



REMOTE DEVICE
USER REFERENCE SHEET
FOR

REMOTE ANALOG I/O [INPUT/OUTPUT] PCB
(ANIO)

Part No. 46S02799-0010

For use on MicroTrac DSD Local Area Network

INTRODUCTION

The Remote Analog I/O [Input/Output] PCB (ANIO) adds I/O capability to a Remote I/O [Input/Output] Controller LAN Node PCB (RIO) in a MicroTrac DSD system. The ANIO is connected to the RIO through use of an I/O expansion bus. Upon power up, the RIO will realize that the ANIO is present, and begin utilizing the added I/O.

This document explains the hardware of the Remote Analog I/O PCB (ANIO) and how to utilize its I/O capability.

HARDWARE DESCRIPTION

POWER REQUIREMENTS

The power connector on the RIO is used to supply the RIO and the Remote I/O PCBs with power. The RIO supplies power to each of the Remote I/O PCBs through the I/O expansion bus. The power requirements for each of the voltages connected to the RIO, therefore, include the power drawn by the RIO and the power drawn by each of the Remote I/O PCBs.

In order to select a properly sized power supply, the current (I) requirements of the PCBs for each of the voltages must be known. The I requirements for the ANIO are as follows:

$$\begin{aligned} I \text{ for } +5 \text{ VDC} &= (I \text{ of ANIO}) + (I \text{ of external loads}) \\ &= (923 \text{ mA}) + (I \text{ of external loads}) \end{aligned}$$

$$\begin{aligned} I \text{ for } +15 \text{ VDC} &= (I \text{ of ANIO}) + (I \text{ of external loads}) \\ &= (82 \text{ mA}) + (I \text{ of external loads}) \end{aligned}$$

$$\begin{aligned} I \text{ for } -15 \text{ VDC} &= (I \text{ of ANIO}) + (I \text{ of external loads}) \\ &= (95 \text{ mA}) + (I \text{ of external loads}) \end{aligned}$$

$$\begin{aligned} I \text{ for } +24 \text{ VDC} &= (I \text{ of ANIO}) + (I \text{ of external loads}) \\ &= (0 \text{ mA}) + (I \text{ of external loads}) \end{aligned}$$

I/O EXPANSION BUS

The I/O expansion bus connects the RIO to Remote I/O PCBs through use of a 40 pin ribbon cable. The bus is intended to be connected in a daisy chain style from Remote I/O PCB to Remote I/O PCB, originating from the RIO. There are two I/O expansion bus connectors (J1-A and J1-B) on the ANIO that allows the ANIO to be added into a given system to meet specific requirements. The intention of having two connectors rather than one is to simplify the making of the ribbon cables. Multiple ribbon cables with one connector on each end can interconnect an entire remote I/O system rather than one complex cable with many connectors.

The I/O expansion bus carries logic level signals and power to the Remote I/O PCBs. Care should be taken in the routing of the cable in order to keep it away from noise inducing circuitry. Furthermore, the maximum I/O expansion bus length should not exceed 10 feet.

CHANNEL SELECT JUMPER

The channel select jumper (J2) allows the ANIO to be defined at a previously specified channel. The channel select jumper must be in place prior to powering up a remote I/O system in order for the RIO to recognize that the ANIO exists. Refer to the drive schematic diagram for the proper jumper positions.

NON-ISOLATED ANALOG INPUTS

The ANIO has 4 non-isolated analog inputs. The inputs have a range of +/- 10 Volts with respect to COMMON, are single

ended, include a filter with a time constant of about 1 millisecond, and have 50K ohm input resistance. The overall A/D conversion accuracy is +/- 0.4% with 12 bits of resolution over the full scale range.

The non-isolated analog inputs are called ANACH0 through ANACH3 and can be connected through TB1 pins 3, 5, 7, and 9, respectively. Connection terminals are provided that will supply +10V reference (TB1 pins 12, 13), -10V reference (TB1 pins 14, 15), COMMON (TB1 pins 4, 6, 8, 10) and shield tie points (TB1 pins 1, 2, 11). The +/- 10 V references will each supply 50 milliamps of current. The shield tie points are shorted together and to the non-isolated analog output shield tie points on the PCB, and are not connected to any other PCB signals.

NON-ISOLATED ANALOG OUTPUTS

The ANIO has 4 non-isolated analog outputs. The outputs have a range of +/- 10 Volts with respect to COMMON, are single ended, and have an output drive limited to +/- 4 mA. The D/A conversion accuracy is +/- 0.4% with 12 bits of resolution over the full scale range.

The non-isolated analog outputs are called ANOUT0 through ANOUT3 and can be connected through TB1 pins 17, 19, 21, and 23, respectively. Connection terminals are provided that will supply COMMON (TB1 pins 18, 20, 22, 24) and shield tie points (TB1 pins 16, 25). The shield tie points are shorted together and to three non-isolated analog input shield tie points on the PCB, and are not connected to any other PCB signals.

ISOLATED ANALOG I/O

The ANIO has four sockets (J3 to J6 for I/O module 0 to 3) that will support up to four 5B series type isolated analog I/O modules. These I/O modules come in a variety of configurations including input range selection from thermocouple, 0-50 millivolt, 0-10 Volt, +/- 5 Volt, or +/- 10 Volt, and outputs that provide 0-20 milliamp or 4-20 milliamp.

The ANIO provides an analog signal of from -5VDC to +5VDC to the output modules and expects an analog signal of from -5VDC to +5VDC to or from the I/O modules. Therefore, the output modules condition an analog signal of from -5VDC to +5VDC to provide an external analog signal, and the input modules condition external analog signals to provide an analog signal of from -5VDC to +5VDC. Some output modules expect an input analog signal of from 0VDC to +5VDC and some input modules provide an output analog signal of from 0VDC to +5VDC. Therefore, the modules that interact with the ANIO with an analog signal in the range of from 0VDC to +5VDC utilize only half of the available resolution.

The analog I/O module's HI and LO signals (pins 6 and 5, respectively, of the module) are brought to terminals for external connection. A shield tie point terminal is also provided for each I/O module. Each shield tie point terminal is isolated from the other PCB circuitry and is provided as a tie point convenience. The connections to the modules can be made as follows:

<u>Module Name</u>	<u>Connection</u>	<u>Function</u>
U19	TB2 pin 1	LO, pin 5 of module
	TB2 pin 2	HI, pin 2 of module
	TB2 pin 3	Shield tie point, isolated
U20	TB3 pin 1	LO, pin 5 of module
	TB3 pin 2	HI, pin 2 of module
	TB3 pin 3	Shield tie point, isolated
U21	TB4 pin 1	LO, pin 5 of module
	TB4 pin 2	HI, pin 2 of module
	TB4 pin 3	Shield tie point, isolated
U22	TB5 pin 1	LO, pin 5 of module
	TB5 pin 2	HI, pin 2 of module
	TB5 pin 3	Shield tie point, isolated

Reference should be made to the I/O module data sheets in order to properly connect the desired I/O module to its source of input or to its output load.

OPERATIONAL DESCRIPTION

NODE/CHANNEL/SUBCHANNEL DEFINITION

The PAC language defines a particular Input or Output by use of a Node, a Channel, and a Subchannel. When concerning an RIO, the Node, Channel, and Subchannel are defined as follows:

NODE: RIO LAN Node Address Switch Setting

CHANNEL: 0 — The Remote I/O LAN Node PCB (RIO)
1 — Remote I/O PCB with jumper J2 at CH 1.
2 — Remote I/O PCB with jumper J2 at CH 2.
3 — Remote I/O PCB with jumper J2 at CH 3.
4 — Remote I/O PCB with jumper J2 at CH 4.
5 — Remote I/O PCB with jumper J2 at CH 5.
6 — Remote I/O PCB with jumper J2 at CH 6.

SUBCHANNEL: The Subchannels of the ANIO are defined as follows:

0 — ANACH0, non-isolated analog input 0
1 — ANACH1, non-isolated analog input 1
2 — ANACH2, non-isolated analog input 2
3 — ANACH3, non-isolated analog input 3
4 — U19, isolated analog I/O module 0
5 — U20, isolated analog I/O module 1
6 — U21, isolated analog I/O module 2
7 — U22, isolated analog I/O module 3
8 — ANOUT0, non-isolated analog output 0
9 — ANOUT1, non-isolated analog output 1
10 — ANOUT2, non-isolated analog output 2
11 — ANOUT3, non-isolated analog output 3

The Subchannels of other Remote I/O PCBs are dependent on their configuration. The definitions of other Remote I/O PCB Subchannels and any Subchannels on the RIO are beyond the scope of this document. However, the Subchannel definitions can be found in the User Reference Sheet for the desired PCB.