



User Guide

Multi-Channel Time Distribution Unit

Model TDU-310

P/N 018000001

Revision G

November 2018

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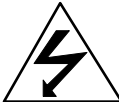
<http://www.brandywinecomm.com>



Revision History

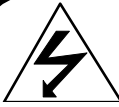
| REVISION | DATE | COMMENTS |
|----------|------------|---|
| NC | 12-08-03 | Initial release of TDU-310 user guide. |
| A | 12-06-04 | Revision of entire TDU-310 user guide. |
| B | 02-21-06 | Customer's comments incorporated into TDU-310 user guide. |
| C | 02-01-08 | Revised input and output configuration tables to reflect correct factory jumper settings. Outline drawing updated to Rev B, showing rounded corners on front panel. |
| D | 01-21-2011 | Clarified Calibration requirements |
| E | 12-12-2012 | Corrected connector voltages |
| F | 07-05-2016 | Corrected pin errors in 1.3.1 Inputs. |
| G | 10-30-2018 | Corrected timecode inputs, updated outline drawing to Rev D |
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Safety Warnings



WARNING:

To prevent fire and electric shock, do not expose this unit to rain or moisture.



WARNING:

The lightning flash with an arrowhead inside of an equilateral triangle is intended to alert the user to the presence of un-insulated “dangerous voltage” within the product’s enclosure. The “dangerous voltage” may be of sufficient magnitude to constitute as a risk of electrical shock to people.



CAUTION:

The exclamation point inside of an equilateral triangle is intended to alert the user to the presence of important operation and maintenance instructions in the user guide.



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1 Introduction

1.1 Scope of Section

Section 1 provides a general description of the Brandywine Communications Multi-Channel Time Distribution Unit (Model TDU-310). The introduction is divided into three parts, purpose of the equipment, physical and electrical specification, and an identification of the external controls, indicators, and connectors.

1.2 Purpose of Equipment

The TDU-310 accepts various inputs from external timing units, chooses between these input sources, and buffers the outputs of the selected source to the user. The selection is essentially a 2 x 1 switch for all inputs. The input chosen is user-programmed to be either user selectable or automatic. Primary to secondary switching is based on amplitude faults of the 1 PPS input, Time Code 1 input (HaveQuick), Time Code 2 input (50 bit/second BCD), and the state change of the Time Fault Discrete input.

The TDU-310 is designed to provide dual redundant timing signals for use in telecommunications, power utilities, and military communication applications.



1.3 Specification

1.3.1 Inputs

| INPUT | SIGNAL | LEVEL | IMPEDANCE | CONNECTOR |
|--------------------|-------------------------|---|---------------------|--|
| Reference A Inputs | 1 PPS | 0 V to +5 VDC or 0 VDC to 10 VDC and positive on time | 50 ohms | J1 |
| | Time Code 1 (HaveQuick) | 0 V to +5 VDC | 50 ohms | J3 |
| | Time Code 2 (BCD) | RS232 or RS422 compatible | DS14C232 and DS8922 | J5 Pin 4 (GND) J5 Pin 8 (-) J5 Pin 9 (+) |
| | Time Fault Discrete | 5 V logic and fault active low | 74 ACT logic | J5 Pin 1 |
| | Isolation | All signal inputs are optically isolated | | |
| Reference B Inputs | 1 PPS | 0 V to +5 VDC or 0 VDC to 10 VDC and positive on time | 50 ohms | J2 |
| | Time Code 1 (HaveQuick) | 0 V to +5 VDC | 50 ohms | J4 |
| | Time Code 2 (BCD) | RS232 or RS422 compatible | DS14C232 and DS8922 | J6 Pin 4 (GND) J6 Pin 8 (+) J6 Pin 9 (-) |
| | Time Fault Discrete | 5 V logic and fault active low | 74 ACT logic | J6 Pin 1 |
| | Isolation | All signal inputs are optically isolated | | |
| Power | | 115/230 VAC selectable, 47Hz to 70 Hz, and 10 W | | IEC-320 receptacle |
| Size | Width | Standard 19" rack mounting | | |
| | Height | 1U (1.72") | | |
| | Depth | 6.15" excluding the connectors | | |
| Weight | | Approximately 10 lbs | | |

Table 1 Inputs



1.3.2 Outputs

| OUTPUT | SIGNAL | LEVEL | IMPEDANCE | RISE TIME | QTY | CONNECTOR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------|---|--|---|--|-----|--|--------|--------|--------|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|---|----|----|----|----|----|
| GROUP 1 | PULSE TIME CODE 1 (HQ) TIME CODE 2 (BCD) LINK SELECTABLE | 0-10 V _{0-pk} | LOW Z OR 50 OHMS LINK SELECTABLE PER OUTPUT | < 10 ns | 5 | J9, J11, J13, J15, AND J17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP 2 | PULSE TIME CODE 1 (HQ) TIME CODE 2 (BCD) LINK SELECTABLE | 0-10 V _{0-pk} | LOW Z OR 50 OHMS LINK SELECTABLE PER OUTPUT | < 10 ns | 5 | J19, J21, J23, J25, AND J27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP 3 | PULSE TIME CODE 1 (HQ) TIME CODE 2 (BCD) LINK SELECTABLE | 0-05 V _{0-pk} | LOW Z OR 50 OHMS LINK SELECTABLE PER OUTPUT | < 10 ns | 5 | J10, J12, J14, J16, AND J18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP 4 | PULSE TIME CODE 1 (HQ) TIME CODE 2 (BCD) LINK SELECTABLE | 0-05 V _{0-pk} | LOW Z OR 50 OHMS LINK SELECTABLE PER OUTPUT | < 10 ns | 5 | J20, J22, J24, J26, AND J28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP 5 AND GROUP 6 | PULSE TIME CODE 1 (HQ) TIME CODE 2 (BCD) LINK SELECTABLE | PER EIA RS232 | PER EIA RS232 | 4.5 V/ μ s PROP. DELAY OF 1 μ s | 10 | J7 <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>SIGNAL</th> <th>GROUND</th> </tr> </thead> <tbody> <tr><td>11</td><td>12</td></tr> <tr><td>13</td><td>14</td></tr> <tr><td>15</td><td>16</td></tr> <tr><td>17</td><td>-</td></tr> <tr><td>28</td><td>29</td></tr> <tr><td>30</td><td>31</td></tr> <tr><td>32</td><td>33</td></tr> <tr><td>44</td><td>45</td></tr> <tr><td>46</td><td>47</td></tr> <tr><td>48</td><td>49</td></tr> </tbody> </table> | SIGNAL | GROUND | 11 | 12 | 13 | 14 | 15 | 16 | 17 | - | 28 | 29 | 30 | 31 | 32 | 33 | 44 | 45 | 46 | 47 | 48 | 49 | | | | | | | | | | | |
| SIGNAL | GROUND | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 | 45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 | 47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 | 49 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP 7 AND GROUP 8 | PULSE TIME CODE 1 (HQ) TIME CODE 2 (BCD) LINK SELECTABLE | PER EIA RS422 | PER EIA RS422 | < 20 ns | 10 | J7 <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>+</th> <th>-</th> <th>GROUND</th> </tr> </thead> <tbody> <tr><td>1</td><td>18</td><td>34</td></tr> <tr><td>2</td><td>19</td><td>35</td></tr> <tr><td>3</td><td>20</td><td>36</td></tr> <tr><td>4</td><td>21</td><td>37</td></tr> <tr><td>5</td><td>22</td><td>38</td></tr> <tr><td>6</td><td>23</td><td>39</td></tr> <tr><td>7</td><td>24</td><td>40</td></tr> <tr><td>8</td><td>25</td><td>41</td></tr> <tr><td>9</td><td>26</td><td>42</td></tr> <tr><td>10</td><td>27</td><td>43</td></tr> </tbody> </table> | + | - | GROUND | 1 | 18 | 34 | 2 | 19 | 35 | 3 | 20 | 36 | 4 | 21 | 37 | 5 | 22 | 38 | 6 | 23 | 39 | 7 | 24 | 40 | 8 | 25 | 41 | 9 | 26 | 42 | 10 | 27 | 43 |
| + | - | GROUND | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 18 | 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 19 | 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 20 | 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 21 | 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 22 | 38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 23 | 39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 24 | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 25 | 41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 26 | 42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 27 | 43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 PPS | PULSE WIDTH | 20 μ s REGARDLESS OF THE 1 PPS INPUT PULSE WIDTH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 2 Outputs



1.4 Controls and Indicators

All operating controls excluding the power control are located on the front panel of the TDU-310.

| CONTROL | FUNCTION |
|------------------|--|
| Reference Select | Manual selection of the input source. Either Reference A, Reference B, or automatic selection. |
| Power | Located on the rear panel of the unit. |

Table 3 Controls

| INDICATOR | DESCRIPTION |
|------------------|---|
| A Online | Indicator shows Reference A is the source of the outputs. |
| A Available | Indicator shows all Reference A signals are present. |
| B Online | Indicator shows Reference B is the source of the outputs. |
| B Available | Indicator shows all Reference B signals are present. |
| Auto | Indicator shows Reference Select is in automatic mode. |
| Power | Indicator shows power is available. |

Table 4 Indicators



2 Installation

2.1 Scope of Section

Section 2 provides installation instructions for the Brandywine Communications Multi-Channel Time Distribution Unit (Model TDU-310).

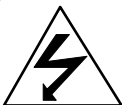
2.2 Unpacking and Inspection

Remove the TDU-310 from its shipping container. Visually inspect the unit for any damage and loose hardware. If any shipping damage is observed, immediately notify the carrier and Brandywine Communications.

The TDU-310 occupies 1U (1.75 inches) of vertical cabinet space.

2.3 TDU-310 Configuration

Refer to Figure 6.4 for the locations of the push on jumper links. The TDU-310 is extremely flexible with respect to the input and output configurations. Setup is done using the push on jumpers on the main printed circuit board assembly.



WARNING:

Remove the AC power cord before removing the top cover of the TDU-310.

To remove the top cover of the TDU-310, remove the four side screws and the center front panel screw. This will expose the main printed circuit board assembly. Install the jumper links as required. Note that the 5/10 V pulse outputs typically used for the 1 PPS may be configured to be either a 50 ohm source impedance or a low source impedance. The 50 ohm source impedance is recommended when driving a 50 ohm terminated coaxial cable for correct impedance matching to prevent pulse reflections. The load will see a 5 V pulse in this configuration. When all link installations are correct, replace the top cover using the five screws. **Please note that the factory default settings are shown in BOLD font.**



2.3.1 Internal Jumper Settings

| Jumper | Connector | Printed Circuit Card Jumper Function | Top or Left | Bottom or Right |
|--------|-------------------------|--------------------------------------|--------------|-----------------|
| LK1 | NA | No 1PPS Channel A | Std | No 1PPS |
| LK2 | NA | No 1PPS Channel B | Std | No 1PPS |
| LK3 | NA | No Have Quick Channel A | Std | No HQ |
| LK4 | NA | No Have Quick Channel B | Std | No HQ |
| LK5 | NA | RS422 or RS232 | RS232 | RS422 |
| LK6 | NA | No BCD Channel A | Std | No BCD |
| LK7 | NA | RS422 or RS232 | RS232 | RS422 |
| LK8 | NA | No BCD Channel B | Std | No BCD |
| LK9 | NA | No /TFD Channel A | /TFD | No /TFD |
| LK10 | NA | No /TFD Channel B | /TFD | No /TFD |
| LK11 | J9, J11, J13, J15, J17 | Ch 1-5: 0-10V 1PPS or HQ | HQ | 1PPS |
| LK12 | J9, J11, J13, J15, J17 | Ch 1-5: 0-10V BCD | | BCD |
| LK13 | J19, J21, J23, J25, J27 | Ch 6-10: 0-10V 1PPS or HQ | HQ | 1PPS |
| LK14 | J19, J21, J23, J25, J27 | Ch 6-10: 0-10V BCD | | BCD |
| LK15 | J10, J12, J14, J16, J18 | Ch 1-5: 0-5V 1PPS or HQ | HQ | 1PPS |
| LK16 | J10, J12, J14, J16, J18 | Ch 1-5: 0-5V BCD | | BCD |
| LK17 | J20, J22, J24, J26, J28 | Ch 6-10: 0-5V 1PPS or HQ | HQ | 1PPS |
| LK18 | J20, J22, J24, J26, J28 | Ch 6-10: 0-5V BCD | | BCD |
| LK19 | J7 | Ch 1-5: RS232 1PPS or HQ | HQ | 1PPS |
| LK20 | J7 | Ch 1-5: RS232 BCD | | BCD |
| LK21 | J7 | Ch 6-10: RS232 1PPS or HQ | HQ | 1PPS |
| LK22 | J7 | Ch 6-10: RS232 BCD | | BCD |
| LK23 | J7 | Ch 1-5: RS422 1PPS or HQ | HQ | 1PPS |
| LK24 | J7 | Ch 1-5: RS422 BCD | | BCD |
| LK25 | J7 | Ch 6-10: RS422 1PPS or HQ | HQ | 1PPS |
| LK26 | J7 | Ch 6-10: RS422 BCD | | BCD |

Table 5 Internal Jumper Settings



2.3.2 Output Jumper Settings

| Link | Connector | Output 1 Level (Typical) | Impedance |
|------|-----------|-----------------------------|-------------|
| | | Link in/out | Link in/out |
| LK27 | J9 | 10V/5V | LoZ/50Ω |
| LK28 | J11 | 10V/5V | LoZ/50Ω |
| LK29 | J13 | 10V/5V | LoZ/50Ω |
| LK30 | J15 | 10V/5V | LoZ/50Ω |
| LK31 | J17 | 10V/5V | LoZ/50Ω |
| LK32 | J19 | 10V/5V | LoZ/50Ω |
| LK33 | J21 | 10V/5V | LoZ/50Ω |
| LK34 | J23 | 10V/5V | LoZ/50Ω |
| LK35 | J25 | 10V/5V | LoZ/50Ω |
| LK36 | J27 | 10V/5V | LoZ/50Ω |
| LK38 | J10 | 5V/2.5V | LoZ/50Ω |
| LK39 | J12 | 5V/2.5V | LoZ/50Ω |
| LK40 | J14 | 5V/2.5V | LoZ/50Ω |
| LK41 | J16 | 5V/2.5V | LoZ/50Ω |
| LK42 | J18 | 5V/2.5V | LoZ/50Ω |
| LK43 | J20 | 5V/2.5V | LoZ/50Ω |
| LK44 | J22 | 5V/2.5V | LoZ/50Ω |
| LK45 | J24 | 5V/2.5V | LoZ/50Ω |
| LK46 | J26 | 5V/2.5V | LoZ/50Ω |
| LK47 | J28 | 5V/2.5V | LoZ/50Ω |

Table 6 Output Settings



2.4 Installation and Testing

Install the TDU-310 in the desired cabinet location. Fabricate the input/output cables and connect them to the TDU-310.



CAUTION:

Verify that the input voltage range selection on the rear panel of the unit is set to match the local line AC voltage (115/230 VAC).

If the input voltage range selection is incorrect, lift the red cover on the power entry module and remove the fuse holder. Rotate the fuse holder 180 degrees and reinstall the fuse holder so that the correct line voltage is shown through the rear window. Connect the AC power source to the TDU-310. Apply power to the unit by switching on the power switch located on the rear panel of the unit.



3 Operating Instructions

3.1 Scope of Section

Section 3 provides operating instructions for the Multi-Channel Time Distribution Unit (Model TDU-310).

3.2 Operation

To operate the unit, apply power to the unit and the Power indicator should illuminate.

3.2.1 Automatic Selection of Signal Sources

Set the 'Reference Select' switch to 'Auto'. The following LEDs should illuminate:

- Reference A Available
- Reference B Available
- Auto
- Reference A Online

In this mode, Reference A is selected unless the TDU-310 detects a missing signal on *ANY* of the three reference signal inputs (1 PPS, Time Code 1 (HQ), and Time Code 2 (BCD)) *OR* the Time Fault Discrete line is pulled low. If any of these conditions is met, the TDU-310 will switch *ALL* outputs to be driven from the Reference B input. If both Reference A *AND* Reference B are faulty, the outputs will be switched to Reference A.

3.2.2 Manual Selection of Reference A as Signal Source

Set the 'Reference Select' switch to 'A'. The following LEDs should illuminate:

- Reference A Available
- Reference B Available
- Reference A Online

3.2.3 Manual Selection of Reference B as Signal Source

Set the 'Reference Select' switch to 'B'. The following LEDs should illuminate:

- Reference A Available
- Reference B Available
- Reference B Online



4 Link Locations and Pin Assignments

4.1 Scope of Section

Section 4 provides the link locations and the input/output pin assignments for the TDU-310.

4.2 Link Locations

Refer to Figure 6.4 for the locations of the push on jumper links.

4.3 Pin Assignments

4.3.1 Input Connectors

| CONNECTOR | SIGNAL | CONNECTOR TYPE |
|-----------|---------------------------------|----------------|
| J1 | Reference A 1 PPS In | BNC |
| J2 | Reference B 1 PPS In | BNC |
| J3 | Reference A TC1 (HaveQuick) | BNC |
| J4 | Reference B TC1 (HaveQuick) | BNC |
| J5 | Reference A TC2 (BCD) | Multi-Pin |
| J6 | Reference A Time Fault Discrete | Multi-Pin |
| | Reference B TC2 (BCD) | Multi-Pin |
| | Reference B Time Fault Discrete | Multi-Pin |

Table 7 Input Connectors

4.3.2 Output Connectors

| CONNECTOR | SIGNAL | CONNECTOR TYPE |
|-----------|------------------------------|----------------|
| J9 – J28 | 5/10 V Pulse and Logic Level | BNC |
| J7 | RS232 and RS422 | Multi-Pin |

Table 8 Output Connectors

4.3.3 Pin Assignments

| CONNECTOR REFERENCE | CONNECTOR TYPE | CONNECTOR PIN | SIGNAL |
|---------------------|----------------|---------------|---------------------------------|
| J5 | DB-9 MALE | 1 | REFERENCE A TIME FAULT DISCRETE |
| | | 2 | GROUND |
| | | 3 | N/C |
| | | 4 | GROUND |
| | | 5 | TIME CODE 2 INPUT RS232 |
| | | 6 | N/C |
| | | 7 | N/C |
| | | 8 | TIME CODE 2 INPUT RS422 (-) |
| | | 9 | TIME CODE 2 INPUT RS422 (+) |
| J6 | DB-9 MALE | 1 | REFERENCE B TIME FAULT DISCRETE |
| | | 2 | GROUND |
| | | 3 | N/C |
| | | 4 | GROUND |
| | | 5 | TIME CODE 2 INPUT RS232 |
| | | 6 | N/C |
| | | 7 | N/C |
| | | 8 | TIME CODE 2 INPUT RS422 (+) |
| | | 9 | TIME CODE 2 INPUT RS422 (-) |
| J7 | DB-50 FEMALE | 1 | RS422 01 + |
| | | 2 | RS422 02 + |
| | | 3 | RS422 03 + |
| | | 4 | RS422 04 + |
| | | 5 | RS422 05 + |
| | | 6 | RS422 06 + |
| | | 7 | RS422 07 + |
| | | 8 | RS422 08 + |
| | | 9 | RS422 09 + |
| | | 10 | RS422 10 + |
| | | 11 | RS232 1 |
| | | 12 | GROUND |
| | | 13 | RS232 2 |
| | | 14 | GROUND |
| | | 15 | RS232 3 |
| | | 16 | GROUND |
| | | 17 | RS232 4 |
| | | 18 | RS422 01 - |
| | | 19 | RS422 02 - |
| | | 20 | RS422 03 - |
| | | 21 | RS422 04 - |
| | | 22 | RS422 05 - |
| | | 23 | RS422 06 - |
| | | 24 | RS422 07 - |
| | | 25 | RS422 08 - |
| | | 26 | RS422 09 - |
| | | 27 | RS422 10 - |
| | | 28 | RS232 5 |
| | | 29 | GROUND |
| | | 30 | RS232 6 |
| | | 31 | GROUND |
| | | 32 | RS232 7 |
| | | 33 | GROUND |
| | | 34 | GROUND |
| | | 35 | GROUND |
| | | 36 | GROUND |
| | | 37 | GROUND |
| | | 38 | GROUND |
| | | 39 | GROUND |
| | | 40 | GROUND |
| | | 41 | GROUND |
| | | 42 | GROUND |
| | | 43 | GROUND |
| | | 44 | RS232 8 |
| | | 45 | GROUND |
| | | 46 | RS232 9 |
| | | 47 | GROUND |
| | | 48 | RS232 10 |
| | | 49 | GROUND |
| | | 50 | N/C |

Table 9 Pin Assignments

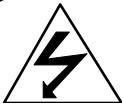
5 Maintenance and Calibration

5.1 Scope of Section

Section 5 describes the recommended maintenance checks for the TDU-310 and outlines a general approach to fault finding and repair.

5.2 Routine Maintenance

During normal operation the TDU-310 functions automatically and does not require continuous manual intervention. Preventative maintenance can therefore be restricted to a regular inspection of the status indicators.



WARNING:

Before removing the TDU-310 cover make sure that the power cord has been detached from the rear panel of the unit.

5.3 Fault Finding



CAUTION:

In case of equipment malfunction or failure, Brandywine Communications strongly recommends that the TDU-310 be returned to the factory for repair. If this is not practical, fault finding and repair must only be undertaken by a qualified test engineer. Brandywine Communications will not accept any liability for injury or damage caused during fault finding and repair by the user.

5.4 Calibration

The Model TDU310 has no calibration requirements.



6 Drawings

| FIGURE | DESCRIPTION |
|--------|----------------------------|
| 6.1 | TDU-310 Front Panel |
| 6.2 | TDU-310 Rear Panel |
| 6.3 | TDU-310 Mechanical Outline |
| 6.4 | TDU-310 Link Location |

Table 10 TDU-310 Drawings



FIGURE 6.1
Front Panel

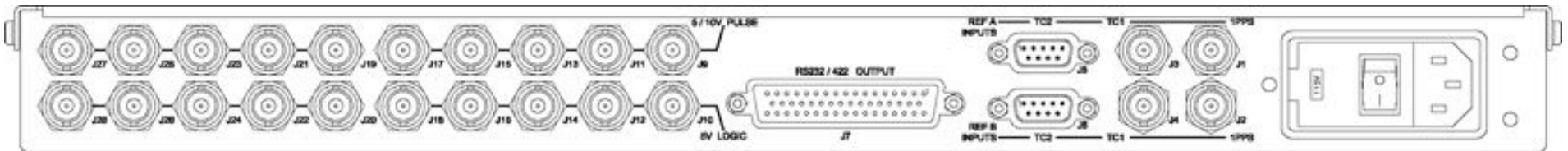


FIGURE 6.2
Rear Panel

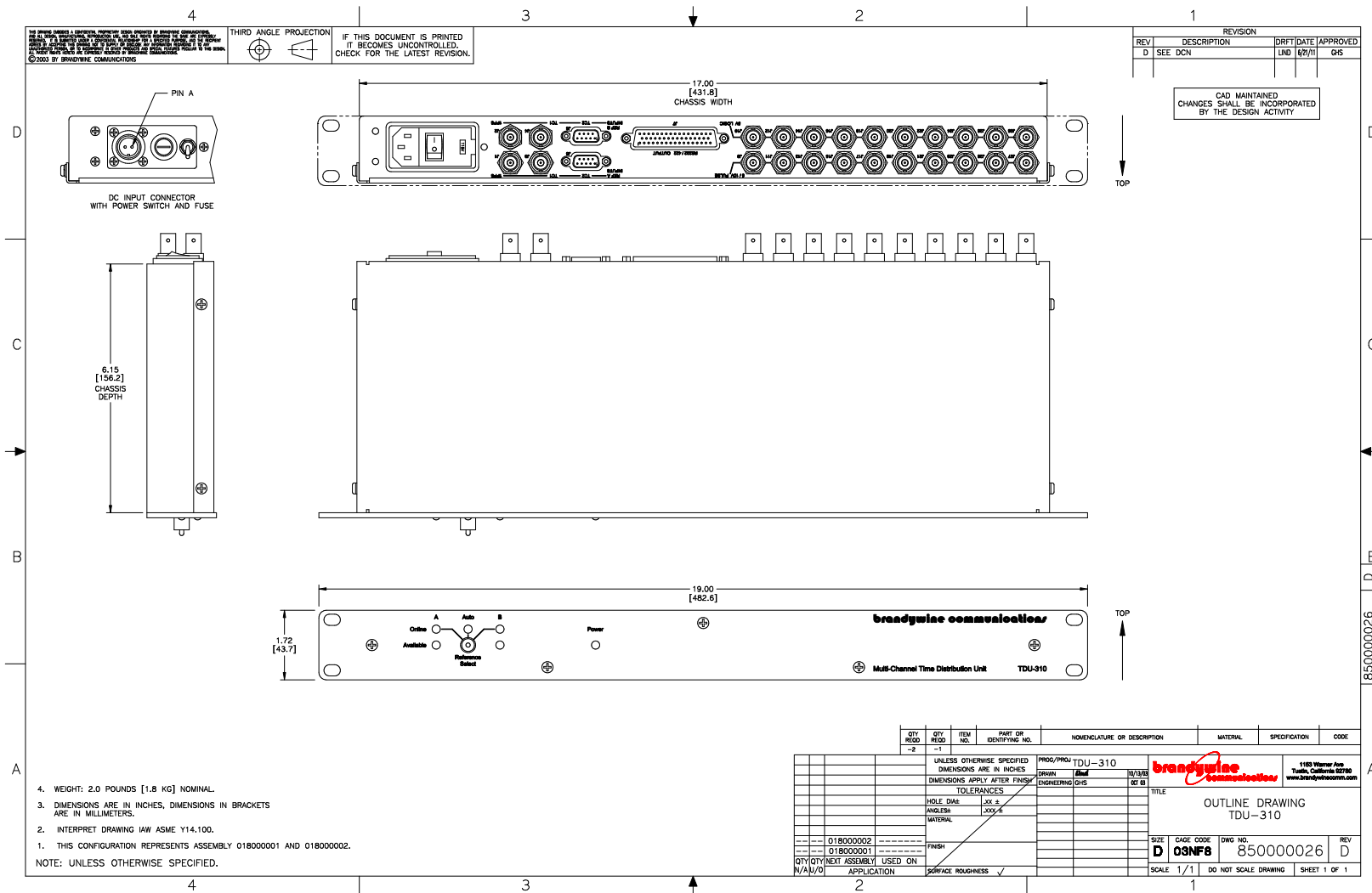


Figure 6.3 Outline Drawing

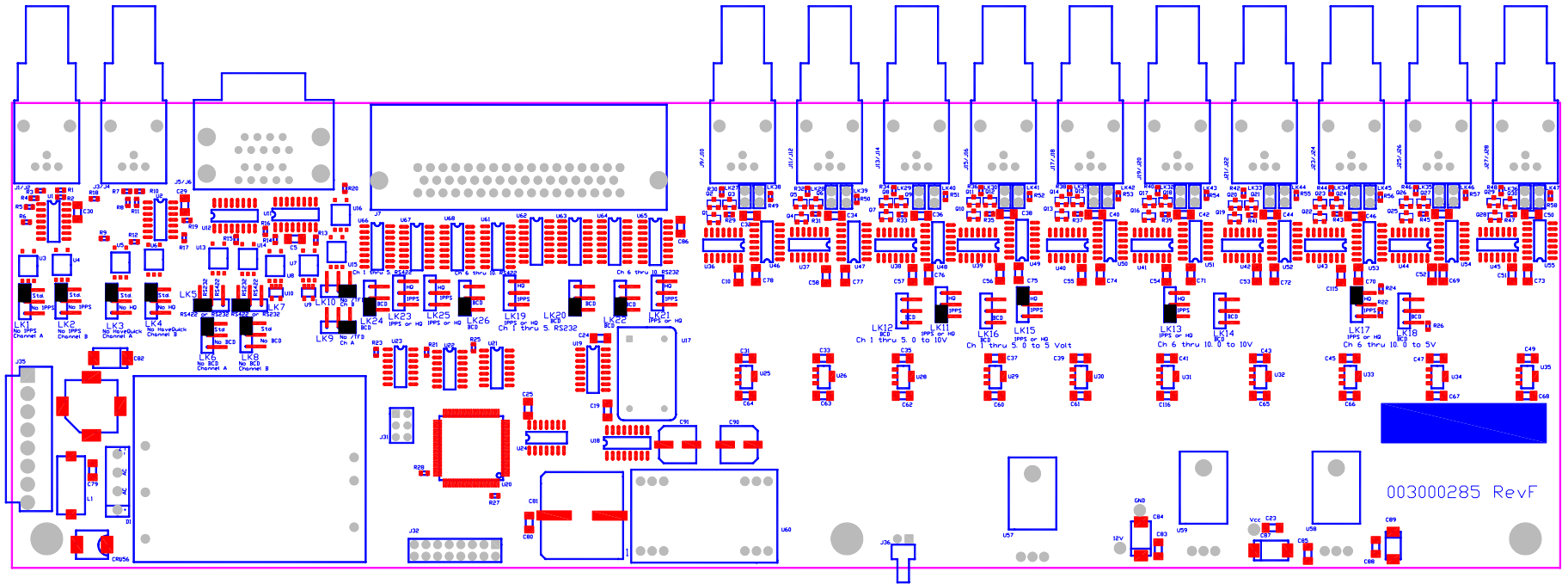


Figure 6.4 - Link Locations

Note: "Std." labels of LK1 to LK4 of 003000285 RevD (or older) were opposite than they're shown.