



**DELAY
STANDARD
UNIT**

067-0832-01

Instruction Manual

WARRANTY

Tektronix warrants that this product, excluding customer-supplied equipment, is free from defects in materials and workmanship. The warranty period is ninety (90) days from the date of installation or one-hundred twenty (120) days from the date of shipment, whichever is shorter. Tektronix will, at its option, repair or replace those components that Tektronix determines to be defective within the warranty period. CRTs are warranted for one (1) year. During the nine (9) months following expiration of the product warranty, Tektronix will replace defective CRTs at no charge for the material.

In the forty-eight (48) contiguous United States, the District of Columbia, and in other areas where Tektronix normally offers on-site service for this product, Tektronix will provide this service at no charge during the product warranty period described above. In areas where Tektronix does not offer on-site service for this product, warranty service will be provided at no charge if the components are returned, freight prepaid, to a service center designated by Tektronix.

Tektronix may use the original vendor's service organization to service any product that is supplied but not manufactured by Tektronix.

Tektronix is not obligated to furnish service under this warranty

- a. to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair, or service the product;
- b. to repair damage resulting from improper use or from connecting the product to incompatible equipment;
- c. if personnel other than Tektronix representatives modify the hardware or software.

There is no implied warranty of fitness for a particular purpose. Tektronix is not liable for consequential damages.

Copyright © 1980 by Tektronix, Inc. All rights reserved. Contents of this publication may not be reproduced in any form without the permission of Tektronix, Inc.

Products of Tektronix, Inc. and its subsidiaries are covered by U.S. and foreign patents and/or pending patents.

TEKTRONIX, TEK, SCOPE-MOBILE, TELEQUIPMENT, and  are registered trademarks of Tektronix, Inc. Printed in U.S.A. Specification and price change privileges are reserved.

DELAY STANDARD UNIT

The Delay Standard Unit (DSU) provides pulses for time correction software packages such as T.I.M.E. and SKEWCAL. The DSU accepts an input pulse and splits it into three parts. The amplitude of each resulting pulse is one third that of the input. If the input is positive, NORM is positive and INV is negative. If the input is negative, the inverse is true. Due to exacting design characteristics, NORM and INV occur at the same time. REF OUT has the same amplitude and polarity as NORM but occurs approximately 18 ns later. The DSU allows insertion of delay lines with known, accurate delay times. Therefore, any two pulses can be measured and compared to the known delay. For example, when used with S-3200 Systems, the difference between the measured delay and the known delay represents the amount of skew in the system's hardware. This skew data is stored in an array and used to correct all system time measurements. The DSU can be used to provide two synchronous pulses of opposite polarity or two identical pulses with a known delay between them.



Front/Top View Delay Standard Unit

DELAY STANDARD UNIT CONNECTORS

Connector	Specification	Description
PULSE IN	Impedance – 50 Ω Pulse Amplitude – ±12 V max. DC Level – ±6 V max.	This input accepts the external signal.
DC IN	Input Voltage – ±4.06 V max. – 1.015 x output voltage Current – 450 mA Accuracy – ±0.1%	DC IN accepts an input voltage that can correct pulse for offsets.
GROUND		External DC ground connection.
NORM	Impedance – 50 Ω Amplitude – ±4 V max. Skew to INV – 0.18 ps Skew to REF OUT – 18 ns ± 2 ns	Pulse output with the same polarity as the input pulse, one third in amplitude.
INV	Impedance – 50 Ω Amplitude – ±4 V max. Skew to NORM – 0.18 ps Skew to REF OUT – 18 ns ± 2 ns	Pulse output with the inverted polarity of the input pulse, one third in amplitude.
REF OUT	Impedance – 50 Ω Amplitude – ±4 V max. Skew to NORM – 18 ns ± 2 ns Skew to INV – 18 ns ± 2 ns	Pulse output with the same polarity and amplitude as NORM, delayed approximately 18 ns.

CHANNEL A and CHANNEL B have the following inputs and outputs:

IN	Impedance – 50 Ω Skew to OUT – 0 ns to 15 ns Accuracy – ±0.4 ps	Channel input connected internally to DELAY 1.
DELAY 1 } DELAY 2 }		External fixtures can be added between DELAY 1 and DELAY 2 to increase delay time.
OUT	Impedance – 50 Ω Skew to IN – 0 ns to 15 ns Accuracy – ±0.4 ns	Channel output connected internally to DELAY 2.

REPLACEABLE PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

SPECIAL NOTES AND SYMBOLS

- X000 Part first added at this serial number
- 00X Part removed after this serial number

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

- ```

1 2 3 4 5 Name & Description
Assembly and/or Component
Attaching parts for Assembly and/or Component
 --- * ---
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
 --- * ---
Parts of Detail Part
Attaching parts for Parts of Detail Part
 --- * ---

```

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol --- \* --- indicates the end of attaching parts.

**Attaching parts must be purchased separately, unless otherwise specified.**

## ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

## ABBREVIATIONS

|       |                    |         |                       |          |                      |          |                 |
|-------|--------------------|---------|-----------------------|----------|----------------------|----------|-----------------|
| "     | INCH               | ELCTRN  | ELECTRON              | IN       | INCH                 | SE       | SINGLE END      |
| #     | NUMBER SIZE        | ELEC    | ELECTRICAL            | INCAND   | INCANDESCENT         | SECT     | SECTION         |
| ACTR  | ACTUATOR           | ELECTLT | ELECTROLYTIC          | INSUL    | INSULATOR            | SEMICOND | SEMICONDUCTOR   |
| ADPTR | ADAPTER            | ELEM    | ELEMENT               | INTL     | INTERNAL             | SHLD     | SHIELD          |
| ALIGN | ALIGNMENT          | EPL     | ELECTRICAL PARTS LIST | LPHLDR   | LAMPHOLDER           | SHLDR    | SHOULDERED      |
| AL    | ALUMINUM           | EQPT    | EQUIPMENT             | MACH     | MACHINE              | SKT      | SOCKET          |
| ASSEM | ASSEMBLED          | EXT     | EXTERNAL              | MECH     | MECHANICAL           | SL       | SLIDE           |
| ASSY  | ASSEMBLY           | FIL     | FILLISTER HEAD        | MTG      | MOUNTING             | SLFLKG   | SELF-LOCKING    |
| ATTEN | ATTENUATOR         | FLEX    | FLEXIBLE              | NIP      | NIPPLE               | SLVG     | SLEEVING        |
| AWG   | AMERICAN WIRE GAGE | FLH     | FLAT HEAD             | NON WIRE | NOT WIRE WOUND       | SPR      | SPRING          |
| BD    | BOARD              | FLTR    | FILTER                | OBD      | ORDER BY DESCRIPTION | SQ       | SQUARE          |
| BRKT  | BRACKET            | FR      | FRAME or FRONT        | OD       | OUTSIDE DIAMETER     | SST      | STAINLESS STEEL |
| BRS   | BRASS              | FSTNR   | FASTENER              | OVH      | OVAL HEAD            | STL      | STEEL           |
| BRZ   | BRONZE             | FT      | FOOT                  | PH BRZ   | PHOSPHOR BRONZE      | SW       | SWITCH          |
| BSHG  | BUSHING            | FXD     | FIXED                 | PL       | PLAIN or PLATE       | T        | TUBE            |
| CAB   | CABINET            | GSKT    | GASKET                | PLSTC    | PLASTIC              | TERM     | TERMINAL        |
| CAP   | CAPACITOR          | HDL     | HANDLE                | PN       | PART NUMBER          | THD      | THREAD          |
| CER   | CERAMIC            | HEX     | HEXAGON               | PNH      | PAN HEAD             | THK      | THICK           |
| CHAS  | CHASSIS            | HEX HD  | HEXAGONAL HEAD        | PWR      | POWER                | TNSN     | TENSION         |
| CKT   | CIRCUIT            | HEX SOC | HEXAGONAL SOCKET      | RCPT     | RECEPTACLE           | TPG      | TAPPING         |
| COMP  | COMPOSITION        | HLCPS   | HELICAL COMPRESSION   | RES      | RESISTOR             | TRH      | TRUSS HEAD      |
| CONN  | CONNECTOR          | HLEXT   | HELICAL EXTENSION     | RGD      | RIGID                | V        | VOLTAGE         |
| COV   | COVER              | HV      | HIGH VOLTAGE          | RLF      | RELIEF               | VAR      | VARIABLE        |
| CPLG  | COUPLING           | IC      | INTEGRATED CIRCUIT    | RTNR     | RETAINER             | W/       | WITH            |
| CRT   | CATHODE RAY TUBE   | ID      | INSIDE DIAMETER       | SCH      | SOCKET HEAD          | WSHR     | WASHER          |
| DEG   | DEGREE             | IDENT   | IDENTIFICATION        | SCOPE    | OSCILLOSCOPE         | XFMR     | TRANSFORMER     |
| DWR   | DRAWER             | IMPLR   | IMPELLER              | SCR      | SCREW                | XSTR     | TRANSISTOR      |

Replaceable Parts—Delay Standard Unit

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

| Mfr. Code | Manufacturer                             | Address            | City, State, Zip       |
|-----------|------------------------------------------|--------------------|------------------------|
| 24655     | GENERAL RADIO CO.                        | 300 BAKER AVE.     | CONCORD, MA 01742      |
| 24931     | SPECIALTY CONNECTOR CO., INC.            | 3560 MADISON AVE.  | INDIANAPOLIS, IN 46227 |
| 58474     | SUPERIOR ELECTRIC CO.                    | 383 MIDDLE ST.     | BRISTOL, CT 06010      |
| 59730     | THOMAS AND BETTS COMPANY                 | 36 BUTLER ST.      | ELIZABETH, NJ 07207    |
| 72982     | ERIE TECHNOLOGICAL PRODUCTS, INC.        | 644 W. 12TH ST.    | ERIE, PA 16512         |
| 73743     | FISCHER SPECIAL MFG. CO.                 | 446 MORGAN ST.     | CINCINNATI, OH 45206   |
| 80009     | TEKTRONIX, INC.                          | P O BOX 500        | BEAVERTON, OR 97077    |
| 83385     | CENTRAL SCREW CO.                        | 2530 CRESCENT DR.  | BROADVIEW, IL 60153    |
| 89663     | REESE, J. RAMSEY, INC.                   | 71 MURRAY STREET   | NEW YORK, NY 10007     |
| 91260     | CONNOR SPRING AND MFG. CO.               | 1729 JUNCTION AVE. | SAN JOSE, CA 95112     |
| 91637     | DALE ELECTRONICS, INC.                   | P. O. BOX 609      | COLUMBUS, NE 68601     |
| 98335     | WEATHERFORD ENGINEERING AND MFG. COMPANY |                    | WEATHERFORD, TX 76086  |

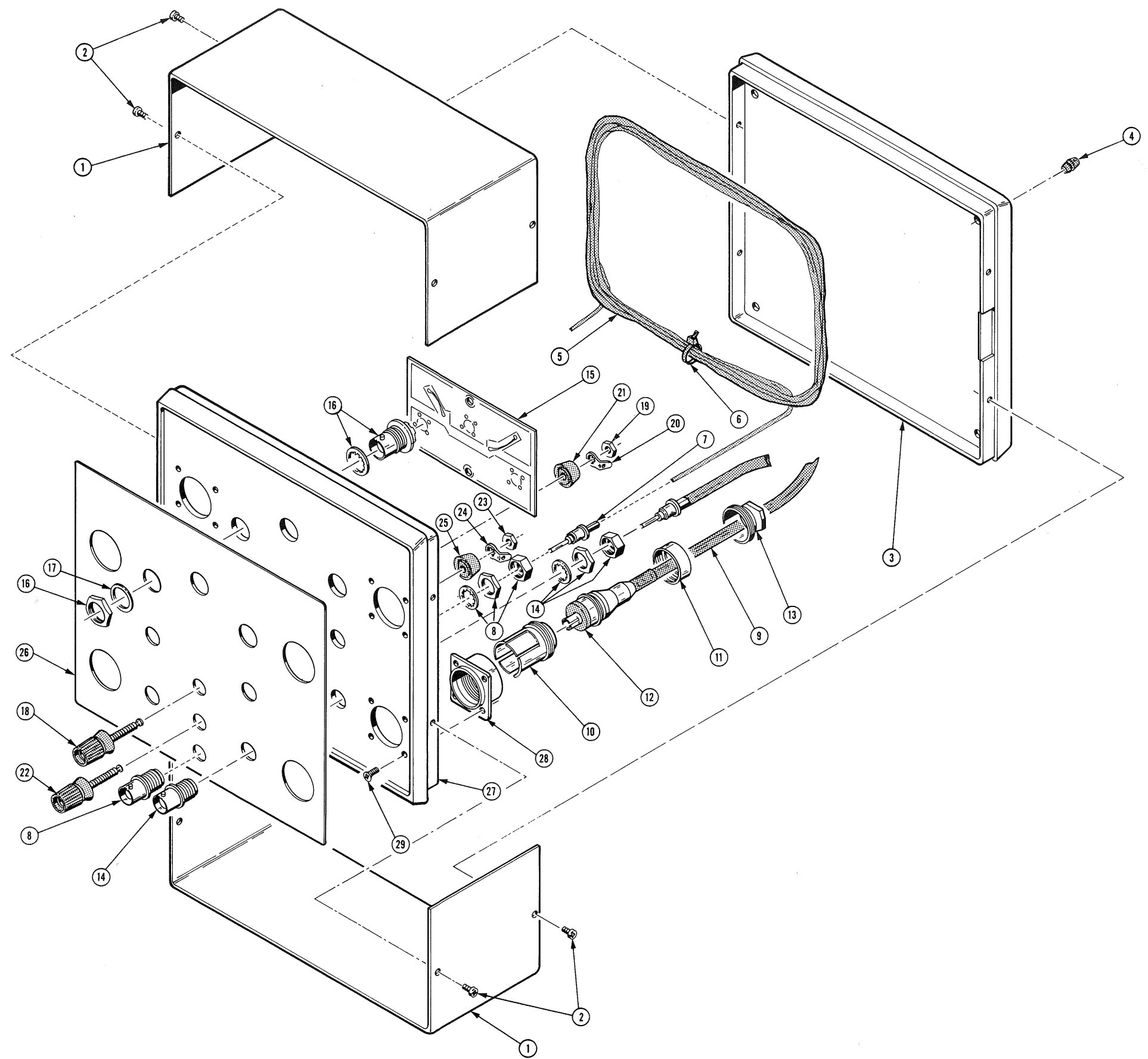
Replaceable Electrical Parts—Delay Standard Unit

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont | Name & Description               | Mfr Code | Mfr Part Number  |
|---------|--------------------|----------------------|--------|----------------------------------|----------|------------------|
|         | 067-0832-01        |                      |        | FIXTURE,CAL:DELAY STANDARD       | 80009    | 067-0832-01      |
|         | 670-5246-01        |                      |        | CKT BOARD ASSY:PULSE INVERTER    | 80009    | 670-5246-01      |
| C99     | 283-0253-00        |                      |        | CAP.,FXD,CER DI:10UF,10%,50V     | 72982    | A15BF9ALW5R0103K |
| C100    | 283-0177-00        |                      |        | CAP.,FXD,CER DI:1UF,+80-20%,25V  | 72982    | 8131N039 E 105Z  |
| C200    | 283-0238-00        |                      |        | CAP.,FXD,CER DI:0.01UF,10%,50V   | 72982    | 8121N075X7R0103K |
| C300    | 283-0177-00        |                      |        | CAP.,FXD,CER DI:1UF,+80-20%,25V  | 72982    | 8131N039 E 105Z  |
| C400    | 283-0238-00        |                      |        | CAP.,FXD,CER DI:0.01UF,10%,50V   | 72982    | 8121N075X7R0103K |
| R100    | 321-0039-00        |                      |        | RES.,FXD,FILM:24.9 OHM,1%,0.125W | 91637    | MFF1816G24R90F   |
| R200    | 321-0039-00        |                      |        | RES.,FXD,FILM:24.9 OHM,1%,0.125W | 91637    | MFF1816G24R90F   |
| R300    | 321-0039-00        |                      |        | RES.,FXD,FILM:24.9 OHM,1%,0.125W | 91637    | MFF1816G24R90F   |
| R400    | 321-0039-00        |                      |        | RES.,FXD,FILM:24.9 OHM,1%,0.125W | 91637    | MFF1816G24R90F   |
| T100    | 120-0445-00        |                      |        | XFMR,TOROID:8 TURNS,BIFILAR      | 80009    | 120-0445-00      |
| T200    | 120-0445-00        |                      |        | XFMR,TOROID:8 TURNS,BIFILAR      | 80009    | 120-0445-00      |
| T300    | 120-0445-00        |                      |        | XFMR,TOROID:8 TURNS,BIFILAR      | 80009    | 120-0445-00      |
| T400    | 120-0445-00        |                      |        | XFMR,TOROID:8 TURNS,BIFILAR      | 80009    | 120-0445-00      |

Replaceable Mechanical Parts—Delay Standard Unit

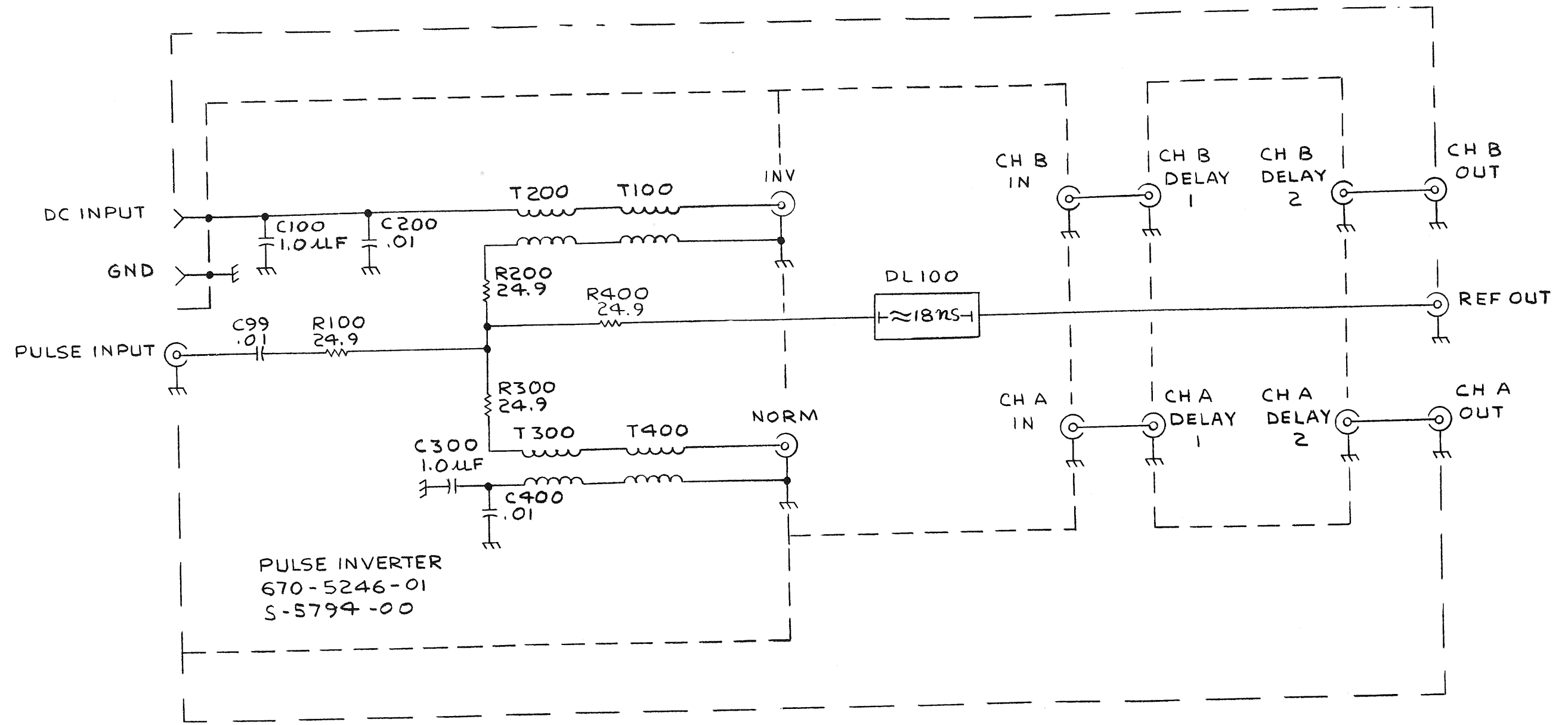
| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | 1 2 3 4 5 | Name & Description                                                     | Mfr Code | Mfr Part Number  |
|------------------|--------------------|-----------------------------|-----|-----------|------------------------------------------------------------------------|----------|------------------|
| 1-               | 067-0832-01        |                             | 1   |           | FIXTURE, CAL: DELAY STANDARD                                           | 80009    | 067-0832-01      |
| -1               | 380-0355-01        |                             | 2   |           | . HSG, HALF, WRAPAR: PAINTED<br>(ATTACHING PARTS)                      | 80009    | 380-0355-01      |
| -2               | 211-0007-00        |                             | 8   |           | . SCREW, MACHINE: 4-40 X 0.188 INCH, PNH STL<br>- - - * - - -          | 83385    | OBD              |
| -3               | 200-0278-04        |                             | 1   |           | . PANEL, CABINET: REAR                                                 | 80009    | 200-0278-04      |
| -4               | 348-0049-00        |                             | 4   |           | . GROMMET, PLASTIC: BLACK, U-SHAPE, 1.562 SQ                           | 80009    | 348-0049-00      |
| -5               | 175-2109-00        |                             | 1   |           | . CABLE ASSY, RF: 50 OHM COAX, 180.0 L                                 | 80009    | 175-2109-00      |
| -6               | 343-0549-00        |                             | 3   |           | . . STRAP, TIEDOWN: 0.091 W X 3.62 INCH LONG                           | 59730    | TY23M            |
| -7               | 132-0116-00        |                             | 1   |           | . . TRANSITION, INR: RG-58                                             | 24655    | 0874-6279        |
| -8               | 131-0889-00        |                             | 1   |           | . LEAD, ELECTRICAL: STRD, 22 AWG, 40KVDC, 26.5 L                       | 80009    | 131-0889-00      |
| -9               | 175-2089-00        |                             | 4   |           | . CABLE ASSY, RF: 50 OHM COAX, 8.0 L<br>(EACH CABLE ASSEMBLY INCLUDES) | 80009    | 175-2089-00      |
| -10              | 132-0002-00        |                             | 1   |           | . . SHELL, ELEC CONN: GENL RADIO                                       | 24655    | 0874-0603        |
| -11              | 132-0001-00        |                             | 1   |           | . . NUT, COUPLING: 0.75-27 X 0.814 OD X 0.31                           | 24655    | 0874-0623        |
|                  | 132-0007-00        |                             | 1   |           | . . RING, RETAINING: 0.575 ID X 0.031 THK                              | 91260    | 132-0007-00B     |
| -12              | 132-0028-00        |                             | 1   |           | . . INSULATOR, DISK: 0.165 ID X 0.625 OD                               | 24655    | 0874-0700        |
| -13              | 132-0121-00        |                             | 1   |           | . . NUT, PLAIN, KNURL: 0.875-27 X 0.344, BRS BRT AL                    | 80009    | 132-0121-00      |
| -14              | 131-0889-00        |                             | 1   |           | . . LEAD, ELECTRICAL: STRD, 22 AWG, 40KVDC, 26.5 L                     | 80009    | 131-0889-00      |
| -15              | -----              |                             | 1   |           | . CKT BOARD ASSY: PULSE INVERTER (SEE EPL)                             |          |                  |
| -16              | 131-1097-00        |                             | 3   |           | . . CONNECTOR, RCPT, : BNC, FEMALE, CKT CARD MT                        | 24931    | 28JR220-2        |
|                  | 198-3711-00        |                             | 1   |           | . . WIRE SET, ELEC:                                                    | 80009    | 198-3711-00      |
| -17              | 210-0845-00        |                             | 3   |           | . WASHER, FLAT: 0.500 ID X 0.625 INCH OD, STL                          | 89663    | 634-R            |
| -18              | 129-0064-01        |                             | 1   |           | . POST, BDG, ELEC: RED, 5-WAY MINIATURE<br>(ATTACHING PARTS)           | 58474    | BB10167G2BX      |
| -19              | 210-0408-00        |                             | 1   |           | . NUT, PLAIN, HEX. : 6-32 X 0.312 INCH, BRS                            | 73743    | 3040-402         |
| -20              | 210-0227-00        |                             | 1   |           | . TERMINAL, LUG: 0.141 ID, LOCKING, BRZ TINNED                         | 98335    | GC7462M          |
| -21              | 358-0181-01        |                             | 1   |           | . INSULATOR, BSHG: RED<br>- - - * - - -                                | 58474    | BB10166G2        |
| -22              | 129-0064-00        |                             | 1   |           | . POST, BDG, ELEC: CHARCOAL, 5-WAY MINIATURE<br>(ATTACHING PARTS)      | 58474    | BINP BB10167G13T |
| -23              | 210-0408-00        |                             | 1   |           | . NUT, PLAIN, HEX. : 6-32 X 0.312 INCH, BRS                            | 73743    | 3040-402         |
| -24              | 210-0227-00        |                             | 1   |           | . TERMINAL, LUG: 0.141 ID, LOCKING, BRZ TINNED                         | 98335    | GC7462M          |
| -25              | 358-0181-00        |                             | 1   |           | . INSULATOR, BSHG: CHARCOAL<br>- - - * - - -                           | 58474    | BB10166G13BX     |
| -26              | 333-2362-00        |                             | 1   |           | . PANEL, FRONT:                                                        | 80009    | 333-2362-00      |
| -27              | 200-0278-05        |                             | 1   |           | . PANEL, CABINET: FRONT                                                | 80009    | 200-0278-05      |
| -28              | 132-0040-00        |                             | 4   |           | . ADAPTER, PANEL:<br>(ATTACHING PARTS)                                 | 80009    | 132-0040-00      |
| -29              | 211-0101-00        |                             | 16  |           | . SCREW, MACHINE: 4-40 X 0.25" 100 DEG, FLH STL<br>- - - * - - -       | 83385    | OBD              |
| ACCESSORIES      |                    |                             |     |           |                                                                        |          |                  |
|                  | 070-3299-00        |                             | 1   |           | MANUAL, TECH: INSTRUCTION                                              | 80009    | 070-3299-00      |





@

DELAY STANDARD UNIT



SCHEMATIC

067-0832-01

3299-01

@

DELAY STANDARD  
UNIT