Keep for Ref.!

ELECTROVALUE

Catalogue No.8

ISSUE 1

Semiconductors
Integrated Circuits
Components
Accessories
Materials
Equivalents Tables
Outline Diagrams

Keep for Ref!

INDEX

Terms of Business

PAYMENT	Cash, postal order or cheque at the time of ordering except for credit account holders and customers using credit cards. Payment not made in sterling and certain overseas remittances will be liable to banker's commission if applicable. Delivery may be held for cheque clearance. GIRO account number: 38/671/4002.
DESPATCH	Goods in stock are normally despatched within two days from receipt of order. Scheduled despatches may be arranged if value per delivery exceeds £25.
CARRIAGE & PACKING	Free on CWO orders unless otherwise stated in UK. *(NOTE SMALL ORDER SURCHARGE SECTION).* Charged on credit card and monthly accounts according to scale depending on order value. Overseas charged at cost.
SMALL ORDER SURCHARGE	15p is charged on CWO mail orders under a list value of £2.00.
MINIMUM CHARGES	Invoice :£1.00 (monthly accounts) Proforma Invoice:£2.00 (Industrial & trade customers) Credit card :£1.00
LIST PRICE	List prices will remain firm until Dec.31st.1975. *(Please send SAE for latest updating information).*
GUARANTEE	All goods are guaranteed brand new and to makers' specifications. Goods will be accepted for replacement only if returned within three months of the date of purchase and with a report of the parameter outside specification, the purchase order reference or invoice no. and subject to our final technical agreement. This guarantee does not cover misuse or consequential damage.
LIABILITY	IT IS AN EXPRESS CONDITION OF SALE THAT LIABILITY IS LIMITED TO THE COST OF GOODS PROVED DEFECTIVE.
DISCOUNTS	CWO orders: 5% if LIST value is £5. or over; 10% if LIST value is £15. or over unless prices are quoted NET which implies no discount. Monthly accounts: As for CWO orders if payment is received within 30 days of invoice date, otherwise NET. Credit card orders: No discount is available.
CANCELLATION	Cancellation cannot be accepted on special purchase items.
VALUE ADDED TAX (VAT)	All prices in this catalogue are exclusive of VAT. UK customers: Where indicated individually or by range, VAT is chargeable at (v)=8%, (V)=25% after any discount due has been deducted. Overseas deliveries are not subject to VAT. These rules are subject to amendment to conform to current law and its interpretation bu H.M. Customs & Exise.
MONTHLY CREDIT ACCOUNTS	Available on request to government and most educational authorities. Industrial customers are invited to offer names and addresses of their banker and two trade references for investigation to open an account. All invoices become payable in full at the end of the month following the date of invoice.
RETURNED GOODS	Goods incorrectly ordered cannot be accepted for replacement unless our prior agreement is obtained. A re-stocking fee of 20% of the list price (minimum 25p) will be charged and the residue will be credited only against a further order. Our invoice number or reference number against which the goods were supplied must be given.
SPECIFICATIONS	All information in this catalogue is believed correct and given in good faith. No liability can be accepted for error.

THIS CATALOGUE CANCELS ALL PREVIOUS CATALOGUES LISTS AND QUOTATIONS

All Mail Orders to registered office please.

Registered office: 28 St. Judes Rd., Englefield Green, Egham, Surrey, TW20 0HB.
Northern Branch : 680 Burnage Lane, Burnage, Manchester M19 1NA

We invite readers in the U.S.A. to contact
Electrovalue - America, PO Box 337, Peterborough, New Hampshire, 03458.

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GENERAL INFORMATION

CUSTOMER LIAISON DEPARTMENTS

Sales Dept.	: For Prices, availability of catalogue items. Orders acceptance.
Sales Manager.	: Scheduled orders, overseas and special transactions.
Progress Dept.	: Records of orders received, despatch information. Retail credits and outstanding orders.
Sales Accounts.	: Credit account enquiries.
Purchasing Dept.	: Enquiries for franchised but non-catalogue items.

VALUE ADDED TAX

The latest three-tier tax system has caused problems with many suppliers but in May 1975, as a result of meetings between major retailers, component manufacturers and HM Customs & Exise, we are able to determine without much doubt the rate of VAT on any of our catalogue items.

The authority for our decisions is contained in:-

1). "Joint Press Announcement by Customs & Exise and the Electronic Coponents Board" dated 22nd May 1975.

2). The results of a meeting between major retailers and Customs & Exise on 25th April 1975 where the decisions have not been superceded by 1) above.

3). A letter from our local VAT office stating that "when components which would otherwise be treated as within the higher rate schedule are of significantly higher quality and price that they are no longer appropriate for domestic use that the standard rate may be applied".

Briefly, the components we sell which are chargeable at the higher rate are as follows unless modified by para 3). above:-

A). Linear integrated circuits suitable for use in TV, radio and audio equipment.

B). Transistors, triacs and thyristors, plastic encapsulated and less than 3 amps rating.

C). Power transistors for TV deflection applications.

D). Plastic diodes of less than 1 amp rating except microwave types.

E). Zener diodes rated at less than 3 watts.

F). Rectifiers suitable for use in low voltage battery charger equipment rated at less than 5 amps.

G). Capacitors excluding:-
- a). Paper exceeding 0.5µF (e.g. M.D.C. 1µF)
- b). Metal case sintered tantalum (e.g. Siemens type D)
- c). Metal cased film capacitors (e.g. B32110)
- d). Mica capacitors

H). Resistors excluding:-
- a). Metal film and metal oxide.
- b). Wire wound (except main ballast resistors for radio & TV).

I). Switches rated at less than 5 amps.

J). Potentiometers rated at less than 2 watts.

K). DIN and Phono connectors.

L). Audio amplifiers excluding professional of 30 watts and over.

M). Loudspeakers and L.S. matching transformers, ear-pieces.

NOTE: We stress that the above is an interpretation of the law and is subject to amendment at any time.

Orders despatched to Overseas destinations are not liable for VAT at present.

VAT is not included in our catalogue prices to avoid accounting problems when discounts are taken and in the preparation of invoices for industrial customers and all orders for overseas customers.

SEMICONDUCTOR DIRECTORY and Price List

Please enquire if the transistor you require is not listed – We may have it in stock, or an equivalent.

TYPE	PRICE	PAGE	TYPE	PRICE	PAGE	TYPE	PRICE	PAGE
1N914	6p	26	2N4289	18p	17	AD150	45pL	10
1N914B	7p	26	2N4291	18p	18	AD161	36p	10
1N916	7p	26	2N4292	19p	11	AD162	44p	10
1N4148	5p	26	2N4303	30p	23	AD161/AD162	95p	
1S920	9p	26	2N4410	30p	15	AF114	34p	6
1S940	5p	26	2N4443	85p	26	AF115	34p	6
2N697	23p	14	2N4991	35p	27	AF116	34p	6
2N706	18p	15	2N5062	42p	28	AF117	34p	6
2N930	21p	12	2N5088	19p	12	AF118	£1.05	6
2N1132	24p	18	2N5163	20p	23	AF124	31p	6
2N1302	30p	8	2N5192	81p	22	AF125	31p	6
2N1303	30p	8	2N5195	95p	22	AF126	31p	6
2N1304	38p	8	2N5457	32p	23	AF127	31p	6
2N1305	38p	8	2N5458	32p	23	AF139	57p	6
2N1306	47p	8	2N5459	32p	23	AF200U	30pL	6
2N1307	47p	8	3A200	20p	27	AF239	60p	6
2N1308	53p	8	3A800	32p	27	AF279	67p	6
2N1309	56p	8	6F40	49p	27	AFY42	£1.40	6
2N1599	76p	28	16F40	82p	27	AL102	£1.25	10
2N1613	22p	14	40HF10	98p	27	AN4131R	£15.40N	42
2N1711	27p	14	40HF40	£1.32	27	ASY26	63p	8
2N1893	40p	14	3401FE	£14.33N	43	ASY27	65p	8
2N2218	24p	15	3501FE	£14.33N	43	ASY28	67p	8
2N2218A	30p	15	3601FE	£14.33N	43	ASY29	67p	8
2N2219	26p	15	40250	80p	21	AU111	£2.25	10
2N2219A	32p	15	40361	48p	14	AUY22/4	£2.75L	10
2N2270	45p	14	40362	44p	18	B60/52-12	£3.20	27
2N2369A	19p	15	40406	44p	18	B0126	65p	28
2N2484	42p	12	40408	50p	14	B0140	94p	28
2N2646	51p	23	40410	65p	18	B0226	88p	28
2N2904	22p	19	40412	40p	15	B0240	£1.05	28
2N2904A	24p	19	40594	93p	14	B0246	£1.58	28
2N2905	27p	19	40595	£1.03	18	B0680	16p	27
2N2905A	29p	19	40602	46p	23	B1906	29p	27
2N2924	16p	12	40636	£1.36	21	B1912	68p	27
2N2925	18p	12	A9903	25p	27	BA102	25p	26
2N2926	13-16p	12	AA113	6p	26	BA138	31p	26
2N3053	30p	14	AA116	6p	26	BA127D	7p	26
2N3054	60p	21	AA117	6p	26	BA133F	16p	26
2N3055	70p	21	AA118	6p	26	BA145	24p	26
2N3325	51p	6	AA119	6p	26	BA156	14p	26
2N3391A	27p	12	AC107	61p	9	BA379	45p	26
2N3405	40p	16	AC126	30p	9	BB103	28p	26
2N3663	40p	11	AC127	33p	7	BB104	54p	26
2N3702	11p	18	AC128	17p	9	BB105B	38p	26
2N3703	10p	18	AC151	24p	9	BB109G	70p	26
2N3704	11p	16	AC151r	36p	9	BC107	18p	13
2N3705	10p	16	AC153	27p	9	BC108	15p	13
2N3706	9p	16	AC153K	32p	9	BC109	18p	11
2N3707	12p	12	AC176	29p	7	BC122	48p	15
2N3708	8p	12	AC176K	38p	7	BC125	15p	14
2N3709	9p	12	AC153K/AC176K	75p		BC126	15p	18
2N3710	10p	12	AC187K	31p	7	BC140	40p	14
2N3711	10p	12	AC188K	29p	9	BC147	12-13p	13
2N3771	£2.80	21	AC187K/AC188K	64p		BC148	11-13p	13
2N3794	18p	16	ACY17	36p	7	BC149	13-14p	11
2N3819	28p	23	ACY18	25p	7	BC154	16p	16
2N3820	58p	23	ACY19	28p	7	BC157	15p	17
2N3823E	24p	23	ACY20	23p	7	BC158	14-15p	17
2N3904	20p	12	ACY21	26p	7	BC159	15p	16
2N3906	17p	17	ACY22	23p	7	BC160	49p	18
2N4036	52p	18	ACY39	69p	7	BC167	12-13p	13
2N4058	13p	16	ACY40	22p	8	BC168	11-13p	13
2N4059	12p	17	ACY41	19p	8	BC169	12-13p	11
2N4060	12p	17	ACY44	54p	8	BC177	25p	17
2N4061	12p	17	AD133	£1.92L	10	BC178	23-24p	17
2N4062	11p	17	AD136	£1.60	10	BC179	26p	16
2N4124	15p	12	AD140	67p	10	BC182	12p	13
2N4126	19p	17	AD142	72p	10	BC182L	12p	13
2N4286	18p	12	AD149	64p	10	BC183	11p	13

MATCHED PAIRS of stock items may be ordered with the following surcharges:-

Pair of the same type number
(hFE matched to within 10% at normal Ic) : 15p
Complementary pair (one NPN and one PNP)
(hFE matched as closely as practicable) : 20p
FETs only (Vgs to within 0.1V @ Id=1mA or lower) : 20p

Certain matched pairs are listed separately at advantageous prices.

SEMICONDUCTOR DIRECTORY
and Price List

TYPE	PRICE	PAGE
BC183L	11p	13
BC184	12p	11
BC184L	12p	11
BC202	57p	17
BC212	12p	17
BC212L	12p	17
BC213	12p	17
BC213L	14p	17
BC214	14p	16
BC214L	14p	16
BC237	12-13p	13
BC238	11-13p	13
BC239	12-13p	11
BC257	14p	17
BC258	12-13p	17
BC259	14p	16
BC267	18p	13
BC268	15p	13
BC269	18p	11
BC300	53p	15
BC301	43p	14
BC303	68p	18
BC327	25p	20
BC328	24p	20
BC337	24p	20
BC338	23p	20
BC477	33p	18
BCY31	£1.12	18
BCY58	30p	13
BCY59	35p	13
BCY70	22p	17
BCY71	27p	17
BCY72	15p	17
BD124	90p	21
BD130	60pL	21
BD131	48p	22
BD132	56p	22
BD131/BD132	£1.19	22
BD135	37p	22
BD136	39p	22
BD135/BD136	89p	22
BD139	65p	22
BD140	74p	22
BD139/BD140	£1.45	22
BD645	N/A	22
BD646	N/A	22
BD645/BD646	£4.90	22
BD649	N/A	22
BD650	N/A	22
BD649/BD650	£6.15	22
BDY20	80p	21
BF115	32p	11
BF167	23p	11
BF173	28p	11
BF177	50p	15
BF178	31p	15
BF194	15p	11
BF195	15p	11
BF244B	25p	23
BF254	15p	11
BF255	15p	11
BF457	37p	21
BF458	43p	21
BF459	47p	21
BFR39	22p	19
BFR40	23p	19
BFR41	23p	19
BFR79	22p	19
BFR80	23p	19
BFR81	23p	19
BFX29	33p	18
BFX84	27p	14
BFX29/BFX84	75p	
BFX85	33p	14
BFX87	27p	18
BFX88	32p	18
BFY50	25p	14
BFY51	23p	14
BFY52	24p	14
BFY90	£1.30	11
BP101/1	£1.04N	39
BPW34	£1.73N	39
BPY61/1	£2.37N	39
BPY61/2	£2.73N	39
BPY61/3	£3.12N	39
BPY62/2	£1.28N	39
BPY62/3	£1.46N	39
BR81WA	80p	27
BR92WA	£1.28	27
BRY39	50p	25
BSX20	22p	15
BT106	£1.20	28
BT107	£1.00	28
BU105	£2.40	21
BU208	£5.15	21
BUX26	£2.60	21
BY164	51p	27
BY238	14p	27
BYX38/300	35p	27
BYX38/300R	35p	27
C106B1	42p	28
C106D1	53p	28
C0326	£3.16	28
C0340	£3.50	28
C407	17p	15
C1406	90p	27
C1412	£1.27	27
CNY17	£2.45N	39
CQY26A	16p	40
CQY28A	20p	40
CQY29A	20p	40
E2506	£1.50	27
E2512	£1.74	27
E99A40	£5.25	29
LD30A	16p	40
LD35A	20p	40
LD37A	20p	40
LD241	89pN	39
LD461	20p	40
LD471	30p	40
LD481	30p	40
MC140	32p	14
MJ481	£1.20	22
MJ491	£1.35	22
MJ481/MJ491	£2.70	22
MJ2955	80p	22
MJ3055	£1.20	22
MJ3055/MJ2955	£2.15	22
MJE2955	£1.12	22
MJE3055	68p	22
MJE3055/2955	£1.95	22
MKY7C38E	48p	39
MPF102	37p	23
MPS6531	20p	14
MPS6534	20p	18
NAS0164W3	40p	29
NAS0164X3	38p	29
NAS2065S	81p	28
NAS0654W5	84p	29
NAS0654X5	80p	29
NAS1001X5	60p	29
NAS1004W5	£1.09	29
NAS1004X5	£1.04	29
NKT211	35p	9
NKT212	35p	9
NKT213	35p	9
NKT214	35p	9
NKT217	75p	9
NKT274	25p	9
NKT275	33p	9
NKT403	71p	10
NKT404	66p	10
NKT405	87p	10
NKT603F	39p	6
NKT613F	40p	6
NKT674F	38p	6
NKT677F	33p	6
NTGD10	40p	26
OA47	9p	26
OA79	7p	26
OA90	6p	26
OA91	6p	26
OA95	6p	26
OA200	14p	26
OA202	15p	26
OC25	60p	10
OC28	78p	10
OC29	79p	10
OC35	68p	10
OC36	65p	10
OC44	46p	6
OC45	42p	6
OC71	44p	9
OC72	41p	7
OC75	56p	9
OC81	28p	7
OC83	28p	7
OC84	28p	7
P346A	17p	15
PM7A2	£1.65	27
PN109	10p	12
PN2905	11p	19
S2CN1	15p	27
S10M1	20p	27
SD4	8p	27
T2700D	£1.22	29
T2800D	96p	29
TAG3-400	£1.06	28
TAG3-600	£1.50	28
TAG6-400	£1.37	28
TAG6-600	£1.68	28
TAG6-800	£2.67	28
TAG302-400	95p	29
TAG302-600	£1.53	29
TIP31A	67p	22
TIP32A	77p	22
TIP31A/TIP32A	£1.59	22
TIP41A	80p	22
TIP42A	92p	22
TIP41A/TIP42A	£1.87	22
TIP41C	£1.12	22
TIP42C	£1.35	22
TIP41C/TIP42C	£2.62	22
TIS43	25p	23
W02	30p	27
ZTX107	13p	13
ZTX108	12p	13
ZTX109	13p	12
ZTX300	14p	16
ZTX301	17p	16
ZTX302	18p	16
ZTX303	19p	16
ZTX304	23p	16
ZTX330	18p	16
ZTX331	19p	16
ZTX500	14p	19
ZTX501	15p	19
ZTX502	18p	19
ZTX503	17p	19
ZTX504	24p	19
ZTX530	25p	19
ZTX531	26p	19
Zener diodes		30

GERMANIUM TRANSISTORS

RADIO FREQUENCY AMPLIFIERS, OSCILLATORS, MIXERS, PNP

	NKT613F	NKT674F	NKT677F	AF114/124	AF115/125	AF116/126	AF117/127
Vcbo max	40	20	20	20	20	20	20
Vce max	40	20	20	20	20	20	20
Veb max	1	0.5	0.5				
Ic max mA	10	10	10	10	10	10	10
Pt max mW	80	80	80	60	60	60	60
hfe typ(*min)@1mA	*40	*40	*40	130	130	130	130
Icbo max µA	5	8	8	8	8	8	8
@Vcb, 25°C	10	10	10	6	6	6	6
fT typ MHz	75	75	75	75	75	75	75
Power gain min dB	14	12.5	40	12.5	10	19	40
@MHz	100	100	0.47	100	100	10.7	0.45
Outline	T07	T07	T07	AF114-117: T07.		AF124-127:	T072b
Principal use	UHF amp	UHF amp	IF amp	UHF amp	UHF amp	IF amp	IF amp
Price	40p	38p	33p	AF114-117: 34p		AF124-127: 31p	

RADIO FREQUENCY AMPLIFIERS, OSCILLATORS, PNP

	AF118	AF139	AF200U	AF239	AF279	AFY42	
Vcbo max	70	20	25	20		30	
Vceo max	70	15		15	15	25	
Vebo max	1	0.3	0.3	0.3	0.3	0.3	
Ic max mA	30	10	10	10	10	10	
Pt max mW	375	60	60	60	60	112	
hfe typ (*hFE)	180	*50	*85	*50	*50	50	
@Ic mA	1	1.5	3	2	2	2	
Icbo max µA	6		10			30	
@Vcb, 25°C	6		12			20	
fT typ MHz	175	500		700	780	700	
Power gain dB		10 min	29 typ	14 min	16 min	13 typ	
@MHz		800	35	800	800	900	
Outline	T07	T072a	T072b	T072a	T050	T072a	
Principal use	Video amp	UHF	Vari-gain	UHF	UHF tuner	UHF amp	
Price	£1.05	57p	30p (L)	60p	67p	£1.40	

(L): limited to stock.

RADIO FREQUENCY AMPLIFIERS, OSCILLATORS, PNP

	2N3325	NKT603F	OC44	OC45			
Vcbo max	35	40	15	15			
Vce max		40					
Veb max			12	12			
Ic max mA		50	10	10			
Pt max mW	150	80	75	72			
hfe typ(*hFE) 1mA	*30-200	100	40-225	25-125			
Icbo max µA		5	2	2			
@Vcb (25°C)		10	2	2			
fT typ(*min)MHz	*200	120	*7.5(fhfb)	9(fhfb)			
Outline	T018	T07	T01	T01			
Principal use	UHF	fast sw.	mix/osc.	IF			
Price	51p	39p	46p	42p			

GERMANIUM TRANSISTORS

AUDIO FREQUENCY AMPLIFIERS, LOW POWER OUTPUT, PNP

	OC72	OC81	OC83	OC84			
Vcbo max	32	32	32	32			
Vceo max	32	32	20	20			
Veb max	10	10	3	10			
Ic max mA	250	500	500	500			
Pt max mW	125	240	220	220			
hFE	30-90	50-250	50-280	60-200			
@Ic mA	80	50	50	50			
Icbo max µA	15	10	100	100			
@Vcb	10	10	32	32			
Vce sat max	0.25		0.5	0.5			
@Ic/Ib	125/12.5		300/9	300/9			
fT (*fhfb) typ	1	*1	0.85	0.85			
Outline	T01	T01	T01	T01			
Price	41p	28p	28p	28p			

AUDIO FREQUENCY AMPLIFIERS, LOW POWER OUTPUT, NPN

	AC127	AC176	AC176K	AC187K			
Vcbo max	32	32	32	25			
Vce max *(Vceo)	32	*20	*20	15			
Veb max	10	5	5	10			
Ic max mA	500	300	300	1000			
Pt max mW	200	#700	#1000	#1000			
hFE	25-143	52-180	52-180	100-500			
@Ic mA	500	500	500	500			
Icbo max µA	10	100	100	15			
@Vcb	0.5	25	25	10			
Vce sat max	1.0	0.6	0.6				
@Ic/Ib mA	500/50	500/10	500/10				
fT min MHz	1.5	1	10	1			
Outline	T01	T01	X9a	X9a			
Price	33p	29p	33p	31p			

#Case temperature =45°C

SMALL, MEDIUM CURRENT SWITCHING, PNP

	ACY17	ACY18	ACY19	ACY20	ACY21	ACY22	ACY39
Vcbo max	70	50	50	40	40	20	110
Vceo max	32	30	30	20	20	15	40
Veb max	12	12	12	12	12	12	12
Ic max mA	500	500	500	500	500	500	500
Pt max mW	260	260	260	260	260	260	260
hFE	50-150	40-120	80-250	50-145	90-250	30-300	50-150
@Ic mA	300	300	300	50	50	300	300
Icbo max µA	10	10	10	10	10	10	10
@Vcb	6	6	6	6	6	6	6
Vce sat max	0.3	0.3	0.3	0.2	0.2	0.3	0.3
@Ic/Ib	300/15	300/15	300/15	50/1.3	50/1.3	300/15	300/15
fT typ MHz	1	1	1.5	1	1.3	0.8	1
Outline	T05	T05	T05	T05	T05	T05	T05
Price	36p	25p	28p	23p	26p	23p	69p

GERMANIUM TRANSISTORS

SMALL, MEDIUM CURRENT SWITCHING, PNP

	ACY40	ACY41	ACY44				
Vcbo max	32	32	50				
Vceo max	32	32	40				
Veb max	12	12	12				
Ic max mA	500	500	500				
Pt max mW	260	260	260				
hFE	30-170	50-250	40-120				
@Ic mA	300	300	300				
Icbo max µA	10	10	10				
@Vcb	6	6	6				
Vce sat max	0.3	0.3	0.3				
@Ic/Ib mA	300/15	300/15	50/1.3				
fT typ MHz	0.8	0.6	!				
Outline	TO5	TO5	TO5				
Price	22p	19p	54p				

COMPLEMENTARY SWITCHING TRANSISTORS, PNP

	ASY26	ASY27	2N1303	2N1305	2N1307	2N1309	
Vcbo max	30	25	30	30	30	30	
Vceo max	15	15	25	20	15	15	
Veb max	20	20	25	25	25	25	
ic max mA	300	300	200	200	200	200	
Pt max mW	150	150	150	150	150	150	
hFE	30-80	50-150	20 min	40-200	60-300	80 min	
@Ic mA	20	20	10	10	10	10	
Icbo max µA	7	7	6	6	6	6	
@Vcb	30	25	25	25	25	25	
Vce sat max	0.25	0.25	0.2	0.2	0.2	0.2	
@Ic/Ib mA	50/2	50/1.55	10/0.5	10/0.25	10/0.17	10/0.13	
fT typ MHz	8	14	5	10	15	20	
Outline	TO5	TO5	TO5	TO5	TO5	TO5	
Price	63p	65p	30p	38p	47p	56p	

COMPLEMENTARY SWITCHING TRANSISTORS, NPN

	ASY28	ASY29	2N1302	2N1304	2N1306	2N1308	
Vcbo max	30	25	25	25	25	25	
Vceo max	15	15	25	20	15	15	
Veb max	20	20	25	25	25	25	
Ic max mA	200	200	200	200	200	200	
Pt max mW	150	150	150	150	150	150	
hFE	30-80	50-150	20 min	40-200	60-300	80 min	
@Ic mA	20	20	10	10	10	10	
Icbo max µA	35	35	6	6	6	6	
@Vcb	30	25	25	25	25	25	
Vce sat max	0.25	0.25	0.2	0.2	0.2	0.2	
@Ic/Ib mA	50/2	50/1.25	10/0.5	10/0.25	10/0.17	10/0.13	
fT typ MHz	14	20	10	15	20	30	
Outline	TO5	TO5	TO5	TO5	TO5	TO5	
Price	67p	67p	30p	38p	47p	53p	

GERMANIUM TRANSISTORS

AUDIO FREQUENCY AMPLIFIERS, LOW LEVEL, LOW NOISE PNP.

	AC107	AC126	AC151	AC151r	NKT274	NKT275	OC71
Vcbo max	15	32	32	32	15	15	30
Vce max *(Vceo)	15	*12	*24	*24	15	15	20
Veb max	5	10	10	10	5	5	10
Ic max mA	10	100	200	200	250	250	10
Pt max mW	80	220	220	220	200	200	125
hFE(*hfe)	60 typ	*130-300	30-250	30-150	*85-250	*30-90	30-75
@Ic mA	0.3	2	2	2	1	1	3
Noise factor dB	5 max	10 max	10 max	6 max	15 max	10 max	16 max
Icbo max µA	3 @ 5V	10 @ 10V	6 @ 32V	6 @ 32V	10	10	13 @ 4.5V
Vce sat max			0.4	0.4			
@Ic/Ib mA			200/10	200/10			
fhfb (*fT)	2 min	*2.3	*1.5	*1.5	1 typ	1 typ	0.3 min
Outline	TO1	TO1	TO1	TO1	TO1	TO1	TO1
Price	61p	30p	24p	36p	25p	33p	44p

AUDIO FREQUENCY AMPLIFIERS, SMALL SIGNAL, PNP

	NKT213	NKT214	OC75				
Vcbo max	32	32	30				
Vce max (*Vceo)	32	32	*30				
Veb max	10	10	10				
Ic max mA	250	250	100				
Pt max mW	200	200	150				
hFE (*hfe)	50-130	*30-75	*60-120				
@Ic mA	1	1	1				
Icbo max µA	10	10	10				
@Vcb	10	10	4.5				
Vce sat max	0.2	0.2	0.21				
@Ic/Ib mA	25/2.5	25/2.5	9/0.5				
fhfb min (*typ)	0.9	0.9	*1				
Outline	TO1	TO1	TO1				
Price	35p	35p	56p				

AUDIO FREQUENCY AMPLIFIERS, LOW POWER OUTPUT, PNP

	AC128	AC153	AC153K	AC188K	NKT211	NKT212	NKT217
Vcbo max	32	32	32	25	32	32	60
Vce (*Vceo)	*16	*18	*18	*15	*30	32	40
Veb	10	10	10	10	10	10	10
Ic max mA	1000	2000	2000	1000	1000	500	500
Pt max mW	220	220	#1000	#1000	200	200	200
hFE	60-175	50-250	50-250	100-500	20-150	50-150	50-150
@Ic mA	300	300	300	300	300	50	25
Icbo max µA	10	30	200	15	10	10	10
@Vcb	10	10	32	10	10	10	
Vce sat max		0.5	0.5		0.5	0.15	0.5
@Ic/Ib mA		1000/50	1000/50		300/30	25/2.5	300/6
fT KHz (*fhfb)	1.5typ	1.5 typ	1.5 typ	1.5 typ	*0.9min	*0.9min	*0.9min
Outline	TO1	TO1	X9a	X9a	TO1	TO1	TO1
Price	17p	27p	32p	29p	35p	35p	75p

#Screwed to metal surface @ 45°C

GERMANIUM TRANSISTORS

REPLACEMENT TYPES PNP HIGH POWER

	OC25	OC28	OC29	OC35	OC36		
Vcbo max	40	80	60	60	80		
Vce max	40	60	48	48	60		
Veb max	10	40	20	20	40		
Ic max A	4	8	8	8	8		
Pt (@°C) W	23(45)	30(45)	30(45)	30(45)	30(45)		
hFE	15-80	20-55	45-130	25-75	30-110		
@Ic A	1	1	1	1	1		
Icbo max µA	100	100	100	100	100		
@Vcb	0.5	0.5	0.5	0.5	0.5		
Vce sat max		1.6	1.6	1.4	1.6		
@ Ic (Vcb=0)		6	6	6	6		
fhfb typ MHz		0.25	0.25	0.25	0.25		
Outline	T03	T03	T03	T03	T03		
Price	60p	78p	79p	68p	65p		

HIGH POWER OUTPUT, PNP

	NKT403	NKT404	NKT405	AD140	AD142	AD149	AD150
Vcbo max	80	60	60	55	80	50	32
Vceo max	32	32	32		50	30	30
Veb max	40	20	20	10	10	20	10
Ic max A	10	10	5	3	10	3.5	3.5
Pt (@°C) W	50(25)	50(25)	50(25)	35(37)	30(55)	22(50)	22(50)
hFE	50-150	50-150	100-200	30-100	30-170	30-100	30-100
@Ic A	1	1	1	1	1	1	1
Icbo max µA	150	150	150	100	5000	350	1000
@Vcb	30	30	30	14	80	14	30
Vce sat max	0.42	0.42	0.42		0.3		
@ Ic/Ib A	1/0.1	1/0.1	1/0.1		5/0.25		
fT typ MHz	0.35	0.35	0.35		0.45	0.5	0.45
Outline	T03	T03	T03	T03	T03	T03	T03
Price	71p	66p	87p	67p	72p	64p	45p L

(L = limited to inventory)

HIGH POWER OUTPUT

PNP NPN

	AUY22/4	AD133	AL102	AU111	AD136	AD162	AD161
Vcbo max(*peak)	80	50	130	*320	40	32	32
Vceo max	60	32	60		30	20	20
Veb max	20	10	2	2	10	10	10
Ic max A	8	15	6	10	10	3	3
Pt (@°C) W	36(45)	36(45)	30(55)	5(55)	11(45)	6(63)	4(72)
hFE	20-40	20-100	40-250	15-80	30-150	50-350	50-350
@ Ic A	5	5	1	6	5	0.5	0.5
Icbo max µA	1000		1000			40	50
@ Vcb	80		40			20	20
Vce sat max	0.35	0.5	0.5	0.5	0.4		
@ Ic/Ib A	8/0.8	15/1.5	5/0.25	5/0.25	10/1		
fT typ (*min)	0.3	0.3	4	2	0.3	*1	*1
Outline	T041	T041	T03	T03	T08	MD17c	MD17c
Price	£2.75L	£1.92L	£1.25	£2.25	£1.60	44p	36p

SILICON TRANSISTORS

RADIO FREQUENCY AMPLIFIERS, NPN

	BF115	BF167	BF173	BFY90	2N3663	2N4292	
Vcbo max	50	40	40	30	30	30	
Vceo max	30	30	25	15	12	15	
Veb max	5	4	4	2.5	3	3	
Ic max mA	30	25	25	50	25	500	
Pt max mW	145	130	260	200	200	200	
hFEtyp @Ic mA	100,3	50,4	87,7	60,2	75,8	20min,3	
fT typ (*min)MHz	230	350	550	*1000	1250	570	
Power gain dB		42 typ	42 typ	22 typ	15 min	29 typ	
@ MHz		35	35	500	200	100	
Noise factor dB	4 typ	3.5 typ		5 max	6.5 max	6 max	
@ MHz	100	35		500	60	100	
@ Rs	100	100		50	400	400	
Outline	T072b	T072b	T072b	T072a	T098a	u29	
Price	32p	23p	28p	£1.30	40p	19p	

RADIO FREQUENCY AMPLIFIERS, NPN

	BF194	BF254	BF195	BF255			
Vcbo max	30	30	30	30			
Vceo max	20	20	20	20			
Veb max	5	5	5	5			
Ic max mA	30	30	30	30			
Pt max mW	220	220	220	220			
hFE	115 typ	115 typ	67 typ	67 typ			
@ Ic mA	1	1	1	1			
fT typ MHz	260	260	260	260			
Noise factor dB	4 typ	4 typ	4 typ	4 typ			
@ MHz	100	100	100	100			
@ Rs	100	100	100	100			
Outline	MM10b	T092za	MM10b	T092za			
Price	15p	15p	15p	15p			

AUDIO FREQUENCY AMPLIFIERS, LOW LEVEL, LOW NOISE, NPN

	BC109	BC149	BC169	BC184	BC184L	BC239	BC269
Vcbo max	20	30	30	45	45	30	30
Vceo max	20	30	30	30	30	20	20
Veb max	5	5	5	5	5	5	6
Ic max mA	50	50	50	200	200	50	1000
Pt max mW	300	300	300	300	300	300	375
hfe (*hFE)	240-900	240-900	240-900	250min	250min	240-900	240-900
@ Ic mA	2	2	2	2	2	2	2
Icbo max nA	15	15	15	15	15	15	15
Noise factor max	4dB	4dB	4dB	4dB	4dB	4dB	4dB
fT typ MHz	300	300	300	150 min	150 min	300	150 min
Outline	T018	MM10	T092a	T092zc	T092	T092zb	T018
Price	18p	13-14p	12-13p	12p	12p	12-13p	18p

BC107 family gain selections and prices: See page 24

SILICON TRANSISTORS

AUDIO FREQUENCY AMPLIFIERS, LOW LEVEL, LOW NOISE, NPN

	2N930	2N2484	2N2924	2N2925	2N2926	2N3391A	2N3707
Vcbo max	45	60	25	25	18	25	30
Vceo max	45	60	25	25	18	25	30
Veb max	5	6	5	5	5	5	6
Ic max mA	60	50	100	100	100	100	20
Pt max mW	300	360	120	120	120	200	250
hfe (*hFE)	*100-300	100-500	150-300	235-470	35-470	250-500	100-400
@ Ic mA	0.01	0.01	2	2	2	2	0.1
Icbo max nA	10	10	500	500	500	100	100
Noise factor dB	3 max	3 max	2.5 typ	2.5 typ	2.5 typ	5 max	5 max
fT typ MHz	80	60 min	120	120	120	120	
Outline	T018	T018	T098a	T098a	T098a	T098a	T092a
Price	21p	42p	16p	18p	13-16p	27p	12p

2N2926 gain selections and prices: See page 24

AUDIO FREQUENCY AMPLIFIERS, LOW LEVEL, LOW NOISE, NPN

	2N4286	2N5088	PN109	ZTX109			
Vcbo max	30	35	30	20			
Vceo max	25	30	20	20			
Veb max	6	3	5	5			
Ic max mA	100	50	100	100			
Pt max mW	250	310	200	300			
hFE (*hfe)	100 min	*300-900	200-800	210-800			
@ Ic mA	0.01	0.1	2	2			
Icbo max nA	50	50		200			
Vce sat			0.25 max	0.1 typ			
@ Ic/Ib mA			10/0.5	10/1			
Noise factor dB		3 max	4 max	4 max			
fT typ MHz	280	50 min	250	350			
Outline	u29	T092b	R097Aa	X59			
Price	18p	19p	10p	13p			

AUDIO FREQUENCY AMPLIFIERS, SMALL SIGNAL, GENERAL PURPOSE, NPN

	2N3708	2N3709	2N3710	2N3711	2N3904	2N4124	
Vcbo max	30	30	30	30	60	30	
Vceo max	30	30	30	30	40	25	
Veb max	6	6	6	6	5	5	
Ic max mA	30	30	30	30	100	200	
Pt max mW	250	250	250	250	310	310	
hFE	45-660	45-165	90-330	180-660	100-300	120-360	
@ Ic mA	1	1	1	1	10	2	
Icbo max nA	100	100	100	100	100	50	
Vce sat max	1	1	1	1	0.2	0.3	
@ Ic/Ib mA	10/0.5	10/0.5	10/0.5	10/0.5	10/1	50/5	
fT typ MHz					200	300 min	
Outline	T092a	T092a	T092a	T092a	T092b	T092b	
Price	8p	9p	10p	10p	20p	15p	

SILICON TRANSISTORS

AUDIO FREQUENCY AMPLIFIERS, SMALL SIGNAL, GENERAL PURPOSE, NPN

	BC107	BC147	BC167	BC182	BC182L	BC237	BC267
Vcbo max	45	50	50	60	60	50	50
Vceo max	45	45	45	50	50	45	45
Veb max	5	6	6	5	5	6	6
Ic max mA	100	100	100	100	100	100	1000
Pt max mW	300	300	300	300	300	300	360
hfe @ Ic = 2mA	125-500	125-500	125-500	100-480	100-480	125-500	125-500
Icbo max nA	10	20	200	15	15	15	15
Vce sat max	0.25	0.6	0.25			0.6	0.22 typ
@ Ic/Ib mA	10/0.25	100/5	10/0.25			100/5	200/10
Noise factor dB	10 max	10 max	10 max			10 max	3 typ
fT typ MHz	300	300	300	150 min	150 min	300	150 min
Outline	TO18	MM10	TO92a	TO92zc	TO92a	TO92zb	TO18
Price	18p	12-13p	12-13p	12p	12p	12-13p	18p

BC107 family gain selections and prices: See page 24

AUDIO FREQUENCY AMPLIFIERS, SMALL SIGNAL, GENERAL PURPOSE, NPN

	ZTX107	ZTX108	BCY58	BCY59			
Vcbo max	45	20					
Vceo max	45	20	32	45			
Veb max	5	5	7	7			
Ic max mA	100	100	200	200			
Pt max mW	300	300	400	400			
hfe	125-500	125-500	120-630	120-630			
@ Ic mA	2	2	2	2			
Icbo max nA	200	200	10	10			
Vce sat max	0.2 typ	0.2 typ	0.3	0.3			
@ Ic/Ib mA	100/10	100/10	100/2.5	100/2.5			
fT typ MHz	350	350	125	125			
Outline	X59	X59	TO18	TO18			
Price	13p	12p	30p	35p			

AUDIO FREQUENCY AMPLIFIERS, SMALL SIGNAL, GENERAL PURPOSE, NPN

	BC108	BC148	BC168	BC183	BC183L	BC238	BC268
Vcbo max	20	30	30	45	45	30	30
Vceo max	20	20	20	30	30	20	20
Veb max	5	5	5	5	5	5	6
Ic max mA	100	100	100	100	100	100	1000
Pt max mW	300	300	300	300	300	300	375
hfe @ Ic = 2mA	125-900	125-900	125-900	100-850	100-850	125-900	125-900
Ic max nA	10	20	20	15	15	15	15
Vce sat max	0.25	0.6	0.25			0.6	0.22 typ
@ Ic/Ib mA	10/0.25	100/5	10/0.25			100/5	200/10
Noise factor	10dB max	10dB max	10dB max			10dB max	3dB typ
fT typ MHz	300	300	300			250	
fT min MHz	150					150	150
Outline	TO18	MM10	TO92a	TO92zc	TO92	TO92zb	TO18
Price	15p	11-13p	11-13p	11p	11p	11-13p	15p

BC107 family gain selections and prices: See page 24

SILICON TRANSISTORS

LOW POWER OUTPUT, MEDIUM CURRENT SWITCHING, NPN

	2N697	2N1613	2N1711	2N2270	2N3053	MPS6531	2N1893
Vcbo max	60	75	75	60	60	60	120
Vceo max (*Vcer)	40	*50	30	45	40	40	80
Veb max	5	7	7	7	5	5	7
Ic max mA	500	500	1000	1000	700	600	500
Pt max mW	600	800	800	1000	1000	310	800
hFE (*hfe)	*40-120	40-120	100-300	50-200	50-150	90-270	30 min
@ Ic mA	150	150	150	150	150	100	1
Icbo max µA	1	0.01	0.01	0.05	0.25	0.05	0.01
Vce sat max	1.5	1.5	1.5	0.9	1.4	0.3	1.2
@ Ic/Ib	150/15	150/15	150/15	150/15	150/15	100/10	50/5
fT min (*typ) MHz	50	60	70	60	100	*390	50
Outline	T05	T05	T05	T05	T05	T092b	T05
Price	23p	22p	27p	45p	30p	20p	40p

LOW POWER OUTPUT, MEDIUM CURRENT SWITCHING, NPN

	BC125	BC301	MC140	40361	40408	40594	
Vcbo max	50	90	80	70	90	95	
Vceo max	30	60	40	70	90		
Veb max	5	7	7	4	4	4	
Ic max mA		700	1000	700	700	2000	
Pt max mW	300	850	**800	1000	1000	1200	
hFE	30 min	40-240	40-300	70-350	40-200	70-350	
@ Ic mA	150	150	150	50	10	300	
Icbo max µA	0.05	0.02	0.5	1	1	1	
Vce sat max	0.5	0.5	0.7 typ	1.4			
@ Ic/Ib mA	150/15	150/15	1A/100	150/15			
fT min (*typ)	40	*120	100	*100	*100		
Outline	R097f	T05	X58b	T05	T05	T05	
Price	15p	43p	32p	48p	50p	93p	

**MC140: 3W when fitted to heat sink at 25°C

LOW POWER OUTPUT, MEDIUM CURRENT SWITCHING, NPN

	BFX84	BFX85	BFY50	BFY51	BFY52	BC140	
Vcbo max	100	100	80	60	40	80	
Vceo max	60	60	35	30	20	40	
Veb max	6	6	6	6	6	7	
Ic max mA	1000	1000	1000	1000	1000	1000	
Pt max mW	800	800	800	800	800	750	
hFE	30 min	70 min	30 min	40 min	60 min	40 min	
@ Ic mA	150	150	150	150	150	1000	
Icbo max nA	500	500	500	500	500	100	
Vce sat max	0.35	0.35	0.2	0.35	0.35	1	
@ Ic/Ib mA	150/15	150/15	150/15	150/15	150/15	1A/100	
fT min MHz	50	50	50	50	50	50	
Outline	T05	T05	T05	T05	T05	T05	
Price	27p	33p	25p	23p	24p	40p	

SILICON TRANSISTORS

SWITCHING TRANSISTORS, GENERAL PURPOSE, NPN

	2N706	2N2369A	BSX20	P346A			
Vcbo max	25	40	40	25			
Vceo max	20	15	15	12			
Veb max	3	4.5	4.5	4			
Ic max mA	200	200	500				
Pt max mW	300	360	360	300			
hFE	20 min	40-120	40-120	20 min			
@ Ic mA	10	10	10	50			
Icbo max µA	0.05	0.4	0.4	0.25			
Vce sat max	0.6	0.2	0.6	1			
@ Ic/Ib mA	10/1	10/1	100/10	100/10			
fT min MHz	200	500	600	400			
Outline	T018	T018	T018	T018			
Price	18p	19p	22p	17p			

HIGH FREQUENCY, MEDIUM POWER, NPN

	2N2218	2N2218A	2N2219	2N2219A			
Vcbo max	60	75	60	75			
Vceo max	30	40	30	40			
Veb max	5	6	5	6			
Ic max mA	800	800	800	800			
Pt max mW	800	800	800	800			
hFE	40-120	40-120	100-300	100-300			
@ Ic mA	150	150	150	150			
Icbo max nA	10	10	10	10			
Vce sat max	1.6	1	1.6	1			
@ Ic/Ib mA	500/50	500/50	500/50	500/50			
fT min MHz	250	250	250	250			
Outline	T05	T05	T05	T05			
Price	24p	30p	26p	32p			

SPECIAL TYPES

	BC122	BC300	40412	BF177	BF178	C407	2N4410
Vcbo max	30	120	250	85	145	120	120
Vceo max (*Vcer)	20	80	*250	60	115	120	80
Veb max	5	7		5	5	5	5
Ic max mA	50	1000	1000	50	50	50	250
Pt max mW	80	850	1000	600	600	200	310
hFE (*hfe)	*75-260	40-240	40 min	20 min	20 min	18 min	60-400
@ Ic mA	0.25	150	30	15	30	3	1
Icbo max nA	250	20				200	10
Vce sat max	0.3	0.5				1.0	0.2
@ Ic/Ib mA	50/2.5	150/15				10/1	1/0.1
fT min (*typ) MHz	*250	*120	10	*120	*120		60
Outline	u32	T05	T05	T05	T05	R097f	T092b
Feature	sub-min	hi-voltage drivers		video outputs		nixie drivers	
Price	48p	53p	40p	50p	31p	17p	30p

SILICON TRANSISTORS

LOW POWER OUTPUT, MEDIUM CURRENT SWITCHING, NPN

	2N3704	2N3705	2N3706	2N3794	2N3405		
Vcbo max	50	50	40	40	50		
Vceo max	30	30	20	20	50		
Veb max	5	5	5	5	5		
Ic max mA	800	800	800	300	500		
Pt max mW	300	300	300	250	*560		
hFE	90-330	45-165	30-660	100 min	180-450		
@ Ic mA	50	50	50	100	2		
Icbo max nA				500	100		
Vce sat max	0.6	0.8	1.6	0.4	0.3		
@ Ic/Ib mA	100/5	100/5	100/5	10/1	50/5		
fT min MHz	100	100	100	100	200 typ		
Outline	T092a	T092a	T092a	u29	X28		
Price	11p	10p	9p	18p	40p		

*2N3405: 900mW when fitted to heat sink at 25°C

FERRANTI PLASTIC NPN

	ZTX300	ZTX301	ZTX302	ZTX303	ZTX304	ZTX330	ZTX331
Vcbo max	25	35	35	45	70	30	45
Vceo max	25	35	35	45	70	30	45
Veb max	5	5	5	5	5	5	5
Ic max mA	500	500	500	500	500	500	500
Pt max mW	300	300	300	300	300	250	250
hFE	50-300	50-300	100-300	50-300	50-300	100-400	40-120
@ Ic mA	10	10	10	10	10	10	10
Icbo max nA	200	200	200	200	200	200	200
Vce sat max	0.35	0.25	0.25	0.35	0.35	0.7	0.7
@ Ic/Ib mA	50/5	50/5	50/5	50/5	50/5	10/0.5	10/0.5
fT min MHz	150	150	150	150	150	30	30
Outline	X59	X59	X59	X59	X59	X59	X59
Price	14p	17p	18p	19p	23p	18p	19p

AUDIO FREQUENCY AMPLIFIERS, LOW LEVEL, LOW NOISE, PNP

	BC154	BC159	BC179	BC214	BC214L	BC259	2N4058
Vcbo max	40	30	20	45	45	25	30
Vceo max	40	20	20	30	30	20	30
Veb max	5	5	5	5	5	5	6
Ic max mA	100	50	50	100	100	50	30
Pt max mW	200	300	300	360	360	300	250
hFE (*hfe)	160 min	*240-500	*240-500	140-400	140-400	*240-500	100-400
@ Ic mA	0.1	2	2	2	2	2	0.1
Icbo max nA	2	50	50	15	15	100	100
Vce sat max	0.25	0.3 typ	0.3 typ	0.2	0.2	0.8	0.7
@ Ic/Ib mA	10/0.5	100/5	100/5	10/0.5	10/0.5	10/0.5	10/0.5
Noise factor max	2.5dB	4dB	4dB	2dB	2dB	4dB	5dB
fT min MHz(*typ)	40	*200	*200	200	200	130	
Outline	R097Aa	MM10	T018	T092zc	T092a	T092a	T092a
Price	16p	15p	26p	14p	14p	14p	13p

BC107 family gain selections and prices: See page 24

SILICON TRANSISTORS

SMALL SIGNAL AMPLIFIERS, LOW CURRENT SWITCHES, PNP

	2N4059	2N4060	2N4061	2N4062	BCY70	BCY71	BCY72
Vcbo max	30	30	30	30	50	45	25
Vceo max	30	30	30	30	40	45	25
Veb max	6	6	6	6	5	5	5
Ic max mA	30	30	30	30	200	200	200
Pt max mW	250	250	250	250	350	350	350
hFE	45-660	45-165	90-330	180-660	50 min	100 min	50 min
@ Ic mA	1	1	1	1	10	10	10
Icbo max nA					10	10	100
Vce sat max	0.7	0.7	0.7	0.7	0.25	0.25	0.25
@ Ic/Ib mA	10/0.5	10/0.5	10/0.5	10/0.5	10/1	10/1	10/1
Noise factor dB					6 max	2 max	6 max
fT min MHz					250	300	200
Outline	T092a	T092a	T092a	T092a	T018	T018	T018
Price	12p	12p	12p	11p	22p	27p	15p

SMALL SIGNAL AMPLIFIERS, LOW CURRENT SWITCHES, PNP

	BC157	BC177	BC212	BC212L	BC257	2N3906	2N4289
Vcbo max	50	45	60	60	50	40	60
Vceo max	45	45	50	50	45	40	45
Veb max	6	5	5	5	5	5	7
Ic max mA	100	100	100	100	100	100	100
Pt max mW	300	300	360	360	300	310	310
hfe	125-500	125-500	60-300	60-300	125-500	100-300	160 min
@ Ic mA	2	2	2	2	2	10	1
Icbo max nA	50	50	15	15	100	50	10
Vce sat max	0.2	0.6	0.2	0.2	0.1 typ	0.25	0.35
@ Ic/Ib mA	10/0.5	100/5	10/0.5	10/0.5	10/0.5	10/1	1/0.1
Noise figure dB	10 max	10 max			10 max		
fT min (*typ)	*200	*130	200	200	*200	250	*170
Outline	MM10	T018	T092zc	T092a	T092a	T092b	u29
Price	15p	25p	12p	12p	14p	17p	18p

BC107 family gain selections and prices: See page 24

SMALL SIGNAL AMPLIFIERS, GENERAL PURPOSE, PNP

	BC158	BC178	BC213	BC213L	BC258	BC202	2N4126
Vcbo max	30	20	45	45	30	30	25
Vceo max	20	20	30	30	25	20	25
Veb max	5	5	5	5	5	5	4
Ic max mA	100	100	100	100	100	75	200
Pt max mW	300	300	360	360	300	80	310
hfe (*hFE)	125-900	125-900	80-400	80-400	125-900	*75-260	*120 min
@ Ic mA	2	2	2	2	2	0.25	2
Icbo max nA	100	100	15	15	100	50	50
Vce sat max	0.6	0.2	0.2	0.2	0.1typ	0.35	0.4
@ Ic/Ib mA	100/5	10/0.5	10/0.5	10/0.5	10/0.5	50/2.5	50/5
Noise figure dB	10 max	10 max			10 max	10 max	
fT min (*typ)	*200	*130	200	200	*200	*200	250
Outline	MM10	T018	T092zc	T092a	T092a	u32	T092b
Price	14-15p	23-24p	12p	12p	12-13p	57p	19p

BC107 family gain selections and prices: See page 24

SILICON TRANSISTORS

MEDIUM CURRENT SWITCHING, LOW POWER OUTPUT, PNP

	2N3702	2N3703	2N4291	BC126	BC477	BCY31	MPS6534
Vcbo max	40	50	40	35	80	64	40
Vceo max	25	30	30	30	90	50	40
Veb max	5	5	6	5	6	45	4
Ic max mA	200	200	600	600		50	600
Pt max mW	200	200	250	300	360	250	310
hFE	60-330	30-150	100-300	30-120	50 min	15-60	90-270
@ Ic mA	50	50	100	150	2	20	100
Icbo max nA	100	100	500	50	10	50	100
Vce sat max	0.25	0.25	0.4	0.5		0.55	0.3
@ Ic/Ib mA	50/5	50/5	100/10	150/15		20/3	100/10
fT min MHz(*typ)	100	100	*150	*200	*150	0.25	*250
Outline	T092a	T092a	u29	R097f	T018	T05	T092b
Price	11p	10p	18p	15p	33p	£1.12	20p

MEDIUM CURRENT AMPLIFIERS, LOW POWER OUTPUT, PNP

	2N1132	2N4036	40362	40406	40410	40595	
Vcbo max	60	90	70		90	95	
Vceo max (*Vcer)	40	65		50		*95	
Veb max	5	7	4	4	4	4	
Ic max mA	600	1000	700	700	700	2000	
Pt max mW	600	1000	1000	1000	3000	1200	
hFE	30-90	40-140	35-200	30-200	50-250	70-350	
@ Ic mA	150	150	50	0.1	150	300	
Icbo max µA	1	0.1		1(Iceo)		1	
Vce sat max	1.5	0.65	1.4			0.8	
@ Ic/Ib mA	150/15	150/15	150/15			300/30	
fT min MHz(*typ)	60	60	*100	*100	50		
Outline	T05	T05	T05	T05	X84	T05	
Price	24p	52p	44p	44p	65p	£1.03	

MEDIUM CURRENT SWITCHING, LOW POWER OUTPUT, PNP

	BC160	BC303	BFX29	BFX87	BFX88		
Vcbo max	40	90	60	50	40		
Vceo max	40	65	60	50	40		
Veb max	5	7	5	4	4		
Ic max mA	1000	1000	600	600	600		
Pt max mW	750	1000	500	600	600		
hFE	40-250	40 min	50-200	40 min	40 min		
@ Ic mA	100	150	10	10	10		
Icbo max nA	100	20	75	50	50		
Vce sat max	1	0.65	0.4	0.4	0.4		
@ Ic/Ib mA	1A/100	150/15	150/15	150/15	150/15		
fT min MHz	50	60	100	100	100		
Outline	T05	T05	T05	T05	T05		
Price	49p	68p	33p	27p	32p		

SILICON TRANSISTORS

HIGH FREQUENCY, MEDIUM POWER, PNP

	2N2904	2N2904A	2N2905	2N2905A	PN2905		
Vcbo max	60	60	60	60	60		
Vceo max	40	60	40	60	40		
Veb max	5	5	5	5	5		
Ic max mA	600	600	600	600	600		
Pt max mW	600	600	600	600	200		
hFE	40-120	40-120	100-300	100-300	100-300		
@ Ic mA	150	150	150	150	150		
Icbo max nA	20	10	20	10	50		
Vce sat max	0.4	0.4	0.4	0.4	0.4		
@ Ic/Ib mA	150/15	150/15	150/15	150/15	150/15		
fT min MHz	200	200	200	200	200		
Outline	T05	T05	T05	T05	R097f		
Price	22p	24p	27p	29p	11p		

FERRANTI PLASTIC PNP

	ZTX500	ZTX501	ZTX502	ZTX503	ZTX504	ZTX530	ZTX531
Vcbo max	25	35	35	45	70	30	45
Vceo max	25	35	35	45	70	30	45
Veb max	5	5	5	5	5	5	5
Ic max mA	500	500	500	500	500	500	500
Pt max mW	300	300	300	300	300	250	250
hFE	50-300	50-300	100-300	50-300	50-300	100-400	40-120
@ Ic mA	10	10	10	10	10	0.1	0.01
Icbo max nA	200	200	200	200	200	200	200
Vce sat max	0.35	0.25	0.25	0.35	0.6	0.7	0.7
@ Ic/Ib mA	50/5	50/5	50/5	50/5	50/5	10/0.5	10/0.5
fT min MHz	150	150	150	150	150	30	30
Outline	X59	X59	X59	X59	X59	X59	X59
Price	14p	15p	18p	17p	24p	25p	26p

SUPER SILECT COMPLEMENTARY PAIRS

	BFR39	BFR40	BFR41	←NPN PNP→	BFR79	BFR80	BFR81
Vcbo max	90	70	60		90	70	60
Vceo max	80	60	50		80	60	50
Veb max	5	5	5		5	5	5
Ic max mA	1000	1000	1000		1000	1000	1000
Pt max mW*	800	800	800		800	800	800
hFE min @ Ic=.1A	50	75	100		50	75	100
hFE min @ Ic=1A	20	25	25		20	25	25
Icbo max nA	100	100	100		100	100	100
Vce sat max	1	0.5	0.5		1.6	1	1
@ Ic/Ib A	1/0.1	1/0.1	1/0.1		1/0.1	1/0.1	1/0.1
fT min MHz	100	100	100		100	100	100
Outline	T092a	T092a	T092a		T092a	T092a	T092a
Price	22p	23p	23p		22p	23p	23p

SILICON TRANSISTORS

LOW POWER OUTPUT COMPLEMENTARY PAIRS

	BC327	BC328	←PNP NPN→	BC337	BC328		
Vcbo max	45	25		45	25		
Vceo max	45	25		45	25		
Veb max	5	5		5	5		
Ic max mA	800	800		800	800		
Pt max mW	360	360		360	360		
hFE	100-600	100-600		100-600	100-600		
@ Ic mA	100	100		100	100		
Icbo max nA	100	100		100	100		
Vce sat max	0.7	0.7		0.7	0.7		
@ Ic/Ib mA	500/50	500/50		500/50	500/50		
fT min MHz	100	100		100	100		
Outline	T092zb	T092zb		T092zb	T092zb		
Price	25p	24p		24p	23p		

SILICON TRANSISTORS

MEDIUM POWER SILICON NPN

	2N3054	40250	BD124				
Vcbo max	90	50	70				
Vceo max	55	40	45				
Veb max	7	5	6				
Ic max A	4	4	5				
Pt max(@°C) W	25(25)	29(25)	15(60)				
hFE	25-250	20-100	35-150				
@ Ic A	0.5	1.5	0.5				
Icbo max mA	1	1	0.002				
Vce sat max	1	1.5	0.25				
@ Ic/Ib A	0.5/0.05	1.5/0.15	0.5/0.05				
fT min MHz(*typ)	0.75	*1.2	60				
Outline	T066a	T066a	MD17c				
Price	60p	80p	90p				

HIGH POWER SILICON NPN

	2N3055	2N3771	40636	BD130	BDY20		
Vcbo max	100	50		100	100		
Vceo max (*Vcer)	60	40	*95	60	60		
Veb max	7	5	7	7	5		
Ic max A	15	30	15	15	15		
Pt max (@°C) W	115(25)	150(25)	115(25)	100(45)	115(25)		
hFE	20-70	15-60	20-70	20-70	20-70		
@ Ic A	4	15	4	4	4		
Icbo max mA	5	2	0.5	5	5		
Vce sat max	1.1	4	1	1.1	1.1		
@ Ic/Ib A	4/0.4	20/2	4/0.4	4/0.4	4/0.4		
fT min MHz(*typ)	0.4	0.2		*1.1	*1		
Outline	T03	T03	T03	T03	T03		
Price	70p	£2.80	£1.36	60p L	80p		

L=*limited to inventory*

HIGH VOLTAGE SILICON NPN

	BUX26	BU105	BU208	BF457	BF458	BF459	
Vcbo (*Vces)max	*750	*1500	*1500	200	250	300	
Vceo max	350	750	700	160	250	300	
Veb max	7	5	7	5	5	5	
Ic max A (peak)	6(10)	2.5	5	0.1	0.1	0.1	
Pt max (@°C) W	60(75)	10(25)	12(25)	6(25)	6(25)	6(25)	
hFE	2.2 min	2 min	2.2 min	25 min	25 min	25 min	
@ Ic A	4.5	2	4.5	0.03	0.03	0.03	
Icbo max mA	15	1	1	0.05	0.05	0.05	
Vce sat max	5		10	1	1	1	
@ Ic/Ib A	4/1		4.5/2	30/6mA	30/6mA	30/6mA	
fT min MHz(*typ)	*20	*7.5	*7	80	80	80	
Outline	T03	T03	T03	X58	X58	X58	
Price	£2.60	£2.40	£5.15	37p	43p	47p	

SILICON TRANSISTORS

SILICON POWER COMPLEMENTARY PAIRS

NPN: / PNP:	2N5192 / 2N5195	BD131 / BD132	BD135 / BD136	BD139 / BD140	BD645 / BD646	BD649 / BD650	
Vcbo max (*Vcer)	80	70	45	*100	60	100	
Vceo max	80	45	45		60	100	
Veb max	5	6	5	5	5	5	
Ic max A	5	4	1.5	1.5	8	8	
Pt max (@°C) W	40(25)	15(60)	6.5(60)	6.5(60)	62(25)	62(25)	
hFE	20-80	40 min	40-250	40-160	750min	750min	
@ Ic A	1.5	0.5	0.15	0.15	3	3	
Icbo max mA	0.1		0.0001	0.0001	0.2	0.2	
Vce sat max	0.6	0.4	0.6	0.6	2	2	
@ Ic/Ib A	2.5/0.25	0.5/0.05	0.5/0.05	0.5/0.05	3/0.012	3/0.012	
fT min MHz	2	60	50	50	1	1	
Outline	X58	X58	X58	X58	X75b	X75b	
Price NPN:	81p	48p	37p	65p	N/A	N/A	
Price PNP:	95p	56p	39p	71p	N/A	N/A	
Matched pair:	£1.96	£1.19	89p	£1.45	£4.90	£6.15	

SILICON POWER COMPLEMENTARY PAIRS

NPN: / PNP:	MJ481 / MJ491	MJ3055 / MJ2955	MJE3055 / MJE2955	TIP31A / TIP32A	TIP41A / TIP42A	TIP41C / TIP42C	
Vcbo max	60	100	70	60	60	100	
Vceo max	60	60	60	60	60	100	
Veb max	5	7	5	5	5	5	
Ic max A	4	15	10	3	6	6	
Pt max (@°C) W	87(25)	150(25)	90(25)	40(25)	65(25)	65(25)	
hFE	30-200	20-70	20-70	25-100	15-75	15-75	
@ Ic A	1	4	4	1	3	3	
Icbo max mA	1	1	1	0.5	0.7	0.7	
Vce sat max	0.4	1.1	1.1	1.2	1.5	1.5	
@ Ic/Ib A	1/0.1	4/0.4	4/0.4	3/0.375	6/0.6	6/0.6	
fT min MHz	4	4	2	3	3	3	
Outline	T03	T03	X58a	X75b	X75b	X75b	
Price NPN:	£1.20	£1.20	68p	67p	80p	£1.12	
Price PNP:	£1.35	80p	£1.12	77p	92p	£1.35	
Matched pair:	£2.70	£2.15	£1.95	£1.59	£1.87	£2.62	

NOTE: All T03 and MD]7c transistors are supplied with insulating sets with 6BA clearance bushes. Please request 4BA bushes in lieu if required.
All other power transistors are supplied with insulating sets as appropriate.

SILICON TRANSISTORS

FIELD EFFECT TRANSISTORS, N–CHANNEL

	2N3819	2N3823E	2N4303	2N5163	2N5457	2N5458	2N5459
Vds max	25	30	30	25	25	25	25
Vdg max	25	30	30	25	25	25	25
Vgs max	–25	–30	–20	–25	–25	–25	–25
Ig max mA	10	10	10	10	10	10	10
Pt max mW	200	250	300	200	200	200	200
Ig rev (max) nA	–2	–0.5	–1	–10	–1	–1	–1
Vgs (cut-off) max	–8	–8	–6	–8	–6	–7	–8
Vgs typ	–4				–2.5	–3.5	–4.5
@ Id mA/Vds	0.2/15				0.1/15	0.2/15	0.4/15
Id @ Vgs=0 mA	2–20	4–20	10 max	1–40	1–5	2–9	4–16
Yfs, mA/V@ Vgs=0	2–6.5	1.8 min	2 min	1.8 min	1–5	1.5–5.5	2–6
Outline	T092c	RO97Ab	RO97Ab	R097Ab	R097Ab*	R097Ab*	R097Ab*
Price	28p	24p	30p	20p	32p	32p	32p

*alternative outline T092d

FIELD EFFECT TRANSISTORS, N– & P–CHANNEL

	40602	BF244B	MPF102	←N–channel P–channel→	2N3820
Vds max	20	30	25		–20
Vdg max		30	25		–20
Vgs max	–8	–30	–25		20
Ig max mA	**	30	10		–10
Pt max mW	200	360	200		200
Ig rev max nA	–1	–5	–2		20
Vgs cut-off max	–2 typ	–8	–8		8
Vgs typ					4
@ Id mA/Vds					
Id @ Vgs=0	18 typ	25 max	2–20		0.3–15
Yfs, mA/V@ Vgs=0	10typ	3–6.5	2–7.5		0.8–5
Outline	T072c	T092c	T092d		T092c
Price	46p	25p	37p		58p

** Mosfet

UNIJUNCTION TRANSISTORS

	2N2646	TIS43
Emitter reverse volts max	30	30
Interbase voltage max	35	35
Peak emitter current	2A	1A
rms emitter current max	50mA	50mA
Power dissipation max mW	300	300
Intrinsic standoff ratio	0.56-0.75	0.55-0.82
Interbase resistance	4K7-9K1	4K - 9K1
Peak point Ie max	25µA	5µA
Valley point Ie min	4mA	2mA
Peak O/P into 20Ω	3V	3V
Max Ce	10µF	
Outline	T072d	T092e
Price	51p	25p

SILICON TRANSISTORS

SILICON TRANSISTOR NOTES

BC107, BC177 and similar series hfe group classifications

BC107	BC167	BC259	BC107	BC158	BC258	BC108	BC268
BC108	BC168	BC267	BC108	BC159	BC259	BC109	BC269
BC147	BC177	BC268	BC109	BC167	BC267	BC148	
BC148	BC178		BC147	BC168	BC268	BC149	
BC157	BC179		BC148	BC169	BC269	BC168	
BC158	BC257		BC149	BC178		BC169	
BC159	BC258			BC179			
Group A			Group B			Group C	
hfe	125 – 260		240 – 500			450 – 900	
hFE	120 – 220		180 – 460			380 – 800	

hfe and hFE are given for Ic = 2mA and Vce @ 5V.

2N2926 hfe groups

2N2926	brown	red	orange	yellow	green
hfe @ Ic = 2mA	35–70	55–110	90–180	150–300	235–470

Not all gain groups are maintained in stock and the nearest available will be supplied to orders.

Preferred classified types normally in stock are:-

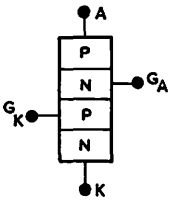
BC107A	BC108A	BC109B	BC147A	BC148A	BC149B
BC107B	BC108B	BC109C	BC147B	BC148B	BC149C
	BC108C			BC148C	
BC157A	BC158A	BC159A	BC167A	BC168A	BC169B
	BC158B	BC159B	BC167B	BC168B	BC169C
				BC168C	
BC177A	BC178A	BC179A	BC257A	BC258A	BC259A
BC177B	BC178B	BC179B		BC258B	BC259B
BC267A	BC268C	BC269C			

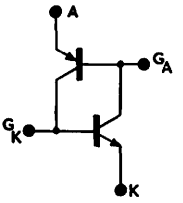
2N2926 red, orange, yellow, green
Add 1p per transistor for each increment in gain except BC107,-8 &-9

SILICON TRANSISTORS

BRY39 Silicon Controlled Switch

Price 50p Outline TO72e (see below)

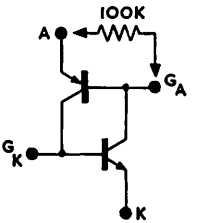




Ratings: Dissipation 275mW max
PNP transistor Vcbo = 70V max
Vebo = 70V max
NPN transistor Vcbo = 70V max
Vebo = 5V max
Ie = 2.5A peak

Device used as a silicon controlled switch
(Parameters with A & G_A connected via 100K)

Vf = 1.4V max @ IA = 50mA
Ih = 1mA max, 0.1mA min
t.on = 0.25 µ.sec max
t.off = 5µ.sec max
IK = 175mA max
I_{GKT} = 1µA max
V_{GKT} = 0.5V max
I_{GAT} = 100µA max
V_{GAT} = 1V max

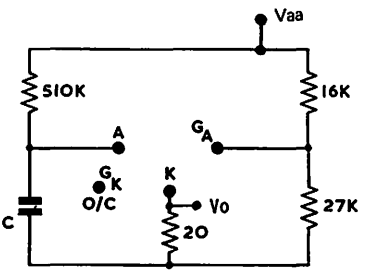


Device used as a unijunction
(See circuit opposite)

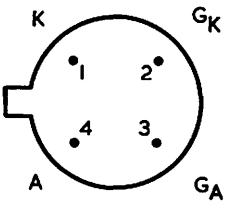
I_P (R_{GA-K} = 10K) = 5µA max
(R_{GA-K} = 1M) = 1µA max
Iv (R_{GA-K} = 10K) = 70µA min
(R_{GA-K} = 1M) = 50µA max

Typical outputs for circuit opposite

Vo for C = 0.1µF = 0.5V_{AA}
C = 0.01µF = 0.3V_{AA}
C = 0.001µF = 0.15V_{AA}



OUTLINE
TO72e



View on pins.

DIODES

GERMANIUM

Type	PIV	If @ max mA	Vf max @ *typ	If mA	If surge mA	Ir µA max @ Vr *typ		Outline	Special feature	Price
AA113	60	50	1.4	20	100	180	60	DO7	rf circuits	6p
AA116	20	45	2.0	30	200	90	20	DO7	rf circuits	6p
AA117	90	150	2.1	30	500	80	100	DO7	gen purpose	6p
AA118	90	150	1.85	30	500	75	100	DO7	gen purpose	6p
AA119	30	100	2.8	30	200	90	45	DO7	rf circuits	6p
NTGD10	30	1000	1.0	1000		20	30	T01b	low Vf	40p
OA47	25	50	*0.6	30	150	*30	25	DO7	low Vf	9p
OA79	45	30	3.0	30		18	60	DO7	low Ir	7p
OA90	30	30	*2.0	30	45	*300	30	DO7	rf detector	6p
OA91	115	50	*2.1	30	150	*75	100	DO7	gen purpose	6p
OA95	115	50	*1.85	30	150	*80	100	DO7	gen purpose	6p

SILICON

1N914	100	75	1.0	10		0.025	20	DO7	high speed	6p
1N914B	75	75	1.0	100		0.025	20	DO7	low Vf	7p
1N916	100	75	1.0	10		0.025	20	SO6	high speed	7p
1N4148	75	200	1.0	10	1A	0.025	20	DO35	high speed	5p
1S920	30	50	1.2	200	2A	0.1	30	SO6		9p
1S940	30	50			2A	5	30	SO6	gen purpose	5p
BA127D	60	200	1.1	100		1	60	DO7	hf rectifier	7p
BA133F	1000	300	1.1	200	30A	1	1K	A1ev	hi-V hf rect	16p
BA145	300	10	1.0	100	1A	10	300	DO14	colour TV	24p
BA156		20	0.8	3				DO7	bias diode	14p
OA200	50	160	*0.9	30	250	*0.02	50	DO7		14p
OA202	200	160	*0.9	30	250	*0.01	150	DO7		15p

VARIABLE CAPACITANCE DIODES

	Vr max	Ir max	Ctyp @ Vr		C @ Vr		C typ@Vr		Qmin@MHz		Outline	Price
BA102yellow	20	5.0µA,80°C	46	1.0	24-30	4	13	20			DO7	25p
BA138 blue	30	0.1µA,25°C	13	3.0	4.4-5.5	30					DO7	31p
BB103 blue	32	0.5µA,60°C	48	0.5	29-33	3	11	30	100	100	DO7	28p
BB103 green	32	0.5µA,60°C	48	0.5	27-31	3	11	30	100	100	DO7	28p
BB104 #	32	0.5µA,60°C	60	0.5	34-42	3	15	30	100	100	M689	54p
BB105B	28	0.5µA,60°C	17.5	1.0	2.0-2.3	25	11.5	3			A246	38p
BB109G	28	0.5µA,60°C	26-32pF @ 3V, 4.3-6pF @ 25V						≈600	200	A246	70p

#: dual diode

≈: typical

SILICON PIN DIODE

BA379: Current controlled rf resistor specially designed for AGC networks.

Forward series resistance @ 10mA = 6.5Ω max.
Reverse cut-off impedance @ -1V = 2K5Ω min. Outline A1vs Price: 45p

Max ratings: Vr 30V; If 20mA;
Characteristics: Ir = 1 µA max @ -10V; C = 0.34pF @ -1V, 100MHz; 0.3pF @ 0V, 900MHz

RECTIFIERS

SILICON RECTIFIER DIODES

Type	PIV	If @ max amp	Vf max @	If A	If surge amp	IrμA max @	Vr	Outline	Special feature	Price
B0680	1000	1			50	100		D027		16p
BY238	850	0.8	1	0.5	30	100	850	C42k	Vrpk.1500V	14p
SD4	400	1	1	1	50	5	400	A1ev	avalanche	8p
S2CN1	160	1.5	2	10	45	10	160	S015	low cost	15p
S10M1	1000	1.5	1.5	5	47	10	1K	D027		20p
BYX38-300	200	2.5	2.1	15	38	10	200	D04 (	stud cath.	35p
BYX38-300R)		(45°C)							stud anode	35p
3A200	200	3	1	3	200	10	200	A1eq		20p
3A800	800	3	1	3	200	10	200	A1eq		32p
6F40	400	6(130°C)			120	4	400	D04		49p
16F40	400	16(115)			365	4	400	D04 .		82p
40HF10	100	40(100°)	1.3	40	445			S21e		98p
40HF40	400	40(100°)	1.3	40	445			S21e		£1.32

Insulating sets are not included with stud type prices.

SILICON BRIDGE RECTIFIERS

Type	V.in rms	If max	Vf max	@ If	If surge	IrμA max	@Vr	Outline	Special feature	Price
W02	140	1A	2	1A	50A	20	200	B2	P.C.	30p
BY164	42	1.4A	2	1A	25A			B4	P.C.	51p
B1906	40	†1.5A			50A			B5	P.C.	29p
B1912	80	†1.5A			50A			B5	P.C.	68p
BR81WA	70	‡3.0A	2.2	3A	60A	5	100	B10	gen purp	80p
C1406	40	†3.2A			100A			B6	P.C.	90p
C1412	80	†3.2A			100A			B6		£1.00
E2506	40	†5.0A			250A			B7		£1.50
E2512	80	†5.0A			250A			B7		£1.74
BR92WA	140	‡6.0A	2.4	6A	300A	10	200	B11	gen purp	£1.28
PM7A2	140	‡10A			200A			B8	tab fix	£1.65
B60/52-12	60	12A			300A			B9	indust.	£3.20

‡with contact cooling. †with contact cooling-derate to 66% in free air.

DIACS (Breakdown diodes)

A9903	: Breakdown 32V nominal, 5V minimum change on breakdown	D07	25p
2N4991	: Breakdown 6 to 10V (gate O/C), 3.5V minimum change	T098b	35p

THYRISTORS

200V			C106B1			
400V	B0126	B0226	C106D1	TAG3-400	TAG6-400	C0326
600V	B0140	B0240		TAG3-600	TAG6-600	C0340
700V		B0246				
800V					TAG6-800	
If. rms max.	4.7	4.7	4	5	7.5	25
If average, max	0.8(45°C)	3(61°C)	2	3.2	4.8	16(59°C)
Vgt max	3	3	0.8	2	2	
Igt max mA	15	15	0.2	15	25	16
Vfm peak @ If			2.2	2.1	1.7	3
Ihx max mA	50	50	5	25	25	30
Outline	M477	M477	M332	T066b	T066b	X383
200V			42p			
400V	65p	88p	53p	£1.06	£1.37	£3.16
Prices: 600V	94p	£1.05		£1.50	£1.68	£3.50
700V		£1.58				
800V					£2.67	

	2N5062	2N1599	BT106	BT107	NAS206S5	2N4443
Vf max	100	400	700	500	400	400
If rms max.	0.8	1.6			6	8
If average, max	0.25	1.0	1.0	6.5		5
Vgt max	1.2	3	3.5	2	1.5	1.5
Igt max mA	0.35	10	50	10	15	30
Vfm peak @ If	1.7	2		2		2.5
Ihx max mA	10				20	40
Outline	T092f	T05b	T064	T064	X75a	X58a
Price	42p	76p	£1.20	£1.00	81p	85p

Insulating sets are supplied at no charge with TAGs & 2N4443.
NAS 206S5 has an isolated tab and requires no insulating set.

TRIACS

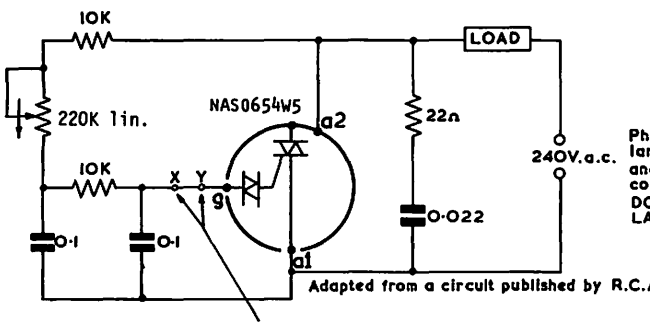
TRIACS

	NAS-0164X3	NAS-0654X5	NAS-1001X5	NAS-1004X5	TAG302-400	TAG302-600	E99A40
Vf max (+ or -)	400	400	100	400	400	600	400
If max rms A	1.6	6.5	10	10	2	2	25
Vgt max (+ or -)	0.8	1.2	1.2	1.2	2	2	2.5
Igt all quadrants	7	20	20	20	25	25	50
Vfm peak @If	1.6	1.6	1.6	1.6	1.7	1.7	
Outline	R097g	X75c	X75c	X75c	T05c	T05c	X131f
Price	38p	80p	60p	£1.04	73p	£1.53	£5.25

	TRIACS			TRIACS WITH DIACS			
	RCA-T2700D	RCA-T2800D		NAS-0164W3	NAS-0654W5	NAS-1004W5	
Vf max (+or-)	400	400		400	400	400	
If max rms A	6	8		1.6	6.5	10	
Vgt max (+or-)	2.2	2.5					
Igt all quadrants	25mA	60mA					
Vfm peak @ If	2.2(30A)	2(30A)		1.6	1.6	1.6	
Outline	T066c	X75c		R097g	X75c	X75c	
Price	£1.22	96p		40p	84p	£1.09	

Insulating sets are supplied at no charge with T2700D & T2800D
NAS types in X75c do not require insulating sets:
(Isolation test voltage: 1.6KV for 1 min. @ 80°C)

APPLICATION CIRCUIT FOR TRIACS



Phase control circuit for lamp dimming, heat controls and universal motor speed controls.
DO NOT USE FLUORESCENT LAMPS AS LOAD.

Adapted from a circuit published by R.C.A.

T2800D may be used for higher current applications but external diac must be used in series with gate connection.

(Type A9903 suggested)

ZENER DIODES

Voltage	400mW rZ	@ IZ	1W rZ	@ IZ	1.5/3W† rZ	@ IZ	20W rZ	@ IZ
2.7	90	5						
3.0	90	5						
3.3	90	5						
3.6	90	5						
3.9	85	5	7	100				
4.3	80	5	7	100				
4.7	80	5	7	100	10	100		
5.1	60	5	5	100	5	100		
5.6	40	5	2	100	4	100		
6.2	10	5	2	100	3	100		
6.8	8	5	3.5	37	3	100		
7.5	7	5	4	34	3.5	50	0.3	2A
8.2	7	5	4.5	31	3.5	50	0.3	2A
9.1	10	5	5	28	4.5	50	0.5	1A
10	15	5	7	25	5	50	0.5	1A
11	20	5	8	23	5	50	1	1A
12	20	5	9	21	5	50	1	1A
13	25	5	10	19	5	50	1	1A
15	30	5	14	17	8	50	1.2	1A
16	40	5	16	16	9	25	1.2	500
18	55	5	20	14	11	20	1.5	500
20	55	5	22	13	12	20	1.5	500
22	58	5	23	12	13	20	1.8	500
24	80	5	15	11	14	20	2	500
27	80	5	35	9.5	18	20	2	500
30	90	5	40	8.5	22	20	2.5	500
33	90	5	45	7.5	25	20	3	500
36			50	7	30	20	4	200
39			60	6.5	35	10	5	200
43			70	6	40	10	6.5	200
47			80	5.5	50	10	7	200
51			95	5	55	10	7.5	200
56			110	4.5	63	10	8	200
62			125	4	75	10	9	200
68			150	3.7	90	10	10	200
75			175	3.3	100	10	10.5	200
82			200	3				
100			250	2.8	300	2		
120			550	2				
150			1000	1.7	600	2		
180			1200	1.4				
200			1500	1.2	1100	2		

†3W when used with 266F heat clip.

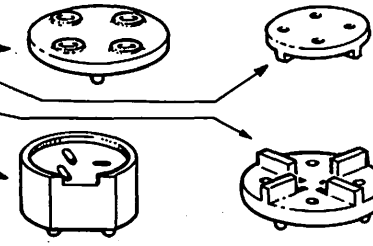
rZ = dynamic slope resistoance (max)
IZ = test current in mA (or amps where stated)
Tolerance 5% at test current
Outlines: 400mW S06 or D07; 1W D027 or D029
1.5W D03; 20W D04.
Polarity: 400mW cathode by coloured band
1W cathode by band or chamfered end.
1.5W & 20W cathode to metal envelope or stud.
NOTE: for zener operation the cathode is made positive.

	Prices
400mW	14p
1W	21p
1.5W	67p (4.7V to 75V)
1.5W	£1.00 (100 to 200V)
20W	94p

TRANSISTOR HARDWARE

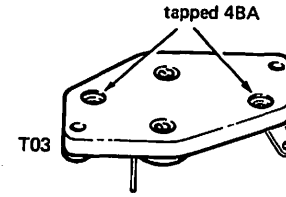
TRANSISTOR MOUNTING PADS

T05 outline, 0.2" P.C.D. — 2 for 1p
T018 outline, 0.15" P.C.D. — 2 for 1p
T05 and T018 outlines, type T0518 black polypropylene — 1.2p each
T092 and T098 outlines, type EPX003 white nylon, spreads T092a and T098a to T05 spacing — 1.2p each
T092, type EPX005 white nylon, spreads T092b to T05 — 1.2p each

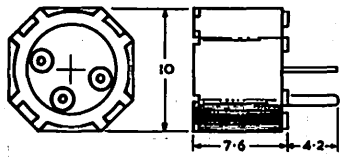


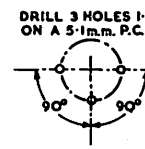
TRANSISTOR HOLDERS

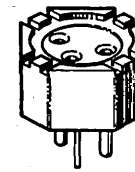
3–lead P.C.B. mtg. T018	No. 2044	12p
3–lead P.C.B. mtg. T05	No. 2045	19p
T03 type flush mtg.	No. S236	12p
MD17c type flush mtg.	No. S239	12p
T066 type flush mtg.	No. S249	12p



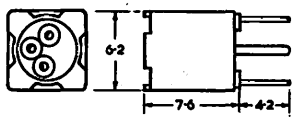
Type 2045







Type 2044



Dimensions in m.m.

INSULATING SETS

Type	Insulating washer	PTFE ring	6BA flange	4BA flange	Flange	Spring washer	Price
D04	2	1					5p
D05	1				1		7p
MD17c	1		2 or 2				5p†
T03	1		2 or 2				5p†
T066	1			2			6p
X58	1					1	4p
X58a,c.	1					1	5p
X75	1		1 small or 1				5p

†Prices of 4BA sets add 1p to those prices shown.

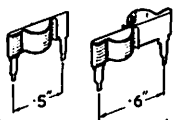
Insulating flanges alone: 4BA: 4p pair; 6BA: 3p pair.

Hard anodised washer T03 and T066 sizes 9p each

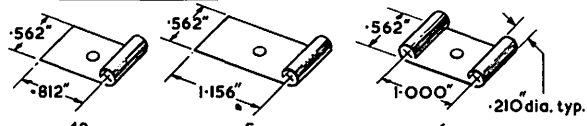
For transistor covers, see Page 33.

COOLING CLIPS & HEATSINKS

COOLING CLIPS



3p Single — TO92 — 4p Double

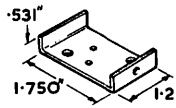


4p A1031 — 5p A1032 — 6p A1053

HEAT SINKS

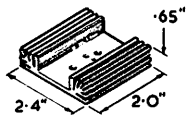
POWER TYPE FOR TO3

A1058
14°C/W
PRICE 22p



BLACK ANODISED

2Y-TO66 34p
2Y-TO3 29p
6·2°C/W

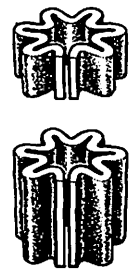


COOLING CLIPS EXTRUDED ALUMINIUM ANODISED

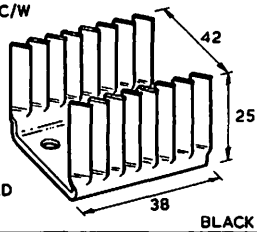
DOUBLES TRANSISTOR DISSIPATION

OUTLINE	HEIGHT	TYPE
TO5	·25"	5F2
TO5	·50"	5F
TO18	·25"	18F2
TO18	·50"	18F
TO1	·50"	224F
DO1	·50"	244F
DO3 DO4	·50"	266F

PRICE 6p each

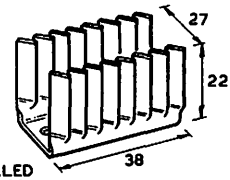


TYPE TV3 PRICE 15p
7·2°C/W



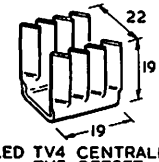
DRILLED TO3

TYPE TV2 PRICE 15p
10·5°C/W



DRILLED TO66

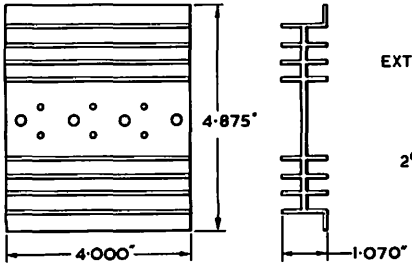
TYPES TV4 & 5 PRICE 15p
17°C/W



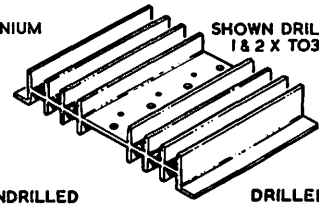
DRILLED TV4 CENTRALLY
" TV5 OFFSET

BLACK ANODISED — DIMENSIONS IN m.m.

HEAT SINK TYPE 10DN400



EXTRUDED ALUMINIUM
2°C/W



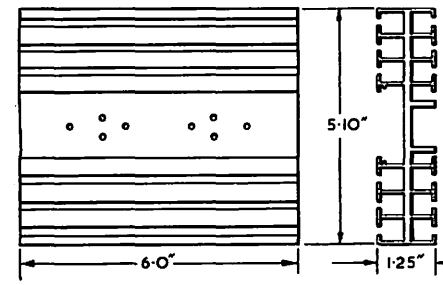
SHOWN DRILLED 1 & 2 X TO3

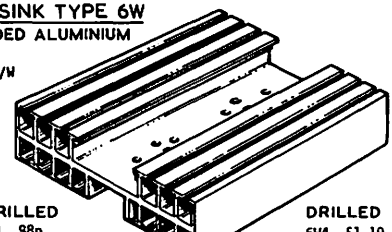
UNDRILLED 10DN400A 50p

DRILLED 10DN400C 60p

HEAT SINK TYPE 6W

EXTRUDED ALUMINIUM
1.25°C/W





UNDRILLED 6W1 98p

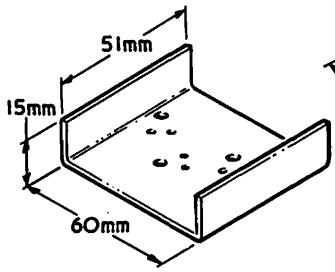
DRILLED 6W4 £1.10

INCREASE $R_{TH.}$ TO 1·5°C/W IF USED HORIZONTALLY
REDUCE $R_{TH.}$ TO 1.1°C/W IF BLACKENED

HEATSINKS

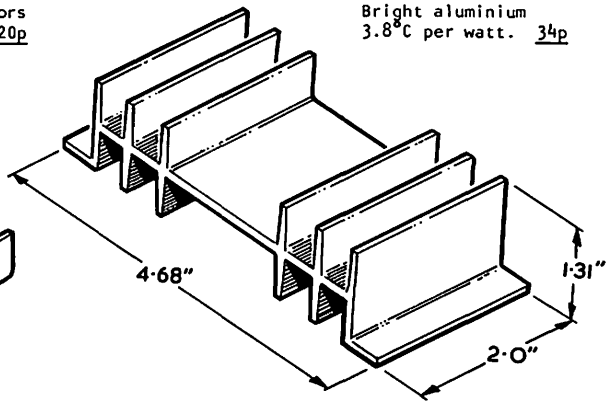
TYPE 17C2

Takes one or two MD17c transistors
Black anodised aluminium. 20p

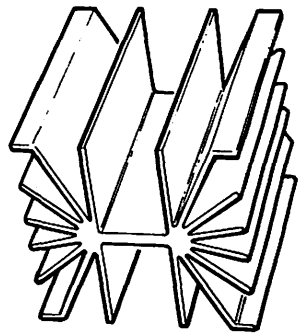


TYPE 2P1

Bright aluminium
3.8°C per watt. 34p



R-TYPE



Length 2.75" (70mm) Type 2.75R £1.40
Black anodised only
Thermal dissipation(from transistor using *Thermopath* compound):1.1°C/W.

Length 5.5" (140mm) Type 5.5R £2.30
Black anodised only
Thermal dissipation (from transistor using *Thermopath* compound):0.7°C/W

The R-type heat sinks are undrilled.

HEAT SINK COMPOUNDS

THERMOPATH 167 compound

Improves heat transfer by up to 50% Per jar, 11gm. 26p
Per tube 45gm. 80p

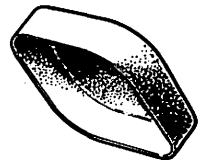
SILICONE GREASE

Well established as an aid to increasing heat transfer from transistor to sink. Per tube 100gm £1.65
Per pack 2.5gm 12p

TRANSISTOR COVERS

Simple clip on types for TO3 and TO66 sizes 7p each

Flanged type with two fixing holes TO3 only 8p each



NEAR EQUIVALENTS TABLE

1N34	0A91
1N36	0A90
1N38	0A91
1N96	0A90
1N290	0A91
1N448	0A91
1N560,-2	BY238
1N597	BY238
1N854	BY238
1N914	1N4148
1N1255,-A	1N5399
1N1695	SD4
1N2069,-A	SD4
1N2071	1N5399
1N3769	0A91
1N4001–5	SD4
1N4006,-7	1N5399
1N4250	BY238
1N4448	1N4148
1S32,-3,-4	0A90
1S124	1N5399
1S127	0A90
1S149	1N5399
1S206,-9	1N5399
1S426	0A90
1S442	0A90
1S686	1N5399
1T23	0A90
2G102	NKT677F
2G301,-3	2N1305
2G302,-4	2N1307
2G306	2N1309
2G308	2N1307
2G309	2N1309
2G371	NKT213
2G374	2N1307
2G377	NKT217
2G381,-2	2N1305
2G383	ACY17
2G384	ACY18
2G385	ACY19
2G386	ACY18
2G387	ACY21
2G401,-2	AF127
2G415	AF124
2G417	AF127
2N63,-4	NKT214
2N65	2N1305
2N79,-86	NKT214
2N107	2N1305
2N111,-A	2N1305
2N112,-A	2N1305
2N113	2N1305
2N114	2N1309
2N130,-A,-1	NKT214
2N131A	2N1305
2N132A	NKT214
2N133,-A	NKT214
2N135,-6,-9	2N1305
2N140	NKT274
2N206	NKT214
2N218,-9	2N1307
2N235,-A,-B	NKT404
2N238,-A,-B	NKT404
2N249	AC128
2N252	NKT677F
2N273,-9	NKT214
2N280	NKT214
2N281	2N1305
2N284,-A	NKT214
2N292	2N1304
2N301,-A	NKT403
2N308,-9	NKT677F
2N310	NKT677F
2N331	AC128
2N335	BFY50
2N337,-8	BFY50
2N350	NKT403
2N351	NKT404
2N368	NKT214
2N370,-2	NKT603F
2N376	NKT404
2N388	BFY50
2N396	ASY26
2N397	ASY27
2N399	NKT404
2N400,-1	NKT404
2N404	2N1305
2N405,-6	NKT214
2N407,-8	ACY20
2N413,-A	2N1303
2N414,-A	ASY26
2N415,-A	2N1307
2N419	NKT404
2N428	2N1307
2N439A	2N1305
2N447A	2N1308
2N456,-7	NKT403
2N481	2N1303
2N482,-3,-4	2N1305
2N497,-8	BC300
2N519	NKT261
2N554	AD150
2N561	NKT404
2N576	2N1304
2N591	AC126
2N614,-5,-6	2N1305
2N617	2N1305
2N634,-A	2N1304
2N647,-9	2N1304
2N698,-9	BC300
2N702,-3	BC107
2N708,-9	BSX20
2N717,-8,-8A	2N2484
2N719,-A	BC300
2N720,-A	BC300
2N721,-2	BC212L
2N728,-9	2N2369A
2N743,-4	2N2369A
2N753,-6,-8	2N2369A
2N834,-A,-5	BSX20
2N869	BFR79
2N871	BFX85
2N910	BFX85
2N911,-2	BFX84
2N914,-6	BSX20
2N918	BF173
2N930	2N3707
2N947	BSX20
2N991	AF127
2N995	BFR79
2N1007	2N1305
2N1008	2N1305
2N1110,-1	AF127
2N1116,-7	BFX84
2N1173	AC176
2N1176	NKT211
2N1227	NKT404
2N1252	BFY50
2N1253	BFY51
2N1370	2N1309
2N1371	ACY19
2N1372	2N1307
2N1373–7	ACY19
2N1378–81	2N1309
2N1382,-3	ACY19
2N1420	2N1711
2N1491	2N2218
2N1507	BFX85
2N1565	BFY50
2N1566	BFX85
2N1639	AF127
2N1700	2N3053
2N1701	2N3054
2N1702	2N3055
2N1714	BFY50
2N1716	BFY51
2N1889,-90	BFX85
2N1924,-5	NKT217
2N1973,-4,-5	BFX85
2N1983,-4	BFX85
2N1985	BFX84
2N1986	BFX85
2N1987–90	BFX84
2N1991	BFX29
2N2049	BFX85
2N2067	NKT404
2N2068	NKT403
2N2092	NKT613F
2N2102	40412
2N2192–4	BFX85
2N2195,-A,-B	BFY50
2N2217	2N2218
2N2236,-7	2N3053
2N2243,-A	40412
2N2256	BSX20
2N2297	BFY50
2N2303	BFX87
2N2368	2N2369A
2N2369	2N2369A
2N2410,-3	2N2218
2N2411,-2	BC177A
2N2430	AC176
2N2443	40412
2N2475	BSX20
2N2476	2N2218
2N2477	2N2219A
2N2481	BSX20
2N2509	C407
2N2537,-8	2N2218
2N2604,-5	2N4289
2N2696	BFR79
2N2708	BFY90
2N2712-4	2N2926/O
2N2715,-6	2N3663
2N2800,-1	BFX87
2N2845,-7	MPS6531
2N2846,-8	2N2218
2N2857	BFY90
2N2892	BFX84
2N2893	BFX85
2N2894	BFR79
2N2906,-A,-7	BC212L
2N2921	2N2926/B
2N2922	2N2926/R
2N2923	2N2926/O
2N2951	2N2218A
2N2987,-9	BC300
2N3010,-1	BSX20
2N3012	BFR79
2N3013	BSX20
2N3015	2N2218
2N3020	BC300
2N3072	BFX29
2N3072 3	BCY70
2N3107	BFX85
2N3108	BFX84
2N3109	BFY51
2N3110	BFY50
2N3115,-6	MPS6531
2N3120	BFX87
2N3121	BCY70
2N3133,-4	2N2905
2N3135,-6	MPS6534
2N3137	BFX55
2N3250,-A	BCY70
2N3251	BCY71
2N3252	2N2218
2N3353	2N2218A
2N3287–94	BSX20
2N3299	2N2218
2N3300–2	2N2218
2N3391	2N3391A
2N3392	2N2926/Y
2N3393	2N2926/O
2N3394	2N2926/R
2N3402–4	2N3405
2N3414–7	2N3704
2N3418	BFX84
2N3614	NKT403
2N3662	2N3663
2N3691–4	BC107
2N3721	2N2926/R
2N3825	ZTX301
2N3877,-A	C407
2N3900,-A	2N2926/G
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2N4434	BF115
2S12,-13	2N1305
2S14	NKT214
2S30,-1,-4	2N1305
2S36	2N1305
2S51,-2,-3	2N1305
2S144	NKT677F
2S302,-A	BCY31
2S303,-4	BCY31
2S322,-A	BCY31
2S323,-4	BCY31
2S433	NKT674F
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2SA37,-42	NKT677F
2SA49	2N1305
2SA51	NKT677F
2SA52,-3	2N1305
2SA58–60	NKT674F
2SA72,-3	NKT674F
2SA76	NKT674F
2SA92,-3	NKT674F
2SA103	NKT677F
2SA108–12	NKT603F
2SA152	2N1305
2SA156,-7	2N1305
2SA175	NKT677F
2SA202,-3	2N1305
2SA220–3	NKT674F
2SA238,-7	NKY674F
2SA241	NKT603F
2SA255–9	NKT674F
2SA267–72	NKT603F
2SA285–7	NKT674F
2SA313–6	NKT674F
2SA323,-4	NKT674F
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2SA350–2	NKT674F
2SA364,-5	NKT603F
2SA367–9	NKT603F
2SA377	NKT603F
2SA400	NKT603F
2SA433	NKT674F
2SB26A	NKT404
2SB32	NKT214
2SB47,-54	2N1305
2SB75	NKT214
2SB77	NKT211
2SB90	NKT214
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2SB107	NKT404
2SB110,-1	NKT214
2SB126,-7	NKT404
2SB153	NKT214
2SB155	NKT211
2SB156,-A	NKT211
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2SB174	NKT211
2SB175	NKT214
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2SB185	NKT214
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2SB201	AC128
2SB202	NKT211
2SB242,-3	NKT404
2SB263	NKT211
2SB293,-4	NKT211
2SB405	AC153
2SB414	NKT404
2SB426	NKT404
2SB448	NKT404
2SC37	BC107
2SC80	BC107
2SC98,-9	BC109
2SC103	BC107
2SC121–4	2N3663
2SC127	BC109
2SC155,-6	BF167
2SC171–4	BC107
2SC186,-7	BF167
2SC206	BC107
2SC171	2N3663
2SC281	BC107
2SC286–8	2N3663
2SC316	BC107
2SC360,-8	BC107
2SC378	BC107
2SC429,-30	BF167
2SD30,-4,-8	AC128
2SD100	AC128
2SD167	AC128
2SD178	AC128
2SD186,-7	AC128
2SD193	AC128
2T16	NKT214
3N34,-5,-6A	BF167
3F5,-10,-20	BZY30-300
6F5,-10,-20	BZY38-300
16J1,-2	2N3663
16X1,-2	C407
33DP1	0A91
40A5	B0680
50D4,-E4	B0680
146T1,-2	NKT404

NEAR EQUIVALENTS TABLE

147T1,2	NKT404
40022	NKT404
40253	NKT211
40254	NKT404
AA112	0A90
AA118	0A91
AA130,1	0A90
AA132	0A91
AC106	AC153K
AC108,9	NKT214
AC113,5	AC126
AC116,7	AC153K
AC121,5	NKT211
AC122	AC126
AC132	AC128
AC154	AC128
AC156	AC126
AC157	AC176
AC170,1	AC126
AC177	AC128
AC181,5	AC176
ACY23	AC151
ACY27–9	AC151
ACY30	AC151
ACY31	ACY18
ACY32,4,5	AC151
ACY36	NKT212
AD130	NKT404
AD139	AD162
AF101	0C44
AF102	NKT603F
AF119	NKT674F
AF113–7	NKT674F
AF143,4	NKT674F
AF150,6	NKT674F
AF166	NKT603F
AF165,8	NKT674F
AF179	AF118
AFZ11,2	AF139
ASY24	NKT674F
ASY30	NKT674F
ASY49	ACY39
ASY50	AC152
ASY51,2	ACY18
ASY55–8	2N1305
ASY59	2N1307
ASY71	ACY39
ASZ15	NKT403
ASZ16	NKT404
ASZ17,8	NKT403
AU101–3	AU111
AUY21	NKT404
BC113	2N2925
BC114	2N3707
BC116	BC126
BC117	C407
BC118	BC107
BC119,20	BFY50
BC123	BC122
BC127	BC122
BC137	BFX88
BC138	BFX85
BC139	2N2904
BC142	BFX85
BC143	40362
BC144	40361
BC150	2N2926/G
BC151	2N3711
BC175	2N3405
BCY33–5	BCY31
BCY38	BCY31
BCY40	BCY31
BCY42,3	BSX20
BCZ11	BCY31
BD116	2N3054
BD155	2N5192
BDY10,11	2N3055
BF152,3	2N4292
BF162,3,4	BSX20
BF175	BF195
BFS59,–61	ZTX304
BFS96,–98	ZTX504
BF216–220	BF255
BFW10	2N5459
BFX13	BF254
BFX43,4	BSX20
BFX86	BFX85
BFY10,11	2N3904
BFY17,19	BSX20
BFY25	2N2218
BFY26,39	BC107
BLY33	BFX55
BSX21	C407
BSX22	2N3053
BSX27	2N3663
BSX44	BSX20
BSX76–8	BSX20
BSX81	BF194
BSY10	2N3053
BSY20	BSX20
BSY24,5	2N3053
BSY26–9	BSX20
BSY39	BSX20
BSY22	BSX20
BSY79	C407
BSY95,A	2N2369A
BY100	B0680
BY114	B0680
BY124,5	SD4
BY126	1N5399
BYY34	B0680
C63,4	BSX20
C400	BSX20
C420,6	2N3053
CG60H–64H	0A90
CG611H	0A95
CG621H	0A91
CG651H	0A90
CS11D	2N1599
EC401	1N914B
EC402	1N914B
EA403	1N4148
EB383	1N4148
GET106	NKT211
GET113,4	NKT211
GET873	2N1305
GET880,1	2N1306
GET882	2N1307
GET885	2N1309
GET887	2N1305
GET888,90	2N1309
GET891	2N1305
GET892	2N1307
GET895	2N1309
GET896,7	2N1305
GET898	2N1309
GEX12,37	0A90
GEX39	0A90
HT100,1	2N3702
HT400,1	2N3705
ME1002	BC107
ME1075	C407
ME2001,2	BC107
ME3001,2	2N3663
ME3011	2N3663
ME4001	2N3710
NE4002	2N3711
ME6001–3	2N3705
ME0404	2N3702
ME0404–1	2N3703
ME0404,–2	2N3702
NKT0003	2N3703
NKT0013	2N3703
NKT152	NKT271
NKT219	ACY21
NKT223,4	ACY20
NKT225,9	ACY20
NKT237	ACY17
NKT238	ACY18
NKT239	ACY19
NKT240	ACY20
NKT241	ACY21
NKT242	ACY22
NKT243	ACY39
NKT244	ACY40
NKT245	ACY41
NKT251	NKT271
NKT451,–3	NKT404
NKT736	2N1306
NKT10419	2N3707
NKT10339	2N3704
NKT10439	2N3704
NKT10519	BC109
NKT12329	2N4286
NKT12429	2N4286
NKT13329	2N2369A
NKT13429	2N4286
NKT16229	BSX20
NKT20329	2N4289
NKT20339	2N4289
NKT35219	BSX20
0A10	NTGD10
0A70	0A90
0A81	0A91
0A150	0A91
0A211	BY238
0C26	NKT404
0C32	NKT274
0C33,34,37	NKT212
0C65,6	AC128
0C73	NKT214
0C76,8	2N1305
0C77	ACY18
0C79,80	AC153
0C139	2N1302
0C140	2N1304
0C141	2N1308
0C169	NKT677F
0C170,1	NKT603F
0C200–7	BCY31
0C304,6	2N1305
0C307,8	AC153
0C400,–3	NKT404
0C601	AC153
0C612,3	NKT214
0C810,11	NKT212
0RP12	TPMD
ST140,1	BSX20
T1415,9	BC107
T1485	BC109
T1537,8	2N4289
V15/10P,DP	NKT404
V15/20DP	NKT404
V205	2N3702
V410	BFX87
XA011	2N1305
XA102	2N1305
XA141–3	NKT677F
XA161,2	NKT677F
XB103	NKT214
XC141,2	NKT404
XC155,6	NKT404
ZS140	SD4
ZS170	1N5399
ZTX107L	BC167
ZTX108L	BC168
ZTX109L	BC169

Every attempt has been made to give accurate substitutions and while types in the right-hand columns may be regarded as substitutes in most cases for those in the left-hand columns, the reverse may not be true.

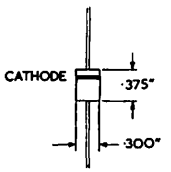
Little account has been taken of the transistor outlines.

Before making a final decision, the characteristics of both types should be consulted.

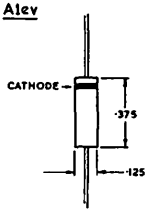
ELECTROVALUE cannot accept responsibility or liability for any effects caused by substitution.

SEMICONDUCTOR OUTLINES

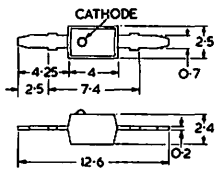
A1eq



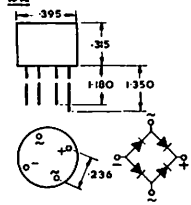
A1ev



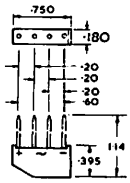
A246



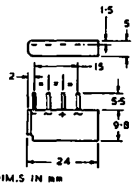
B2



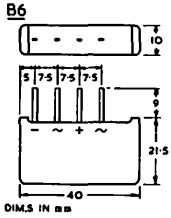
B4



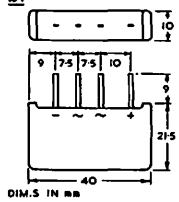
B5



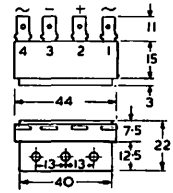
B6



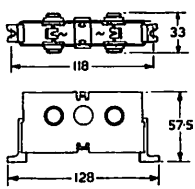
B7



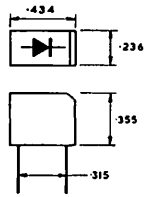
B8



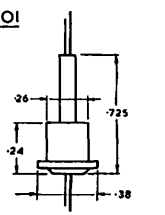
B9



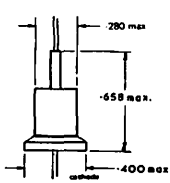
C42k



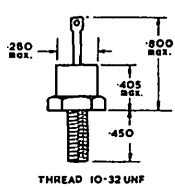
DO1



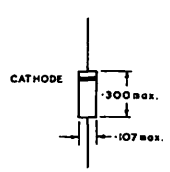
DO3



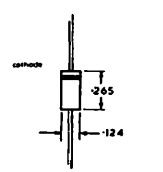
DO4



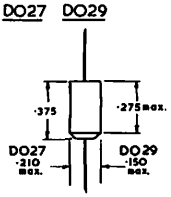
DO7



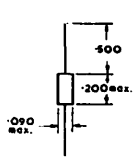
DO14, DO15



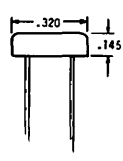
DO27 DO29



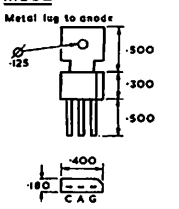
DO35



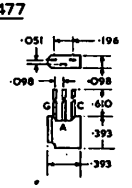
M289



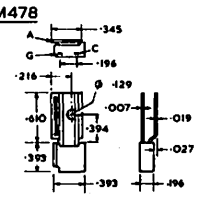
M332



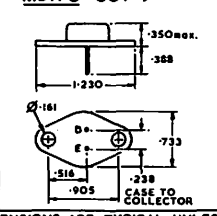
M477



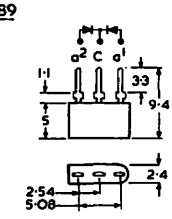
M478



MD17C SOT-9



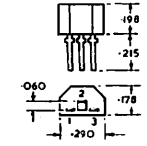
M689



ALL DIMENSIONS IN INCHES UNLESS OTHERWISE STATED. DIMENSIONS ARE TYPICAL UNLESS OTHERWISE STATED

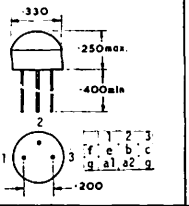
SEMICONDUCTOR OUTLINES

MM10a,b



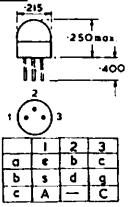
	1	2	3
a normal	e	b	c
b	b	e	c

RO97



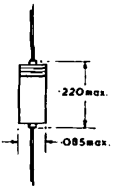
	1	2	3
	c	b	e
	g	a1	a2

RO97A

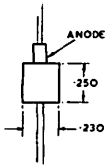


	1	2	3
a	e	b	c
b	s	d	g
c	A	—	C

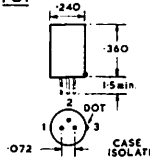
SO6



SO15

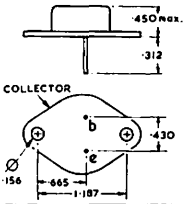


TO1

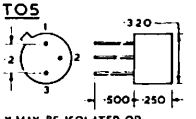


	1	2	3
normal	e	b	c
b	a	—	c

TO3



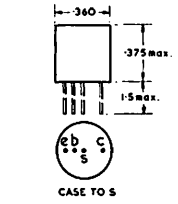
TO5



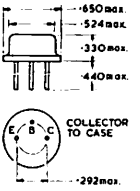
* MAY BE ISOLATED OR CONNECTED TO 'D OR C'

	1	2	3	case
normal	e	b	c	*
b	c	g	a	
c	a1	g	a2	

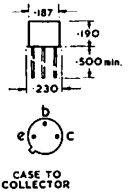
TO7



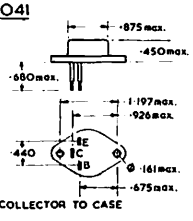
TO8



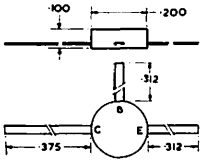
TO18



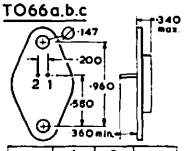
TO41



TO50

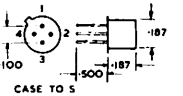


TO66a.b.c



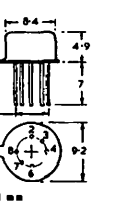
	1	2	case
a	e	b	c
b	c	g	a
c	a1	g	a2

TO72a.b.c.d

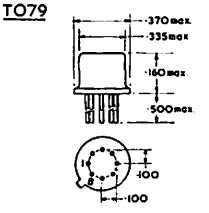


	1	2	3	4
a	e	b	c	s
b	b	e	c	s
c	d	g2	g1	s/sub
d	e	b1	—	b2

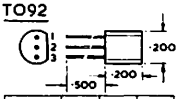
TO78



TO79

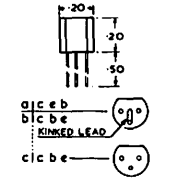


TO92

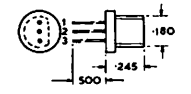


	1	2	3
a	e	c	b
b	e	b	c
c	s	g	d
d	d	s	g
e	e	b2	b1
f	c	g	a

TO92z

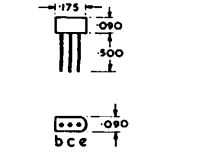


TO98

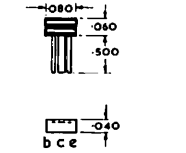


	1	2	3
a	e	c	b
b	a1	g	a2

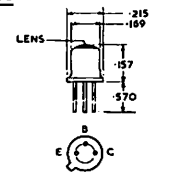
u29



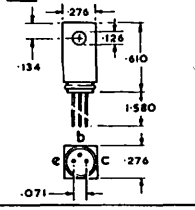
u32



X8e



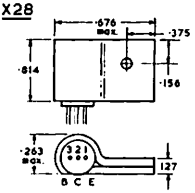
X9a



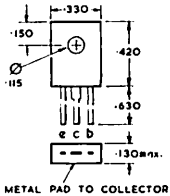
DIAGRAMS ARE BASED ON MANUFACTURER'S DATA AND NOT ON REGISTERED SPECIFICATIONS.

SEMICONDUCTOR OUTLINES

X28

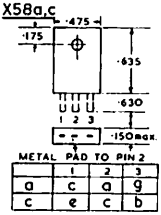


X58



METAL PAD TO COLLECTOR

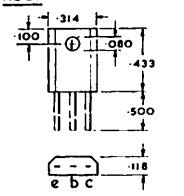
X58a,c



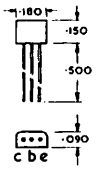
METAL PAD TO PIN 2

a	c	a	g
c	e	c	b

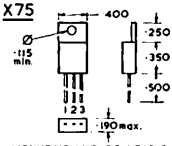
X58b



X59



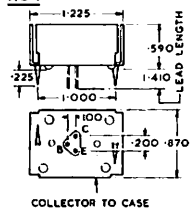
X75



MOUNTING LUG TO LEAD 2

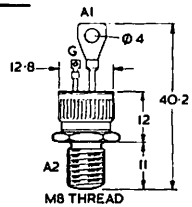
a	c	a	g
b	b	c	e
c	a1	a2	g

X84



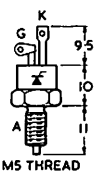
COLLECTOR TO CASE

X131F



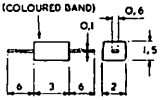
M8 THREAD

X383

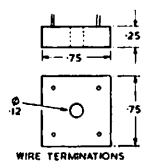


M5 THREAD

A1vs

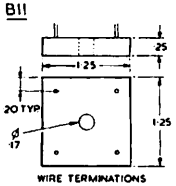


B10



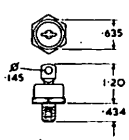
WIRE TERMINATIONS

B11



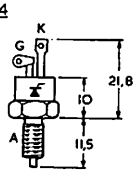
WIRE TERMINATIONS

S21e



THREAD 1/4-28 UNF-2A

TO64



THREAD 10-32UNF

OPTO-DEVICES

PHOTO TRANSISTORS

Type	Vceo max	Vcbo max	Ie max mA	Pt max mW	Ic cut-off nA max	Sensitivity mA @ 1000Lux	Outline	Price NET
BP101/1	32	5	25	200	100	0.063-0.125	X8e	£1.04
BPY61/1	32	7	50	50	100	0.8 - 1.6	X69	£2.37
BPY61/2	32	7	50	50	100	1.25 - 2.5	X69	£2.73
BPY61/3	32	7	50	50	100	2 - 4	X69	£3.12
BPY62/2	32	5	25	250	100	2 - 4	X8a	£1.28
BPY62/3	32	5	25	250	100	3.2 - 6.3	X8a	£1.46

BP101, BPY61, BPY62 characteristics:

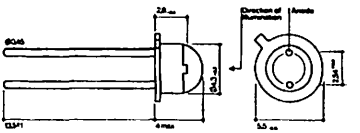
Spectral sensitivity: 0.45µm to 1µm at 20% of max sensitivity
Wavelength at max sensitivity: 0.78µm
Rise or fall time (to within 10% of final value) : 5µs typ, 10µs max.

INFRA-RED TRANSMITTER AND DETECTOR

BPW34 PHOTO SENSITIVE DIODE

Price £1.73 NET

Max ratings: Vr : 32V; Pt : 150mW
Characteristics: Sensitivity: 50nA per lux.
Max. sensitivity@ 0.85µm
Sensitive area : 3mm x 3mm.
Dark current : 30nA max, 2nA typical.



LD241 LIGHT EMITTING DIODE

Price 89p NET

Max ratings: If : 150mA (1Apk; 10Apk,1µs). Pt: 180mW
Characteristics: Emitted total power @ If =100mA, 5mW min.
Wavelength of radiation 950nm.
Directional radiation: half intensity @ 72°
quarter intensity @ 90°

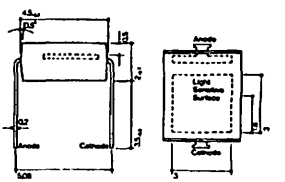
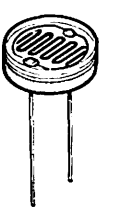


PHOTO CONDUCTIVE CELL (LDR) TYPE MKY7C38E

Cadmium sulphide

Resistance dark	:	0.3MΩ minimum
100 lux (twilight)	:	1KΩ typical
5000 lux (sunlight)	:	100Ω maximum
Maximum ratings	:	150V, 70mW
Outline	:	M289

Price 48p



OPTO-COUPLER Type CNY17 featuring high current transmission ratio. Price £2.45 NET

6-pin dual-in-line encapsulation allows voltage differences of up to 2500V between input and output ciruits.

Maximum ratings of emitter:

Reverse voltage	:	3V
Forward current	:	60mA
Surge current	:	1.5A
Power dissipation	:	100mW

Characteristics:

Fwd voltage @ If = 60mA	:	1.65Vmax
Reverse current Vr = 3V	:	10µA
Capacitance Vr = 0	:	45pF

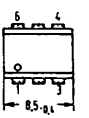
Maximum ratings of detector:

Vceo	:	32V
Vebo	:	5V
Ic	:	150mA
Pt	:	150mW

Characteristics:

hFE (Ic = 100 A)	:	100 min
Iceo (Vce = 10V)	:	50nA max.
Cce (Vce = 0)	:	15pF typ

Characteristics of Coupler:
Current transmission ratio, (If = 10mA, Vce = 5V) : 40 min.

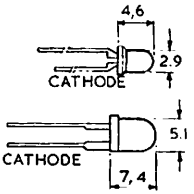


1 anode
2 cathode
3 not wired
4 emitter
5 collector
6 base

OPTO-DEVICES

LIGHT EMITTING DIODES

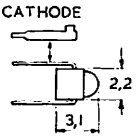
LD30A	Red	wavelength 655nm	Outline A	Price	16p
LD35A	Yellow	wavelength 575nm	Outline A	Price	20p
LD37A	Green	wavelength 560nm	Outline A	Price	20p
CQY26A	Red		Outline B	Price	16p
CQY29A	Yellow		Outline B	Price	20p
CQY28A	Green		Outline B	Price	20p



The above LEDs are supplied with panel mountings.

0.1" matrix LEDs for assembly into arrays.

LD461	Red	Outline C	Price	20p
LD471	Green	Outline C	Price	30p
LD481	Yellow	Outline C	Price	30p



Assemblies of the above three types are available in strings of one colour up to a length of 10 LEDs. Min. quantity to special order: 25 assemblies.

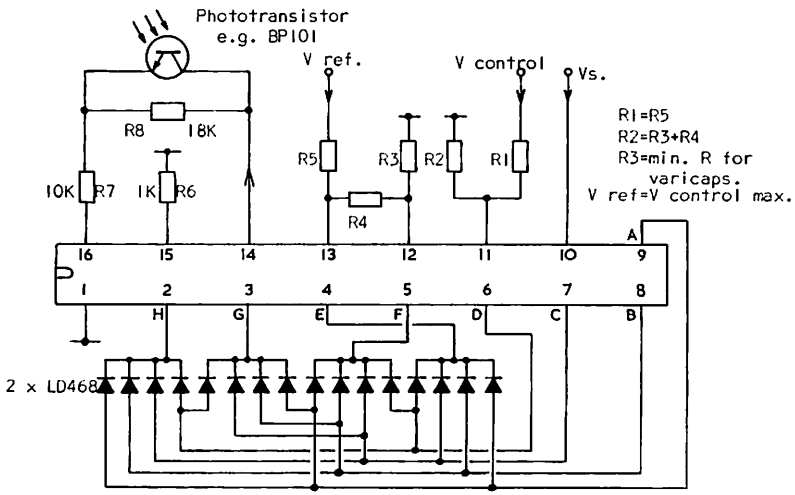
LED ARRAY DRIVERS

UAA170 For driving a string of 16 LEDs. Price £3.44
Two UAA170's may be used to drive 30 LEDs.

Operation: As input voltage increases, LD2 lights and then LD1 extinguishes. Action continues along the string until an excessive voltage input condition is reached when the last lamp remains 'on'. Transistion between two LEDs can be adjusted from 'gentle' to 'abrupt' by adjustment of two resistors. Intensity of LEDs may be adjusted and also made dependant on ambient light by the use of a BP101 in the external circuit.

UAA180 Similar to UAA170 but low numbered LEDs remain 'on' when higher numbered lamps are powered. Capacity is 12 lamps only. (Useful where more power is available)

Supply requirements: +12V (max. 18V)
Input (100% control): 0 to 1.2V. @ 1µA. Price £3.44



DISPLAYS

INCANDESCENT MINITRON Type 3015 — Price £1.20 each NET

9.2mm character height
Right hand decimal point
8mA and 15mA per segment versions
8mA type can be operated up to 9V
(doubles intensity for each volt over 5)
Average life over 10 years at 5V.
No limiting resistors with 7447 driver.
Plugs into 16-DIL holder (DRD8 unsuitable)

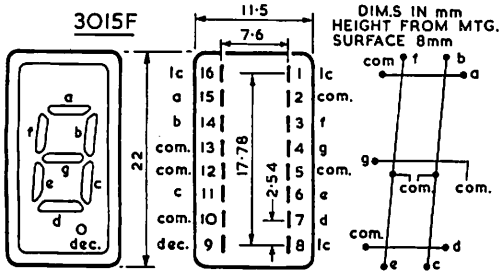
Types available

3015F/BM8 and 3015F/BM15

7 segment + decimal point
8mA & 15mA @ 5V per segment

3015G/BM8

+-1 & dec. pt. 8mA/segment.



POLARISED FILTERS (Neutral)

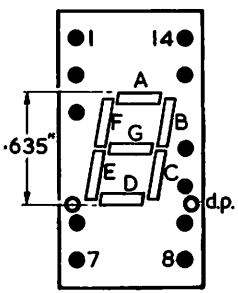
Circular polarisation allow unpolarised light to pass but cuts off light which has become circularly polarised.
Ideal for use with visual displays to render metal parts invisible and inhibit glare.

Size 2" x 1" PNF21 29p
Size 3" x 1" PNF31 42p

LED 7-SEGMENT DISPLAYS Series 1712 in RED, YELLOW or GREEN — Price £1.75 each NET

Right hand decimal point.
Common anode construction
Reflectorized design for high contrast
IC compatible (1.8V @ 10mA /segment)
Standard 14-pin outline.

Max. If @ 25°C per segment	25mA
Peak pulse If, 1µs, 1% duty	1A
Peak reverse voltage	5V
Intensity @ If = 10mA, typ	250µcd
Fwd. voltage @ If =10mA, max	2.4V

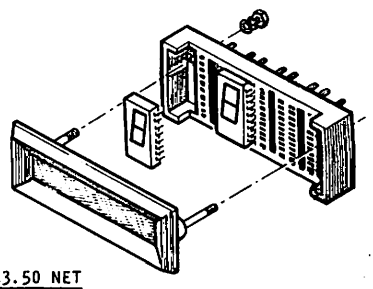


PIN	FUNCTION
1	cathode A
2	cathode F
3	common anode
6	cathode DP
7	cathode E
8	cathode D
9	NC
10	cathode C
11	cathode G
13	cathode B
14	common anode

DISPLAY MOUNTING HARDWARE

4-section on 0.5" centres
Circularly polarised screen.
Replaces individual sockets
Attractive black bezel

Panel cut-out : 2.593 x 0.5"
Viewing area : 2.180 x 0.48"
Bezel size : 2.7 x 1"



Price £3.50 NET

LIQUID CRYSTAL DISPLAYS

BY SIEMENS

Applications

Liquid crystal displays are particularly suitable for battery powered equipment in which their low power requirements are an advantage over other forms of display such as LEDs, gas discharge tubes and incandescent filament indicators.
The low voltage and current requirement gives a further advantage in that the displays can be directly addressed by M.O.S. circuits without the need for an intermediate driver stage.

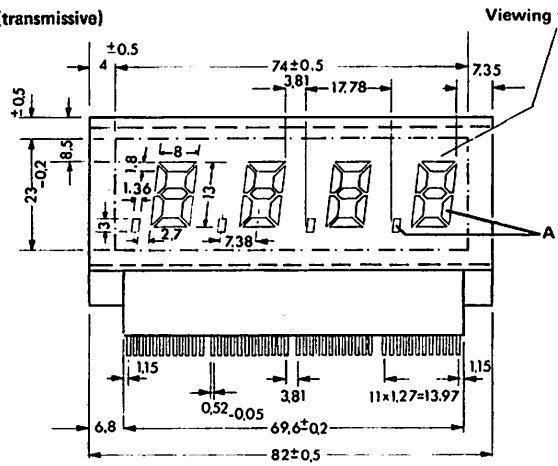
Electrical and optical data

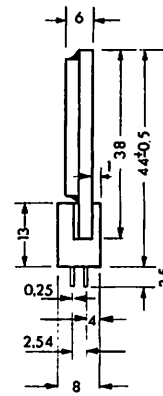
	min	nom	max	unit	
Operating voltage†	15	25	50	V	pk-pk 100V max. limit.
Frequency	20	50	400	Hz	
Temperature	-5	25	65	°C	
Current per segment		1		µA	
Capacity per segment		25		pF	
Rise time		25	40	ms	
Turn on delay		25	40	ms	
Decay time		80	150	ms	
Contrast		15:1			
Barometric pressure	100		3100	mbar	
Storage temperature	-20		80	°C	

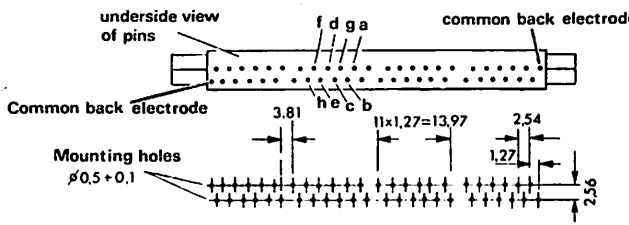
Price £15.40 NET

†symmetric alternating voltage.
The nominal values are for square wave AC 50Hz.

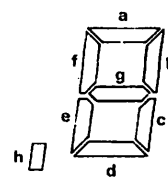
AN4131 (transmissive)







single character 'A'
Scale 4:3



Socket	:	Special 48 position
Weight	:	approx. 50g
Mounting Position:		any

dimensions in mm

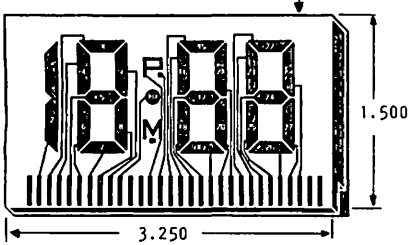
LIQUID CRYSTAL DISPLAYS

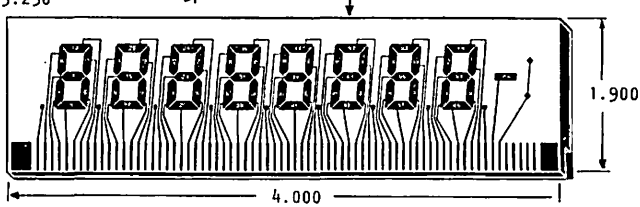
BY HAMLIN

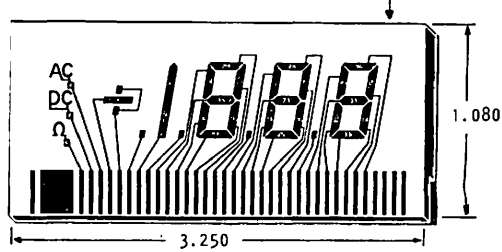
FIELD EFFECT Liquid Crystal Displays are a brand new development featuring a remarkable development in contrast giving a black image on a light background. These reflective units require no rear illumination and combine all the major advantages of liquid crystal displays, (low operating power, excellent contrast in all lighting situations, display reliability and long life) into one unit.

Electrical and optical data

Model No. Application	3401FE 3½ digit clock			3501FE 8 digit calculator			3601FE 3½ digit inst.			
	min	typ	max	min	typ	max	min	typ	max	unit
Operating voltage	5	7	20	5	7	20	5	7	20	V
Operating frequency	25	35	120	15	35	120	15	50	120	Hz
Power consumption at 15V applied					180			73		µW
Operating current at 7V 32Hz		300								nA
Turn on time		150			150			150		ms
Turn off time		300			300			300		ms
Character height		1.12			0.47			0.6		inch
Terminal spacing					0.05			0.075		inch
Operating temperature	0		50	0		50	0		50	°C
Price	£13.92 NET			£11.50 NET			£11.91 NET			
Edge connector	£2.00 NET			£2.00 NET			£2.00 NET			







INTEGRATED CIRCUITS

T.T.L. DIRECTORY

TYPE	PRICE	TABLE NO.	EQUIVALENTS	
7400	18p	1	FLH101	FJH131
7401	18p	11	FLH201	FJH231
7402	18p	10	FLH191	FJH221
7403	18p	18	FLH291	FJH291
7404	25p	12	FLH211	FJH241
7405	22p	16	FLH271	FJH251
7407	50p	49	FLH491	
7408	25p	23	FLH381	FJH421
7409	28p	24	FLH391	
7410	18p	2	FLH111	FJH121
7413	44p	20	FLH351	FJH131
7414	70p	50		
7420	18p	3	FLH121	FJH111
7430	18p	4	FLH131	FJH101
7440	18p	5	FLH141	FJH141
7442	80p	17	FLH281	FJH261
7443	£1.30	21	FLH361	
7444	£1.25	22	FLH371	
7447	£1.15	48	FLL121T	
7450	18p	6	FLH151	FJH151
7451	18p	7	FLH161	FJH161
7453	18p	8	FLH171	FJH171
7454	18p	9	FLH181	FJH181
7460	18p	47	FLY101	FJY101
7470	36p	25	FLJ101	FJJ101
7472	37p	26	FLJ111	FJJ111
7473	48p	27	FLJ121	FJJ121
7474	45p	29	FLJ141	FJJ131
7475	60p	30	FLJ151	FJJ181
7476	42p	28	FLJ131	FJJ191
7480	60p	13	FLH221	FJH191
7482	94p	14	FLH231	FJH201
7483	£1.22	15	FLH241	FJH211
7485	£1.30	51	FLH431	
7486	44p	19	FLH341	FJH271
7490	59p	31	FLJ161	FJJ141
7491	99p	37	FLJ221	FJJ151
7492	74p	32	FLJ171	FJJ251
7493	65p	33	FLJ181	FJJ211
7494	95p	38	FLJ231	
7495	80p	34	FLJ191	FJJ231
7496	99p	41	FLJ261	FJJ241
74100	£1.90	44	FLJ301	
74104	60p	43	FLJ281	
74107	40p	42	FLJ271	
74121	45p	45	FLK101	FJK101
74141	99p	46	FLL101	FJL101
74151	£1.10	52	FLY121	FJH441
74190	£1.90	35	FLJ201	
74191	£1.90	36	FLJ211	FJJ401
74192	£1.90	39	FLJ241	FJJ331
74193	£1.90	40	FLJ251	FJJ411

INTEGRATED CIRCUITS

TYPE	PRICE, NET	EQUIVALENTS
FZH101	£1.51	4 NAND 32
FZH111	£1.66	4 NAND 30
FZH121	£1.39	2 NAND 30
FZH131	£1.51	2 NAND 31
FZH141	£1.68	2 NAND 32
FZH151	£2.41	2 AOR 30
FZH161	£1.66	4 LI 31
FZH171	£1.51	2 NAND 33
FZH181	£1.02	4 LI 30
FZH191	£1.60	3 NAND 33
FZH201	£1.60	6 IN 30
FZH211	£1.48	4 NAND 34
FZH231	£1.31	2 NAND 35
FZH241	£2.61	AST 30
FZJ101	£2.41	FF 30
FZJ111	£2.41	FF 31
FZJ121	£3.37	2 FF 32
FZJ131	£3.69	4 FF 33
FZJ141	£4.08	FF 34
FZJ151	£4.08	FF 35
FZK101	£2.61	OS 30
FZL101	£5.15	ND 30

LINEAR	PRICE	PAGE	DESCRIPTION
µA709CE	44p	70	Metal can 709
µA709CJ	44p	70	14-DIP 709
µA723	see TDB0723,-A		
µA741CE	47p	70	Metal can 741
µA741CP	43p	70	8-DIP 741
µA741CJ	45p	70	14-DIP 741
µA748CJ	62p	70	14-DIP 748 (741 with no freq. comp.)
LM301AN	55pNet	70	8-DIP improved 709
LM308N	£1.30Net	70	Precision operational amplifier
NE555V	70p	61	timer
NE556A	£1.30Net	61	dual timer
SAJ131	£3.00Net	66	1000:1 frequency divider
SAJ141	£3.00Net	66	10, 100, 1000:1 frequency divider
SAJ205	£3.00Net	67	Staircase generator
SAJ410	£3.00Net	67	7-octave divider
SAS201A	£1.70Net	64	Magnetic switch, pulse output
SAS211A	£1.70Net	64	Magnetic switch, step output
SAS560	£1.80Net	62	touch switch
SAS570	£1.80Net	62	expander for SAS560
SAS580	£2.00Net	62	touch switch
SAS590	£2.00Net	62	expander for SAS580
SN76013ND	£1.45Net	69	3W audio amplifier
SN76023ND	£1.45Net	69	3W audio amplifier
TAA761A	70pNet	71	Similar TAA861 series, higher voltage
TAA861	70pNet	71	Similar to µA741 series, high current O/P. Metal
TAA861A	65pNet	71	8-DIP
TAA865A	80pNet	71	8-DIP, extended temp. range
TAA2761A	£1.14Net	71	dual 761
TAA4761A	£1.76Net	71	quad 761
TBA800	£1.50Net	68	audio power amplifier
TBA820	£1.70Net	68	audio power amplifier
TBB0747A	£1.42Net	70	dual 748
TBB1458B	£1.07Net	70	dual 741
TCA105	£1.56Net	65	threshold switch with oscillator stage.
TCA311A	87pNet	70	Darlington 761
TCA345A	£1.00Net	65	threshold switch for battery operation.
TCA965	£1.75Net	74	window discriminator
TDB0723	85p	72	universal voltage regulator, metal can
TDB0723A	78p	72	14-DIP regulator
TDB7805T	£2.23Net	72	5V power regulator
TDB7812T	£2.36Net	72	12V power regulator
TDB7815T	£2.36Net	72	15V power regulator

INTEGRATED CIRCUITS

TTL DESCRIPTIONS & CHARACTERISTICS

TYPE	DESCRIPTION	FAN-OUT	FAN-IN	ON INPUTS
7400	Quad 2-input NAND	10	1	all
7401	Quad 2-input NAND O/C collector	10	1	all
7402	Quad 2-input NOR	10	1	all
7403	Quad 2-input NOR O/C collector	10	1	all
7404	Hex inverter	10	1	all
7405	Hex inverter)/C collector	10	1	all
7407	Hex buffer O/C collector	25	1	all
7408	Quad 2-input AND	10	1	all
7409	Quad 2-input AND O/C collector	10	1	all
7410	Triple 3-input NAND	10	1	all
7413	Dual 4-input NAND Schmitt	10	1	all
7414	Hex inverter Schmitt	10	1	all
7420	Dual 4-input NAND	10	1	all
7430	8-input NAND	10	1	all
7440	Dual 4-input NAND Power	30	1	all
7442	BCD-decimal decoder	10	1	all
7443	Excess-3 decimal decoder	10	1	all
7444	Excess-3 Gray-decimal decoder	10	1	all
7447	BCD 7-segment decoder/driver	24	1	all
7450	Expandable 2-wide 2-input	10	1	all
7451	Dual 2-wide 2-input	10	1	all
7453	Expandable 4-wide 2-input	10	1	all
7454	4-wide 2-input	10	1	all
7460	Dual 4-input expander	-	1	all
7470	J-K flip-flop	10	1	all
7472	J-K master-slave flip-flop	10	2	$\overline{R},\overline{S},T$
7473	Dual J-K master-slave flip-flop	10	2	R,T
7474	Dual D-type edge triggered flip-flop	10	2	R,T
7475	Quad bi-stable latch	10	2	D
7476	Dual J-K master-slave flip-flop	10	2	$\overline{R},\overline{S},T$
7480	Gated full adder	5 on Cn+1 3 on A*,B*	4	Cn
7482	2-bit binary full adder	5 on C2	4	A1,B1
7483	4-bit binary full adder	5 on C4	4	A1,A3,B1,B3
7485	4-bit comparator	10	1 3	A<B,A>B remainder
7486	Quad 2-input exclusiver OR gate	10	1	all
7490	Decade counter	10	2 4	A B
7491	8-bit shift register	10	1	all
7492	Divide by 12 counter	10	2 4	A B
7493	4-bit binary counter	10	2	A,B
7494	4-bit shift register parallel input, series output	10	4	S1,S2
7495	4-bit left shift right shift register	10	2	(B)
7496	5-bit shift register	10	5	S
74100	Dual quad bi-stable latch	10	2 8	D T
74104	J-K master-slave flip-flop, JK input	10	2 3	$\overline{J},\overline{K},J,K$ R,S
74107	Dual J-K master-slave flip-flop	10	2	R,T
74121	Monostable flip-flop	10	2	B
74141	BCD decimal decoder, nixie driver	-	2	B,C,D
74151	Data selector, multiplexer, 8-bit	10	1	all
74190	Up-down decade counter	10	1	all
74191	Up-down binary counter	10	1	all
74192	Up-down decade sounter with clear	10	1	all
74193	Up-down binary counter with clear	10	1	all

INTEGRATED CIRCUITS

GENERAL DATA, TTL.

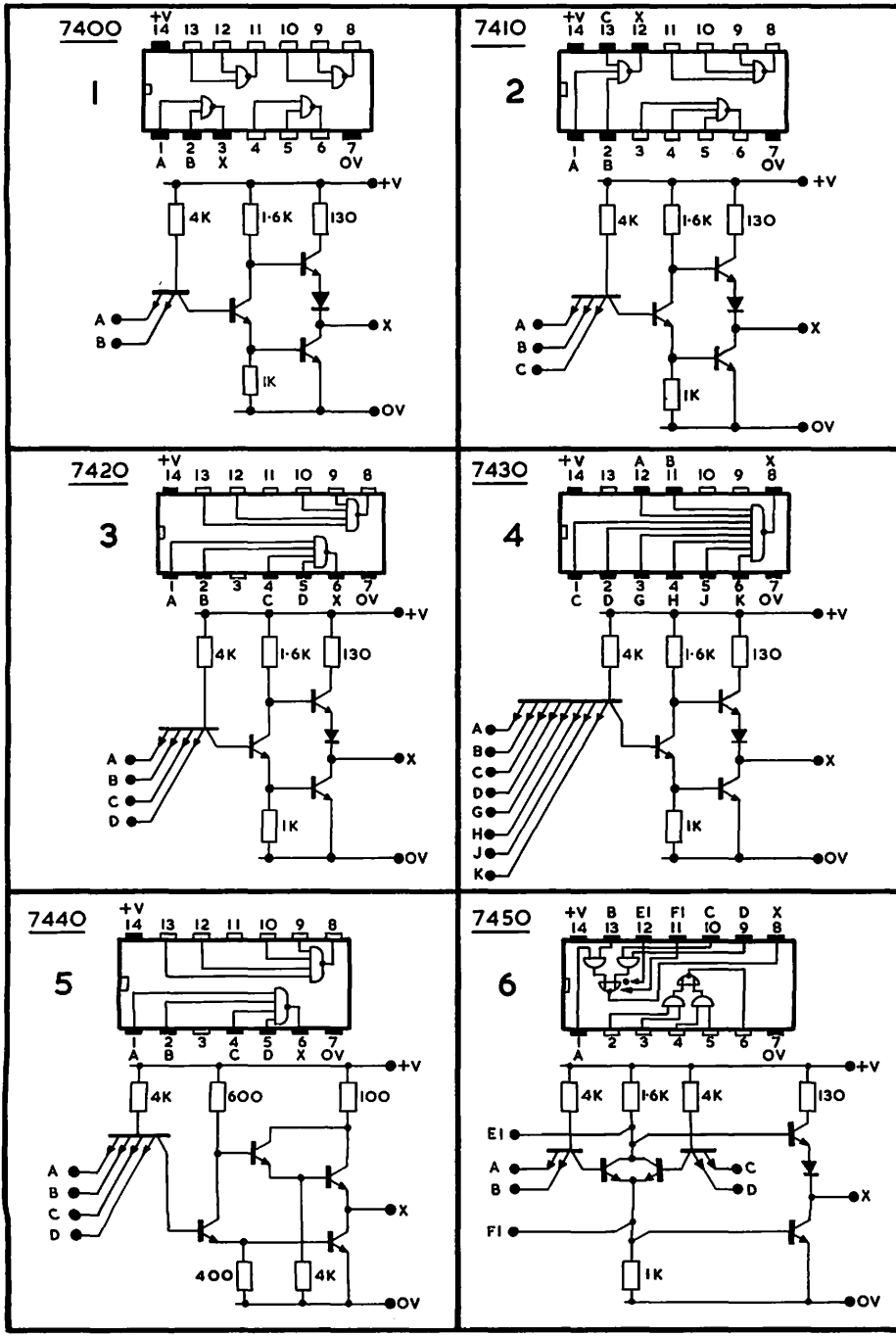
	7400 series	FZH series
Supply voltage max limit.	7V	18V†
Operating voltage	4.75-5.25	12V-15V
Operating temperature range	0 to 70°C	0 to 70°C
Storage temperature range	-65 to 150	-65 to 150
Thermal resistance	150 C/W max	
Logic 1 limits	2.4 to 5.5V	7.5V min
Logic 0 limits	0 to 0.4V	4.5V max
		†except FZH181
Unit load	1.6mA	1.5mA for 12V supply 1.8mA for 15V supply

LSL DATA (FZ series)

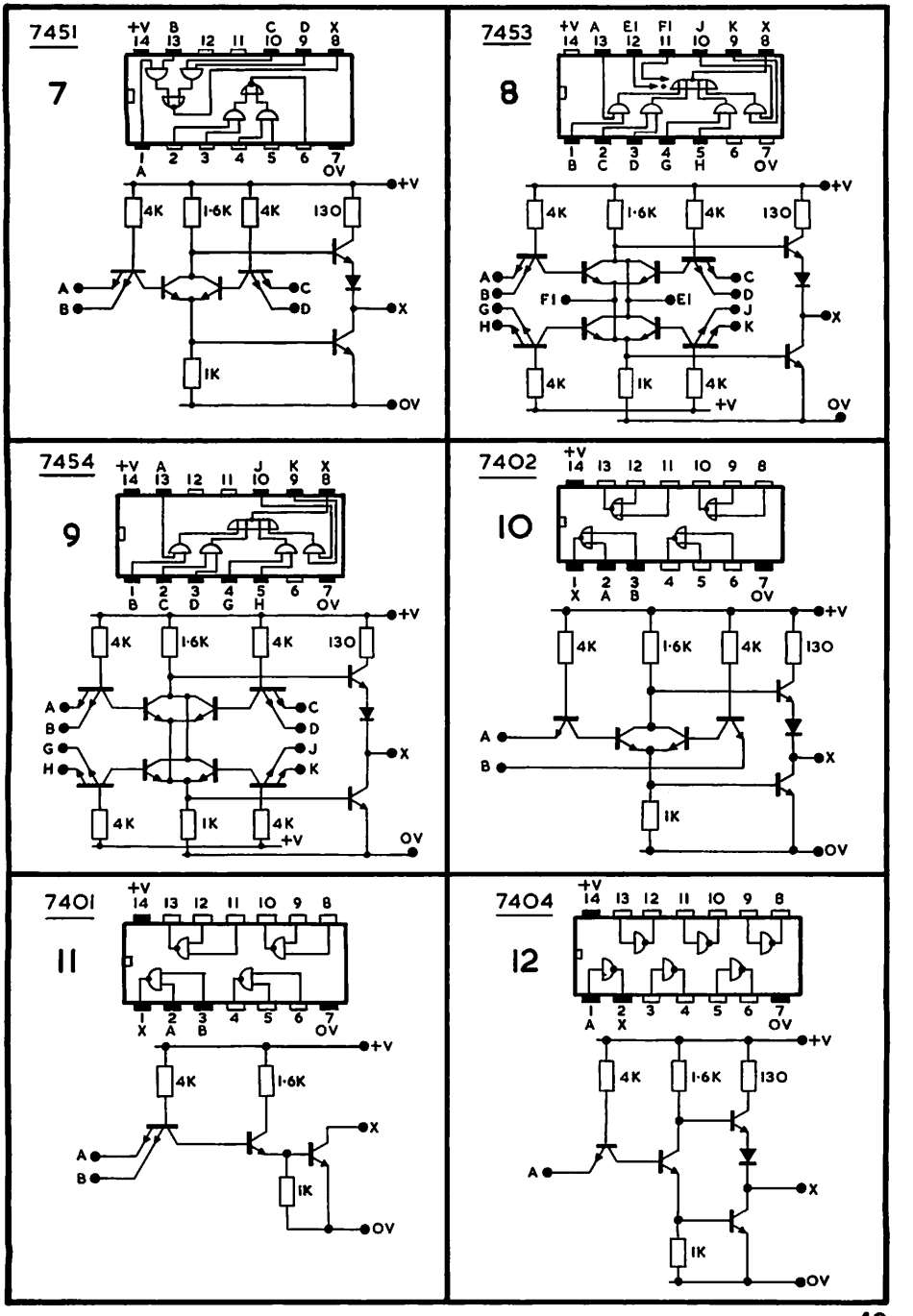
TYPE	DESCRIPTION	FAN-OUT	FAN-IN	ON INPUTS
FZH101	Quad 2-input NAND	10	1	all
FZH111	Quad 2-input NAND with N input	10	1	all
FZH121	Dual 5-input NAND	10	1	all
FZH131	Dual 5-input NAND with N input	10	1	all
FZH141	Dual 5-input power NAND with N input	30	1	all
FZH151	Dual AND-OR with N input	16	1	all
FZH161	Quad interface 15V to 5V	10	2	A
FZH171	Dual 4-input NAND, expandable, N input	10	1	all
FZH181	Quad interface 5V to 15V	10	1	all
FZH191	Triple 3-input NAND	10	1	all
FZH201	Hex inverter with strobe inputs	10	4 2	strobe 1 strobe 2
FZH211	Quad 2-input NAND with O/C collector	10	1	all
FZH231	Dual 5-input NAND	10	1	all
FZH241	Dual 5-input NAND Schmitt, expandable	10	1	all
FZJ101	J-K master slave flip flop, 2 JK inputs	10	2 1	C others
FZJ111	J-K master slave flip flop, , N inputs	10	2	C
FZJ121	Dual J-K master slave flip flop	10	2	C,$\overline{R}$,$\overline{S}$
FZJ131	Quad D latch	10	2 4	D C
FZJ141	1248 Decade counter	10	1	all
FZJ151	4 bit binary counter	10	1	all
FZK101	Monostable multivibrator	10	1	all
FZL101	Single N.I.T. driver	(20mA)	1	all
FZL111	BCD-7segment decoder driver	(40mA)	1	all
FZL121	400mA power driver (load to supply +ve)	-	1	all
FZH131	400mA power driver (load to 0V)	-	1	all
FZH141	Driver for power switching transistor	(25mA)	1	all

Fan-in for inputs not specified is 1.

INTEGRATED CIRCUITS



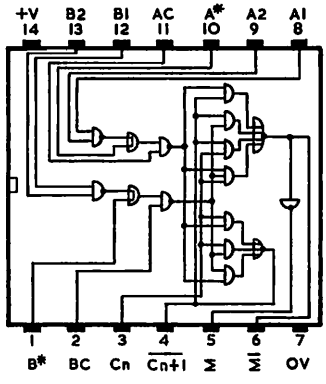
INTEGRATED CIRCUITS



INTEGRATED CIRCUITS

7480

13



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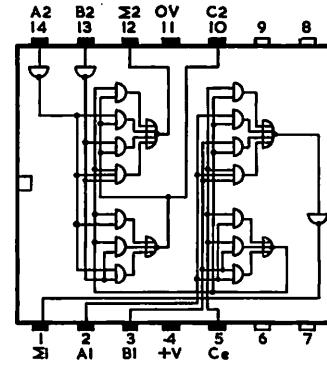
14



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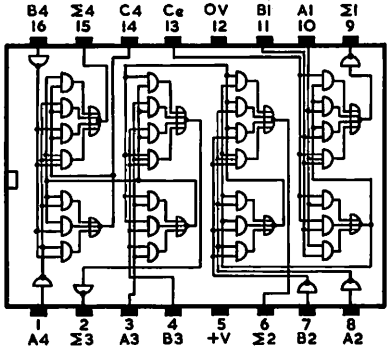
15



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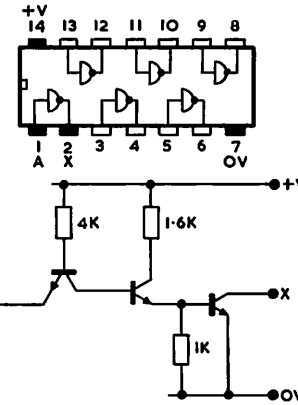
16



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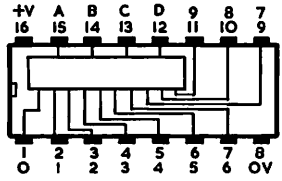
17

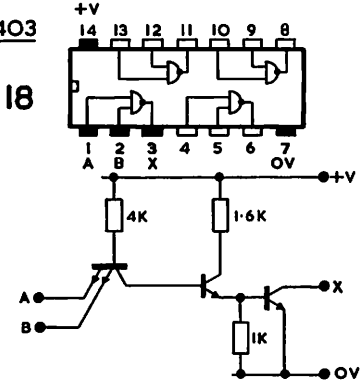


LOGIC

INPUT D	C	B	A	OUTPUT
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9

7403

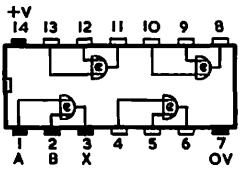
18



INTEGRATED CIRCUITS

7486

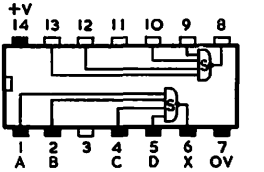
19



NO CIRCUIT PUBLISHED

7413

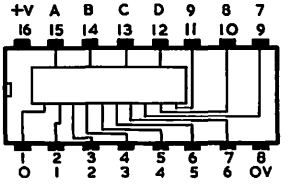
20



NO CIRCUIT PUBLISHED

7443

21

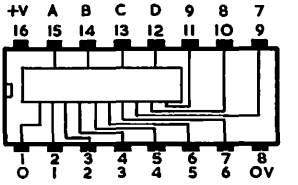


LOGIC

INPUT				OUTPUT
D	C	B	A	
0	0	0	1	0
0	0	1	0	1
0	0	1	1	2
0	1	0	0	3
0	1	0	1	4
0	1	1	0	5
0	1	1	1	6
1	0	0	0	7
1	0	0	1	8
1	0	1	0	9

7444

22

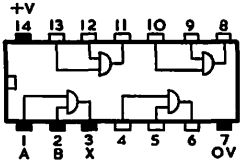


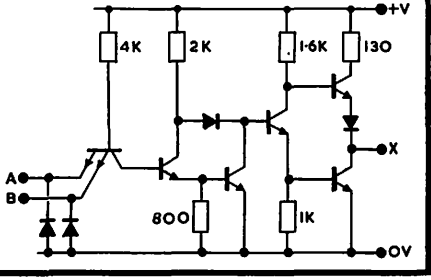
LOGIC

INPUT				OUTPUT
D	C	B	A	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9

7408

23





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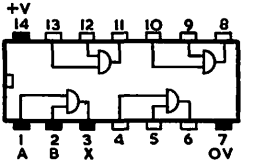
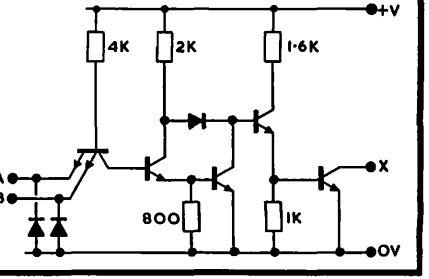
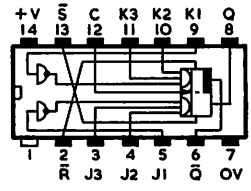


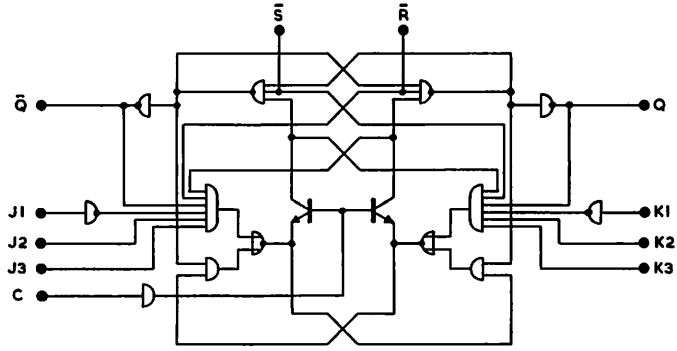


INTEGRATED CIRCUITS

7470

25





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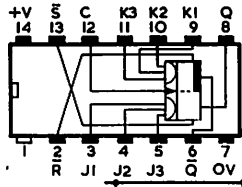
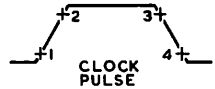
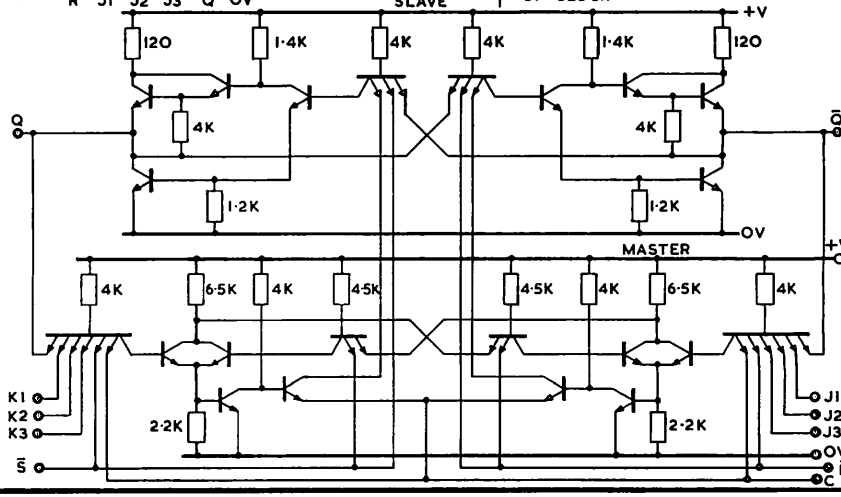
26





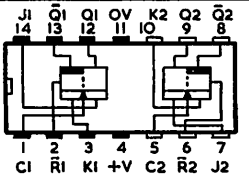
1—ISOLATE SLAVE FROM MASTER
2—ENTER INFORMATION INTO MASTER
3—DISABLE INPUTS
4—TRANSFER INFORMATION FROM MASTER TO SLAVE

LOW INPUT TO $\bar{R}$ SETS Q TO Log.0
LOW INPUT TO $\bar{S}$ SETS Q TO Log.1
R & S OPERATE INDEPENDENTLY OF CLOCK



INTEGRATED CIRCUITS

27



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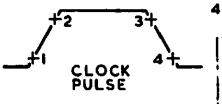

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4—TRANSFER INFORMATION FROM MASTER TO SLAVE

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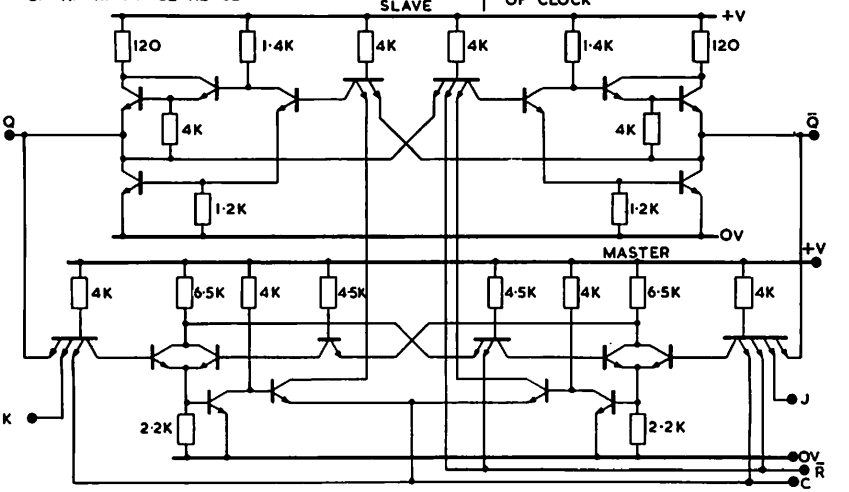
LOW INPUT TO $\bar{S}$ SETS Q TO Log.1
R & S OPERATE INDEPENDENTLY OF CLOCK



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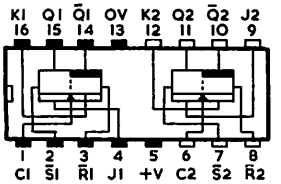

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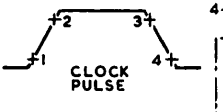
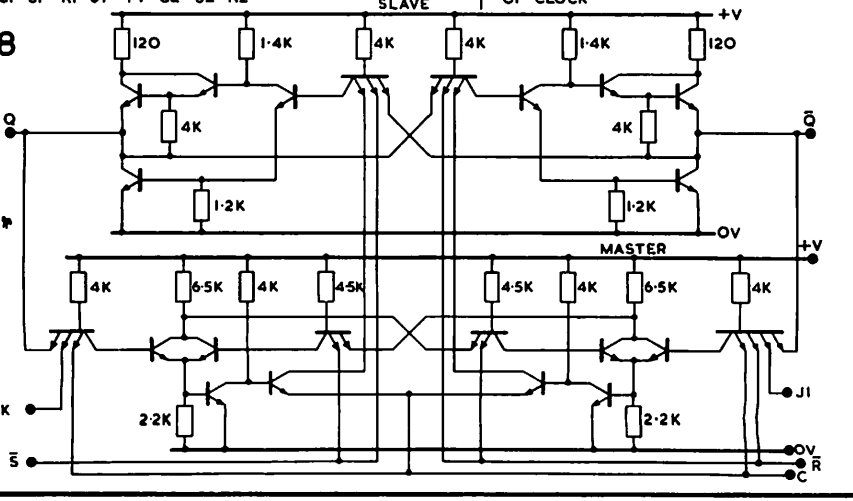


1—ISOLATE SLAVE FROM MASTER
2—ENTER INFORMATION INTO MASTER
3—DISABLE INPUTS
4—TRANSFER INFORMATION FROM MASTER TO SLAVE

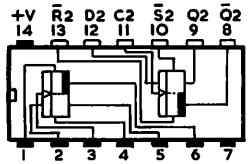
LOW INPUT TO $\bar{R}$ SETS Q TO Log.0
LOW INPUT TO $\bar{S}$ SETS Q TO Log.1
R & S OPERATE INDEPENDENTLY OF CLOCK

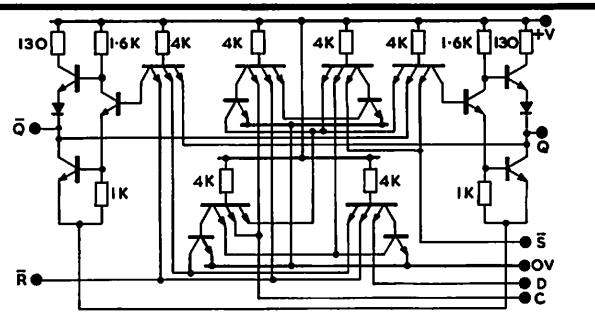


INTEGRATED CIRCUITS

7474

29





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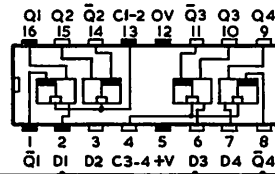
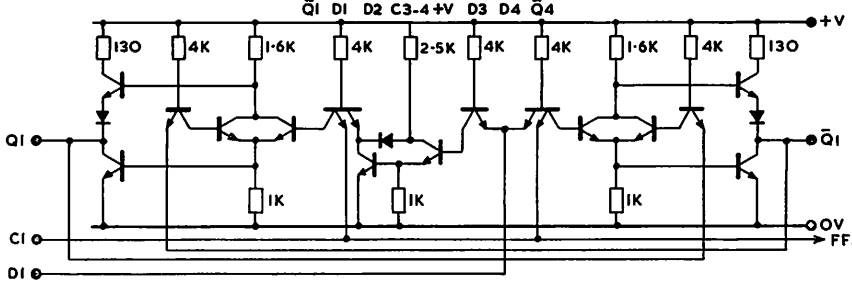
30





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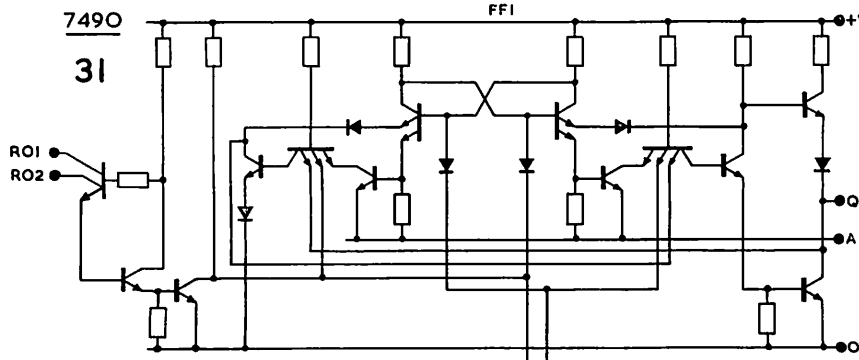
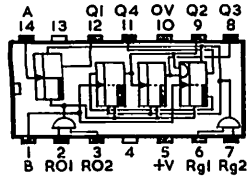
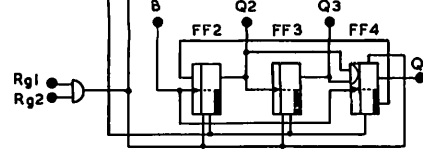


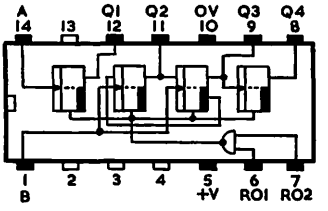




INTEGRATED CIRCUITS

7492

32



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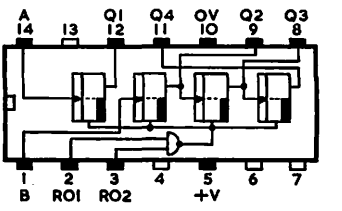
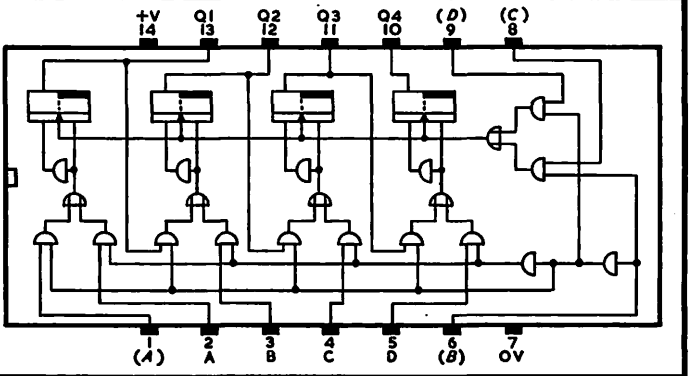


7495

34

LEGEND

(A) SERIAL INPUT
(B) MODE CONTROL
(C) CLOCK 2 LEFT SHIFT
(D) CLOCK 1 RIGHT SHIFT



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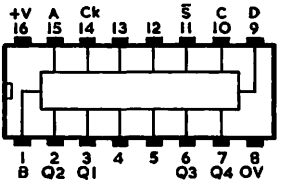

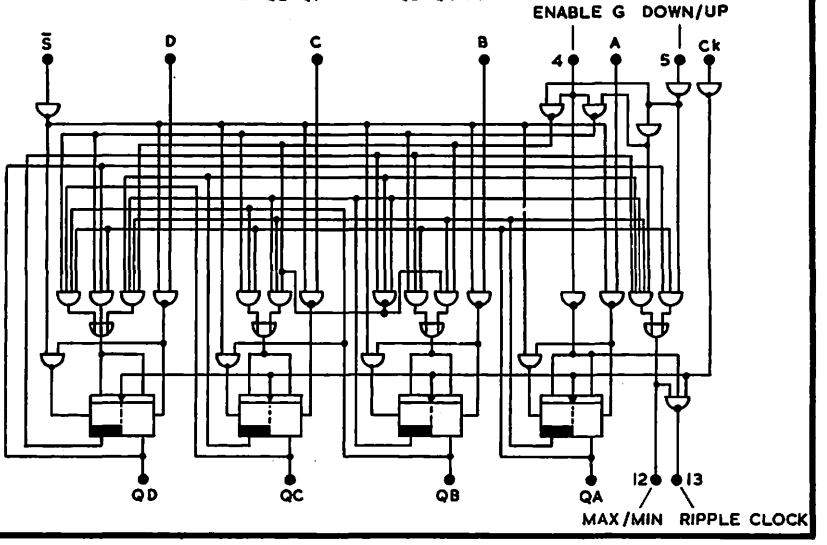

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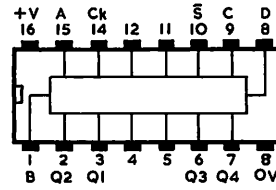

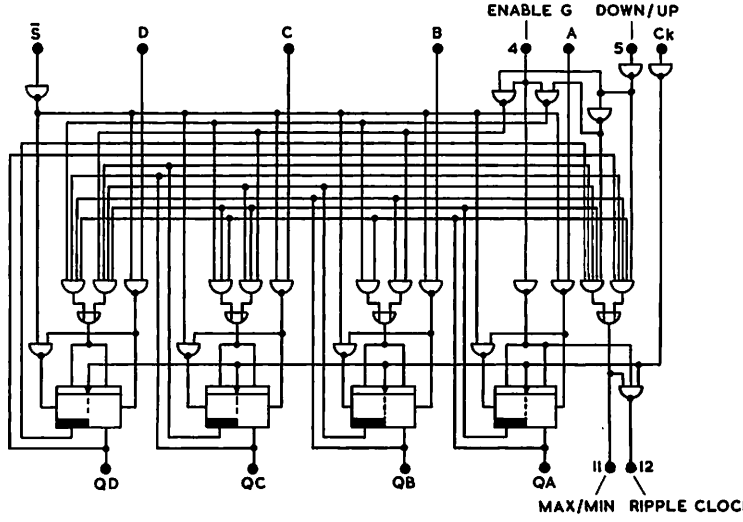

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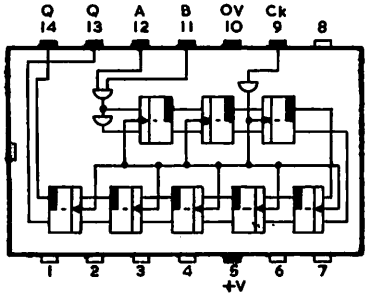
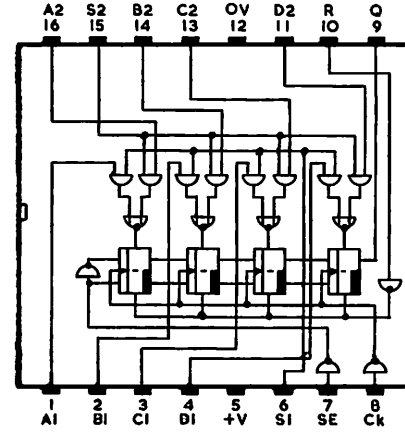
37



7494

38



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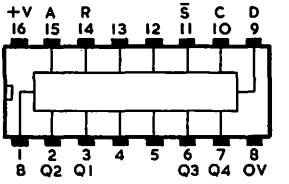

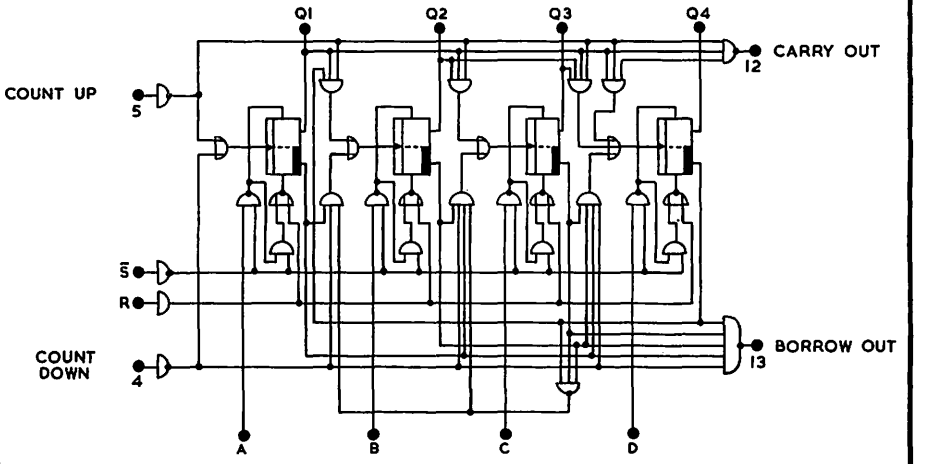

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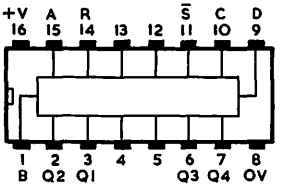

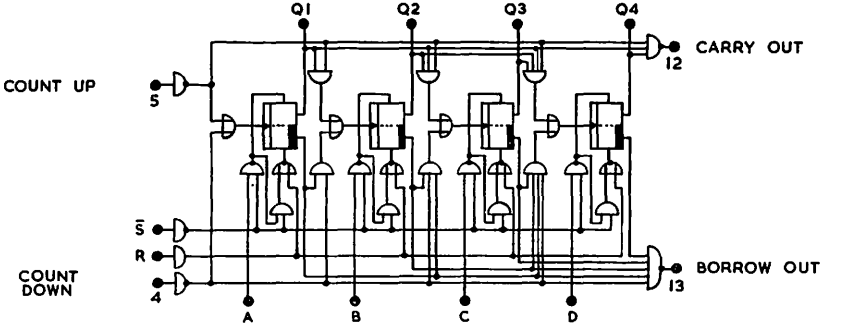

INTEGRATED CIRCUITS

7496

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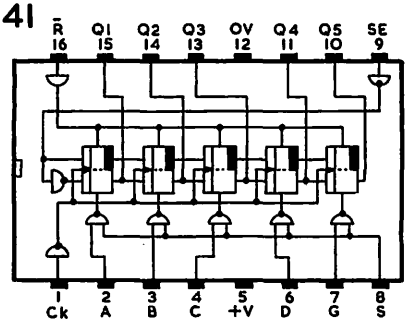
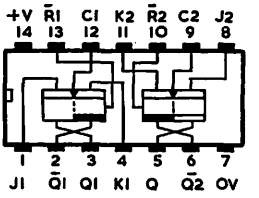
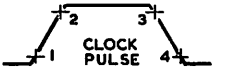


74107

42

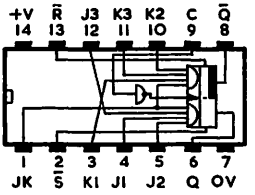


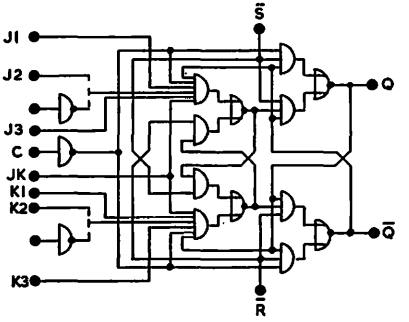


1–ISOLATE SLAVE FROM MASTER
2–ENTER INFORMATION INTO MASTER
3–DISABLE INPUTS
4–TRANSFER INFORMATION FROM MASTER TO SLAVE

74104

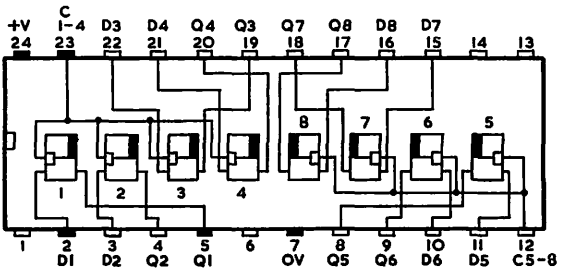
43

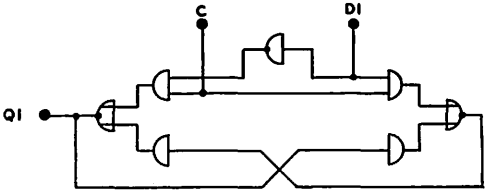




74100

44

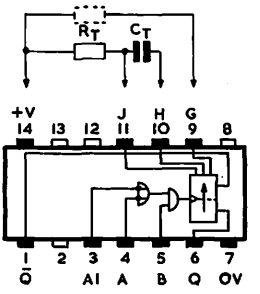




INTEGRATED CIRCUITS

74121

45

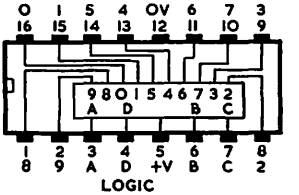


Pulse duration: t = 0.7CR approx.

Limits: R_T (min) = 1.4K
R_T (max) = 40K
C_T (max) = 1000uF

74141

46

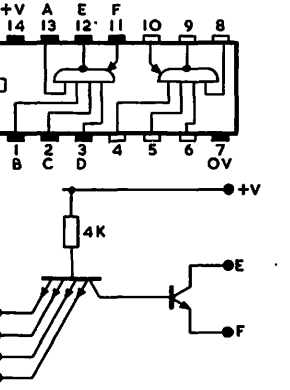


LOGIC

INPUT D	C	B	A	OUTPUT
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9

7460

47



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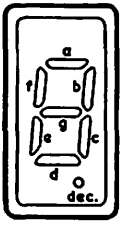
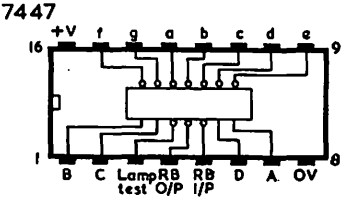


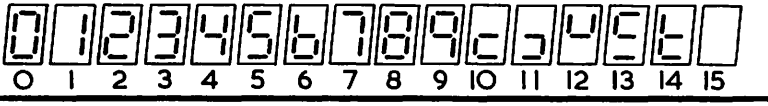
Segment identification (viewed from above)

7447



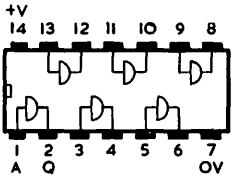
Connect terminals a to g to the respective terminals on the indicator(e.g. 3015F, p41)
Binary input to A=1, B=2, C=4, D=8
indicates in hexadecimal on the indicator
as in the following configuration diagram:

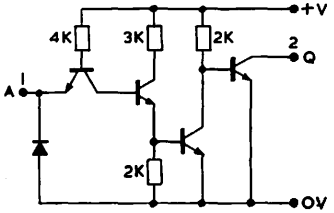
INDICATOR CONFIGURATION



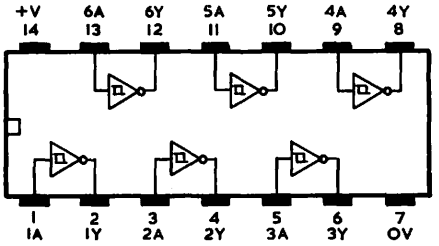
INTEGRATED CIRCUITS

7407
49

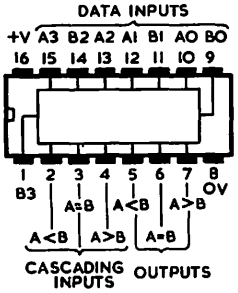




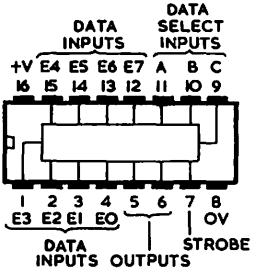
7414
50



7485
51



74151
52

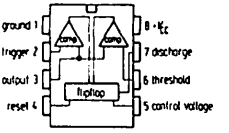


INTEGRATED CIRCUITS

SINGLE AND DUAL TIMERS

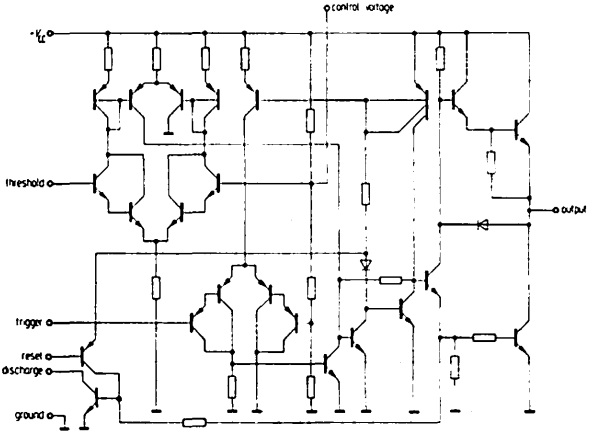
TDB0555B equivalent to NE555V 8-pin DIL
TDB0556A equivalent to NE556A 14-pin DIL

TDB 0555 B

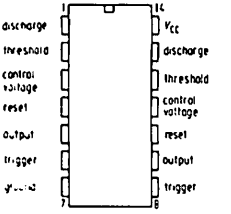


Supply voltage	16V max
Operating range	4.5V to 16V
Ambient operating temperature	0° to 70°C
Storage temperature range	-65° to +150°C
Supply current (no load, 15V supply)	10mA typical
Frequency range	0.001Hz to 1MHz
Initial accuracy (Ra=1K to 1M, C=0.1µF)	1% typical (TDB0555B only)
Initial accuracy (Ra=2K to 100K, C=0.1µF)	0.75% typical (TDB0556A only)
Temperature coefficient	50ppm (0555); 150ppm (0556) per °C
Control voltage level range (15V supply)	9 to 11V
Typ. rise and fall times	100nS

Equivalent circuit (shown for one side only)

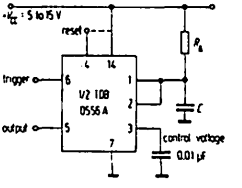


Pin configuration TDB 0556 A

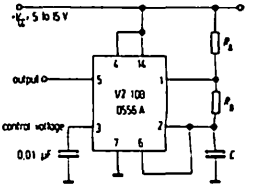


Application

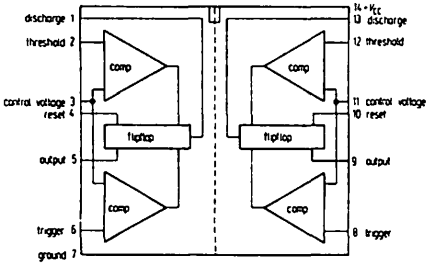
monostable multivibrator



astable multivibrator



Block diagram TDB 0556 A



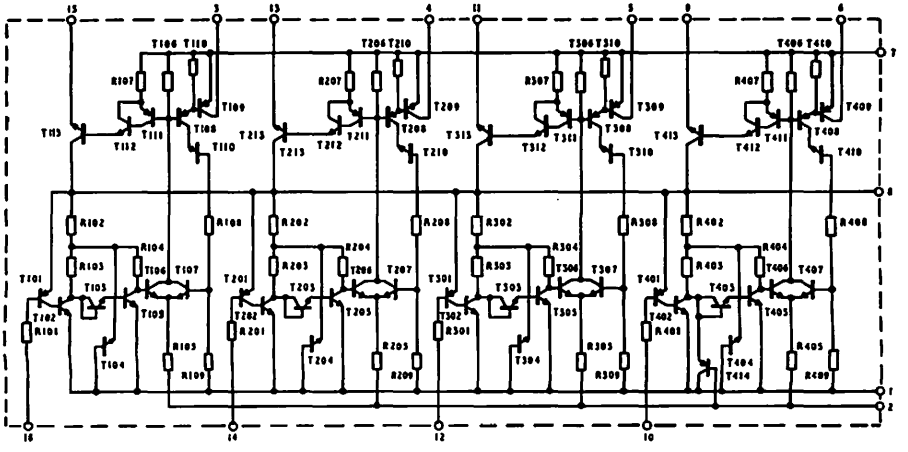
INTEGRATED CIRCUITS

TOUCH SWITCH INTEGRATED CIRCUITS Types SAS560, SAS570, SAS580, SAS590.

These IC's are particularly suitable for use in radio and TV receivers and in lifts for touch control circuits.
By switching one amplifier, outputs are set to operate external circuits and indicators.
Up to four IC's may be operated in an interdependant system.
The SAS560 and SAS580 always energise one of their outputs when the supply is connected — the other types do not.
The use of SAS580 and SAS590 obviates several diodes and can operate LED's, filament lamps, neons or nixie tubes. An example is shown for the operation from a high voltage supply thereby making use of its internal voltage stabiliser.

	SAS560/570	SAS580/590
Supply voltage V7 max	36V	
Supply voltage V8 max	24V	
Lamp current max continuous	55mA	55mA
Lamp current max peak	100mA	100mA
Tuning current available	1.5mA	
Ambient temperature max	70 C	70 C
Operating range V7	15 to 33V	
V8	6 to 22V	
V7-V8	2 to 24V	
Supply voltage V16 max		36V
Operating range V16		10 to 36V
Current comsumption max		15mA
Outline	16 pin DIL	18 pin DIL

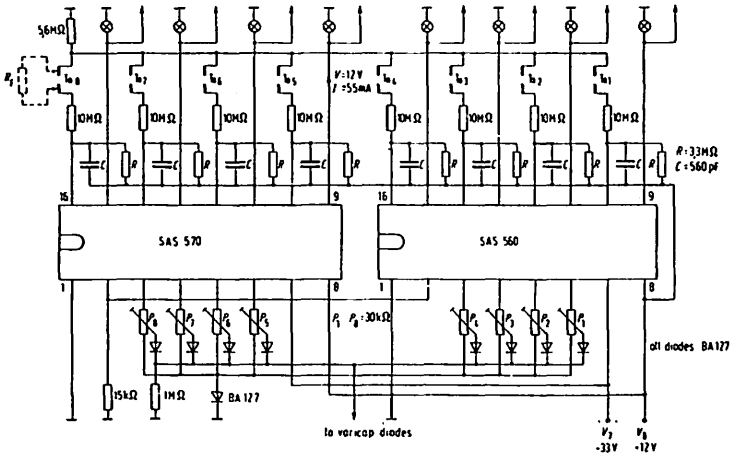
CIRCUIT DIAGRAM OF SAS560



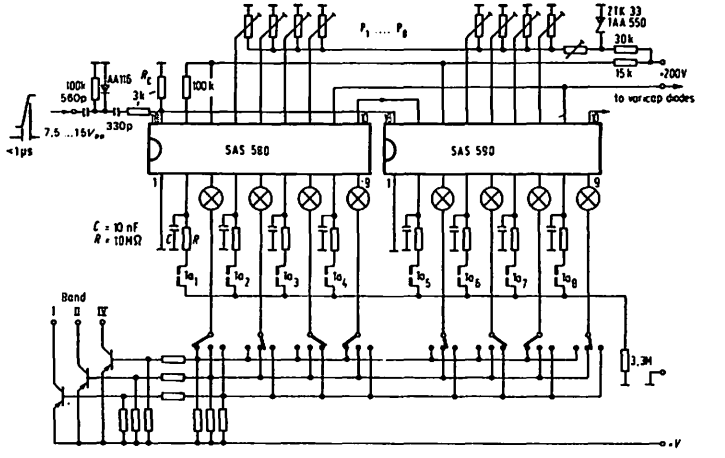
INTEGRATED CIRCUITS

APPLICATION CIRCUIT FOR SAS560 AND SAS570

Switching voltages for range selection



APPLICATION CIRCUIT FOR SAS580 AND SAS590



CONTACTLESS SWITCHES

The integrated circuits SAS 201A and SAS 211A are contactless switches which are operated by a magnetic field. The outputs Q1 and Q2 provide in-phase signals from open collector stages. The SAS 201A gives a single pulse of defined length. The pulse length is independent of the duration of the magnetic field. The SAS 211A gives a level change whilst the magnetic field is present.

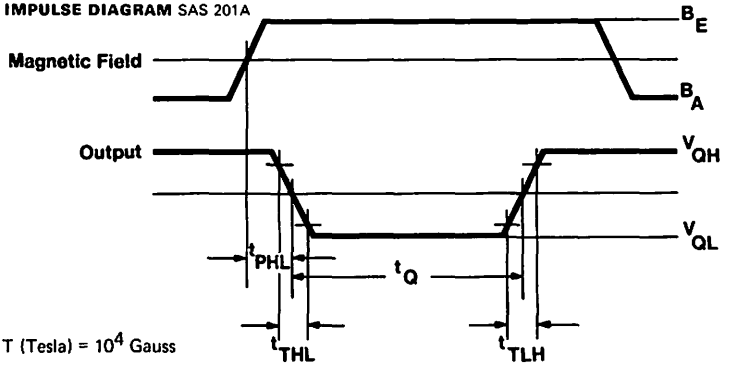
MAXIMUM RATINGS

		min	typ	max	
Operating voltage	Vs			18	V
Output current	Iq1 Iq2			20	mA
Tamb operating	Tamb	0		70	°C
Storage temperature	Ts	-40		150	°C

OPERATING CHARACTERISTICS (Vs=4.5v to 15v, T=5 to 60°C)

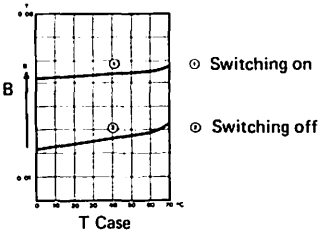
Operating current	Is			6	mA
Field to switch ON	BE	0.088			T*
Field to switch OFF	BA			0.016	T
Hysterisis	Bh	0.017		0.032	T
Output current B<BA				10	µA
Output current B>BE			16		mA
Output voltage				0.4	V
SWITCHING TIMES SAS 201A					
Output pulse length	Tq	15	40		µS
Rise and fall times	t_{THL}			1.5	µS
SWITCHING TIMES SAS 211A	t_{TLH}			1.5	µS
Rise and fall times	t_{THL}			1	µS
	t_{TLH}			1	µS

IMPULSE DIAGRAM SAS 201A



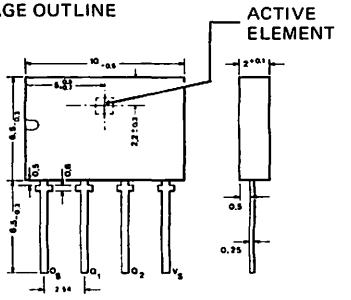
*1T (Tesla) = 10^4 Gauss

SAS 211A



Field strength requirements as function of case temperature

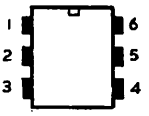
PACKAGE OUTLINE



INTEGRATED CIRCUITS

THRESHOLD SWITCHES

Threshold Switch TCA105

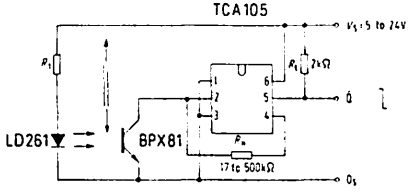


Supply voltage max		30V		
Range of operation		4.5 to 30V		
Output voltage (pins 4,5)		30V		
Output current max		50mA		
Switching frequency max		40KHz		
Oscillating frequency range		1 to 5MHz		
Operating ambient temperature		-25 to +85°C		
Static characteristics: (pin 3 to 0V, supply = 12V)	min	typ	max	
Supply current max		8	9.5	mA
Input threshold voltage with compensation resistor Rk	300	400	450	mV
Input threshold voltage without compensation resistor Rk	500	600	760	mV
Input threshold current		45	60	µA
Low state voltage at Io=50mA		0.7	1.15	V
Fan-out as TTL driver = 10				
Switching time as TTL driver		3		µs

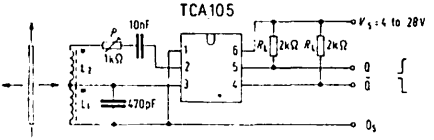
Outline: 6-pin DIL

APPLICATIONS

Light barrier switch



Proximity detector



L1=20 turns on ½ x B65517A0000R001
L2= 7 turns " "

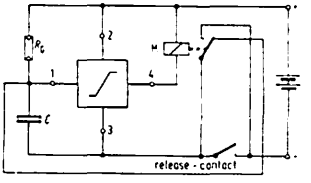
Threshold Switch TCA345A

Supply voltage max	7V
Range of operation	2 to 7 V
Output current max	70mA
Operating ambient temperature	-25 to +85°C
Saturation voltage, Io=40mA	300mV max.
Threshold current	10nA typ.

Threshold voltage is approx. 66% of supply voltage
Supply current is approx. 1.5mA per volt of supply.

A 'catching' diode is incorporated at the output so that inductive loads (i.e. relays) may be used.

Application example
Shutter-timing control
TCA345A



INTEGRATED CIRCUITS

MOS INTEGRATED CIRCUITS

FREQUENCY DIVIDERS

SAJ131

Static MOS frequency divider with a ratio of 1000:1 in T072 package.

SAJ141

Asynchronous counter with three open-drain outputs Q1 (10:1), Q2 (100:1) and Q3 (1000:1). A second input is provided with a higher input level for applications where higher noise immunity is required.

These circuits require negative supply voltages but are particularly suitable for battery operation due to their very low current consumption.

Characteristics	Unit	SAJ131	SAJ141
Supply voltage max.	V	-20	-12
Input frequency max.	KHz	25	1000
Input voltage max.	V	-20	-12
Output current max.	mA	-1	
Operating temperature max.	°C	70	70
Input resistance min.	MΩ	10	
H-output (worst case)	V	-7	
L-output (worst case)	V	-15	
Pulse width min. (L)	µs	10	
Pulse width min. (H)	µs	15	

PIN CONNECTIONS

	SAJ131	SAJ141
Supply	2	8
Substrate	4	1
Input	1	
Output	3	
Input 1 (low level)		2
Input 2 (high level)		3
Output 10:1		7
100:1		5
1000:1		6
Reset		4
Outline	T072	8-DIL

INTEGRATED CIRCUITS

MOS INTEGRATED CIRCUITS

IC's particularly suitable for electronic musical instrumnets

SAJ205

MOS circuit for the generation of staicase waveforms. When a sine or square wave is applied to the input, the outputs are at f/2, f/4, f/8....., f/256. The outputs are switchable between sawtooth and sqare-wave voltages.

SAJ410

MOS static 7-stage binary frequency divider which will find many applications in delay circuits and time relays as well as frequency division in musical instruments.

Characteristics	Unit	SAJ205	SAJ410
Supply voltage max.	V	-12	-14
Gate supply voltage	V	-27±1	
Input frequency max.	KHz	100	100
Output voltage	V	10±0.8	
H-output (worst case)	V		-1
L-output (worst case)	V		-9
Output current max.	mA		-6
Operating temperature max.	°C		70
Input impedance min.	MΩ		1
Output impedance max.	Ω		800

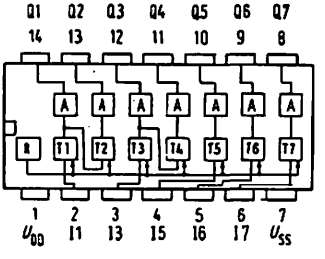
PIN CONNECTIONS

	SAJ205	SAJ410
Supply		1
Gate supply		
Substrate		7
Input		
Input 1		2
Input 3		3
Input 5		4
Input 6		5
Input 7		6
Outputs 1 to 7		14 to 8
Outputs 1 to 8		
Mode switching		
Outline	14-DIL	14-DIL

SAJ205

Further information on request.

SAJ410



INTEGRATED CIRCUITS

AUDIO POWER AMPLIFIERS

TBA800

A monolithic integrated power amplifier in a 12-lead quad in-line plastic package. External cooling tabs enable 2.5W output power to be achieved without external heat sink and 5W using a small area of the P.C. board copper as a heat sink.
It will work with a 5 to 30V supply, gives high efficiency, very low harmonic distortion and no crossover distortion.

TBA820

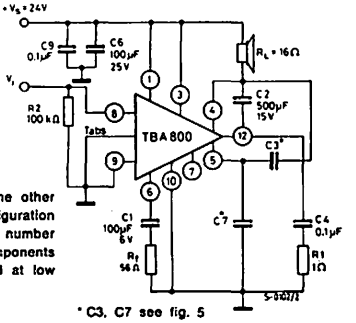
A small integrated power amplifier in a 14-lead quad in-line plastic package. Its main features are a minimum working voltage of 3V, low quiescent current, good ripple rejection and no crossover distortion.

	Conditions	TBA800	Conditions	TBA820	Unit
Supply voltage range		5 to 30		3 to 16	V
Peak output current		1.5		1.5	A
Power output @ 1KHz typ	Dist. 10%	5	Dist. 10%	2	W
Frequency response(-3dB)	C3=330pF	40-20K	Cb=220pF	25-20K	Hz
Distortion @ 1KHz	50mW-2.5W	0.5%	500mW	0.5%	-
Input sensitivity @ 1KHz	Po=5W	80	Po=1.2W	60	mV
Open loop voltage gain	1KHz	80	1KHz	75	dB
Closed loop voltage gain	1KHz	42	1KHz	34	db
Input resistance		5		5	MΩ
Outline		12-QIL		14-QIL	

Standard conditions for above table: TBA800 24V, 16Ω load
TBA820 12V, 8Ω load, Rf=120Ω

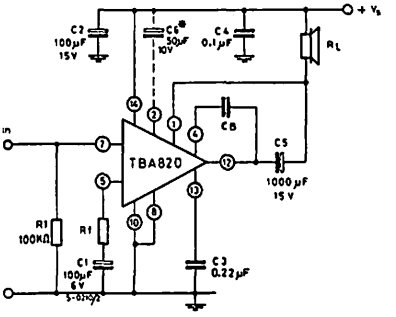
TBA800 example of heat sink required:
With 24V unregulated supply, 16Ω load, 55°C ambient, 0.0014" thick copper, the area of copper required on each tab is 26mm²

APPLICATION INFORMATION



Compared with the other circuits, this configuration entails a smaller number of external components and can be used at low supply voltages.

* C3, C7 see fig. 5



INTEGRATED CIRCUITS

AUDIO POWER AMPLIFIERS

SN76013ND

A popular integrated circuit made by Texas Instruments for use as audio amplifier s up to 3 watts at only 1% distortion. This amplifier incorporates a negative feedback path thus reducing the nuber of external components required. Particular features are low quiecsent current and operating temperatures up to 70°C at 3 watts output into 15 ohms.

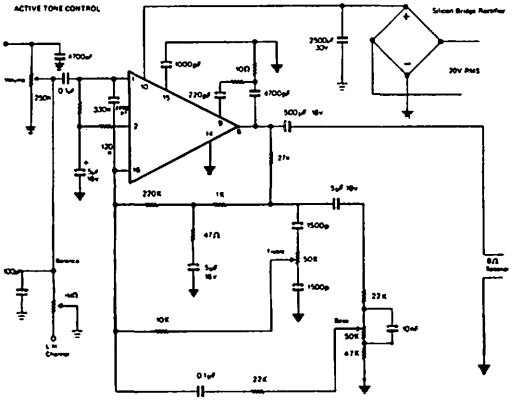
SN76023ND

An amplifier similar to the SN76013ND but without the internal negative feedback path. Thus active tone controls are possible and an application to show its use is given.

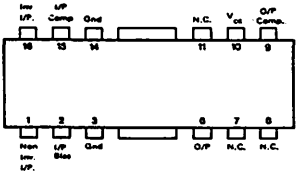
	Both types	
Supply voltage		
Power output min	24V (peak 28V)	
Distortion, total, 0.05 to 3W	1% max.	
Closed loop gain min.	46dB	SN76013ND only
Open loop gain, typ.	80dB	SN76023ND only
Input impedance, min.	200KΩ	
Quiescent current, typ.	10mA	
Noise voltage output	1mV	SN76013ND only
Noise voltage output	1.5mV	SN76023ND only

Outline: Similar to 16-DIL but with broad tabs in centres for heat dissipation.

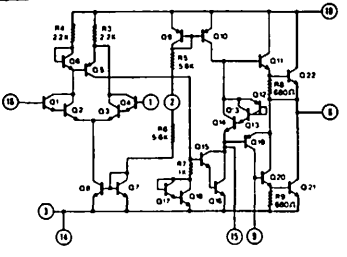
Ceramic cartridge circuit for SN76023ND



Connections (both types)



SN76023ND circuit



INTEGRATED CIRCUITS

LINEAR INTEGRATED CIRCUITS

OPERATIONAL AMPLIFIERS

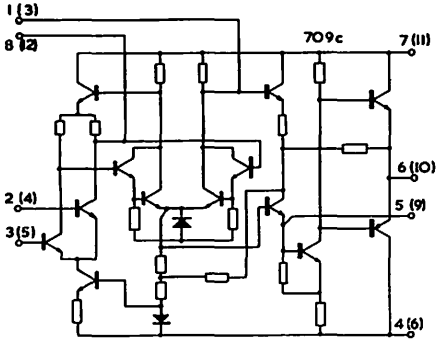
	LM301AN	LM308N	µA709C	µA741C	TBB 0747A	µA748CJ	TBB 1458B
Supply voltage range	±18	±18	±18	±18	±18	±22	±18
Max. differential I/P voltage	±30	±15	±18	±30	±30	±30	±30
Max Common mode I/P voltage			±10	±15			±15
Max load current			10mA	10mA			
Max ambient operating temperature	55°C	55°C	75°C	70°C	70°C	70°C	70°C
Max dissipation	500mW	500mW	400mW	400mW			
Max O/P short circuit duration			5 secs				
Output voltage swing	±13	±14	±13	±13	±13	±13	±13
Voltage gain, dB typ.	104	109	93	104	100	100	100
Input impedance	2M	40M	250K	400K	2M	2M	1M
Input offset voltage max	7.5mV	7.5mV	7.5mV	6mV	6mV	6mV	6mV
Common mode rejection ratio dB	90	100	90	90	100	90	90

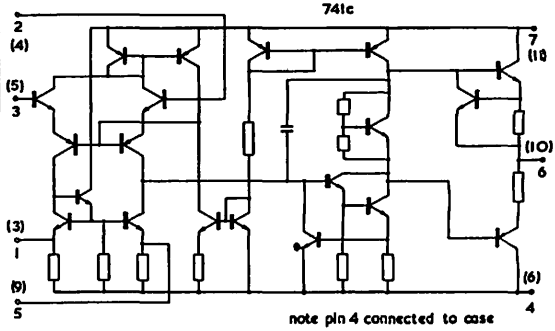
PIN CONNECTIONS

	LM301AN	LM308N	µA709CE	µA709CJ	µA741CE µA741CP	µA741CJ	TBB 0747A	µA748CJ	TBB 1458B
Inverting I/P	2	2	2	4	2	4	1,6	4	2,6
Non-inv. I/P	3	3	3	5	3	5	2,7	5	3,5
+V	7	7	7	11	7	11	13,9	11	8
-V	4	4	4	6	4	6	4	6	4
O/P	6	6	6	10	6	10	12,10	10	1,7
Input comp. 1		1	8	12					
Input comp. 2		8	1	3					
Output comp.			5	9					
Offset null 1					1	3	3,14	3	
Offset null 2					5	9	5,8	9	
Balance comp.	1								
Balance	5								
Freq. comp.	8								
Outline	8-DIL	8-DIL	TO79	14-DIL	TO79 8-DIL	14-DIL	14-DIL	14-DIL	8-DIL

NOTES: TBB0747A is equivalent to µA747CJ; CA3747CE; LM747CM; ML747CP
TBB1458B is equivalent to LM1458N; ML1458S

TYPICAL CIRCUIT DIAGRAMS





Linear Integrated Circuits

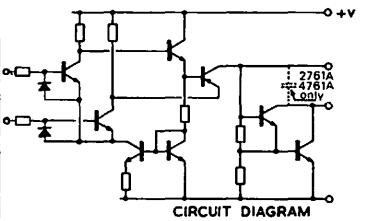
OPERATIONAL AMPLIFIERS (High current)

Type Numbers:	TAA761,761A,2761A,4761A		TAA861,861A,865A	
Characteristics	Conditions @ Vi=±15	Value	Conditions @ Vi=±10	Value
Max supply volts		±18		±10
Input offset voltage max.	Rg=50Ω	±6mV	Rg=50Ω	±10mV
Input offset current max.		±300nA		±300nA
Input current max.		1μA		1μA
Output voltage swing min.	R_L=2KΩ	±14	R_L=2KΩ	±9
Input impedance typ.	F=1KHz	200KΩ	F=1KHz	200KΩ
Open loop voltage gain typ.	R_L=10KΩ, F=1KHz	90dB	R_L=10KΩ, F=1KHz	90dB
Output current max.		70mA		70mA
Max. differential I/P voltage		±18		±10
Max. ambient operating temp.		70°C		*70°C
Temp. coeff. of I/P offset V.	Rg=50Ω	6 V	Rg=50Ω	6 V
Temp. coeff. of I/P offset I.	Rg=50Ω nA/°C:	0.3	Rg=50Ω nA/°C:	0.3
Input common mode range	R_L=2KΩ	±13	R_L=2KΩ	±9
Common mode rejection ratio	R_L=2KΩ typ:	79dB	R_L=2KΩ typ:	74dB
Input offset voltage max.	Vcc=5V	±6mV	Rg=50Ω	±10mV
Input offset current max.	Vcc=5V	±300nA		±300nA

*85°C for TAA865A

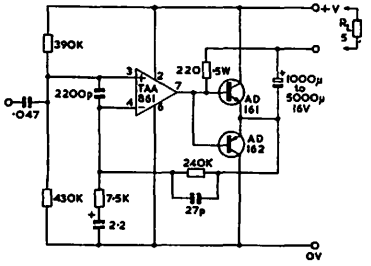
PIN CONNECTIONS

TAA:	761 861	761A 861A 865A	2761A	4761A
Inv. I/P	4	3	2, 4	4, 5, 10, 12
Non- inv. I/P	3	2	1, 5	3, 6, 9, 13
Freq. comp'.	8	6	internal	internal
O/P	7	5	8, 6	2, 7, 8, 14
+V	2	1	3	11
-V	6	4	7	1
Outline	TO78	8-DIL	8-DIL	14-DIL

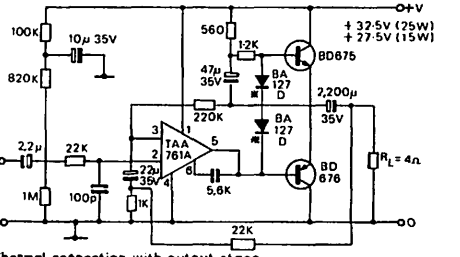


CIRCUIT DIAGRAM

4 Watts AMPLIFIER

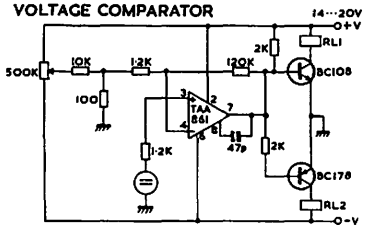


AUDIO AMPLIFIER

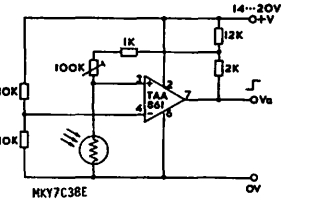


*Thermal connection with output stage.

VOLTAGE COMPARATOR



SENSITIVE PHOTO AMPLIFIER



We regret that no further technical details are available concerning the above circuits.

INTEGRATED CIRCUITS

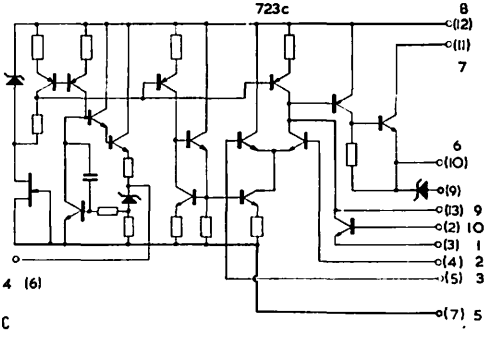
Io=500mA, T=25°C unless otherwise stated		TDB7805T		TDB7812T		TDB7815		unit
		condition	value	condition	value	condition	value	
Output voltage	min		4.8		11.5		14.4	V
	typ	Vi=10V	5	Vi=19V	12	Vi=23V	15	V
	max		5.2		12.5		15.6	V
Line regulation	typ	Vi 8-12V	1	Vi 14-22V	3	Vi 20-26V	3	mV
	max		50		120		150	mV
Load regulation	typ	Io=	15	Io=	12	Io=	12	mV
	max	5-1500mA	100	5-1500mA	240	5-1500mA	150	mV
Quiescent current	typ	Vi=	4.2	Vi=	4.3	Vi=	4.4	mA
	max	10V	8	19V	8	23V	8	mA
Output noise	typ	BW 100KHz	40		75		90	µV
Long term stability	max	0 - 70°C	20	-	48		60	mV
Ripple rejection	min	Vi=	62	Vi=	55	Vi=	54	dB
	typ	8-18V	78	20-25V	71	19-28V	70	dB
Dropout voltage	typ	Io=1A	2	Io=1A	2	Io=1A	2	V
Short circuit current	typ		750		350		230	mA
Peak O/P current	typ		2.2		2.2		2.1	A
O/P resistance	typ	1KHz	17		18		19	mΩ
Temp. coefficient	typ	0-70°C	-1.1		-1.0		-1.0	mV/°C

Thermal resistance(junction to case) : 4°C/W
Max junction temperature : 150°C
Ambient operating temperature : 0 to 85°C
Max power dissipation @ Tc=85°C : 15W
" " " @ Ta=40°C, 10°C/W sink, : 6W
" " " @ Ta=40°C, no heat sink : 2.5W

Pin configuration

X75: Pin 1 Input (+)
Pin 2 0V
Pin 3 Output (+)

UNIVERSAL VOLTAGE REGULATOR TDB0723.



Maximum limits and characteristics:

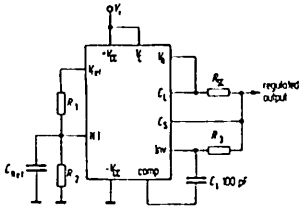
Maximum input voltage	: 50V
Maximum continuous voltage	: 40V
Maximum input to output voltage	: 40V
Maximum output current	: 150mA
Maximum current from Vz	: 25mA
Maximum current from Vref	: 15mA
Maximum internal power dissipation	: 800mW
Operating temperature range	: 0 to 70°C
Line regulation, Vin = 12 to 15V	: 0.01% Vo typ
Line regulation, Vin = 12 to 40V	: 0.1% Vo typ
Load regulation, Io = 1 to 50mA	: 0.03% Vo typ
Ripple rejection, 50Hz to 10KHz	: 74dB typ
Temperatur coefficient of Vo	:0.003%/°C
Output noise voltage 100Hz-10KHz	: 25µV typ rms
Long term stability	:0.1% per 1000 hrs. typical
Quiescent current, Vi = 30V	: 2.3mA typ
Input voltage range	: 9.5 to 40V
Output voltage range	: 2.0 to 37V†
Input to output differential	: 3.0 to 38V

Figures in () denote TDB0723A 14-DIL
Other figures are for TDB0723 10-pin TO5

†May be used for much higher voltages by 'floating' the regulator.

INTEGRATED CIRCUITS

Fig. 1 Basic low voltage regulator (V_{out} = 2 to 7 V)

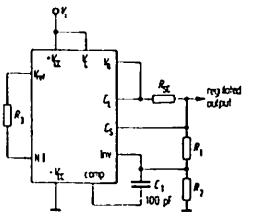


Typical performance

Regulated output voltage	5 V
Line regulation (ΔV_i = 3 V)	0.5 mV
Load regulation (ΔI_L = 50 mA)	1.5 mV

Note: $R_3 = \frac{R_1 \cdot R_2}{R_1 + R_2}$ for minimum temperature drift.

Fig. 2 Basic high voltage regulator (V_{out} = 7 to 37 V)



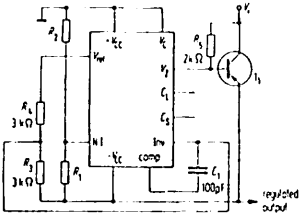
Typical performance

Regulated output voltage	15 V
Line regulation (ΔV_i = 3 V)	1.5 mV
Load regulation (ΔI_L = 50 mA)	4.5 mV

Note: $R_3 = \frac{R_1 \cdot R_2}{R_1 + R_2}$ for minimum temperature drift.

R_3 may be eliminated for minimum component count.

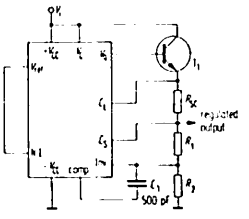
Fig. 3 Negative voltage regulator



Typical performance

Regulated output voltage	−15 V
Line regulation (ΔV_i = 3 V)	1 mV
Load regulation (ΔI_L = 100 mA)	2 mV

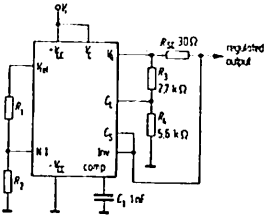
Fig. 4 Positive voltage regulator



Typical performance

Regulated output voltage	+15 V
Line regulation (ΔV_i = 3 V)	1.5 mV
Load regulation (ΔI_L = 1 A)	15 mV

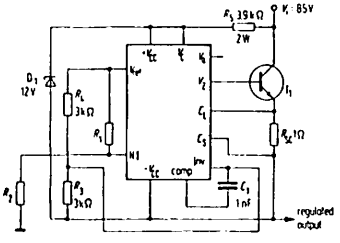
Fig. 5 Foldback current limiting



Typical performance

Regulated output voltage	+5 V
Line regulation (ΔV_i = 3 V)	0.5 mV
Load regulation (ΔI_L = 10 mA)	1 mV
Short circuit current	20 mA

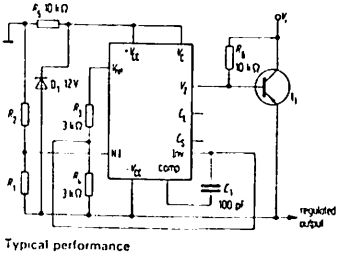
Fig. 6 Positive floating regulator



Typical performance

Regulated output voltage	+50 V
Line regulation (ΔV_i = 20 V)	15 mV
Load regulation (ΔI_L = 50 mA)	20 mV

Fig. 7 Negative floating regulator



Typical performance

Regulated output voltage	−100 V
Line regulation (ΔV_i = 20 V)	30 mV
Load regulation (ΔI_L = 100 mA)	20 mV

Formulae for intermediate output voltages:

Figs 1 & 5: Vo = Vref.R2/(R1 + R2) Figs 3 & 7: Vo = Vref(R1 + R2)/2R1, R3 = R4
Figs 2 & 4: Vo = Vref(R1 + R2)/R2 Fig 6 : Vo = Vref(R2 - R1)/2R1, R3 = R4

Foldback current limiting: (Vs = Vsense)

I(knee) = [Vo.R3 + Vs(R3 + R4)]/Rsc.R4 I(short cct.) = Vs(R3 + R4)/Rsc.R4

INTEGRATED CIRCUITS

WINDOW DISCRIMINATOR TCA965

OPERATION

The window discriminator compares the height of an input voltage with two externally set limits and causes four output signals to be set according to whether the input is INSIDE, OUTSIDE, ABOVE, or BELOW the "window".
The limits may be set by two methods:

1). Set upper and lower limits at pins 6 & 7; connect pin 9 to 0V.
Use pin 8 as the input.
Pins 13, 3, 14, 2 indicate whether inside, outside, above or below respectively.

2). Set mean of limits at pin 8 and half window width at pin 9.
Connect pins 6 and 7 and use this connection as input.
Pins 13, 3, 2, 14 indicate whether inside, outside, above or below respectively.

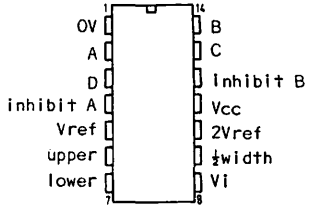
Complex modes

By setting the limit and/or width levels by potentiometers fed from pin 10 (6.4V) the limits may be varied together by loading pin 5 by a variable resistor.
By coupling inputs to outputs, oscillators, wave generators, adjustable Schmitt triggers and many other useful circuits may be devised.

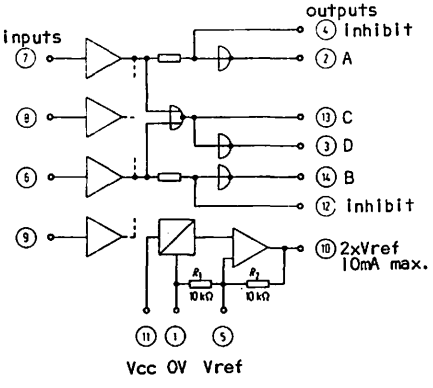
DATA

Supply voltage	Vcc	27V max.
Voltage range		4.75V to 27V
Differential input voltage		27V max
Output current		50mA
Operating ambient temperature		-25 to +85°C
Input current		50nA max.
Ref voltage (pin 5)		3.2 ± 150mV
Outline		14-pin DIL
Inputs 6, 7, 8		1.5V min, Vcc max.
Input 9		0 to Vcc
Voltage at pin 10 (Vcc 7.9V) (twice voltage at pin 5)		6.4V nominal

Pin configuration (top view)



Block diagram:

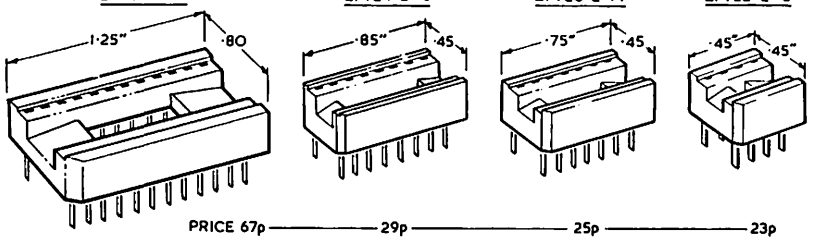


Truth table

$V_8 > V_5 + V_9$
$V_8 < V_6 + V_9$
$V_8 > V_7 - V_9$
$V_8 < V_7 - V_9$

A	B	C	D
	L	H	L
	H	L	H
H		L	H
L		H	L

INTEGRATED CIRCUITS

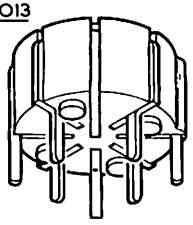


PRICE 67p — 29p — 25p — 23p

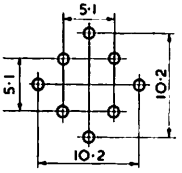
APPROXIMATE SIZE

CONTACTS BERYLLIUM COPPER GOLD PLATED

TYPE 2013

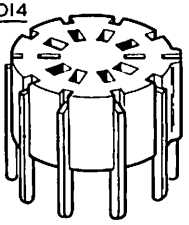


Price 30p

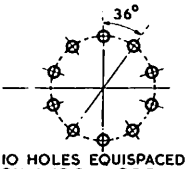


DRILL SIZE 1mm dia.

TYPE 2014



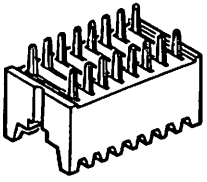
Price 31p

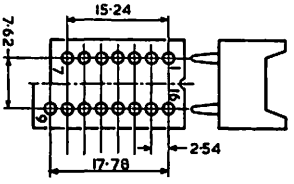


10 HOLES EQUISPACED ON A 10·2mm P.C.D. DRILL SIZE 1mm dia.

CONTACTS: PHOSPHOR BRONZE, GOLD PLATED

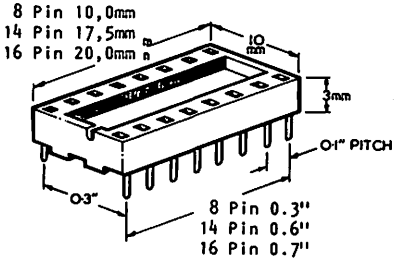
LOW COST





Type No.		Price
DRD-4	8-pin	11p
DRD-7	14-pin	14p
DRD-8	16-pin	15p
DRD-9	18-pin	17p

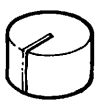
LOW PROFILE TEXAS IC HOLDERS



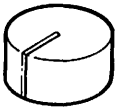
	Price
8-pin	17p
14-pin	22p
16-pin	24p

KNOBS

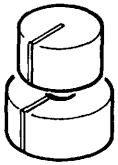
KNOBS All grub screw fitting for 0.25" shafts, black unless otherwise stated.



18mm dia
JV18: 16p



23mm dia.
JV23: 16p



18mm dia.
JV18/4: 18p

23mm dia.
JV23/6T: 18p

JV18/4 & JV23/6T are for use with DP20 potentiometers

JV-slider: 7p

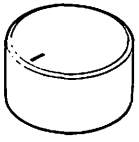
For use with PG58 potentiometers.

All JV knobs are available in the following colours:
black, red, yellow, green, blue, light grey, dark grey, white.

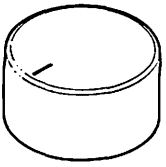
Aluminium range with polished bevel, insulated from shaft.

18mm dia.
EV18A: 42p

22mm dia.
EV22A: 47p



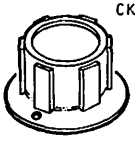
32mm dia.
EV32A: 54p



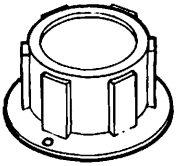
38mm dia.
EV38A: 62p

Plastic range, some metal decoration.

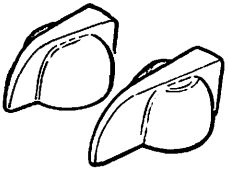
CK: metal insert



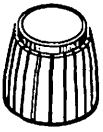
25mm dia.
K1: 13p
CK1: 18p



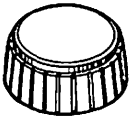
35mm dia.
K2: 15p
CK2: 20p



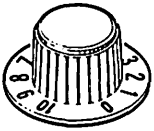
K3: 27mm long, 12p
K4; 32mm long, 12p



19mm dia.
K5: 20p



25mm dia.
K6: 25p

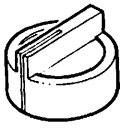


41mm dia.
SK6: 36p

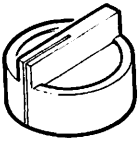
19mm dia
K7: 20p

25mm dia.
K8: 20p

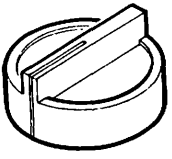
'Modern' Range



29mm dia.
K491: 40p

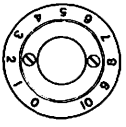


32mm dia.
K493: 42p

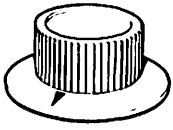


37mm dia.
K492: 45p

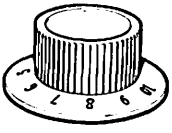
Numbered dials.



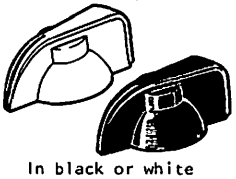
48mm dia
K382 270°: 22p
K389 300°: 22p



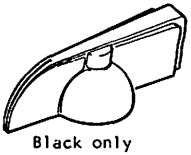
36mm dia
PK: 37p



36mm dia
NK: 37p



In black or white
32mm long
K107: 12p



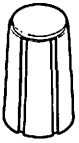
Black only
57mm long
K108: 22p

KNOBS

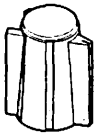
SIFAM COLLET KNOBS

Material: nylon; Colour: black *(cap, colour of your choice included in price).*
All types for 0.25" shaft fitting.

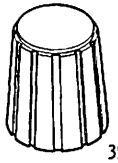
30p
Short S150B
Dia. 15.5mm
Length 13.4mm



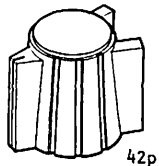
31p
Long K150B
Dia. 15.5mm
Length 21.4mm



35p
Winged W150B
Dia. 15.5mm
Length 21.4mm

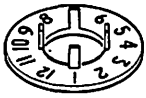


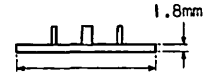
39p
Long K210B
Dia. 21.5mm
Length 21.4mm



42p
Winged W210B
Dia. 21.5mm
Length 21.4mm

DIALS (not for winged knobs)





150 series 29mm
210 series 37mm

15mm D151
21mm D211
0-11 x 30°

15mm D152
21mm D212
1-12 x 30°

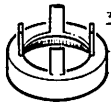
15mm D158
21mm D218

15mm D159
21mm D219
Black, white arrow

DIALS 15p each

Dials are transparent with black markings
except D159 & D219

NUT COVERS (15mm range only)



N150B Black
N151B +white line

Price N150B: 5p; N151B: 10p.

CAPS

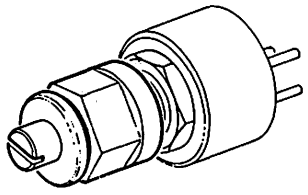
15mm C150 3p.
21mm C210 3p.

15mm C152 5p.
21mm C212 5p.

Available in colours black, red, yellow, green, blue, grey.

NON-DRIFT NUTS

Drift of potentiometer spindles due to vibration can easily and inexpensively be prevented by fitting to the spindle of each potentiometer a plastic non-drift nut which screws onto the fixing bush on which it cuts its own thread. It has a clearance hole which grips the spindle with sufficient firmness to check any tendency to rotate but still permits intentional adjustment.



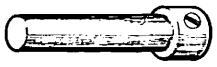
Non-drift nuts are available in Black, White and Red to facilitate coding. Price 7p each.

SHAFT COUPLINGS AND EXTENSIONS

Sturdily manufactured from solid brass to fit 0.25" spindles.

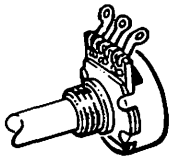
Shaft coupler 15p.

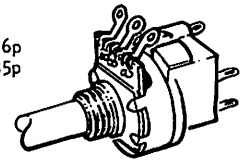
Shaft extension 15p.



POTENTIOMETERS

TYPE P20 CARBON TRACK



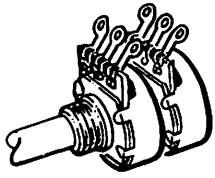


Spindle length	2.5" (from rear of mounting surface)
Spindle diameter	0.25" round
Spindle material	black plastic
Body diameter	0.79"
Depth behind panel	0.45" (1" with switch)
Bush details	0.35" long, 0.375" x 32TPI
Power rating	10K 0.30W 220K 0.25W Less switch 16p 470K 0.15W 2M2 0.1W With switch 35p

Resistance values

Linear	Log
100, 220, 470, 1K,	1K, 2K2, 4K7, 10K,
2K2, 4K7, 10K, 22K,	22K, 47K, 100K, 220K,
47K, 100K, 220K, 470K,	470K, 1M, 2M2.
1M, 2M2, 4M7.	

TYPE JP20 CARBON TRACK



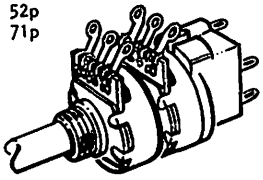
(Two tracks operated together by one spindle)

Spindle length	2.5" (from rear of mounting surface)
Spindle diameter	0.25" round
Spindle material	black plastic
Body diameter	0.79"
Depth behind panel	0.85" (1.40" with switch)
Bush details	0.35" long, 0.375" x 32TPI
Power rating	as for P20

Resistance values

Linear and log	Linear only
4K7, 10K, 22K, 47K, 100K, 220K, 470K, 1M, 2M2.	1K

Less switch 52p
With switch 71p

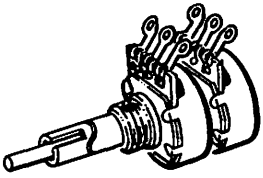


Balance log/antilog: 10K, 22K, 47K, 1M.
Dual antilog 10K, 22K only.

Linear and log types are matched for stereo as follows:

Linear	Between 15% & 85% rotation	±2dB
Log	Attenuation not exceeding 20dB	±2dB
	Attenuation not exceeding 30dB	±3dB
	Attenuation not exceeding 40dB	±4dB

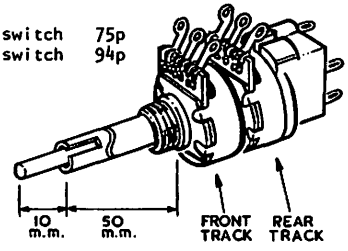
TYPE DP20 CARBON TRACK



(Two tracks, each operated by its own spindle)

Spindle lengths	inner 60mm outer 50mm
Spindle diameters	inner 4mm outer 6mm
Body diameter	0.79"
Depth behind panel	0.85" (1.40" with switch)
Bush details	0.35" long, 0.375" x 32TPI
Power rating	as for P20

Less switch 75p
With switch 94p



Resistance values as for P20 in any combination
(state which track required nearest bush)

DP20 potentiometers cannot be supplied stereo matched.
DP20 potentiometers may be supplied unclamped at front to facilitate spindle cutting to required lengths.
Please specify front and rear track resistances when ordering.

P20, JP20 and DP20 potentiometers have double wipers for low noise and long life

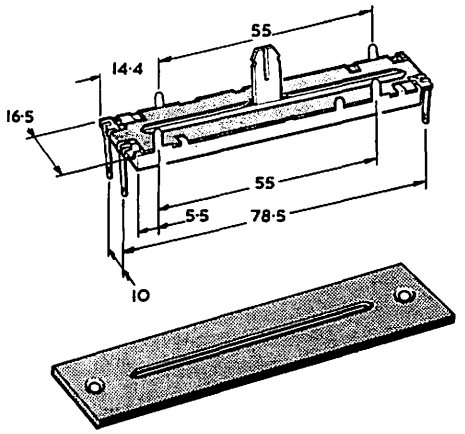
Track laws are coded as follows:- A = linear, B = log, C = antilog(reverse log)

Switch ratings:- 2 amps @ 250V a.c.

 P.C. Terminals are normally supplied in lieu of the ordinary wiring type illustrated

POTENTIOMETERS

TYPE PG58 CARBON TRACK



Dimensions as shown
Power rating as for P20 potentiometers
Resistance values:
Linear and Log 4K7 10K 22K
47K 100K 220K
470K 1M.

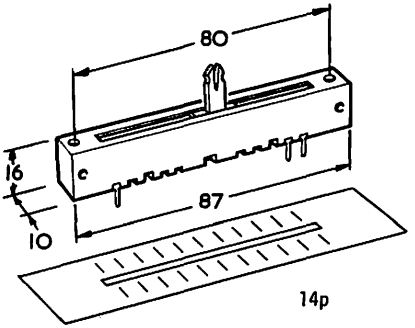
30p each

PG58 ESCUTCHEON PLATE, grey. 10p each

For masking panel slots and drilling
Fixing on 85mm centres.
(Unsuitable for C1PG58 series)

TYPE C1PG58 (MONO) 35p each

TYPE C1PG58ST (STEREO) 65p each



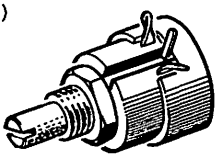
Dimensions of both types similar as shown.
Power ratings as for P20 potentiometers.
Resistance values:
Linear and Log 4K7 10K 22K
47K 100K 220K
470K 1M.
Log/anti-log 10K (C1PG58ST only)

SLIDE CONTROL BEZEL

Self adhesive aluminium bezel
Semi-matt anodised, black graduations.
(Suitable for PG58 only if sub-panel is used for mounting the potentiometer)

14p

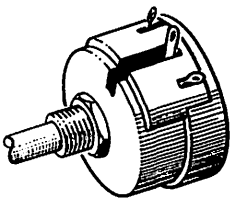
COLVERN TYPE CLR1106/11S Wire wound potentiometers



Spindle length : 0.75"(from rear of mounting surface) with screwdriver slot
Spindle diameter : 0.25" round
Spindle material : brass
Body diameter : 0.938"
Depth behind panel : 0.688"
Bush details : 0.375" long, 0.375" x 32 TPI
Power rating : 1 watt continuous for whole track.

Resistance values 10, 22, 47, 100, 10Ω to 10K 65p
220, 470, 1K, 2K2, 15K to 47K 79p
4K7, 10K, 22K, 47K

COLVERN TYPE CLR905C Wire wound potentiometers

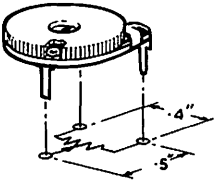


Spindle length : 2.5"(from rear of mounting surface)
Spindle diameter : 0.25" round
Spindle material : brass
Body diameter : 1.375"
Depth behind panel : 0.8"
Bush details : 0.375" long, 0.375" x 32 TPI
Power rating : 3 watts continuous for whole track.

Resistance values 10, 15, 25, 50,
100, 150, 250, 500, 10Ω 77p
1K, 1K5, 2K5, 5K, 15Ω to 10K 58p
10K, 15K, 25K, 50K. 15K to 50K 61p

POTENTIOMETERS

PR140
HORIZONTAL

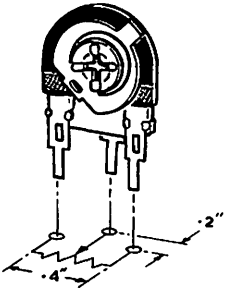


TYPE PR15 & PR140, linear only

Width	0.625"
Height	(vertical) 0.75", (horizontal) 0.2".
Length	(horizontal) 0.7"
Power rating	up to 470K: 0.15W
Resistance values	100, 220, 470 1K, 2K2, 4K7 10K, 22K, 47K 100K, 220K, 470K 1M, 2M2, 4M7, 10M.

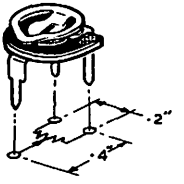
7p each

PR15
VERTICAL



All values and types available in horizontal or vertical mounting.

PR10
HORIZONTAL

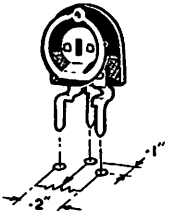


TYPE PR10, linear only

Width	0.375"
Height	(vertical) 0.453", (horizontal) 0.24"
Length	(horizontal) 0.4"
Power rating	0.1W
Resistance values	100, 220, 470 1K, 2K2, 4K7 10K, 22K, 47K 100K, 220K, 470K 1M, 2M2, 4M7.

7p each

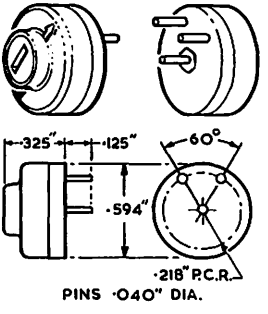
PR10
VERTICAL



All values available in horizontal or vertical mounting.

TYPE MPWT, linear only

Diameter	0.594"
Height	0.32"
Power rating	0.25W @ 70°C
Resistance values	47 ohms — 35p each 100, 220, 470 — 35p each 1K, 2K2, 4K7 — 23p each 10K, 22K, 47K — 23p each 100K, 220K, 470K — 23p each 1M, 2M2 — 29p each



PINS ·040" DIA.

THERMISTORS

THERMISTORS, NTC. *Basic formula: $R = Ae^{B/T}$, A & B constants, T = °K absolute.*

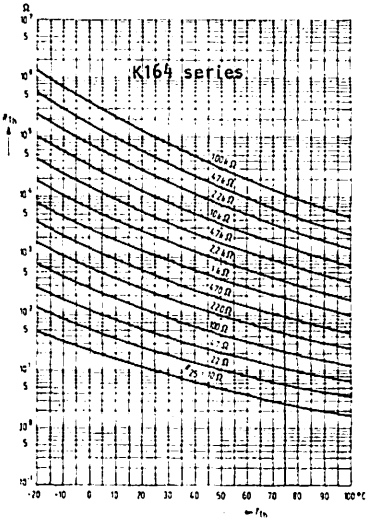
Type	Form	R @ 25°C	R @ T°C	@	ImA	'B' factor	mW/°C	max.W	Price
VA1066s	rod	4K7	200	150	55	3250	5.5	0.6	18p
VA1055s	rod	15K	540	150	33	3550	5.5	0.6	18p
VA1056s	rod	47K	1K	150	23	3925	5.5	0.6	18p
VA1067s	rod	150K	3K	150	15	4075	5.5	0.6	18p
VA1039	disc	500	5.4	120	430	5200	10	1	18p
VA1040	disc	130	2.6	120	620	4400	10	1	18p
VA1077	plate	32	0.8	120	1200	4200	14	1	16p
VA1100	disc	15	0.7	120	1200	3000	10	1	18p
VA1104	disc	15	1.0	105	2200	3350	17	2.2	20p
CZ4	rod	1K7(20°C)	320	50		(max current = 0.8A)			28p
CZ6	rod	3K (20°C)	1120	50		(max current = 0.45A)			28p
RA24	bead	20K(20°C)	150	220	4.5	3400	0.016	3mW	£1.50
RA53	bead	5K(20°C)	63	220	7	3100	0.016	3mW	£1.50
RA54	bead	50K(20°C)	270	220	3.3	3650	0.016	3mW	£1.50

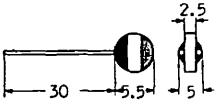
SIEMENS K164 range

Resistance tolerance : 20% @ 20°C
'B' tolerance : 5%
Max. power dissipation : 750mW
Colour code : standard resistance
Diameter : 5.5mm.
Lead length : 30mm.

Resistance	B°K	Resistance	B°K
6.8	2580	1K	3560
10	2580	2K2	3850
22	2900	4K7	3930
47	3050	10K	4050
100	3050	22K	4200
220	3280	47K	4450
470	3480	100K	4600

All values Price 22p each





RESISTORS FIXED

Type	Power watts	Tolerance	Range	Values see P68	Prices each, pence 1–9	10–99*	100-up*
RSX 0	1/20	5%	82Ω – 220K	E12	11.0	10.0	9.0
MR25	1/10	2%	5.1Ω – 100K	E24	4.0	3.3	2.3net
CR25	1/3	5%	1.0Ω – 3.9Ω	E12	1.3	1.1	0.9net
UPM033	1/3	5%	4.7Ω – 1M	E24	1.3	1.1	0.9net
CR25	1/3	10%	1.2M– 10M	E12	1.3	1.1	0.9net
TR5	1/2	2%	10Ω – 1M	E24	4.0	3.3	2.3net
UPM050	1/2	5%	4.7Ω – 4M7	E12	1.3	1.1	0.9net
CR37	1/2	5%	1.0Ω – 3.9Ω	E12	1.5	1.2	1.1net
UPM075	3/4	5%	4.7Ω – 10M	E24	1.5	1.2	0.97net
UPM100	1	5%	4.7Ω – 2M2	E12	3.2	2.5	1.92net
UPM100	1	10%	2M7 – 10M	E12	3.2	2.5	1.92net
TW1	1	1/20Ω	0.22Ω- 0.47Ω	E12	16	14	11 net
TW1	1	10%	0.56Ω- 3.9Ω	E12	12	10	8 net
GWS3	3	1/20Ω	0.47Ω only	–	11	10	8 net
GWS3	3	10%	1Ω – 8.2Ω	E12	11	10	8 net
GWS3	3	5%	10Ω – 10K	E12	11	10	8 net
GWS7	7	10%	1Ω – 8.2Ω	E12	11	10	8 net
GWS7	7	5%	10Ω – 10K	E12	11	10	8 net

CR25 may be suuplied in lieu of UPM033 according to availability.
GWS resistors under 8.2Ωand TW under 0.47Ω may have a temperature coefficient of up to 0.45%/°C depending on actual resistance value.

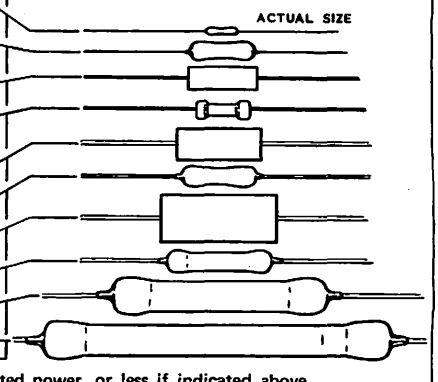
*NOTE: Ohmic values may not be mixed to obtain quantity price.
100-up Net prices are for units of 100 only.
1000-up prices in mixes of 100's availble on UPM types.
Ignore fractions of 1p on total resistor order.

Resistor types:
RSX0, CR25, CR37, UPM series : Carbon film, high stability, low noise
MR25 : Metal film, Mullard
TR5 : Metal oxide, Electrosil
TW1, GWS3, GWS7 : Wire wound, Plessey

E12 range: 10, 12, 15, 18, 22, 27, 33, 39, 47, 56, 68, 82 and their decades.
E24 range: 10, 11, 12, 13, 15, 16, 18, 20, 22, 24, 27, 30,
33, 36, 39, 43, 47, 51, 56, 62, 68, 75, 82, 91 and their decades.

DIMENSIONS, maximum.

Type	Length	Dia.	Voltage † (max)	Temp. for rated load.
RSX0	4	1.2	70(100pk)	70°C
CR25	7.5	2.5	250	70°C
UPM033	7	2.5	250	70°C
UPM050	9	3	350	70°C
MR25	6.5	2.5	250	70°C
CR37	10	3.7	350	70°C
UPM075	11	4.5	450	70°C
TR5	9.5	3.8		70°C
UPM100	16	6.6	500	70°C
TW1	15.9	4.6		20°C
GWS3	28.6	5.6		20°C
GWS7	47.6	5.6		20°C



† Maximum voltage is that which will dissipate the rated power, or less if indicated above.
All above dimensions in mm.

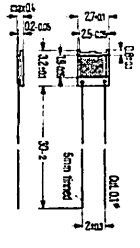
MAGNETO RESISTORS

MAGNETO RESISTORS

Type	Resistance (basic)	Resistance ratio 3KG	10KG	Temperature coefficient 0KG	3KG	10KG	Thermal Resistance	Outline	Price NET
FP17D500E	500	2.8--3.2	12--18	−1.8	−2.7	−2.9	150 max	1	£2.07
FP30D250E	250	2.8--3.2	12--18	−1.8	−2.7	−2.9	250 max	2	£1.33
FP17L200E	200	1.7--2.0	7--10	−0.16	−0.38	−0.54	150 max	1	£2.28
FP30L100E	100	1.7--2.0	7--10	−0.16	−0.38	−0.54	250 max	2	£1.26
FP38L40E	40	1.7--2.0	7--10	−0.16	−0.38	−0.54	250 max	3	£1.24
FP17L200J	200	1.7--2.0	7--10	−0.16	−0.38	−0.54	200 max	4	£3.73
FP100L100	115	4 typ @ 6KG		+0.7			100 typ	5	£2.52
FP200L100	1K	differential pair without magnet					100 typ	6	£5.24
FP210L100	1K	differential pair with integral magnet					200 typ	7	£6.51

Outline:–

1



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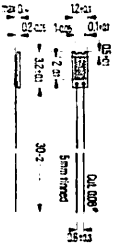

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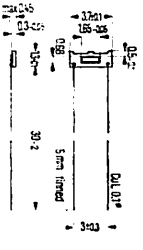

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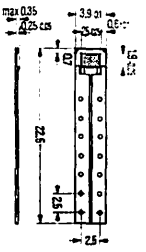

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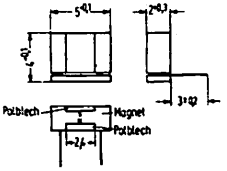

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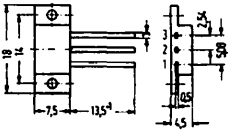

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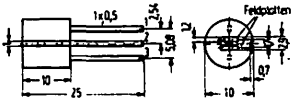


HALL EFFECT PROBES

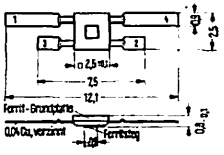
HALL EFFECT DEVICES

Type	I max	Hall emf @ KG @ I mV	Control R	Hall R	Offset max	Outline	Price NET
SBV566	75mA	300 min 2.5 25mA	30 Ω	30 Ω	1.5V/A	8	£1.06
EA218	150mA	85 min 10 100mA	70 Ω	1.5 Ω	.005V/A	9	£22.05
FA22E	200mA	80 min 10 150mA	65 Ω	1.5 Ω	.002V/A	10	£32.43
SV130/I	70mA	1700 min 10 35mA	200 Ω	250 Ω	0.3V/A	11	£15.17

10,000 gauss = 10KG = 1 Tesla

Outline:–

8



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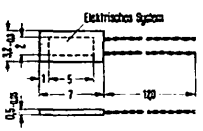

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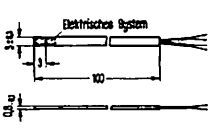

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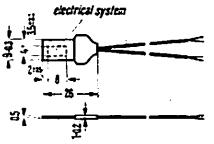


RESISTORS FIXED

GENERAL DATA

CARBON FILM, UPM033, UPM050, UPM075, UPM100.

Loading:	1000 hours at 65% of the maximum voltage produces a variation of typically +1% except for the 1 Watt range between 1M and 10M, where the variation is typically +1.5%.	
Temperature:	2 cycles–55°C to + 125°C	0.5% max.
Overload:	2.5 times maximum voltage for 5 seconds.	0.5% max.
Soldering:	Terminals immersed in solder bath for 2 secs. @ 270°C and 3 secs. @ 350°C.	0.5% max.
Humidity:	90 to 96% R.H. 40°C for 21 days then operated at max. voltage for 24 hours.	0.5% max. under 1K 1% max. 1K to 470K 2% max. 470K to 4.7M 3% max. 4.7K to 10M
Noise:	Typically 0.1μV/V up to 100K, rising to 0.5μV/V at 10M	

METAL OXIDE, ELECTROSIL type TR5, 2% selection tolerance.

Manufactured by bonding a tin oxide film into the surface of an alkali free glass rod of special quality. The film is impervious to moisture, unaffected by the heat of soldering and more abrasion resistant than the base glass. The film is of low expansion which is matched exactly with that of the glass; the resistor is therefore unusually resistant to thermal shock. These resistors are coated with a unique heat resisting material which has excellent mechanical, electrical and solvent resisting properties.

Stability: (DEF 5115 tests.)

Soldering:	0.15% max. change
Noise:	under 0.1μV/V
Damp heat:	0.5% max.
Shelf life:	0.1% max.

Endurance at 70°C	2000 hrs.	25000 hrs.
@ 1/8 W	0.5%	1%
@ 1/4 W	1%	2%
@ 1/2 W	2%	3%

Temperature coefficient (–55°C to +150°C) under 0.025% per °C

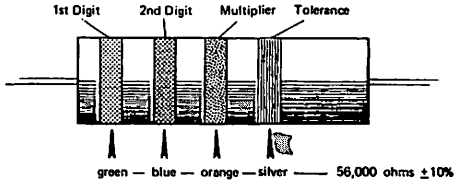
METAL FILM, Mullard type MR25, 2% selection tolerance.

Manufactured by depositing a homogeneous film of nickel-chromium on a high grade ceramic body. The required resistance value is obtained by cutting a helical track through the metal film. The ends of the resistors are fitted with endcaps to which solder coated copper wires are welded. The resistor body is protected by several layers of lacquer and colour coded.

Temperature coefficient:- under 0.01% per °C.

RESISTANCE COLOUR CODE

Colour	1st digit	2nd digit	multiplier	tolerance
black	0	0	1	
brown	1	1	10	1%
red	2	2	100	2%
orange	3	3	1000	
yellow	4	4	10,000	
green	5	5	100,000	
blue	6	6	1,000,000	
violet	7	7		
grey	8	8		
white	9	9		
gold			0.1	5%
silver			0.01	10%



BS1852 RESISTANCE CODE

This code is now often used on resistors where the resistance value is given in figures:

Multipliers are indicated thus : R = x1; K = x1000; M = X1,000,000.
Position of the decimal point indicated by the position of the multiplier.

Example – 1R0 = 1.0 ohms.
4K7 = 4.7K ohms or 4700 ohms
68K = 68K ohms or 68,000 ohms.

Tolerances are given by a letter:
F = 1%; G = 2%; H = 2.5%; J = 5%; K = 10%; M = 20%

Example – 4R7J = 4.7 ohms ±5%
2R2K = 2.2 ohms ±10%
68KK = 68K ohms ±10%
4M7K = 4.7M ohms ±10%

CAPACITORS

POLYSTYRENE

Self inductance is approximately 1nH per 1mm lead + capacitor length.
All Siemens polystyrene conform to this low inductance specification.
Colour ring is red for 160V types and at the end connected to the outer conducting layer.
Leads should not be stressed when assembling, neither should the temperature be allowed to rise above 70°C.

POLYCARBONATE

Self healing layer type capacitor designed for high volume production.
Unprotected types B32540 and B32541 absorb moisture in conditions of high humidity - this produces a reversible increase in capacitance.
B32551 should be used for high levels of humidity.

METALLISED LACQUER FILM

Self healing winding with cellulose acetate as dielectric.
Tubular metal cased with epoxy resin end seals (B32110) or with glass to metal end seals(B32120).

ALUMINIUM ELECTROLYTICS (Siemens types)

Leakage current formula, typical values after 30 minutes:

$$I_L = 0.02 \times C \times V + 3\mu A$$

(I_L in μA, C & V are rated capacitance and working voltage)

Leakage approximately doubles for each rise of 20°C up to 80°C.
The leakage after long storage may be up to 100 times higher in the first 10 minutes after switch-on, however, the capacitor will not be damaged by application of its full working voltage under these conditions.

TANTALUM ELECTROLYTIC CAPACITORS

Leakage current formula, typical values after 3 minutes:

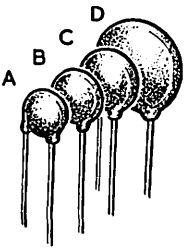
B45134: $I_L = 0.05 \times C \times V\ \mu A$ or $2\mu A$ whichever is greater.
(I_L in μA, C & V are rated capacitance and working voltage)

Series D: $I_L = 0.015 \times C \times V\ \mu A$ or $0.6\mu A$ whichever is greater.

CAPACITORS Non polarised

CERAMIC DISCS

Value pF	Voltage	dia. mm	thickness mm	tolerance %	Price.
0.001µF	500	6.4	3.0	20	2p
0.002µF	500	6.4	3.0	20	2p
0.005µF	500	7.6	3.2	20	2p
0.01µF	50	7.6	3.2	20	2p
0.02µF	50	9.1	3.2	20	2p
0.05µF	50	13.1	3.2	20	3p
0.1µF	3	9.0	3.5	+50-20	3p



CERAMIC, Siemens type B37448

Flat tubular, PCM = 2.5mm.

Tolerance : +50-20%
Working voltage : 63V

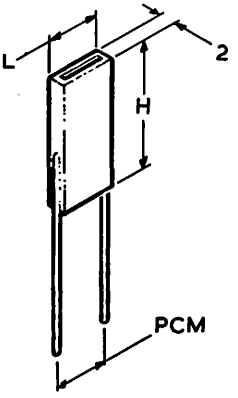
Value µF	H	L	Price
0.022	4	4	5p
0.033	6	4	5p
0.047	8	4	5p
0.068	10	4	6p

CERAMIC, Siemens type B37449

Flat tubular, PCM = 5mm.

Tolerance : +50-20%
Working voltage : 63V

Value µF	H	L	Price
0.047	4	6	5p
0.068	7	6	6p
0.1	9	6	6p
0.22	18	6	12p



CERAMIC PLATE, Mullard C333 series. (Low values only)

Working voltage : 63V

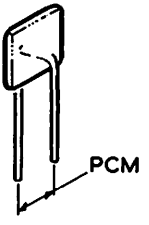
Value pF	H	L	Price
1.8 to 18 (E12 series)	3.5	4.5	3p each.

CERAMIC PLATE

Price 2p each.

Working voltage : 50V

Value pF	Tol. %	Temp. coeff.	Max. dims.*
22,27,33	5	A	4 x 2.5
39,47,56,68	5	A	6 x 2.5
82,100,120	5	A	8 x 5.0
150,180	5	A	10 x 5.0
220,270	5	A	12 x 5.0
330,390	5	B	12 x 5.0
470,560,680	5	B	12 x 5.0
820,1000	5	C	12 x 5.0
1500,2200	$(^{-20}_{+50})$	D	6 x 2.5
3300		D	8 x 5.0
4700,6800		D	10 x 5.0



Negative temperature coeff.:
A: 47±30 p.p.m
B: 750±100 p.p.m.
C: 1500±200 p.p.m.
D: -10 to +15% over range -10 to +55°C

*Dimensions detailed: Side of square plaquette body x PCM.

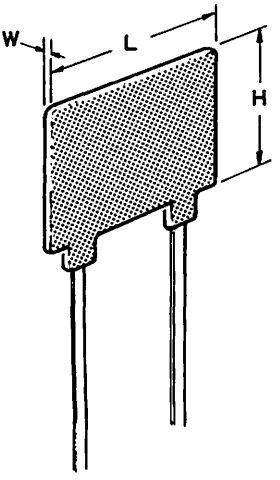
All dimensions in m.m.

CAPACITORS Non polarised

SILVERED MICA

Special HD finish for strong physical protection.

Close tolerance : 1%, or 0.5pF if under 50pF
Working voltage : 500V d.c.
Temp. coeff. : 30 ± 30 p.p.m. per °C

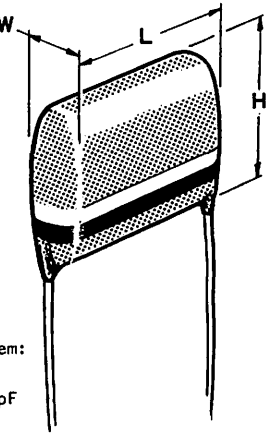


Values pF	size m.m. L	H	W	Price
2.2,3.3,5,10	12.7	7.93	3.17	6p
15,18,20,22	"	"	"	6p
25,27,30,33	"	"	"	6p
39,47,50,56	"	"	"	6p
68,75	"	"	"	6p
82,100,120,150	15.9	11.3	3.17	6p
180,200,220	"	"	"	7p
250,270,300	"	"	"	7p
330,390,470	27	17.6	3.17	9p
500,560,680	"	"	"	10p
820,1000	"	"	"	12p
1500,1800	28.3	20.7	3.17	12p
2200,2700	"	"	"	14p
3600	"	"	"	19p
4700,5000	"	"	"	21p
6800	"	"	"	27p
8200,10000	"	"	"	36p

POLYESTER, Mullard Type C280

Radial leads (modular construction) for P.C. Board mounting.

Tolerance : 0.01µF to 0.22µF 20%; 0.33µF to 2.2µF 10%.
Working voltage : 250V d.c.



Values	size m.m. L	H	W	Price
0.01,0.015,0.022	12.5	10	4	4p
0.033, 0.047	12.5	10	4	4p
0.068	12.5	11	5	5p
0.1	12.5	12	6	5p
0.15	17.5	11.5	6.5	5p
0.22	17.5	12.5	7.5	6p
0.33	22.5	13	7	9p
0.47	22.5	14.5	8.5	10p
0.68	22.5	16.5	10.5	13p
1.0	30	16.5	10.5	16p
1.5	30	20	11.5	25p
2.2	30	22.5	14	28p

The above capacitors are coded by the following colour system:

1st. band	1st. significant digit	
2nd. band	2nd. significant digit	values in pF
3rd. band	multiplier (power of 10)	
4th. band	tolerance: black 20%, white 10%	
5th. band	voltage: red 250V, absent 30V (obsolete)	

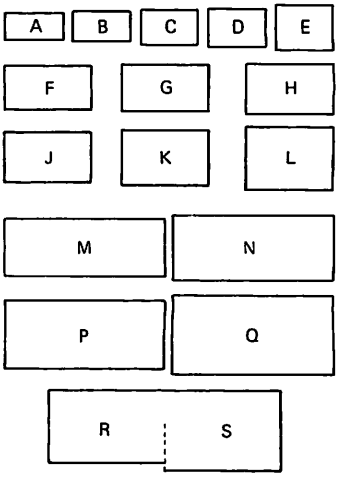
Colours conform to the international resistance colour code.
Adjacent bands may be of the same colour, unseparated.

CAPACITORS Non polarised

POLYSTYRENE, Siemens Type B31110 (470pF) & B31310 (560pF)

Axial leads
Tolerance : 5% (or 1pF if under 22pF)
Working voltage : 160V d.c.
Temperature coeff.: -150p.p.m. per °C nominal.

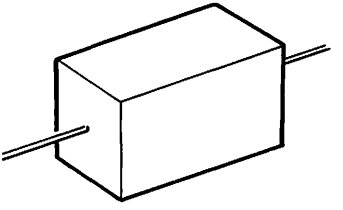
Value, pF	dia.	length	figure	Price
5, 7, 10, 12, 15	3.5	8	A	5p
18, 22, 27, 33, 39	3.5	8	A	5p
47, 56, 68, 82	3.5	8	A	5p
100, 120, 150, 180	3.8	8	B	4p
220, 270, 330	4.4	8	C	4p
390, 470	5.0	8	D	4p
560, 680	5.8	12	F	4p
820	6.0	12	G	4p
1000	6.2	12	H	4p
1200, 1500	6.8	12	J	4p
1800, 2200	7.5	12	K	4p
2700, 3300	8.6	12	L	4p
3900, 4700	8.4	22	M	4p
5600	8.8	22	N	5p
6800	9.5	22	P	5p
8200,10000	10.9	22	Q	5p
12,000, 15,000	10.0	32	R	6p
18,000, 22,000	11.8	32	S	7p



PRECISION CAPACITORS

Axial leads
Tolerance 1%
Voltage 63V
Material Polycarbonate

Value	Cross-section	length	Price
1µF	14 x 12	24	90p
10µF	20 x 17	34	£2.94



1000V MIXED DIELECTRIC CAPACITORS (MDC)

Axial leads
Tolerance 20%
Working voltage 600V or 1000V d.c.; 300V a.c. both types.
Temperature coefficient +600p.p.m. per °C

Value µF	V	dia.	length	Price
0.001	1000	9.0	25	11p
0.0022	1000	9.0	25	11p
0.0047	1000	9.0	25	11p
0.01	1000	9.0	25	13p
0.022	1000	13.0	35	15p
0.047	1000	13.0	35	20p
0.1	600	13.0	35	16p
0.1	1000	13.0	49	20p
0.22	1000	16.0	49	32p
0.47	600	22.0	49	46p
0.47	1000	25.0	49	47p
1.0	600	25.0	49	49p

All dimensions in m.m.

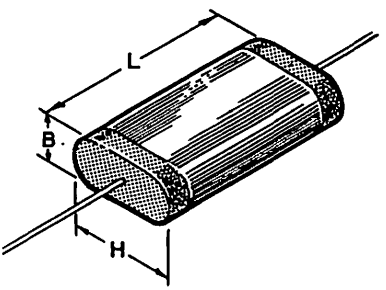
CAPACITORS Non polarised

SIEMENS

POLYESTER Siemens Type B32231

Tolerance : 20%
Working voltage : 250V unless otherwise stated.
Temp. coeff. : +400p.p.m. per °C

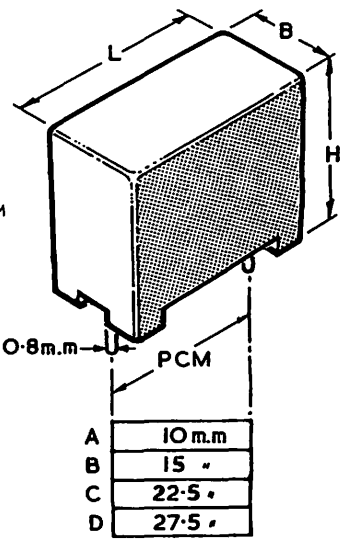
Value µF	B	H	L	Price
0.01,0.015 630V	4.5	8	14	9p
0.022 630V	5	8.5	14	11p
0.033 400V	4.5	7.58	14	9p
0.047	4.5	8.5	14	8p
0.047 400V	4.5	8	19	9p
0.047 630V	5	10.5	19	13p
0.068	5.5	9	14	8p
0.1	6	9	14	8p
0.1 400V	5.5	8.5	19	11p
0.1 630V	5	12.5	26.5	16p
0.15	5.5	9	19	10p
0.22	4.5	10.5	19	11p
0.33	7	11	19	13p
0.47	4.5	13.5	26.5	15p
0.68	6	15	26.5	18p
1.0	8	17	26.5	22p
1.0 400V	9	21	29	38p
2.2	10.5	22.5	29	47p
4.7	12	27.5	44	76p
10	19.5	34.5	44	£1.54



POLYESTER (P.C. mounting)

Tolerance : 20%
Working voltage : 0.01 to 0.047µF 250V d.c.
0.068 to 6.8µF 100V d.c.
0.1 and 1µF also in 250V d.c.
Temp. coeff. : +400p.p.m. per °C

Value µF	B	H	L	Price	PCM
0.01,0.015,0.022	4.5	10	13	6p	A
0.033,0.047	4.5	10	13	6p	A
0.068,0.1(100V)	4.5	10	13	8p	A
0.1(250V)	5	11	18	8p	B
0.15	5	10.5	13	9p	A
0.22	6	11.5	13	10p	A
0.33	5.5	11	18	13p	B
0.47	6	11.5	18	14p	B
0.68	7	13	18	17p	B
1.0(100V)	9	14.5	18	21p	B
1.0(250V)	8.5	18.5	27	21p	C
2.2	8.5	18.5	27	37p	C
4.7	11	20	32	68p	D
6.8	13.5	22.5	32	88p	D



CAPACITORS Non polarised

MKM POLYCARBONATE, Siemens Type B32540

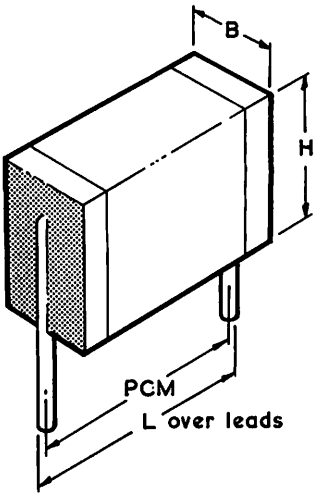
Radial leads for P.C.Boards.
Tolerance : 5% (10% up to 0.0068µF)
Temperature coeff. : -50p.p.m. per °C

Working voltage 250V:

Value µF	B	H	L	Price
0.001	2.6	7.3	9	4p
0.0015	2.6	7.3	9	4p
0.0022	2.5	7.3	9	4p
0.0033	2.3	7.3	9	4p
0.0047	2.3	7.3	9	4p
0.0068	2.7	7.3	9	4p
0.0082	2.3	7.3	9	5p
0.01	2.3	7.3	9	4p
0.012	2.5	7.3	9	5p
0.015	2.9	7.3	9	4p
0.018	2.3	7.3	9	5p
0.022	2.6	7.3	9	4p
0.027	2.4	7.3	9	5p
0.033	2.6	7.3	9	5p
0.039	2.9	7.3	9	5p
0.047	3.2	7.3	9	5p
0.056	3.5	7.3	9	6p
0.068	3.5	9.1	9	5p
0.082	3.5	11.0	9	6p
0.1	3.9	11.5	9	5p

Working voltage 100V:

Value µF	B	H	L	Price
0.1	3.2	8.1	9	5p
0.12	3.5	8.3	9	6p
0.15	3.6	10.0	9	6p
0.18	4.1	10.0	9	7p
0.22	4.7	10.0	9	7p
0.27	5.0	11.5	9	9p
0.33	5.5	11.5	9	9p
0.39	6.6	11.5	9	11p
0.47	7.2	12.5	9	11p
0.56	8.4	12.5	9	16p
0.68	8.0	13.0	9	16p



MKM POLYCARBONATE, Siemens Type B32541

Tolerance : 5%
Temperature coeff. : -50p.p.m. per °C

Working voltage 250V:

Value µF	B	H	L	Price
0.01	3.2	6.6	11.5	4p
0.022	3.2	6.6	11.5	4p
0.047	3.2	6.6	11.5	5p
0.1	3.5	8.3	11.5	5p

Working voltage 100V:

Value µF	B	H	L	Price
0.22	3.5	9.5	11.5	7p
0.47	5.3	11.5	11.5	11p
1.0	9.8	11.5	11.5	17p

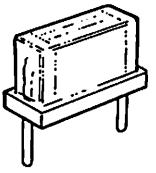
All dimensions in m.m.

CAPACITORS Non polarised

MKM POLYCARBONATE, Siemens Type B32551 (P.C.M. = 10mm.)

Radial leads for P.C. Boards.
Coated version with epoxy resin seals at the terminals.

Value µF	B	H	L	Price
0.01 250V				6p
0.015 250V				6p
0.022 250V				6p
0.033 250V				6p
0.047 250V				7p
0.068 250V				7p
0.1 100V				9p
0.15 100V				10p
0.22 100V				11p

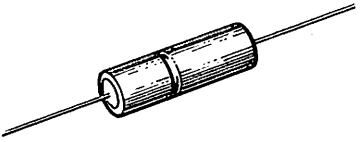


MKL METALLISED LACQUER FILM, Siemens Type B32110

Professional grade, high reliability version.

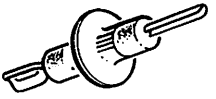
Tolerance : 20%
Working voltage : 63V unless otherwise stated.

Value µF	L	D	Price
0.1 100V	18	5.4	34p
0.15	18.5	5.4	28p
0.22	18.5	5.4	31p
0.33	18.5	6.4	34p
0.47	18.5	7.4	37p
0.68	18.5	7.4	40p
1.0	21	7.4	48p
2.2	21	10.7	71p
3.3	25	9.4	85p
4.7	25	10.7	99p
6.8	34	10.7	£1.24
10.0	34	12.7	£1.63
10.0 100V	34	16.7	£2.10



FEED-THROUGH CAPACITORS 1000pF

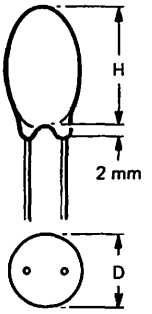
Tolerance : +50-20%
Voltage : 500V max
Fixing hole : 0.144" dia. 4p each.



CAPACITORS Electrolytic

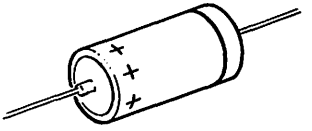
TANTALUM BEAD CAPACITORS, Siemens type B45134

Miniature, solid, sintered, polarised.
Tolerance +50-20%



Value µF	Voltage	H	D	Price
0.1	35	7	4	14p
0.22	35	7	4	14p
0.47	35	7	4	14p
1.0	35	7	4	14p
2.2	16	7	4	14p
2.2	35	8	5	14p
4.7	16	8	5	14p
4.7	35	9	5.5	14p
6.8	25	9	5.5	14p
10	6.3	8	5	14p
10	16	9	5.5	14p
10	25	9.5	6	14p
15	25	11.5	8.5	17p
22	6.3	9	5.5	14p
22	16	10	6.5	14p
22	25	13.5	9.5	17p
47	6.3	10	6.5	14p
47	16	14	9.5	22p
100	3	10	6.5	14p
100	6.3	13.5	9.5	21p
100	10	14	10	25p

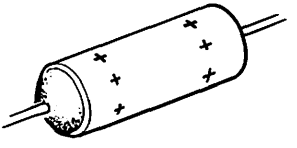
TANTALUM CAPACITORS, Siemens type D



Axial lead
Solid, hermetically sealed, professional grade.
Tolerance 20%

Value µF	Voltage	L	D	Price
0.1	35	7.3	3.4	22p
0.47	35	7.3	3.4	22p
1.0	35	7.3	3.4	22p
2.2	20	7.3	3.4	22p
2.2	35	12	4.7	27p
4.7	10	7.3	3.4	22p
4.7	35	12	4.7	27p
10	20	12	4.7	27p
22	15	12	4.7	27p
47	10	12	4.7	27p

ALUMINIUM NON-POLARISED ELECTROLYTICS, Type EX50

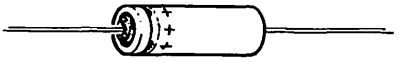


Axial lead, specially designed for crossover networks.
Tolerance 20%
Working voltage 50V d.c. or peak a.c.
Dissipation factor 5% @ 120Hz, 7% @ 1KHz

Value µF	L	D	Price
1.0	14.2	6.3	10p
2.0	14.2	6.3	10p
4.0	19.1	7.9	11p
6.0	25.4	9.5	11p
8.0	25.4	9.5	12p
10	25.4	9.5	12p
16	25.4	9.5	13p
25	25.4	11.1	14p
40	31.8	12.6	20p
60	41.3	12.6	20p
100	41.3	12.6	26p

All dimensions in m.m.

CAPACITORS Electrolytic



SIEMENS AXIAL LEAD

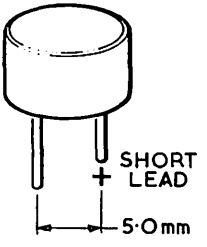
B41313 (tol.+100-10%); B41283 (tol.+50-10%); B41010 (tol.+50-10%).

Rated voltage:		3V	6V	10V	16V	25V	40V	63V	100V
Capacity µF	Type	PRICES (Letter indicates case size, see table below)							
0.47								12p A	9p B
1.0							12p A		9p B
2.2	B41313					12p A		9p B	11p C
4.7	B41313				12p A		9p B	11p C	10p D
10	B41313		12p A			9p B	11p C	10p D	11p F
22	B41313			9p B		11p C	10p D	11p F	12p H
47		9p B		11p C	10p D	10p E	11p F	12p H	16p K
100		11p C	10p D	10p E	11p F	11p G	13p J	16p K	25p M
220	B41283	11p E	11p F	11p E	12p H	14p J	15p K	23p M	35p R
470	B41283	12p G	12p H	14p J	14p K	18p L	23p M	32p R	58p T
1,000	B41283	15p J	16p K	17p L	22p M	26p N	32p R	53p T	
2,200	B41010	18p L			33p R	47p S	53p T		
4,700	B41010			51p S	53p S	68p U			
10,000	B41010	54p S	58p T						

Case size	A	B	C	D	E	F	G	H	J	K	L	M	N	R	S	T	U
Diameter	4	5	6	7	7	9	9	9	11	11	13	15	17	19	22	26	26
Length	13	13	13	18	21	16	18	21	21	26	31	31	31	36	41	41	51

SIEMENS PLUGGABLE, Type B41316

Diameter Height	8.5 12.5	10.5 12.5	12.5 12.5	12.5 16.5	12.5 20.5
Voltage	Capacitance µF				
3V	-	220	-	-	-
6.3V	100	-	470	-	-
10V	-	-	220	-	470
16V	47	100	-	220	-
25V	22	-	100	-	220
40V	-	47	-	100	-
50V	-	-	-	-	100
63V	1,2.2	22	-	-	-
63V	4.7,10	-	-	-	-
Price:	10p	10p	12p	13p	16p



CAPACITORS Electrolytic

ELECTROLYTIC CAPACITORS, Siemens type B41070 (cans)

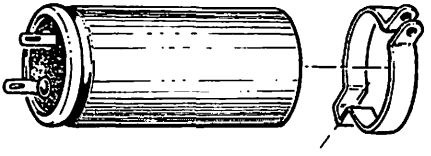
Capacitance µF	Voltage	Ripple current max. @ 100Hz, 40°C	Dia. (m.m.)	Height (m.m.)	Price
1000	40	1.4A	25	35	60p
1000	63	2.0A	25	50	76p
1000	100	2.3A	30	55	£1.19
2200	25	2.2A	25	45	71p
2200	40	2.6A	30	45	81p
2200	63	3.5A	30	60	£1.06
4700	25	3.6A	30	50	95p
4700	40	4.0A	35	55	£1.15
4700	63	5.4A	40	70	£1.80

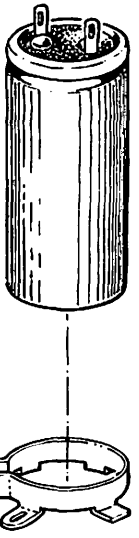
(derate to 80%ripple current rating @ 60°C)

ELECTROLYTIC CAPACITORS, Daly (cans)

These types are plastic sleeved.

Capacitance µF	Voltage	Ripple current max. @ 100Hz, 60°C	Dia. (m.m.)	Height (m.m.)	Price
1000	25	0.9A	26	46.5	46p
1000	50	1.6A	36	53.5	50p
1000	100	1.4A	36	53.5	86p
2200	25	1.2A	26	46.5	56p
2200	50	2.0A	26	63.5	70p
2200	100	2.7A	36	104.5	£1.56
5000	25	2.5A	26	63.5	86p
5000	50	3.4A	36	78.5	£1.44
5000	100	4.8A	52	104.5	£3.05





CAPACITOR CLIPS

Horizontal mounting

Dia. m.m.	25	35	44
Dia. inches	1.0	1.37	1.75
Price	7p	7p	7p

Vertical mounting

Dia. m.m.	25	30	35	41	44	51	64
Dia. inches	1.0	1.18	1.37	1.61	1.75	2.0	2.5
Price	7p	11p	7p	11p	7p	12p	13p

POT CORES

APPLICATION NOTES FOR SIFERRIT MATERIALS

Application	Freq. range MHz	Materials	Type
High Q coils in resonant circuits and filters	up to 0.1 up to 0.3 0.2 to 1.6 1.5 to 12 6 to 30	N28 N22 M33 K1 K12	Pot cores and RM cores with air gap
Transformers with flat permiability characteristic	up to 0.3	T26 N30 T38	Pot cores RM cores
Wide band transformers e.g. aerial transformers	up to 0.3	N30	Pot cores
	up to 5	T26	RM cores
	up to 10	N22, M33	Pot cores
	up to 250	U17	twin hole beads
pulse transformers	up to 400	K1	Pot cores ring cores twin hole beads
	up to 1000	U60	twin hole beads
Power transformers	up to 0.1	T26	Pot cores

Inductance of a winding is A_L value x N^2 (N=no. of turns, A_L in 10^{-9}henries)

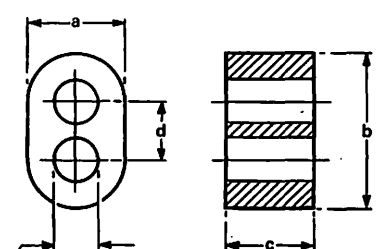
DOUBLE APERTURE CORES (Twin hole beads)

A_L	CORE B62152	PRICE	MATERIAL	Size, max a	b	c	d
7.5	A0008X017	15p	U17	2.1	3.6	2.5	1.45
14	A0007X060	18p	U60	4.2	7.25	6.2	2.9
18	A0004X060	21p	U60	8.5	14.5	8.3	5.85
28	A0001X060	30p	U60	8.5	14.5	14.5	5.85
144	A0007X001	18p	K1	4.2	7.25	6.2	2.9
180	A0004X001	22p	K1	8.5	14.5	8.3	5.85
300	A0001X001	32p	K1	8.5	14.5	14.5	5.85
2300	A0008X030	14p	N30	2.1	3.6	2.5	1.45
5700	A0007X030	18p	N30	4.2	7.25	6.2	2.9
7300	A0004X030	22p	N30	8.5	14.5	8.3	5.85

The A_L value quoted is for windings entering one hole and returning through the other. Approximately 55% A_L is obtained by windings using one hole only.

NEAR EQUIVALENTS

Mullard	Siemens	size
FX2236	B65541K0000R026	14mm
FX2238	B65651K0000R026	18mm
FX2239	B65661L0000R026	22mm
FX2240	B65671L0000R026	26mm
FX2242	B65611L0000R026	36mm
FX2243	B65631J0000R026	47mm



Hole diameters are 3.4, 3.4, 1.7, and 0.8mm in descending core sizes respectively.

POT CORES

SIZE 9m.m.(D) x 5m.m.(H)						Adjusting tool type B63399-B0004-X000			
A_L	Core B65517	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW B65518	COLOUR	% ADJ	PRICE
16	A0016-A012	44p	0.8	3%	K12	A3000-X101	Brown	19.5	10p
25	A0025-A001	44p	0.45	3%	K1	A3000-X101	Brown	18.5	10p
40	A0040-A001	44p	0.26	3%	K1	A3000-X001	Blue	19	10p
40	A0040-A033	37p	0.37	3%	M33	A3000-X101	Brown	20	10p
63	A0063-A033	37p	0.2	3%	M33	A3000-X001	Blue	22.5	10p
100	A0100-A022	37p	0.12	3%	N22	A3000-X022	Green	20	10p
160	A0160-A028	37p	0.06	3%	N28	A3000-X022	Green	12	10p
95	A0000-R001	22p		+30–20%	K1				
1200	A0000-R026	19p		+30–20%	T26				
2500	A0000-R030	23p		+30–20%	N30				
5000	A0000-Y038	28p		+40–30%	T38				

MOUNTING ASSEMBLY			BOBBIN single section			
TYPE	TAGS	PRICE	TYPE	No. of Sections	PRICE	X-sec. mm^2 per section
B65518-A2001-X000	4	15p	B65522-A0000-R001	1	4p	2.8
B65518-A2002-X000	6	15p				

SIZE 11m.m.(D) x 7m.m.(H)						Adjusting tool B63399-B0004-X000			
A_L	CORE B65531	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. screw B65539	COLOUR	% ADJ	PRICE
16	L0016-A012	44p	1.0	3%	K12	A1003-X101	Black	15	11p
25	L0025-A001	44p	1.0	3%	K1	A1003-X101	Black	18	11p
40	L0040-A001	44p	0.41	3%	K1	A1003-X001	Yellow	18	11p
63	L0063-A033	37p	0.38	3%	M33	A1003-X101	Black	12	11p
100	L0100-A022	37p	0.2	3%	N22	A1003-X001	Yellow	17	11p
160	L0160-A028	37p	0.1	3%	N28	A1002-X022	Red	17	11p
250	L0250-A028	37p	0.06	3%	N28	A1002-X022	Red	8.5	11p
400	L0400-K026	37p	0.03	10%	T26				
1600	L0000-R026	19p		+30–20%	T26				
3200	L0000-R030	23p		+30–20%	N30				
6500	L0000-Y038	28p		+40–30%	T38				

MOUNTING ASSEMBLY			BOBBINS			
TYPE	TAGS	PRICE	TYPE	No. of Sections	PRICE	X-sec. mm^2 per section
B65535-A0002-X000	4	13p	B65532-A0000-R001	1	4p	4.2
B65535-A0003-X000	8	18p	B65532-A0000-R002	2	4p	1.9

When ordering ferrites please state the whole type number e.g. B64290J0046X026

POT CORES

SIZE 14m.m.(D) x 8m.m.(H)						Adjusting tool type B63399-B0004-X000			
A_L	CORE B65541	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW B65549	COLOUR	% ADJ	PRICE
40	K0040-A001	49p	1	3%	K1	C0003-X101	Green	12.5	11p
40	K0040-A033	41p	0.9	3%	M33	C0003-X101	Green	16	11p
100	K0100-A033	41p	0.3	3%	M33	C0003-X023	White	12	11p
100	K0100-A022	41p	0.31	3%	N22	C0003-X023	White	12	11p
160	K0160-A022	41p	0.16	3%	N22	C0004-X023	Black	12	11p
160	K0160-A028	41p	0.17	3%	N28	C0004-X023	Black	22	11p
400	K0400-A028	41p	0.05	3%	N28	C0004-X023	Black	7	11p
140	K0000-R001	27p		+30–20%	K1				
1500	K0000-R022	23p		+30–20%	N22				
2100	K0000-R026	23p		+30–20%	T26				
4200	K0000-R030	27p		+30–20%	N30				
9000	K0000-Y038	35p		+40–30%	T38				

MOUNTING ASSEMBLIES			BOBBINS			
TYPE	TAGS	PRICE	TYPE	No. of sections	PRICE	X-sec. mm^2 per section
B65545-A0009-X000	4	16p	B65542-A0000-M001	1	4p	8.4
B65545-A0010-X000	6	16p	B65542-A0000-M002	2	5p	3.8
B65543-A0001-X000	none	11p				

SIZE 18m.m.(D) x 11m.m.(H)						Adjusting tool type B63399-B0004-X000			
A_L	CORE B65651	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW B65659	COLOUR	% ADJ	PRICE
25	K0025-A001	51p	3.1	3%	K1	C0001-X101	White	17	11p
40	K0040-A001	51p	1.6	3%	K1	C0001-X101	White	15	11p
63	K0063-A033	42p	1.1	3%	M33	C0001-X101	White	16	11p
100	K0100-A033	42p	0.6	3%	M33	C0001-X101	White	12	11p
250	K0250-A022	42p	0.18	3%	N22	C0003-X023	Black	22.5	14p
315	K0315-A028	46p	0.15	3%	N28	C0003-X023	Black	15	14p
400	K0400-A028	46p	0.1	3%	N28	C0003-X023	Black	12	14p
500	K0500-A028	46p	0.07	3%	N28	C0004-X023	Yellow	12	15p
2800	K0000-R026	27p		+30–20%	T26				
5600	K0000-R030	32p		+30–20%	N30				
12000	K0000-Y038	40p		+40–30%	T38				

MOUNTING ASSEMBLIES			BOBBINS			
TYPE	TAGS	PRICE	TYPE	No. of sections	PRICE	X-sec. mm^2 per section
B65655-A0009-X000	4	24p	B65652-A0000-M001	1	4p	16.0
B65655-A0010-X000	8	24p	B65652-A0000-M002	2	5p	6.5
B65653-A0001-X000	none	12p	B65652-A0000-M003	3	5p	4.0

When ordering ferrites please state the whole type number e.g. B64290J0046X026

POT CORES

SIZE 22m.m.(D) x 13m.m.(H)							Adjusting tool type B63399-A0001-X000		
A_L	CORE B65661	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW B65669	COLOUR	% ADJ	PRICE
250	L0250-A022	52p	0.26	3%	N22	B0011-X001	Yellow	17	12p
400	L0400-A028	52p	0.14	3%	N28	B0007-X022	Red	14	12p
3800	L0000-R026	37p		+30–20%	T26				
7000	L0000-R030	46p		+30–20%	N30				

MOUNTING ASSEMBLIES			BOBBINS			
TYPE	TAGS	PRICE	TYPE	No. of sections	PRICE	X-sec. mm^2 per section
B65665-B0004-X000	8	22p	B65662-A0000-M001	1	5p	23.4
B65663-A0001-X000	none	19p	B65662-A0000-M002	2	6p	11.0
			B65662-A0000-M003	3	6p	6.7

SIZE 26m.m.(D) x 16m.m.(H)							Adjusting tool type B63399-B0004-X000		
A_L	CORE B65671	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW B65679	COLOUR	% ADJ	PRICE
160	L0160-A022	58p	0.8	3%	N22	B0002-X022	Black	6	15p
4900	L0000-R026	47p		+30–20%	T26				
9000	L0000-R030	54p		+30–20%	N30				

MOUNTING ASSEMBLY			BOBBINS			
TYPE	TAGS	PRICE	TYPE	No. of sections	PRICE	X-sec. mm^2 per section
B65675-A0005-X000	8	33p	B65672-A0000-M001	1	6p	32.0
			B65672-A0000-M002	2	8p	15.0
			B65672-A0000-M003	3	8p	9.6

SIZE 30m.m.(D) x 19m.m.(H)									
A_L	CORE B65701	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW	COLOUR	% ADJ	PRICE
10500	L0000-R030	93p		+30–20%	N30	—	—	—	—
25000	L0000-Y038	£1.12		+40–30%	T38	—	—	—	—

MOUNTING ASSEMBLY			BOBBINS			
TYPE	TAGS	PRICE	TYPE	No. of sections	PRICE	X-sec. mm^2 per section
B65703-A0006-X000	8	49p	B65702-A0000-M001	1	8p	48.0
			B65702-A0000-M002	2	9p	22.5

 When ordering ferrites please state the whole type number e.g. B64290J0046X026

POT CORES

SIZE 36m.m.(D) x 22m.m.(H)									
A_L	CORE B65611	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW	COLOUR	% ADJ	PRICE
7600	L0000-R026	90p		+30–20%	T26	—	—	—	—
13500	L0000-R030	£1.07		+30–20%	N30	—	—	—	—

MOUNTING ASSEMBLY			BOBBINS			
TYPE	TAGS	PRICE	TYPE	No. of sections	PRICE	X-sec. mm^2 per section
B65615-A0001-X000	10	59p	B65612-A0000-M001	1	9p	63
			B65612-A0000-M002	2	10p	29.5
			B65612-A0000-M003	3	10p	18.3

SIZE 47m.m.(D) x 28m.m.(H)									
A_L	CORE B65631	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW	COLOUR	% ADJ	PRICE
9500	J0000-R026	£1.61		+30–20%	T26	—	—	—	—

MOUNTING ASSEMBLY			BOBBINS			
TYPE	TAGS	PRICE	TYPE	No. of sections	PRICE	X-sec. mm^2 per section
B65633-A0001-X000	none	46p	B65632-A0000-M001	1	15p	115
			B65632-A0000-M003	3	36p	33

SIZE 59m.m.(D) x 36m.m.(H)									
A_L	CORE B65691	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW	COLOUR	% ADJ	PRICE
12500	K0000-R026	£4.03		+30–20%	T26	—	—	—	—

MOUNTING ASSEMBLY			BOBBINS			
TYPE	TAGS	PRICE	TYPE	No. of sections	PRICE	X-sec. mm^2 per section
B65693-A0001-X000	none	65p	B65692-A0000-M001	1	26p	203
			B65692-A0000-M002	2	30p	98

When ordering ferrites please state the whole type number e.g. B64290J0046X026

POT CORES

SIZE 70m.m.(D) x 42m.m.(H)									
A_L	CORE B65696	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW	COLOUR	% ADJ	PRICE
15000	K0000-R026	£10.73		+30–20%	T26				

MOUNTING ASSEMBLY			BOBBIN			
TYPE	TAGS	PRICE	TYPE	No. of sections	PRICE	X-sec. mm^2 per section
B65698-A0001-X000	none	43p	B65697-A0000-M002	2	97p	140

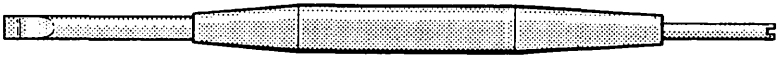
SIZE RM6 18m.m.(L) x 12m.m.(B) x 12m.m.(H)						Adjusting tool B63399-B0004-X000			
A_L	CORE B65807	PRICE	AIR-GAP m.m.	TOL	MAT'L TYPE	ADJ. SCREW B65659	COLOUR	% ADJ	PRICE
100	N0100-A033	43p	0.38	3%	M33	C0001-X101	White	20	11p
160	N0160-A028	41p	0.20	3%	N28	C0001-X023	Red	14	14p
250	N0250-A028	41p	0.11	3%	N28	C0003-X023	Black	11	14p
400	N0400-A028	41p	0.05	3%	N28	C0004-X023	Yellow	17	15p
1250	C1250-K026	32p	0.005	10%	T26				
4000	C0000-R030	32p		+30–20%	N30				
8000	C0000-Y038	38p		+40–30%	T38				

MOUNTING ASSEMBLIES (incorporating bobbins)				
TYPE	PINS	No. of sections	X-sec. mm^2 per section	PRICE
B65808-B1001-D001	6	1	15	23p
B65808-B1001-D002	6	2	7	25p
B65808-B1003-D001	4	1	15	23p
B65808-B1003-D002	4	2	7	25p

Each assembly requires two clamps B65808-B2002-X000 which will be supplied in the inclusive mounting assembly price above.

ADJUSTING TOOLS

B63399-B0004-X000 24p

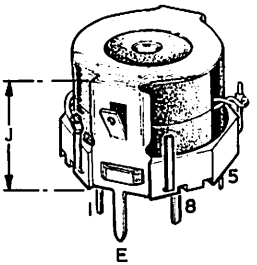


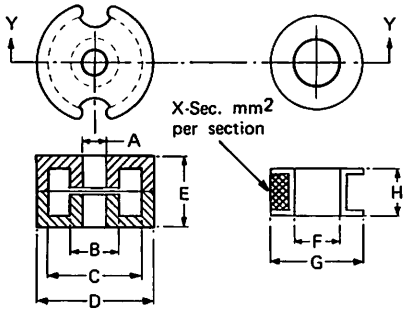
handle for above type
B63399-B0005-X000 20p

B63399-A0001-X000 15p

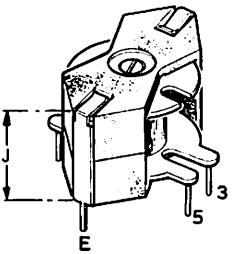
POT CORES

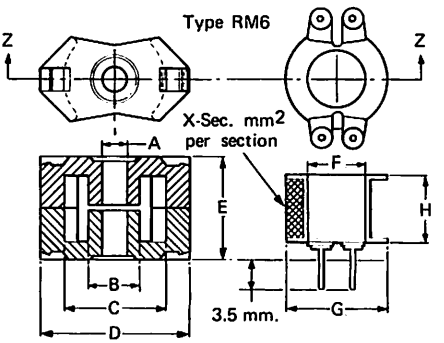
SIFERRIT POT CORES
All dimensions in mm.





SECTION ON 'Y'–'Y'





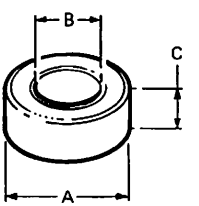
SECTION ON 'Z'–'Z'

CORE TYPE	CORE SIZE	A	B	C	D	E	F	G	H	J
B65517	9	2.0	3.9	7.5	9.3	5.4	4.0	7.4	3.5	8.3
B65531	11	2.0	4.7	9.0	11.3	6.6	4.8	8.9	4.2	9.5
B65541	14	3.0	6.0	11.6	14.2	8.5	6.1	11.5	5.4	11.3
B65651	18	3.0	7.6	15.0	18.2	10.7	7.7	14.8	7.0	13.5
B65661	22	4.4	9.4	17.9	22.0	13.6	9.6	17.8	9.0	16.6
B65671	26	5.5	11.5	21.2	26.0	16.3	11.7	20.9	10.8	19.0
B65701	30	5.5	13.5	25.0	30.5	19.0	13.7	24.7	12.8	25.5
B65611	36	5.5	16.2	29.9	36.0	21.6	16.5	29.6	14.4	27.2
B65631	47	5.5	20.0	39.0	47.0	28.0	20.2	37.5	18.8	31.5
B65691	59	5.5	25.5	49.0	59.3	35.6	25.9	48.5	23.2	39.7
B65696	70	8.5	29.5	57.5	70.0	42.0	29.9	57.0	27.6	45.0
B65807	RM6	3.0	6.4	12.4	17.9	12.5	6.5	15.0	7.8	12.5

See pages 86,87 for dimensions of Pot Core assemblies

SIFERRIT RING CORES

CORE B64290	A_L	MAT'L TYPE	A	B	C	PRICE
J0046-X026	2240	T26	25.0	15.0	10.0	47p
J0022-X026	2560	T26	41.8	26.2	12.5	£1.14
K0037-X830	1090	N30	6.3	3.8	2.5	24p
K0038-X830	1760	N30	10.0	6.0	4.0	28p
A0056-X001	16	K1	5.8	3.0	1.5	17p

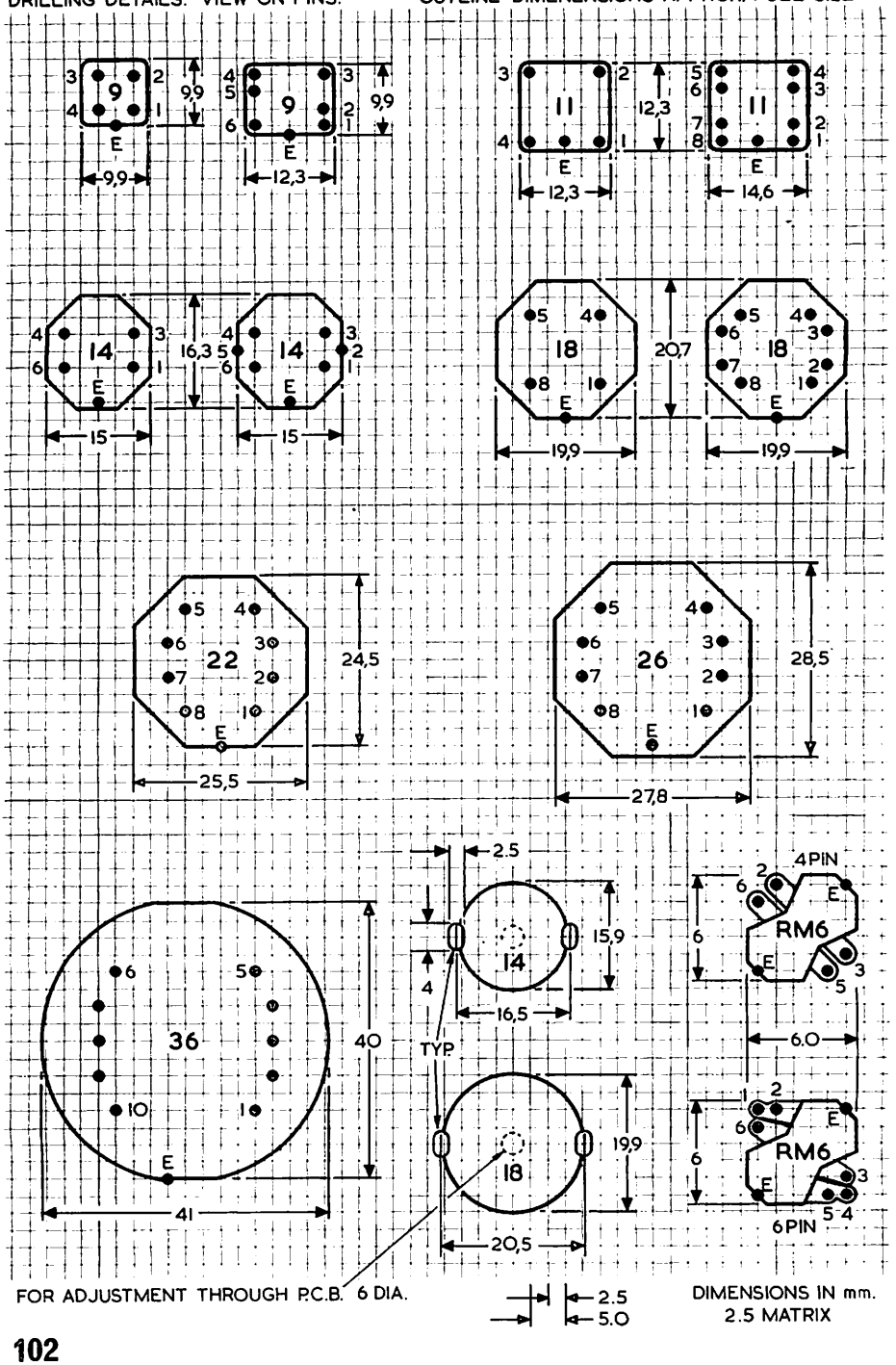


When ordering Ferrites please state whole type number.
e.g. B64290-J0046-X026

POT CORES

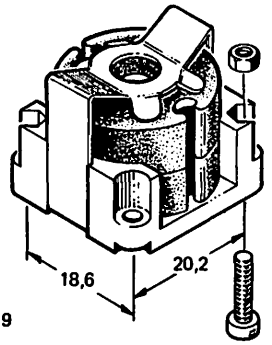
DRILLING DETAILS. VIEW ON PINS.

OUTLINE DIMENENSIONS APPROX. FULL SIZE



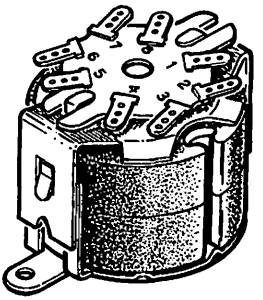
POT CORES

B65663-A0001-X000 22mm



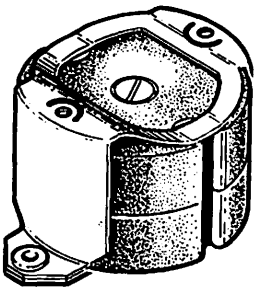
Height 19

B65703-A0006-X000 30mm



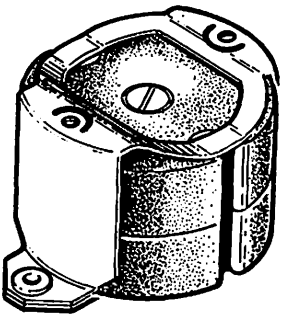
Fixing centres 36,8 Height 25,5

B65613 -A0001-X000 36mm



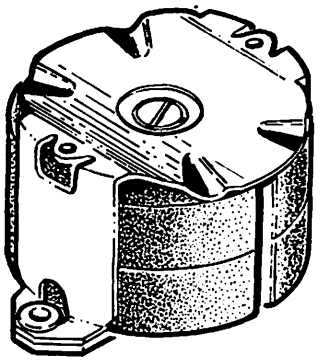
Fixing centres 37 Height 23,7

B65633-A0001-X000 47mm



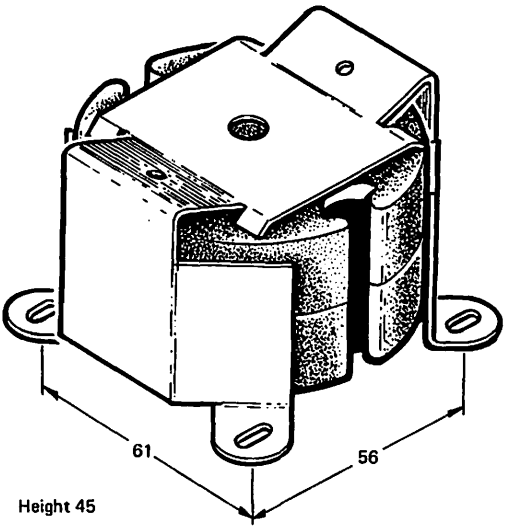
Fixing centres 56 Height 31,5

B65693-A0001-X000 59mm



Fixing centres 68 Height 40

B65698-A0001-X000 70mm



Height 45

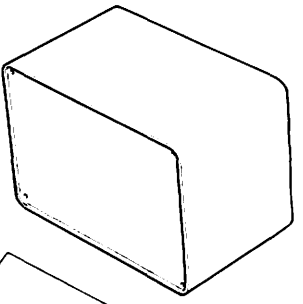
Height from mounting surface All dimensions in mm

BOXES

INSTRUMENT CASES AND BOXES.

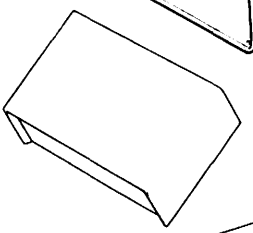
INSTRUMENT CASES, Fibreglass series, light grey.

Type	L	D	H	Price
FB1	133	74	38	62p
FB2	152	101	100	£1.75
FB3	229	77	101	£1.94
FB4	203	128	139	£3.12



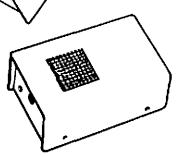
INSTRUMENT CASES, Aluminium, black covers.

Type	L	D	H	Price
WB1	154	120	45	£1.11
WB2	205	134	51	£1.31



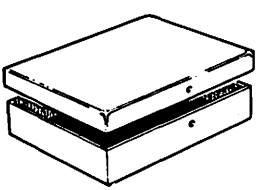
PLASTIC CASE, miniature, black

Type	L	D	H	Price
PB301	122	67	43	66p



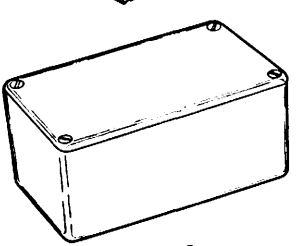
ALUMINIUM BOXES

Type	L	W	H	Price
AB7	70	133	38	43p
AB8	101	101	38	43p
AB9	101	70	38	43p
AB10	101	133	38	48p
AB11	101	64	51	43p
AB12	76	51	25	38p
AB13	152	101	51	60p
AB14/2	127	89	64	52p



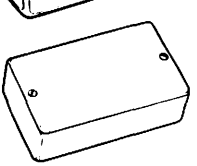
DIECAST BOXES

Type	L	W	H	Price
992	89	35	30	90p
993	114	64	30	£1.13
998	114	64	55	£1.20
994	114	89	55	£1.84
999	171	121	55	£2.29
974	171	121	106	£3.49



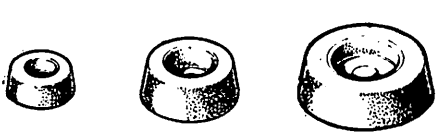
PLASTIC BOX, white

Type	L	W	H	Price
PB1	116	77	35	44p



CABINET FEET

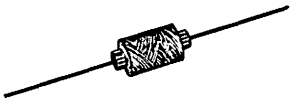
Type 12	0.5" dia.	1p each
Type 34	0.75" dia.	1.5p each
Type 1	1.0" dia.	2p each



CHOKES

R.F. CHOKES, Repanco, r.f.

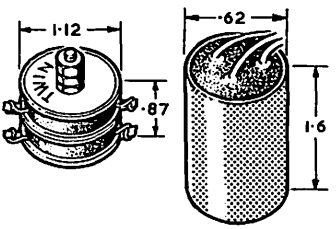
Type	L	D	mH	Price
CH1	19	9.5	2.5	
CH2	19	11	5.0	
CH3	19	12.5	7.5	
CH4	19	15	10	
CH5	19	9	1.5	



"TV" SUPPRESSOR CHOKES

				µH	
TV1	1amp	14	5	5	10p
TV2	2amp	19	5	9	11p
TV3	3amp	23	8	4	14p

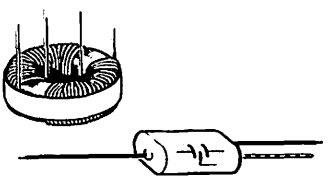
INTERFERENCE SUPPRESSOR COMPONENTS



Choke: Mains input filter choke, twin section.
Maximum current 0.5amp.
Inductance 1mH each section. £1.50

Capacitor: 0.1 + 0.005 + 0.005 µF
For radio suppression of small appliances, delta connection.
To BS2135 for 250V a.c. 46p

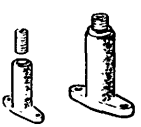
SIEMENS suppressor components.



Choke: Double wound toroidal
Type B82623AA13
Maximum current 6 amps
Inductance for one section £2.76

Capacitor: 0.2 + 0.0025 + 0.0025 µF
Type B81311BB8
For 250V a.c. 84p

COIL FORMERS, with tuning slugs.

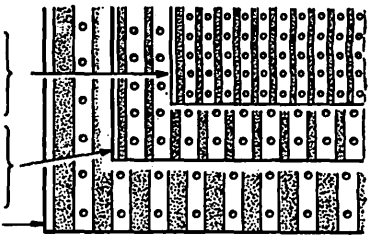


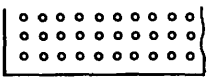
0.25" dia. 8p
0.375" dia. 8p

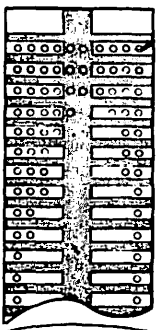
CIRCUIT MOUNTINGS

VEROBOARD AND ACCESSORIES

Copper clad 0.1" matrix (hole dia. 0.040")	2.5" x 3.75"	33p
	3.75" x 3.75"	37p
	2.5" x 5"	37p
	3.75" x 5"	41p
Copper clad 0.15" matrix (hole dia. 0.052")	2.5" x 3.75"	25p
	3.75" x 3.75"	37p
	2.5" x 5"	37p
	3.75" x 5"	46p
Copper clad 0.2" matrix	3.4" x 5"	76p
Unclad 0.1" matrix	2" x 3.75"	17p
	2.75" x 3.75"	20p
	5" x 3.75"	38p
Vero Strip 0.1" matrix	8.45" x 1.5"	39p
0.15" matrix	8.45" x 1.5"	39p
Vero D.I.P. Breadboards	4.5" x 6.15"	£1.89 *See below*
Plug-in Single sided		
24-way 0.1" matrix	2.55" x 4.75"	£1.40 *See below*
32-way 0.1" matrix	3.75" x 5.1"	£1.77
Plug-in Double sided, cross milled on reverse		
24-way 0.1" matrix	2.50 x 4.75"	£1.45 *See below*







NOTE: Copper strips run along second dimension unless otherwise stated.
All of the above are in S.R.B.P.

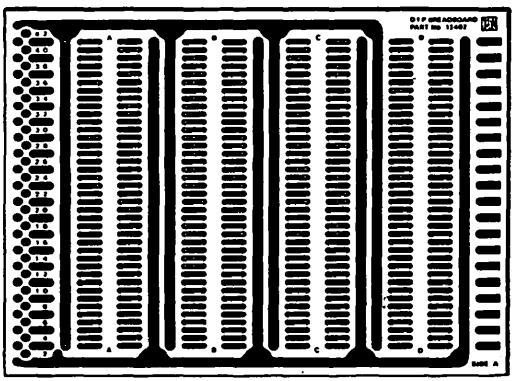
EDGE CONNECTORS See page opposite.

SPOT FACE CUTTER: For any matrix above 56p

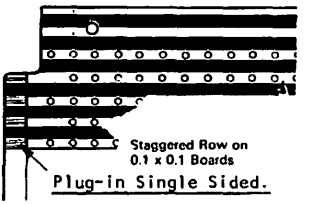
PIN INSERTION TOOLS: for 0.1" matrix 81p
for 0.15 & 0.2" matrix 81p

TERMINAL PINS

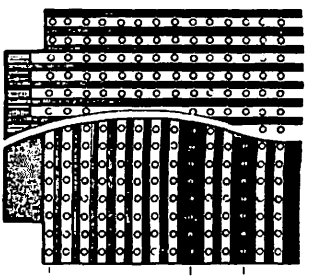
matrix	pin dia.	36-pack	100-pack	500-pack
0.1"	0.040"	15p	35p	£1.15
0.15" 0.2"	0.052"	15p	35p	—



D.I.P. Breadboard.



Plug-in Single Sided.



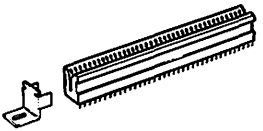
Plug-in Double Sided showing positions of Milling.

CONNECTORS

EDGE CONNECTORS, High quality

0.1" matrix

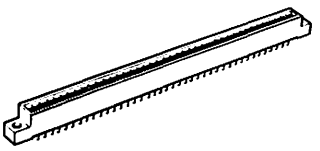
Material : Phenolic
Contacts : Phosphor-bronze, gold over silver
Voltage : 700V d.c. max.
Leakage : $10^{10}\ \Omega$ min. (dry)
Terminals : P.C. type
Key : One supplied with each connector



24-way 95p 32-way £1.15 36-way £1.30

0.15" matrix

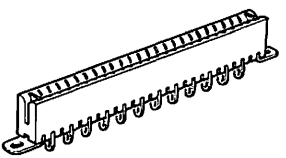
Material : Phenolic
Contacts : Phoshor-bronze, gold over silver
Voltage : 750V d.c. max.
Leakage : $10^{12}\ \Omega$ min. (dry)
Terminals : P.C. type
Key : One supplied with each connector



16-way 72p 24-way £1.07 40-way £1.59

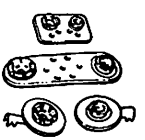
EDGE CONNECTORS, low cost

16-way for 0.15" matrix	35p
24-way for 0.15" matrix	52p
24-way for 0.1" matrix	52p
36-way for 0.1" matrix	69p



BATTERY CONNECTORS

Dual type A, small for PP3, PP6, B152	5p
Dual type B, large for PP1, PP8, PP9	6p
Pair type C, large for PP1, PP7, PP8, B101, B117, B131, B139	7p pr.

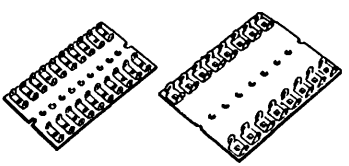


CROCODILE CLIPS

Standard size — 5p each

GROUP BOARDS

Paxolin 8-way (standard)	3" x 2.125"	13p
10-way (miniature)	2.5" x 1.5"	13p
16-way (standard)	6" x 2.125"	25p
20-way (miniature)	5" x 1.5"	23p



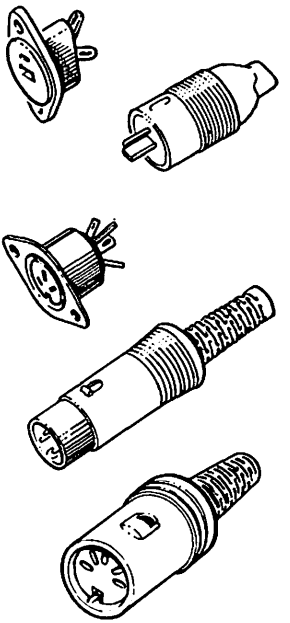
TAG STRIPS

Strip of 28 tags spaced 0.25" on Paxolin	14p
5-way tag strip with centre earthed	4p
7-way tag strip with outers earthed	5p

CONNECTORS

DIN CONNECTORS, for audio applications

Loud-speaker type	2-way		Plug	12p
			Sockets:	
			Unswitched	10p
			Switched	12p
			Line	12p
Audio type	3-way		Plug	13p
			Sockets:	
			Unswitched	10p
			Line	18p
	4-way		Plug	14p
			Socket	12p
	5-way (180°)		Plug	15p
			Sockets:	
			Unswitched	12p
			Line	20p
	5-way (240°)		Plug	15p
			Socket	12p
	6-way		Plug	15p
			Socket	13p
	7-way		Plug	16p
			Socket	14p



Side entry plugs are available in 3-way @ 36p; 5-way @ 42p

PHONO CONNECTORS

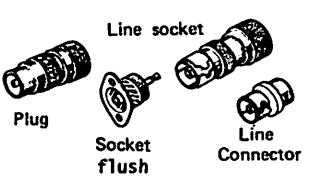
Plugs, screened, in red, black, grey or yellow 7p each

Sockets with fibre insulator for panel mounting.

Single	fixing centres	17.5mm	5p
Double	"	30.1 x 12.7	7p
3-way	"	41.3 x 12.7	10p
4-way	"	54.0 x 12.7	13p

COAXIAL CONNECTORS, 'TV' style.

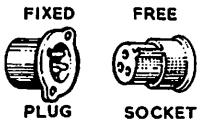
Plug : Aluminium body	10p
Socket : Chassis mounting, flush	16p
Socket : Chassis mounting, surface	12p
Line socket : Aluminium body	27p
Line connector : Aluminium	20p



CONNECTORS

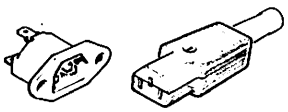
MAINS CONNECTORS

Chassis plug and cable ended socket
3 amps Type P340 38p
As type P340 but small size,
1.5 amps Type P360 40p
Chassis socket and cable ended plug
1.5 amps Type P438 53p
As type P360 but six pin version
1.5 amps Type P194 70p



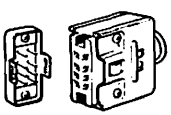
EUROPEAN (I.E.C.) design

Conforms to BS 4491 and CEE 22.
Current rating 250V a.c., 6 amps.
Chassis plug type EU2P 36p
Cable socket type EU2S 63p
Cable socket also available with
2 metres of fitted lead type EU2L £1.00

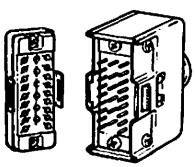


MULTIWAY CONNECTORS, 1300 series by Henry & Thomas

Contact resistance : 5mΩ max., contacts gold plated.
Insulation resistance : 1000MΩ min. @ 500V d.c.
Current rating : 5 amps per contact.

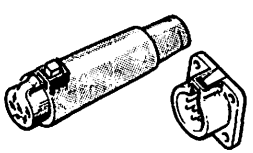


No. of Contacts	Free plug	Free socket	Chassis plug	Chassis socket
8	P13A08CT £1.50	S13A08CT £1.48	P13A08SB 62p	S13A08SB 58p
16	P13A16CT £2.00	S13A16CT £1.95	P13A16SB 90p	S13A16SB 84p
24	P13A24CT £2.45	S13A24CT £2.32	P13A24SB £1.24	S13A24SB £1.10



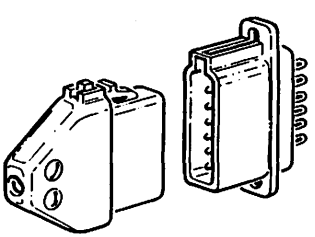
LOCKABLE CONNECTORS, RPC series

Contact arrangement : 6-way
Contact rating : 250V a.c. 5amp.
Contact finish : gold plated
Contact resistance : 5mΩ max.
Cable socket 48p
Chassis plug 38p



LOCKABLE CONNECTORS, 25A06 series

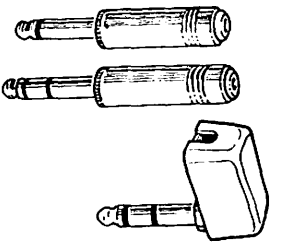
Contact arrangement : 6-in-line
Contact rating : 250V a.c. 5amp.
Contact finish : gold plated
Contact resistance : 5mΩ max.
Cable socket 48p
Cable plug 48p
Chassis socket 38p
Chassis plug 38p



CONNECTORS

JACK CONNECTORS

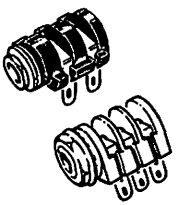
0.25" SERIES



PLUGS:

Standard 2-circuit screened, top entry	Type P1	24p
Standard 2-circuit insulated, top entry, in colours black, white, red, blue, green, grey, yellow	Type P2	18p
As P1 but side entry	Type SEP1	46p
Stereo, 3-circuit (Not GPO), screened	Type P3	57p
Stereo, 3-circuit (Not GPO), insulated in colours black, white, red, blue, green, grey, yellow	Type P4	51p
As P3 but side entry	Type SEP3	66p

SOCKETS:



Standard 2-circuit, unswitched, insulated in colours black, grey or white	Type S1/SS	13p
As S1/SS but with 2 break contacts	Type S1/BB	16p
Stereo, 3-circuit (Not GPO), unswitched, insulated in colours black, grey or white	Type S3/SSS	17p
Stereo, as S3/SSS but with 3 break contacts	Type S3/BBB	20p
Standard 2-circuit, chrome plated mounting bush, insulated, with bezels in colours: black, white, red, blue, green, grey	Type S5/SS	16p
As S5/SS but with 2 break contacts	Type S5/BB	20p
As S5/BB but stereo, black bezel only	Type 3284	46p
Standard line socket for MONO screened	Type 231	40p
Standard line socket for STEREO screened	Type 244	45p

3.5m.m. SERIES

PLUGS:

2-circuit, screened	Type P5	13p
2-circuit, insulated in colours: black, white, red, blue, green, grey	Type P6	10p

SOCKETS:

2-circuit, insulated with chrome plated fixing nut and 2 break contacts	Type S6/BB	10p

2.5m.m. SERIES

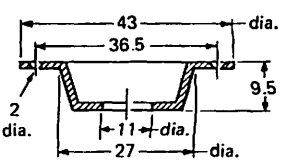
PLUG:

2-circuit, insulated	Type P25	10p

SOCKET:

2-circuit, non-insulated with 1 break contact	Type S25	10p

RECESS PLATE for 0.25" series



Moulded in black or white plastic material, suitable for S1, S3, S5 and 3284 sockets — Type SRP1 — 4p

FIXING HARDWARE

NUTS, SCREWS, ETC.

Finish: Screws, nuts, washers in cadmium or zinc plating (as available)
Tags are electro-tinned
Screws in BA sizes are available in round-head (RH), cheese head (CH), and countersunk (CSK)

Size	1"	0.5"	0.375"	0.25"	nuts	washers		tags
						plain	s/proof	
2BA	116	75	67	67	65	11	18	36
4BA	62	37	35	31	45	10	18	28
6BA	40	33	31	30	38	10	18	28
8BA	–	53	48	48	58	10	–	–

No.6PK self tapping, pan head 3/8" 40p
No.4PK self tapping, pan head 5/16" 30p, 3/8" 30p
No.2PK self tapping, pan head 3/16" 27p

All prices above in pence per 100. *(See below)*

10 to 90	in units of 10	pro-rata, round up to nearest whole penny.
100 to 900	in units of 100	deduct 20%
1000-up	in units of 1000	deduct 30%

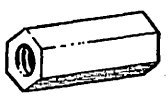
SPACERS AND PILLARS

Spacers: 4BA and 6BA clearance, brass, nickel plated.
Pillars: 4BA and 6BA tapped through, brass, nickel plated.

length (inches)	4BA		6BA	
	spacer	pillar	spacer	pillar
0.125	£1.20	–	£1.15	–
0.25	£1.35	£1.70	£1.30	£1.30
0.375	£1.45	£2.10	£1.40	£1.40
0.5	£1.75	£2.60	£1.65	£1.75
0.625	£1.80	£4.50	£1.70	£2.86
0.75	£1.90	£4.80	£1.80	£3.00

Spacers

Pillars



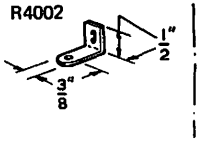
All prices above in pence per 100. *(See below)*

10 to 90	in units of 10	pro-rata, round up to nearest whole penny.
100 to 900	in units of 100	deduct 20%
1000-up	in units of 1000	deduct 30%

BRACKETS, RIGHT-ANGLED

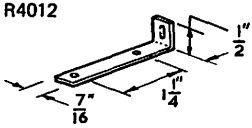
Mild steel, cad-plated, 4BA clearance holes.

R4002



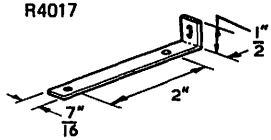
2p each
£1.35NET per 100

R4012



4p each
£2.85NET per 100

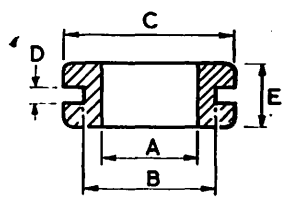
R4017



5p each
£3.30NET per 100

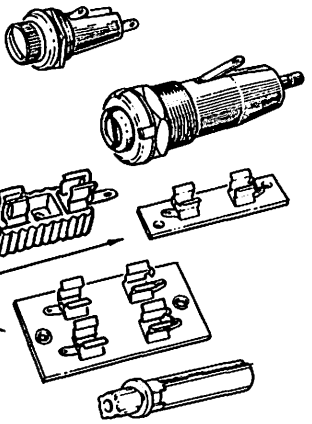
GROMMETS

Type	A	B	C	D	E	Price per 10	Price per 100
G14	5/32"	1/4"	3/8"	1/16"	7/32"	10p	72pNET
G10	1/4"	3/8"	9/16"	1/16"	1/4"	10p	72pNET
G28	3/8"	1/2"	21/32"	1/16"	17/64"	15p	£1.NET



FUSES

FUSE HOLDERS



Panel type for 20mm x 5mm fuses
12.6mm hole fixing — No. 296 — 20p

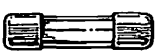
Panel type for 1.25" x 0.25" fuses
16.7mm hole fixing — No. 1348 — 51p

Chassis mounting
plastic for 20mm fuses — Single 20mm — 6p
paxolin for 1.25" fuses — Single 1.25" — 5p
Double 1.25" — 8p

Automobile type fully insulated,
supported in wiring — 1.25" Auto — 8p

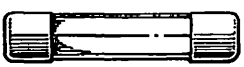
FUSE LINK 20m.m.

100, 200, 250, 500mA
1, 1.6, 2, 3, 5A — 3p each



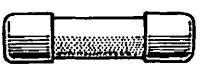
FUSE LINK 1.25"

100, 150, 250, 500, 750mA
1, 1.5, 2, 2.5, 3, 5, 7.5, 10, 15A — 3p each



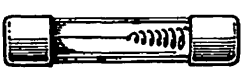
FUSE LINK 1"

(for 13A plugs) to BS 1362
2, 3, 5, 7, 10, 13A — 5p each



FUSE LINK Anti-surge. (20mm type to IEC127)

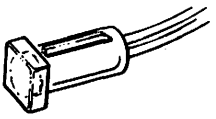
20m.m.: 100, 250, 500mA, 1, 2A — 6p each
1.25" : 250, 500, 750mA, 1, 1.5, 2A — 12p each



LAMPS

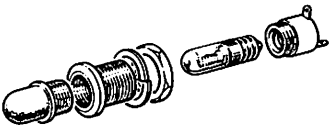
LAMPS, INDICATOR

ROUND NEON	200-250V	Red	Type NR/R	36p
		Amber	Type NR/A	36p
		Clear	Type NR/C	36p
SQUARE NEON	200-250V	Type JH12S in colours red, amber or clear		26p
SQUARE FILAMENT		Type JH12S in colours red, amber, clear or green		
			6 volt 0.1A	28p
			12 volt 0.06A	30p
			28 volt 0.04A	36p



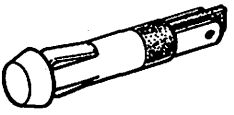
MINIATURE FILAMENT (supplied without bulb)

Type LR in colours red, blue, yellow, green & white.	20p
LES bulb 6V 0.75W	10p
LES bulb 12V 1W	12p



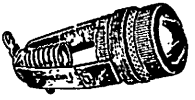
SMALL ROUND NEONS

230-250V	Type MM in colours red, amber or clear	24p
	Type MM in green	31p



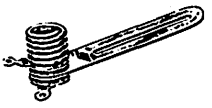
SIGNAL LAMP (supplied without bulb) Type D360 In colours red, amber, green, blue or clear 57p

MES bulbs *(See below)*



BATTEN LAMPHOLDER — Moulded construction — 16p

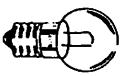
SKELETON LAMPHOLDER — For MES bulbs — 16p
Max. voltage between contacts or contact & bracket: 125V



BULBS, MES

Voltage	Current	Principal use	Type	Price
1.25	0.25A	torch	1427	9p
2.2	0.25A	torch†	2225	9p
2.5	0.3A	torch	2111	9p
3.5	0.3A	torch	2112	9p
5.5	0.3A	torch	2114	9p
6.0	0.1	cycle	2610	9p
6.0	0.5	cycle	2650	9p
6.5	0.3	radio	2272	9p
12	0.1	inst.	201	10p
24	0.12	inst.	324	14p

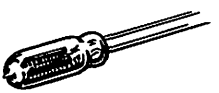
† = lens end.



BULBS, NEON, miniature, wire ended

High brilliance, type HB1725, 1.9mA max.
Use 100K on 240V.a.c. 135V max breakdown 6p

Standard brilliance, type SB1725, 0.6mA max.
Use 270K on 240V.a.c. 90V max breakdown 6p



LITERATURE

FOULSHAM - TAB ELECTRONIC BOOKS

No.75 Transistors theory and practice — Price £1.40

Semiconductor theory, transistor chanracteristics, equivalent circuits and many other topics.

No. 83 Fun with Electricity — Price £1.30

Teaches fundamentals of electricity and magnetism to student and hobbyist. Projects to build and learn from.

No. 93 Radio Control Handbook — Price £1.90

Covers large range of control systems. Contains detailed information on simple to more complex systems including engine speed controls for use in model cars, planes and boats.

No. 94 Transistors how to test them - How to build all-Transistor Test Equipment — Price £1.30

Awaiting re-print

No. 100 Basic Math Course for Electronics — Price £1.40

"Down to brass tacks". From Ohm's law to network calculations, a.c., use of vectors, complex numbers and logarithms.

No. 125 Handbook of Electronic Tables — Price £1.40

Versatile selection covering most aspects of everyday electronics.

No. 129 New Skill-building Transistor Projects — Price £1.45

Shows how to conduct experiments to give new facts and prove key points.

No. 464 Electronic Hobbyists IC Projects Handbook — Price £1.40

Although specially for the hobbyist, many projects will be useful for general information and for further development. 50 Varied projects.

No. 485 How to use Test Instruments in Electronic Servicing — Price £1.80

How to make the most of workshop equipment. Connections to test instruments for testing and servicing.

No. 493 Semiconductors from A to Z — Price £1.50

Awaiting re-print

No. 501 Working with Semiconductors — Price £1.50

Guide to semiconductor operation that helps you develop a thorough understanding of semiconductors and actually enjoy doing it!

No. 504 How to fix transistor radios and printed circuits — Price £1.60

Basic theory of, and repair techniques for, transistor radios. From 5-transistor pocket radios to the AM-FM home receiver and car radio.

No. 505 Installing and servicing Home Audio Systems. — Price £1.60

Intended for professional technicians. Deals with circuit theory and test gear required. Trouble shooting is also covered.

No. 513 Understanding Solid-State Circuits. — Price £1.45

Written to serve the interests of anyone at sub-engineering level. Explains semiconductor circuit operation.

No. 528 Pulse Switching Circuits — Price £1.95

Complete source of practical pulse and switching circuit operation and application data. Applications are thoroughly discussed.

No. 530 Basic Electronic Problems Solved — Price £1.60

Simple and abstruse. Some recourse to maths in the treatment of d.c. and a.c. circuits, receivers and power supplies.

No. 538 Computer Circuits and How They Work — Price £1.45

Technical training on computer circuitry. Applications and circuitry dealt with in detail. Computing principles also discussed.

FOULSHAM - TAB ELECTRONIC BOOKS CONT'D

No. 546 Electronic Musical Instruments Price £1.80

From basic simple amplification to total electronic music generation. Simulation of traditional instruments. Synthesisers.

No. 550 How to use Vectorscopes, Oscilloscopes and Sweep Signal Generators Price £1.60

Oscilloscopes: standard, storage, sampling, spectrum analysers, vectorscopes sweep signal generators and their uses are described and well illustrated.

No. 553 Electronics, Self-Taught with Experiments and Projects. Price £1.85

Basic principles of electronics. How to set up a private electronics laboratory and how to build useful devices.

No. 568 IC projects for Amateur and Experimenter Price £1.45

Miniaturisation efficiency and economy are the keynotes of these projects which are of a general but interesting nature.

No. 571 "Radio Electronics" Hobby Projects Price £1.45

Novel projects for home and car, audio, stereo and Hi-Fi, musical and test equipment.

No. 581 Radio Communication Tranceiver Servicing. Price £1.45

Awaiting re-print

No. 619 Troubleshooting Solid State Electronic Power Supplies Price £1.35

Awaiting re-print

No. 625 Troubleshooting Solid State Amplifiers Price £1.60

All types including Audio, power, r.f., i.f.,differential, operational are covered. For servicing engineers, designers, technicians and hobbyists.

No. 628 Basic Eelctricity and Beginning Electronics Price £1.40

Combines electron theory with reader interest. Use of transistors, resistors and other components. Electricity from the time of its discovery.

No. 630 Introduction to Medical Electronics Price £1.70

The subject of medical electronicsis discussed for personnel versed in either medical aspects or in electronics. Deals with design and use of e-m equipment.

No. 647 Stereo Quad Hi-Fi Principles and Projects Price £1.50

Transducers, amplifiers, frequency response etc. are discussed. Several hi-fi projects for stereo, quad, and loudspeaker construction are included.

No. 653 Troubleshooting Sold State Wave Generating and Shaping Circuits Price £1.55

Covers L-C, R-C, crystal, multivibrator and blocking oscillator circuits. Also pulse shaping circuits, detection mixers and frequency converters, modulation, limiters and clamps.

No. 656 Four-Channel Stereo from Source to Sound. Price £1.35

General information, available equipment and current standards are covered. Discrete and matrix systems of reproduction are explained.

No. 665 Mobile Radio Handbook Price £1.50

Discusses basic systems in common use. Subjects such as power and range, paging, telephone systems, power supplies and aerials are covered.

No. 666 Experimenting with Electronic Music. Price £1.50

A unique combination of a science, a hobby and a pleasure. Practical experiments offer scope for originality and research.

No. 667 Miniature Projects for Electronic Hobbyists Price £1.45

Wide range of practical projects in miniaturised form affording maximum variety with a minimum of parts.

Continued on Page 117

LITERATURE

BERNARD BOOKS

BP1	Handbook of Transistor Equivalents and Substitutes	40p
BP2	Handbook of Radio, TV & Industrial Tube and Valve equivalents	60p
BP3	Handbook of tested transistor circuits	40p
BP4	World's Short, Medium & Long Wave FM & TV Broadcasting Stations Listing	60p
BP5	Handbook of Simple Transistor Circuits	35p
BP6	Engineers and Machinists Reference Tables	20p
BP7	Radio and Electronic Colour Codes and Data Chart	15p
BP8	Sound and Loudspeaker Manual	50p
BP9	38 Practical Tested Diode Circuits for the Home Constructor	35p
BP10	Modern Crystal and Transistor Set Circuits for Beginners	35p
BP11	Practical Transistor Novelty Circuits	40p
BP12	Manual of PA amplifiers up to 1KW. (Mainly valve amplifiers)	75p
BP13	Electronic Novelties for the motorist	50p
BP14	Second book of transistor equivalents	95p
BP15	Constructors Manual of Electronic Circuits for the Home	50p
BP16	Handbook of Electronic Circuits for the Amateur Photographer	60p
BP17	Radio Receiver Construction Hanbook using IC's and Transistors	60p
BP18	Boys & Beginners Book of Practical Radio and Electronics	60p
BP19	Second Constructors Manual of Electronic Circuits for the Home	75p
BP20	Ham's Handbook of Radio and Electronic Circuits	75p
BP21	Practical Circuits for Solid State Receivers	75p
BP22	79 Electronic Novelty circuits	75p
BP23	First Book of Practical Electronic Projects	75p

196	AF-RF Reactance Frequency Chart	15p
200	Handbook of Practical Musical Novelties	50p
201	Practical Transistorised Novelties for Hi-Fi Enthusiasts	35p
202	Handbook of Integrated Circuits Equivalents and Substitutes	75p
203	IC's and Transistor Gadgets Construction Handbook	60p
204	Second Book of Hi-Fi- Loudspeaker Enclosures	60p
205	First Book of Hi-Fi Loudspeaker Enclosures	60p
206	Practical Transistor Circuits for Modern Test Equipment	60p
207	Practical Electronic Science Projects	75p
208	Practical Stereo and Quadrophony Handbook	75p
209	Modern Tape Recording Handbook	75p
210	Complete Car Radio Manual	75p
211	1st. Book of Diode characteristics, equivalents and substitutes	95p
RCC	Resistance Colour Code Indicator Disc	10p
USI	Universal Gram Motor Speed Indicator	8p

ELECTRONICS TODAY INTERNATIONAL

ETI Top Projects No.2. 75p

FOULSHAM

Transistor Selector (Towers) £2.95

Comprehensive tabulation of basic specifications for over 10,000 transistors of the most common current and widely used obsolete types from Europe, U.S.A. and Japan. One of the most useful data books published, it also gives equivalents from America and Europe to most entries.

LITERATURE

NEWNES-BUTTERWORTH

		PRICE
150X	THE AUDIO HANDBOOK. Hi-Fi fundamentals, Voltage amplifiers, feedback and control circuits, the power amplifier, Radio tuners, System operation, Amplifier faults and remedies, Loudspeakers and enclosures, Disc recording, Pickups and record playing equipment, Microphone and mixers, Principles of tape recording, Tape recorder mechanics and operation, circuits and servicing, Surround sound and quadrophony,Video tape recording, Amplifier performance specifications.	£4.90
163	BEGINNERS GUIDE TO RADIO. Gives a basic understanding of how and why radio receivers work. Survey from first principles of electricity and magnetism to Hi-Fi.	£1.00
473	ELECTRONICS POCKET BOOK. 2nd. edition.	£1.40
486	20 SOLID STATE PROJECTS FOR THE CAR & GARAGE. All the project easily built and make use of internationally available components.	£1.20
546	QUESTIONS & ANSWERS ON RADIO & TELEVISION. Step by step form to a thorough grasp of the principles of Radio and Television.	75p
745	110 THYRISTOR PROJECTS USING SCR's & TRIACS Outlines the essential operating characteristics and presents 110 fully evaluated projects.	£1.55
767	INTEGRATED CIRCUIT POCKET BOOK. Intended primarily for technicians and students and all who are concerned with integrated circuits and their applications.	£2.50
1267	BEGINNERS GUIDE TO ELECTRONICS. Reference work written for those entering the diverse field of electronics. 3rd. edition fully revised and brought up to date.	£1.90
1453	BEGINNERS GUIDE TO TRANSISTORS. Describes what transistors are, how they work, types available and many applications. I.C's and logic principles introduced.	£1.95
2864	110 SEMICONDUCTOR PROJECTS FOR THE HOME CONSTRUCTOR. Presents established and new semiconductor devices, circuit design and component values. Operational descriptions.	£1.20
81619	QUESTIONS AND ANSWERS ON TRANSISTORS. 3rd. edition.	75p
413276	TRANSISTOR POCKET BOOK.	£1.40

FOULSHAM - TAB ELECTRONIC BOOKS CONT'D

No. 669 Practical Test Equipment you can build — Price £1.80

Collection of highly useful, easy to build equipment from simplest polarity tester to digital counter.

No. 681 Questions and answers about Tape Recording — Price £2.05

Practical advice on everything related to recording. Just about all problems associated with recording are covered in detail.

No. 698 10-Minute Test Techniques for P.C. Servicing — Price £1.60

Where time is money, the time saving hints could repay the cost of this book many times over.

No. 699 Solid State Circuits Guide Book — Price £1.75

An "Idea Stimulator". Source of inspiration to evolve practical plans for new projects.

No. 702 Electronic Measurements Simplified. — Price £1.70

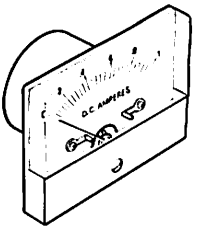
Helps you make the fullest use of the versatile measuring equipment now available.

METERS

PANEL METERS

2" scale all ratings d.c. Price £3.75

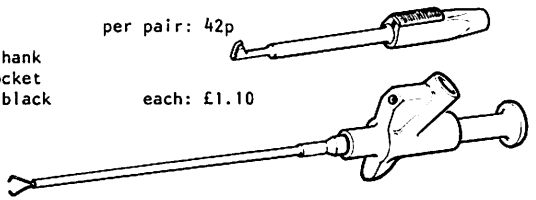
Type T21	50μA f.s.d.	Type T27	50mA f.s.d.
Type T22	100μA f.s.d.	Type T28	100mA f.s.d.
Type T23	500μA f.s.d.	Type T29	500mA f.s.d.
Type T24	1mA f.s.d.	Type T30	1A f.s.d.
Type T25	5mA f.s.d.	Type T33	50V f.s.d.
Type T26	10mA f.s.d.	Type T34	300V f.s.d.



TEST PRODS

Type A Spring-loaded grip
One red, one black — per pair: 42p

Type B Long reach, flexible shank
Connection by 4m.m. socket
Spring-loaded, red or black — each: £1.10

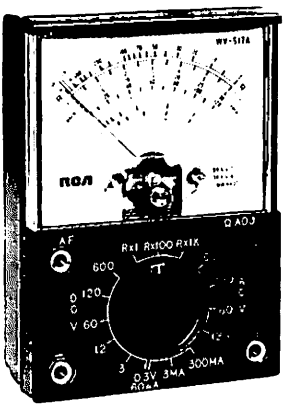


R.C.A. TEST METERS

Full service facilities at R.C.A., Sunbury-on-Thames.
12 months warrenty for parts and labour.(WV539A-3 months only)

TYPE WV-539A £6.00 NET

Ranges:
d.c.: 15V
150V
1000V
150mA
Resistance: R x 1KΩ
1KΩ per volt on d.c.



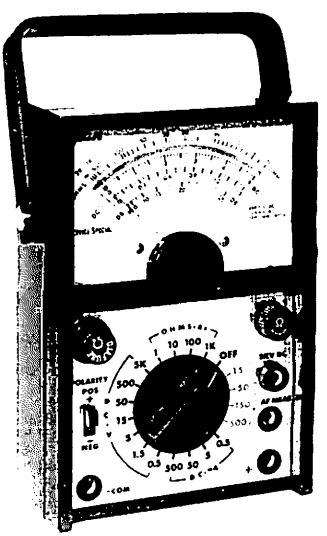
TYPE WV-517B £14.00 NET

Ranges:
d.c.: 0.3; 3; 12; 60; 120; 600V all at 20KΩ/volt
3mA; 300mA.
a.c.: 12; 60; 120; 600V all at 10KΩ/volt
-20 to +23dB
+20 to +37dB
Res.: R x 1Ω; x 100Ω; x 1KΩ

TYPE WV-529A £30.00 NET

The "Service Special".
Taut band movement.
Diode protected.
Designed to withstand normal falls and bumps and remain accurate.
Reverse polarity switch.
Fuse for ohms circuit.

Ranges:
d.c.: 0.5; 5; 15; 50; 500; 5000V all at 20KΩ/volt
0.5; 5; 50; 500mA
a.c.: 15; 50; 150; 500V all at 10KΩ/volt
Res.: R x 1; x 100; x 1KΩ



PRINTED CIRCUIT MATERIALS

P.C.B. MATERIALS

COPPER CLAD BOARD, best quality.

300 x 150m.m. x 1.5m.m. thick nominal. 1oz. copper.

Single sided S.R.B.P.	74p
Double sided S.R.B.P.	92p
Single sided Fibreglass	£1.30

UNCLAD S.R.B.P. Board.

300 x 150m.m. x 1/16" thick nominal	35p

FERRIC CHLORIDE CRYSTALS

Laboratory grade $FeCl_3 6H_2O$

Use a saturated solution for etching copper clad board.

WARNING! Ferric chloride is corrosive!

500 gram in plastic reagent jar	£1.30
100 gram plastic pack	30p

POSITIV-20 Photo-sensitive aerosol

For production of PC boards, scales, front panels etc.

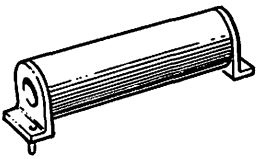
Clean lightly with VIM or similar and rinse well. Spray horizontal board in subdued light and dust-free conditions until coating shows orange-peel effect. Dry for 20 mins at about 80°C. Expose up to 1hr. depending on light intensity and wavelength. Develope with caustic soda solution, 7gm/litre. Etch with ferric chloride solution. Remove photo-resist with acetone etc. 75cc can 72p

SERVISOL SERVICE AIDS

SUPER SERVISOL A highly efficient switch cleanerthat removes dirt, grease, oil etc., and leaves a residual relatively conducting oil filmwhich reduces contact resistance		65p
SILICONE GREASE Waterproofs, insulates, lubricates and preserves electrical and electronic equipment. Temp. range -50to+80°C	8oz.	65p
FOAM CLEANSER Mixture of solvents, detergents with antistatic properties to remove grease and grime from glass, wood, plastic and paint.	16oz.	65p
PLASTIC SEAL Transparent insulator to prevent arcing in high voltage circuits. Also useful for weatherproofing connections.	6oz.	55p
AERO-CLEAN Selective precision cleaner for all plastics, paint, rubber etc. Leaves no residue on evaporation.	6oz.	50p
FREEZE-IT Can reduce temperature down to 50°C to assist locating faults in components.	6oz.	50p
ANTI-STATIC Prevents build-up of static. Useful for all plastic, polished metal and wooden surfaces, TV screens, fluorescent light fittings, telephones etc.	6oz.	50p

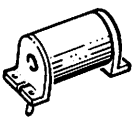
RELAYS

REED RELAY COMPONENTS, Coils



Type SS/12, Length 2.375", Dia. 0.5" 37p
12V, 885Ω, 135 ampere turns at 12V
Takes one standard reed.

Type SD12 Length 2.375", Width 0.75" 37p
12V, 355Ω, 175 ampere turns at 12V
Takes two standard reeds.

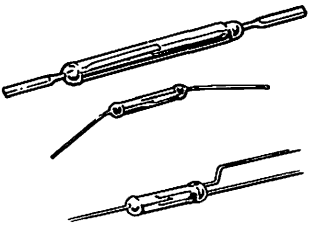


Type MS/12, Length 1.125", Dia. 0.5" 40p
12V, 1040Ω, 95 ampere turns at 12V
Takes one miniature reed.

Type MD/12, Length 1.125", Width 0.75" 40p
12V, 575Ω, 120 ampere turns at 12V
Takes two miniature reeds.

Type MT/12, Length 1.125", Width 1" 40p
12V, 285Ω, 150 ampere turns at 12V
Takes three miniature reeds.

REEDS



Type SR1, Standard size, 250V, 15VA, 1A max.
50 - 70 ampere turns to operate 30p

Type MR1, Miniature size, 250V, 10VA, ¼A max.
30 - 50 ampere turns to operate 40p

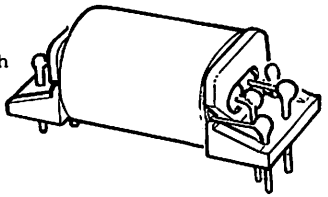
Type MRGDT, miniature size
30 - 50 ampere turns to operate
SPDT contacts, 28V, 3VA, 0.25A max. £1.29

REED RELAYS, Open construction

Contacts normally open.
Max. ratings: 200V, 15VA, 0.5A per contact.

Type CSA5 & CSA12, single pole 70p each

CSA5: 5V coil 106Ω
CSA12 12V coil 645Ω

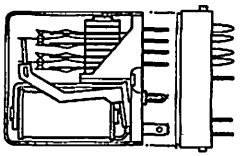


Type CDA5 & CDA12, double pole 85p each

CDA5: 5V coil 57Ω
CDA12 12V coil 320Ω

MINIATURE RELAYS

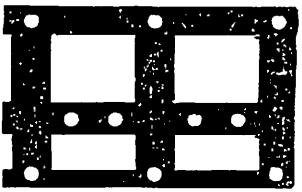
Type 24. 2 change-over, heavy duty contacts, 12V coil.
Contact rating: 220V d.c., 100VA, 5A max.
Coil resistance: 185Ω. £1.40



Type 25. 4 change-over, standard duty contacts, 12V coil.
Contact rating: 100V d.c., 30VA, 1A max.
Coil resistance: 185Ω. £1.50

SOCKETS for above relays, ordinary wiring type connections.

Type 240 for relay type 24 36p
Type 250 for relay type 25 40p



MOUNTING STRIP

Pre-punched aluminium mount to take 6 relays type 24 or 25 side by side or their sockets. 26p

RELAYS

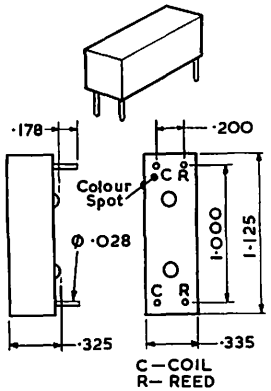
REED RELAYS

ENCAPSULATED TYPES, LPS12 & LPD12

Contacts normally open.
Contact rating: 200V, 15VA, 0.5A max.

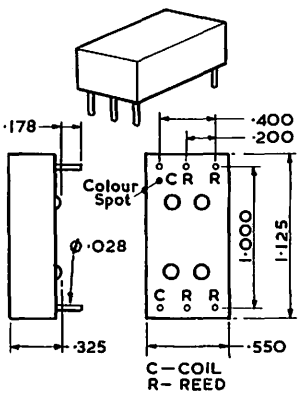
TYPE LPS12

12 volt 590Ω coil — 79p



TYPE LPD12

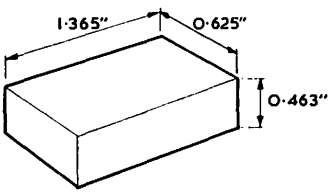
12 volt 355Ω coil — £1.20

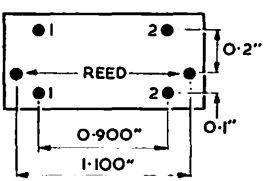


LATCHING RELAY TYPE CL5 & CL12

£1.60 each.

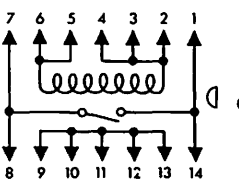
Operation: pulse coil 1. to make, pulse coil 2. to break contacts.





DUAL-IN-LINE RELAY TYPE 1A5A

Coil voltage 5V d.c., 200Ω.
Contact rating 100V, 10VA, 0.25A max.
Operating temperature: -40°C to +105°C
Operates in 1mS, releases in 0.5mS.



98p each

PIGMY MAINS RELAY

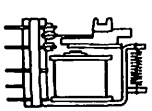
Chassis mounting

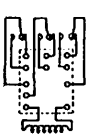
£1.65 each

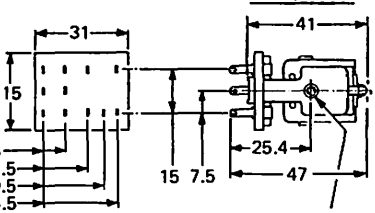
Contacts are of large diameter and have good wiping action.
They are manufactured from fine silver.
Rating is 250V a.c., 10 amps.
Life @ 3000 ops/hour exceeds 20 million.

Voltages available:

6V d.c.: 29.5Ω
12V d.c.: 110Ω
24V d.c.: 475Ω
240V a.c.: 8200Ω

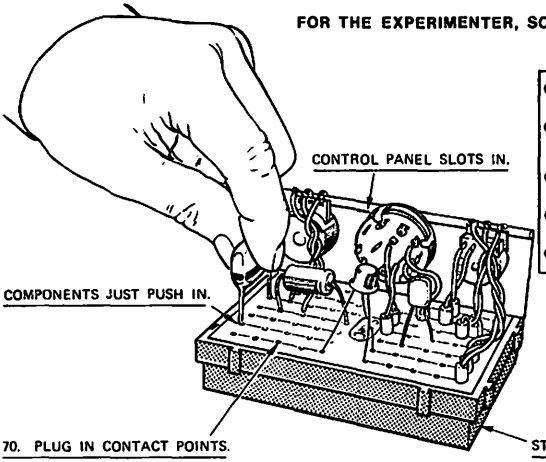






S-DeC The Breadboard for the Transistor Age

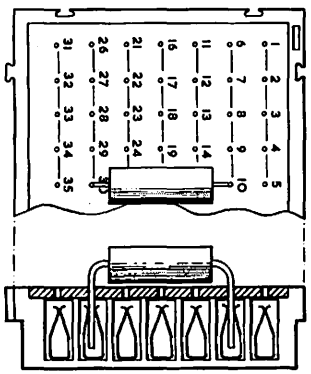
FOR THE EXPERIMENTER, SCHOOL, COLLEGE OR INDUSTRY



- QUICK, FIRM AND RELIABLE CIRCUIT ASSEMBLY.
- LASTS INDEFINITELY – performance unchange after 1000 insertions.
- PUTS AN END TO "BIRDSNESTING"
- RE-USE COMPONENTS AGAIN AND AGAIN.
- SAVES TIME MONEY AND EFFORT.

TECHNICAL DATA
Insertion force 90 gm wt.
Withdrawal force 90 gm wt.
Resistance between adjacent holes 10mΩ
Insulation resistance between adjacent strips $\geq 10^{10}\Omega$
Capacitance between adjacent strips 3 pF

£1.98



The contacts are arranged in numbered rows of five which are joined together electrically as shown in the diagram. This arrangement is similar to that used in the popular wiring board, so that the same methods of laying out circuits may be used. An S–DeC contains two of these 5 x 7 panels enabling most electronic building blocks to be accomodated. For very large circuits the decking may easily be enlarged by keying the units together forming a firm and continuous area of any desired size.

Components are simply pushed into the sockets where they are held securely by the double leaf spring phosphor-bronze contacts. This system ensures a good wiping action in insertion and withdrawal so giving a low resistance contact. Little force is required to push in or pull out the components but they are firmly held when inserted. The controls are mounted on a panel which slots into the S-DeC base.

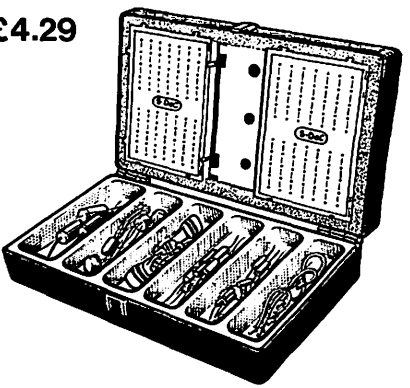
FOUR Pack

£7.50

Four S–Decs and two control panels are supplied in an attractive plastic container. Makes storage of S–Decs a simple matter – an economical way to buy your S–Decs!

DeCSTOR Pack

£4.29



Two S–Decs and a control panel are supplied in this pack which also contains a divided compartment for the storage of components.

Components shown are for illustration purposes only and are not supplied with S. D. C. products.

T-DeC μ-DeC A μ-DeC B

T-DeC

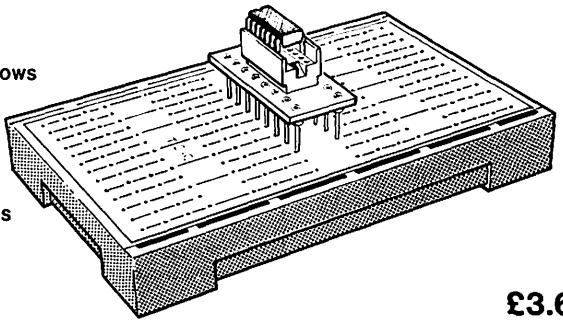
ADVANCED VERSION OF S-DeC

TOTAL OF 208 CONTACTS IN 38 ROWS

MAY BE TEMPERATURE CYCLED

ACCEPTS ONE 16 LEAD D.I.L. CARRIER WITH SOCKET
OR
ONE FOR SOLDERED CONNECTIONS

CARRIERS SUPPLIED SEPARATELY



£3.63

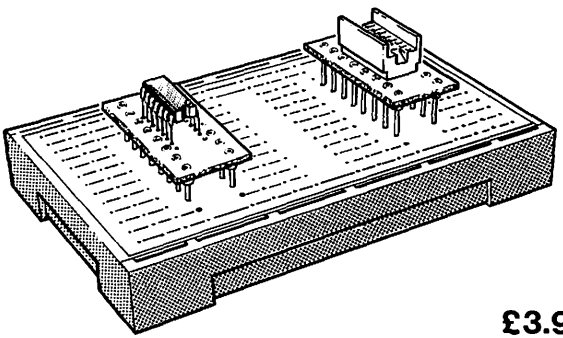
μ-DeC A

TOTAL OF 208 CONTACTS

ACCEPTS TWO 16 LEAD D.I.L. CARRIERS.
USE EITHER CARRIER

MAY BE TEMPERATURE CYCLED

CARRIERS SUPPLIED SEPARATELY



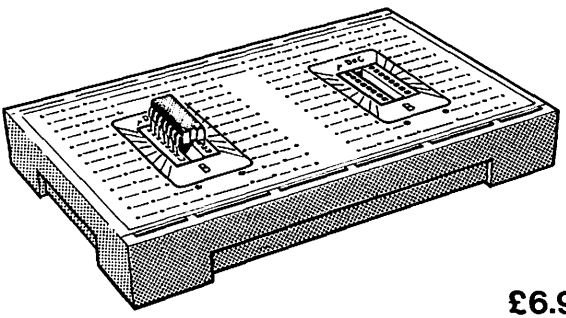
£3.99

μ-DeC B

SIMILAR TO μ-DeC A EXCEPT THAT I.C. SOCKETS ARE AN INTEGRAL PART OF DeC

THE DeCS LINK TOGETHER TO FORM A BREADBOARD OF ANY REQUIRED SIZE.

TOTAL OF 176 CONTACTS

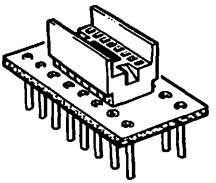


£6.99

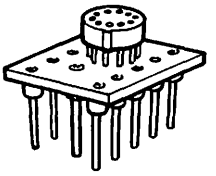
Components shown are for illustration purposes only and are not supplied with S. D. C. products.

S.D.C. PRODUCTS

I.C. CARRIERS

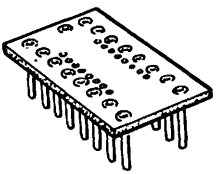


16 lead DIL carrier
with socket No. BB062.
£1.92

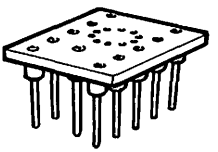


10 lead TO5 carrier
with socket No. BB072
£1.80

Sockets are designed to withstand the frequent use of experimental applications.



16 lead DIL carrier
less socket No. BB061
99p



10 lead TO5 carrier
less socket No. BB071
90p

Carriers accept integrated circuits directly for soldering-in to produce a permanent assembly.

EXPERIMENT GUIDES Each guide contains information of a basic educational nature followed by a series of associated projects.

Guide A. (BB 121) £1.50 (Z)

This consists of elementary experiments and projects to aid the understanding of the ideas of current, voltage and resistance leading to the use of R=V/I and to the main considerations when using ammeters and voltmeters: (Lamps, batteries, resistors; The Ammeter; The Voltmeter).

Guide B. (BB 122) £1.77 (Z)

This consists of experiments and projects to explore in a simple manner the properties of various components. (Resistors; Capacitors; Inductors; Diodes; Transistors)

Guide C. (BB 123) 90p (Z)

This guide covers experiments and projects concerned with potential dividers, bridges and potentiometers. (Bridges, Potentiometers)

Guide D. (BB 124) £2.40 (Z)

This covers L,C,R circuits mainly with AC sinusoidal signals but including response to pulses and transient effects. (CR circuits, LR circuits, LCR in series, LCR in parallel, Projects)

Guide E. (BB125) £4.20 (Z)

This covers various aspects of electronics. (Diode Circuits, Biassing Transistors, The Transistor Amplifier, The Multivibrator Family, Feedback, Generators of Special Waveforms, Logic Circuits)

Plugs for DeCs: (BB 103 + colour) Yellow, Blue, Red, Green, Black. in packs of 10 of one colour 45p pack.

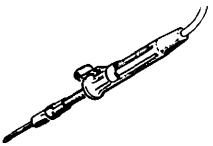
(Z) = Vat free

SOLDERING IRONS

ANTEX SOLDERING EQUIPMENT

SOLDERING IRON TYPE C2-240V £2.45 NET

Power consumtion 15 watts.



SOLDERING IRON TYPE CCN-240V £2.90 NET

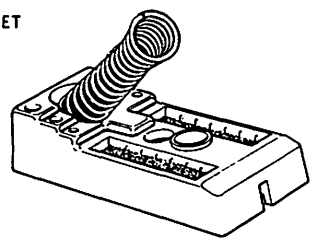
Power consumption 15 watts.
Low capacitance version with ceramic covered element.

SOLDERING IRON TYPE X25-240V £2.45 NET

Power consumption 25 watts.

SOLDERING IRON STAND TYPE ST3 £1.35 NET

Suitable for the above soldering irons
and many other types too!



SPARE BITS for Antex irons

C2-240V:
Nickel plated copper
No. 2 (3/32"), No.4 (3/16"), No. 6 (3/64") 35p each NET

Iron coated copper (long life)
No.102 (3/32"), No.104 (3/16"), No.106 (3/64") 42p each NET

CCN240:
Iron coated copper
No.1101 (3/32"), No.1101 (1/8"), No.1102 (3/16") 45p each NET

X25-240V:
Iron coated copper
No.50 (3/32"), No.51 (1/8"), No.52 (3/16") 48p each NET

SPARE ELEMENTS for Antex irons

C2-240V	£1.20 NET
CCN240V	£1.55 NET
X25-240V	£1.30 NET

SOLDER

Multicore Savbit	Size 12	carton	18 SWG	£1.60 NET
Savbit	Size 1	carton	18 SWG	50p NET
Multicore 60/40	Size 10	carton	22 SWG	£1.40 NET
60/40	Size 1	carton	18 SWG	50p NET
Multicore Savbit	Size 5	tube	18 SWG	32p NET
Multicore 60/40	Size 15	tube	22 SWG	35p NET
Electrovalue 60/40		500gm.	20 SWG	£2.35 NET

SOLDERING IRONS

SOLDERSTAT SOLDERING EQUIPMENT

HMS SERIES

Type HMS/240/16 240V 16W £3.12
Recommended for occasional use.

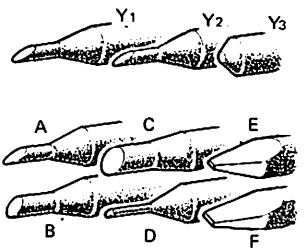
Type HMS/240/24 240V 24W £3.12
Recommended for frequent use.

Also available in 110V, 16W & 24W ratings.

SPARE ELEMENTS for HMS series £1.38

SPARE COPPER BITS for HMS (3/16" bore)

Nickel plated	3.2mm dia. type	2037	50p	Y1
	2.4mm dia.	2038	50p	Y2
	2.0mm stub	2003	50p	Y3
Iron plated (long life)	3.5mm dia.	2031	£1.67	A
	4.5mm dia.	2032	£1.67	B
	6.5mm dia.	2033	£1.67	C
	2.0mm dia.	2034	£1.67	D
	1.0mm chisel	2018	£1.67	E
	4.0mm chisel	2017	£1.67	F



STAND, cast aluminium £2.53
spare wiper pad 12p

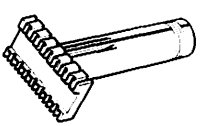
Similar to Solerstat 420 illustrated opposite

DE-SOLDER BRAID

Card containing 6 feet 91p
Reel containing 25 metres £9.87

DE-SOLDER HEADS for HMS irons, 24W £3.75

Makes light work of removing 8, 14 and 16-lead dual in line I.C.'s from P.C. boards,



OTHER ELREMCO-WOLF (SOLDERSTAT) SOLDERING IRONS in stock:
Prices are for current stock only

No. 21	General purpose solder gun, 2.25" x 0.625" dia bit	60W	£5.29
No. 31	General purpose solder gun, 1.875" x 0.25" dia bit	60W	£6.04
No. 62	Rugged workshop iron, 1.5 x 0.375" dia. bit	75W	£8.63
No. 71	General workshop use, 2" long x 0.75" square bit	75W	£6.48
No. 81	Heavy duty type, 4" long x 1.25" square bit	200W	£11.22
No. 92	Lightweight radio & TV use, 1.562" x 0.187" dia bit	25W	£3.57
No. MS	Sub-miniature for electronic use	10W	£2.16

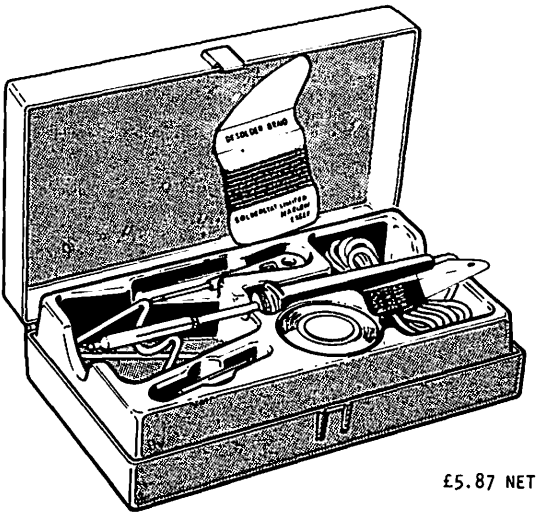
No. 92 is available in 110V only; others in 240V and 110V.

SOLDERING IRONS

SOLDERING KIT

List of contents

240V 24W Soldering iron
Iron stand
Spare bit
Reel plastic insulating tape
Card desolder braid
Wiper pad
Packet solder
Combination stripper and screwdriver
Asstd. solder tags
Hints on soldering

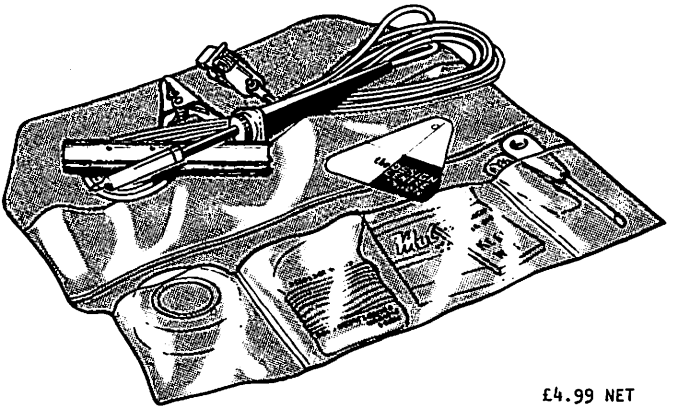


£5.87 NET

MOTORISTS KIT

List of contents

12V soldering iron
Heat shield
Reel plastic insulating tape
Card desolder braid
Wiper pad
Packet solder
Combination stripper and screwdriver
Asstd. solder tags
Hints on soldering



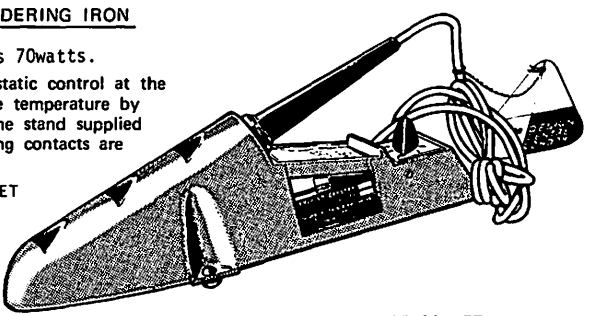
£4.99 NET

TEMPERATURE CONTROLLED SOLDERING IRON

Solderstat type 420, 240volts 70watts.

Incorporates electronic thermostatic control at the working point. Fully adjustable temperature by means of a control knob in the stand supplied with the instrument. No moving contacts are employed.

Spare bits: No.4002 £2.32 NET



£25.09 NET

UNSOLDERING TOOL

Purpose
This tool is designed to permit the removal of multiterminal integrated components and relays from circuit boards quickly and without damage. In operation, it simultaneously heats the solder joints on all the terminal pins of a component, sucks the holes in the soldering pads of the circuit board clear of solder and removes the component from the circuit board. A new component can then be installed without further preparation of the circuit board. The whole removal process takes less than one minute. The maximum acceleration force is only 20 G, so that the tool is also suitable for removing mechanically delicate relays.

Construction

Basic unit:
pair of jaws
suction pump
trigger mechanism

Attachments:
heater head
pulling mechanism

Components that can be unsoldered
All 14 and 16-terminal dual in-line packages as per DIN 41866 (version for 24-terminal dual in-line packages in preparation).

Technical Data

Heater element operating voltage
10 V to 13 V (10 to 12 V for 14/16-terminal components and 13 V for 24-terminal components).

Power supply
An ac network power pack supplying 9 to 13 V is available for the unsoldering tool.
The 12 V supply is for work on multi-layer boards.

Power draw
40 to 50 W

Heater head temperature
300 °C

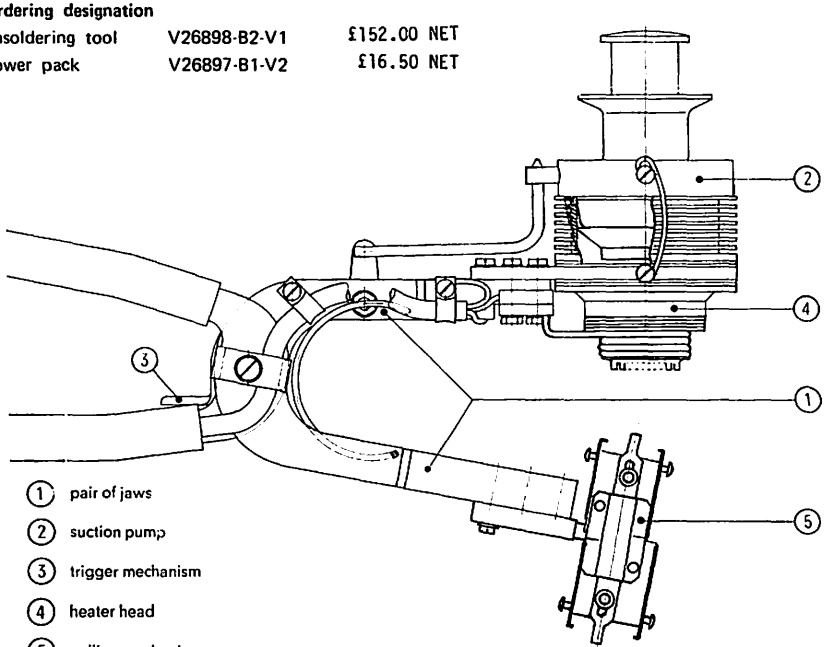
Maximum accelerative force
20 G

Dimensions

length	300 mm
width	70 mm
height	150 mm
weight	500 g

Ordering designation

unsoldering tool	V26898-B2-V1	£152.00 NET
power pack	V26897-B1-V2	£16.50 NET



1. pair of jaws
2. suction pump
3. trigger mechanism
4. heater head
5. pulling mechanism

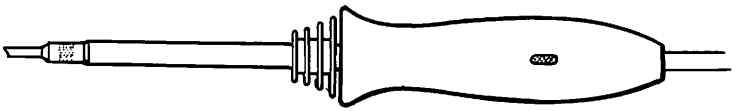
SOLDERING IRONS

ORYX SOLDERING EQUIPMENT

TEMPERATURE CONTROLLED SOLDERING IRON MODEL 50

MAIN FEATURES:
Temperature control within ±2%; range 200°C to 400°C. Operating temperature reached within 45secs., and controlled by thermostat in handle while in operation. Long life coated tip fitted as standard; one tip for all temperatures. Range of tip sizes and styles available.
Available in 115V or 240V. Power rating 50 Watts. Indicator lamp in handle.

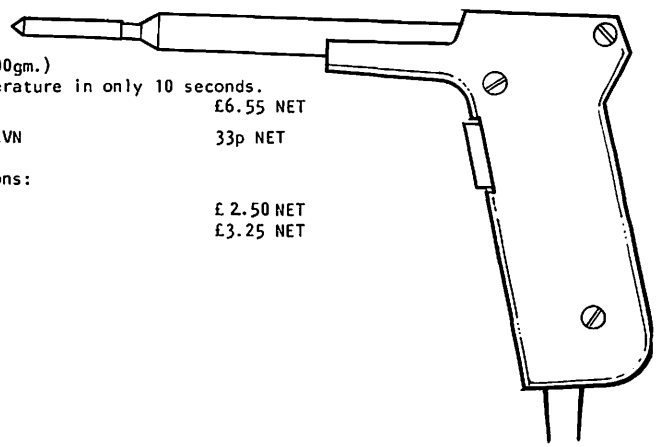
£6.90 NET.



REPLACEMENT BITS, Iron coated for long life

Single flat:	LL/SF/16	1.6mm wide	60p NET
	LL/SF/24	2.4mm	60p NET
	LL/SF/32	3.2mm	60p NET
	LL/SF/48	4.8mm	60p NET
	LL/SF/64	6.4mm	60p NET
Double flat:	LL/DF/08	0.8mm wide	60p NET
	LL/DF/16	1.6mm	60p NET
	LL/DF/24	2.4mm	60p NET
	LL/DF/32	3.2mm	60p NET
	LL/DF/48	4.8mm	60p NET
	LL/DF/64	6.4mm	60p NET

ERSA SPRINT SOLDERING GUN



Weighs only 7 oz. (200gm.)
Reaches maximum temperature in only 10 seconds.

£6.55 NET

REPLACEMENT BITS Type 862VN — 33p NET

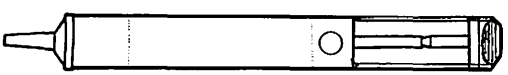
ELEMENTS for the above irons:

Model 50 element	£2.50 NET
Sprint element	£3.25 NET

DESOLDERING TOOL Type SR3A

Deals with solder removal where components are tightly grouped together or otherwise inaccessible. The spring loaded piston is fitted with a safety guard and is released by a simple push-button. The PTFE nozzle is easily removable for cleaning or replacement. Tip dia is 2mm.

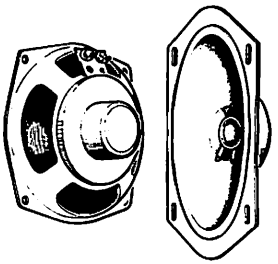
£4.95NET
Spare tip 60p NET



LOUDSPEAKERS

LOUDSPEAKER UNITS

Type TP26G	2.75" round, 80Ω replacement transistor radio speaker	84p
Type CS2	2.5" round, 8 or 25Ω	70p
Type 563	5" round, 3 or 8Ω	£1.46
Type 6414	6x4" eliptical 3 or 8Ω	£1.46
Type 73133	7x4" eliptical 3 or 8Ω	£1.68
Type 85239	8x5" eliptical 3 or 8Ω	£1.85
Type 85337	8x5" eliptical, twin cone, 8Ω only	£1.98
Type 59RM109	9x5" eliptical, as used in the Baxandall speaker 15Ω	£2.75
Type 59RM114	9x5" eliptical 8Ω	£2.75

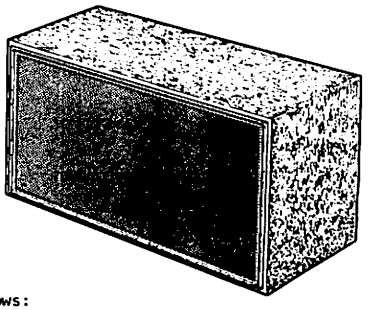


BAXANDALL LOUDSPEAKER KIT, 10 watt, 15Ω.

Designed by Peter Baxandall and featured in articles in the Wireless World. The loudspeaker was formerly manufactured by Peak Sound and received very good reviews in several magazines for the excellence of reproduction in a unit of this price and is claimed to be comparable with speakers at double the price. There is a steady decline in frequency response below 100Hz and for this reason a cross-over choke is available so that a woofer may be employed for low frequencies.

Specification:

Frequency response 100Hz to 10KHz : +3dB
Maximum continuous power (music) : 10 watts
Impedance : 15 ohms
Size when built : 18" x 12" x 10"



Price £16.25 NET for one
£31.00 NET for two if ordered and delivered together.

Parts of this kit are available separately as follows:

Equaliser chokes and components	£2.60 NET
Loudspeaker unit 59RM109 as above	
Pack-flat cabinet	£11.60 NET
Cross-over choke (not included in full kit above)	£1.80 NET

VYNAIR

Coal black	plain		
Rhapsody	black with silver streaks		
Silver fleck	black with silver lines	Sheets 36" x 25"	£1.00
Graphite grey	dark grey, plain	Sheets 18" x 25"	60p
Oyster beige	white with beige lines		
Fresno	black with coarse weave effect		

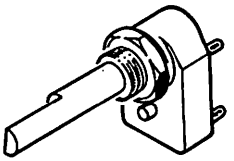
TYGAN

T394	Brown and gold		
T521	Brown, contemporary fawn		
T533	Dull gold, red and beige	Sheets 36" x 27"	£2.20
T569	Predominantly gold, blue weave	Sheets 18" x 27"	£1.20
T615	White, black, beige and gold weave		
T723	Predominant stripes beige, gold and green		
T869	Grey and black		
224	Black, heavy weave		

The descriptions gold and silver above indicate colour, not material composition.

SWITCHES

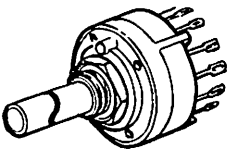
ROTARY MAINS SWITCH Type MS 31p



2" x 0.25" diameter shaft

Contact rating	:	4 amps at 250V a.c.
Current surge	:	80 amps for 0.01 sec.
Contact resistance	:	less than 20mΩ
Insulation resistance	:	Over 50,000MΩ at 500V d.c.
Breakdown voltage	:	Over 4KV rms.

WAVECHANGE SWITCH Type CK 35p



2" x 0.25" diameter shaft, body diameter 1.03"

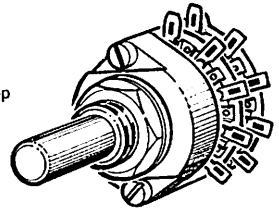
Contact ratings	:	350mA at 110V ac/dc 150mA at 250V ac/dc
Contact resistance	:	less than 10mΩ
Non-switched current	:	5A max continuous.
Proof voltage at STP	:	1KV.

Switching arrangements available:
1 pole 12 way; 2 pole 6 way;
3 pole 4 way; 4 pole 3 way.

All arrangements have one fixed and one adjustable stop.

ROTARY SWITCH KIT Type RA

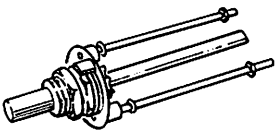
Shafting assemblies and Wafers are supplied separately.



Body diameter	:	1" max.
Spindle	:	0.25" dia. x 2" long, steel
Mounting bush	:	0.375" dia x 32 TPI
Contact details	:	as for type CK above
Indexing	:	30°, one adjustable, one fixed stop
Max. No. of wafers	:	6, close spaced per assembly

RA Shaft assembly		44p
RA Wafer: MBB:	1P 11W; 2P 5W	52p
BBM:	1P 12W; 2P 6W	52p
BBM:	3P 4W; 4P 3W; 6P 2W	52p
MBB:	1P shorting wafer	45p

ROTARY SWITCH KIT (R.S. Min-Maka switch).



Body diameter	:	1" max.
Spindle diameter	:	0.25"
Spindle length	:	13/16" including bush
Mounting bush	:	0.375" x 32 TPI
Max. ratings	:	300V 50mA or 50V 300mA (non-reactive)

Supplied in the following parts:

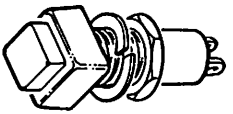
Shafting assembly (one fixed, one adjustable stop)		95p
Min spacers		15p pack of 10
Min screens (inter-wafer)		3p
Min wafers: MBB:	1P 11W; 2P 5W	55p
BBM:	1P 12W; 2P 6W; 3P 4W	55p
	4P 3W; 6P 2W	55p
Min mains switch, ratings 250V a.c. 2A		45p

Switch capacity: 6 wafers or 5 wafers and one min mains switch.

SWITCHES

PUSH BUTTON SWITCHES

STANDARD SIZE



Ratings: 250V a.c. 3A
Panel Bush 0.5" dia with locating lug.
Button in black moulded nylon

Type	SSP10	Single pole Push-on-Push-off	45p
Type	SSP11	Single pole Push to make	55p

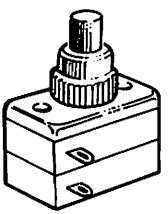
MINIATURE

Ratings: 250V a.c. 0.5A
115V a.c. 1A
28V d.c. 1A

Push button colour: Black phenolic
Bush diameter : 0.25"

Type	8531	Single pole Push to make	39p
Type	8533	Single pole Push to break	39p

CASTELCO

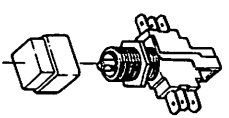


Ratings: 250V a.c. 1A
Panel bush 0.375" dia
Button in white plastic
Front fixing ring, long or short in the following colours:
black, red, yellow, green, blue, white and pink
Long ring for panels up to 2.4mm thick 1p each
Short ring for panels from 6 to 7.6mm thick 1p each
Fibre spacing washers 1.2mm thick available 2 for 1p

One fixing ring is supplied free of charge with each switch.
(Long white ring supplied if no other choice made)

Type	2644	Single pole push to make	13p
Type	3244	Double pole push to make	24p
Type	2648	Single pole push to break	13p
Type	3248	Double pole push to break	24p
Type	2634	Single pole push on push off	13p
Type	3234	Double pole push on push off	24p
Type	4434	As 3234 but sections reversed.	24p
Type	4444	Front make, rear break.	24p

HIGH CURRENT



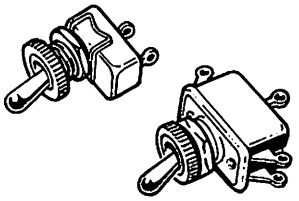
Ratings: 250V a.c. 10A
Terminals 0.25" spade
Mounting bush 0.655"dia., for panel thickness up to 0.7"

Type 42.Push-push double pole double throw £1.05

SWITCHES

TOGGLE SWITCHES

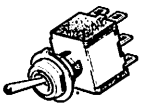
APR STANDARD SIZE



Chrome dolly and milled nut
Ratings: 250V 1.5A a.c. inductive
250V 2.5A a.c. non-inductive

Type 1011C	Single pole single throw	33p
Type 1016C	Single pole double throw	34p
Type 1019C	Single pole double throw, centre off	38p
Type 409	Double pole double throw	40p

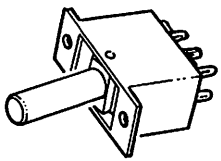
MINIATURE



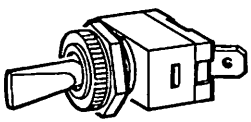
Chrome dolly, hexagon nut.
(Panel dress nut available at 4p extra)
Ratings: 250V a.c. 2A non-inductive
120V a.c. 5A "
28V d.c. 5A "
Bush diameter 0.25"

Type 7101	Single pole double throw	45p
Type 7201	Double pole double throw	60p
Type 7203	Double pole double throw centre off	72p
Type 7205	as 7203, biassed each side	90p
Type 7207	as 7203, biassed one side	90p
Type 7301	Three pole double throw	£1.15
Type 7401	Four pole double throw	£1.44

HIGH CURRENT TYPES

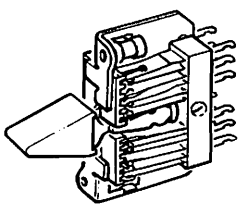


Type 46 Chrome-effect lever
Two-screw fitting
Ratings: 250V 5A a.c. non-inductive
Double pole double throw 39p



Type 475 Black paddle-shaped dolly
Bush diameter 0.475"
Ratings: 250V 10A a.c. non-inductive
110V 20A a.c. non-inductive
Single pole double throw 48p

MINIATURE LEVER KEY SWITCHES (BPO 1000 type)



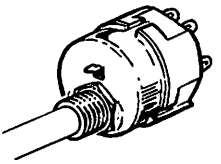
Ratings: d.c.: 0.1A/250V; 0.3A/100V; 1A/12V.
a.c.: 0.3A/250V; 1A/100V.
Contacts: Twin, fine silver.
Connections: solder tag.
Capacitance: spring/spring or spring/frame 2 to 3pF
Insulation: 1000MΩ at 500V d.c.
Maximum packing density: horizontal 0.625"
vertical 1.875"

Type MLK08	4-changeover each direction, non-locking	£1.50
Type MLK10	4-changeover each direction, locking	£1.50

SWITCHES

ROTARY MAINS SWITCH Type EG2

Ratings: 250V a.c. 2A
Bush : 0.375" x 32TPI
Shaft : 2" min x 0.25" dia. 30p



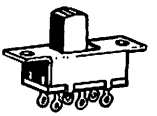
SLIDER SWITCHES

Type MS1

Ratings: 250V a.c. 0.25A non-inductive 12p

Type MS2

Ratings: 250V a.c. 1A non-inductive 17p



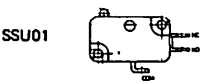
MICROSWITCHES Pin, lever and roller operated.

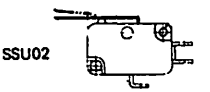
Ratings: 5A 250V a.c.
10A 125V a.c.
Single pole double throw.
Terminals: solder tag.

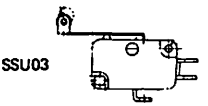
Type SSU01 Operating force 350gm. max. (pin)
Movement differential 0.4mm max. 48p

Type SSU02 Operating force 190gm. max. (lever)
Movement differential 1.2mm max 62p

Type SSU03 Operating force 190gm. max. (roller)
Movement differential 1.2mm max 68p







ROCKER SWITCHES

Type 40

Ratings: 10A 250V a.c. non-inductive
Contacts: Single pole double throw 30p

Type 70

Ratings: 12A 250V a.c. non-inductive
Contacts: Single pole double throw 35p

Type 50

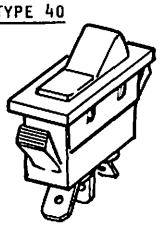
Ratings: 15A 250V a.c. non-inductive
Contacts: Double pole double throw 45p

Type 73

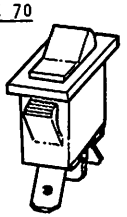
Ratings: 15A 250V a.c. non-inductive
Contacts: Double pole double throw 45p

All rocker switches above have 0.25" spade terminals.
Interference fitting to panel is used.

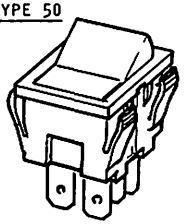
TYPE 40



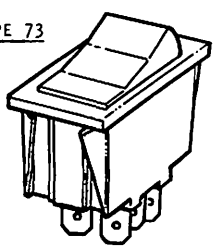
TYPE 70



TYPE 50



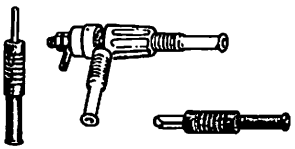
TYPE 73



TERMINALS

INSULATED SCREW TERMINALS 4mm. range. Type TP1 14p each.

Each terminal has 2mm acceptance hole for wire or plug and end hole to accomodate 4mm plug.
Available in colours: black, brown, red, yellow, green, blue, grey or white.
Rating: 15 amp, 250V.
Panel piercing: 7mm dia + keyway 2mm wide.



TERMINAL PLUGS 2mm Type P12 4p each.
4mm Type P14 7p each.

Polypropylene and silver plated brass.
Available in colours as for TP1 terminals above.

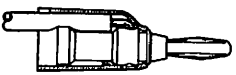
INSULATED SCREW TERMINALS 2mm range. Type 200 14p each.

2mm acceptance holes for wire, side entry or top entry plug.
Available in colours: black, red, green, blue or white
Rating: Screw to wire, 15A
Terminal to plug, 5A
Panel piercing: 7mm dia (5.6mm A/F)

PANEL SOCKETS 2mm Type 800
4mm Type 900

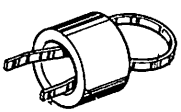
Cadmium plated insert
Rating: 10 amps
Panel piercing: 2mm size, 7mm dia (5.6mm A/F)
4mm size, 8.25mm dia (6.3mm A/F)
Available in colours as for terminal 200 above.

STACKABLE TERMINAL PLUGS 2mm Type1200
4mm Type1080



Solderless connections
Wire size 3.65mm OD max.
Bare for16mm when assembling.
RAting: 2mm, 10A
4mm, 15A
Colours available as for terminal 200 above.

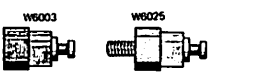
TEST JACKS 2mm. short Type 1100 10p each
long Type 750 8p each
loop Type 2136 4p each



Short and long types silver plated, 5A rating.
Loop type solder dipped
Long type accepts 2mm plug in top or bottom.
All types accept 2mm plug
Mounting holes: 1.3mm (0.052") dia.
Types 1100 and 750 available in colours as for terminal 200 above.
Type 2136 in black only.
Type 2136 is also ideal for mounting "select-on-test" components.

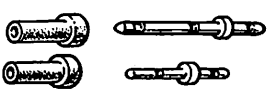
TERMINAL BLOCKS

12 way flexible plastic 2.5 amp 17p
5 amp 17p
15 amp 30p



STAND-OFF TERMINALS 6BA fitting W6003 6p
W6025 6p

Terminal: brass, tinned.



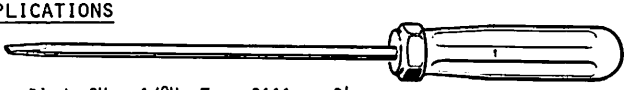
PTFE INSULATED TERMINALS Lead through 12000/31 4.5p
Stand-off 2200/41 4.5p

Supplied as two parts
Assemble bush into 0.156" hole
Force in pin to lock permanently.
Rating: 5 amps

TOOLS

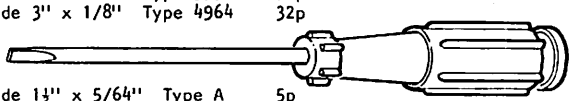
TOOLS FOR ELECTRONIC APPLICATIONS

SCREWDRIVERS Professional



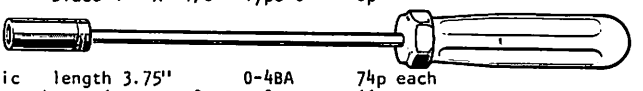
Handle: yellow plastic	Blade 2" x 1/8"	Type 3111	34p
	Blade 4" x 1/8"	Type 3112	37p
	Blade 6" x 3/16"	Type 3123	45p
Crosshead type	Blade 3" x 3/16"	Type 3421	50p
Posidrive No.1	Blade	Type 3521	60p
Posidrive No.2	Blade 3" x 3/16"	Type 3532	70p
Insulated shaft	Blade 3" x 1/8"	Type 4964	32p

SCREWDRIVERS low cost.



Plastic handle	Blade 1½" x 5/64"	Type A	5p
	Blade 2.4" x 1/8"	Type B	5p
	Blade 4" x 1/8"	Type C	6p

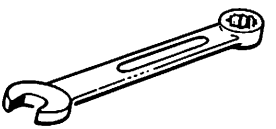
NUT SPINNERS



Handle: yellow plastic length 3.75" 0-4BA 74p each
in: 0, 1, 2, 3, 4, 5, 6, 7 and 8BA 5-8BA 66p each

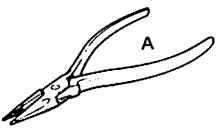
COMBINATION SPANNERS

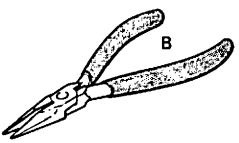
Ring and open-ended spanners
Material: Chrome vanadium in 2, 4, 6BA 57p each

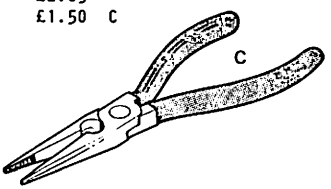


PLIERS

4.5" low cost, light duty	Type 1275	£1.50	A
4.75" professional grade, standard	Type 206P	£2.39	B
4.75" professional grade, long nose	Type 213P	£2.63	
6.5" radio pliers with wire snips	Type 1258	£1.50	C

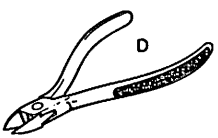


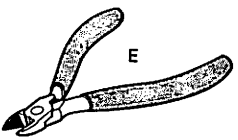


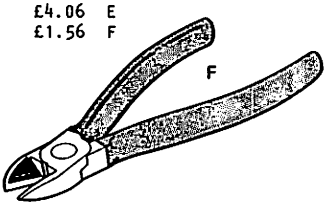


WIRE CUTTERS

4.25" low cost, light duty	Type CK3921	£1.44	D
4.75" professional grade	Type 349MTR	£4.06	E
6.5" electrical grade	Type 1262	£1.56	F



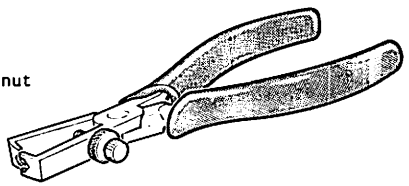




WIRE STRIPPERS

Fully adjustable with set screw and locking nut
Spring loaded, insulated handles

Type 3755 £2.50



TOOLS

Q-MAX CHASSIS CUTTERS

See illustration below.

Supplied complete with Allen Key.

Diameter	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1"sq.	1.1/16"	2"
Allen key	T	A	A	A	A	B	B	B	C
Pilot hole	1/4"			5/16"			3/8"		1/2"
Price	£1.11	£1.22	£1.27	£1.32	£1.38	£1.47	£2.66	£1.47	£3.00

HIGH SPEED TWIST DRILLS

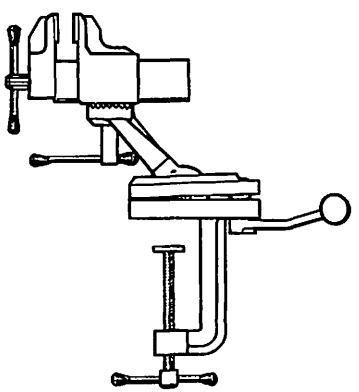
Diameter	1/16"	1/8"	1/4"	5/16"	3/8"	1/2"	1mm	1.3mm
Price	13p	16p	41p	79p	£1.08	£1.87	13p	13p

Drill sizes above 1/4" diameter are supplied with 1/4" shank.

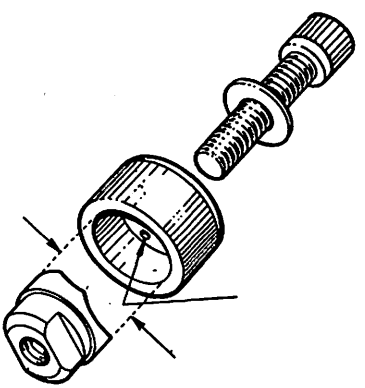
ADJUSTABLE BENCH VICE Model 1B

£15.90NET.

This very well engineered bench vice has two adjustment facilities making it possible to position the vice and work-piece in almost any position.
The vice is equipped with nylon jaw linings enabling the work-piece to be firmly gripped without damage. The jaws open to a maximum distance of 90mm to enable larger components to be held.



Q-MAX CUTTER



TRANSFORMERS

MAINS TRANSFORMERS

ALL PRIMARIES are 0 - 220 - 240V unless otherwise stated.

DOUGLAS MT3/AT £4.65
Sec.: 0 - 12 - 15 - 20 - 24 - 30 volts 2 amps

DOUGLAS MT103/AT £4.10
Sec.: 0 - 19 - 25 - 33 - 40 - 50 volts 1 amp

DOUGLAS MT104/AT £5.50
Sec.: 0 - 19 - 25 - 33 - 40 - 50 volts 2 amps

DOUGLAS MT126/AT £4.40
Sec.: 0 - 24 - 30 - 40 - 48 - 60 volts 1 amp

DOUGLAS MT127/AT £6.00
Sec.: 0 - 24 - 30 - 40 - 48 - 60 volts 2 amps

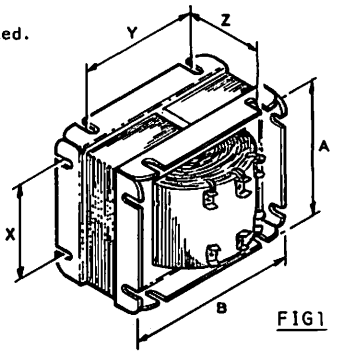


FIG1

ELECTROVALUE 50TS2 £5.35
Sec.: 0 - 25 - 45 - 50 volts 2 amps Pri/sec screen.

ELECTROVALUE 50TS2A £5.60
Pri.: 0 - 110 - 120 volts
Sec.: 0 - 25 - 45 - 50 volts 2 amps Pri/sec screen.

ELECTROVALUE 28T2 £4.60
Sec.: 0 - 12; 0 - 12; 2 - 0 - 2 volts 2 amps

BRAZENNOSE E1-76 £3.95
(As fig 2 but base clamp & fixing holes only)
(Flying leads)
Pri.: 0 - 240 volts
Sec.: 0 - 12 - 15 - 20 - 24 - 30 volts 1 amp

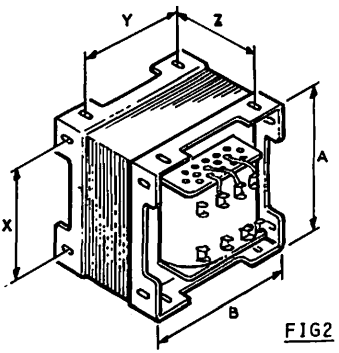


FIG2

ELECTROVALUE 28T05 £3.05
Sec.: 0 - 12; 0 - 12; 2 - 0 - 2 volts 0.5 amps

ELECTROVALUE 28T1 £3.55
Sec.: 0 - 12; 0 - 12; 2 - 0 - 2 volts 1 amp

R.S. COMPONENTS 6T1 £2.30
Pri.: 0 - 210 - 230 - 250 volts
Sec.: 0 - CT - 6.3 volts 1 amp

R.S. COMPONENTS 13T05 £2.30
Pri.: 0 - 210 - 230 - 250 volts
Sec.: 0 - CT - 13 volts 0.5 amp

R.S. COMPONENTS 40T07 £4.20
Pri.: 0 - 205 - 225 - 245 volts
Sec.: 20 - 12 - 0 - 12 - 20 volts 0.7 amps

BRAZENNOSE 151A, fully shrouded, 3FL £2.40
Pri.: 0 - 240 volts
Sec.: 15 - 0 - 15 volts 1 amp

BRAZENNOSE 301A, fully shrouded, 3FL £2.60
Pri.: 0 - 240 volts
Sec.: 30 - 0 - 30 volts 1 amp

GP 909 £1.80
Pri.: 0-240 volts
Sec.: 9 - 0 - 9 volts

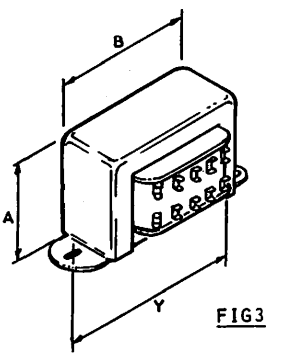


FIG3

Fig 3P with terminal pins.
Fig 3TB with tag board on top.
Fig 3FL with flying leads.

TRANSFORMERS

CHARGER TRANSFORMERS (Voltages are nominal)

Primary : 0 - 240 volts
Secondary: 0 - 9 - 17 volts
Fig. 3P or 3FL as available

Type CT1	Secondary 1 amp.	£1.90
Type CT2	Secondary 2 amps.	£2.50
Type CT4	Secondary 4 amps.	£2.80

FILAMENT TRANSFORMER

Pri.: 0 - 240 volts
Sec.: 0 - 6.3 volts 1.5 amps. £1.65

SUB-MINIATURE MAINS TRANSFORMERS (Brazennose)

Primary: 0 - 230 volts

Type 606/1	Sec.: 6 - 0 - 6 volts 100mA	85p
Type 909/1	Sec.: 9 - 0 - 9 volts 100mA	£1.00
Type 12012/1	Sec.: 12 - 0 - 12 volts 100mA	£1.05

OUTPUT TRANSFORMER (Eagle)

Type LT700 200mW 53p

Primary : 1200Ω centre tapped.
Secondary: 3.2Ω

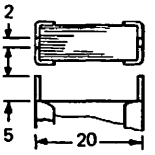
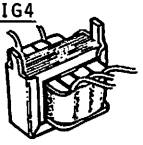


FIG4



TYPE	FIG	A	B	C	X	Y	Z
MT3/AT	1	3.000	3.500	2.87	2.215	2.215	1.500
MT103/AT	1	2.625	3.125	3.00	1.750	2.000	1.500
MT104/AT	1	3.250	3.875	3.75	2.375	2.750	2.125
MT126/AT	1	3.000	3.500	2.75	2.125	2.125	1.500
MT127/AT	1	3.250	3.875	3.75	2.375	2.750	2.125
50TS2	2	3.250	3.875	3.12	2.500	2.500	2.250
50TS2A	2	3.250	3.875	3.12	2.500	2.500	2.250
28T2	2	2.625	3.125	2.85	2.125	2.125	2.000
1-E76	2FL	3.000	2.500	2.90	-	2.000	2.375
28T05	3	1.94	2.318	2.05	-	2.94	-
28T1	3	2.25	2.687	2.42	-	3.25	-
6T1	3	1.58	1.937	1.25	-	2.375	-
13T05	3	1.58	1.937	1.25	-	2.375	-
40T07	3	2.250	2.687	2.31	-	3.250	-
151A	3FL	2.070	2.450	2.34	-	3.000	-
301A	3FL	2.300	2.700	2.38	-	3.150	-
GP909	3TB	1.85	2.135	1.50	-	2.750	-
CT1	3FL	2.00	2.375	2.00	-	2.875	-
CT2	3P	2.625	2.75	2.13	-	3.625	-
CT4	3P	2.625	3.125	2.375	-	3.625	-
FT1	3TB	1.875	2.250	1.625	-	2.500	-
606/1	3FL	1.04	1.16	1.00	-	1.45	-
909/1	3FL	1.25	1.45	1.06	-	1.70	-
12012/1	3FL	1.25	1.45	1.06	-	1.70	-
LT700	4	0.63	0.787	0.59	-	-	-

Dimension 'C' = approximate width across winding including terminals.

WIRE

TINNED COPPER WIRE	16, 18, 20, 22 SWG	200 gm reel	£1.05
	16, 18, 20, 22, 24 SWG	4.oz reel	50p
ENAMELLED COPPER WIRE			
	16, 18, 20, 22 SWG	4.oz reel	50p
	16, 18, 20, 22 SWG	2.oz reel	34p
	24, 26, 28, 30 SWG	2.oz reel	40p
	32, 34 SWG	2.oz reel	46p
	36, 38, 40 SWG	2.oz reel	54p
P.V.C. SLEEVING	0.5mm, 1mm, 2mm bore in red, yellow, green, white		per yd. 2p
LACING CORD	Gauge 5/18	10yd. coil	10p

COPPER WIRE TABLES

SWG	Yd/lb	m/Kg	Ω/1000yd	Ω/Km	copper diameter		enamelled dia.		Amps @ 1000/sq.in.
					inches	m.m.	inches	m.m.	
16	26.5	53.42	7.596	8.307	0.064	1.626	0.0683	1.734	3.217
18	47.0	94.74	13.50	14.76	0.048	1.219	0.0519	1.313	1.810
20	83.2	167.7	24.01	26.26	0.036	0.914	0.0396	1.006	1.018
22	137	276.2	36.69	40.12	0.028	0.711	0.0312	0.729	0.616
24	221	445	64.28	70.30	0.022	0.559	0.0249	0.632	0.380
26	329	663	96.03	105.0	0.018	0.457	0.0207	0.526	0.255
28	486	980	142.0	155.3	0.0148	0.376	0.0171	0.434	0.172
30	689	1389	202.4	221.3	0.0124	0.315	0.0146	0.371	0.120
32	906	1826	266.7	291.7	0.0108	0.274	0.0129	0.328	0.091
34	1246	2512	367.6	411.8	0.0092	0.234	0.0111	0.282	0.066
36	1818	3665	538.7	589.1	0.0076	0.193	0.0093	0.236	0.045
38	2912	5870	864.3	945.2	0.0060	0.152	0.0074	0.188	0.028
40	4521	9114	1350	1477	0.0048	0.122	0.0061	0.155	0.018

Resistance temperature correction factors (1.0000 @ 20°C)

0°C	0.9214	30°C	1.0393	50°C	1.1179	70°C	1.1965	90°C	1.2751
10°C	0.9607	40°C	1.0786	60°C	1.1572	80°C	1.2358	100°C	1.3144

WIRE AND CABLE

CONNECTING WIRE

PVC insulated in 1/0.6, 7/0.1, 7/0.2, 13/0.2 conductor in 5metre coils in any of the following standard colours:-

BLACK, BROWN, RED, ORANGE, YELLOW, GREEN, BLUE, VIOLET, GREY, WHITE, PINK.

24/0.2 is also available in BLACK, RED and GREEN only

1/0.6	10p coil
7/0.1	7p coil
7/0.2	10p coil
13/0.2	15p coil
24/0.2	22p coil

RIBBON CABLE

10 cores of 7/0.2 conductor in sequence of colours black to white — 17p ft.

EXTRA FLEXIBLE CABLE

Suitable for meter leads, 55/0.1 conductor PVCinsulation rated at 2KV rms, 6A
Colours BLACK and RED — 8p yd.

MAINS LEAD (PVC covered)

Flat fig. of 8	13/0.2 white	2 amp	5p yd.
Twin oval	13/0.2 white	2 amp	6p yd.
3-core circular	7/0.2 grey	1 amp	7p yd.
3-core circular	13/0.2 black, white or grey	2 amp	12p yd.
3-core circular	24/0.2 black	6 amp	18p yd.
3-core circular	40/0.2 black	13 amp	24p yd.

SCREENED CABLE (PVC covered)

Single	7/0.1 grey	(lightweight)	8p yd.
Single	7/0.2 grey		6p yd.
Twin	7/0.1 grey	(lightweight)	11p yd.
Stereo	7/0.12 ivory		9p yd.
Stereo	7/0.2 grey		11p yd.
Quad	7/0.12 grey		22p yd.

MICROPHONE CABLE

Single	16/0.2 grey	14p yd.
Twin	16/0.2 grey	26p yd.

LOW NOISE CABLE

Single — 7/0.2 black — 20p yd.

EHT WIRE

Single — 13/0.2 clear polythene — 4p yd.

RF AND TV CABLE

75Ω Coaxial for bands 1, 2, 3. 7/0.25 conductor 9p yd.
1.1dB @ 100MHz, 4dB @ 900MHz per 10m run

75Ω Coaxial for band 5 1/1.12 conductor 15p yd.
0.75dB @ 100MHz, 2.6dB @ 900MHz per 10m run

300Ω twin feeder for bands 2, 5. 7/0.25 conductor 7p yd.
1.68dB @ 1000MHz per 10m run

MISCELLANEOUS PRODUCTS

BATTERIES by Ever-Ready or Mallory

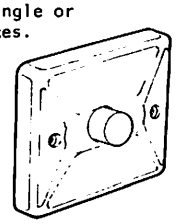
ALKALINE MANGANESE range.

Type No.	Typical life @ 20°C @ load			Height	Dia.	Price NET
MN9100	580mAH	to 0.8V	83Ω	29.0mm	12.0mm	14.5p
MN2400	750mAH	to 0.8V	83Ω	44.5mm	10.5mm	14.5p
MN1500	1800mAH	to 0.8V	50Ω	50.0mm	14.2mm	19p
MN1400	5000mAH	to 0.8V	15Ω	50.0mm	25.4mm	27p
MN1300	10AH	to 0.8V	5Ω	60.4mm	33.2mm	46p

The battery prices above do not include VAT.

LAMP DIMMERS for 200 to 250V a.c. supply. (by LAB-CRAFT)

These Dimmer Switches are light intensity controls which enable incandescent light bulbs to be adjusted instantly to the required level of brightness from very dim to full illumination. They may be switched on and off without disturbing the previous setting of brightness and may be used in single or two-way switched circuits. Mounting is in standard steel plaster boxes. They are not suitable for controlling Fluorescent lighting.



Type DS804 Loading 400 watts at 240V maximum
Single control Price £4.15 NET

Type DS805 Loading 250 watts at 240V maximum per circuit
Twin controls Price £8.25 NET

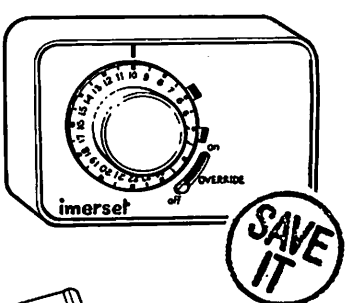
TIME SWITCH for Domestic Immersion Heaters.

Smiths Industries "IMERSET"

Imerset controls your immersion heater by switching it on and off to your requirements.
This means hot water only when you need it and big savings on those electricity bills!

Specification:
24 hour repeater time switch with two variable time periods per day.
240V, 50Hz, 15amp to control 3KW resistive load.
For permanent wiring, either surface or conduit.

Price £9.60 NET



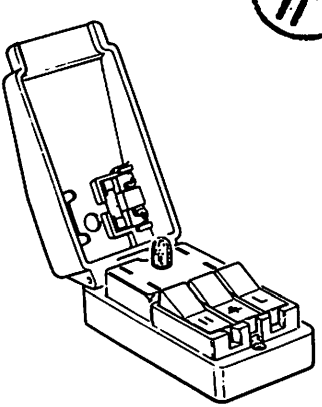
QUICK-TEST (by CLIFF PRODUCTS)

The quick-test is ideal for electrical shops, factories, laboratories and test departments.

*Plugless leads are rapidly connected to mains
*Raised lid cuts current for safety.
*Neon indicates when power is connected.

The OPEN AND SHUT CASE for abolishing dangerous connections

Price £3.95 NET



AMPLIFIER COMPONENT PACKS

MAINLINE 70A component pack

Typical performance data at 25°C and 1KHz.

Power output continuous	: 70 watts
Hum and noise (dB) relative to 70W	
input shorted	: 85
input open	: 80
Sensitivity for full output	: 700mV
Input impedance (at output = 7W)	: 20K.ohms
Intermodulation distortion (%)	:
at 60Hz &7KHz, 4:1, 7W	: 0.1
Recommended load impedance	: 8 ohms

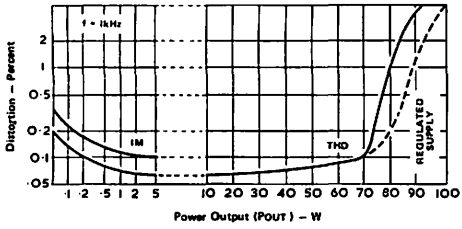
This amplifier provides outstanding performance for the most stringent requirements of manufacturers of high fidelity equipment.

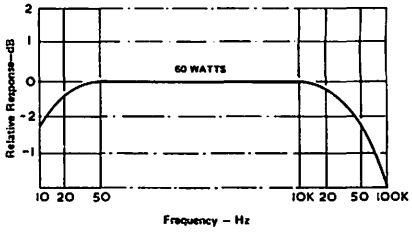
The kits are complete with printed circuit board, resistors, capacitors and heat sink, two kits being necessary for stereo operation.

The circuit is a universal Quasi Complementary Symmetry amplifier, which uses rugged N-P-N Hometaxial base output transistors. The design provides full power to beyond 20KHz.

Short-circuit protection and safe area limiting are one of its main features.

Performance curves Representative of the capability of the Universal Quasi Complementary Symmetry design are these two curves for the 70watt amplifier.





Mainline 70A

Power supply requirements: 42 – 0 – 42 volts
Suitable unregulated power supply kit

Price £12.60 NET
Price £9.75 NET

BAILEY 30-WATT amplifier component packs

Article published in the Wireless World, May 1968 and modified for single rail power supply in an article published November 1968.

Brief specifications:

Output { 30W into 8 ohms / 20W into 15 ohms } at less than 0.1% distortion over the whole audio range.
Input — 1.2 volts into 20K ohms for full output.

SET of transistors including the reprint of Nov. 1968 article giving full circuit diagram:
MJ481 and MJ491 matched pair
40361 and 40362 matched pair
40361, 40362, BC107, BC109, BC125, BC126 —— Set of transistors only £5.25
SRBP printed circuit board and layout diagram —— Price 96p
SET of metal oxide and wire-wound resistors, pre-set, capacitors and capacitor clip —— Price £2.40
POWER SUPPLY components, single rail, unregulated —— Price £7.75
Reprint of 1968 article —— Price 10p(Z)

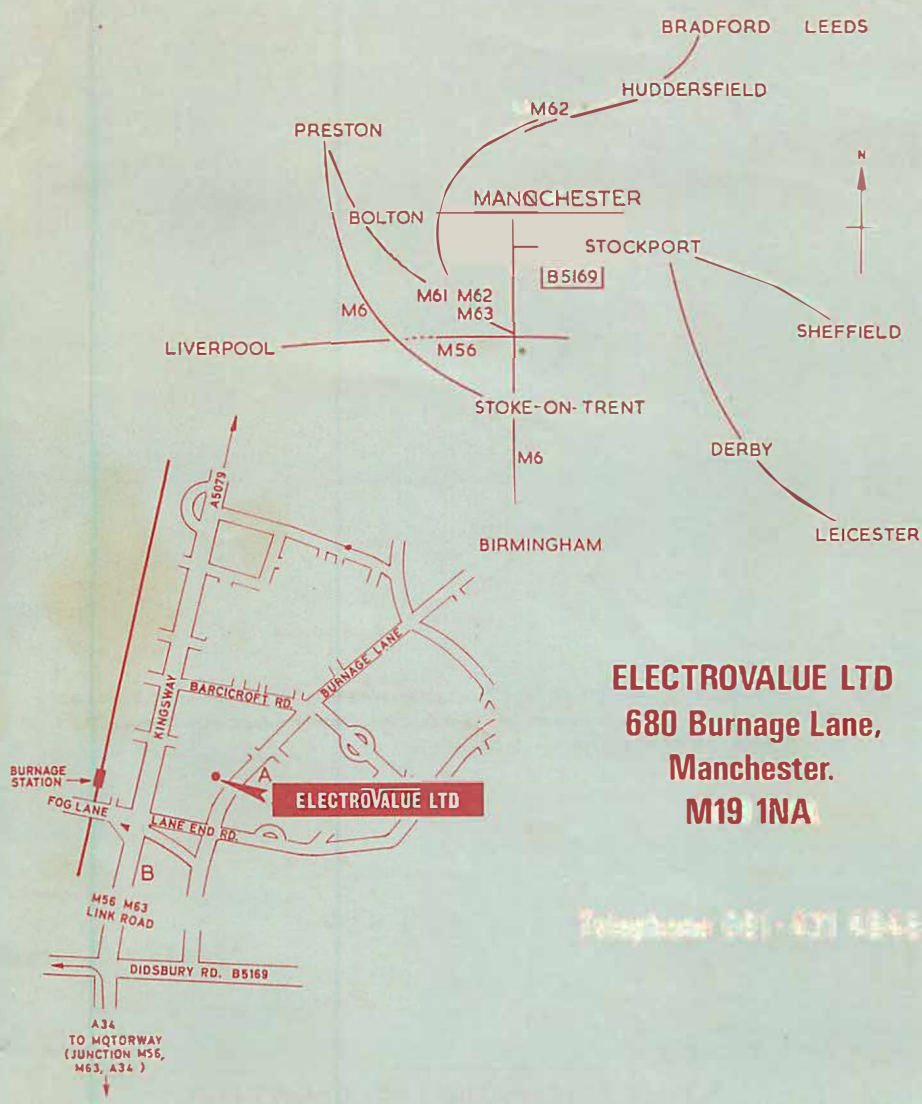
The supplies described above for the MAINLINE and BAILEY amplifiers are designed to supply one power amplifier channel but will supply a stereo pair at reduced maximum output.

(V) = VAT free.

GLOSSARY OF TERMS

A_L	Inductance of a single turn quoted here in nano-henries (10^{-9}H).
Ce	Emitter discharge capacitor (unijunction).
fhfb	Frequency at which the common base current gain is reduced by 3dB.
fT	Frequency at which the common emitter current gain is unity.
hFE	Large signal current gain. (= Ic/Ib).
hfe	Small signal current gain. Equals resultant small change in Ic divided by an initial small change in Ib at constant junction temperature.
Ib	Base current.
Ic	Collector current.
Icbo	Collector-base current with emitter open-circuit.
Icev	Collector-emitter cut-off current with base reverse biassed.
Id	Drain current.
Ie	Emitter current.
If	Forward current
Ig	Gate current.
Igt	Gate current to trigger thyristor.
Ihx	Holding current, i.e. minimum anode current to maintain thyristor in conducting condition.
Ir	Reverse current.
Iz	Zener current.
PIV	Peak inverse voltage (working).
Pt	Maximum total power dissipation at 25°C ambient unless other cooling conditions are stated.
rz	Characteristic impedance of zener at stated test current. Equals resultant small change in Vz divided by initial small change in Iz at constant Tj.
Tj	Junction temperature.
Vcbo	Collector-base voltage with emitter open-circuit.
Vce	Usually Vcer
Vceo	Collector-emitter voltage with base open-circuit.
Vcer	As Vceo but with specified resistance between base and emitter.
Vces	As Vceo but with base shorted to emitter.
Vcev	As Vceo but with base reverse biassed usually by 0.5 to 1 volt.
Vcex	As Vces.
Vds	Drain-source voltage of FET.
Veb	Base-emitter reverse voltage.
Vf	Forward voltage of diode.
Vfm	Maximum limit of "on" voltage of thyristor.
Vgs	Gate-source voltage of FET.
Vgt	Gate voltage of thyristor to trigger.
Vr	Reverse voltage.
Vz	Zener voltage.
yfs	Small signal forward transfer admittance in FET at constant Vds. and Tj.

NORTHERN BRANCH



ELECTROVALUE LTD
680 Burnage Lane,
Manchester.
M19 1NA

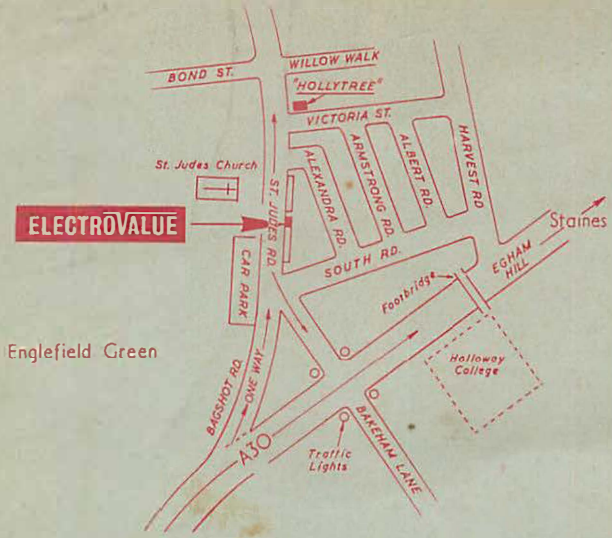
Telephone 061-431 4843

Greater Manchester Transport bus Nos. 169 and 170 from Droylsden Bus Station to West Didsbury, stop at Lane End Rd. (A)

Greater Manchester Transport bus Nos. 95, 96, 130 and 133 from Picadilly Bus Station, to East Didsbury, stop at Fog Lane. (B)

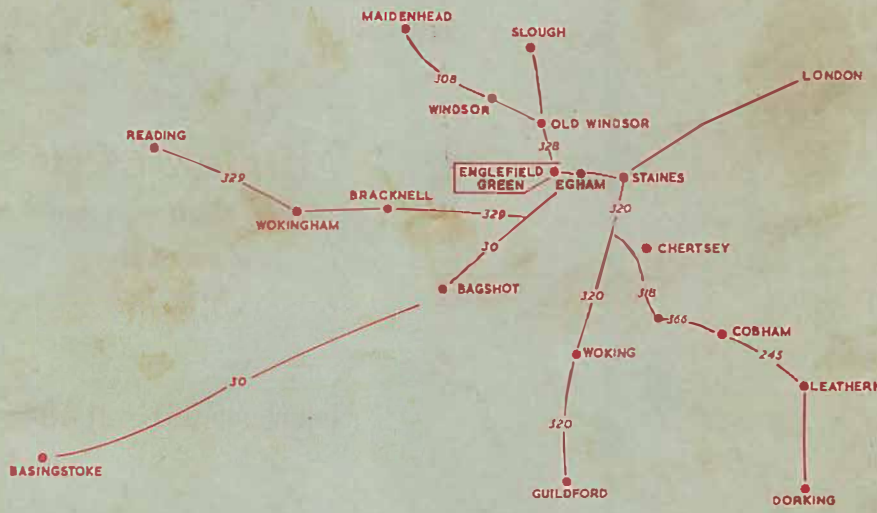
Greater Manchester Transport bus Nos. 29, 50, and 131 from Albert Square to East Didsbury, stop at Fog Lane. (B)

British Railways Train from Picadilly Railway Station, platform 13 and Oxford Road via Burnage Railway Station to Alderley Edge, via Style Line.



L.C. BUS No. 441 FROM STAINES STATION (TO HIGH WYCOMBE VIA WINDSOR & SLOUGH) AND No.441C FROM STAINES TO ENGLEFIELD GREEN. BUS STOPS AT ENGLEFIELD GREEN CHURCH.

L.C. BUS No.725 (GRAVESEND TO WINDSOR) & No.718 (HARLOW TO WINDSOR) BUS STOPS AT THE HOLLYTREE PUBLIC HOUSE.



ELECTROVALUE LIMITED
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EGHAM SURREY