

DN-760 (CRT Display) (Cont' d)

Char./Line	46
No. of Lines	26 (1 Terminal/Memory)
	16 (2 Terminal/Memory)
	8 (4 Terminal/Memory)
	4 (8 Terminal/Memory)
Special	Blink, Auto Transmission of ACK Messages
Input Keyboard	Standard
Display Only	Optional
Environment	
Temperature	40° to 100°F
Relative Humidity	10 - 90%
Power Requirements	105-125V AC @ 15 Amps Maximum 60 Hz
	Single Phase
Asynchronous	Yes
Interrupt Rate	Approx. 120 Times/Sec.

GENERAL ELECTRIC
PROCESS COMPUTER BUSINESS SECTION
 Phoenix, Arizona

GE/PAC 4000
**PROCESS
COMPUTER**

Summary of Characteristics
OCTAL LISTING OF INSTRUCTIONS

OCTAL FORMAT	CMD	OCTAL FORMAT	CMD
00X*Y	LDA	25X6D	JNR
01X	SFP/STEP MPY	25X6D1D	JCB
02X*Y	TFE	25X6D2D	JDR
03X*Y	AFA	25X7D	JNE
04X*Y	XEC	25000001	STM
05000000	LDZ	25000302	LMR
05004137	CLO	25000300	LMR2
05004237	CMO	25010000	SSA
05004470	RNZ	25020000	PAI
05004570	SNZ	25030000	IAI
05004637	SET	25040000	JND
05004670	TZE	25050000	RCS
05004737	RST	25060000	JNO
05004770	TNZ	25070000	JNP
05010000	CPL	26X*K	INX
05013000	NEG	26200000	NOP
05060000	LMO	27X*Y	RPT
05064670	TZC	30X*Y	BTR
05070137	CLZ	31X*Y	SUB
05070237	CMZ	32X*Y	STA
05070770	TNM	33X*Y	SPB
05X0004K	SRL	34X*Y	BTS
05X0100K	IBK	35X*Y	LPR
05X0300K	LDO	36X*Y	STB
05X0404K	SRC	37X*Y	LDB
05X0440K	ROD	40X*K	LDK
05X0450K	SOD	41X*Y	DLD
05X0464K	TSC	42X*Y	LDQ
05X0470K	TOD	44X*Y	STQ
05X0700K	ADO	45004330	MAQ
05X1404K	SRA	45X0200K	SLL
05X4500K	RBK	45X0204K	SLA
05X4560K	TER	45X0430K	DRL
05X4570K	TOR	45X0440K	DRA
05X4600K	SBK	45X0530K	DRC
05X4660K	TES	45X0644K	DLA
05X4670K	TOS	45X0720K	DLL
05X4700K	CBK	46X*Y	REL
05X6300K	LBM	47X*Y	AEL
05X7040K	REV	50X0K	SKA
05X7050K	SEV	51X*Y	DAD
05X7070K	TEV	52X*Y	LDI
06X*Y	STX	53X*Y	STI
060*Y	DMT	54X*Y	STR
07X*K	LXK	55X*Y	MPY
10X*Y	ERA	56X*Y	RBL
11X*Y	ADD	57X*Y	ABL
12X*Y	TFL	60X0K	AKA
13X*Y	STF	61X*Y	DSU
14X*Y	BRU	62X*Y	OOM
15X*Y	LDP	63X*Y	DST
16X*Y	LDX	64X*Y	LDR
17X00000	LXC	65X*Y	DVD
20X*Y	ANA	66X*Y	ODL
21X*Y	ORA	67X*Y	IDL
22X*Y	SFA	70X*Y	FAD
23X*Y	LDF	71X*Y	FSU
24X0-K	TXH	72X*Y	FMP
25X0D	SEL	73X*Y	FDV
25X1D	ACT	74X0K	FIX
25X2D	OPR	74X2K	FLO
25X3D	ABT	74X3K	FMS
25X4D	OUT	75X*Y	Optional
25X5D	IN	76X*Y	Optional
		77X*Y	Optional



GE/PAC INSTRUCTIONS

CMD	OCTAL FORMAT	NON-INDEXED EXECUTION TIMES (μs)			
		4020	4040	4050-II	4060
ABL	57X*Y	(Q) 130.0	(Q) 572	16.66	9.86
ABT	25X3D	8.5/ 26.5	32	31.62	29.92
ACT	25X1D	8.5/ 26.5	32	31.62	29.92
ADD	11X*Y	3.2	16	6.80	3.40
ADO	05X0700K	4.7	16	13.26	11.56
AEL	47X*Y	(Q) 125.0	(Q) 580	16.66	9.86
AFA	03X*Y	-----	---	14.96	11.56
AKA	60X0K	(Q) 6.4	(Q) 127	3.40	1.70
ANA	20X*Y	3.2	16	6.80	3.40
BRU	14X*Y	1.6	14	3.40	1.70
BTR	30X*Y	1.6	14	3.40	1.70
BTS	34X*Y	1.6	14	3.40	1.70
CBK	05X4700K	4.7	16	13.26	11.56
CLO	05004137	4.7	16	13.26	11.56
CLZ	05070137	4.7	16	13.26	11.56
CMO	05004237	4.7	16	13.26	11.56
CMZ	05070237	4.7	16	13.26	11.56
CPL	05010000	4.7	16	13.26	11.56
DAD	51X*Y	(Q) 48.8	(Q) 284	10.20	5.10
DLA	45X0644K	4.8- 8.0	(Q) 967	5.10- 15.64	3.40- 13.94
DLD	41X*Y	(Q) 25.6	(Q) 125	10.20	5.10
DLL	45X0720K	4.8- 8.0	(Q) 734	5.10- 15.64	3.40- 13.94
DMT	060*Y	4.8	21	10.20	5.10
DRA	45X0440K	4.8- 8.0	(Q) 691	5.10- 15.64	3.40- 13.94
DRC	45X0530K	4.8- 8.0	(Q) 821	5.10- 15.64	3.40- 13.94
DRL	45X0430K	4.8- 8.0	(Q) 797	5.10- 15.64	3.40- 13.94
DST	63X*Y	28.8	(Q) 132	10.20	5.10
DSU	61X*Y	(Q) 42.4	(Q) 298	10.20	5.10
DVD	65X*Y	13.7	(Q) 5,344	30.94	27.54
ERA	10X*Y	3.2	16	6.80	3.40
FAD- S/D	70X*Y	(Q) 203.0/295.0	(Q)** 993/ 3,016	(Q)** 162.00/401.00	(Q)** 99.00/226.00
FDV- S/D	73X*Y	(Q) 182.0/288.0	(Q)** 2,631/16,081	(Q)** 233.00/427.00	(Q)** 140.00/272.00
FIX- S/D	74X0K	(Q) 111.0/112.0	(Q)** 448/ 991	(Q)** 228.00/248.00	(Q)** 131.00/146.00
FLO- S/D	74X2K	(Q) 123.0/145.0	(Q)** 566/ 1,129	(Q)** 185.00/361.00	(Q)** 106.00/206.00
FMP- S/D	72X*Y	(Q) 151.0/216.0	(Q)** 1,460/ 7,230	(Q)** 189.00/306.00	(Q)** 110.00/184.00
FMS	74X3K	(Q) 208.0	(Q) -----	(Q) 357.00	(Q) 357.00
FSU- S/D	71X*Y	(Q) 208.0/300.0	(Q)** 1,034/ 3,046	(Q)** 170.00/412.00	(Q)** 99.00/232.00
IAT1(2)	2503(4)0000(5)	2.2	32	6.80	3.40
IBK	05X0100K	4.7	16	13.26	11.56
IDL	67X*Y	-----	---	51.32	39.44
IN	25X5D	8.5/ 26.5	32	31.62	29.92
INX	26X*K	4.8	21	10.20	5.10
JCB	25X6D2D	8.5/ 26.5	32	31.62	29.92
JDR	25X6D4D	8.5/ 26.5	32	31.62	29.92
JND	25040000	2.2	32	6.80	3.40
JNE	25X7D	8.5/ 26.5	32	31.62	29.92
JNO	25060000	2.2	32	6.80	3.40
JNP	25070000	2.2	32	6.80	3.40
JNR	25X6D	8.5/ 26.5	32	31.62	29.92
LBM	05X6300K	4.7	16	13.26	11.56
LDA	00X*Y	3.2	16	6.80	3.40
LDB	37X*Y	-----	---	6.80	3.40
LDF	23X*Y	-----	---	14.96	11.56
LDI	52X*Y	(Q) 35.1	(Q) 162	10.20	5.10
LDK	40X*K	(Q) 6.4	(Q) 97	3.40	1.70
LDO	05X0300K	4.7	16	13.26	11.56
LDP	15X*Y	3.2	16	6.80	3.40
LDQ	42X*Y	4.8	(Q) 132	6.80	3.40
LDR	64X*Y	-----	---	10.20- 51.00	5.10- 25.50
LDX	16X*Y	4.8	21	10.20	5.10
LDZ	05000000	4.7	16	13.26	11.56
LMO	05060000	4.7	16	13.26	11.56
LMR	25000302	2.2	---	-----	-----
LMR2	25000300	2.2	---	-----	-----

GE/PAC INSTRUCTIONS (Continued)

CMD	OCTAL FORMAT	NON-INDEXED EXECUTION TIMES (μs)			
		4020	4040	4050-II	4060
LPR	35X*Y	3.2	16	6.80	3.40
LXC	17X00000	4.8	---	10.20	5.10
LXK	07X*K	3.2	21	10.20	5.10
MAQ	45004330	7.3	-----	13.26	11.56
MPY	55X*Y	8.9- 12.1	(Q) 2010/4924	15.98-26.18	12.58-22.78
NEG	05013000	4.7	16	13.26	11.56
NOP	26200000	4.8	21	10.20	5.10
ODL	66X*Y	-----	---	51.32	39.44
OOM	62X*Y	(Q) 60.8	(Q) 263	10.20	5.10
OPR	25X2D	8.5/ 26.5	32	31.62	29.92
ORA	21X*Y	3.2	16	6.80	3.40
OUT	25X4D	8.5/ 26.5	32	31.62	29.92
PAI	25020000	2.2	32	6.80	3.40
RBK	05X4500K	4.7	16	13.26	11.56
RBL	56X*Y	(Q) 122.0	(Q) 544	16.66	9.86
RCS	25050000	2.2	32	6.80	3.40
REL	46X*Y	(Q) 136.0	(Q) 627	16.66	9.86
REV	05X7040K	4.7	16	13.26	11.56
RNZ	05004470	4.7	16	13.26	11.56
ROD	05X0440K	4.7	16	13.26	11.56
RPT	27X*Y	-----	---	17.00	8.50
RST	05004737	4.7	16	13.26	11.56
SBK	05X4600K	4.7	16	13.26	11.56
SEL	25X0D	8.5- 26.5	32	31.62	29.92
SET	05004637	4.7	16	13.26	11.56
SEV	05X7050K	4.7	16	13.26	11.56
SFA	22X*Y	-----	---	14.96	11.56
STEP MPY/SFP	01X___		STEP MPY 32	SFP 6.80-13.27	SFP 3.40-11.56
SKA	50X0K	(Q) 6.4	(Q) 141	3.40	1.70
SLA	45X0204K	4.8- 8.0	(Q) 878	5.10-13.26	3.40-11.56
SLL	45X0200K	4.8- 8.0	(Q) 878	5.10-13.86	3.40-11.56
SNZ	05004570	4.7	16	13.26	11.56
SOD	05X0450K	4.7	16	13.26	11.56
SPB	33X*Y	3.2	16	6.80	3.40
SRA	05X1404K	4.7	16	13.26	11.56
SRC	05X0404K	4.7	16	13.26	11.56
SRL	05X0004K	4.7	16	13.26	11.56
SSA	25010000	2.2	32	6.80	3.40
STA	32X*Y	3.2	(Q) 14	6.80	3.40
STB	36X*Y	-----	---	6.80	3.40
STF	13X*Y	-----	---	18.36	13.26
STI	53X*Y	(Q) 40.9	(Q) 190	10.20	5.10
STM	25000001	2.2	---	6.80	3.40
STQ	44X*Y	6.4	(Q) 132	6.80	3.40
STR	54X*Y	-----	---	10.20-51.00	5.10-25.50
STX	06X*Y	6.4	21	10.20	5.10
SUB	31X*Y	3.2	16	6.80	3.40
TER	05X4560K	4.7	16	13.26	11.56
TES	05X4660K	4.7	---	13.26	11.56
TEV	05X7070K	4.7	---	13.26	11.56
TFE	02X*Y	-----	---	14.96	11.56
TFL	12X*Y	-----	16	14.96	11.56
TIM	API	12.7/ 30.7	---	-----	-----
TNM	05070770	4.7	---	13.26	11.56
TNZ	05004770	4.7	---	13.26	11.56
TOD	05X0470K	4.7	---	13.26	11.56
TOM	API	12.7/ 30.7	---	-----	-----
TOR	05X4570K	4.7	---	13.26	11.56
TOS	05X4670K	4.7	---	13.26	11.56
TSC	05X0464K	4.7	---	13.26	11.56
TXH	24X0-K	3.2	21	6.80	3.40
TZC	05064670	4.7	16	13.26	11.56
TZE	05004670	4.7	16	13.26	11.56
XEC	04X*Y	1.6	14	3.40	1.70

* - Relative Addressing

** - 4026 F. P. Hardware Module Available

(Q) - Extended Function of "Quasi" Instruction (Approximate Times)

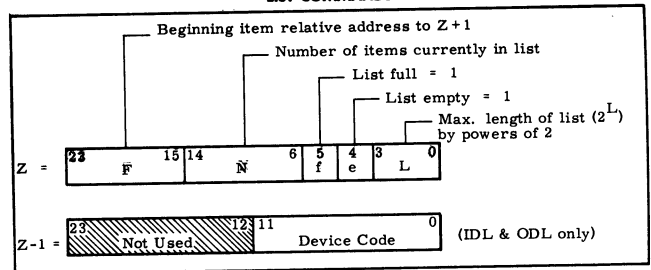
S/D - Single-Double

CHARACTER CODE TRANSLATION

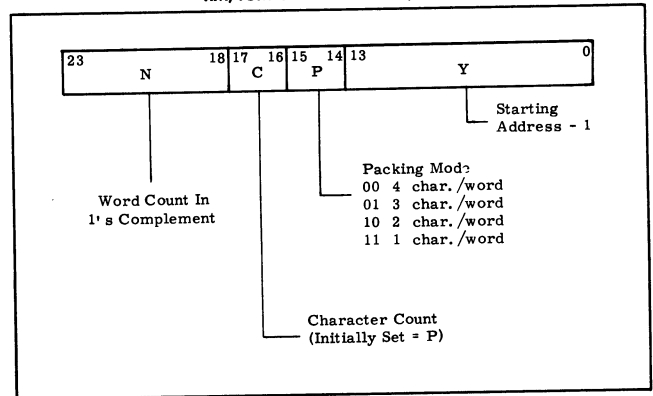
CHARACTER	GE/PAC	CARD CODE	ASCII
0	00	0	060
1	01	1	061
2	02	2	062
3	03	3	063
4	04	4	064
5	05	5	065
6	06	6	066
7	07	7	067
8	10	8	070
9	11	9	071
A	21	12-1	101
B	22	12-2	102
C	23	12-3	103
D	24	12-4	104
E	25	12-5	105
F	26	12-6	106
G	27	12-7	107
H	30	12-8	110
I	31	12-9	111
J	41	11-1	112
K	42	11-2	113
L	43	11-3	114
M	44	11-4	115
N	45	11-5	116
O	46	11-6	117
P	47	11-7	120
Q	50	11-8	121
R	51	11-9	122
S	62	0-2	123
T	63	0-3	124
U	64	0-4	125
V	65	0-5	126
W	66	0-6	127
X	67	0-7	130
Y	70	0-8	131
Z	71	0-9	132
Space	20		040
.	33	12-3-8	056
,	73	0-3-8	054
+	60	12	053
-	52	11	055
*	54	11-4-8	052
/	61	0-1	057
=	75	3-8	075
(35	0-4-8	050
)	55	12-4-8	051
\$	53	11-3-8	044
"	76	4-8 α	042
'	57 <u>LC</u>		047
#	13 <u>LC</u>		043
@	14 <u>LC</u>	4-8 α	100
&	32 <u>LC</u>		046
%	74 <u>LC</u>		045
?	17 <u>LC</u>		077
!	77 <u>LC</u>		041
>	16 <u>LC</u>		076
<	36 <u>LC</u>		074
^	12 <u>LC</u>		133
~	34 <u>LC</u>		135
:	15 <u>LC</u>		072
;	56 <u>LC</u>		073
/	37 <u>LC</u>		134
↑	40 <u>LC</u>		136
←	72 <u>LC</u>		137
Carriage Ret.	100		015
Tab	140		011
Stop	170 FLEX		
Punch On	162 FLEX		
Punch Off	164 FLEX		
Print Red	161		023
Print Black	160		022
Delete	177 FLEX		177

α - On keyboard and card substitutes for ".
LC - Not Long Carriage Typer.
 FLEX - Flexwriter only.

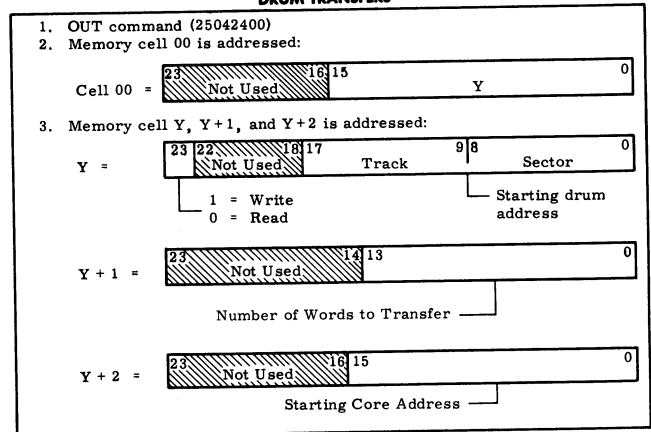
LIST COMMANDS



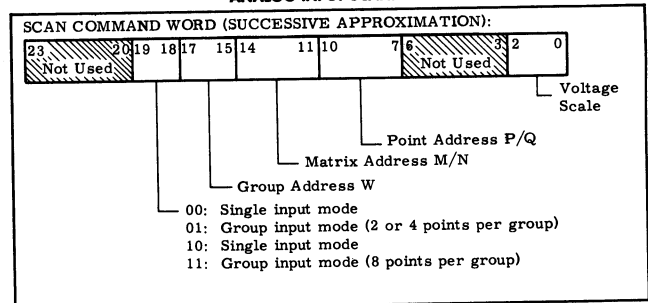
TIM/TOM CONTROL WORD (4020)



DRUM TRANSFERS

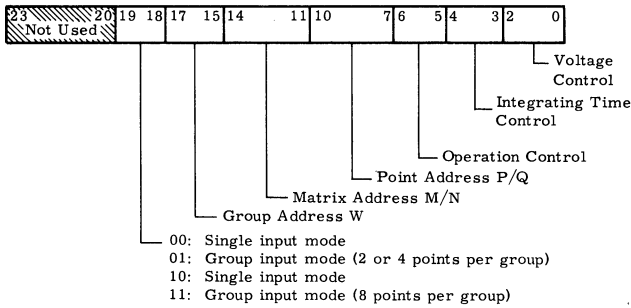


ANALOG INPUT SCANNING

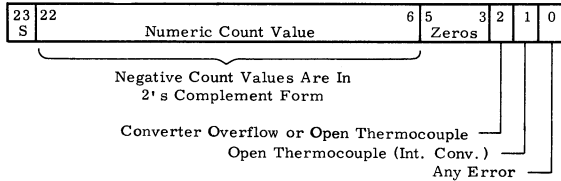


ANALOG INPUT SCANNING (Cont'd)

SCAN COMMAND WORD (INTEGRATING CONVERTER):



C REGISTER FORMAT:



SUCCESSIVE APPROXIMATION CONVERTER:

$$\text{Voltage} = \frac{\text{Full Scale Value}}{4000} \times \text{Numeric Count Value}$$

INTEGRATING CONVERTER:

$$\text{Voltage} = \frac{\text{Full Scale Value}}{\text{Full Scale Counts}} \times \text{Numeric Count Value}$$

VOLTAGE SCALE CONTROL:

SCW 02-00	FULL SCALE VOLTAGE			
	Successive Approximation Converter, Model 4130			
	Model 4120* (REDCOR) Low-Level Amplifier	Model 4121 (PRESTON) Low-Level Amplifier	Model 4127 (PRESTON) High-Level Amplifier	Model 4135 (VIDAR) Integrating Converter
0	80 mv	10 mv	80 mv	10 mv
1	40 mv	20 mv	160 mv	20 mv
2	20 mv	40 mv	320 mv	40 mv
3	--	80 mv	640 mv	80 mv
4	10 mv	160 mv	2.5 V	160 mv
5	--	10 V	10 V	320 mv
6	--	--	--	640 mv
7	--	--	--	1 V

OPERATION CONTROL FOR INTEGRATING CONVERTER:

SCW 06-05	MODE OF OPERATION
0	Voltage, DC
1	Voltage, AC
2	Voltage, DC with Open Thermocouple detection
3	Count pulses per unit Integrating Time

INTEGRATING TIME CONTROL FOR INTEGRATING CONVERTER:

SCW 04-05	INTEGRATING TIME (MS)		FULL SCALE COUNTS AT 1000 KC COUNT RATE		OPERATION TIME (MS) SINGLE INPUT MODE	
	60 Cycle	50 Cycle	60 Cycle	50 Cycle	60 Cycle	50 Cycle
0	16.67	20	1:16,667	1:20,000	35.2	38.5
1	33.33	40	1:33,333	1:40,000	51.9	58.5
2	100.	100	1:65,535	1:65,535	118.5	118.5
3	1000.	1000	1:65,535	1:65,535	1018.5	1018.5

Memory Type	Random Access
Maximum Capacity	32,768 Words
Minimum Capacity	4,096 Words
Increments	4,096 Words
Cycle Time	1.6 μs
Mode	Parallel
Checking	Parity
Special Feature	Temp. Controlled
Word Structure	
Number of Bits	25
Format	24 Data, 1 Parity
Representation	Binary
Largest Decimal No.	8,388,607 and -8,388,608
Largest Octal No.	37,777,777 and -40,000,000
Arithmetic Type	Binary, 2 ^S Complement
Add Time	3.2 μs
Subtract Time	3.2 μs
Multiply Time	8.9 - 12.1 μs
Divide Time	13.7 μs
Full Shift	4.7 μs
Logical "AND"	3.2 μs
Logical "OR"	3.2 μs
Exclusive "OR"	3.2 μs
Mode	Parallel
Product Size	46 Bits + Sign
Quotient Size	23 Bits + Sign
	23 Bit Remainder + Sign of Divisor
Floating Point	Via Quasi } Subroutine
Double Precision	Via Quasi }
Index Registers	
Number	7 (Memory)
Time Required	1.6 μs
Increment	4.8 μs
Decrement	4.8 μs
Load	4.8 μs
Load with Count	4.8 μs
Load with K	3.2 μs (K = Operand Address Becomes Operand)
Store	6.4 μs
Test Hi or Equal	3.2 μs
Programming	
Number of Instructions	29 Basic
Addresses/Instructions	1
Operands/Instructions	1
Addressing Modes	4
	Direct to 16K
	Indexed to 32K
	Relative ±8K
	Indexed-Relative
Other Instructions	See Instruction Repertoire
Indirect Addressing	Via Program
Special	Microcoded Commands
Automatic Priority Interrupt	
Maximum Number Points	128
Minimum Number Points	8
Increments	8
Levels of Interrupt	128
Mask Register	Yes - Option
Maximum No. Positions	32
Minimum No. Positions	0
Increments	2
Echo Generators	Yes - Option System
Maximum Number	64
Minimum Number	0
Increments	8
Hardware Decode Time	< .5 μs
Classes	Inhibitible, Non-Inhibitible, Internal, External
API Watchdog	
Available	Yes - Option (With Memory Protect)
Time to ACK. Any Non-Inhibitible	.1 μs Minimum, 1.1 ms Maximum
Time to Service All Interrupts	25 ms Minimum, 500 ms Maximum
Purpose	Prevent Loss of Data
Stall Alarm	
Available	Yes - Option
Time Interval	1 to 5 Seconds, Adjustable
Set Timer	25010000g (2.2 μs) (SSA Instr.)
Purpose	Detect Program Stall or Machine Malfunction

4212/13C Characteristics Paper Tape Reader (Cont'd)	
Units/Control	1
Synchronous Operation	Yes
Interrupting Rate	100 Times/Sec. (4212C) 200 Times/Sec. (4213C)
Interrupts Required	2
Tape Width and Thickness	1 Inch/.004 Inches
Distance from Control	To 2,000 Feet
Supply Reel Capacity	300 Feet Minimum
Take Up Reel Capacity	300 Feet Minimum
Rewind Speed	100 IPS
Environment	
Temperature	32° to 131°F
Relative Humidity	5 - 95%
Power Required	115V AC ±10% @ 2 Amps 50/60 Hz

4221C Characteristics Typewriter (Fixed Carriage)	
Output Speed	15.5 CPS
Buffered	7-Bit in Control
Carriage Length	11" (FF) 15.5" (FF) 11" (PF) 15.5" (PF)
Characters/Line	102 156 102 154
Maximum Paper Width	8 1/2" 13" 9 7/8" 13 5/8"
Pin to Pin Spacing	--- --- 9 3/8" 13 1/8"
Spacing	12 CPI @ 6 LPI
Checking	Device Off-Line
Type Style	Manifold 10 Type
Interrupting Rate	15 Times/Sec.
Interrupts Required	2
Units/Control	1
Distance from Control	To 2,000 Feet
No. of Printable Char.	63 Plus Space
Red/Black Shift	Yes
Environment	
Temperature	32° to 131°F
Relative Humidity	5 - 95%
Power Required	115V AC ±10% @ 1 Amp 50/60 Hz

4223C Characteristics Typewriter (Long Carriage)	
Output Speed	10 CPS
Buffered	7-Bit in Control
Interrupts Required	2
Distance from Control	To 500 Feet
No. Printable Char.	41 Plus Space
Red/Black Shift	Yes
Checking	Off-Line
Type Style	Pica - Gothic
Asynchronous Operation	Yes
Interrupting Rate	10 Times/Sec.
Carriage	12" FF @ 10 CPI @ 110 CPL
Carriage	12" FF @ 14 CPI @ 154 CPL
Carriage	12" PF @ 14 CPI @ 124 CPL
Carriage	16" FF @ 10 CPI @ 126 CPL
Carriage	16" FF @ 14 CPI @ 176 CPL
Carriage	16" PF @ 10 CPI @ 126 CPL
Carriage	16" PF @ 14 CPI @ 176 CPL
Carriage	20" FF @ 10 CPI @ 190 CPL
Carriage	20" FF @ 14 CPI @ 266 CPL
Carriage	20" PF @ 10 CPI @ 177 CPL
Carriage	20" FF @ 14 CPI @ 234 CPL
Carriage	24" FF @ 10 CPI @ 205 CPL
Carriage	24" FF @ 14 CPI @ 286 CPL
Carriage	24" PF @ 10 CPI @ 205 CPL
Carriage	24" FF @ 14 CPI @ 286 CPL
Carriage	30" FF @ 10 CPI @ 290 CPL
Carriage	30" FF @ 14 CPI @ 406 CPL
Carriage	30" PF @ 10 CPI @ 260 CPL
Carriage	30" PF @ 14 CPI @ 371 CPL
Environment	
Temperature	32° to 131°F
Relative Humidity	5 - 95%
Power Required	115V AC ±10% @ 1 Amp 50/60 Hz

Teletypewriter		4233C (35)	4234C (33)
Input Speed		10 CPS	10 CPS
Output Speed		10 CPS	10 CPS
Buffered		8-Bit Via Control	8-Bit Via Control
Checking		Parity/Timing/Off Line	Parity/Timing/Off Line
Frames/Inch		10	10
Channels/Frames		8	8
Platen Type		PF (All)	PF (ASR), FF (RO & KSR)
Pin to Pin Spacing		8 Inches	8 Inches

PF = Pin Feed
FF = Friction Feed

Teletypewriter (Cont'd)		4233C (35)	4234C (33)
Characters/Line		86	86
Spacing		12 CPI @ 6 LPI	12 CPI @ 6 LPI
No. Printable Chars.		63 Plus Space	63 Plus Space
Carriage Length		8.5 Inches	8.5 Inches
Form Size		8.5 Inches	8.5 Inches
Red/Black Shift		No	No
Mode		Bit Serial	Bit Serial
Transfer Rate		110 BPS	110 BPS
Synchronous Operation		Yes - Tape Rd/Keyb.	Yes - Tape Rd/Keyb.
Asynchronous Operation		Other	Other
Interrupt Rate		10 Times/Sec.	10 Times/Sec.
Interrupts Required		4 (ASR-KSR)	4 (ASR-KSR)
		2 (RO)	2 (RO)
Tape Width & Thickness		1" x .004"	1" x .004"
Units/Control		No Practical Limit	No Practical Limit
Distance from Control		To 1 Mile	To 1 Mile
Auto Verification		Yes	Yes
Auto Answer Back		Option	Yes
Off-Line Tape Prep.		Yes	Not Recommended
Remote Communications		Option	Option
Programmed Printer		ON/OFF	Yes
Programmed Reader		ON/OFF	Yes
Programmed Punch		ON/OFF	Yes
Auto Line Feed & CR		No	No
Method of Connection		4-Wire Full Duplex	4-Wire Full Duplex
Rub-Out Deleter		No - Option Late 67	No
Type Face		Murray	Murray
Environment			
Temperature		65° to 85°F	65° to 85°F
Relative Humidity		20 - 80%	20 - 80%
Power Required		115V AC ±3.8 Amps	115V AC ±2.1 Amps
		60 Hz, Option: 50 Hz	60 Hz, Option: 50 Hz
		Late 67 (ASR) 50 Hz	

4244C Characteristics (Card Reader)	
Input Speed	100/200/300 CPM
Buffered	Via Control (12-Bit)
Hopper Capacity	> 500 Cards
Stacker Capacity	> 750 Cards
Type of Read	Photo-Electric
Mode	Character Serial
Units/Control	1
Synchronous Operation	Yes
Interrupting Rate	1000 Times/Sec.
Interrupts Required	2
Checking	Timer, Hopper Empty/Stacker Full, Etc.
Code	Normally 12-Bit Binary
Distance from Control	To 1,500 Feet
Environment	
Temperature	65° to 85°F
Relative Humidity	20 - 80%
Power Required	120V AC +7, -17 @ 50/60 Hz +5, -1.5 Hz (60 Hz)

4253C Characteristics (Paper Tape Punch)	
Output Speed	120 FPS
Frames/Inch	10
Channels/Frame	8 + Sprocket
Buffered	Via Control (8-Bit)
Mode	Character Serial
Asynchronous Operation	Yes
Interrupting Rate	120 Times/Sec.
Interrupts Required	2
Tape Width	1 Inch
Supply Reel Capacity	1,000 Feet Minimum
Take-Up Reel Capacity	300 Feet Minimum
Units/Control	1
Distance from Control	To 2,000 Feet
Checking	Off Line, Out of Tape
Environment	
Temperature	32° to 131°F
Relative Humidity	5 - 95%
Power Required	115V AC ±10% @ 2 Amps 50/60 Hz ±3%

ID. Card Reader		4260A
Method of Inserting Cards		Manual
Read Heads		1, 60-Bit or 2, 30-Bit
Card Format		5 Rows @ 7-Bits/Row, 6 Data Plus
Validity		3 1/4 x 2 1/4
Card Size		

I. D. Card Reader (Cont'd)	4260A
Type of Read	Photo-Electric
Buffered	No
Controller	MOC and DIC
Mode	6 or 12-Bit Parallel
Units/Control	Several
Interrupts Required	None or One
Distance from Control	To 1,500 Feet
Special Feature	Explosion Proof
Transfer Rate	1,000 CPS Burst Rate
Environment	
Temperature	32° to 131° F
Relative Humidity	5 - 95%
Power Required	115V AC ± 10% @ 2 Amps 50/60 Hz ± 5%

4262C Characteristics (Line Printer)	
Print Speed	300 LPM
Skipping Speed	27.5 IPS
Line Space Time	12 ms
Characters/Line	120 or 160
Characters/Position	64 Plus Space
Buffered	120 or 160 Characters
Format Control	Program and Paper Loop
Spacing	10 CPI @ 6 LPI
Paper Size	4 to 20" @ 120 Col. 4 to 26" @ 160 Col.
Ribbon Width	13" @ 120 Col. 17" @ 160 Col.
Type Face	Anelex Open Gothic
Asynchronous Operation	Yes
Interrupting Rate	40,000 Times/Sec. (Approx.)
Interrupts Required	2
Checking	Off Line/Paper Low/Other
Units/Control	1
Distance from Control	To 2,000 Feet
Environment	
Temperature	65° to 85° F
Relative Humidity	20 - 80%
Power Required	115V AC ± 10% @ 13 Amps 50/60 Hz ± 1%

Lister Printer	4264	4265
Print Speed	1,200 LPM	300 LPM
Skipping Speed	Option	NA
Characters/Line	1 to 12	11, 12 Optional
Characters/Position	To 16	11 Plus Space
Buffered		Yes
Format Control		Program, Space
Spacing	10 CPI, 6 LPI	10 CPI, 6 LPI
Paper Size	2 1/4" Roll or Fan Fold	3" Roll or Fan Fold
Code Input	1-2-4-8 BCD	1-2-4-8 BCD
Ribbon Type	Web Type (1 7/8")	Typar Ribbon
Interrupts Required	One	One
Checking	None	None
Units/Control	Several	Several
Uses Moc (3 Groups Req.)		
Available Compute Time		
Distance from Control	To 2,000 Feet	To 2,000 Feet
Line Spacing	Single	1 or 2
Red/Black Shift	No	Yes
Environment		
Temperature	65° to 85° F	65° to 85° F
Relative Humidity	5 - 95%	5 - 95%
Power Required	105-125V AC @ 4 Amps, 60 Hz, 50 Option	115-230V AC @ 130 Watts, 60 Hz, 50 Option

4270C Characteristics I/O Typer (Fixed Carriage)	
Input Speed	15.5 CPS
Output Speed	15.5 CPS
Buffered	Via Control (7-Bit)
Carriage Length	15.5 Inches
Characters/Line	120 PF, 156 FF
Type Style	Manifold 10
Maximum Paper Width	15.5 Inches
Spacing	12 CPI @ 6 LPI
Asynchronous Operation	Yes - Output Only
Interrupting Rate	15.5 Times/Sec.
Interrupts Required	4
Distance from Control	To 2,000 Feet
No. Printable Characters	63 Plus Space
Red/Black Shift	Yes
Checking	Off Line/Parity/Timing

4270C Characteristics I/O Typer (Cont'd)	
Environment	
Temperature	32° to 131° F
Relative Humidity	5 - 95%
Power Required	115V AC ± 10% @ 1 Amp 50/60 Hz
Card Punch	4281/82 Unit
Output Speed	100 CPM
Buffered	80-Bit
Hopper Capacity	800 Cards
Stacker Capacity	800 Cards
Mode	Row Parallel
Unit/Control	1
Interrupts Required	1
Transfer Rate	62 KC Burst Rate
Code	12-Bit Binary
Checking	Non-Operational
Available Compute Time	> 99% of 600 ms
Distance from Control	To 2,000 Feet
Special Feature	Control Panel
Environment	
Temperature	65° to 85° F
Relative Humidity	20 - 80%
Power Required	115V AC ± 10% @ 14 Amps 50/60 Hz

4284C Characteristics (Not Yet Available)	
Output Speed	60 to 200 CPM (100 Col./Sec.)
Buffered	Via Control, 12-Bit
Hopper Capacity	1,500 Cards
Stacker Capacity	1,500 Cards
Mode	Character Serial
Units/Control	1
Synchronous	Yes
Interrupt Rate	
Interrupts Required	2
Checking	Punch Check/Timing
Code	12-Bit Binary
Distance from Control	To 2,000 Feet
Special	Fast Eject on Last Column Punched
Environment	
Temperature	65° to 85° F
Relative Humidity	20 - 80%
Power Required	

Multiple Output Control	4300B
Maximum Contact Capacity	128/256/512/1,024
Increments	16 Contacts
Number of Groups	8, 16, 32, 64
Contacts/Group	16
Type of Contacts	Momentary (4 or 75 ms & 40 μs & 4 ms opr.)
	Latching
Contact Rating	100 or 250 VA (AC/DC)
Maximum Analog Output (Incr. -1)	128, 8-Bit (2/Group) 64, 10-Bit (1/Group)
Decimal Display Output in Increments of 4 Digits	256 Digits (4/Group)
Transfer Rate	4,000 CPS Burst Rate (PPS)
Compute Time	26.5 μs/Group
Environment	
Temperature	32° to 131° F
Relative Humidity	5 - 95%
Power Required	2.6 or 4.35 Amps
	Note: Contacts may be Hi Current and Lo Voltage or Hi Voltage and Lo Current.
Relay Operate Time	2.4 ms (5 ms Allowed)
Output Operations/Sec.	250

Timed Output Control	4302
Maximum Contact Capacity	8/64/128 Addresses
Contacts/Address	1
Type of Contacts	Momentary
Maximum Count	256
Checking	Current Overload
Contact Rating	100/250 VA
No. of Counts	0-255 Counts @ 20 CPS to 2,000 CPS
Pulse Frequency	20 to 2,000 or Line Source (20-2,000 OPT)
Pulse Duration	200 μs
Environment	
Temperature	32° to 131° F
Relative Humidity	5 - 95%
Power Required	2.7 Amps

Remote Scanner	4306/4307
Analog Input (4100)	To 512 Pts/Control/4307 @ 18 PPS
Analog Output (4300)	To 8, 10-Bit Units/Control/4307 @ 29 PPS or 32, 8-Bit

Remote Scanner (Cont'd)	4306/4307
Digital Input (4400)	To 704 Pts/Control/4307 @ 88/250 PPS
Timed Outputs	To 32 Pts/Control/4307 @ 64 Counts
Keyboard Input (4201B)	
Typewriter Output (4201B)	1/4307 @ 12 CPS (Fixed Carriage)
Paper Tape I/O (4201B)	7/4307 @ 29 CPS
Card Input (4201B, Incre.)	7/4307 @ 22.CPM
No. of 4307 per 4306	To 4 on Party Line
Modems Used	202C/202D or TDM 210 or LD/LR
Transmission Rate	To 1800 BPS or 5000 BPS (Direct 1 Mile)
Checking	Parity and/or Repeat
Method of Connection	4-Wire Half Duplex
Simultaneous Operations	Digital and Analog Inputs
Environment	
Temperature	32° to 104° F (Analog) to 131° F (Digital)
Relative Humidity	0-95% Analog Common Mode Performance
Power Required	Degraded Above 60%
Notes:	1. May use synchronous or asynchronous type modems or direct connection up to one mile. 2. Scan Rates - Customer Line @ 1800 BPS.

Digital Input Control	4400B
Total Contact Capacity	1,536 Points
No. of Groups	16 or 64
Contacts/Group/Input	24 (1 for Validity if Required)
Increments	24 Contacts
Transfer Rate	Approx. 800K Burst Rate
Types of Contacts	Isolated
Change Detector	1-Bit/24 Std. (Option)
Load on Customer Contact	10 ma, 28 or 125V DC (Option)
Computer Time	26.5 µs per 24 Contacts
Environment	
Temperature	32° to 131° F
Relative Humidity	5 - 95%
Power Required	.7 to 1.45 Amps

Magnetic Drum Sub-System	4520C	4520B
Capacity in Words	16 to 262K	16 to 131K
Transfer Rate	16.6K Wds/Sec.	33.3K Wds/Sec.
Bit Rate	850K	1.7M BPS
Memory Time Per Word	One Memory Cycle	One Memory Cycle
Time to Rd/Wr Full Track	2 Revolutions	2 Revolutions
Maximum Words Transferred	16K	16K
No. of Tracks	32 to 512	16 to 128
Sectors/Track	512	1,024
Words/Sector	1	1
Words/Track	512	1,024
Access Time		
Minimum	0 µs	0 µs
Average	8.3 ms	8.3 ms
Maximum	16.6 ms	16.6 ms
Fast Access Storage	No	No
Method of Recording	Bit Serial	Bit Serial
Write Protect	Yes (8 Tracks/SW)	Yes (4 Tracks/SW)
Drum Speed	3600 RPM @ 60 CPS	3600 RPM @ 60 CPS
	3000 RPM @ 50 CPS	3000 RPM @ 50 CPS
One Rd/Wr Head/Track	Yes	Yes
Checking	Parity	Parity
Interrupt Rate	Once/Record	Once/Record
Environment		
Temperature	32° to 131° F	32° to 131° F
Relative Humidity	5 - 95%	5 - 95%
Power Required	14 to 18.7 Amps	
	50/60 Hz	
Surface Speed	2,262 IPS	2,262 IPS
Drum Diameter	12 Inches	12 Inches
Drum Length	17 Inches Max.	<9 Inches
Heads/Mounting Surface	512	128
Axes of Rotation	Vertical	Vertical
Floating Heads	Yes	Yes

Magnetic Disc Model No. (4515/4547/4548)	
No. of Disc	6
Recording Surfaces	10
Total Capacity	1M words (4547) or 2M words (4548)
Transfer Rate	52.1K words (Burst Rate)
Access Time	
Track to Track	
Minimum	30/30 ms
Maximum	165 ms
No. of Cylinders	100/200
Tracks/Surface	100/200
Tracks/Cylinder	10
Sectors/Track	16
Sectors/Cylinder	160

Magnetic Disc Model No. (4515/4547/4548) (Cont'd)	
Words/Sector	64
Words/Track	1,024
Words/Cylinder	10,240
Checking	Address & Data Check Sum
Disc Speed	2,400 RPM
Disc Diameter	14"
Controls/System	4
Drives/Control	4
Rd/Wr/Seek	Yes (Also Return to Zero Seek)
Interchangeable Disc	Yes
Special Feature	Prog. Read Status
Cylinder equals 10 corresponding tracks on 5 surfaces	
Environment	
Temperature	65° to 85° F
Relative Humidity	20 - 80%
Power Required	208V AC ±10% 3-Phase @ 3 Amps/Phase
	60 Hz +1%, -2%
	230V AC ±10% 1-Phase @ 10 Amps 60 Hz
Rotational Delay	25 ms Maximum
Synchronous	Yes
Interrupt Rate	Once/Record
Distance from Control	To 200 Feet

Magnetic Tape Model No. (CED Tape Sub-System)						
Tape Speed	150	150	75	75	37.5	37.5
Rewind Speed	300	300	300	300	300	300
Frames/Inch	200	200	200	200	200	200
	556	556	556	556	556	556
		800		800		800
Channels/Frame	7	7	7	7	7	7
	6 Data	6 Data	6 Data	6 Data	6 Data	6 Data
Transfer Rate (KC)	30	30	15	15	7.5	7.5
	83.3	83.3	41.7	41.7	20.9	20.9
		120		60		30
Buffered	Yes	Yes	Yes	Yes	Yes	Yes
Single/Dual Controllers	Yes	Yes	Yes	Yes	Yes	Yes
Units/Control	8	8	8	8	8	8
Start Time (ms)			10-15	10-15	18-25	18-25
Stop Time						
Checking	Vertical/Horizontal-----					
	Parity	Parity	Parity	Parity	Parity	Parity
Tape Length	2400'	2400'	2400'	2400'	2400'	2400'
Tape Width	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
Rd. After Wr.	Yes	Yes	Yes	Yes	Yes	Yes
Write Protect	Yes	Yes	Yes	Yes	Yes	Yes
IBM Compatible	727/729-----					
Special	Automatic Error Correction-----					
Synchronous	Yes	Yes	Yes	Yes	Yes	Yes
Interrupt Rate	1/Record-----					
L.R.G.	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
9 Channel Available	Yes	Yes	Yes	Yes	Yes	Yes
Environment						
Temperature	65° - 85° F-----					
Relative Humidity	20 - 80% Control - 40 - 60% Transport -----					
Power Required	120/208 ±10%, 3 Ø, 60 Hz +.5 -1.5 Hz					
Instructions	Rd/Wr. - BCD, Binary Wr. End of File Backspace One Record on File Set Low/High Density Space Forward One Record/File Rewind/Rewind Standby Erase - 8 1/2" Tape Request or Reset Status					
Rewind Interrupt	Yes					
Var. Length Records	Yes					
Continuous Rd./Wr.	Yes					

DN-760 (CRT Display)	
Screen Size	14 Inch or 23 Inch
Character Set	ASCII
Terminals/Control	32 Maximum
Method of Connection	Full Duplex
Transmission Rate	110/1200 BPS or 5000 CPS (Direct*) Opt.
Modems Used	202C or D
Checking	Parity Longitudinal Parity Option
Hard Copy	Optional
No. of Memories	1 to 4
Memory Size	1,196 Characters/Memory
Terminals/Memory	1 to 8
Char. Displayed/Terminal	1,196 (1 Terminal/Memory) 736 (2 Terminal/Memory) 368 (4 Terminal/Memory) 184 (8 Terminal/Memory)