Quadrature Encoder User's Manual
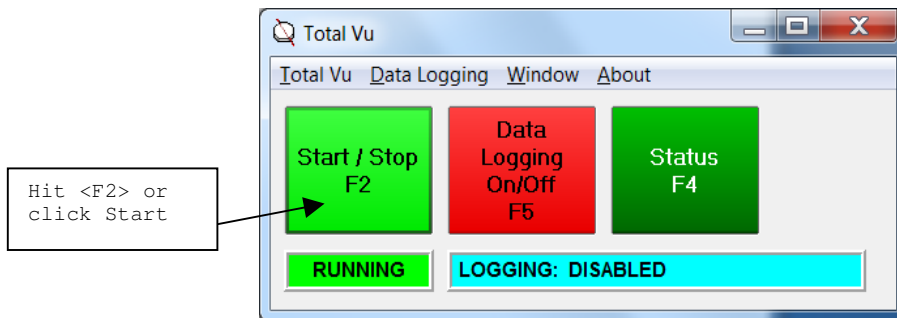
Specification and Installation Guide

NetLinc, TLAser400 & PTRBe

Oct 2015

This document assumes that you have already installed a NetLinc, TLAser400 card or PTRBe, and at least one laser micrometer—if not, please see Quick Start Guides 1-4.

NOTE: Total Vu **must be *Started*** or, in the ***Running*** state for encoder updates to occur.

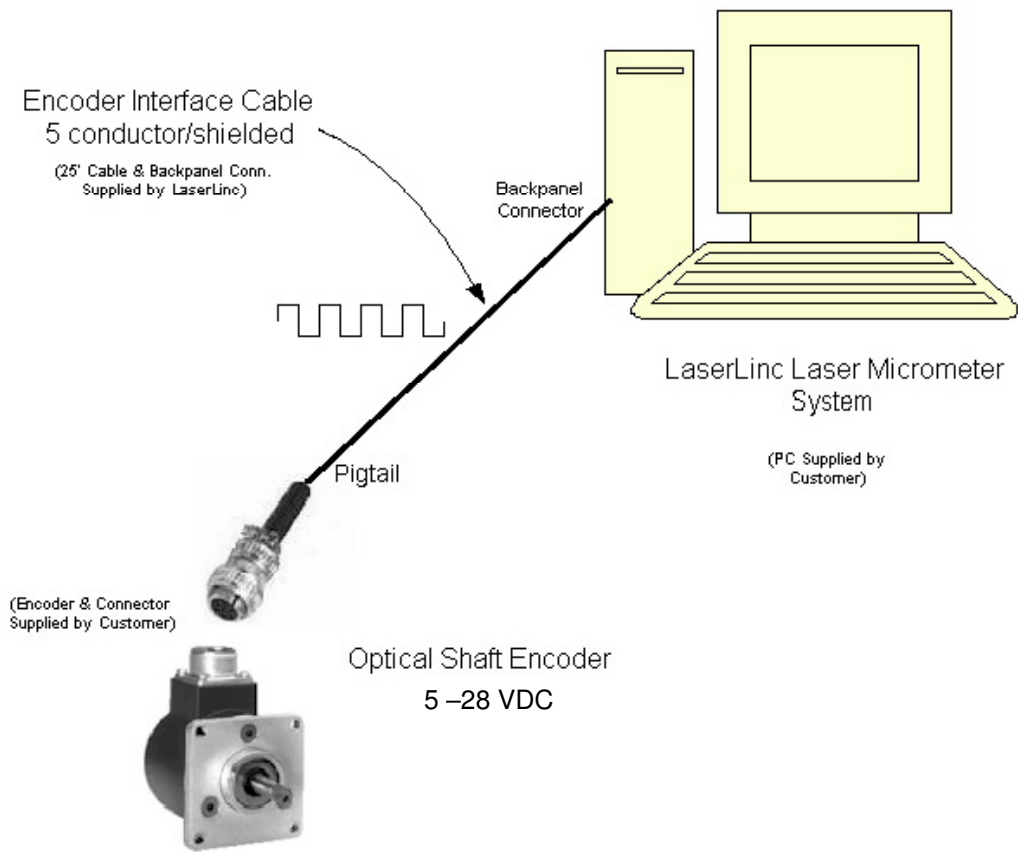Hit <F2> or click Start

Encoder Specification

A line-speed/length encoder is a device that produces pulses to indicate line or product movement. With an encoder connected, Total Vu™ software monitors the incoming pulses to determine line speed or total product footage. Each measurement scan is then tagged with the product footage. The measurement reading and product footage pairs can be used to compute pitch measurements (see the *Total Vu User's Guide* for more information), product footage in log files, etc.

Multiple encoder inputs are possible with Total Vu. *Zero latency quadrature* inputs are available using the TLAser400 card(s), and/or NetLinc(s). *Non zero latency / non quadrature* counter inputs are available using an I/O device - Precision Timer Relay Box (PTRBe NetIO or PCIe version).

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937-318-2440
info@laserlinc.com
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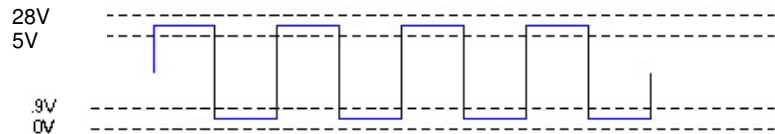| TABLE 2 ENCODER INTERFACE SPECIFICATION	
INPUT	VALUE / DESCRIPTION
Input Voltage - TLAser400/NetLinc PTRBe	4.75–28 VDC, RS-422 (factory config) - TLAser400 / NetLinc 4.75-5.25 VDC - PTRBe default. Optional 4.75–28 VDC - factory config only
Input Low Voltage Threshold	< .9V
Input High Voltage Threshold	> 1.7V
Input Impedance/Pull-up/Pull down resistors	5VDC, or 12 VDC pull-up or pull-down positions available. 2.2K ohm recommended if needed, Factory Default: - None
Input Phase - TLAser400/NetLinc PTRBe	Single Phase or Quadrature Single Phase
Input Circuit Types - TLAser400/NetLinc PTRBe	Single ended or Differential, jumper selectable, Factory Default–differential Single ended
Input Signal Type	Square wave
Maximum Frequency	1MHz
Max Cable Length	Consult your encoder manufacturer's specification
Encoder / Measurement Correlation TLAser400/NetLinc Only	Zero seconds latency between encoder sampling and measurement sampling
Encoder Interface Cable Style	Hirose, HR10A-7P-6P, provided with tinned leads
Back Panel Connector Style	Hirose, HR10A-7R-6S, provided on PC back panel
OUTPUTS	VALUE/DESCRIPTION
Encoder Supply Voltage	5 or 12 VDC for TLAser400 (Jumper J7 select), 5VDC only for NetLinc
Supply Current, fused	.150mA continuous maximum

Encoder Interface Cable
5 conductor/shielded

(25' Cable & Backpanel Conn.
Supplied by LaserLinc)

Backpanel
Connector

LaserLinc Laser Micrometer
System

(PC Supplied by
Customer)

Pigtail

(Encoder & Connector
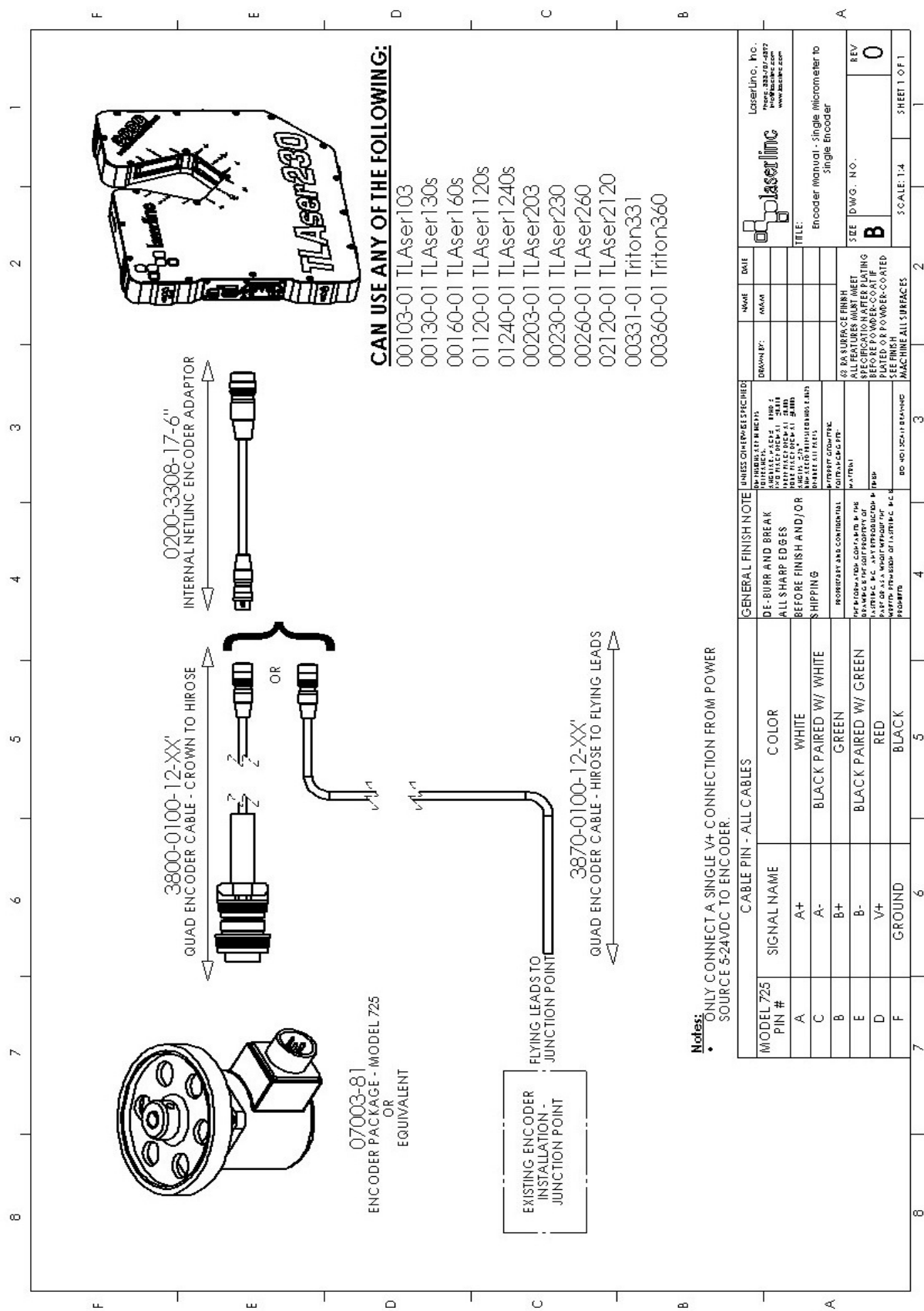Supplied by Customer)

Optical Shaft Encoder
5 –28 VDC

(e.g.) Encoder Products Inc. Model 725
725-NSS1000AHV1FNSYN

Typical Encoder
Waveform

28V
5V

.9V
0V

*Typical Encoder Connector Wiring Diagram - TLAser400*
Diagram 1

CAN USE ANY OF THE FOLLOWING:

00103-01 TLAser103
00130-01 TLAser130s
00160-01 TLAser160s
01120-01 TLAser1120s
01240-01 TLAser1240s
00203-01 TLAser203
00230-01 TLAser230
00260-01 TLAser260
02120-01 TLAser2120
00331-01 Triton331
00360-01 Triton360

0200-3308-17-6"
INTERNAL NETLINC ENCODER ADAPTOR

3800-0100-12-XX'
QUAD ENCODER CABLE - CROWN TO HIROSE

OR

3870-0100-12-XX'
QUAD ENCODER CABLE - HIROSE TO FLYING LEADS

07003-81
ENCODER PACKAGE - MODEL 725
OR
EQUIVALENT

FLYING LEADS TO
JUNCTION POINT

EXISTING ENCODER
INSTALLATION -
JUNCTION POINT

Notes:
- ONLY CONNECT A SINGLE V+ CONNECTION FROM POWER SOURCE 5-24VDC TO ENCODER.

CABLE PIN - ALL CABLES

MODEL 725 PIN #	SIGNAL NAME	COLOR
A	A+	WHITE
C	A-	BLACK PAIRED W/ WHITE
B	B+	GREEN
E	B-	BLACK PAIRED W/ GREEN
D	V+	RED
F	GROUND	BLACK

GENERAL FINISH NOTE

DE-BURR AND BREAK
ALL SHARP EDGES
BEFORE FINISH AND/OR
SHIPPING

PROPRIETARY AND CONFIDENTIAL

63 RA SURFACE FINISH
ALL FEATURES MUST MEET
SPECIFICATION AFTER PLATING
BEFORE POWDER-COAT IF
PLATED OR POWDER-COATED
SEE FINISH
MACHINE ALL SURFACES

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TITLE:
Encoder Manual - Single Micrometer to
Single Encoder

DWG. NO.

SIZE B   REV 0

SCALE: 1:4   SHEET 1 OF 1

Typical Encoder Interface Wiring Diagram - Internal NetLinc(s)
Diagram 2
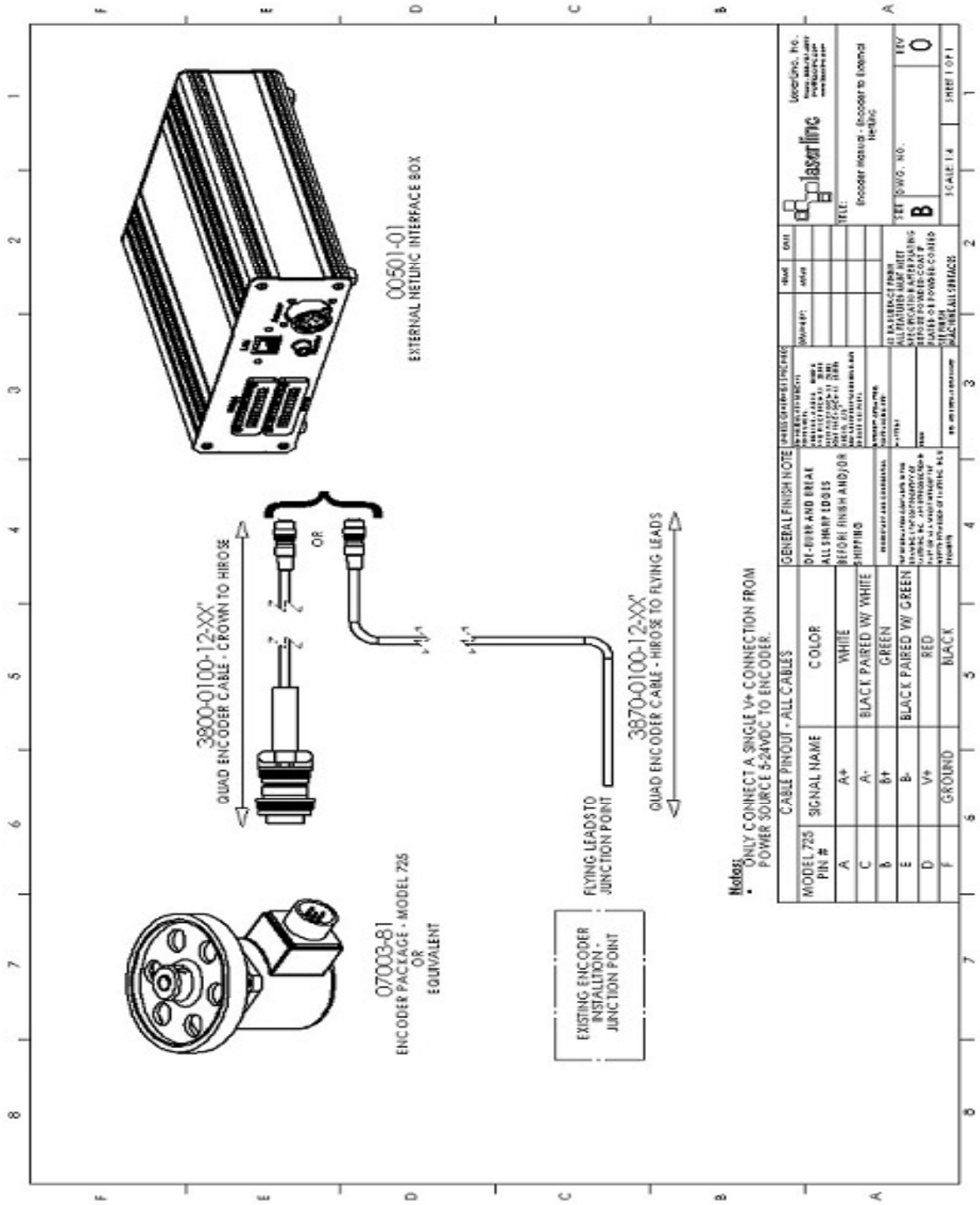
Typical Encoder Interface Wiring Diagram - External NetLinc
Diagram 3
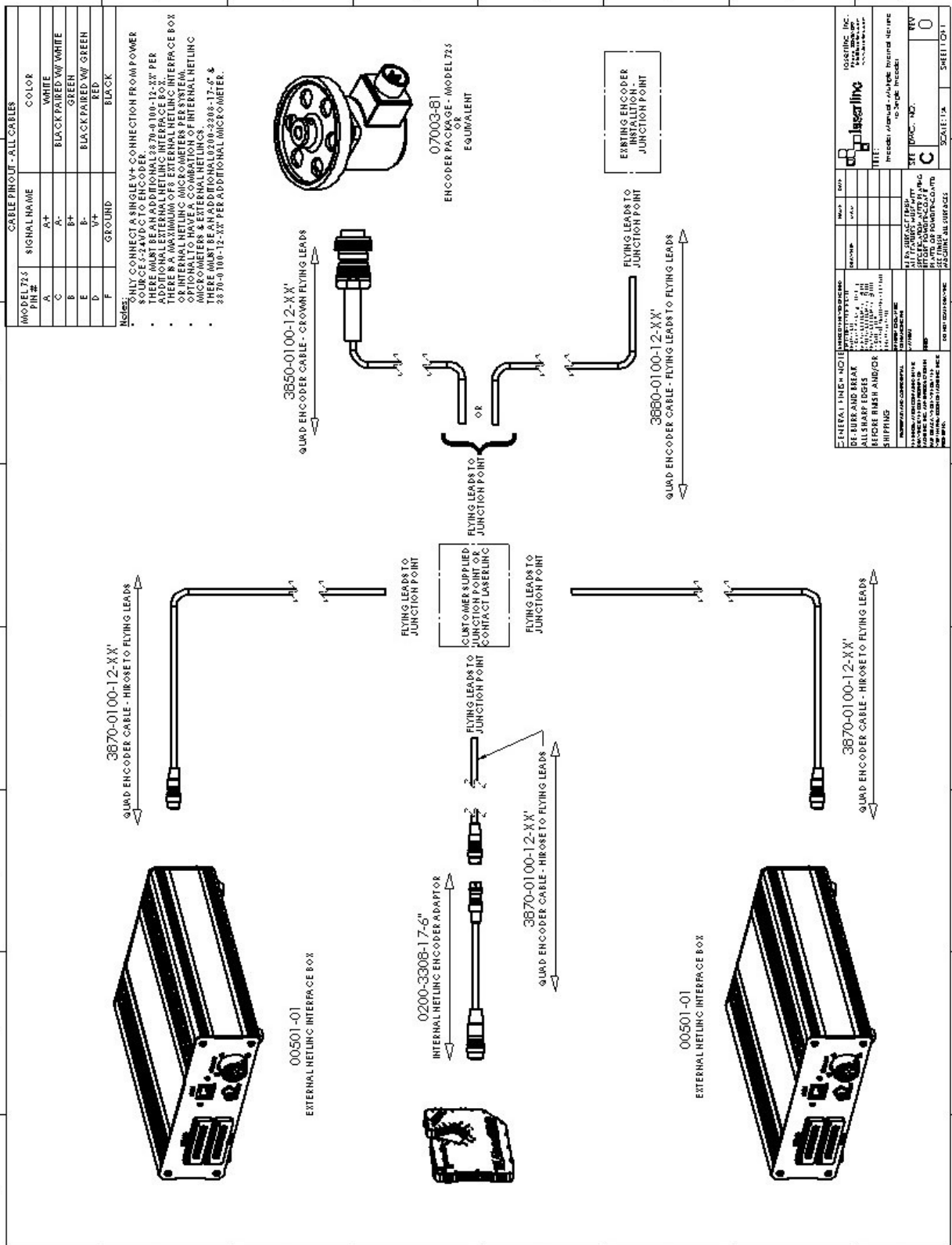
Typical Encoder Interface Wiring Diagram - Multiple Ext/Int NetLinc(s)
Diagram 4

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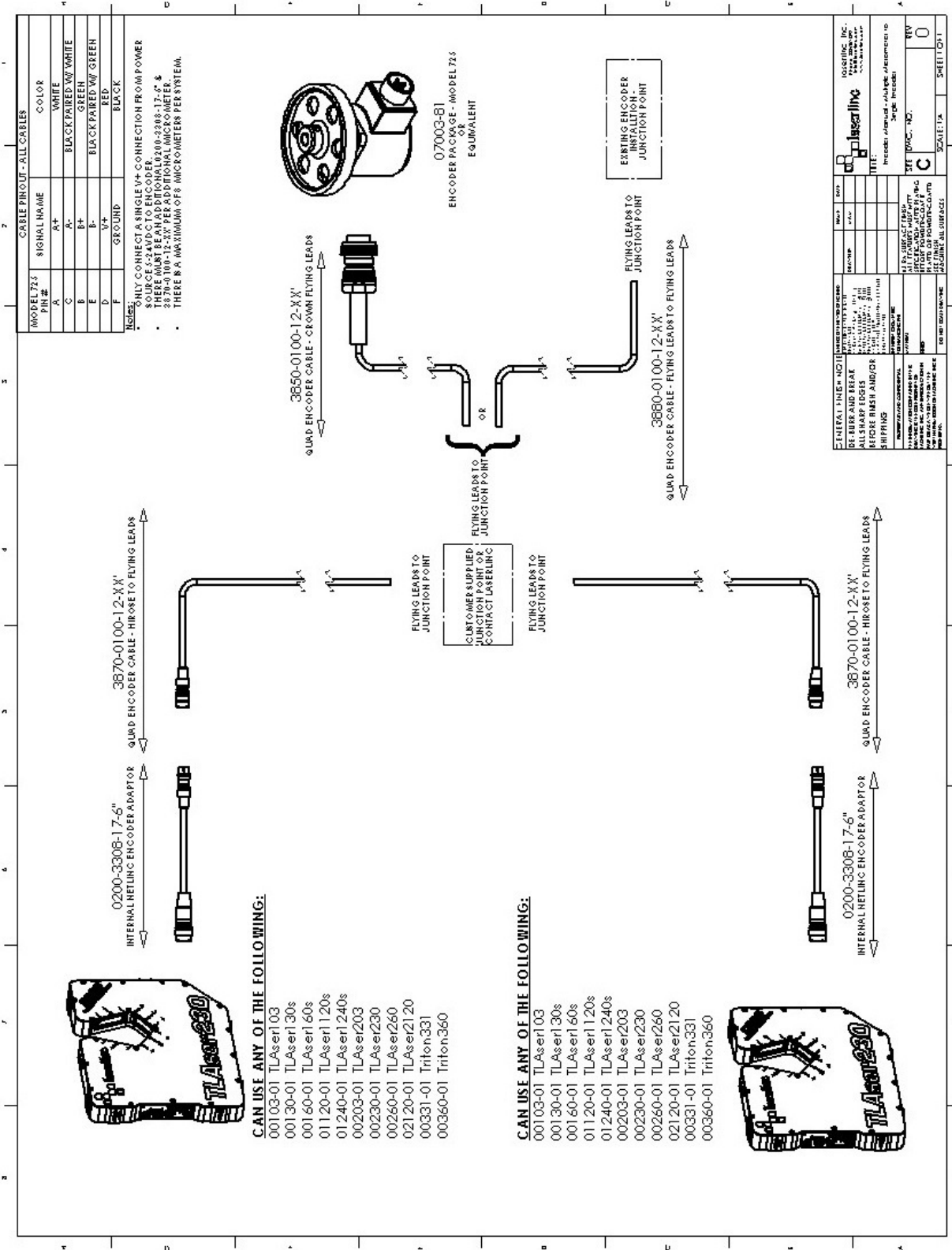
Typical Encoder Interface Wiring Diagram - Multiple Internal NetLinc(s)

Diagram 5

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Installation Procedure - NetLinc Internal or External Style

1. Ensure the *Encoder / Quadrature* option is added to your Total Vu software.

2. <u>Internal NetLinc</u> - Connect adapter cable PN 0200-3308-17-6" to LaserLinc scanner.

    2.1 Connect encoder interface cable to encoder pulse source. Connect 6 pin Hirose connector to
       adapter cable marked "Encoder". Proceed to Step 4.

3. <u>External NetLinc</u> - Connect encoder interface cable to encoder pulse source. Connect directly to
    the 6 pin Hirose connector marked "Encoder" on External NetLinc box.

4. Define an encoder in *Total Vu / Full Config / Encoders*. NOTE: The 1st encoder is predefined and
    assigned to either a TLAser400 or NetLinc encoder input. Measurement name is "*Length*".

Installation Procedure - PTRBe Counter Inputs

1. Add an encoder counter measurement in *Total Vu/Full Config/Encoders*. Upon selection of a counter
    (A0-D3), the connection pin-out within the Precision Timer Relay Enclosure (PTRBe) will be listed.
    Please note; this input is *non zero latency / non quadrature,* i.e., the count value IS NOT correlated to a
    measurement value, and counting is one direction only. The PTRBe is factory configured for (4)
    5VDC encoder inputs only. Contact tech support should you need additional inputs or voltages.

2. Connect to the specified single-ended connection-point within the PTRBe enclosure using (2) wires
    from your encoder source - Signal & Ground, e.g., in the PTRBe enclosure, connect SIGNAL to
    TB31.1 (green terminal block) and GND to TP31.GND (blue push-button terminal).

Installation Procedure - Module on TLAser400 Card

Note: If you purchased the encoder option with your system, proceed to step 7.
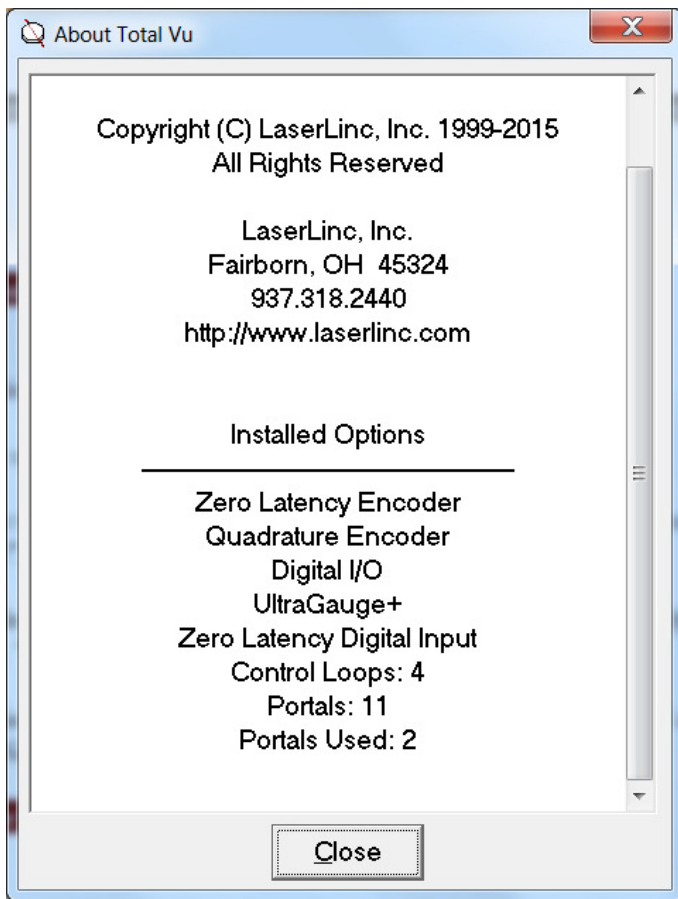
1. Power down the PC.

2. Remove the TLAser400 card.

3. Select desired signal input type.
   3.1 For single ended operation, remove jumper J4 on encoder module PCB (see assembly drawing - Diagram 9 below).
   3.2 For differential, install jumper J4 pins 1-2.
   NOTE: refer to the data sheet for your particular encoder part number to determine this option.

4. Install the encoder module in channel 4 of the TLAser400 card.
   Channel 4 is the SIMM module marked 'CH 4 J6' on the printed circuit board silkscreen.

5. Install/reinstall the PCI TLAser400 card.

6. Install the encoder input connector/PC bracket in any open rear panel slot.
   6.1 Tighten provided screws to secure connector.

7. Connect encoder using the provided encoder interface cable.
   The leads are labeled and described in Table 3 (if connecting to your existing encoder output) or, plug directly into the LaserLinc supplied encoder.

8. Connect the encoder interface cable to the rear panel connector.

9. Ensure the *Encoder / Quadrature* option is added to your Total Vu Software.

TABLE 3 TLASER400 ENCODER SIGNAL DESCRIPTION		
SIGNAL NAMES	DESCRIPTION	SIGNAL SOURCE
+5VDC/+12VDC Jumper J7 1-2 12V Jumper J7 2-3 5V	Used to provide power to the encoder. If encoder is already powered, these signals **are not used**. Insulate and tie-off leads.	TLAser400 card
Signal Ground (GND, GRD)	Reference signal for TLAser400 card. This must be connected to the encoder ground **regardless of power source**.	TLAser400 card
Encoder A (ENC A+) (DATA A)	Encoder output signal for single ended or positive half of differential signal pair.	Encoder
Encoder A' (ENC A-) (DATA Ā)	Encoder output signal for negative half of differential signal pair. If not used, then insulate and tie-off this lead.	Encoder
Encoder B (ENC B+) (DATA B)	Encoder output signal for single ended or positive half of differential signal pair. Use for quadrature operation.	Encoder
Encoder B' (ENC B-) (DATA B')	Encoder output signal for negative half of differential signal pair. Use for quadrature operation.	Encoder

Encoder Connection

The LaserLinc encoder interface connects to encoders from many different manufactures. Please refer to your particular encoder data sheet for pin-out information. FAILURE TO CONNECT THE ENCODER PROPERLY MAY RESULT IN DAMAGE TO THE ENCODER INTERFACE, TLAser400 CARD, NETLINC, PTRBe AND ENCODER!

Depending on what encoder output options are selected, your encoder may require pull-up resistors. Consult your encoder manufacturer's data sheet for details. Failure to use pull-up resistors when needed will prevent the encoder from generating pulses. No damage will occur. Pull-up resistors may be added to the encoder interface module. Contact LaserLinc technical support for details: 937-318-2440.

1   Choose a method for encoder interfacing.

     The power is supplied to the encoder from either the TLAser400 encoder interface, NetLinc, or the encoder is already powered by another device.

     1.1   If the encoder is powered by another device, determine the voltage level that is used.

            The TLAser400 & NetLinc encoder interfaces are factory-set to accept signals up to 28V. The PTRBe is factory configured for 5VDC operation only. Voltage inputs up to 28VDC are available, contact LaserLinc tech support.

TABLE 4 BACKPANEL HIROSE CONNECTOR PIN OUT		
WIRE LEAD	CONNECTOR	ENCODER FUNCTION
ENC A'	PIN 1	Signal Ã (line over A) (optional, install jumper J4 1-2 (default) on TLAser400 encoder interface if used–enables differential signal)
ENC B	PIN 2	Signal B (Use for quadrature only)
ENC B'	PIN 3	Signal B' (Use for quadrature only)
GRD	PIN 4	Supply Common (must use)
+5VDC/+12VDC	PIN 5	Power Source (if used, select with jumper J7)
ENC A	PIN 6	Signal A (must use)

You must first have Total Vu software and a scanner installed with a measurement configured.

1. Hit <F2> or click the Start button.

2. Right click in any measurement window (or create a new window).

3. Select Properties then Measurement tab.

4. Select the Length measurement and Add.   Click OK.

5. Turn the encoder shaft.

6. The Length field should count up as the encoder is turned. Refer to the *Total Vu User's Guide* for further application setup.

7. To calibrate your encoder, determine the number of pulses per <desired unit of measure>. Enter values into the encoder configuration in Full Config / Encoders.

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Flying Lead Cable Schematic (Hirose to flying lead)
Diagram 6
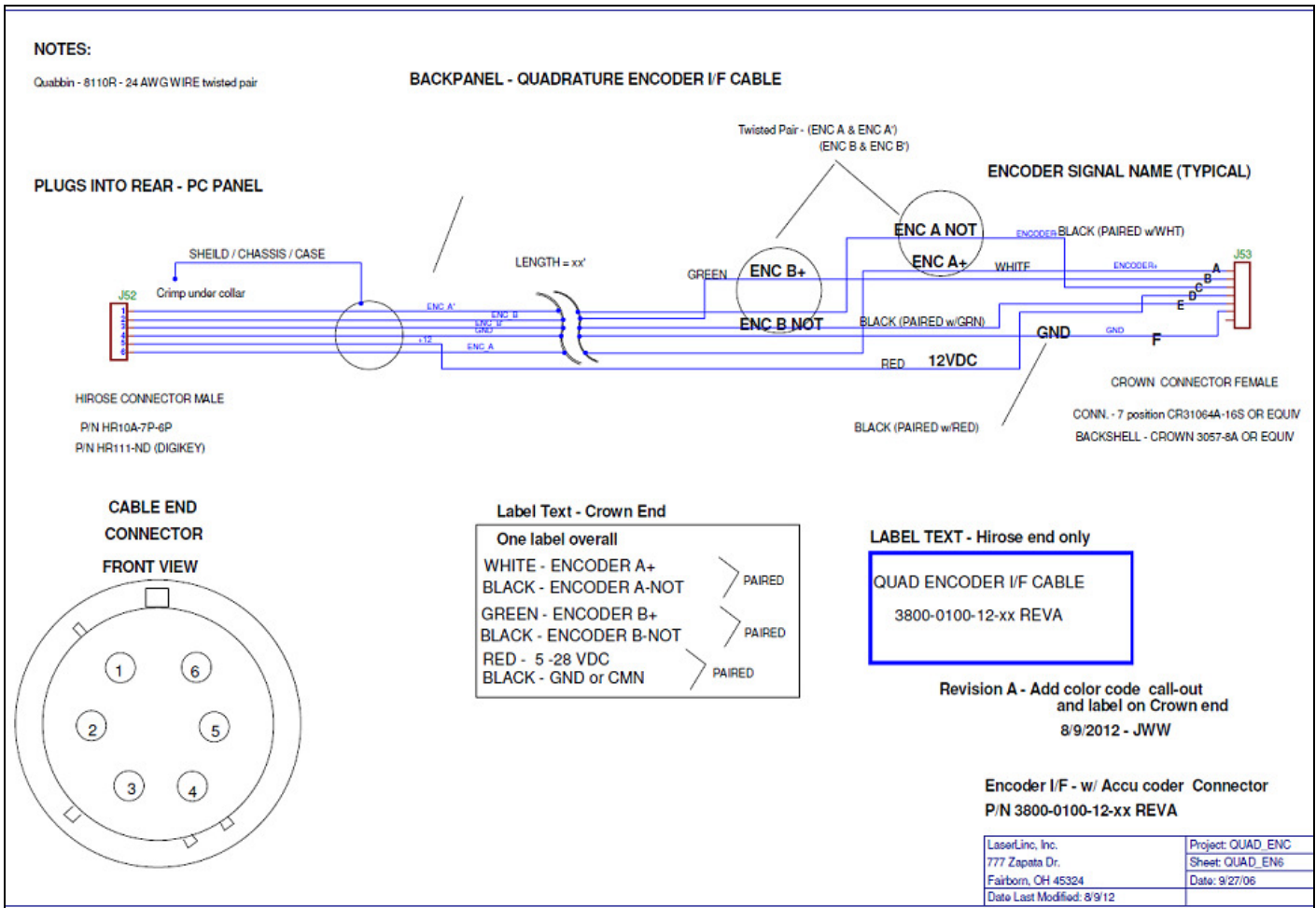
Direct Encoder Cable Schematic (Hirose to Crown)
Diagram 7

Encoder Pin Out - Encoder Products Inc. Model 725-NSS1000AHV1FNsyn

ENCODER PIN	FUNCTION	LASERLINC CONNECTION
		TABLE 5 SAMPLE OPTICAL ENCODER WIRING FOR MODEL 725 FROM ENCODER PRODUCTS CO.
A	DATA A	Signal A / Encoder A+
B	DATA B	Signal B / Encoder B+
C	DATA A'	Signal A'/Encoder—Use alone (along with GND) if encoder module on TLAser400 Card has Jumper J4 removed
D	+ VOLTS DC	5 - 28VDC
E	DATA B'	Signal B' / Encoder B-
F	COMMON	Ground
G	CASE	Shield optional

Encoder Mechanical Drawing

Diagram 8

1 2 3
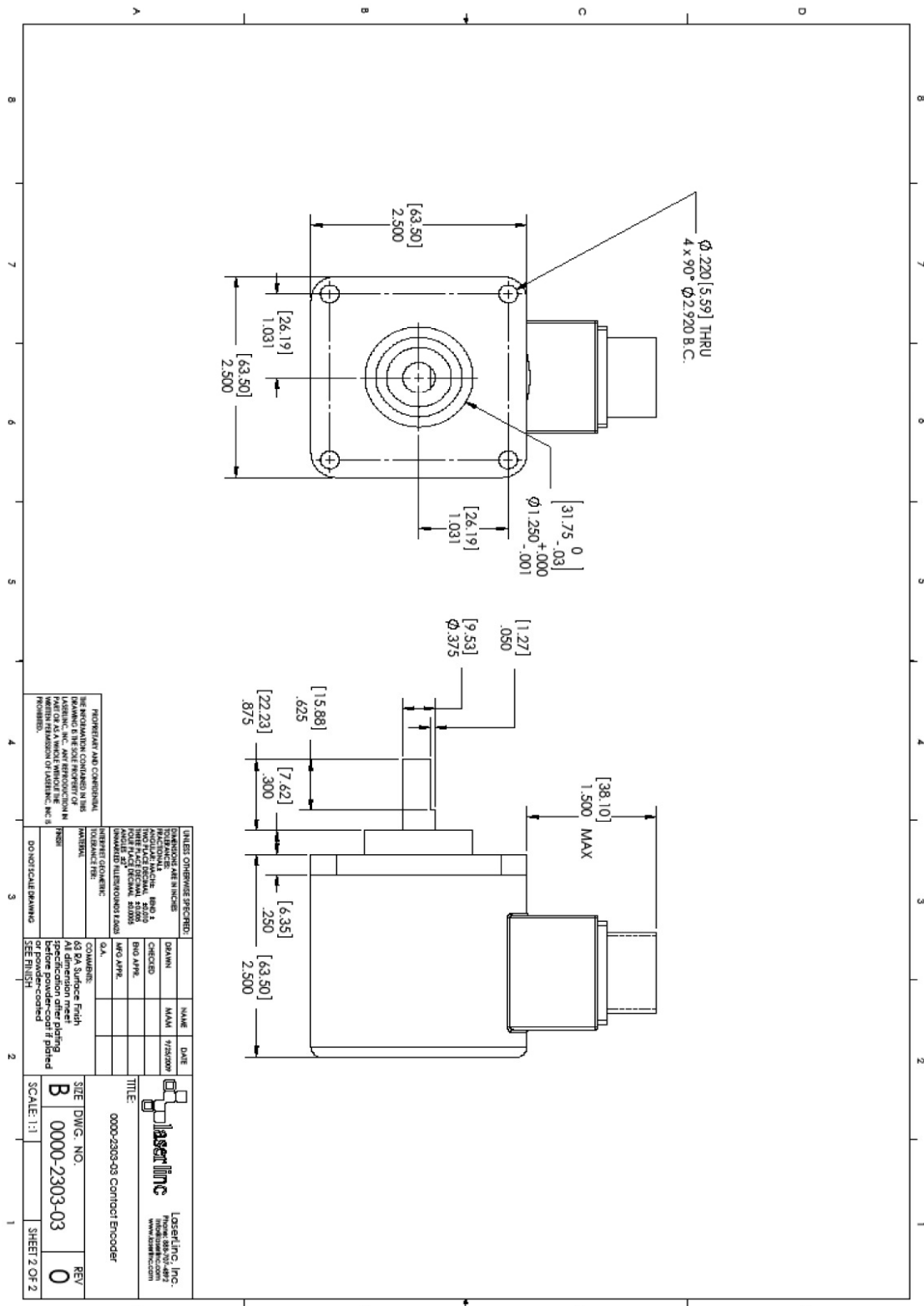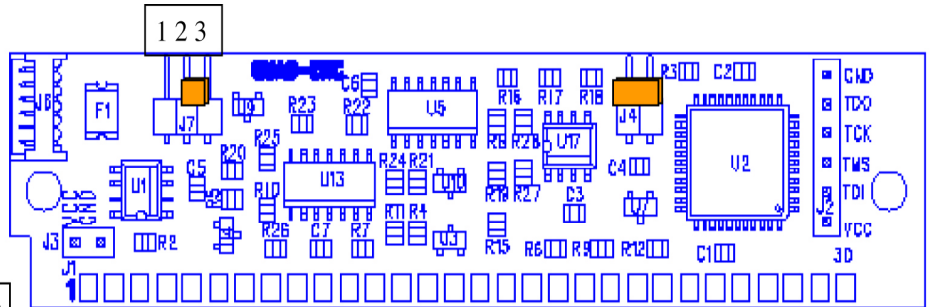
Default Jumper Settings
J7 – 2-3 (5V)
J4 – Installed (differential)

LaserLinc
INC.

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Fairborn, OH 45324
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QUADRATURE ENCODER
Board No.: 3800-1105-01

RS274X FORMAT, ASCII, ABSOLUTE
3 INTEGER DIGITS
5 FRACTIONAL DIGITS

REV: A

PRIMARY ASSEMBLY

CDC Technologies Inc.

PHONE # (937) 886-8715   FAX # (937) 886-8715
WWW.CDCTECHINC.COM

LAYERS VIEWED FROM PRIMARY SIDE

DATE: 1/26/07
CDC JOB NO.: CDC1362

Diagram 9

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