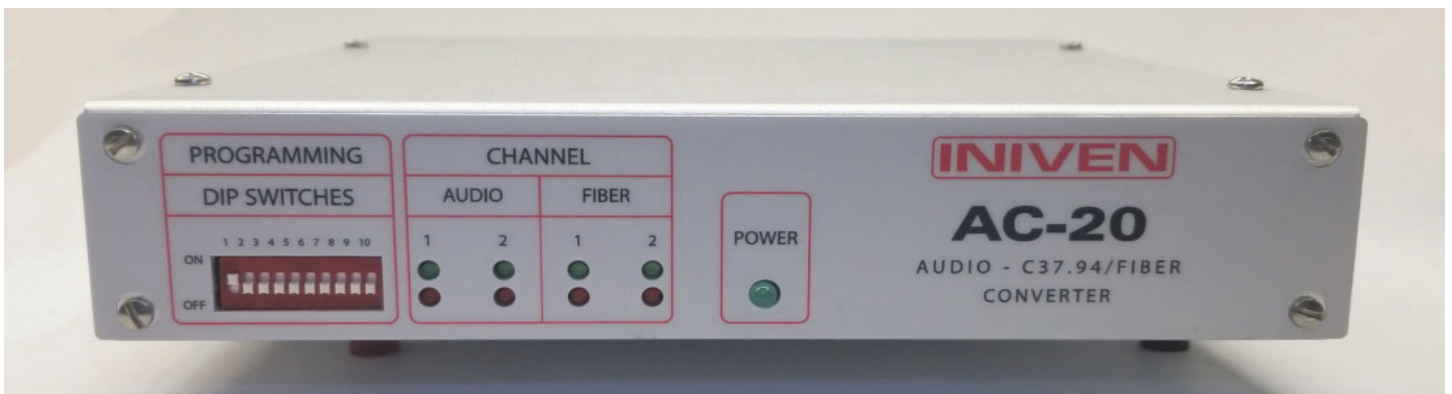




AC-20

AUDIO TO FIBER OPTIC/C37.94 CONVERTER

- Convert Voice Grade Audio to Fiber
- Supports IEEE Std C37.94
- Up to 2 Audio Channels (2 wire or 4 wire)
- Point-to-Point or C37.94 Fiber
- Singlemode or Multimode Available
- Upgrade Existing Protection Channels



INTRODUCTION

The AC-20 is a voice grade audio (300 to 3800Hz) to fiber converter. It supports both direct point-to-point fiber communications as well as the IEEE Std C37.94 protocol. There are two sets of audio and fiber ports. Each audio port can be configured as a 2 wire or 4 wire connection. Each fiber port can be programmed to operate for point-to-point or C37.94 applications. Both singlemode and multimode fiber heads are available. The ports are independent of each other and can be configured differently. Audio ports may be bi-directional or uni-directional but fiber ports must be bi-directional.

The AC-20 acts transparently in the communications path. It is ideal for converting older audio equipment to fiber optic, without the need of replacing the IED.

The AC-20 is designed for audio communications to be converted to a fiber optic channel. The unit is not designed to have C37.94 signals transported over an audio channel.

The AC-20 is intended to communicate using a multiplexer or other device that will source the master clock, as per the IEEE Std C37.94. Point-to-point fiber communications can be accomplished by using one of the two AC-20s in the circuit as a master clock. Clock settings are adjusted using the DIP switches on the front panel. 850nm multimode LED TX/RX fiber optic heads are standard, and are commonly used for C37.94 communications and point-to-point applications over short distances. Optional 1310nm singlemode LED heads are available for longer direct fiber paths, and C37.94 applications requiring singlemode fiber. The optional 1550nm singlemode LASER option is intended for longer point-to-point communication applications. The fiber ports are independent, and the AC-20 can be equipped with two different types of fiber head sets in a single unit.

The AC-20 was designed for applications such as protective relaying, and other environments where substation hardened equipment is required.

The AC-20 has limited programmability. It has been designed as a plug-and-play system. Programming is limited to turning off unused channels via DIP switches, setting the audio channels to 2 wire or 4 wire, and turning on the master clock when needed. Additional DIP switches are available for future options and requirements. Communications are transparent, regardless of the brand of communications equipment used.

Monitoring of both the audio and C37.94 signals is a standard capability. The AC-20 displays the status of the channels using LED's on the front panel and relays for remote monitoring.

PROGRAMMING AND CONNECTIONS

PROGRAMMING

The AC-20 is programmed using the a 10 position DIP switch located on the front panel.

Switch 1 through 6 operate as follows:

- 1) Switch 1 in the up position enables Port 1; Down disables the channel.
- 2) Switch 2 in the up position enables 4 wire audio on Port 1; Down enables 2 wire audio.
- 3) Switch 3 in the up position enables the master clock function on Port 1; Down disables master clock.
- 4) Switch 4 in the up position enables Port 2; Down disables the channel.
- 5) Switch 5 in the up position enables 4 wire audio on Port 2; Down enables 2 wire audio.
- 6) Switch 6 in the up position enables the master clock function on Port 2; Down disables master clock.

The other switches are not used at this time, and are reserved for future use.

INPUTS AND OUTPUTS

The rear panel contains all the I/O connections. Communication interfaces consist of two removable terminal blocks for the audio connections and two fiber optic interfaces. Each fiber interface has one transmit and one receive 850nm multimode head with an ST connector. A singlemode 1310nm LED or 1550nm LASER is available as an option. Both the LED interfaces may be used for C37.94 communications. All fiber types may be used for point-to-point fiber communications.

Two sets of removable terminal blocks, for wiring power and alarms, are located on the rear of the chassis. Each connection is labeled as indicated in Figure 1.

The AC-20 uses a wide range power supply capable of operating, between 24 and 125 VDC. A 250 VDC option is available. One of the two terminal blocks are dedicated for DC connections.

The second terminal block is used to connect the two, dry contact, Form C relay alarms. The alarms are for communication fail on any of the communication channels, audio and/or fiber, and power fail. Each alarm has 3 connections: normally open (NO), normally closed (NC), and armature (A). This allows the user to select which type of output they would prefer, without the need to perform any programming or jumper settings. The user simply connects the armature and their choice of NO or NC. The alarm relays do not have polarity, and accept voltages up to 125VDC.

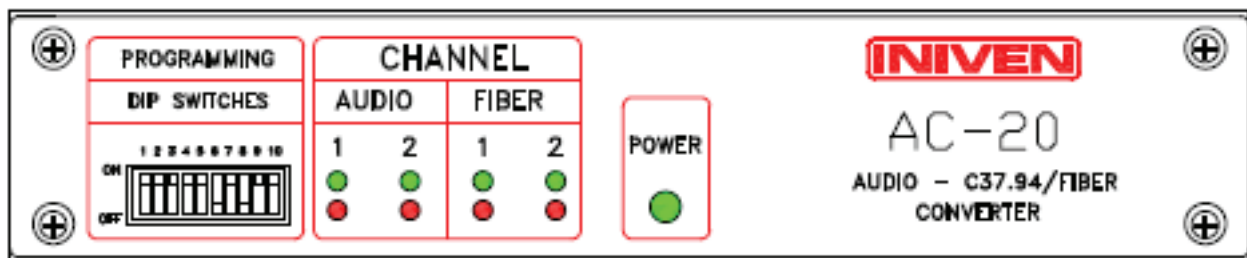
ALARMS AND INDICATORS

There are two status relay alarms on the AC-20: Power Fail and Com Fail. Each alarm relay is a Form C relay and may be used as NO or NC.

Power Fail is used to indicate that the unit's power supply can no longer operate within acceptable parameters. In the case of a power failure, all status relays will return to their "normal" position and the green Power LED on the front panel will turn off. When power is being supplied to the unit, the green Power LED will remain illuminated.

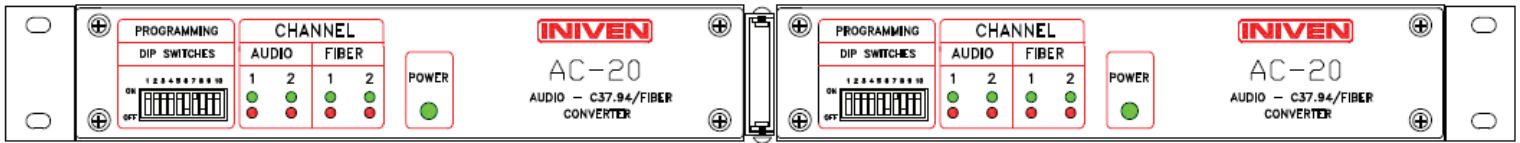
Com Fail is a common alarm shared by the, audio and fiber interfaces. If any of the communication channels were to stop communicating, the Com Fail relay will go to its "normal" state. This alarm will also return to normal if there is a power failure.

The front panel contains eight communication status LEDs: four for audio and four for fiber. Each channel is labeled 1 and 2, for both the audio and fiber ports. A green LED indicates communication is detected over the channel. A red LED indicates that the channel is on, but no communication is detected. If neither LED is on, the channel has been turned off by the DIP switch on the front of the AC-20.

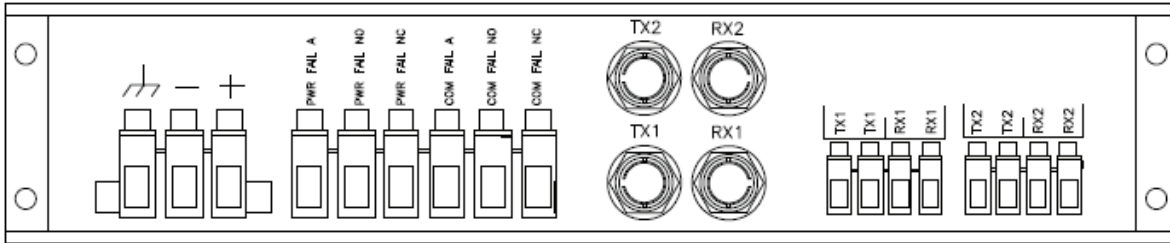


FRONT PANEL INDICATORS

CHASSIS

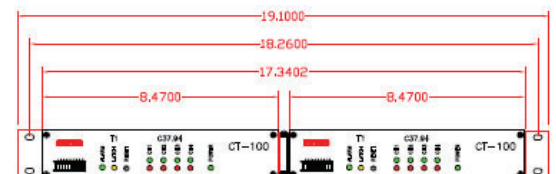
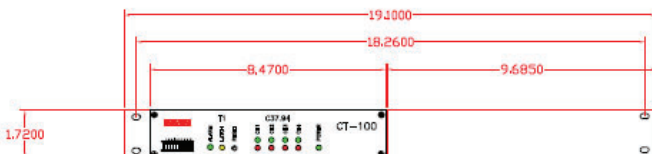
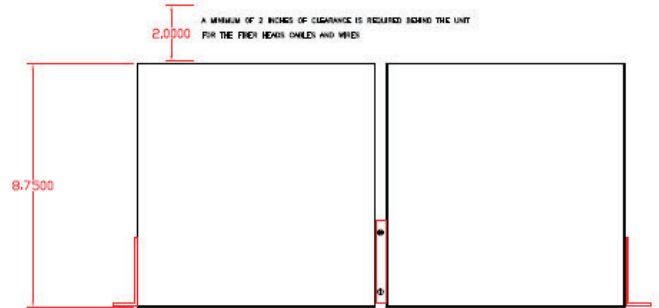
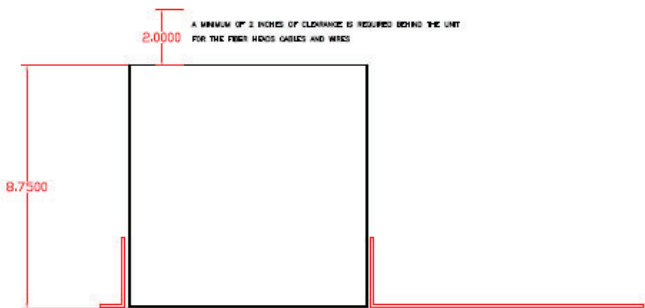


CHASSIS FRONT, 19" RACK, DUAL



CHASSIS BACK

A single AC-20 aluminum enclosure is 1U tall and half the width of a standard 19" rack. It can be mounted alone in a 19" rack, using an extended bracket, side by side with standard brackets, or the unit can be shelf mounted. An AC-20 can be mounted side by side with another AC-20, or a CT-100 in a single 1U 19" rack.

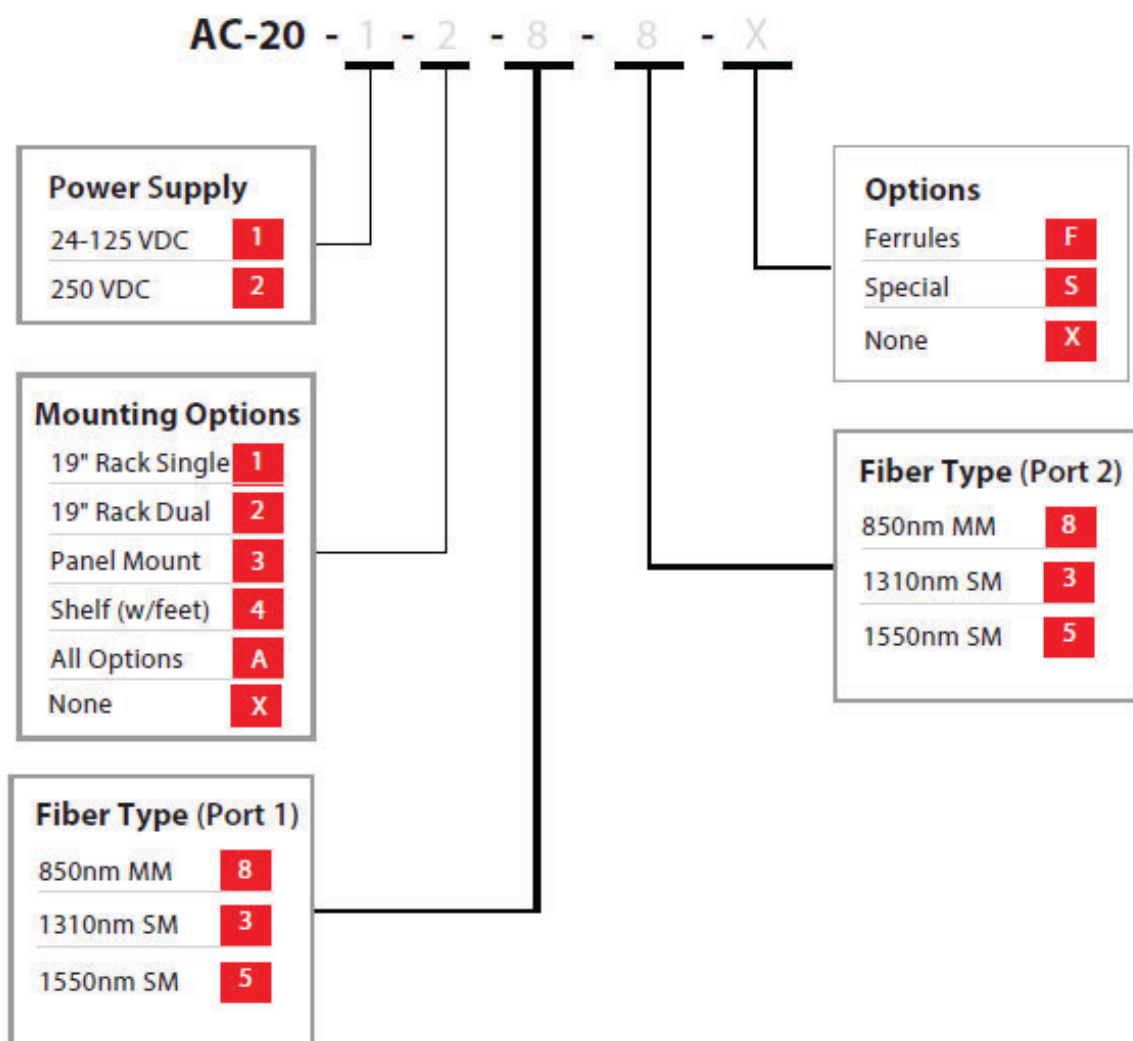


19" RACK MOUNTING DIMENSIONS

ORDERING INFORMATION



AC-20 PART GENERATOR



AC-20 PART NUMBER GENERATOR

SPECIFICATIONS

Power Supply	24-125 VDC or 250 VDC Current Draw Max, 195 ma @ 24 VDC
Optical	ST, 850 nm LED, 1310 nm LED, 1550 nm LASER
Audio	2 Wire or 4 Wire 300 to 3700 Hz
Relays	Form C, 1 Amp max contact rating 24, 48, or 125 VDC Optional: 250 VDC @ 0.5 A
Alarms	Power Fail Communication Fail (Audio and/or Fiber)
Environmental	DC Rated Control Power Inputs Interface Dielectric Strength Impulse Voltage Surge Withstand Capability (SWC) Radio Frequency Susceptibility (RF) Electrostatic Discharge (ESD) Vibration and Shock IEEE Standard 1613-2003 Class 2 95% relative humidity, non-condensing
Chassis Dimensions	Dimension: Height: 1.72 inches (43.69 mm) Width 8.5 inches (215.9 mm) Depth 9.5 inches (241.3 mm) Weight: 2.5 pounds (1.1 kg)

