component news

May 21, 1979 COMPANY CONFIDENTIAL Issue 270

Component carriers "grip" wire wrap connections

Discrete component carriers for wire wrap applications are being introduced to Tek. Using these carriers will assure reliable electrical connections because their leads have sharp corners that bite into the wire being wrapped around them. Wires wrapped to round leads don't hold tightly and are often unreliable.

Eight different carrier options will be available for mounting axial-lead (resistors, diodes), parallel-lead (capacitors, crystals) and plug-in (transistors) discrete components.

Axial-lead components can be mounted three ways: (1) a 14-pin slotted terminal dual-in-line header; (2) an 8-pin slotted terminal header; or (3) a single slotted terminal.

Single slotted terminal

Components with parallel lead configurations can be mounted as follows: (1) a 14-pin solder cup dual-in-line header; (2) an 8-pin solder cup header; or (3) a single solder cup terminal.

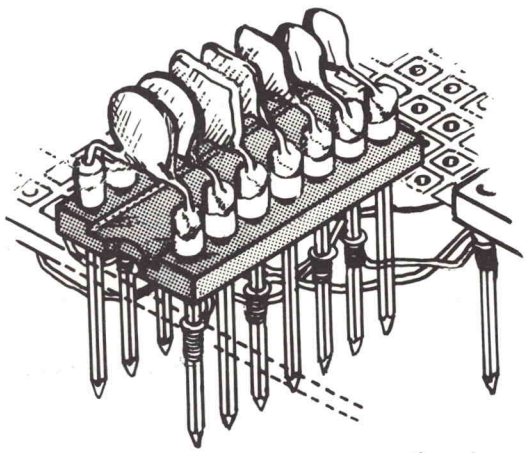
Single solder cup terminal

Also, a 3- or 4-pin transistor socket with wire wrap tails is available.

Why use discrete component carriers?

In addition to improving the integrity of any wire wrap connection, component carriers can provide versatility and easier troubleshooting. The use of single terminals allows random distribution of components, and the terminals can be spaced apart as far as desired.

The header-type packages (8- and 14-pin) cluster discrete components together and have dual-in-line terminal rows spaced 0.3" apart (see illustration below). This spacing will accommodate either vector or multilayer circuit boards.



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Also in this issue

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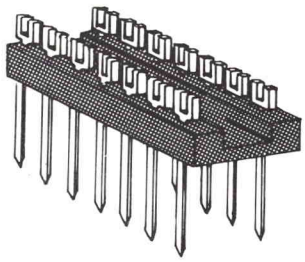
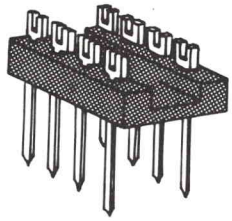
UL-certified 94V-0, thermoplastic polyester is used as the insulator in the headers, with Teflon insulation used in the transistor sockets. The terminals are gold-plated brass. (A word of caution, though: due to the thickness of the gold plating, these parts should not be used in severe environments.)

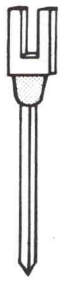
The price of the carriers ranges from $1 to $2 each for the headers; transistor sockets are about 80¢ each. All of the adapter options will be available in Engineering Stock areas during the first quarter of FY000 (solder pot headers and transistor sockets are in stock now). The Tek part-numbers are:



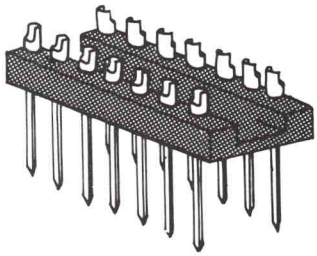
14-pin slotted terminal
(7 axial-lead components)
136-0721-01



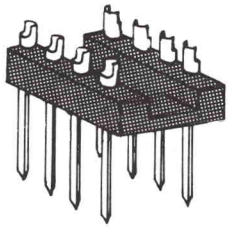
8-pin slotted terminal
(4 axial-lead components)
136-0722-01



Single slotted terminal
131-2421-00

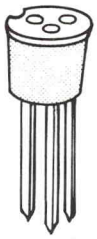


14-pin solder pot terminal
(7 parallel-lead components)
136-0720-00

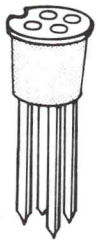


8-pin solder pot terminal
(4 parallel-lead components)
136-0719-00

Single solder pot terminal
131-2422-00



3-pin transistor socket
136-0724-00



4-pin transistor socket
136-0725-00

For more details

See **Glenna Jones (CAD Wire Wrap) 50-126, ext. 5781,** for more information. Glenna also has a display of all wire wrap carriers and sockets available at Tek.

Editor's note: For information on Tek's assembly criteria for wire wrap connections, you may want to reference the *Assembly Workmanship Guide.* The guide is published by Manufacturing Engineering and can be obtained by calling ext. 7233.

Part I of a series

9914 GPIB chip shows promise

Editor's note: This is the first in a series of reports written by Jim Howe on the new GPIB chip from Texas Instruments. In the next issue, the 9914 Controller functions will be discussed.

We have recently completed an analysis of the new TI 9914 GPIB controller. Steve Hubbins, the MOS design engineer responsible for the GPIB logic portion of the device, visited Tek last month, and together we did our best to skewer the design. Fortunately there were no major surprises, only minor ones.

The chips we analyzed initially, using the S-3263 in Component Engineering, were the first devices TI produced, and had a known error in the Source Handshake (SH) portion of the chip. In spite of this, all of the addressing and command recognition was successfully demonstrated, as was the operation of the 23 user commands. We have subsequently analyzed fully functional chips.

The architecture of the chip is very straightforward. A map of the internal registers is shown in Figure 1, page 4. The interrupt mask bits are used to enable the particular function of the chip in addition to unmasking the interrupt for that function. If a particular function is enabled, the device holds the Acceptor Handshake in ACDS until the instrument microprocessor acknowledges the interrupt.

Interrupt structure

All but one of the bits which are set as a result of recognition of Remote Messages are preserved by holding in ACDS. These include APT, which enables secondary addressing; GET, which enables the Device Trigger function; UUCG and UACG, which allow for recognition of Undefined commands; DCAS, which enables the Device Clear function; and MA (My Address), which enables a special function for holdoff on primary address recognition. One other bit, MAC (My Address Change), is set on either primary address recognition or on unaddressing, and does not hold the Acceptor Handshake.

The other interrupt bits are set on state changes and remain set until read. These include IFC, set on IFC becoming true as an input; RLC, set whenever there is a change in the Remote bit; SRQ, set on SRQ becoming true as an input when the 9914 is a controller; SPAS, set on an exit from SPAS when the 'rsv' message is true, i.e., the controller has responded to my SRQ.

'BI' is set on entry into ACDS while an active Listener. The input byte is latched into the data-in register, and the handshake is held in ANRS until the data-in register is read. 'BO' is set on entry into TACS and on completion of a handshake. It is cleared only by writing a data byte out or by reading the interrupt status register. It is not cleared when ATN is asserted at the end of an output sequence; therefore the microprocessor is guaranteed to know exactly how many characters were actually output to the bus.

END Out and END In

The END message is asserted true at the time that the data-out register is written to, following the use of the 'feoi' (force end-or-identify) command. The END message is set false either at the time a new data byte is written to the data-out register or on the use of the 'nbaf' (new byte available false) command. The END message interrupt status bit is set on DAV going true when EOI is true.

Special features

This device appears to have an unambiguous user interface. It is the first of the three GPIB chips with a totally functional interrupt register. It is also the first device to implement a fail-safe method for keeping tabs on a data output process.

The fail-safe method involves using the 'MA' (My Address) interrupt, which halts the bus on receipt of MLA or MTA. This interrupt should normally be masked, and should only be unmasked on the first 'BO' interrupt at the beginning of a transmit sequence. It should be masked again at the time the Untalk message is detected, which will set the 'MAC' interrupt. Thus a normal, undisturbed output process will never raise the 'MA' interrupt;

continued on page 4

continued from page 3

but if an abnormal sequence should take place the microprocessor will be guaranteed to have enough time to detect the fact.

The other half of the method is the implementation of the 'nbaf' (new byte available false) command. This command will abort the END message and disarm the Source Handshake function. Thus if the 'MA' interrupt is received in the midst of an output sequence, indicating that MLA or MTA has been received, the microprocessor will be able to use the 'nbaf' command, if desired.

There is one other point to be made about the 'nbaf' command. The proposed Tek standard for Codes and Formats for programmable instruments provides for clearing of the output buffer on receipt of Device Clear or on first Byte Input. The Motorola chip will not permit the implementation of either condition. (See **Component News 253, page 2**). The Intel chip does the second automatically, but will do the first only if the Device Clear message is associated with Untalk. Therefore, the 9914 is the only device available which guarantees the implementation of both conditions.

Other features

IFC is debounced as an input on going true, but not on going false. Thus a noise pulse on IFC which is less than 4μS duration will have no effect. In the same way, REN is debounced going false, but not on going true. The debounce mechanism involves a shift register toggled by the clock input, so the actual debounce times are clock dependent.

Figure 1

9914 Read Registers

Address			Register	Contents							
RS2	RS1	RS0	Name	D0	D1	D2	D3	D4	D5	D6	D7
0	0	0	INT STATUS 0	INT0	INT1	B1	B0	END	SPAS	RLC	MAC*
0	0	1	INT STATUS 1	GET	UUCG	UACG	APT	DCAS	MA*	SRQ	IFC
0	1	0	ADDRESS STATUS	REM	LLO	ATN	LPAS	TPAS	LADS	TADS	ulpa
0	1	1	BUS STATUS	ATN	DAV	NDAC	NRFD	EOI	SRQ	IFC	REN
1	0	0	ADDRESS SWITCH 1)	edpa	dal	dat	A5	A4	A3	A2	A1
1	1	0	CMD PASS THRGH	D108	D107	D106	D105	D104	D103	D102	D101
1	1	1	DATA IN	D108	D107	D106	D105	D104	D103	D102	D101

* Disabled on APT

Note: This register is external to the TMS 9914 and will consist of a DIL switch at the rear of the instrument.

9914 Write Registers

Address			Register	Contents							
RS2	RS1	RS0	Name	D0	D1	D2	D3	D4	D5	D6	D7
0	0	0	INT MASK 0	X	X	BI	BO	END	SPAS	RLC	MAC
0	0	1	INT MASK 1	GET	UUCG	UACG	APT	DCAS	MA	SRQ	IFC
0	1	1	AUXILIARY CMMD	c/s	x	x	f4	f3	f2	f1	f0
1	0	0	ADDRESS REG	edpa	dal	dat	A5	A4	A3	A2	A1
1	0	1	SERIAL POLL	S8	RSV	S6	S5	S4	S3	S2	S1
1	1	0	PARALLEL POLL	PP8	PP7	PP6	PP5	PP4	PP3	PP2	PP1
1	1	1	DATA OUT	D108	D107	D106	D105	D104	D103	D102	D101

Second-sourcing CMOS devices

Integrated circuit technologies tend to mature after several years, causing some smaller manufacturers to drop out of the market. This has recently been the case with many CMOS devices.

Harris Semiconductor decided that they no longer wanted to produce the CD40XX and 74CXX lines. The reason given was their introduction of a new line of RAMs which will sell for about $15 each. These new RAMs can be produced by the same lines that are now producing 20¢ gates.

Harris was our second source for many of the CD40XX parts, and/or prime source on the 74CXX parts. There are other sources for the CD40XX line, but National Semiconductor was the only other supplier for most of the 74CXX line. This has led to a large portion of the 74CXX line being single-sourced. National realizes that this is a problem for Tektronix, so they have instituted a special stocking procedure to try and guarantee a supply of parts.

Design engineers should take note that most of these parts are single-sourced, and using them in new designs poses some risk.

To help in the selection of parts for new design, I have compiled a list of the 74CXX devices with Tek part numbers, plus a note on second-sourcing status.

Device	Tek P/N	Second Source?
74C00	156-0941-00	No
74C04	--	Yes
74C08	156-0577-00	No
74C10	156-0938-00	No
74C14	156-0876-00	Yes
74C32	156-0766-00	No
74C42	156-0566-00	No
74C48	156-0886-00	No
74C86	--	Yes
74C89	156-0894-00	No
74C107	156-0680-00	No
74C151	156-0869-00	No
74C154	156-0650-00	No
74C157	156-0547-00	No
74C160	--	Yes
74C161	--	Yes
74C162	--	Yes
74C163	--	Yes
74C164	156-0572-00	No
74C165	156-0625-00	No
74C173	156-0574-00	Yes
74C174	156-0682-00	Yes
74C175	156-0931-00	Yes
74C192	--	Yes
74C193	156-0627-00	Yes
74C221	156-0755-00	No
74C374	156-1327-00	Yes
80C97	156-0649-00	Yes
80C98	156-1341-00	Yes

If you have any questions please contact me at 58-125, ext. 7607.

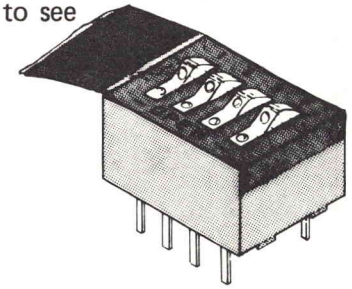
Wilton Hart

"Sealed" rocker switches withstand solderflow/wash

A new option will soon be available on all Grayhill Series 76B rocker switches. In addition to an epoxy-sealed base, the DIP switches will have a removable tape seal on top which protects the parts during solderflow and wash processes. Tests show these switches will even withstand freon washing.

Although the tape-seal option will add about 5¢ to the cost of each switch, this cost is much less than we spend now to hand-insert and clean the switches. Life test results show no mechanical degradation or change in contact resistance immediately following (and seven days after) solderflow, wash and freon immersion.

Three versions of the SPST rocker switch are Tek part-numbered: 260-1579-00 (5-wide), 260-1721-00 (6-wide), and 260-1827-00 (8-wide). All three parts will have the tape-seal option, and using areas can expect to see the new parts during the first quarter of FY000.



If you have any questions, or for more information, please contact **Joe Joncas (58-299), ext. 6365.**

Supply problem still serious

Alternatives for beryllium-nickel sought

Tek's beryllium-nickel (BeNi) supply is uncertain at best, and a concerted effort is underway to find alternate materials to meet our needs.

Our supplier's point of view

Representatives from Tek's only BeNi supplier visited here recently to discuss supply and fabrication problems. The following points were discussed:

- Our supplier loses money on every pound of BeNi they sell.
- BeNi must compete for production time with BeCu (beryllium-copper). BeCu is a more profitable portion of our supplier's business.
- Our vendor doesn't want to supply us with annealed, 0.003-inch thick BeNi in the future. (This material accounts for about 70% of our annual usage.) Instead, they would supply this thickness in ¼- or ½-hard temper. We're investigating this possibility.
- For our vendor to consistently produce this product, they would have to set up a separate fabrication line. Because this is very expensive, and future BeNi demand is uncertain, a market survey is underway to determine the demand for BeNi.
- Future mill orders will have to be 200 pounds or greater. Smaller orders will be filled by distribution centers. Of the 13 BeNi part numbers at Tek, only one meets this minimum order requirement.
- Finally, our supplier was unable to assure us that their ability to produce BeNi would improve. As a matter of fact, there was some discussion about eliminating BeNi production altogether! This decision will be made after examining the market survey results.

As a result of this meeting, and our past supply problems, we cannot assume a consistent and dependable supply of BeNi.

Tek's point of view

We have made great strides in converting existing BeNi uses to different materials, with full-hard stainless steel and BeCu as the prime alternatives. The majority of our present BeNi applications are for 0.003-inch annealed material that is heat-treated for strength. Many of these parts can be fabricated from full-hard stainless steel (P/N 251-0711-01), which is mechanically similar, doesn't have to be heat-treated and, in some instances, can be formed on existing tooling. In other instances, some tooling rework will be necessary to overcome the greater spring-back of the stainless steel.

One point to remember about stainless steel — it has greater resistivity than BeNi, so each application must be evaluated with this fact in mind. At this time, however, the higher resistivity has not been identified as causing electrical problems.

Beryllium-copper is presently being converted for use in some grounding spring applications. This material isn't as strong as BeNi, which results in less contact pressure. BeCu, however, should be nickel-plated to compare with BeNi environmentally. As with any material change, these environmental considerations should be checked with Tek's Environmental Labs.

To recap the present situation — the supply problem is still very serious; therefore, **do not** use BeNi in any new applications. We are making good progress in converting to other materials, and several mods have already been written to utilize alternate materials.

If you have any questions, or would like more information, please contact me at 19-194, ext. 6391.

Frank Javorsky
ME Component Quality Control

NiCd battery pack for Bruning erasers

Those of you who have Bruning battery-operated erasers with a defective battery pack (very expensive and hard to get) will be happy to know that two AA-type NiCd batteries will fit in the case side by side. You can order the batteries (#14106) from Central Stores and have tabs welded on for connections.

Byron Witt
ext. 5417

Component reliability test options

Component Reliability Engineering has compiled a list of recommended test level options by major component categories, with estimated cost and benefits for each.

Reliability lot sample testing is included as an option in some categories. This involves running a reliability acceptance test on a sample of each incoming lot, and rejecting lots which fail. To permit lot rejection, added inventory is necessary. This option is not cost-effective for parts costing more than $1 because the inventory holding costs become excessive (especially where lot size is large in comparison to annual usage). Therefore, for parts costing over $1., 100% screening (burn-in) is usually preferable.

If you have any questions about these reliability test options please contact **Ron Schwartz, ext. 6511.**

Incremental test level	Incremental cost, ¢	Plant fail. rate (quality), %△	Field fail. rate, %†
Small Signal Transistors (including FETs)			
Raw	0	0.50	0.030
+Reliability lot sample	+0.14	0.50	0.020
+100% electrical test	+1–5*	0.05	0.020
+Burn-in (in-house)	+15	0.03	0.005
*Depends on package style and other factors.			
Power Transistors, SCRs, TRIACs			
Raw	0	0.50	0.10
+Reliability lot sample	+0.2	0.50	0.08
+100% electrical	+10	0.05	0.06
+Burn-in (in-house)	+15	0.03	0.01
Diodes, Power Rectifier			
Raw	0	0.50	0.10
+Reliability lot sample	+0.2	0.50	0.08
+100% electrical	+10	0.05	0.06
+100% burn-in (in-house)	+20	0.03	0.03
Diodes, Signal, Switching, Zener			
Raw	0	0.50	0.020
+Reliability lot sample	+0.1	0.50	0.015
+100% electrical	+0.1–5.0*	0.05	0.010
+100% burn-in (in-house)	+15	0.03	0.005
*Depends on extent of testing required, zeners highest.			

△ Plant failure data based on estimates made by CRE; Dave Humphreys is leading a task force to develop more accurate data based on intensive data-taking during some sample two-week periods.

†Note: Field failure rates expressed in percent failures per year for 70°C junction temperature.

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Incremental test level	Incremental cost, ¢	Plant fail. rate (quality), %	Field fail. rate, %
Optoisolators			
Raw	0	0.50	0.10
+Reliability lot sample	+2	0.40	0.05
+100% temp. cycle with high temperature continuity	+5	0.05	0.01
+Reliability stress test	+15	0.05	*

*under evaluation

Microcircuits, Digital (TTL, LS, S, CMOS)			
Raw	0	0.5–1.0	0.050
+Reliability lot sample	+2	0.5–1.0	0.040
+100% electrical test (Tek)	+4–5	0.05	0.030
100% temp. cycle, burn-in, high temperature, and room temp. elec. (vendor)*	+8–12*	0.05	0.006

*This increment does **not** include the immediately preceding increment.

Microcircuits, Digital, ECL			
Raw	0	0.50	0.050
+Reliability lot sample*	–	–	–
+100% elec. test (Tek)*	–	–	–
100% burn-in (vendor), elec. test	+20	0.05	0.006

*Full speed AC testing not currently available – being investigated.

Microcircuits, Memory (MOS RAM/ROM)			
Raw	0	0.50	0.08
+Reliability lot sample	Not recommended		
+100% electrical test (Tek)	+5	0.10	0.05
+100% burn-in (Tek)	+30	0.10	0.01

Microcircuits, PROM/EPROM/EAROM			
Raw	0	0.50	0.08
+Reliability lot sample	Not recommended		
+100% elec. test*	+20%*	0.10	0.05
+100% burn-in (Tek)*	+60*	0.10	0.02

*Not currently available – costs estimated.

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Incremental test level	Incremental cost, ¢	Plant fail. rate (quality), %	Field fail. rate, %
Microcircuits, Linear			
Raw	0	0.5	0.10
+Reliability sample test	+2	0.4	0.08
+100% electrical test (Tek)	+5	0.1	0.05
100% temp. cycle, burn-in, electrical test (vendor)*	+8–15	0.1	0.01
*This increment is exclusive and independent of previous one.			
Microcircuits, LSI, Microprocessor or Microprocessor Support			
Raw	0	0.5	0.10
+Reliability sample test	not recommended (high inventory cost)		
+100% electrical test	+10	0.1	0.08
+100% burn-in, electrical test*	+50	0.1	0.01
*Either vendor burn-in or in-house burn-in/depending on part type.			
High Voltage Multiplier Modules			
Raw	0	0.5	0.5
+Reliability lot sample	High inventory cost, special evaluation needed		
+100% electrical test	+20	0.4	0.4
+100% burn-in (in-house)	+50	0.1	0.1
Optoelectronics, Discrete			
Raw	0	0.5	0.05
+Reliability lot sample	+2–10	0.4	0.03
+100% temp. cycle with high temperature continuity test*	+10	*	*
*under evaluation			
Crystals			
Raw	0	0.50	0.020
+100% electrical test	+5	0.05	0.015
+100% temp. cycle + high temperature bake	+5	0.05	0.008

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Incremental test level	Incremental cost, ¢	Plant fail. rate (quality), %	Field fail. rate, %
Capacitors, Ceramic or Mica (≤500V)			
Raw	0	0.10	0.010
+Reliability sample test	+0.2	0.10	0.008
+100% voltage conditioning (burn-in) Tek	+10	0.05	0.002
Capacitors, Ceramic, HV			
Raw	0	0.10	0.04
+Reliability sample test	+0.5	0.10	0.03
+100% burn-in (Tek)	+10	0.05	0.01
Capacitors, Electrolytic, Aluminum (Large can)			
Raw	0	0.20	0.05
+Reliability sample test	+4	0.10	0.03
+100% burn-in or high temperature storage	+10	0.05	0.01
Capacitors, Electrolytic, Tantalum			
Raw	0	0.20	0.020
+Reliability sample test	+1	0.20	0.015
+100% electrical test	+5	0.08	0.012
+100% voltage conditioning (burn-in)	+10	0.05	0.005

CAUTION: Shock hazard with high-voltage dividers

When using a high-voltage divider and a voltmeter there is a sequence of steps that must be followed to prevent shock to the operator and damage to the voltmeter:

(1) ground the divider **first** by attaching its LO lead(s) to the LO of the voltage source being measured and ground;

(2) attach HI lead of divider to HI of voltage source;

(3) attach ground lead(s) of voltmeter to common LO of divider/voltage source and ground;

(4) attach sense lead of voltmeter to divider.

This procedure applies for any high-voltage divider such as the Tek 63.005 (10KV). If this sequence cannot be followed due to design of voltmeter / voltage source / divider / etc., call Measurement Standards (ext. 5540) for procedures to use in special cases.

It is important to remember that divider and voltmeter grounds be attached first and that they remain attached to guard against the shock hazard that exists.

This notice has been sent to known holders of Tek 63.005 dividers, but please share this information with anyone who may not have received word.

Jerry Turnbaugh
Safety Services

Carbon composition resistor supply dwindles

We have a serious supply problem with all of our carbon composition resistors. Our Japanese source for these parts, Matsushita, has cancelled our orders, and other domestic sources have stopped manufacturing carbon composition resistors.

This situation puts the replacement demand on Allen-Bradley Co., which still produces the part. However, the lead time has jumped to 8 to 10 weeks on contract orders, and 14 weeks on extra orders. The cost of these resistors is also higher — $33.40 per thousand, compared to $13.40 per thousand for the Japanese parts! All series 301, 302 and 316 suffix -00 numbers are affected, and using areas will receive carbon film resistors as replacements.

Therefore, we *strongly* recommend that you use carbon film or metal film resistors instead of the carbon composition parts in any new design or modification. The list that follows shows the part-numbered Allen-Bradley resistors which are affected. The card-pack-only parts (*) should not be used for large quantity orders. Card-pack parts will be restricted to hand insertion applications only.

If you have any questions, please contact me at 58-299, ext. 6520.

Ray Powell

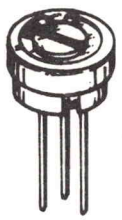
Allen-Bradley Carbon Composition Resistors

(* denotes card-pack only)

301-0100-01 *	315-0202-02	315-0514-02	307-0036-00
301-0104-01	315-0203-02	315-0560-02	307-0037-00
301-0151-01 *	315-0203-03	315-0561-03	307-0040-00
301-0430-01 *	315-0203-05	315-0562-03 *	307-0047-00
301-0510-01 *	315-0204-02	315-0620-02	307-0048-00
301-0622-01 *	315-0206-01	315-0620-04 *	307-0049-00
302-0102-03 *	315-0220-01	315-0621-03	307-0050-00
302-0150-03 *	315-0220-03 *	315-0680-02	307-0051-00
302-0181-02 *	315-0221-03	315-0680-03 *	307-0052-00
302-0221-01 *	315-0221-04 *	315-0681-03	307-0053-00
302-0392-02 *	315-0223-03	315-0682-03 *	307-0054-00
315-0100-02	315-0224-01	315-0683-03	307-0055-00
315-0100-04 *	315-0226-01	315-0750-02	307-0056-00
315-0101-03	315-0241-02	315-0751-04	307-0057-00
315-0101-06 *	315-0241-04 *	315-0754-03	307-0058-00
315-0102-03	315-0243-03	315-0820-01	307-0059-00
315-0102-06 *	315-0270-01	315-0821-03	307-0059-01
315-0103-03	315-0271-03	315-0824-02	307-0060-00
315-0104-03	315-0272-03	315-0910-01	307-0061-00
315-0105-03	315-0300-02	315-0915-02	307-0062-00
315-0120-01	315-0301-02	316-0102-02 *	307-0063-00
315-0121-02	315-0303-03	316-0151-03 *	307-0093-00
315-0124-02	315-0330-01	316-0331-02 *	307-0103-00
315-0131-01	315-0330-03 *	316-0474-02	307-0104-00
315-0132-01	315-0331-03	307-0004-00	307-0105-00
315-0136-01	315-0335-03	307-0005-00	307-0106-00
315-0153-03	315-0360-01	307-0006-00	307-0107-00
315-0160-01	315-0392-03	307-0007-00	307-0108-00
315-0161-02	315-0430-02	307-0008-00	307-0109-00
315-0162-02	315-0430-03 *	307-0009-00	307-0110-00
315-0163-01	315-0470-03	307-0014-00	307-0111-00
315-0181-02	315-0470-04 *	307-0015-00	307-0112-00
315-0182-03	315-0471-03	307-0023-00	307-0113-00
315-0183-03	315-0472-03	307-0024-00	307-0114-00
315-0184-01	315-0474-02	307-0025-00	307-0115-00
315-0200-02	315-0510-04	307-0033-00	307-0115-01 *
315-0201-02	315-0511-02	307-0034-00	307-0116-00
315-0201-04 *	315-0513-03	307-0035-00	307-0590-00

Is a solderable case necessary?

The small (¼" diameter) cermet trimmers used at Tek have always had solderable metal housings, so that electrical connection can be made where necessary for proper circuit performance. One of our two vendors, who supplies this option at extra cost, has notified us that it will now cost 10 — 12 cents more than their standard part. Because we use about 1,800,000 of these trimmers each year, a substantial cost savings is possible if case solderability is no longer needed.



We are asking readers to report any applications requiring a solderable case to **Gene Single, (58-299), ext. 5302.**

The following is a list of affected part numbers:

311-0605-00	311-0633-00		311-1007-00
311-0605-01	311-0634-00		311-1035-00
311-0607-01	311-0644-00		311-1256-00
311-0609-00	311-0644-01	through	311-1258-00
311-0613-00	311-0660-00		311-1290-00
311-0614-00	311-0698-00		311-1293-00
311-0622-00	311-0978-00		311-1757-00
311-0622-01	311-0978-01		311-1862-00

Static protection update

Fabric softener cleans pink poly

Anti-static pink polyethylene is used for benchtops, trays, bags and many other materials at Tek. Pink poly contains a small amount of detergent (similar to laundry detergent) which attracts water vapor, forming a conductive layer on the surface of the polyethylene. **Component News 269** reported that Downy Fabric Softener is an effective cleaning agent for anti-static surfaces, because Downy reinforces the detergent already in the pink poly. Here are more details on cleaning anti-static surfaces.

The Environmental Labs recently finished tests on Downy-coated RCA 1200 pink poly benchtop covering and found it does not corrode copper or tin that is in direct contact with the polyethylene surface. However, there appeared to be some corrosion of copper surfaces which were **not** in direct contact with the polyethylene, indicating some outgassing of corrosive vapors from the Downy.

Downy was also tested for sodium because sodium in detergents is very destructive to ICs. No significant amount of sodium was found in the analysis.

This analysis indicates that Downy-coated RCA 1200 pink poly is satisfactory for most benchtop use, but components should not be stored in Downy-coated materials in boxes or other enclosures.

Black polyethylene, on the other hand, depends on the electrical conductivity of the carbon particles imbedded in it. The carbon is in high enough concentrations to form a continuous surface of conductivity, and doesn't need to be cleaned with Downy. Downy, though, will not hurt black poly.

Problems with Wescorp black poly

A problem has been found with Wescorp brand benchtops (and possibly their other products). During the manufacture of these benchtops the carbon particles migrate to the surface. Because the carbon-impregnated layer is only 0.004- to 0.005-inch thick, it is easily scratched and scraped, leaving the nonconductive surface exposed. And, because the polyethylene is black you can't see the absence of carbon or the condition the surface is in.

Wescorp products should be checked periodically for effectiveness with a static meter.

Don't "recycle" pink poly bags

The life expectancy of anti-static pink poly bags is currently being tested in the Environmental Labs. Initial results from tests performed on 6-month-old bags show that they do not protect against static discharge, especially if the bags are punctured.

In general, the 6-month-old bags retained sufficient charges to cause damage to static-sensitive parts. The problem is compounded when circuit board pins or other objects have pierced the bags because IC leads sticking through the holes are directly vulnerable to external static charges.

To protect sensitive parts, we do not recommend storage in used pink poly bags. If you do decide to re-use pink poly, always discard the punctured/torn bags.

Paul Phelps, ext. 6297
Packaging Design

8251A USART information

We have some information concerning "new features" in the 8251A USART (Universal Synchronous/Asynchronous Receiver Transmitter). Contact **Bill Pfeifer (ext. 6303)** for details.

Benefits of component burn-in assessed

An early example of component burn-in (or preconditioning) at Tek was the T-900 instrument line. All semiconductor devices were subjected to some kind of stress testing. The effectiveness of this program has been debated; however, the tests were devised over four years ago, and were based on considerations deemed important at that time. Component Reliability Engineering has since developed a more selective approach to component burn-in and can now report some "before and after" data from actual field results.

Our present approach holds that significant benefit will be gained from burn-in if: (1) the part is applied at over 70°C junction temperature or over 60% of rated voltage; (2) the absolute lowest possible failure rates are necessary to meet instrument reliability goals.

Several specific component reliability problems have been solved by the application of 100% burn-in. These are:

Tek P/N	Instrument	Field Removal Rate (%/year)		Added Part Cost△
		Before Burn-in	After Burn-in	
151-0279-03	603, 604	0.6%	0.05%	20¢
151-0444-03	7623, 7633, 7834	5% *	<0.5% *	20¢
156-0635-01	4051	0.27%	0.02%	50¢
156-0899-01	7D01	0.9%	0.02%	30¢
156-0900-01	7D01	0.9%	0.02%	30¢
283-0627-01	528	2% *	0.1% *	10¢

△ including yield loss

* in-plant removal rate data; field data not yet available

For an increasing number of high-stress applications, 100% burn-in is a way to achieve desired levels of field reliability. Also, many instrument designers are selecting 100% screened microcircuits in order to achieve lowest possible failure rates, or to avoid the use of IC sockets.

The following tables list the burned-in and tested microcircuits that are currently available at Tek. Table A shows the parts tested in-house; Table B lists the parts tested by our vendors.

For more information on component burn-in, contact **Ron Schwartz, ext. 6511.**

Table A — 100% Burn-In and Test at Tektronix

150-1011-02	151-0444-03	156-1027-01	156-0927-02
150-1011-04	156-0277-01	156-1127-02	156-0972-05
151-0279-03	156-0285-01	156-0899-01	156-1301-01
151-0347-01	156-0968-01	156-0900-01	156-1359-01

This list does not include all part numbers set up for the T-900 program because the burn-in process has not yet been updated for most of those parts.

Table B on page 14

Table B — 100% Burn-In and Test by Suppliers

THIS IS A LIST OF CURRENTLY PART NUMBERED ICS WHICH HAVE BEEN 100% BURNED IN AND TESTED BY PART VENDORS. SEE COMPONENT NEWS ISSUE 261 FOR FURTHER EXPLANATION OF THIS PROCESS.

156001802	156003003	156003203	156003402	156003502
156004105	156004303	156005802	156007802	156008102
156009302	156011303	156011803	156014002	156014102
156014302	156014502	156015302	156016502	156017202
156018004	156018202	156020502	156021902	156022102
156022602	156022701	156023002	156025202	156026601
156028902	156029502	156030301	156030402	156030804
156031102	156031604	156032003	156032102	156032302
156032402	156032502	156032602	156033103	156034702
156034906	156035005	156035301	156036102	156036201
156036602	156036803	156036903	156037102	156037402
156037601	156038102	156038202	156038302	156038402
156038502	156038602	156038702	156038803	156039002
156039102	156039203	156040203	156040401	156040503
156041001	156041102	156041202	156041302	156041902
156042202	156042402	156042605	156042704	156045502
156045801	156045902	156046402	156046502	156046902
156047002	156047102	156047203	156047802	156047902
156048002	156048102	156049402	156049502	156049702
156050302	156050502	156051302	156051401	156051502
156052001	156052301	156052402	156052503	156052902
156053002	156053102	156053901	156054102	156054201
156054301	156054402	156054501	156054703	156056602
156056702	156056901	156057202	156057402	156057503
156057602	156057702	156057802	156057902	156058002
156058302	156059901	156061702	156062401	156062702
156062901	156063001	156063103	156063202	156063302
156063602	156063701	156063801	156063901	156064002
156064101	156064201	156064502	156064602	156064902
156065102	156065202	156065302	156065602	156067901
156068002	156068102	156068202	156068701	156068801
156069003	156069302	156070703	156071601	156071003
156072002	156072102	156072201	156072402	156072701
156072802	156073002	156073102	156073302	156073502
156073602	156073804	156073902	156074301	156075201
156075701	156075801	156075902	156076001	156076702
156077101	156078402	156078602	156078801	156078902
156079302	156079601	156079802	156079901	156080402
156084402	156084502	156084701	156084801	156085202
156085302	156086002	156086101	156086301	156086401
156086502	156087001	156087402	156087502	156087601
156087602	156087801	156087901	156088002	156088802
156090303	156091002	156091302	156091402	156091602
156092001	156093501	156093801	156094802	156095102
156095302	156095502	156095602	156095701	156096502
156096601	156097502	156098203	156098401	156098501
156099301	156099402	156101801	156101902	156102101
156102201	156102301	156102502	156102602	156103801
156104501	156104602	156105401	156105801	156105901
156106102	156106402	156106501	156111102	156112601
156113302	156114901	156115201	156117201	156117601
156117701	156120101	156121201	156121501	156121601
156123500	156124601	156125100	156125200	156126700
156127700	156128500	156128600	156129300	156131500
156131600	156132600	156132700	156133600	156133700
156135200				

Need material availability information?

All active Tektronix parts (Tek-made and purchased) are now displayed on IMS terminals through an improved material availability information system. This system offers improved planning resolution by providing one year's data on present and future demand, orders, current availability, and planned availability of material by part number.

The data is displayed for the upcoming twelve-week period in weekly buckets, and from that point on in ten one-period buckets. Any consecutive three periods can be designated to display twelve weekly buckets, which allows selective display of one year's data in weekly buckets.

Another feature, "Allocation," allows selected terminals to allocate material "on line." This means that when material is designated for issue by a control terminal, the available balance, demand, planned orders, and planned availability will change immediately to show the adjusted quantities in all affected buckets. Subsequent terminal inquiries will then immediately show the new adjustments.

IMS terminals which have "SCSCRAVL" capability have received this new "MSSCRAVI" inquiry automatically. Others interested in this capability should request it through **Dick Jewett, (55-952) ext. 6354.**

In addition, the format of the Req. Review Log Sheet (000-8750-00) has been revised. An additional copy (pink) has been provided for the user to keep as a record of the request. The top two copies (original and yellow) are sent to Material Availability (55-952). The original will be sent back to the requester after it is keypunched to verify the order has been entered and to advise of the delivery date. Office supplies and chemicals should be ordered via stock requisitions and sent directly to the warehouse.

Column 30 (RC) on the Req. Review Log sheet (RRLS) has been provided for the appropriate Reason Code of the request. Detailed reason codes and instructions can be found in your Material Ordering and Planning Procedures (MOPP) book. (Copies of this book are available from Master Scheduling, 55-952.)

We anticipate that this system will result in planning and allocating "unplanned" material in a far more timely, accurate and efficient manner. Also, we will gain high resolution in determining schedules for adding material through Mods and New Product Bills of Material.

Additional information or a demonstration of this system can be obtained from:

Bob Dozier, Master Scheduling,
ext. 6908, del. sta. 55-952
Brad Jeffries, Systems Development,
ext. 5696, del. sta. 55-540
Terry Smith, New Product Introduction,
ext. 5200, del. sta. 55-962

Terry Smith
NPI Logistics Manager

P/N list for digital μcircuits

A table showing part number suffixes for major suppliers of digital microcircuits is now available. The table reflects Tek's current marking requirements for standard (off-the-shelf) and reliability-screened digital microcircuits in both plastic and ceramic packages.

An up-to-date copy of this table is available from **Yvonne Brinck (58-125).**

To all holders of engineering notebooks:

It is in the best interest of Tektronix to use engineering notebooks to record important information regarding inventions. Such items as when the invention was conceived, sketches and diagrams, and other descriptive information should be included in the notebook log.

Engineering notebooks can be obtained from Patents and Licensing (50-419) ext. 5385.

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, ext.
✓	283-XXXX-XX (see list)	Sprague	Fixed ceramic capacitors	Harry Tanielian, 6405

We've found that the leads on many of Sprague's fixed ceramic capacitors have not been adequately soldered to the body of the capacitor, causing intermittencies with the parts. *All 7908 and later date-coded parts* (more readily identified by the brighter orange color than the older Sprague parts) are affected.

Please purge all the Sprague parts with 7908 and later date codes and replace them with other brand parts until further notice. Send defective parts to 71-899 along with an RSO (Reject/Scrap/Obsolete) form. A list of the affected part numbers follows.

283-0008-00	283-0057-00	283-0111-00	283-0169-00	283-0189-00	283-0203-00	283-0238-00
283-0010-00	283-0058-00	283-0129-00	283-0176-00	283-0191-00	283-0204-00	283-0249-00
283-0024-00	283-0059-00	283-0134-00	283-0177-00	283-0193-00	283-0208-00	283-0268-00
283-0026-00	283-0079-00	283-0155-00	283-0178-00	283-0194-00	283-0210-00	283-0328-00
283-0027-00	283-0100-00	283-0164-00	283-0179-00	283-0195-00	283-0220-00	283-0341-00
283-0051-00	283-0108-00	283-0167-00	283-0180-00	283-0198-00	283-0221-00	283-0426-00
			283-0183-00			

✓	156-1246-00	Motorola	MC68488 GPIA	Jim Howe, 6303

The 'UACG' bit is not properly implemented in the MH mask parts. The problem is that future implementations of IEEE-488 may define one of those codes to be used in conjunction with LADS or TADS, but not both. For example, 'GET' is ANDED with LADS in the DT function; 'TCT' is ANDED with TADS in the C function.

The 68488 MH parts are designed so that there is no way to know whether or not the chip is in TADS or LADS when ATN is true; therefore, future defined members of the Addressed Command Group may not be implemented using the 68488.

✓	156-1153-00	National	5740, 90-key Keyboard encoder	Bill Pfeifer, 6303

National Semiconductor has announced they are phasing out production of this keyboard encoder. We therefore do not recommend it for new design.

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)*

NASA technical briefs

Technical Standards now has an index to the National Aeronautic and Space Administration Technical Briefs. These briefs are short articles on new technology derived from the research and development activities of NASA and cover a vast field of technical subjects. The index is located at 58-187. Briefs may be borrowed. The Winter 1978 issue is now available (call ext. 7976).

metric information available

We have a few copies of "Metric Units of Measure and Style Guide" by the U. S. Metric Association. We will appreciate knowing if there is an interest in such metric material.

acronyms standard available*

We want to remind readers there is a Tektronix Standard (062-1737-00) that provides identification for most acronyms and abbreviations. Please notify Technical Standards, ext. 7976, if you do not find what you need in this standard. You may receive it by calling Reprographics, ext. 5577, and requesting a copy.

Vol. I Standards (Letter-Series)

The Directory of Standards (062-4055-04), lists available letter-series standards that are still valid for use at Tektronix. However, some of the listed standards are out of date, and any questions should be addressed to Technical Standards, ext. 7976. Copies of the Directory are available on request.

racks and panels

Technical Standards has received a letter from the Head Standardization Branch of the Naval Electronics Systems Command to the effect that MIL-STD-189 (1955) is recommended for cancellation in favor of using ANSI/EIA RS-310-C-77. Because the EIA standard is more restrictive in space than the Military Standard, we recommend designers adhere to the EIA specifications. Tektronix Standard 062-1733-00 at present follows the Military Standard and specifies 17.750, +0.062, −0.000 inches between upright frames. The EIA dimension is presently 17.750, minimum, but is to be reduced to 17.720 by January 1, 1981.

terms and/or abbreviations

In answer to requests, we are listing the following published standards as sources for terms and/or abbreviations:

062-2851-00 Cable Standards, Glossary of Terms
062-1737-00 Communications Standards, Abbreviations and Symbols
062-1736-00 Communications Standards, Glossary of Technical Terms
062-3752-00 Communications Standards, Product Marking, Abbreviations
062-2846-00 Drafting Standards, Glossary of Terms — Dimensioning and Tolerancing
062-1703-00 Finish Standards, Glossary of Terms

Other standards are under consideration, and input to those listed is encouraged.

For information about the publications listed, call Carol Whitmore, Technical Standards, ext. 7976.

***Note:** *Component News' Index and Reference Guide* and the March 1979 *Tektronix Telephone Directory* also have lists of frequently-used acronyms.

ComponentNewsNewComponents

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						
Signetics	NE5018N	D/A Converter, 8-bit μP-compatible; onboard ref. and output op amp	now	No P/N	$5.25	Don Gladden, 6700
Analog Devices	AD7524JN	D/A Converter, 8-bit microprocessor-compatible, D/A multiplying, CMOS	now	No P/N	3.00	Don Gladden, 6700
Analog Devices	AD7523JN	D/A Converter, 8-bit CMOS multiplying	now	No P/N	2.00	Don Gladden, 6700
National	LF398H	IC, Monolithic sample and hold	now	No P/N	3.50	Don Gladden, 6700
TRW	TDC-1007J	D/A Converter, 8-bit 25 MHz	——	156-1345-00	——	Chris Martinez, 7709
Microwave Assoc.	——	Diode, Schottky, 0.7pF, (7V, replacement for 152-0442-00)	7/1/79	152-0748-00	2.90	Gary Sargeant, 5345
digital devices						
Intel	8048	MPU, 8-bit with RAM and custom ROM	——	160-0405-00	——	Wilton Hart, 7607
Intel	8748	MPU, 8-bit with RAM and EROM	now	No P/N	——	Wilton Hart, 7607
Intel	8741A	MPU, 8-bit	now	No P/N	——	Wilton Hart, 7607
Motorola, AMI and Fairchild	6802	NMOS, 8-bit with clock and RAM	now	156-1342-00	9.25	Carl Teale, 7148
Motorola, AMD	2910	Low power Schottky, 12-bit microprogram controller	now	156-1355-00	——	Carl Teale, 7148
TI, AMD, and Signetics	74S158	Data Selector/Multiplexer quadruple 2-line to 1-line	soon	No P/N	——	Don VanBeek, 5414
electromechanical devices						
Berg	A7799	Post, 0.025" square, 1.00" long, machine-insertable, reel form	now	131-2441-00	.03	Peter Butler, 5417
AMP	4-67987-3	Connector, edgecard	——	131-1757-01	——	Peter Butler, 5417
Viking	3VH50/ 1CNK1	Connector, edgecard 50/100, 0.125" contact centers, 0.026" diameter round PC tail	now	131-2402-00	——	Peter Butler, 5417
Berg	75060-12	Spring socket, without dimple, (improved version of 136-0252-04)	now	136-0252-00	.03	Peter Butler, 5417
Molex	10-18-1041	Interconnect, 0.045" sq.	now	131-2447-00	——	Peter Butler, 5417
Berg	65057-007	Mini-PV holder, black, 50-position	now	352-0580-00	——	Peter Butler, 5417
LEDCO	300-10-CMT218	Cartridge lamp, 10V, 27mA, white lens, 4" leads	now	150-0193-00	.75	Peter Butler, 5417
Molex	16-02-0034	Strain relief terminal, crimp to D2-26AWG, board solder-in	now	343-0854-00	.02	Peter Butler, 5417
AMP	353570-3	Terminal, 0.04" dia.,, fits 24-18 AWG, female, universal mate-n-lock	now	131-2455-00	——	Peter Butler, 5417
Pacific Metal	——	Aluminum bar, 1.0"W x 0.125" thick, alloy 2024T4, ASTM B211	now	251-1603-00	2.33/lb	Rod Christiansen, 5953
Pacific Metal	——	Aluminum bar, 1.0" sq., alloy 6061-T6, ASTM B211	now	251-1602-00	1.03/lb	Rod Christiansen, 5953
Reynolds Alum.	——	Brass strip, 3.5"x0.016" alloy 260, ASTM B-36, ½-hard	now	251-0315-07	1.56/lb.	Rod Christiansen, 5953

continued on page 19

Vendor	No.	Description	When available	Tek P/N	Approx. Cost	Engineer to contact
electromechanical devices, continued						
Belden	——	Cable, special, elec., 2-cond., 22AWG, stranded, 51 jacket	now	175-2311-00	0.41/ft.	Rod Christiansen, 5953
Precision Tube	BE50141	Cable, RF, 50Ω Coax, without Jacket	now	175-1045-08	0.70/ft	Rod Christiansen, 5953
——	——	Cable, special elec., 6-cond., 18 AWG, Ribbon	now	175-5057-00	0.15/ft.	Rod Christiansen, 5953
——	——	Cable Assembly, special elec., 26-cond., 28 AWG, 18.0"L	now	175-2322-00	4.15	Rod Christiansen, 5953
Viking	28-7012-0000	Cable Assembly, special, elec., 12-cond., 22 AWG, 7.5"L	now	175-2477-00	6.00	Rod Christiansen, 5953
Zepher Elec.	——	Cable Assembly, special, elec., 64-cond., 28 AWG, 20.0"L	now	175-2574-00	11.00	Rod Christiansen, 5953
Zepher Elec.	——	Cable Assembly, special, elec., 26-cond., 28 AWG, 12.0"L		175-2005-00	7.55	Rod Christiansen, 5953
Zepher Elec.	——	Cable Assembly, special, elec., 25-cond., 26 AWG, 16.0"L	now	175-2197-00	7.00	Rod Christiansen, 5953
Zepher Elec.	——	Cable Assembly, special, elec., 34-cond., 28 AWG, 33.5"L	now	175-2476-00	12.00	Rod Christiansen, 5953
Zepher Elec.	——	Cable Assembly, special, elec., 34-cond., 28 AWG, 32.75"L	now	175-2475-00	12.00	Rod Christiansen, 5953
Zepher Elec.	——	Cable Assembly, special, elec., 34-cond., 28 AWG, 26.25"L	now	175-2473-00	11.00	Rod Christiansen, 5953
Zepher Elec.	——	Cable Assembly, special, elec., 34-cond., 28 AWG, 29.0"L	now	175-2474-00	11.00	Rod Christiansen, 5953
Zepher Elec.	——	Cable Assembly, special, elec., 40-cond., 28 AWG, 20.0"L	now	175-2457-00	7.00	Rod Christiansen, 5953
Stock Drive	——	Gear, Spur, SST, 96 teeth, 32 pitch dia., w/hub	now	401-0268-00	1.00	Rod Christiansen, 5953
——	——	Stainless Steel Foil, 0.84" x 0.003", Alloy 301, ASTM A-167, High Yield	now	251-0728-00	0.05/ft.	Rod Christiansen, 5953
Insulectro	CRN	Tubing, heat shrink, 3/64" dia., ½" long	——	162-0693-00	——	Rod Christiansen, 5953
Belden	8899	Wire, Test Prod., 18 AWG, Red	now	175-2522-00	0.07/ft.	Rod Christiansen, 5953
Belden	8899	Wire, Test Prod, 18 AWG, Black	now	175-2523-00	0.07/ft.	Rod Christiansen, 5953
Belden	8899 Black	Wire, Elec., Stranded 18 AWG, 5000VDC, Rubber, Test Lead	now	175-2523-00	0.07/ft.	Rod Christiansen, 5953
Belden	8899 Red	Wire, Elec., Stranded 18 AWG, 5000VDC, Rubber, Test Lead	now	175-2522-00	0.07/ft.	Rod Christiansen, 5953
Motorola	K1100A	Oscillator, DIP	now	118-0642-00	10.00	Byron Witt, 5417
Motorola	K1100A	Oscillator, crystal clock DIP packaged	now	No P/N	10.00	Byron Witt, 5417
Northern Eng.	NE13	Crystal unit, quartz 31.5KHz, ± 0.02% series	now	158-0059-00	——	Byron Witt, 5417
Colorado Crystal	HC25/U	Crystal, 2.977 MHz ±0.01% series	now	158-0035-00	10.00	Byron Witt, 5417
optoelectronic devices						
H-P	5082-4658	LED, discrete, point source, high intensity, 635 nm (orange red)	now	150-1059-00	0.85	Betty Anderson, 6389
Sprague, TRW	X675HV	Film case, plastic, 0.22UFD, 8 KV metallized polyester	now	No P/N	——	Don Anderson, 5415
G.E.	21L6066	Capacitor, fixed, 50/60 Hz AC, 2.5 370 VAC pressure sensitive interrupt, non PCB	now	No P/N	——	Don Anderson, 5415
United Chem-con	——	Capacitor, fixed, 1μF, electrolytic, 50V	now	290-0891-00	——	Don Anderson, 5415
——	——	Capacitor, axial lead, ceramic180 pF, 100VDC	——	281-0851-00	——	Harry Ford, 6520
Emcon	——	Capacitor, axial lead, ceramic, 1800 pF, 100VDC	——	281-0852-00	——	Harry Ford, 6520
——	——	Capacitor, axial lead ceramic, 820 pF, 50VDC	——	281-0850-00	——	Harry Ford, 6520

continued on page 20

Vendor	No.	Description	When available	Tek P/N	Approx. Cost	Engineer to contact
		optoelectronic devices, continued				
Allen Bradley	CB5625	Resistor, fixed carbon comp., 5.6 KΩ, 5%, ¼W	July 10	315-0562-03	0.03	Ray Powell, 6520
Allen Bradley	CB1245	Resistor, fixed carbon comp., 120 KΩ, 5%, ¼W	July 10	315-0124-02	0.03	Ray Powell, 6520
Allen Bradley	CB5625	Resistor, fixed carbon comp., 5.6 KΩ, 5%, ¼W	July 10	315-0562-03	0.03	Ray Powell, 6520
Allen Bradley	CB1245	Resistor, fixed carbon comp., 120 K	July 10	315-0124-02	0.03	Ray Powell, 6520
Beckman	765-1-430	Resistor, fixed network, 9-430 Ω 3 2%, 1.25W	June 15	307-0674-00	0.22	Ray Powell, 6520
Beckman	765-1-RIK	Resistor, fixed network 9 - 1KΩ 3 2%, 1.25W	June 15	307-0675-00	0.22	Ray Powell, 6520
Bourns	4310R-101-182	Resistor, fixed network 9 - 1.8 KΩ ± 2%, 1.25W	June 15	No P/N	0.22	Ray Powell, 6520
Dale	MDP1605-331/681	Resistor, fixed network DIP 16-28, 14-330Ω, 14-330Ω ±2%	June 15	307-0676-00	0.72	Ray Powell, 6520
Dale	MFF1226G-93100F	Resistor, fixed metal film 9.31 KΩ, 1%, T0, ½W	May 31	323-0286-00	0.05	Ray Powell, 6520
Dale	MFF1226G-332R0D	Resistor, fixed metal film, 332Ω, 0.5%, T0, ½W	June 30	323-0147-01	0.05	Ray Powell, 6520
Dale	MFF1226G-22102F	Resistor, fixed metal film, 221 KΩ ±1% T0, ½W	June 15	323-0148-00	0.05	Ray Powell, 6520
Dale	MSP10A01-504J	Resistor, fixed film 9-500kΩ, 5%	June 15	307-0673-00	0.35	Ray Powell, 6520
Mepco/Electra	5033R400	Resistor, fixed metal film, 400Ω, 0.1%, T9 1/8W	June 20	321-0773-07	0.22	Ray Powell, 6520
Mepco/Electra	5033R	Resistor, fixed metal film 1.4 KΩ 0.1% T9 1/8W	June 30	321-0207-07	0.22	Ray Powell, 6520
Mepco/Electra	5033R	Resistor, fixed metal film 3.397 KΩ, 0.1% T9, 1/8W	June 30	321-1722-07	0.22	Ray Powell, 6520
Mepco/Electra	5033R	Resistor, fixed metal film 17.145 KΩ, 0.1% T9, 1/8W	June 30	321-1721-07	0.22	Ray Powell, 6520
Mepco/Electra	5033R	Resistor, fixed metal film 6.81 KΩ, 0.5%, T2, 1/8W	June 30	321-0670-00	0.07	Ray Powell, 6520
Mepco/Electra	5053R	Resistor, fixed metal film 23.2 KΩ, 1%, T0, ½W	now	323-0324-00	0.05	Ray Powell, 6520
Mepco/Electra	5033R	Resistor, fixed metal film 1.4 KΩ 0.1% T9 1/8W	June 30	321-0207-07	0.22	Ray Powell, 6520
Mepco/Electra	5033R	Resistor, fixed metal film 3.397 KΩ, 0.1% T9, 1/8W	June 30	321-1722-07	0.22	Ray Powell, 6520
Clarostat Mfg.	——	Panel Control, 50 KΩ Lin. —— Pot, CP, w/Push-Mom Sw., DPST, 1-open, 1-closed contacts, PC pins		311-2068-00	3.00	Gene Single, 5302
Clarostat Mfg.	——	Panel Control, 50 KΩ Lin. —— Pot, CP, w/Rot. Sw., SPDT, w/Push-Mom Sw., DPST, 1-open/1-closed contacts, PC pins		311-2069-00	4.50	Gene Single, 5302

New responsibilities in CE

Dennis Johnson, Electromechanical Component Engineering, is now handling the evaluation of fuses, power cords, solenoids, keycaps and membrane switches. Joe Joncas continues to handle mechanical and solid state switches, thermo switches and meters.

As part of his new responsibilities, Dennis is assessing the cause of an unnecessarily high failure rate on low-current fuses (particularly the 159-0074-00, a 1/16 ampere, normal blow fuse). In recent tests, 1% of the sample opened up, simply due to temperature cycling. These units were manufactured by Littelfuse. Bussman fuses will be compared in the future, with the possibility that Bussman may be designated as prime source for the parts.

You can contact Dennis on ext. 5953 if you have questions about the above-mentioned components. Joe Joncas can be reached on ext. 6365. Both Dennis and Joe report to Bob Aguirre.

Component/ Engineer/ Buyer listing

Component/ Commodity	Component Evaluation Engineer	Manufacturing Eng. Component Support	Engineering Buyer	#	Production Buyer	#
Adapters	Bill Stadelman 7711	Emerson Beer 5034	Harry Wilson 7779	47	Karel Strand 7919	05
Aluminum bar, sheet tubing	Rod Christiansen 5953	Frank Javorsky 6391	Cal Bjerke 6603	06	Cal Bjerke 6603	06
Batteries	Byron Witt 5417	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
Blades, cutter	———	Frank Javorsky 6391	Dick Tollisen 7911	10	Ed Holszchuh 2-2258	35
Boards, etched circuit	———	Neill Martin 7642	———		Anita Wright 7814	37
Bobbins	———	Emerson Beer 5034	Dave Lemas 7931	42	Lloyd Davidson 6195	19
Brass	Rod Christiansen 5953	Frank Javorsky 6391	Cal Bjerke 6603	06	Cal Bjerke 6603	06
Bulbs	Peter Butler 5417	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
Bushings	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Cables	Rod Christiansen 5953	Emerson Beer 5034	Dave Elle 6059	46	Bill Wendt 7844	08
Cable Assembly	Rod Christiansen 5953	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
Cameras & accessories	———	Emerson Beer 5034	Bill Wendt 7844	08	Bill Wendt 7844	08
Cans & boxes	———	Frank Javorsky 6391	Dave Elle 6059	46	Lloyd Davidson 6195	19
Capacitors						
ceramic, high-voltage,mica	Harry Ford 6520	Harry Tanielian 6405	Dave Lemas 7931	42	Ron Wetzler 7172	12
electrolytic, film	Don Anderson 5415	↓	↓		↓	
variable	Alan LaValle 5415					
Casters	Peter Butler 5417	Frank Javorsky 6391	Dave Elle 6059	46	Lloyd Davidson 6195	19
Ceramic raw materials	———	Delano Dalesky 5037	Bill Hart 5376	20	Bill Hart 5376	20
Chemicals	(Chet Schink 5278)	(Chet Schink 5278)	Bill Hart 5376	20	Bill Hart 5376	20
Circuit breakers	Joe Joncas 6365	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
Clamps, clips	Rod Christiansen 5953	Emerson Beer 5034	Dave Elle 6059	46	Russ McKichan 7922	24
Coils, fixed & variable	Harry Ford 6520	Emerson Beer 5034	Dave Lemas 7931	42	Glenn Ross 7915	31
Coil forms	———	Emerson Beer 5034	Dave Lemas 7931	42	Lloyd Davidson 6195	19
Computers	———	———	Jim Seed 1161	25	Jim Seed 1161	25
Connectors	Peter Butler 5417	Emerson Beer 5034	Harry Wilson 7779	47	Karel Strand 7919	05
Copper	Rod Christiansen 5953	Frank Javorsky 6391	Cal Bjerke 6603	06	Cal Bjerke 6603	06
Cords, facing	Rod Christiansen 5953	Vince Bail 5036	Dave Elle 6059	46	Lloyd Davidson 6195	19
Cords, power	Joe Joncas 6365	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
Cores, ferrite	Byron Witt 5417	Emerson Beer 5034	Dave Lemas 7931	42	Lloyd Davidson 6195	19
Couplings	———	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Covers, caps	———	Frank Javorsky 6391	Dave Elle 6059	46	Lloyd Davidson 6195	19
Crystals	Byron Witt 5417	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
CRT materials	———	Delano Dalesky 5037	Mel Swire 7571	07	Mel Swire 7571	07
Deflection yoke	Harry Ford 6520	Delano Dalesky 5037	Harry Wilson 7779	47	Ed Holzschuh 2-2258	35
Delay lines	Byron Witt 5417	———	Harry Wilson 7779	47	Glenn Ross 7915	31
Die castings	———	Frank Javorsky 6391	Dave Elle 6059	46	Lloyd Davidson 6195	19
Diodes						
IR emitter, laser diode	Louis Mahn 6389	Dennis Crop 6402	Dave Lemas 7931	42	Ken Stucki 7923	38
visible LEDs	Betty Anderson 6389	↓	↓		↓	
all others	Gary Sargeant 5345					
Electronic cabinets, enclosures	———	Frank Javorsky 6391	Jim Seed 1161	25	Jim Seed 1161	25
Etched circuits	———	Neill Martin 7642	Ed Kolb 7814	36	Anita Wright 7814	37
Eyelets	Rod Christiansen 5953	Emerson Beer 5034	Dave Elle 6059	46	Russ McKichan 7922	24
Fans & blowers	Bill Stadelman 7711	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
Fasteners	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Ferrite cores	Byron Witt 5417	Emerson Beer 5034	Dave Lemas 7931	42	Lloyd Davidson 6195	19
Fiber optics	Louis Mahn 6389	———	Harry Wilson 7779	47	———	
Film	———	———	———		Don Adams 6695	04

continued

Component/ Commodity	Component Evaluation Engineer	Manufacturing Eng. Component Support	Engineering Buyer	#	Production Buyer	#
Filters						
air	Bill Stadelman 7711	———	Dave Elle 6059	46	Russ McKichan 7922	24
light	Jim Deer 7711	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
line	Joe Joncas 6365	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
Foam	———	Frank Javorsky 6391	Lloyd Davidson 7127	19	Lloyd Davidson 6195	19
Fuses & fuseholders	Joe Joncas 6365	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
Gaskets	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Glass items	———	———	Mel Swire 7571	07	Mel Swire 7571	07
Glides, slides, casters	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Lloyd Davidson 6195	19
Grommets	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Handles	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Hardware	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	———	
					Russ McKichan 7922	24
Heat sinks	Jim Williamson 5345	Dennis Crop 6402	Dave Elle 6059	46	Russ McKichan 7922	24
High-voltage multipliers	Gary Sargeant 5345	Dennis Crop 6402	George Roussos 7927	09	Ken Stucki 7923	38
Holders	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	———	
					Russ McKichan 7922	24
Housings	———	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Hybrid, raw material	———	Paul Lamer 5276	Paul Tripp 5449	23	Paul Tripp 5449	23
Implosion shields	———	Frank Javorsky 6391	Ed Holszshuh 2-2258	35	Ed Holszshuh 2-2258	35
					Lloyd Davidson 6195	19
Inductors	Byron Witt 5417	Emerson Beer 5034	Dave Lemas 7931	42	Glenn Ross 7915	31
Instruments, test	———	———	Art Peterson 7913	13	Art Peterson 7913	13
Inserts, knob	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Integrated circuits						
A/D converters	Chris Martinez 7709					
bubble memory devices	Brad Benson 6302					
CCD - analog	John Hereford 6700					
CCD - digital	Bob Goetz 6302					
CMOS devices	Wilton Hart 7607					
communications	Matt Porter 7461					
comparators	John Hereford 6700					
D/A converters	Don Gladden 6700					
digital semidonductor storage	Eric Peterson 6302					
digital voltmeters	Chris Martinez 7709					
EAPROMs, EPROMs	Bob Goetz 6302	↑	↑		↑	
ECL devices	Don Van Beek 5414					
FPLAs, PLAs	Carl Teale 7148	Paul Lamer 5276	George Roussos 7927	09	Ken Stucki 7923	38
hi-frequency special purpose	Jerry Willard 7461					
hi-speed logic	Don Van Beek 5414	↓	↓		↓	
linear devices	Don Gladden 6700					
low-power Schottky TTL	Ernie Estrada 7148					
MOS (general)	Bill Pfeifer 6303					
operational amplifiers	John Hereford 6700					
regulators, linear	Chris Martinez 7709					
switching	Jim Williamson 5345					
RAMs, dynamic	Bob Goetz 6302					
static	John Carlson 6003					
ROMs	Gene Stout 6003					
Schottky TTL	Don Van Beek 5414					
TTL devices	Ernie Estrada 7148					
Keyboards	Jim Deer 7711	Delano Dalesky 5037	Ed Holszshuh 2-2258	35	Ed Holszshuh 2-2258	35
Knobs	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24

continued

Component/ Commodity	Component Evaluation Engineer	Manufacturing Eng. Component Support	Engineering Buyer	#	Production Buyer	#
Labels	Rod Christiansen 5953	Frank Javorsky 6391	Sharon Webb 7912	33	Russ McKichan 7922	24
Lamps	Peter Butler 5417	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
LEDs	Louis Mahn 6389	Dennis Crop 6402	George Roussos 7927	09	Ken Stucki 7923	38
Memories	Bob Goetz 6302	Paul Lamer 5276	George Roussos 7927	09	Ken Stucki 7923	38
Metals	Rod Christiansen 5953	Frank Javorsky 6391	Cal Bjerke 6603	06	Cal Bjerke 6603	06
Meters, meter parts	Joe Joncas 6365	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
Microcircuits	see integrated circuits	Paul Lamer 5276	George Roussos 7927	09	Ken Stucki 7923	38
Microprocessors						
bit-slice microprocessors	Carl Teale 7148	Paul Lamer 5276	George Roussos 7927	09	Ken Stucki 7923	38
peripherals and interfaces	Bill Pfeifer 6303	↓	↓		↓	
Z80, 8080, 8085	Wilton Hart 7607					
Motors & generators	Bill Stadelman 7711	Vince Bail 5036	Harry Wilson 7779	47	Bill Wendt 7844	44
Mounts	Bill Stadelman 7711	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Nuts	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Optical components (lenses)	Louis Mahn 6389	Emerson Beer 5034	Bill Wendt 7844	08	Bill Wendt 7844	44
Oscillators	Byron Witt 5417	Vince Bail 5036	Harry Wilson 7779	47	Ed Zilk 6355	16
Packaging material	(Lane Gossett 6585)	Lee Crocker 7383	———		Glenn Johnson 7128	01
Paints, vinyl	Rod Christiansen 5953	———	Bill Hart 5378	20	Lloyd Davidson 6195	19
Phosphor bronze	———	Frank Javorsky 6391	Cal Bjerke 6603	06	Cal Bjerke 6603	06
Plastic, copper clad laminating	Rod Christiansen 5953	Neill Martin 7642	Lloyd Davidson 6195	19	Lloyd Davidson 6195	19
Plastic, insulating tubing	Rod Christiansen 5053	Emerson Beer 5034	Dave Elle 6059	46	Lloyd Davidson 6195	19
Plastic, resins & hardeners	Rod Christiansen 5953	Frank Javorsky 6391	Paul Tripp 5449	23	Paul Tripp 5449	23
Plastic film, sheet strip	Rod Christiansen 5953	Frank Javorsky 6391	Lloyd Davidson 6196	19	Lloyd Davidson 6195	19
Plugs	Peter Butler 5417	Emerson Beer 5034	Harry Wilson 7779	47	Karel Strand 7919	05
Potentiometers	Gene Single 5302	Ken Nordling 6938	Dave Lemas 7931	42	Walter Sonksen 7917	03
Power cords	Joe Joncas 6365	Vince Bail 5036	Harry Wilson 7779	47	Glenn Ross 7915	31
Power supplies	———	Vince Bail 5036	Harry Wilson 7779	47	Harriet Frank 7917	03
Precious metals	Rod Christiansen 5953	Frank Javorsky 6391	Bill Hart 5376	20	Bill Hart 5376	29
Punches, tape	———	———	———		Ed Holszshuh 2-2258	35
Relays	Paul Johnson 6365	Vince Bail 5036	Harry Wilson 7779	47	Bill Wendt 7844	44
Resistors, deposited & molded cardon	Ray Powell 6520	Ken Nordling 6938	Sharon Webb 7912	33	Dave Elliott 7916	28
Resistors, metal film	Ray Powell 6520	Ken Nordling 6938	Sharon Webb 7912	33	Dave Elliott 7916	28
Resistors, wirewound	Ray Powell 6520	Ken Nordling 6938	Sharon Webb 7912	33	Dave Elliott 7916	28
Rings, O & retaining	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Lloyd Davidson 6195	19
Rivets	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Rubber	Rod Christiansen 5953	Frank Javorsky 6391	Cal Bjerke 6603	06	Cal Bjerke 6603	06
Screws	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Shields	Harry Ford 6520	Frank Javorsky 6391	Dave Elle 6059	46	Cal Bjerke 6603	06
Shock mounts	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Silicone	Rod Christiansen 5953	Frank Javorsky 6391	Lloyd Davidson 6195	19	Lloyd Davidson 6195	19
Silicon wafers	Rod Christiansen 5953	Paul Lamer 5276	Paul Tripp 5449	23	Paul Tripp 5449	23
Sintered metal parts	Rod Christiansen 5953	Vince Bail 5036	Dave Elle 6059	46	Lloyd Davidson 6195	19
Sleeves	Peter Butler 5417	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Sockets						
crystal	Byron Witt 5417	Emerson Beer 5034	Harry Wilson 7779	47	Karel Strand 7919	05
all others	Peter Butler 5417	Emerson Beer 5034	Harry Wilson 7779	47	Karel Strand 7919	05

continued

Component/ Commodity	Component Evaluation Engineer	Manufacturing Eng. Component Support	Engineering Buyer	#	Production Buyer	#
Solder	———	Neill Martin 7642	Cal Bjerke 6603	06	Cal Bjerke 6603	06
Sony, Sony Tek	———	Delano Dalesky 5037	Harry Wilson 7779	47	Bill Wendt 7844	44
Spacers	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Stainless steel & steel	Rod Christiansen 5953	Frank Javorsky 6391	Cal Bjerke 6603	06	Cal Bjerke 6603	06
Stops	Rod Christiansen 5953	Frank Javorsky 6391	Mel Swire 7571	07	Mel Swire 7571	07
Straps	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Studs	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Switches						
general, solid state	Joe Joncas 6365	Neill Martin 7642	Harry Wilson 7779	47	Glenn Ross 7915	31
reed	Paul Johnson 6365	———	———		Glenn Ross 7915	31
Tape, magnetic	———	———	Ed Holszshuh 2-2258	35	Ed Holszshuh 2-2258	35
Tapes, insulating	———	———	Glenn Johnson 7128	01	Lloyd Davidson 6195	19
Terminal pins	Peter Butler 5417	Emerson Beer 5034	Dave Elle 6059	46	Karel Strand 7919	05
Test equipment	———	———	Art Peterson 7913	13	Art Peterson 7913	13
Tooling dies & patterns	———	Frank Javorsky 6391	Rex Gedney 7125	30	Rex Gedney 7125	30
Transformers	Byron Witt 5417	Emerson Beer 5034	Dave Lemas 7931	42	Glenn Ross 7915	31
power	Bill Stadelman 7711	———	———		———	
Transistors						
field-effect	Jerry Willard 7461	Dennis Crop 6402	Dave Lemas 7931	42	Ken Stucki 7923	38
phototransistors	Louis Mahn 6389	↓	↓		↓	
power	Jim Williamson 5345					
small signal, arrays	Matt Porter 7461					
triacs, unijunctions	Paul Johnson 6365					
Triacs	Paul Johnson 6365	Dennis Crop 6402	George Roussos 7927	09	Ken Stucki 7923	38
Tubes, vacuum	(LeMoyne Warner 7914)	Dennis Crop 6402	George Roussos 7927	09	Bill Wendt 7844	44
Tubing, plastic insulating	Rod Christiansen 5953	Emerson Beer 5034	Dave Elle 6059	46	Lloyd Davidson 6195	19
Washers	Rod Christiansen 5953	Frank Javorsky 6391	Dave Elle 6059	46	Russ McKichan 7922	24
Wheels	———	Frank Javorsky 6391	Dave Elle 6059	46	Lloyd Davidson 6195	19
Wire	Rod Christiansen 5953	Emerson Beer 5034	Dave Elle 6059	46	Bill Wendt 7644	08

component news

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