INPUT/OUTPUT DEVICE

USER REFERENCE SHEET

FOR

ANALOG TACH AND INPUT/OUTPUT PCB
(a Local I/O board)
Part No. 46S02785-0010

For use in MicroTrac DSD Drive

Effective 10/18/91

CONTENTS

INTRODUCTION

This Local I/O board allows inputs from an Analog Tachometer and other I/O. This board can be installed in either the upper or lower Local I/O board position, and is interfaced to the Main CPU Control PCB by connecting the 50 conductor ribbon cable (from J1 of this board) to either J1 or J9 of the Main CPU Control PCB. However, if the Analog Tachometer is to be utilized, then the upper board position and connector J9 of the Main CPU Control PCB must be used.

HARDWARE DESCRIPTION

INPUT/OUTPUT INTERCONNECT

There are three header connectors (J2 - 34 pin, J3 - 26 pin, and J4 - 34 pin) on this board that allow ribbon cable connection to Terminal Transition Adapter PCBs with the same connector pin/terminal count. This terminal transition arrangement allows input/output wiring for this board to be accomplished without having to open the power cube.

INPUT/OUTPUT DESCRIPTIONS

The following sections describe each input and output in detail. Table 1 describes the PAC needed information.

Analog Tachometer Input. Either an AC or DC Analog Tachometer may be connected to connector J8. The differential input has a DC range of +/- 300 VDC and an AC range of up to 300 VAC rms, with an input resistance of 134K ohm. The overall A/D conversion accuracy is +/- 0.4 % with 12 bits of resolution over the full scale range. The signal names are labeled (-) DC OR AC and (+) DC OR AC.

Analog Inputs. There is provision for 4 non-isolated analog inputs. The inputs have a maximum range of +/- 10 Vdc 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 signal names are labeled ANACH1 through ANACH4. Full scale range may be less than the maximum range. The full scale range is determined by the PAC program.

Connection terminals are provided that will supply +10.0 Vdc reference, -10.0 VDC reference, COMMON, and SHIELD tie points. Each of the references will supply up to 50 milliamps of current.

Differential Analog Input. There is provision for one non-isolated differential or single ended analog input. The input has a maximum differential range of +/- 10 VDC or +/- 0.5 VDC with an input common mode voltage range of +/ 10 VDC. The overall A/D conversion accuracy is +/- 0.4 % with 12 bits of resolution over the full scale range. The signal names are labeled DIFF IN (+) and DIFF IN (-). Full scale range may be less than the maximum range. The full scale range is determined by the PAC program.

Connection terminals are provided that will supply COMMON and SHIELD tie points. Also see **SETUP**.

Table 1 Analog Tach and I/O PCB PAC Definitions

NODE: 252. When connected to J9 of Main CPU Control PCB
253. When connected to J1 of Main CPU Control PCB

CHANNEL-SUBCHANNEL:

0-1. ANACH1, Non-isolated Analog Input 1
0-2. ANACH2, Non-isolated Analog Input 2
0-3. ANACH3, Non-isolated Analog Input 3
0-4. ANACH4, Non-isolated Analog Input 4
0-5. CUR. FOL. IN, 4-20 mA Input
0-6. DIFF IN, Differential Analog Input
0-7. DC OR AC, Analog Tachometer Input
1-0. ANOUT1, Non-isolated Analog Output 1
1-1. ANOUT2, Non-isolated Analog Output 2
2-0. LIN0, Non-isolated Logic Input 0
2-1. LIN1, Non-isolated Logic Input 1
2-2. LIN2, Non-isolated Logic Input 2
2-3. LIN3, Non-isolated Logic Input 3
2-4. LIN4, Non-isolated Logic Input 4
2-5. LIN5, Non-isolated Logic Input 5
2-6. LIN6, Non-isolated Logic Input 6
2-7. LIN7, Non-isolated Logic Input 7
3-0. K4, Logic Output Relay Coil For K4
3-1. K3, Logic Output Relay Coil For K3
3-2. K2, Logic Output Relay Coil For K2
3-3. K1, Logic Output Relay Coil For K1
3-4. LOGIC OUT 4, Non-isolated Logic Output 4
3-5. LOGIC OUT 3, Non-isolated Logic Output 3
3-6. LOGIC OUT 2, Non-isolated Logic Output 2
3-7. LOGIC OUT 1, Non-isolated Logic Output 1
4-0. B0, Thumbwheel Switch Bank 0
4-1. B1, Thumbwheel Switch Bank 1
4-2. B2, Thumbwheel Switch Bank 2
4-3. B3, Thumbwheel Switch Bank 3
4-4. B4, Thumbwheel Switch Bank 4
4-5. B5, Thumbwheel Switch Bank 5
4-6. B6, Thumbwheel Switch Bank 6
4-7. B7, Thumbwheel Switch Bank 7
4-8. B8, Thumbwheel Switch Bank 8
5-6. Selects DC ar AC Tachometer

4-20 mA Input. There is provision for one non-isolated 4-20 mA analog input. The input signal feeds a differential amplifier with a maximum of +5 VDC across a 249 ohm burden resistor at the 20 mA level. The input common mode voltage range is +/- 10 VDC. The overall A/D conversion accuracy is +/- 0.4 % with 12 bits of resolution over the full scale range. The signal names are labeled CUR. FOL. IN (-) and CUR. FOL. IN (+).

Connection terminals are provided that will supply +5 Vdc, COMMON, and SHIELD tie points.

Logic Inputs. There is provision for 8 non-isolated logic inputs. The inputs are suitable for 24 VDC logic only. All of the inputs are software configurable to be of type sink or source, however, all of the inputs must be of the same type.

An input that is specified as sink is a logical 1 (High) when the input is grounded. In the sink configuration, a pullup 2.7 K ohm resistor is provided to the +24 VDC source. The resistor is provided to keep the input in the off state (logic 0) in the absence of an input.

An input that is specified as source means that an input is a logical 1 (High) when the input is at the +24 VDC level. In the source configuration, a pulldown 2.7 K ohm resistor is provided to COMMON. The resistor is provided to keep the input in the off state (logic 0) in the absence of an input.

The signal names are labeled LIN0 through LIN7.

Connection terminals are provided that will supply +24 Vdc, COMMON, and SHIELD tie points.

Thumbwheel Inputs. There is a 26 pin Thumbwheel Switch Interface connector (J3) that allows Thumbwheel Selector Switch Assemblies to be added, via ribbon cable, in order to configure a given system to meet specific requirements. The cable is intended to be connected in a daisy chain style from Thumbwheel Selector Switch Assembly to Thumbwheel Selector Switch Assembly, originating from the Local I/O board. The Thumbwheel Switch Interface carries 24 volt logic level signals and power (+24 VDC, COMMON) to the Thumbwheel Selector Switch Assemblies.

The PUSH TO LOAD input is continually scanned. If the input is present, then all of the thumbwheel switch banks will be scanned.

A maximum of nine Thumbwheel Selector Switch Assemblies may be connected to the Thumbwheel Switch Interface at one time. Each Thumbwheel Selector Switch Assembly may have up to three pairs of thumbwheel switches, for a total of six thumbwheel switches. The following are examples of valid thumbwheel switch bank configurations:

5 digits and a sign
6 digits
2 digits

The thumbwheel switches are scanned by pairs, starting from the least significant pair in the Thumbwheel Selector Switch

Assembly. The scanning will continue until one of the following occurs:

1. All 3 pairs are scanned.
2. A negative sign is scanned.
3. An invalid thumbwheel switch setting is scanned.

When the scanning is complete, any unscanned significant digits are set to 0.

The Thumbwheel Switch Banks are labeled B0 through B8.

Analog Outputs. There is provision for 2 non-isolated analog outputs. The outputs have a range of +/- 10 VDC 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 signal names are labeled ANOUT1 and ANOUT2.

Connection terminals are provided that will supply COMMON and SHIELD tie points.

Logic Outputs. There is provision for 4 non-isolated logic outputs. Each output is capable of sinking 200 mA to COMMON when in the on state (when a logic 1 is written). When in the off state (when a logic 0 is written), the output will float. The signal names are labeled LOGIC OUT 1 through LOGIC OUT 4.

Connection terminals are provided that will supply +24 Vdc, COMMON, and SHIELD tie points.

Relay Contact Outputs. There is provision for four relays with one form C type and three form A type contacts being brought to the connector. The maximum switching voltage is 36 VAC/VDC. The maximum switching current is 0.5 A. The signal names for the form C contacts are labeled K1-C, K1-NO, and K1-NC. The signal names for the form A contacts are labeled K2-C, K2-NO through K4-C, K4-NO.

INSTALLATION AND HOOKUP

This board is factory installed in the drive and should require no further connections to be made to it. However, if it should become necessary to install the board in the field, then the following steps should be taken:

WARNING

HAZARDOUS VOLTAGES CAPABLE OF SEVERE INJURY OR DEATH MAY BE PRESENT WITHIN CABINET. BEFORE OPENING CABINET DOOR, DISCONNECT AND LOCK-OUT INCOMING POWER.

CAUTION

TO AVOID DAMAGE TO ELECTRONIC COMPONENTS, DO NOT MAKE ANY CONNECTIONS WITH POWER APPLIED. USE PROPER ELECTROSTATIC DISCHARGE (ESD) PROCEDURES WHEN HANDLING PRINTED CIRCUIT BOARDS.

1. Turn off incoming power.

2. Locate where this board is to be physically mounted. The Local I/O boards mount onto the back side of the Main CPU Control PCB in either the upper position (next to

connector J9) or the lower position (next to connector J1). Refer to the System Schematic for the location.

3. Disconnect all cables to the Main CPU Control PCB and to the Local I/O board(s) attached to it, noting location of cables for proper replacement.

4. Remove the Main CPU Control PCB from the hinged door by removing two screws, at center top and center bottom.

5. If replacing an existing Local I/O board, then unmount the existing board by removing the nuts, washers and bolts that secure it to the Main CPU Control PCB.

6. Mount this board into its proper position using the nuts, washers and bolts procvided.

7. Remount the Main CPU Control PCB, with the attached Local I/O board(s), back onto the hinged door.

8. Connect (reconnect) all of the cables per the Interconnection Diagram.

Refer to the equipment Interconnection Diagram for detailed wiring information. Ensure that wire size and disconnect devices conform to the installation contractor's drawings and to all applicable codes. Observe the following:

A. In long cable runs, take care to prevent excessive voltage drop.

B. Separate the leads used for speed reference, feedback, and other low level signals from those used for the motor armature, field and AC power. Do not run these two groups in the same conduit or wire trough.

C. Provide shielded and twisted leads as indicated on the schematic and Interconnection Diagrams. Connect all shields on shielded wire to system common (not ground) on one end only. Twisted shielded pair wire should be used for long runs.

SETUP

There are no jumpers or potentiometers to set up.

The Differential Input Setup Switch (S1) on this board should be set according to the drive schematic to ensure that the PAC software and the drive hardware are set to the same scaling. If the drive schematic is not available or if the switch position isn't shown, the PAC software and hardware GAIN switch should be in the "HI" position for signals of -0.5 volts to +0.5 volts, and in the "LO" position for signals of -10 volts to +10 volts. If the input is a differential signal, the INPUT switch should be in the "DIF" position. If the input is a single ended signal (i.e. referenced to the power supply common of this drive), the switch should be in the "SE" position.