

COMPONENT NEWS



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Tek Lab (Component Group) develops GaAs devices

Presently available silicon bipolar transistors have useful gain up to approximately 10 GHz, with comparatively high noise figures (10 dB at 10 GHz). To operate an amplifier beyond this range with low noise figures (3 dB at 8 GHz and 5 dB at 14 GHz), a gallium-arsenide field effect transistor, or GaAs FET, is the only device which offers a variety of features for high-frequency instrumentation.

Two experimental gallium-arsenide devices have been developed by Tek Labs' Component Development Group. One device, a GaAs FET, combines ion implantation, micron-level photolithography and unique, thin-film processing techniques. Typical applications include use as low-noise amplifiers and oscillators, and as an element for MSI logic.

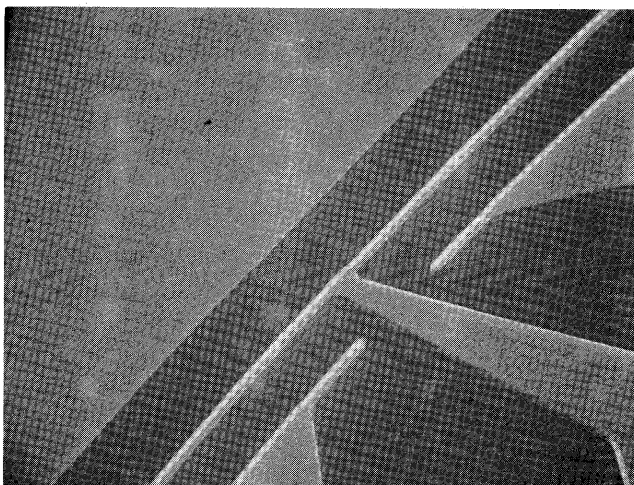
For extremely fast switching circuits, a GaAs Schottky barrier diode has also been designed. The diodes offer a rise time in the range of picoseconds, due to the higher electron mobility of the GaAs substrate (five times more than silicon). To develop these diodes, it became essential to have epitaxial layer growth capability on a highly doped substrate. We've recently built a reactor in-house to deposit this liquid-phase, epitaxial layer.

Potential applications for the diode are as phase detectors, mixers, limiters, amplitude detectors for leveling and as an element for MSI logic.

Our GaAs component development effort is a recent one, and improvement in the device and processing technology will be a major effort in coming months. The information following describes the fabrication process, DC parameters and expected RF performance for these devices.

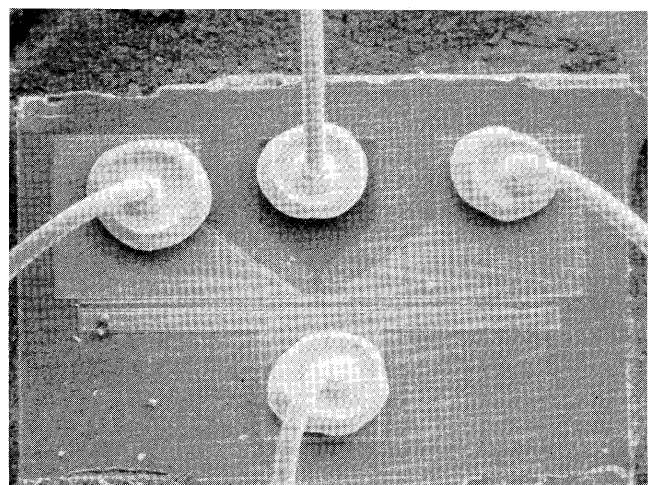
If you have an interest in gallium-arsenide microwave devices, or questions concerning our component development work, please contact me at ext. 5636, 50-327.

Krishna Verma



MESFET Geometry (1 μ Gate of Al)

2000X



Bonding of GaAs FET

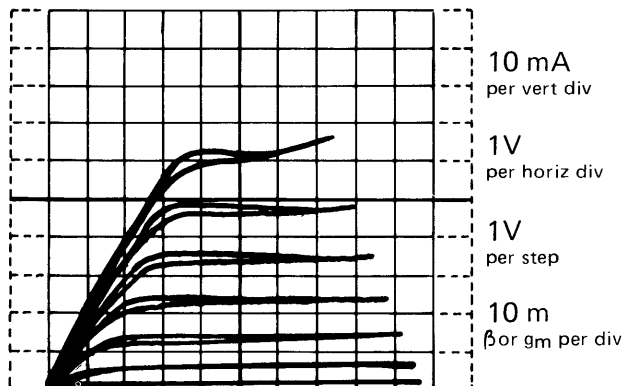
200X

Tek GaAs FET (D187)

Fabrication Process

Steps	Description
Substrate	<100>Cr ⁻ doped substrate 15-18 mil thick. Laser diode material one side polished.
Cleaning	Acetone, ICE, ISOP
Ion Implantation	$1 \times 10^{13} \text{S}^+$ at 150 KEV $5 \times 10^{12} \text{S}^+$ at 30 KEV
Si ₃ N ₄ Deposition	Sputter deposition on both sides
As Capsule	To anneal the damaged crystal and consequently improve the mobility. (900°C for 20 minutes)
Si ₃ N ₄ Etch	Hot H ₃ PO ₄ to remove all nitride
Source-Drain Lift Off and Alloying	Contact photolithography NiCr, Au-Ge-Au
Mesa Etch	Isolate devices from each other and provide n ⁻ substrate to gate pad for minimum capacitance.
Gate Lift Off	Schottky gate with Al metallization for better reliability. Cr Pt-Au can also be used.
Backlapping or Chemical Thinning	5-6 mil thick
Back Metallization	Cr = 250 Å, Au = 2000 Å
Scribing and Breaking	Die size 20 x 15 mil ²
Packaging for RF Characterization	Microwave package 100 x 100 mil ²

Tek GaAs MESFET



Electrical Performance

Gain = 8 dB at 8 GHz
 NF (5V, 5mA) = 3 dB at 10 GHz
 $f_{\text{max}} = 30 \text{ GHz}$
 $BV_{\text{ds}} = 15 \text{ V}$
 $BV_{\text{gs}} = 10 \text{ V}$
 $V_{\text{p}} = -1 \text{ to } -3 \text{ V}$
 $g_{\text{m}}(5 \text{ V}, 10 \text{ mA}) = 15 \text{ m}$

Applications

- Low-Noise Amplifier
- Low-Noise Oscillator
- As an Element in MSI Logic

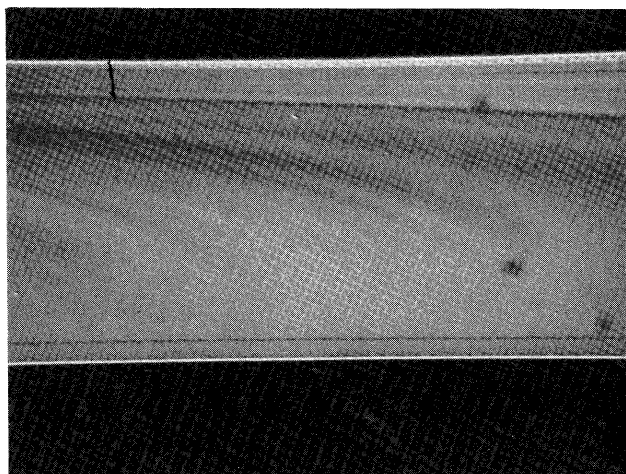
Tek GaAs Schottky Diode

Fabrication Process

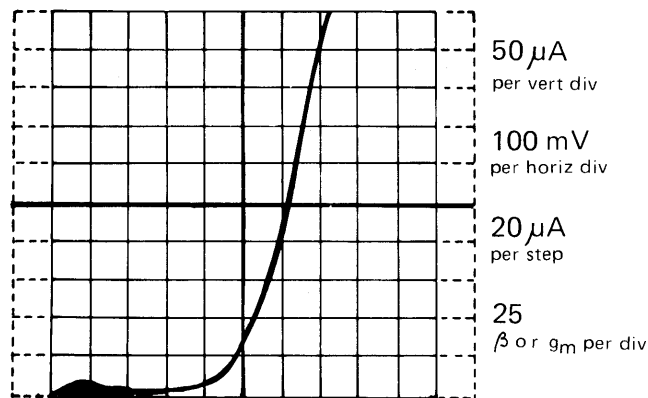
Steps	Description
GaAs Substrate	<100> Sn doped ($N_d = 2 \times 10^{18}/\text{cm}^3$) 15-16 mil thick, laser diode material
Substrate Preparation	Chemical-mechanical polishing to produce mirror finish surface.
Liquid-Phase EPI Growth	$N_d = 10^{16}/\text{cm}^3$, thickness = 8μ , 750°C 20 minutes
Metal Deposition through Metal Mask (Evaporation)	Cr = 500\AA , Au = 3000\AA
Back Etching	5.0-6.0 mils
Back Metallization	Cr = 200\AA , Au = 1000\AA

Applications

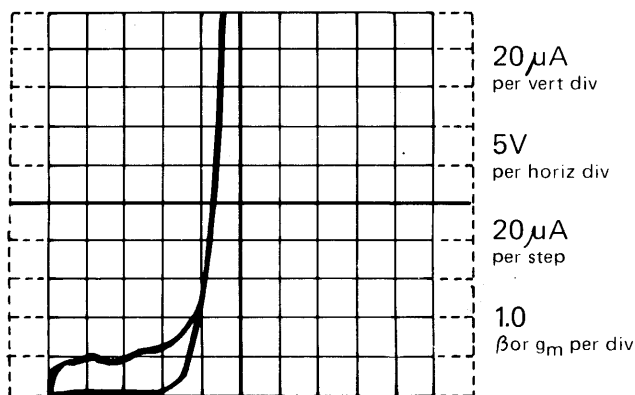
- Phase detectors
- Mixers
- Amplitude detectors for leveling
- Limiters
- Element for MSI Logic



Liquid-phase EPI $\approx 8\mu$ thick



Forward Voltage (V_f) = 0.5V at $50\mu\text{A}$



Reverse Voltage (V_R) = 20V at $20\mu\text{A}$

Board-mountable slide switch designed

A new, low profile slide switch (LPSS) has been developed in Electromechanical Component Design. In addition to a reduced profile, the switch is board-mountable with replaceable contacts.

The LPSS is available in two- to six-position (0.15" throw) and eight-position (0.10" throw) versions, see illustrations. Housing size for the two- and three-position switches is 0.200"H x 0.490"W x 1.025"L. The four-, five-, six- and eight-position switches measure 1.478" in length (height and width are the same).

These switches mount directly on the ECB using push-on nuts pressed onto the housing pins. The contacts then make with the gold-plated pads on the circuit board. This mounting method makes the switches easy to remove, replace or clean.

Specifications and Performance Data

Electrical/Mechanical:

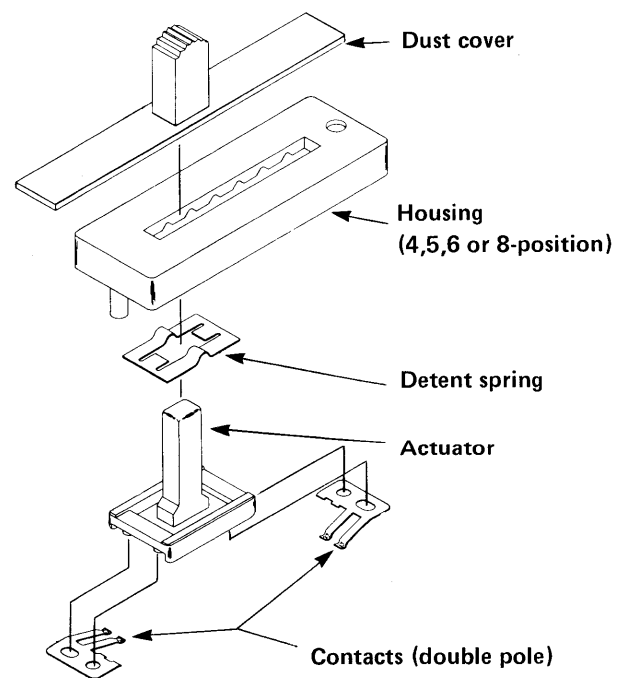
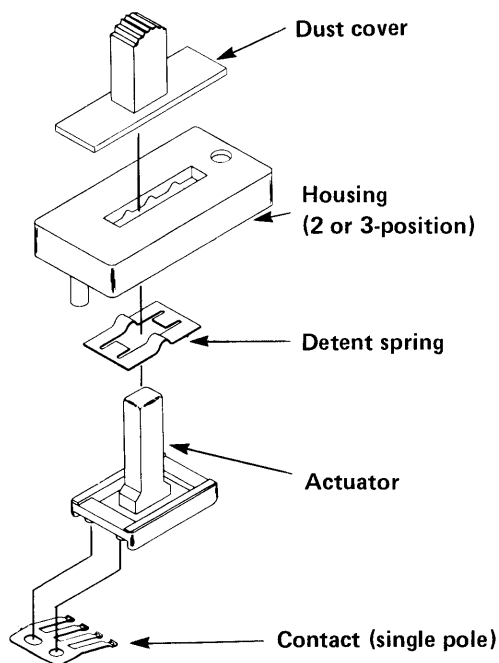
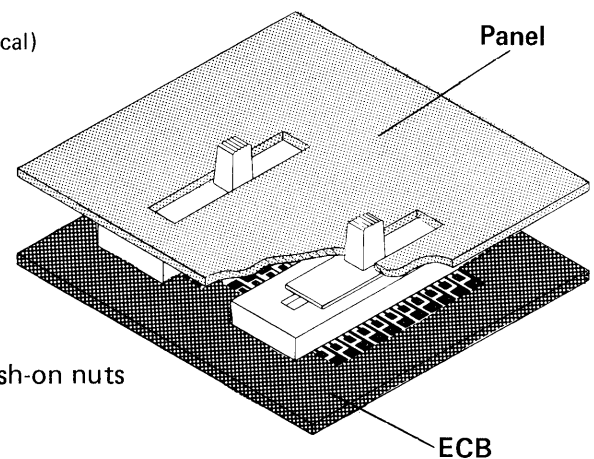
Life	50,000 cycles (mechanical) or 500,000 closures (electrical)
Detent force	approximately 300 grams
Rated voltage and current	250 mA at 28 VDC
Contact resistance	50 m Ω maximum
Insulation resistance	1.2 x 10 ¹¹ Ω minimum
Operating temperature range	-30°C to +85°C

Options: Single pole or double pole on all switches

Cost: Between 40 and 50¢ each

Mounting Hardware: Two, 0.25" diameter polycarbonate push-on nuts

Availability: 2, 3 and 4-position switches are in production
5, 6 and 8-position switches are in prototype phase



For more information on the LPSS and its possible applications, contact Nader Rezvani (58-021) ext. 6565.

New 'Caution' label for Tek-made switches

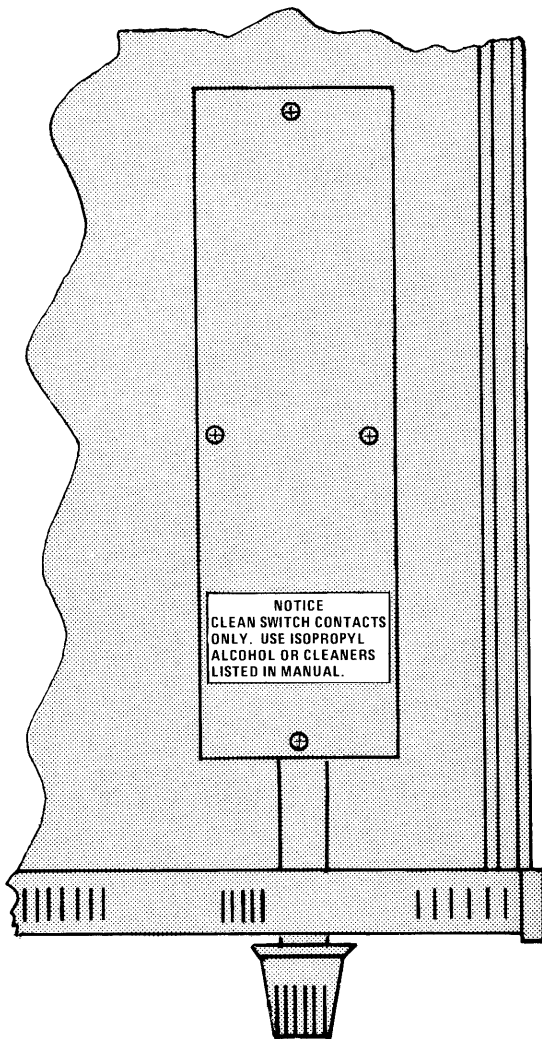
Some customers both maintain and service their Tek instruments, and we've found they are not always aware of the delicate nature of certain plastics used in Tek-made components.

For example, the use of cleaning materials containing 1,1,1 trichloroethane (a hydrocarbon-based solvent), will cause stress cracking and subsequent failure of many plastics — particularly polycarbonates. Many commercial spray cleaners do not list this solvent clearly on the product label.

for use on Tek-made cam switches. It is recommended for new design, and should be considered for addition to existing instruments utilizing cam switches.

The label is available in stock under Tek P/N 334-3448-00. The label should be applied in *plain sight* on the metal cam switch cover, on the plastic stiffener used with certain double board applications or on the board near the switch assembly.

For more information, contact Neill Martin (19-668), ext. 7642.



In addition, we've received numerous field complaints of damage to Tek-made switches during routine maintenance.

This has prompted us to design a **Caution** label to supplement the warnings in the "General Maintenance" section of our manuals. The self-adhering label (shown actual size) is now available

Carrying case designs

Distribution Packaging Design is the place to go for design of reusable packaging and carrying cases. Whether it's an instrument, component or accessory item, a suitable carrying container can be developed here.

There are numerous types and styles of carrying cases currently available at Tek. New and existing cases are designed with respect to protection, durability, appearance, cost, weight and availability. The goal is to provide reusable, protective packaging, capable of withstanding our worldwide distribution cycle.

If you have an instrument, accessory item or other project requiring a reusable carrying container, contact Distribution Packaging Design early in your design process. This will avoid unnecessary problems and help us design the optimum package for your needs.

Sil Arata, manager
Distribution Packaging Design
58-287, ext. 6585

CRT controller samples

A limited number of samples of National's DP8350 CRT controllers and Motorola's 6845 interlace CRT controllers are available from Jim Howe (58-299), ext. 5698.

LSI failure mechanisms described

Several new LSI failure mechanisms were described at the 1978 IEEE Reliability Physics Symposium held in San Diego three weeks ago.

MOS RAM soft failure mode

Intel presented a paper describing a "soft" failure mode of 16K read-write memories. Such memories sense the presence or absence of one million electrons to discern a stored logic one or zero.

Intermittent "soft" errors (loss of significant bits of data) were detected in memory system operation but were not reproducible in subsequent single device testing. The soft error rate was about equal to the hard failure rate or about 10 to 100 errors per 10^9 device-hours.

Further study revealed that alpha particle emission from the package material was responsible for the soft (non-reproducible) errors. The ceramic package material (aluminum oxide) was found to emit one to four alpha particles per cm^2 -hour which could enter the chip active area, strike the silicon lattice and generate hole-electron pairs, upsetting the small amounts of charge stored in the memory cell.

Trace amounts of uranium and thorium present in the package materials generated the alpha particles. Other materials such as solder glass, gold plate, and epoxy were also found to emit alpha particles.

This mechanism of alpha particle emission is of significance in devices which must depend on small charge packets for their operation, such as 16K memories and charge-coupled devices. Less complex memories (4K and below) have larger charge packets and are not significantly affected by alpha particle emission.

Intel is now working on reducing the content of alpha particle emitting substances in the package material.

MOS EPROM failure mechanism

Users of MOS EPROM's with quartz windows (for ultraviolet erasing) discovered occasional failures after the top surface was sprayed with freeze spray such as "Arctic Freeze." Suspecting a thermal effect to be the cause of failure, users complained to the vendor (Intel).

Intel found the failures to be related to electrostatic charging of the device lid. The freeze spray generated a +1500 volt charge (measured by an electrometer) when the gas exited from the nozzle, causing the top surface of the lid to charge to about +1000 to +1500 volts. The bottom surface of the lid then charged to an equal and opposite potential. The resulting charge across the EPROM chip interfered with proper data storage.

Intel investigated depositing a very thin layer of gold on the bottom of the lid to make it conductive, dissipating any charge. This is a successful preventive measure but there is no indication that Intel will adopt this practice on a production basis.

Therefore, avoid using freeze sprays on MOS EPROM's.

for more information

If you have questions or need more details, contact Ron Schwartz in Component Reliability Engineering, ext. 6511, or Eric Peterson in Component Engineering, ext. 6302.




Randall named UL industry rep

Bob Randall, Product Safety engineer in Wilsonville, has been invited to serve in the Industry Advisory Conference for Electronic Data Processing Equipment.

As a UL Industry Representative, Bob will be actively involved in new UL proposals and will consult with other representatives on how proposed requirements will affect industry and users, as well as UL.

If you or your group would like to discuss any UL requirements, please feel free to bring your questions and comments to Bob's attention. Contact Bob in Wilsonville at 60-643, ext. 2231.



Op amp reliability: plastic vs. metal can

A reliability study has been completed on National's LF 351 (Tek P/N 156-1149-00) comparing plastic and metal can parts.

test results

The life test was performed at 125°C ambient on 70 plastic and 70 metal can parts with seven volts differential applied to the inputs. The power supply was set at +15 volts.

Life test results

Package type	Number of failures at					
	0 hr.	16 hrs.	36 hrs.	96 hrs.	336 hrs.	1000 hrs.
plastic	1	1	0	0	1	2
metal can	6	0	0	0	1	0

Failures of the plastic parts had a log normal distribution with a failure rate of 0.01% per thousand hours at $T_j = 70^\circ\text{C}$, $t = 1000$ hours.

The metal can devices had a random failure distribution during life test with a calculated failure rate of $< 0.01\%$ per thousand hours over the life of the device.

recommendations

Based on the life test results and the failure rate calculations, we conclude that:

1. Plastic parts offer roughly the same reliability as metal can parts during normal instrument life.
2. 100% electrical testing before use is strongly advised.
3. Burn-in screening is not necessary for acceptable field reliability.

for more information

For more details, contact Steve Hui in Component Reliability Engineering, 58-176, ext. 6511.

Effective TTL screening procedure found

A reliability study to determine the most effective screening procedure for reliable Schottky TTL devices has been completed on the 74S00 quad NAND gates (Tek P/N 156-0181-00).

test results

A total of 190 plastic 14-pin DIP parts from National, Texas Instruments and Signetics were tested. The life test was run at 150°C junction temperature with the supply and all inputs tied to V_{CC} (5.5 volts). Electrical tests were performed on the S3260 in Incoming Inspection.

Table 1 – Initial test results

vendor	sample size	no. of failures
National	50	1
TI	100	0
Signetics	148	6

Continued on page 8

Continued from page 7

Table 2 — Life test results

vendor	number of failures at			sample size
	16 hrs.	36 hrs.	100 hrs.	
National	0	0	0	49
TI	0	0	2*	100
Signetics	0	0	0	142

*failures were I_{IH}

The failure rates for parts tested at 70°C junction temperature were:

raw parts	0.08%
100% electrical test (no burn-in)	0.03%
after 100-hour burn-in	0.01%

recommendations

Based on the life test results, Component Reliability Engineering recommends the following screening procedures for Schottky TTL devices:

1. Raw part usage is not recommended because of the high infant failure rate.
2. 100% electrical testing is recommended (e.g. use the - 01 part).
3. For higher reliability, the burn-in option is desirable.

Vendors can provide an extra cost screening sequence consisting of:

1. temperature cycling
2. 168 hours burn-in at 125°C
3. 100% functional test at 100°C (to detect thermal intermittents)
4. 100% test at 25°C

This sequence costs 6 to 9¢ extra and should result in field failure rates of 0.01% or lower.

for more information

For more details, contact Steve Hui at 58-176, ext 6511.

Search begins for reed switch replacement

Mercury reed switches are characterized by consistently low contact resistance, long life and "bounceless" contact. Unfortunately, these switches have limitations which make the search for alternative devices imperative.

Most of the mercury reed switches used at Tek are pressurized with hydrogen to enhance high-voltage breakdown withstand capability, dissipate heat and reduce arcing. Pressurizing the switches, however, creates several safety hazards.

If the glass capsules are scratched, or the leads cut or stressed near the glass-to-metal seals, toxic mercury may leak into the work environment. Under certain conditions, the capsule may even explode. The raw switches are wrapped at Tek with Teflon or Mylar tape, or encapsulated in epoxy, to help keep the glass from shattering. However, the danger of mercury leakage still exists.

In addition, Merle Vanderzanden (Component Preconditioning and Test) has noted a reject rate between 50 and 90% for these devices.

This is not a vendor problem, but reflects our pushing the switch to its electrical and mechanical limits.

The most critical usage of mercury reed switches is in Tek's Type 109 Pulse Generator. (The 109 is used in-house for calibrating virtually all our product lines.) Unfortunately, there are no plans to replace this instrument line, which is dependent on the 260-0282-01 mercury reed switch for a 250 pS rise time pulse capability.

To make matters worse, these switches are single-sourced from C. P. Clare, who must import them from Belgium. We are also having problems obtaining quality parts. (The raw switch costs approximately \$5, but when the cost of rejects and added tooling are figured in, the cost per switch approaches \$55.)

Therefore, we are searching for any other device capable of switching *50 volts into 50 ohms, with a rise time of less than 250 picoseconds, without bounce.* If you have any input in our search for an alternative to the 260-0282-01 (or any other mercury switch), contact Paul Johnson (58-299), ext. 6365.

TECHNICAL STANDARDS

The function of Technical Standards is to identify, describe, and document standard processes, procedures, and practices within the Tektronix complex, and to insure these standards are consistent with established national and international standards. Technical Standards also provides a central repository for standards and specifications required at Tektronix.

Chuck Sullivan, manager (58-187)

new and revised standards that may be seen at Technical Standards and ordered

- QQ-S-700C** (1967) Federal Specification: Steel Sheet and Strip, Medium and High Carbon
QQ-C-533B (1972) Federal Specification: Copper-Beryllium Alloy Strip (Copper Alloy Numbers 170 and 172)
QQ-A-250/4E (1971) Federal Specification: Aluminum Alloy 2024, Plate and Sheet
QQ-A-250/5F (1971) Federal Specification: Aluminum Alloy Alclad 2024, Plate and Sheet
QQ-B-613D (1973) Federal Specification: Brass, Leaded and Nonleaded: Flat Products (Plate, Bar, Sheet, and Strip)
QQ-C-576B (1961) Federal Specification: Copper Flat Products With Slit, Slit and Edge-Rolled, Sheared, Sawed, or Machined Edges, (Plate, Bar, Sheet, and Strip)
MIL-STD-1695(AS) (1977) Environments, Working, Minimum Standards for
MIL-STD-704C (1977) Aircraft Electric Power Characteristics
MIL-HDBK-25A (1971) Glossary of Photographic Terms Including Document Reproduction
MIL-C-49055/1 (May 1977) Cables, Special Purpose, Electrical, (Flexible, Flat, Unshielded), (Round Conductor), (Wire Size 16, 600 Volts, 105°C and 150°C)
MIL-C-49055/2 (May 1977) Cables, Special Purpose, Electrical, (Flexible, Flat, Unshielded), (Round Conductor), (Wire Size 18, 700 Volts, 105°C and 150°C)
MIL-C-85028/1 (Oct 1977) Connector, Electric, Rectangular, Individual Contact Sealing, Polarized Center Jackscrew, Plug, Crimp Removable Pin Contacts, Class E
MIL-C-85028/2 (Oct 1977) Connector, Electric, Rectangular, Individual Contact Sealing, Polarized Center Hardware, Receptacle, Crimp Removable Socket Contacts, Class E
MIL-C-85028/3 (Oct 1977) Connector, Electric, Rectangular, Individual Contact Sealing, Polarized Center Jackscrew, Interfacial Seal, Size 16, Crimp Contacts
MIL-C-85028/4 (Oct 1977) Connector, Electric, Rectangular, Individual Contact Sealing, Polarized Center Jackscrew, Sealing Plug, Size 16, Crimp Removable Contacts
MIL-G-49141 (Sep 1977) Generator, Sweep SG-677()/U
MIL-C-39029 (Dec 1977) Contacts, Electrical Connector
MIL-M-28787A (Supplement 1 (Dec 1977) Standard Electronic Modules Program
MIL-C-85028 (Oct 1977) (Connector, Electrical, Rectangular, Individual Contact Sealing, Polarized Center Jackscrew
MIL-R-83401C (Dec 1977) Resistor Networks, Fixed, Film
MIL-S-19500F (Dec 1977) Semiconductor Devices
MIL-C-3871B (Dec 1977) Capacitors, Fixed, Electrolytic (AC, Dry-Electrolytic, Nonpolarized)
MIL-STD-1639 (Jan 1978) Power Dividers, Power Combiners, and Power Divider/Combiners, Selection of
MIL-STD-1674(AS) (Oct 1977) Insert Arrangements for MIL-C-85028(AS) Connector, Electric Rectangular, Individual Contact Sealing, Polarized Center Jackscrew
MIL-E-3845A (USAF) (Dec 1971) Environmental Control, Environmental Protection, and Engine Bleed Air Systems, Aircraft
MIL-E-8983B (July 1973) Electronic Equipment, Aerospace, Extended Space Environment
MIL-G-49141 (EL) (Sep 1977) Generator, Sweep SG-677 ()/U
DOD-W-83575A (Dec 1977) Wiring Harness, Space Vehicle, Design and Testing
MIL-STD-1389A (Dec 1977) Design Requirements for Standard Electronic Modules
MIL-M-28787A Supplement 1 (Dec 1977) Standard Electronic Modules Program
MIL-R-83401C (Dec 1977) Resistor Networks, Fixed, Film

For information on the above publications, call Carol Schober, Technical Standards, ext. 7976.

new and revised standards that may be seen at Technical Standards and ordered

- MIL-STD-961 Notice 2 (Mar 1977) Outline of Forms and Instructions for the Preparation of Specifications and Associated Documents
- MIL-C-83723D (Dec 1977) Connectors, Electrical, (Circular, Environment Resisting), Receptacles and Plugs
- MIL-HDBK-251 (Jan 1978) Reliability/Design, Thermal Applications
- MIL-K-48213 (Mar 1973) Knob, Setting
- MIL-K-5089 (Apr 1971) Knob, Setting

new and revised standards that can be ordered by Technical Standards

- UL 1012 Power Supplies (May 1977) (\$4.00)
- UL FIRE PROTECTION EQUIPMENT DIRECTORY (Jan. 1978) (\$2.50)
- UL FIRE RESISTANCE DIRECTORY (Jan. 1978) (\$6.25)
- UL 62 Flexible Cord and Fixture Wire (April 1978), Eleventh Edition (\$4.50)
- UL 796 Printed-Wiring Boards (revision pages for third edition, Mar. 1978)

books available to borrow from our lending library

- NBSIR 75-939 The National Measurement System for Radiometry and Photometry (Nov 1977)
- NBSIR 75-940 The National Measurement System for Spectrophotometry (Nov 1977)
- NBS TECHNICAL NOTE 910-2 Self-Study Manual on Optical Radiation Measurements Part 1- Concepts (Feb 1978)

standards in stock available to purchase

- ANSI Y1.1-1972 Abbreviations for Use on Drawings and in Text (\$12.00)
- ANSI Y32.2-1975 Graphic Symbols for Electrical and Electronic Diagrams (Including Reference Designation Class Designation Letters) (\$8.00)

For information on the above publications, call Carol Schober, Technical Standards, ext. 7976.

Directory of (Tektronix) Standards

Additional binders have been received for the Directory of Standards. This directory is issued and maintained by Technical Standards and contains:

- (1) Standard 062-1699-00, which explains the reason for and the use of the Directory,
- (2) Standard 062-1700-00, subject index for both the "old" Volume 1, Letter-Series Standards and the "new" standards identified by nine-digit part numbers,
- (3) Standard 062-1738-00, available part-numbered standards, and
- (4) Standard 062-2463-00, index of Letter Series Standards.

Standards are arranged in both numerical order and by category for easy identification of available standards.

Copies of the Directory may be obtained from Technical Standards without cost. Call Carol Schober, ext 7976, or stop by 58-187 for a directory.

Vol. I, Letter-Series standards

Because of heavy demands for new standards we have not been able to reformat all "old" letter-series standards. However, Vol. I standards are important to Tek practices and will remain valid until reformatted. The standards are primarily engineering in nature and copies are available directly from Technical Standards. Call Carol Schober, ext. 7976, or stop at 58-187 to discuss your standards needs.

ComponentNews **New Components**

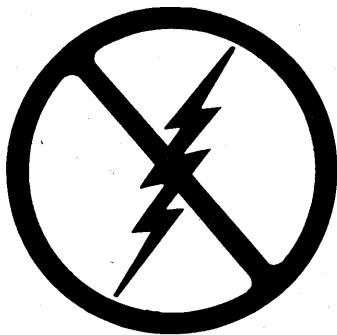
This column is designed to provide timely information regarding new components, vendors, availability and price. "New Components" can also be used as an informal update to the Common Design Parts Catalogs. Samples may or may not be available in Engineering Stock.

Vendor	No.	Description	When available	Tek P/N	Approx. cost	Engineer to contact
analog devices						
Intersil	ICL8063LPE	Power Transistor Driver Amp	now	no P/N	\$ 1.50	John Hereford, 6700
TRW	TDC1001J	Converter, A/D, 8-bit, 1 μ S	now	no P/N	75.00	Chris Martinez, 7709
TRW	TDC1002J	Converter, A/D, 8-bit, 400 nS	now	no P/N	175.00	Chris Martinez, 7709
TRW	TDC1007J	Converter, A/D, 8-bit, 30 nS	now	no P/N	485.00	Chris Martinez, 7709
Analog Devices	AD571K	Converter, A/D, 10-bit, 25 μ S	now	no P/N	38.00	Chris Martinez, 7709
Motorola	MC78L15ACP	+15V Regulator, 100mA, TO-92	now	no P/N	.25	Chris Martinez, 7709
Motorola	MC79L15ACP	-15V Regulator, 100 mA, TO-92	now	no P/N	.35	Chris Martinez, 7709
digital devices						
Intersil	IM6604	512x8 CMOS - EPROM	now	no P/N	—	Wilton Hart, 7607
Synertek	SY2332	4Kx8 Static - ROM	now	no P/N	—	Bob Goetz, 6302
Synertek	—	8Kx8 ROM	5/78	no P/N	—	Bob Goetz, 6302
Motorola	—	8Kx8 ROM	5/78	no P/N	—	Bob Goetz, 6302
National	MM5235	8Kx8 ROM	soon	no P/N	—	Bob Goetz, 6302
T.I.	2532	4Kx8 EPROM	6/78	no P/N	50.00+	Bob Goetz, 6302
Intel	2732	4Kx8 EPROM	6/78	no P/N	—	Bob Goetz, 6302
MMI	6353-1J	1Kx4 PROM	now	156-1213-00	—	Dave Sutherland, 6301
T.I.	74S189	16x4 RAM	now	156-1189-00	—	Dave Sutherland, 6301
Fairchild	93425A	1Kx1 RAM, high speed	now	156-1210-00	—	Dave Sutherland, 6301
T.I.	74S197	Binary Counter/Latch	now	156-1183-00	—	Dave Sutherland, 6301
T.I.	74S138	3 to 8-line Decoder	now	156-1194-00	—	Dave Sutherland, 6301
AMD	26S02	Dual Multivibrator	now	156-1195-00	—	Dave Sutherland, 6301
T.I.	74S181	Arithmetic Logic Unit (ALU)	now	156-1196-00	—	Dave Sutherland, 6301
T.I.	74S299	8-bit Shift Register	now	156-1197-00	—	Dave Sutherland, 6301
T.I.	74S163	4-bit Binary Counter	now	156-1198-00	—	Dave Sutherland, 6301
AMD	2911	Microprogram Sequencer	now	156-1209-00	—	Dave Sutherland, 6301
Motorola	10118	Dual 2-wide, 3-input OR/AND Gate	now	156-1214-00	—	Dave Sutherland, 6301
T.I.	74S37	Quad 2-input NAND Buffer	now	156-1216-00	—	Dave Sutherland, 6301
Intel	—	8291 GPIB LSI	6/78	no P/N	30.00	Jim Howe, 5698
Motorola	—	6845 Interlace CRTC	now	no P/N	30.00	Jim Howe, 5698
National	—	Pre-programmed DP-8350 CRTC	now	no P/N	30.00	Jim Howe, 5698
Western Digital	—	1791 double density Floppy Disc Controller	7/78	no P/N	60.00	Jim Howe, 5698
electromechanical devices						
Botron	MW2C1	Fan, 115V AC 50/60 Hz, 100 CFM; quiet operation	now	119-1045-00	13.00	Bill Stadelman, 7711
G.E.	THQC2130WL	2-pole 30 amp breaker	—	260-1895-00	5.50	Paul Johnson, 6365
E.A.C.	051AY700BAP	Relay, reed, SPST, low thermal EMF	now	148-0117-00	3.69	Paul Johnson, 6365
Arrow-M	HC2-P-12VDC	Relay, DPDT, 7A, 250V, UL	now	148-0118-00	2.55	Paul Johnson, 6365
P + B	TIO-E2-26-12	Relay, flat back, 6PDT, 1.0A, 120V UL	now	148-0119-00	6.28	Paul Johnson, 6365
Arrow-M	HC2-P-DC6-UL	Relay, DPDT, 7A, 250V, UL	now	148-0121-00	2.55	Paul Johnson, 6365

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Vendor	No.	Description	When available	Tek P/N	Approx. cost	Engineer to contact
Bendix	33754-1	BNC, 50Ω male	—	131-2287-00	15.00	Pete Butler, 5913
Bendix	—	BNC, 75Ω female	—	131-2286-00	15.00	Pete Butler, 5913
Bendix	33755-1	N, 50Ω male	—	131-2280-00	20.00	Pete Butler, 5913
screws						
—	—	Tapping, TF:6-32x.375, Taptite, PNH, Stl, Cd pl, Poz	now	213-0789-00	—	Rod Christiansen, 5953
—	—	Tapping, TF:4-24x.625, Type B FLH, Stl, Cd pl, Poz	now	213-0811-00	—	Rod Christiansen, 5953
—	—	Tapping, TR:8-32x.625, TT, FILH, Stl, Cd pl, Poz	5/78	213-0808-00	—	Rod Christiansen, 5953
—	—	Tapping, TR:4-20x.750, Plastite PNH, Stl, Cd pl, Poz	now	213-0810-00	—	Rod Christiansen, 5953
—	—	Tapping, TR:4-20x.75, Plastite, FLH, Stl, Cd pl, Poz	now	213-0809-00	—	Rod Christiansen, 5953
—	—	Machine, 6-32x.625, PNH, Black oxide, Poz	now	211-0670-00	—	Rod Christiansen, 5953
—	—	Pressmount nut, 4-40x.216, Stl Cd pl	now	220-0829-00	—	Rod Christiansen, 5953
—	—	Self-clinching standoff, 6-32x1.0, SST	now	129-0704-00	—	Rod Christiansen, 5953
—	—	Screw-thread insert, 10-24x0.25, SST	now	377-0479-00	—	Rod Christiansen, 5953
resistor, capacitor, optoelectronic devices						
Varadyne	—	Capacitor, 680 pF, 50V DC, axial	—	281-0820-00	.10	Harry Ford, 6520
Unitrode	—	Capacitor, 33 pF, 50V DC, axial	—	281-0819-00	.10	Harry Ford, 6520



CAUTION
STATIC CAN DAMAGE COMPONENTS
DO NOT HANDLE
UNLESS WRIST STRAP IS WORN

DO NOT LET CLOTHING OR PLAIN PLASTICS TOUCH DEVICES

ANDERSON EFFECTS, INC. P.O. box 657, Menlo Park, CA. 92359

We are now stocking 5" x 12" caution signs (see above) for posting in areas where operators are required to wear anti-static wrist straps. The cost is \$3.00 each and the Tek part number is 006-2806-00.

If you have any questions, please contact Sil Arata, ext. 6585, or Glen Johnson, ext. 7128.

COMPONENT CHECKLIST

The "Component Checklist" is intended to draw attention to problems or changes that affect circuit design. This listing includes: catalog and spec changes or discrepancies; availability and price changes; production problems; design recommendations; and notification of when and how problems were solved. For those problems of a continuing nature, periodic reminders with additional details will be included as needed.

Tek P/N	Vendor	Description of Part	Who to contact
156-0410-00	Mostek	Counter time-base circuit	Bill Pfeifer, 6303
<p>Several designers have had difficulties using the internal crystal oscillator circuit on the Mostek 5009. The recommended circuit includes two large resistors (12 MΩ and 18 MΩ), which makes the configuration very humidity-sensitive. Often, simply breathing on the board stops the oscillator.</p> <p>For over eight months we have tried to get specifications for the crystal inputs, but Mostek seems uninterested in supplying this information. Therefore, the use of the internal oscillator on this part is not recommended for future projects. Also, note that all inputs on this device need at least 4.0 V for a logic 1, which normally requires a pull-up resistor if driven by TTL logic. This modification is necessary even though the manufacturer claims the device is fully TTL compatible.</p>			
no Tek P/N	Motorola	General Purpose Interface Adaptor	Jim Howe, 5698
<p>After several communications with Motorola concerning future mask revisions on the MC68488 General Purpose Interface Adaptor (GPIA), the following information has been gathered:</p> <ol style="list-style-type: none"> 1. Reading Register 7, Data-In register— may be depended upon to cause release of Data Accepted (will allow NDAC to go high). This may be used when responding to interrupts from 'GET', 'UUCG', 'UAGC' or 'DCAS', in place of writing 'dacr' high. 2. The SRQ pin, pin 23, is an open-drain output which should be pulled up to +5 V through about 20 KΩ. 3. Difficulties may arise when using the 68488 in an interrupt-driven system. In particular, the 'END' interrupt may cause problems for instruments which are active listeners. <p>If the interrupt service routine is fast enough to read Register 0 after 'END' has become true (but prior to 'BI' becoming true), it is possible that when 'BI' does become true, there will be no output from the IRQ flag (pin 40).</p> <p>The reason is this: the IRQ flag is asserted when the INT bit in Register 0 changes state from false to true. The IRQ flag is cleared when Register 0 is read. The INT bit is set when 'END' goes high, and will not change state when Register 0 is read; neither will it change state when the 'BI' bit becomes true because 'END' is still true. Therefore, there will be no interrupt request when 'BI' becomes true.</p> <p>Any time overlapping interrupt sources occur there is a chance of losing the second reason for interrupt. Thus, 'BI' typically overlaps 'END'; 'BI' or 'BO' may overlap 'RLC.'</p> 4. Another difficulty will arise with the 'SPAS' bit. In a system equipped with a fast GPIB controller, the 'SPAS' bit may cause an interrupt, but very possibly disappear by the time the interrupt service routine attempts to discover the cause of the interrupt. <p>Furthermore, the 'INT' bit will be long gone as well, leaving no record of the 68488 having caused an interrupt to occur in the first place.</p> <p>We have suggested several methods for improving this situation to Motorola, with no results to date.</p> <p>For more details on the 68488 GPIA, reference Component News 252, October 12, 1977.</p>			
156-0427-00	Motorola	Peripheral Interface Adaptor (PIA)	Bill Pfeifer, 6303
<p>The 6820 PIA has been replaced by the 6821. Even though Motorola has promised to supply us with the 6820 for the time being, future supplies are in doubt. Therefore, the 6820 is not recommended for future design. Use the 6821 instead.</p>			

FINAL DRAFT OF U.L.1244 AVAILABLE

The proposed first edition of UL 1244 (Standard for Electrical and Electronic Measuring and Testing Equipment) is now available from Product Safety. This is the February, 1978, draft of UL 1244, which outlines the criteria for gaining UL recognition of our products.

This draft supersedes previous issues of UL 1244, and using areas should replace their older versions with this draft.

To receive your copy of this standard, fill out the application below and send to Product Safety, 58-262.

For more details concerning this standard for Test & Measurement equipment, contact the Product Safety engineer assigned to your division. They are:

Service Instrument Division	Bob Crawford	ext. 7728
Communications	Don Hanson	ext. 7728
Lab Instrument Division	Vaughn Weidel	ext. 7466
Meas. Systems Division	George Clark	ext. 1563 (WRIP)

Please send me the February, 1978, draft of UL 1244

Name _____

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COMPONENT NEWS

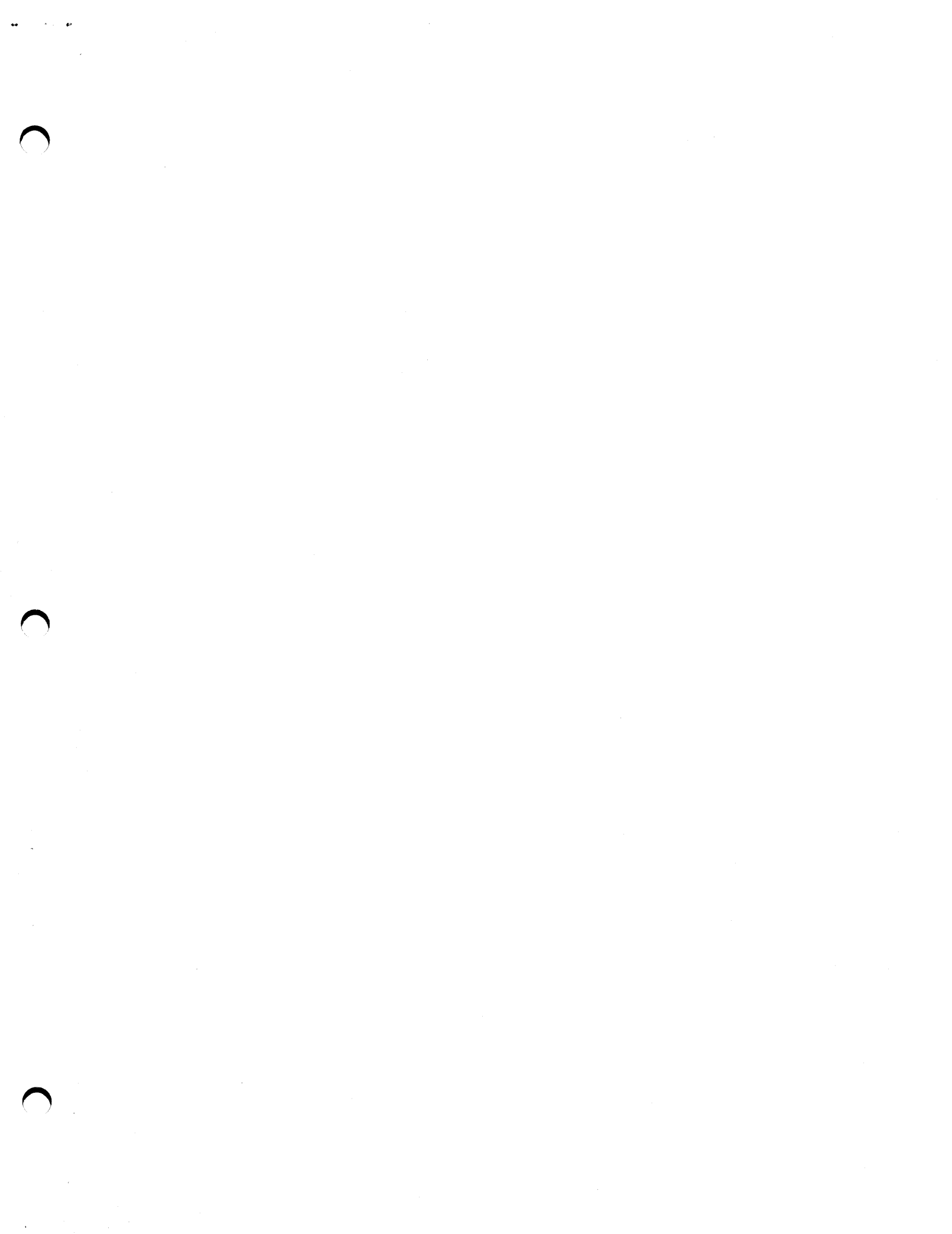
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Deliver to:

For additions or corrections to the mailing list, call Lola Janes, ext. 6867.



94-311

Dick Dunipace

94-529