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DEUCE PROGRAMME NEWS - No. 18. January, 1958.
Lists of DEUCE Library Routines.

Report by

R.A.Smith.

SUMMARY.

This report contains complete lists of subroutines and programmes in the DEUCE Library at 31st December, 1957. A few of the most recent routines may not have been completely published (i.e. cards or reports may not have been issued) by the time this report appears in print.

The lists have been prepared on an I.B.M. tabulator at N.R.L. Blackheath so that future lists can be prepared more quickly. This has meant that titles etc. are restricted to alphanumeric characters together with a decimal point and a minus sign. These two symbols occur on alternate type bars on the tabulator and have been used interchangeably in these lists. Titles have been limited to 40 alphanumeric characters so that straight tabulations can, in future, be made of a size which can be filed. This restriction has meant that in a few cases spelling is not 100%. Some titles have been altered slightly from the originals to give more information. It has however been found impossible in a few cases to make the title convey enough information on what the routine does. In these cases it will be necessary to refer to the relevant report.

Up-to-date copies of the punched cards from which these lists have been prepared may be obtained on application.

R.A.Smith.

MATHEMATICS DEPARTMENT.

NW

SUBROUTINE CATEGORIES

A	ARITHMETIC SYSTEMS
B	BLOCK FETCH AND STORE
C	CHECKING-NOT YET USED
D	DIVISION
E	EXPONENTIALS AND LOGARITHMS
F	FRACTIONAL POWERS+SQUARE ROOT ONLY
G	DIFFERENTIAL EQUATIONS
H	
I	NOT USED
J	SPECIAL FUNCTIONS
K	
L	LINEAR ALGEBRA
M	MULTIPLICATION
N	NUMERICAL ANALYSIS
O	NOT USED
P	PUNCH OR OUTPUT
Q	
R	READ OR INPUT
S	POWER SERIES
T	TRIG FUNCTIONS-INCLUDING HYPERBOLIC
U	
V	VECTOR ANALYSIS
W	
X	
Y	
Z	MISCELLANEOUS

KEY

- OR *	REPLACES THE STROKE IN THE ALPHABETICAL CODE NUMBER
USE XXXX	MEANS THAT XXXX IS IN EVERY WAY SUPERIOR
SEE XXXX	MEANS THAT XXXX SHOULD ALSO BE CONSIDERED
SGLE	MEANS SINGLE OR SINGLE LENGTH
DBLE	MEANS DOUBLE OR DOUBLE LENGTH
QUAD	MEANS QUADRUPLE LENGTH
SFB	MEANS STANDARD FLOATING BINARY
ARG	MEANS ARGUMENT
VAL	MEANS VALIDITY
CONCT	MEANS CONCURRENT
FLTG OR F	MEANS FLOATING
C	MEANS COMPLEX
D	MEANS DOUBLE LENGTH ARITHMETIC
H	MEANS HIGHER THAN DBLE LENGTH

USE A13F	58	A01F	FLOATING ADD SUBTRACT MULT AND PREPARE	NSTO051
USE A13F	89	A01F-1	FASTER VERSION OF A01F	NSTO060
USE A14F	89	A02F	A01F WITH DIVIDE	NSTO052
USE A14F	142	A02F-1	FASTER VERSION OF A02F	NSTO138
USE A15F	60	A03F	A02F WITH SQUARE ROOT	NSTO053
USE A15F	143	A03F-1	FASTER VERSION OF A03F	NSTO139
USE A15F	165	A03F-2	A03F-1 WITH FASTER SQUARE ROOT	NSTO152
USE A04FC-1	74	A04FC	FLOATING COMPLEX ADD SUBTRACT AND MULT	NSTO067
	144	A04FC•1	IMPROVED VERSION OF A04FC	NSTO140
USE A05FC-1	75	A05FC	A04FC PLUS MODULUS AND DIVIDE	NSTO068
	145	A05FC•1	FASTER VERSION OF A05FC	NSTO141
USE A06FC-1	76	A06FC	A05FC PLUS SQUARE ROOT	NSTO069
	146	A06FC•1	FASTER VERSION OF A06FC	NSTO142
	92	A07DF	DOUBLE LENGTH FLOATING ADD AND MULTIPLY	NSTO083
	123	A08C	COMPLEX MULT DIV MODULUS AND SQUARE ROOT	NSTO113
	139	A09DF	DOUBLE LENGTH FLOATING ARITHMETIC	NSTO128
	187	A10F	TRIPLE LENGTH FLOATING ARITHMETIC	NSTO172
	191	A11	SEMI FLOATING ARITHMETIC	NSTO175
	192	A11•1	SEMI FLOATING ARITHMETIC INC UNPACK	NSTO176
	221	A12	FIXED POINT ARITHMETIC-30 BP	NSTO201
	222	A12•1	ARITHMETIC-30 BP-INCLUDING SUM SERIES	NSTO201
	236	A13F	FLOATING ADD SUBTRACT MULT AND PREPARE	NSTO212
	237	A14F	A13F WITH DIVIDE	NSTO213
	238	A15F	A14F WITH SQUARE ROOT	NSTO213
	239	A16F	A15F WITH SUM SERIES	NSTO213
	19	B01	FETCH AND STORE AND MODIFY	NSTO014
NOT ISSUED	137	B02	MAGNETIC FETCH AND STORE	
	161	B02•1	MAGNETIC FETCH AND STORE	NSTO126
	181	B03	CONTINUOUS DRUM FETCH	NSTO166
	182	B04	CONTINUOUS DRUM STORE	NSTO167
	199	B05	CONTINUOUS DRUM MODIFY	NSTO182
	200	B06	CONCT CONTINUOUS DRUM FETCH AND STORE	NSTO183
	203	B07	READ TRACKS	NSTO186
SEE B08-1	204	B08	PROGRAM FETCH	NSTO187
SEE B08	224	B08•1	PROGRAM FETCH•FAST	NSTO203
	210	B09	DRUM FETCH AND STORE	NSTO193
	34	D01	DIVISION-WITH NO SHIFT OR ROUND OFF	NSTO026
	45	D02	DIVN-WITH VALIDITY TEST AND ROUND OFF	NSTO036
	53	D03	DIVN-WITH TRUE REMAINDER	NSTO048
	54	D04	DIVN-WITH SHIFT NO ROUND OFF	NSTO046
	55	D05	DIVN-WITH RND OFF AND SHIFT LESS THAN 30	NSTO047
	56	D05•1	D05 WITH SHIFT OF 30	NSTO047
	85	D06	DIVN-WITH SHIFT AND ROUND OFF•NO VAL TST	NSTO077
	107	D07D	DIVN-QUAD BY DOUBLE GIVING DOUBLE LENGTH	NSTO090
	50	D08	DIVN-DBLE BY SGLE LNTH-NO VAL TEST-SLOW	NSTO042
	51	D09	DIVN-DBLE BY SGLE LNTH-NO VAL TEST•FAST	NSTO043
	49	D10	DIVN-DBLE BY SGLE LNTH-VALIDITY TST•SLOW	NSTO041
	35	D11	DIVN-WITH ROUND OFF BUT NO SHIFT	NSTO027
	42	D11•1	DIVISION-ROUNDED TO NEAREST P1-NO SHIFT	NSTO032
	66	D12D	DOUBLE LENGTH SIGNED DIVISION	NSTO089
	68	D13	DIVN-TRIPLE BY DBLE GIVING SINGLE LENGTH	NSTO061
	88	D14	DIVN-SINGLE LENGTH-PROGRAMMED	NSTO079
	95	D15D	ADJUSTABLE DOUBLE LENGTH DIVISION	NSTO086
	116	D16H	LONG POSITIVE DIVISION	NSTO106
	118	D17	DIVN-SHIFT AND RND OFF-DIVISOR UNLIMITED	NSTO108
	150	D18	MOD OF D17 WITH VARIABLE SHIFT	NSTO134
	61	E01	NATURAL LOGARITHM	NSTO084
	77	E02F	EXP X OR 2 TO THE POWER X IN SFB	NSTO070
SEE E04	79	E03	EXPONENTIAL FUNCTIONS USING S06	NSTO072
SEE E03	80	E04	EXPONENTIAL FUNCTIONS USING S05	NSTO073
SEE E05F•1	94	E05F	EXP X IN SFB GIVEN X IN SFB	NSTO085
SEE E05F	235	E05F-1	IMPROVED VERSION OF E05F	NSTO202
SEE E07	99	E06	LOG OF PSEUDO FLOATING NUMBER•SLOW	NSTO090
SEE E06	100	E07	LOG OF PSEUDO FLOATING NUMBER•FAST	NSTO091
	156	E08F	A TO THE POWER B IN SFB	NSTO146
	174	E09	EXP X	NSTO160
USE E10F•1	185	E10F	FLOATING NATURAL LOGARITHM	NSTO170
	209	E10F-1	FLOATING LOGARITHM-IMPROVED E10F	NSTO192
SEE F04	20	F01	SQUARE ROOT•VARIABLE SHIFT	NSTO018
	43	F02	SQUARE ROOT•DOUBLE GIVING SINGLE LENGTH	NSTO034
	67	F03D	SQUARE ROOT•DOUBLE GIVING DOUBLE LENGTH	NSTO060
SEE F01	135	F04	SQUARE ROOT•NUMBER OF BP UP TO 30•FAST	NSTO125
SEE F01	136	F04•1	SQUARE ROOT•NUMBER OF BP UP TO 31•FAST	NSTO125
	39	G01	SECOND ORDER RUNGE KUTTA	NSTO029
	57	G02	RUNGE KUTTA	NSTO050
	151	G03F	FLTG 2ND ORDER RUNGE KUTTA-UP TO 8 EQNS	NSTO135
	154	G03F-1	FLTG 2ND ORDER RUNGE KUTTA-UP TO 14 EQNS	NSTO138
	157	G04	RUNGE KUTTA•BOULTONS METHOD	NSTO145
	159	G05	CYLINDRICAL EQUATIONS	NSTO147
	96	J01F	WEIGHTED MOMENTS	NSTO087
SEE J03	122	J02	BESSEL FUNCTIONS OF 1ST KIND-J0 J1 I0 I1	NSTO112
SEE J12	155	J03	BESSEL FUNCTIONS OF 1ST KIND-J0 AND J1	NSTO143
	156	J04	FUNCTIONS OF BESSEL FUNCTIONS	NSTO144
	162	J05	BESSEL FN OF 1ST KIND AS AN INTEGRAL	NSTO149
SEE J02	166	J06F	BESSEL FUNCTION OF FIRST KIND•I0	NSTO153
SEE J02	167	J06F-1	BESSEL FUNCTION OF FIRST KIND•I1	NSTO153
	168	J07	BESSEL FUNCTIONS-K0 AND K1	NSTO154
	169	J08F	BESSEL FN K1 AS AN INTEGRAL	NSTO155
	170	J09F	BESSEL FN I1 AS AN INTEGRAL	NSTO156
	183	J10F	RATIOS OF BESSEL FUNCTIONS	NSTO168
	184	J11F	1ST ROOT OF TRANSCENDENTAL BESSEL EQTN	NSTO169
SEE J03	193	J12	BESSEL FUNCTIONS J0 AND J1	NSTO176
	198	J13F	FUNCTIONS OF BESSEL FUNCTIONS	NSTO181
	201	J14	ERROR FUNCTION	NSTO184
	215	J15	COMPLETE ELLIPTIC INTEGRAL	NSTO196
	216	J16	JACOBIAN ELLIPTIC FUNCTION	NSTO197

	97	LO1F	SCALAR MULTIPLIED BY VECTOR•FLOATING	NST0088
	98	LO2F	VECTOR ADD SUBTRACT OR DIRECT PRODUCT	NST0089
	106	LO3	UNFLOAT A VECTOR	NST0097
	138	LO4	ANCHOR A FLOATING VECTOR	NST0127
USE M01-1	2	M01	MULT-WITH NO SHIFT OR ROUND OFF	NST0002
	26	M01•1	MULT-FASTER THAN M01	NST0021
	3	M02	MULT-WITH ROUND OFF BUT NO SHIFT	NST0002
	4	M03	MULT-WITH SHIFT BUT NO ROUND OFF	NST0002
USE M04-1	5	M04	MULT-WITH SHIFT AND ROUND OFF	NST0002
	64	M04•1	FASTER VERSION OF M04	NST0057
SEE M05-1	6	M05	COMBINED M01 TO M04 WITH PARAMETERS	NST0003
SEE M05-2	7	M05•1	M05 WITH PARAMETER IN D8 21	NST0003
	8	M05•2	WITH PARAMETER IN T8 15	NST0003
	9	M06H	MULT-SNGLE BY DBLE GIVING TRIPLE LENGTH	NST0004
	73	M08H	MULT-SINGLE BY N-LENGTH GIVING N-LENGTH	NST0066
	72	M09H	MULT-SGLE BY N-LENGTH GIVG N PLUS 1 LNTH	NST0065
	36	M10D	MULT-DBLE BY DBLE GIVING DOUBLE LENGTH	NST0033
	11	M11C	MULT OF TWO COMPLEX NUMBERS	NST0006
SEE A12	197	M12•1	MULT-30BP•IMPROVED M12	NST0180
USE M12-1	14	M12	MULT-30BP	NST0009
	70	M13H	MULT-DOUBLE BY DOUBLE GIVING QUAD LENGTH	NST0063
	115	M14H	LONG POSITIVE MULTIPLICATION	NST0105
	121	M15	MULT-AS USED BY S10 AND TOP	NST0111
	134	M16C	COMPLEX MULTIPLICATION-30BP	NST0124
	163	M17D	MULT-DBLE BY SGLE GIVING DBLE•SHIFT OF 2	NST0150
	126	N01	INTERPOLATION•AITKENS METHOD	NST0116
	141	N02F	INTEGRATION•SIMPSONS RULE	NST0130
SEE P01-1	12	P01	PUNCH 1 SIGNED DEC NUMBER	NST0007
SEE P01	133	P01•1	PUNCH 1 TEN•DIGIT INTEGER	NST0123
SEE P02-1	13	P02	PUNCH 2 SIGNED DEC NUMBERS	NST0008
SEE P02	91	P02•1	P02 WITH ONE INSTRUCTION LESS	NST0082
SEE P03-1	22	P03	PUNCH 3 N•DIGIT NUMBERS	NST0017
SEE P03	177	P03•1	SCALE AND PUNCH 3 SIGNED 5-DIGIT NUMBERS	NST0162
SEE P04-1	23	P04	PUNCH 4 N•DIGIT NUMBERS•N UP TO 6	NST0018
SEE P04-2	109	P04•1	PUNCH 4 N•DIGIT NUMBERS•N UP TO 7	NST0100
	173	P04•2	SCALE AND PUNCH 4 FIVE-DIGIT DEC NOS	NST0159
	37	P05	PUNCH 8 POSITIVE FOUR DIGIT NUMBERS	NST0048
	21	P06D	PUNCH 1 DOUBLE LENGTH DEC NUMBER	NST0016
	35	P08	PUNCH SEMI-FLOATING DECIMAL	NST0038
	38	P09	PUNCH 8 SIGNED FOUR DIGIT NUMBERS	NST0049
SEE P10F•2	78	P10F	PUNCH FLOATING DEC GIVEN SFB	NST0071
USE P10F•2	86	P10F-1	MORE ACCURATE VERSION OF P10F	NST0071
	220	P10F-2	PUNCH STANDARD FLOATING DEC GIVEN S F B	NST0200
USE P11D•1	101	P11D	PUNCH DOUBLE LENGTH DECIMAL NUMBER	NST0092
	148	P11D-1	PUNCH DOUBLE LENGTH DECIMAL NUMBER-FAST	NST0138
	102	P12DF	PUNCH DOUBLE LENGTH SFB AS 16 DIGIT DEC	NST0093
USE P13F•3	111	P13F	PUNCH FLOATING NUMBER IN FLOATING FIELD	NST0102
USE P13F•3	112	P13F-1	P13F WITH CONTINUOUS PUNCHING	NST0103
SEE P13F•3	117	P13F-2	PUNCH FLOATING VECTOR IN FLOATING FIELD	NST0107
	202	P13F-3	P13F-1 AMENDED TO GIVE CORRECT ROUND OFF	NST0189
	130	P14	GENERAL PUNCH ROUTINE	NST0120
	132	P15D	PUNCH DOUBLE LENGTH NUMBER-19 DEC DIGITS	NST0122
	147	P16	PUNCH ONE TO THREE INTEGERS	NST0131
	225	P17	PUNCH 5 NUMBERS PER CARD	NST0204
	229	P18T	PUNCH 6 NINE-DIGIT NUMBERS	NST0208
	230	P19T	PUNCH 8 EIGHT•DIGIT NUMBERS	NST0209
	223	P20	PUNCH ALPHANUMERIC COLUMNS FROM 5BIT BIN	NST0213
SEE R01-1	27	R01	READ 1 SIGNED DEC N•DIGIT NUMBER	NST0022
SEE R01-2	64	R01•1	READ ONE DECIMAL NUMBER	NST0076
SEE R01-5	127	R01•2	READ AND SCALE ONE NUMBER	NST0117
	228	R01•5	READ ONE DECIMAL FRACTION	NST0207
SEE R02-1	93	R02	READ 2 NINE•DIGIT DECIMAL NUMBERS	NST0084
SEE R02	171	R02•1	READ AND SCALE 2 NINE•DIGIT SIGNED NOS	NST0157
SEE R03-1	48	R03	READ 3 SIGNED NINE-DIGIT NUMBERS	NST0040
SEE R03	108	R03•1	READ AND SCALE 3 NINE•DIGIT NUMBERS	NST0099
SEE R04-2	105	R04	READ 4 SIGNED FIVE-DIGIT DEC NUMBERS	NST0096
USE R04-2	172	R04•1	READ AND SCALE 4 FIVE•DIGIT SIGNED NOS	NST0158
SEE R04	189	R04•2	IMPROVED VERSION OF R04•1	NST0173
	17	R05	READ 8 POSITIVE 4 DIGIT DEC NUMBERS	NST0012
	47	R06	READ 1 DOUBLE LENGTH SIGNED NUMBER	NST0039
USE R07-2	26	R07	READ 8 SIGNED FOUR-DIGIT NUMBERS	NST0023
USE R07-2	129	R07•1	READ 8 SIGNED FOUR-DIGIT NUMBERS	NST0119
	211	R07•2	READ 8 SIGNED FOUR-DIGIT NUMBERS	NST0194
	18	R08	READ A DECIMAL NUMBER FROM ID	NST0013
	52	R09	READ 6 GROUPS STERLING OR DECIMAL	NST0044
	62	R10	READ 1 10•DIGIT AND 2 4•DIGIT NUMBERS	NST0055
	69	R11	READ 1 18-DIGIT NUMBER	NST0062
	103	R12	READ 10 THREE•DIGIT SIGNED DEC NUMBERS	NST0094
	149	R13	GENERAL DECIMAL READ	NST0133
	160	R14	READ 16 TWO•DIGIT NUMBERS	NST0148
SEE R15-1	175	R15	READ 6 FIVE•DIGIT POSITIVE NUMBERS	NST0161
SEE R15-2	176	R15•1	READ 6 FIVE•DIGIT NUMBERS AND UNPACK	NST0161
	207	R15•2	READ 6 FIVE•DIGIT SIGNED NUMBERS	NST0190
	178	R16	READ 32 COLS PUNCHED 0 TO 19 TO 5BIT BIN	NST0163
	179	R16•1	READ 32 DEC COLUMNS TO 4BIT BINARY	NST0164
	180	R16•2	READ 32 COLS PUNCHD 0 TO 9 TO 5 BIT BIN	NST0165
	194	R16•5	READS UP TO 32 ALPHANUMERICAL COLUMNS	NST0177
	186	R17	READ 4 THREE-DIGIT AND 4 FIVE•DIGIT NOS	NST0171
USE R18-1	190	R18	READ 4 SEVEN-DIGIT NUMBERS	NST0174
	217	R18•1	READ 4 SEVEN-DIGIT SIGNED NUMBERS	NST0196
SEE R22F	205	R19F	READS FLOATING DEC AND CONVERTS TO SFB	NST0186
	208	R20	READ 8 SIX-DIGIT SIGNED NUMBERS	NST0191
	231	R21T	READ 6 NINE•DIGIT SIGNED DEC NUMBERS	NST0210
SEE R19F	216	R22F	READ FLOATING DECIMAL•4 PER CARD-TO DLS	NST0199
SEE R19F	219	R22F-1	READ FLOATING DECIMAL•4 PER CARD-TO DRUM	NST0199
SEE R23T•1	232	R23T	READ 16 FOUR-DIGIT POSITIVE NUMBERS	NST0211
SEE R23T	233	R23T-1	READ 16 FOUR-DIGIT SIGNED NUMBERS	NST0211
USE S01-1	10	S01	SUM SERIES-UP TO 32 TERMS	NST0005

				NST0088 (N5y85)
	65	S01•1	SUM POWER SERIES	NST0001
USE S02-1	1	S02	FAST SUM SERIES•UP TO 32 TERMS	NST0078
	83	S02•1	IMPROVED VERSION OF S02	NST0038
	44	S03D	DOUBLE LENGTH SUM SERIES	NST0019
	24	S04	SUM DOUBLE SERIES	NST0020
	25	S05	SUM SERIES-S05P•FIRST ORDER	NST0010
SEE S06	15	S06	SUM SERIES-S05P•USES N12	NST0011
SEE S05	16	S07	EVALUATE POLYNOMIAL AND DERIVATIVES	NST0086
	63	S09	SUM CHEBYSHEV SERIES	
USE S09-2	168	S09•1	IMPROVED VERSION OF S09	NST0189
USE S09-2	206	S09•2	SUM CHEBYSHEV SERIES-IMPROVED S09•1	NST0110
	120	S10	SUM SERIES-AS USED BY T09	NST0191
	164	S11D	SUM SERIES-DOUBLE LENGTH COEFFS	
SEE T01-2	29	T01	SIN OR COS-ARG IN RIGHT ANGLES-3RD ORDER	NST0024
SEE T01-2	30	T01•1	T01 WITH BUILT IN COEFFS	NST0024
	199	T01•2	T01•1 BUT 1ST ORDER FAST	NST0178
SEE T02-1	31	T02	SAME AS T01 BUT 2ND ORDER•USES S05	NST0029
	32	T02•1	T02 WITH BUILT IN COEFFICIENTS	NST0028
SEE T03-1	61	T03	SIN X OR COS X-SLOW	NST0074
	62	T03•1	T03 WITH COEFFS PUNCHED	NST0074
	40	T04	INVERSE SINE AND COSINE	NST0030
USE T05-2	41	T05	INVERSE TANGENT	NST0031
USE T05-2	110	T05•1	IMPROVED VERSION OF T05	NST0101
	140	T05•2	CORRECTED VERSION OF T05-1	NST0129
	71	T06	SIN OR COS-3RD ORDER-FAST	NST0064
	113	T07	COSH X	NST0103
	114	T08	SINH X	NST0104
	119	T09	[illegible] AND COSINE•20 BP	NST0109
	125	T10	[illegible] Y AND COS Y FROM TAN Y	NST0115
	126	T11	[illegible]SE SINH AND COSH	NST0116
USE V01-1	153	V01	THREE DIMENSIONAL VECTOR ALGEBRA	NST0137
	196	V01•1	IMPROVED VERSION OF V01	NST0179
	46	Z01	NUMBER DISPLAY	NST0037
	87	Z02	ROTATE DISPLAY	NST0078
	90	Z03	MODIFY DRUM INSTRUCTION	NST0081
	104	Z04	FLOATING DECIMAL TO FLOATING BINARY	NST0095
	124	Z05	EVALUATE DIRECTION COSINES AND MODULUS	NST0114
	131	Z06	ROTATION MATRIX	NST0121
	192	Z07	RANDOM NUMBER GENERATOR	NST0136
	226	Z08	FORM SCALING FACTOR•SIN•DEC	NST0205
	227	Z09	FORM SCALING FACTOR•DEC•SIN	NST0206

PROGRAM CATEGORIES

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A     AIRCRAFT ENGINEERING
  F     FLUTTER
B
C     COMMERCIAL
  P     PAYROLL
  W     WORKS ACCOUNTS
D     DATA REDUCTION-NOT YET USED
E     ENGINEERING-OTHER THAN AIRCRAFT
F     FUNCTIONS
  C     COMPLEX
  F     ELLIPTIC INTEGRALS
  P     POLYNOMIALS
G     DIFFERENTIAL EQUATIONS
  E     ELLIPTIC
  H     HYPERBOLIC
  L     LINEAR
  P     PARABOLIC
  Z     MISCELLANEOUS
L     LINEAR ALGEBRA
  A     DIAGONAL PRE-MULT
  B     BACK SUBSTITUTION
  C     CHECKING
  D     DIAGONAL POST-MULT
  E     SOLUTION OF EQUATIONS
  F     FORM COLUMN SUMS
  G     FORM GRAND SUM
  H     MATRIX ADDITION
  J     REDUCTION OF EQUATIONS
  K     CONVERSION-BIN-DEC OR DEC-BIN
  L     LATENT ROOTS
  M     MULTIPLICATION
  N     NORMALISATION
  P     PUNCH
  Q     DETERMINANTS
  R     READ
  S     SCALAR MULT
  T     TRANSPOSITION
  U     RESIDUALS
  V     INVERSION
  W     MATRIX SUBTRACTION
  X
  Y
  Z     MISCELLANEOUS
N     NUMERICAL METHODS-NOT YET USED
R     ROOTS OF EQUATIONS
  P     POLYNOMIALS
S     SCIENTIFIC CALCULATIONS
  H     HARMONIC ANALYSIS
T     TEST PROGRAMMES
  A     ARITHMETIC
  C     CONTROL
  H     HOLLERITH
  M     MAGNETICS
  S     STORE
X     STATISTICS
  A     ANALYSIS
  C     CORRELATION
  M     MOMENTS
  R     REGRESSION
  S     STOCHASTIC PROCESSES
  T     TABULATION
Z     MISCELLANEOUS
  C     CONTROL
  P     AIDS TO PROGRAMMERS
  T     TRANSFORMATIONS
  V     VISITORS-DEMONSTRATION PROGRAMMES
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KEY

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- OR -        REPLACES THE STROKE IN THE
              ALPHABETICAL CODE NUMBER
USE XXXX      MEANS THAT XXXX IS IN EVERY
              WAY SUPERIOR
SEE XXXX      MEANS THAT XXXX SHOULD ALSO
              BE CONSIDERED
SFD           MEANS STANDARD FLOATING DECIMAL
INVN          MEANS INVERSION
SIG           MEANS SIGNIFICANT
FN            MEANS FUNCTION
1             FOLLOWING NST NUMBER MEANS FLOW
              DIAGRAMS ARE IN REPORT NST 1174
2             FOLLOWING NST NUMBER MEANS FLOW
              DIAGRAMS ARE IN REPORT NST 1200


NST1174       AND 1200 CONTAIN FLOW DIAGRAMS
              OF MISCELLANEUS SCHEME B BRICKS
FULL DETAILS OF GIP AND SCHEME B ETC CAN
              BE FOUND IN DEUCE NEWS 10
NOTES ON ZP   PROGRAMS CAN BE FOUND IN
              DEUCE NEWS NUMBER 16
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	42	AF01	FLUTTER•16 DEGREES OF FREEDOM		
	14	CP01	STAFFORD WORKS PAYROLL-PAY	NST1006	
	15	CP02	STAFORD WORKS PAYROLL•TAX AND PUNCH COIN	NST1006	
	24	CW01	FACTORY OVERHEAD DISTRIBUTION	NST1013	
	339	FC01	COMPLEX RATIONAL FN•FREQUENCY RESPONSE	NST1192	
	814	FE01	ELLIPTIC INTEGRALS	NST1121	
	48	FP01	COMPUTE AND PUNCH OUT COEFFS OF POLYNML		
	58	FP02	SUM A SERIES	NST1032	
	95	FP03	CURVE FITTING•NON DRUM VERSION		
	96	FP04	CURVE FITTING•HALF DRUM VERSION		
	99	FP05	FORM POWER SERIES FROM FACTORS	NST1067	
	215	FP06	ECONOMISE SERIES	NST1122	
	243	FP07	CHEBYSHEV COEFFS OF TABULATED FUNCTIONS	NST1145	
	367	FP08	EVALUATION OF A POLYNOMIAL	NST1212	
	368	FP09	SUM CHEBYSHEV SERIES	NST1213	
	134	GL01	LINEAR DIFFERENTIAL EQUATIONS		
	135	GL02	LINEAR DIFFERENTIAL EQNS-VARIABLE COEFFS		
	310	GL03B	TWO STAGE RUNGE KUTTA	NST1173	
	353	GL04	SCHEME B MATRIX TO FOX-GOODWIN MATRIX	NST1074	
	122	LA01A	DIAGONAL PRE-MULT	NST1089	
	139	LA02B	DIAGONAL PRE-MULT	NST1200	
	150	LB01Z	LIN EQNS-N PLUS R UP TO 95-BIN OUTPUT		
	166	LB02Z	BACK SUB AND PUNCH-INVERSION		
	170	LB03Z	BACK SUB AND STORE IN SCHEME A FORM		
	171	LB04B	BACK SUB AND STORE IN SCHEME B FORM		
	251	LB04B•1	BACK SUB ETC-CAN BE USED FROM READER		
	46	LC01	CHECK 3 PER CARD PUNCHING•FOR LIN EQNS	NST1021	
	149	LC02Z	LIN EQNS-N PLUS R UP TO 95-CHECK STORE		
	160	LC03A	CHECK MATRIX STORE	NST1138	
	167	LC04Z	CHECK STORE•INVERSION		
	252	LC04Z•1	CHECK STORE•INVN-CAN BE USED FROM READER		
	248	LC05A	CHECK DIAGONAL STORE	NST1149	
	397	LC06B	CHECK GRAND SUM OF MATRIX A	NST1222	
	125	LD01A	DIAGONAL POST MULT	NST1092	
	140	LD02B	DIAGONAL POST MULT	NST1200	
	12	LE01	SIMULTANEOUS EQUATIONS-UP TO 14	NST1005	
	26	LE02	SIMULT EQUTNS•N PLUS M LESS THAN 31	NST1015	
	222	LE03	CHOLESKI PROGRAMME	NST1139	
USE LE06	146	LE04	LINEAR EQUATIONS-N PLUS R LESS THAN 95		
USE LE06	236	LE04-1	LINEAR EQUATIONS-N PLUS R UP TO 95		
	300	LE05	DOUBLE LENGTH EQTNS•N PLUS R UP TO 31		
	352	LE06	LINEAR EQUATIONS-FAST•N PLUS R UP TO 95	NST1207	
	127	LF01A	FORM COLUMN SUMS	NST1094	
	317	LF01A•1	FORM COL SUMS•SLOW-ANY N	NST1200	
	238	LF02A	PUNCH COLUMN SUMS	NST1146	2
	303	LG01	FORM GRAND SUM OF A MATRIX	NST1113	
USE LH018-3	76	LH01B	MATRIX ADDITION	NST1051	1
USE LH018-3	275	LH018•1	MATRIX ADDITION•7 DLS	NST1200	
USE LH018-3	332	LH018•2	MATRIX ADD-CAN BE USED FROM READER		
	371	LH018•3	MATRIX ADD	NST1216	
	136	LH02B	ADD I TO MATRIX	NST1115	
	187	LH03A	MATRIX ADD	NST1069	
	165	LJ01Z	REDUCE-INVERSION		
	249	LJ01Z•1	REDUCE-INVERSION-CAN BE USED FROM READER		
	168	LJ02Z	LIN EQNS-N PLUS R UP TO 95-REDUCE		
	169	LJ03Z	PREPARE FOR REDUCE		
	169	LJ04B	PREPARE FOR REDUCE		
	250	LJ04B•1	PREP FOR REDUCE•CAN BE USED FROM READER		
	290	LJ05B	PREPARE FOR REDUCE-LINEAR EQUATIONS	NST1159	
	11	LK01	DEC•BIN CONVERSION •3 PER CARD	NST1004	
	60	LK02	CONVERT A DOUBLE LENGTH VECTOR TO SFB	NST1034	
	97	LK03	BINARY-DECIMAL-NON MAGNETICS	NST1218	
	133	LK04	DEC•BIN CONVERSION WITH SCALING		
	131	LK05	10-4-4 DEC-BIN-ROW SUMS AS FOR R06	NST1098	
	132	LK05-1	10-4-4 DEC-BIN-ROW SUMS 10-4-4	NST1098	
	106	LK06	BIN•DEC OF MATRIX•9•3•3 WITH SCALING	NST1073	2
	204	LK07	BINARY-DECIMAL-3 PER CARD		
	228	LK08	DEC•BIN•ONLY NON ZEROS PUNCHED		
	273	LK08-1	DEC•BIN•NON ZEROS ONLY-MOST SIG DGIT P30	NST1153	
	274	LK08-2	DEC•BIN•NON ZEROS ONLY-MOST SIG DGIT P31	NST1153	
	267	LK09	BIN•DEC 3 PER CARD-FOR MATRIX ALGEBRA		
	268	LK09-1	BIN•DEC 3 PER CARD-GENERAL		
	288	LK09-2	BIN•DEC 3 PER CARD	NST1166	
	269	LK10	BIN•DEC 4 PER CARD-FOR MATRIX ALGEBRA		
	270	LK10-1	BIN•DEC 4 PER CARD-GENERAL		
	278	LK10-2	BIN•DEC 4 PER CARD-B EQUAL TO 7		
	31	LL01	LATENT ROOTS PARTS 1 AND 2	NST1019	
	32	LL02	LATENT ROOTS PART 3	NST1019	
	107	LL03	COMPLEX LATENT ROOTS		
	308	LL03-1	COMPLEX LATENT ROOTS		
	172	LL04Z	LATENT ROOTS-ITERATE-N UP TO 32	NST1200	
	173	LL05Z	LATENT ROOTS-PUNCH LAMBDA N AND K		
	174	LL06Z	LATENT ROOTS-REMOVE ROOTS	NST1200	
	175	LL07Z	LATENT ROOTS-SPEED CONVERGENCE-AITKEN	NST1200	
	176	LL08Z	LATENT ROOTS-STORE AWAY VECTOR	NST1200	
	177	LL09Z	LATENT ROOTS-READ IN GOOD GUESS	NST1200	
	178	LL10Z	LATENT ROOTS-ITERATE ONCE ONLY	NST1200	

	178 LL11Z	LATENT ROOTS-PUNCH UNNORMALISED VECTOR	NST1200	
	247 LL18Z	LATENT ROOTS-N UP TO 32+BACK SUB		
	248 LL19Z	LATENT ROOTS-N UP TO 32+PUNCH ROOTS		
USE LL14Z-1	293 LL14Z	LATENT ROOTS-READ BACK LAMBDA P K		
	278 LL15Z	LATENT ROOTS-STORE LAMBDA P K	NST1200	
	288 LL16Z	LATENT ROOTS-READ BACK FINAL ROOTS ETC	NST1200	
	283 LL17Z	LATENT ROOTS-FORM AND PUNCH RESIDUALS	NST1200	
	284 LL20Z	LATENT ROOTS-PUNCH K AND CURRENT VECTOR	NST1200	
	324 LL21	LATENT ROOTS-GIVENS+SYMMETRIC MATRIX	NST1177	
			NST1087	
	120 LN01A	MATRIX MULT	NST1095	
	128 LN02A	SHIFT MATRIX AFTER MULT	NST1096	
	129 LN03A	PREPARE FOR SHIFT AFTER RESTARTING MULT	NST1097	
	130 LN04A	RESTART SHIFT MATRIX	NST1048	1
	73 LN05B	MATRIX MULTPLICATION	NST1137	
	189 LN06A	MATRIX MULT+N UP TO 128	NST1144	
	184 LN07B	SCALAR PRODUCT OF TWO MATRICES	NST1174	
	206 LN08B	MATRIX MULT+N UP TO 64	NST1147	
	244 LN09A	SHIFT AND STORE MATRIX	NST1164	2
	296 LN10B	FORM C TRANSPOSE MULT BY Z MULT BY C	NST1165	
	297 LN10B+1	FORM C TRANSPOSE MULT BY Z MULT BY C	NST1200	
SEE LZ19B	326 LN11B	SHIFT MATRIX UP OR DOWN		
	316 LN01	NORMALISE VECTORS		
	116 LP01A	PUNCH BINARY MATRIX	NST1083	
	117 LP02A	PUNCH OUT DIAGONAL	NST1084	
	118 LP03A	PUNCH OUT SCALAR	NST1085	2
	119 LP04A	PUNCH OUT GRAND SUM	NST1086	
	74 LP05B	PUNCH OUT BINARY MATRIX	NST1049	1
	137 LP06B	PUNCH MATRIX CONTINUOUSLY	NST1115	
	169 LP07A	PUNCH TRANSPOSE OF MATRIX	NST1143	2
	199 LP08B	PUNCH MATRIX FOR LL01	NST1200	
	288 LP09A	PUNCH SCALARS IN DECIMAL	NST1197	
	368 LP10BT	PUNCH BINARY MATRIX+DOUBLE FIELD	NST1210	
	304 LQ01	DETERMINANTS-N UP TO 84		
	89 LR01	READ A VECTOR OF DOUBLE LENGTH INTEGERS		
	111 LR02A	READ BINARY MATRIX	NST1078	2
	112 LR03A	READ DIAGONAL MATRIX	NST1079	
	113 LR04A	READ SCALAR	NST1080	
	114 LR05A	READ K CARD	NST1081	
SEE LR06A-1	115 LR06A	READ DECIMAL INTEGER MATRIX	NST1082	
SEE LR06A	374 LR06A+1	READ DECIMAL INTEGER MATRIX AND CHECK	NST1219	
SEE LR07B-1	72 LR07B	READ BINARY MATRIX	NST1047	1
SEE LR07B	327 LR07B+1	READ BINARY MATRIX	NST1200	
	98 LR08	CONVERT AND STORE DOUBLE LENGTH VECTOR	NST1066	
	136 LR09B	CONTINUOUS READ	NST1114	
	151 LR10Z	LIN EQNS-N PLUS R UP TO 99-READ BIN EQNS		
	196 LR11A	READ NUMBER INTO 2ND SCALAR STORE	NST1033	
	164 LR12Z	READ BINARY MATRIX FOR INVERSION		
	272 LR13B	READ SCALARS-STORE AS FLOATING MATRIX	NST1200	
	287 LR14A	READ DECIMAL SCALARS	NST1156	
	295 LR15B	READ C TYPE MATRIX	NST1163	
	366 LR16BT	READ BINARY MATRIX-DOUBLE FIELD	NST1211	
	181 LS01A	SCALAR MULTIPLICATION	NST1088	
	180 LS02B	SCALAR MULTIPLICATION	NST1200	
	126 LT01A	TRANSPOSE MATRIX	NST1093	
	79 LT02B	TRANSPOSE MATRIX	NST1050	1
	389 LT02B+1	TRANSPOSE MATRIX-WITHOUT 17+0		
	124 LU01A	LATENT ROOTS RESIDUALS	NST1091	
	209 LV01	MATRIX INVERSION-N UP TO 83	NST1072	
	301 LV02	DOUBLE LENGTH INVN-N PLUS R UP TO 31		
	266 LV03A	INVERT SCALAR	NST1200	
	77 LW01B	MATRIX SUBTRACTION	NST1051	1
	123 LZ01A	FORM CONVERSION FACTOR	NST1090	
	78 LZ02B	RENUMBERED ZP33B	NST1052	
	104 LZ03	PREPARE MATRIX FOR INVERSION-BINARY I		
	188 LZ03-1	PREPARE MATRIX FOR INVERSION-DECIMAL I		
	198 LZ04A	REVERSE SIGNS OF MATRIX	NST1068	
	161 LZ09A	SQUARE SCALAR	NST1141	2
	162 LZ06A	DIVIDE FIRST SCALAR BY SECOND SCALAR	NST1142	
	182 LZ07B	FETCH SCALAR	NST1200	
	181 LZ08B	COMPARE COLUMNS	NST1174	
	183 LZ09B	COMPARE ROWS	NST1174	
	185 LZ10B	EXTRACT SUBMATRIX	NST1174	
	186 LZ11B	EXTRACT DIAGONAL	NST1174	
	187 LZ12B	SELECT ELEMENT	NST1200	
	294 LZ12B+1	SELECT ELEMENT-INTO EITHER SCALAR STORE	NST1162	
	188 LZ13B	INSERT ZERO ROWS AND COLUMNS	NST1174	
	189 LZ14B	EXPAND DIAGONAL		
	319 LZ14B+1	EXPAND DIAGONAL+STORED AS ROW OR COL		
SEE LN11B	190 LZ15B	SHIFT UP OR DOWN	NST1200	
	191 LZ16B	BLOCKFLOAT	NST1200	
	192 LZ17B	RECIPROCAL-ELEMENT BY ELEMENT	NST1200	
	193 LZ18B	SQUARE ROOT+ELEMENT BY ELEMENT	NST1200	
	194 LZ19B	EXPAND SCALAR AS A MATRIX	NST1200	
	195 LZ20B	MATRIX SCHEME A TO SCHEME B OR B TO A	NST1200	
SEE LZ21B-1	196 LZ21B	ROW MAX+MAX ELEMENT MODULUS FOR EACH ROW	NST1200	
SEE LZ21B	376 LZ21B+1	ROW MAX OR MIN	NST1221	
	197 LZ22B	FLOAT RATIO	NST1200	
	198 LZ23B	FLOATING ARITHMETIC WITH SCALARS	NST1200	
SEE LZ25B	216 LZ24B	FORM MATRIX OF ZERO TERMS	NST1123	
SEE LZ24B	217 LZ25B	FORM A ZERO MATRIX-A BY B	NST1124	
	218 LZ26B	FORM TRIANGULAR MATRIX OF ONES-A BY A	NST1125	
	219 LZ27B	FORM TRIANGULAR MATRIX OF ONES-2A BY A	NST1126	
	220 LZ28B	FORM A DIAGONAL OF 2 BY 2 MATRICES	NST1127	
	223 LZ29	PUNCH PARTIAL ROW AND ROW SUMS ETC	NST1128	
USE LZ30B-3	224 LZ30B	CHANGE DIMENSIONS OF MATRIX TO 1 BY MN	NST1129	
USE LZ30B-3	285 LZ30B+1	CHANGE DIMENSIONS OF MATRIX TO MN BY 1	NST1129	
USE LZ30B-3	236 LZ30B+2	FLATTEN MATRIX	NST1136	

	349	LZ308-3	FLATTEN MATRIX	NST1197
SEE LZ318	226	LZ318	CHANGE DIMENSIONS OF MATRIX TO S BY C	NST1135
USE LZ318	348	LZ318-1	CHANGE DIMENSIONS OF A MATRIX	NST1196
USE LZ318	234	LZ33A	MOVE DOWN 2 PLACES	NST1148
	246	LZ33B	FIND NEXT TRACK	NST1150
	264	LZ34B	FIND DIMENSIONS OF A MATRIX	NST1151
	268	LZ35	OMIT ELEMENTS FROM VECTOR	NST1200
	266	LZ36	SHIFT DOWN MATRIX	NST1200
	271	LZ37B	REPLACE SPECIFIED ELEMENTS WITH ZEROS	NST1152
	277	LZ38B	MODIFY CODES	NST1200
	302	LZ39B	LINEAR INTERPOLATION BETWEEN 2 MATRICES	NST1167
	305	LZ40B	REVERSED PROGRESSIVE SUM	NST1200
	316	LZ41B	ELIMINATE A ROW OR COL OF A MATRIX	NST1161
	322	LZ43B	FORM SYMMETRIC MATRIX	NST1184
	329	LZ45B	FORM MATRIX=JP1 PLUS IP17	NST1187
	330	LZ46B	EXTRACT GENERAL SUBMATRIX	NST1188
	331	LZ48B	FORM UNIT MATRIX	NST1189
	333	LZ46B	EXTRACT OR OMIT SUBMATRIX	NST1190
	334	LZ47B	EXTRACT PARAMETERS	NST1191
	391	LZ48B	FORM COS OR SIN OF ELEMENTS	NST1199
	362	LZ49B	COMPOUND DIAGONALLY	NST1206
	378	LZ50B	LINEAR INTERPOLATION FROM SET OF CURVES	NST1223
	361	LZ51B	CHANGE MATRIX PARAMETERS	NST1226
	43	RP01	COMPLEX ROOTS OF REAL POLYNOMIAL	
	100	RP02	REAL ROOTS OF REAL POLYNOMIALS	
	101	RP03	COMPLEX ROOTS OF COMPLEX POLYNOMIALS	
	221	RP03-1	COMPLEX ROOTS OF COMPLEX POLYNOMIALS	NST1059
	299	RP04	TRIPLE LENGTH BAIRSTOW	
	13	SH01	HARMONIC ANALYSIS-32 ORDINATES	
	227	SH02	FOURIER ANALYSIS	NST1180
	19	TA01	SHORT ACCUMULATOR TEST	NST1008
	21	TA02	LOGICAL OPERATIONS TEST	NST1010
	312	TA02-1	LOGICAL OPERATIONS TEST. BUZZ AND GO	NST1175
	94	TA03	SOURCE 22 TEST	NST1064
	106	TA04	MULTIPLIER-DIVIDER TEST PROGRAMME	NST1075
	307	TA05	LONG ACCUMULATOR TEST	NST1171
	396	TA06	CONTINUOUS DIVN TEST WITH CHECK DISPLAY	NST1202
	397	TA07	CONTINUOUS MULT TEST WITH CHECK DISPLAY	NST1203
	364	TA08	AUTOMATIC INSTRUCTION MODIFIER TEST	NST1209
	20	TC01	CHARACTERISTIC TEST	NST1009
	110	TC02	DISCRIMINATION TEST	NST1077
	47	TH01	READER TIMING TEST	NST1022
	201	TH01-1	READER TIMING TESTS	NST1111
	48	TH02	READER TIMING TEST	NST1023
	202	TH02-1	READER TIMING TESTS	NST1112
	51	TH03	READER AND PUNCH TIMING TEST	NST1025
	52	TH04	READER AND PUNCH TIMING TEST	NST1026
	53	TH05	READER AND PUNCH TIMING TEST	NST1027
	54	TH06	READER AND PUNCH TIMING TEST	NST1028
	55	TH07	READER AND PUNCH TIMING TEST	NST1029
	56	TH08	READER AND PUNCH TIMING TEST	NST1030
	57	TH09	READER AND PUNCH TIMING TEST	NST1031
	64	TH10	READER AND PUNCH TIMING TEST	NST1039
	144	TH11	HOLLERITH TIMING TESTS	NST1102
	65	TH12	READER AND PUNCH TIMING TEST	NST1040
	66	TH13	READER AND PUNCH TIMING TEST	NST1041
	143	TH14	HOLLERITH TIMING TESTS	NST1101
	67	TH15	READER AND PUNCH TIMING TEST	NST1042
	142	TH15-1	HOLLERITH TIMING TESTS	NST1100
	68	TH16	READER AND PUNCH TIMING TEST	NST1043
	69	TH17	READER AND PUNCH TIMING TEST	NST1044
	70	TH18	READER AND PUNCH TIMING TEST	NST1045
	71	TH19	READER AND PUNCH TIMING TEST	NST1046
	141	TH20	HOLLERITH TIMING TESTS	NST1099
	146	TH21	READER TIMING TEST	NST1104
	145	TH22	PUNCH TIMING TEST	NST1103
	147	TH23	TIL PANORAMA TEST-READER OR PUNCH	NST1105
	193	TH24	READER AND PUNCH TIMING TESTS	NST1106
	194	TH25	READER AND PUNCH TIMING TESTS	NST1107
	200	TH26	PUNCH TIMING TEST	NST1110
	230	TH27	HOLLERITH TEST PROGRAMMES	NST1131
	231	TH28	HOLLERITH TEST PROGRAMMES	NST1132
	232	TH29	HOLLERITH TEST PROGRAMMES	NST1133
	320	TH30	GENERAL HOLLERITH TEST	NST1182
	378	TH31	HOLLERITH READER TEST-WINDOW SETTER	NST1220
	23	TM01	MAGNETICS TEST	NST1012
	309	TM01-1	MAGNETICS TEST-32-ROW PUNCH	NST1172
	61	TM02	MAGNETICS INTERLOCK TIMING TEST	NST1054
	62	TM03	MAGNETICS TIMING TESTS	NST1055
	63	TM04	MAGNETICS TIMING TESTS	NST1056
	64	TM05	MAGNETICS TIMING TESTS	NST1057
	67	TM06	MAGNETIC ALIGNMENT TEST	NST1060
	60	TM07	MAGNETICS TREE TEST	NST1061
	69	TM08	MAGNETICS WRITE-HEAD-SHIFT TIME TEST	NST1062
	93	TM09	MAGNETICS READ HEAD SHIFT TIMING TEST	NST1063
	109	TM10	MAGNETIC READ CONSISTENCY TEST	NST1076
	211	TM11	MAGNETICS SATURATION TEST	NST1118
	229	TM12	TEST INTERLOCK	NST1130
	233	TM13	TEST ABSENCE OF INTERLOCK	NST1134
	303	TM14	MAGNETICS MARGINAL CHECK PROGRAMME	NST1168
	22	TS01	MERCURY STORE TEST	NST1011
	41	TS02	AUTOMATIC MERCURY STORE TEST	NST1020
	86	TS03	MERCURY STORE TEST-NON AUTOMATIC	NST1059
	399	TS04	AUTOMATIC SOURCE AND DESTINATION TEST	NST1201
	379	TS05	FUNCTIONAL BUZZ AND GO-WITH READ TO DRUM	NST1224
	380	TS06	ID TEST-BUZZ AND GO	NST1225
	336	XA01	SPECTRAL ANALYSIS-SPECTRAL FUNCTION	NST1193

	337	XA02	SPECTRAL ANALYSIS•SPECTRAL FUNCTION	NST1193	
	338	XA03	SPECTRAL ANALYSIS•SPECTRAL FUNCTION	NST1193	
	339	XA04	SPECTRAL ANALYSIS•INTEGRATED SPECTRUM	NST1193	
	340	XA05	SPECTRAL ANALYSIS•INTEGRATED SPECTRUM	NST1193	
	341	XA06	SPECTRAL ANALYSIS•INTEGRATED SPDCTRUM	NST1193	
	342	XA07	SPECTRAL ANALYSIS•BAND SPECTRUM	NST1193	
	343	XA08	SPECTRAL ANALYSIS•BAND SPECTRUM	NST1193	
	344	XA09	SPECTRAL ANALYSIS•BAND SPECTRUM	NST1193	
	285	XC01	LAGGED CORRELATION PROGRAMME	NST1155	
	305	XC02	CORRELATION PROGRAMME	NST1169	
	321	XM01	MEAN AND VARIANCE	NST1183	
USE ZC01•3	206	ZC01	GIP 1		
USE ZC01•3	209	ZC01-1	GIP 2		
USE ZC01•3	210	ZC01-2	GIP 3		
	323	ZC01-3	GIP 5		
	239	ZC02B	REPLACE PROGRAMME FOR GIP 3		
	240	ZC03B	AUXILIARY CODE PROGRAMME	NST1200	
	241	ZC04B	READ A B C R	NST1200	
	256	ZC05	BINARISE CODES FOR SCHEME B		
	313	ZC05-1	DEC•BIN CODES		
	257	ZC06	DECIMALIZE CODES FOR SCHEME B	NST1200	
	258	ZC07	RESTORE CONTROL		
	259	ZC08	CLEAR ALL TRACKS		
	260	ZC09	READ PROGRAMMES		
	292	ZC10B	INTERCHANGE BRICKS ETC-SLOW	NST1160	
	293	ZC10•1	INTERCHANGE BRICKS ETC-FAST	NST1161	
SEE ZC13	311	ZC11	PROGRAMME CHANGING ROUTINE	NST1176	
	325	ZC12B	TRANSFER TRACKS	NST1185	
SEE ZC14	348	ZC13	PROGRAM STORE AND FETCH	NST1194	
SEE ZC13	360	ZC14	BRICK ASSEMBLY	NST1198	
	373	ZC15	TABULAR INTERPRETIVE PROGRAM		
	1	ZP01	ACE PILOT MODEL•DEUCE INTERPRETER	NST1001	
	3	ZP02	SUBROUTINE TEST PROGRAMME WITH QUADS	NST1002	
	5	ZP02-1	SUBROUTINE TEST PROGRAMME WITHOUT QUADS	NST1002	
	4	ZP03	SUBROUTINE COPY PROGRAMME	NST1003	
SEE ZP14	25	ZP04	TRACK ASSEMBLY	NST1014	
USE ZP05•1	18	ZP05	SYNCHRONIZE DISPLAY	NST1007	
	49	ZP05-1	SYNCHRONISE DISPLAY•1 CARD	NST1024	
USE ZP06•1	16	ZP06	CHECK DETAILED CODING		
	213	ZP06-1	CHECK DETAILED CODING•WITH P22 DIGTS ETC	NST1120	
	17	ZP07	CHECK DEC PUNCHING FOR R01 TYPE CARDS		
	27	ZP08	PUNCH OUT DIFFERENCES OF DELAY LINES	NST1010	
USE ZP29	28	ZP09	PUNCH OUT TANKS	NST1017	
SEE ZP10•1	29	ZP10	PUNCH N SFS NUMBERS IN SFD WITH SUM	NST1018	
SEE ZP22	30	ZP10-1	PUNCH N SFS NUMBERS IN SFD WITHOUT SUM	NST1018	
REDUNDANT	33	ZP11	MAGNETIC FETCH AND CARRY		
REDUNDANT	34	ZP12	TEST MAGNETIC FETCH AND CARRY		
USE ZP13•1	38	ZP13	CLEAR DRUM	NST1108	
	315	ZP13-1	CLEAR DRUM-IMPROVED VERSION OF ZP13	NST1179	
	36	ZP14	READ TO DRUM	NST1108	
SEE ZP34	37	ZP15	PUT UP CLOCK TRACK	NST1108	
SEE ZP34	79	ZP15-1	PUT UP CLOCK TRACK AND INITIAL CARD	NST1053	
	36	ZP16	SYNCHRONISE	NST1108	
	80	ZP16-1	SYNC WITH CLOCK TRACK AND INITIAL CARD	NST1053	
USE ZP29	39	ZP17	PUNCH OUT DRUM-NON ZERO TRACKS		
SEE ZP26	40	ZP18	PUNCH CONTENTS OF STORES		
SEE ZP10	44	ZP19	FLOATING BINARY TO DECIMAL		
USE ZP29	61	ZP20	PUNCH TRACK 16A PLUS B	NST1035	
USE ZP29	62	ZP21	PUNCH OUT DLS IN CORRECT POSITIONS	NST1036	
SEE ZP10	65	ZP22	CONVERT SFS VECTOR TO FLOATING DECIMAL	NST1037	
	80	ZP23	CONVERT ALPHA CARDS TO DECIMAL AND PUNCH	NST1038	
SEE ZP13•1	102	ZP24	CLEAR MAGNETIC STORE AND VERIFY	NST1070	
SEE ZP29	103	ZP25	PUNCH OUT SPECIFIED TRACKS	NST1071	
SEE ZP29	155	ZP26	PUNCH CONTENTS OF STORES	NST1109	
USE ZP29	207	ZP27	PUNCH OUT DLS	NST1117	
SEE ZP29	276	ZP27-1	PUNCH DLS AND NON ZERO TRACKS	NST1154	
	248	ZP28	ROW SELECTIVE REPRODUCTION	NST1140	
SEE ZP27•1	261	ZP29	POST MORTEM	NST1170	
USE ZP29	268	ZP30	PUNCH NON•ZERO TRACKS STARTING AT T	NST1200	
	263	ZP31	PUNCH TEMPORARY STORES-SCHEME B BRICK	NST1200	
	264	ZP32	PUNCH DL N-SCHEME B BRICK	NST1200	
	78	ZP33B	PUNCH NON•ZERO TRACKS	NST1052	2
SEE ZP36	314	ZP34	CLOCK TRACK SET AND SYNC-P31 TYPE	NST1178	
	328	ZP35	FILL SHORT TANKS	NST1186	
SEE ZP34	348	ZP36	SET CLOCK TRACK	NST1195	
	347	ZP37	SYNC WITH CLOCK TRACK	NST1195	
USE ZP14	384	ZP38	READ TO DRUM		
	388	ZP39T	READ AND ENTER PROGRAMME-DOUBLE FIELD	NST1204	
	361	ZP40	CARD ROW REARRANGEMENT	NST1205	
	363	ZP41	STOP AND FIELD DETECTOR	NST1208	
	369	ZP42	BIN•DEC CONVERSION	NST1214	
	370	ZP43	DETAILED CODING PROGRAM	NST1215	
	372	ZP44	RE-SYNCHRONISE DRUM	NST1217	
	269	ZT01A	CARTESIAN•POLAR CONVERSION	NST1158	
	68	*ZV01N*	*NARRATOR*	*NST1058*	
	291	*ZV01N•1*	*NARRATOR-REVISED ONITTING 17-0*		
	6	ZV02	EASTER DAY		
	7	ZV03	MILLION FACTORS•SLOW		
	8	ZV03-1	MILLION FACTORS•FAST		
	90	ZV03N	MILLION FACTORS•SLOW-USE WITH NARRATOR		
	237	ZV03-2	BILLION FACTORS		
	9	ZV04	REACTION TIMES		
	91	ZV04N	REACTION TIMES-USE WITH NARRATOR		
	10	ZV05	DOWN YOU GO		
	5	ZV06	BIRTHDAYS		
	92	ZV07N	10 SIMULT EQUTNS-USE WITH NARRATOR		
	212	ZV08	NIM	NST1119	
	255	ZV09	DISPLAY SIMPLE SUM		
	350	ZV10	NOUGHTS AND CROSSES		