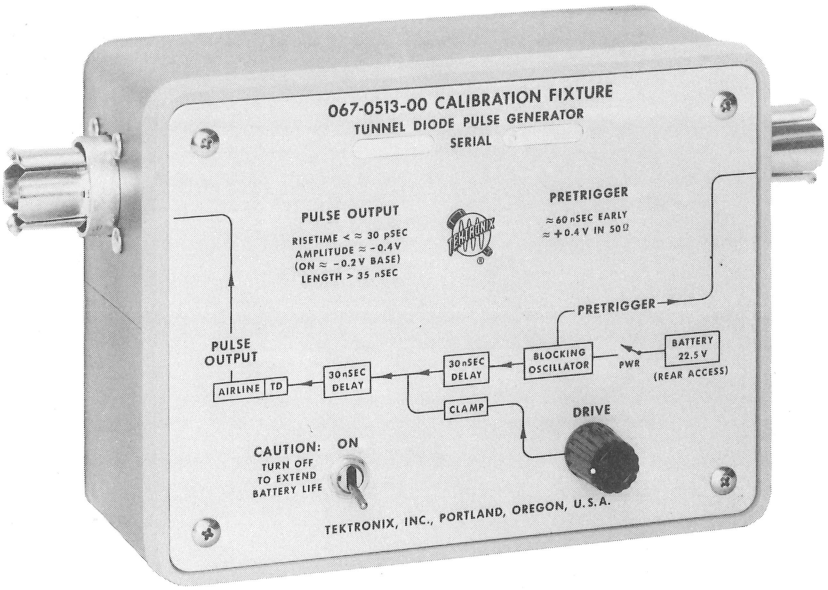
# 067-0513-00 CALIBRATION FIXTURE

Tunnel Diode Pulse Generator






| REF. NO. | PART NO. | SERIAL/MODEL NO. EFF. | SERIAL/MODEL NO. DISC. | QTY. | DESCRIPTION |
|---|---|---|---|---|---|
| | 067-0513-00 | SN-204 | | | The T.D. Pulse Generator is battery powered and is used for checking step function response of all Tektronix sampling systems. It can be used with a minimum of correction due to pulse source risetime limitations.<br><br>The repetition rate varies from about 50 kHz to 150 kHz depending on battery condition. A pretrigger (60 to 70 nSEC early) permits operation in conjunction with any of the Tektronix sampling systems.<br><br>The pulser contains a transistor blocking oscillator, an adjustable diode drive clamp, a delay cable and a 100 mA, 6 pF, tunnel diode mounted in a special coaxial air-line environment. The free-running blocking oscillator generates a 50 nSEC pulse with adequate amplitude to drive the clamp, tunnel diode and pretrigger. The diode clamp, 30 nSEC from the blocking oscillator, flattens the negative-going pulse at a level just sufficient to switch the 100 mA tunnel diode which is another 30 nSEC past the clamp. This device draws about 1.5 mA. It is difficult to predict battery life but approx. 1 month can be expected with average use. New batteries may be ordered on a standard order form. |

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## Tunnel Diode Pulse Generator Calibration (includes specifications)

Equipment Required:

1 - Sampling plug-in (1S1, 4S1, or 3S76) and scope.

1 - Type 575 curve tracer.

1 - Triplett VOM or equivalent.

1 - General Radio coaxial connector tool kit 874TOK, p/n 003-0038-00.

1. Inspect pulser for wiring errors, unsoldered joints, shorted coaxial cable connections and loose hardware. Separate wrap-around from pulser and unplug both cables.
2. Measure resistance to ground from secondary side of power switch (SW129). Resistance should be about 10 to 20K using Triplett 630 Meter. (common is negative)
3. Install batteries, plug (+) end to ground and insert transistors; 151-0083-00 in Q100 socket and 2N1304 in Q123.
4. Connect VOM to battery terminal and ground. Meter should indicate about 22.5 volts. Turn power switch to ON, meter reading with fresh batteries should show 0.5 to 1V drop.
5. Connect PRETRIGGER cable from wrap-around housing to pretrigger connector on chassis. Connect a GR cable from PRETRIGGER GR connector on housing to input of sampling plug-in. Pretrigger signal, as viewed on sampling scope, should have a rise time of 1.0 nSEC or less for 0 to 200MV amplitude. Total pulse amplitude should be 400 MV. 151-0083-00 transistors will have to be selected to meet these specs.

6. With the tunnel diode correctly installed and checked (see separate tunnel diode installation procedure) in the airline, plug it into the input of the sampling plug-in.
7. Position the pulser assembly so the cable for the tunnel diode drive will plug on to the LR119 isolation network which will then plug on to the coax connector on the side of the airline.
8. With power switch ON, advance DRIVE control clockwise and trigger sampler until a negative step is viewed on the sampling scope. Decrease DRIVE until tunnel diode just fires and is stable, and foot of negative step is the flatest. Check for the following specs: risetime, equal to the sampler plug-in; fast-pulse step amplitude, 400 mV; pulse-base amplitude (foot), 200 mV 100 mV; pulse length, 35 nSEC.
9. Turn off pulser power and disconnect pulser from sampling scope. Assemble pulser in wrap-around housing being careful not to get internal cables between airline and coiled delay line cable. Connect pretrigger internal cable to chassis-mounted connector and tunnel-diode drive cable to right-angle connector of isolation network which is connected to side of airline. Install bottom cover plate and secure by attaching feet.
10. Using two 2-nSEC cables into each channel of the sampling plug-in, display both the PULSE OUTPUT and the PRETRIGGER signals on a dual trace. Trigger on the plus polarity of the PRETRIGGER signal and measure the time difference. If the 1S1 is the sampling plug-in used, a dual trace display is not possible; but by using two 2X GR attenuators on the two pulse outputs and connecting through the two 2-nSEC cables into a GR "Tee", the "Tee" output can be displayed on a single trace. In either case, trigger positive on the plus (+)

step of the PRETRIGGER pulse and identify the PRETRIGGER pulse from the negative step of the PULSE OUTPUT. With the sampling timing at 10 nSEC/cm and the pulser DRIVE fully clockwise, check that the time difference is 55 nSEC or greater. ( 55 nSEC) the PRETRIGGER pulse should be on the left (early) side of the display.

Specifications:

Pulse Output

Risetime: 30 pSEC (Not checked)

Amplitude: - 0.4 V

Duration: 35 nSEC

Pretrigger

Amplitude: + 0.4 V into 50Ω approx. 60 nSEC early

Recommendations:

To be used for risetime checks on Tektronix sampling systems.

# Tunnel Diode Installation Procedure.

A. To remove diode:

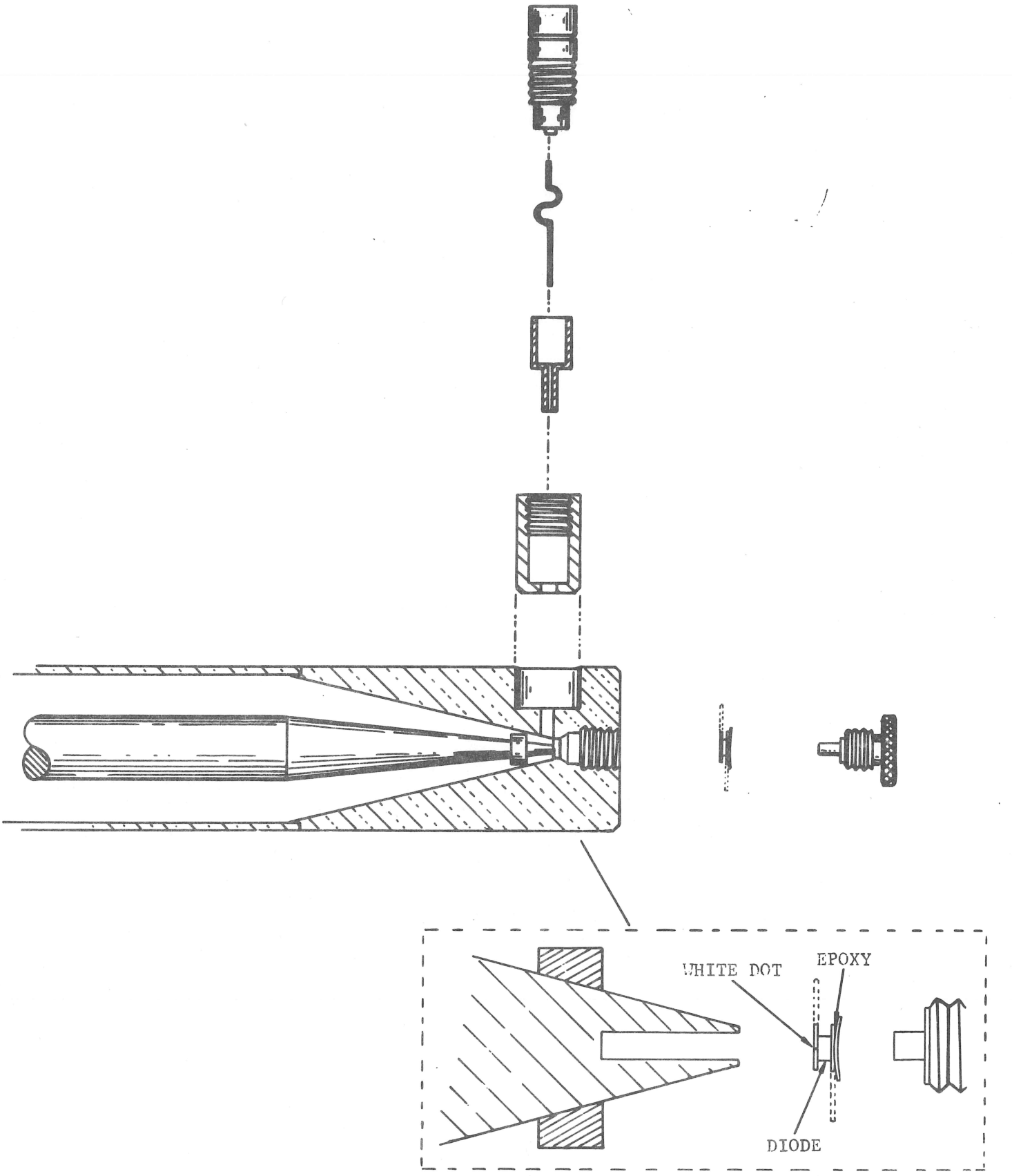
1. Remove airline completely from wrap-around by unscrewing knurled retaining nut.
2. Remove locking nut and unscrew small coaxial connector where the LR isolation network plugs on. Remove connector and spring contact. Tweezers may be necessary to get spring contact out.
3. Unscrew and remove knurled clamp nut at end of airline. Diode removed at this time.
4. Using the GR tools, loosen the coupling nut at the output end of the airline. Unscrew by hand.
5. Remove the outer transition GR conductor along with the insulator bead, inner conductor and airline center conductor. Do not lose delrin center-conductor spacer.

B. To install diode:

1. First prepare new diode according to diagram.
2. Be sure center conductor and GR inner conductor are tight to GR insulator bead. Replace bead if crazed and tighten with GR inner conductor wrench. Insert bead into outer transition piece. Slip on center conductor spacer on taper. Install in housing. (See A-4 above)
3. Install center conductor assembly into housing, lining up slot on airline housing with GR transition piece. Tighten coupling nut on outer transition piece. Use GR tools.
4. Insert tunnel diode in threaded hole, disc side out, so knurled clamp nut will make the electrical connection to the disc on the diode.

5. Install knurled clamp nut; finger tight only.
6. Check electrical diode connections with the Type 575. Set 575 up for 100 mA TD check and connect airline center conductor to negative and airline housing to positive.
7. Install spring contact into small coaxial connector with the long end out. Insert long end of spring contact into small hole on side of airline and screw small connector into place on airline finger tight. Check electrical connection as in step 7 only connect negative to center conductor of small coaxial connector. Tighten connector more if connection is not made.
8. Install lock nut on small coaxial connector and reinstall airline in wrap-around housing.

# TUNNEL DIODE INSTALLATION DIAGRAM



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Tunnel Diode Pulse Generator

| NEW ITEM | or 1-3 | PART NUMBER | TOTAL QUANT | QTY PER | DESCRIPTION | CIRCUIT # |
|---|---|---|---|---|---|---|
| | | 006-0506-00 | 2 | | Battery, 22.5V Meda 215 | |
| | | E108-0364-00 | 1 | | Coil, 0.1mh LR-109 | |
| | | 120-0247-00 | 1 | | Toroid, TD 43 | |
| | | 120-0264-00 | 1 | | Toroid, TD 61 | |
| | | 124-0158-00 | 4 | | Strip, ceramic, 7 notch | |
| | | E129-0086-00 | 4 | | Post, hex spacer | Dwg. #1313-A |
| | | E129-0087-00 | 2 | | Post, delay line cord | Dwg. #1314-A |
| | | 131-0155-00 | 2 | | Connector, Amph. 27-1, 50Ω cable | |
| | | 131-0156-00 | 1 | | Connector, Amph, 27-3, 50Ω chassis | |
| | | E131-0156-02 | 1 | | Connector, 131-0156-00 reworked | Dwg. #1322-A |
| | | E131-0370-00 | 1 | | Connector, Amph. 27-2, 50Ω | |
| | | 131-0394-00 | 1 | | Connector, Amph. 50Ω snap on | |
| | | 132-0001-00 | 2 | | Nut, coupling, GR 874-62 | |
| | | 132-0002-00 | 2 | | Conductor, outer, GR 874-60-3 | |
| | | 132-0007-00 | 2 | | Ring, snap, GR 874-81 | |
| | | 132-0016-00 | 2 | | Nut, retaining, GR 874-620 | |
| | | 132-0026-00 | 1 | | Outer, transition, GR 874-653 | |
| | | 132-0027-00 | 1 | | Inner transition, GR 874-654 | |
| | | 132-0028-00 | 2 | | Insulator, GR 874-70 | |
| | | 132-0029-00 | 2 | | Inner conductor, GR 874-61-4 | |
| | | 132-0040-00 | 2 | | Adapter, panel, Zamak #5 | |
| | | 136-0181-00 | 2 | | Socket, transistor, 3-pin | |
| | | 151-0069-00 | 1 | | Transistor, 2N1304 | |
| | | 151-0083-00 | 1 | | Transistor, 2N964, selected | |
| | | 152-0008-00 | 1 | | Diode, T-12-G | |
| | | 152-0115-00 | 2 | | Diode, snap off | |

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|---|---|---|---|---|---|---|
| | | E152-0254-01 | 1 | | Tunnel diode (w/disc) ass'y | Dwg. #1469 (Cir. #D-119) |
| | | 166-0221-00 | 1 | | Tube, ferrule, 0.089 x 1/4 | |
| | | E200-0277-01 | 1 | | Cover, top | Dwg. #1417-B |
| | | E200-0277-02 | 1 | | Cover, bottom | Dwg. #1419-B |
| | | E205-0061-00 | 1 | | Shell ass'y (RF XMSN Line) | |
| | | | | | 1)E204-0058-00 Dwg. #1323-A | |
| | | | | | 1)E205-0059-00 Dwg. #1319-A | Shell ass'y Dwg. #1412-B |
| | | | | | 1)E205-0060-00 Dwg. #1321-A | |
| | | 210-0004-00 | 4 | | Lockwasher, Int. #4 | |
| | | 210-0046-00 | 1 | | Lockwasher, Int. | |
| | | 210-0215-00 | 3 | | Lug, solder, pee wee | |
| | | 210-0223-00 | 1 | | Lug, solder, 1/4" | |
| | | 210-0562-00 | 2 | | Nut, hex 1/4-32 x 1/16 | |
| | | 210-0940-00 | 2 | | Washer, flat, 1/4" | |
| | | 211-0007-00 | 8 | | Screw, 4-40 x 3/16 BHS or PHS Phil. | |
| | | 211-0014-00 | 4 | | Screw, 4-40 x 1/2 BHS or PHS Phil. | |
| | | 211-0071-00 | 1 | | Screw, 4-40 x 3/8 PHS Phil. | |
| | | 211-0507-00 | 2 | | Screw, 6-32 x 5/16 BHS or PHS Phil. | |
| | | 213-0055-00 | 3 | | Screw, 2-32 x 3/16 PHS Phil. Thrd form | |
| | | 213-0123-00 | 4 | | Screw, 6-32 x 3/8 FHS Phil. | |
| | | E213-0145-00 | 1 | | Screw, thumb | Dwg. #1317-A |
| | | E214-0685-00 | 1 | | Conductor, inner, RF XMSN line | Dwg. #1318-A |
| | | E214-0686-00 | 1 | | Contact, elec., spring action | Dwg. #1326-A |
| | | 260-0643-00 | 1 | | Switch, toggle | |
| | | E276-0110-00 | 1 | | Bushing, insulator | Dwg. #1320-A |
| | | 281-0524-00 | 1 | | Capacitor, 150 pf 500V | |

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|---|---|---|---|---|---|---|
| | | 283-0003-00 | 2 | | Capacitor, 0.01μf 150V discap | |
| | | 283-0026-00 | 1 | | Capacitor, 0.2μf 25V discap | |
| | | 283-0065-00 | 2 | | Capacitor, 0.001 ±5% 100V discap | |
| | | 283-0590-00 | 2 | | Capacitor, button, 7.5pf ±5% 500V | |
| | | E311-0160-00 | 1 | | Pot, 50K ±10% 3/8 x 3/8 | |
| | | 315-0102-00 | 4 | | Resistor, 1K 1/4W 5% | |
| | | 315-0223-00 | 1 | | Resistor, 22K 1/4W 5% | |
| | | 315-0510-00 | 4 | | Resistor, 51Ω 1/4W 5% | |
| | | 316-0124-00 | 1 | | Resistor, 120K 1/4W 10% | |
| | | 316-0684-00 | 1 | | Resistor, 680K 1/4W 10% | |
| | | E333-0928-00 | 1 | | Panel, top (front) Film #3023 | Dwg. #1316-A |
| | | 334-0679-00 | 1 | | Tag, serial number insert | |
| | | E344-0128-00 | 2 | | Clip, battery, spring tension | Dwg. #1315-A |
| | | 348-0005-00 | 1 | | Grommet, rubber, 1/2" | |
| | | 348-0037-00 | 4 | | Foot, rubber, 1/2" | |
| | | 354-0234-00 | 2 | | Ring, transistor socket | |
| | | E358-0295-00 | 1 | | Bushing, insulator, inner cond. | Dwg. #1325-A |
| | | E358-0297-00 | 1 | | Bushing, form, delay line | Dwg. #1416-B |
| | | 361-0007-00 | 8 | | Spacer, ceramic strip | |
| | | 366-0153-00 | 1 | | Knob, charcoal | |
| | | E380-0098-00 | 1 | | Housing, wraparound | Dwg. #1289-C |
| | | E386-1046-00 | 1 | | Plate, top, delay line | Dwg. #1413-B |
| | | E386-1047-00 | 1 | | Plate, bottom, delay line | Dwg. #1414-B |
| | | E441-0673-00 | 1 | | Chassis, (S/S #2254) | Dwg. #1415-B |
| | | | | | Shell assembly instructions | Dwg. #1418-B |
| | | | | | Schematic | Dwg. #1534-B |

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| NEW ITEM | or 1-3 | PART NUMBER | TOTAL QUANT | QTY PER | DESCRIPTION | CIRCUIT # |
|---|---|---|---|---|---|---|
| | | 162-0020-00 | 1 | | Tubing, ins. #6 black 3/8" | |
| | | 162-0531-00 | 3 | | Thermofit, #12 black 1" | |
| | | 175-0068-00 | 1 | | Cable, coax, RG174 8-66 20 ft. | |
| | | 175-0068-00 | 1 | | Cable, coax, RG174 8-34 20 ft. | |
| | | 175-0068-00 | 1 | | Cable, coax, RG174 8-55 9 1/2" | |
| | | 175-0527-00 | 1 | | Wire, #22 strand. 9-6 5" | |
| | | 175-0527-00 | 1 | | Wire, #22 strand. 9-6 3 3/4" | |
| | | | | | | |
| | | | | | | |
| | | PACKAGING | | | | |
| | | | | | | |
| | | 004-0212-00 | 1 | | End cap | |
| | | 004-0409-00 | 1 | | Box | |
| | | 004-0521-00 | 2 | | Pad | |
| | | 006-0640-00 | | | 'Popcorn' - packing material | |
| | | 006-0768-00 | 1 | | Bag, poly, 8 x 12" | |
| | | 067-0513-00 | 1 | | Tunnel Diode Pulse Generator | |
| | | | 1 | | Cal. procedure, parts lists, specs. | |
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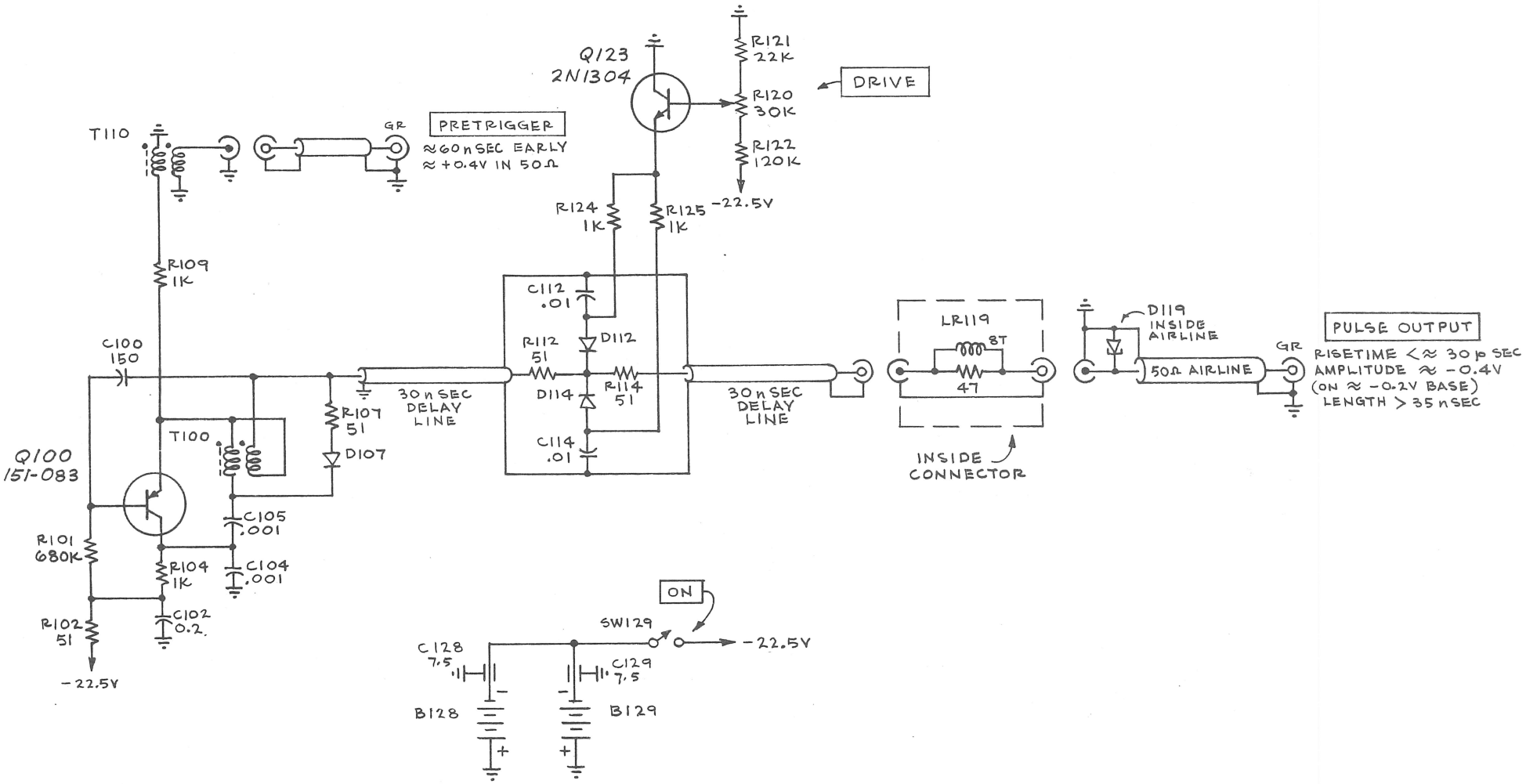


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