

Troubleshooting - G2 Controls

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Introduction

The built-in feature of the Reelex troubleshooting program can be an essential tool in troubleshooting many types of issues associated with the equipment. With the troubleshooting program, it is possible to test communication with the DeviceNet system as well as test inputs and outputs associated with the 782-B (REELEX part # BOARD-PC782) input board and PB-24 (REELEX part # RACK-PB-24) output board. Motor control and encoder monitoring is also built into the software, giving the user complete control to test any electrical system within the machine.

Entering Troubleshooting

There are two main methods used to enter into troubleshooting program:

Method 1:

1. Ensure machine is in a stopped state, including accumulator and/or payoff.
2. In control cabinet, open monitor/keyboard and press F10 key. This will return to C: prompt.
3. In C: prompt, enter TSHOOT or appropriate troubleshooting program and press Enter.
4. A screen may ask if you wish to bypass Emergency Stop Circuit. Press Y to bypass.
5. You will now be at the main menu of the Troubleshooting Program with four possible options.

Method 2:

1. With machine stopped, press Emergency Stop button on HMI.
2. Pull Emergency Stop button out and press reset.
3. Before machine resets, go into control cabinet and open monitor/keyboard.
4. Hold F5 key until a column of @ symbols are seen in C: prompt.
5. Input TSHOOT or appropriate troubleshooting program name and press Enter key.
6. A screen may ask if you wish to bypass Emergency Stop Circuit. Press Y to bypass.
7. You will now be at the main menu of the Troubleshooting Program with various options.

NOTE: If error message appears as a bad file name, the troubleshooting program may have been renamed. Input DIR into C: prompt to view files on hard drive, and select TSHOOT.EXE file or look for other applicable file name used for troubleshooting program.

Menu Selection

When entering Troubleshooting Program, multiple options will be displayed. To enter the desired section, press number associated with section.

D-1500 example below:

```
D-1500

1.DeviceNet. Read Input & Control Output:
2.Monitor encoders:
3.Motor control:
4.Read/Write Dio48

Press ESC to Exit:
```

DeviceNet

NOTE: G2 Single-Spindle machines do not use DeviceNet. This section only applies to G2 D-1500 and other machines using DeviceNet. Other features may vary by machine.

```
STATUS OF DEVICE NET RAM
62-1500

Output
Node 1  1A  1 1 1 1 1 1 1 1  255
        1B  0 0 0 0 0 0 0 0  0
        1C  0 0 0 0 0 0 0 0  0
Node 2  2A  0 0 0 0 0 0 0 0  0
        2B  0 0 0 0 0 0 0 0  0
        2C  0 0 0 0 0 0 0 0  0
Node 3  3A  0 0 0 0 0 0 0 0  0
        3B  0 0 0 0 0 0 0 0  0

Input
Node 1  1A  0 0 0 0 0 0 0 0  0
Node 2  2A  0 0 0 0 0 0 0 0  0
        2B  0 0 0 0 0 0 0 0  0
Node 3  3A  0 0 0 0 0 0 0 0  0
        3B  0 0 0 0 0 0 0 0  0

OUT PORT:
Offset is 0 Value is 255
```

Reading Inputs

All DeviceNet Inputs can be read in the same manner. There are 8 bits per row, indicating 8 inputs per block within the Node number, and a letter designation for each section. A “0” indicates an OFF condition, and a “1” indicates an ON condition. All sections of the node, including inputs and outputs, are read from RIGHT to LEFT. Bit 1 is the far right placeholder, whereas 128 is the leftmost bit in its respective section. When multiple switches are seen at once, their binary values will be added and displayed in the column to the right of each section. For example, if the left Endform is up and in, a 40 will be displayed.

Node 1 Inputs (1A)

Component	Bit Value
Table Left	1
Left Transfer Arm Down	2
Left Endform Arm Down	4
Left Endform Arm Up	8
Left Endform Out	16
Left Endform In	32
Unused	64
Unused	128

Node 2 Inputs (2A)

Component	Bit Value
Table Right	1
Right Transfer Arm Down	2
Right Endform Arm Down	4
Right Endform Arm Up	8
Right Endform Out	16
Right Endform In	32
Unused	64
Unused	128

Node 3 Inputs (3A)

Component	Bit Value
Start	1
Stop	2
Speed Up	4
Speed Down	8
Transfer	16
Unused	32
Length Reset	64
Endform On	128

Node 3 Inputs (3B)

Component	Bit Value
Door Open/Close	1

Writing Out in Devicenet

WARNING: Procedures should be followed closely to avoid potential damage to equipment.

Like Inputs, the Outputs are read from right to left with binary values, with a sum of values displayed to the right of the respective section row. The Node is broken down into bytes (1A,2A, etc.) and bits. To write to an output, first use the alphanumeric byte designation, followed by a period, then the output you wish to write out to. To turn off all bits in a byte, type the byte section, followed by a 00. See address chart below for details.

When writing to outputs, it is recommended to have movable surfaces such as Endforms in a proper starting position. The best to start with, is having both Endforms down and out, and the Table on the left side. This is necessary to be able to safely pressurize the back side of cylinders prior to moving them in their desired direction.

For example, when starting from the down and out position, it is necessary to write out to down and out first. This provides back pressure to the cylinders to avoid slamming the Endforms in or up. This is also true of the Table when writing to move the Table left or right.

To turn on Wire Clamp, write out 1A.01 then press Enter. To turn off Wire Clamp, write a 1A.00 then press Enter.

WARNING: Transfer arms are only able to start from a neutral resting position, and should never be held one way or another, as this may cause damage to the equipment or injury to any person holding the transfer arms.

Node 1 Outputs (1A)

Component	Bit Address
Wire Clamp	1A.01
Oiler On	1A.02
Guard Lock	1A.04

Node 1 Outputs (1B)

Component	Bit Address
Left Endform In	1B.01
Left Endform Out	1B.02
Left Endform Up	1B.04
Left Endform Down	1B.08
Left Guarding Open	1B.16
Left Guarding Closed	1B.32

Node 1 Outputs (1C)

Component	Bit Address
Left Transfer Arm Up	1C.16
Left Transfer Arm Down	1C.32
Left Cutter In	1C.64
Left Cutter Out	1C.128

Node 2 Outputs (2B)

Component	Bit Address
Right Endform In	2B.01
Right Endform Out	2B.02
Right Endform Up	2B.04
Right Endform Down	2B.08
Right Guarding Open	2B.16
Right Guarding Closed	2B.32

Node 2 Outputs (2C)

Component	Bit Address
Right Transfer Arm Up	2C.16
Right Transfer Arm Down	2C.32
Right Cutter In	2C.64
Right Cutter Out	2C.128

Node 2 Inputs (2D)

Component	Bit Address
Traverse Table Right	2D.04
Traverse Table Left	2D.08

Node 3 Outputs (3A)

Component	Bit Address
Red Tower Light	3A.01
Yellow Tower Light	3A.02
Green Tower Light	3A.04
Blue Tower Light	3A.08
Tower Buzzer	3A.16

To return to menu, press ESC key.

Monitor Encoders

NOTE: Encoder screen is read-only.

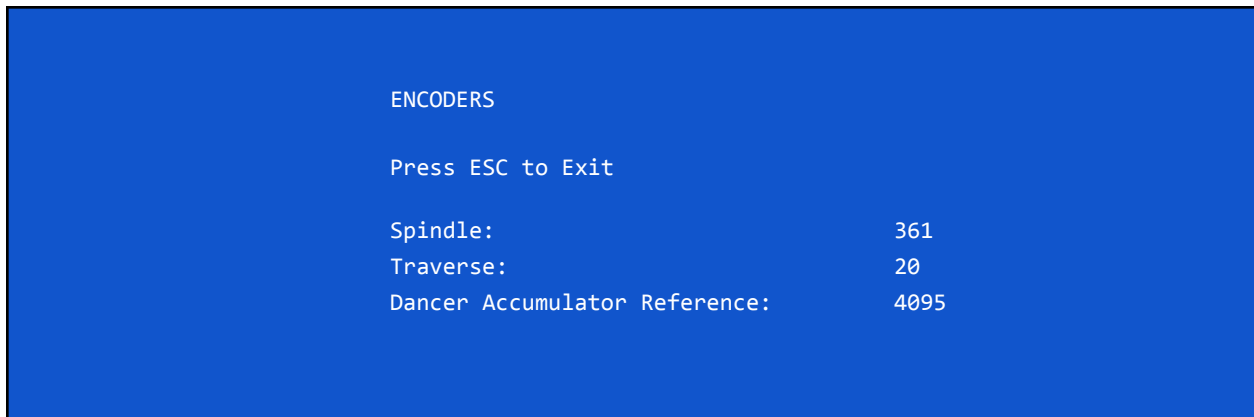
Manual Encoder Monitoring

The monitor encoder allows the user the ability to check encoder counts for Spindle(s), as well as the Traverse, without the need to have a motor enabled. This allows the ability to rotate Spindles and Traverse by hand at any desired speed and direction to manually check encoder count to ensure there are no issues with the encoders or encoder couplings. Encoders will count from 0-719 for a total of 720 pulses

Spindle encoders will count up when rotated in a clockwise direction (if using a D-1500, Spindle 2 will count up in the CCW direction). One revolution = 360 pulses.

The Traverse will typically count up when gearbox is rotating in a clockwise direction, when viewed from the left side of the machine looking to the right. This will be when the connecting rod is toward the top of the Traverse arm assembly, moving outward. One revolution = 720 pulses.

To return to menu screen, press ESC.



Motor Control

WARNING: Ensure motors are clear without obstruction before enabling.

Motor Control Menu

Section three allows for motor control through the Digital-to-Analog circuit, as well as simultaneously monitoring its respective encoder. The motor control page is broken down into multiple sections depending on the machine model.

D-1500 example:

```
Motor Controls

1. Left Spindle Motor
2. Right Spindle Motor
3. Traverse Motor
4. Pressure Regulator D/A

Press ESC to Exit
```

Writing D/A Values and Enabling Motor Drives

Each motor can be controlled and enabled separately. First, select which motor is to be written to by pressing the number associated with it.

```
Spindle

Enter reference 0-4095: 2048 = 0v ref
E <enter> = Exit
```

Here, a value can be written to the D/A to create a reference for the motor drive. A value between 0 and 4095 can be written, with 0 being full speed in the reverse direction and a reference of approximately -10VDC, and a 4095 being full speed in the forward direction with a reference of approximately +10VDC.

If a 2048 is written, a 0 reference will be written to stop motor rotation. Generally, every 1VDC of reference is every 205 written to the D/A. Values given are close estimates, and may fluctuate slightly depending on motor drive tune. See chart below.

NOTE: For single spindle machines, use the left spindle motor option for moving the spindle.

D/A Reference Chart

D/A Forward Direction

Reference	D/A Value
1VDC	2253
2VDC	2458
3VDC	2663
4VDC	2868
5VDC	3072
6VDC	3277
7VDC	3481
8VDC	3686
9VDC	3891
10VDC	4095

D/A Reverse Direction

Reference	D/A Value
-1VDC	1843
-2VDC	1638
-3VDC	1433
-4VDC	1229
-5VDC	1024
-6VDC	819
-7VDC	614
-8VDC	410
-9VDC	205
-10VDC	0

Entering Reference Values

Once the desired reference is written, press Enter. A prompt will now display for Enabling and Disabling the drive.

```
Ref = 2048

Enable hit < E >                               Encoder 204
Disable hit < D >
Change Ref Return < B >

Left Spindle Enabled
```

Press E to enable the drive for the desired D/A reference. The encoder for the enabled motor can also be viewed. To disable the drive, Press D. If a different reference is to be used, press B to return back to write a different reference.

```
Ref = 2048

Enable hit < E >                               Encoder 204
Disable hit < D >
Change Ref Return < B >

Drive Disabled Off
```

To navigate back to the main troubleshooting menu, return to the reference value input prompt, press E for exit, then press Enter.

WARNING: Pressing E will cause the selected motor to move. Ensure motors are clear to move.

Read/Write IO

Section four allows reading inputs on the 782B input board, as well as writing to outputs on the PB-24 output board.

Inputs and outputs have an alphanumeric designation that is required to view or write to. This section of inputs and outputs is also read and written in binary values. This is a good source for checking if certain inputs are being recognized by the computer, and to confirm the ability for the computer to write an output to the PB-24 to turn on desired outputs.

```
                                Status of opto-coupled I/O boards

OUT A0-- 0 0 0 0 0 1 1 1   7      IN B0-- 0 0 0 0 0 0 0 0   0
OUT A1-- 0 0 0 0 0 0 0 0   0      IN B0-- 0 0 0 0 0 0 0 0   0
OUT A2-- 0 0 0 0 0 0 0 0   0      IN B0-- 0 0 0 0 0 0 0 0   0

OUT PORT

                                PORT 0
                                VALVE 7
```

Reading Inputs

Section 4 inputs are those being used by the 782B circuit board. This board is located in the front of the control cabinet inside the left door. This is the smaller green rectangular board with 24 red LEDs. When a switch is closed, a 1 should be seen in the correct location with the correct value on the Input side of the I/O screen, as well as the associated red LED illuminated on the 782B input board. If multiple inputs are on at once, the total binary value will be displayed to the right of their associated block

Inputs are broken down into 3 “B” blocks, B0, B1, and B2.

Single Spindle Machines

NOTE: The following apply to single spindle machines such as D-750, RS1 and X290.

Inputs (B0)

Component	Bit Address
Sparker/Lump Relay	B0.04
Sequential Print	B0.08
Payoff Ready/ Crash Relay	B0.32
Guarding Closed & Locked(Optional)	B0.64
Key Inserted(Optional)	B0.128

Inputs (B1)

Component	Bit Address
Stop	B1.01
Start	B1.02
Length Reset	B1.04
Increase Speed	B1.08
Decrease Speed	B1.16
Emergency Stop Pushed	B1.32
Jog	B1.64
Endform On/Off	B1.128

Inputs (B2)

Component	Bit Address
Moveable Bar(Optional)	B2.01
Open/Close Guarding(Optional)	B2.02
Motor Overloads	B2.04
Screen Lockout(Optional)	B2.08
Endform IN switch	B2.16
Endform OUT switch	B2.32
Endform UP switch	B2.64
Endform DOWN switch	B2.128

Dual Head Machines

NOTE: The following apply to dual spindle machines such as D-1500.

Inputs (B0)		Inputs (B1)		Inputs (B2)	
Component	Bit Address	Component	Bit Address	Component	Bit Address
Spindle 1 Pickup	B0.01	Spooler Stop	B1.01	Unused	B2.01
Traverse Pickup	B0.02	Spooler Start	B1.02	Unused	B2.02
Spindle 2 Pickup	B0.04	Spooler Length Reset	B1.04	Motor Overloads	B2.04
Sequential Input	B0.08	Unused	B1.08	Guarding Doors	B2.08
Sparker Input	B0.16	Unused	B1.16	Right Floor Mat	B2.16
Payoff Crash Relay	B0.32	Emergency Stop Reset	B1.32	Left Floor Mat	B2.32

Writing Outputs

Section 4 Outputs are the outputs being utilized by the PB-24 opto relay output board. This is the longer and narrow board with 24 red opto relays with red LED status indicators. When an output is written, the red LED will be illuminated, as well as a 1 in the corresponding location on the computer monitor on the output side. Like the inputs, the outputs that are written to will be summed and the total will be displayed in binary to the right of the output block. A maximum of 255 can be written to turn all bits on in each section, even if not all bits are being utilized. If multiple outputs are required to be turned on at once, add the total amount in binary and use that number with the corresponding block.

To write to and turn on an output, type the address given below and press Enter. To turn off any outputs that have been turned on, type the desired block designation, followed by a .00

For example, if both the Run Light and the Run Relay are to be turned on at once, an A0.20 is to be written. To turn both off, type A0.00 and press Enter.

PB-24 Outputs are separated into 3 "A" blocks, A0, A1, and A2.

Single Spindle Machines

NOTE: The following apply to single spindle machines such as D-750, RS1 and X290.

Outputs (A0)

Component	Bit Address
Run Light	A0.04
Run Relay	A0.16
Traverse Enable	A0.64
Spindle Enable	A0.128

Outputs (A1)

Component	Bit Address
Endform IN	A1.01
Endform OUT	A1.02
Endform UP	A1.04
Endform DOWN	A1.08
DUMP Valve	A1.16
Oiler	A1.32
Open/Close Guarding Door(Optional)	A1.64
Lock D-750 Guarding(Optional)	A1.128

Outputs (A2)

Component	Bit Address
Not Used	N/A

Dual Head Machines

Outputs (A0)

Component	Bit Address
Run Light	A0.04
Run Relay	A0.16
Spindle 2 Enable	A0.32
Traverse Enable	A0.64
Spindle 1 Enable	A0.128

Outputs (A1)

Component	Bit Address
Dump Valve	A1.08

Outputs (A2)

Component	Bit Address
Spooler Enable	A2.128

NOTE: The following apply to dual spindle machines such as D-1500.

NOTE: For further D-1500 Output options, use Devicenet section of troubleshooting.

