

Training Manual

T Series Addendum

All Models



© **TELEDYNE ADVANCED POLLUTION INSTRUMENTATION**
(T-API)

9480 CARROLL PARK DRIVE

SAN DIEGO, CA 92121-5201

TOLL-FREE: 800-324-5190

TEL: 858-657-9800

FAX: 858-657-9816

E-MAIL: api-customerservice@teledyne.com

WEB SITE: www.teledyne-api.com

073300000 RevA

DCN# 5869

10-4-2010

TABLE OF CONTENTS

- 1. FRONT PANEL, REAR PANEL, AND DISPLAY**
- 2. CALIBRATION & UPDATE PROCEDURES**
- 3. TROUBLESHOOTING FAULTS**
- 4. DIAGRAMS AND SCHEMATICS**
- 5. E SERIES COMPATIBILITY**

1. FRONT PANEL, REAR PANEL, AND DISPLAY

1. Getting Started

This section introduces you to the instrument components of the front and rear panel, which are unique to the T series analyzers.

1.1. Front Panel

Figure 1-1 shows the analyzer's front panel layout, followed by a close-up of the display screen in Figure 1-2, which is described in Table 1-1. The two USB ports on the front panel are provided for the connection of peripheral devices:

- plug-in mouse (not included) to be used as an alternative to the touchscreen interface
- thumb drive (not included) to upload new versions of software (contact T-API Customer Service for information).
- plug-in keyboard (not included) to reach the touchscreen display calibration menu

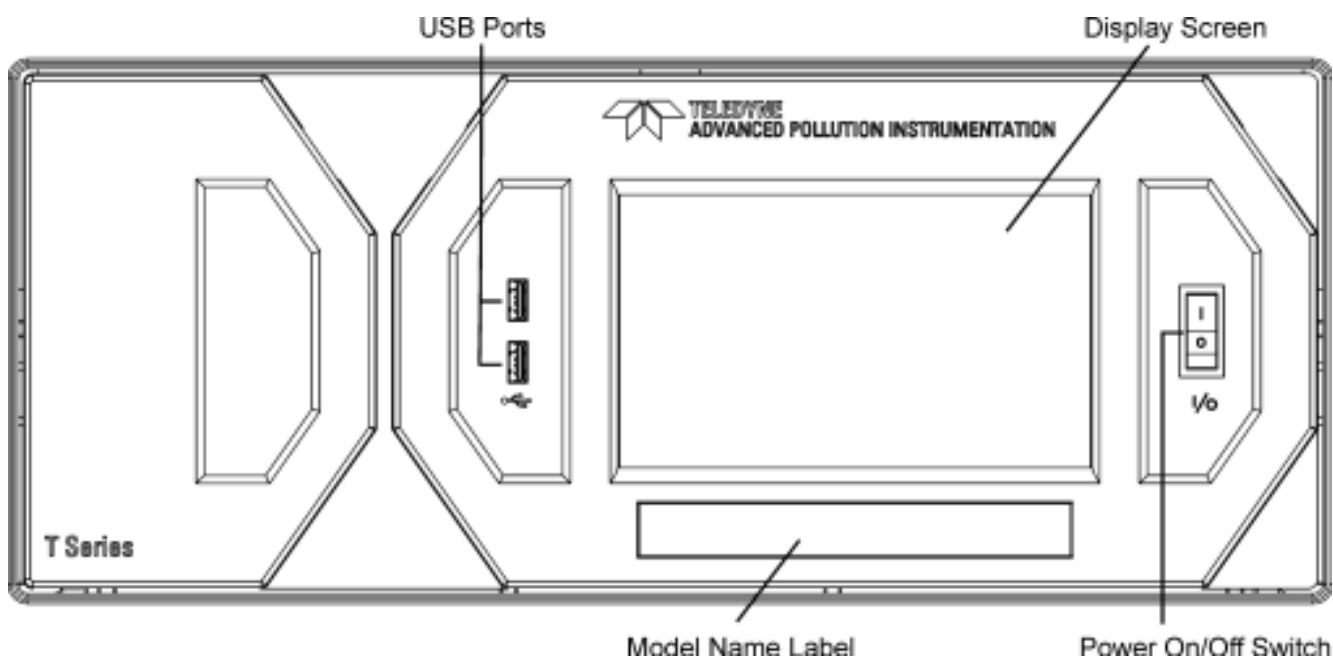


Figure 1-1: Front Panel Layout



Figure 1-2: Display Screen and Touch Control

The front panel liquid crystal display screen includes touch control. Upon analyzer start-up, the screen shows a splash screen and other initialization indicators before the main display appears, similar to Figure 1-2 above (may or may not display a Fault alarm). The lights on the display screen indicate the Sample, Calibration and Fault states; also on the screen is the gas concentration field (Conc), which displays real-time readouts for the primary gas and for the secondary gas if installed. The display screen also shows what mode the analyzer is currently in, as well as messages and data (Param). Along the bottom of the screen is a row of touch control buttons; only those that are currently applicable will have a label. Table 1-1 provides detailed information for each component of the screen.

ATTENTION

COULD DAMAGE INSTRUMENT

Do not use hard-surfaced instruments, such as pens, to touch the control buttons.

Table 1-1: Display Screen and Touch Control Description

Field	Description/Function			
Status	Lights indicating the states of Sample, Calibration and Fault, as follows:			
	Name	Color	State	Definition
	SAMPLE	Green	Off	Unit is not operating in sample mode, DAS is disabled.
			On	Sample Mode active; Front Panel Display being updated; DAS data being stored.
	Blinking	Unit is operating in sample mode, front panel display being updated, DAS hold-off mode is ON, DAS disabled		
CAL	Yellow	Off	Auto Cal disabled	
		On	Auto Cal enabled	
		Blinking	Unit is in calibration mode	
FAULT	Red	Off	No warnings exist	
		Blinking	Warnings exist	
Conc	Displays the actual concentration of the sample gas currently being measured by the analyzer in the currently selected units of measure			
Mode	Displays the name of the analyzer's current operating mode			
Param	Displays a variety of informational messages such as warning messages, operational data, test function values and response messages during interactive tasks.			
Control Buttons	Displays dynamic, context sensitive labels on each button, which is blank when inactive until applicable.			

Figure 1-3 shows how the front panel display is mapped to the menu charts illustrated in this manual. The Mode, Param (parameters), and Conc (gas concentration) fields in the display screen are represented across the top row of each menu chart. The eight touch control buttons along the bottom of the display screen are represented in the bottom row of each menu chart.

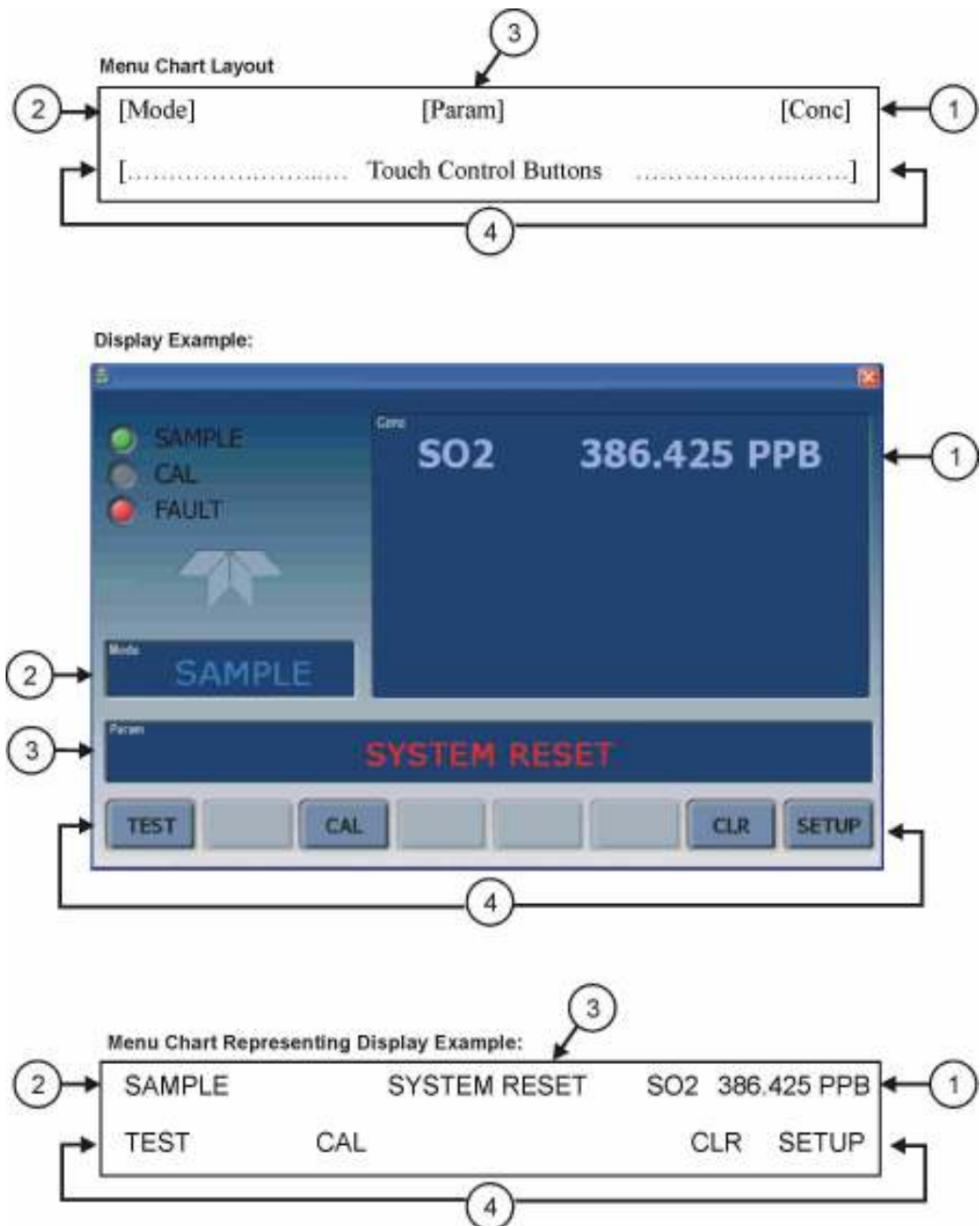


Figure 1-3: Display/Touch Control Screen Mapped to Menu Charts

1.1.2 Front Panel/Display Interface

Users can input data and receive information directly through the front panel touch-screen display. The LCD display is controlled directly by the CPU board. The touchscreen is interfaced to the CPU by means of a touchscreen controller that connects to the CPU via the internal USB bus and emulates a computer mouse.

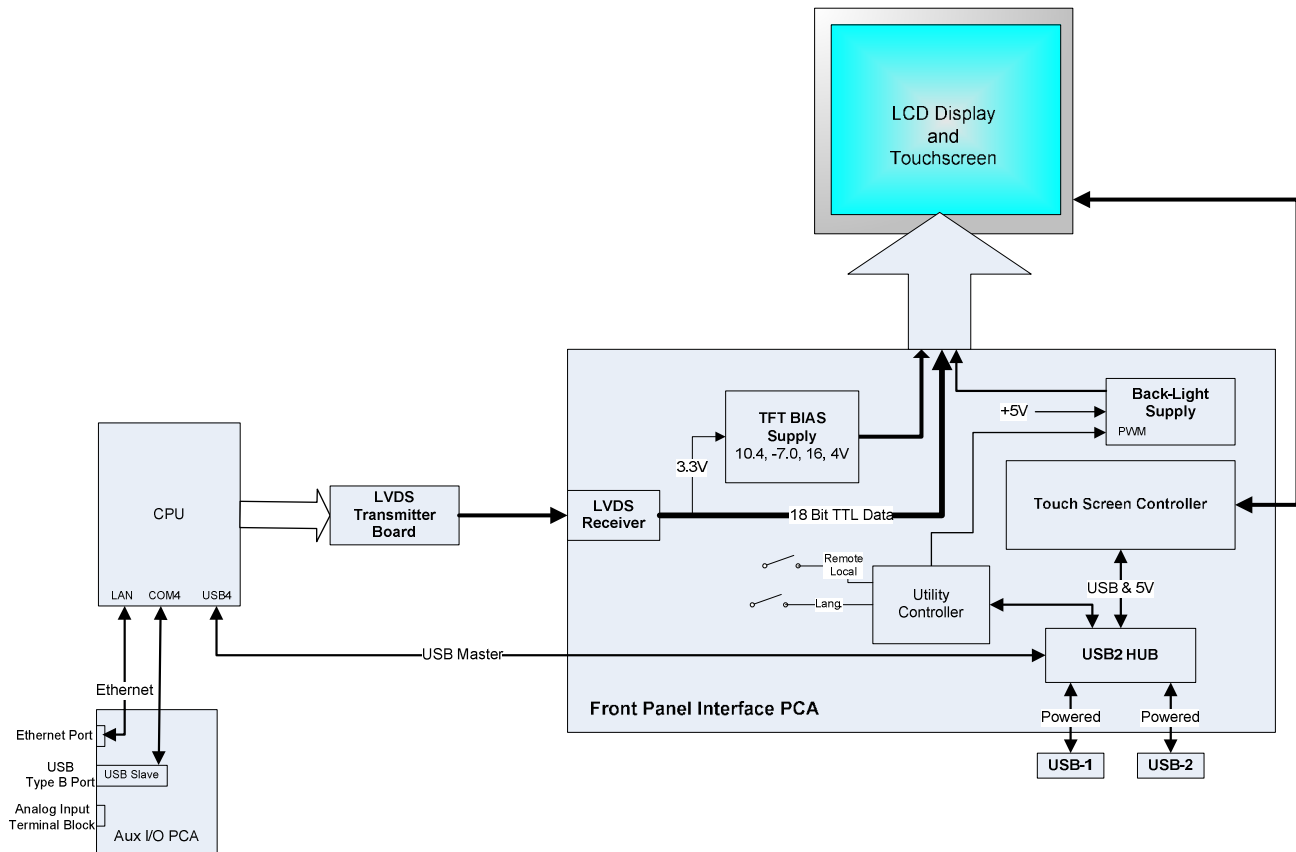


Figure 1-4: Front Panel and Display Interface Block Diagram

1.1.2.1. LVDS Transmitter Board

The LVDS (low voltage differential signaling) transmitter board converts the parallel display bus to a serialized, low voltage, differential signal bus in order to transmit the video signal to the LCD interface PCA.

1.1.2.2. Front Panel Interface PCA

The front panel interface PCA controls the various functions of the display and touchscreen. For driving the display it provides connection between the CPU video controller and the LCD display module. This PCA also contains:

- power supply circuitry for the LCD display module
- a USB hub that is used for communications with the touchscreen controller and the two front panel USB device ports
- the circuitry for powering the display backlight (current driven)

1.2. Rear panel

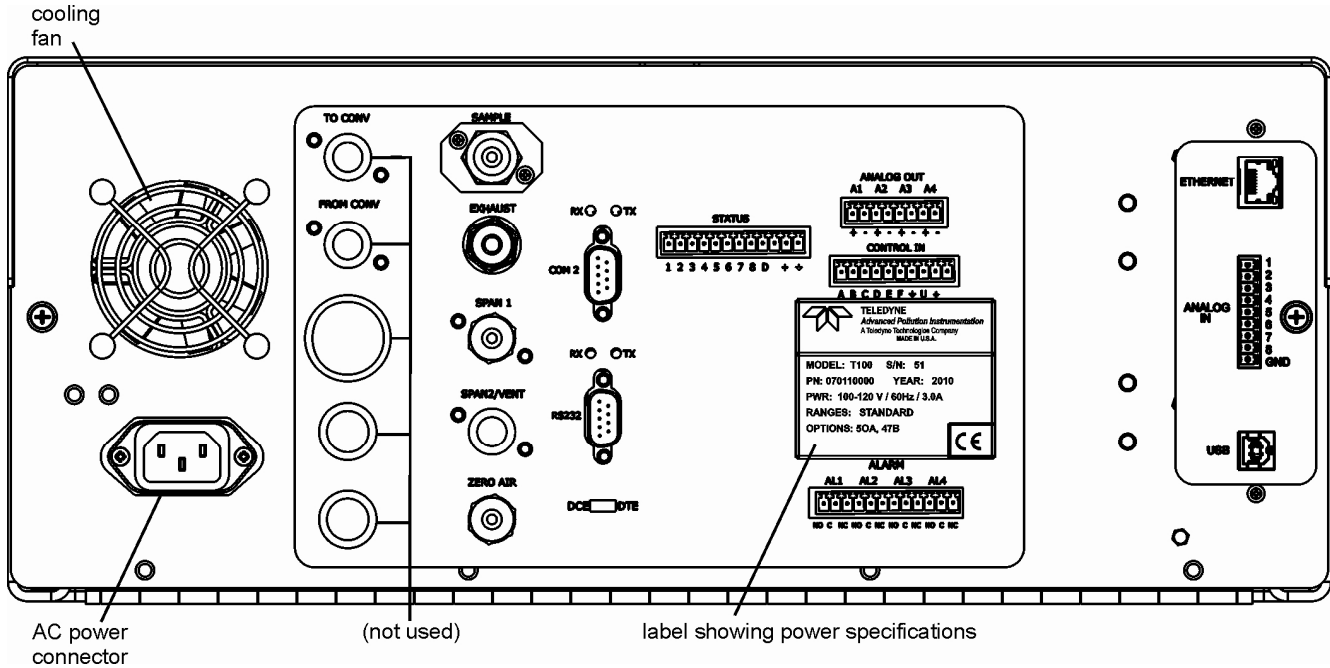


Figure 1-5: Rear Panel Layout

Table 1-2 provides a description of new components on the rear panel.

Table 1-2: Rear Panel Description

Component	Function
ANALOG IN	Option for external voltage signals from other instrumentation and for logging these signals
USB	Connector for direct connection to personal computer, using USB cable.

1.2.1. Connecting Analog Inputs (Option)

The Analog In connector is used for connecting external voltage signals from other instrumentation (such as meteorological instruments) and for logging these signals in the analyzer’s internal DAS. The input voltage range for each analog input is 0-10 VDC.

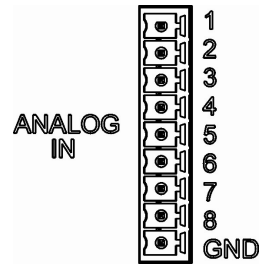


Figure 1-6: Analog In Connector

Pin assignments for the Analog In connector are presented in Table 1-3.

Table 1-3: Analog Input Pin Assignments

PIN	DESCRIPTION	DAS PARAMETER ¹
1	Analog input # 1	AIN 1
2	Analog input # 2	AIN 2
3	Analog input # 3	AIN 3
4	Analog input # 4	AIN 4
5	Analog input # 5	AIN 5
6	Analog input # 6	AIN 6
7	Analog input # 7	AIN 7
8	Analog input # 8	AIN 8
GND	Analog input Ground	N/A

1.2.2. USB Connection (Option)

For direct communication between the analyzer and a PC, connect a USB cable between the analyzer and desktop or laptop USB ports. (If this option is installed, the **COM2** port can only be used for Multidrop communication). The baud rate of the PC and the analyzer must match.

2. CALIBRATION & UPDATE PROCEDURES

2.1 Display Calibration

The touchscreen display for the T series analyzer can be calibrated for the user's individual touch. To calibrate the display, you will need a USB keyboard. With the keyboard plugged into either USB port on the front panel, power off the instrument and then re-power.

A Teledyne logo will appear and flash, wait until a logo appears again with the words **System Booting** and a loading bar appear below the logo, and hold down the left shift and left control key on the keyboard throughout the rest of the boot up. This may take several minutes to reach the destination screen.

Once the screen becomes solid blue and a mouse cursor appears on the center of the display, release the left shift and left control keys. A red and white target will appear near the center of the screen. Press the target to start the calibration. The target will now appear in a different location. Press and hold each target following the instructions on the display until you are asked to hit either ACCEPT or CANCEL. Hit accept to accept the changes or cancel to decline the changes. After you hit accept, remove the keyboard and re-power the instrument.

2.2. Analog Input Calibration

Analog I/O Configuration for Analog In

Table 2-1: DIAG - Analog I/O Functions (Example functions for a T100, AOUTS may vary)

SUB MENU	FUNCTION
AOUTS CALIBRATED:	Shows the status of the analog output calibration (YES/NO) and initiates a calibration of all analog output channels.
CONC_OUT_1	Sets the basic electronic configuration of the A1 analog output (SO ₂). There are three options: <ul style="list-style-type: none"> RANGE: Selects the signal type (voltage or current loop) and full scale level of the output. REC_OFS: Allows setting a voltage offset, not available when RANGE is set to Current Loop (CURR). AUTO_CAL: Performs the same calibration as AOUT CALIBRATED, but on this one channel only. NOTE: Any change to RANGE or REC_OFS requires recalibration of this output.
CONC_OUT_2	Same as for CONC_OUT_1 but for analog channel 2 (SO ₂)
TEST OUTPUT	Same as for CONC_OUT_1 but for analog channel 4 (TEST)
CONC_OUT_3	(Not available in the analyzer's standard configuration; applies when optional sensor installed).
AIN CALIBRATED	Shows the calibration status (YES/NO) and initiates a calibration of the analog input channels.
XIN1 . . . XIN8	For each of 8 external analog inputs channels, shows the gain, offset, engineering units, and whether the channel is to show up as a Test function.

2.2.1. AIN Calibration

This is the sub-menu to conduct the analog input calibration. This calibration should only be necessary after major repair such as a replacement of CPU, motherboard or power supplies. Navigate to the **ANALOG I/O CONFIGURATION MENU** from the DIAG Menu, then press:

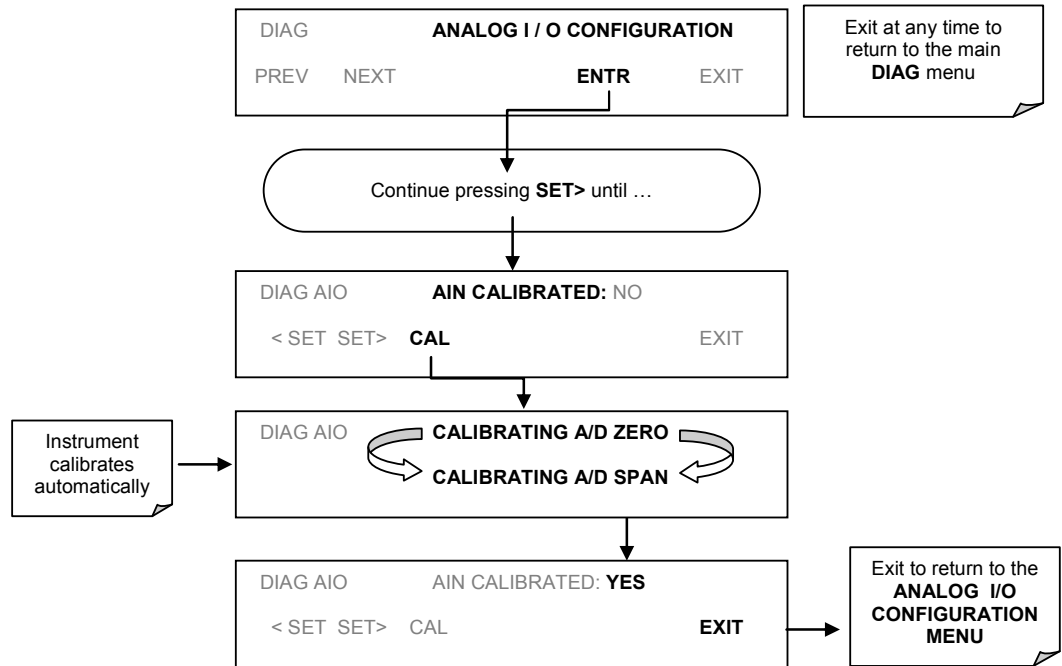


Figure 2-1: DIAG – Analog I/O Configuration – AIN Calibration

2.2.2. Analog Inputs (XIN1...XIN8) Option Configuration

To configure the analyzer's optional analog inputs define for each channel:

- gain (number of units represented by 1 volt)
- offset (volts)
- engineering units to be represented in volts (each press of the touchscreen button scrolls the list of alphanumeric characters from A-Z and 0-9)
- whether to display the channel in the Test functions

To adjust settings for the Analog Input option parameters press:

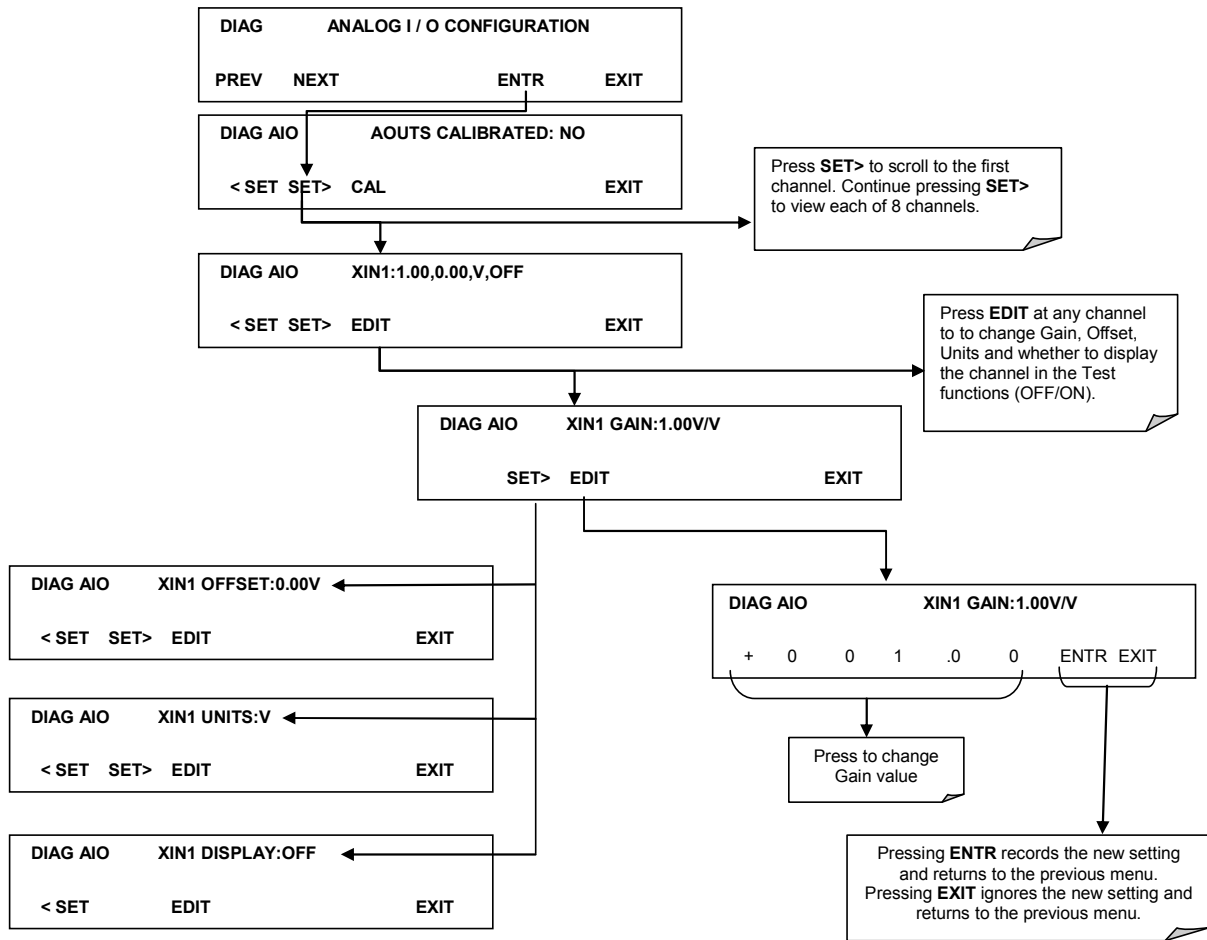


Figure 2-2 DIAG – Analog Inputs (Option) Configuration Menu

2.3. USB Configuration

After connecting a USB cable between your PC and the instrument, ensure their baud rates match (change the baud rate setting for either your PC’s software or the instrument). COM2 is the default setup menu for USB configuration.

Also, while there are various communication modes available, the default settings are recommended for USB, except to change the baud rate if desired.

Your computer may need the correct drivers in order to communicate via the USB port. These drivers will be available on TAPI’s website in the near future. You can contact API customer service if you need the drivers and instructions before then. Once the drivers are installed, the instrument’s USB port should work as a standard COM2 port.

2.4. Firmware Updates via USB

The T series analyzers can receive firmware updates using a flash drive and the USB ports on the front panel. To update the firmware, locate the file you want to use for the update, and rename it to “update.exe” and copy to the flash drive. This file must not be in a folder on your flash drive in order to be recognized by the T series instrument. Plug in the flash drive and the instrument will give you a popup message with the model the firmware is intended for and the version of firmware, the analyzer will ask if you wish to continue, press yes to continue.

Warning, the instrument will load any recognizable firmware you tell it to regardless of if it is intended for that instrument or not. Double check the firmware model and version before selecting continue.

3. TROUBLESHOOTING FAULTS

3.1. Touch-screen Interface

Verify the functioning of the touch screen by observing the display when pressing a touch-screen control button. Assuming that there are no wiring problems and that the DC power supplies are operating properly, but pressing a control button on the touch screen does not change the display, any of the following may be the problem:

- The touch-screen controller may be malfunctioning.
- The internal USB bus may be malfunctioning.

You can verify this failure by logging on to the instrument using APICOM or a terminal program. If the analyzer responds to remote commands and the display changes accordingly, the touch-screen interface may be faulty.

3.2. LCD Display Module

Verify the functioning of the front panel display by observing it when power is applied to the instrument. Assuming that there are no wiring problems and that the DC power supplies are operating properly, the display screen should light and show the splash screen and other indications of its state as the CPU goes through its initialization

3.3. Touch-screen not working correctly

If you experience problems where the display reacts to touch in a different location to where you are pressing, you may need to re-calibrate the touch-screen. Also, if you are in the touch-screen calibration mode and press cancel at the end of the calibration sequence, you will lose the previous calibration and the display will be mis-calibrated. To correct this, follow the calibration procedure in section 2.1.

4. DIAGRAMS AND SCHEMATICS

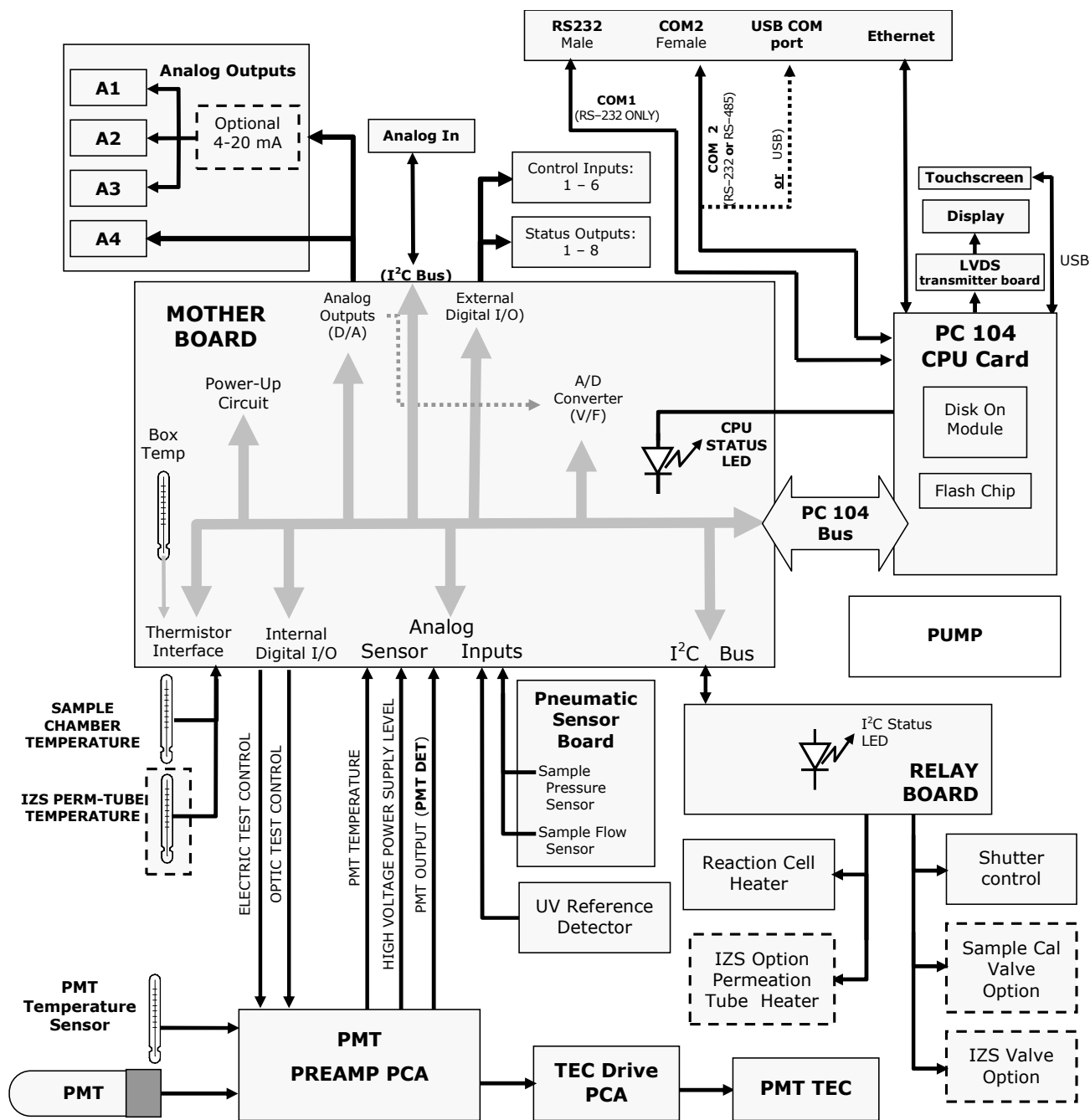


FIGURE 4-1, EXAMPLE OF AN ELECTRONIC BLOCK DIAGRAM (T100)

5. “E” SERIES COMPATIBILITY

5.1. INCOMPATIBLE COMPONENTS

The following components are not compatible between E series and T series analyzers:

CPU

Multidrop

Display and Keyboard components

Ethernet

USB

Analog Inputs