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Acceptable Parts List

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This report contains a list of electronic common parts which are recommended for application in ALSEP equipment. The principle factors in listing these parts is the reliability and availability status. Recommended stress levels are indicated.

- A. Introduction
- B. Order of Preference
- C. Recommendations on Derating
- D. Use of Component Selection Request (CSR)

ATTACHMENTS: (I) Acceptable Parts List

- 1. Capacitors
- 2. Resistors
- 3. Diodes
- 4. Transistors
- 5. Connectors
- 6. Relays
- 7. Transformers
- 8. Integrated Circuit
- 9. Misc Electronic Components
- 10. Mechanical Parts

(II) Parts Data Sheets:

NOTE: Detailed information for these parts as well as general application factors are contained in BSC 42275 "Parts Application and Reliability Bulletin" Vols. I & II.

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**A: Introduction:**

In selecting parts for ALSEP equipment, principle emphasis is to be given to those types of parts which have documented reliability history. This emphasis is needed because the stringent reliability goal and the compressed schedule will not allow a reliability determination to be made at the piece-part level.

Established Reliability (E.R.) parts have been documented under Minuteman specifications (North American Aviation (NAA) purchase documents or more recently a series of MIL specs, MIL-R-38100) and subsequently certain tri-service coordinated MIL specs (generally in the MIL-X-39000 series) as shown on Table I. Bendix experience has indicated that the MIL-R-38100 series which was an "interim" series did not receive enough industry support and is now being phased out.

Additional high-reliability parts and devices, produced for various DOD and NASA programs have been described by NASA (Marshall Space Flight Center (MSFC), Jet Propulsion Lab (JPL) and others) documents and are sometimes more applicable and/or available than the 39000 series parts or NAA spec parts.

Many of the vendors furnishing parts to various DOD and NASA programs have developed their own means of characterising hi-rel products, which may then be furnished to several customers. Motorola's "Meg-a-Life," Fairchild's "FACT" program and Raytheon's "X-L" series are examples of this.

It is to be noted that the end-result of many of these hi-rel programs is to sort out a premium product from a well-controlled product line having adequate yields and a well-established market. It has been shown that the market for hi-rel products cannot support a completely distinct production facility. While this furnishes an economical solution to hi-rel product availability, it creates a concern that the supplier may have established a number of grades with subtle differences in reliability potential.

**B: Order of Preference:**

Notwithstanding the subtle differences in reliability potential, the following order of preference has been established:

Ref Desig	PART TYPE	ER Spec. No Mil-(-)-	Failure Rate %/KHR	Conf Level %	Accel Factor (1)	Requal for FR			Interval Level			GP A Lot Limit	Size Limit	GP B Life Test Time	Qty	Disp GP B SAMPLES	Conditioning Tests (100% of Lot)			Extended Life Tests	
						L	M	P	R	S	T						Time Hrs	% Stress	Temp °C	Time Hrs	% Drift
	Capacitors					5	1	1	01	001	0001										
CYR	Glass	23269A	1.0-.001	90	A	-	3	6	9	12		5%	N.S.	250	A	N.D.	50	1500V	+25	30K (4)	2%
CMR	Mica	39001	1.0-.0001	90	B	-	3	6	9	12	24	8%	1 wk	250	A	N.D.	48	1000V	+125	50K (5)	1%
CSR	Tantalum, solid	39003	5.0-.001	60	-	3	3	6	9	12		5%	1 wk	250 (8)	A	D.	40 (6)	100%	+85	10K	10%
CLR	" non-solid	39006	5.0-.001	60	-	3	3	6	9	12		5%	1 wk	250	A	D.	24-100	Surge V	+125	10K	25% (10)
CPV	Paper (-plastic)	44157D	5.0-.001	90	C	3	3	6	9	12		5%	N.S.	250	E	N.D.	15 sec (12)	200%	+15-35	6K	init. tol.
CZR	Feedthrough	39001	5.0-.001	90	C	(1)	6	9	12	15		5%	1 mo	250	B	N.D.	1 sec	250%	+25	10K (5)	5%
CKR	Ceramic, G.P.	39014	1.0-.001	90	D		3	6	9	12		2%	1 wk	250	A	D.	100	200%	Max R.	32K (7)	20%
CHR	Paper-P Metal	39022	5.0-.001	90	C	3	3	6	9	12		8%	1 mo	250	A	N.D.	5 Cyc	Max Temp M202/102D	10K (5)	10%	
LTR	Coil, R.F.	39010	1.0-.001	60	-	-	3	6	9	12		5%	N.S.	250 (8)	A	N.D.	7.5 (Cyc)	0	-65,+125	10K	init. tol.
RS	Connector, P.W.B.	23353	5.0-.001	60	-	4	6	10	12	18		N.S.	N.S.	1000 (8)	G	N.D.	(None)			10K	ARc<50%
CR	Crystal Unit, quartz	39020	5.0-.01	60	-	3	6	9	12			N.S.	N.S.	500	C	D.	500	0	+85	5K	Indiv. Spec.
*	Relay	39016	1.0-.01 (11)			(1)	6	24	-			10%	1 wk	100K ops	D	N.D.	2500 ops x 2	Rated Load	Min R, Max R	100K ops	Rc<2x
	*MS39016/()																				
	Resistors, fixed																				
RNR	Film	55182B	1.0-.001	60	-	-	3	6	9	12		1%	1 mo	2000 (13)	A	N.S.	1 (6)	500% 400%	20-45	10K	2%
RBR	W.W. accurate	39005	"	"	-	-	3	6	9	12		5%	1 mo	250	A	N.D.	100	100%	+125	10K	1%
RWR	W.W. power	39007	"	"	-	-	3	6	9	12		5%	1 mo	250 (9)	A	N.D.	100	100%	+25	10K	1.5%
RCR	Composition, 5%	39008	"	"	-	-	3	6	9	12		5%	1 wk	250 (9)	A	N.D.	None (Meas. Res.)	100%		10K	15%
RER	W.W. pwr, chas.	39009	"	"	-	-	6	9	12	15		5%	1 mo	250 (9)	B	N.D.	96	100%	+25	10K	2%
RLR	Film, insul.	39017	"	"	-	-	3	6	9	12		2%	1 mo	250 (9)	A	N.D.	24	150%	+25	10K	4%
RTR	Resistor, var, ww	39015	"	"	-	-	6	9	12	15		10%	1 mo	250 (9)	F	N.D.	96	1W	+25	10K	3%
TFR	Transformers, inductors	39013	5.0-.01	60	-	3	6	9	12	-		5%	N.S.	250 (8)	C	D.	None	-	-	10K	±50% elec
TPR	Transformers, pulse	39026	5.0-.01	60	-	3	6	9	12	-		N.S.	-	250 (8)	C	D.	1 min (AQL)	200%	+25	10K	Δ<50%
																		(25-50%DF)			
ABBREVIATIONS: I.N.A. - INFORMATION NOT AVAILABLE ops = operations																					
		K = 1.000	N.S. = Not Specified																		
NOTES:																					
(1) Acceleration factor		(1) is lot-by-lot qualification																			
Tested at Max Rated Temp		(3) (N.D.) D means samples are deliverable																			
Code Ratio		(4) 6K hrs at accelerated conditions																			
% Stress		(5) 2K " " "																			
A	5:1	150	(6) also requires temp. cycling and X-ray inspection																		
B	2.5:1	150	(7) 4K hrs at accelerated conditions																		
C	5:1	140	(8) Group C Life Tests																		
D	8:1	200	(9) Cycled 1-1/2 hr "on", 1/2 hr "off"																		
E			(10) Except 16 (#10, -60%) and 110 (#20%)																		
			(11) Per 10,000 operations																		
			(12) Also requires seal test & X-ray inspection																		
			(13) Lot can be accepted at 250 hours																		

Table I - Summary of Selected Features of "FR" Specifications



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1. NAA spec parts (and MIL-R-38100)
2. MSFC parts, JPL parts
3. ER series specs (and MIL-S-19500 TX series)
4. Industry Hi-Rel, (Mega-Life; FACT, etc.)
5. MIL-spec with added burn-in and screening

The order above coorelates inversely with the delivery cycle expected being longer with the first items in the list, and it is noted that it may be necessary to waive some of the longer duration tests or the time-consuming procedures (such as in-process detail visual inspection called out on MSFC specs or group "B" and "C" test of NAA or ER specs) in order to expedite delivery. None of the Group "A" (100% tests) shall be waived. It is recommended that before deleting a preferred item, consideration be given to granting waivers rather than accepting a product to a lower-rated spec, because of the risk of accepting parts rejected from the preferred category.

C: Recommendations on Derating:

The stress levels tabulated indicate a maximum upper limit for the majority of applications based on 100% duty cycle. These are summarized in the table below:

Capacitors

Ceramic	50% Voltage
Mica	" "
Paper/Plastic	" "
Electrolytic, wet	80% "
" solid	40% "

Resistors

Film	50% Power
Wirewound	" "

Diodes, silicon

50% Voltage, 50% current  
(Max.  $T_J$  140°C)

Transistors, silicon

50% Voltage, 50% current  
(Max.  $T_J$  140°C)

Transformers & Coils

15°C rise

The derating shall be computed after recommended operating temperature derating has been made.





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D: Use of Component Selection Request (C.S.R.):

For circuit requirements which cannot be met using Acceptable Parts, within the recommended derating limits, the detail part requirements should be entered on a C.S.R. in accordance with BxS Division Procedure 2.205 and submitted to the Parts and Materials Group.

BxS subcontractor's needs which cannot be met using parts from this list will require a non-standard part approval request as stated in App. G, Par. 3.12.2 of their work statement and submitted to BxS Parts & Materials Group for approval.

## ACCEPTABLE PARTS LISTS - (1) CAPACITORS, ESTABLISHED RELIABILITY

Issue: A 3/24/66

No.	Description	Mil-C	Slash No.	Style	Voltage	Temp. °C	Value Min	Range Max.	% Tol.	Derating % of Rated	Vendor (Q-QPL)
1.1	Capacitors, Fixed: Glass Dielectric	23269A	1	CYR10	500	125	5μmf	150μmf	+5	50	Corning
			1	"	300	"	180μmf	220μmf	"	"	"
1.2	Mica Dielectric	39001	1	CMR01	300	125	5μmf	160μmf	+5	50	Elmenco
			2	CMR02	300	"	180μmf	5100μmf	"	"	"
			3	CMR03	300	"	5600μmf	02μf	"	"	"
1.3	Tantalum, Solid Diel. (Polarized)	39003	1	CSR13	6-100	85	.56/100V	6.8/6V	+10	60	Kemet
			1	"	"	"	2.7/100V	56/6V	"	"	"
			1	"	6-75	"	10/75V	180/6V	"	"	"
			1	"	"	"	15/75V	330/6V	"	"	"
1.4	Tantalum, Non-solid (Polarized) (Etched Foil)	39006	1	CLR25	10-100	125	1/100V	15/10V		75	Sprague
			1	(Max.	"	"	4/100V	60/10V	-15	"	"
			1	case	"	"	13/100V	200/10V	+30	"	"
			1	sizes)	"	"	25/100V	400/10V		"	"
			1	"	"	"	36/100V	580/10V		"	"
	Tantalum, Non-solid (Non-polarized) (Etched Foil)	39006	2	CLR27	10-100	125	.5/100V	10/10V	-15	"	"
			2	(Max.	"	"	2/100V	40/10V	+30	"	"
			2	case	"	"	6/100V	120/10V		"	"
			2	sizes)	"	"	12/100V	250/10V		"	"
			2	"	"	"	18/100V	350/10V		"	"
	Tantalum, Non-solid (Polarized) (Plain Foil)	39006	3	CLR35	10-300	"	15/300V	4.5/10V	+20	"	"
			3	"	"	"	.6/300V	18/10V	"	"	"
			3	"	"	"	2/300V	55/10V	"	"	"
			3	"	"	"	4/300V	110/10V	"	"	"
			3	"	"	"	6/300V	160/10V	"	"	"
1.5	Ceramic Dielectric	39014	1	CKR05	200V	+150	10μmf	1000μmf	+10	60	Erie or Aerovox
			2	CKR06	"	"	1200μmf	0.1μf	"	"	
			5	CKR12	50V	+125	10μmf	10Kμmf	"	50	
			6	CKR13	"	"	15Kμmf	0.1μf	"	"	
1.6	Paper/(-plastic)	14157	2	CPV09		125			+5	50	Sprague

## ACCEPTABLE PARTS LIST - (2) RESISTORS, ESTABLISHED RELIABILITY

Issue: A 3/24/66

No.	Type	Spec. No. Mil-R	Slash No.	Style	Size (Nom)		Power Rating Watts	°C Temp.	Resistance		%	Derating % of Rated Power	Vendor (Q) QPL
					Length	Dia.			Min.	Max.			
2.1	Metal Film	55182	1	RNR55C	.250	.109	.100	125	49.9	.1 Meg	1	50	IRC, Mepco
	" "	"	2	RNR57C	.281	.155	.125	125	10	.2 Meg	1	50	" "
	" "	"	5	RNR65C	.625	.188	.250	125	49.9	1.0 Meg	1	50	" "
	" "	"	6	RNR70C	.750	.250	.500	125	24.9	1.0 Meg	1	50	" "
2.2	Film	38102	21	21ER--	.235	.107	.125	70	51	150K	2	50	Corning
2.3	Wire Wound; Power	39007	3	RWR69	.5	.187	2.5	25	1	3570	1	40	Dale
	" " "	"	4	RWR70	.406	.093	1	25	1	1210	1	40	"
	" " "	"	5	RWR71	.812	.187	2	25	1	6040	1	60	"
2.4	W.W. Power, Chassis Mounted	39009	1	RER65	1.375X	.406X	10	25	0.1	5.62K	1	50	Dale
2.5	Composition	39008	1	RCR07	.250	.090	.250	70	10 Meg	1 Meg	5	40	IRC
	"	"	2	RCR20	.375	.138	.500	70	10	1 Meg	5	40	IRC
2.6	W.W. Accurate	39005	1	RBR52	1.0	.375	.500	125	0.1	.806 Meg	0.1	50	Aerovox
	" " "	"	3	RBR54	.750	.250	.250	125	0.1	.255 Meg	0.1	50	"
	" " "	"	4	RBR55	.500	.250	.150	125	0.1	.150 Meg	0.1	50	"



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## (3) Diodes

## Classification of Diodes

- A. Diodes are listed in numerical order by JEDEC designation (type no.).
- B. The types of diodes indicated in column 2 are:
1. General Purpose
  2. Reference (zener)
  3. Switching
  4. Rectifier
  5. Silicon Controlled Rectifiers
  6. Microwave
  - 7.
  8. Miscellaneous
- C. Hi-rel categories
1. NAA North American Aviation  
Purchase documents (Minuteman Program) also described in MIL-S-38103
  2. MSFC Marshall Space Flight Center  
Preferred Parts List MSFC-PPD-600
  3. TX MIL-S-19500 devices containing added process conditioning (100% basis)
  4. JPL Jet Propulsion Laboratory Preferred Parts List  
ZPP-2061-PPL
  5. FSC Fairchild Semiconductor devices in FACT-II Component Test Program
  6. MOTA Motorola Meg-A-Life device
  7. RCA Radio Corp. of America High Reliability types - assigned 5 digit type numbers
  8. GE General Electric High Reliability devices - assigned 4JA-- numbers
  9. LEM Lunar Excursion Module. Preferred Parts tabulated by Apollo Information Center (APIC)



# ACCEPTABLE PARTS LIST 3 DIODES

NUMERICAL LISTING OF HI-REL DIODES	TYP E	N A	M S F C	T X	J P L C	F S C	M O T A	R C A	G E	L E M	7 0 1 E	PEAK INV. PIV VOLT	MAX OUT PUT I DC T AMPS	MAX REV CUR I R MA	FWD VOLTR DROP 25C	POWER 25C W	ZEN VOLTAGE		ZEN I M D	STR C	CASE UCT STYL U R E E
																	MIN	MAX			
																	VOLT	VOLT			
1N 21WE	6										X										
1N 21WEM	6										X										
1N 21WEMR	6										X										
1N 26	6										X										
1N 26B	6										X										
1N 31	6										X										
1N 32	6										X										
1N 53	6										X										
1N 78	6										X										
1N 78C	6										X										
1N 82A	8										X										
1N 93A	4										X										
1N 249B	4										X										
1N 250	4										X										
1N 277	1										X										
1N 483B	1										X										
1N 485	1				X																
1N 485B	1										X										
1N 486B	1										X										
1N 540	4	X							X												
1N 547	4		X																		
1N 560	4										X										
1N 561	4										X										
1N 626	3		X																		
1N 645	4	X	X								X										
1N 647	4									X	X										
1N 647A	4									X	X										
1N 649	4		X		X				X		X										
1N 658	3									X											
1N 691	3										X										
1N 697	3										X										
1N 746A	2		X	X	X		X				X										
1N 747A	2			X	X		X				X										
1N 748A	2			X	X		X				X										
1N 749A	2			X	X		X				X										
1N 750A	2		X	X	X		X			X	X										
1N 751A	2		X	X	X		X				X										
1N 752A	2		X	X	X		X				X										
1N 753A	2	X	X	X	X		X			X	X										
1N 754A	2		X	X	X		X				X										
1N 755A	2		X	X	X		X				X										
1N 756A	2		X	X	X		X			X	X										
1N 757A	2		X	X	X		X				X										
1N 758A	2		X	X	X		X			X	X										
1N 759A	2	X	X	X	X																
1N 761A	2		X																		

# ACCEPTABLE PARTS LIST 3 DIODES

NUMERICAL LISTING HI-REL DIODES	T OF P F	N A F	M S F C	T X	J P C	F S C	M O T A	R C A	G E	L E M	7 0 1 E	PEAK INV. VOLT PIV	MAX OUT PUT I DC TAMPS	MAX REV CUR I R MA	FWD VOLTR DROP 25C	POWER 25C	ZENER VOLTAGE MIN MAX	ZEN IMDSTR CASE UCTSTYL KEE
1N 762A	2		X															
1N 763A	2		X															
1N 764A	2		X															
1N 765A	2		X															
1N 766A	2		X															
1N 767A	2		X															
1N 768A	2		X															
1N 769A	2		X															
1N 793	3		X															
1N 816W	1	X									X							
1N 821	1	X					X				X							
1N 823	1						X				X							
1N 825	1						X				X							
1N 827	1	X					X				X							
1N 827A	1				X													
1N 829	2						X											
1N 83CA	8										X							
1N 914	3			X						X	X							
1N 916B	3		X															
1N 933	3										X							
1N 935B	2	X									X							
1N 937B	2										X							
1N 938B	2										X							
1N 939B	2										X							
1N 941B	2										X							
1N 943B	2										X							
1N 944B	2										X							
1N 945B	2		X								X							
1N 962B	2						X				X							
1N 963B	2						X			X	X							
1N 964B	2				X		X			X	X							
1N 965B	2		X		X		X			X	X							
1N 966B	2				X		X			X	X							
1N 967B	2		X		X		X			X	X							
1N 968B	2				X		X			X	X							
1N 969B	2				X		X			X	X							
1N 970B	2				X		X			X	X							
1N 971B	2				X		X			X	X							
1N 972B	2				X		X			X	X							
1N 973B	2				X		X			X	X							
1N 974B	2				X		X			X	X							
1N 975B	2				X		X			X	X							
1N 976B	2				X		X			X	X							
1N 977B	2				X		X			X	X							
1N 978B	2				X		X			X	X							
1N 979B	2				X		X			X	X							

## ACCEPTABLE PARTS LIST 3 DIODES

NUMERICAL LISTING OF HI-REL DIODES	T OF P E	N A A	M S F C	I X	J P L	F S C	M O T A	R C A	G E	L E M	7 0 1 E	PEAK INV. VOLT PIV	MAX OUT PUT I DC AMPS	MAX REV CUR I R MA	FWD VOLTR DROP 25C	POWER 25C W	ZENER VOLTAGE MIN	ZENER VOLTAGE MAX	ZEN IND	INDSTR UCT URE	CASE STYL
1N 980B	2				X		X				X										
1N 981B	2				X		X				X										
1N 982B	2				X		X				X										
1N 983B	2				X		X				X										
1N 984B	2				X		X				X										
1N 985B	2				X						X										
1N 986B	2				X						X										
1N 987B	2										X										
1N 988B	2										X										
1N 989B	2										X										
1N 990B	2										X										
1N 991B	2										X										
1N 992B	2										X										
1N 995	3										X										
1N1124A	4										X										
1N1126A	4									X	X										
1N1128A	4										X										
1N1130	4										X										
1N1131	4										X										
1N1147	4										X										
1N1149	4										X										
1N1186	4										X										
1N1180	4										X										
1N1189	4		X								X										
1N1190	4										X										
1N1198A	4										X										
1N1202	4								X		X										
1N1204	4								X	X	X										
1N1204A	4	X	X								X										
1N1206	4								X		X										
1N1614	4										X										
1N1615	4										X										
1N1616	4		X								X										
1N1672	4	X									X										
1N1731A	4										X										
1N1733A	4										X										
1N1734A	4										X										
1N1766A	2	X									X										
1N1235A	4	X									X										
1N2156	4								X		X										
1N2158	4								X		X										
1N2160	4								X		X										
1N2175A	8										X										
1N2623A	2				X																

# ACCEPTABLE PARTS LIST 3 DIODES

NUMERICAL LISTING OF HI-REL DIODES	T P E	N A F C	M S F C	T X	J P L	F S C	M O T A	R C A	G E M	L E M	7 E M	PEAK INV. VOLT PIV	MAX OUT PUT I DC AMPS	MAX REV CUR I R MA	FWD VOLT DROP 25C	POWE 25C	ZENER VOLTAGE MIN VOLT	ZEN MAX VOLT	IMD VOLT	STR UCT URE	CASE STYL OHM
1N2790	2										X										
1N2804B	2						X					X									
1N2805B	2						X					X									
1N2806B	2						X					X									
1N2807B	2						X					X									
1N2808B	2						X					X									
1N2809B	2						X					X									
1N2810B	2						X					X									
1N2811B	2						X					X									
1N2812B	2						X					X									
1N2813B							X					X									
1N2814B	2						X					X									
1N2815B	2						X					X									
1N2816B	2						X					X									
1N2817B	2						X					X									
1N2818B	2						X					X									
1N2819B	2						X					X									
1N2820B	2						X					X									
1N2821B	2						X					X									
1N2822B	2						X					X									
1N2823B	2						X					X									
1N2824B	2						X					X									
1N2825B	2						X					X									
1N2826B	2						X					X									
1N2827B	2						X					X									
1N2828B	2						X					X									
1N2829B	2						X					X									
1N2830B	2						X					X									
1N2831B	2						X					X									
1N2832B	2						X					X									
1N2833B	2						X					X									
1N2834B	2						X					X									
1N2835B	2						X					X									
1N2836B	2						X					X									
1N2837B	2						X					X									
1N2838B	2						X					X									
1N2839B	2						X					X									
1N2840B	2						X					X									
1N2841B	2						X					X									
1N2842B	2						X					X									
1N2843B	2						X					X									
1N2844B	2						X					X									
1N2845B	2						X					X									
1N2846B	2						X					X									
1N2970B	2		X				X				X	X									
1N2970RB	2		X																		

# ACCEPTABLE PARTS LIST 3 DIODES

NUMERICAL LISTING OF HI-REL DIODES	T P L	N A A	M S F C	T X	J P L	F S C	M O T A	R C A	G E	L E M	7 O 1 E	PEAK INV. VOL PIV	MAX OUT PUT 1 DC VOL TAMPS	MAX REV CUR T OC I R MA	FWD VOLTR DROP 25C	POWER 25C W	ZENER VOLTAGE MIN MAX	ZEN IMDSTR CASE UCTSTYL UREE
1N2971B	2		X				X				X							
1N2971RB	2		X															
1N2972B	2		X				X			X	X							
1N2972RB	2		X															
1N2973B	2		X				X				X							
1N2973RB	2		X															
1N2974B	2		X				X			X	X							
1N2974RB	2		X															
1N2975B	2		X				X				X							
1N2975RB	2		X															
1N2976B	2		X				X			X	X							
1N2976RB	2		X															
1N2977B	2		X				X				X							
1N2977RB	2		X															
1N2978B	2		X				X											
1N2979B	2		X				X			X	X							
1N2979RB	2		X															
1N2980B	2		X				X				X							
1N2980RB	2		X															
1N2981B	2		X				X											
1N2982B	2		X				X			X	X							
1N2982RB	2		X															
1N2983B	2		X				X											
1N2983RB	2		X															
1N2984B	2		X				X				X							
1N2984RB	2		X															
1N2985B	2		X				X			X	X							
1N2985RB	2		X															
1N2986B	2						X				X							
1N2987B	2						X											
1N2988B	2						X			X	X							
1N2989B	2						X				X							
1N2990B	2						X				X							
1N2991B	2						X				X							
1N2992B	2						X				X							
1N2993B	2						X				X							
1N2994B	2						X											
1N2995B	2						X				X							
1N2996B	2						X											
1N2997B	2						X				X							
1N2998B	2						X											
1N2999B	2						X				X							
1N3000B	2						X				X							
1N3001B	2						X				X							
1N3002B	2						X				X							



# ACCEPTABLE PARTS LIST 3 DIODES

NUMERICAL LISTING OF HI-REL DIODES	T OF P E	N A A	M S F C	T X	J P L	F S C	M U T A	R C A	G E	L E M	7 0 1 E	PEAK INV. VOLT PIV	MAX OUT PUT I DC VOLTS	MAX REV CUR T I OC R MA	FWD VOLTR DROP 25C	POWER 25C W	ZENER VOLTAGE MIN VOLT	ZENER VOLTAGE MAX VOLT	ZEN IMDSTR CASE UCTSTYL URLE
1N3003B	2						X				X								
1N3004B	2						X				X								
1N3005B	2						X				X								
1N3006B	2						X				X								
1N3007B	2						X				X								
1N3008B	2						X				X								
1N3009B	2						X				X								
1N3010B	2						X				X								
1N3011B	2						X				X								
1N3012B	2										X								
1N3014B	2										X								
1N3016B	2		X				X				X								
1N3017B	2		X				X				X								
1N3018B	2		X				X			X	X								
1N3019B	2	X	X				X				X								
1N3020B	2		X				X			X	X								
1N3021B	2		X				X				X								
1N3022B	2	X	X				X			X	X								
1N3023B	2		X				X				X								
1N3024B	2		X				X			X	X								
1N3025B	2		X				X				X								
1N3026B	2		X				X			X	X								
1N3027B	2		X				X				X								
1N3028B	2		X				X			X	X								
1N3029B	2						X				X								
1N3030B	2						X			X	X								
1N3031B	2						X				X								
1N3032B	2						X				X								
1N3033B	2						X				X								
1N3034B	2						X				X								
1N3035B	2						X				X								
1N3036B	2						X				X								
1N3037B	2						X				X								
1N3038B	2						X				X								
1N3039B	2						X				X								
1N3040B	2						X				X								
1N3041B	2						X				X								
1N3042B	2						X				X								
1N3043B	2						X				X								
1N3044B	2										X								
1N3045B	2										X								
1N3046B	2										X								
1N3047B	2										X								
1N3048B	2										X								
1N3049B	2										X								
1N3050B	2										X								

# ACCEPTABLE PARTS LIST 3 DIODES

NUMERICAL LISTING OF HI-REL DIODES	T P E	N A A	M S F C	T X L	J P L	F S C	M O T A	R C A	G E M	L E M	7 0 1 E	PEAK INV. VOLT PIV	MAX OUT PUT I DC AMPS	MAX REV CUR I T OC R MA	FWD VOLTR DROP 25C	POWE 25C MW	ZENER VOLTAGE MIN MAX	ZEN IMDSTR VOLTAGE VOLTAGE FORM	CASE UCTSTYL UREE
1N3051B	2											X							
1N3064	3			X								X							
1N3070	3											X							
1N3154	2						X					X							
1N3055	2						X					X							
1N3156	2						X												
1N3157	2	X										X							
1N3164	4											X							
1N3168	4											X							
1N3170	4											X							
1N3189	4			X								X							
1N3190	4									X		X							
1N3191	4			X					X			X							
1N3206	3											X							
1N3207	3											X							
1N3263	4											X							
1N3267	4											X							
1N3269	4											X							
1N3287W	1											X							
1N3289W	4											X							
1N3291	4											X							
1N3293	4											X							
1N3294	4											X							
1N3295	4											X							
1N3305B	2				X														
1N3306B	2				X														
1N3307B	2				X														
1N3308B	2				X														
1N3309B	2				X														
1N3310B	2				X														
1N3311B	2				X														
1N3312B	2				X														
1N3313B	2				X														
1N3314B	2				X														
1N3315B	2				X														
1N3316B	2				X														
1N3317B	2				X														
1N3318B	2				X														
1N3319B	2				X														
1N3320B	2				X														
1N3321B	2				X														

# ACCEPTABLE PARTS LIST 3 DIODES

NUMERICAL LISTING OF HI-REL DIODES	T P E	N A F C	M S F C	T X	J P L	F S C	M O T A	R C A	G E	L E M	7 C 1 E	PEAK INV. VOLT PIV	MAX OUT PUT I DC TAMPS	MAX REV CUR I R MA	T OC	FWD VOLTR DROP 25C	POWE 25C	ZEN VOLTAGE MIN VOLT	ZEN IMD VOLTAGE MAX VOLT	ZEN UCT STYL UREE	CASE
1N3595	3											X									
1N3600	3											X									
1N3649	4											X									
1N3650	4											X									
1N3666M2	3											X									
1N3821A	2						X					X									
1N3822A	2						X					X									
1N3823A	2						X					X									
1N3824A	2						X					X									
1N3825A	2						X			X		X									
1N3826A	2						X					X									
1N3827A	2						X					X									
1N3828A	2						X			X		X									
1N3891	3								X												
1N3893	3								X												
1N3911	3								X												
1N3913	3								X												
1N3993A	2						X					X									
1N3994A	2						X					X									
1N3995A	2						X					X									
1N3996A	2						X					X									
1N3997A	2						X					X									
1N3998A	2						X					X									
1N4087	3											X									
1N4306	3											X									
1N4307	3											X									
1N4370A	2			X			X														
1N4371A	2			X			X														
1N4372A	2			X			X														
1N4376	3											X									
1N4454	3			X																	
1N4506	4								X												
1N4507	4								X												
1N4508	4								X												
1N4525	4								X												
1N4526	4								X												
1N4527	4								X												
1N 23WE	6											X									
1N 23WEM	6											X									
1N 23WEMR	6											X									
1N 25	6											X									

## ACCEPTABLE PARTS LIST

Date: 4/12/66

Issue: A

## 4. TRANSISTORS

Numerical Listing of Hi-Rel. Transistors	Type*	NAA	MSFC	TX	JPL	FSC	MOTA	RCA	LEM	701E
2N329A	4									X
2N335A	5	X								
2N335B	5		X							
2N337	5	X								
2N338B	5		X							
2N341	5									X
2N388	5									X
2N389	9									X
2N424	9									X
2N489	1	X								
2N491	1		X						X	X
2N657	5								X	X
2N657A	5		X							
2N697	5/0	X								
2N699B	5					X				
2N706	5/0								X	X
2N708	5/0		X		X				X	
2N718A	5/0		X						X	X
2N720A	5								X	
2N722	4		X						X	
2N760A	5									X
2N834	5/0		X							
2N869A	4/0								X	
2N870	5					X				
2N871	5					X				
2N910	5				X	X			X	
2N911	5					X				
2N912	5					X				
2N914	5/0				X				X	
2N915	5				X	X				
2N916	5					X			X	X
2N918	5			X	X				X	
2N930	5		X		X				X	X
2N956	5				X					
2N995	4				X					X
2N996	4								X	
2N1016B	9									X
2N1016C	9								X	
2N1016D	9		X		X					
2N1050A	9									X
2N1118	4									X
2N1119	4/0									X
2N1132	4/0	X			X					X

\*

LOW POWER		HIGH POWER		SPECIAL	
2	Ge PNP	4	Si PNP	0	Switching
3	Ge NPN	5	Si NPN	1	Miscellaneous



# ACCEPTABLE PARTS LIST

Date: 4/12/66

Issue: A

## 4. TRANSISTORS

Numerical Listing of Hi-Rel Transistors	Type #	NAA	MSFC	TX	JPL	FSC	MOTA	RCA	LEM	701E
2N1234	4									X
2N1469	4									X
2N1482	9								X	
2N1485	9/0									X
2N1486	9/0		X						X	
2N1490	9/0									X
2N1506A	9									X
2N1514	9/0								X	
2N1613	5/0				X				X	X
2N1675	5								X	
2N1711	5/0								X	X
2N1722	9			X						
2N1724	9		X	X	X				X	X
2N1889	5					X				
2N1890	5					X				
2N1893	5/0				X	X			X	X
2N1973	5				X	X			X	
2N1974	5					X			X	
2N1975	5					X				
2N2016C	9								X	
2N2034	9				X					
2N2034A	9	X								
2N2049	5					X	X		X	
2N2060	1				X					X
2N2102	9		X							
2N2126	9		X							
2N2150	9				X					
2N2192A	5/0								X	
2N2218	5/0						X			
2N2218A	5/0						X			
2N2219	5/0			X			X			X
2N2219A	5/0						X			
2N2221	5/0						X			
2N2221A	5/0						X			
2N2222	5/0			X	X		X			X
2N2226A	9				X					
2N2297	5				X					
2N2303	4					X			X	
2N2331	5/1				X					
2N2369	5				X					
2N2412	4		X		X					
2N2432	5				X					
2N2481	5/0			X			X			X

\*

LOW POWER			HIGH POWER			SPECIAL	
2	Ge PNP	4	Si PNP	6	Ge PNP	8	Si PNP
3	Ge NPN	5	Si NPN	7	Ge NPN	9	Si NPN
						0	Switching
						1	Miscellaneous



## ACCEPTABLE PARTS LIST

Date: 4/12/66

Issue: A

## 4. TRANSISTORS

Numerical Listing of Hi-Rel. Transistors	Type*	NAA	MSFC	TX	JPL	FSC	MOTA	RCA	LEM	701E
2N2484	5				X					
2N2497	1				X					
2N2604	4				X					
2N2616	5					X				
2N2645	5					X			X	
2N2708	5							X		
2N2729	5					X				
2N2801	<del>4</del> 0	X								
2N2857	5					X				
2N2904	<del>4</del> 0						X			
2N2904A	<del>4</del> 0						X			
2N2905	<del>4</del> 0						X			X
2N2905A	<del>4</del> 0						X			
2N2906	<del>4</del> 0						X			
2N2906A	<del>4</del> 0						X			
2N2907	<del>4</del> 0				X		X			X
2N2907A	<del>4</del> 0						X			
2N2935	5	X								
2N2970B	1			X						
2N2974B	1			X						
2N2979	1				X					
2N3037	<del>5</del> 0	X								
2N3038	<del>5</del> 0	X								
2N3043	1	X								
2N3045	1	X								
2N3048	1	X								
2N3049	1	X								
2N3050	1	X								
2N3051	1	X								
2N3052	1	X								
2N3231	1							X		
2N3250	<del>4</del> 0						X			
2N3250A	<del>4</del> 0						X			
2N3251	<del>4</del> 0						X			
2N3251A	<del>4</del> 0						X			
2N3265	9							X		
2N3299	<del>5</del> 0					X				
2N3300	<del>5</del> 0					X				
2N3301	<del>5</del> 0					X				
2N3302	<del>5</del> 0					X				
2N3375	9							X		
2N3553	9							X		
2N3632	9							X		

LOW POWER				HIGH POWER				SPECIAL	
2	Ge PNP	4	Si PNP	6	Ge PNP	8	Si PNP	0	Switching
3	Ge NPN	5	Si NPN	7	Ge NPN	9	Si NPN	1	Miscellaneous

## ACCEPTABLE PARTS LIST

Date: 4/12/66

Issue: A

## 4. TRANSISTORS

[illegible]

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LOW POWER		HIGH POWER		SPECIAL
2 Ge PNP	4 Si PNP	6 Ge PNP	8 Si PNP	0 Switching
3 Ge NPN	5 Si NPN	7 Ge NPN	9 Si NPN	1 Miscellaneous

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