 AC to 9V DC converter.

“RADIO” Connection:

This “N” connector is connected to the wireless radio equipment via RF cable.

“AMPLIFIER” Connection:

This “N” connector is cabled to the FCI-2401 Intelligent Amp via the appropriate RF cable.

FCI-2401 Intelligent Amp Connections and Indicators:**“INPUT” Connection:**

This “N” connector is connected to the DC Power Injector via the transmission cable.

“Antenna” Connection:

This “N” Female connector connects to the antenna with an appropriate length of coax cable.

LEDS: The LEDS indicate the current output power settings.

LED Settings: Selecting Signal Output Power

[NOTE: Only Professional Installers are allowed to set or change the output power on the amplifier. Once these settings are established, the amplifier unit must be installed in a manor that the end user is prevented from modifying the configuration].

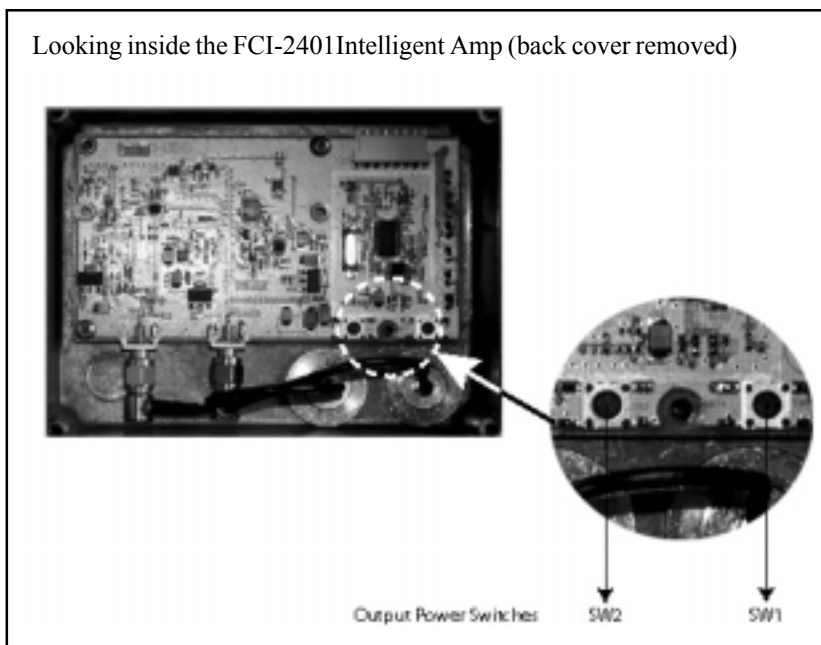
When power is applied one of the four (4) output power indicator LEDs will light.

To make changes to the power settings follow instructions below:

The Signal boost can be set two ways:

- 1) Take out the four (4) Philips head screws and remove back cover, being careful not to lose the neoprene O ring gasket around the screws. With power applied to the amplifier, press SW1 or SW2 (as shown in **Figure 1**) until the desired output power LED lights.

Figure 1:



- 2) If the installer does not want to open the case it is possible to set the output power through the infrared (IR) port. See **Appendix A** for instructions.

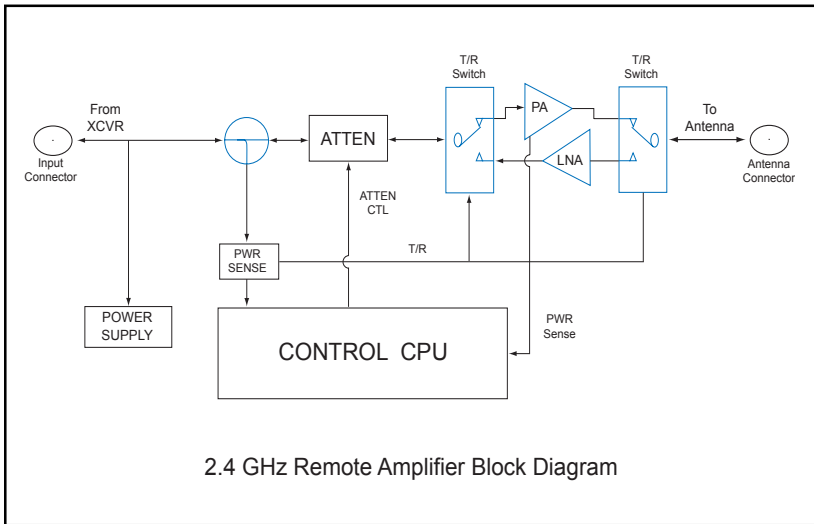
OPERATION:

It may take several seconds for the FCI-2401 to sense and accurately determine the input power level. Once the input power is established the unit will automatically maintain a stable output power. The FCI-2401 Intelligent Amp contains a high performance power detector and directional coupler. It senses the input power and switches to transmit mode in less than 60 ns (the best performance currently available). The remainder of the time the FCI-2401 is in receive mode. The signal level must be greater than 2 mW to turn the transmitter on as it is designed to work with both Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread

SPECIFICATIONS:

PARAMETERS	SPECIFICATIONS
Frequency Range	2400 to 2484 MHz
Receive Gain	20 dB maximum. Adjusts to maintain optimum performance
Receive Noise Figure	<3.0 dB
Transmit Gain	Automatically adjusts to maintain output power
Minimum Signal Level	10 dBm
Maximum Signal Level	25 dBm
DC Input Power	7 to 24V dc
Output Power	Selectable; 100 mW, 250 mW, 500 mW, 1 Watt
Operating Temperature Range	-40 Celsius to +85 Celsius
Connections	N Connectors

FUNCTIONAL BLOCK DIAGRAM:



SAFETY NOTICE

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment when installed as directed. When this device is installed as a fix-mount application there is a minimum required separation distance of one (1) meter between the antenna and all persons during normal operation. For mobile mounted antennas, the required separation distance is a minimum of twenty (20) cm between the antenna and all persons during normal use.

LIMITED WARRANTY

Fidelity Comtech, Inc. warrants that this device is free of defects in material and workmanship for a period of one (1) year after initial purchase. Fidelity Comtech will, in this period of time, repair or replace, any FCI-2401 Intelligent Amp product returned to the factory, freight prepaid.

The Fidelity Comtech warranty covers repairs or replacement (at our option) of the product only. Fidelity Comtech is not responsible for the cost of removal, reinstallation or shipping to the place of repair. Fidelity Comtech does not extend or modify its warranty period as a result of repair or replacement.

Fidelity Comtech reserves the right to void a warranty and/or make reasonable charges for repair of a unit if the warranty seal is broken or the unit displays evidence of misuse, abuse or tampering.

Fidelity Comtech is not responsible for damage to any other equipment or property, or any other consequential or incidental damages of any kind, whether based on contract, negligence, or strict liability. Maximum liability shall not in any case exceed the purchase price of the unit.

Warranties give you (the buyer) specific legal rights. You may also have other rights that vary from state to state. This warranty is only extended to purchases made in the United States of America or its possessions.

WARRANTY NOTICE

The FCI-2401 Intelligent Amp warranty is null and void if any of the following occurs:

1. The antenna connections are not properly waterproofed.
2. Improper connectors are used.

INSTALLATION TIPS:

The FCI-2401 unit should be mounted as near the antenna as possible in order to eliminate any cable loss between the radio and the antenna. From this position the unit will provide full output from the antenna.

When mounting the amplifier unit the N-connectors should face in the downward direction in order to minimize the impact of any possible moisture.

APPENDIX A: Infrared (IR) Link Configuration Instructions

Overview:

It is possible to set the output power of the FCI-2401 amplifier without opening the weatherproof seal. This feature is especially useful for installers who may need to install these devices frequently.

IR programming of the FCI-2401 amplifier is performed through the IrDA port of a Palm Pilot PDA. Programming is limited to setting the correct output power

Setup

Download the program "Pocketerm II." This program is available from www.palmgear.com. Follow the instructions to install this program in your palm pilot. This program is free for the first 30 days. After 30 days, there is a small use fee.

Once the program has been installed, follow this process to configure Pocketerm II and establish communications with the FCI-2401 amplifier:

1. Pull down the main menu
2. Under "Options -> COMM" press "Configure"
3. Set the serial options to: 8 data bits, 9600 baud, 1 stop bit, No parity, no flow control, and most importantly, **check the box that says "USE IR"**. Press "OK" Press "OK" again at "COMM options."
4. In the upper right hand corner of the screen, tap the button marked "Connect".

The IR link serves as a way to communicate with the amplifier in the FCI-2401, but is not intended to provide a long distance link. It can easily be confused by direct sunlight and it is necessary to hold the palmpilot within about 6" of the amplifier to achieve a reliable connection. Most installers find it beneficial to set power prior to installing the amplifier.

Setting the output power

If power is applied to the bi-directional amplifier while a palm pilot is monitoring the IR port, the user will observe “Booster amplifier vX.X” which indicates the software release.

Using either the pop-up keyboard or the graffitti, the user can enter the digit “1” through “4”, to send a message to the amplifier through the IR link. The user will be prompted with a message similar to “Confirm set power to 500 mW?” If this is correct, press “y” on the keyboard, or enter the graffitti stroke for “y”. The amplifier will respond by setting the output LED to the new value and sending the following message over the IR link: “Power set to 500mW.”

If the installer waits more than 10 seconds before pressing “y” to confirm the new power setting the request to change power times out, and the amplifier assumes it received a spurious input on the IR port. This is to prevent the amplifier from accidentally reconfiguring its power to a value lower than that required to maintain a suitable link.

APPENDIX B: FCC Part 15 Certified Systems

FCC Certified systems consist of:

- * FCI-2401 amplifier, DC Power injector and 9V power adapter
- * Orinoco WLAN card: FCC ID: IMRWLPCE24H
- * Outdoor Antenna

Orinoco certified antennas:

Model	Power Settings	Certified Channels	Installation
MAXRAD 4 dBi Omni MFB 24008	100 mW 250 mW 500 mW 1 Watt	Channels 01-11 Channels 01-11 Channels 03-10 Channel 06	Mobile or Fixed Mounted installation
ARC Wireless 13 dBi Flat Panel	100 mW 250 mW 500 mW 1 Watt	Channels 01-11 Channels 03-09 Channel 06 n/a	Fixed Mounted installations only
ARC Wireless 19 dBi Flat Panel AAI-00084	100 mW 250 mW 500 mW 1 Watt	Channels 04-08 Channel 06 n/a n/a	Fixed Mounted installations only

NOTE: The 13 dBi and 19 dBi panel antennas are only authorized for use in point to point systems. It is the installer's responsibility when using these antennas to ensure that the system is used exclusively for point to point operations, and that the antenna may not be co-located with other intentional radiators transmitting the same information. Reference FCC regulations 15.247(b)(3).

This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter

Important Information for the User

Your wireless system has been installed and configured by an RF professional to comply with FCC part 15 regulations. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the installation and configuration manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the end user will be required to correct the interference at their own expense.

Modifications to this system including changing antenna, power setting or transmit channel may result in a non-compliant system, and should only be undertaken by professional installers after reading the Installation and Configuration guide for this system.

For further information, please contact:

Fidelity Comtech Customer Support
5485 Conestoga Court, Suite 237
Boulder, CO 80301
e-mail: info@fidelity-comtech.com

SAFETY NOTICE

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment when installed as directed. When this device is installed as a fix-mount application there is a minimum required separation distance of one (1) meter between the antenna and all persons during normal operation. For mobile mounted antennas, the required separation distance is a minimum of twenty (20) cm between the antenna and all persons during normal use.

Installer: Please post this notice in a prominent location near the amplifier