# ITC-402P Two Place Panel Mount with Enhanced Noise Reduction Technology

## Introduction

Congratulations on purchasing the new FlightTech ITC-402P panel mount intercom.  The ITC-402P is designed using the latest in technology.
For pilot conveyance, there is a Pilot/All switch which allows the pilot to disable passenger audio to the pilots headphones

With proper installation, the ITC-402P will give many years of reliable cockpit communications for both the pilot and passengers.

**FlightTech ITC-402P Features**

**Enhanced Noise Reduction**
 The ITC-402P features Enhanced Noise Reduction or ENRI.  The ENRI feature will eliminate or greatly reduce all background noise picked up the headsets microphone.  Sounds such as engine noise and wind noise that are commonly heard with voice operated intercoms when the microphone circuits are open, are eliminated with ENRI.

**Pilot Isolate**
 At times, it is desirable for the pilot to listen to ATC and allow the passages to commutate while not interfering with the pilot.  The Pilot Isolate switch in the "ALL" position allows the pilot to hear and talk to every one connected to the intercom.  In the "PILOT" position, the pilot will only hear the communication radio audio.

**Pilot & Co-Pilot PTT**
 The ITC-402P includes PTT functions for both the Pilot and Co-Pilot and depending on which PTT switch is enabled, either the Pilot or Co-Pilot will key the communications radio and be able to speak.

**Auxiliary Audio Stereo Input**
 A Stereo Auxiliary input is provided allowing a tape or CD player to be connected to the ITC-402P.  The audio output is mono to the headphones

**Auxiliary Audio Muting**
 The Auxiliary audio will mute audio from the Communication radio is occurs.

**Cellular Phone Interface**
The Cell Phone interface will connect the pilots headphones to a Cellular Phone.  Unlike headphone with built in cell jacks,  the audio to the phone from the pilot headset is derived from the intercom audio processor, eliminating engine noise or other background noise that may be heard during the phone call.  Connection between the ITC-404SP and the cell phone is done through a patch cord with 2.5mm plugs.

**Fail Safe**
 In the event that power should fail to the intercom, the pilots microphone is automatically connected directly to the radio microphone.  Moving the PILOT/ALL to the PILOT position will connect the pilots headphone to the radio audio.

## Unpacking
The ITC-402P intercom comes complete ready for installation and includes the follow.
- Intercom  Unit
- Two 1/4" Headphone Jacks and mounting hardware
- Two Headphone Microphone Jack and mounting hardware
- Connector Housing and  hardware for Headphone, Power and   Audio connections to the Intercom Unit.
- Installation Manual

Carefully review the constantans to ensure that all of the items are included.  If you find missing parts, contact the factory.

## Installation

**Mounting the Control Panel** requires four holes in the instrument panel and can easily be secured in place by the Volume Control mounting nut and a 4-40 3/8" screw. Refer to pages 6 and 7 for the DRILL DRAWING (Fig. 1) and mounting drawing for correct holes sizes and locations. In addition to the Fig. 1, a separate drilling template is enclosed.

**Control Panel Label,**  After the holes are drilled and the control panel is checked for proper mounting, the Control Panel Label can be applied.  Make sure the surface is clean form oil or drill chips.  Remove the back protective cover from the label and apply it to the instrument carefully aliening the holes.  Insert the control panel and install the Volume control nut.

**Cable Connections**, the Intercom Unit contains two cables and connectors. A 12 pin Plug is for connecting the Power, Audio Inputs and Headphone connections for the Pilot, Co-pilot.

The cable connector is a Molex K.K. Series .100" housing and crimp terminals. The terminals can be crimped onto wire size ranging from 22 to 30 gage, 24 gage wire is recommended for the intercom installation.

Recommended tools for installing the terminals are,
Molex Universal Crimp Tool,
part # 63811-1000
Molex Extraction Tool,
part # 11-03-0022

Power (12 VDC) and Ground wires should be 22 Gage wire with a 2 amp fuse in line with the Plus Voltage line.

Microphone cables as well as headphone cables should be a shielded cable . All ground or shield connections should be terminated at one point at the connector.

### Mounting Microphone and Headphone Jacks


Mic Jack

1. Locate the mounting areas making sure that the jacks will not interfere with any aircraft control components. (The jack contacts will expand when a plug is inserted into the jack.)

2. Drill 3/8" diameter holes for the headphone jacks.

3. Drill 1/2" diameter holes for the microphone jacks and install with the insulating washers supplied. (see Fig. 7 )
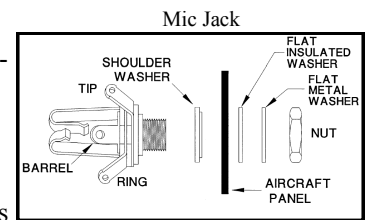
### Auxiliary Audio Input For Music

The Auxiliary Audio input is available for connecting a portable CD Player or other audio device to the intercom system. The Stereo inputs are low level with 560 ohm termination resistors. The Left and Right Channels and ground are connected to pins 1-L, 2-R and 3-Ground of Socket S-2.

### Auxiliary Audio Input for Audio Warning Devices.

A second, single channel input is available for devices such as Traffic Watch receivers and Angle of Attack Indicators. This audio input is un-muted and is always both Pilot and Copilot when the Pilot/All switch is in the **ALL** position. The tones or audio will not be heard by the pilot if the Pilot/All switch in in the **PILOT** position.

### Push-to-Talk Switch
The ITC-402P will accept both Pilot and Co-Pilot PTT switch installation. SPST push button switch's can be used with one terminal connected to ground and the other terminal connected to socket S1-9 for the Pilots PTT and S1-8 for the Co-Pilot's PTT.

<div align="center">

**Operation of the ITC-402P**

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The ITC-402P is one of the simplest intercoms available to operate, plug in the headphones, turn on the power and start talking. It's that easy!

With the ITC-402P Enhanced Noise Reduction circuit, there are no squelch controls or functions to contend with. Since there are no squelch function either manual or automatic, it is not necessary to kick-start the audio with the first spoken word. Also, the missed words due to long pauses are gone. Simply talk.

### Volume and Power Control
     Turning the Volume control clock wise will turn on power to the intercom and increase the intercom volume. This controls the amplitude of the headsets microphone heard by the pilot and passengers. The volume control has no effect of the auxiliary audio or the communications radio audio level.

**Pilot/All Switch**

The Pilot/All switch controls the audio heard by the pilot and passenger. In the ALL position, the Pilot, Passengers, Auxiliary audio and Communication Audio can be heard by everyone.

With the switch in the Pilot position, the pilot will hear audio from the communication radio but not the passenger or the auxiliary audio. There will be no side-tone heard by the pilot, unless the comm radio provides a side tone.

**Headphones and ENRI**

As with any intercom installation, the amount of ambient noise heard through the Passive ear cups is dependent on the quality of the headphones. The better the Passive headphones, the better the nose reduction.

What the passive headphones do not do, is reduce or eliminate is the noise picked up by the headsets microphone and heard when the intercoms audio path is open. This where the ENRI function comes into action, eliminating or reducing the background noise heard by the headsets microphone.

NOTE: for best results, it is necessary to speak close to the headsets microphone.

**ANR Headsets** ANR Headsets provide additional noise reduction at the headset's ear cups but some background audio from the headsets microphone can still be heard. ANR headsets used in conjunction with the ITC-402P ENRI intercom will have an added benefit of no microphone noise. ANR headsets are not required for the Electronic Noise Reduction circuit to operate.

**Push-to-Talk**

The ITC-402P features Pilot and Co-Pilot PTT function allowing either the pilot or co-pilot to key and talk on the communication radio. When ever the pilots PTT is pushed, only the pilot will be able to talk but when the co-pilot PTT is keyed, the audio path is switch from the pilots microphone to the co-pilots microphone. The pilot can still talk through the intercom but not to the radio.

**Auxiliary Stereo Audio & Muting Function**

When a device such as a CD player is connect to the intercom and stereo headphones are used, pilot and passengers can enjoy music while on long trips.

The Auxiliary Audio will mute when one of two things take place.
1. When ever there is audio present from the communication radio.
2. During intercom communications.

The muting action from either source will effect all the headsets and auxiliary audio will remain muted for a short period after the intercom audio or radios audio stops.

**Intercom Internal Adjustment**

There are several potentiometers located on the main intercom circuit board that may require adjustment. These include POT VR-1 the microphone gain control, VR-2, the Noise Reduction Pot, VR-3, the Comm Radio audio balance and VR-4, Cell phone microphone level control. To adjust VR-1, 2, 3 and 4, remove the top cover on the intercom box.

**VR1 Mic Gain.** The headset's microphone audio quality, noise canceling qualities and gain or volume, vary wieldy from manufacture to manufacture. It has been found that microphone gain, the volume from the microphone can be as much as a factor of 10. Therefore, it is best to use headphones of the same type when possible. If it is found that the microphone volume is too low or too high, VR-1 can be adjusted to provide a comfortable level. The two microphone inputs are common to VR-1, adjusting VR-1 will effect both microphone equally.

Pot VR-1 the Pilot microphone gain, adjusting the pots CCW will increase the microphone gain. The gain control should not be adjusted any more then necessary to give a comfortable listing level. As the gain is increased, so is the possibility of picking up some background noise.

For best results, the microphone should be used with it next to the mouth or touching the lips as recommended in the headsets instructions and the gain pot adjusted for a minimum level.

**Refer to Fig. 8, Page 7 for the location of VR-1, 2, 3 and 4**

## Field Adjustment of Noise Reduction Control

In some aircraft it may be necessary to adjust both the Microphone gain control and the Noise Reduction control.  This can easily be done on the ground by placing an loud audio.  If there is a cabin speaker for the comm radio, open the squelch and turn up the volume.  A portable radio with the squelch open, located close to the headset also works well.

- While listening on the headset, the radio should not be heard, but if there is audio heard, adjust the Noise Reduction Control "Clockwise" to eliminate the background sound.  This control can be ***over adjusted*** by turning too far clockwise.
  Talk into the microphone and note a point at which the microphone audio decreases, at this point, turn the pot slightly CCW.  This should give the best balance between microphone audio and background noise reduction.

After the adjustments are set and before closing the case, check to ensure that no wires are pinched or broken.  Reassemble the two parts of the case and tighten the two screws in the bottom of the case.

## Headphones with Microphone Gain Adjustment.

Headphones, such as LightSpeed have a microphone gain adjustment located on the back of the microphone.  It is recommended that this level or Gain control be set to minimum position for best results.

## High Noise Environment

It has been found that in aircraft such as open cockpit airplanes, wind passing over the microphone and high engine power settings such as take off and climb will produce a popping sound in the intercom.  For wind noise, it is recommended that a wind muff be used on the microphone.  High engine power settings are a bit more difficult to deal with and may be reduced by adjusting the microphone level control for the lower setting.  During normal cruise power setting, there should be no outside noise coming through the intercom.
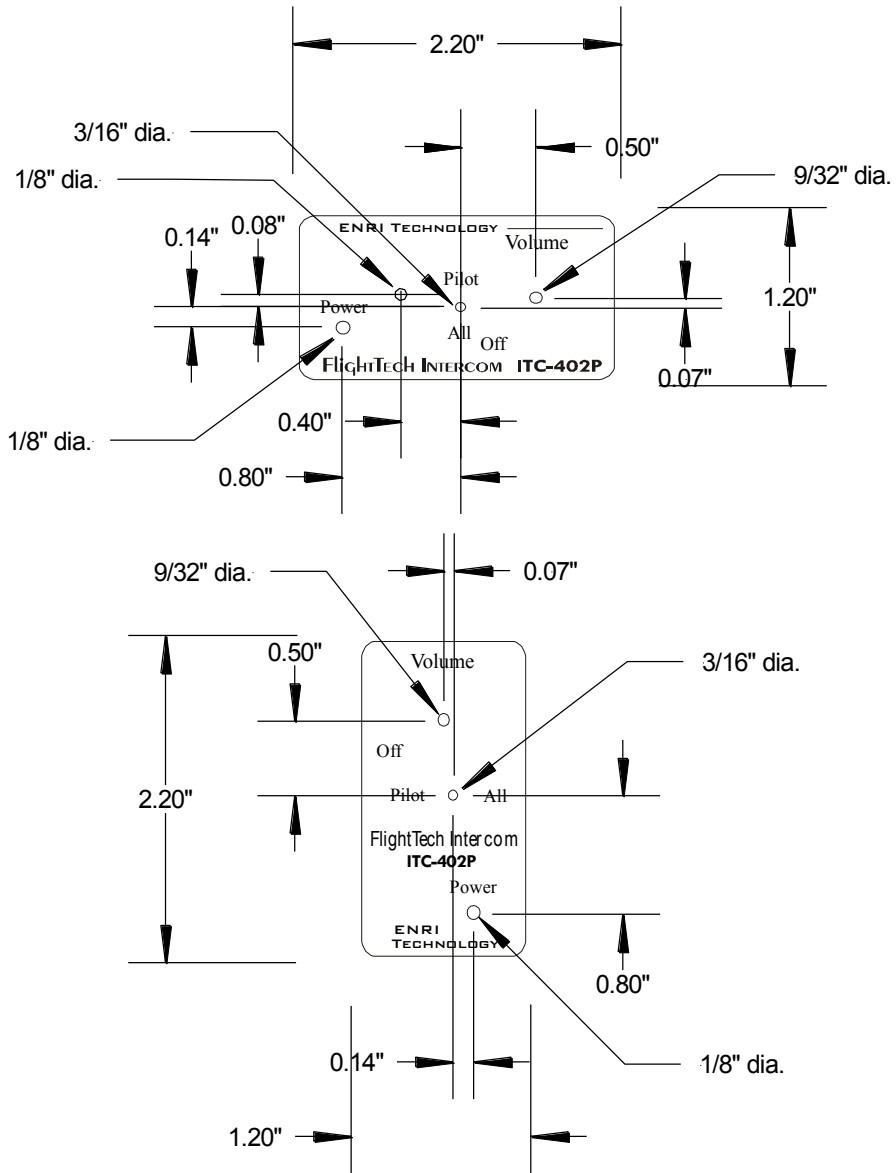
## Communication Radio Line Balance

When  toggling the Pilot/ISO switch, a difference in the radio audio level may be heard.  To correct this level difference, a level balance pot, **VR-3** can be adjusted to set the audio level.  Locate VR-5 and while listening to the communication radio audio through the PILOTS headphone position, toggle the PILOT/ISO switch.  Adjust VR-3 until a even audio level is heard in both the PILOT and ISO position.

## Service

With your new FlightTech ITC-402P intercom properly installed,  you will enjoy many years of trouble free operation.  In the event of a problem and after checking the obvious, fuse, jacks or wiring, you should contact the FlightTech Intercom Technical Support center for suggestions or returning the intercom for repair.

The FlightTech phone numbers are located on the back cover of this manual.

## Drawing is not to scale, Dimensions are correct.
## Use the enclosed full scale drill template.

2.20"

3/16" dia.

1/8" dia.

0.50"

9/32" dia.

0.14"  0.08"

ENRI Technology

Volume

1.20"

Pilot

Power

All  Off

FlightTech Intercom  ITC-402P

0.07"

1/8" dia.

0.40"

0.80"

9/32" dia.

0.07"

0.50"

Volume

3/16" dia.

Off

2.20"

Pilot  All

FlightTech Intercom
ITC-402P

Power

0.80"

ENRI
Technology

1/8" dia.

0.14"

1.20"

FLAT
INSULATED
WASHER

SHOULDER
WASHER

TIP

FLAT
METAL
WASHER
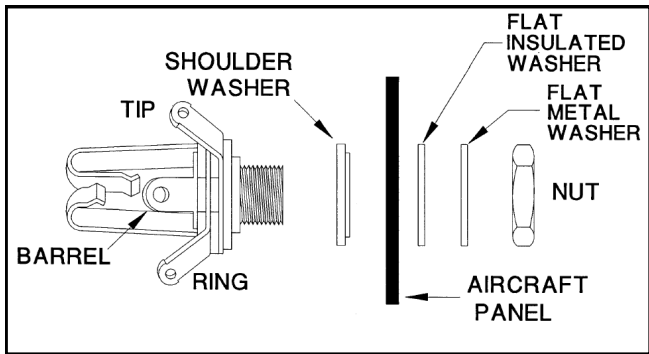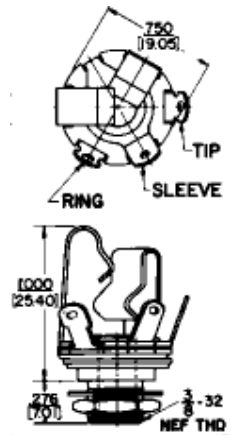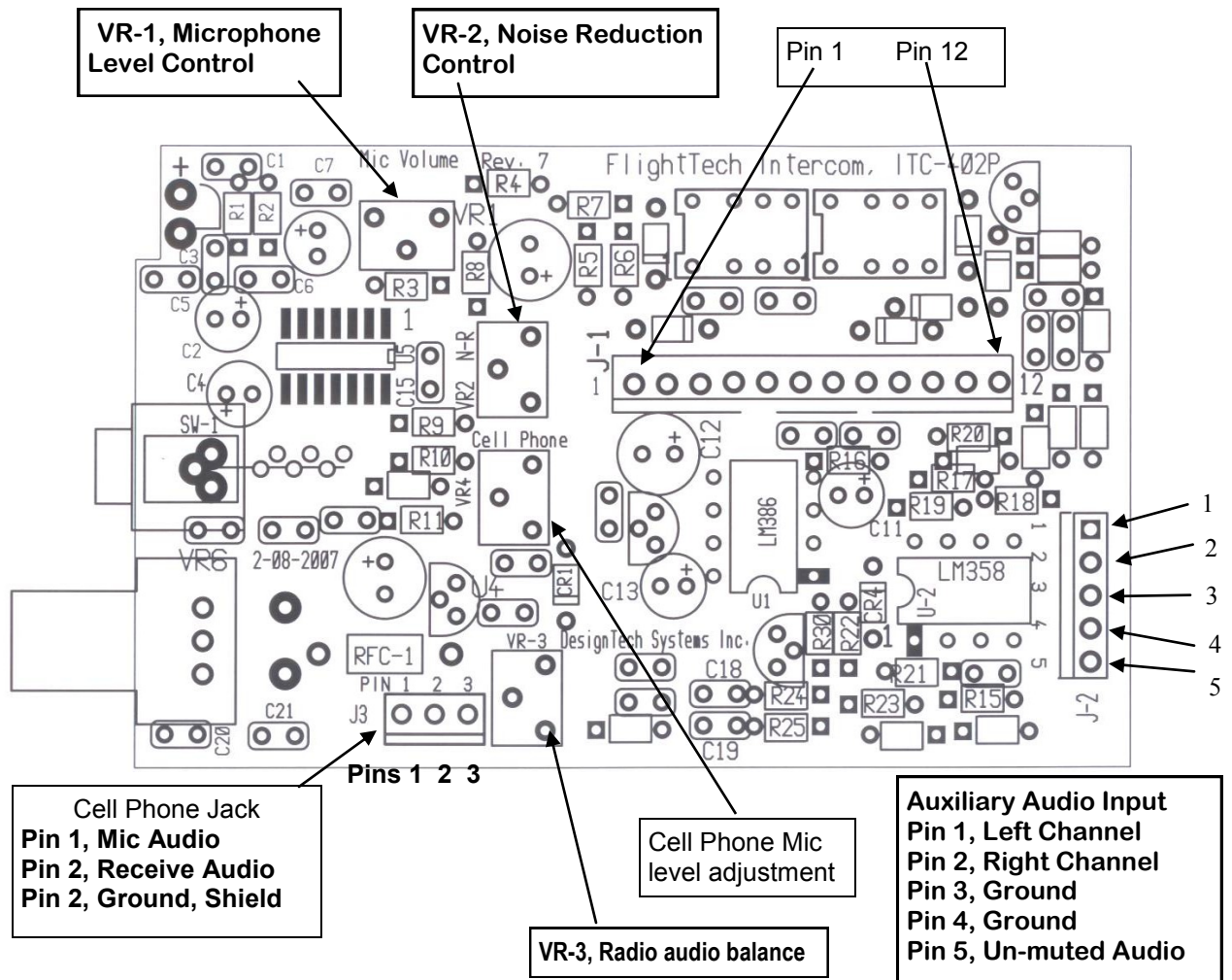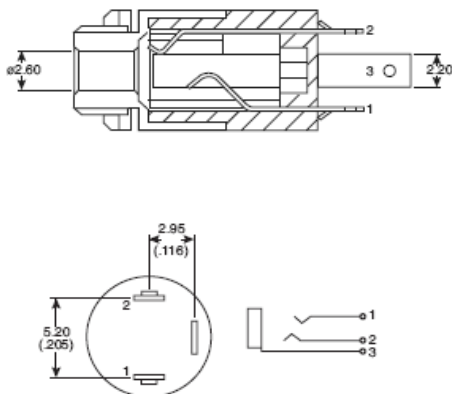
NUT

BARREL

RING

AIRCRAFT
PANEL

3/8" Dia. Hole

Diagram for microphone jacks showing location of Tip, Ring and Sleeve.

Microphone Jack
Tip– PTT Line
Ring– Mic Audio
Sleeve– Ground

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[19.05]

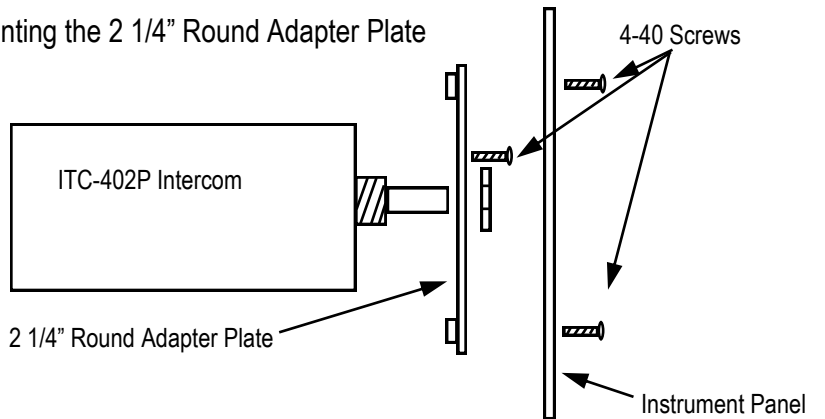TIP

RING

SLEEVE

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3/8 -32
NEF THD

Fig. 8

VR-1, Microphone Level Control

VR-2, Noise Reduction Control

Pin 1    Pin 12

Pins 1 2 3

Cell Phone Jack
**Pin 1, Mic Audio**
**Pin 2, Receive Audio**
**Pin 2, Ground, Shield**

Cell Phone Mic level adjustment

VR-3, Radio audio balance

Auxiliary Audio Input
**Pin 1, Left Channel**
**Pin 2, Right Channel**
**Pin 3, Ground**
**Pin 4, Ground**
**Pin 5, Un-muted Audio**

Cellular Phone Jack

Pin 1, Mic to J3-1
Pin 2, Audio to J3-2
Pin 3, shield to J3-3

Mounting the 2 1/4" Round Adapter Plate

4-40 Screws

ITC-402P Intercom

2 1/4" Round Adapter Plate

Instrument Panel

4-40 x 3/8 screw

Volume Control Nut

Pilot PTT Switch
Connect PTT switch at jack

Soc.1-7   White
Soc.1-9   White/Blue   Pilot Mic

Soc.1-5   White
Soc.1-8   White/Blue   CoPilot Mic
Soc.1-11

CoPilot PTT Switch
Connect PTT switch at jack
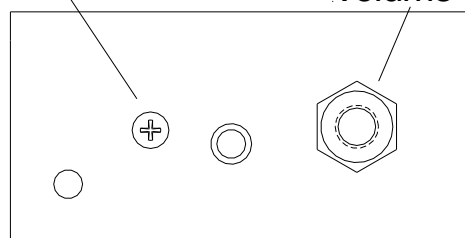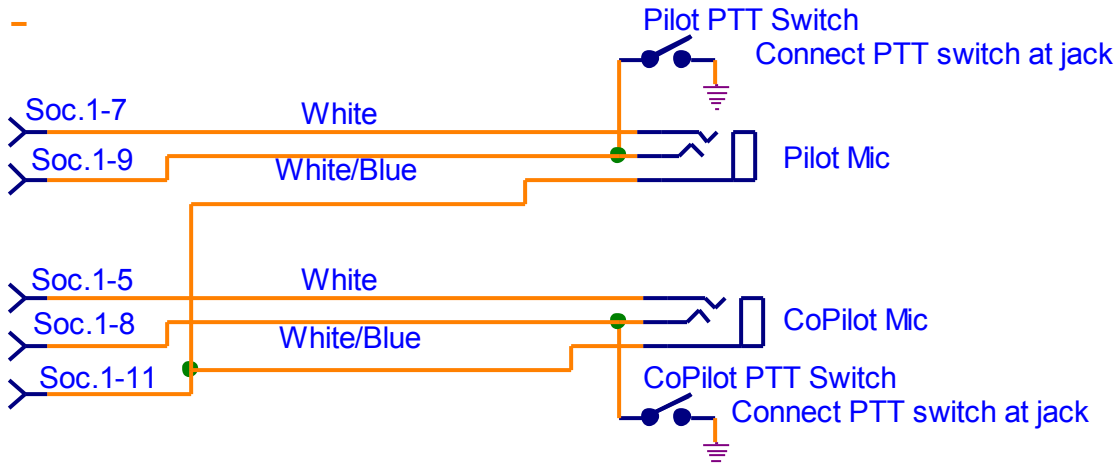
Connect microphone cable schield together at intercom plug end of cable.

Soc.1-6   White   To Radio Mic Input
Soc.1-10   White/Blue   To Radio PTT
Soc.1-3   White   To Radio Headphone Output
Soc.1-1   1 amp fuse   A/C Plus Voltage, 12-28VDC
Soc.1-12   Ground

Soc.1-2   White
Shield   Pilot Headphone
Soc.1-4   White
Shield   CoPilot Headphone

Cellular Phone connection

Soc.2-1   White   To Aux. audio output L. Channel
Soc.2-2   White/Blue   To Aux. audio output R. Channel
Soc.2-3   Shield   To Aux. audio output Ground or Shield

LOOKING FROM THE WIRE END OF THE CONNECTOR

Looking from the Wire Side of the connector

GND
GND
PTT Out
Pilot PTT
CoPilot PTT
Pilot Mic
Mic Audio Output
CoPilot Mic
CoPilot Headphone
Low Level Audio
Pilot Headphone
12-28VDC

Soc.1-12
Soc.1-11
Soc.1-10
Soc.1-9
Soc.1-8
Soc.1-7
Soc.1-6
Soc.1-5
Soc.1-4
Soc.1-3
Soc.1-2
Soc.1-1
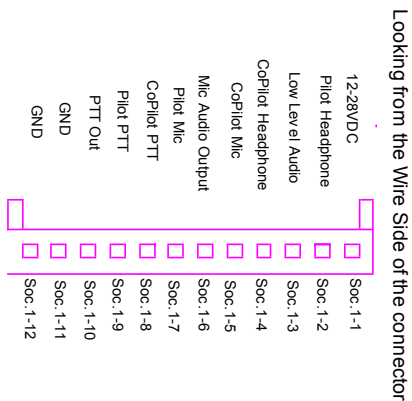
## 3-YEAR UNCONDITIONAL WARRANTY

"FlightTech Intercoms" are warranted against defects for three years from date of purchase from authorized distributors and dealers. Within the three year period, the FlightTech Intercom will be repaired or exchanged (at our option) without charge for parts or labor. Simply return your intercom along with proof of purchase, return postage of $10.00 (within USA) and it will be repaired or replaced within two weeks. Warranty does not cover transportation cost or product misuse, accidental damage, owner tampering or reworking.

Except as provided herein, either FlightTech Intercoms or DesignTech Systems makes no warranties, expressed or implied, including warranties or merchantability and fitness for a particular purpose.

**NOTE:** Some states do not permit limitations or exclusions of implied warranties, therefore, the aforesaid limitations (s) may not apply to the purchaser.

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### ITC-402P Technical Data

- Power Requirements: 12 to 28 VDC @ 40ma
- Size: Main Unit, 3.25" L x 2.2"W x 1.2" H
- Microphone inputs
- Headphone inputs
- Headphone Audio output
- Auxiliary Audio input

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FlightTech Intercoms
DesignTech Systems, Inc.
P.O. Box 828, Downers Grove, IL 60515
Phone: 630-324-8199  Fax: 866-896-4431
Internet: http://www.flighttech.com
Email: info@flighttech.com

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