MODEL LVDT-8

USER MANUAL

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Chapter 1: Introduction

Linear Variable Differential Transformers, LVDTs, are the most commonly used passive type displacement transducers. They operate under the principle of a mutual inductance change due to movement of a magnetic core. This movement produces an electrical output proportional to the displacement of the core.

An AC, (5kHz, 3.2V rms) excitation voltage, is applied to the primary winding (see the specification section for other frequency options). Two identical secondary windings, symmetrically spaced from the primary, are connected in a series-opposing circuit. Motion of the magnetic core varies the mutual inductance of each secondary to the primary, which in turn, determines the voltages induced from the primary to each of the secondaries.

If the core is centered between the secondary windings, the voltage induced in the secondaries is identical and 180 degrees out-of-phase, so there is no net output. This is the NULL point. If the core is moved off center, the mutual inductance of the primary with one secondary is greater than with the other, and an AC differential voltage appears across the secondaries in series. For displacements within the operating range of the transducer used, this voltage is a linear analog of the displacement.

Each LVDT-8 card supplies power, excitation, and signal conditioning for up to eight independent LVDT transducers. Up to eight LVDT-8 cards may be connected to one AD12-8 Analog Input Card, thereby supporting up to 64 LVDTs.

All eight LVDT Signal Processor chips have oscillator capability. To assure that all eight sensors will be excited by the same frequency, a synchronizing signal is supplied by the oscillator associated with LVDT #1 to the seven other signal processor chips. If more than one LVDT-8 is to be used, then you can assure that ALL sensors, regardless which card they are connected to, will be excited by the same source. You do this by placement of Master/Slave jumpers as described in the Option Selection section of this manual.

The 5 KHz signals from the secondary windings are amplified and then converted to DC by synchronous demodulators and low-pass active filters prior to application to the output multiplexer. These DC signals are the measure of LVDT core movements at each transducer. Offset, gain, and phase correction adjustments are provided. The phase adjustment eliminates minor phase differences between the primary and secondary windings of each LVDT transducer.

All DC outputs are connected to an 8:1 multiplexer. Each DC output is selected by the multiplexer under control of three address lines from the A/D card in the host computer. The output is connected via a post amplifier and one of the jumpers OV0 through OV7 to one of eight output channels.

Since each LVDT-8 Module requires only one output channel to pass the data from eight transducers to a host computer and eight output channels are available, a total of 64 LVDT transducers can be used with a single AD12-8 A/D card from ACCES. If more LVDT sensors are required multiple AD12-8 cards can be used in a system. Alternatively, other multiplexed A/D cards can be used as long as proper pin connections are maintained and proper LVDT-8 channel selection commands are generated.

Warning

The LVDT-8 uses pin 4 (on the 37-pin connector J1 and J2) to send the oscillator sync signal to other LVDT-8 cards. Since other cards may use this pin, the LVDT-8 cards should be the last in the chain from the AD12-8 and you should not connect non-LVDT-8 cards to the J2 connector on a LVDT-8 card.

Specifications

The LVDT-8 provides power, excitation, and signal conditioning for eight independent transducers. Conditioned DC outputs are multiplexed and coupled to an analog-to-digital converter card in a host computer. As many as eight LVDT-8s may be cascaded to provide interface for up to 64 transducers.

- Transducers Served: LVDT, RVDT, LVRT with primary impedances of 150 Ohms or greater.

- Excitation Frequency: 5 KHz, all channels synchronized. Optionally, the frequency may be anywhere in the range of 1 to 10 KHz. Also, frequency selection can be made individually for each LVDT channel. Actual frequency may be slightly different.

- Available Gains: Each channel has a gain from 1 to 8, selected by jumpers and adjustment potentiometers. A post amplifier provides a gain of 2 or 3 applied to all channels on a card.

- Control Inputs: Three binary digital inputs for channel selection. Logic levels compatible with LSTTL logic.

- Power Required: +12 VDC at 230 mA
  -12 VDC at 230 mA.

- Output Analog Voltage: +/-5 VDC.

Environmental
- Operating Temperature Range: 0 °C. to 65 °C.
- Storage Temperature Range: -40 °C. to +100 °C.
- Humidity: 0 to 90%, non-condensing.

- Size (LVDT-8 module): 8.0" long (203 mm) X 4.74" wide (120 mm) X 0.75" high(19 mm). Fits inside of T-BOX enclosure (included)
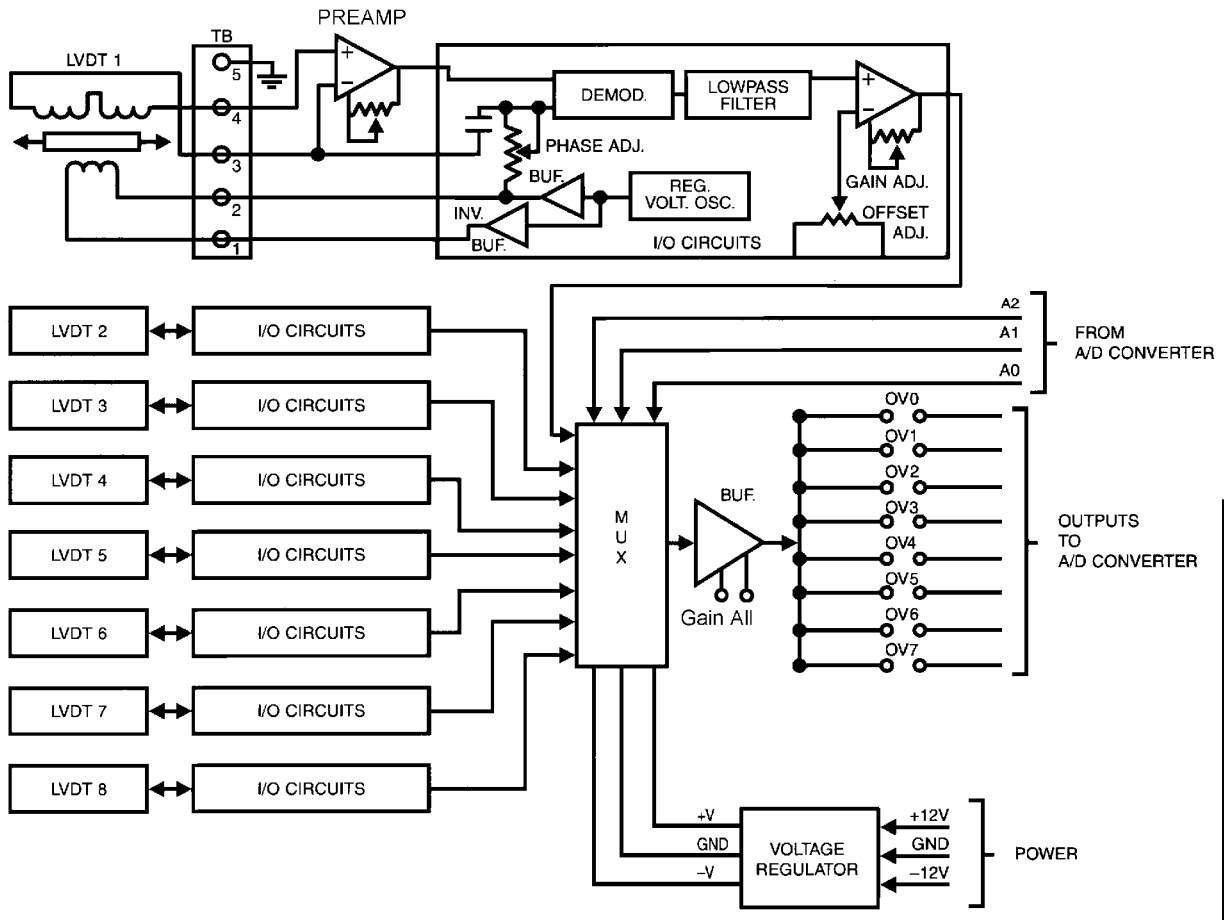- Size (T-BOX): 8.5" long (216 mm) X 5.25" wide (133 mm) X 2.0" high (51 mm).

Figure 1-1: LVDT-8 Block Diagram

Chapter 2: Installation

The software provided with this card is contained on either one CD or multiple diskettes and must be installed onto your hard disk prior to use. To do this, perform the following steps as appropriate for your software format and operating system. Substitute the appropriate drive letter for your CD-ROM or disk drive where you see d: or a: respectively in the examples below.

CD Installation

DOS/WIN3.x
1.   Place the CD into your CD-ROM drive.
2.   Type d:K to change the active drive to the CD-ROM drive.
3.   Type installK to run the install program.
4.   Follow the on-screen prompts to install the software for this card.

WIN95/98/NT
a.   Place the CD into your CD-ROM drive.
b.   The CD should automatically run the install program after 30 seconds. If the install program does not run, click START | RUN and type d:install, click OK or press K.
c.   Follow the on-screen prompts to install the software for this card.

3.5-Inch Diskette Installation

As with any software package, you should make backup copies for everyday use and store your original master diskettes in a safe location. The easiest way to make a backup copy is to use the DOS DISKCOPY utility.

In a single-drive system, the command is:

diskcopy a: a:K

You will need to swap disks as requested by the system.
In a two-disk system, the command is:

diskcopy a: b:K

This will copy the contents of the master disk in drive A to the backup disk in drive B.

To copy the files on the master diskette to your hard disk, perform the following steps.
a.   Place the master diskette into a floppy drive.
b.   Change the active drive to the drive that has the diskette installed. For example, if the diskette is in drive A, type a:K.
c.   Type installK and follow the on-screen prompts.

Directories Created on the Hard Disk

The installation process will create several directories on your hard disk. If you accept the installation defaults, the following structure will exist.

[CARDNAME]
Root or base directory containing the SETUP.EXE setup program used to help you configure jumpers and calibrate the card.

DOS\PSAMPLES: A subdirectory of [CARDNAME] that contains Pascal samples.
DOS\CSAMPLES: A subdirectory of [CARDNAME] that contains "C" samples.
Win32\language: Subdirectories containing samples for Win95/98 and NT.

WinRisc.exe
A Windows dumb-terminal type communication program designed for RS422/485 operation. Used primarily with Remote Data Acquisition Pods and our RS422/485 serial communication product line. Can be used to say hello to an installed modem.

ACCES32
This directory contains the Windows 95/98/NT driver used to provide access to the hardware registers when writing 32-bit Windows software. Several samples are provided in a variety of languages to demonstrate how to use this driver. The DLL provides four functions (InPortB, OutPortB, InPort, and OutPort) to access the hardware.

This directory also contains the device driver for Windows NT, ACCESNT.SYS. This device driver provides register-level hardware access in Windows NT. Two methods of using the driver are available, through ACCES32.DLL (recommended) and through the DeviceIOControl handles provided by ACCESNT.SYS (slightly faster).

SAMPLES

Samples for using ACCES32.DLL are provided in this directory. Using this DLL not only makes the hardware programming easier (MUCH easier), but also one source file can be used for both Windows 95/98 and WindowsNT. One executable can run under both operating systems and still have full access to the hardware registers. The DLL is used exactly like any other DLL, so it is compatible with any language capable of using 32-bit DLLs. Consult the manuals provided with your language's compiler for information on using DLLs in your specific environment.

VBACCES

This directory contains sixteen-bit DLL drivers for use with VisualBASIC 3.0 and Windows 3.1 only. These drivers provide four functions, similar to the ACCES32.DLL. However, this DLL is only compatible with 16-bit executables. Migration from 16-bit to 32-bit is simplified because of the similarity between VBACCES and ACCES32.

PCI

This directory contains PCI-bus specific programs and information. If you are not using a PCI card, this directory will not be installed.

SOURCE

A utility program is provided with source code you can use to determine allocated resources at run-time from your own programs in DOS.

PCIFind.exe

A utility for DOS and Windows to determine what base addresses and IRQs are allocated to installed PCI cards. This program runs two versions, depending on the operating system. Windows 95/98/NT displays a GUI interface, and modifies the registry. When run from DOS or Windows3.x, a text interface is used. For information about the format of the registry key, consult the card-specific samples provided with the hardware. In Windows NT, NTioPCI.SYS runs each time the computer is booted, thereby refreshing the registry as PCI hardware is added or removed. In Windows 95/98/NT PCIFind.EXE places itself in the boot-sequence of the OS to refresh the registry on each power-up.

This program also provides some COM configuration when used with PCI COM ports. Specifically, it will configure compatible COM cards for IRQ sharing and multiple port issues.

WIN32IRQ

This directory provides a generic interface for IRQ handling in Windows 95/98/NT. Source code is provided for the driver, greatly simplifying the creation of custom drivers for specific needs. Samples are provided to demonstrate the use of the generic driver. Note that the use of IRQs in near-real-time data acquisition programs requires multi-threaded application programming techniques and must be considered an intermediate to advanced programming topic. Delphi, C++ Builder, and Visual C++ samples are provided.

Findbase.exe

DOS utility to determine an available base address for ISA bus , non-Plug-n-Play cards. Run this program once, before the hardware is installed in the computer, to determine an available address to give the card. Once the address has been determined, run the setup program provided with the hardware to see instructions on setting the address switch and various option selections.

Poly.exe

A generic utility to convert a table of data into an nth order polynomial. Useful for calculating linearization polynomial coefficients for thermocouples and other non-linear sensors.

Risc.bat

A batch file demonstrating the command line parameters of RISCTerm.exe.

RISCTerm.exe

A dumb-terminal type communication program designed for RS422/485 operation. Used primarily with Remote Data Acquisition Pods and our RS422/485 serial communication product line. Can be used to say hello to an installed modem. RISCTerm stands for Really Incredibly Simple Communications TERMinal.

Installing the Hardware

Prior to installing LVDT-8, refer to the Option Selection section of this manual and place jumpers as required for the mode of operation that you wish.

The LVDT-8 is installed external to the host computer and a steel enclosure (model T-BOX) is provided. A 37-conductor ribbon cable is available to provide interconnection to an AD12-8 multiplexed analog-to-digital converter (A/D) installed in an I/O slot of the computer. If pin connections are correct, the LVDT-8 may also be used with other multiplexed A/D converters.

As many as eight LVDT-8 modules may be cascaded to accommodate up to 64 LVDTs. In this case, the modules are chained together by 37-conductor ribbon cables and the first module in the chain provides connection to the A/D as described above. The address of each LVDT-8 is established by selecting an output channel via a jumper installed at locations marked OV0 through OV7.

Signals from the transducers to the LVDT-8 module are connected via eight terminal blocks labeled TB-2 through TB-9. To ensure that there is minimum susceptibility to EMI, proper EMI cabling techniques (twisted-pair wiring and, in extreme cases, shielded wiring) should be used on input wiring. Each of the terminal blocks has five terminals:

1-2 Primary winding
3-4 Secondary winding
 5   Chassis Ground
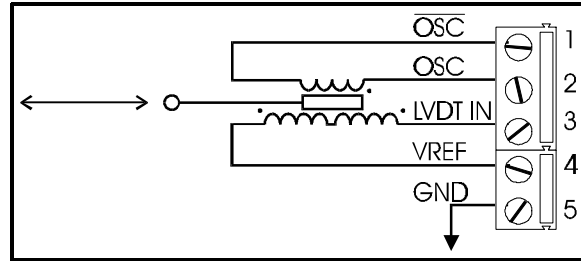
If the optional CT-BOX is used, then input connections must be made from the circular DIN connectors to these terminal blocks.

Each LVDT-8 card requires 230 mA of +12VDC and 230 mA of -12VDC. If the +12VDC and -12VDC power supplies in your computer cannot provide the current required in your application, then it will be necessary to use an external power supply with adequate rating. Connect inputs from that supply to terminal block TB1 and change the jumpers adjacent to that terminal block from the "PS" position to the "EX" positions.

Note

To minimize possibility of extraneous noise, short terminals 3 and 4 on any unused inputs. DO NOT ground the inputs or connect them to pin 5.

Chapter 3: Option Selection

LVDT-8 options are selected by placement of jumpers on the card. In the text that follows, jumper identification is given in capital letters and is identical to what is silk-screened on the board. Refer to the Block Diagram on the preceding page and the Option Selection Map at the end of this section. The setup program provided on CD illustrates the location of jumpers and adjustment potentiometers.

Output Channel

Jumper positions labeled OV0 through OV7 are used to select the LVDT-8 output to an AD12-8 (or compatible) analog input channel. The jumper block is immediately adjacent to the ribbon cable I/O connectors J1 and J2.

External +12VDC and -12VDC Power

Two jumper blocks located between the ribbon cable connectors and terminal block TB1 are used to connect +/-12V power to the LVDT-8. If computer power carried by the ribbon cable is used, the jumpers should be placed in the PS positions. If an external power supply is used, then these jumpers should be placed in the EX positions and the power supply connected to the adjacent screw terminals on TB1.

Sensor Excitation

While all of the LVDT Signal processor chips contain oscillator capability, the output of U7 is used as the master oscillator and a synchronizing signal from U7 is supplied to the other signal processor chips. In this way, you are assured that all eight sensors will be excited by the same source. If there are to be more than one LVDT-8s in a system, then one must be designated the Master and the others may be designated Slaves.

A Master card is designated by installing jumpers in the two positions labeled MSTR that are located near ribbon cable connectors J1 and J2.

A Slave card is designated by installing jumpers in the two positions labeled SLV that are located at those same locations. Interconnection is via a ribbon cable from the J2 connector on the master card or through other slave cards.

In a system that contains only one LVDT-8, that LVDT-8 must be configured as a master. The jumper in the other SLV jumper block must be installed to internally slave the other channels to channel one.

In a multiple-card system, there are several options:

A multiple-card system may contain a Master card and as many Slave cards as the analog input card can support. This assures that all LVDT sensors are excited from the same frequency.

A multiple-card system may contain all Masters. This means that all sensors connected to a given LVDT-8 will be excited by the same source but each card will provide excitation according to the oscillator on that particular card.

For both situations, the chain of LVDT-8 cards should start with a connection of the Master LVDT-8 card to the AD12-8 side via 37-pin connector J1, and with connections to Slave cards from J2 of the Master LVDT-8, to J1 on the Slave card until it ends with no connection to connector J2 on the final Slave card.

Selecting Amplifier Gain

The overall gain of each channel of an LVDT-8 card should be carefully selected so that a change in LVDT sensor displacement over the total desired sensor travel results in the maximum output voltage change without exceeding the limits of the LVDT-8 amplifiers or AD12-8 input amplifiers. Both are designed for voltage spans from -5.00V to +5.00V. Further, to make best use of the LVDT-8 card, the output of the sensor should be 0.0V RMS at the center of this displacement range.

The card contains individual preamplifiers associated with each channel plus one post amplifier on the output of the multiplexer. Gain of this post amplifier is common to all channels.

Warning

Use caution in selecting amplifier gain. Too high of a gain could create distorted readings or cause the final amplifier to oscillate (which might appear as noise).The individual preamplifier gains can be adjusted from a gain of 1 to a gain of 8 and, thus accommodating sensors of different sensitivities, or the same type sensors but with different displacement spans. Each channel has a four-position jumper selection of gain: 1 to 2, 2 to 4, 3 to 6, and 4 to 8. A gain-adjust potentiometer (RP2 on channel 0, for example) then permits "tweaking" within the selected range. Only one jumper should be installed.
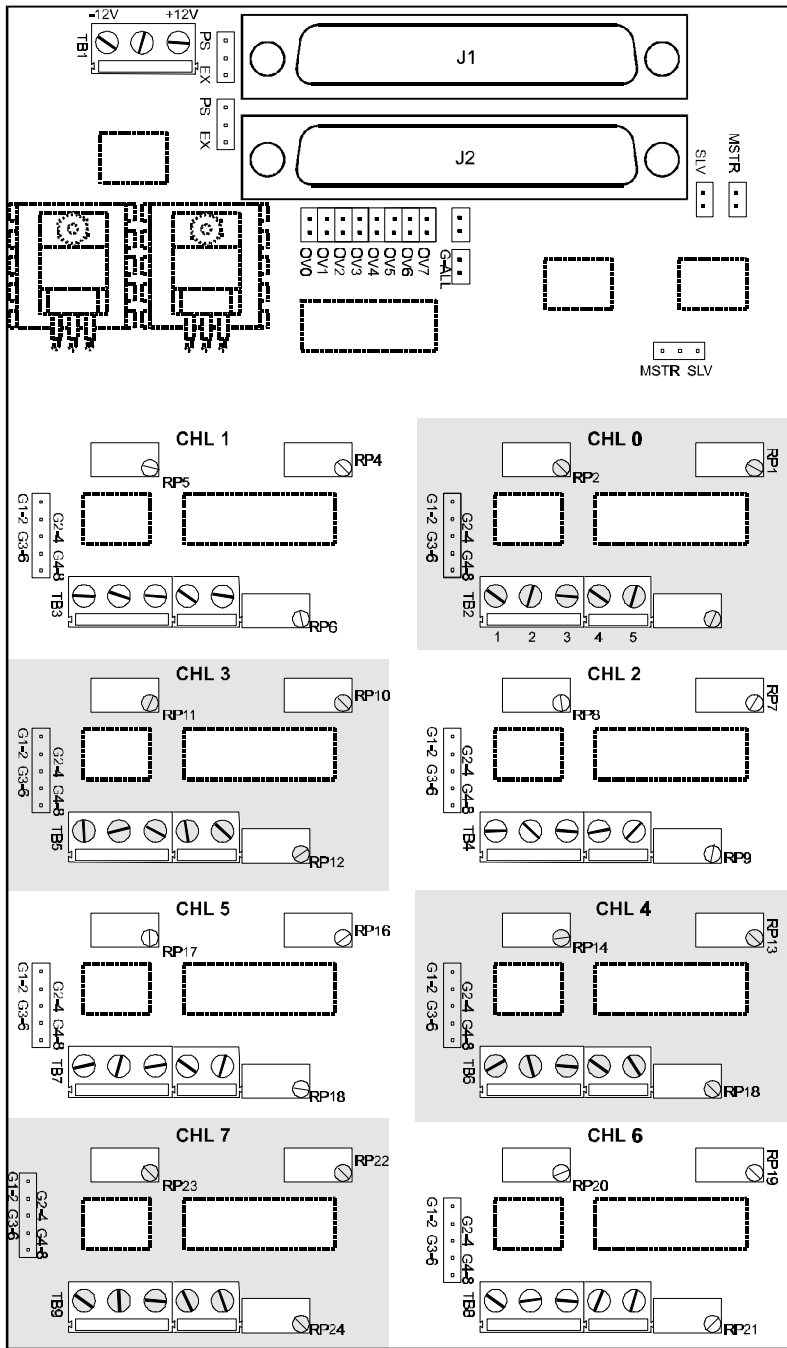
Figure 3-1: Option Selection Map

TB2 thru TB9 Screw Terminal Connections: 1&2 Sensor Excitation, 3&4 Sensor Output,5 Shield Common or Ground.
Note: Do not connect terminals 4&5 together.

The post amplifier gain is selected by jumper installation at the jumper block labeled G-ALL. That block is located immediately adjacent to connector J2 and above the output-channel-select jumper block. If a jumper is installed, the gain is 2. If a jumper is not installed, the gain is 3.

An approximation of the DC output of the LVDT-8 card is as follows:

   0.9 x (LVDT sensor input in RMS units) x Preamplifier gain x Postamplifier gain

When deciding what gains to use at the preamplifier and the post amplifier, it is important to remember that the output of the preamplifier to the demodulator must not exceed 3.75V peak-to-peak or serious distortion will occur. For example, consider the following:

If the LVDT to be used has a sensitivity of 4 volts/inch/volt of excitation, the linear range of the LVDT is 0.025 inches, and the excitation provided by the LSI chip on the LVDT-8 card is nominally 3.2 VRMS , then the full scale output of the sensor will be:

   4 x 0.025 x (3.2 x 1.414) = 0.452 VP-P

If a gain of eight is selected at the preamplifier, the output to the demodulator in the LSI chip will be 3.62 VP-P; well within the 3.75 V limit. However, there is a ±3% tolerance on the amplitude of the LSI oscillator circuit output. Thus, the excitation could be as high as 3.4VRMS and the resulting sensor output would be:

   4 x 0.025 x (3.4 x 1.414) = 0.481 VP-P

In this case, if a gain of eight is selected at the preamplifier, the output to the demodulator will be 3.85V and distortion will occur. In this case, the answer is to reduce the gain at the preamplifier.

Gain at the post amplifier (which amplifies outputs on all eight channels) should then be selected so that the full scale output falls within the ± 5 VDC range of the A/D converter card. Typically, a gain of two will be your choice.

Chapter 4: Software

Two software programs are provided with the LVDT-8 module, the Setup/Calibration program and EASY-ACCESS, a menu-driven data acquisition package specifically designed for use with the LVDT-8. EASY-ACCESS was designed to work seamlessly with the AD12-8 A/D converter and, because the software is completely menu-driven, you can set up and run data acquisition without doing any programming. The EASY-ACCESS manual is a separate manual included within the LVDT-8 manual binder.

EASY-ACCESS provides an update rate of approximately 100 channels per second. If more elaborate, or faster data acquisition is required then you may use the drivers provided with the AD12-8 card and write your own dedicated program.

For programming analog-to-digital converter cards other than the AD12-8, use the following sensor selection table. Sensors connected to the LVDT-8 module are multiplexed to a single output channel via the Output multiplexer IC (type HI-508). Digital inputs A0, A1, and A2 are used to select individual sensors. (These correspond to lines OP0, OP1, and OP2 respectively at the AD12-8 card).

A2 - PIN 9	A1 - PIN 8	A0 - Pin 7	Sel. Sensor	Channel
0	0	0	0	1
0	0	1	1	2
0	1	0	2	3
0	1	1	3	4
1	0	0	4	5
1	0	1	5	6
1	1	0	6	7
1	1	1	7	8

The input voltage range of the AD12-8 A/D card should be set to +/-5VDC.

Review the software examples provided on the CD or the Calibration chapter for more information.

Chapter 5: Calibration

Refer to the Block Diagram and Option Selection Map presented earlier in this manual for guidance as you perform the calibration procedure. A simplified calibration procedure is part of the setup program provided on CD.

Equipment Required

a.   A means of moving the LVDT sensor in precision increments across the desired range of movement (a micrometer jig).

b.   An oscilloscope and a 4 ½ digit DVM.

c.   An XT or AT class computer with an AD12-8 installed, connection made from the A/D card to the LVDT-8 (typically our CAB37-18 cable), and the LVDTSET setup program. (The sensor will be connected to an LVDT-8 input in a later step.)

Calibration Procedure

1.   Select a preamplifier gain range of 1 to 2 on the channel to be calibrated by placing the jumper at the G1-2 position. Set the G-ALL jumper to a gain of 2 by installing the jumper at the G-ALL position.

2.   OFFSET ADJUST: Short terminals 3 and 4 together at the input terminal board (e.g. TB2 for channel 0.). Adjust the Offset Adjust pot (e.g. RP1 for channel 0) until the DVM or computer program monitor displays 0.0000 volts (or the mid-scale equivalent if other display units are used).

3.   Remove the input short from terminals 3 and 4. Connect the sensor to the input terminal board (TB2 for channel 0). Terminals 1 and 2 are sensor excitation; terminals 3 and 4 are sensor output; and terminal 5 is used for a shield ground or common. Terminals 4 and 5 must not be tied together. Remember to short terminals 3 and 4 on all unused channels.

4.   Adjust the position of the LVDT sensor until the computer monitor display reads 0.0000 volts or equivalent. The sensor output at input terminals 3 and 4 should show a null or minimum reading on the oscilloscope.

5.   PHASE SHIFT ADJUST: Adjust the position of the LVDT sensor until the monitor reads approximately 4 volts. Now observe the phase shift at pin 5 of the signal processing chip (U7 for channel 0) using an oscilloscope. The pattern should be similar to a rectified sine wave. Adjusting the phase-shift potentiometer (RP3 for channel 0) should correct any displacement between halves of the rectified sine wave pattern.

Note

Reverse the connections to terminals 3 and 4 if the LVDT responds backwards to what you expect. (e.g., Decreasing voltage for increasing deflection.)6. If it is not possible to completely correct this displacement with the phase-shift adjustment potentiometer, then it may be necessary to remove the input phase shift capacitor (C30 for channel 0). Before removing this capacitor, make certain that all the previous steps have been performed successfully. ALSO, make certain that power is removed from the LVDT-8 card before removing the capacitor.

Note

Capacitor removal should be accomplished by cutting the component leads rather than unsoldering.7.If it was necessary to remove the phase shift capacitor, repeat step 5 above. If it is now possible to remove all displacement between rectified halves of the sine wave, proceed. If not, the factory should be consulted.

6.   Adjust the position of the LVDT sensor until the computer monitor display reads approximately -4 volts. Now again observe the phase shift at pin 5 of the signal processing chip. The oscilloscope should show a pattern similar to that from step 5 except now it should be of opposite phase. Any displacement between phases should be quite small. If there is any, again adjust the phase shift potentiometer, but this time, adjust to correct about one-half of the displacement between halves of the rectified sine wave pattern. It may be necessary to repeat steps 5 and 8 several times to achieve minimum, but equal, positive and negative phase shift error.

7.   Repeat step 4.

8.   FULL SCALE ADJUST: Position the LVDT sensor for the desired maximum positive displacement. The output on the monitor should read less than positive full scale. Adjust the LVDT sensor for maximum negative displacement and check to see that the output on the monitor reads less than negative full scale. The object now is to set the gain of the LVDT-8 so that full sensor travel produces full scale output in both positive and negative directions. If the gain adjust potentiometer (e.g. RP2 for channel 0) will not accomplish this, change the jumper from the G1-2 position to the G2-4 position and try again.

Now, check for linearity at +/- 0.5 and at 0.0 times full scale. The zero-adjust potentiometer (e.g. RP1 for channel 0) may be used to balance small differences between positive and negative displacements. If that pot is adjusted, then the gain-adjust pot (e.g. RP2 for channel 0) may now require slight re-adjustment.

9.   If not satisfied with calibration results, repeat all steps beginning with step 5.

10.   If other LVDT sensors of the same type are to be used and if it was necessary to remove the phase shift capacitors, remove the corresponding capacitors from all channels that will use these sensors. Capacitors C30, C38, C46, C54, C62, C70, C78, and C86 are the input phase-shift capacitors for channels 1 through 8 respectively. Do not remove any capacitors from inputs that will use another type or model LVDT sensor.

11.   Connect and calibrate all other LVDT sensors, one at a time, using the zero adjust, phase shift, and gain potentiometers corresponding to the particular channel.

12.   Once all LVDT sensors are installed and calibrated, recheck each sensor to see that its calibration (i.e., position input versus voltage output) is still correct.

Chapter 6: Connector Pin Assignments

Two parallel 37 pin D-Sub type connectors are provided on the LVDT-8 module. The mating connectors are AMP type 747304-1 or equivalent.

Pin#	Label	Used for
1	+VS	+12 V POWER
2	(UNUSED)	
3	" "	
4	" "	MASTER/SLAVE SYNC
5	" "	
6	" "	
7	A0	LSB FOR CHANNEL SELECT
8	A1	2SB FOR CHANNEL SELECT
9	A2	MSB FOR CHANNEL SELECT
10	(UNUSED)	
11	DGND	DIGITAL GROUND
12	(UNUSED)	
13	" "	
14	" "	
15	" "	
16	" "	
17	" "	
18	AGND	ANALOG GROUND
19	(UNUSED)	
20	-VS	-12 V POWER
21	(UNUSED)	
22	" "	
23	" "	
24	" "	
25	" "	
26	" "	
27	" "	
28	" "	
29	+5VDC	+5 V POWER
30	OV-7	OUTPUT TO A/D CHANNEL 7
31	OV-6	OUTPUT TO A/D CHANNEL 6
32	OV-5	OUTPUT TO A/D CHANNEL 5
33	OV-4	OUTPUT TO A/D CHANNEL 4
34	OV-3	OUTPUT TO A/D CHANNEL 3
35	OV-2	OUTPUT TO A/D CHANNEL 2
36	OV-1	OUTPUT TO A/D CHANNEL 1
37	OV-0	OUTPUT TO A/D CHANNEL 0

Table 6-1: Connector Pin Assignments

Customer Comments

If you experience any problems with this manual or just want to give us some feedback, please email us at: *manuals@accesioproducts.com.*. Please detail any errors you find and include your mailing address so that we can send you any manual updates.